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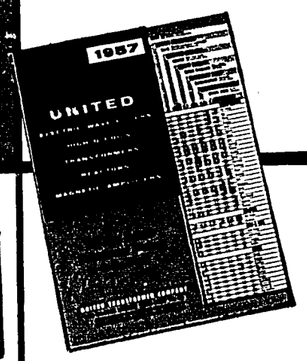

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1958
IRE DIRECTORY

A YEARBOOK CONTAINING

- A ROSTER OF MEMBERS OF THE IRE
- A DIRECTORY OF FIRMS AND PRODUCTS IN THE RADIO-ELECTRONICS INDUSTRY

Published by

THE INSTITUTE OF RADIO ENGINEERS, INC.
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THE INSTITUTE OF RADIO ENGINEERS
1957

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YASUJIRO NIWA
Vice-President

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Associate Editor	*Assistant Advertising Manager*

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 60,000. 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 tubes, 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-President 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. The grade of Special Member is similarly conferred by invitation only. 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 the table below and in the Constitution.

MEMBERSHIP REQUIREMENTS AND DUES

GRADE	EXPERIENCE* AND REFERENCES	ENTRANCE FEE	ANNUAL DUES
FELLOW	Awarded only. No application permitted.	$3.00	10.00[1] & 15.00
SENIOR MEMBER	a. Radio engineer or scientist—eight years of active practice and important technical radio or allied work and shall have performed or taken responsibility for important engineering or scientific work in these fields for at least three of these years. b. College teacher for eight years and in responsible charge of radio or allied subjects for at least three years. c. Eight years of active practice, with contributions to radio or allied engineering fields. d. Executive for eight years with direct supervision of important radio engineering or allied work. e. A person regularly employed in radio or allied technical work for at least sixteen years, who, by experience and education, has attained a standing equivalent to that required for Senior Member under paragraph "a" and shall have performed or taken responsibility for important technical work in these fields for at least six years. REFERENCES: Five Fellows, Senior Members, or other responsible individuals.	3.00	10.00[1] & 15.00
SPECIAL MEMBER	Conferred only by invitation of the Board of Directors.	3.00	10.00[1] & 15.00
MEMBER	a. Radio engineer or scientist—professionally competent and in active practice for three years. b. College teacher of radio or allied subjects for three years. c. A person regularly employed in radio or allied work for at least three years, who, by invention or by contribution to the advancement of engineering or science in radio or allied fields, or to the technical literature thereof, has attained a standing equivalent to that required for Member under paragraph "a". d. An executive who, for at least six years, has had under his direction important technical, engineering, or research work in radio or allied fields. e. A person regularly employed in radio or allied technical work for at least six years, who, by experience and education, has attained a standing equivalent to that required for Member under paragraph "a." REFERENCES: Four Fellows, Senior Members, Members, or other responsible individuals.	3.00	10.00[1] & 15.00
ASSOCIATE	Interest in radio engineering or allied field. REFERENCES: Three Fellows, Senior Members, Members, Associates, or other responsible individuals.	3.00	10.00[1] & 15.00
STUDENT[2]	College student pursuing regular 4-year engineering or science course for a degree, or student enrolled in approved technical institute. REFERENCE: Faculty Member.	—	5.00

* For more detailed information, see Bylaws, Sec. 1–5, pp. 11–12.

[1] For members who join the IRE July 1, 1955, or thereafter, $10.00 per year for the first three years of membership. After three years dues automatically increase to $15.00.

[2] Special application blank required. When student status expires no entrance fee is required to transfer to Associate or Member.

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 a national 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, Territory of Hawaii, Egypt, Israel, Japan, Argentina, and Brazil, 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-six 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, for the last thirty years 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, about 5,700 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 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-six 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 National Convention in New York, and the other for the WESCON meeting on the West Coast. They are known as the IRE NATIONAL CONVENTION RECORD and the IRE WESCON CONVENTION RECORD, respectively. Each RECORD is issued in several Parts. All members of Professional Groups automatically receive a free copy of the Part pertaining to the field of their Group.

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.

*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.

*A list of available standards appears in the June and December issues of the PROCEEDINGS OF THE IRE.

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

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

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 Vladimir K. Zworykin Television Prize

B. D. Loughlin	1952	Harold B. Law	1955
Frank Gray	1953	Frank J. Bingley	1956
Alda V. Bedford	1954	Donald Richman	1957

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 check for $1,000. 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	G. C. Southworth	1938
R. A. Weagant	1920	H. T. Friis	1939
R. A. Heising	1921	H. A. Wheeler	1940
C. S. Franklin	1922	P. T. Farnsworth	1941
H. H. Beverage	1923	S. A. Schelkunoff	1942
J. R. Carson	1924	W. L. Barrow	1943
Frank Conrad	1925	W. H. Hansen	1944
Ralph Bown	1926	P. C. Goldmark	1945
A. H. Taylor	1927	Albert Rose	1946
W. G. Cady	1928	J. R. Pierce	1947
E. V. Appleton	1929	S. W. Seeley	1948
A. W. Hull	1930	C. E. Shannon	1949
Stuart Ballantine	1931	O. H. Schade	1950
Edmond Bruce	1932	R. B. Dome	1951
Heinrich Barkhausen	1933	William Shockley	1952
V. K. Zworykin	1934	John A. Pierce	1953
F. B. Llewellyn	1935	Robert R. Warnecke	1954
B. J. Thompson	1936	Arthur V. Loughren	1955
W. H. Doherty	1937	Kenneth Bullington	1956
		Oswald G. Villard, Jr.	1957

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	H. W. Welch, Jr.	1952
C. L. Dolph	1947	Richard C. Booton, Jr.	1953
W. H. Huggins	1948	R. L. Petritz	1954
R. V. Pound	1949	Blanchard D. Smith, Jr.	1955
J. F. Hull	1950	Jack E. Bridges	1956
A. W. Randalls	1950	Dudley A. Buck	1957
A. B. Macnee	1951		

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	Harold A. Zahl	1954
M. J. E. Golay	1951	Barnard Salzberg	1955
Newbern Smith	1952	Wilbur S. Hinman	1956
Robert M. Page	1953	Georg Goubau	1957

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	Robert L. Trent	1957
		D. Raymond Fewer	1957

OFFICERS AND DIRECTORS, 1912—1957

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; 1946–57; Pres., 1947; Treas., 1951–57.
*Ballantine, Stuart	Bd. of Dir., 1935–37; Pres., 1935.
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.
Beverage, H. H.	Bd. of Dir., 1936–39; Pres., 1937.
Black, K. C.	Bd. of Dir., 1952.
Bonne, 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, 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.
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; Secty., 1928–29.
Clement, L. M.	Bd. of Dir., 1945.
Coggeshall, I. S.	Bd. of Dir., 1941–44; 1951–53; Pres., 1951.
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.
*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.
Dyer, J. N.	Bd. of Dir., 1955–56.
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; 1957; 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.
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., 1912–57; Pres., 1928; Secty., 1918–27; Editor, 1912–28; 1930–53; Editor Emeritus, 1954–57.
Graf, A. W.	Bd. of Dir., 1952–53, 1957.
Graham, Virgil M.	Bd. of Dir., 1935–41; 1946–48.
*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.
Hamburger, F., Jr.	Bd. of Dir., 1950–51.
Hammond, J. H., Jr.	Bd. of Dir., 1912–17; Treas., 1913–14.
Hanson, O. B.	Bd. of Dir., 1938–43.
Hazeltine, Alan	Bd. of Dir., 1923–28; 1936–39; Pres., 1936.
Hegbar, H. R.	Bd. of Dir., 1957.
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., 1953–57; Pres., 1957.
Henney, Keith	Bd. of Dir., 1945–48.
Herold, E. W.	Bd. of Dir., 1956–57.
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.
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.
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.

(Continued on page 8)

OFFICERS AND DIRECTORS, 1912—1957 (Cont'd)

Name	Office held
Kranz, 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., 1952–57; 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
*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.
*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
Nichols, H. W.	Bd. of Dir., 1924–25.
Niwa, Y.	Bd. of Dir., 1957; V. Pres., 1957.
Noble, D. E.	Bd. of Dir., 1957
Oxley, A. B.	Bd. of Dir., 1951–52, 1957.
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.
*Piere, 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
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., 1935–57; Pres., 1938; Treas., 1941–42; Secty., 1943–57.
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.
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.
Rust, W. M.	Bd. of Dir., 1951–52.
Rybner, Jorgen	Bd. of Dir., 1951; V. Pres., 1951.
Ryder, J. D.	Bd. of Dir., 1952–57; Pres., 1955.
Sarnoff, David	Bd. of Dir., 1915–20; Secty., 1915–17.
Seely, Samuel	Bd. of Dir., 1957.
Shackelford, B. E.	Bd. of Dir., 1945–50; 1953–55; Pres., 1948.
Shepherd, J. E.	Bd. of Dir., 1948–50.
Shute, E. R.	Bd. of Dir., 1933–34.
Simon, E. J.	Bd. of Dir., 1912–15; Secty., 1912–14.
Sinclair, D. B.	Bd. of Dir., 1945–54; Pres., 1952; Treas., 1949–50.
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.
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.
*Weagant, R. A.	Bd. of Dir., 1913–17.
Webb, W. L.	Bd. of Dir., 1946.
Weber, Ernst	Bd. of Dir., 1952–57.
Webster, E. M.	Bd. of Dir., 1946.
Wells, H. W.	Bd. of Dir., 1954–55.
Westman, H. P.	Bd. of Dir., 1930–42; Secty., 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., 1956–57.
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.

THE INSTITUTE OF RADIO ENGINEERS

(Incorporated, August 23, 1913)

CONSTITUTION

Adopted at the First Meeting of The Institute of Radio Engineers, May 13, 1912. Amended, November 2, 1914; December 5, 1915; October 7, 1931; March 1, 1939; November 5, 1941; September 8, 1943; November 29, 1944; May 5, 1945; December 15, 1945; June 27, 1946; July 30, 1946; and August 15, 1947.

ARTICLE I

NAME AND OBJECT

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

SEC. 2—Its objects shall be scientific, literary, and educational. Its aims shall include the advancement of the theory and practice of radio and allied branches of engineering and of the related arts and sciences, their application to human need, and the maintenance of a high professional standing 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.

ARTICLE II

MEMBERSHIP

SEC. 1—The membership of the Institute shall consist of:

a. Fellows, who shall be entitled to all rights and privileges of the Institute.

b. Senior Members, who shall be entitled to all rights and privileges of the Institute.

c. Special Members, who shall be entitled to all rights and privileges of the Institute except the right to hold the offices of President and Vice President.

d. Members, who shall be entitled to all rights and privileges of the Institute except the right to hold the offices of President, Vice President, and Director.

e. Associates, who shall have such rights and privileges as are provided by the Bylaws. However, Associates who have maintained a continuous membership in this grade since March 1, 1939, shall have the right to vote and shall be entitled to all rights and privileges of the Institute except the right to hold any corporate office, the office of Director, and the chairmanships of standing Committees and of Sections.

f. Students, who shall have such rights and privileges as are provided by the Bylaws.

SEC. 2—The qualifications for the various grades of membership shall be specified in the Bylaws in accordance with the following principles:

a. Fellow is a grade of unusual professional distinction and shall be conferred only by invitation of the Board of Directors.

b. Senior Member is the highest professional grade for which application may be made and shall require experience or attainment reflecting professional maturity.

c. Special Member is a grade limited to those who have shown an interest in furthering the radio or allied arts and sciences and who have attained such position or prestige that by membership they shall advance the objectives of the Institute. This grade shall be conferred only by invitation of the Board of Directors.

d. Member is a professional grade limited to those who have demonstrated professional competence in radio or allied fields.

e. Associate grade shall be open to those interested in the theory or practice of radio engineering or the allied arts and sciences.

f. Student grade shall be open to those devoting a major part of their time as registered students in a regular course of study in engineering or science in a school of appropriate standing. Membership in this grade may extend a limited time after termination of student status.

SEC. 3—The requirements for admission, transfers, and severance of members shall be specified in the Bylaws.

SEC. 4—The term "allied" as used in this Constitution and Bylaws refers to electrical communication, electronics, and such other technical fields as are directly contributory to, or derived from radio.

SEC. 5—The terms "member" and "membership" when printed without an initial capital where used in this Constitution and Bylaws include all grades.

SEC. 6—The term "voting member" where used in this Constitution and Bylaws means a member entitled to vote on Institute matters.

ARTICLE III

DUES AND FEES

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

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

ARTICLE IV

OFFICERS AND DIRECTORS

SEC. 1—The governing body of the Institute shall be the Board of Directors and shall consist of the President, Vice President, Secretary, Treasurer, Editor, six Directors elected-at-large, three appointed Directors, one Regional Director elected by each Region, and the two most recent past Presidents.

SEC. 2—The Corporate Officers of the Institute shall be the President, Vice President, Secretary, Treasurer, and Editor.

SEC. 3—The terms of office for Directors elected-at-large shall be for three years; for appointed Directors, one year; for Regional Directors, two years; and for all Corporate Officers, one year, except as provided in Article VI, Section 1.

SEC. 4—Each year of a term of office established in Article IV shall begin with the assembly of the Board of Directors at its annual meeting and terminate with the assembly of the Board of Directors at its following annual meeting.

SEC. 5—No Corporate Officer or Director shall receive, directly or indirectly, any salary, traveling expenses, compensation, or emolument from the Institute, unless authorized by the Board of Directors or by the Bylaws.

SEC. 6—The United States and Canada, and other areas at the discretion of the Board of Directors, shall be divided into Regions, which shall be specified in the Bylaws. The Board of Directors shall delineate the Regions, make changes in the number of Regions, as it deems desirable, and number the Regions with consecutive numbers. The voting members of each Region shall elect one representative who shall thereby become a member of the Board of Directors and be designated a Regional Director.

ARTICLE V

MANAGEMENT

SEC. 1—The President shall be the regular presiding officer at meetings of the Board of Directors and at meetings of the Insti-

tute. He shall be an ex-officio member of each committee.

The Vice President shall assume the duties of the President in the absence or incapacity of the President.

In the event that neither the President nor the Vice President can personally act, the Board of Directors may elect a chairman from its membership who is authorized to perform the presidential duties during the period of the incapacity of the President and Vice President. The tenure of such temporary chairmen shall be at the discretion of the Board of Directors.

SEC. 2—The Board of Directors shall manage the affairs of the Institute. An annual report on the activities and finances of the Institute shall be made to the members.

Eight members of the Board of Directors shall constitute a quorum.

SEC. 3—The Board of Directors may make, amend, or revoke Bylaws to this Constitution. The proposed changes and reasons therefore shall be mailed to all members of the Board at least twenty days before the stipulated meeting at which the vote shall be taken. Two-thirds of all votes cast at the stipulated meeting shall be required to approve any new Bylaw, amendment, or revocation.

SEC. 4—The Secretary shall be responsible for the preparation for all meetings of the Board of Directors and all principal meetings of the Institute and the recording of the minutes of such meetings. He shall be responsible for the correspondence of the Institute and the keeping of full records thereof, and shall be responsible for the provision of such information from them as is requested by the Board of Directors.

SEC. 5—The Treasurer, under the control of the Board of Directors, shall have general supervision of the fiscal affairs of the Institute and shall be responsible for the keeping of the books of account. An annual audit of the affairs of the Institute shall be made by certified public accountants and submitted to the Board.

SEC. 6—All funds received by the Institute shall be deposited in an account requiring the signatures of at least two of the following for withdrawal: President, Vice President, Secretary, Treasurer, and Editor. Funds from this account may be deposited in other accounts authorized and limited in size by the Board of Directors. Funds from these accounts shall be withdrawable on the signatures of authorized bonded individuals for current disbursements. Before additional funds are transferred from the first-mentioned account to another account, the individuals responsible for such other accounts shall submit a statement of the disposition of the previously expended funds to the Treasurer.

SEC. 7—All committees shall be appointed by the Board of Directors or in such manner as the Board may designate.

SEC. 8—The fiscal year of the Institute shall end with the thirty-first day of December.

ARTICLE VI

NOMINATION, ELECTION, AND APPOINTMENT OF OFFICERS AND DIRECTORS

SEC. 1—On or before July first of each year, the Board of Directors shall submit to qualified voters a list of nominations containing at least one name each for the offices of President and Vice President, at least four names for the office of Director elected-at-large, the names of all nominees for the office of Regional Director, and shall entertain nominations by petition for all of the offices specified.

Nominations 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 it is desired he be nominated. For acceptance a letter of petition must reach the Institute office before twelve o'clock noon on the last weekday prior to August fifteenth of any year and shall be signed by at least one hundred voting members qualified to vote for the office of the candidate nominated.

Each proposed nominee shall be consulted and if he so requests his name shall be withdrawn. The names of proposed nominees who are not eligible under the Constitution shall be withdrawn by the Board.

On or before September first, the Board of Directors shall submit to all voting members as of August fifteenth, a list of nominees for the offices of President, Vice President, and Director elected-at-large, and shall submit to all such voting members of each Region a list of their nominees for the office of Regional Director, the names of the nominees for each office being 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.

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 the Institute office before twelve o'clock noon on the last 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 nominees for President and Vice President, the two nominees for Director elected-at-large, and the nominees for each office of Regional Director receiving the greatest number of qualified votes shall be declared elected. In the event of a tie vote the Board shall choose between the nominees involved.

Nominees for the office of Regional Director shall be members of and live in the Regions which nominate them. They shall be elected by the voting members of the Institute in the Region. The Regional Directors from even-and odd-numbered Regions shall be chosen by the Regions in even- and odd-numbered years, respectively. In placing the Regional Representation Plan into operation, or when new Regions are established, or when changes are made in Regions, candidates for the office of Regional Director may be nominated and elected for one-year terms as required to ensure representation during the period preceding their normal election years. No Regional Director shall have his term shortened by changes in Regions. Each Region shall have a Regional Committee whose duties shall include making at least one nomination for Regional Director from its Region during election years. In the event a Regional Director dies, is unable to serve, or is disqualified by removal from the Region, the Regional Committee shall appoint a Regional Director for the unexpired portion of the term. The organization and procedure of the Regional Committees for nominating candidates for Regional Director shall be specified in the Bylaws.

SEC. 2—The Secretary, Treasurer, Editor, and three appointed Directors shall be appointed by the Board of Directors at its annual meeting to serve until the next annual meeting or until their successors are appointed and accept.

SEC. 3—The Board of Directors is authorized to fill a vacancy other than Regional Director occurring in the governing body.

ARTICLE VII

MEETINGS

SEC. 1—There shall be an annual meeting of the Board of Directors during January of each year at which newly elected officers shall begin their terms of service, and the Board shall make necessary appointments.

SEC. 2—There shall be an annual meeting of the Institute as soon as practicable after the annual meeting of the Board of Directors at which reports of the Secretary and Treasurer shall be presented.

SEC. 3—Meetings of the Board may be held at such times as are necessary to carry out the provisions of this Constitution and shall be held at such other times as any five members of the Board may determine, but only on notice to all members of the Board. The method of calling such special meetings shall be specified in the Bylaws.

ARTICLE VIII

SECTIONS AND OTHER GROUPS

SEC. 1—The Board of Directors may authorize the establishment of Sections and other groups of members for the purpose of promoting the interests of the Institute. The Board of Directors may, at its discretion, terminate the existence of any such group.

ARTICLE IX

AMENDMENTS

SEC. 1—Amendments to this Constitution may be proposed by means of a resolution adopted by the Board of Directors or by means of a petition signed by at least one hundred voting members. Such proposed amendment or amendments shall be submitted to legal counsel by the Board of Directors, and if, in the opinion of such counsel, they are in accordance with the laws under which the Institute is organized, a copy shall be mailed with a ballot to each voting member.

SEC. 2—Constitutional amendment ballots shall be mailed to the voting members at least sixty days before the date appointed for counting the ballots and the ballots shall carry a statement of the time limit for their return to the Institute office. 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 within signed outer envelopes shall be counted. No votes by proxy shall be counted. Only ballots arriving at the Institute office prior to the stated time limit shall be counted. The Tellers Committee shall count such votes and report to the Board of Directors at its next meeting. If the total vote be at least twenty per cent of the total voting membership and if at least sixty-seven per cent of all votes cast shall be favorable, the proposed amendment or amendments shall be immediately declared by the Tellers Committee to be adopted.

SEC. 3—Amendments shall take effect thirty days after their adoption but officers and officers-elect of the Institute at the time any amendment becomes effective shall continue in office until the end of the terms for which they were elected.

SEC. 4—Copies of the amendments shall be distributed to the members as soon as practicable after adoption.

SEC. 5—A complete history of amendments shall be kept in the files of the Institute.

BYLAWS

(As of May 15, 1957)

Article V, Section 3, of the Institute Constitution provides for Bylaws as follows:

"The Board of Directors may make, amend, or revoke Bylaws to this Constitution. The proposed changes and reasons therefore shall be mailed to all members of the Board at least twenty days before the stipulated meeting at which the vote shall be taken. Two-thirds of all votes cast at the stipulated meeting shall be required to approve any new Bylaw, amendment, or revocation."

MEMBERSHIP QUALIFICATIONS

SEC. 1—Fellow: The grade of Fellow shall be conferred only upon a person who is either a Senior Member of the IRE, or meets all requirements for Senior Member, and has been a member in any grade for a period of five (5) years preceding year of nomination, except that these provisions in individual cases may be waived for cause by the Board of Directors, as in the case of members-at-large who are not members of any established IRE Section, and is:

a. An engineer or scientist in radio or allied fields. As such he shall have attained distinction in his profession and shall be eminently qualified to take responsible charge of important radio or allied work. He shall have been in the active practice of his profession for at least ten years, and shall have had responsible charge of important radio or allied work for at least three years, or

b. A professor of engineering or of physical science. As such he shall have attained special distinction as an expounder of the principles of engineering or of science in radio or allied fields. He shall have had at least ten year's experience as a teacher of electrical or physical subjects and shall have had responsible charge for at least three years, of a course in radio or allied subjects in a school of recognized standing, or

c. A person who has done notable original work contributing to the advancement of engineering or science in radio or allied fields, which has given him a recognized standing at least equivalent to that required for Fellow under paragraph "a" or "b", or

d. A person regularly engaged in radio or allied work for at least ten years, who, by invention or contribution to the advancement of engineering or science in radio or allied fields, or to the technical literature thereof, has attained a standing at least equivalent to that required for Fellow under paragraph "a" or "b".

SEC. 2—Senior Member: For admission or transfer to the grade of Senior Member, a candidate shall be:

a. An engineer or scientist in radio or allied fields. As such he shall have been in the active practice of his profession for at least eight years, and shall have performed or taken responsibility for important engineering or scientific work in these fields for at least three of these years, or

b. A teacher of radio or allied subjects for at least eight years in a school of recognized standing. As such he shall have been in responsible charge of a major course in such subjects for at least three years, or

c. A person regularly employed in radio or allied fields for at least eight years, who, by invention or by contribution to the advancement of engineering or science in radio or allied fields, or to the technical literature thereof, has attained a standing equivalent to that required for Senior Member under paragraph "a", or

d. An executive who, for at least eight years, has had under his direction important engineering or research work in radio or allied fields and who is qualified for direct supervision of the technical or scientific features of such activities, or

e. A person regularly employed in radio or allied technical work for at least sixteen years, who, by experience and education has attained a standing equivalent to that required for Senior Member under paragraph "a" and shall have performed or taken responsibility for important technical work in these fields for at least six years.

SEC. 2-A—Special Member: The grade of Special Member shall be conferred only upon a person who meets the requirements of the grade set forth in the Constitution. Proposals for election to the grade, together with supporting information, may be presented by a member of the Board of Directors at any meeting of the Board. After full consideration at a Board meeting, the proposal, unless withdrawn, shall be placed on the agenda for action at the next Board meeting. A favorable vote of at least two-thirds of the members of the Board present shall be required for election.

SEC. 3—Member: For admission or transfer to the grade of Member, a candidate shall be either:

a. An engineer or scientist in radio or electrical engineering, or allied fields, who shall have had at least three years of professional experience.

b. A teacher of radio or electrical engineering, or allied subjects, 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 radio or allied technical work 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 radio or allied fields.

e. A person regularly employed in radio or allied technical work for at least six years, who, by experience and education, has attained a standing equivalent to that required for Member under paragraph "a".

SEC. 4—Associate: For admission or transfer to the grade of

Associate, a candidate shall be interested in the theory or practice of radio engineering or of the allied arts and sciences.

Sec. 5—Student: For admission to the grade of Student, a candidate shall be

a. devoting a major portion of his time as a registered student in a regular course of study in electrical engineering or allied science, physics, or mathematics in a school of recognized standing, or

b. devoting a major portion of his time as a resident and registered student in a regular course of study in radio, electronics, or allied fields in a technical institute approved by the Executive Committee. These students shall be known as Student Associates.

Membership in this grade shall not extend more than six months beyond the termination of his student status as described above.

Sec. 6—The expression, "school of recognized standing," includes only schools which provide an electrical engineering, engineering physics, physics, or mathematics curriculum of not less than four years' duration, leading to a degree, and are designated as such by the Executive Committee.

Sec. 7—Graduation from an electrical engineering, engineering physics, physics, or mathematics curriculum, of at least four years' duration, in a school of recognized standing shall be accepted as equivalent to three years' professional experience in radio or allied fields.

Graduation from an accredited radio, electronics, or allied curriculum, of at least two years' duration, in a technical institute approved by the Executive Committee, shall be accepted as equivalent to one year's professional experience in radio or allied fields.

Full-time graduate work, or part-time graduate work with teaching or research, in an electrical engineering, engineering physics, physics, or mathematics course, in a school of recognized standing, shall be accepted as equivalent to professional experience.

Sec. 8—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 that grade.

Sec. 9—Members are authorized to assert Institute affiliation. In doing so, they should indicate their grade of membership and, if necessary, use the following abbreviations:

Fellow—Fellow IRE
Senior Member—Sen. Mem. IRE
Special Member—Spec. Mem. IRE
Member—Mem. IRE
Associate—Assoc. IRE

Sec. 10—The emblem of the IRE is protected by trade-mark registration and shall be reproduced only in connection with official business of the IRE.

MEMBERSHIP APPLICATIONS

Sec. 11—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.

Sec. 12—When an applicant for Senior Member or Member shows that his work or location is such as to make impracticable compliance with Section 11, 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 and waiving Section 11.

Sec. 13—Applications for admission or transfer to any grade of membership, except Fellow or Special Member, shall be addressed to the Board of Directors and submitted to the IRE Headquarters. Election or transfer of an applicant to any grade, except Fellow or Special Member, shall be by two-thirds affirmative vote of a committee of the Board of Directors duly authorized in the Bylaws to act for the Board in electing members or transferring their membership grades.

Sec. 14—The Executive Committee is authorized to act for the Board of Directors in electing members or transferring their membership grades in the case of all except Fellow and Special Member grades, and may waive application, and reference requirements in the transfer of members in grade from Student to Associate or Member grade. The Executive Committee shall handle readmissions on the basis of policies established by the Board of Directors.

Sec. 15—A reapplication for admission or transfer to a particular grade may be made by the applicant after the expiration of one year from the date of a rejection.

MEMBERSHIP PROPOSALS

Sec. 16—Admission or transfer to Fellow or Special Member grade shall be by invitation by the Board of Directors only.

Sec. 17—Each year, the Awards Committee shall recommend to the Board of Directors nominees for Fellow Grade not more than seventy-five (75) in number. A citation summarizing the accomplishments of the nominee shall be a part of each recommendation.

Sec. 18—Deleted by Board of Directors, January 6, 1955.

Sec. 19—Deleted by Board of Directors, January 5, 1956.

Sec. 20—Admission or transfer to any grade except Fellow or Special Member 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 for their action. 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 grade 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.

Sec. 21—Deleted by Board of Directors, May 10, 1956.

ADMISSIONS AND TRANSFERS

Sec. 22—The entrance fee for all grades shall be three dollars ($3) except that there shall be no entrance fee for Student grades.

Sec. 22A—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 of the termination of his student status.

Sec. 23—There shall be no transfer fees. A member whose grade of membership is changed during his annual dues period shall be billed pro rata for the remainder of that period.

Sec. 24—The name of every newly-admitted or transferred Senior Member, Special Member, Member, or Associate shall be published in the Proceedings of the IRE.

Sec. 25—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.

Sec. 26—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.

Sec. 27—A notice of election 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 60 days and 120 days 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.

ANNUAL DUES

Sec. 28—Every member's annual dues period and the period during which he shall receive publications of the Institute shall run concurrently with his membership period. The annual dues shall be payable in advance at the beginning of the annual dues period.

Sec. 29—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 or grades other than Student. Beginning with the sixth such year, the Annual Associate dues shall be fifteen dollars ($15).

For members elected July 1, 1955, or thereafter, the annual dues shall be ten dollars ($10) for the first three years of membership in the IRE in any grade or grades other than Student, and fifteen dollars ($15) for each succeeding year. The annual dues for Student grade shall be five dollars ($5).

Sec. 30—The Board, by this Bylaw, waives the dues of each and every member of the Institute who has attained the age of 65 years and has been a member of the Institute for 35 years.

BILLING

Sec. 31—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 Institute, to notify the member that his membership has terminated.

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 member shall be mailed a notice to the effect that, according to the Bylaws of the Institute, his membership in the Institute has in fact terminated. Accompanying the notice of termination shall be a final bill, with the suggestion that the member pay the bill and resume his membership.

Membership so terminated may be resumed on payment of all dues in arrears, or on payment of a new entrance fee and current dues.

Sec. 32—For purposes of Article II, Section 1-c, of the Constitution, resumption of membership as provided under Bylaws Sections 31 and 36, shall not constitute maintenance of continuous membership.

Sec. 33—The mailing of bills or statements to the last known address of a member shall be considered a valid notice of indebtedness.

Sec. 34—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 will be made in lieu of copies of the Proceedings of the IRE not available.

SEVERANCES

Sec. 35—A member in good standing may resign by submitting a written resignation to the Secretary.

Sec. 36—Subject to the approval of the Board of Directors, a resigned member may resume his membership upon payment of current dues.

Sec. 37—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 the hearing, which shall be at least twenty days away. 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 of Directors 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.

Sec. 38—The Secretary shall, as soon as possible after the end of each year, present to the Board of Directors a report giving the number of members of each grade at the close of the year, and the gains and losses in each grade of membership during the year as a result of elections, transfers, reinstatements, debts, resignations, failure to pay dues, and all other causes. This report shall also give the number of newly-elected members whose elections become void during the year through the failure to pay entrance fee and initial dues, and the number of newly-elected members who at the end of the year have not yet paid entrance fee and initial dues but whose election is still effective as of that date. The report shall also give the number of Professional Group Affiliates.

BOARD OF DIRECTORS

Sec. 39—The annual meeting of the Board of Directors required by the Constitution to be held during January of each year, shall be held in the office of the Institute in New York, N.Y. Scheduled meetings of the Board shall be held on the first Wednesday of May and the first Wednesday after the second Monday in November, the place to be determined by the Board at the annual meeting in January, subject to change as provided for in Sec. 40 of the Bylaws. At the annual meeting, the Board shall determine the time and place of other scheduled meetings to be held throughout the year, subject to change as provided in Sec. 40 of the Bylaws.

Sec. 40—The time or place of any scheduled Board meeting may be altered or the meeting cancelled only by consent of a majority of all Board members 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 given all Board members by mailing notice not less than ten days before the original or the new date, whichever is the earlier.

Sec. 41—As provided in the Constitution, special meetings of the Board of Directors may be called by any five members of the Board on notice to all other members. Notice of such special meeting, giving the time and place of meeting, the purpose of the meeting, and the names of the Board members calling the meeting shall be mailed to all Board members not less than twenty days before the date set for the special meeting. The place of such special meetings may be only the Institute office in New York, N.Y., unless otherwise authorized by a majority vote of all Board members.

EXECUTIVE COMMITTEE

Sec. 42—The Board of Directors, in managing the affairs of the Institute according to the Constitution, shall appoint a committee of Officers and members of the Board of Directors called the Executive Committee, to exercise powers and assume duties of executive management, to the extent that the Board of Directors directs, and as outlined in Bylaws, subject to the following limitations: that the Board may, by a majority vote of those present at any meeting, overrule any act or decision of the Executive Committee, except insofar as any act has in fact been carried out, or suspend at any meeting any power conferred upon the Executive Committee, such suspension to remain in effect pending repeal of the Bylaw conferring such power, or direct any action or plan of the Executive Committee.

Sec. 43—The President, the Secretary, the Treasurer, the Editor, and at least two other members of the Board of Directors shall comprise the Executive Committee. The President shall be Chairman, the Treasurer shall be Vice Chairman, and the Secretary shall be Secretary of the Executive Committee. The terms of appointments of all members of the Executive Committee, except the President, shall start with the first meeting of the Committee after appointment and shall continue notwithstanding any change in status on the Board until the first meeting of the succeeding Executive Committee.

Sec. 44—The Executive Committee shall appoint, direct, and co-ordinate the work of, all standing committees except the Appointments, Awards, Constitution and Laws, Editorial Board, Executive, Nominations, Policy Advisory, and Tellers Committees.

Sec. 45—The Executive Committee shall prepare and present an annual budget to the Board of Directors for approval.

Sec. 46—The Executive Committee shall be responsible for the management of the office of the Institute, which shall include special activities, technical activities, office operations, accounting,

advertising, and publications, and the setting of salaries (with the exception of Officers' salaries) in all instances in the limits of the budget. Such activities as the Executive Committee shall direct shall be administered by the Executive Secretary. The salary of the Executive Secretary shall be determined by the Executive Committee.

SEC. 47—The Executive Committee shall set dates and locations of conventions, conferences, and meetings of the Institute, and shall manage them.

SEC. 48—The Executive Committee shall approve or disapprove, and supervise the formation and operation of Sections, Professional Groups, and other groups of members.

SEC. 49—The Executive Committee shall direct and manage Institute standardization activities including relations with other organizations.

SEC. 50—The Executive Committee may divide its duties and responsibilities among its members as it sees fit and conduct its business as it finds necessary, and shall formulate a "Code of Administrative Practice."

SEC. 51—Minutes of the meetings of the Executive Committee shall be mailed to the members of the Board of Directors.

SEC. 52—In addition to its other duties, the Executive Committee is charged with broadly considering Institute policies, and making appropriate recommendations to the Board of Directors on its own initiative.

NOMINATIONS

SEC. 53—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 Committee for the various elective offices.

SEC. 54—The Nominations Committee shall submit the name or names of one or more candidates for the office of President, and the names of more than one candidate for each of the other elective offices.

SEC. 55—The Nominations Committee shall transmit its list of proposed nominees to members of the Board of Directors at least one week before the date at which the Board is expected to act upon them.

SEC. 56—When the Board of Directors has not scheduled a meeting to be held between August 14 and September 1 of each year, the Executive Committee is authorized to take any necessary actions on any petitions and to approve the ballot.

REGIONS

SEC. 57—The United States shall be divided into seven (7) Regions, which shall be given consecutive numbers for identification, and the eighth (8th) Region shall be the Canadian Region.

Regions which fail to maintain reasonable activity may, at the discretion of the Board of Directors, be dissolved and the Sections may be absorbed into other Regions.

SEC. 58—The Regional Committee of each Region shall consist of at least the Regional Director, the junior past Regional Director, 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 Executive Committee of the Section 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.

SEC. 58-1—In addition to the duties specified in the Constitution, the Regional Committee shall be expected to participate in the development of the Institute by means of suggestions, on national matters, to the Board of Directors, and on Regional and Sectional matters, to the Sections comprising the Region.

SEC. 59—Pending installation of the first Regional Director of each Region, the chairman of the largest Section numerically in the Region shall act as chairman pro tem, and the chairman pro tem shall appoint a secretary-treasurer pro tem who shall act until the secretary-treasurer of the Regional Committee is appointed.

The Regional Director shall be chairman of the Regional Committee and shall appoint a vice chairman from the membership of the Committee. The chairman of the Regional Committee shall appoint a secretary-treasurer from members 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 and 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 the optional provisions of Bylaws Section 58 are invoked.

SEC. 60—Each Regional Committee shall submit to the Board of Directors by May first of the Regional election year, the names of at least one qualified nominee for the office of Regional Director. To qualify, each candidate shall indicate to the Regional Committee his acceptance of the nomination.

SEC. 61—Each member of the Regional Committee shall be of Member, Special Member, Senior Member, or Fellow grade in the Institute. Vacancies, except for Regional Director, shall be filled by appointment by the Executive Committee of the Section in which the vacancy exists. The term of office shall be one year concurrent with the term of office of the Section officers.

SEC. 62—The Regional Committee shall hold at least one meeting per year. A quorum for the transaction of business at meetings of the Regional Committee shall consist of at least one-third of the members of the Committee or their alternates and shall include representatives from at least half the Sections in the Region. The chairman, or in the event of his unavailability, the vice chairman of the Regional Committee, shall be responsible for calling the necessary number of Regional Committee meetings.

SECTIONS

SEC. 63—A petition for the formation of a Section within the IRE Regional organization shall be signed by not fewer than twenty-five (25) members, other than Students, with mailing addresses within the territorial limits proposed in the petition.

A petition for the formation of a Section outside of the IRE Regional organization shall be signed by not fewer than ten (10) members, other than Students, with mailing addresses within the territorial limits proposed in the petition.

SEC. 64—The Executive Committee, upon receipt of a petition to form a Section, and after arranging for the territory to be encompassed by the New Section, may authorize its formation. After the Section is organized and a Constitution adopted, the Executive Committee may give tentative approval to its establishment pending submission to the Board of Directors for final approval.

SEC. 65—Each Section authorized by the Executive Committee, shall within not more than six months thereafter accept, and conform to a Constitution provided by the Executive Committee.

SEC. 66—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 Institute.

SEC. 67—Section Secretaries shall forward to the Secretary of the Institute a report of each meeting held by the Section and its Subsections for the presentation or discussion of papers, and at the end of each fiscal year, a financial statement for that fiscal year.

SEC. 68—Local non-compulsory financial contributions may be accepted by Sections.

SEC. 69—All Sections shall be exclusively those of the Institute. No joint Section shall be recognized. However, Sections of the Institute may cooperate with other organizations in the holding of joint meetings and may invite members of such organizations and the public to their meetings.

SEC. 70—Failure of a Section to maintain the following required activities shall place the Section on probation: the holding of at least five meetings each year; the maintenance by each Section within the IRE Regional organization of a minimum membership of twenty-five (25) members, other than Students; the maintenance by each Section outside of the IRE Regional organization of a minimum membership of ten (10) members, other than Students. All members of the Section shall be informed of the probation by the Secretary of the IRE, who shall also call to their attention 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 IRE 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 Secretary shall so report to the Board of Directors and so inform the Section membership.

SEC. 70-1—For section maintenance, the Institute shall pay to each Section for each calendar year the following sums:

One dollar and ten cents ($1.10) for each member, except Students, up to and including seven hundred, and one dollar and twenty-five cents ($1.25) for each member, except Students, over seven hundred, and fifty cents ($.50) for each Affiliate of each and every Professional Group, with mailing addresses within the territory of the Section, on December 31st of the calendar year for which payment is made, plus ten dollars ($10) per meeting for not more than ten meetings of the Section within the calendar year.

SUBSECTIONS

SEC. 70-2—In conformance with the Constitution for Sections, Sections may establish Subsections, which shall be geographical subdivisions of such Sections, subject to the same limitations and control as the Section itself.

SEC. 70-3—For each Subsection which meets the following requirements, the Institute shall pay to the Section a meeting allowance of ten dollars ($10) per meeting up to a maximum of ten (10) meetings per year, during the time the Subsection remains in good standing according to the Constitution for Sections:

(a) Submission to Parent Section Executive Committee of a petition signed by twenty (20) or more members, other than Students, with mailing addresses within the proposed territory;

(b) Approval of the petition by the Parent Section Executive Committee;

(c) Notification of Institute Headquarters of these actions by Parent Section and its Executive Committee with a copy of the petition;

(d) Approval by the Executive Committee of the Institute.

PROFESSIONAL GROUPS

SEC. 70-A—A petition for the formation of a Professional Group shall be signed by not fewer than twenty-five (25) members, other than Students, and shall state the proposed field of interest.

SEC. 70-B—The IRE Executive Committee, upon receipt of a petition to form a Professional Group, may authorize its formation. After the Group is organized and a Constitution approved by the IRE Executive Committee, the Executive Committee may give final approval to its establishment.

SEC. 70-C—Each Professional Group authorized by the Executive Committee shall within not more than six months thereafter adopt and conform to a 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.

SEC. 70-D—All Professional Groups shall consist exclusively of members of the IRE and such Affiliates as may be recognized by the Executive Committee under the Bylaws. No joint Professional Groups shall be recognized. However, IRE Professional Groups may cooperate with other organizations in the holding of joint meetings and may invite members of such organizations and the public to their meetings.

SEC. 70-E—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 Institute.

SEC. 70-F—A Professional Group may not charge dues. A Group may hold or join in holding conventions or conferences and may charge for registration; but a Group may not charge for registration at a meeting, conference, or convention which it operates as part of an IRE Section, Regional, or National meeting, conference or convention. A Group may, but only after approval of the IRE Executive Committee, make a charge for sending out notices to non-Group IRE members and to Group Affiliates to cover the extra expenses involved. A Group may raise revenues by other means approved by the Executive Committee.

SEC. 70-G—All members of the Institute may become members of Professional Groups in conformance with the respective Group Constitutions.

SEC. 70-H—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 IRE Executive Committee, shall receive any notices of meetings of any Group.

SEC. 70-I—All publications of Professional Groups, other than programs, notices, and the like, shall be subject to prior authorization of the IRE Executive Committee, and shall be made available to all IRE members or Group Affiliates on equitable bases approved by the Executive Committee.

SEC. 70-J—The Secretary-Treasurer of each Professional Group shall forward to the Secretary of the Institute a copy of each meeting notice of the Group, an annual report, and at the end of each Institute fiscal year a financial statement for that fiscal year.

SEC. 70-K—The Board of Directors may dissolve a Professional Group for any reason deemed sufficient by the Board of Directors.

STUDENT BRANCHES

SEC. 71—Upon receipt of a petition signed by a representative of the faculty and by fifteen (15) 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.

Upon receipt of a petition signed by a representative of the faculty and by fifteen (15) or more IRE members who are students in a technical institute approved by the Executive Committee, the Executive Committee may authorize the establishment of an IRE Student Associate Branch in that school.

SEC. 72—Each IRE Student Branch and each IRE Student Associate Branch shall adopt and conform to a Constitution which shall have been submitted to, and approved by, the Executive Committee.

SEC. 73—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 technical institute 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, and by ten (10) or more national Student members of either society; at least twenty-five percent (25%) of the petitioners must be IRE Student members.

SEC. 73-A—Each Joint Student Branch and each Joint Student Associate Branch shall adopt and conform to a constitution which shall have been submitted to, and approved by, both the IRE Executive Committee and the other co-sponsoring societies. At least the chairman and a corresponding secretary of each Joint Student Branch or Joint Student Associate Branch shall be members of the IRE.

SEC. 74—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.

SEC. 75—Each IRE Student Branch, IRE Student Associate Branch, Joint Student Branch or Joint Student Associate Branch corresponding secretary shall forward to the Secretary of the IRE 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.

SEC. 76—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.

SEC. 77—Failure of an IRE Student Branch or IRE Student Associate Branch to maintain a minimum of ten (10) IRE Stu-

dent members and to hold at least three (3) meetings each year shall place the Branch on probation. All officers of the Branch and the IRE Representative shall be informed of the probation by the Secretary of the IRE, 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 IRE Secretary shall so report to the Board of Directors, and so inform the officers of the Branch and the IRE Representative.

Failure of a Joint Student Branch or Joint Student Associate Branch to maintain a minimum of ten (10) national Student members, of which at least twenty-five percent (25%) must be IRE Student members, and to hold at least three (3) meetings each year shall be reported by the Executive Secretary to the Executive Committee.

SEC. 78—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, the IRE shall pay to each Branch upon request the sum of twenty-five dollars ($25) for any one school year; and shall pay to each Branch the sum of one dollar ($1) for each IRE Student member of the Branch as of November 15 of each year and the sum of fifty cents ($.50) for each additional IRE Student member of the Branch as of the following February 1.

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, the IRE shall pay to each Branch upon request the sum of fifteen dollars ($15) for any one school year; and shall pay to each Branch the sum of fifty cents ($.50) for each IRE Student member of the Branch as of November 15 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 1.

SEC. 79—The Board of Directors 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 Board of Directors.

COMMITTEES AND REPRESENTATIVES

SEC. 80—The standing committees, each of which shall normally consist of five or more persons, shall include the following:

Admissions
Antennas and Waveguides
Appointments
Audio Techniques
Awards
Awards Coordination
Constitution and Laws
Circuits
Editorial Board
Education
Electroacoustics
Electron Tubes
Electronic Computers
Facsimile
Feedback Control Systems
Finance
History
Industrial Electronics
Information Theory and Modulation Systems
Measurements and Instrumentation
Medical Electronics
Mobile Communications Systems
Navigation Aids
Nominations
Nuclear Techniques
Piezoelectric Crystals
Policy Advisory
Professional Groups
Radio Frequency Interference
Radio Receivers
Radio Transmitters
Recording and Reproducing
Solid State Devices
Standards
Symbols
Television Systems
Tellers
Video Techniques
Wave Propagation

On matters which are reasonably described by the committee names, these committees or boards shall be advisory to the Board of Directors, or the Executive Committee, whichever appoints them and directs their activities. Each committee or board shall have the power to create subcommittees of its own selection.

SEC. 81—The terms of appointments to the Admissions, Appointments, Awards, Awards Coordination, Constitution and Laws, Editorial Board, Education, Finance, History, Nominations, Policy Advisory, Professional Groups, and Tellers Committees shall start with the first day of the month following appointment and continue until the date the succeeding terms of appointments take effect. Appointments shall be made to the remaining standing committees each year between January first and May first, and the terms of appointment shall be from May first of the year when the appointments are made until April thirtieth of the following year; additional appointments may be made to fill vacancies or to care for special cases as the need arises, with the term of the appointment expiring April thirtieth.

SEC. 82—Deleted by Board of Directors, May 10, 1956.

SEC. 82-A—The Awards Committee shall be chosen from among Institute members of Fellow grade.

SEC. 83—The Committee on Professional Groups shall include the Chairman of each Professional Group, ex-officio.

SEC. 83-A—The Chairman of the Finance Committee shall be chosen from among the members of the Executive Committee.

SEC. 83-B—Deleted by Board of Directors, Jan. 5, 1956.

SEC. 83-C—The Policy Advisory Committee shall consist of eight (8) members, appointed annually, all of whom shall be present or former members of the Board of Directors. At least half of the members, including the Chairman, shall be members of the then present Board of Directors. Each year, at least four (4) of the members shall be re-appointed.

SEC. 83-D—The Editorial Board shall consist of the Editor as chairman, a vice chairman, the Managing Editor, and not less than three nor more than five other members.

SEC. 83-E—The Awards Coordination Committee shall consist of three members chosen, if possible, from among past chairmen of the Awards Committee.

SEC. 84—The Appointments Committee shall be appointed by the Board of Directors at its regular November meeting. Its membership shall be chosen from those members of the Board of Directors whose terms continue through the following year and from the new Directors-elect, and shall include the President-elect. At least fourteen days before the next annual meeting of the Board of Directors, the Appointments Committee shall mail to the members of the new Board of Directors, a list of candidates for the offices of Secretary, Treasurer, Editor, and Appointed Directors, and a list of candidates to fill vacancies that exist among the Chairmen and members of the Awards, Constitution and laws, Executive, Nominations, Policy Advisory, Tellers Committees, and the Editorial Board.

SEC. 85—The Treasurer shall make a report to the Executive Committee semi-annually at the September and March Executive Committee meetings concerning the status of the Institute's investments. The Treasurer, before making changes in the Institute's portfolios, shall report the proposed changes to the Executive Committee and obtain its approval.

SEC. 86—The President is authorized to appoint as IRE Representatives, IRE members who are teachers of science or engineering at schools of recognized standing or at technical institutes approved 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 IRE Student membership.

SEC. 87—The Board of Directors may appoint or direct the appointment of representatives of the Institute on joint committees, boards, and other local, national and international bodies.

PUBLICATIONS

SEC. 88—The Institute shall publish a periodical under the title, PROCEEDINGS OF THE IRE. The Board of Directors may establish additional publications either periodical or otherwise in character.

SEC. 89—The Executive Secretary is authorized to accept orders for IRE publications at prices to be determined from time to time by the Executive Committee.

SEC. 90—The price of a single annual subscription to the PROCEEDINGS OF THE IRE for a Fellow, Senior Member, Special Member, Member, or Associate shall be $9.00, to be included in his annual dues.

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 1, 1957; 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 1, 1957.

In the Roster the following symbols indicative of grade 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 1, 1957)

ABRAHAM, Leonard G. (SM'46—F'57), Director, Transmission Engineering, Bell Telephone Laboratories, Inc., 463 West St., New York 14, N.Y.
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., 83-30 Kew Gardens Rd., Kew Gardens 18, L.I., N.Y.
Born: January 18, 1903, Denison, Tex. B.S.(E.E.), 1924, Rice Institute. **Committees:** Editorial Review, 1954–56; Papers, 1937, Papers Review, 1951–53.

ADAIR, George P. (A'42—SM'44—F'47), Consulting Radio Engineer, 1610 I 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, Robert (A'42—SM'47—F'51), 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:** Editorial Review, 1954; Modulation Systems, 1948–50.

AFFEL, Herman A. (A'14—M'40—SM'43—F'49), Assistant Vice-President, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: August, 1893, Brooklyn, N.Y. S.B., 1914, Massachusetts Institute of Technology. **Committees:** Editorial Review, 1954–57; Meetings and Papers, 1930; New York Program, 1939–41, *chairman 1940;* Papers, 1931–45; Papers Review, 1946–53. **Awards:** Modern Pioneers Award, National Association of Manufacturers, 1940.

ALBERSHEIM, Walter J. (SM'48—F'57), Supervisor, Military Analysis Group, Bell Telephone Laboratories, Whippany, N.J.
Born: April 22, 1897, Cologne, Germany. E.E., 1922, Sc.D.(Eng.), 1924, Institute of Technology, Aachen, Germany. **Committees:** Papers, 1951–53; Editorial Reviewer, 1954–57. **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, 1942–57. **Awards:** Fellow, AIEE, 1941.

ALEXANDER, Samuel N. (A'44—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, Massachusetts Institute of Technology. **Committees:** Electronic Computers, 1948–58, *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 Rd., 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. President, 1921; Vice-President, 1920; Manager, 1917-19. **IRE Offices:** Director, 1920–23. **Committees:** Meetings and Papers, 1928; Standardization, 1916–24; Wave Length Regulation, 1916–17, 1919–20. **Awards:** Gold Medal, IRE, 1920; 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.; also President, Alford Manufacturing Company.
Born: August 5, 1904, Samara, Russia. A.B., 1924, University of California. **Committees:** Annual Review, 1944–46; Antennas, 1944–49, *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.

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.

ANDERSON, Clifford N. (A'19—F'34), 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), Engineer-in-Charge, Industry Service Laboratory, RCA Laboratories Division, 155 E. 24 St., New York 10, N.Y.
Born: April 19, 1907, Chicago, Ill. **Professional Groups:** Broadcast and Television Receivers, *vice-chairman, 1952–53; chairman, 1954–55.*

ANDREW, Victor J. (A'25—M'40—SM'43—F'55), Chairman, Board of Directors, Andrew Corporation, 363 E. 75 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.*

ANKENBRANDT, Francis L. (SM'50—F'57), Manager, Defense Projects; Major General, USAF (Retired), Radio Corporation of America, 1625 K St., N.W., Washington, D.C.
Born: January 27, 1904, Chicago, Ill. B.S., 1926, U. S. Military Academy; M.S., 1927, Yale University. **Professional Groups:** Administrative Committee, Military Electronics, 1956–58.

ANTON, Nicholas G. (M'44—SM'44—F'56), President, Director of Research & Engineering, Anton Electronics Laboratories, Inc., 1226–1238 Flushing Ave., Brooklyn 37, N.Y.
Born: December 14, 1906, Trieste, Italy. Graduate of the Technical Institute Leonardo da Vinci; Columbia University, 1925–26. **Professional Groups:** RETMA Nuclear Instrumentation and Control Committee, *chairman;* Advisory Nuclear Instrumentation Committee to the F deral Civil Defense Administration, *chairman;* Nuclear Instrumentation Manufacturers' Council of The Atomic Industrial Forum, *chairman.*

ARNAUD, Jean P. (A'35—M'40—SM'43), Systems Engineer, RCA International, Clarktownship, N.J.
Born: September 1, 1905, London, England. E.E., 1929, University of Buenos Aires. **Sections:** Buenos Aires, *vice-chairman, 1941, chairman, 1942, 1949.* **IRE Representative in Colleges:** 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; Vice-President, 1947; President, Junior Institution of Engineers, 1949–50; MICE; MIEE.

ASHBY, Robert M. (SM'51—F'55), Chief Engineer, Autonetics, No. Amer. Aviation, 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. in Physics, 1926; Ph.D. in Physics, 1928, New York University; Sc.D. (Honorary), 1953, Lehigh University. **Awards:** Exceptional Service Award, Dept. of Commerce, 1952; President's Certificate of Merit, 1948.

AUSTIN, Arthur O. (F'30), Manufacturing Electrical Engineer, Box 109, Barberton, Ohio
Born: December 28, 1879, Stockton, Calif. A.B., 1903, Stanford University.

AVINS, Jack (A'39—SM'49—F'57), Section Engineer, RCA Laboratories, 155 E. 24 St., New York 10, N.Y.
Born: March 1911, New York, N.Y. A.B., 1932, Columbia University; M.E.E., 1949, Brooklyn Polytechnic Institute. **Committees:** Receivers, 1948–54, *chairman, 1955;* Standards, 1951–55; Subcommittee on Intercarrier Sound TV Receivers, *chairman, 1949–50.* **IRE Representative:** ASA Sectional Committee (C16) on Radio, 1953–55; Chief Delegate, International Electrotechnical Committee, 1956.

BACHMAN, Charles H. (S'32—A'35—VA'39—SM'54—F'55), Professor of Physics, Physics Dept., 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 7 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, 1954–57. **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, International Resistance Company, 401 N. Broad, 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 Assn., 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), Mobile Radio Engineer, American Telephone & Telegraph Company, 195 Broadway, New York 7, N.Y.
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, 1939–40;* Winter Technical Meeting, *chairman, 1945–46.* **Professional Groups:** Vehicular Communications, Administrative Committee 1949–57, *chairman, 1950–51.* **IRE Representative:** ASA Sectional Committee on Graphic Symbols and Abbreviations for Use on Drawings, 1940–57; ASA Sectional Committee on Standards for Drawings and Drafting Room Practices, 1940–50, 1951–57; 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. **IRE Offices:** Executive Secretary, 1945–1957. **Committees:** IRE National Convention, *chairman, 1948–57;* Military Liaison, *chairman;* Constitution and Laws, 1946–47; Office Quarters, 1947; Public Relations, 1945–48. **IRE Representative:** ASA Conference of Executives of Organization Members, 1954–56; ASA Conference of Staff Executives, 1949–51. **Awards:** Marconi Medal for Service, Veteran Wireless Operators Association, 1944; President's Certificate of Merit, 1946.

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:** President, 1949; Treasurer, 1948; Director, 1943–55. **Committees:** Admissions, 1943–44; Appointments, 1948; Awards, 1950–52; Broadcasting, 1931–32, 1934–35; *alternate, 1931–32;* Constitution and Laws, 1944, 1948, 1954–57; Executive, 1945–54, *vice-chairman, 1948, chairman, 1949;* Finance, 1948, 1950–51, 1953–54; National Convention, 1947–48, 1953–55, *vice-chairman, 1953–57;* Nominations, 1946–52, 1956–57, *chairman, 1946;* Office Practices, 1947; Planning, 1947; Policy Development, 1948, 1951; Professional Groups, 1950; Public Relations, 1945–46, 1950, *alternate, 1945–46, 1950;* Radio Wave Propagation, 1942–46; Radio Wave Propagation and Utilization, 1945–48; Sections, 1946–47; Special Publication Fund, 1947; Wave Propagation, 1937–42, 1948–55; Winter Technical Meeting, 1946. **IRE Representative:** ASA Sectional Committee (16) on Radio, *chairman, 1953–54;* Executive Council Central Radio Propagation Laboratory, 1949–51; 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; RMA-IRE Problem No. 2, 1949–50; U.S.A. National Committee, URSI, 1949–57.

BAILEY, William F. (S'33—A'36—VA'39—SM'51—F'54), Assistant Director of Research, Hazeltine Research Corporation, 59-25 Little Neck Pkwy., Little Neck 62, L.I., N.Y.
Born: May 4, 1911, Buffalo, N.Y. M.E., 1933, M.S., 1941, Stevens

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

Institute of Technology. **Committees:** Television, 1946–49; Television Systems, 1949, *vice-chairman, 1955–58;* Tellers, 1953–55, *chairman,* 1954. **Sections:** Long Island, *chairman, 1954–55.*

BAKER, W. R. G. (A'19—F'28), Vice-President & General Manager, Electronics Division, General Electric Company, Syracuse 1, N.Y.
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, 1946–57; Treasurer, 1951–57; Standards Coordinator, 1948–50. **Committees:** Admissions, 1941; Annual Review, 1948–49; Appointments, 1948; Awards, 1940; Broadcasting, 1935, 1948–50, *vice-chairman, 1951;* Executive, 1947–57, *chairman, 1947; vice-chairman, 1951–57;* Finance, *chairman, 1948–57;* 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, 1950–57;* 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.

BALDWIN, Millard W., Jr. (A'40—SM'45—F'48), Research Engineer, 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, 1949–57, *vice-chairman, 1951–55;* Television, 1948–49, *chairman, 1956–57;* Television Systems, 1949–58; Video Techniques, 1949–52. **IRE Representative:** ASA Sectional Committee (C42) on Definitions of Electrical Terms, 1951–57; 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, 1952–57;* Joint IRE-SMPTE-NARTB Committee for Inter-Society Co-ordination (Television), *alternate, 1954–55,* 1956; ASA Sectional Committee on Radio, 1956.

BALLARD, B. Guy (SM'47—F'55), Vice-President (Scientific & 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.

BARKLEY, William J. (M'29—SM'43—F'56)(L), Consultant, Vice-President, Tele-Broadcasters, 41 E. 42 St., New York 17, N.Y.
Born: April 25, 1889, Leominster, Mass. **Committees:** Public Relations, 1949–50.

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 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 and Extra Premiums of Institution of Electrical Engineers, 1930, 1952, 1954.

BARNES, John L. (A'27—SM'44—F'52), Dr., President, Systems Laboratories Corporation, Sherman Oaks, Calif. Professor of Engineering, University of California, Los Angeles 24, Calif.
Born: October 16, 1906, Haddonfield, N.J. B.S.(E.E.), 1928, M.S.(E.E.), 1929, Massachusetts Institute of Technology; M.A., 1930; Ph.D., 1934, Princeton University. **Committees:** Papers Review, 1948–50; Radio Wave Propagation, 1942–46. **Professional Groups:** Circuit Theory, Administrative Committee, 1952–55. **IRE Representative:** Tufts College, 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 Review, 1954–56; 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, 1944–46, *alternate, 1944–45;* RMA-IRE Co-ordinating, 1948. **Awards:** IRE Morris Liebmann Memorial Prize, 1943.

BARTON, F. Sherbrooke (F'35), Chief Scientific Officer, Ministry of Supply, Shell Mex House, Strand, London, W.C. 2, England. Defense Supply Advisor, United Kingdom High Commissioner, Ottawa.
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. **Committees:** International Liaison, 1947, 1955–57. **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 Manufacturing Company, Wayland, Mass.
Born: October 1906, Cambridge, Mass. A.B., 1928, M.S., 1929, Harvard University. **Professional Groups:** Ultrasonics Engineering, Administrative Committee, 1956–59. **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, N.Y.
Born: June, 1897, Dysart, Iowa. B.S.(E.E.), 1920, Iowa State College. **Committees:** Annual Review, *chairman, 1949–53;* 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.*

BATSEL, Max C. (A'21—F'27), Chief Technical Administrator, Defense Electronic Products, Radio Corporation of America, Cooper St., Camden, 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; Radio Receivers, 1927–28; Standardization, 1925–26, 1927–31; Use of Transmission Unit, 1928–29; Professional Groups, 1956. **Professional Groups:** Engineering Management, 1952–55, *vice-chairman, 1954–55, chairman, 1955–56;* Administrative Committee, 1955–58.

BAUER, Benjamin B. (S'27—A'39—SM'44—F'53), Vice-President, Engineering, Shure Brothers, Inc., 222 Hartrey Ave., Evanston, Ill.
Born: June 26, 1913, Odessa, Russia. E.E., 1937, University of Cincinnati. **Committees:** Awards, 1955; Board of Editors, 1950–53; Editorial Review, 1954–57; Electroacoustics, 1945–58, *vice-chairman, 1949–53, chairman, 1953–54, vice-chairman, 1954–55;* Papers Procurement, 1947–50; Professional Groups, 1952–53; Standards, 1954–56. **Professional Groups:** Audio, *vice-chairman, 1950, chairman, 1951–52,* Editor of *Transactions, 1952,* Associate Editor, *1953–57, secretary, 1953–57.* **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.
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. **IRE Representative:** Northwestern University, 1945–47; Southern Methodist University, 1941–45.

BEDFORD, Alda V. (A'31—SM'46—F'50), Research Engineer, 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, *secretary-treasurer, 1946, vice-chairman, 1947, chairman, 1948–49;* Princeton Subsection, *Secretary-treasurer, 1946, vice-chairman, 1947, chairman, 1948.* **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940; Incentive Awards, RCA Laboratories, 1949, 1950; IRE Vladimir K. Zworykin Television Prize, 1954.

BEDFORD, Leslie H. (M'34—SM'43—F'48), Chief Television Engineer, Marconi's Wireless Telegraph Company, Ltd., Chelmsford, Essex, 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.

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), Electronics Engineers, General Electric Research Laboratory, P.O. Box 1088, Schenectady, N.Y.
Born: May 9, 1908, Omaha, Neb. B.S.(E.E.), 1931, Purdue University. **Awards:** Certificate of Commendation, U. S. Navy Bureau of Ships, 1947.

BEGUN, S. J. (S'46—F'52), Director of Marketing, Clevite Corporation, 1700 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. **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), General Manager, Smith & Stone Ltd., Georgetown, Ont., 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 Rd., 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.

BENNETT, William R. (SM'45—F'56), Technical Program Coordinator, Bell Telephone Laboratories, Mountain Ave., 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, 1949–58, *vice-chairman, 1951–53, chairman, 1953–56;* Information Theory and Modulation Systems, 1952–58; Papers Review, 1951–52; Standards, 1953–58.

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.; Associate Professor of 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 Review, 1954–57; National Convention, 1947; Professional Groups, 1948, 1951. **Professional Groups:** Audio, 1949–52, *chairman, 1949–51.*

BERKNER, Lloyd V. (A'26—M'34—SM'43—F'47), President, Associated Universities, Inc., 350 Fifth Ave., New York 1, N.Y.
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. **Committees:** *Board of Editors, 1941–42;* Editorial Review, 1954–55; Papers, 1941; Professional Groups, 1954; Wave Propagation, 1937–42; Editorial Reviewer, 1955. **Professional Groups:** American Geophysical Union, *vice-president;* International Council of Scientific Unions, *president;* International Scientific Radio Union, *vice-president;* Nuclear Science, Administrative Committee, *chairman, 1953.* **IRE Representative:** Joint Technical Advisory, 1952–54, *vice-chairman, 1953, chairman, 1954.* **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; Fellow, American Institute of Electrical Engineers; Fellow, American Physical Society.

BEVERAGE, H. H. (A'15—M'26—F'28), Director, Radio Research Laboratory, RCA Laboratories, Radio Corporation of America, 66 Broad St., New York 4, 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;* Standards, 1934–35; Standardization, 1930–31. **Awards:** Armstrong Medal, Radio Club of America, 1938; IRE Medal of Honor, 1945; IRE Morris Liebmann Memorial Prize, 1923; President's Certificate of Merit, 1948; Signal Corps Certificate of Appreciation, 1944.

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; Editorial Review, 1954–57; Papers Review, 1946–53; Awards, 1957. **Awards:** Gold Medal, Television Broadcasters' Association, IRE Vladimir K. Zworykin Television Award, 1956.

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; Knight Bachelor, 1955; Institution of Electrical Engineers, Vice-President, 1948–53; President, 1953–54; Fellow, The City and Guilds Institute, 1947.

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; Education, 1948; Frequency Modulation, 1946–47; Modulation Systems, 1947–50, *chairman, 1948–50;* Papers Review, 1947–48; Standards, 1948–50; Editorial Review, 1957. **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; Fellow, AIEE; Fellow, American Association for the Advancement of Science.

BLACK, Knox Charlton (M'29—SM'43—F'49), Technical Assistant to the Manager, Government Relations Division, Raytheon Manufacturing Company, Waltham, Mass.
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;* Electro-Acoustic 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, 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 Dr., 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), Director of Research, Physical Sciences, Bell Telephone Laboratories, Inc., Murray Hill, 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.

BOND, Donald S. (SM'46—F'54), Research Engineer, RCA Laboratories Division, Princeton, N.J.
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), Professor, Department of Engineering Physics and School of Electrical Engineering, Cornell University, Ithaca, N.Y.
Born: December, 1910, Barking, Essex, England. B.A., 1933, Ph.D., 1936, Cambridge University. **Committees:** Editorial Review, 1954–57; Standards 1949–52; Wave Propagation, 1949–56, *vice-chairman, 1949–50, chairman, 1950–52.* **Professional Groups:** Antennas and Propagation, *vice-chairman, 1955–56.* **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 Tube 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:** Education, 1956–57; Nominations, 1956; Papers Review, 1946; Electron Tubes and Solid State Devices, 1951–52; Electron Devices, 1952–55; Electron Tubes, 1955–56. **Sections:** Columbus, *chairman, 1946–47.* **IRE Represetative:** Ohio State University, 1946–50.

BOOTHROYD, Wilson P. (SM'47—F'56), Director of Engineering Development, Philco Corporation, Tioga & C Sts., Philadelphia, Pa.
Born: February, 1916, Lawrence, Mass. B.S., 1937, Rhode Island State College. **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 Pkwy., Akron 17, Ohio.
Born: August 26, 1896, Gateshead, Durham, England. Whitworth Exhibition, 1916; Honors Diploma, E.E., 1917, Sunderland Technical College, England. **Committees:** Industrial Electronics, 1946–47, *chairman, 1947–49,* 1949–58; Standards, 1947–49; Annual Review, 1947–50. **Professional Groups:** Industrial Electronics Administrative Committee, 1951–54, *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), Physics Section Head, 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), Director of Research, Sylvania Electric Products, 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.
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), 85 Pine St., Maplewood, 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, 1946;* 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, 1949–51;* Receiving Sets, 1927–28; Research, 1949–50; Standardization, 1925–27, *chairman, 1925–26;* Standards, 1941–42. **IRE Representative:** IRE-RMA Joint Technical Advisory, 1948–55, *chairman, 1952–53;* IRE-IEE International Liaison, 1955–56. **Awards:** IRE Medal of Honor, 1949; IRE Morris Liebmann Memorial Prize, 1926.

BRADLEY, William E. (SM'45—F'53), Director of Research—Technical, Philco Corporation, C & Tioga Sts., Philadelphia 34, Pa.
Born: January 7, 1913, Lansdowne, Pa. B.S.(E.E.), 1936, Moore School, University of Pennsylvania. **Committees:** Editorial Review, 1954–57.

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, 1947–56, *chairman, 1948–49;* Standards, 1948–58, *chairman, 1949–51,* Editorial Review, 1955–57. **Professional Groups:** Circuit Theory, *chairman, 1950–51.* **Sections:** Philadelphia, *secretary, 1951–52; chairman, 1953–54.* **IRE Representative:** ASA Sectional Committee (C42) on Definitions of Electrical Terms, 1949–57; ASA Sectional Committee (C16) on Radio, 1950–51; ASA Standards Council, 1949–51; ASA Subcommittee on General Terms, 1948, 1952–56; AAAS, Council, 1956-57.

BREIT, Gregory (SM'45—F'45), Professor, Department 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, Johns Hopkins University; D.Sc., 1954, University of Wisconsin. **Committees:** Research, 1949–50.

BRIGGS, Maynard R. (A'37—SM'46—F'54), Manager, Missile Ground Control Engineering, Westinghouse Electric Corporation, P.O. Box 746, Baltimore 3, Md.
Born: July 19, 1904, St. Paul, Minn. B.(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. **IRE Representative:** IRE-RTMA Problems #2 Committee, 1948–49; IRE-RTMA—SMPTE Coordinating Committee, 1949–52; ASA Sectional Committee (C16) on Radio, 1952.

BRILLOUIN, Leon N. (SM'44—F'52), 88 Central Park West, New York 23, N.Y.
Born: August 7, 1889, Sévres, France. Ph.D., 1921, University of Paris.

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. **Committees:** Education, 1944–47, *chairman, 1945–46;* Papers Procurement, 1945–47. **Sections:** Chicago, *chairman, 1943–44.* **IRE Representative:** Northwestern University, 1941–45.

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. **Sections:** San Francisco, *vice chairman, 1933;* Engineering Management, San Francisco, *chairman, 1954.* **Awards:** U. S. Navy Commendation, 1946; Order of the British Empire, 1946.

BROWN, George H. (A'30—VA'39—F'41), Chief Engineer, Commercial Electronic Products Division, Radio Corporation of America, Camden, N.J.
Born: October 14, 1908, N. 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, AIEE.

BROWN, Gordon S. (SM'53—F'55), Professor and Head, Department of Electrical 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. **Awards:** Certificate for Distinguished Service to Naval Ordnance Development, 1945; President's Certificate of Merit, 1948; 7th George Westinghouse Award, American Society for Engineering Education, 1952; Fellow, American Academy of Arts and Sciences, 1950; Fellow, American Institute of Electrical Engineers, 1950.

BROWN, Jesse E. (A'24—M'28—SM'43—F'49), Assistant Vice-President and Chief Engineer, 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, 1945–51; Receivers, 1949–51; Regular Papers, 1941; Sections, 1937; Special Publications Funds, 1947; Television, 1940–49; Television Systems, 1949–58. **Sections:** Chicago, *secretary, 1936–37, chairman, 1938–39.* **IRE Representative:** Army Signal Association, 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.*

BRUNETTI, Cledo (A'37—SM'46—F'49), Director, Engineering, Research and Development, General Mills, Inc., Mechanical Division, 2003 E. Hennepin, Minneapolis, Minn.
Born: April, 1910, Virginia, Minn. B.E.E. (with High Distinction), 1932, Ph.D., 1937, University of Minnesota. **Committees:** Circuits, 1944–51, *vice-chairman, 1949–50;* Papers Procurement, 1948–50; Radio Transmitters, 1946–49. Industrial Electronics, 1955–58; Awards, 1957. **Professional Groups:** Automatic Controls, Administrative Committee, 1954. **Awards:** National Scholarship Key; National I.A. Civic League, 1937; Outstanding Young Electrical Engineer, Eta Kappa Nu, 1941; Naval Ordnance Development Award for Exceptional Service, United States Navy, 1945; Certificate for Outstanding Service, War Department, 1945; Certificate of Appreciation of Services, Office of Scientific Research and Development, 1945; The Material and Methods Achievement Grand Award, Materials and Methods Magazine, 1947; Army-Navy Certificate of Appreciation for Outstanding Services during World War II, War and Navy Department, 1947; Fellow, AIEE.

BUDENBOM, HORACE T. (A'40—SM'46—F'56), Bell Telephone Laboratories, Whippany, N.J. Retired. Presently associated with Stavid Engineering, Inc., Plainfield, 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.*

BUILDER, Geoffrey (A'32—F'41), School of Physics, University of Sydney, Sydney, N.S.W., Australia.
Born: June 21, 1906, Cue, Western Australia. B.Sc., 1928, University of Western Australia; Ph.D., 1933, D.Sc., 1956, University of London. **Awards:** Fellow, Institute of Physics, London, England.

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:** Papers Review, 1949–53; Editorial Review, 1954–57; Wave Propagation, 1954–56. **Awards:** IRE Morris Liebmann Memorial Prize, 1956; Stuart Ballantine Medal, Franklin Institute, 1956.

BURKE, Charles T. (A'25—M'27—F'37), Director of Planning, General Radio Company, 275 Massachusetts Ave., Cambridge 39, Mass.
Born: August 4, 1902, Watertown, Mass. S.B., 1924, S.M., 1924, Massachusetts Institute of Technology. **Committees:** Radio Receivers, 1927–28; Handbook, 1945–48; Papers Procurement, 1946; Power Supply, 1928–29; Standards, 1941–43.

BURNAP, Robert S. (A'30—F'47), Manager, Commercial Engineering, Tube Division, Radio Corporation of America, 5 & 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 Review, 1954; Electron Devices, 1952–56; Electronics, 1936–46, *chairman, 1942–46;* Electron Tubes, *chairman, 1946–49;* Electron Tubes and Solid State Devices, 1949–52; 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 for Engineering, Ford Instrument Company, Long Island City, N.Y.
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 Review, 1955–57; 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, 1937–56, *vice-chairman, 1948–49, chairman, 1949–50.* **Sections:** Ithaca, *chairman 1953–54.* **Professional Groups:** Engineering Management, *vice-chairman, 1956.* **Awards:** Presidential Certificate of Merit; Distinguished Alumnus, University of Michigan; Fellow AIEE; Fellow, American Physical Society.

BUSIGNIES, Henri (M'42—SM'43—F'45), President, Federal Telecommunication Laboratories, a division of International Telephone and Telegraph Corporation, 500 Washington Ave., Nutley, N.J.
Born: December 29, 1905, Sceaux, Paris, France, E.E., 1926, Institut Normal Electro-technique, Paris France. **Committees:** Annual Review, 1948–49; Awards, 1955–56; 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), Vice-President, International Telephone and Telegraph Corporation, 67 Broad St., New York 4, 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:** Awards, 1953–55; Tellers, 1949; Appointments, 1955; Policy Advisory, 1956–57. **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 Rd., 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. **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, 1941–58, *chairman, 1942–49;* Standards, 1943–51. **Sections:** Connecticut Valley, *chairman, 1927–28.* **Awards:** Duddell Medal, Physical Society of London, 1936; IRE Morris Liebmann Memorial Prize, 1928.

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; M.E., 1945, McGill University. **Sections:** Winnipeg Subsection, *chairman, 1949–50.*

CALDWELL, Orestes H. (M'28—SM'43—F'44), Editorial Consultant, Electronic Industries, Electronics Technician, Catrock Rd. at Bible Corners, Cos Cob, Conn.
Born: March 8, 1888, Lexington, Ky. B.S.(E.E.), 1908, E.E., 1931, D.E., 1933, Purdue University. **IRE Offices:** Manager, 1932; Director, 1932–33. **Committees:** Admissions, 1933; Annual Review, 1942–43; Board of Editors, 1946–53; Constitution and Laws, 1932–33, 1935; Nominations, 1934; Publicity, 1931–37, 1939, *chairman, 1934–36;* Public Relations, 1942–46, 1949–50, *chairman, 1942;* Tellers, 1932–33. **Awards:** Fellow, AIEE.

CALLAHAN, John L. (A'21—M'31—SM'43—F'53), Assistant to Director, Radio Research Laboratory, RCA Laboratories, 66 Broad St., New York, 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; Televison 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, AIEE; Fellow, Radio Club of America.

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 Physicist, 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:** Nominating, *chairman, 1954–56;* Chapters, *chairman, 1956;* Recording and Reproducing, 1954–58. **Professional Groups:** Audio, 1951–53, *secretary, 1951–52, chairman, 1953.* **Awards:** Fellow, Acoustical Society of America, 1951; 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; John Scott Medal, 1955.

CARLIN, Herbert J. (M'47—SM'50—F'56), Research Professor, Microwave Research Institute, 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:** Editorial Reviewer, 1954–56. **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, Patent Operations, Radio Corporation of America, Laboratories Division, Princeton, N.J.
Born: January, 1897, Jamestown, N.Y. **Committees:** Radio Receivers, 1946–47.

CARNAHAN, C. Wesley (A'34—SM'45—F'52), Technical Assistant to General Manager, 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, 1949–53.*

CARSON, Victor S. (S'39—A'42—SM'51—F'55), Professor, Electrical Engineering, North Carolina State College, Raleigh, N.C.
Born: June 29, 1908, Pocatello, Idaho. B.S.(E.E.), 1938, Oregon State College; Engr., 1940, Ph.D., 1946, Stanford University. **Sections:** North Carolina-Virginia, *secretary-treasurer, 1950, chairman, 1952.* **IRE Representative:** University of Connecticut, 1941–42; Stanford University, 1945.

CARTER, E. Finley (A'24—F'36), Director 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, 1949–58; Board of Editors, 1937–46; Standards, 1945–57. **Professional Groups:** Antennas and Propagation, 1949–57, *chairman, 1953.* **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940; Citation for Overseas Work on Countermeasures "V" 2 Rocket, Secretary of War, 1947; Army-Navy Certificate of Appreciation, 1948.

CAWEIN, Madison (M'36—SM'43—F'54), Consultant in Television and Physics, 3010½ S. Calhoun, Ft. Wayne 6, Ind.
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.
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:** Electronics, 1936–45; Electron Tubes, 1946–47; 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.

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), Chief Engineer, Engineering Department, CBS Television, 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 Committee on Definitions of Electrical Terms, 1948–49. **Awards:** Legion of Merit, 1946.

CHAMBERS, Dudley E. (M'41—SM'43—F'48), Manager, Engineering Services Research, General Electric Company, 1 River Rd., Schenectady 5, N.Y.
Born: November 27, 1905, Kansas City, Mo. B.A., 1927, E.E., 1928, Stanford University. **Committees:** Awards, 1948, 1950–51; Board of Editors, 1953; Education, 1953, Research, *chairman, 1949–50;* Standards, 1949–50. **Awards:** Fellow, AIEE, 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, Phoenix, Ariz.
Born: August 1, 1903, Union, S.C. B.S., 1924, Clemson. **Committees:** Editorial Review, 1954–57.

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; Member, National Academy of Sciences; American Academy of Arts and Sciences; Fellow, Physical Society.

CHINN, Howard A. (A'42—SM'45—F'45), Chief Engineer, Audio-Video Division, 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 Review, 1954–57; 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.

CHIPP, Rodney D. (A'34—SM'43—F'55), Director, Engineering, Allen B. DuMont, Inc., 35 Market St., East Paterson, N.J.
Born: May 16, 1910, New Rochelle, N.Y. **Committees:** Constitution and Laws, 1950; National Convention, 1947–52. **Sections:** New York, *secretary, 1948–49, vice-chairman, 1949–50, chairman, 1950–51.* **Professional Groups:** *president, 1953–54,* Technical Societies Council of New York. **Awards:** U. S. Navy Commendation 1946.

CHITTICK, Kenneth A. (A'26—SM'49—F'53), Manager, TV Receivers, RCA Victor TV Department, Cherry Hill, Camden, N.J.
Born: November 6, 1903, Old Bridge, N.J. B.S., 1925, Rutgers University. **Committees:** Instruments and Measurments, 1949–50; Papers Procurement, 1947–50; Radio Receivers, 1951–58; Television, 1945–48; Television Systems, 1949–58. Radio Frequency Interference, 1955–58. **Awards:** Award of Merit, RCA, 1947.

CHODOROW, Marvin (A'43—SM'47—F'54), Professor, Applied Physics and Electrical Engineering, Stanford University, Stanford, Calif.
Born: July 16, 1913, Buffalo, N.Y. B.A., 1934, University of Buffalo; Ph.D., 1939, Massachusetts Institute of Technology. **Committees:** Editorial Review, 1954–57.

CHRISTALDI, P. Samuel (S'35—A'40—SM'44—F'52), 132 Squire Hill Rd., 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, 1949–58, *vice-chairman, 1952–54, chairman, 1954–58;* Standards, 1954–58; Tellers, 1956. **Sections:** Northern New Jersey Subsection, *secretary, 1951–53, chairman, 1955–56.* **Professional Groups:** U. S. National Committee, International Eelectrotechnical 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, ScD., 1938, Massachusetts Institute of Technology. **Committees:** Antennas, 1948–49; Antennas and Wave Guides, 1949–51, *vice-chairman, 1949–50;* Editorial Review, 1954–57; Technical Program, 1949–50.

CLAPP, James K. (A'24—M'28—F'33), Engineer, General Radio Company, 275 Massachusetts Ave., Cambridge 39, Mass.
Born: December 30, 1897, Denver, Colo. B.S., 1923, S.M., 1926, Massachusetts Institute of Technology. **Committees:** Editorial Review, 1954–57; Papers, 1931–45; Papers Review, 1946–53; Piezoelectric Crystals, 1940–56; Standards, 1934–35; Editorial Reviewer, 1955–57.

CLAVIER, André G. (M'30—F'39), Vice-President and Technical Director, Federal Telecommunication Laboratories, a division of International Telephone and Telegraph Corporation, 500 Washington Ave., Nutley 10, N.J.
Born: February 15, 1894, Cambrai, France. Licéncié-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, 1951–58; Symbols, 1949–54, *vice-chairman, 1949–50, chairman, 1951–53.* **Professional Groups:** Communication Systems, Administrative Committee, 1953; 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, 1955–56. **Awards:** Fellow, AIEE; Membre Lauréat de la Société Française des Eléctriciens; President, Fifth Section, Société des Radioéléctriciens, Paris, 1945–47; Vice-President, American Section of Société des Ingénieurs Civils de France, 1952–56.

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), Technical Advisor to the General Manager, Crosley Division, Avco Manufacturing Corporation, Evendale Plant, Cincinnati 15, Ohio.
Born: January 25, 1892, Oakland, Calif. B.S.(E.E.), 1914, University of California. **IRE Offices:** Director, 1945. **Committees:** Board of Editors, 1941–53; Electro-Acoustic 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 Field of Aircraft Electronic Development, Dayton Section IRE, 1950; Radio-Electronics-Televsion Manufacturers Association IRE Annual Award, Radio Fall Meeting Plaque, Syracuse, 1955.

CLEWELL, Dayton (M'49—SM'49—F'54), General Manager, Socony Mobil Laboratories, 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, 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:** Education, 1945–46; Board of Editors, 1945–54; Admissions, 1946–49; Editorial Review 1954–57. **Sections:** Schenectady, *secretary-treasurer, 1949–51.* **Awards:** Army-Navy Certificate of Appreciation, World War II, 1947.

COGGESHALL, Ivan, S. (A'26—M'29—F'42), Director of Planning, International Communications, Western Union Telegraph Company, 60 Hudson St., New York 13, N.Y.
Born: September 30, 1896, Newport, R.I. Ph.D. (Honorary), Engineering, 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–*57, chairman, 1948, 1950;* Executive, 1942, 1951–52, *chairman, 1951;* Finance, 1948–52 *ex officio, 1951;* 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, AIEE.

COLEMAN, John B. (A'25—M'29—SM'43—F'48), Administrative Engineer, Product Engineering, 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, East Pittsburgh, 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 Review, 1954–57; Research, 1949–50. **Sections:** Nuclear Science, Pittsburgh, *chairman, 1956.* **Awards:** Fellow, American Physical Society, 1954.

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.

COMSTOCK, George C. (A'47—M'47—SM'51—F'57), Director, Research and Engineering Division, Airborne Instruments Laboratory, Inc., 160 Old Country Rd., Mineola, L.I., N.Y.
Born: May 1911, Peoria, Ill. B.S., 1932, Bradley University; Ph.D., 1938, University of Chicago. **Committees:** Navigation Aids, 1949–51. **Awards:** War-Navy Department Award of Appreciation, 1947.

CONDON, Edward U. (M'42—SM'43—F'53), Professor of Physics, Washington University, St. Louis 5, 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), 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), Executive Vice-President and Director of Engineering, Times Facsimile 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. **IRE Representative:** University of Maryland, 1950–53. **Awards:** Fellow, American Institute of Electrical Engineers, 1950.

CORRINGTON, Murlan S. (SM'49—F'54), Group Manager, RCA Victor Television Division, Bldg. 204–2, Camden 8, 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:** Sound Recording and Reproducing, 1950–56, *vice-chairman, 1953–56;* Ad Hoc Committee on Spurious Radiation, 1954–55; Radio Frequency Interference 1955–58. **Professional Groups:** Audio, Administrative Committee, 1952–57, *vice-chairman, 1954–56;* 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), Vice-President, Development and Research, The Western Union Telegraph Company, 60 Hudson St., New York 13, N.Y.
Born: December 3, 1892, Water Mill, L.I., N.Y. M.E., 1916, Cornell University. **Committees:** Admissions, 1949–1954, *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), Operations and Communications Superintendent (Argentina), Pan American-Grace Airways, Inc., Avenida Pte. R. Saenz Pena 788, 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.*

COWAN, Frank A. (M'30—SM'43—F'55), Assistant Director of Operations, American Telephone and Telegraph, Long Lines Department, 32 Ave. of the Americas, New York 21, N.Y.
Born: August 30, 1898, Escatawpa, Ala. B.S.(E.E.), 1919, Georgia Institute of Technology. **Committees:** Annual Review, *vice-chairman, 1948–49.* **Awards:** AIEE Lamme Gold Medal, 1953.

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.

CRAVEN, Tunis A. M. (F'29), Commissioner, Federal Communications Commission, New Post Office Bldg., Washington 25, D.C. Mail: Langley, McLean P.O., 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.

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

CROSBY, Murray G. (A'25—M'38—SM'43—F'43), Radio-Electronic Consultant; President, Crosby Laboratories, Inc., Box 233, Robbins Lane, Hicksville, L.I., N.Y.
Born: September, 1903, Elroy, 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 Review, 1954–57; 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 Propagation, 1948–56, *chairman, 1948–49.* **Professional Groups:** Broadcast Transmission Systems, Administrative Committee 1956–59. **Awards:** Presidential Certificate of Merit, 1948.

CULVER, Charles (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:** Member, Acoustical Society of America; Fellow, American Institute of Electrical Engineers; Member, Scientific Research Society of America.

CUTLER, C. Chapin (A'40—SM'53—F'55), Member of the Technical Staff, Bell Telephone Laboratories, Murray Hill, N.J.
Born: December 16, 1914, Springfield, Mass. B.S., 1937, Worcester Polytechnic Institute. **Committees:** Editorial Review, 1954–57.

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; Manager, 1920; Director, 1921–24. **Committees:** Education, 1944; Investments, 1944–46.

DARLINGTON, Sidney (SM'53—F'57), Member, Technical Staff, Bell Telephone Laboratories, Inc., Mountain Ave., 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 Review, 1954–57.

DAVIS, Harry I. (A'44—SM'49—F'55), Technical Director, Rome Air Development Center, Griffiss Air Force Base, Rome, N.Y.; 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), Head, Radio Techniques Branch, U. S. Naval Research Laboratory, Washington 25, 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, chairman, 1934–35.*

DAWSON, John W. (A'39—SM'52—F'55), Chief Engineer Special Tubes, Electronics Division, Sylvania Electrical Products, Inc., 100 Sylvan Rd., Woburn, 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, AIEE.

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

DeCOLA, Rinaldo E. (A'37—SM'43—F'57), Director of Engineering, 3800 Cortland Ave., Chicago 47, Ill.
Committees: Radio Receivers, 1951–54. **Professional Groups:** Broadcast and Television Receivers, Administrative Committee, 1956–57.

deFOREST, Lee (Charter Member)(A'12—M'14—F'18)(L), Director, United Engineering Company, 1027 N. Highland Ave., Los Angeles, Calif.
Born: August 26, 1873, Council Bluffs, Iowa. Ph.B., 1896, Ph.D., 1899, Yale University; Sc.D., 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:** Edison Medal, 1947; IRE Medal of Honor, 1922; Legion of Honor, 1921. President, Society of Wireless Telegraph Engineers, 1909–10.

DELLINGER, John Howard (F'23), 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 Wave Propagation, 1942–45, *chairman, 1942–44;* Radio Receivers, 1927–28; 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, *chairman, 1937–41,* 1956–58. **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.
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. **Committees:** 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, 180 S. Alvarado, Los Angeles, Calif.
Born: November 1907, Berkeley, Calif. B.S.(E.E.), 1929, University of California. **Committees:** 7th Region, *secretary-treasurer, 1956–57.* **Sections:** Cincinnati, Membership Committee, *chairman, 1948.* **Professional Groups:** Los Angeles Chapter, *chairman,* Engineering Management, 1955–56; Publicity Committee, IRE-WESCON, 1948; Visitors' Hospitality Committee, IRE-WESCON, *chairman, 1950;* Convention Registration Committee, IRE-WESCON, *chairman, 1952, 1954.*

deROSA, Louis A. (A'45—SM'51—F'52), Laboratory Director Electronic Countermeasures Laboratory, Federal Telecommunication 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:** Modulation Systems, 1951–58. **Professional Groups:** Information Theory, *vice-chairman, 1954–55.*

DEVORE, Lloyd T. (A'42—SM'44—F'52), General Manager, Stewart-Warner Electronics, Division of Stewart-Warner Corporation, 1300 N. Kostner Ave., Chicago 51, Ill.
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, *chairman, 1948–49, 1952–53.* **Professional Groups:** Engineering Management, *secretary, 1951–54.* **Awards:** Exceptional Civilian Service Award, 1947, War Department.

DeWITT, John H., Jr. (A'31—M'38—SM'43—F'51), President, WSM Incorporated, 301 7 Ave., N., Nashville 3, Tenn.
Born: February 20, 1906, Nashville, Tenn. **Committees:** Professional Groups, 1948.

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 Transmitters and Antennas, 1929–30; Radio Receivers, 1928–29. **Sections:** Philadelphia, *chairman, 1933–34, convention chairman, 1934.* **AWARDS:** United States Navy Certificate Commendation.

DIETZOLD, Robert L. (M'40—SM'43—F'55), Director, Military Systems Studies, Bell Telephone Laboratories, 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.

DINGLEY, Edward N., Jr. (A'28—M'43—SM'43—F'56), Chief Comunications Engineer, National Security Agency, Washington 25, D.C.
Born: July 18, 1902, Kalamazoo, Mich. B.Sc.(E.E.), 1936, George Washington University. **Committees:** Papers Procurement, *vice-chairman, 1955.* **Professional Groups:** Communications Systems; Administrative Committee and Sectional Activities Committee, *chairman, 1955–57;* National Symposium on Global Communications, Washington, 1955. **Sections:** Washington, *secretary, 1954–55, vice-chairman, 1955–56, chairman, 1956–57.* **Awards:** Department of Defense Distinguished Civilian Service Award for 1955.

DISHAL, Milton (A'41—SM'46—F'57), Executive Engineer, Federal Communications Laboratory, 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 Review, 1953–57. **Professional Groups:** Circuit Theory, *secretary-treasurer, 1953–56;* Administrative, 1954–56.

DOHERTY, William H. (A'29—M'36—SM'43—F'44), Assistant to the President, Bell Telephone Laboratories, 463 West St., New York 14, 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. **Committees:** Editorial Review, 1954–55; Membership, 1943–46; Nominations, 1952–53, *chairman, 1953;* Policy Advisory, 1952–53; Policy Development, 1951; Professional Groups, 1948–51. **Awards:** IRE Morris Liebmann Memorial Prize, 1937.

DOME, Robert B. (A'27—M'38—SM'43—F'48), Consulting Engineer, Television Receiver Department, Appliance and Television Receiver 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 Review, 1954–57; Papers, 1940–45. **Awards:** Coffin Award, 1936, 1948; IRE Morris Liebmann Memorial Prize, 1951; R.E.S.A., 1951.

DOOLITTLE, Franklin M. (A'13—M'30—F'54), President, Connecticut Broadcasting Company, 869 Blue Hills Ave., Hartford 12, 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 Pl., 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; AIEE; Fellow, American Association for the Advancement of Science.

DOW, Jennings B. (M'26—F'42), Executive Vice-President, Hazeltine Electronics Corporation, 58–25 Little Neck Pkwy., 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 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; Electronics, 1939–45; Electron Tubes, 1946–47; Electron Tubes and Solid State Devices, 1949–52; 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, Old Denville Rd., Boonton, N.J.
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 Aeronautical Engineering; 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:** Electronics 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.

DUBILIER, William (A'14—M'18—F'29)(L), Vice-President and Technical Director, Cornell-Dubilier Electric Corporation; President, Radio Patents Corporation, 10 E. 40 St., New York 16, N.Y.
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; Gano Dunn Medal, Cooper Union, N.Y., 1955.

DUFFENDACK, Ora S. (SM'44—F'56), Consultant Physicist, Retired.
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., and DuMont Broadcasting Corporation, 205 E. 67 St., New York 21, N.Y.
Born: January 29, 1901, Brooklyn, N.Y., E.E., 1924, D.Eng., 1944 Rensselaer Polytechnic Institute. D.Eng., Brooklyn Polytechnic

Institute, 1949; D.Laws, Fairleigh Dickinson, 1955; D. Science, New York University, 1955. **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), President, Magnecord, Inc., 1101 S. Kilbourn Ave., Chicago 24, Ill.
Born: December 19, 1903, Asheville, N.C. A.B., 1926, Johns Hopkins University. **Committees:** Radio Receivers, 1940–47.

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

DYER, John N. (J'30—A'32—SM'45—F'49), Vice-President, Research and Engineering Airborne Instruments Laboratory, 160 Old Country Rd., Mineola, L.I., N.Y.
Born: July, 1910, Haverhill, Mass. B.S., 1931, Massachusetts Institute of Technology. **IRE Offices:** Director, 1955–56. **Committees:** Navigation Aids, 1949–50; American Institute of Electrical Engineers—Institute of Radio Engineers Coordination Committee on Student Activities, 1955–56; Education, 1955–57; Appointments, 1955–56; Nominations, 1956; Policy Advisory, 1955–57, *chairman, 1956–57.* **Sections:** Long Island Subsection, *vice-chairman, 1949–50, chairman, 1950–51.*

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:** Treasurer, 1928–40; Manager, 1922–27; Director, 1927–41; Administrator, Building Fund, 1947–48. **Committees:** Admissions, 1937–39, 1941–42; Awards, 1929, 1931, 1935, 1939, 1941–42, *chairman, 1929, 1941;* Bibliography, 1930–32, 1934, *chairman, 1932, 1934;* Constitution and Laws, 1930–31, 1933; Education, 1944–48; Electro-Acoustic Devices, 1929–30; History, 1954–57; 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 for Merit, 1948; New England Engineering Award, 1948.

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 Wisconsin, 1941–47.

ECKERSLEY, Peter Pendelton (F'25), Telephone Manufacturing Company, St. Mary Cray, Kent, 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.

ECKERSLEY, Thomas L. (F'44), Retired, Chief Scientific Advisor to Marconi Company, Great Baddow, Chelmsford, Essex, England.
Born: December 27, 1886, London, England. B.Sc., University College, London; B.A., Cambridge University. **Committees:** Wave Propagation, 1937–40. **Awards:** Fellow, Royal Society, 1939; Faraday Medal, 1951.

ECKERT, John Presper (S'41—A'47—F'56), Vice-President, Director of Engineering, Remington Rand, Inc., Eckert-Mauchly Division, 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. **Awards:** Modern Pioneers Award, National Association of Manufacturers, 1940; Joseph A. Sprague Memorial Award, National Press Photographic Association, 1949; Franklin L. Burr Prize, National Geographic Society, 1953.

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 College; M.A. (physics), 1923, Ph.D. (physics), 1930, University of California at Berkeley. **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), Consulting Engineer, General Electric Microwave Laboratory, 601 California Ave., Palo Alto, Calif.
Born: October, 1912, Burchard, Neb. B.S. and M.S., 1934–35, University of Kansas; Sc.D., 1937, Harvard University. **Committees:** Papers, 1951–53; Piezoelectricity, 1949–57; Editorial Review, 1953–57; Education, 1955–57. **Sections:** Atlanta, *vice-chairman, 1947, chairman, 1948;* San Francisco, *director, 1955.* **Professional Groups:** WESCON, Technical Program Committee, 1955.

EDWARDS, Martin (SM'48—F'54), Manager of Engineering, X-Ray Department, General Electric Company, 4855 Electric Ave., Milwaukee 14, Wis.
Born: March 22, 1905, Chautauqua, Kan. B.S.(E.E.), 1928; B.S.(M.E.), 1929; M.E., 1934; D.Sc., 1946. **Awards:** Fellow, AIEE, 1946.

EITEL, William W. (A'39—SM'52—F'53), President, Eitel-McCullough, Inc., 798 San Mateo Ave., San Bruno, Calif.
Born: January 16, 1908, San Jose, Calif. **Awards:** Distinguished Service Award, U. S. Navy, 1950.

ELLEFSON, Bennett S. (A'38—M'44—F'48), Vice-President, Engineering and Research, Sylvania Electric Products, Inc., 1740 Broadway, New York 19, 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 Dr., 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 Rd., Palo Alto, Calif.
Born: August 20, 1884, 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. **Professional Groups:** Communications Systems, Washington Chapter, *chairman, 1954, vice-chairman, 1956;* Military Electronics, *chairman, 1956.*

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.
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 and Facsimile, 1936–38; Television, 1939–40.

EPSTEIN, David W. (A'34—SM'43—F'52), Associate Director, Electronic Research Laboratory, RCA Laboratories Division, Radio Corporation of America, Princeton, N.J.
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 Review, 1954–57.

ESPENSCHIED, Lloyd (IRE Charter Member)(A'12—M'13—F'24)(L) Retired. 99 82 Rd., Kew Gardens 15, L.I., N.Y.
Born: April 27, 1889, St. Louis, Mo. Pratt Institute, 1909. **IRE Offices:** Manager, 1912–13, 1915–26, 1931. **Committees:** Admissions, 1942–47; Awards, 1919; Editing, 1914; History, 1954–57; 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:** IRE Medal of Honor, 1940; AIEE Award (co-receiver), 1935; Medal Award, Television Broadcasters Association, 1944; Radio Pioneers, Citation, 1954.

ESPERSEN, George A. (A'34—VA'39—SM'51—F'56), Section Chief, Microwave and Electron Optics Sections, Philips Laboratories, Irvington-on-Hudson, N.Y.
Born: May 17, 1906, Jersey City, N.J. B.S.(Physics), 1931, New York University. **Committees:** Professional Groups, 1956; Electron Tubes and Solid-State Devices, 1951–52; Electron Devices, 1952–56. Electron Tubes, 1955–56, *vice-chairman, 1956–57.* **Professional Groups:** Electron Devices, *vice-chairman, 1953–54, chairman, 1954–55.* **Awards:** Samuel F. B. Morse Medal for Excellence in Physics, New York University, 1929.

ESPLEY, Dennis C. (SM'52—F'54), Dr., Chief Executive, Computer Developments Ltd., Computer House, 390–394 Kenton Rd., Kenton, Middlesex, England.
Born: September 19, 1906, Wellington, Shropshire, England. B.Eng. (1st Class Honors), 1928; D.Eng., 1940, Liverpool University. **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;* Board of Editors, 1941–53; Awards Coordination, *chairman, 1955;* Circuits, 1944–51; Editorial Review, 1954–57; Education, 1944, 1950, *chairman, 1944;* Executive, *chairman, 1945;* Frequency Modulation, 1941–45; Investments, 1945; Membership, 1942–43; 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 Co-ordination 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, 1954–57. **Awards:** IRE Medal of Honor, 1954.

EWING, Douglas H. (SM'46—F'54), Vice-President, Research and Engineering, RCA, 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; Editorial Review, 1954–57, Education, 1949–56; Papers Review, 1953; Awards, 1956. **Professional Groups:** Administrative Committee, Information Theory.

FARNSWORTH, Philo T. (A'28—M'34—F'39), Director, Vice-President and Technical Director, Farnsworth Electronics Company, a Division of International Telephone & Telegraph Corporation, 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, American Association for the Advancement of Science; IRE Morris Liebmann Memorial Prize, 1941.

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 Electronic Equipment Department, 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 Coordination, 1945–47.

FARRINGTON, John F. (A'19—M'29—F'31), Staff Engineer, MS Division, Raytheon Manufacturing Company, Bedford, Mass.
Born: January 11, 1895, New York, N.Y. **Committees:** Admissions, 1938–39; New York Program, 1939.

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

FAY, Clifford E. (A'26—SM'45—F'56), Member, Technical Staff, Bell Telephone Laboratories, 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 Tubes and Solid State Devices, 1949–52; Electron Devices, 1952–53. **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), Military Development Engineer, Bell Telephone Laboratories, Whippany, N.J.
Born: January, 1909, Madison, N.J. A.B., Physics, 1929, Dartmouth College.

FERRELL, Enoch B. (A'25—M'29—SM'43—F'53), Switching Research Engineer, Bell Telephone Laboratories, 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;* Papers, 1933–15. **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. of E.E., 1946, Polytechnic Institute of Brooklyn. **Committees:** Electron Devices, 1952–56; Standardization, 1929–32; Standards, 1932–33.

FICK, Clifford G. (A'25—SM'46—F'51), Manager, Research Liaison Section, Research Applications 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, 1948–58.

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), Associate Director, Hughes Research Laboratories, Culver City, Calif.
Born: February 9, 1918, Chicago, Ill. B.S., 1939, Purdue University; Ph.D., 1941, Stanford University. **Committees:** Editorial Review, 1954–57; 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, 101 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, James L. (A'19—M'28—SM'43—F'54), Assistant Chief Engineer, 66 Broad St., New York 4, N.Y.
Born: February, 1893, Grand Island, Neb. B.S., 1915, University of Washington. **Awards:** Modern Pioneer, National Association of Manufacturers, 1940.

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

FINK, Donald G. (A'35—SM'45—F'47), Director of Research, R, T and A, 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:** Director, 1949–51, 1956–57; Editor, 1956–57. **Committees:** Annual Review, 1946–49; Appointments, 1948–49; Awards, 1947; Board of Editors, 1946–53; Editorial Board, *vice-chairman, 1954–55, chairman, 1956–57;* Handbook, 1945–47; Membership, 1942–48; *chairman, 1946;* Navigation Aids, 1946–51, *chairman, 1946–48;* Papers, 1943–45; Preparedness, 1940–41; Public Relations, 1940–42; Research, 1946–47; Standards, 1946–49; Television, 1946–48, *chairman, 1948–49;* Television Systems, 1949–57; Tellers, 1949; Professional Groups, 1956; Executive, 1956–57. **IRE Representative:** 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.

FINK, Lyman R. (SM'48—F'53), Manager, Research Application Department, General Electric Research Laboratory, Schenectady, N.Y.
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. **Sections:** Syracuse, *vice-chairman, 1949–50, chairman, 1950–51.* **Professional Groups:** Administrative Committee Broadcast and Television Receivers, 1954–59, *vice-chairman, 1955, chairman, 1956–57.*

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, Middle., 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 Medallist, Royal Society of Arts (London); Honorary Member, Institute of Radio Engineers, Australia.

FISK, James B. (SM'52—F'55), Executive Vice-President, Bell Telephone Laboratories, 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. **Awards:** Fellow, American Physical Society; 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, 1955–57. **Awards:** Overseas Award, British Institute of Electrical Engineers, 1938; RCA Laboratories Award, 1949 and 1950.

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 Review, 1954–57; Electronic Computers, 1948–52, *chairman,* 1949–51; Instruments and Measurements, 1949–50; Papers Review, 1951–53; Standards, 1949–51. **Awards:** Honorable Mention Award for Young Engineers, 1948, Eta Kappa Nu.

FOSTER, Dudley E. (A'26—M'37—SM'43—F'50), Vice-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, 85 Livingston St., Brooklyn 1, N.Y.
Born: October 3, 1896, Brooklyn, N.Y. S.B., 1917, Harvard University. **Committees:** Circuits, 1947–58.

FOX, A. Gardner (A'40—SM'45—F'56), Radio Research Engineer, Bell Telephone Laboratories, 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:** Editorial Reviewer, 1954–55; Annual Review, 1949–50, Antennas, 1948–49; Antennas and Wave-guides, 1949–54, *chairman, 1949–52;* Radio Wave Propagation and Utilization, 1947–48; Wave Propagation, 1949–50; Standards, 1949–52; Instruments and Measurements, 1949–50. **Awards:** Naval Ordnance Development Award, U.S. Navy, 1945.

FRANKEL, Sidney (A'37—SM'44—F'57), Head, Radar and Countermeasures Department, Litton Industries, 336 N. Foothill Rd., Beverly Hills, 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:** Transmitters and Antennas, 1943–44; Transmitters, 1944–45; Handbook, 1945–47; Antennas, 1944–49; Antennas and Waveguides, 1949–50, *vice-chairman, 1950–51,* 1953–54. **Sections:** West Coast Subcommittee on Antennas and Waveguides, *chairman, 1952–54.*

FREDENDALL, Gordon L. (A'41—SM'46—F'55), Senior Member of 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 Review, 1954–57; Frequency Modulation, 1946–47; Measurements and Instrumentation, 1950–58; Video Techniques, 1949, *vice-chairman, 1957–58.*

FRIEND, Albert (A'34—M'39—SM'43—F'54), Consulting Engineer and Physicist, P.O. Box 29, Bala-Cynwyd, Pa. Office: 1334 Montgomery Ave., Narberth, 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 Recording and Reproducing, 1948–58, *vice-chairman, 1950–51, chairman, 1952–56;* Standards, 1952–56. **IRE Representative:** ASA Sectional Committee (Z57) on Sound Recording, *alternate,* 1952–57; IRE-AIEE Committee on Noise Definitions, 1951–53. **Awards:** Fellow, American Physical Society RCA Laboratories Award, 1951; Second National Electronics Conference Award, 1955.

FRIIS, Harald T. (A'18—M'26—F'29), Director of Research in High Frequency and Electronics, Bell Telephone Laboratories, Inc., Box 107, Red Bank, 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.

FRISCHE, Carl A. (SM'54—F'57), Executive Vice-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. and Ph.D., 1932, Iowa State University; Research Fellowship, 1933, Columbia University; D.Sc.(Honorary), 1955, Miami University, Ohio.

FUBINI, Eugene G. (A'36—SM'46—F'54), Director, Research and Engineering Division, Airborne Instruments Laboratory, Inc., 160 Old Country Rd., Mineola, L.I., N.Y.
Born: April, 1913, Turin, Italy. Doctor of Physics, 1933, University of Rome, Italy. **Committees:** Editorial Review, 1954–57; Papers Review, 1949–53; Tellers, 1948; Wave Propagation, 1949–53. **Awards:** Presidential Certificate of Merit.

FULLER, Leonard F. (A'14—M'14—F'25)(L), Retired, 2345 Waverly 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), Vice-President for Engineering, the Teleregister Corporation, Stamford, Conn.
Born: June 27, 1912, Middleton, Lancs., England. B.S.(E.E.), 1935, Northeastern University. **Committees:** Instruments and Measurements, 1949–50; Measurements and Instrumentation, *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 Electrocchnical Commission, Advisers on Elecrical Measuring Instruments, *alternate, 1953–55.* **Awards:** Certificate of Merit, 1947.

GEBHARD, Louis August (A'20—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:** Presidental Certficate 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.

GETTING, Ivan A. (SM'46—F'54), Vice-President, Engineering and Research, Raytheon Manufacturing Company, Administration Bldg., Waltham 54, Mass.
Born: January 18, 1912, New York, N.Y. S.B., 1933, Massachusetts Institute of Technology; Ph.D., 1935, Oxford University. **Committees:** Board of Editors, 1947–53; Editorial Review, 1954–57. **Awards:** Fellow, Institute of Physics; Fellow, American Academy of Arts and Sciences; Presidential Medal for Merit.

GILL, Archibald J. (M'20—F'40)(L), General Manager and Director, British Telecommunications Research, Ltd., Taplow, Bucks., 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), Owner, Ulrey & Gillett, Wholesale Electric Motor Dealers, 2500 S. San Pedro St., Los Angeles 11, 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; Director, Microwave Laboratory, Stanford University, Stanford, Calif.; Member, 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.

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.* **Institute 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.

GLOVER, Alan M. (A'39—SM'46—F'56), General Manager, Semiconductor 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:** Papers Procurement, 1946; Electronics, 1943–46; Electron Tubes, 1946–49; Electron Tubes and Solid State Devices, 1949–52; Vacuum Tubes, 1945–46. **Sections:** Lancaster Subsection, *chairman, 1948–49.*

GOLDBERG, Harold (A'38—M'44—SM'44—F'55), Vice-President, Emerson Radio and Phonograph Corporation, Emerson Research Laboratories, 701 Lamont St., N.W., Washington 10, D.C.
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, 1949–58, *vice-chairman, 1953–56, chairman, 1956–58;* Solid State Devices, 1955–58; Standards, 1956–58. **Sections:** Rochester, *secretary, 1944–45.* **Professional Groups:** Washington Chapter, Information Theory, *chairman, 1956.* **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:** Papers, 1944–45; Papers Review, 1946–50; Circuits, 1947–51; Information Theory and Modulation Systems, 1956–58. **IRE Representative:** IRE-AIEE Committee on Noise Definitions, 1949–53.

GOLDMARK, Peter C. (A'36—M'38—F'42), President, CBS Laboratories, a Division of Columbia Broadcasting System, Inc., 485 Madison Ave., New York 22, N.Y.
Born: December 2, 1906, Budapest, Hungary, B.Sc., 1930, Ph.D., 1931, Vienna Technical College. **Committees:** Board of Editors, 1941–50; Television, 1939–49; Television and Facsimile, 1938–39; Television Systems, 1949–58. **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, 1954–57; Director 1912–57, **Committees:** Administrative Committee of the Board of Editors, *chairman, 1951–53;* Admissions, 1925; Circuit Elements, 1928–29; Awards, 1919, 1930–33, 1935–38, *chairman, 1919, 1931;* Bibliography, 1934; Board of Editors, *chairman, 1928, 1930–53;* 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,* 1913–31, *secretary, 1913; chairman, 1915–16;* Standards, 1932–36; Television and Facsimile, 1936–38; Tellers, *chairman, 1932;* Wave Length Regulation, 1916, 1919. **IRE Representative:** ASA Standards Council, 1936, 1939–46; ASA Sectional Committee on Radio, 1936, 1939–40, *chairman, 1942–48;* 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; National Television Systems, 1940–43; Panel 2, *chairman, 1942–43;* Joint IRE-AIEE, Co-ordination Committee, 1952; National Television Film Council, *president, 1957.* **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.

GOLDSMITH, Thomas T., Jr. (A'38—SM'46—F'49), Vice-President, Government and Research, Allen B. DuMont Laboratories, Inc., 35 Market St., East Paterson, N.J.
Born: January, 1910, Greenville, S.C. B.S., 1931, Furman University; Ph.D., 1936, Cornell University. **Committees:** Admissions, 1944–47; Electronics, 1942–46; Electron Tubes, 1946–47; Professional Groups, 1948; Regular Papers, 1941; Television, 1939–46; Tellers, 1944; Vacuum Tubes, 1945–46. **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, Dombrad, 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 Pl., London, W.C.1, England.
Born: April 30, 1894, London, England. **Awards:** Commander of the Order of the British Empire, 1954.

GOODALL, William McH. (A'29—M'37—SM'43—F'51), Technical Staff, Bell Telephone Laboratories, Inc., Box 107, Red Bank, N.J.
Born: September 7, 1907, Washington, D.C. B.Sc., 1928, California Institute of Technology. **Committees:** Editorial Review, 1954–57; New York Program, 1939–41, 1949–50; 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), Consulting Engineer, Weston Electrical Instrument Corporation, 614 Frelinghuysen Ave., Newark 5, N.J.
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.

GOUBAU, Georg J. E. (A'49—SM'56—F'57), Consultant, Signal Corps Engineering Laboratories, Ft. Monmouth, N.J.
Born: November 29, 1906, Munich, Germany. M.S., 1931, Ph.D. (physics), 1932, Dr. habil., 1935, Institute of Technology, Munich. **Awards:** Harry Diamond Memorial Award, IRE, 1957.

GRAF, Alois W. (A'26—M'44—SM'45—F'55), Patent Lawyer, Graf, Nierman and Burmeister, 141 W. Jackson Blvd., Chicago 4, Ill.
Born: March 20, 1901, Mankato, Minn. B.S.(E.E.), 1926, University of Minnesota; LL.B., 1930, National Law University. **IRE Offices:** Director, 1952–53, 1957. **Committees:** Board of Editors, 1945–53; Constitution and Laws, 1953–57, *chairman, 1954–57;* Editorial Review, 1954; Education, 1945–57; Membership, 1944; National Convention, 1948; Nominations, 1952–54; Policy Advisory, 1954–57; Policy Development, 1948; Professional Groups, 1953–57; *vice-chairman, 1954–57;* Sections, 1945–50, *chairman, 1948–50.* **Sections:** Chicago, *secretary, 1944–45, chairman, 1946–47.* **IRE Representative:** National Electronics Conference, Board of Directors, 1952, 1954–56.

GRAHAM, Virgil M. (A'24—M'27—F'35), Associate Director, Engineering Department, Radio-Electronics-Television Manufacturers Association, Room 650, 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, 1954–56. **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.*

GRANGER, John V. N. (S'42—A'45—M'46—SM'51—F'56), President, Granger Associates, 966 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, 1954–57. **Sections:** Palo Alto Subsection, *secretary, 1952, chairman, 1954–55.* **Professional Groups:** Aeronautical and Navigational Electronics, Editor of *Transactions,* 1955–56. **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.

GREEN, Estill I. (A'27—M'36—SM'43—F'55), Vice-President, Bell Telephone Laboratories, Inc., 463 West St., New York 14, N.Y.
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:** Measurements and Instruments, 1950–53; Institute Sections, 1928. **IRE Representative:** Joint IRE-AIEE Committee on High Frequency Measurements, 1950–52.

GROSS, Gerald C. (A'27—M'30—SM'43—F'57), Assistant Secretary-General, International Telecommunication Union, I.T.U. 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), Technical Staff Member, The Ramo-Wooldridge Corporation, Control Systems Division, 5500 W. El Segundo Blvd., Hawthorne, Calif.
Born: September, 1914, Berlin, Germany. Diplôme Ingénieur (E.E.), 1940, Swiss Federal Institute of Technology, Zurich; M.E.E., 1952, Syracuse University.

GUÉNARD, Pierre R. (SM'50—F'55), Directeur Téchnique du Département de Recherches "Eléctronique et Atomistique" de La Compagnie Générale de T.S.F., Boite Postale N° 10, Orsay, Seine et Oise, France. Professeur à l'École Supérieure d'Eléctricité.
Born. January 22, 1914, Amiens, France. Licéncié ès Sciénces, 1935, Agrégé des Sciénces Physiques, 1937, École Normale Supérieure. **Awards:** Prix D'Aumale de L'Académie des Sciences de Paris, 1952; Médaille Ampère de La Société Française des Eléctriciens; Médaille Blondel, 1956.

GUILLEMIN, E. A. (A'41—SM'48—F'49), Professor of Electrical Communications, 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 Review, 1954–57; Education, 1947–48; Standards, 1944–47. **IRE Representative:** Massachusetts Institute of Technology, 1945–54. **Awards:** Presidential Certificate of Merit, 1948.

GUNN, Ross (A'35—SM'47—F'49), Director, Office of Physical Research, United States Weather Bureau, Washington 25, D.C.
Born: May, 1897, Cleveland, Ohio. B.S.(E.E.), 1920, M.S., 1921, University of Michigan; Ph.D., 1926, Yale University. **Awards:** Air Safety Distinguished Service Award, 1951; Exceptionally Distinguished Service Citation, United States Navy, 1945; Fellow, American Physical Society; National Academy of Sciences; Robert M. Losey Award, Institute of Aeronautical Sciences, 1956; U.S. Department of Commerce Gold Medal for Exceptional Service, 1957.

GUNTHER, Clarence (A'27—SM'48—F'54), Chief Defense Engineer, Defense Engineering Department, Defense Electronic Products, Radio Corporation of America, Building 15-7, 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, 1952, Radio Corporation of America.

GUSTAFSON, Gilbert E. (A'27—M'38—F'40), Vice-President in Charge of Engineering, Zenith Radio Corporation, 6001 Dickens Ave., Chicago 39, Ill.
Born: November 15, 1905, Rock Island, Ill. **IRE Offices:** Director, 1943. **Committees:** Admissions, 1943; Awards, 1942.

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:** 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:** Presi-

dent, Radio Pioneers, 1956; Marconi Memorial Gold Medal of Achievement, 1956.

HACKBUSCH, Ralph A. (A'26—M'30—F'37), President, Hackbusch Electronics Ltd., 23 Primrose 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, 1949–58. **Sections:** Toronto, *secretary, 1930–31, chairman, 1932–33.*

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:** Administrative Committee of the Board of Editors, 1951; Board of Editors, 1951–53; Editorial Administrative, 1949–50; Editorial Review, 1954; Nuclear Studies, 1948. **Awards:** IRE Harry Diamond Memorial Award, 1950; Special Research Fellowship, California Institute of Technology, 1932–33.

HAFSTAD, Lawrence R. (SM'52—F'53), Vice-President, General Motors Corporation, Director, Research Staff, P.O. Box 188, North End Station, Detroit 2, Mich.
Born: June 18, 1904, Minneapolis, Minn. B.S.(E.E.), 1926, University of Minnesota; Ph.D.(Physics), 1933, 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; British "King's Medal in Defense of Freedom," 1946; Distinguished Service Award from U. S. Atomic Energy Commission, 1954; Medal of Merit from Secretary of the Navy, 1946; U.S. Delegate to International Radio Union Conference in London, 1934.

HAGEN, John P. (A'37—SM'47—F'54), Director, Project Vanguard, Superintendent, on leave, Atmosphere and Astrophysics Division, Naval Research Laboratory, 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; RESA, Sigma Xi.

HALL, Nathan I. (SM'47—F'56), Vice-President and Director of Weapons System Development, 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. **Committees:** Editorial Reviewer, 1955–56. **Awards:** Eta Kappa Nu Outstanding Electrical Engineer, 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.

HALLBORG, Henry E. (F'45), Research and Engineering Consultant on Propagation and Associated Equipments. Home address: 26 Macopin Ave., Upper Montclair, N.J.
B.Sc.(E.E.), 1907, Brown University. **Committees:** Constitution and Laws, 1928–32; Radio Transmitters and Antennas, 1930–31; Standardization, 1929–31.

HALLER, George L. (A'28—M'36—SM'43—F'50), 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. **Professional Groups:** 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. **Sections:** Dayton, *chairman, 1945–46.* **Professional Groups:** Administrative Committee, Aeronautical and Navigational Electronics, 1951–53, 1956–59; Papers Committee, Aeronautical and Navigational Electronics, *chairman, 1951–53;* National Conference on Aeronautical Electronics, *chairman, 1954.* **Awards:** War Department Commendation, 1946.

HAMBURGER, Ferdinand, Jr. (A'32—M'39—SM'43—F'53), Professor and Chairman, Electrical Engineering Department, Johns Hopkins University.
Born: July 5, 1904, Baltimore, Md. B.E., 1924, Dr. Engr., 1931, Johns Hopkins University. **IRE Offices:** Director, 1950–51. **Committees:** Appointments, 1951; Editorial Board, 1956–57; Education, 1955–57; Nominations, 1951; Policy Advisory, 1952–55. **Sections:** Baltimore, *chairman, 1940–41.* **IRE Representative:** Johns Hopkins University, 1941–54. **Awards:** Fellow, American Institute of Electrical Engineers, 1949.

HANSEL, Paul G. (S'39—A'42—SM'50—F'57), Chief Radio Engineer, Servo Corporation of America, 20-20 Jericho Turnpike, New Hyde Park, N.Y.
Born: June, 1917, Grand Island, Neb. B.S., 1946, University of Kansas. **IRE Offices:** *secretary, 1954–55; chairman, 1955–56.* **Committees:** Tellers, 1955–57. **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), Associate Director, Radio Research Laboratory, RCA Laboratories, Radio Corporation of America, Rock Point, N.Y.
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.

HANSON, O. B. (A'18—M'27—F'41), Vice-President, Engineering Services, Radio Corporation of America, 30 Rockefeller Plaza, New York 20, N.Y.
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.*

HARMON, Ralph N. (A'30—SM'45—F'52), Vice-President, Engineering, Director, Westinghouse Broadcasting Company, Inc., 1625 K St., N.W., Washington 6, D.C.
Born: August 29, 1905, California, Pa. B.S. in E.E., 1928, Carnegie Institute of Technology. **Committees:** Broadcast, 1935–38; Membership, 1950–51; Television, 1945–49; Television Systems, 1949–58. Radio Transmitters, 1956–58. **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 Corp.

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, 1953–56, *chairman, 1956;* Vacuum Tubes, 1929–30; Standards, 1956–58. **IRE Representative:** ASA Sectional Committee (C16) on Radio, 1956.

HARRIS, Donald B. (SM'45—F'56), Manager, Electron Tube Research, General Electric Microwave Laboratory at Stanford, 601 S. California Ave., Palo Alto, Calif.
Born: February 10, 1901, Minneapolis, Minn. B.A., 1922, Yale University. **Committees:** Board of Editors, 1950–53, Editorial Reviewer, 1954–56; Constitution and Laws, 1951; Railroad and Vehicular Communications, 1948–50; Mobile Communications, 1950–56. **Sections:** Cedar Rapids, *chairman, 1950.* **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, Advanced Development 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 Review, 1954–56; Education, 1949–57; Papers Procurement, 1945–46; Papers Review, 1946–53; Membership, 1951. **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 City, *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), Operations Manager, Tubes, Electronics Division, Sylvania Electric Products, 1891 E. 3rd St., Williamsport, Pa.
Born: October 9, 1911, Ossian, Iowa. B.S. in 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. **Awards:** 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:** Educational, 1946–50; Television Systems, 1952–58.

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 Dr., 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, *chairman, 1937–1938;* Education, 1945–47; Meetings and Papers, 1925, 1927; New York Program, 1935; Standardization, 1924–28; Radio Receivers, 1927–28; Vacuum Tubes, *chairman, 1927–28;* Vacuum Tube Terminology, *chairman, 1924–25.* **Awards:** Armstrong Medal, Radio Club of America, 1937.

HEADRICK, Lewis B. (A'36—M'38—SM'43—F'53), Staff Engineer, Color Kinescopes, RCA Tube Division, New Holland Pike, Lancaster, Pa.
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 Review, 1954–57; Electronics, 1942–46; Electron Tubes, 1946–49; Electron Tubes and Solid State Devices, 1949–50; Membership, 1943–46; Vacuum Tubes, 1945–46. **Sections:** Philadelphia, Lancaster Subsection, *chairman, 1952.*

HEGBAR, Howard R. (S'41—A'42—SM'46—F'57), Manager, Avionics and Electronics, 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. **Sections:** Akron Subsection, *chairman, 1948–49;* Akron, *chairman, 1949–50;* Region 4, *director, 1957–58.*

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) 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, 1941–57, *chairman, 1943–44, 1951–53, 1954–57;* 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, 1948–57; Sections, 1941–52, *chairman, 1941–15;* Standardization, 1925–26. **Awards:** IRE Morris Liebmann Memorial Prize, 1921; Modern Pioneer Award, National Association of Manufacturers, 1940; Fellow, American Institute of Electrical Engineers; Fellow, American Physical Society; Armstrong Medal, 1953; IRE Founders Award, 1957.

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, 1953–57; President, 1957. **Committees:** Appointments, 1954–57; Executive, *chairman, 1957;* Nominations, 1954; Policy Advisory, 1955–56, *chairman, 1955;* Professional Groups, 1954–57. **Sections:** Ottawa, *vice-chairman, 1949, chairman, 1950.* **Awards:** Fellow, Royal Society of Canada, 1944; Member of the Order of the British Empire, Dominion of Canada, 1943.

HENNEY, Keith (A'18—M'26—SM'43—F'43), Consulting Editor, Electronics and Nucleonics, McGraw-Hill Publishing 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, 1937–48; Awards, 1945–46, 1948–50, *chairman, 1949;* Executive, 1946–47; History, 1954–57; 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, 1952–57; Joint IRE-RMA Co-ordination Committee, 1947–49, 1951.

HERBST, Philip J. (M'41—SM'43—F'53), Staff Engineer, Radio Corporation of America, Camden, N.J.
Born: January 24, 1903, Philadelphia, Pa. B.S.(Physics), 1925, St. Thomas College; M.S.(Physics), 1927, La Salle College. **Committees:** Editorial Review, 1954–57; Radio Transmitters, 1952–58, *hairman,* 1953–55; Standards, 1953–56.

HERGENROTHER, Rudolf C. (A'37—VA'39—SM'52—F'56), Manager of Beam Tube Research and Development Laboratory, Raytheon Manufacturing Company, Willow St., Waltham, 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), Director, Electronic Research Laboratory, RCA Laboratories, Radio Corporation of America, Princeton, N.J.
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; Board of Editors, 1946–53; Editorial Administrative, 1946–51; Editorial Board, 1956–57; Membership, 1942; Papers, 1944–45; Policy Advisory, 1956–57; Winter Technical Meeting, 1945; Appointments, 1956; Nominations, 1957; Education, 1957. **Sections:** Princeton, *vice-chairman, 1948, chairman, 1949.* **IRE Representative:** Joint AIEE-IRE Student Activities Coordination 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, Gashen College; M.A. (Physics), 1930, George Washington University; Ph.D.(E.E.), 1937, University of Pennsylvania. **Committees:** Education, 1946.

HERZOG, Gerhard (SM'46—F'55), Assistant General Manager, Research and Technical Department, The Texas Company, P.O. Box 425, Bellaire, Tex.
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:** Colonel, Signal Corps, USAR; 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), Vice-President, Hewlett-Packard Company, 275 Page Mill Rd., 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, 1955;* Executive, 1953–55, *chairman, 1954;* Editorial Board, 1955; Editorial Review, 1955; Finance, 1953–55; Papers Review, 1952–53; Nominations, 1950–56, *chairman, 1956;* Policy Advisory, *chairman, 1952;* Policy Development, 1950–51; Constitution and Laws, 1956–57. **Sections:** San Francisco, *vice-chairman, 1948–49, chairman, 1949–50.*

HIGHT, Stuart C. (A'31—M'39—SM'43—F'55), Director of Research, Sandia Corporation, Sandia Base, Albuquerque, N.M.
Born: July 28, 1906, Berkeley, Calif. B.S.(E.E.), 1930, University of California; M.A., 1934, Columbia University. **Awards:** Naval Ordnance Award, 1945.

HILL, Albert G. (SM'46—F'50), Professor of Physics; Director of Research, W.S.E.G., Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge, Mass. and The Pentagon, Washington 25, 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.

HILLIARD, John K. (A'25—M'29—SM'43—F'52), Director of Advanced Engineering, 9356 Santa Monica Blvd., Beverly Hills, 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 Review, 1954–57; Professional Groups, 1952. **Professional Groups:** Audio, *vice-chairman, 1951–53;* Medical Electronics, Los Angeles Chapter, *chairman, 1955–56.* **Sections:** Los Angeles, *chairman, 1933–34.* **Awards:** Fellow, Acoustical Society of America; Fellow, Audio Engineering Society; Fellow, Society of Motion Pictures and Television Engineers.

HILLIER, James (SM'55—F'57), General Manager, 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; Harry Diamond Memorial Award, IRE, 1956.

HINNERS, Frank A. (IRE Charter Member)(A'12—M'15 F'26), President, Hinners-Galanek Radio Corporation, 28-14 Broadway, Long Island City 6, 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), Executive Vice-President, Hazeltine Research Corporation, 58-25 Little Neck Pkwy., Little Neck, L.I., N.Y.
Born: October, 1902, Pittsburgh, Pa. A.B., 1923, Columbia College; E.E., 1925, Columbia University. **Committees:** Awards, 1956–57; Board of Editors, 1952–53; Editorial Review, 1954–57; Navigation Aids, 1947–53, *vice-chairman, 1950–52.* **Sections:** Long Island Subsection, *chairman, 1952.* **Awards:** Certificate of Commendation, U. S. Navy, 1947.

HOBSON, Jesse E. (M'45—F'56), Vice-President and Assistant to The President, 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. **Awards:** Eta Kappa Nu Outstanding Young Electrical Engineer, 1940; Fellow, Charles Coffin Foundation, 1933–34; Fellow, Tau Beta Pi Research, 1932–33.

HOGAN, John V. L. (IRE Founder and Charter Member) (A'12—M'12—F'15)(L), Founder and President, Hogan Laboratories, Inc., 155 Perry St., New York 14, N.Y.
Born: February 14, 1890, Philadelphia, Pa. **IRE Offices:** President, 1920; Vice-President, 1916–19; Manager, 1912–15, 1921–32; Director, 1916–20, 1932–36, 1948–50. **Committees:** Annual Review, 1927, 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, 1916–19;* Radio Receivers, 1927–28; Revision of the Constitution, 1925–27, *chairman, 1925;* Sections, 1925; Specifications for Steamship Radio Equipment, 1914–15; Standardization, 1913, 1915–29, *chairman, 1916–20,* 1929–30; Standards, 1932–33, 1936–37, 1947–48, 1949–51; Use of the Transmission Unit, *chairman, 1928;* 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, 1948-57. **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:** Papers Review, 1952–53; Editorial Review, 1955–57.

HOLLMANN, Hans E. (A'48—F'53), Consultant Physicist, Studio City, Calif.
Born: November 4, 1899, Solingen, Germany. Ph.D., 1928; Dr. Habil., 1933, Technical University, Berlin.

HOLMES, Lynn C. (M'44—SM'49—F'49), Director of Research, Stromberg-Carlson Company, 1432 Goodman St., N., Rochester 9, 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, Research Contracts, 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.

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:** National Advisory Council on Radio in Education, 1936, 1939–40; Committee on Engineering Developments, 1941–43.

HORNER, S. George L. (M'46—SM'50—F'57), Superintendent, Radio Division, Hudson Bay Company, Fur Trade 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, J. Warren (A'20—F'29)(L), Chief Consultant, 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 on Electric and Magnetic Magnitudes and Units, 1952–56; United States National Committee, Advisers on Symbols (International Electrotechnical Committee), 1936, 1939–51.

HOUCK, Harry W. (A'19—M'28—SM'43—F'57), President and General Manager, Measurements Corporation of Canada, Ltd.; Vice-President, Armstrong Memorial Research Foundation; Director, Sag Harbor Industries, Inc., Intervale Rd., Boonton, N.J.
Born: April 11, 1896, New Cumberland, Pa. Extension Course, 1931, Columbia University. **IRE Offices:** Manager, 1931–32; Director, 1932. **Committees:** Radio Receivers, 1928–29; Admissions, 1932; Constitution and Laws; Tellers, 1940; History, 1954–55, 1956–57. **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 Dr., 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 and Director, Department University Extension, 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, 1941–57.

HUGGINS, William H. (S'39—A'44—SM'55—F'57), Professor of Electrical Engineering, 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:** Editorial Review, 1951–53, 1954–57; Papers, 1951–53; Circuits, 1949, 1955–58. **Professional Groups:** Circuit Theory, *Secretary, 1952–53.* **IRE Representative:** Johns Hopkins University, 1955–7.

HULL, David R. (A'36—F'47), Captain, United States Navy, Retired; Vice-President, General Manager, Equipment Operations, Raytheon Manufacturing Company, Waltham 54, Mass.
Born: October, 1903, Newton, N.J. B.S., 1925, United States Naval Academy; M.S., 1933, Harvard University. **Committees:** Electronics, 1943–46; Electron Tubes, 1946–47; Vacuum Tubes, 1945–46; Awards, 1956–57. **Awards:** Fellow, Acoustical Society of America; Legion of Merit; Navy Commendation Ribbon.

HULL, Lewis M. (J'17—A'19—M'27—F'28), Chairman of the Board, Aircraft Radio Corporation, 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 Procurements, 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*, 1954–57. **Committees:** Editorial Board, 1954–57; Education, 1954–57; Nominations, 1949, 1950, *chairman, 1949;* Papers Procurement, 1945–50; Policy Advisory, 1948–53; Policy Development, 1948–51; Sections, 1950. **Sections:** Cedar Rapids, *temporary chairman, 1945, chairman, 1946–47.*

HUNTOON, Robert D. (A'40—SM'47—F'54), 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, State University of Iowa; Ph.D.(Nuclear Physics), 1938, State University of Iowa. **Awards:** Washington Academy of Sciences Award, 1948, in Physical Sciences; Naval Ordnance Development Award, 1945, U.S. Navy Bureau of Ordnance; 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), Manager, Physics Laboratory, Sylvania Electric Products, Inc., Bayside 60, N.Y.
Born: February 12, 1910, Berlin, Germany. State Examination, 1936, University of Berlin; Ph.D., 1944, Stanford University. **Committees:** Board of Editors, 1953; Editorial Review, 1954–57.

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, N.S., 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), Administrative Director, Systems Development Laboratories, Hughes Aircraft Company, Florence 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.* **Sections:** Long Island Sub-Section, *chairman, 1947–49;* New York, *treasurer, 1951–52.* Long Island Section, Awards, *chairman, 1954–55.* **Professional Groups:** Military Electronics, *Nominating Committee, 1956.* **Awards:** U. S. Navy Certificate of Commendation, 1947; Polytechnic Institute of Brooklyn, Certificate of Distinction, 1956.

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 Review, 1954–57; 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 Co-ordination Committee, 1947–48.

JACKSON, William E. (A'29—M'34—SM'43—F'51), Chief, Electronics Division, Civil Aeronautics Administration, Technical Development Center, Weir Cook Airport, Indianapolis 21, Ind.
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, 1931; Cull Prize in Engineering, Brown University, 1925.

JACKSON, Willis (SM'48—F'50), Director, Research and Education, Metropolitan Vickers Electrical Company, Ltd., Trafford Park, Manchester & St. Paul's Corner, London, E.C.4, England.
Born: October 29, 1904, Burnley, Lancs., England. D.Sc., 1936, Manchester University; D.Phil., 1936, Oxford University; D.Sc. Tech., Zurich, 1955; D.Sc.(Eng.), 1956, Bristol. **IRE Representative:** IRE-IEE International Liaison Committee, 1955–57. **Awards:** Fellow, Royal Society, 1953.

JANES, Robert B. (A'37—M'50—SM'51—F'55), Manager, Semi-Conductor Design, 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.*

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, 1932–42. **Committees:** Admission, 1929–33, 1936–40, *chairman, 1931, 1936–37;* Awards, 1942; Board of Editors, 1942–50; Broadcast, 1935–37, *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; Publicity, 1936; Public Relations, 1945–46; Radio Receivers, 1928–29; Sections, 1925; Standardization, 1928–32; Standards, 1932–33; Use of the Transmission Unit, 1928–29. **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, 1140 Cherry St., Winnetka, Ill.
Born: October 18, 1901, Mansfield, Ohio. B.E.E., 1923, Ohio State University. **Committees:** Receiver Sets, 1927–28; Radio Receivers and Parts, 1930–32; Receivers, 1947–56. **Sections:** Chicago, *chairman, 1948–49.*

JENSEN, Axel G. (A'23—M'26—F'42), Director of Visual and Acoustics Research, Bell Telephone Laboratories, Inc., Murray Hill, 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 Review, 1954–57; Executive, 1955–56; Instruments and Measurements, 1949–50; Policy Advisory, 1954–56; Standards, 1948–56, *vice-chairman, 1950, chairman, 1951–54;* Television, 1939–48, *chairman, 1948–49;* Television and Facsimile, 1938; Television Systems, 1949–56, *vice-chairman, 1949, chairman, 1949–51.* **IRE Representative:** ASA Electrical Standards Board, 1953–56; ASA Sectional Committee (C42) on Definitions of Electrical Terms, 1949–56; ASA Sectional Committee (C16) on Radio (sponsored by IRE), 1951–56, *chairman, 1953–54, 1955–56;* ASA Standards Council, 1951–54, *alternate, 1955–56;* International Radio Consultative Committee: Executive Committee of U.S. Delegation, 1952–56; International Radio Consultative Committee, U. S. Study Group XIV (Vocabulary), *chairman, 1952–56;* 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 Co-ordination, 1952–55; U. S. National Committee of the International Electrotechnical Commission, 1953–56.

JENSEN, John C. (M'19—SM'43—F'56)(L), Consulting Engineer.
Born: October, 1880, Utica, Neb. B.Sc., 1909, Nebraska Wesleyan University; A.M., 1916, Ph.D., 1939, University of Nebraska. **Committees:** Membership, 1925; Sections, 1925. **Sections:** Omaha-Lincoln, *vice-chairman, 1954.* **IRE Representative:** American Association for the Advancement of Science, 1930–56; ASA Subcommittee on General Terms, 1949–51. **Awards:** Fellow, American Association for the Advancement of Science, 1924; Fellow, American Physical Society, 1935; President, Nebraska Academy of Sciences, 1914, 1922.

JESTY, Leslie C. (M'54—F'56), In Charge Colour Television Research, Sylvania-Thorn Colour T.V. Laboratories, Ltd., Great Cambridge Rd., 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; Member, Institute of Electrical Engineers, London.

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

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, 1941–49, 1954–57; 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), 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.

JOLLIFFE, Charles B. (M'25—F'30), Vice-President and Technical Director, Radio Corporation of America, 30 Rockefeller Plaza, New York 20, N.Y.
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, 1925–27, 1929–30, *chairman, 1928;* Vacuum Tubes, 1927–28, *chairman, 1928–29;* Television and Facsimile, 1936–39. **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'33), 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 Review, 1954–57; Membership, 1950–51; Papers Review, 1951–53. **Sections:** Columbus Subsection, *chairman, 1945.* **IRE Representative:** Ohio State University, 1942–45; University of Illinois, 1946–50.

JORDAN, John F. (A'40—M'45—SM'53—F'54), Director of Engineering & Research, The Baldwin 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. **IRE Representative:** Joint Technical Advisory, 1950–56, *chairman, 1950–52.* **Awards:** Certificate of Commendation, U.S. Navy, 1947; Fellow, American Institute of Electrical Engineers, 1951.

KALMUS, Henry P. (A'39—SM'45—F'56), Chief, Supporting Research Laboratory, Associate Director, Diamond Ordnance Fuze Laboratory, 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.

KANDOIAN, Armig G. (S'35—A'36—SM'44—F'51), Director, Radio Communication Laboratory, Federal Telecommunication 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. **Awards:** Eta Kappa Nu, Honorable Mention, 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, 275 Massachusetts Ave., Cambridge 39, Mass.
Born: September 7, 1899, Moedling, Austria. Ingénieur, 1923, Technische Hochschule, Vienna, Austria.

KATZIN, Martin (J'27—A'29—M'42—SM'43—F'55), President, 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 Review, 1954–57; Papers Procurement, 1946–50; Papers Review, 1948–53; Wave Propagation, 1954–58. **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, Schuylkill 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, General Electric Company, Electronic Components Division, Semiconductor Products Department, Syracuse, N.Y.
Born: July 11, 1914, Coburg, Iowa. B.S.(E.E.), 1935, Cornell University. **Committees:** Audio-Video Techniques, *vice-chairman, 1948–49;* Annual Review, 1949–50; Standards, 1949–51; Video Techniques, *chairman, 1949–51, 1951–53.* **Awards:** Navy "E", 1944; Navy Certificate of Commendation, 1947.

KELL, Ray D. (A'35—F'47), Associate Director, Systems Research Laboratory, 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 Review, 1954–57; Television, 1941–42, 1946–49; Television Systems, 1949–58. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940; Stuart Ballantine Medal, Franklin Institute, 1948; David Sarnoff Gold Medal, SMPTE, 1954.

KELLY, Mervin J. (M'25—F'38), President, Bell Telephone Laboratories, Inc., 463 West St., New York, N.Y.
Born: February 14, 1894, Princeton, Mo. B.S., 1914, Missouri School of Mines and Metallurgy, Rolla; 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., 1954, University of Pennsylvania; D.Eng., 1955, New York University; D.Eng., 1955, Polytechnic Institute of Brooklyn. **Committees:** Vacuum Tubes, 1927–31. **IRE Representative:** ASA Technical Committee, Vacuum Tubes, 1930. **Awards:** Air Force Association Trophy, 1953; Presidential Certificate of Merit; Industrial Research Institute Medal, 1954; Christopher Columbus International Communication Prize, 1955.

KENNEDY, Maurice E. (A'41—SM'47—F'56), Director and Chief Engineer, Department of Communications, Los Angeles County, 234 N. Main St., Los Angeles 12, Calif.
Born: September 8, 1907, Galva, Ill. **Committees:** Professional Groups, 1955–57. **Professional Groups:** Western Electric Show and Convention, *vice-chairman, 1950.* **IRE Representative:** Technical Societies Council, 1947–48.

KETO, John E. (A'38—SM'46—F'48), Technical Director, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio.
Born: June 9, 1909, Maynard, Mass. E.E., 1932, M.S., 1935, University of Cincinnati. **Committees:** Wave Propagation, 1948–52; Awards, 1956–58. **Professional Groups:** Aeronautical and Navigational Electronics, *chairman, 1951.* **Sections:** Dayton, *chairman, 1946–47.* **Awards:** Presidential Medal of Merit, 1946.

KILGORE, G. Ross (A'30—M'40—SM'43—F'57), Director, Electron Devices Division, Signal Corps Engineering Laboratories, Evans Signal Laboratory, Belmar, N.J.
Born: January 31, 1907, Freemont, Neb. M.S.(E.E.), 1931, University of Pittsburgh. **Committees:** Electron Devices, 1952–54. **Professional Groups:** Administrative Committee, Electron Devices, 1953, 1956–57.

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. **Awards:** Regional Prize, AIEE, 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. **Committees:** Awards, 1956–57; Mobile Communication Systems, 1950–56; Railroad and Vehicular Communication, 1945–50. **Sections:** Kansas City, *vice-chairman, 1941–43.*

KING, Ronold W. P. (A'30—SM'43—F'53), Gordon McKay Professor of Applied Physics, Cruft 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.

KINMAN, Thomas Hilary (M'29—SM'43—F'57), Manager, Semiconductor Material Engineering Department, The British Thomson-Houston Company, Ltd., Rugby, Warwickshire, England.
Born: January, 1894, London, England. 1910–20 Signal School, Portsmouth; Portsmouth Technical College, England. **Professional Groups:** AMIEE, 1933; MIEE, 1944. **Awards:** Member of the British Empire, 1944. Institution Premium, Institution of Electrical Engineers, London, 1956.

KLEEN, Werner J. (SM'50—F'57), Dr. Phil. Nat. Habil., Head, Electron Tube Development, Siemens and Halske, St. Martinstrasse, 76, Munich 8, Germany.
Born: October 29, 1907, Hamburg, Germany. Dr.Phil.Nat., 1931, Dr.habil., 1940, University of Heidelberg. **Committees:** Electron Tubes, 1955–58. **Awards:** Medal of Svenska Teknologföreningen, Stockholm, 1950; Honorary Member Instituto Nacional 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.
Born: June 18, 1890, Armada, Mich. B.S.(E.E.), 1913, University of Michigan; S.M., 1930, Massachusetts Institute of Technology.

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 Review, 1954–55; Electroacoustics, 1936–41, 1946–47, 1953–55, *chairman, 1938–42;* Papers, 1941; Papers Procurement, 1942–43; Regular Papers, 1941; Standards, 1938–42; Symbols, 1940–41, 1943–48. **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), General Manager, Engineering Products Department, RCA Victor Company, Ltd., 1001 Lenoir, Montreal 30, P.Q., Canada.
Born: November, 1910, Winnipeg, Man., Canada. **Committees:** Radio Transmitters, 1947–53.

KOCH, Winfield R. (A'28—SM'48—F'54), Engineer, RCA-Victor TV Division, Bldg. 204-2, Camden 2, N.J.
Born: December 23, 1903, Omaha, Neb. B.S.(E.E.), 1925, University of Minnesota. **Committees:** Receivers, 1951–58. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940.

KOCK, Winston E. (SM'45—F'52), Chief Scientist, Systems Division, Bendix Aviation Corporation, Ann Arbor, 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,* 1947–48; Antennas and Waveguides, 1950–51; Editorial Reviewer, 1953–57; Papers Review, 1951–53. **Professional Groups:** Audio, *chairman, 1955.* **Awards:** Outstanding Young Electrical Engineer, Eta Kappa Nu, 1938.

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, 1941–57.

KOGA, Issac (SM'54—F'57), Professor of Electrical Communications, Electrical Engineering Department, School of Engineering, Tokyo University, Bunkyo-ku, Tokyo, Japan.
Born: December, 1899, Tosu City, Saga Province, Japan. B.E., 1923, Ph.D.(Eng.), 1930, Tokyo University. **Sections:** Tokyo, Papers Committee, *chairman, 1956.* **Awards:** Japan Academy of Science Prize, 1948; Memorial Prize, Institute of Electrical Communication Engineers of Japan, 1950; Medal of Honor, Japanese National Government, 1956.

KOMPFNER, Rudolf (F'50), Director of Electronics Research, Bell Telephone Laboratories, Murray Hill, N.J.
Born: May 16, 1909, Vienna, Austria. Engineering Diploma, 1933, Technical College, Vienna; D. Phil., Oxford University. **Committees:** Editorial Review, 1954–57. **Professional Groups:** Administrative Committee, Electron Devices, 1955. **Awards:** Duddell Medal, Physical Society, London, 1955.

KORMAN, Nathaniel I. (S'38—A'39—SM'45—F'56), Assistant Chief Engineer, Missile and Surface Radar Department, Radio Corporation of America, Borton Landing Rd., Moorestown, N.J.
Born: February 23, 1916, Providence, R.I. B.S.(E.E.), 1937, Worcester Polytechnic Instiute; M.S.(E.E.), 1938, Massachusetts Institute of Technology. **Awards:** Charles A. Coffin Fellowship, 1937; Award of Merit, RCA, 1951.

KRAUS, John D. (A'32—M'43—SM'43—F'54), Professor, Department of Electrical Engineering; Director, Radio Observatory, Ohio State University, 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.*

KUPER, J. B. Horner (A'37—SM'45—F'54), Department Chairman, Brookhaven National Laboratory, Upton, 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 Review, 1954–57; Instruments and Measurements, 1949–50; Nuclear Studies, 1948–49. **Professional Groups:** Administrative Committee, 1949–54. **Awards:** Fellow, American Physical Society, 1950.

LACK, Frederick R. (A'20—F'37), Vice-President, Western Electric Company, Inc., 120 Broadway, New York 5, N.Y.
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), Executive Staff Consultant, Remington Rand, Division of Sperry Rand Corporation, Wilson Ave., South Norwalk, Conn.
Born: November 30, 1900, Michigan, N.D. B.S.(E.E.), 1922, Catholic University of America. **Committees:** Papers Review, 1948–53; Radio Transmitters and Antennas, 1929–30; Symbols, 1929–30; High Frequency Receivers, 1929–30; Nomenclature, Symbols and Definitions, 1929–30.

LAMSON, Horatio W. (A'15—M'27—F'33), Engineer, General Radio Company, 275 Massachusetts Ave., Cambridge, Mass.; Faculty Member, Northeastern University, Boston, 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), Research Engineer, RCA Laboratories Division, Princeton, N.J.
Born: May, 1901, Denver, Colo. Attended Detroit Junior College, 1920. **Committees:** Frequency Modulation, 1941–47; Information Theory and Modulation System, 1952–56; Modulation Systems, 1947–52; Papers Review, 1947–52.

LANGLEY, Ralph H. (A'12—M'16—F'29)(L), Assistant to the President, Farrand Optical Company, Inc., 4401 Bronx Blvd., New York 70, 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 Telegraph and Receiver Terminology, *chairman, 1924–25;* Registration of Engineers, 1940–41; Sections, 1930–33, 1935; Radio Receivers and Parts, 1930–31; Standards, 1934–35; Standardization, 1924–28; 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, 30 Rockefeller Plaza, New York 20, N.Y.
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;* NNJ, *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 Review, 1954–57. **Awards:** Television Broadcasters' Association Award, 1946; IRE Vladimir K. Zworykin Television Prize, 1955.

LAW, Russell R. (A'34—M'40—SM'43—F'53), Director of Research and Development, CBS-Hytron, Danvers, Mass.
Born: January 11, 1907, Hampton, Iowa. B.S., 1929, M.S., 1931, Iowa State College; D.S., 1933, Harvard Engineering School. **Committees:** Editorial Review, 1954–57; 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 Review, 1955–56; National Convention, 1954; Tellers, 1952–53, *chairman, 1953.* **Sections:** Long Island, *chairman, 1953.*

LEDERER, Ernest A. (M'28—SM'43—F'55), Chief Engineer, Westinghouse Electric Corporation, Elmira, N.Y.

Born: January 25, 1895, Prague, Austria. Ph.D., 1920, University of Vienna. **Awards:** Modern Pioneer Award, N.M.A., 1940.

LEE, Reuben (A'32—SM'45—F'54), Consulting Engineer, Electronics Division, Westinghouse Electric Corporation, Box 746, Baltimore 3, Md.
Born: November, 1902, Shirland, Derby., England. B.S.(E.E.), 1924, West Virginia University.

LEEDS, Laurence M. (A'30—M'40—SM'43—F'57), Consulting Engineer, General Electric Company, Technical Products Department, 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), President, Pendleton Terminal Corporation, 1050 Constance St., New Orleans, La.; Owner Electron Engineering Company; President, Sunshine Buildings, 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), Head, Research Section and Semiconductor Laboratory, 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), Assistant Director, Electronic Defense Laboratory, 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.*

LEVERENZ, Humboldt W. (SM'54—F'56), Assistant 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 H. (A'12—M'15—SM'43—F'51)(L), Retired. Formerly Assistant Vice-President, International Telephone and Telegraph Corporation, 67 Broad St., New York, N.Y.
Born: September 15, 1887, Media, Pa. M.E.1., 1911, Bliss School of Applied Science. **IRE Offices:** Manager, 1918–19, 1923, 1926; Director, 1935. **Committees:** Admissions, 1929–30, 1942; Awards, 1935; Electronics, 1936–39; Facsimile, 1939–41; 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 Switching Research, Bell Telephone Laboratories, 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 Review, 1955–57. **Awards:** Naval Ordnance Development Award, United States Navy, 1946; Rhodes Scholarship, 1935.

LIBBY, Tyng M. (A'14—M'16—SM'43—F'55), Telecommunications Consultant, 1808 N. 40 St., Seattle 3, 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), Program Director, Division of Scientific Personnel and Education, National Science Foundation, Washington, D.C.
Born: September 3, 1905, Butler, Mo. B.A., 1926, Central College; Ph.D., 1941, George Washington University. **Committees:** Awards, 1956–57; Nuclear Studies, 1948–49. **Professional Groups:** Nuclear Science, *vice-chairman, 1950–51, secretary, 1953–54.* **IRE Representative:** ASME Glossary Review Board (Nuclear Physics), *alternate, 1952.*

LINDENBLAD, Nils E. (M'34—SM'43—F'48), Research Engineer, 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 Awards, 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 Award for Development of Thermoelectric Refrigerator, 1955.

LINDER, Ernest G. (A'40—SM'49—F'55), Administrator, Electronic Research Laboratory, Princeton, N.J.
Born: May 16, 1902, Waltham, Mass. B.A., 1925, M.S., 1927, University of Iowa; Ph.D., 1931, Cornell University.

LINDSAY, William W., Jr. (A'24—M'26—F'39), Research and Development Scientist, Military 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. **Sections:** Los Angeles, *secretary-treasurer, 1928–30, chairman, 1940–41.*

LITTLE, Donald G. (A'20—M'27—F'29), Product Manager, Westinghouse Electric Corporation, Box 746, Baltimore 3, 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 Review, 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., 463 West St., New York 14, N.Y.
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, 1956–57; Board of Editors, 1949–53; Constitution and Laws, 1947, 1950; Electronics, 1939–44; Editorial Administrative, 1946–53; Executive, 1942–44, 1946, *chairman, 1946;* Finance, 1948–51; Fiscal, 1947–48; International Liaison, 1947, 1949; 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; Editorial Review, 1954–57. **IRE Representative:** ASA Electrical Standards Committee, 1948–55; National Research Council, Division of Engineering and Industrial Research, 1948–56; United States National Committee of the International Electrotechnical Commissions, 1949–54; International Liaison Committee, 1947, 1949, 1955–57. **Awards:** IRE Morris Liebmann Memorial Prize, 1935.

LODGE, William B. (A'34—M'37—SM'43—F'49), Vice-President in Charge of Engineering, CBS Television, 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; Member, National Academy of Science.

LOUGHLIN, Bernard D. (A'40—M'45—SM'53—F'55), Chief Engineer, Research Division, Hazeltine Research Corporation, 59-25 Little Neck Pkwy., Little Neck, 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.

LOUGHREN, Arthur V. (A'24—M'29—SM'43—F'44), Vice-President, Applied Research Division, Airborne Instruments Laboratory, 160 Old Country Rd., Mineola, L.I., N.Y.
Born: September 15, 1902, Rensselaer, N.Y. B.A., 1923, E.E., 1925, Columbia University. **IRE Offices:** Director, 1952–57; President, 1956. **Committees:** Admissions, 1931–33; Awards, 1949–55, *chairman, 1951;* Editorial Review, 1954; Executive, 1955–57, *chairman, 1956;* Membership, 1934; Papers Procurement, 1947–50; Policy Advisory, 1953–54, *chairman, 1954;* Radio Receivers, 1927–28; Standards, 1947–48; Television, 1940–46; Vacuum Tubes, 1927–28. Finance, 1953, 1955–57; Awards Coordination, 1955–57, *chairman, 1957;* Appointments, 1956–57; Editorial Board, 1957; Nominations, 1957. **IRE Representative:** Joint Technical Advisory Committee, 1951–55, *chairman, 1953–54.* **Awards:** Fellow, Society of Motion Picture and Television Engineers; IRE Morris Liebmann Memorial Prize, 1955; SMPTE David Sarnoff Gold Medal Award, 1953; U. S. Navy Certificate of Commendation, 1947.

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:** Papers Review, 1946–47. **Awards:** Academy of Television Arts and Sciences Award, 1951; "Best Branch Paper" Award, Institute of Electrical Engineers, 1930; Certificate of Commendation, U. S. Navy, World War II; Certificate, War Department (U. S. Army), World War II.

LUCK, David G. C. (M'46—SM'50—F'51), Aviation Staff Engineer, Radio Corporation of America, Camden, N.J.
Born: July, 1906, Whittier, Calif. B.S., 1927, Ph.D., 1932, Massachusetts Institute of Technology.

MacDONALD, William A. (A'19—M'26—SM'43—F'53), President 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), Development Engineer, Radio Corporation of America, Cherry Hill, Camden 8, 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), Chief Engineer, Semiconductor Division, Radio Corporation of America, Harrison, N.J.
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. **Awards:** Fellow, American Physical Society.

MANSON, Ray H. (M'23—F'50), Director, Stromberg-Carlson Company, 100 Carlson Rd., Rochester 3, 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; Electro-Acoustic 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.

MARKS, William S., Jr. (A'44—SM'44—F'52), Chief Scientist, Army Electronic Proving Ground, Ft. Huachuca, Ariz.
Born: March 18, 1900, Nashville, Tenn. B.S.(E.E.), 1929, Louisiana State University.

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:** Papers Procurement, 1945–46.

MARTIN, Daniel W. (M'50—SM'54—F'57), Acoustical Research Supervisor, 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:** Editor, IRE *Transactions on Audio,* 1953–55. **Sections:** Cincinnati, *secretary, 1952–53, vice-chairman, 1954–55, chairman, 1955–56.* **Professional Groups:** Administrative Committee, 1954–57; Awards Committee, *chairman, 1955.* **Awards:** Fellowship, Acoustical Society of America.

MARVIN, Harry B. (M'31—SM'43—F'50), Engineer, General Electric Company, 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, Warren P. (A'36—VA'39—F'41), Research Engineer, 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 Review, 1954–55; Papers Procurement, 1947–50; Papers Review, 1947–53; Standards, 1953–55; Piezoelectric Crystals, 1940–58, *vice-chairman, 1951–52, chairman, 1953–55.*

MATHES, Richard E. (J'22—A'24—SM'46—F'57), Assistant Project Manager, Ballistic Missile Division, Burroughs Research Center, Paoli, Pa.

Born: April 1902, Minneapolis, Minn. B.S.(E.E.), 1924, University of Minnesota.

MAUCHLY, John W. (A'42—M'56—F'57), Director, Applications Research Center, Remington Rand Univac, 2300 W. Allegheny Ave., Philadelphia 29, Pa.
Born: August 30, 1907, Cincinnati, Ohio. Ph.D.(Physics), 1932, Johns Hopkins University. **Awards:** Potts Medal, Franklin Institute, 1949.

MAYER, Harry F. (A'36—SM'47—F'56), Manager, Advance Engineering, Light Military Electronic Equipment Department, General Electric Company, French Rd., Utica, 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, Electron Tube 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:** Board of Editors, 1945–53; Editorial Review, 1954–57.

McCULLOUGH, Jack A. (A'39—SM'52—F'53), Vice-President and Treasurer, Eitel-McCullough, Inc., 798 San Mateo Ave., San Bruno, 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.; Chairman of Board, Applied Science Corporation of Princeton; 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, Technical Operations, 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), Design Engineer, General Radio Company, 275 Massachusetts Ave., Cambridge 39, Mass.
Born: August 7, 1899, Toledo, Ohio. A.B., 1920, A.M., 1921, Harvard University. **Committees:** Membership, 1940. **Sections:** Boston, *secretary, 1939–41.* **Professional Groups:** Reliability and Quality Control, Admissions Committee, 1951–57, *vice-chairman, 1955–57.* **IRE Representative:** ASA Sectional Committee (C83) on Components for Electronic Equipment, 1954–56.

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. **Awards:** Fellow, American Institute of Electrical Engineers; Fellow, American Association for the Advancement of Science; Certificate of Appreciation, U.S. Armed Forces.

McILWAIN, Knox (A'31—M'40—SM'43—F'48), Assistant to Vice-President of Research and Engineering, 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 Review, 1954–57; Education, 1945; Electroacoustics, 1936–46; Electronics, 1936–39; 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. **Sections:** Ottawa—Ontario, *chairman, 1946–47;* **Professional Groups:** Canadian National Committee for U.R.S.I., *chairman, 1951–57.* **Awards:** Fellow, American Physical Society; Fellow, Royal Society of Canada; Order of the British Empire.

McNALLY, James O. (J'24—A'26—SM'44—F'57), Assistant Director, Electron Tube Development, 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, Western Electric Company and President, Sandia Corporation, Sandia Base, Albuquerque, N.M.
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:** Director, 1950–56; President, 1953. **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, 1952–58; Modulation Systems, 1949–52. **Awards:** Eta Kappa Nu, Outstanding Young Electrical-Engineer, 1939.

MERTZ, Pierre (SM'44—F'50), Engineer, Bell Telephone Laboratories, Inc., 463 West St., New York 14, N.Y.
Born: April, 1897, Paris, France. A.B., 1918, Ph.D., 1926, Cornell University. **Committees:** Editorial Review, 1954–57; Facsimile, 1939–56, *vice-chairman, 1957–58;* Papers Procurement, 1945–50; Television Picture Element, 1954–57. **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), General Manager, Missile and Ordnance Systems Department, Defense Electronics Division, General Electric Company, 3198 Chestnut St., Philadelphia 4, Pa.
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.*

MIEHER, Walter W. (A'40—M'44—SM'51—F'54), Chief Engineer, Special Missile Systems 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 Wave Guides, 1947–50. **Sections:** Long Island, *vice-chairman, 1952–53.*

MIESSNER, Benjamin F. (A'37—F'37), President, Miessner Inventions, Inc., Van Buren Rd., Morristown, N.J.
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, Development and Research, 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:** Tellers, 1951–52, *chairman, 1952;* Annual Review, *chairman, 1953–54;* Standards, 1953–54; IRE Convention Technical Program, *chairman, 1955.* **Professional Groups:** Communications Systems, *chairman, 1954–55.*

MILLER, Burton F. (J'24—A'26—SM'44—F'56), Director, Communications Division, Ramo-Wooldridge Corporation, 8820 Bellanca Ave., Los Angeles 45, Calif.
Born: July, 1905, Milwaukee, Wis. B.S.(E.E.), 1926, M.S.(Physics), 1927, Ph.D.(Physics), 1929, University of Wisconsin. **Awards:** Two Technical Achievement Awards, Academy of Motion Picture Arts and Sciences, 1947.

MILLER, John H. (A'19—M'25—SM'43—F'50), Vice-President and Consultant, Weston Electrical Instrument Corporation, 614 Frelinghuysen Ave., Newark 5, N.J.
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. **Awards:** Medal of Honor, Institute of Electrical Engineers, 1953.

MILLER, John M. (A'17—F'20)(L), Retired, c/o Robt. W. Miller, 6535 Abbington Dr., Washington 21, D.C.
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.

MINTON, John P. (F'39), Retired, 245 Waverley St., Menlo Park, Calif., Research Adviser, Magnolia Petroleum Company, Field Research Department, Dallas, Tex.; Research Associate, 1952–55, Department of Physics, University of California, Berkeley, Calif.
Born: November 7, 1889, Wapella, Ill. Engineering, 1910, Bradley University; B.S., 1912, Massachusetts Institute of Technology; Ph.D., 1921, University of Chicago; D.Sc. (Honorary) Bradley University, 1955. **Committees:** Electroacoustic Devices, 1927–28; Membership, 1941–43. **Awards:** Fellow in Physics, National Research Council, University of Chicago, 1921–22; Fellow, American Physical Society; Distinguished Alumni Award, Bradley University, 1953.

MITTELMANN, Eugene (A'38—SM'44—F'57), Consulting Engineer, 549 W. Washington, Chicago 6, Ill.
Born: May 29, 1903, Bratislava, Hungary. E.E., 1927, Vienna Institute of Technology; Ph.D., 1931, University of Vienna. **Committees:** Industrial Electronics, 1946–51, *vice-chairman, 1951–58;* Methods of Measurements, *chairman, 1951–57;* Instrumentation and Control, *chairman, 1955–57.* **Professional Groups:** Industrial Electronics, *chairman, 1950–51;* Administrative Committee, 1950–57. **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, Electronics 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.* **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; Silver Pin of Honor, Robert Bosch GMBH, 1955.

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.
Born: December 14, 1896, Manchester, Lancs., England. B.Sc. Tech., 1921, Manchester College of Technology. **Awards:** Order of the British Empire, 1945.

MOORE, Robert C. (F'55), Section Engineer, TV Division, Philco Corporation, Tioga & C Sts., Philadelphia 34, 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.

MORGAN, Howard K. (A'27—M'41—SM'43—F'57), Director of Commercial Aviation Systems, Bendix Aviation Corporation, Fisher Building, Detroit 2, Mich.
Born: February, 1906, New York, N.Y. B.S.(E.E.), 1929, University of California. **Committees:** Papers, 1941; Regular Papers, 1941; Papers Procurement, 1942–43; Navigation Aids, 1947, 1950–51. **Sections:** Kansas City, *chairman, 1941–43.* **Awards:** Radio Technical Commission for Aeronautics Citation.

MORLOCK, William J. (A'43—SM'46—F'57), General Manager, Technical Products Department, Industrial Electronics Division, General Electric Company, Syracuse, N.Y.
Born: July, 1908, McKeesport, Pa. B.E.E., 1930, Ohio State University. **Committees:** Professional Groups, 1957. **IRE Representative:** ASA Subcommittee (Z57.1) on Magnetic Recording, 1948–51.

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:** Standardization, 1929–30; Meetings and Papers, 1930; Membership, 1936; Standards, 1938–41; Frequency Modulation, 1941–42; Papers Review, 1947–48; 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 Rd., 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. **Professional 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, 1951–58; Nuclear Studies, 1948–49; Nuclear Techniques, *chairman, 1955–58;* Standards, 1955–58. **IRE Representative:** ASA Planning Committee on Nuclear Standards, 1955–57. **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), Director of Device Development, Bell Telephone Laboratories, 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:** Electronics, 1943–46; Electron Tubes, 1946–49; Electron Tubes and Solid State Devices, 1949–53; 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. **Professional Groups:** ANTC, 1948. **Sections:** Dayton, *vice-chairman, 1943;* Pasadena Subsection, *vice-chairman, 1955.* **Awards:** Flight Safety Foundation Award, 1955.

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; Receivers, 1942–58; Papers Review, 1953; 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.

MUMFORD, William W. (A'30—SM'46—F'52), Technical Staff Member, 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, 1926, Willamette University.

MURRAY, Albert F. (A'20—M'26—F'38), Consulting 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 Review, 1946–53; Papers Procurement, 1947–50; Television, 1939–46; Television and Facsimile, 1936–39; Television Systems, 1949–58. **Sections:** Philadelphia, *chairman, 1937–38.*

NERGAARD, Leon S. (A'29—M'38—SM'43—F'52), Research Engineer, 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; Electronics, 1940–45; Electron Devices, 1952–55; Electron Tubes, 1946–48, *vice-chairman, 1948;* Electron Tubes and Solid State Devices, *chairman, 1949–51;* Measurement and Instrumentation, 1952; 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 Military Systems Development, Bell Telephone Laboratories, Whippany Rd., 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.

NICHOLS, William 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. **Awards:** President, the Institute of Communication Engineers of Japan, 1942–43; President, Japan Radio Society, 1943–44; President the Institute of Electrical Engineers of Japan, 1950–51; President, Television Society of Japan, 1954–56; Asano Prize from the Institute of Electrical Engineers of Japan, 1929; Imperial Prize from Japan Society of Invention, 1932; Imperial Prize from Japan Academy, 1937; Medal of Merits from the Institute of Communication Engineers of Japan, 1942; Order of Rising Sun, Japanese Government, 1940; Medal of Cultural Merits, Japan Broadcasting Association, 1956.

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. **IRE Offices:** Director, 1957–59. **Committees:** Annual Review, 1941–43, 1946–47; Frequency Modulation, *chairman, 1940–43;* Mobile Communication Systems, 1950–56; Papers Procurement, 1942–43, 1947, 1949–50; Railroad and Vehicular Communication, 1945–47, 1949–50, *chairman, 1945–48;* Regular Papers, 1941; Standards, 1940–43, 1946–47. **Sections:** Connecticut Valley, *chairman, 1938.*

NOIZEUX, Pedro J. (A'30—F'47), Assistant General Manager, Transradio Internacional, Compania Argentina de Telecommunicaciones, 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), Research Engineer, 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 Review, 1954; 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 Review, 1954–57. **Professional Groups:** Electron Devices, *treasurer,* 1952–53; 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 Devices, WESCON, San Francisco, *chairman, 1955;* Papers Study and Procurement, Electron Devices, *co-chairman, 1955–56.* **IRE Representative:** New York IRE National Convention, Transistor Session, *chairman, 1955.* **Awards:** Fellow, American Physical Society.

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; Board of Editors, 1951–53; Editorial Administrative, *alternate, 1949–50, 1951; 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; Editorial Review, 1955–57; Awards, 1957. **Awards:** Stuart Ballantine Medal of the Franklin Institute, 1954; 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 Review, 1954–57; Professional Groups, 1948. **Awards:** Louis E. Levy Medal, Franklin Institute, 1932.

NYQUIST, Harry (A'39—SM'47—F'52), Retired, 1954, as Assistant Director of Systems Studies, Bell Telephone Laboratories, 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.

O'CONNELL, James D. (SM'53—F'57), Chief Signal Officer (Major General U.S.A.), Department of the Army, Office of the Chief Signal Officer, Room 2 E 262, The Pentagon, Washington 25, D.C.
Born: September 25, 1899, Chicago, Ill. B.S., 1922, U. S. Military Academy; M.S., 1930, Yale University. **Awards:** Poor Richard Club, Silver Medal, 1956; Legion of Merit.

OHL, Russell S. (A'24—M'25—SM'43—F'55), Radio Research Engineer, Bell Telephone Laboratories, P.O. Box 107, Red Bank, N.J.
Born: January 31, 1898, Macungie, Pa. B.S. in Eeh.E., 1918, Penn State University; Post Graduate, University of Maryland, 1918; Post Graduate, University of Colorado, 1921–22.

OLIVE, Gordon W. (A'29—VA'39—F'51), Retired, R.R. #2, Gananoque, Ont., Canada; Formerly Director General of Engineering, Canadian Broadcasting Corporation.
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), Director of Research, Hewlett-Packard Company, 275 Page Mill Rd., Palo Alto, Calif.
Born: May, 1916, Santa Cruz, Calif. B.S., 1935, Stanford University; M.S., 1936, Ph.D., 1940, California Institute of Technology. **Committees:** Editorial Review, 1954–56. **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.

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, E.E. (Professional, 1932), Ph.D., 1928, University of Iowa. **Committees:** Annual Review, 1949–51; Board of Editors, 1940–53; Editorial Review, 1954–57; Electroacoustics, 1932–58, *chairman, 1934–39;* Papers Procurement, 1943–47; Standards, 1934–39. **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.

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:** Board of Editors, 1952–53; Editorial Review, 1954–56; Electron Devices, 1945–57, *vice-chairman, 1951–52, chairman, 1952–54;* Electronics, 1936–46; Electron Tubes, 1946–49, 1955–57; Standards, 1952–54; Vacuum Tubes, 1945–46; Editorial Reviewer, 1955–57. **Professional Groups:** Electron Devices, 1951–54, *chairman, 1951–52.* **IRE Representative:** ASA Subcommittee (C42.14) on Electron Tubes, 1954.

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., 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—M'52), General Manager, 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. **Committees:** Education, 1944; Television, 1946–49; Television Systems, 1949–53. **Sections:** Montreal, *chairman, 1942–43.* **Awards:** Ross Medal, 1948, Engineering Institute of Canada.

OXLEY, Allan B. (A'25—M'33—SM'46—F'53), Chief Engineer, RCA-Victor Company, Ltd., 1001 Lenoir St., 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. **Sections:** Toronto, *chairman, 1934–35;* Montreal, *chairman, 1939–40, 1949–50.* **Awards:** Member, Corporation of Professional Engineers of Quebec, Canada, 1953–54.

PACKARD, David (S'34—A'41—SM'47—F'48), President, Hewlett-Packard Company, 275 Page Mill Rd., Palo Alto, Calif.
Born: September 7, 1912, Pueblo, Colo. A.B., 1934, E.E., 1939, Stanford University. **Committees:** Awards, 1949; Instruments and Measurements, 1949–50. **Sections:** San Francisco, *secretary, 1943–44, chairman, 1945–46.*

PACKARD, Lucius E. (M'41—SM'43—F'57), President-Treasurer, Technology Instrument Corporation of California, 7229 Atoll Ave., North Hollywood, Calif.
Born: January 21, 1914, Somerville, Mass. B.S.(E.E.), Massachusetts Institute of Technology. **Committees:** Sections, 1946–47; Appointments, 1955. **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:** Papers Review, 1951–53; Editorial Reviewer, 1954–57; Circuits, 1949–58, *vice-chairman, 1950–51, chairman, 1951–54;* Electronic Computers, 1948–51; Standards, 1951–56. **Professional Groups:** Circuit Theory, *chairman, 1953–54;* Coordinator, *vice-chairman, 1956–57.* **Awards:** Certificate for Exceptional Service, Bureau of Ordnance; Gold Medal Award, Department of Commerce; Ce tificate of Appreciation, War Department, O.S.R.D.

PAGE, Robert M. (SM'45—F'47), Associate Director of Research for Electronics, 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 Review, 1954–57. **Sections:** Washington, *treasurer, 1955–56.* **Awards:** Citation O.S.R.D., 1946; Presidential Certificate of Merit, 1947; Distinguished Civilian Award, United States Navy, 1945; IRE Harry Diamond Memorial Award, 1953.

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:** Navigation Aids, 1951-58, *vice-chairman, 1954-56, chairman, 1957-58;* Modulation Systems, 1951-54. **Awards:** Certificate of Commendation, U.S. Navy, 1947.

PARKER, Henry W. (SM'48—F'52), Professional Engineer, 4043 172 St., Flushing 58, L.I., N.Y.
Born: Brooklyn, N.Y. B.S.(E.E.), New York University. **Committees:** Electronics, 1935-45; Industrial Electronics, 1944-58; Papers Review, 1944-53.

PAYNE, Leonard S. (M'16—SM'43—F'49)(L), Retired, Room 523, Marconi House, London, England.
Born: February 28, 1886, London, England.

PETERSON, Harold O. (A'22—M'31—F'41), Associate Laboratory Director, RCA Laboratories Division, Radio Corporation of America, 140 Moriches Rd., Riverhead, L.I., N.Y.
Born: November 3, 1899, Blair, Neb. B.Sc.(E.E.), 1921, Doctor of Engineering (Honorary), 1951, University of Nebraska. **Committees:** Board of Editors, 1944-53; Editorial Review, 1954-1957; Industrial Electronics, 1947-51; Instruments and Measurements, 1949-50; Papers, 1934-44; Radio Receivers, 1936-48; Radio Wave Propagation, 1942-45; Radio Wave Propagation and Utilization, 1945-49; Aircraft Receivers, 1930-31; Standards, 1934-35; Transmitters and Antennas, 1936-37; Wave Propagation, 1937-42, 1949-56; Advisory Committee to the National Bureau of Standards, 1954-56. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940.

PETRILLO, Salvatore E. (A'42—F'56), Director of Engineering, Signal Corps Engineering Laboratories, Ft. 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), Professor of Electrical Engineering, Electronics Research Laboratory, Stanford University, Stanford, Calif.
Born: July 15, 1916, Rochester, Minn. B.S., 1938, University of California (Berkeley); E.E., 1940, Ph.D., 1942, Stanford University. **IRE Offices:** Director, 1954-55. **Committees:** Editorial Review, 1954-55; Education, 1949-57, *chairman, 1955-56;* Policy Advisory, 1954-55; Radio Receivers, 1946-52. **Sections:** Palo Alto, *chairman, 1951-52.* **IRE Representative:** Stanford University, 1948-51. **Awards:** Electronics Achievement Award, Region 7, 1952; Presidential Certificate of Merit, U.S. Government, 1949.

PICKERING, William H. (A'41—SM'49—F'55), Director, Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Dr., 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 Review, 1954-57; 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.

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 Review, 1954-57; Navigation Aids, 1947-50, *chairman, 1948-50;* Radio Wave Propagation and Utilization, 1945-49; Standards, 1949; Wave Propagation, 1949-50, 1956-58. **Awards:** Fellow, American Academy of Arts and Sciences; Fellow, American Association for the Advancement of Science; IRE Morris Liebmann Prize, 1953; President's Certificate of Merit, 1948; Thurlow Award (Institute of Navigation), 1947.

PIERCE, John R. (S'35—A'38—SM'46—F'48), Director of Research, Electrical Communications, 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:** Eta Kappa Nu, Outstanding Young Electrical Engineer, 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: July 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.*

POCH, Waldemar J. (A'28—VA'39—SM'48—F'56), Administrator, Technical Analysis, Radio Corporation of America, Front & Cooper, Camden, N.J.
Born: July, 1905, London, England. B.S.(E.E.), 1928, University of Michigan; M.S., 1934, University of Pennsylvania. **Committees:** Editorial Review, 1954-57; Annual Review, 1950-51; Audio and Video Techniques, 1948-49; Video Techniques, 1949-56, *vice-chairman, 1949-51, chairman, 1951-55;* Standards, 1951-56. **IRE Representative:** IRE-SMPTE-NARTB Committee for Inter-Society Coordination (Television), 1954-56.

PODOLSKY, Leon (A'30—M'46—SM'53—F'57), 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, 1955-57; Professional Groups, 1955-57. **Professional Groups:** Administrative Committee, Component Parts. **Awards:** ASA War Standards Award, 1946; Certificate of Commendation, U.S. Navy, 1947; IRE-RETMA Fall Meeting Award, 1956; Fellow, AIEE, 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. **Committees:** Radio Receivers, 1932-34; Admissions, 1943-48, *vice-chairman, 1945-48;* National Convention, 1948; Sections, 1941-45; High-Frequency Receivers, 1930-31; Radio Receivers, 1932-34; Policy Advisory, 1957. **Sections:** Northern New Jersey Subsection, *vice-chairman, 1953-54;* Northern New Jersey Section, *chairman, 1954-55.* **IRE Representative:** ASA Sectional Committee on Radio, 1935-38. **Awards:** Honorary Member, Denki Tushin Gakkai. (Institute of Electrical Communication Engineers of Japan).

PONTE, Maurice J. H. (SM'48—F'54), Managing Director, Compagnie Générale de Télégraphie Sans Fil, 79 Boulevard Haussmann, Paris, France.
Born: April, 1902, Voiron, Isère, France, Sciences Doctorship, Ecole Normale Supérieure of Paris (Sciences Division). **IRE Offices:** Vice-President, 1954; Director, 1954.

POPPELE, J. R. (A'30—M'39—SM'43—F'50), Consulting Television and Radio Engineer, 9 Crest Circle, South Orange, N.J.; Member Advisory Board, Voice of America, U. S. Information Agency.
Born: February 4, 1898, Newark, N.J. **IRE Offices:** Director, 1947. **Committees:** Building Fund, 1945-46; Facsimile, 1940, 1943; Membership, 1939-40; National Convention, 1947; New York Program, 1940; Papers, 1942-45; Papers Procurement, 1942-43; Public Relations, 1943-46; Regular Papers, 1941.

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;* Region No. 2 Education Subcommittee of Education Committee, *chairman, 1955-56.* **Institute 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 Dr., 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), Assistant General Manager, Canadian Radio Manufacturing Corporation, Ltd., 11-17 Brentcliffe Rd., 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), Vice-President, Dualex Corporation, Wake Robin Lane, Stamford, Conn.
Born: July 18, 1891, San Francisco, Calif. B.S., 1914, University of California. **IRE Offices:** President, 1938; Treasurer, 1941-42; Secretary, 1943-57; Director, 1935-57. **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; Editorial Administrative, 1947-50; Executive, *vice-chairman, 1941-42, secretary, 1943-57;* Fiscal, 1947-48, *chairman, 1947,* 1955-57; History, *chairman, 1954-57;* Investments, 1944-46; New York Program, 1933, 1935-37, *chairman, 1936, 1937;* 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 Definition 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.

PREISMAN, Albert (M'38—SM'43—F'53), Vice-President in Charge of Engineering, Capital Radio Engineering Institute, 3224 16 St., N.W., Washington 10, D.C.; Consulting Engineer.
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.

PRESSLEY, Jackson H. (A'20—F'31), Consulting Engineer, 1036 San Diego Rd., 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), Manager, Engineering, Radio Valve Company, Ltd., 189 Dufferin St., Toronto 3, 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, 1954-55.* **Sections:** Syracuse, *chairman, 1947.*

PUGSLEY, Donald W. (A'39—M'45—SM'46—F'52), Manager, Parts and Special Products Engineering, General Electric Company, Syracuse, N.Y.
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; Television, 1945-49; Television Systems, 1949-58. **Sections:** Syracuse Chapter, Professional Group on Engineering Management, *vice-chairman, 1955-56, chairman,* 1956-57. **Awards:** Eta Kappa Nu, Outstanding Young Electrical Engineer, (Honorary Mention), 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.S., 1933, University of Toronto. **Committees:** Radio Transmitters, 1947-51; Awards, 1957. **Sections:** Montreal, *secretary, 1941-44, chairman, 1946-47;* Canadian Council, I.R.E., *secretary, 1947-53;* Bay of Quinte, *chairman, 1955-56.*

QUARLES, Donald A. (M'41—SM'43—F'54), Secretary of the Air Force, Room 4E-871, Pentagon Building, Washington 25, D.C.
Born: July 30, 1894, Van Buren, Ark. A.B., 1916, Yale University; Doctor of Engineering (Honorary), 1953, University of Arkansas; D.Eng.(Honorary), 1955, New York University; D.Sc.(Honorary), 1956, Grinnell College; D.Sc.(Honorary), 1956, Stevens Institute. **Awards:** AIEE, Director and Past President.

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:** Exceptional Service Award, Department of Commerce, 1949; Certificate of Merit, 1948; Naval Ordnance Development Award, 1945; Certificate of Commendation, National Defense Research Council, 1954; Certificate of Appreciation, War Department, 1949.

RADFORD, William H. (A'41—SM'45—F'54), Professor of Electrical Communications, Massachusetts Institute of Technology; Division Head, Lincoln Laboratory, Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge 39, Mass.
Born: May, 1909, Philadelphia, Pa. B.S., 1931, Drexel Institute of Technology; M.S., 1932, Massachusetts Institute of Technology. **Committees:** Editorial Review, 1954-57; Education, 1945-48, *chairman, 1947-48;* Membership, 1947-48. **Sections:** Boston, *chairman, 1947.* **Professional Groups:** Joint Technical Advisory Committee, *vice-chairman, 1956.* **IRE Representative:** Massachusetts Institute of Technology, 1941-54.

RAGAZZINI, John R. (A'41—M'46—SM'52—F'55), Professor of Electrical Engineering, Columbia University, Engineering Bldg., New York 27, 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 Review, 1954-57; 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), Member Research Staff, 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 Review, 1954–57; Electronic Computers, 1948–57; Papers Review, 1950–52, 1954–57. **Awards:** Levy Medal, Franklin Institute, 1948.

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.

RAMO, Simon (A'38—SM'44—F'50), Executive Vice-President, The Ramo-Wooldridge Corporation, Los Angeles, 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 Review, 1954–55; Papers, 1941–45. **Awards:** Electronic Achievement Award, Pacific Region, IRE, 1953; Eta Kappa Nu Honorable Mention, 1941; Raymond E. Hackett Award, 1955.

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, 1956–57.*

RAPPAPORT, George (A'41—M'44—SM'46—F'56), Director, Government Electronics Division, Emerson Radio and Phonograph Corporation, 701 Lamont St., N.W., Washington, D.C.
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:** Membership, 1954–56; Sections, 1950–51; Annual Review, 1948–52; Standards, 1949–52. **Sections:** Dayton, *secretary, 1947–48, chairman, 1948–49.* **Professional Groups:** Aeronautical and Navigational Electronics, *chairman, 1952.*

RATCLIFFE, John A. (M'29—A'32—F'53), Cavendish Laboratory, Cambridge, England.
Born: December, 1902, Bacup, Lancs., England. M.A., 1927, Cambridge. **Awards:** Fellow of the Royal Society.

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;* Electronics, 1941–16; Electron Tubes, 1946–49, 1956–58; Electron Tubes and Solid State Devices, 1949–53; Vacuum Tubes, 1945–46. **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 370, North 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, 1946–58, *vice-chairman, 1950–56.* **Sections:** Cincinnati, *chairman, 1946–47.* **IRE Representative:** National Electronics Conference, Board of Directors, 1950–51. **Awards:** Naval Ordnance Development Award, United States Navy, 1945; Presidential Certificate of Merit, 1948.

REISZ, Eugene E. R. Home address: 225 Central Park West, New York 24, N.Y.
Born: September 9, 1879, Budapest, Hungary. Vienna University, Austria.

RETTENMEYER, Francis X. (A'26—M'29—SM'43—F'44), Engineering Department, Philco Corporation, Tioga & C Sts., Philadelphia 32, 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; Publicity, 1939; Public Relations, 1941–42; 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, 123 Cory Hall, University of California, 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.

RICE, Stephen O. (SM'47—F'53), Member of Technical Staff, Bell Telephone Laboratories, 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, Federal Telecommunications Laboratories, Inc., 500 Washington Ave., Nutley 10, N.J.
Born: March, 1901, Brooklyn, N.Y. E.E., 1924, Brooklyn Polytechnic Institute. **Committees:** Navigation Aids, 1954–58. **Sections:** Northern New Jersey Subsection, *secretary, 1950, chairman, 1952.* **Awards:** Certificate of Commendation, U. S. 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, Queen's University.

RICHMOND, Harold B. (A'14—M'23—F'29)(L), Chairman of the Board, General Radio Company, 275 Massachusetts Ave., Cambridge 39, 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 Rd., 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, Administration Committee, 1954–55; Industrial Electronics, Administrative Committee, 1952–55. **Awards:** Fellow, American Institute of Electrical Engineers, 1942.

RIDENOUR, Louis N. (SM'52—F'55), Director of Research, Missile Systems Division, Lockheed Aircraft Corporation, Palo Alto, Calif.
Born: November 1, 1911, Montclair, N.J. B.S., 1932, University of Chicago; Ph.D., 1936, California Institute of Technology. **Committees:** Board of Editors, 1946. **Awards:** Bronze Star, 1946; President's Medal for Merit, 1948; Citation of Honor Award, Air Force Association, 1951.

RINIA, Herre (SM'51—F'54), Director of Research, Philips 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, 1948.

RIVES, Tom C. (SM'48—F'54), Consultant, Technical Military Relations, General Electric Company, Syracuse, N.Y.
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. **Professional Groups:** Engineering Management, 1951–54, *chairman, 1953–54;* Aeronautical and Navigational Electronics, *vice-chairman, 1956.*

ROBERTS, Walter van B. (A'22—F'29), Retired, 155 Hodge Rd., Princeton, N.J., Consultant, Radio Corporation of America.
Born: November 13, 1893, Titusville, Pa. B.S., 1915, E.E., 1917, Ph.D., 1924, Princeton University. **Committees:** Use of the Transmission Unit, 1928.

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.*

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.

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., 1953 (Honorary), Technische Hochschule, Munich.

ROSE, Albert (A'36—M'40—SM'43—F'48), Physicist; Director of Research Laboratories, RCA, Ltd., 169 Hardturmstrasse, Zurich, Switzerland.
Born: March, 1910, New York, N.Y. A.B., 1931, Ph.D.(Physics), 1935, Cornell University. **Committees:** Editorial Review, 1954. **Awards:** Journal Award, Society of Motion Picture Engineers, 1946; IRE Morris Liebmann Memorial Prize, 1946; Television Broadcasters Association Award, 1945.

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, 1954–57, *chairman, 1955–56.* **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940.

ROYDEN, George T. (A'19—M'27—F'33), Engineer, Mackay Radio and Telegraph Company, 67 Broad St., New York 4, N.Y.
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.*

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 Review, 1954–57; 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. **Awards:** Fellow, Audio Engineering Society, 1953; Fellow, Acoustical Society of America, 1954.

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;* Professional Groups, 1953–56. **Awards:** President, Society of Exploration Geophysics, 1945.

RYAN, Francis M. (J'14—A'17—M'26—F'40), Radio Engineer, American Telephone and Telegraph Company, 195 Broadway, New York 7, N.Y.
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:** Communication 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, Frederiksberg, Denmark. M.S.(E.E.), 1926, Royal Technical University of Denmark. **IRE Offices:** Vice-President, 1951. **Awards:** President, Danish National Committee of URSI, 1948; Member, Danish Academy of Technical Sciences, 1937.

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, 1952–57. **Committees:** Appointments, 1954–57) (Ex-officio, 1955), *chairman, 1957;* Editorial Review, 1954–57; Education, 1945–46, 1949–57, *chairman, 1953–54;* Executive, 1954–1957, *chairman, 1955;* Finance, 1954–57; Membership Relations Coordinator, 1954–57; Papers Review, 1948–53; Policy Advisory, 1952–53, *chairman, 1953;* Editorial Board, 1956; Professional Groups, 1956; Nominations, 1956–57, *chairman, 1957.* **Sections:** Des Moines-Ames, *vice-chairman, 1948.*

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:** Advanced Developments, 1944–46; Electron Tubes, 1948–49; Task Force on Unit Definitions and Tests, *chairman, 1947–51;* Semiconductor Devices, *chairman, 1949–53;* Electron Devices, 1949–56, *vice-chairman, 1952–54;* Conference Committee on Electron Tube Research, 1948–50, *chairman, 1951;* Editorial Review, 1954–57. **IRE Representative:** IRE-AIEE Committee on Noise Definitions, 1951.

SALINGER, Hans W. G. (A'37—SM'46—F'51), Technical Advisor to the Director of Research, Farnsworth Electronic Company, 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), Director, Zenith Radio Research Corporation, Salisbury Laboratory, Redwood City, Calif.
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 Instruments Laboratory, Inc., 160 Old Country Rd., 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. **Awards:** IRE Harry Diamond Memorial Award, 1955.

SAMUEL, Arthur L. (A'24—VA'39—SM'44—F'45), Research Advisor, International Business Machines Corporation, Poughkeepsie, 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; Electronics, 1944–45; Electron Tubes, 1946–47; Electron Tubes and Solid State Devices, 1949–54, *vice-chairman, 1950–51, chairman, 1951–52;* Papers Review, 1952–53; Research, 1949–50; Standards, 1951–52; Symbols, 1950–52; Vacuum Tubes, 1945; Editorial Review, 1955–57. **Sections:** Mid Hudson Subsection, *chairman, 1951–52.* **Awards:** Paper Award, 1937.

SAMUELSON, Robert E. (SM'45—F'57), Chief Engineer, Motorola, Inc., Western Military Electronics Center, 8201 E. McDowell Rd., 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), Vice-President and Technical Director, Federal Telecommunication Laboratories, 500 Washington Ave., Nutley, N.J.
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, 1950–54;* Papers, 1942–44; Papers Procurement, 1942–43; Professional Groups, 1952–54; Regular Papers, 1941; Standards, 1950–54. **Professional Groups:** Aeronautical and Navigational Electronics, 1952–53, *vice-chairman, 1952.* **Sections:** Chicago, *secretary-treasurer, 1940.* **Awards:** Bronze Star, 1945; Brigadier General, U. S. Air Force Reserve, 1950.

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 Carrol 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 College; 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. **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 Representation, 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; Appointed Brigadier General, Honorary Reserve, Army of U. S., 1951; Honorary Life Member, Engineers Club of Philadelphia, 1952; Honorary Fellow, Weismann Institute of Science, Rehovoth, Israel, 1952; 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.

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-Carlottenberg, 1922-24; D.E.E.(Honorary), 1953, Renssalaer Polytechnic Institute. **Committees:** Editorial Review, 1954–57. **Awards:** David Sarnoff Gold Medal, 1951; Fellow, Society of Motion Picture and Television Engineers, 1951; Modern Pioneer Award, National Association of Manufacturers, 1940; IRE Morris Liebmann Memorial Prize, 1950; RCA Victor Award of Merit, Radio Corporation of America, 1946.

SCHAIRER, Otto S. (M'43—SM'43—F'57), Consultant, 89 Battle Rd., Princeton, N.J.
Born: October 7, 1879, Saline, Mich. A.B., 1901, B.S.(E.E.), 1902, Honorary Doctor of Engineering, 1942, University of Michigan.

SCHELKUNOFF, Sergei A. (A'40—F'44), Assistant Director of Mathematical Research, 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. **Committee:** Annual Review, 1947–48; Antennas, 1945–49; Antennas and Wave Guides, 1949–51; Papers, 1942–45; Papers Review, 1946; Radio Wave Propagation and Utilization, 1945–47, *chairman, 1947–48;* Standards, 1947–48; Editorial Review, 1954. **IRE Representative:** ASA Sectional Committee (C61) on Electric and Magnetic Magnitudes and Units, 1949–57. **Awards:** Stuart Ballantine Medal, Franklin Institute, 1949; IRE Morris Liebmann Memorial Prize, 1942.

SCHELLENG, John C. (A'23—M'25—F'28), Director of Radio Research, Bell Telephone Laboratories, Inc., Holmdel, N.J.
Born: November 12, 1892, Freeport, Ill. A.B., 1915, Cornell University. **Committees:** Methods of Testing Apparatus, Equipment and Devices, 1929–30; Annual Review, 1937–38; Antennas, 1944–49; Antennas and Wave Guides, 1949–50; Awards, 1943; Handbook, 1945–46; Radio Transmitters, 1945–48; Standardization, 1931–32; Standards, 1936–37; Transmitters, 1944–45; Transmitters and Antennas, 1936–45, *chairman, 1936–38.* **IRE Representatives:** ASA Definitions Co-ordinating Committee, 1948; ASA Sectional Committee (C42) on Definitions of Electrical Terms, 1948–50; ASA Subcommittee (C42.13) on Communications, 1948–56; Joint IRE-AIEE-ASA (C42) Definitions Co-ordinating Committee, 1949–51.

SCHLEIMANN-JENSEN, Arne (A'45—SM'47—F'48), Owner, Schliemann-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), Head, Television Research Department, Motorola, Inc., 4545 W. Augusta Blvd., Chicago 51, Ill.
Born: April, 1906, Berlin, Germany. Dipl. Eng., 1928; Doctor of Engineering 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'4—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.* **Awards:** Sigma Xi Award, 1935; National Research Council Fellowship, 1937; Sir Halley Stewart Fellowship, 1938; Government Citation, 1950; Fellow, American Physical Society, 1953.

SCHOLZ, Carl E. (M'26—SM'43—F'56), 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; Tellers, 1941–44, *chairman, 1943–44;* Standardization, 1928–29. **Awards:** Fellow, American Institute of Electrical Engineers, 1955.

SCHOOLEY, Allen H. (A'35—SM'47—F'54), Superintendent, Electronics Division, 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.* **Awards:** Fellow, AAAS, 1950; Navy Distinguished Civilian Service Award, 1946.

SCHREIBER, Ernst H. (A'28—M'32—SM'43—F'57), Staff Engineer, Television and Radio Program Services, Pacific Telephone and Telegraph Company, Room 202, 747 S. Hill St., Los Angeles 55, 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), Deputy Development Coordinator, Department of the Navy, Office of Naval Research, 17th St. & Constitution Ave., Washington 25, D.C.
Born: September 6, 1902, Naperville, Ill. B.A., 1922, North Central College; M.A., 1926, Syracuse University. **Sections:** Washington, *acting vice-chairman, 1952;* Membership Committee, *chairman, 1953.* **Awards:** Presidential Certificate of Merit, 1946; Fellow, American Physical Society, 1952.

SCHRADER, Harold J. (A'31—M'38—SM'43—F'54), Staff Engineer, Defense Electronic Products, RCA, Camden, N.J.
Born: May 2, 1900, Schuyler, Neb. Attended University of Nebraska, 1919–23. **Sections:** Philadelphia, *chairman, 1938–39, secretary, 1942–44.*

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.

SCHUCK, O. Hugo (A'34—M'44—SM'49—F'57), Director of Aeronautical Research, Minneapolis-Honeywell Regulator Company, 2600 Ridgway Rd., 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. **Sections** Twin Cities, *vice-chairman, chairman, 1947.* **Awards:** Certificate of Appreciation, U. S. Navy, Department of Defense, 1947.

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 Director of Engineering, Hermon Hosmer Scott, Inc., 385 Putnam Ave., Cambridge 39, Mass.
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 Review, 1954; Electroacoustics, 1941–46. **Sections:** Boston, *vice-chairman, 1948–49, chairman, 1949–50.* **Awards:** Fellow, Acoustical Society of America; Fellow, Audio Engineering Society; John Potts Memorial Award, 1951.

SCOTT, James C. W. (M'47—F'57), Chief Superintendent, Telecommunications Establishment, Defense Research Board, Department of National Defense, Ottawa, Ont., Canada.
Born: March 1, 1904, Havre, France. B.Sc., 1930, University of Washington. **Committees:** Wave Propagation, 1956–58. **Sections:** Ottawa, *chairman, 1951.* **Professional Groups:** Canadian National Committee for URSI, *secretary, 1951–53;* Canadian Commission on Ionospheres for URSI, *chairman, 1951–57.*

SCOTT-TAGGART, John (A'18—F'35), Wynwood, Beaconsfield, Bucks., England.
Born: May 27, 1897, Bolton, Lancs., England.

SEELEY, Stuart W. (M'40—SM'43—F'43), Director, Industry Service Laboratory, RCA Laboratories Division, Radio Corporation of America, 155 E. 24 St., New York 10, 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 Review, 1954–57; Modulation Systems, 1947–51; Professional Groups, 1948; Receivers, 1950–58. **Awards:** 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.
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:** Editorial Review, 1954–57; Papers Review, 1946–56; Education, 1955–56, *chairman, 1957;* Policy Advisory, 1957. **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.

SHACKELFORD, Benjamin E. (A'23—M'26—F'38), 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;* Winter Technical Meeting, *chairman, 1944;* Professional Groups, 1950; Sections, 1943–45, 1949–50; Special Papers, *chairman, 1940–41;* Special Publications Fund, 1947; Standardization, 1931–32; Standards, 1932–33. **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.

SHANNON, 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, AIEE, 1940; IRE Morris Liebmann Memorial Prize, 1949; Stuart Ballantine Medal, Franklin Institute, 1955.

SHAW, George R. (M'40—SM'43—F'54), Chief Engineer, Tube Division, RCA, 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 Dr., 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, Power Plant Equipment, 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 Review, 1954–57; Radio Receivers, 1946–56, *vice-chairman, 1948–49, chairman, 1949–51;* Radio Frequency Interference, 1955; Papers Review, 1953; Standards, 1949–57, *vice-chairman, 1954–56.* **Sections:** Connecticut Valley, *secretary, 1943, vice-chairman, 1944, chairman, 1945;* Syracuse, *vice-chairman, 1952, chairman, 1953.*

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.* **Sections:** Elmira-Corning, *vice-chairman, 1953–54, chairman, 1954–55.*

SHEPHERD, James E. (A'36—SM'44—F'48), Manager Electronic Tube Division, Sperry Gyroscope Company, Great Neck, L.I., N.Y.
Born: May 29, 1910, Houtson, 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. **Committees:** Electron Tubes and Solid State Devices, 1951–52; Electron Devices, 1952–56, *vice-chairman, 1954–56;* Electron Tubes, 1955–58.

SHOCKLEY, William (SM'51—F'55), Director, Shockley Semiconductor Laboratory of Beckman Instruments, Inc., 391 S. San Antonio Rd., Mountain View, 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:** IRE Morris Liebmann Award, 1952; Medal of Merit, War Department, 1946; Citation of Honor, Air Force Association, 1951; 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 Commercial Atomic Power Activities, 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.*

SILING, Philip F. (M'40—SM'43—F'51), Director, RCA Frequency Bureau, 30 Rockefeller Plaza, New York 20, N.Y. and 1625 K St., N.W., Washington 6, 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, 1948–55, *chairman, 1948.*

SILVER, Samuel (M'46—SM'50—F'54), Professor of Engineering Science, Division of Electrical Engineering, Cory Hall, 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, International Scientific Radio Union, *president, 1954–57.* **Awards:** Guggenheim Fellowship, John Simon Guggenheim Memorial Foundation, 1953–54.

SILVERMAN, Daniel (A'42—SM'51—F'53), Exploration Research Director, Stanolind Oil and Gas Company, P.O. Box 591, Tulsa, Okla.
Born: June 24, 1905, Montreal, P.Q., Canada. B.S., 1927, University of California, M.S., 1929; Sc.D., 1930, Massachusetts Institute of Technology. **Committee:** Papers Procurement, 1947–50. **Sections: Tulsa,** *chairman, 1951–52.* **Awards:** Heller Travelling Fellow, 1928–30, University of California; Medallist, 1927.

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. **IRE Offices:** Secretary, 1912–14; Director, 1912–14; Manager, 1915. **Committees:** Publicity, 1913, 1915; Specifications for Steamship Radio Equipment, 1914–15; Standardization, 1914–15.

SINCLAIR, Donald B. (J'30—A'33—M'38—SM'43—F'43), Vice-President, Engineering, General Radio Company, 275 Massachusetts Ave., Cambridge 39, Mass.
Born: May 23, 1910, Winnipeg, Man., Canada. S.B., 1931, S.M., 1932, Sc.D., 1935, Massachusetts Institute of Technology. **IRE Offices:** President, 1952; Treasurer, 1949–50; Director, 1945–54. **Committees:** Admission, 1948; Antennas, 1944–47; Awards, 1951; Appointments, *chairman, 1954;* Editorial Review, 1955–57; Executive, 1948–50, 1952–53, *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. **IRE Representative:** Radio Technical Planning Board, 1947, *alternate, 1946;* Joint IRE-AIEE Co-ordination Committee, 1952 (ex-officio). **Awards:** Fellow, American Institute of Electrical Engineers; President's Certificate of Merit, 1948.

SINCLAIR, George (A'37—SM'46—F'54), Professor (President, Sinclair Radio Laboratories, Ltd.), Electrical Building, University of Toronto, Toronto 12, Ont., Canada.
Born: November, 1912, Hamilton, Ont., Canda. B.Sc., 1933, M.Sc., 1935, University of Albert; Ph.D., 1946, Ohio State University. **Committees:** Antennas, 1945–49; Antennas and Wave Guides, 1946–56; Awards, 1956–57; Editorial Review, 1954–57;

Education, 1951–57; Papers Review, 1951–53; Wave Propagation, 1946–55; Wave Propagation and Utilization, 1946–49. **Professional Groups:** Antennas and Propagation, *chairman, 1951.* **IRE Representative:** University of Toronto, 1948–56; Technical Program Committee, Canadian IRE Convention, *chairman, 1956–57.* **Sections:** Toronto, *vice-chairman, 1950, chairman, 1951.* **Awards:** U. S. War and Navy Departments, Certificate of Appreciation, 1948.

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:** Papers Procurement, 1945–46; Accounting, 1949–50; Awards, 1950; Membership, 1949–50. **Sections:** Northern New Jersey, *chairman, 1956–57.*

SKIFTER, Hector R. (A'31—M'36—SM'43—F'51), President, Airborne Instruments Laboratory, Mineola, 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.* **Awards:** Presidential Certificate of Merit, 1947.

SLATTERY, John J. (J'29—A'30—SM'46—F'56), Manager, West Coast Operations, Government and Industrial Divisions, The Magnavox Company, West Los Angeles, Calif.
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.* **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:** AIEE Award, 1933; Benjamin Garver Lamme Medal, 1942, AIEE; Edison Medal, 1948, AIEE; John Scott Medal, 1932; Member, National Academy of Science, 1941.

SMITH, Carl E. (A'30—M'39—SM'43—F'55), Proprietor, Carl E. Smith Consulting Radio Engineers, 4900 Euclid Ave., Cleveland 3, Ohio. President, Cleveland Institute of Radio Electronics and Smith Electronics, Inc.
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 Review, 1954–56; Professional Groups, 1955; Industrial Electronics, 1956–58. **Professional Groups:** Industrial Electronics, *secretary, 1951–54, vice-chairman, 1954–56, chairman, 1956–57.* **Sections:** Cleveland, *chairman, 1940–41.* **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, Research, 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, 1949–58. **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 Corporation, 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. **Committees:** Annual Review, 1949–50; Membership, 1929–35, 1937–40; Papers Procurement, 1947–48; Papers Review, 1949–53; Radio Transmitters, 1949–50.

SMITH, Newbern (A'41—SM'46—F'52), Research Engineer, University of Michigan Engineering Research Institute, Willow Run Laboratories, Ypsilanti, 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.* **Awards:** IRE Harry Diamond Memorial Award, 1952.

SMITH, Phillip H. (A'34—SM'46—F'52), Technical Staff, Bell Telephone Laboratories, Inc., Morristown Rd., Whippany, N.J.
Born: April 29, 1905, Lexington, Mass. B.S.(E.E.), 1928, Tufts College. **Committees:** Antennas, 1946–49; Antennas and Wave Guides, 1949–58, *vice-chairman, 1953–54, chairman, 1954–55;* Standards, 1954–56. **Professional Groups:** Antennas and Propagation, *secretary-treasurer, 1953–54.*

SMITH-ROSE, Reginald L. (SM'44—F'44), Director of Radio Research, Department of Scientific and Industrial Research, Radio Research Station, Ditton Park Slough, Bucks., 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, 1949–58. **IRE Representative:** IRE-IEE International Liaison Committee, 1955–57. **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), Associate 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 Review, 1954–57. **Awards:** Army-Navy Certificate of Appreciation, 1948.

SMYTH, John B. (SM'52—F'56), Smyth Research Associates, 3930 4 Ave., San Diego 3, Calif.
Born: June 8, 1914, Pembroke, Ga. B.S., 1934, M.S., 1937, University of Georgia; Ph.D., 1942, Brown University. **Committees:** Wave Propagation, 1956–58. **Professional Groups:** Antennas and Propagation, Editor of *Transactions.* **Awards:** Electronics Achievement Award, Seventh Region, IRE, 1954.

SNOW, Harold A. (A'24—VA'39—F'56), Senior Project Engineer, Federal Telecommunication Laboratories, Inc., 500 Washington Ave., Nutley, N.J.
Born: October, 1898, Santa Barbara, Calif. B.S.(E.E.), 1921, George Washington University.

SOUTHWORTH, George C. (M'26—F'41), Technical Consultant, 19 Williams Rd., 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:** Louis Levy Medal, Franklin Institute, 1946; IRE Morris Liebmann Memorial Prize, 1938; Stuart Ballantine Medal, Franklin Institute, 1947.

SPANGENBERG, Karl R. (A'34—SM'45—F'49), Professor, Electrical Engineering; Associate Director, Electronics Research Laboratory, Stanford University, Stanford, 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; Membership, 1941; Papers, 1943–45; Papers Procure-

ment, 1942–43, 1945; Regular Papers, 1941; Electron Tubes, 1955. **Sections:** San Francisco, *secretary, 1940–42, chairman, 1943–44.* **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, N.Y.
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, 1955–57. **Awards:** Associate Fellow, Institute of Aeronautical Sciences, 1953; Naval Civilian Service Award 1947; Naval Citation, U. S. Navy, 1948.

SPENCER, Percy L. (A'53—SM'53—F'55), Vice-President and General Manager, Microwave and Power Tube Operations Division, Raytheon Manufacturing Company, Waltham 54, Mass.
Born: July 9, 1894, Howland, Me. Sc.D.(Honorary) 1950, University of Massachusetts. **Awards:** Naval Ordance Development Award, 1945; USN Certificate of Commendation, 1947; USN Distinguished Public Service, 1949; Fellow, American Academy of Arts and Sciences, 1955.

SPITZER, Edwin E. (A'28—M'38—SM'43—F'56), Manager, Engineering, Cathode Ray and Power Tube Operations, 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.*

STEEL, W. Arthur (M'19—SM'43—F'50)(L), Commercial Manager, 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), Division Manager of Quality Control, Sylvania Electric Products, Inc., 100 Sylvan Rd., Woburn, Mass.
Born: June 29, 1901, West Bloomfield, N.Y. B.S.(E.E.), 1923, University of Wisconsin. **Committees:** Annual Review, 1948–49; Electronics, 1944–45; Electron Tubes, 1946–47; Instruments and Measurements, 1949–50; Papers Review, 1948–55; Professional Groups, 1950–52; Standards, 1948–51; Symbols, 1945–47; Vacuum Tubes, 1945–46; Editorial Review, 1954–57; Measurements and Instrumentation, 1950–55. **IRE Representative:** ASA Sectional Committee (C67) on Standardization of Voltages—Preferred Voltages—100 Volts and Under, 1951–53 (No IRE Voting Representative; Liaison, 1954). **Awards:** Fellow, American Society for Quality Control.

STERLING, George E. (M'41—SM'43—F'49), Engineering Consultant, Peak's Island, Portland, Me. Federal Communications Commission Commissioner, Retired.
Born: June 21, 1894, Portland, Me.

STEVENS, Archie M. (A'12—M'25—F'31)(L), 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.*

STONE, Ellery W. (A'14—M'16—F'24), Rear Admiral, United States Naval Reserve; President and Director, American Cable and Radio Corporation; President and Director, All America Cables and Radio, Inc.; President and Director, The Commercial Cable Company; President and Director, Mackay Radio and Telegraph Company; Vice-President and Director, International Telephone and Telegraph Corporation; Director, International Marine Radio Company, Ltd., (England). 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, 1956–57; Education, 1955–57; Nominations, 1953–54; Policy Advisory, 1953–54; Wave Propagation, 1949–58; Editorial Review, 1955–57. **IRE Representative:** University of Texas, 1947–50.

STRATTON, Julius A. (M'42—SM'43—F'45), Chancellor, 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. **IRE Offices:** Director, 1948–51, 1954. **Committees:** Annual Review, 1945–46; Appointments, 1948; Board of Editors, 1946–53; Editorial Board, 1954–55; Education, 1945; International Liaison, 1949; Membership, 1947–48; Policy Development, 1949–51; Professional Groups, 1954; Radio Wave Propagation and Utilization, 1945–48, *chairman, 1945–47;* Standards, 1945–46. **Awards:** Presidential Medal for Merit, 1946.

STRONG, Charles E. (A'25—M'27—SM'43—F'49), Chief Radio Engineer, Standard Telephones and Cables, Ltd., Oakleigh Rd., 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, 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; D.Eng.(Honorary), 1950, Institute of Technology, Karlsruhe, Germany. **Awards:** Gauss Medal, Brunswick (Germany) Society of Sciences, 1954; Honorary Member, Brunswick Society of Sciences, 1955.

SUITS, Chauncey G. (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, Nat. 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. **Awards:** America's Young Man 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.

SWINYARD, William O. (A'37—M'39—SM'43—F'45), Chief Engineer, Hazeltine Research, Inc., 325 W. Huron St., Chicago 10, Ill.
Born: July 17, 1904, Logan, Utah. B.S., 1927, Utah State College. **IRE Offices:** Director, 1945–46. **Committees:** Annual Review, 1947–48; Education, 1945–48; National Convention, 1947; Radio Receivers, 1946–49, 1954–56, *chairman, 1946–48, vice-chairman, 1956–57;* Receivers, 1950–54; Sections, 1945–50, *chairman, 1946–47;* Standards, 1947–48. **IRE Representative:** National Electronics Conference, *president, 1946; chairman of the board, 1947.* **Sections:** Chicago, *secretary 1943–44; chairman, 1944–45.*

SYKES, Roger A. (A'41—M'42—SM'43—F'57), Transmission

Apparatus Engineer, Bell Telephone Laboratories, Inc., Whippany Rd., Whippany, N.J.
Born: February 17, 1908, Windsor, Vt. B.S., 1929, M.S., 1930, Massachusetts Institute of Technology; 1930–34, Columbia University. **Committees:** Piezoelectric Crystals, 1945–48, *vice-chairman, 1948–51, chairman, 1951–56,* 1957; 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. **Committees:** Papers Review, 1952–53.

SZIKLAI, George C. (A'41—M'43—SM'43—F'55), Assistant to the Vice-President, Westinghouse Electric Corporation, Electronic Tube Division, Elmira, N.Y.
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 Review, 1954–57; 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 of High-Frequency Techniques and Physics, Swiss Federal Institute of Technology, Sternwartstrasse 7, Zurich, 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; President, Swiss Electrotechnical Institution, 1952. **IRE Offices:** Vice-President, 1955; Director, 1955.

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; Meetings and Papers, 1928; Institute Sections, 1928. **Sections:** Washington, *chairman, 1919–28.* **Awards:** John Scott Medal and Premium, Board of City Trustees, Philadelphia, 1942; Presidential Medal of Merit, 1944; IRE Morris Liebmann Memorial Prize, 1927; IRE Medal of Honor, 1942, Pioneer Award, Professional Group on Aeronautical and Navigational Electronics, 1952.

TAYLOR, Charles H. (M'13—F'15)(L), 390 Riverside Dr., New York 25, N.Y.
Born: August 22, 1875, Uxbridge, Middle., 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 Division, Texas Instruments, Inc., 6000 Lemmon Ave., Dallas 9, Tex.
Born: January 10, 1907, Dallas, Tex. A.B., 1927, Baylor University; Sc.M., 1928, Ph.D., 1931, Brown University. **Committees:** Editorial Review, 1955–57; Section Publications, *chairman, 1957.* **Sections:** Dallas-Fort Worth, *secretary, 1953–54, vice-chairm · 1955–56;* Dallas, *chairman, 1956–57.*

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 Researsh Medal, Royal Netherlands Institution of Engineers, 1954.

TERMAN, Frederick E. (A'25—F'37), Provost and Dean of School of Engineering, Stanford University, Stanford, Calif.
Born: June 7, 1900, English, Ind. A.B., 1920, Engineer, 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, 1940–43, 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:** Medal of Honor, Institute of Radio Engineers, 1950.

THAYER, Gordon N. (SM'47—F'51), Chief Engineer, American Telephone and Telegraph Company, 195 Broadway, New York 7, N.Y.
Born: October 6, 1908, Delta, Colo. Stevens Institute of Technology, 1926–30, M.E., 1946.

THOMAS, Henry P. (A'39—VA'39—M'44—SM'47—F'51), Consulting Engineer, Microwave Engineering, General Electric Company, Syracuse, N.Y.
Born: May, 1904, Boston, Mass. B.A., 1925, M.S., 1927, Harvard University. **Committees:** Editorial Review, 1954–57; Papers Review, 1946–53; Radio Wave Propagation, 1942–46; Wave Propagation, 1940–41. **Awards:** Coffin Award, General Electric Company, 1948.

THOMPSON, Leland E. (A'35—SM'44—F'57), Engineer, Radio Corporation of America, Building 10-1, 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. of Engineering (Honorary), 1954, Texas Agricultural and Mechanical College. **Committees:** Board of Editors, 1946–53.

TOLMIE, John R. (J'15—A'18—M'32—SM'43—F'55), Staff Supervisor, Pacific Telephone & Telegraph Co., Exchange Bldg., Seattle 4, 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.*

TOLSON, William A. (A'28—SM'43—F'56), Senior Research Engineer, RCA Laboratories, Princeton, N.J.
Born: November 2, 1896, San Angelo, Tex. B.S. (Engineering), 1923, Texas A. and M. **Awards:** Modern Pioneer, Radio Manufacturers Association, 1940.

TOWN, George R. (A'37—SM'44—F'50), Executive Director, Television Allocations Study Organization, 808 Warner Bldg., 13th & E Sts., N.W., Washington, D.C.
Born: May 26, 1905, Poultney, Vt. E.E., 1926, D.Engr., 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. **Sections:** Rochester, *secretary, 1942–44, chairman, 1944–46.*

TRAVIS, Irven (SM'46—F'53), Vice-President of Research and Engineering, Burroughs Corporation, Research Center, Paoli, Pa.
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. **Sections:** Philadelphia, *vice-chairman, 1933–34.* **Awards:** Alumni Citation, Drexel Institute of Technology; Commendation, U. S. Navy, 1946.

TREVOR, Bertram A. (A'29—M'38—SM'43—F'53), Engineer, Member of Technical Staff, Radio Corporation of America, Princeton, N.J.
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.

TUPPER, Bertram R. (A'36—SM'46—F'54), Vice-President and General Manager, Northwest Telephone Company, 2226 W. 10 Ave., Vancouver 9, B.C., Canada.
Born: April 15, 1906, Vancouver, B.C., Canada. B.S., 1928, University of British Columbia. **Sections:** Vancouver, *chairman, 1950.*

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:** Standardization, 1926–27; Membership, 1927. **Sections:** Atlanta, *secretary, 1938–39, vice-chairman, 1940.*

TURNER, Hubert M. (A'14—M'30—F'37)(L), Associate Professor-Emeritus of 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:** Admissions, 1936, 1939–43, *chairman, 1941–42;* Annual Review, 1937–10, 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, 1941;* 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, 1940–44, 1946–48, *chairman, 1940–45;* Tellers, 1940. **IRE Representative:** Yale University, 1941–47; ASA Subcommitee 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, 1940–57;* United States National Committee of the International Electrotechnical Commission, 1944–48; Technical Advisor, U. S. National Committee, International Electrotechnical Commission, Letter Symbols, 1946–57; Chief Delegate, United States National Committee on Letter Symbols for Electrical Quantities, International Electrotechnical Commission, Paris, France, 1950; Philadelphia, 1954; United States Paper Committee, World Power Conference, London, 1950.

TUSKA, Clarence D. (A'14—M'41—SM'43—F'57), Director, Patent Operations, Radio Corporation of America, David Sarnoff Research Center, Princeton, N.J.
Born: August 15, 1896, New York, N.Y. B.S., 1919, Trinity College; L.L.B., 1934, La Salle Extension University.

TUTTLE, W. Norris (A'26—SM'46—F'49), Engineering Consultant, General Radio Company, 275 Massachusetts Ave., Cambridge 39, 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, 1944–56, *chairman, 1949–51;* Editorial Board, 1954–57; Education, 1953–57; 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 Rd., 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, Johns Hopkins University; D.Sc., 1948, Case Institute; D.Sc., 1949, Kenyon College; D.Sc., 1949, Williams College; D.Sc., 1950, Johns Hopkins University; D.Sc., 1953, University of Alaska. **Professional Groups:** American Association for the Advancement of Science, *vice-president, 1947.* **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; C.B.E., 1949; Howard N. Potts Medal, Franklin Institute, 1950; Outstanding Achievement Medal, University of Minnesota, 1950.

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.

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.

VAN ATTA, Lester C. (M'42—SM'43—F'52), Associate Director, Research Laboratories; Head, Microwave Laboratory, Hughes Aircraft Company, Culver City, Calif.
Born: April 18, 1905, Portland, Ore, Ore. B.A., 1927, Reed College; M.S., 1929, Ph.D., 1931, Washington University. **Committees:** Antennas, 1945–48, *vice-chairman, 1948–49;* Antennas and Wave-guides, 1949–51, *chairman, 1949–50, 1950–51;* Awards, 1953; Editorial Review, 1954–55; Membership, 1953; Papers Review, 1951–53; Professional Groups, 1951–57, *vice-chairman, 1953; Research,* 1946–47, 1949–51; Standards, 1949–51. **Professional Groups:** Antennas and Propagation, Administrative Committee, 1951–55, *chairman, 1949–50.*

VAN DER POL, Balthasar (M'20—F'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. **Professional Groups:** Union Radio Scientifique Internationale, *vice-president, 1934–50;* Organisation Internationale de Radiodiffusion, Technical Committee, *president, 1946–49.* **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.

VAN DER ZIEL, Aldert (SM'49—F'56), Professor of Electrical Engineering, University of Minnesota, Minneapolis 14, Minn.
Born: December 12, 1910, Zandeweer, Gronigen, Netherlands. B.A. (Physics and Math.), 1930, M.A. (Physics and Math.), 1933, Ph.D. (Physics and Math.), 1934, University of Groningen.

VAN DYCK, Arthur F. (IRE Charter Member)(A'12—M'18—F'25), 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, 1937–39, 1943–44, *chairman, 1937–40;* Awards, 1934, 1940, 1952–53; Bibliography, 1930–32; Constitution and Laws, 1933–34, 1943; Executive, 1942–43, *chairman, 1942;* Nominations, 1932, 1951; New York Program, 1934–35, 1939–40, *chairman, 1934;* 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 (Z-17) on Preferred Numbers, 1936, 1939–55; ASA Sectional Committee (Z-67) on Standardization of Voltage—Preferred Voltages 100 Volts and Under, 1949–50. **Awards:** Legion of Merit, 1946; Modern Pioneer Award, National Association of Manufacturers, 1940.

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 Review, 1957; 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, 1945–58, *chairman, 1940–42, 1949–51;* 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 Review, 1955–57. **Sections:** Palo Alto Subsection, *chairman, 1952.* **Awards:** Outstanding Young Bay Area Engineer, Bay Area Engineers' Week Committee, 1955; Morris Liebmann Memorial Prize, IRE, 1957.

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.

WALLACE, Robert L., Jr. (SM'53—F'56), Director of Transmission Research, Bell Telephone Laboratories, Murray Hill, N.J.
Born: February 21, 1916, Coolidge, Tex. B.A. (Physics), 1936, M.A. (Physics), 1939, University of Texas. **Committees:** Editorial Review, 1954–56.

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 Review, 1955–57.

WARNECKE, Robert R. (SM'48—F'50), Director, Electronics and Atomistics Research Department, Compagnie Générale de Télégraphie Sans Fil, Domaine de Corbeville, B.P. N° 10, Orsay, Seine et Oise, France.
Born: November, 1906, Tours, France, Doctor, 1933, University of Paris. **Committees:** Electron Tubes, 1955–56. **Professional Groups:** Vice-President of the Société Française des Ingénieurs et Téchniciens du Vide. **Awards:** Henri Becquerel Prize, Academy of Sciences of Paris, 1945; Ancel Prize, French Society of Electricians, 1943; 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").

WATSON-WATT, Sir Robert (SM'46—F'47), Governing Director, Sir Robert Watson-Watt and Partners, Ltd., London, S.W. 1, England: President, Adalia, Inc., New York, Adalia, Ltd., Montreal and London, England. Suite 810, 1410 Castle Bldg., Montreal, P.Q., Canada.
Born: April 13, 1892, U.K., C.B. D.Sc., LL.D., **IRE Offices:** Vice-President, 1950; Director, 1950. **Awards:** Hughes Medal of the Royal Society of London, 1948; Presidential Medal for Merit, U. S., 1946; Valdemar Poulsen Gold Medal, Danish Academy of Technical Sciences, 1947; Fellow of the 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. **Committees:** Wave Propagation, 1949–57; Professional Groups, 1954. **Professional Groups:** Propagation, *chairman, 1952.* **IRE Representative:** U.S.A. National Committee, URSI, *secretary,* U.S.A. National Committee, URSI, *chairman;* Technical Program Committee, 12th URSI General Assembly, *chairman.* **Awards:** Navy Ordnance Development Award, 1945; Office of Scientific Research and Development Award, 1945; Guggenheim Fellow, Cambridge University, England, 1954–55.

WEBB, Wilbur L. (A'35—SM'44—F'54), General Manager, Bendix Products-Missiles, 400 S. Beiger, Mishawaka, Ind.
Born: July, 1906, Stanberry, Mo. B.S.(E.E.), State College of Washington. **IRE Offices:** Director, 1946. **Committees:** Admissions, 1946–47; Papers Procurement, 1945–50; Awards, 1955–57. **Sections:** Baltimore, *chairman, 1944–45.* **Awards:** Certificate of Commendation, U. S. Navy, 1947.

WEBER, Ernst (M'41—SM'43—F'51), Vice-President for Research, Polytechnic Institute of Brooklyn, 55 Johnson 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, 1952–58. **Committees:** Administrative Committee of Board of Editors, 1951; Annual Review, 1950–51; Awards, 1952–54, *chairman, 1953–54;* Board of Editors, 1949–53; Circuits, 1949–53; Editorial Administrative, 1949–51; Education, 1944–51; Executive, 1957; Finance, 1952; Instruments and Measurements, 1948–52, *chairman, 1949–51;* Membership, 1941–48; National Convention, 1947, 1951; Policy Advisory, 1952, 1956; Professional Groups, 1951, 1953–57, *vice-chairman, 1954–57;* Standards, 1949–58, *vice-chairman, 1951–53, chairman, 1954–56;* Awards Coordination, 1957. **Professional Groups:** Measurements and Instrumentation, *chairman, 1950–52.* **IRE Representative:** ASA Standards Council, 1952–57; ASA Sectional Committee (C16) on Radio, 1954–57; ASA Subcommittee (C42.6) on Electrical Instruments, 1952–55; C.C.I.R., Executive Committee of U. S. Delegation; United States National Committee, International Electrotechnical Commission, Adviser on Electrical Measuring Instruments (alt. 1952); United States National Committee, U.R.S.I., 1956–58; Joint Technical Advisory Committee, *vice-chairman, 1955–56, chairman, 1956–57.* **Awards:** Fellow, American Institute of Elec-

trical Engineers; Fellow, American Physical Society; Presidential Certificate of Merit, 1948.

WEBSTER, Edward M. (A'30—M'38—SM'43—F'44), Telecommunications Consultant, 9518 E. Stanhope Rd., 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.

WEEKS, Paul T. (A'19—M'28—SM'43—F'54)(L), Engineer, Receiving and Cathode Ray Tube Operations, Raytheon Manufacturing 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:** Member, American Physical Society; Fellow, American Association for the Advancement of Science; Naval Ordnance Development Award, 1945.

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, Johns Hopkins University; M.S., 1926, University of Pittsburgh. **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 Review, 1954–57. **Sections:** Princeton, *secretary, 1956.* **Awards:** Television Broadcasters Association Award, 1946.

WEINBERGER, Julius (A'13—F'25), Staff Member, RCA Laboratories Division, Radio Corporation of America, 155 E. 24 St., New York 10, 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), Manager, Engineering Administration C and 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, 1945–58; Transmitters, 1944–45.

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 Review, 1955–57.

WELLS, Harry W. (M'36—SM'43—F'53), Chairman, Upper Atmosphere Section, Carnegie Institution of Washington, Department of Terrestrial Magnetism, 5241 Broad Branch Pl., 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, Region III, 1954–55. **Committees:** Annual Review, 1950–51; Awards, 1953, 1956–57; Nominations, 1955–57; Policy Advisory, 1955; Radio Wave Propagation and Utilization, 1945–48; Wave Propagation, 1949–52, *vice-chairman, 1949–52.* **Professional Groups:** Antennas and Propagation, Editor, 1951–52. United States National Committee, URSI, *chairman.* **Sections:** Washington, *secretary, 1948, vice-chairman, 1949, chairman, 1949–50.* **Awards:** Scientific Achievement, Washington Academy of Sciences, 1947.

WENDELL, Edward N. (A'26—M'33—SM'43—F'47), Managing Director, Compania Standard Electric Argentina, Calle Uruguay 1037, Buenos Aires, Argentina.
Born: August 11, 1903, Rockport, Mass. B.Sc., 1925, Massachusetts Institute of Technology.

WENDT, Karl R. (A'36—SM'46—F'54), Director, TV Research, Telemeter Magnetics, Inc., 2245 Pontius Ave., Los Angeles 64, Calif.
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), Consulting Radio Physicist; President, Wheeler Laboratories, Inc., 122 Cutter Mill Rd., Great 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, 1949–52; Editorial Review, 1954–57; 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; Professional Recognition, 1947; 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. **Sections:** Long Island Subsection, *chairman, 1948–49.* **IRE Representative:** ASA Sectional Committee (C-42) on Definitions of Electrical Terms, 1948, 1950–51; National Television Systems Committee, *alternate, 1940–13.* **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.

WHEELER, Lynde P. (F'28), Staff Consultant, Pickard and Burns, Inc., 240 Highland Ave., Needham 94, Mass.
Born: July 27, 1874, Bridgeport, Conn. Ph.B., 1894, Ph.D., 1902, Yale University. **IRE Offices:** President, 1943; Director, 1940–45. **Committees:** Bibliography, 1930–32; Board of Editors, 1930–32; Executive, *chairman, 1943;* Frequency Modulation, 1940–45; Meetings and Papers, 1929–30; Membership Solicitation Policy, 1945; Nominations, 1939, 1942, 1944; Papers, 1931–32, 1934; Papers Procurement, 1942–43; Public Relations, 1945–46; Regular Papers, 1941; Standardization, 1928. **Sections:** Washington, *chairman, 1930–32.* **IRE Representative:** RMA-IRE Co-ordinating, 1943.

WHINNERY, John R. (A'41—SM'44—F'52), Professor, Chairman of Electrical Engineering, University of California, 231 Cory Hall, Berkeley 4, Calif.
Born: July 26, 1916, Read, Delta County, Colo. B.S., 1937, Ph.D., 1948, University of California. **IRE Offices:** Director, 1956, 1957–58. **Committees:** Antennas, 1948–49; Awards, 1952; Board of Editors, 1946–53; Editorial Review, 1954–57; Education, 1956–57; Handbook, 1945–48; Papers, 1944–45; Papers Procurement, 1947–50; Nominations, 1957. **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), Consulting Engineer, 460 Coffee Pot Riviera, St. Petersburg, Fla.
Born: July 5, 1896, Valley City, N.D. B.A., 1922, M.S., 1925, George Washington University. **Awards:** Fellow, American Institute of Electrical Engineers, 1947.

WHITE, Warren D. (A'47—SM'48—F'57), Engineering Consultant, Airborne Instruments Laboratory, 160 Old Colony Rd., Mineola, 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:** Transmitters and Antennas, 1942–45; Frequency Modulation, 1942–46; Radio Wave Propagation, 1942–46; Editorial Review, 1954–57. **Professional Groups:** Information Theory, Administrative Committee, 1952–57.

WHITE, William C. (A'15—M'25—F'40)(L), Retired, 1422 Lowell Rd., 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. **IRE Representative:** National Electronics Conference, Board of Directors, 1947–50.

WHITTEMORE, Laurens E. (A'16—M'25—F'27), 31 Martindale Rd., 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, 1927–40, *chairman, 1940–49,* 1949–53; Awards, 1937, 1948; Bibliography, 1930–32; Board of Editors, 1929–53; Broadcast, 1933–34, 1953; Direction Finding Terminology, *chairman, 1924–25;* Electroacoustic Devices, 1927–28; Editorial Administrative, 1946–53; History, 1956–57; Institute Sections, *chairman, 1926;* Meetings and Papers, 1929; Membership, *chairman, 1925;* Standardization, 1920–32, *chairman, 1926–29;* Standards, 1932–35, 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 Review, 1954–56; Modulation Systems, 1949–50; Nuclear Studies, 1948–49; Professional Groups, 1955; Research, 1949–50.

WILLIAMS, Albert J., Jr. (A'30—VA'39—SM'49—F'55), Science Director, 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, 4814 38 Ave., N.E., Seattle 5, Wash.
Born: March 15, 1896, Seattle, Wash. **Committees:** Standardization, 1929–30; Sections, 1925. **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:** Sections, 1947–48, Awards, 1956–57. **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.

WILLIAMS, Frederick C. (SM'54—F'57), Edward Stocks Massey Professor, Electrical Engineering, University of Manchester, Sandy Lane, Romily, Cheshire, England.
Born: June, 1911, Romily, Cheshire, England, B.Sc., 1932, M.Sc., 1933, D.Sc., 1939, Manchester University, England; Phil.D., 1936, Oxford University. **Awards:** Order of the British Empire, 1945; F.R.S., 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.

WILLIAMSON, Raymond H. (A'31—M'44—SM'46—F'51), Manager, Engineering Administration, Communication Products Department, General Electric Company, Syracuse, N.Y.
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), Consulting Engineer and President, Raymond M. Wilmotte, Inc., Box 397, Kendall Branch Post Office, Miami, Fla.
Born: August 13, 1901, Paris, France. M.A., 1921, Cambridge University, England. **Committees:** Handbook, 1945–17; Industrial Electronics, 1947–48; New York Program, 1933; Papers, 1932–33; Papers Review, 1946–52; Radio Receivers, 1940–17; Radio Transmitters and Antennas, 1929–30; Sections, 1932; Standardization, 1931; Standards, 1932. **Awards:** Premium for Research, Institution of Electrical Engineers, 1930; Bureau of Ordnance Development Award, 1945.

WILSON, James R. (M'31—SM'43—F'54), Assistant Vice-President, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
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.

WING, Arthur K., Jr. (J'28—A'30—M'40—SM'43—F'57), Director, Electron Tube Laboratory, Federal Telecommunication 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:** 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.*

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; Television Systems, 1953–56, *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 Director, Gilfillan Bros., Inc., 1815 Venice Blvd., Los Angeles 6, Calif.
Born: January 11, 1907, Anderson, Ind. Northwestern University. **IRE Offices:** Director, 1957. **Committees:** Receivers, 1946–49; Nominations, 1956; Policy Advisory, 1956, *chairman, 1957;* Appointments, 1957–57. **Sections:** Los Angeles, *secretary, 1941,*

chairman, 1942; Nominating Committee, *chairman, 1951;* Sections Relations Committee, *chairman, 1954-56.* **Professional Groups:** Liaison Officer, IRE-WCEMA West Coast Convention, 1948; Registration, *chairman,* 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), Vice-President, Research, RCA Laboratories, Radio Corporation of America, 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;* Board of Editors, 1946-53; Editorial Review, 1954-57; 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, 1953, *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.

WOOLDRIDGE, Dean E. (SM'50—F'54), President, The Ramo-Wooldridge Corporation, 5730 Arbor Vitae St., Los Angeles 45, 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:** Citation of Honor Award for Outstanding Achievements in Field of Electronic Research and Development, Air Force Association, 1950; National Research Fellowship, California Institute of Technology, 1936; 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:** University of Western Ontario, 1941-47. **Awards:** Fellow, Royal Society of Canada; International Chairman, Commission VII, URSI.

WYCKOFF, Ralph D. (M'29—SM'43—F'55), Director, Geophysical 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:** O.S.R.D. Certificate of Appreciation, 1945; War and Navy Departments' O.S.R.D. 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. **Committees:** Annual Review, 1944-47; Board of Editors, 1941-46; Facsimile, 1939-46, 1948-56, *chairman, 1944-47, 1949-50, 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.

ZAHL, Harold A. (A'39—SM'46—F'50), Director of Research, Signal Corps Engineering Laboratories, 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:** Awards, 1956-57, Administrative Committee on the Board of Editors, 1951-53; 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, Über 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 Officers:** 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 Verdienstkreus des deutsches Verdienstordens, 1952; Honorary President, Deutsches Museum, 1953; Ehrenerkunde dest verbands deutschen Elektrotechniker, 1954.

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; Ph.D., 1926, University of Pittsburgh; D.Sc., 1938, Polytechnic Institute of Brooklyn. **Committees:** Board of Editors, 1944-53; Medical Electronics, 1955-56. **Awards:** IRE Medal of Honor, 1951; IRE Morris Liebmann Memorial Prize, 1934; Modern Pioneer Award, National Association of Manufacturers, 1940; Rumford Medal, American Academy of Arts and Sciences, 1941; Overseas Award, British Institution of Electrical Engineers, 1939; 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; Society of Motion Picture and Television Engineer Progress Medal Award, 1951; AIEE Edison Medal, 1952; 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 French Academy of Science; the New York Academy of Sciences; Affiliate Member of the Rockefeller Institute for Medical Research.

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OTS—Ottawa
PHI3—Philadelphia
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SAL8—South Alberta
SBM5—South Bend-Mishawaka
SCH1—Schenectady
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Anniston (HUN-3)
Ferguson, G. D., Jr. (A)
Molyneux, M., Jr. (M)
Ryan, J. D. (M)

Athens (HUN-3)
Holt, J. M. (M)
Sanders, J. F. (A)

Auburn (ATL-3)
Deshazo, S. G. (M)
Murphy, G. L. (M)
O'Kelley, H. E. (SM)
Summer, H. M. (A)

Birmingham (HUN-3)
Alexander, C. S. (A)
Bliss, S. A., Jr. (M)
Carl, H. D. (A)
Chapman, J. E. (M)
Collins, R. H., III (A)
Cordero, F. (A)
Culver, W. N. (A)
Davenport, G. M. (A)
Davis, H. G., Jr. (A)
Emens, F. H. (M)
Gray, C. M. (M)
Greven, P. J. (M)
Humphreys, T. G., Jr. (A)
Lichtenstein, H. (M)
Lowery, H. R. (M)
Malone, J. C. (A)
Minton, R. (M)
Muse, A. W. (M)
Phillips, D. E., Jr. (A)
Sartain, A. (M)
Schwab, G. G. (M)
Shortley, W. M. (M)
Wallace, W. C. (M)

Brownsboro (HUN-3)
Wallace, R. E. (M)

Decatur (HUN-3)
Kulberg, L. E. (M)

Enterprise (ATL-3)
Waller, S. L. (M)

Fairfield (HUN-3)
Bradley, B. C. (M)
Clements, C. C. (M)

Fort Rucker (ATL-3)
Piscatello, D. J. (A)

Gadsden (HUN-3)
Barnes, B. B. (M)
Pate, J. R. (M)

Fort McClellan (HUN-3)
Fechter, G. B. (M)

Hartselle (HUN-3)
Rusa, F. J. (A)
Self, F. J. (M)

Hazel Green (HUN-3)
Hogue, A. M. (A)

Horton (HUN-3)
Morgan, A. O. (A)

Huntsville (HUN-3)
Allen, W. S. (A)
Angele, W. (A)
Arnold, J. R. (A)
Avery, J. D. (M)
Bailey, R. M. (A)
Baker, R. L. (A)
Barr, T. A. (A)
Bratcher, A. L. (SM)
Brock, C. O. (A)
Butler, P. H. (M)
Cliias, D. I. (A)
Clanton, H. M. (SM)
Cook, W. H., Jr. (M)
Cunningham, G. W., Jr. (M)
Currle, R. E. (A)
Cutting, E. (A)
Daniels, L. H. (M)
De Luca, L. A. (A)
Derington, J. C. (M)
Di Paolo, L. A. (A)
Dlouhy, G. J. (M)
Dollar, J. H. (A)
Douma, J. E. (A)
Edwards, R. L. (A)
Farrior, J. S., Jr. (SM)
Finch, M. D. (M)
French, D. E. (SM)
Frost, W. O. (M)
Garson, J. P. (M)
Gibson, M. (M)
Golden, H. (M)
Graham, A. S. (A)
Gravlee, G. P. (M)
Greenwood, T. L. (SM)
Grivet, P. E. (M)
Hallowes, J. P., Jr. (A)
Hammond, R. L. (A)
Haraway, R. C. (M)
Harper, J. W. (A)
Hirschler, O. H. (A)
Hoberg, O. A. (A)
Horn, H. J. (M)
Hosenthien, H. H. (A)
Howell, J. E., Jr. (A)
Johnston, S. L. (SM)
Katter, O. E., Jr. (M)
Keeffe, T. A. (A)
Kienle, H. G. (A)
Lakebrink, R. T. (M)
Lindberg, W. J. (M)
Loeb, W. S. (M)
Loo, W. (M)
Lusser, R. (M)
Martin, R. C. (A)
Millsap, W. J. (M)
Morgan, C. G. (A)
Nelson, C. G. (M)
Norman, J. E. (M)
Parker, W. (A)
Paul, T. T., Jr. (M)
Perry, B. A. (SM)
Phillips, H. D. (A)
Pitts, E. H. (A)
Powers, H. C. (A)
Rachmeler, L. (A)
Reinbolt, E. J. (A)
Robinson, W. J., JR. (M)
Russell, C. H. (M)
Saunders, G. H. (SM)
Schack, R. H. (A)
Scofield, H. N. (M)
Seashore, C. R. (M)
Shaver, P. T. (M)
Siller, J. (A)
Smith, A. G. (A)
Spitsbergen, M. (A)
Stubbs, D. L. (M)
Sundeen, S. G., Jr. (M)
Stuhlinger, E. (A)
Swindal, P. M. (M)
Taylor, H. M., Jr. (M)
Thornthwaite, W. L. (M)
Threlkeld, W. B., Jr. (M)
Vincent, H. F. (SM)
Weimer, J. W. (A)
Wells, B. C. (A)
White, P. R. (M)
Williams, V. B. (M)

Jacksonville (HUN-3)
Freymuth, J. J., Jr. (M)

Maxwell AFB (ATL-3)
Holcomb, W. L. (M)
Sigethy, R. (M)

Menomonee Falls (MIL-5)
Luecke, M. W. (A)
Ruff, H. M. (A)
Van Alstyne, A. (M)

Mobile (NO-6)
Baucum, P. G. (M)
Chapin, J. H. (M)
Evans, B. D. (M)
Haeger, J. R. (M)
Harbin, T. F. (A)
Hicks, C. R. (M)
Hutchison, R. (A)
Mahan, O. C. (M)
Reither, S. I. (M)
Seid, H. (M)
Van Aller, H. H. (M)

Montgomery (ATL-6)
Allen, C. F. (A)
Anderson, R. C. (M)
Butsch, L. M., Jr. (A)
Cool, P. E. (A)
Derey, C. H. (M)
Doyle, W. A. (A)
Hargreaves, L. D. (A)
Hayward, R. M. (A)
Kovar, M. M. (M)
Lowry, J. L. (M)
MacDowell, J. E. (M)
Opelika (ATL-3)
Moore, T. O. (M)

Ozark (ATL-3)
Galloway, R. E., Sr. (M)
Palmer, G. E., Jr. (A)

Phenix City (ATL-3)
Layfield, L. C. (M)

Selma (ATL-3)
Reid, H. (M)

Silverhill (NWF-3)
Lacey, H. L. (A)

Springhill (NO-6)
McDowell, M. S. (A)

Tuscaloosa (HUN-3)
Littlefield, J. T. (A)
Ryan, P. J. (A)

University (HUN-3)
Nelson, P. H. (SM)
Whitehurst, R. N. (A)

ARIZONA

Benson (FT-H-7)
Arnold, W. L. (M)
Blom, B. V. (SM)
Campbell, R. E. (M)
Ehler, W. M. (M)
Johnson, H. G. (A)
Spittle, S. E. (M)

Bisbee (FT-H-7)
Diehl, F. A. (M)
Homsy, J. H. (SM)
Knowles, E. R. (M)

Douglas (FT-H-7)
Allen, W., Jr. (M)
Wynstock, S. (A)

East Flagstaff (PHO-7)
Phillippi, E. C. (M)

Fort Huachuca (FT-H-7)
Albee, M. M. (M)
Breeding, C. S. (SM)
Brown, G. J. (M)
Clarke, D. R. (A)
Crawford, A. H., Jr. (M
Dillingham, J. H. (M)
Dominque, J. C. (M)
Evers, A. J. (A)
Fisher, R. D. (A)
Forcier, R. A. (SM)
Fund, J. L. (A)
Gallant, R. M. (A)
Garcia, V. A. (SM)
Grady, J. H. (M)
Hogg, F. G. (SM)
Holtum, A. G., Jr. (SM)
Ivys, F. H. (A)
Johnson, R. M. (M)
Lamar, K. (M)
Lenzner, E. (SM)
Lowy, W. M. (A)
Marino, P. F. (M)
Marks, W. S., Jr. (F)
Meyer, R. G. H. (SM)
Oliver, J. K. (SM)
Park, L. C. (M)
Pierce, E. P., Jr. (M)
Pollock, C. (M)
Ryason, R. R. (A)
Shelton, W. C. (M)
Strawn, G. M. (M)
Thames, W. M. (SM)
Wentworth, H. B. (A)
Wilcox, C. S. (M)
Williams, H. C. (A)
Willoughby, D. E. (A)

Fry (FT-H-7)
Blatchley, C. M. (A)
Coe, J. C. (M)
Paul, B. W. (M)

Gilbert (PHX-7)
Norman, H. W. (A)

Glendale (PHO-7)
Edwards, M. J. (M)
Gaul, E. R. (SM)
Gebert, V. D. (A)
Hyder, H. R., III (SM)
Levine, D. (SM)
Murray, P. W. (A)
Newman, W. P. (A)
Reddoch, C. E. (A)
Rhodes, J. F. (M)
Rudolf, S. (M)
Wakefield, S. J. (A)

Goodyear (PHO-7)
Blount, E. M. (M)

Hereford (FT-H-7)
Foley, W. R. (SM)
Webster R. G. (SM)

Jerome (PHO-7)
Ruddock, K. A. (M)

Kingman, (PHO-7)
Hulet, J. F. (A)

Litchfield Park (PHO-7)
Ballantine, J. H. (M)
Belanger, F. (M)
Kelly, K. O. (M)
Robertson, S. D. (SM)
Vecchio, E. A. (M)

Lowell (FT-H-7)
Stuermer, E. H. (SM)

Mesa (PHO-7)
Howard, J. R. (M)
Sabin, W. D. (M)
Smith, W. H. (M)

Morenci (FT-H-7)
Shaver, F. W. (M)

Phoenix (PHO-7)
Adams, W. L. (A)
Anderson W. J. (A)
Ash, H. O. (A)
Barkmo, H. O. (M)
Baroch, G. F. (A)
Barth, J. A. (M)
Barton, R. W. (SM)
Baum, R. W. (M)
Benham, M. J. (M)
Bettis, L. W. (A)
Bitter, C. R., Jr. (M)
Blackert, R. O. (M)
Blair, L. R. (A)
Bottom, V. E. (M)
Bower, F. H. (M)
Brendecke, W. H., Jr. (A
Bricker, N. P. (A)
Brown, D. D. (M)
Bushong, J. G. (M)
Butcher, R. J. (A)
Carden, M. W., Jr. (M)
Chambers, J. A., (F)
Clark, C. J. (M)
Cleary, E. P. (M)
Clelland, F. W., Jr. (SM)
Cook, M. F. (M)
Crawlis, E. D., Jr. (SM)
Creighton, A. M., Jr. (SM)
Cuckler, V. A. (M)
Culver, J. E. (M)
Cummings, K. G. (SM)
Dalton, D. E. (M)
Davisson, R. R. (A)
De Baryshe, B. D. (M)
Dellcath, R. C. (M)
Dentzler, R. J. (A)
Diehl, H. A. (M)
Dimucci, V. A. (M)
Diven, L. (SM)
Dreste, F. E. (M)
Eberhard, E. (SM)
Echols, R. A. (A)
Edson, G. L. (SM)
Edwards, E. J. (M)
Ellinger, L. P. (SM)
Ellstrom, R. V. (A)
Elsner, R. W. (SM)
Emmett, J. T. (A)
Engler, A. R. (M)
Englund, R. A. (M)
Esher, M. (A)
Freeman, G. H. (A)
Funk, R. E. (M)
Gardiner, A. J. (M)
Gerould, L. D. (A)
Gilpin, D. J. (M)
Gielchauf, T. J. (M)
Goodman, R. G. (M)
Grab, F. W. (M)
Greenburg, A. R. (M)
Greer, P. H. (A)
Grosch, H. R. J. (SM)
Gundry, J. C. (A)
Ham, N. C. (M)
Hammond, J. R. (A)
Hansburg, M. (M)
Hancock, N. W. (M)
Harris, T. L. (M)
Hartig, E. O. (SM)
Hays, J. I. (A)
Hembise, P. M. (A)
Hempel, R. A. (A)
Hershey, L. M. (SM)
Hickman, J. E. (A)
Hinkle, W. L. (M)
Hitt, W. R. (SM)
Hittel, L. A., Jr. (A)
Hogan, A. W. (M)
Hooper, W. O. (A)
Hopper, B. (M)
Horton, M. C. (A)
Hostetter, J. M. (M)
Hume, A. S. (SM)
Huntington, R. C. (A)
Ittenbach, L. J., Jr. (A)
Jacobsen, A. H. (SM)
James, R. L. (A)
Janevic, J. J. (A)
Jensen, R. E. (M)
Jeralaman, W. D. (M)
Jones, A. C. (A)
Jones, J. E. (A)
Jurich, S. (A)
Kees, H. (SM)
Kehrer, O. H. (A)
Kemmerics, F. D. (A)
Kettlety, R. W. (A)
Kidwell, W. M. (SM)
Kiesel, A. F. (M)
Knowles, W. N. (M)
Koch, J. G. (M)
Krueger, E. C. (M)
La Prade, G. L. (A)

Samuelson, R. E. (F)
Sanborne, J. M. (M)
Saxon, W. R. (M)
Schaffner, G. (M)
Schauer, H. L. (M)
Schultheis, H. B., Jr. (SM
Scrafford, R. L. (M)
Shaner, J. R. (A)
Shepard, E. S. (M)
Sherman, M. R. (M)
Shower, E. G. (SM)
Shumway, K. J. (A)
Sittner, W. R. (SM)
Smith, A. L. (M)
Smith, L. R. (M)
Sokoloff, P. W. (SM)
Spielberg, A. M. (M)
Staats, R. U. (A)
Steele, E. L. (A)
Sterns, W. G. (M)
Stevens, C. R. (M)
Stringer, P. P. (A)
Symons, D. M. (M)
Szupillo, R. E. (A)
Tardiff, R. J. (M)
Thomson, M. E. (A)
Tillman, W. F. (A)
Tinsley, C. G. (M)
Trego, D. G. (SM)
Tregub, B. G. (M)
Vandiveer, P. R. (M)
Vlasak, W. R. (A)
Voigts, W. H. (A)
Ward, S. A. (M)
Wartriner, B. (SM)
Washburn, R. P. (SM)
Weaver, W. B. (M)
Weiler, J. H. (M)
Whitaker, W. H., Jr. (M
White, E. A. (M)
Wiley, C. A. (M)
Wilhelm, R. L. (A)
Wilson, C. T. (M)
Wilson, L. H. (A)
Winkler, M. R. (M)
Witt, R. P. (M)
Wittenburg, C. W. (A)
Woodside, W. J. (A)
Wooley, R. L. (SM)
Wunderlich, L. J. (A)
Yost, R. R., Jr. (M)

Scottsdale (PHO-7)
Berens, G. F. (SM)
Brommer, R. A. (M)
Dahl, W. E. (A)
Deerhake, F. M. (SM)
Estes, C. L. (M)
Flickinger, W. J. (A)
Gabrielson, R. G. (A)
Gamble, G. W. (A)
Gosswiller, R. O. (M)
Groth, E. J., Jr. (SM)
Hale, R. F. (A)
Hinsdale, J. G. (SM)
Jacobi, G. T. (SM)
Kelting, W. M., Jr. (A)
Knight, W. H. (M)
Marlon, T. M. (SM)
McKee, R. M. (A)
Miller, R. H. (A)
Minard, R. E., Jr. (A)
Mitton, D. V. (A)
Pine, C. C. (M)
Porter, K. W. (M)
Richman, M. A. (M)
Ritz, W. A. (M)
Sheldko, R. J. (M)
Simpson, E. J. (A)
Stautner, P. L. (M)
Ter Heun, P. K. (A)
Van Ness, B. O. (M)
Waller, K. L. (M)
Winlund, E. S. (M)
Woolsey, K. A. (M)

Sierra Vista (FT-H-7)
Brauner, E. J. (A)
Gregg, R. C. (M)
Montasser, A. S. (M)
Waller, B. F. (SM)

Tempe (PHO-7)
Andrews, R. C. (A)
Board, C. Z. (A)
Cronshey, R. W. (M)
Cuccio, A. B. J. (M)
Harkins, D. (A)
Hausman, D. J. (A)
Helman, D. (M)
Hill, R. S. (A)
Lowney, S. W. (A)
Mayes, T. L., Jr. (A)
McSpadden, W. R., Jr. (M)
Merritt, C. H. (M)
Miraglia, J. F. (A)
Morton D. E. (A)
Robinson, R. D. (SM)
Steele, R. B. (M)
Weiss, H. (M)

Tombstone (FT-H-7)
Colby, G. V., Jr. (A)
Ferguson, L. N. (A)
Mudgett, A. H. (M)

Tucson (TUC-7)
Ajeman, M. S. (M)
Allison, G. D. (M)
Althouse, J. E. (M)
Anderson, M. A. (A)
Anderson, W. H. (A)
Armstrong, A. C. (A)
Baldwin, H. A. (M)
Bard, W. E. (A)
Bayless, C. R. (M)
Becker, C. L. (A)
Bershach, A. J. (SM)
Blattman, L. A. (M)
Brooks, H. B. (SM)
Brown, H. W. (VA)
Brown, T. R., Jr. (M)
Bundy, R. C. (SM)
Burch, E. C. (M)
Burns, G. A. (A)
Byrd, R. E. (A)
Carnevale, A. D. (A)
Chinnock, R. S. (M)
Cinquemani, A. P. (M)
Clark, H. L. (SM)
Clark, M. R. (M)
Cole, J. E. (A)
Constantinides J. S. (A)
Crone, R. L. (SM)
Cronin, W. M. (SM)
Daly, W. E. (M)
Davis, R. G. (M)
De Bolt, A. L. (A)
Dickey, W. S. (SM)
Dlouhy, F. W. (M)
Donaldson, J. W. (M)
Douglas H. T. (M)
Dunn, E. J. (A)
Dusterdick, H. G. E. (A)
Eddy, R. C. (M)
Featherston, J. R. (A)
Finley, W. S. (M)
Ford, J. W. (M)
Foster, F. N. (M)
Friedman, M. F. (A)
Gartner, J. K. (M)
Gibbings, J. F. (M)
Hamilton, E. W. (M)
Hammond, N. B. (A)
Hausenbauer, C. R. (M)
Haville, D. (M)
Hessener, R. A., Jr. (M)
Hildreth, D. E. (A)
Hoelman, D. (M)
Horlin, A. J., Jr. (SM)
Howland, R. L. (A)
Hudgings, D. W. (SM)
Jackson, J. J. (M)
Janza, F. J. (M)
Jorden, B. W., Jr. (M)
Kamhi, M. (A)
Kasten, J. W. (M)
Kenna, L. A. (M)
Kenney, B. D. (A)
Kernkamp, C. F. (A)
King, D. L. (A)
Koenig, A. A. (M)
Koerner, H. (M)
Lester, P. (M)
Lindenberg, E. C. (SM)
Little, D. E. (M)
Lynn, R. B. (A)
Macurak, A. (M)
Manhart, R. A. (SM)
Marston, E. J. (A)
Martin, T. L., Jr. (M)
Martinson, G. O. (M)
McClellan J. P. (M)
McGehee, W. W. (M)
McKinster, R. G. (M)
McMullen, A. L. (M)
Meyer, C. (M)
Meyer, R. J. (A)
Michalk E. R. (M)
Miller, F. G. (M)
Miller, R. J. (M)
Morris, W. J. (A)
Neumer, O. A., Jr. (M)
Nielson, R. M. (A)
Norby, H. A. (SM)
Pascoe, D. (M)
Perkins, A. N. (M)
Perper, L. (SM)
Peterson, G. R. (M)
Ream, S. M. (M)
Record, W. V. (M)
Reinecke, B. E. (SM)
Rogers, P. H. (M)
Russel, G. M. (M)
Russell, P. E. (SM)
Sakrison, D. J. (M)
Schick H. F. (M)
Skinner, B. S., Jr. (M)
Smith, J. (A)
Smith, L. J. (M)
Spillane, J. K. (M)
Spogen, L. R., Jr. (M)
Stangl, P. J. (SM)
Stewart, H. E. (SM)
Stock, G. B. (A)
Stultz, L. R. (M)
Svien, A. J. (M)
Swanda, E. E. (M)
Swartz, A. (A)
Taylor, C. K. (A)
Tihkan, G. (A)
Wade, J. A. (A)
Wagner, H. E. (M)
Walker, G. A. (SM)
Walsh, L. R. (A)
Ware, H. W., Jr. (SM)
Watson, C. L. (A)
Weiss, H. H. (M)
Wendahl, R. E. (A)
Wendt, R. B. (M)
Whatley, W. W. (A)
Whiteman, C. O. (M)
Willie, N. (SM)
Williamson, A. K. (A)
Wilson, L. A., Jr. (M)
Wipff, F. P. (M)
Wozniak, J. R. (A)

Warren (P-FH-7)
Cubbage, J. F. (A)

Williams AFB (PHO-7)
Horvath, M. J., Jr. (M)
Keeler, W. D. (A)

Winslow (PHO-7)
Hart, P. C. (A)

Yuma (PHO-7)
Hangartner, J. E. (M)
Landers, E. L. (M)
Nass, H. M. (M)
Powers, F. W. (A)

ARKANSAS

Blytheville (LR-6)
Dean, R. J. (A)
Mooney, R. M. (M)

Cabot (LR-6)
Cordrey, E. E. (SM)

Eldorado (LR-6)
Leins, F. R. (M)
Surrels, W. E. (A)

England (LR-6)
McClanahan, W. J. (A)

Fayetteville (LR-6)
Cannon, W. W. (A)
Girard, L. J. (M)
Lewis F. W. (M)
Raible, R. W. (A)

Fort Smith (LR-6)
Duvall, G. (M)
Logan, W. L. (M)

Harrison (LR-6)
Ward, F. E. (A)

Hope (LR-6)
Klipsch, P. W. (SM)

Hot Springs (LR-6)
Papoullias, V. P. (M)

Jacksonville (LR-6)
Watts, H. T., Jr. (A)

Little Rock (LR-6)
Barr, J. C. (M)
Cooke, H. F. (M)
Dillaplain, V. L. (SM)
Duncan, J. M. (A)
Edwards, J. M. (A)
Ellefson, G. E., Jr. (A)
Garrett, O. R. (A)
Hammil, R. B. (M)
Hegar, E. A. (SM)
Kunkel, W. E. (A)
McDonald, A. E. (A)
Menees, W. (A)
Price, L. E. (M)
Raedels, S. G., Jr. (A)
Reid, J. D. (F)
Warren, D. (A)
Weber, R. A. (M)
Wilson, F. J. (M)
Winn, D. L. (SM)
Woolfolk, R. L. (M)
Wylie, J. E. (M)

Malvern (LR-6)
Beem, R. M. (SM)
Nider, M. E. (M)

North Little Rock (LR-6)
Lamm, H. T. (A)
Lowery, H. J. (M)
Meyer, J. A. (A)
Mountjoy, G. (F)
Scott, G. H. (SM)

Quitman (LR-6)
Tarver, A. L. (M)

Scott (LR-6)
McRae, J. P. (A)

Siloam Springs (LR-6)
Anderson, M. K. (M)
Smith, C. E. (M)

Stuttgart (LR-6)
Burrow, W. R. (A)

Texarkana (LR-6)
Beall, L. S. (A)

Valley Springs (LR-6)
London, R. E. (A)

CALIFORNIA

Acampo (SAC-7)
Rinaudo, R. F. (A)

Alameda (SF-EB-7)
Colvin, L. D. (M)
Hall T. D. (M)
Hansen, H. M. (M)
Jensen, P. A., Jr. (M)
McNulty, J. W. (M)
Thompson, E. M. (M)

Alamo (SF-EB-7)
Bundrick, R. J. (A)

Albany (SF-EB-7)
Knapp, W. S. (M)
Sorensen, R. W. (M)
Wing, C. (A)

Alhambra (LA-P-7)
Ayers, J. L. (M)
Balling, R. A. (M)
Bunker, E. R., Jr. (M)
Cary, H. H. (M)
Filbert, W. B. (M)
Glelin, R. A. (M)
Gum, J. D. (M)
Hauerwaas, R. V. (M)
Hoffman, T. S. (A)
Hooper, G. E. (M)
Horton, D. K. (M)
Jones, C. E. (M)
Kirk, C. E., Jr. (M)
Levy, M. S. (M)
Ludekens, L. E. (M)
Schutz, R. W. (A)
Seidner, O. R. (M)
Silk, N. R. (SM)
Weeks, A. D. (M)
Whitacre, D. P., Sr. (SM)

Alondra (LA-7)
Cornell, J. R. (M)

Altadena (LA-P-7)
Alrich, J. C. (M)
Bagley, G. D. (SM)
Bielebach, M. C. (M)
Black, L. (M)
Braun, T. H. (M)
Braun, V. J. (SM)
Bruns, R. A. (M)
Chittenden W. R. (A)
Cowley J. P. (M)
Cox, W. F. (A)
Eichwald, W. F. (M)
Elkin, H. S. (A)
Gossland, J. K. (SM)
Hare, G. H. (M)
Hartig, D. E. (M)
Heath, G. F. (M)
Ingall, W. E. (A)
Israelsen, B. P. (A)
Johnson, H. S. (M)
Jugend, J. (M)
Kalbach, J. F. (SM)
Kimmel, R. O. (M)
Lewis, R. S. (A)
Lindholm, C. R. (M)
Linnea K. W. (M)
Lorandi, B. N. (M)
Lolass, A., Jr. (A)
Lucas, E. D., Jr. (M)
Martel, H. C. (A)
Mathison R. W. (M)
Mattson, D. F. (SM)
McCarthy, E. R. (A)
McCone, G. L. (M)
McCotter, G. R. (A)
Neumeyer, F. W. (M)
Nielsen, C. L. (M)
Oliver, D. S. (M)
Pugh, M. D. (M)
Riedel, J. C. (M)
Russell, W. E. (SM)
Schicke, P. F. (M)
Sem-Sandberg, S. (M)
Shannon, C. V. (M)
Shuey, C. W. (A)
Sibilia, L. (A)
Sink, R. L. (SM)
Sinnette, J. T., Jr. (A)
Sirri, N. (A)
Slocomb, G. M. (A)
Stephenson, H. G., Jr. (A)
Sternke, E. C. (SM)
Sussman, R. J. (M)
Talmo, R. E. (M)
Tehan, M. F. (A)
Thurman, R. V. (M)
Tucker, R. E. (M)
Vincent, D. A. A. (M)
West, L. E. (SM)
Westlake, P. R. (M)
Whalen, P. K. (A)
Whitney, M. G. (A)
Young, W. D. (M)
Young, W. L. (M)
Younger, U. E. (M)

Anaheim (LA-7)
Acker, W. W. (M)
Bailey, B. C. (A)
Brewer, H. C. (M)
Brown, J. H. (M)
Butler, D. S. (A)
Cairns D. N. (A)
Conrad, D. K. (A)
Cooney K. B. (M)
Darringer, R. E. (M)
Del Duca, A. (M)
Dierken, K. C. (M)
Doty, R. L. (SM)
Evinger, H. W. (A)
Gardner, F. M. (A)
Glowacki, W., Jr. (M)
Glowalla, J. (M)
Harinec, R. G. (A)
Horwitz, H. C. (M)
Jacobsen, G. C. (M)
Jenkins, F. W. (SM)
Jeschke A. W. (M)
Johnson, R. W. (SM)
Katz, L. (SM)
Keeler, W. H. (A)
Knepper, R. C. (A)
Knight, J. D. (M)
Lind, W. P. N. (M)
Little, F. A. (M)
Malik, O. J. (A)
Mallinckrodt A. J. (SM)
Masin, G. F. (SM)
McFarlane, M. D. (F)
Michael, H. (M)
Miller, R. D. (A)
Morton, W. B., Jr. (M)
Payne, D. W. (M)
Peters, G. (A)
Peterson, C. A. (M)
Peterson, H. C. (A)
Pride, F. W. (SM)
Ramont, R. L. (A)
Rassler, D. B. (A)
Redden, E. T. (A)
Schalk, N. (M)
Schenck, S. R. (A)
Seeley, E. S. (SM)
Shapin, T., Jr. (M)
Sierra, J. G. (M)
Smith, R. R. (SM)
Smith, S. L. (M)
Stephens, E. J. (A)
Stone, J. A. (A)
Strickland, W. H. (M)
Ullrich, W. J. (A)
Vogel, V. H. (M)
Wack, C. B. (A)
Webster, G. C. (A)
Wendt, J. R. (M)

Angwin (SF-7)
Neilsen, I. R. (M)
Robinson, J. D. (M)

Apple Valley (LA-7)
Ball, L. G. (A)
White, J. L. (M)

Aptos (SF-7)
Wrathall, G. R. (M)

Arcadia (LA-P-7)
Anderson, R. I. (A)
Askren P. S. (A)
Babeaux A. G. (A)
Backus, R. A. (A)
Chandler, J. A. (A)
Cramer, P. W., Jr. (A)
Dietz, D. P. (A)
Duncan, D. B. (A)
Eland, R. C. A. (M)
Fesko, J., Jr. (M)
Fiske, J. J. (M)
Foster, J. F. (M)
Fritz, W. (A)
Galavan, T. P. (A)
Grobeckrr, A. J. (M)
Horton, E. J. (M)
Johannesen, O. M. (SM)
Johnson, R. E. (M)
Lang, D. W. (A)
McElwee, J. F. (A)
McLauchlan, J. M. (A)
Murray, J. M. (A)
Nielsen, J. L., Jr. (SM)
Paquin, R. H. (SM)
Pfund, E. T. Jr. (M)
Pitzer, R. L. (M)
Price, J. F. (M)
Qua, W. C. (A)
Reynolds, K. A. (A)
Robertson, G. R. (M)
Schwank, R. T. (A)
Seiler, R. C. (SM)
Shaw, W. C. (M)
Sorge, B. W. (SM)
Sundberg, G. G. (M)
Swan, M. L. (SM)
Sykes, S. D. (M)
Thomas, E. H., Jr. (M)
Wald, K. A. (M)
Waldschmidt, N. E. (A)
Walp, R. M. (A)
Whistler, W. J. (A)
Wilson, L. M. (A)

Arlington (LA-OB-7)
Baker, W. L. (M)
Besel, H. (A)
Bishop, B. E. (M)
Bogue, H. (A)
Bradshaw, S. R. (SM)
Campbell, F. D. (M)
De La Briandais, R. E. (M)
Gray, K. B. (A)
Hoyt, E. P. (A)
Lott, L. R. (A) (A)
Rahtos, P. A. (M)
Todd, B. J. (A)
Witbeck, L. H. (M)

Artesia (LA-7)
Seldeen, D. J. (M)

Atherton (SF-PA-7)
Blanchard, H. P. (M)
Borden, H. C., Jr. (M)
Byrne, P. F. (M)
Crapuchettes, P. W. (M)
Eldred, W. N. (SM)
Geisler, W. S., Jr. (A)
Jones, R. M. (SM)
Kane, R. W. (M)
McCullough, J. V. (A)
Moore, N. H. (SM)
Ross, D. H. (M)
Scofield, P. F. (SM)

Auburn (Sac-7)
Chesney, A. P. (SM)

Azusa (LA-OB-7)
Clark, P. A. (M)
Cohen, L. B. (M)
Gispen, S. J. (M)
Griffin, D. J., Jr. (M)
Jamieson, J. A. (M)
Moss, J. F., Jr. (A)
Squires, D. C. (A)
Thorpe, R. W. (SM)
Zaxman, B. (A)

Bakersfield (LA-7)
Andress, E. A. (M)
Clement, P. F. (M)
Hoffman, R. D. (A)
Hood, H. E. (A)
Mazziotti, A. J. (A)
Voge, F. (A)
Whiting, W. E. (M)

Balboa Island (LA-7)
Hunsen, E. H. (SM)

Baldwin Park (LA-OB-7)
Michle, C. G. (M)

Beaumont (LA-7)
Dinga, E. W. (A)
Hotine, W. (M)

Bell (LA-7)
Clark, O. J. (A)
Louie, W. (A)
Zelenay, J. (A)

Bellflower (LA-7)
Bean, R. C. (M)
Brannian, W. R. (A)
Cone, R. D. (M)
Crandon, L. H. (SM)
Noar, R (A)
Pollack, M. (SM)
Thompson, M. F. (SM)
Witt, A. N. (M)

Bell Gardens (LA-7)
Adams, R. L. (A)
Rickard, L. D. (A)
Roper, M. M. (M)

Belmont (SF-PA-7)
Bianco, J. D. (M)
Bly, T. S. (M)
Carter, J. M. (SM)
Damonte, J. B. (M)
Ehrmantraut, H. C. (A)
Ellison, T. A. (M)
Gates, W. F. (M)
Hack, W. L. (A)
Hale, E. H. (A)
Hyne, A. D. (M)

Johnson, R. E. (A)
Johnstone, F. C. (M)
Kuhn, H. G. (SM)
Lee, Stanley (M)
Towne, A. E. (M)
Zellmer, N. A. (M)

Berkeley (SF-EB-7)
Acker, R. C. (SM)
Allison, R. W. Jr. (A)
Angelakos D. J. (SM)
Anger, H. O. (M)
Badger, G. M. W. (M)
Baron, A. A. (M)
Batten, H. W. (A)
Bently, D. E. (M)
Berte, D. W. (M)
Bonner, H. W. (M)
Bourne, H. C., Jr. (SM)
Braslau, N. (A)
Brown, L. E. (M)
Buffum, J. H. (A)
Chou, T. L (M)
Clapp, F. D (SM)
Cole, E. E. (A)
Corey, V. B. (M)
Crocker, C. F. (M)
Davis, D. D. (M)
Dell, H. R. (M)
Ellsworth, R. L. (M)
Evans, F (A)
Farly, G. M. (SM)
Fass, S. J (VA)
Freeman, E. D. (M)
Freeman, J. E. (A)
George, A. J. (M)
Gephart, C. L. (M)
Gerchberg, R. W. (A)
Goldsmith, A. (M)
Gorham, J. S. H. (M)
Greene, G. B. (A)
Haubrock, F. W. (M)
Heard, H. G. (M)
Hopkin A. M. (A)
Hunter, J. (A)
Huskey, H. D. (M)
Inman, F. W. (A)
Iwamoto, I. (M)
Johnson, B. M. (A)
Jury, E. (SM)
Kluver, B. (A)
Kuh, E. S. (A)
Lutz, I. C. (SM)
Mack, D. A. (M)
Melvin, R. B. (A)
Morris R. J. (M)
Morton, P. L. (F)
Nakamura, M. (M)
Neelands, R. (A)
Nelson, W. H. (SM)
Noller, W. E. (SM)
Oden, D. E. (A)
Ogg, R. D. (M)
Paige, A. (A)
Pederson, D. O. (M)
Plonsey, R. (M)
Pope, J. C. (A)
Pritchett, W. (SM)
Ray, R. L. (M)
Rector, R. H. (M)
Reukemu, L. E. (F)
Rodgers, P. W. (A)
Russell, J. A. G (M)
Scott, D. A. (A)
Scott, H. J. (SM)
Shiu, P. D. C. (A)
Silver, S. (F)
Sloan, D. H. (SM)
Smith, A. J (M)
Smith, B. H. (SM)
Smith, O. J., M. (SM)
Soule, W., Jr. (A)
Strothman, R. A. (M)
Stubblns, W. F. (M)
Susskind, C. (SM)
Taskett, D. A. (M)
Thomasian, A. J. (M)
Turner, S. E. (A)
Van De Riet, E. K. (A)
Veltfort, T. E., Jr. (A)
Vogelsberg, F. E. (A)
Walsh, R. M. (A)
Whinnery, J. R. (F)
Williams, C. S. (A)
Williamson, S. R. (M)
Windsor, A. A. (M)
Wong, R. B. (A)
Woodyard, J. R. (M)

Beverly Hills (LA-7)
Albin, F. G. (A)
Austrian, R. B. (SM)
Barnett, A. H. (A)
Burrows, D. E. (A)
Campbell, E. J. (A)
Cannon, H. L. (A)
Crawford, A. A. (SM)
Ellis, D. O. (M)
Fisch, M. W. (A)
Frankl, S. (F)
Gilson, R. J. (SM)
Green, D. J. (SM)
Harmon, W. S. (SM)
Helland, J. C. (SM)
Johnson H. (M)
Krack, J. J. (A)
Lichterman, G. (M)
Lieberman, I. J. (A)
Magnuson, R. W. (M)
Manion, E. F. (M)
Nutt, J. H. (A)
Paskusz, G. F. (M)
Pederson, W. O. (M)
Pourtales, J. R. (A)
Rorden, R. J. (M)
Rutherford, C. E. (SM)
Shanahan, E. F. (M)
Signer, R. M. (M)
Skoller, M. (SM)
Terry, R. L. (SM)
Weiss, L. H. (M)
Wilkening, C. F. (M)
Wilson, T. A. (SM)
Winchell, R. W., (M)
Wolcott, C. F. (F)
Zint, K. E. (SM)

Bishop (LA-7)
Rudolph, E. (A)
Wolf, J. E. (M)

Boron AFB (CL-7)
Andrews, J. V. (A)

Brea (LA-7)
Donner, W.(M)
Kirk, R. J. (M)

Buena Park (LA-7)
Cuningham, G. W. (A)
Hovda, R. E. (A)
Kemper, D. M. (A)
Lipsky, D. (A)
Nickerson, H. H. (A)
Rose, T. L. (A)
Sisco, W. B. (M)
Sprong, D. C. (A)

Burbank (LA-SF-7)
Alderete, C. T. (A)
Ames, B. C. (M)
Asking, J. L., Jr. (A)
Barcock, D. F. (SM)
Baworouski, J. (A)
Beans, J. B. (A)
Bennett, P. L. (M)
Bercovitz, N., Jr (A)
Brockway, D. C. (VA)
Brown, C. W. (M)
Bukhdud, J. (A)
Bunce, J. W. (A)
Campbell, D. E. (SM)
Clabaugh, R. G. (M)
Clark, R. W., Jr. (M)
Clarke, F. H., Jr (SM)
Cox, W. E. (M)
Coogan, J. H. (A)
Dahl, E. E. (M)
Davis, J. F. (M)
Davis, W. K. (M)
Draper, E. K. (A)
Edgerton, A. K. (M)
Everett, F. A. M. (VA)
Fairbanks, G. G. (M)
Fawcett, K. D. Jr. (A)
Freedall, B. F. (M)
Frieburg, H. E. (A)
Ganzenhuber, J. H. (SM)
Gilbert, E. M (M)
Gish, C. (A)
Goda, O. S. (A)
Hansbrough, F. G. (A)
Hathaway, J. C. (M)
Hoff, K. (SM)
Horvath, J. S (M)
Huston, O. E. (M)
Ittleson, J. S (A)
Jones, W F (M)
Kent, R C. (SM)
Lagarsani, G. C. (M)
Lamphear, G. (A)
Lehan, F. W. (SM)
Markley, J. E., Jr. (A
Martin, W. R. (SM)
Matthews, C. (A)
McAdam, J. C. (M)
McGee, M. E. (M)
Mintz, P. (M)
Mitchell, J. A. (A)
Monroe, P. P. (A)
Moriarty, J. L. (M)
Mosier, R. R. (SM)
Moyer, J. N. (SM)
Mueller, W. A. (M)
Mullich, G. L. (A)
Murad, E. J. (M)
Myers, J. L. (M)
Nicol, R. A. (M)
Olson, O. P. (A)
Orr, R. A. (M)
Perman, E. M. (A)
Primozich, F. G. (A)
Quist, R. C. (A)
Roberts, P. S. (M)
Romandin, P. R. (A)
Sawman, R. W. (A)
Schreiber, W. F. (M)
Schwartz, H. (M)
Schwartz, N. A. (M)
Seitz, F. R. (M)
Seit, D. (M)
Shahan, O. (M)
Sigler, H. R., Jr. (A)
Slocum, R. L. (M)
Smith, C. A., Jr. (A)
Smokler, M. L. (M)
Starr, A. R. (A)
Stevens, R. W. (M)
Taylor, E. H. (A)
Tzschelen, E. A. (A)
Wainscott, D. M. (A)
Walz, D. A. (M)
Warrington, W., Jr. (A)
Watson, W. J. (A)
Weatherford, R. V. (A)
Woolard, T. C. (M)
Woodring, R. L. (A)
Woods, H. D. (M)
Zilm, C. F. (A)

Burlingame (SF-7)
Haines, W. D. (M)
Haliua, J. W. (M)
McCann, R. E. (A)
Reinartz, J. L. (SM)
Turkot, A. (A)
Welcome, W. W. (A)
Wunderlich, G. F. (SM)

Calabasas (LA-SF-7)
Clavin, A. (M)
Elliott, R. S. (SM)
Krausz R. (SM)
Newton, A. E. (SM)
Rosen, S. A. (M)
Schetne, H. A. (M)

Calexico (SD-7)
Lacarro, A. A. (A)

Camarillo (LA-B-7)
Angle, E. E. (M)
Buland, R. N. (M)
French, R. L. (M)
Harvey, J. P. (A)
Hill, C. V. (A)
Jennett, N. E., Jr. (M)
Keller, E. G. (A)

Campbell (SF-7)
Allen, F. K. (A)
Rowley, J. J. (A)
Thompson, A. J. (M)

Canoga Park (LA-SF-7)
Aiken, W. S. (A)
Amdahl, G. M. (A)
Apa, F. E. (A)
Auld, S. H., Jr.(M)
Baker, B. W. (A)
Barnhart W. H. (A)
Bauman, V. R. (A)
Bemis, F. S. (M)
Bertucci, J. F. H (M)
Block, E. B. (A)
Buchholz, C. W. (A)
Campbell, S. (M)
Capps, J. W. (A)
Carson, D. G. (M)
Chapman, R. R. (A)
Cooper, H. V. (A)
Corbin, G. C. (A)
Craig, L. J. (M)
Crawford, D. B. (A)
Cummins, E. L. (A)
Cutler, W. B (M)
Daverio, A. J. (M)
Erhardt, K. D. (M)
Flint, J. C. (A)
Fortescue, G. H. (A)
Frankos, D. T. (A)
Geary, L. W. F. (M)
Gebel, J. L. (A)
Gleason, M. J. (M)
Graham, W. (M)
Grant, P. M. (M)
Heald, E. T. (SM)
Hitz, G. D. (M)
Hoefener, C. E. (A)
Hoff, G. (M)
Homer, E G. (M)
Hoskinson, E. A. (M)
Hund, E. (M)
King, J E. (A)
Kouba, J. T. (A)
Kuffert, J. E. (A)
Laubenstein, R. A. (M)
Leach, H. L. (A)
Littlefield, K. E. (M)
Makinli, W. S. (M)
Mason, A. A. (A)
McAfee, P. (A)
McCurley, E. A. (M)
McKeown, H. F. (A)
Mooney, G. F. (A)
Perlman, M. (M)
Powell, R. M. (M)
Powell, W. K. (M)
Pratt, J. W., Jr. (M)
Ramsauer, F. J. (A)
Rice, S. M. (M)
Ross, H. H., Jr. (M)
Sawman, R. W. (A)
Schreiber, W. F. (M)
Schwitz, H. H. (A)
Silverstein, M. M. (M)
Sisson, A. R. (SM)
Sutton, W. R. (M)
Thomas, R. (M)
Webb, C. A. (A)
Weber, D. R. (M)
Westenhaver, J. L. (M)
Whitten, G. A. (M)
Wilson, F. V. (A)

Carmel (SF-7)
Chitwood, J. S., Jr. (A)
Martinez, H. M. (A)
Pastel, M. P. (M)

Carmel Valley (SF-7)
MacDonald, F. W. (SM)

Carmichael (SAC-7)
Ashley, A. B. (M)
Bills, G. R. (A)
Hajnik, A. P. (A)
Kelffher, J. E. (VA)
Wilson, J. T. R. (M)

Castle AFB (SF-7)
Martin, J. R. (A)

Castro Valley (SF-EB-7)
Diamond, A. M. (M)
Ewing, D. L. (M)
Kippenhan, D. O. (A)

Chatsworth (LA-SF-7)
Woodward, E. O. (M)

Chico (SAC-7)
Clausnitzer, F. W. (A)

China Lake (CL-7)
Arnold, P. G. (M)
Ashbrook, F. M. (SM)
Bell, W. C. (A)
Beresford, D. R. (M)
Boyle, J. M. (M)
Breitenstein, R. E. (M)
Bryant, L. D. (M)
Crawford, J. A. (M)
Creusere, M. C. (M)
Defenbach, R. W. (M)
De Groot, N. F. (M)
Dember, A. B. (A)
Deyoe, D. C. (M)
Domen, S. L. (A)
Dorsey, S. E. (M)
Ducoff, G. (M)
Everett, J. A. (A)
Farrington, H. W. (A)
Ferris, A. B. (A)
Field, W. A. (M)
Freeman, C. F. (M)
Gado, L. G. (M)
Glatt, B. (A)
Gregory, J. H. (SM)
Harris, J. F. (A)
Heeke, G. D. (M)
Hendrix, C. E. (A)
Herman, R. W. (M)
Hilker, H. V., Jr. (A)
Jeung, J. L. (A)
Johanboeke, R. B. (M)
Kermode, D. W. (M)
Keyes, J. C. (SM)
Kim, P. K. S. (A)
King, R. E. (M)
Koster R. A. (A)
Lawrence, R. E. (A)
Loper, W. E. (M)
Lowe, N. (M)
Madden, J. P. (A)
McLane, J. J. (A)
Merriam, R. T. (A)
Mitchell, P. P. (A)
Neal, C. L. (M)
Ollikkala, E. E. (A)
Olsen, R. C. (A)
Ostenso, A. S. (A)
Reins, E. R., Jr. (M)
Ronning, H. N. (A)
Rosenberg, H. W. (M)
Rountree, W. R. (A)
Schimmel, G. (A)
Sherwin, S. (M)
Skeeters, R. N. (M)
Slampyak, S., Jr. (M)
Smith, R. T. (M)
Stevenson, D. D. (A)
Sykes, L. (A)
Vore, W. E. (M)
Warr, G. D. (M)
Weber, J. E. (A)
Zellmer, W. G. (A)
Zilmer, D. E. (A)
Zimnoch, J. J. (A)

Chula Vista (SD-7)
Chiles, J. R., Jr. (A)
Hart, J. M. (M)
Hauk, G. L. (A)
Rockowitz, J. B. (A)
Schulman, M. (M)
Sean, J. (M)
Smith, H. C. (M)
Steiner, F. A. (A)
Taylor, W. G. (M)
Varian, R. H. (A)

Citrus Heights (SAC-7)
Froeschle, E. J., Jr. (M)

Claremont (LA-OB-7)
Agerholm, M. (M)
Andrew, V. J. (F)
Birch, R. S. (A)
Bryla, L. (A)
Carroll, L. R. (A)
Chrystie, H. (M)
Culver, C. A. (F)
Depew, H. Jr. (M)
Gaddis, L. W. (M)
Gibbons, T. J. (SM)
Grumbein, P., Jr. (M)
Guay, J. F. (A)
Guinane, J. E. (A)
Hansen, O. R. (M)
Hostetler, R. R. (M)
Irvine, R. G. (M)
Jacobson, O. M. (M)
Konkel, T. C. (M)
Kuntz, G. L. (A)
Lloyd, A. T. (M)
McDowell, D. E. (A)
Michaels, E. L. (SM)
Montgomery, J. D., Jr. (M)
Pile, D. H. (SM)
Porter, J. W. (A)
Schock, J. D. (SM)
Sommer, H. H. (A)
Street, N. C. (M)
Taylor, A. H. (F)
Utman, R. E. (M)
Wildman, R. C. (SM)
Young, C. W. (SM)

Colton (LA-OB-7)
Hollinrake, J. M. (M)

Compton (LA-7)
Balgenorth, G. V. (M)
Bravo, M. V. (A)
Duarte, S. R. (M)
Gerhard, F. H. (M)
Moulton, J. A. (M)
Pritchette, T. J. (A)
Risley, E. O. (A)
Schneider, R. L. (M)
Weber, W. R. (M)
Willcocks, S. J. (A)

Concord (SF-EB-7)
Billinghurst, E. M. (A)
Bogdanoff, A. G. (M)
Bruce, C. A. (A)
Castanera, T. E. (A)
Chenoweth, W. G. (A)
Clemens, G. W., Jr. (M)
Derflinger, H. L., Jr. (A)
Hyde, W. E., Jr. (M)
Kimes, R. E. (A)
Laudeck, O. (A)
Perry, C. L. (M)
Thomas, C. L. (A)
Watson, J. K. (M)
Wheeler, G. M., Jr. (M)

Conrad (SF-EB-7)
Nielsen, G. A. (M)

Corona (LA-OB-7)
Adrian, D. J. (A)
Bastelo, G. R. (SM)
Bell, D. E. (M)
Blank, S. (M)
Bulgerin, H. A. (A)
Dorn, C. G. (A)
Emerson, R. R. (A)
Ganahl, P. J. (SM)
Gosley, A. W. (A)
Hamilton, R. E. (A)
Harris, E. A., Jr. (M)
Husten, B. F. (SM)
McCormick, E. M. (SM)
McCroskey, A. A. (SM)
Meggers, W. F., Jr. (M)
Nordseth, M. F. (M)
Parker, M. J. (M)
Sacks, J. M. (A)
Scharp, G. A. (M)
Schevts, D. F (M)
Strother, C., Jr. (A)
Talbot, R. V. (A)
Van Orsdel, K. A. (A)
Walters, A. W. (M)
Weiss, A. (A)
Whiteley, T. B. (A)
Wiesler, H. H. (M)
Wood, B. C. (M)

Corona Del Mar (LA-7)
Bream, H. C (SM)
Goodwin, P. H., Jr. (M)

Coronado (SD-7)
Bowen, C. H. (A)
Franks, B. W. (M)
Garard, E. A. (SM)
Held, R. W. (M)
McDonald, W. H. (M)
Toohill, D. L. (M)

Costa Mesa (LA-7)
Robinett, D. H. (A)
Schneider, S. (A)

Covelo (SF-7)
Brown, E. L. (M)

Covina (LA-OB-7)
Anderson, R. W. (M)
Bewley, L. L. (A)
Carlson, H. (A)
Clark, J. H. (SM)
Gross, J. E. (A)
Hendrickson, R. J. (M)
Johnson, C. W. (M)
Johnston, D. L. (A)
Jones, L. L. (M)
Jones, J. G. (VA)
Joyce, J. H. (M)
Kring, J. D., Jr. (A)
Little, R. W. (A)
Lord, D. S. (SM)
Lowe, M. E. (M)
Luty, R. C., Jr. (A)
McAllister, M. W. (A)
Mleczko, E. L. (M)
Powers, K. G. (M)
Rahlf, J. P. (A)
Skaggs, E. R. (M)
Sylvester, G. E. (M)
Watkins, K. S. (A)
Wells, M. A. (M)
Verdon, G. W. (SM)

Crannell (SF-7)
Kidder, R. T.

Hendricks, M. (A)
Herrnfeld, F. P. (SM)
Hiehle, M. E. (SM)
Hill, D. A. (M)
Hirshson, R. M. (M)
Holmer, J. S. (M)
Hull, R. E. (M)
Hyland, L. A. (F)
Hyneman, R. F. (A)
Jacobs, J. E. (M)
Jerrems, A. S. (SM)
Johnson, D. H. (A)
Julian, R. S. (M)
Kelly, D. S. (M)
Kingman, G. M. (M)
Klapp, C. D. (A)
Klein, S. I. (A)
Klestadt, B. (M)
Knowlton, C. S. (M)
Kolin, N. J. (M)
Kramer, A. G. (A)
Kreinheder, D. E. (A)
Lane, C. A. (M)
Le Moin, P. M. (A)
Levin, S. (M)
Livesay, M. A. (SM)
Long, M. C. (M)
Lottermann, C. (A)
Lun, W. B. (A)
Lym, V. W. (M)
Lyons, H. (SM)
Maguire, W. W. (M)
Maserjian, J. (M)
Maxey, T. J. (SM)
Mayper, V., Jr. (M)
McCoy, J. G. (M)
McFadden, B. V. (M)
McGaughey, J. R. (SM)
McKenzie, J. A. (A)
McMullen, W. H. (A)
Medow, A. (A)
Mendel, J. T. (M)
Miwa, T. M. (M)
Miya, K. (A)
Munushian, J. (A)
Myer, J. H. (M)
Nelson, J. S., Jr. (A)
Norsell, P. E. (A)
North, H. Q. (F)
Nuttall, H. V. (A)
Ollum, F. H., Jr. (A)
O'Toole, J. B. (M)
Parode, L. C. (SM)
Paul, P. F. (M)
Pease, R. L. (SM)
Plecha, L. M. (M)
Platt, W. D. (A)
Proud, W. H. (M)
Purl, O. T. (A)
Ranftl, R. M. (SM)
Regal, W. J. (A)
Riley, R. L. (A)
Robin, G. W. (A)
Root, C. S. (SM)
Rubel, J. H. (M)
Saye, T. A. (M)
Schnause, E. R. (M)
Schoen, S. (M)
Scholnick, S. A. (A)
Schwartz, E. V. (M)
Seuf, G. A. (A)
Shamban, W. S. (A)
Shank, R. J. (SM)
Slepian, P. (M)
Smith, H. M. (SM)
Talcott, G. P. (M)
Talle, C. A. (A)
Tang, R. (M)
Tate, W. R. (M)
Thompson, B. V. (SM)
Tobin, G. C. (A)
Tong, K. C. (A)
Trapeur, R. E. (A)
Vail, A. E. (M)
Van Atta, L. C. (F)
Van Horne, T. B. (M)
Vesser, W. C. (A)
Wager, M. C. (M)
Walters, W. H. (A)
Watanabe, E. (M)
Weber, G. J. (M)
Wegman, R. S. (SM)
Wilcox, C. H. (M)
Williams, J. V., Jr. (SM)
Winston, H. (M)
Wong, K. L. (M)
Woodruff, M. J. (M)
Wright, W. V., Jr. (M)
Yee, W. W. B. (M)
Young, G. O. (SM)

Cupertino (SF-7)
Bettendorff, O. A. (M)
Blessing, R. L., Jr. (M)
Chesebro, E. L. (M)
Colin, C. B. (M)
Cottrell, C. J. (A)
Gillmeister, F. W. (VA)
Hart, A. L. (A)
Heneslan, A. (A)
Perry, R. L. (M)
Peterson, N. C. (M)
Roth, I. (A)
Seader, L. D. (A)
Sutton, J. G., Jr. (M)
Theisner, W. C. (A)
Varian, R. H. (F)

Cutler (SF-7)
Walston, A. G. (M)

Daly City (SF-7)
Helfey, R. M. (A)
Tudor, B. J. (A)

Dana Point (LA-7)
Weekes, B. B. (M)

Danville (SF-EB-7)
Norris, N. J. (A)

Davis (SAC-7)
Jacob, F. C. (M)

Delmar (SD-7)
Boelens, J. (A)
Howe, D. H. (M)
Jones, W. C. (M)
Levy, G. S. (M)
Robbins, L. E. (A)
Westerwick, R. A. (M)
Widenmann, J. A. (M)

Del Paso Heights (SAC-7)
Pehrson, C. R. (A)

Denair (SAC-7)
Sayre, M. B. (A)

Downey (LA-7)
Agalsoff, J. (A)
Alfrey, P. R. (M)
Altman, G. G. (M)
Baggao, J. J. (A)
Beall, A. (M)
Bell, H., Jr. (A)
Bilis, G. V. (M)
Boyer, R. J. (M)
Bower, J. L. (SM)
Bruemmer, R. K. (M)
Bunker, R. S. (M)
Butler, A. G. (M)
Cahn, S. L. (SM)
Campbell, A. T. (M)
Carey, G. D. (M)
Christgau, N. A. (A)
Clements Z. S. (A)
Cliffgard, A. (M)
Comyns, L. S. (M)
Davis, D. A. (A)
Deutsch, W. F. (M)
D'Evelyn, R. P. (A)
Gamson, E. R. (M)
Glenn, R. D. (M)
Hailey, R. D. (A)
Harper, C. E. (A)
Haynes, J. (M)
Hochwald, W. (SM)
Hodson, W. G. (SM)
Jahimiak, R. (A)
Johnson, M. W. (M)
Jones, M. R. (M)
Kennel, J. M. (SM)
Kilpatrick, L. L. (M)
Knobbe, L. J. (A)
Kukel, (M)
Larsen, H. F. (M)
Leicester J. F., III (M)
Lulofs, J. R. (A)
Lutes, C. L. (M)
Maroza, J. (M)
Marshall, B. (M)
Matticich, J. R. (M)
McDonald, C. E. (M)
Meade, R. O. (M)
Melgaard, J. L. (SM)
Mielke, J. J. (M)
Morgan, L. J. (M)
Morgan, V. T. (M)
Murray, M. W. (A)
Nameth, J. F. (A)
Nelson R. A. (M)
Palmer, W. E. (M)
Petersen, L. D. (M)
Phillips, W. J. (M)
Pope, W. S. (M)
Popp, D. R. (A)
Rasmussen, C. F. (M)
Sanchakey, Z. A. (M)
Schmid, R. C. (SM)
Schumann, W. A. (A)
Schwab, B. B. (M)
Schwarzmann, W. A. (SM)
Shelley, R. G. (A)
Singleton, H. E. (SM)
Smedley, J. A. (A)
Stoll, C. N. (M)
Straus, L. (M)
Szabo, J. E. (A)
Tarca, E. L. (A)
Trousdale, R. B. (M)
Varanny, C. J. (M)
Weber, E. L. (M)
White, J. G. (M)
Williams, N. (M)
Wolfe, A. E., Jr. (M)
Wong, D. W. (M)
Worden, J. M. (A)
Yamada, D. A. (A)

Duarte (LA-P-7)
Hain, M. E. (M)
Baker, C. W. (A)
Larson, M. H. (M)

East Palo Alto (SF-PA-7)
Iseri, C. H. (A)
Roder, A. (A)

East Whittier (LA-7)
Sanders, L. L. (M)
Sorensen, E. G. (M)

Edwards (CL-7)
Anderson, L. A., Jr. (A)
Courtney, J. D. (M)
Freeman, W. L. (A)
Horwinski, E. R. (M)
Howell, F. S. (SM)
Luthrop, R. C. (M)
Lauby, J. W. (M)
Lawson, J. B. (A)
McKenzie, J. N. (A)
McPherson, J. J. (M)
Robichaud, R. H. (M)
Steen, J. E. (A)
Thomas, C. P. (A)

El Cajon (SD-7)
Bayley, L. B., Jr. (A)
Burton, K. M. (A)
Chazotte, M. M., Jr. (A)
Cunningham, E. E. (M)
Dana, J. J. (M)
Grammas, E. G. (M)
Hardy, W. G. (M)
Hedrick, W. (A)
Helbeck, H. L. (A)
Pitt, C. J. (M)
Quintana, I. M. (M)
Rees, B. A. (A)
Sherburne, C. J. (M)
Sievers, S. S. (M)
Smith, G. W. (M)
Solteaz, E. S. (M)
Wells, T. C. (A)
Williams, A. A. (A)

El Centro (SD-7)
Hesse, J. F. (M)
Planinac J. W. (M)

El Cerrito (SF-EB-7)
Dimmick, R. R. (M)
Gray, H. F., Jr. (SM)
Lawrence, M. J. (M)
Maeshner, E. (M)
Nakamoto T. (M)
Olson, J. B. (M)
Patterson, S. J. (A)
Scott, N. B. (A)
Spiegel, L. (M)
Watson, H. M. (M)

El Granada (SF-PA-7)
Underwood, W. B. (A)

El Monte (LA-P-7)
Atherton, C. A. (A)
Dolde, L. A. (A)
Larson, A. G. (M)

El Segundo (LA-7)
Beard, M. R. (SM)
Betinelli, E. F. (M)
Byck, D. M. (M)
Diamond, P. (SM)
Eaton, C. F. (A)
Garon, R. J. (M)
Gould, G. F. (M)
Gray, J. O. (M)
Lindquist, W. I. (A)
Mesak, C. (M)
Mousel, G. W. (A)
Pederson, R. H. (M)
Rodgers, J. W., Jr. (A)
Schmitz, P. J. (M)
Thornley, W. R. (M)

El Sobrante (SF-EB-7)
Farrell, S. R. (A)
Weinstein, D. A. (A)

El Toro (LA-7)
Burke, R. M. (A)
Mongan, A. J. (M)

Emeryville (SF-EB-7)
Cowley, P. E. A. (A)

Encinitas (SD-7)
Woodworth, J. D. (M)

Encino (LA-SF-7)
Anderson, G. W. (M)
Bailey, G. W. (A)
Benbrooks, L. A. (M)
Berwin, T. W. (A)
Brown, B. J. (M)
Cain, G. A. (A)
Clark, F. J. (M)
Ferber, D. (M)
Fuller, R. E. (A)
Gibson, R. G. (M)
Goldstick, G. H. (M)
Hadden, F. A. (M)
Hall, R. D. (M)
Hepperle, C. M. (SM)
Hoover, J. R. (A)
Huroodo, K. W. (A)
Iur, C. J. (A)
Kalson, N. H. (SM)
Lacy, R. R. W. (M)
McCann, J. G. (SM)
McCusker, R. W. (A)
Meteviu, E. E. (A)
Mintz, E. (M)
Morrow, H. W. (M)
Nibbe, G. H. (SM)
O'Halloran, J. F. (SM)
Perrine, C. D., Jr. (A)
Pfeffer, L. (M)
Pischel, E. F. (SM)
Sarture, C. W. (M)
Scanlan, J. A. (A)
Schertle, W. B. (A)
Schroder, R. D. (SM)
Scott, H. A. (A)
Seltzer, L. J. (A)
Senf, H. R. (SM)
Sharpe, L. E. (A)
Von Buelow, R., (A)
Widell, C. D. (M)

Escondido (SD-7)
Seabaugh, D. A. (M)

Eureka (SF-7)
Olson, A. E. (A)
Smullin, W. B. (A)

Fairfax (SF-7)
Gray, G. P. (VA)

Fairfield (SF-7)
Haag, M. W. (M)
Martinell, R. E. (M)
Merrill, J. H. (M)
Morsy, E. (A)

Fair Oaks (SAC-7)
Mellott, K. W. (A)
Miles, C. W. (A)

Fillmore (LA-B-7)
Alker, C. A. (A)

Florin (SAC-7)
Tahara, G. R. (A)

Folsom (SAC-7)
Jenkins, O. D. (A)

Fontana (LA-OB-7)
Riggins, M. R. (A)
Wayman, J. M. (A)
Zinn, S. D. (M)

Fort Jones (SAC-7)
Fowler, J. A. B. (M)

Fort Ord (SF-7)
Kuzmich, G. (A)

Fremont (SAC-7)
Weed, N. M. (M)

Fresno (SF-7)
Bartlett, P. R. (M)
Bird, J. R. (SM)
Foin, O. F., Jr. (M)
Foreman, R. E. (A)
Hancock, J. B. (A)
Mealey, K. L. (M)
Whitby, E. R. (A)

Fullerton (LA-7)
Barden, V. R. (A)
Barnes, J. L. (F)
Barter, L. D. (A)
Beekman, R. E. (SM)
Berger, J. E. (A)
Bishop, J. F. (A)
Chaffee, B. J. (M)
Chapman, C. W. (SM)
Chute, R. D. (M)
Clark, C. M. (M)
Cother, R. H. (A)
Cunningham, R. E. (A)
Elias, J. (M)
Fischer, J. J. (A)
Fischer, P. F. (SM)
Flatten, O. H. (A)
Fletcher, C. C. (M)
Foster, H. E. (M)
Fowler, B. V. (M)
Gade, D. W. (M)
Gayton, C. F., Jr. (A)
Geipel, D. H. (A)
Gunning, W. F. (M)
Harding, G. A. (A)
Hart, M. T. (M)
Hartenstine, R. M. (M)
Henderson, R. D. (M)
Hoffman, M. (M)
Horrocks, S. W. (M)
Hunt, E. B. (M)
Janeway, R. K. (A)
Joerger, J. (M)
Jones, P. D. (SM)
Kazebee, C. R. (SM)
Kerber, S. M. (M)
Kerr, A. (M)
Knipe, W. M. (A)
Kohlenberger, C. W. (M)
Kramer, R. F. (M)
Lewis, H. F. (M)
Lo Cascio, O. (A)
Mankinen, E. J. (A)
Mayor, W. G. (A)
Meyer, A. W. (A)
Mickelson, J. R. (M)
Moore, J. R. (SM)
Redlich, H. S. (M)
Richter, E. M., Jr. (A)
Riffle, L. V. (A)
Robertson, R. E. (SM)
Roberts, J. H. (A)
Silva, L. M. (M)
Sollenberger, T. E. (SM)
Squires, F. B., Jr. (M)
Tilley, A. E. (M)
Way, G. B. (A)
Weir, W. R. (M)
White, L. M. (M)
Wipson, J. W. (A)

Gardena (LA-7)
Ajioka, J. S. (M)
Akers, R. F. (M)
Altieri, J. B. (M)
Andrews, L. J. (M)
Baker, F. A. (M)
Bartling, M. H. (A)
Berry, D. C. (A)
Boutsel, E. O., Jr. (M)
Brown, W. A. (A)
Campbell, D. A. (A)
Cohen, M. (A)
Cowan, H. W. (A)
Dillon, M. (A)
Dillon, R. S. (M)
Dougherty, C. M. (A)
Doyle, R. E. (M)
Du Vall, W. E. (M)
Ehrlich, M. J. (SM)
Eick, M. K. (A)
Evans, W. S. (M)
Flynn, F. J. (SM)
Frohman, R. (M)
Geisert, F. W. (M)
Ginsburg, S. (M)
Grimmett, C. A. (SM)
Halliday, R. G. (A)
Harris, A. W. (M)
Harvey, G. C. (A)
Hayes, J. E. (M)
Holly, C. M. (A)
Houck, R. D. (M)
Hruby, R. J. (M)
Kerater, G. (M)
King, H. E. (SM)
Knopp, G. L. (M)
Krause, C. A. (M)
Lebell, D. (M)
Lee, D. N. (A)
Magnuson, V. P. (A)
Malbrain, J. P. (A)
Martin, A. P. (M)
Maxson, S. H. (M)
McGhee, R. B. (A)
McGregor, G. L. (A)
Middleton, B. A. (M)
Minka, G. F. (M)
Moller, R. T. (M)
Najemnik, G. F. (A)
Nakamura, L. T. (M)
Nakatsukasa, F. V. (M)
Nelson, C. E. (A)
Nishball, J. L. (M)
Nissim, W. (M)
Okefuji, S. (A)
Olsen, L. V. (M)
Osborn, R. H. (A
Quick, T. C. (M)
Rose, D. J. (M)
Rothwell, T. L., Jr. (A)
Sandberg, A. J., Jr. (M)
Schroeder, W. (M)
Shiowitz, M. (M)
Sibillo, R. A. (M)
Skinner, M. R. (M)
Stark, L. (M)
Taber, J. E. (M)
Thompson, W. L., Jr. (M)
Webb, J. R. (A)
Wizelman, A. (A)
Young, G. L. (M)
Zdanowich, C. A. (M)

Garden Grove (LA-7)
Anton, F. C. (A)
Bertrem, C. J. (A)
Bishop, R. L. (M)
Carr, E. A. (A)
Cherney, J. F. (M)
Colgan, A. R. (A)
Dunklee, L. H. (M)
Freeman, R. E. (M)
George, R. E. (A)
Hurst, W. F. (A)
Jacklin, E. M. (A)
Jones, R. W. (M)
Katzenberger, H. J. S. (M)
Knecht, R. O. (A)
Linton, T. B. (M)
Lordan, T. G. (M)
Lucas, F. G. (M)
Pares, J. E. (A)
Prather, R. D. (A)
Rabbin, I. G. (M)
Reimherr, R. N. (A)
Schnitger, A. W. (A)
Schnur, S. T. (M)
Swayze, D. W. (A)
Symons, W. E. (M)
Vandal, W. L., Jr. (A)
Wyatt, W. C. (A)

Glendale (LA-7)
Archer, W. L. (A)
Aseltine, J. A. (M)
Auerbach, M. (A)
Bailey, K. D. (SM)
Bertrand, W. T. (A)
Bible, R. E. (A)
Brandon, E. T. (M)
Bridges, L. (A)
Brouillette, D. A. (M)
Buchanan, H. R. (M)
Collins, D. L. (M)
Courtney, L. J., Jr. (A)
Curran, C. F. (SM)
Davis, J. S. (A)
De Witz, G. H. (SM)
Dixon, A. M. (M)
English, R. B. (M)
Ericson, R. L. (A)
Fencl, J. G. (M)
Foodim, C. (SM)
Foster, D. E. (F)
Frilot, R. J. (A)
Gates, H. A. (SM)
Geist, W. K. (M)
Glassford, H. A. (A)
Glaze, R. H. (A)
Griffin, W. R. (A)
Gudmundson, M. C. (M)
Hamilton, H. J. (A)
Hasche, J. C. (A)
Insalaco, L. (M)
Kelsey, A. L. (A)
Kent, G. R. (A)
Kindt, D. H. (M)
Koehler, L. K. (M)
Koerner, C. F. (M)
Krill, C. K. (SM)
Kruger, F. W. (M)
Larter, T. C. (SM)
Lowry, J. M. (M)
Meersman, R. J. (M)
Merriman, P., Jr. (A)
Michael, C. (A)
Nuut, A. (M)
Paral, R. C. (M)
Pope, G. S. (M)
Pressman, G. L. (M)
Russak, A. (A)
Schmidt, L. M. (SM)
Scott, W. (A)
Seizer, R. H. (M)
Silliman, W. B. (M)
Smith, C. H., Jr. (M)
Spencer, R. L. (A)
Steele, E. (A)
Stefanov, B. (M)
Szirmay, S. Z. (A)
Taverina, G. B. (A)
Terkla, M. (A)
Thoman, D. C. (A)
Vallar, T. F. (M)
Weatherall, T. Q. (M)
Worden, H. E. (M)

Glendora (LA-OB-7)
Allen, D. H. (SM)
Bennett, J. R. (M)
Friend, J. O. (SM)
Gehring, J. L. (M)
Goodman, K. (A)
Grinnell, A. L. (M)
Hill, F. E. (M)
Kneen, W. (SM)
Kreager, P. H. (M)
McDonald, J. J. (A)
McGee, H. A. (SM)
Montgomery, D. N. (M)
Schroeder, R. L. (A)
Schultz, R. T. (A)
Snodgrass, D. D. (M)
Sparling, W. M. (M)
Tallman, C. R. (A)
Van Biene, F. K. (A)
Wardein, H. E. (M)
Wolfe, C. M. (M)

Goleta (LA-B-7)
Ainsworth, M. J. (SM)
Bode, D. E. (SM)
Miller C. E., Jr.

Paul, A. D. (M)
Rauch, S. E. (SM)
Solem, R. J. (M)

Granada Hills (LA-SF-7)
Abaher, G. E. (M)
Aleshire, T. S. (M)
Allen, R. J. (A)
Alpine, P. E. (SM)
Batson, D. D. (M)
Carl, R. J. (M)
Cole, B. M. (SM)
Cote, E. P. (M)
Deaux, F. J. (M)
Dendy, K. H. (SM)
Edwards, R. O. (A)
Entin, A. J. (A)
Fletcher, F. L. (M)
Fuller, F. J. (SM)
Galati, V. J. (A)
Gautney, C. (A)
Gillespie, E. S. (M)
Hagerty, R. L. (A)
Jackson, R. O. (M)
Laschiver, J. (M)
Law, L. R. (A)
Lombardo, C. P. (A)
Loveless, R. M. (A)
Machlis, J. (M)
Makris, J. (M)
McDougle, R. H. (M)
Meyer, D. R. (M)
Midcalf, W. A. (A)
Nelson, C. A. (A)
Olson, C. F., Jr. (M)
Patterson, M. A. (M)
Phillips, G. A. (M)
Pierson, G. R. (A)
Reich, J. E. (M)
Seldon, M. (A)
Smith, W. E. (A)
Strohm, R. B. (M)
Thomsen, R. K. (A)
Thomson, B., Jr. (M)
Trouttman, A. F. (M)
Valery, N. A. (A)
Wanlass, S. D. (A)
Watt, E. J. (M)
Wilson, D. B. (SM)
Wilson, D. R. (M)
Wilson, R. A. (M)

Grass Valley (SAC-7)
Hickerson, R. L. (A)
Litton, C. V. (F)

Hamilton AFB (SF-7)
Adams, C. W. (M)
Haines, R. S. (M)
Howell, H. R. (M)
Lord, W. P. (M)
Ritter, F. (M)

Hanford (SF-7)
Nelson, R. A. (M)

Harbor City (LA-7)
Abbott, C. C. (M)
Redding, A. G. (A)
Wada, J. V. (M)

Hawthorne (LA-7)
Abascal, N. (M)
Barnes, J. G. (M)
Bryan, D. H. (A)
Christensen, A. V. (M)
Chu, H. (M)
Clark, G. L. (M)
Connell, A. D. (A)
Eady, L. J. (A)
Elder, C. (M)
Eliades, J. (M)
Erznoznik, F., Jr. (SM)
Frank, J. L. (A)
Galle, H. P. (A)
Garrison, F. (A)
Gee, L. C. (M)
Geisert, W. O. (M)
Gerson, H. (A)
Girvin, E. A. (M)
Goodell, E. M. (M)
Griffin, J. W. (M)
Haag, E. J. (M)
Hardin, R. H. (A)
Hickel, W. H. (A)
Igram, R. G. (M)
James, E. (M)
Jugend, H. E. (A)
Kaufman, F. H. (M)
Kincaid, N. L. (A)
Klammer, R. W. (M)
Knoll, D. W. (M)
Langdon, J. G. (M)
Lund, W. W., Jr. (SM)
Mabie, D. E. (M)
Malin, L. J. (A)
McCann, F. A. (M)
MacGarvey, E. R. (M)
Meerschaert, C. M. (A)
Mohr, M. E. (SM)
Norsell, H. C. (M)
Pitt, G. E. (A)
Price, G. O. (A)
Rose, D. E. (M)
Shedd, I. A. (M)
Smith, E. A. (A)
Snively, H. A. (A)
Stewart, G. R. (M)
St. John E. E. (SM)
Stein, S. (M)
Swan, R. L. (A)
Tilkens, C. C. (M)
Valentine, R. H. (A)
Van Doorne, J. R. (M)
Wade, J. P. (M)
Walker, R. B. (A)
Wannlund, A. L., Jr. (M)
Weber, J. W. (M)
Wertheim, L. A. (M)
Wilkinson, J. H. (M)
Williams, C. E. (SM)
Woerdemann, H. H. (SM)
Wolfe, G., Jr. (A)

Hayward (SF-EB-7)
Fort, J. R. (A)
Galles, C. E. (M)
Gaunt, R. P. (SM)
Gluth, N. P. (M)
Gola, A. S. (A)
Graham, J. D. (M)
Gregory, C. N., Jr. (M)
Hack, N. R. (M)
Hall, G. D. (A)
Hammer, L. W. (M)
Hargrove, R. O. (A)
Harrington, L. M. (M)
Heebner, D. R. (M)
Hilberg, R. P. (A)
Hoin, W. E. (M)
Howes, R. E. (M)
Hughes, E. S. (A)
Johnson, D. G. (A)
Jones, W. B., Jr. (SM)
Kanter, E. (M)
Kayner, H. J. (SM)
Keenan, O. B. (A)
Kelly, P. M. (M)
Koeneker, D. B. (A)
Kotlarski, J. R. (M)
Kuefler, P. M. (M)
Lamm, L. M. (A)
Lawrence, A. F., III (M)
Lee, H. B. (M)
Loonam, J. R. (A)
Lorentz, N. A., Sr. (M)
Lynch, N. F. (A)
Malone, H. L. (A)
Manahan, W. A. (M)
Manlove, W. R. (A)
Marable, W. T., Jr. (M)
Matthaei, G. L. (A)
Mayberry, L. A. (SM)
Meier, D. A. (M)
Moore, L. W. (A)
Noland, J. W. (A)
Norans, M. (M)
Ota, N. (A)
Partridge, A. B. (M)
Patrusky, N. (SM)
Peck, C. B., III (M)
Petersen, E. L. (M)
Peterson, A. L. (M)
Pol, W. F. (M)
Potter, R. W. (A)
Prothers, L. T. (M)
Quinn, T. B. (A)
Rance, R. A. (A)
Redmond, J. G. (M)
Rice, H. E. (SM)
Richesson, R. W. (M)
Rogers, W. J. (M)
Roth, A. R. (M)
Rush, T. D. (M)
Ryan, L. E. (M)
Saltzberg, B. (SM)
Sampson, H. L. (A)
Schlewe, A. J. (M)
Schnoor, J. E. (A)
Schnurr, M. J. (SM)
Schultz, P. R. (M)
Seaton, A. F. (A)
Seid, E. (M)
Silva, W. (M)
Simmons, J. W., III (M)
Simpson, M. P. (SM)
Spencer, P. E. (M)
Stevens, J. E. (M)
Stokes, L. S. (A)
Taylor, E. N. (M)
Tendick, C. B., Jr. (A)
Tengelsen, W. E. (M)
Trew, J. W. (A)
Troetschel, W. O. (M)
Umlauf, E. W. (M)
Unitis, E. R. (A)
Vavra, J. A. (A)
Voith, W. L. (M)
Vose, A. W. (M)
Wagner, R. E. (M)
Walker, N. L. (M)
Wellin, A. G. (SM)
Wershoven, G. A. (A)
Whirry, W. L. (M)
White, D. C. (A)
Widenhoefer, J. G. (A)
Willard, D. A. (M)
Williams, H. M. (A)
Winter, J. A. (A)
Womack, R. H. (A)
Wood, J. R. (M)
Yates, F. F. (M)
Zak, E. T. (A)

Inverness (SF-7)
Thompson, H. K. (M)

Irvington (SF-EB-7)
Bennett, R. D. (F)

Jackson (SAC-7)
Van Thiel, J. (VA)

Kelseyville (SF-7)
Quarfoot, H. B. (M)

Kentfield (SF-7)
Conrad, R. C. (M)
Damron, S. S. (M)
Kulmann, C. A. (A)

Kenwood (SF-7)
Hosmer, E. A. (SM)

Kerman (SF-7)
Anson, C. T. (VA)

Kingsburg (SF-7)
Kidd, T. L. (M)

Knights Landing (SAC-7)
Harris, W. B., Jr. (M)

La Canada (LA-P-7)
Barnes, R. B. (M)
Bly, J. R. (M)
Breckenridge, W. G., Jr. (A)
Brewer, M. S. (M)
Cane, M. P. (A)
Chase, W. P. (A)
Curtis, H. A. (M)
Ellis, A. R. (SM)
Faris, E. M. (A)
Goodwin, P. S. (SM)
Grill, F. J. (A)
Harker, R. B. (M)
Haurlan, P. N. (M)
Henry, D. S. (A)
Higgins, S. F. (M)
Hylkema, C. G. (M)
James, J. N. (A)
Henkel, H. H. (SM)
Keyser, J. H., Jr. (SM)
Koerner, T. W. (A)
MacMillan, R. S. (A)
McFadden, W. C. (M)
Moore, M. H. (M)
Parks, R. J. (M)
Peoples, J. E. (A)
Raines, O. E. (A)
Read, G. W. (M)
Rhoads, J. A. (SM)
Schor, F. W. (SM)
Seeley, W. M., Jr. (A)
Seifret, E. J., Jr. (SM)
Shadle, P. W. (M)
Slaughter, D. W. (A)
Varian, S. B. (SM)
Well, P. M. (SM)
Whittier, W. H. (A)
Wieland, C. W. (M)

La Crescenta (LA-P-7)
Davis, F. E. (M)
Ermatinger, C. E. (A)
Feland, R. F., Jr. (A)
Fischer, D. H. (A)
La Casse, S. G. (SM)
Lange, G. F. (A)
Maithonis, W. C. (A)
Meyer, H. (M)
Morecroft, J. H., Jr. (SM)
Noland, A. R. (VA)
O'Neil, T. (M)
Pirounian, M. A. (M)
Reinholtz, W. H. (A)
Silvertooth, E. W. (M)
Stagnaro, J. A. (SM)
Sweetman, G. E. (M)
Thompson, R. W. (A)

Lafayette (SF-EB-7)
Huntenbach, R. W. (M)
Cook, L. J. (SM)
Keller, J. E. (M)
Kirsten, F. A. (A)
Kruger, R. E. (M)
Martin, W. L. (M)
Montalbano, M. (A)
Morrison, G. E. (M)
Morrison, K. G. (M)
Nofrey, L. C. (A)
Sutton, J. S. (SM)
Waddell, J. F. (SM)

Laguna Beach (LA-7)
Holmes, P. (A)
Welsch, C. H. (A)

La Habra (LA-7)
Bechtold, I. C. (SM)
Bennett, J. R. (A)
Blake, F. G., Jr. (SM)
Blanton, M. J. (A)
Chester, M. S. (M)
Horst, C. W. (A)
Karsh, H. (M)
Rollins, R. C. (M)
Rubendall, K. W. (M)
Shade, R. R. (M)
Trorey, A. W. (A)
Unterberger, R. R. (M)

La Honda (SF-7)
Palthe, R. W. (M)

Lakeside (SD-7)
Rogers, T. E. (M)

Lakewood (LA-7)
Ashcraft, W. D. (M)
Beard, G. W. (A)
Bean, J. F. (A)
Bowen, E. J. (A)
Cain, G. H., Jr. (M)
Coombs, W. J. (A)
Eno, R. F. (M)
Fonda-Bonardi, G. (SM)
Frankiewich, C. (M)
Guggenheim, R. W. (M)
Himber, G. J. (M)
Lee, R. E. (A)
Mintz, M. (M)
Page, R. K. (M)
Storch, H. (SM)
Walker, H. E. (M)
Willett, R. M. (M)

Lakewood Plaza (LA-7)
Rumsey, W. E., Jr. (A)

La Jolla (SD-7)
Bishop, H. O. (SM)
Burgar, D. G. (A)
Chadbourne, H. L. (M)
Cotcher, A. L. (SM)
Cox, T. M. E. (A)
Erickson, W. A. (M)
Fox, E. M. (M)
Hafstrom, J. R. (SM)
Howat, J. R. (M)
Langston, J. F. (M)
Liddiard, Glen E. (M)
Madsen, R. G. (M)
McLeod, J. H., Jr. (A)
Michael, F. J. (A)
Naive, J. A. (M)
O'Neal, K. R. (M)
Otis, E. J. (M)
Ritchart, R. C. (M)
Shultz, E. P. (A)
Theobald, D. J. (M)
Tucker, D. P. (SM)
Vasques, H. A. (M)

La Mesa (SD-7)
Ackerman, S. L. (SM)
Adams, R. D. (M)
Bachman, C. R. (M)
Ball, N. E. (M)
Boyer, W. E. L. (A)
Burch, B. A. (A)
Carberry, J. F. (A)
Cary, R. J., Jr. (M)
Cassutt, R. J. (M)
Christensen, R. J. (SM)
Clapp, E. B. (M)
Cleveland, W. C., Jr. (SM)
De Mers, E. F. (SM)
Ferner, R. O. (M)
Fisher, H. G. (A)
Folland, D. F. (SM)
Hill, D. M. (M)
Hulbert, S. G. (M)
Ivans, W. S., Jr. (SM)
Lebduska, R. L. (M)
Loveberg, A. G., Jr. (M)
Lowe, D. M. (M)
Madsen, E. C. (M)
Mathisen, W. D. (A)
Miller, R. H., Jr. (SM)
Moody, D. G. (M)
Moore, W. E. (M)
Olesen, C. E. (M)
Oliver, E. F. (A)
Raper, A. J. (A)
Runyan, T. W. (A)
Smyth, J. B. (F)
Torrible, A. W. (A)
Trolese, L. G. (SM)
Tweed, G. C., Jr. (M)
Ward, A. L., III (A)
Webb, J. A. (M)
Whittaker, J. L. (M)

La Mirada (LA-7)
Benjamin, F. (M)
Boutin, C. U. (M)
Cain, E. L. (A)
Carlson, R. S. (A)
Cohen, A. W. (A)
Gaston, J. B. (A)
Goldman, H. (A)
Johnson, O. A. (M)
Kraemer, W. H., (M)
Kreager, P. C. (A)
Molloy, J. M. (M)
Myers, W. A. (M)
Peterson, W. R. (M)
Robertson, S. D. (M)
Scofield, B. L. (A)
Sward, W. W. (M)
Westwick, J. (A)

Lancaster (LA-7)
Adams, W. C. (M)
Anderson, J. D. (M)
Bandtel, K. C. (M)
Branum, D. R. (M)
Carlson, B. V. (A)
Carstensen, H. K. (M)
Compton, P. D., Jr. (M)
Couzin, R. I. (M)
Curry, C. R. (A)
Dimmick, J. V. (A)
Epps, R. C. (M)
Follette, L. C. (A)
Francis, H. D., Jr. (M)
Gallaher, J. F. (SM)
Hansen, C. F. (M)
Inami, F. K. (M)
Jones, E. D. (M)
Kaifer, R. C. (A)
Kenrich, C. M. (A)
Krause, O. H. (A)

La Puente (LA-OB-7)
Ervi, W. L., Jr. (M)
Gillespie, H. R., Jr. (M)
Zumoa, C. F. (M)

La Verne (LA-OB-7)
Buehler, M. E. (A)
Crofts, G. B. (A)
Flanders, A. E. (M)
Goff, L. O. (SM)
Nelson, E. K. (M)
Riley, O. V. (M)

Lawndale (LA-7)
Ahlberg, W. E. (A)
Bullock, W. W. (M)
Dye, R. R. (M)
Hannum, A. J. (A)
Hollingsworth, V. N. (A)
Polzin, E. M. (A)
Roper, W. J. (M)
Young, J. W., Jr. (A)

Lemon Grove (SD-7)
Bocchio, F. R. R. (A)
Jagerman, D. L. (M)

Lennox (LA-7)
Murakami, I. (A)

Little Rock (LA-7)
Ne Smith, W. W. (M)

Livermore (SF-EB-7)
Anland, K. (M)
Anderson, J. D. (M)
Bandtel, K. C. (M)
Branum, D. R. (M)
Carlson, B. V. (A)
Carstensen, H. K. (M)
Compton, P. D., Jr. (M)
Couzin, R. I. (M)
Curry, C. R. (A)
Dimmick, J. V. (A)
Epps, R. C. (M)
Follette, L. C. (A)
Francis, H. D., Jr. (M)
Gallaher, J. F. (SM)
Hansen, C. F. (M)
Inami, F. K. (M)
Jones, E. D. (M)
Kaifer, R. C. (A)
Kenrich, C. M. (A)
Krause, O. H. (A)

Kritzer, E. A. (A)
Landeman, J. A. (M)
McFarlane, H. B. (A)
Motzahn, D. W. (M)
Moore, J. M. (A)
Murnighan, R. J. (A)
Nelson, G. G. (M)
Owren, H. M. (A)
Ripley, J. N., Jr. (M)
Schreiber, O. W. (M)
Sorensen, H. D. (A)
Strahl, G. E. (M)
Tockey, R. J. (A)
Walker, H. C. (M)
Werner, R. E. (A)
Whitten, C. L. (M)

Loma Linda (LA-OB-7)
Woods, R. W. (SM)

Lompoc (LA-B-7)
Daughton, G. B. (M)

Long Beach (LA-7)
Andersen, E. A. (M)
Anderson, F. A. (A)
Ashcraft, A. E., Jr. (M)
Bakst, A. A. (A)
Bromley, G. V. (A)
Belvin, F. (M)
Bement, W. A. (M)
Bent, J. E., Jr. (A)
Booth, F. T. (A)
Bowman, W. G. (A)
Brown, K. H. (M)
Browne, K. R. (A)
Buckley, J. W. (A)
Burley, C. H. (M)
Burns, J. J., Jr. (M)
Butterbaugh, J. N. (A)
Campora, M. T. (A)
Carlon, C. B. (A)
Chavarria, J. N. (SM)
Cole, B. T. (M)
Conrad, E. G. (A)
Cox, J. E. (A)
Cranston, E. M. (A)
Creswell, J. C. (A)
Dahlin, K. K. (A)
Daly, E. E. (M)
Dillard, G. B. (A)
Dufty, B. A. (A)
Enholm, E. C. (M)
Farrand, C. E. (M)
Ferreira, R. (A)
Fether, W. B. (A)
Frieberg, M. (A)
Gall, C. E. (A)
Gardiner, F. H. (SM)
Grammes, E. G., Jr. (A)
Greene, W. E. (M)
Hayden, R. J. (A)
Henrion, W. S. (A)
Hettinger, F. J. (M)
Heyman, E. R. (A)
Howard, R. D. (A)
Husman, P. A. (A)
Jenkins, A. F., Jr. (A)
Jimenez, J. W. (A)
Jones, C. H. (A)
Kennann, J. E. (A)
Kidd, R. A. (A)
Kline, D. C. (M)
Kollanse, D. C. (M)
Krauss, W. N. (M)
Kroy, W. H., Jr. (M)
Kurz, F. A. (M)
Landis, V., Jr. (M)
Linder, C. O. (M)
Loewenstein, C. N. (M)
Lulken, D. G. (M)
Luttrell, J. A., Jr. (M)
Mac Coll, J. B. (A)
Mackey, E. F. (M)
Madson, G. A. (M)
Malasky, S. W. (M)
Miller, E. F. (M)
Malone, M. (M)
McLeod, M. G. (M)
Mitsutomi, T. (A)
Moorhouse, T. R. (A)
Morrin, E. S. (M)
Morris, G. R. (A)
Muhlestein, R. W. (M)
Muret, L. G. (M)
Overmier, C. S. (A)
Pelc, T. (SM)
Pelteson, F. M. (M)
Pentecost, E. E. (M)
Phelps, J. F., Jr. (M)
Poff, A. C., Jr. (A)
Porter, B. W. (M)
Price, E. L. (M)
Proctor, D. W. (M)
Raines, R. F. (M)
Rumer, F. H., Jr. (M)
Rupert, M. J. (M)
Salisbury, D. L. (M)
Samuelian, B. (M)
Schiffelbein, W. L. (M)
Schwartz, M. J. (M)
Seymour, H. A. (SM)
Siegel, J. C. (M)
Sims, J. L. (A)
Smith, R. G. (A)
Snow, R. B. (M)
Solley, J. C. (M)
Souter, R. E. (M)
Stearns, W. R. (M)
Stephens, H. M. (A)
Stouse, L. E., Jr. (M)
Strasburger, T. J. (A)
Tanner, W. O., Jr. (M)
Tapp, J. E. (M)
Thomas, P. M. (M)
Thresh, J. L. (A)
Tracey, B. P. (A)
Trapp, J. A. (SM)
Uebele, G. S. (M)
Vulliet, P. O. (M)
Walquist, R. L. (A)
Wells, W. W. (SM)
Wilcox, W. R. (M)
Wiley, F. L. (M)
Williamson, G. H. S. (A)
Wiseman, S. D. (M)
Wright, B. (SM)
Young, J. A. (M)

Los Alamitos (LA-7)
Hutcherson, J. V. (M)

Los Altos (SF-PA-7)
Adams, M. B. (SM)
Addelman, L. A. (M)
Aiken, W. R. (M)
Allen, T. L., Jr. (M)
Armstrong, B. H. (M)
Avis, A. J. A. (SM)
Ayres, W. P. (M)
Bagley, A. S. (SM)
Beeson, R. H. (A)
Bell, R. E. (M)
Bernard, J. D. (A)
Blumberg, M. (M)
Boswau, H. P. (SM)
Brown, J. F. (SM)
Burkhard, F. J. (M)
Butterfield, F. E. (M)
Cage, J. M. (SM)
Christensen, W. V. (A)
Cogshall, P. D. (M)
Corduan, A. E. (M)
Corson, D. K. (A)
Doak, R. S. (SM)
Doersam, P. D. (SM)
Earle, D. H. (M)
Ehret, R. J. (SM)
Eldredge, E. E. (SM)
Elster, S. (M)
Elwell, C. F. (F)
Ferguson, S. A. (SM)
Freeman, G. V. H. (A
Gamura, N. J. (M)
Giulle, J. D. (M)
Ginsburg, C. P. (M)
Ginzton, E. L. (F)
Green, H. H. (M)
Hackley, G. E. (SM)
Hanisch, W. R. (M)
Harrison, H. W. (A)
Hathaway, E. C. (M)
Heintz, R. M., JR. (M)
Helwig, N. C. (M)
Hiestand, N. P. (M)
Hix, R. C. (M)
Hodges, E. B. (M)
Hogg, J. E. (M)
Hunter, P. B. (SM)
Hussey, J. G. (M)
Johnson, R. R. (M)
Kendall, J. W., Jr. (M)
Koch, G. E. (M)
Konina, A. P. (M)
Larse, G. L. (A)
La Rue, A. D. (SM)
Lauler, L. J. (M)
Lind, J. (A)
Linderth, C. O. (M)
Mansur, F. (SM)
Marletta, R. A. (M)
Marshall, N. E. (SM)
McGuigan, W. D. (SM)
Melchor, J. L. (SM)
Meyer, C. F., Jr. (SM)
Meyer, J. C. (M)
Miller, H. C. (M)
Mills, M. E. (M)
Moreno, T. (M)
Morris, F. W., Jr. (SM)
Murphy, E. J. (SM)
Myers, W. D. (SM)
Napier, C. J. (SM)
Nelson, B. E. (M)
Nelson, J. W., Jr. (SM)
Nikonenko, P. V. (SM)
Norgaard, D. E. (SM)
Nurmela, G. E. (A)
Overacker, H. E. (SM)
Pappas, N. L. (SM)
Patterson, H. R. (SM)
Peart, R. L. (A)
Peterson, A. M. (M)
Peterson, C. J. (M)
Price, G. W. (SM)
Pruett, J. W. (M)
Reece, O. A. (A)
Rich, G. C. (SM)
Rocklitz, H. C. (A)
Rockwell, W. S. (M)
Rockwood, C. G. (M)
Sackman, R. (A)
Scharfman, W. E. (A)
Scholes, H. M. (M)
Schrock, N. B. (SM)
Secard, E. L. (M)
Semluk, W. (SM)
Sifford, B. M. (M)
Smith, C. A. (M)
Soderstrom, H. W. (M)
Soderstrom, J. C. (SM)
Sorvaag, C. M. (SM)
Stanley, C. B. (SM)
Stone, J. E. (A)
Sweeney, J. F. (M)
Tenill, D. E. (M)
Tetenbaum, S. J. (A)
Vader, R. L. (SM)
Van Rensselaer, C. (SM)
Varenhorst, V. D. (M)
Whitmer, R. F. (M)
Wholey, W. B. (SM)
Wilder, K. T. (M)
Woolsey, L. W. (A)

Los Altos Hills (SF-PA-7)
Hoover, W. G. (M)
Muhi, W. F., Jr. (M)
McCullough, J. A. (F)

Los Angeles (LA-7)
Aaron, B. D. (SM)
Abel, A. O. (M)
Abernathy, O. R. (A)
Abeson, J. S. (A)
Adachi, T. (SM)
Adams, W. (M)
Ahlport, B. T. (A)
Ahrensdorf, R. E. (A)
Albro, P. W. (M)
Alexakis, N. G. (M)
Alexander, M. A. (M)
Allen, W. L. (M)
Allgeyer, G. O. (A)
Alper, S. M. (M)
Ambrosio, A. (M)
Ambrosio, B. F. (M)
Anderson, D. N., Jr. (A)
Anderson, K. W. (SM)
Anderson, S. E. (M)
Anderson, W. J. (M)
Angwin, B. S. (SM)
Andres, A. J. (M)
Anker, E. R. (M)
Antell, S. (M)
Anzel, B. M. (M)
Apger, F. E. (A)
Appelman, J. F. (A)
Appleton, H. (A)
Aristei, J. (M)
Armstrong, T. K. (A)
Arnold, H. J. (A)
Arnstein, G. P. (M)
Aroyan, G. F. (M)
Arsenault, W. R. (A)
Atkins, J. W., Jr. (A)
Aurich, W. G. (M)
Ausbourne, R. K. (M)
Averck, N. (M)
Ayers, R. D. (A)
Azuma, J. T. (M)
Azuri, E. (M)
Babcock, R. L. (A)
Bailey, H. J., Jr. (M)
Bailin, L. L. (SM)
Baker, C. L. (A)
Baker, J. J. (A)
Baker, M. (A)
Baker, R. G. (M)
Balakrishnan, A. (M)
Balugo, J. J. (A)
Banks, L. (M)
Banks, R. E. (A)
Baran, P. (A)
Barnett, R. S. (M)
Barrett, M. J. (M)
Barton, B. H. (M)
Battelett, J. L. (M)
Bauer, W. F. (A)
Bauman, H. W. (M)
Bayley, R. M. (A)
Beck, L. (M)
Becker, J. (M)
Beckley, T. L. (M)
Begovich, N. A. (A)
Bell, A. F. (M)
Bell, R. G. (A)
Bennett, R. S. (M)
Berman, B. (M)
Bernstein, P. P. (A)
Bernstein, R. (A)
Berozn, P. P. (SM)
Bialek, J. (A)
Bird, R. N. (A)
Black, S. H. (A)
Blackman, B. G. (SM)
Blair, D. R. (A)
Blake, J. B. (M)
Blasberg, L. A. (A)
Bocast, D. R. (M)
Bockwoldt, W. H. (A)
Bodenstein, J. (A)
Bogge, C. A. (SM)
Bohlke, P. G. (SM)
Bolling, H. E. (A)
Bonebreak, R. L. (SM)
Bonness, Q. L. (M)
Bonney, R. B. (SM)
Boothroyd, J. H. (A)
Borks, M. D. (M)
Bosley, C. T. (M)
Bovich, E. J. (A)
Bowler, G. E. (SM)
Bowman, L. H. (SM)
Braden, J. R. (M)
Bradley, J. L. (SM)
Brady, M. E. (M)
Brandt, R. (M)
Brauer, G. W. A. (SM)
Braun, L. E. (SM)
Braverman, D. J. (M)
Bravo, A. (M)
Breitwieser, C. J. (SM)
Bright, D. C. (M)
Britton, C. W. (M)
Brooks, W. O. (SM)
Brousseau, J. M. (A)
Browdy, A. A. (M)
Brownstone, S. (M)
Brubaker, C. P., Jr. (M)
Brugman, W. E. (A)
Bucknell, W. H. (VA)
Budnick, J. A. (M)
Burbeck, D. W. (M)
Burch, J. E., Jr. (A)
Burkhardt, G. N. (M)
Burnett, J. R. (SM)
Burnham, J. (M)
Burnsweig, J. J. (M)
Burr, K. E. (A)
Burt, R. A. (M)
Busick, L. P. (M)
Butler, J. E. (A)
Buzzelli, T. S. (A)
Byrd, D. J. P. (M)
Cahn, C. R. (A)
Camerzell, P. L. (M)
Campbell, P. L. (SM)
Campbell, H. C. (A)
Campillo, W. J. (M)
Canning, R. G. (M)
Cargill, S. E. (A)
Carl, W. J. (M)
Carlile, R. N. (A)
Carlson, C. O. (M)
Carlson, E. H., Jr. (M)
Carlson, H. A. (M)
Carpenter, L. B. (M)
Carpenter, R. L. (A)
Carr, J. W. (M)
Carter, E. C. (M)
Caswell, J. R. (A)
Cataldo, J. T. (M)
Caulkins, D. C. (A)
Chamberlain, A. T. (M)
Chamorro, R. D. (M)
Chandler, C. W. (M)
Chang, D. (M)
Chapin, R. G. (M)
Chapman, A. C. (M)
Chew, T. W. (SM)
Chieffo, A. B. (A)
Chow, A. V. (A)
Christoffers, W. H. (M)
Churchill, O. R. (A)
Claar, D. E. (M)
Clanton, R. A. (M)
Clapp, M. F. (A)
Clark, A. C. (A)
Clark, B. L. (M)
Clark, D., Jr. (M)
Clark, R. W. (SM)
Clarke, D. R. (M)
Clary, W. T., Jr. (SM)
Clock, D. P. (M)
Cloon, R. E. (A)
Coerver, L. E., Jr. (A)
Cohen, H. (M)
Cohen, M. (A)
Cole, E. M., Sr. (A)
Cole, L. G. (M)
Collins, E. L. (A)
Collins, J. W. (A)
Collins, W. C. (A)
Colombano, L. (M)
Conn, R. B. (M)
Conner, D. D. (A)
Considine, J. H. (A)
Conviser, H. (VA)
Cooke, R. M. (A)
Cooper, P. V. (A)
Copeland, W. H. (SM)
Corlett, H. G. (A)
Corner, K. T. (M)
Cornez, A. L. (A)
Cornwall, E. A., Jr. (M)
Costanza, S. T. (M)
Court, J. R. J. (SM)
Cox, H. N. (A)
Crabb, R. C. (SM)
Crooke, V. E. (M)
Crossman, T. E. (M)
Crydenn, J. (SM)
Culver, W. H. (A)
Cunningham E. W. (M)
Currie, D. E. (M)
Currie, W. D. (M)
Curtiss, A. N. (SM)
Cutler, L. S. (M)
Dalley, D. G. (M)
Dalton, M. M. (A)
Dalton, R. A. (M)
Daniels, J. A. (A)
Darling, J. K. (A)
D'Asta, J. (A)
Davenport, E. J. (A)
Davis, A. L. (A)
Davis, D. L. (M)
Davis, F. H. (M)
Davis, H. G., Jr. (M)
Davis, H. (SM)
Davis, J. (M)
Davis, J. I. (M)
Davis, R. (SM)
Dawson, S. L. (A)
Dea, D. V. F. (SM)
Dean, N. J. (SM)
Deen, J. R. (M)
De Forest L. (F)
De Klimpe, R. A. (M)
Evans, H. W. (A)
Evans, N. T. (M)
Evtimenko, A. (A)
Fabian, S. H. (A)
Fafarman, A. A. (M)
Fails, W. A. (M)
Fatton, G. A. (A)
Feigus, J. I. (A)
Feldman, N. E. (M)
Feldman, R. E. (M)
Fenn, W. H. (SM)
Fields, L. G. (A)
Fine, E. (M)
Finegold, L. (A)
Finley, W. A. (A)
Firle, T. E. (M)
Firth, E. (M)
Fischer, C. H. (A)
Fish, K. L. (A)
Fish, W. Y. (M)
Fishback, K. H. (M)
Fitting, G. M. (A)
Fitzgerald, G. E. (M)
Fitzwater, H. L. (M)
Fleary, W. K. (A)
Fletcher, J. C. (M)
Fling, J. J. (A)
Flores, W. (M)
Floyd, G. W. (A)
Fluhrer, A. C. (A)
Fodor, F. H. (VA)
Forbath, E. P. (M)
Ford, R. G. (M)
Forrest, C. B. (M)
Fort, J. E. (M)
Foulon, F. (SM)
Foxman, L. (A)
Frauer, R. W. (A)
Francis, J. P. (A)
Francis, T. F. (A)
Frank, M. E. (M)
Frear, G. C. (M)
Fredericks, A. E. (M)
Freytag, K. C. (A)
Friedman, P. (M)
Frink, F. W. (SM)
Fry, B. L. (M)
Fuhrman, T. A. (A)
Fujimoto, T. Y. (A)
Fuller, L. D. (M)
Fulmis, M. J. (A)
Futterman, D. M. (M)
Gabler, R. T. (SM)
Gaines, B. R. (SM)
Gall, R. G. (M)
Gallagher, H. E. (A)
Galloway, W. J. (M)
Gangi, A. F. (M)
Garafalo, J. J. (M)
Garblik, A. M. (SM)
Garcia, E. M. (M)
Garrigus, W. L. (SM)
Gasper, C. A. (A)
Gaston, J. L. (M)
Gates, H. P., Jr. (SM)
Gaude, W. G. (M)
Gaylord, R. S. (M)
Gebhardt, H. W., Jr. (M)
Greer, W. (SM)
Geissinger, G. I. (M)
Genco, F. (M)
Gerardi, F. R. (A)
Gerlough, D. L. (M)
Gertsch, E. P. (SM)
Ghose, R. (SM)
Gibbs, L. C. (A)
Giddis, A. R. (A)
Gilbert, H. L. (A)
Gillett, G. D. (M)
Gillmer, A. H. (SM)
Ginutling, A. (A)
Giser, H. W. (A)
Gloor, R. D. (M)
Goff, R. H. (M)
Goldberg, S. A. (A)
Gold, D. (M)
Goldenstern, G. M. (SM)
Goldman, S. (M)
Goodell, C. E. (M)
Goodrich, H. E. (A)
Goodwin, J. W. (A)
Goodykoontz, J. R. (M)
Gordon, G. (A)
Gordy, M. (M)
Gore, M. R. (A)
Goris, E. N. (M)
Gossland, S. (A)
Gottier, T. L. (SM)
Gould, E. W. (M)
Gould, R. E. (M)
Gould, R. G. (M)
Gourrich, G. E. (M)
Grabbe, E. M. (A)
Graham, R. V. (A)
Graham, R. F. (M)
Grant, E. W. (M)
Grantham, G. W. (M)
Green, J. S. (SM)
Green, R. W. (M)
Greenbaum, M. (M)
Gregory, G. D. (M)
Griest, R. H. (SM)
Griffith, M. H. (VA)
Griffiths, R. W. (M)
Grigg, R. W. (M)
Griggs, J. R. D.Sc. (SM)
Grignon, L. D. (SM)
Grimes, W. J. (A)
Gross, L. (M)
Gruen, W. J. (F)
Gudmundsen, R. A. (M)
Guerrero, E. S. (SM)
Guillin, R. M. (SM)
Gulmes, H. A. (A)
Gunny, E. R. (A)
Gutcheon, W. Y. (M)
Guthrie, W. R. (A)
Haas, R. W. (A)
Haberland, E. R. (M)
Habra, J. H. (M)
Haeff, A. V. (F)
Hagaman, D. H. A. (A)
Hahn, A. C. (M)
Hall, E. C. (M)
Hall, K. A. (M)
Hall, T. S. (M)

Hamilton, R. F. (A)
Hance, H. V. (SM)
Hanover, P. N. (M)
Hans, E. (A)
Hansen, H. R. (M)
Harberts, H. H. (A)
Harpenau, R. L. (M)
Harper, R. B. (M)
Harrington, V. L. (M)
Harris, R. C. (M)
Harrison, W. (A)
Hart, P. R. (A)
Hart, T. J. (M)
Hassencahl, L. J. (M)
Hata, F. T. (M)
Hayashida, B. N. (M)
Hayers, W. T. (A)
Haywood, V. M. (M)
Hecht, B. (SM)
Hellfron, J. (A)
Helm, F. A. (M)
Helmiller, R. C. (A)
Heinke, C. B. R. (M)
Hellwarth, R. W. (A)
Henderson, M. C. (A)
Herrick, T. A., Jr. (M)
Hershberger, W. D. (F)
Hesse, V. L. (M)
Hetland, G. Jr. (M)
Hewitt, R. W. (A)
Higashi, R. (A)
Higashi, P. (M)
Hill, C. R. (SM)
Hill, D. M. (M)
Hillard, W. R. (M)
Hiller, E. R., Jr. (M)
Hilliard, J. K. (F)
Hilsdale, F. A. (A)
Himes, R. (M)
Hoelder, W. K. (M)
Hofgson, Robert W. (M)
Hoffman, H. L. (SM)
Hoffman, L. A. (M)
Holcomb, D. R. (A)
Holdsworth, D. M. (A)
Holland, J. E. (A)
Holley, A. E. (M)
Holmes, J. L. (A)
Holt, D. G. (M)
Holt, W. L. (A)
Hom, F. M. (SM)
Honey, J. F. (SM)
Hoo, E. (A)
Hook, W. R. (M)
Hopkins, R. C. (M)
Horton, B. W. (A)
Hosbach, G. H. (A)
Hoy, E. C. (M)
Hughes, (M)
Hughes, H. M. (M)
Hughes, R. A. (M)
Hultberg, D. E. (M)
Humphries, D. H. (M)
Hunt, C. W. (A)
Huntley, W. P. (A)
Hyatt, W. R., Jr. (SM)
Iaunelli, E. (M)
Ingrassia, F. S. (M)
Inouye, G. T. (A)
Ireland, F. (SM)
Ireland, R. O. (A)
Isley, C. T., Jr. (A)
Izuel, A. G. (M)
Jackman, R. W. (M)
Jackson, B. B. (M)
Jackson, J. A. (M)
Jackson, J. R. (M)
Jackson, K. R. (SM)
Jacob, D. M. (SM)
Jacobi, W. J. (M)
Jaffe, R. M. (M)
Jahns, E. R. (SM)
Jamieson, H. W. (SM)
Jamison, J. W., Jr. (M)
Jamison, R. S. (A)
Jarrett, H. F. (M)
Jarrett, J. W. (A)
Jeffs, C. R., Jr. (A)
Jensen, R. D. (M)
Jepsen, T. L. (M)
Jernigan, E. D., Jr. (SM)
Jen, L. H. (A)
Jevons, L. O. (A)
Johnson, G. (SM)
Johnson, H. R. (SM)
Johnson, J. S. (M)
Johnson, L. E. (M)
Johnson, R. M. W. (M)
Johnson, W. A. (M)
Jones, R. M. (A)
Jordan, K. E. (A)
Joseph, H. (A)
Kaar, I. J. (F)
Kagan, M. F. (SM)
Kahne, L. (A)
Kahrilas, P. J. (SM)
Kalbfleisch, R. (A)
Kamarek, J. J. (M)
Kaneko, G. S. (A)
Kanner, R. H. (M)
Kappler, M. O. (SM)
Karplus, W. J. (M)
Karr, P. R. (SM)
Kasai, G. S. (M)
Kasding, G. M. (A)
Kato, M. M. (M)
Kato, P. S. Jr. (A)
Kaufman, A. B. (M)
Kaufman, I. (M)
Kaufman, S. (M)
Kawafuchi, P. M. (M)
Kawahata, B. I. (M)
Kawana, H. Y. (A)
Kazarian, D. G. (A)
Keeha, D. G. (M)
Keenan, R. V. (SM)
Kelly, D. A. (SM)
Kelly, K. C. (A)
Kelly, R. D. (M)
Kelly, W. R. (A)
Kelso, J. M. (SM)
Kemanis, G. (M)
Kennedy, C. B. (A)
Kennedy, F. M. (SM)
Kennedy, M. E. (F)
Keppel, R. A. (M)
Kerr, J. S. S. (SM)
Kersch, C. J. (M)
Kibler, P. J. (SM)
Kiesel, R. H. (M)
Kilchenman, L. D. (A)
Kilpatrick, H. T. (A)
Kimbrough, W. R. (A)
Kinnga, T. (M)
Kind, D. E. (M)
King, C. F. (M)
King, G. G., Jr. (M)
King, E. F. (SM)
King, E. N. (M)
King, R. E., Jr. (SM)
King, S. (SM)
Kinsell, W. L. (SM)
Kircher, R. (SM)
Kirkman, H. L. (A)
Kirsch, H. A. (M)
Kisld, F. H. (A)
Kitabayashi, T. (A)
Klapper, E. (A)
Klein, F. A. (M)
Klein, W. S. (M)
Kline, M. B. (SM)
Kline, P. (A)
Klinge, W. H. (A)
Kluche, W. (M)
Knaul, J. E. (M)
Knauss, R. G. (A)
Knell, E. D. (M)
Knopoff, L. (M)
Knudson, J. A. (M)
Kobayashi, J. T. (M)
Kobera, C. (M)
Koski, L. C. H. (M)
Koukol, J. F. (SM)
Kovach, L. D. (A)
Kovensky, D. J. (M)
Kraffi, W. K. (SM)
Krausz, C. (A)
Krebs, J. H. (A)
Kroemer, J. R. (A)
Krone, L. (M)
Kruger, E. E. (M)
Kryske, L. E. (M)
Kummelshuh, K. J. (M)
Kups, E. F. (SM)
Kurahashi, D. K. (M)
Kuratani, K. S. (A)
Kurkjian, L. H. (M)
Kuypers, M. W. (A)
Lader, L. J. (SM)
La Face, D. T. (M)
Lambros, J. G. (M)
Lance, A. L. (M)
Landman, R. M. (A)
Langlois, R. F. (A)
Lark, F. (M)
Larke, S. D. (M)
Larrimer, J. K. (A)
Larson, D. E. (M)
Lash, E. (M)
Latimer, O. T., Jr. (M)
Latt, H. A. (M)
Lavin, J. H. (M)
La Violette, R. F. (A)
Law, R. R. (F)
Lawlor, J. C. (SM)
Lazar, H. (M)
Lee, E. C. F. (M)
Lee, L. K. (SM)
Lee, R. L. (M)
Leeds, R. C. (M)
Leeper, R. A. (M)
Lehman, T. A. (A)
Leiby, R. (VA)
Mallon, T. A. (A)
Manderfeld, E. C. (SM)
Manly, R. (A)
Manner, H. (A)
Manov, F. S. (A)
Manser, D. E., Jr. (M)
Mar, W. A. (A)
Margoll, L. (M)
Margolis, M. (A)
Margowsky, H. M. (M)
Markowitz, S. (A)
Marmont, G. H. (M)
Marsh, S. V. (SM)
Marshall, F. C. (M)
Marshank, D. N. (A)
Martin, L. B. (A)
Mason, C. W. (SM)
Masuda, H. B. (M)
Mathews, E. (M)
Mathews, W. E. (SM)
Matsubara, G. S. (M)
Matsumoto, T. E. (A)
Mautner, L. (SM)
McAllister, J. T. (A)
McCaron, S. L. (M)
McCharles, J. R. (M)
McClung, R. R. (M)
McCoy, R. E. (M)
McDonald, W. W. (M)
McGaughey, R. P. (M)
McIntyre, G. F. (A)
McKechnie, R. M. (A)
McKinney, D. J. (M)
McKinney, N. P. (M)
McLawler, M. S. (A)
McRuer, D. C. (SM)
McVey, B. D. (M)
Mead, C. E. (M)
Meier, E. H. (SM)
Meisels, G. (SM)
Meisninger, J. P. (M)
Melas, C. M. (M)
Mellas, A. (M)
Mellott, R. N. (M)
Melnick, R. A. (M)
Mencey, W. T. (M)
Merrill, H. M. (M)
Messner, G. P. (M)
Metcalf, D. E. (M)
Mettler, R. F. (M)
Meyer, J. C. (M)
Meyers, R. C. (A)
Michels, L. S. (M)
Mikkelson, M. E. (A)
Milby, B. C. (M)
Milham, R. F., Jr. (M)
Miller, D. S. (M)
Miller, T. (M)
Miller, W. B. (SM)
Millstone, S. D. (M)
Mintzer, A. L. (A)
Mirankeutz, A. (A)
Missler, C. W. (M)
Mitchell, B. B. (M)
Mitchell, C. A. (A)
Mitchell, H. F., Jr. (M)
Mitchell, J. M. (A)
Mitchell, W. C. (M)
Miyata, J. J. (A)
Moehlee, R. L. (A)
Modlinski, W. M. (A)
Molnar, A. W. (M)
Monos, S. (M)
Monroe, A. J. (M)
Monroe, J. C. (M)
Moore, D. W. (A)
Moore, R. T. (M)
Moreno, C. A. (SM)
Morgyn, H. J. (M)
Morrison, R. (M)
Morrison, S. C. (A)
Morrow, C. T. (M)
Moser, M. B. (A)
Moskalo, V. G. (M)
Moss, J. F. (A)
Mueller, G. J. (SM)
Mueller, W. M. (A)
Mullin, J. T. (M)
Munger, J. C. (M)
Munson, J. E. (M)
Murakami, E. T. (M)
Murakami, P. S. (A)
Murgatroyd, R. T. (A)
Murray, R. M. (SM)
Myers, K. E. (M)
Nagel, R. (M)
Nash, H. (A)
Neal, F. R. (A)
Nedland, E. H. (A)
Nelson, K. L. (A)
Newhoffer, F. L. (A)
Newhouse, G. H. (M)
Newton, C. P. (M)
Nichols, C. A. (SM)
Nichols, M. H. (SM)
Niebuhr, J. E. (M)
Niemoff, N. (M)
Nishihara, M. (M)
Nordstrom, G. J. (SM)
Norton, J. L. (M)
Norwood, L. R. (SM)
Norwood, V. T. (A)
Notvest, R. A. (M)
Nourse, R. B. (M)
Oatt, R. L., Jr. (M)
Obray, D. C. (A)
O'Brian, E. D. (A)
O'Brien, B. B. (M)
O'Brien, W. C. (A)
O'Connor, G. (M)
Ogawa, K. (M)
Ogleshy, W. D. (A)
O'Hara, C. L. (A)
Okino, T. V. (M)
Oleesky, S. S. (SM)
Olson, A. J. (M)
Olson, N. L. (A)
Olson, R. F. (M)
Olson, T. H. (M)
Ordahl, C. A. (M)
Ordesch, W. E. (A)
Orr, J. A. (A)
Ort, D. L. (A)
Oshike, J. J. (A)
Otoshi, T. Y. (M)
Ovitt, M. D. (M)
Padwa, M. N. (A)
Palmer, D. L., Jr. (A)
Palmer, H. J. (M)
Pamler, R. G. (M)
Papas, C. H. (M)
Parisky, R. N. (A)
Parker, A. T. (M)
Parker, H. F. (M)
Parkinson, R. W. (A)
Parsons, G. W. (A)
Paschke, M. J. (M)
Pascoe, T. S. (M)
Pasteriack, M. (A)
Patton, W. L. (A)
Pedersen, C. R. (M)
Pelta, E. R. (A)
Perez, A. A. (A)
Perry, E. D. (A)
Perry, R. H. (M)
Perry, W. C. (A)
Peterson, D. A. (A)
Peterson, E. J. (M)
Peterson, N. J. (M)
Pett, L. E. (M)
Pew, J. M. (A)
Philipson, L. L. (M)
Phinizy, R. B. (M)
Pidhayny, D. D. (M)
Pieper, R. P. (A)
Pierce, C. G. (SM)
Pinckney, G. B. (M)
Pinczower, H. J. (M)
Pipes, L. A. (SM)
Plass, S. (A)
Plummer, D. (SM)
Post, G. (SM)
Pound, A. E. (M)
Preston, L. S. (SM)
Pritchard, C. A. (M)
Proctor, D. R. (SM)
Quan, J. (A)
Quan, N. (M)
Radant, M. E. (M)
Ralnville, L. E. (M)
Ramo, S. (F)
Rappaport, R. B. (M)
Rath, E. D. (M)
Rauschkolb, A. J. (A)
Rawson, M. D. (A)
Raymond, J. L. (M)
Redding, F. W., Jr. (A)
Redwood, R. C., Jr. (A)
Reed, A. C. (A)
Reed, R. H. (M)
Regnier, N. J. (A)
Reichenthal, A. (M)
Reidel, J. E. (A)
Reimer, R. N. (SM)
Reiner, O. Jr. (A)
Reinsch, F. J. (M)
Reiter, G. S. (M)
Rescoe, J. M. (M)
Reynolds, G. W. (A)
Rich, A. (SM)
Richards, W. S. (VA)
Richman, I. (M)
Rickords, T. J. (M)
Riflind, J. (A)
Riser, C. R. (M)
Rittersbacher, J. E. (M
Roach, W. E. (A)
Robb, E. J. (M)
Roberts, A. N. (M)
Robinson, D. E. (A)
Robinson, J. H., III (A)
Robinson, P. (A)
Robinson, W. H. (M)
Rockwell, R. E. (A)
Rodman, N. (M)
Rogers, J. G. (A)
Rogers, T. A. (M)
Rokn, E. G. (A)
Roney, R. K. (M)
Rosa, G. N. (M)
Rose, D. A. (A)
Rose, W. (A)
Rosenbaum, J. L. (A)
Rosenstein, A. B. (M)
Rosman, A. S. (A)
Ross, W. L. (M)
Rousseau, A. L. (M)
Royal, D. E. (A)
Rubinstein, R. (A)
Ruderman, M. (M)
Rudich, R. (A)
Rulin, M. B. (A)
Ruiz, M. L. (M)
Rumble, B. E. (M)
Rupp, V. T. (A)
Ruppenthal, J. C. (A)
Rush, J. M. (M)
Russell, W. T. (SM)
Rutishauser, R. W. (M)
Rutkin, B. B. (A)
Sakamoto, R. (M)
Samuels, A. H. (M)
Samuelson, H. R. (A)
Samulon, H. A. (SM)
Sander, W. B. (M)
Saturensky, G. (A)
Sautter, P. J. (A)
Savant, C. J., Jr. (M)
Saworotnow, I. P. (M)
Sawyer, G. L. (VA)
Scammel, B. C. (M)
Schaefer, J. H. (M)
Schaefer, W. C. (A)
Schaifer, A., Jr. (A)
Schapiro, H. A. (M)
Schauwecker, H. E. (A)
Schenck, G. C. (M)
Schilling, M. O. (M)
Schlesinger, R. J. (A)
Schmid, A. A. (M)
Schmidt, B. F. (M)
Schmidt, L. W. (A)
Schneberger, E. J. (M)
Schneidewind, N. F. (A)
Schoenduve, H. W. (A)
Schonheinz, E. J. (SM)
Schott, F. W. (M)
Schramm, F. R. (M)
Schreiber, E. H. (F)
Schroer, P. E. (A)
Schulz, P. (A)
Schuster, D. H. (M)
Schwartz, A. (A)
Schwartz, B. (M)
Schwartz, W. L. (M)
Sciuto, F. A. (A)
Scoffone, R. G. (M)
Scope, S. (M)
Scott, R. C. (A)
Scoville, R. R. (SM)
Segel, D. L. (A)
Seidman, J. J. (M)
Selleck, R. S. (M)
Semel, D. (A)
Semeniuk, B. G. (M)
Sensiper, S. (SM)
Seplow, S. (M)
Sepmeyer, L. W. (SM)
Setzer, L. E. (M)
Shallon, S. C. (M)
Shapiro, H. (A)
Shapiro, S. (A)
Shaw, L. B. (A)
Shaw, R. G. (M)
Shearer, R. W. (M)
Sher, B. L. (M)
Shigemoto, J. M. (A)
Shimabukuro, F. I. (M)
Shimabukuro, G. T. (A)
Shoemaker, H. M. (A)
Shohara, S. (A)
Shohet, N. (M)
Shook, R. R. (M)
Shore, H. G. (M)
Shoulders, H. D. (M)
Shuler, M. H. (M)
Shrum, L. R. (A)
Sievers, E. S. (M)
Sigmon, L. C. (SM)
Silvern, L. C. (A)
Simon, A. (M)
Simone, L. A. (M)
Sinn, G. (A)
Slogar, J. W. (A)
Smead, H. J. (A)
Smith, A. W. (M)
Smith, G. F. (M)
Smith, H. A. (M)
Smith, R. T. (A)
Snapp, K. M. (A)
Snell, H. R. (M)
Snitzer, T. L. (A)
Snow, V. M. (M)
Snyder, R. M. (M)
Solaro, J. F. (SM)
Soiterland, A. G. (M)
Sofen, I. A. (A)
Sohler, J. F. (M)
Sollars, R. C. (M)
Somers, F. L. (SM)
Sommer, J. C. (M)
Sorensen, C. E. (A)
Speer, W. S. (A)
Spellmire, R. J. (M)
Sperling, P. (SM)
Spriesterabach, R. C. (M)
Spring, E. (A)
Stahl, R. (A)
Stameson, S. A. (A)
Stankevich, P. J., Jr. (A)
Stanton, R. S. (M)
Staudlhammer, J. (M)
Stearns, G. W. (A)
Stearns, L. D. (A)
Steenson, B. O. (M)
Stein, R. L. (M)
Steinberg, R. (A)
Steindler, H. K. (A)
Stellmacher, D. D. (SM)
Stephenson, R. G. (SM)
Steward, M. H. (M)
Steward, R. H. (A)
Stewart, A. G. (A)
Stewart, R. K. (A)
Stockhoff, K. C. H. (M)
Stone, C. A. (A)
Stone, D. (M)
Stone, D. (M)
Stork, J. E. (M)
Stout, T. M. (SM)
Strieby, M. (M)
Strumwasser, F. (M)
Stuart-Williams, R. (M)
Stuver, H. J. (A)
Suddjian, S. L. (M)
Suffield, F. G. (SM)
Sutherland, C. C. (A)
Swain, E. G. (A)
Swanson, E. R. (SM)
Tajima, G. K. (SM)
Takahashi, A. V. (M)
Takashashi, K. (A)
Talbot, J. J. (M)
Tanielian, G. (A)
Tarot, A. (A)
Tauber, R. W. (M)
Taylor, E. K. (M)
Taylor, G. J. (A)
Teffez, J. M. B. (M)
Terzian, R. C. (M)
Teske, J. A. (M)
Tesler, A. (M)
Tetherow, R. C. (M)
Theodore, C. (M)
Therrien, H. J. (M)
Thomas, D. L

Tylka, J., Jr. (A)
Tyson, G. (A)
Uenapiler, K. W. (A)
Underwood, P. L. (A)
Underwood, W. H. (A)
Unger, I. L. (M)
Uplovic, W. C. (A)
Valliant, J. G. (M)
Van Curen, V. (M)
Vanderstaay, T. P., Jr. (A)
Van Duzer, C. (A)
Vant Hull, L. L. (M)
Vargas, R., Jr. (M)
Veach, C. W. (SM)
Vega, C. J. (A)
Venator, T. J. (M)
Venecklasen, P. S. (M)
Villa, R. (A)
Vincent, B. T., Jr. (M)
Vincent, L. R. (A)
Vinotsky, V. M. (A)
Vitzelio, R. B. (A)
Von Lanken, J. R. (M)
Vorndran, J. W. (A)
Wachowski, H. M. (SM)
Wakeman, A. (M)
Walker, E. S. (M)
Wall, J. E. (A)
Wallace, D. C. (M)
Waller, R. W. (A)
Walley, B. (SM)
Walter, E. T. (A)
Walthers, G. A. (A)
Wang, F. (A)
Ward, H. R. (A)
Ward, R. A. (M)
Warshaw, M. (M)
Waters, W. P. (M)
Weatherford, A. V. (M)
Weber, F. V. (A)
Weglein, R. D. (A)
Weinberg, L. (SM)
Weinberger, H. L. (M)
Weinlof, D. R. (M)
Weiner, E. L. (M)
Weingarten, R. (M)
Weiss, S. K. (A)
Welge, V. (SM)
Welliver, C. L. (M)
Wells, R. M. (A)
Wendt, K. R. (F)
Wenick, R. L. (A)
Wenters, R. L. (M)
Wersen, D. T. (M)
Wertz, L. C. (M)
Wessel, R. E. (M)
West, G. P. (A)
Westman, J. J. (M)
Wheelon, A. D. (M)
Whiston, R. W. (M)
White, C. R. (A)
White, W. H. (M)
Whitten, M. G. (A)
Wicker, G. E. (M)
Wiggins, E. T. (M)
Wiley, C. A. (M)
Wiley, T. A. (M)
Wilke, W. E. (A)
Wills, M. R. (A)
Wills, C. F. (M)
Wilmot, R. D. (M)
Wilson, A. E. (A)
Wilson, H. G. (M)
Wilson, L. W. (SM)
Wingard, C. G. (A)
Winters, B. C. (M)
Winters, M. M. (M)
Witherwax, H. E. (A)
Witten, E. L. (M)
Wohlwill, H. E. (M)
Wolff, A. F. (A)
Wolfson, H. (M)
Wollrich, A. E. (M)
Wong, E. C. (A)
Wong, F. (A)
Wong, H. V. (M)
Woo, C. (M)
Wood, G. D. (A)
Wooldridge, D. E. (F)
Worthen, K. J. (M)
Worthington, J. H. (A)
Wrenn, S. H., Jr. (M)
Wrestler, G. R. (M)
Wright, P. B. (A)
Wunderlich, F. J. (M)
Wybrow, E. (SM)
Yasuda, J. K. (M)
Yatskin, G. C. (SM)
Yoder, D. R. (M)
Yoder, E. R. (A)
Yonemoto, N. (A)
York, R. L. (M)
Yoshii, H. (A)
Young, R. D. (M)
Yowell, C. O. (A)
Zacharias, R. (M)
Zaculak, R. R. (M)
Ziegler, R. M. (M)
Zimmerman, F. M. (A)
Zinsser, H. H. (A)

Los Banos (SF-7)
Hunt, M. D. (A)

Los Gatos (SF-7)
Abbott, W. R. (SM)
Belleville, L. M. (SM)
Collett, W. I. (A)
Critchlow, A. J. (A)
De Vault, R. L. (M)
Eliezer, D. E. (A)
Glass, F. W. (M)
Goddard, W. A. (M)
Goetz, J. A. (M)
Heintz, R. M. (F)
Henschke, R. A. (A)
Hexem, J. (M)
Hummel, K. H., Jr. (A)
Jaffe, J. S. (M)
Illes, C. N. (M)
Kaufman, J. (SM)
McEuen, A. H. (M)
McLaughlin, J. A. (M)
Morrison, H. L. (M)
Orrock, R. L., Jr. (M)
Stoner, F. E. (SM)
Sund, H. E. (M)
Vinding, J. P. (A)
Wilds, R. B. (M)
Worlton, D. C. (M)

Lynwood (LA-7)
Audick, G. C. (A)
Davidson, J. K. (A)
Decker, O. T. (A)
England, R. E. (M)
Gerken, G. H. (M)
Holtrichter, J. (M)
Jacobsen, L. R. (SM)
Krogstad, J. K. (A)
Miller, D. E. (M)
Roth, E. L. (A)
Steele, R. W. (M)
Weston, H. C. (M)

Malibu (LA-7)
Knowles, W. S. (SM)
Koontz, D. E. (A)
Metcalf, H. E. (SM)
Scheuer, R. D. (A)
Straw, R. J. (M)
Yearsley, W. A. C. A. (M)

Manhattan Beach (LA-7)
Anderson, R. S. (M)
Baker, D. L. (M)
Beachler, R. R., Jr. (SM)
Borgeson, P. W. (M)
Buell, F. D. (A)
Burke, H. W. (M)
Cheney, R. W. (A)
Clapp, R. W. (SM)
Clark, T. L. (M)
Clay, J. D. (M)
Curtis, W. (M)
Dampier, W. P. (M)
Destabelle, R. (A)
Dobbins, W. E. (M)
Evans, J. C. (M)
Frost, P. K. (A)
Frysinger, E. B. (M)
Fulton, A. S. (M)
Gebhardt, C. C. (A)
Gillen, T. W. (M)
Glavcock, R. D. (M)
Gray, E. E. (M)
Gregory, H. D. (M)
Gustafson, L. A. (A)
Haas, D. B. (SM)
Hardy, F. J. (A)
Hassel, R. R. (M)
Howard, R. C. (A)
Jones, L. E. (A)
Kelly, R. S. (M)
Kirkland, V. D. (A)
Klein, W. J. J. (M)
Knittle, D. L. (A)
Landry, S. G. (M)
Lodge, H. L. (M)
Marlhugh, W. (M)
Martin, R. A. (M)
McCann, M. J. (A)
Moore, J. M. (M)
Mullins, W. H. (M)
Nitman, G. R., Jr. (M)
Poppen, L. W. (M)
Putter, K. (M)
Rodman, S. B. (M)
Russell, W. J. (M)
Ryan, W. R., Jr. (M)
Shoemaker, H. L. (A)
Shore, J. D. (M)
Sinclair, J. G., Jr. (SM)
Sloan, A. E. (M)
Smith, W. B. (M)
Starkey, M. J. (M)
Stodder, D. J. (A)
Stone, R. J. (M)
Straube, G. F. (M)
Sur, J. (A)
Swarthe, E. (SM)
Tallon, W. J. (A)
Tucker, V. L. (A)
Vandergrift, R. B. (SM)
Walters, R. F. (A)
Washburn, D. M. (M)
Webb, J. O. (A)
Wooldridge, E. J. (M)

Mare Island (SF-7)
Rue, A. K. (A)

Maricopa (LA-7)
Mays, C. H. (A)

Martinez (SF-EB-7)
Bumpass, R. C. (A)

Mar Vista (LA-7)
Allen, B. G. (A)

Mather AFB (SAC-7)
Liu, C. K. (A)
McCormack, E. J. (A)
Thompson, W. R. (M)

McClellan AFB (SAC-7)
Coover, J. L. (A)
Holman, W. S. (M)
Lowe, W. H. (A)
McKay, W. T., Jr. (M)
Takacs, S. J. (A)

Menlo Park (SF-PA-7)
Alcorn, C. L. (SM)
Ault, C. E. (M)
Ayer, W. E. (SM)
Bailey, H. M. (A)
Barnard, G. A., III (SM)
Barnes, C. W., Jr. (SM)
Benedict, D. L. (SM)
Bennett, B. J. (SM)
Bird, S. P. (A)
Bliss, J. C. (M)
Bothun, R. B. (M)
Boysen, J. A. (M)
Brierly, F. A. (M)
Broderick, D. L. (M)
Brown, O. H. (SM)
Cameron, E. G. (SM)
Carswell, I. (M)
Carter, E. F. (F)
Carter, P. S., Jr. (M)
Caryotakis, G. (M)
Clarke, L. G. (SM)
Coale, F. S. (A)
Cohn, S. B. (SM)
Connor, T. J. (A)
Cox, B. (SM)
Crane, H. D. (SM)
Curtis, E. C. (A)
Dalton, R. C. (M)
Demere, R. M., Jr. (M)
Dodge, C. A., Jr. (A)
Dorsett, J. W., Jr. (M)
Drake, A. L., Jr. (M)
Dunbar, A. S. (SM)
Durfey, G. K. (A)
Eisenberg, M. (A)
Eitel, W. W. (F)
Elam, J. M. (M)
Eldredge, K. R. (SM)
Elliott, H. F. (F)
Evans, W. E., Jr. (SM)
Fisher, L. L. (M)
Fleenor, E. G. (M)
Gaminell, H. C. (A)
Gano, L. D. (A)
Gardiner, K. W. (A)
Greco, N. A. (A)
Green, C. A. (A)
Grow, R. W. (A)
Gunn, L. W. (M)
Hagopian, R. H. (M)
Hall, E. G. (M)
Hayes, M. H., Jr. (SM)
Henderson, K. W. (M)
Hennies, S. R. (M)
Herold, H. L. (A)
Hilton, E. A. (A)
Hirotsu, G. S. (M)
Hoffman, R. J. (A)
Holt, W. W. (M)
Honey, R. C. (M)
Huggins, R. A. (SM)
Jones, E. M. T. (SM)
Kaar, J. M. (M)
Kamphoefner, F. J. (SM)
Kantz, W. L. (M)
Kebby, M. H. (M)
Kennedy, H. D. (M)
King, R. C. (M)
Klein, W. F. (M)
Kruse, C. J. (M)
Leadabrand, R. L. (M)
Lennert, F. G., Jr. (SM)
Light, R. H. (A)
Long, R. A. (M)
Luckey, W. S. (SM)
Luckenbach, R. R. (M)
Lynch, W. M. (M)
Mapsher, D. P. (M)
Masters, D. W. (M)
Matovich, M. J. (A)
McKay, D. (SM)
McKey, D. B. (SM)
McWhorter, M. M. (A)
Meisling, T. H. (SM)
Melville, R. W. (M)
Meyer, H. W., Jr. (A)
Minich, G. E. (M)
Minton, J. P. (F)
Moll, K. D. (A)
Monson, J. E. (M)
Moore, E. J. (SM)
Moore, L. (M)
Morita, T. (SM)
Morrin, T. H. (SM)
Mosley, R. B. (M)
Nelson, E. A. (M)
Nelson, R. A. (M)
Nevins, J. E., Jr. (M)
Noe, J. D. (SM)
Notthoff, A. P., Jr. (M)
Olson, D. D. (A)
Paget, F. W. (M)
Paivinen, J. O. (M)
Patton, W. R. (M)
Petrak, J. R. (SM)
Post, E. A. (SM)
Presnell, R. I. (M)
Priedigkeit, J. H. (SM)
Reyling, G. F. (M)
Rice, P. L. (SM)
Robbiano, P. P. (M)
Rock, A. J. (A)
Rockwell, R. G. (SM)
Ruder, D. J. (M)
Salmon, V. (SM)
Scarborough, D. S. (A)
Schlobohm, J. C. (A)
Schreiner, R. J. (M)
Senise, J. T. (M)
Serang, A. M. (A)
Sherk, P. M. (M)
Shumate, M. S. (M)
Siera, M. M. (A)
Silhavy, W. J. (A)
Sleeper, G. E., Jr. (SM)
Sparks, H. (M)
Spiar, C. H. (VA)
Swanson, J. P. (A)
Symons, R. S. (A)
Tanner, R. L. (SM)
Thille, R. W. (M)
Thomas, A. C. (M)
Thornton, D. D. (M)
Travis, L. L., Jr. (M)
Trumbull, A. F. (A)
Tucker, C. H., Jr. (A)
Valdes, L. B. (SM)
Vallarino, A. R. (M)
Vane, A. R. (M)
Vartanian, P. H., Jr. (SM)
Walter, C. A., Jr. (A)
Walters, A. M. (M)
Westburg, V. B. (M)
Whitburn, R. A. (M)
Whitby, O. (SM)
Whitehorn, R. M. (A)
Willrodt, M. J. (M)
Wing, R. Y. (M)
Woosley, O. C. (M)
Yadavalli, S. V. (A)

Mentone (LA-OB-7)
Simmons, V. J., Jr. (A)

Merced (SF-7)
Hintz, H. F. (A)
Pinsky, B. (A)
Sweeley, G. K. (A)
Taylor, M. A. (A)

Millbrae (SF-7)
Bean, T. C. (M)
Brichta, E. C. (A)
Calvert, C. C. (A)
Moore, K. A. (M)
Murdock, C. E. (A)
Robinson, W. H. (A)
White, H. A. (M)

Mill Valley (SF-7)
Behringer, D. S. (M)
Harbridge, E. A. (A)
Jacobs, H. N. (M)
Kotzum, J. (A)
McFadden, R. R. (M)
Smith, H. H. (M)
Vreeland, R. W. (M)

Modesto (SAC-7)
Bates, W. H., Jr. (VA)

Moffett Field (SF-PA-7)
Logan, J. S. (M)

Mojave (CL-7)
Notar, C. A. (A)

Monrovia (LA-P-7)
Ambrose, E. G. (A)
Bell, N. W. (M)
Brandes, R. A. (M)
Bremner, D. S. (A)
Hawes, R. C. (A)
Kielty, D. T. (M)
Lawler, R. H. (A)
Lothringer, R. C. (M)
McGill, J. A. (A)
Perrault, R. E. (A)
Petry, C. B. (SM)
Potter, P. D. (M)
Sear, A. W. (SM)
Skeirik, R. M. (M)
Speck, G. (M)
Tong, S. R. (A)

Montara (SF-7)
Booker, J. P. (M)

Monta Vista (SF-7)
Patience, D. L. (M)

Montebello (LA-7)
Doeleman, H. (SM)

Monterey (SF-7)
Anderson, R. W. (M)
Bauer, W. M. (M)
Bryan, W. C. (M)
Chaney, J. G. (SM)
Church, R. (A)
Downing, J. (M)
Frey, A. R. (SM)
Giet, G. R. (SM)
Glasgow, R. S. (F)
Gilder, J. M. (M)
Hall, W. W., Jr. (M)
Hoisington, D. B. (SM)
King, J. W., Jr. (M)
Klamm, C. F., Jr. (M)
Miller, R. L. (M)
Norris, W. E. (M)
Oler, C. B. (SM)
Pette, D. C. (M)
Riggin, J. D. (M)
Rightmyer, J. M. (M)
Rothauge, C. H. (M)
Sheingold, A. (M)
Smith, W. C. (M)
Spears, R. W. (M)
Stallberg, H. R. (M)

Monterey Park (LA-7)
Bacon, W. L. (A)
Brown, S. (M)
Carlin, J. H. (M)
Danner, D. H. (M)
Flagg, D. J. (M)
Fucile, F. B. (M)
Kaluger, W. (M)
Kliment, P. (A)
Kopp, E. H. (M)
Leff, B. (M)
Lockhart, R. W. (SM)
Perry, J. (M)
Smith, R. A. (M)
Stanton, G. (M)
Steuer, V. F. (M)

Montrose (LA-P-7)
Bronstein, L. M. (A)
Bullock, R. E. (M)
Christilaw, J. S. (M)
Cox, J. A. (A)
Jensen, C. K. (M)
McClure, G. E. (M)

Moraga (SF-EB-7)
Price, R. L. (SM)
Tibbetts, D. R. (SM)

Morro Bay (LA-7)
Waltz, K. E. (M)

Mountain View (SF-PA-7)
Aden, A. L. (SM)
Allen, S. E., Jr. (A)
Andrews, R. E. (M)
Ashman, R. E. (M)
Beard, C. L. (SM)
Becker, H. A. (M)
Bert, J. E. (A)
Bettner, K. J. (A)
Blachman, N. M. (SM)
Blasi, E. A. (SM)
Blickensderfer, J. A. (SM)
Booth, R. E. (M)
Borghi, R. P. (A)
Bradley, E. J. (A)
Bridgman, A. D., Jr. (M)
Brockemeier, A. E. (M)
Burkhart, R. N. (A)
Cancio, P. (A)
Card, A. A. (M)
Chang, N-C (M)
Clark, C. B. (M)
Clifton, J. K. (M)
Cross, H. V. (M)
Davis, J. H. (M)
Davis, R. A. (A)
Diessner, O. G. (M)
Dilley, L. E. (A)
Dry, J. H. (A)
Ebling, H. J. (M)
Eggers, R. E. (M)
Evans, K. R. (M)
Fanjul, E. L. (M)
Farlow, C. (M)
Gregorian, R. P. (M)
Grimm, R. A. (SM)
Grinich, V. H. (A)
Happ, W. W. (SM)
Hargreave, P. E. (A)
Holaday, R. E. (A)
Horsley, G. S. (M)
Howard, A. B. (A)
Huber, S. J. (M)
Filtebrown, S. M. (A)
Fire, P. (M)
Frincke, P. O. (M)
Garriott, O. K. (A)
Gates, J. P. (M)
Geppert, L. (SM)
Graham, R. E. (M)
Greener, A. E. (M)
Hummel, C. F. (M)
Humphries, J. (M)
Hunter, L. W. (M)
Ipp, J. (M)
Johnson, C. C. (M)
Kafitz, P. H. (M)
Kelch, J. (M)
Kellogg, H. A. (M)
Kessinger, H. E. (A)
Knapp, R. L. (M)
Koski, T. (M)
Kozlik, F. S. (M)
Kyle, W. F., Jr. (A)
Leifer, M. (F)
Lundstrom, O. C. (M)
Maccono, F. J. (SM)
MacKenzie, M. H. (M)
Mansur, D. W. (M)
Mathers, G. C. (M)
Maudens, L. C. (M)
McAllster, W. (A)
McClintock, R. K. (SM)
McKee, L. H. (M)
Medlin, J. E. (A)
Meinheit, C. E. (M)
Metten, L. F. (A)
Mortimore, T. N. (M)
Nord, R. H. (M)
Noyce, R. N. (M)
Nyden, R. C. (SM)
Oberg, E. A. (A)
O'Neill, J. R. (M)
Palmer, D. L. (A)
Pershing, P. D. (M)
Pfost, R. F. (A)
Ramsay, W. R. (M)
Reis, C. S. (M)
Rice, B. G. (M)
Rolfe, J. J. (M)
Roney, E. L. (SM)
Roumbanis, T. (M)
Rowe, R. M. (M)
Sah, C-T (M)
Sarquis, R. H. (A)
Schiffman, B. M. (A)
Schoderbek, J. J. (A)
Seaman, W. E. (SM)
Shockley, W. (F)
Show, O. C. (A)
Sperry, A. B. (A)
Summers, J. W. (A)
Swindels, S. F. (SM)
Thon, W. H. (SM)
Tomlin, W. T. (M)
Tweraky, V. (M)
Vassiliadis, A. (A)
Velin, R. E. (M)
Walker, L. F. (M)
Weeks, R. L. (A)
Wesenberg, C. M. (M)
Whitacre, R. N. (A)
Wihtol, W. (A)
Winn, C. B. (A)
Woodward, R. F. (A)
Wright, R. B., Jr. (M)
Wunderman, L. (A)
Young, R. K. (M)
Zaphiropoulos, R. (M)
Zimmerman, H. G. (A)

Mount Laguna (SD-7)
Hanson, K. L. (M)

Mount Wilson (LA-P-7)
Knight, J. B., Jr. (SM)

Napa (SF-7)
Guyton, C. W. (M)
Mingst, H. C. (SM)
Morris, W. S. (M)
Nawrocki, J. T. (M)
Roberts, W. L. (SM)
Shepard, C. S. (A)
Sorensen, A. G. (A)

National City (SD-7)
Gilliland, G. A. (A)

Newport Beach (LA-7)
Bixler, O. C. (SM)
Ceccarini, R. E. (M)
Cole, F. H. (VA)
Diamond, A. (M)
Ducati, A. C. (A)
Elms, J. C. (SM)
Fritchle, F. P. (M)
Helperin, J. (A)
Herbert, C. (SM)
Pregler, R. A. (M)
Slagle, W. R. (M)

Norco (LA-OB-7)
Brown, L. B. (A)

North Fork (SF-7)
Pearson, D. R. (M)

North Highlands (SAC-7)
Bril, D. H. (A)
Elder, C. B. (A)
Fisher, R. W. (A)

North Hollywood (LA-SF-7)
Abousslleman, W. (SM)
Allen, F. W. (M)
Arne, R. E. (A)
Bailey, F. W. (M)
Bakeman, D. C. (M)
Beaudine, D. M. (M)
Berns, H. L. (A)
Bertolet, E. C. (M)
Bindewald, E. R. (M)
Black, W. C. (A)
Blount, I. T. (A)
Boland, C. D., Jr. (M)
Bookee, J. R. (A)
Brewster, R. A. (M)
Brown, R. M. (A)
Burkart, E. H., Jr. (A)
Burrell, J. E. (A)
Campbell, B. K. (A)
Chester, W. H. (SM)
Choleva, H. L. (M)
Clayton, J. F. (SM)
Clithero, W. H., Jr. (A)
Cochran, E. D. (M)
Combes, R. M. (SM)
Compton, R. L. (M)
Curtis, J. P. (A)
Daniel, R. L. (SM)
Dickerson, D. H. (M)
Diem, C. W. (M)
Dresselhouse, D. H. (A)
Farnsworth, H. D. (SM)
Farrand, W. A. (M)
Filizola, V. F. (M)
Fogle, J. A. (M)
Fuller, C. L. (M)
Garbowitz, L. (A)
Gardner, L. B. (M)
Geib, D. G. (A)
Gigante, G. A. (A)
Gilliland, W. D. (M)
Golden, B. H. (M)
Gove, E. L. (SM)
Hansen, R. L. (M)
Harrison, W. H. (M)
Hedene, T. H. (SM)
Hickman, D. D. (A)
Hughes, W. A. (SM)
Huntsman, H. F. (M)
Jensen, K. K. (SM)
Kellner, M. (A)
Laslo, M. Z. (M)
Leonard, N. E. (M)
Levine, S. E. (A)
Lindquist, M., Jr. (M)
Lui, L. H. P. (M)
Lukenbill, R. S. (M)
Lyons, L. F. (SM)
MacDonald, R. L. (M)
Mallory, G. L. (M)
Mallory, T. (SM)
Momjian, E. A. (A)
Mont, C. H. (A)
Montgomery, D. R. (A)
Moore, V. (SM)
Morgan, R. L. (M)
Muir, H. M. (A)
Neely, N. B. (M)
Newton, W. P. (M)
Oliverio, A. P. (M)
Rahmel, H. S. (A)
Rathburn, R. H. (M)
Rausch, W. D. (A)
Robinson, T. O. (M)
Rupnik, G. F. (M)
Sadler, B. L. (M)
Salz, H. (A)
Schollard, R. J. (M)
Selvidge, H. (SM)
Shon, A. (A)
Sloan, C. S. (A)
Sperling, R. D. (A)
Stalford, W. E. (M)
Stumpf, R. J. (M)
Sullivan, J. R. (M)
Sumner, T. B. (A)
Swenson, A. N., Jr. (M)
Tiedeman, C. R. (M)
Titus, R. W. (M)
Vedovoz, E. (A)
Ward, B. M., Jr. (M)
Weaver, J. H. (M)
Wilson, O. B., Jr. (M)
Winkler, J. L. (A)
Winter, F. J., Jr. (A)
Wise, D. O., Jr. (M)
Wohl, J. (A)
Wolman, L. L. (M)
Zeitzew, H. (M)

Northridge (LA-SF-7)
Adams, P. R. (SM)
Bartholomew, R. J. (A)
Bass, L. J. (M)
Berlin, W. N. (M)
Billings, R. G. (M)
Blight, A. F., Jr. (M)
Burton, E. B. (A)
Daush, A. A., Jr. (M)
Deming, A. F. (M)
Doelz, M. L. (SM)
Everson, C. T. (A)
Fauvre, R. F. (A)
Greenwood, P. E., Jr. (SM)
Guarrera, J. J. (SM)
Hamilton, R. E. (SM)
Hammond, J. G. (SM)
Icenbice, P. J. (SM)
Karpenske, C. D. (A)
Kime, K. L. (M)
Lazarus, A. (M)
Levine, A. J. (A)
Liu, F. F. (M)
Mancini, A. R. (M)
Marsh, K. W. (SM)
McCuaig, J. E. (M)
Morrissey, D. J. (M)
Palm, A. W. (A)
Paulos, L. B. (M)
Paulson, E. T. (SM)
Sisson, R. L. (M)
Telle, G. R. (A)
Wiggins, C. P. (A)
Wyland, G. P. (SM)
Zimmerman, R. L. (M)

Norton AFB (LA-OB-7)
Weseman, H. E. (M)

Novato (SF-7)
Alley, W. D. (A)

Norwalk (LA-7)
Auday, W. S. (A)
Brandes, R. E. (M)
Bruder, R. M. (A)
Campbell, D. H. (A)
Collier, G. H. (A)
Leisz, G. W. (SM)
Loop, D. M. (M)
Morgan, R. C. (SM)
Mund, M. A. (A)
Roehl, E. R. (M)
Saltsburg, S. S. (M)
Schmied, W. F., Jr. (M)
Thurman, E. J. (M)

Oakland (SF-EB-7)
Andersen, V. O. (M)
Anderson, O. A., Jr. (A)
Avery, H. T. (A)
Barabe, J. J. (SM)
Black, L. J. (F)
Buttschardt, C. C. (M)
Cagle, D. S. (A)
Carter, L. J., Jr. (A)
Chew, R. H. (A)
Clark, O. (A)
Cone, D. R. (SM)
Conn, J. A. (A)
Downey, C. E. (M)
Drake, H. B. (SM)
Efstathiou, J. (A)
Engelbart, D. C. (M)
Forbes, A. C. (SM)
Gennett, D. F., Jr. (A)
Gilroy, J. W. (M)
Glessner, J. M. (M)
Gunst, M. A., Jr. (M)
Hunter, S. P. (A)
Jenkins, K. D. (M)
Jones, H. R. (A)
Jones, M. H. (A)
Kan, G. (A)
Kinariwala, B. K. (M)
Lar Rieu, E. A., Jr. (SM)
Lee, D. Y. (M)
Mac Leod, D. A. (M)
Malone, W. C., Jr. (M)
Mizuno, E. (M)
Murr, W. C. (A)
Olson, S. R. (A)
Park, C. W. (SM)
Pattison, A. (A)
Penther, C. J. (SM)
Pigozzi, L. J. (A)
Rosenberg, J. M. (M)
Ross, A. (A)
Russell, G. M. (A)
Schwemin, A. J. (A)
Seamount, D., Jr. (M)
Siefert, G. G. (M)
Steed, W. P. (A)
Stripeika, A. J. (A)
Torrealba, J. (M)
Upham, F. T. (A)
Wahlgren, W. W. (SM)
Weller, G. S. (A)
Werlin, J. H. (A)
Wisniewski, J. (M)
Wolfe, H. T. (M)

Ocean Park (LA-7)
Chapman, D. M. (M)
Geiger, A. E. (M)

Oceanside (SD-7)
Sutherland, J. J. (SM)
Ulmer, H. W. (SM)

Ojai (LA-B-7)
Case, D. M. (M)

Ontario (LA-OB-7)
Adams, F. L. (A)
Arvin, J. S. (A)
Baird, W. H. (M)
Bessette, A. (M)
Calderwood, K. J. (A)
Corrons, B. E. (M)
Grigg, J. W. (A)
De Tiemar, J. L. (SM)
Howland, R. W. (A)
June, R. H. (M)
Livdstrom, R. G. (A)
Lock, R. W. (M)
Mayeda, T. A. (A)
Odekirk, M. D. (M)
Oliverson, M. (A)
Pollock, R. D. (M)
Resnik, A. E. (M)
Ritchie, R. W. (A)
Ritter, E. (SM)
Scarborough, T. H. (A)
Stephens, F. M. (M)
Towler, W. R. (M)
Wagner, D. (A)
Wesley, G. H. (M)

Orange (LA-7)
Bunge, W. R. (A)
Eatough, C. D. (A)
Lephakis, A. J. (M)
Mayfield, J. D. (A)
Medak, M. M. (M)

Orangevale (SAC-7)
Petersen, M. C. (M)

Orinda (SF-EB-7)
Dexter, W. L. (SM)
Herlihy, W. W. (A)
Hill, C. M. (A)
Thumen, G. W. (M)
Viales, L. O. (M)

Oxnard (LA-B-7)
Agrelius, K. C. (A)
Aller, J. C. (A)
Bossoletti, J. E. (M)
Bowen, W. A., Jr. (SM)
Bradford, W. O. (SM)
Canavan, J. J. (M)
Clodfelter, G. C. (M)
Demos, W. A. (M)
Dvoracek, F. H. (A)
Fields, M. H. (M)
Frederick, J. A. (M)
Furumoto, S. (M)
Gibson, J. G. (A)
Gleason, J. L. (M)
Gomez, P. D. (A)
Gregory, R. M. (M)
Hall, R. M. (M)
Hayes, C. R. (A)
Heidbrink, M. E. (M)
Heron, D. J. (M)
Hiser, E. F., Jr. (M)
Hlavaty, E. M. (M)
Howe, W. F. (M)
Hughes, D. D. (A)
Ishii, F. K. (M)
Johnson, W. A. (A)
Jones, M. S. (M)
Kettlewell, J. (M)
Kinne, C. B. (M)
Kopp, G. W. (M)
Krames, C. V. (SM)
Lambert, G. M. (A)
La Plant, O. (M)
Manahan, G. F. (A)
Marvin, P. K. (M)
McIntyre, R. D. (A)
Miller, J. W. (A)
Miller, W. A. (A)
Murray, H. J., Jr. (M)
O'Bryan, R. L. (M)
Parsons, R. L. (A)
Phares, M. E. (M)
Pike, B. W. (SM)
Pike, J. M. (M)
Schneider, P. R. (A)
Sedlacek, W. C. (M)
Shine, E. F., Jr. (M)
Shroyer, H. M. (A)
Solferino, T. A. (M)
Sorden, L. V. (A)
Swanson, E. C. (M)
Taylor, B. J. (A)
Tipple, R. J. (A)
Waddell, T. P. (M)
Wood, L. E. (M)
Wright, D. B. (M)
Ziherl, E. J. (A)

Pacific Beach (SD-7)
Sadler, E. J. (A)

Pacific Grove (SF-7)
Bayless, H. (A)
Burn, J. W., Jr. (A)
Mace, J. C. (SM)

Pacific Palisades (LA-7)
Alberts, W. A. (SM)
Albrecht, A. (SM)
Arndt, W. F. (SM)
Barker, C. B., Jr. (SM)
Beagles, R. (SM)
Bekey, I. (A)
Boykin, E. M. (SM)
Bradshaw, H. B. (M)
Brewer, A. F. (SM)
Brigden, J. K. (M)
Carlson, C. G. (SM)
Cochran, K. W. (A)
Collup, D. O. (SM)
Curtis, J. S. (M)
Danenberg, L. W. (A)
Doyle, E. J. (SM)
Fisher, B. E. (M)
Friedman, T. H. (SM)
Garber, R. S. (M)
Gillin, K. A. (SM)
Grantham, R. W. (A)
Greene, G. M. (SM)
Halloran, R. G. (A)
Hartmann, W. A., Jr. (M)
Hauffe, G. S. (M)
Hertzberg, A. (M)
Hollander, F. H. (M)
Holtzclaw, L. C. (SM)
Holt, W. J., Jr. (M)
Howard, G. L. (A)
Howard, L. W. (SM)
Iams, H. (F)
Jacobson, R. E., Jr. (SM)
Justice, L. E. (M)
Kauke, J. R. (SM)
Lengyel, B. A. (SM)
Loretz, N. F. (A)
Mallett, J. D. (M)
Mayner, G. S. (A)
McCloud, W. W. (M)
Miller, B. F. (F)
Miller, K. M. (SM)
Muchmore, R. B. (SM)
Oser, E. A. (SM)
Paddock, O. K. (SM)
Pernick, L. J. (M)
Perry, C. S. (SM)
Reedy, C. W. (M)
Robertson, O. F. (SM)
Robbins, P. M. (SM)
Romig, H. G. (SM)
Rosenberg, J. (M)
Sarkissian, H. H. (M)
Smith, O. K. (M)
Snider, R. C. (M)
Spandau, E. P. (SM)
Speer, J. H., Jr. (M)
Steidley, J. W. (SM)
Symonds, R. J. (SM)
Trumpy, J. W. (A)
Tyson, O. A. (A)
Van Ackere, M. G. (A)
Walkup, L. A. (M)
Wennerberg, G. (SM)
Whelan, D. E. (A)

Pacoima (LA-7)
Bassett, D. M. (M)
Bixson, L. L. (A)
Briggs, J. G. (M)
Burnett, W. A. (M)
Bustamante, H. A. (M)
Deitz, J. L. (M)
Deyo, A. E. (M)
Dixon, T. P. (M)
Dunn, G. R. (M)
Emus, H. (A)
Fingerett, J. A. (M)
Franco, M. (M)
Griffith, C. D. (A)
Holt, D. E. (A)
Ingebretsen, E. E. (M)
Jacobson, R. (SM)
Krulish, R. G. (M)
Ladine, D. A. (M)
Link, W. F. (A)
Lobenberg, T. J. (A)
Martin, D. L. (M)
Nelson, D. F. (A)
Patin, O. E. (SM)
Pixley, N. S., Jr. (M)
Ramos, A. A. (M)
Reaver, R. R. (M)
Reed, D. S. (A)
Shovlowsky, M. (M)
Swain, P. F. (A)
Swarthout, W. M. (SM)
Turnbull, J. S., Jr. (M)
Ware, C. H. (A)
Zechiel, W. J. (M)

Palmdale (LA-7)
Bennett, A. (A)
Bunce, D. S. (A)
Evans, R. E. (M)
Ferris, P. W. (A)
Johnson, V. C. (A)
Keever, D. B. (M)
Kollar, T. J. (A)
Long, L. A. (M)
McLarin, M. (M)
Mjelde, E. L. (A)
Wilkes, W. M. (A)

Palo Alto (SF-PA-7)
Abraham, W. G. (SM)
Aldgren, W. E. (M)
Andersen, C. V. (A)
Andersen, R. A. (M)
Anderson, C. J. (A)
Anderson, W. A. (A)
Arnold, C. A. (M)
Arnold, D. T. (A)
Asper, H. (A)
Baker, G. R. (M)
Baker, R. H. (M)
Bartholomew, C. S. (M)
Bates, J. F. (A)
Bauler, L. (A)
Bauer, B. (SM)
Beatie, R. N. (M)
Bell, R. L. (M)
Bennion, B. R. (M)
Birdsall, C. K. (M)
Bodily, L. N. (M)
Bolljahn, J. T. (SM)
Brennan, P. A. (M)
Brown, A. S. (F)
Bruno, J. (A)
Burgess, E. (M)
Burkhart, L. M. (M)
Burlingame, L. G. (SM)
Byerlay, H. L. (SM)
Byrne, G. C. (M)
Carnahan, C. W. (F)
Chan, W. W. (A)
Chiang, F. C. (M)
Chown, J. B. (A)
Christenson, P. C. (A)
Clifford, D. G. (SM)
Cline, J. F. (SM)
Code, J. A. (SM)
Coburn, D. S. (A)
Colvin, R. S. (A)
Cone, D. I. (SM)
Conquest, E. A. (M)
Cooper, P. W. (M)
Coulter, H. N. (M)
Craig, R. (A)
Crain, N. R. (A)
Crumly, C. B. (SM)
Cumming, R. C. (SM)
Daniel, R. D. (A)
Daniels, L. C. (SM)
Davies, L. E. (SM)
Davies, R. W. (A)
De Grasse, R. W. (M)
Dixon, S. T. (A)
Dodds, W. (SM)
Dolphin, L. T., Jr. (M)
Doten, E. F. (M)
Dow, D. G. (A)
Dunwoodie, D. E. (A)
Dwight, H. M., Jr. (M)
Eaves, H. H. (SM)
Edberg, E. B. (M)
Edson, W. A. (SM)
Eldon, C. A. (M)
Eldridge, D. F. (M)
Elspas, B. (M)
Fank, F. B. (M)
Farley, W. W., III (SM)
Fawcett, R. G. (SM)
Feinstein, L. (M)
Ferri, G. (M)
Filmer, J. C. (M)
Fisher, C. (SM)
Fitzpatrick, J. P. (M)
Floyd, W. B., Jr. (A)
Fong, A. (SM)
Forrer, M. P. (A)
Foster, C. P., Jr. (SM)
Foy, R. H. (M)
Franke, R. T. (A)
Fuller, L. E. (F)
Gane, R. E. (A)
Gerig, J. S. (A)
Gilden, M. (M)
Gillette, P. R. (SM)
Gleason, C. A. (A)
Goddard, E. G. (SM)
Goldberg, J. (M)
Goldfarb, E. M. (A)
Goodman, D. H. (SM)
Graham, B. (SM)
Grande, V. J. (A)
Granger, J. V. S. (F)
Grass, J. W. (M)
Greuer, G. H. (M)
Griese, R. H. (A)
Guggi, W. B. (A)
Hamilton, R. H., Jr. (A)
Hand, B. D. (M)
Hans, W. J. (A)
Hansen, J. F. (M)
Harman, W. A. (M)
Harris, D. B. (F)
Hasin, H. (A)
Hauser, J. R. (A)
Heckinger, R. G., Jr. (A)
Heinzmann, F. C. (A)
Hemmila, A. (A)
Hewlett, W. R. (F)
Heywood, J. E. (M)
Hightower, W. D. (M)
Hilbers, G. R. (A)
Hlavka, L. F. (M)
Holden, G. R. (M)
Horn, H. S. (SM)
Hufford, G. (M)
Hur

Sherrill, P. N. (A)
Shimizu, J. K. (M)
Sholes, A. E. (SM)
Sibley, C. E. (SM)
Simons, W. S. (A)
Singleton, R. C. (A)
Smith, A. R. (M)
Smith, J. (M)
Smith, K. E. (A)
Smith, S. L. (A)
Snyder, W. (M)
Sorenson, K. G. (A)
Sorg, L. F. (M)
Spades, J. F. (M)
Spangenberg, K. (F)
Stearns, H. M. (SM)
Steele, C. W. (M)
Stelter, E. C. (A)
Stevens, J. C. (A)
Strassner, R. M. (M)
Sullivan, J. W. (A)
Swain, J. R. (A)
Swanson, J. A. (M)
Teeter, W. L. (SM)
Ter Veen, L. A. G. (A)
Thormahlen, W. H. (A)
Tomiyasu, K. (SM)
Towle, R. W. (M)
Turner, G. K. (M)
Turner, T. F. (M)
Ura, F. (M)
Ven, T. H. (A)
Villard, O. G., Jr. (F)
Vlacent, W. R. (A)
Wagener, W. G. (SM)
Waldman, M. D. (A)
Ward, C. E. (SM)
Wasielewski, S., Jr. (M)
Watson, R. H. (SM)
White, F. M., Jr. (M)
Whitson, A. L. (M)
Wick, E. L. (SM)
Wickenden, R. C. (A)
Wielenga, L. J. (M)
Windsor, R. N. (A)
Winkler, R. H. (M)
Wise, W. L. (A)
Wood, L. F. (A)
Wood, W. S. (M)
Yadoff, O. (SM)
Yocom, W. H. (M)
Zeidler, H. M. (M)
Zevenbergen, J. W. (A)
Zitelli, L. T. (M)

Palos Verdes Estates (LA-7)
Bohrow, E. N. (M)
Brewer, G. R. (SM)
Caldwell, J. L., Jr. (SM)
Clement, A. J. F. (M)
Dazey, M. H. (M)
Dutton, O. B. (SM)
Eckdahl, D. E. (M)
Flynt, F. V. (A)
Frady, W. E. (A)
Gleghorn, G. T. (M)
Hannum, D. E. (M)
Helsenstreit, W. R. (SM)
Hughes, W. R. (SM)
Krogh, R. A. (M)
Laverty, N. P. (M)
Leone, W. C. (A)
Mallinckrodt, C. O. (SM)
Martin, W. R. (M)
McCoy, R. T. (A)
McKenna, O. C. (M)
McRae, F. B. (M)
Mitchell, E. (M)
Moore, H. E. (SM)
Muldoon, W. J. (SM)
Newberry, A. W. (A)
Owens, A. T. (M)
Peterson, W. E. (SM)
Phister, M., Jr. (A)
Raffensperger, M. J. (SM)
Scarbrough, A. D. (M)
Stevens, F., Jr. (SM)
Van Patten, W. D. (A)
Vittum, W. M. (M)
Wagensell, W. (SM)
Wallance, G. (SM)
Williams, C. (M)

Panorama City (LA-7)
Bennett, J. L. (M)
Berri, R. E. (A)
Flyr, J. G. (A)
Gaul, T. W. (M)
Hawkins, W. R. (A)
Kleinschmitt, C. J. (A)
Rosenthal, W. F. (M)

Paramount (LA-7)
Child, C. H. (SM)
Green, C. S. (A)
Hunn, G. W. (M)
Ley, E. W. (A)
Pryga, S. A. (M)

Pasadena (LA-P-7)
Adler, J. A. (A)
Ames, W. S. (A)
Ashby, R. M. (F)
Bacon, R. N. (A)
Barnard, M. V. (SM)
Baskins, C. M. (A)
Beatty, C. G. (M)
Bemis, R. C. B. (A)
Benioff, H. (VA)
Blackman, W. S. (M)
Blatterman, H. L. (M)
Bradburn, J. R. (SM)
Bradish, W. M. (A)
Bradley, W. Jr. (M)
Brockmann, M. H. (SM)
Brown, D. E. (A)
Brown, W. J. (M)
Cady, W. G. (F)
Caldwell, P. G. (SM)
Cartwright, V. F. (M)
Chafin, R. L. (M)
Charpentier, D. E. (M)
Chase, N. C. (M)
Choate, R. L. (A)
Coffey, H. J. (A)
Coker, F. B. (A)
Conway, J. F., Jr. (A)
Cook, G. W. (M)
Crafts, C. A. (SM)
Cummings, C. L. (SM)
Czerwonka, H. W. (A)
David, J. R. (SM)
Davis, D. C. (M)
Davis, W. H. (A)
Delp, R. E. (A)
Dennison, P. R. (M)
Diemer, F. P. (M)
Dierckx, A. D. (M)
Dieter, M. R. (A)
Dixon, W. J. (M)
Dlugatch, C. (SM)
Ellis, A. T. (A)
Erdman, D. C. (A)
Fearman, E. L. (A)
Fithian, D. H. (M)
Fullerton, R. W. (SM)
Garber, L. F. (M)
Gates, C. R. (M)
George, N., Jr. (M)
Gerrie, A. L., Jr. (M)
Gilbertson, B. I. (M)
Gilchriest, C. E. (A)
Glaser, E. L. (M)
Goldsmith, P. (M)
Goodman, F. R. (A)
Gordon, R. M. (M)
Gould, R. W. (M)
Gratton, R. E. (M)
Grove, H. G. (M)
Hadaly, R. E. (M)
Haglund, H. H. (A)
Hale, C. R. (M)
Hamilton, R. C. (M)
Harden, P. A. (M)
Hatchl, S. (A)
Hawn, L. R., Jr. (M)
Heacock, R. L. (A)
Herbst, C. (SM)
Heyser, R. C. (A)
Hien, W. H. (SM)
Hill, R. E. (M)
Hiraoka, F. A. (M)
Holden, H. T. (SM)
Hoskins, F. E. (SM)
Houdyshell, H. H. (M)
Howes, E. T. (M)
Iwasaki, F. T. (A)
Jack, R. W. (A)
Janeway, W. F. (M)
Johnson, R. T. (M)
Joslas, C. S. (M)
Kapriellan, Z. A. (M)
Kelm, L. B. (M)
Kennedy, C. J. (SM)
Knickrehm, A. F. (A)
Kowallis, O. K. (A)
Kreutz, W. (A)
Krossa, K. D. (M)
Kuehn, R. L. (SM)
Kuta, G. (SM)
Larey, B. W. (A)
Lawrence, J. F., Jr. (SM)
Le Gette, M. A. (A)
Le Vay, T. C. (M)
Liang, M.-T. M. (M)
Linderman, O. E. (SM)
Lindley, P. L. (A)
Maass, C. F. (A)
Marshall, J. G. (A)
Madine, E. J. (M)
McCann, D. (SM)
McCool, J. M. (A)
McKeon, R. M. (M)
Middlebrook, R. D. (M)
Milgard, A., Jr. (A)
Miller, G. J. (M)
Moore, W. G. (A)
Moran, R. B., Jr. (SM)
Morison, R. (M)
Moseley, F. L. (F)
Motta, (A)
Mulock, R. B. (M)
Mundt, E. (A)
Musty, C. V. (M)
Neff, G. A. (A)
Newhouse, G. B. (M)
Nicholson, W. Q. (M)
Nickel, L. (M)
Nowack, R. W. (A)
Oshiro, F. K. (M)
Owen, R. F. (SM)
Pickering, W. H. (F)
Pomeroy, I. D. (A)
Powers, J. T. (M)
Priebsey, D. (M)
Pullen, M. F. (A)
Ramstedt, C. F. (A)
Ranks, J. E. (M)
Rechtin, E. (SM)
Reilly, M. (A)
Riblet, F. M. (M)
Rieth, H. F. (A)
Robinson, L. P. (SM)
Rohrer, G. W. (M)
Sanborn, K. L. (M)
Schwartz, E. D. (M)
Sefton, W. E. (M)
Seigle, R. K. (M)
Shaffer, P. A., Jr. (A)
Shapiro, M. (M)
Shaw, R. A. (A)
Shultise, Q. M. (M)
Simmons, E., Jr. (M)
Simpson, B. L. (A)
Slavin, M., III (A)
Smith, H. A. P. (M)
Stack, G. C. (A)
Stensgaard, C. P., Jr. (M)
Stevens, B. A. (A)
Stevens, R. (M)
Stewart, J. L. (SM)
Stimpson, L. D., Jr. (A)
Stuart, J. L. (A)
Taylor, T. (M)
Tejada-Flores, L. H. (M)
Telleson, N. (M)
Thomas, D. W. (A)
Timothy, K. O. (M)
Torbron, J. T. (M)
Tonkdarian, R. Z. (SM)
Vail, R. W. (M)
Vernon, F. L., Jr. (A)
Wagner, D. W. (A)
Walker, F. R. (SM)
Waller, R. L. (A)
Warner, A. H. (SM)
Watt, C. W., Jr. (SM)
Watts, E. W. (M)
Wedel, J. L., Jr. (M)
Weigel, W. G. (SM)
Whitehead, E. H. (A)
Wilson, G. P. (SM)
Wood, D. O. (A)
Wright, H. D. (SM)
Zahnky, N. J. (A)
Zarem, A. M. (SM)
Zeman, J. A. (A)

Paso Robles (LA-7)
Ramey, J. C. (A)

Pebble Beach (SF-7)
Menneken, C. E. (M)

Pedro Valley (SF-7)
Weimer, J. W. (A)

Penryn (SAC-7)
Yoshizuka, R. K. (A)

Petaluma (SF-7)
Boutz, F. E. (M)
Ravenscroft, H. A. (M)

Pico (LA-7)
Fuller, C. A. (A)
Riggs, P. F. (M)
Swanson, R. L. (M)

Piedmont (SF-EB-7)
Cole, C. H. (M)
Criglar, J. (M)
Evans, C. P. (M)
Fliegner, A. F. (A)
Forster, A. G. (M)
Fountain, J. G. (A)
Lasky, F. G. (M)
Mac Mahon, A. E. (SM)
Palmer, D. H. (A)

Placentia (LA-7)
Smith, B. K. (M)

Playa Del Rey (LA-7)
Andzer, A. L. (M)
Barhydt, H. (A)
Beckman, J. A. (SM)
Boucher, R. J. (M)
Boucher, R. A. (M)
Cahn, J. M. (A)
Fisher, M. K. (M)
Hartel, R. R. (M)
Hasin, S. L. (A)
Hawthorne, E. T. (SM)
Hayes, E. A. (SM)
Horrell, M. W. (SM)
Markakis, M. J. (M)
McIntosh, D. (A)
Pustarfi, H. S., Jr. (A)
Robinson, G. G. (M)
Ruch, D. E. (M)
Shepard, W. (A)
Smith, R. E. (A)
Strom, R. L. (A)
Williams, R. W. (M)
Woods, W. A. (M)

Pleasant Hill (SF-EB-7)
Backlund, D. L. (A)
Davis, R. W. (M)
Nish, J. G. (M)
Roush, G. E. (SM)
Single, C. H. (A)
Skiff, E. W. (SM)
Trumbo, D. F. (A)
Voelker, F., III (SM)

Pleasanton (SF-EB-7)
Helgeson, G. L. (A)
Herron, R. G. (M)
Wharton, C. B. (A)

Point Mugu (LA-B-7)
Corvi, J. A. (M)
Fleming, F. L., Jr. (M)
Reiff, G. A. (A)
Skahill, B. J., Jr. (A)
Thomas, D. E. (A)

Point Reyes (SF-7)
Reid, I. H. (VA)

Pomona (LA-OB-7)
Allen, J. W. (SM)
Ashley, G. W., Jr. (M)
Bailey, N. A. (M)
Barnett, W. C. (M)
Bartel, J. N. (A)
Black, L. M. (A)
Blackwell, M. B. (M)
Bredon, A. D. (M)
Brewer, C. P. (M)
Bryant, J. A. (M)
Burenko, D. (M)
Burnett, W. B. (A)
Callot, S. (A)
Collins, W. G. (M)
Cooper, R. G. (A)
Craig, F. D. (SM)
Crisp, R. F. (SM)
Davis, O. R. (M)
Douglas, I. M. (M)
Drake, W. A. (A)
Drescher, L. (A)
Dunn, C. E. (A)
Eldridge, A. J. (SM)
Ellis, G. M. (SM)
Elvan, M. (A)
Gastineau, L. (A)
Gill, D. A. (M)
Gottler, R. L. (M)
Gross, F. A. (M)
Harris, H. F. (A)
Hartke, D. H. (M)
Hasenbeck, H. W. (SM)
Heffner, E. K. (A)
Hennings, H. H. (A)
Hermann, P. C. (A)
Horne, C. F., Jr. (SM)
Jackson, J. C. (A)
Kimura, A. M. (M)
Lee, H. J. (A)
Low, R. G. (M)
Madsen, C. A. (A)
Marino, L. A., Jr. (A)
Matheson, G. R. (M)
McLachlan, G. W., Sr. (M)
O'Brien, J. C. (SM)
Ogilvie, W. E. (A)
Overall, G. D. (A)
Patterson, T. C. (SM)
Pizzuti, A. D. (A)
Ranish, H. (M)
Raybin, M. W. (SM)
Reeves, J. T. (A)
Reid, J. N. (A)
Sandler, B. (M)
Schertz, C. W. (A)
Schwenker, R. B. (M)
Shimada, G. (M)
Smith, C. R., Jr. (M)
Smith, D. L. (M)
Smith, L. B. (M)
Smith, R. D. (M)
Soward, R. (M)
Sprague, D. L. (A)
Stenger, F. J. (M)
Sticht, R. J. (A)
Stokely, R. G. (M)
Stone, R. E. (M)
Sutton, A. A., Jr. (M)
Tamnico, J. (SM)
Taylor, A. G., Jr. (M)
Titcomb, E. M., Jr. (M)
Tomita, H. H. (M)
Ward, W. S. (A)
Watkins, E. L. (SM)
Wellsand, R., Jr. (A)
Wessels, P. S. (SM)
Wheeler, D. D. (M)
White, M. A. (M)
Wickstrom, O. A. (A)
Zeller, H. R. (M)

Porterville (SF-7)
Poundstone, J. R. (A)

Port Hueneme (LA-B-7)
Gulda, J. A. (SM)

Portola Valley (SF-PA-7)
Battelle, R. B. (A)
Burke, R. J. (SM)
Dawson, P. F. (M)
Larkin, K. T. (SM)

Portuguese Bend (LA-7)
Keene, L. C. (SM)

Poway (SD-7)
Grindle, C. E. (SM)
Snyder, D. R. (M)

Puente (LA-OB-7)
Allison, R. E. (SM)
Berkley, W. H. (A)
Bills, R. D. (A)
Garcia, G. (A)
Hamilton, L. E. (M)
Linebarger, P. J. (A)
McMahon, J. E. (M)
Poirier, G. R. (A)
Ramirez, M. (A)
Thomas, J. B. (M)
Yamashiro, J. M. (A)

Ramona (SD-7)
Brown, A. F. (A)
Learnard, H. P. (A)
Schanke, F. E. (M)

Rancho Cordova (SF-EB-7)
Lambert, W. E. (A)
Prue, W. W., Jr. (M)

Rancho Santa Fe (SD-7)
Gardner, B. R. (SM)
Haflinger, D. J. (A)
Herbert, W. J. (M)

Redding (SAC-7)
Hoeflich, A. F. (M)
Oestreicher, D. C. (M)
Olsen, R. K. (SM)

Redlands (LA-OB-7)
Herman, J. B. (A)

Redondo Beach (LA-7)
Ake, T. E. (M)
Albright, A. R. G. (M)
Amdahl, L. D. (A)
Andrews, A. A. (A)
Baker, J. N. (A)
Barrar, R. B. (M)
Birkenhead, W. (M)
Bissett, T. B. (A)
Brown, K. H. (M)
Buehner, M. R. (SM)
Cohee, A. V. (A)
Covington, A. W. (A)
Cutrona, L. J. (SM)
Davis, C. H. (M)
Donnelly, J. E. (A)
Ellis, T. O. (M)
Emmerich, L. (M)
Fiet, O. (SM)
Gaston, R. N. (A)
Gehrke, R. A. (M)
Gibbs, F. R. (M)
Hostetter, D. M.
Howard, S. A. (A)
Jolley, N. A. (SM)
King, G. J. (A)
Lytle, A. C., Jr. (SM)
McClellan, L. D. (M)
McLaughlin, R. G. (A)
Nishimura, R. K. (A)
Owens, W. W. (A)
Pearce, C. R. (A)
Perry, J. L. (A)
Pinol, D. G. (M)
Reddicks, J. E. (A)
Rocks, J. K. (A)
Romano, A. J. (M)
Russell, B. J. (M)
St. John, J. L. (A)
Schmitz, J. F. (M)
Snyder, W. A. (M)
Thompson, K. A. (A)
Thrall, L. L. (A)
Wolverton, R. W. (M)

Redwood City (SF-PA-7)
Alff, W. H., Jr. (M)
Amara, R. C. (A)
Babin, V. (M)
Barkley, J. W., Jr. (A)
Berry, B. H. (A)
Black G. (A)
Bloom, G. (A)
Bohoricken, S. (A)
Bradford, C. W. (M)
Cerruti, B. A. (M)
Cooper, J. L. (A)
Covell, D. F. (M)
Davies, R. S. (M)
Edens, R. L. (M)
Elfving, C. T. (A)
Ellis, I. M. (M)
Eshleman, V. (SM)
Firschein, O. (A)
Fleming, H. B. (M)
Freise, W. H. (A)
Gerling, J. E. (M)
Gulick, E. C. (SM)
Gundy, P. L. (M)
Hamilton, D. J. (A)
Hedberg, H. E. (M)
Holtmann, E. H. (A)
Hulett, H. R. (M)
Kazanjian, H. A. (A)
Klein, A. L. (M)
Lacy, P. D. (SM)
Leslie P. E. (SM)
Luebke, W. R. (M)
McAlpine, W. N. (M)
McCann, J. E. (M)
Morris, A. J. (SM)
Murphy, H. L. (M)
Nye, W. H. (M)
Parks, H. F. (M)
Patterson, G. K. (SM)
Piotnikoff, G. P. (A)
Redeker, G. E. (M)
Reed, D. E. (M)
Reiche, L. P. (M)
Rolly, W. J. (A)
Romander, H. (SM)
Rosenthal, G. W. (M)
Rudee, E. (A)
Schmidt, R. C. (SM)
Seated, W. T. (SM)
Short, R. A. (A)
Smalin, N. F. (A)
Stahl, R. J. (M)
Stewart, J. A. (M)
Stoddard, D. J., Jr. (M)
Sweet, H. C., Jr. (A)
Tallmadge, L. E. (M)
Thompson, R. E. (M)
Tipping, C. C. Jr. (M)
Wattenbarger, J. W. (M)
Weber, P. J. (M)
Wersill, J. M. (M)
Wickersham, P. D. (A)

Reseda (LA-SF-7)
Berger, J. B. (A)
Bowers, E. O. (A)
Bowling, J. S. (M)
Briel, L. A. (A)
Chaiken, L. (A)
Colander, R. E. (SM)
Cole, E. J. (A)
Countis, T. J. (SM)
Crippen, C. E. (SM)
Davis, C. W. (M)
Davis, S. (M)
Dulin, J. J. (A)
Elberger, M. (A)
Frank, C. E. (A)
Freedman, L. M. (A)
Garland, M. D., Jr. (M)
Goulet, T. A. (A)
Green, R. D. (M)
Harlan, R. E. (A)
Held, H. (M)
Johnson, R. W. (M)
Keeter, R. E. (A)
Knontz, R. H. (A)
Lynch, W. L. (A)
Mackey, R. C. (A)
Martin, R. W. (M)
McQuiston, W. R. (SM)
Milwitt, W. (SM)
Mock, R. E. (M)
Mumma, J. W. (M)
Murray, R. W. Jr., (M)
Nauss, B. M. (M)
Nelson, E. W. (A)
Peterson, J. A. (A)
Phillips, F. R. (M)
Plank, C. (M)
Politi, E. V. (M)
Politis, S. (A)
Rader, D. F. (A)
Ruby, E. W. (A)
Schuster, N. J. (M)
Scott, R. C. (SM)
Seferian, R. K. (M)
Sutton, L. S. (M)
Thaler, S. (A)
Underberger, G. M. (M)
Verano, F. (A)
Wessel, H. J. (A)
Wills, J. D. (M)
Wood, J. R. (M)
Wynhoff, F. J. (A)

Rialto (LA-OB-7)
Doll, C. L. (A)

Richmond (SF-EB-7)
Airhart, R. V. (M)
Chisholm H. C. (A)
Cori, J. L. (SM)
Enzler, A. J. (M)
Hamilton, E. P. (A)
Harger, W. W. (SM)

Hom, N. P. (A)
Jensen, R. H. (A)
Larsh, A. E., Jr. (M)
Lovell, E. L. (A)
Lowe, C., Jr. (VA)
Mancuso, W. (A)
McWaid, J. A. (A)
Nelson, O. A. (A)
Olivares, J. E., Jr. (A)
Paxson, B. L. (M)
Schrader, G. F. (M)
Stovall, H. E. (M)
Thomason, T. H. (A)
Veburg, J. C. (M)
Wilson, G. L. (A)

Ridgecrest (CL-7)
Appleton, D. T. (M)
Atkinson, R. E. (M)
Beggere, L. M. (M)
Crawforth, J. E. (M)
Cummins, R. L. (M)
Hohl, R. W. (A)
Kramer, L. V. (A)
Larsen, C. L. (A)
Miller, J. R. (A)
Newburgh, H. (M)
Rasque, D. E. (M)
Tkachuk, J. J. (M)

Rivera (LA-7)
James, B. B. (A)
Jones, K. E. (A)
Morse, F. A. (M)
Poulson, W. A. (M)
Samp, T. A. (M)
Schmidt, J. N. (M)
Serrett, J. B. (M)
Smyth, R. K. (M)

Riverside (LA-OB-7)
Atchison, F. S. (SM)
Bauer, R. L. (A)
Bedrosian, E. (SM)
Berns, K. L. (A)
Bluthan, E. (SM)
Borunda, G. S. (M)
Bowen, G. G. (SM)
Bradley, J. (M)
Brown, L. E. (SM)
Brown, M. H. (M)
Buchanan, W. D. (M)
Buchfeller, J. E. (A)
Byrne, J. F. (F)
Casey, S. D. (A)
Davis, W. W. (M)
De Marco, R. J. (A)
Dick, J. O. (M)
Eto, H. S. (M)
Fletcher, R. C. (A)
Galbraith, H. J. (M)
Gilpin, A. B. (A)
Grycko, S. S. (SM)
Haile, E. J. (M)
Heberling, E. D. (SM)
Hopkins, P. E. (SM)
Jackson, T. B. (SM)
Kelley, S. (M)
Kinzer, G. E. (A)
Knoob, G. B. (SM)
Kopulsky, S. (M)
Krilanovich, N. J. (A)
Lepoff, H. (M)
Lindberg, A. C. (M)
Lundquist, C. R. (SM)
Macadam, J. F. (M)
MacAfee, J. W. (M)
Mitchell, J. R. (A)
Moglia, A. B. (A)
Morehouse, G. D. (SM)
Osinski, W. M. (A)
Pawley, M. G. (SM)
Powers, A. B. (SM)
Rowe, D. E. (SM)
Seeley, E. W. (A)
Smith, R. P. (SM)
Spradlin, K. M. (A)
Van Vorhis, J. L. (A)
Waggoner, G. J. (A)
Wall, R. A. (M)
Waltner, C., Jr. (M)
Wells, R. E. (M)

Rolling Hills (LA-7)
Anderson, M. J. (A)
Ankerstar, R. H. (A)
Beutler, F. J. (M)
Boyer, J. M. (A)
Chambers, G. R. (M)
Clark, A. R. (A)
Cummins, J. W. (SM)
Edwards, R. F. (M)
Emerson, M. R. (A)
Engel, H. L. (A)
Gilkison, C. A. (M)
Gillies, M. A. (M)
Hall, C. A. (A)
Hogan, J. D. (A)
Humfield, J. B. (A)
Jackson, R. B. (M)
King, W. J. (A)
McClintock, D. G. (A)
McMahon, G. V. (M)
McMahon, M. E. (M)
McPherson, R. G. (A)
Moore, P. H. (M)
Riggs, D. D. (A)
Steffen, G. P.
Stephan, P. W. (A)
Stone, M. M. (A)
Swanson, W. V. (M)

Rosamond (CL-7)
Kibler, L. S. (M)
Orrick, T. W. (M)

Rosemead (LA-P-7)
Ferl, R. H. (A)
Kenison, R. G. (M)

Running Springs (LA-OB-7)
Sutton, O. D., Jr. (M)

Sacramento (SAC-7)
Bairos, C. A. (M)
Bennett, R. C. (M)
Berger, E. W. (SM)
Bourget, L. (M)
Breuer, H. J. (M)
Broderson, L. V. (A)
Dawson, E. C. (M)
De Cesare, J. F., Jr. (A)
Dickinson, I. E. (M)
Driggs, L. O. (A)
Durr, E. (M)
Edwards, L. Z. (A)
Friedlander, S. (A)
Fukuda, S. I. (M)
Garcia, L. W., Jr. (M)
Geer, H. J. (A)
Glum, D. E. (A)
Godfrey, X. W. (M)
Goss, W. (M)
Hartman, W. H. (M)
Hill, W. C. (SM)
Hogge, L. M. (M)
Kaduk, J. S. (A)
Karpiack, W. J. (M)
Klinke, E. R. (M)
Koch, W. F. (M)
Kowalczyk, J. R. (A)
Leecing, R. W. (A)
Liviakis, G. J. (A)
Mager, R. F. (M)
Mahoney, D. F. (SM)
McKinnon, R. J. (A)
McLane, A. R. (M)
Monuki, A. T. (M)
Naschke, E. S. (M)
Nefelsen, W. (A)
Oates, T. L. (M)
O'Connell, E. D. (A)
Ornigian, P. K. (M)
Polgar, E. A. (A)
Pouzier, R. A., Jr. (M)
Pound, A. W. (M)
Ptomey, D. E. (A)
Quackenbush, H. H. (A)
Roberts, E. A., Jr. (A)
Scott, G. (A)
Shapiro, H. L. (M)
Sirbola, G. (A)
Slater, A. P. (A)
Slater, H. C. (M)
Smart, M. E. (M)
Spadoni, A. F. (A)
Sprackien, R. K. (A)
Stonce, G. S. (M)
Strace, J. S. (A)
Thompson, R. L. (M)
Tsuda, H. M. (M)
Wester, E., Jr. (A)
Williams, H. T. (M)
Zander, C. E. (A)

Salinas (SF-7)
Johnson, R. M., Jr. (A)
Wright, O. N. (A)

San Anselmo (SF-7)
Berryhill, J. L. (M)
Schnell, A. O. (A)
Oberg, V. H. (A)

San Bernardino (LA-OB-7)
Apostolos, T. (M)
Carnuccio, J. N. (M)
Dyrr, E. H. (M)
Ewing, G. W. (M)
Featherstone, S. J. (M)
Huddleston, J. C. (M)
Joe, R. H. (M)
Steve, W. T. (M)

San Bruno (SF-7)
Baker, B. J. (A)
Corbett, W. F. (A)
Fuller, H. H. (A)
Geller, W. (M)
Hart, F. J. (A)
Hawkins, E. R. (A)
Lee, T. G. (A)
McDade, J. J., Jr. (A)
Mizuhara, A. (M)
Morwood, R. C. (A)
Preist, D. H. (M)
Snoddy, R. E. (M)
Strauven, W. C. (M)
Wolfson, A. S. (M)
Woodward, W. J. (A)

San Carlos (SF-P-7)
Acuna, S. P. I. (M)
Aldous, C. N. (M)
Armstrong, P. S. (A)
Combellick, T. A. (SM)
Cook, R. (M)
Culbertson, A. F. (SM)
Cummings, K. M (SM)
Cushing, T. D. (M)
Farinon, W. B. (SM)
Fisher, W. C. (SM)
Gaubatz, D. C. (M)
Gielow, D. E. (M)
Gillen, D. A. (A)
Graves, H. F. (SM)
Greene, H. A., Jr (SM)
Groberg, L. R. (M)
Harper, J. W. (M)
Hull, J. F. (M)
Ingersoll, J. C. (M)
Johnson, J. B. (A)
Johnson, L. B. (SM)
Jolly, J. A. (SM)
Joseph, W. F. (A)
Kaisel, F. (SM)
Kiessling, R. C. (M)
Lewenstein, H. J. (M)
Lichtenstein, M. I. (A)
Maltzer I. (SM)
McAulay, W. H. (M)
Miller, R. J. (M)
Oseas, J. (A)
Peirce, J. A. (M)
Randall, K. K. (M)
Robbins, C. M., Sr. (SM)
Ross, A. T. (M)
Rudisuhle, E. J. (M)
Seymour, A. M. (SM)
Stefanoff, M. J. (M)
Walter, R. L. (SM)
Winenow, R. E. (A)
Zukin, A. S. (M)

San Clemente (LA-7)
Casad, T. A. (A)

San Clemente Island (LA-7)
Scott, N. O. (A)

San Diego (SD-7)
Abbey, K. (SM)
Abel, C. F. (A)
Ahrens, H. R. (A)
Alam, H. H. (M)
Albin, A. L. (M)
Alexander, W. G. (SM)
Altman, D. E. (M)
Anderson, J. S. (M)
Anderson, V. C. (SM)
Anthony, D. J. (M)
Applin, R. H. (M)
Austin, R. W. (M)
Babbitt, H. B. (M)
Bailey, D. G. (M)
Bakakos, G. J. (A)
Bange, E. E. (A)
Barber, G. D. (A)
Barley, C. E. (A)
Barnum, T. G. (A)
Bauer, J. A. (M)
Bell, D. A. (M)
Bendel, R. C. (M)
Bergant, G. G. (M)
Biering, A. H. (M)
Birkett, B. T. (M)
Block, E. A. (M)
Blosles, F. H. (M)
Blumenstein, W. C. (M)
Bond, C. H. (SM)
Boscia, A. F. (A)
Bostwick, W. E. (M)
Bowers, R. W. (VA)
Bowers, J. L. (SM)
Brack, T. F. (A)
Brackett, R. T. (M)
Bradford, W. R. (M)
Braun, S. (A)
Brengle, A. S. (M)
Briggs, R. W., II (A)
Brokaw, H. R. (SM)
Brown, J. W. (SM)
Brunt, N. F. (A)
Burbank, C. J. (SM)
Burke, A. F. (SM)
Burnett, W. L. (M)
Burrauss, S. J. (M)
Byrnes, F. X. (M)
Campbell, A. F. (A)
Campbell, C. C. (M)
Campbell, R. (M)
Campbell, W. D. (M)
Caporaletti, G. A. (M)
Carlson, E. W. (M)
Casal, E. G. (A)
Caspers, J. W. (M)
Cawley, J. H., Jr. (A)
Chadwick, R. F. (A)
Chaitoff, M. (M)
Chang, G. M. (M)
Chaniowitz, C. (M)
Chatelain, M. G. (M)
Cheney, A. G. (A)
Cherry, W. R., Jr. (M)
Clark, H. W. (A)
Clare, E. T. (SM)
Clark, E. (A)
Clarke A. G. (A)
Clarke, G. W. (A)
Coleman, G. M. (M)
Comstock, R. L. (M)
Cook, M. (M)
Corkhill, J. M. (A)
Cram, C. C. (M)
Creel, J. W. (A)
Creutz, E. C. (SM)
Crispell H. L. (SM)
Crocker, W. F. (A)
Crottinger, R. M. (M)
Curl, G. H. (SM)
Dameson, L. G., Jr. (M)
Dausend, J. P. (M)
Davis, J. F. (M)
Day, J. C. (SM)
Deavenport, J. E. (M)
Decker, J. L. (A)
De Haas, D. G. (M)
Densmore, M. E. (A)
Derenthal, R. J. (M)
Dickstein, H. D. (M)
Dobyne, J. C., Jr. (A)
Dodd, G. M. (M)
Doig, H. J. (M)(A)
Donahue, J. (M)
Drayner, A. H. (SM)
Dressesen, W. B. (M)
Dyess, C. H. (A)
Eby, M. D. (A)
Esson, O. E. (M)
Evans, A. R. (A)
Evans, R. E. (A)
Evans, W. O. (A)
Farmer, A. A., Jr. (A)
Fay, W. J. (M)
Fiske, P. E. (SM)
Flarity, W. H. (M)
Forke, A. B. (SM)
Fogel, L. J. (SM)
Franklin, W. S. (M)
Freres, C. H. (M)
Frost, J. W. (M)
Fuhrer, D. L. (M)
Garcia, G. E. (A)
Geren, K. E. (M)
Gill, S. W. (A)
Gillette, A. J., Jr. (A)
Gedard, W. R., Jr. (M)
Gordon, R. A. (M)
Gottwald, C. H. (M)
Granger, H. (SM)
Greeley, A. C. (M)
Greenspan, L. E. (M)
Greenstein, J. L. (A)
Halonen, C. A. (A)
Hamann, O. F. (A)
Hamilton, E. A. (M)
Hansen, H. J., Jr. (A)
Hansen, W. C. (A)
Harley, J. M. (SM)
Harris, L. G. (M)
Harrison, J. F. (M)
Hartin, W. J. (A)
Hatcher, C. M. (A)
Hatchett S. E. (SM)
Hauser, J. H. (M)
Hedlund, K. W. (M)
Heritage, D. P. (M)
Heritage, J. L. (M)
Herman, J. J. (A)
Herz, E. (M)
Hicks, C. N. (A)
Hicks, F. A. (A)
Hitney, C. J. (M)
Hodgson, V. R. (A)
Hogg, J. A. (SM)
Holcomb, D. E., Jr. (A)
Holiak, A. F. (A)
Holloway, J. (SM)
Holmes, G. B. (A)
Honer, R. E. (SM)
Hood, I. A. (M)
Hopkins, R. U. F. (M)
Hornsby, J., Jr. (M)
Hose, E. (M)
Howell, J. E. (M)
Hughes, L. R. (M)
Ikerd, H. M. (M)
Ingram, C. J. (M)
Jamison, J. D. (M)
Jallu, F. M. (M)
Johnston, D. L. (A)
Jones, H. G. (M)
Jones, K. N. (M)
Jones, L. C., Jr. (A)
Justice, R. (A)
Kalbfell, D. C. (SM)
Karcher, E. R. (SM)
Karel, L. (M)
Kasal, K. (A)
Keener, M. A. (A)
Keith, I. W. (M)
Kelly, D. R. (A)
Kerr, H. G., Jr. (A)
Kiernan, E. F. (SM)
Kikushima, C. S. (M)
Kilpinen, R. M. (M)
Kimball, J. L. (A)
Kimberg, I. (A)
Kluck, J. H. (M)
Kohn, I. A. (M)
Kowalewski, J. C. (A)
Kozloff, V. S. (M)
Lakins, B. B. (A)
Lambert, T. M. (M)
La Motte, K. E. (M)
Lasitter, H. A. (A)
Lay, P. D. (A)
La Zelle, L. L. (M)
Lee, R. H. (SM)
Lee, W. L. (M)
Leeds, M. F. (M)
Leffler, D. (A)
Leger, R. M. (SM)
Lessem, M. (M)
Levitt, M. (A)
Levy, E. S. (A)
Linney, G. D. (M)
Lodge, C. R. (M)
Loeb, M. (A)
Logue, S. H. (A)
Long, J. V. (M)
Lopez, O. (M)
Luebben, R. G. (M)
Mainland, R. (M)
Makinson, H. O. (M)
Martin, F. E. (M)
Martin, G. E. (SM)
Mason, J. R. (A)
Maughmer, J. M. (A)
May, R. C. (A)
Mayeaux M. (A)
Mazurkiewicz, H. G. (M)
McAllister, J. A. (M)
McCue, D. E. (A)
McDaniel, G. A. (A)
McFaddin, R. R. (M)
McGehee, C. R. (M)
McKnight, C. L. (A)
McManus, R. P. (M)
McNaney, J. T. (SM)
Mealey, J. (A)
Meckfessel, E. F. (A)
Medved, D. B. (SM)
Mehner, E. C. (A)
Merrill, J. R. (M)
Michels, P. J. (A)
Milek, H. (A)
Miller, C. N. (M)
Milligan, F. M. (M)
Mills, W. N. (M)
Mizushima, M. (M)
Moe, C. R. (SM)
Moffatt, V. J. (M)
Montalvo, E. (M)
Moore, E. J. (M)
Moore, J. E. (A)
Morris, G. A. (A)
Moser, J. L. (M)
Mott, M. H. (M)
Mulvey, J. X., Jr. (A)
Murray, J. H. (M)
Nawalinski, T. E. (M)
Nichols, R. B. (M)
Niryborski, E. S. (M)
Norton, H. N. (M)
Novak, E. K. (M)
Noyes, A. E. (A)
Nuess, C. (M)
Ogram, R. L. (M)
Olds, O. S. (M)
Oliver, G. W. (A)
Olmsted, M. (SM)
Ono, A. M. (A)
Onstad, R. C. (M)
Orpin, L. H. (SM)
Osborn, N. III (M)
Ozaki, K. (A)
Pagels, W. (A)
Paine, S. T. (M)
Parisa, S. G. (A)
Parish, M. L. (M)
Parker, A. B. (M)
Parker B. E. (SM)
Parker, R. O. (M)
Parker, S. E. (M)
Peek, G. E. (A)
Peterson, R. M. (M)
Pfender, W. H., Jr. (M)
Phillips, C. E. (A)
Phillips, E. T. (M)
Photinos, H. E. (M)
Pickens, G. O. (M)
Pike, F. R. (M)
Pine, T. G. (M)
Pochop, D. R. (A)
Poe, C. M. (A)
Pokorny, F. A. (M)
Porter, J. B. (M)
Powell, D. S. (SM)
Prager, R. H. (M)
Prather, A. W. (M)
Prim, D. C. (SM)
Proctor, D. (M)
Quigg, R. R. (A)
Rathbone, R. R. (A)
Ratkevich, A. E. (A)
Ratte, J. P. G. (A)
Ravey, D. L. (M)
Rayburn, D. A. (A)

Zable, W. J. (A)
Zagon, A. R. (A)
Zimmerman, J. K. (A)

San Dimas (LA-OB-7)
Martin, R. L. (M)
Wilkins, W. H. (M)

San Fernando (LA-SF-7)
Bailey, C. C. (A)
Bauer, J. A. (A)
Begley, W. W. (M)
Berglund, A. Q. (M)
Bouquet, F. L., Jr. (M)
Clinger, E. C. (A)
Coltin, A. H. (M)
Daniel, D. B. (A)
Friedman, J. A. (A)
Girouard, L. O., Jr. (M)
Graber, R. E. (SM)
Holly, J. A. (M)
Hopkins, W. L. (A)
Horning, I. D. (A)
Larson, C. C. (SM)
Loger, D. B. (M)
Lowy, M. A. (M)
McLaughlin, F. G. (A)
Mo re, J. G. (A)
Richter, R. O. (A)
Rosenberg, R. E. (A)
Slor, A. D. (M)
Sohlgren, C. E. (M)
Stankovich, D. (A)
Starr, I. M. (A)
Toomin, H. (M)
Tyrrell, R. A. (A)
Vincent, R. C. (M)
Walters, L. G. (M)
Warne, V. J. (VA)
White, G. S. (A)
White, R. H. (A)
Williams, W. E. (M)
Wills, R. V., Jr. (M)

San Francisco (SF-7)
Adkison, G. O. (M)
Alcorn, R. C. (A)
Alexander, C. S., Jr. (A)
Anders, F. W. (M)
Andrews, B. H. (M)
Anmuth, M. (M)
Antosy, S. J. (M)
Apostolakis, G. C. (M)
Armstrong, W. F. (A)
Bailey, J. J. (A)
Bajus, J. C. (M)
Baldwin, R. S. (M)
Ball, G. F. (A)
Ballard, J. L. (A)
Barbee, G. A. (A)
Barrie, T. H. (M)
Beahr, A. W. (A)
Bean, H. C., Jr. (A)
Beatrez, R. (A)
Beaulieu, J. P. (A)
Belford, K. R. (A)
Bernard, J. T. (M)
Berthold, W. L. (M)
Betts, R. W. (A)
Betzer, W. E. (M)
Beynon, D. J. (M)
Bird, D. (A)
Biscomb, L. I., Jr. (M)
Black, J. G. (A)
Blazek, G., Jr. (A)
Blough, A. K., Jr. (A)
Booth, G. H. (A)
Bose, K. W. (M)
Boss, L. J. (M)
Bourne, C. P. (A)
Bourret, P. L. (M)
Bowne, J. C. (M)
Brace, F. R. (M)
Bradshaw, L. (A)
Breeding, C. R. (A)
Brinton, R. L. (SM)
Brown, A. E. (A)
Brown, C. M. (SM)
Brown, R. L. (A)
Brown, R. S. (M)
Bryan, W. L. (M)
Buhrman, H. M. (A)
Bullock, J. B. (A)
Butler, J. E. (M)
Campbell S. S. (A)
Carnicom, R. T. (A)
Carpenter, A. B., Jr. (M)
Carroll, D. T. (A)
Cheney, F. H. (M)
Cheu, E. D. (SM)
Colburn, L. J. (A)
Conroy, C. L. (A)
Constant, J. N. (M)
Convery, T. J. (A)
Cook, J. D. (M)
Cooke, L. G. (M)
Corte, L. L. (A)
Crandall, W. R. (M)
Curtis, R. E. (M)
Czeikowitz, R. F. (M)
Daniel, D. (A)
Danielson, E. G. (VA)
Daubenheyer, H. W. (M)
Dausman, R. H. (M)
Davidson, J. D. (A)
Davie, L. J. (M)
Davy, L. H. (M)
Dawson, J. B. (M)
Dennis, A. R. (M)
Dent, W. U. (M)
Dere, D. J. (M)
Detrick, D. M. (M)
De Veaux, E. C. (M)
Doherty, D. T. (M)
Dolsen, J. A. (M)
Doran, J. W. (A)
Dunlap, G. R. (A)
Dunlap, H. B. (M)
Dunning, R. A. (A)
Durakov, J. S. (A)
Dutoit, D. A. (M)
Enchus, W. J. (M)
Eckart, J. H. (A)
Edison, E. (A)
Eklund, M. H. (M)
Elderkin, C. D. (M)
Engle, C. G. (M)
Fairbrother, C. W. (A)
Faithorn, N. R. (M)
Fanning, J. J., Jr. (A)
Felch, J. L. (M)
Flowers, W. P. (A)
Fouch, J. W. (A)
Fowler, E. B. (A)
Fozdar, J. K. (M)
Freeman, R. R. (M)
Freiermuth, V. J. (M)
Froman, J. (SM)
Fuss, P. S. (M)
Gallagher, W. E. (A)
Gallo, F., Jr. (M)
Gapasin, F. G. (M)
Geary, J. T. (A)
Gee, H. W. (A)
Gillin, G. F. (A)
Gilmour, A. S., Jr. (M)
Given, I. (M)
Graf, E. A. (M)
Gregal, J. (M)
Greulich, H. J. (A)
Groves, W. E. (SM)
Grzesik, J. (A)
Hallbeck, R. F. (M)
Hamlin, D. E. (M)
Hammett, R. L. (M)
Hankel E. M. (A)
Hant, W. (M)
Harmon, G. W. (SM)
Harris, C. E. (A)
Harris, R. D. (M)
Harrison, J. C. (A)
Hartman, R. V. (M)
Haruyama, B. K. (M)
Hayes, J. (A)
Heide, W. H. (M)
Held, H. E. (VA)
Herrmann, W. T. (A)
Hitzelmann, A. D. (SM)
Hoffman, L. E. (A)
Hofmeister, L. A. (A)
Holland, E. R. (A)
Holmes, D. K. (A)
Holmes, R. E. (M)
Horowitz, M. W. (M)
Houston, R. W. (M)
Howe, G. A. (A)
Hughes, J. M. (M)
Hume, G. A. (M)
Humphreys, J. D. (M)
Hurlbut, G. N. (M)
Hurt, F. W. (M)
Johson, C. B. (A)
Johnson, G. G. (A)
Johnston, J. G. (A)
Jones, E. C. Jr. (A)
Jouvenat, J. M. (A)
Kafalenos, L. (M)
Kalb, H. N. (M)
Kang, K. H. (A)
Karp, A. L. (A)
Karp, P. W. (M)
Kastl, R. H. (A)
Kaufmann, A. W. (M)
Kavanaugh, J. C. (M)
Kawal, W. T. (M)
Keen, T. J. (M)
Kees, A. A. (M)
Kelley, J. B. (M)
Kern, F. W. (A)
Kile, R. L. (M)
Kilpatrick, D. D. (M)
King, R. B. (M)
Klise, K. W. (M)
Knight, L. J. (A)
Knorpp, J. L., Jr. (M)
Kochenderfer, W. E., Jr. (A)
Kosar, W. S., Jr. (M)
Kotulak, J. J. (M)
Kramer, J. (VA)
Kruesi, G. G. (M)
Lackowski, D. H. (M)
Laine, D. (M)
Landells, J. H. (A)
Larney, J. L. (A)
Lee, F. B. (M)
Lee, J. A. (A)
Lee, W. (VA)
Lee, W. (A)
Lenz, W. K. (A)
Levandosky, J. R. (A)
Lewis, E. L. (A)
Liewald, V. R. (A)
Lippincott, D. K. (SM)
Little, W. A. (A)
Lotz, W. E., Jr. (SM)
Low, S. (A)
Lucas, G. R. (M)
Luce, R. R. (M)
Lynne, S. (M)
Mackay, R. S., Jr. (SM)
Magrant, H. (M)
Maher, P. D., III (M)
Manetsch, T. J. (A)
Marshall, E. G. (M)
Marshall, E. K. (M)
Marshall, C. M. (M)
Marsinkavage, D. M. (A)
Massoglia, F. P. (A)
Mathews, C. A., Jr. (M)
McBride, W. J., Jr. (SM)
McCain, G. (A)
McCarley, H. H. (SM)
McCluskey, P. M. (M)
McConnell, V. (A)
McDowell, D. E. (A)
McGibbon, G. D. (A)
McKay, H. B. (M)
McKnight, C. J. (M)
McNell, L. H. J. (A)
McNulty, J. L. (A)
McQueeney, K. A. (M)
Meader, H. W. (A)
Mente, J. E. (A)
Mercer, W. T. (A)
Mergy, A. E. (A)
Miller, C. W. (M)
Millet, A. J. (A)
Morrison, A. C. (M)
Most, N. (M)
Moulin, H. J. (A)
Munday, W. A. (A)
Nelson, L. O. (M)
Ness, R. J. (A)
Neuman, R. H. (A)
Newell, L. T. (SM)
Newell, R. R. (A)
Newell, R. S. (A)
Newman, H. L. (M)
Niemi, L. T. (M)
Noble, M. L. Jr. (M)
Nolen, J. F. (A)
Nowak, M., Jr. (A)
Nyberg, R. A. (A)
Olcovich, T. A. (A)
Olinger, A. M., Jr. (A)
Olsen, J. C. (M)
Olszewski, L. T. (A)
O'Neil, J. A. (M)
O'Rourke, J. B. (M)
Ottinger, G. L. (M)
Over, J. J., Jr. (M)
Pacher, E. A. (A)
Pallas, C. M. (A)
Parkkinen, M. (A)
Parsons, L. W. (M)
Patch, H. W., Jr. (M)
Paull, J. O. (A)
Penniwell, A. F. (M)
Perry, W. S., Jr. (M)
Phillips, J. T. (A)
Pinkney, J. L. (A)
Plummer, L. T. (M)
Powell, R. I. (M)
Pratt, J. D. (A)
Prohofsky, L. A. (M)
Purvis, R. D. (A)
Qualkinbush, C. N. (A)
Quenstedt, R. E. (A)
Ralls, J. W. (M)
Rende, A. A. (A)
Renker, R. A. (A)
Rice, H. A. (M)
Richard, P. T. (A)
Richter, R. E. (A)
Rison, D. M. (A)
Roberts, C. O., Jr. (M)
Roberts, R. W. (M)
Robinson, K. L. (M)
Rogers, D. E. (M)
Rogers, J. H., Jr. (A)
Rossi, F. (M)
Royce, E. R. (M)
Ruggles, K. W. (A)
Rundlett, L. M. (M)
Saganowich, J. C. (A)
Sander, E. E. (M)
Schauers, C. J. (M)
Scheetz, R. E. (A)
Schibi, H. R. (M)
Schinabeck, J. R. (M)
Schmidt, L. C. (M)
Schreiber, E. L. (M)
Schwarzschild, B. (A)
Schwenter, G. E. (A)
Schrievers, B. J. (A)
Seaver, G. E. (M)
Sewell, F. T. (A)
Sharman, H. M. (M)
Sherry, J. J. (M)
Simas, F. O. (A)
Simonds, R. L. (A)
Singer, H. (M)
Smith, S. B. (SM)
Smith, T. C. (M)
Smithey, L. D. (M)
Solomon, S. S. (A)
Spillane, J. W. (A)
Sprunk, W., Jr. (A)
Stark, H. M. (M)
Starrett, W. R. (A)
Steele, R. E. (M)
Stortz, R. A. (A)
Swisher, L. W. (A)
Szatrowski, Z. T. (A)
Tanaka, G. J. (A)
Tansel, D. C. (M)
Taormina, B. J. (A)
Tau, J. C. (A)
Terranova, D. S. (M)
Test, A. J. (M)
Timm, F. W. (A)
Tourville, G. A. (M)
Trip, R. E. (A)
Tufts, R. M. (SM)
Turek, C. W. (M)
Unsworth, R. G. (A)
Veliz, J. R. (A)
Wenger, L. S. (SM)
Wheeler, R. D. (A)
Whelan, F. W. (A)
Whitehead, E. A. (M)
Wholey, C. W. (A)
Wight, G. S. (A)
Wilke, R. R. (SM)
Wilkins, D. E. B. (A)
Williams, N. H. (M)
Williams, P. A. (VA)
Wine, J. R. (M)
Witsiepe, R. E., Jr. (M)
Wojcik, B. M. (M)
Wollenberg, H. A. (M)
Wong, D. S. (A)
Wong, E. (A)
Wong, H. F. (A)
Wong, S. S. (A)
Wong, W. E. (A)
Wood, G. V. (M)
Woodruff, R. L. (M)
Woolverton, R. B. (F)
Yamamoto, N. (M)
Yanagihara, F. T. (A)
Yee, A. W. (A)
Yee, P. (M)
Yoon, P. (A)
Young, K. A. (A)
Young, W. E. (M)
Zipf, A. R. (A)

San Gabriel (LA-P-7)
Black, J. M. (A)
Burtner, R. K. (A)
Fitzwater, W., Jr. (M)
Franklin, P. G. (M)
Kizer, D. E. (M)
Leggett, D. A. (M)
Lincoln, C. C., Jr. (A)
Reilly, R. R. (M)
Ross, I. (M)
Ruterman, E. R. (A)
Seeley, E. M. (A)
Slote, D. M. (A)
Spargo, P. W. (A)
Weaver, C. E. (VA)
Wells, J. L. (M)
Williams, G. E. (A)
York, E., Jr. (M)

San Jose (SF-PA-7)
Agadoni, C. A. (M)
Applequist, J. E. (A)
Astrahan, M. M. (M)
Athens, A. S. (M)
Bailey, S. H. (A)
Barquist, W. S., Jr. (M)
Beck, J. W. (M)
Benoit, R. E. (A)
Benz, W. G. (M)
Bixby, L. H., Jr. (A)
Boennighausen, R. A. (M)
Borgese, A. J. (M)
Bramley, N. V. (SM)
Bray, G. E. (M)
Brown, C. J. (A)
Burns, W. E. (M)
Cain, D. C. (M)
Carter, D. (A)
Christopherson, W. A. (A)
Clauer, C. K. (M)
Conrod, C. D. (A)
Cowden, R. C. (A)
Croad, J. G. (M)
Daniels, J. W. (A)
Davenport, K. R. (A)
Dibb, G. (M)
Dinapoli, F. C. (A)
Di Napoli, G. W. (A)
Dodgworth, W. F. (M)
Dowling, R. H. (M)
Duba, L. (A)
Eldridge, A. J. (M)
Engwicht, H. (SM)
Erdman, J. P. (M)
Fine, W. P. (A)
Fisher, D. L. (M)
Gibson, M. M. (M)
Gonzalez, J. (A)
Hagopian, J. J. (M)
Hancock, N. (M)
Hasen, J. E. (A)
Heit, I. M. (M)
Herrera, R. (A)
Hillhiber, D. F. (M)
Hoagland, A. S. (SM)
Hopner, F. (M)
Ihly, F. J. (M)
Isaacson, R. G. (A)
Jacobs, I. M. (M)
Jakubowski, M. C. (M)
Jennings, E. E. (SM)
Jesse, E. (M)
Johnson, W. J., Jr. (A)
Johnson, W., Jr. (A)
Jones, D. F. (A)
Kiely, D. J., Jr. (A)
Klein, E. A. (A)
Larson, R. C., Jr. (M)
Libby, L. L. (SM)
Markey, H. G. (A)
Martin, V. G. (SM)
McCullough, J. S. (SM)
Mendez, I. O. (M)
Moe, C. R. (M)
Molzahn, V. L. (A)
Mongeon, R. W. (M)
Moog, J. D. (A)
Mundrick, E. L. (A)
Nye, R. L., Jr. (M)
O'Keefe, E. W. (A)
O'Loughlin, J. J. (M)
Paulsen, J. N. (A)
Quement, F. J. (VA)
Rambo, W. R. (SM)
Reynolds, W., Jr. (M)
Rinsler, L. (M)
Roelda, E. N. (A)
Ross, H. C. (SM)
Rothe, M. E., Jr. (A)
St. Clair, R. (M)
Samario, E. J. (M)
Saylor, R. A. (A)
Schlaepfer, C. E. (A)
Sierra, H. M. (M)
Smith, P. F. (M)
Specht, D. F. (M)
Speck, R. S. (M)
Steadling, T. W., Jr. (M)
Stephenson, D. L. (M)
Stevens, L. D., Jr. (SM)
Stewart, L. B., Jr.
Stock, J. A. (M)
Stoft, P. E. (M)
Stringall, W. S. (A)
Stuart, G. S. (A)
Svigals, J. (M)
Townsend, C. K. (A)
Tralle, G. E. (M)
Travis, N. W., Jr. (M)
Treseder, R. C. (M)
Ujiiisua, R. L. (M)
Vanderbeek, H. B. (M)
Van Zuuk, D. A. (M)
Warshaw, H. D. (M)
Wear, G. L. (A)
Wengert, R. A. (M)
Widener, M. W. (M)
Willard, D. D. (A)
Williams, C. S. (M)
Wilshinsky, I. (M)
Wood, F. B. (M)

San Leandro (SF-EB-7)
Allnutt, J. F. (A)
Holloman, C. J. (M)
Jones, F. W. (M)
Sanders, J. G. (A)
Silverman, B. P. (M)
Solnanz, L. (A)
Still, J. G. (A)

San Lorenzo (SF-EB-7)
Jacobs, H. L. (A)
Lyon, D. J. (M)
Murray, J. L. (A)
Winningstal, C. N. (M)

San Lorenzo Village (SF-EB-7)
Donahue, W. J. (A)

San Luis Obispo (LA-7)
Brown, C. F. (M)
Fisher, C. E. (A)
Hendriks, H. J. (SM)
Landyshev, A. (M)
McClellan, D. H. (A)
Radius, C. (SM)
Wills, J. R. (M)
Wolf, H. K. (M)
Zimmerman, H. S. (M)

San Marino (LA-P-7)
Baumgartner, W. S. (SM)
Cahalan, E. F. (M)
Cummins, R. G. (M)
Gauldin, C. B. (M)
Herron, J. R. (SM)
Irwin, E. M. (M)
Mauritz, F. E. (M)
Moore, R. L. (A)
Pfeiffer, W. F. (A)
Sanders, L. J., Jr. (M)
Spaulding, C. P. (SM)
Stimson, J. D. (M)
Thatcher, J. W. (SM)
Whistler, J. P. (SM)

San Mateo (SF-7)
Andrews, W. F. (A)
Bartholomew, H. C. (M)
Bennett, K. (M)
Chow, B. (M)
Cotterill, M. J. (M)
Daly, J. J. (M)
De Lorimier, J. B. (A)
Downie, W. A. (M)
Eakin, J. H. (A)
Erickson, L. G. (SM)
Fujii, W. M. (A)
Greve, G. M. (M)
Haylock, W. B. (M)
Heller, R. E. (SM)
James, S. D. (SM)
Janakos, N. (A)
Line, G. D. (M)
Lott, T. M. (M)
Mackenzie, R. G. (SM)
Maninger, R. C. (M)
Miller, C. M. (M)
Mueller, M. (M)
Newman, R. J. (A)
Ogden, J. E. (M)
Oshima, K. (A)
Palmquist, J. F. (SM)
Smith, M. (A)
Smyrnos, G. J. (M)
Sutherland, R. I. (A)
Taylor, E. D. (M)
Taylor, R. A. (M)
Wilber, E. (A)
Wilder, T. W., III (M)
Zweifel, F. A. (M)

San Pablo (SF-EB-7)
McDaniel, R. F. (A)

San Pedro (LA-7)
Adams, W. H. (SM)
Baines, E. L. (M)
Dahl, J. D. (M)
Deaver, J. M. (A)
Frasco, W. Y. (M)
Goforth, J. L. (M)
Gross, W. (A)
Gustin, J. (A)
Haack, R. W. (M)
Heaverlo, H. D. (A)
Hettich, J. J. (A)
Holland, R. J. (A)
Howard, C. T. (A)
Kerr, W. B. (M)
Klein, E. F. (M)
Lillibridge, E. H. (A)
McCord, H. L. (A)
McCready, K. F. (M)
McWilliams, J. D. (M)
Ransom, D. H. (M)
Reiss, R. L. (A)
Robinson, N. C., Jr. (M)
Rosenberg, H. S. (A)
Schmid, L. H. (A)
Sherman, M. (M)
Smith, G. C. (A)
Stroud, S. G. (A)
Thomas, D. W. (M)
Yoder, R. F. (M)
Young, H. A. (SM)

San Rafael (SF-7)
Catania, C. J. (A)
Collier, R. E. (M)
Matthews, D. W. (A)
Neff, R. W. (M)
Paulson, G. A. (A)
Schaub, L. E. (A)
Shephard, R. W. (SM)
Wood, R. W. (A)

Santa Ana (LA-7)
Barnoff, A. J. (SM)
Boyle, B. H. (M)
Brown, C. S. (A)
Buchanan, J. A. (A)
Burke, J. E. (SM)
Cobb, H. A., Jr. (M)
Fussell, L. B. (A)
Giannini, G. F. (SM)
Gordon, J. P. (SM)
Holbrook, J. G. (M)
Horn, R. H. (M)
Jarmie, T. W. (SM)
Johnson, H. B. (A)
Keene, E. F. (A)
Koger, G. W. (M)
Lander, R. F. (A)
Levering, C. A. (VA)
McCandless, J. B. (M)
Meyer, J. C. (A)
Mileson, D. F. (M)
Morrison, A. I. (M)
Newman, C. (M)
Noble, J. J. (M)
Persons, L. D. (A)
Porter, W. R. (M)
Rau, J. M., Jr. (M)
Reedy, P. H. (SM)
Rouney, W. A. (A)
Schupak, L. (M)
Simler, L. L. (M)
Snyder, R. L. (M)
Wheeler, R. W. (A)

Santa Barbara (LA-B-7)
Baltz, L. E. (M)
Benton, R. E. (A)
Beveridge, H. N. (A)
Bock, M. J. (M)
Brown, F. W. (M)
Brun, G. E. (A)
Cohen, L. R. (M)
Crane, S. D. (SM)
Crippa, E. R. (M)
Cruse, P. M. (A)
Dawley, R. L. (M)
Escher, P. H. (M)
Gannaway, R. (SM)
Goodale, D. M. (A)
Gordon, B. E. (M)
Gullatt, S. P., Jr. (A)
Hannah, D. C. (A)
Hartel, C. F., Jr. (M)
Hausz, W. (F)
Hedges, C. P. (M)
Hutcheon, R. S. (A)
Imoue, N. S. (A)
Kalastrom, R. D. (M)
Little, D. R. (M)
Mnjka, C. J. (M)
Maki, G. J. (SM)
Mark, R. A. (M)
Markin, J. (SM)
McCabe, A. P. (M)
McCaughna, J. R. (M)
McMaster, W. J. (A)
Melnema, H. (A)
Moore, J. A. (A)
Moseley, J. A. (M)
Patchell, J. T. (A)
Poole, H. H. (M)
Pressley, J. H. (F)
Raymond, R. C. (SM)
Reed, J. C. (M)
Robbins, W. M., Jr. (A)
Smith, H. W. (A)
Swift, I. H. (M)
Thomsen, P. H. (SM)
Thoren, C. A. (M)
Tornheim, H. (SM)
Trammell, A. K. (M)
Villers, D. (M)
Wall, V. W. (SM)
Wildman, A. J. (M)
Woerner, J. J. (M)
Wolthuan, L. H. (A)
Wright, D. (M)
Zopf, D. O. (A)

Santa Clara (SF-PA-7)
Adelson, M. B. (A)
Anderson, E. P. (SM)
Budd, W. E. (M)
Butt, N. C. (M)
Cambra, J. M. (M)
Conner, C. (SM)
Convertino, R. O. (A)
De Tolly G. E. B. (A)
Estrada, M. S. (A)
Guthrie, E. E. (A)
Hanny, Daniel, E. M. (M)
Helm, J. L. (M)
Huebschen, R. G. (A)
Ingwerson, D. R. (M)
Kikoshima, R. T. (A)
Lally, J. P. (M)
Lewis, F. V. (M)
McCune, E. W. (M)
Newman, H. L. (SM)
Pen, R. O. (A)
Ramell, R. J. (A)
Reinhardt, P. M. (M)
Rice, J. E., Jr. (M)
Stead, D. A. (M)
Sturdevant, J. T. (M)
Sullivan, J. M., Jr. (M)
Thornburg, R. O. (M)
Titcomb, R. D. (A)
Van Ess, J. C. (A)
Weiner, A. (M)
Welch, J. R. (SM)
Yngi, H. S. (A)
Gerhart, R. E. (M)
Jackson, C. L. (A)
Janitschke, F. O. (VA)
Maurer, C. D. (A)

Santa Fe Springs (LA-7)
Switzer, W. L. (M)
Tompson, A. E. (A)

Santa Monica (LA-7)
Allman, D. L. (M)
Beckwith, H. W. (A)
Belntema, C. D. (M)
Bendar, J. A. (M)
Bennett, R. G. (M)
Bertram, S. (SM)
Blumenthal, I. S. (M)
Boyle, S. R. (M)
Broadwell, W. B. (M)
Brubaker, J. W. (M)
Butt, C. (M)
Carne, J. B. (SM)
Carver, F. R. (SM)
Clark, J. W. (M)
Combs, W. E. (A)
Holbrook, J. G. (M)
Criss, G. B. (SM)
Currie, J. D. (M)
De Lucia, V. E. (A)
D'Nelly, G. O. (SM)
Drozniakiewier, D. L. (M)
Eisenstein, A. M. (M)
Erickson, R. L. (A)
Everest, F. A. (SM)
Ezner, W. L. (SM)
Fliman, N. J. (M)
Francis, G. A. L. (A)
Gaskins, F. J. (A)
Gauronskas, P. P. (M)
Georges, L. (A)
Grabowski, K. P. (M)
Graves, R. E. (SM)
Gumbart, H. E. (A)
Hadlock, C. K. (M)
Haladej, M. A. (M)
Harbaugh, A. W. (M)
Harkins, S. F. (A)
Heil, J. F. (M)
Heinrich, F. (M)
Herr, D. L. (SM)
Hlerath, D. C. (M)
Ho, E. (A)
Juran, W. (M)
Kellogg, C. H. (A)
Kidd, A. T. (M)
Kiner, L. E. (A)
Klein, G. H. (A)
Krantz, C. H. (M)
Krawiec, J. C. (M)
Lakatos, E. (SM)
Lalande, H. H., Jr. (A)
Langmuir, D. B. (SM)
Linquiti, A. A. (A)
Lopez, R. L. (M)
Lyons, L. H. (M)
MacLachlan, R. K. (M)
Mallison, J. A. (M)
Malone, E. P. (M)
Marsh, A. H. (M)
McKee, W. P., Jr. (M)
McLaughlin, W. J. (A)
Melara, J. D. (A)
Miller, E. M. (A)
Miller, M. L. (A)
Moore, D. H. (M)
Morgan, R. B. (A)
Neidfeffer, C. R. (A)
Neumann, J. W. (A)
Parkin, T. R. (A)
Parkinson, C. R., Jr. (SM)
Paschal, E. A. (M)
Plew, H. E., Jr. (M)
Putnam, B. G. (M)
Quandt, R. L. (M)
Randall, B. (A)
Reese, R. F. (SM)
Rehler, K. M. (M)
Robertson, V. H. (A)
Rosen, H. A. (M)
Rosenberg, M. (M)
Salzer, J. M. (M)
Schindler, M. (M)
Schuil, G. R. (M)
Scuitto, T. J. (A)
Shinoda, K. (M)
Skelton, P. (M)
Smith, D. G. (M)
Smith, L. C. (A)
Snow, W. B. (SM)
Sparling, A. J. (A)
Speer, J. G. (SM)
Steinkolk, R. B. (M)
Stephens, C. H. (A)
Stewart, W. F. (SM)
Stineman, V. E. (M)
Swiger, J. M. (A)
Tatum, F. A. (A)
Tillotson, J. H. (M)
Van Dyke, W. D. (SM)
Wack, W. J. (M)
Wade, G. L. (A)
Walsh, B. L. (M)
Ware, P. H. (M)
Ware, W. H. (SM)
Washington, L. H., Jr. (A)
Wehner, R. S. (M)
Weiss, F. (M)
Whitaker, J. N. (SM)
Wilson, D. W. (M)
Wood, G. P. (M)
Yaru, N. (A)
Yoshida, M. (M)
Zweizig, J. R. (M)

Santa Monica Canyon (LA-7)
Dodge, W. A., Jr. (SM)

Santa Paula (LA-B-7)
Sharp, J. M. (M)
Wasmansdorff, C. (SM)
Wymore, R. H. (A)

Santa Rosa (SF-7)
Merrill, G. E. (M)
Parker, J. F. (A)

Santa Ynez (LA-B-7)
Shannon, W. W. (M)

Santee (SD-7)
Freedman, S. (SM)

Saratoga (SF-7)
Ackerlind, E. (SM)
Black, R. J., Sr. (M)
Boyer, B. E. (M)
Brolly, A. H. (SM)
Cherry, D. D. (M)
Chromy, B. J. (VA)
Haanstra, J. W. (M)
Hammack, C. M. (SM)
Hartke, D. C. (M)
Holge, M. H., Jr. (A)
Horvath, A. (SM)
Muntz, W. E. (SM)
Nettesheim, H. P. (SM)
Rice, C. T. (SM)
Roberts, T. E., Jr. (SM)
Rolph, D. B. (A)
Smith, P. G. (SM)
Stone, A. H. (A)
Test, L. D. (M)
Tyminski, W. V. (M)

Saugus (LA-7)
Marandino, N. J. (M)
Parks, K. W. (A)

Seal Beach (LA-7)
Cosgrave, S. J. (M)
Frankel, S. P. (M)

Sebastopol (SF-7)
Spiess, H. H. (M)
Sepulveda (LA-SF-7)
Benson, S. A. (A)
Bock, E. L. (SM)
Borofka, R. P. (A)
Carpenter, S. L. (A)
Casarow, L., Jr. (M)
Corey, E. J. (A)
Davis, M. E. (M)
Decuir, L. E. (M)
Dored, W. (A)
Fredman, N. E. (M)
Holly, R. (M)
Howard, W. J. (A)
Hughes, E. L. (M)
Leach, S. (M)
Montijo, R. E., Jr. (M)
Nesbit, E. E. (SM)
Palmquist, M. L., Jr. (M)
Rigg, G. L. (SM)
Shannon, F. J., Sr. (SM)
Speen, G. B. (M)
Waxman, M. J. (M)
Wylie, L. (A)

Sharp Park (SF-7)
Nemirow, D. M. (A)

Sherman Oaks (LA-SF-7)
Abbott, J. R. (M)
Allen, F. C. (M)
Arn, S. F. (SM)
Blumberg, N. (M)
Brock, P. A. (M)
Butts, L. E. (A)
Caldwell, W. D. (M)
Chatheuer, W. (A)
Childs, H. A. (SM)
Cory, W. E. (M)
Davis, K. S. (M)
Dean, J. P. (M)
Dickinson, H. B. (A)
Di Giuseppe, A. (M)
Epstein, S. (A)
Ettinghoff, M. G. (SM)
Foote, S. H. (M)
Gilder, G. (M)
Glasspool, W. F. G. (M)
Herlinger, L. F. (A)
Hilburn, E. D. (A)
Kober, B. K. (M)
Lamberg, R. (M)
Lamm, R. A. (SM)
Margerum, D. L. (SM)
Miller, M. H. (M)
Moon, R. B. (M)
Murray, R. E. (A)
Neuman, G. O. (A)
Ross, M. N. (M)
Russell, D. C. (M)
Rutland, F. (A)
Rypinski, C. A., Jr. (M)
Schinazi, B. N. (A)
Smith, S. S. (M)
Spranger, P. (A)
Stevens, S. S. (SM)
Usim, W. (M)
Van Groos, J. C. (SM)
Wahlstrom, J. W. (M)
Zuehlke, E. R. (A)

Sierra Madre (LA-P-7)
Burke, H. E., Jr. (SM)
Carpenter, F. C., Jr. (M)
Cordray, R. E. (A)
Kelley, R. (M)
Lindsey, A. O. (A)
Phillips, E. V. (M)
Posthill, B. N. (A)
Siegmeth, A. J. (SM)
Tahl, J. E. (A)
Williamson, R. J. (M)
Zeuschner, R. F. (A)

Solana Beach (SD-7)
Blum, M. (M)
McIlwraith, C. G. (A)

Somis (LA-B-7)
Manning, K. P. (A)

Sonoma (SF-7)
Eimstad, H. A. (A)

Soquel (SF-7)
Wheeler, D. E. (A)

South Gate (LA-7)
Dickinson, H. (A)
Fujimoto, M. (A)
Gilliam, C. E. (A)
Maurer, R. A. (A)
Rogers, J. M. (A)
Rosland, T. A., Jr. (M)
Solie, A. J. (A)
Steiner, F. W. (M)
Whalley, J. M. (A)
Wilgus, D. S. (A)
Yoshioku, G. (A)

South Palo Alto (SF-PA-7)
Beaver, W. L. (M)
Huynen, J. R. (M)

South San Francisco (SF-7)
Bowie, R. L. (A)
Garzoli, F. F. (A)
Jenkins, C. D., Jr. (M)
Rumble, G. F. (A)
Schmalzbach, G. S. (A)
Tripp, A. L. (M)
Tudor, H. (M)

South San Gabriel (LA-P-7)
Painchaud, P. A. (A)
Pitsenbarger, G. A. (M)

South Pasadena (LA-P-7)
Bartel, W. B. (A)
Blasier, H. E. (VA)
Byrne, D. A. (A)
Downs, G. W., Jr. (SM)
Edelson, L. (A)
Farzan, J. (M)
Freel, C. L. (A)
Green, A. W. (M)
Holmes, W. T. (M)
King, R. C. (A)
Kuck, R. G. (SM)
Miller, R. A. (M)
Morrison, R. T. (M)
Rasmussen, S. B. (A)
Short, F. E. (A)
Stott, R. F. (M)
Tracy, T. (M)
Trzyna, T. S. (A)
Watkins, J. S. (M)

Spring Valley (SD-7)
Blalock, J. N. (A)
Brunswick, H. D. (A)
De Witt, C. P. (M)
Kirkman, R. A. (SM)

Stanford (SF-PA-7)
Bahrs, G. S. (M)
Barnett, E. F. (A)
Bracewell, R. N. (SM)
Bryan, J. H. (M)
Buss, R. R. (SM)
Cholorow, M. (F)
Christie, J. W. (A)
Crane, M. (M)
Cranz, J. H. (A)
De Brockert, J. C. (M)
Dunn, D. A. (SM)
Egan, R. D. (M)
Falconer, R. (A)
Fontana, J. (A)
Gallagher, P. B. (A)
Garbutt, H. E. (A)
Gewartowski, J. W. (M)
Golde, H. (A)
Grace, D. J. (M)
Grigsby, J. L. (SM)
Hare, M. D. (M)
Harman, W. W. (SM)
Heffner, H. (SM)
Helliwell, R. A. (SM)
Jasberg, J. H. (M)
Jaynes, E. T. (SM)
Kincheloe, R., Jr. (SM)
Kino, G. S. (A)
Klotter, K. (SM)
Kohl, W. H. (SM)
Lagerstrom, R. P. (M)
Lebaczy, J. S. (SM)
Linvill, J. G. (M)
Manning, L. A. (SM)
McLaughlin, J. W. (M)
Otsuka, S. P. (M)
Petuit, J. M. (F)
Regenos, K. M. (A)
Rosen, B. M. (M)
Ruetz, J. A. (M)
Scarborough, C. S. (A)
Shellett, M. (M)
Shoens, C. J. (M)
Siegman, A. E. (M)
Sonkin, S. (SM)
Stein, S. (M)
Sterrett, J. E. (A)
Stoltz, J. R. (M)
Stoltz, P. G. (M)
Storke, F. P., Jr. (A)
Terman, F. E. (F)
Tuttle, D. F., Jr. (SM)
Valverde, J. F. (M)
Wada, G. (M)
Wade, G. (A)
Wanlsganms, B. A. (M)
Waterman, A. T., Jr. (SM)
Watkins, D. A. (SM)
Wessel-Berg, T. (A)
Wightman, B. A. (A)

Stockton (SAC-7)
Echandi, J. (A)
Fegan, A. A. (M)
Greene, M. (A)
Welch, H. E. (M)

Studio City (LA-SF-7)
Berntsen, P. L. (M)
Fjeldsted, N. B. (A)
Fox, M. (M)
Hollmann, H. E. (F)
Kaeburn, L. K. (SM)
Nelson, C. S., Jr. (M)
Nercessian, V. T. (M)
Norwalt, R. H. (A)
Rich, K. J. (M)
Smith, W. W. (A)

Sunland (LA-7)
Arrowsmith, N. M. (A)
Chernof, J., Jr. (M)
Dinning, L. C. (M)
Fielding, B. L. (M)
Geldke, D. A. (SM)
Hubbard, A. L. (SM)
Kaplan, M. N. (M)
Saunders, C. F. (A)
Schneider, W. J., Jr. (A)
Waddell, B. L. (A)

Sunnyvale (SF-PA-7)
Acker, A. E. (A)
Adler, L. K. (SM)
Allard, G. A. (A)
Andrews, C. A., Jr. (M)
Batdorf, S. B. (SM)
Benjaminson, A. (M)
Benson, S. (SM)
Blatt, E. L., Jr. (M)
Bower, D. A. (A)
Campbell, W. E. (M)
Carpe, B. (M)
Case, M. D. (M)
Chalmers, P. H. (M)
Chao, S. C. (A)
Cleme, C. B. (A)
Contos, P. A. (M)
Cornwell, R. C. (M)
Daw, E. H. (A)
Dickerson, L. W. (A)
Downey, J. P. (M)
Duer, S. J. (M)
Dutton, I. L. (M)
Endaley, J. P. (A)
Finney, D. J. (SM))
Fischgrund, H. (M)
Fishman, M. (M)
Fogard, D. C. (A)
Gallichotte, J. H. (A)
Gillard, C. (M)
Goldsborough, R. R. Jr. (SM)
Gray, R. D. (SM)
Grushkin, M. (M)
Hammond, E. B., Jr. (SM)
Hansen, H. W., Jr. (M)
Harlan, R. A. (M)
Hefte, C. B. (A)
Heslop, M. D. (M)
Heuselgrave, D. H. (M)
Hughes, L. T. (A)
Jensen, P. E. T. (M)
Jobbins, C. W. (M)
Johnson, D. E. (M)
Kean, D. W. (SM)
Kerwin,

Hakala, P. E. (M)
Harmon, W. G. (A)
Hartzell, W. M. (M)
Heylinger, G. E. (M)
Hudspeth, T. (A)
Hunter, R. D., Jr. (M)
Ives, G. M. (SM)
Jessen, W. E. (A)
Jicha, A. J. (A)
Kanawyer, W. N. (A)
Kern, W. W. (A)
Kinsman, R. G. (M)
Lambert, J. M. (M)
Leonard, D. L. (M)
Lindewall, G. W. (M)
Low, H. (M)
Martin, D. P. (M)
Martin, W. W. (A)
Matheny, L. E. (A)
McClure, D. H. (A)
McCoy, H. L. (M)
McDonald, W. H. (M)
McRee, B. R. (M)
Mehner, E. W. (A)
Mellor, J. R. (A)
Mills, R. A. (M)
Monroe, F. R. (M)
Murdock, L. C. (SM)
Norris, R. M. (M)
Nussbaum, O. N. (A)
Nyberg, J. J. (A)
Oliver, J. R. (M)
O Neil, C. E. (A)
Parsons, J. H. (M)
Peterson, C. H. (A)
Rash, K. H. (M)
Robbins, L. S. (A)
Rovenstine, J. A. (A)
Ryland, M. E. (A)
St. John, D. E. (SM))
Sanders, R. C. (A)
Silence, N. C. (M)
Smeltzer, J. C. (M)
Spencer, D. J. (M)
Stephens, C. W. (M)
Stephenson, R. O. (M)
Thomas, W. M. (A)
Van Buskirk, D. (A)
Velasco, F. C. (M)
Whistler, C. H. (SM)
Whitford, R. K. (M)
Woods, E. L. (A)

Tujunga (LA-7)
Gannon, M. T. (SM)
Kreuder, N. L. (M)
Paul, D. I. (M)
Walcek, E. J. (M)

Tustin (LA-7)
De Bord, M. J. (A)

Twentynine Palms (LA-OB-7)
Hayes, R. W. (M)

Upland (LA-OB-7)
Hempy, R. L. (M)
Hitchcock, R. W. (M)
Takenaka, G. (M)

Vacaville (SAC-7)
Moore, E. F. (M)

Vallejo (SF-7)
Angst, D. C. (M)
Bakalis, B. G. (A)
Baker, R. P. (A)
Bougher, W. G. (A)
Ekstrand, P. A. (SM)
Elam, E. M. (A)
Fahy, E. J. (SM)
Frosolone, A. (M)
Hanley, R. J. (M)
Hartman, A. G. (M)
Hopper, M. C. (A)
Lenihan, J. E. (A)
Lewis, H. W. (M)
Mann, F. E. (M)
Teager, H. M. (M)
Timmerman, H. A. (A)
Traver, J. W. (A)

Van Nuys (LA-SF-7)
Abstein, H. T., Jr. (M)
Alexander, W. L. (M)
Anderson, G. R. (M)
Arndt, L. A. (M)
Axel, S. J. (M)
Bangs, G. A., Jr. (A)
Barlett, F. R. (A)
Becker, J. T. (M)
Bederka, S. E. (A)
Bernds, E. L. (A)
Blaine, R. F. (A)
Blancher, D. W. (A)
Bland, S. B. (A)
Boyd, J. C. (A)
Briggs, J. B. (A)
Brockway, W. W. (SM)
Broyles, R. S. (M)
Bumstead, C. R. (M)
Busenkell, C. C. (SM)
Carroll, C. T. (M)
Cohen, J. E. (M)
Cutler, S. (M)
Davis, S. W. (M)
Demo, B. L. (M)
Derderian, N. (A)
Deuser, D. A. (A)
Drukaroff, I. (A)
Ericson, C. W., Jr. (M)
Farley, E. J. (SM)
Fricke, V. S. (M)
Gallenson, L. (M)
Gardner, J. M. (A)
Gieske, G. R. (A)
Glon, J. A. (A)
Goldstein, A. (M)
Goltz, A. D. (M)
Green, A. P. (M)
Halpern, R. L. (SM)
Hammond, J. R. (A)
Hanson, R. A. (M)
Harper, R. B. (M)
Herter, V. E., Jr. (M)
Hewitt, G. E. (SM)

Hidy, J. H. (SM)
Hirschberg, W. J. (M)
Hobbs, L. C. (M)
Hoffart, H. M. (A)
Hudson, C. A. (M)
Hyden, I. F. (M)
Jacobson, S. (M)
Johnson, R. D. (SM)
King, E. B. (A)
Klemens, W. P. (SM)
Kline, S. R. (A)
Korson, I. (M)
Krause, W. B. (M)
Kroll, W. (M)
Kuhlman, F. M. (A)
Lamb, W. N., Jr. (M)
Larson, H. T. (M)
Lohr, M. L. (M)
Lovick, E., Jr. (SM)
Lyon, R. E. (A)
Malcolm, L. (A)
Mallach, L. W. (SM)
Mancini, R. A. (A)
Margolin, A. R. (M)
Marygold, G. E. (A)
McClanahan, R. T. (M)
Mentzer, S. C. (A)
Meyer, W. E. (A)
Miller, C. F. (SM)
Moglewer, S. (M)
Monderer, R. A. (M)
Morris, G. H. (A)
Nelson, R. M. (M)
North, N. B. (M)
Ohrenstein, S. B. (A)
Olsefsky, C. C. (M)
Paganelli, A. C. (M)
Paller, J. L. (M)
Pangborn, H. W. (SM)
Parker, W. H., Jr. (SM)
Pastor, G. J. (M)
Paul, F. A. (M)
Pekrul, P. J. (M)
Peterson, R. W. (M)
Pyle, W. I. (A)
Radmacher, D. S. (M)
Rundolph, R. C. (M)
Reichenbach, H. F. (M)
Richards, J. A. K. (SM)
Ripplinger, T. L. (M)
Rodgers, J. L. (A)
Ross, W. J. (M)
Scharf, W. (A)
Schulte, R. W. (A)
Schultz, W. R. (M)
Schy, S. T. (A)
Shepherd, J. H., Jr. (A)
Sherwood, D. M. (SM)
Shlonsky, L. P. (A)
Siegrist, R. F. (A)
Smith, I. C. (M)
Smith, I. E. (M)
Smith, S. (A)
Spoor, L. C. (M)
Stegen, R. J. (SM)
Stewart, C. O. (A)
Strassman, A. J. (SM)
Tannenbaum, M. (M)
Tasker, R. B. (SM)
Timineri, A. A. (M)
Turner, H., Sr. (A)
Urman, B. S. (M)
Wagner, H. B. (A)
Walker, P. B. (SM)
Wasmer, W. F. (A)
Watstein, J. I. (M)
Weems, S. (A)
White, R. A. (A)
Whiteley, R. L. (M)
Whitman, K. C. (M)
Wick, O. F. (A)
Worth, F. L. (A)
Zane, K. F. (A)
Zboril, F. R. (SM))

Venice (LA-7)
Bekey, G. A. (M)
Bonney, L. A. (A)
Fenton, A. N. (SM)
Goad, R. J. (M)
Gurley, J. G. (M)
Huggins, W. G. (A)
McJunkin, F. C. (M)
Naef, C. A. (A)
Nuban, E. (M)
Pfiffner, H. J. (A)
Reedy, J. F. (M)
Sykes, R. P. (M)
Valette, H. C. (M)
Zuccaro, S. J. (A)

Ventura (LA-B-7)
Andersen, J. F. (M)
Arnold, W. F. (M)
Baugh, H. W. (A)
Browning, R. A. (M)
Dame, R. O. (M)
Hudson, R. (A)
Kirch, J. H. (A)
Lash, J. R. (A)
Leiper, J. H. (M)
MacDonald, W. L. (M)
Newman, D. B. (SM)
Quan, H. L. (M)
Skoog, H. A. (M)
Sturm, T. F. (SM)
Thacker, C. L. (A)
Timm, J. D. (A)
Weidemann, H. K. (M)

Vista (SD-7)
Albert, S. L. (A)

Walnut Creek (SF-EB-7)
Chase, R. C. (M)
Cooper, R. D. (M)
Dorr, R. (SM)
Elsken, R. H. (M)
Eukel, W. W. (A)
Mitchell, J. R. (A)
Sterne, K. E. (A)
Thomas, R. E. (A)

Weaverville (SF-7)
Snyder, W. G. (M)

Westchester (LA-7)
Davidson, H. A. (M)

West Covina (LA-OB-7)
Abramis, D. (M)
Allen, J. R. (M)
Arford, F. W. (A)
Auletti, R. L. (M)
Barr, H. J. (SM)
Bass, J. W. (M)
Bethard, C. T. (M)
Bosch, E. I. (M)
Brown, R. E. (A)
Chaney, J. F. (A)
Delaney, H. J. (M)
Dickey, R. G. (M)
Ford, J. R. (M)
Foster, W. H. (M)
Homer, C. W. (M)
Hurley, R. B. (M)
Jacobs, H. M. (A)
Jennings, E. V. (A)
Johnson, H. A. (A)
Kemp, G. H. (M)
Kempf, W. F., Jr. (A)
Kirsten, C. C. (A)
Knox, N. W. (M)
McCormick, G. F. (M)
Metzger, H. W. (A)
Ming, D. L. (M)
Mulvey, J. A. (A)
Quackenbush, R. E. (M)
Ross, H. (A)
Sampson, J. C. F. (A)
Seamer, C. W. (A)
Shaffer, A. (M)
Shield, R. G., Jr. (M)
Smith, R. A. (M)
Steinback, F. A. (M)
Taylor, L. A. (M)
Tucker, M. C. (M)
Walley, W. E. (A)
Winner, R. J. (M)

West Hollywood (LA-7)
Wong, H. (M)

West Los Angeles (LA-7)
Akrell, C. A. S. (SM)
Burdick, D. D. (A)
Fahnestock, R. I. (M)
George, V. L. (M)
Hathaway, B. (M)
Humphreys, T. I. (SM)
Kelly, D. H. (A)
Leondes, C. T. (A)
Mizell, M. H. (SM)
Pearce, P. F. (A)
Reiter, A. M. (M)
Rogne, R. J. (A)
Schonbrun, L. M. (A)
Turin, G. L. (M)
Wright, E. C. (M)
Zeoli, G. W. (A)

Westminster (LA-7)
Watts, D. E. (M)

Westmorland (SD-7)
Austin, H. B. (M)
Stout, D. J. (M)

West Sacramento (SAC-7)
Fuller, G. R. (A)

Whittier (LA7)
Amendt, L. E. (A)
Anderson, D. B. (M)
Antista, B. A. (A)
Armstrong, A. B. (M)
Becker, D. R. (A)
Blaski, M. F. (A)
Brainin, S. M. (M)
Breere, R. C. (M)
Brown, H. R., Jr. (SM)
Brown, P. M. (M)
Carroll, W. P. (A)
Clevenger, R. F. (A)
Conly, E. R. (A)
Correa, F. (A)
Darlington, H. T., Jr. (M)
Davenport, C. M. (M)
Diedrich, W. A. (M)
Downey, W. F. (M)
Elbinger, B. (M)
Flippen, R. E. (A)
Geiger, R. F. (M)
Gillings, J. W. (M)
Gow, K. P. (SM)
Grieve, W. R. (A)
Hall, C. R. (A)
Harriman, D. E., Jr. (M)
Hodge, J. (M)
Hoffmann, H. J. (M)
Holmes, E. A., III (SM)
Ingersoll, E. R. (SM)
Jackson, M. O. (A)
Ju, R. (M)
Kent, S. S. (M)
Kleinhofer, B. A. (SM)
Klepinger, L. H. (SM)
Knox, R. V. (M)
Kounalis, L. E. (M)
Kreider, P. A. (M)
Lanzinger, D. J. (A)
Lent, W. C. (SM)
Lockhart, E. H. (M)
Marsh, J. A. (SM)
Martin, P. W. (M)
McGaffey, H. F. (M)
McGuire, T. B. (A)
Meigs, V. C. (A)
Miller, J. F. (M)
Moody, R. E. (M)
Munsey, C. J. (M)
Noe, L. B. (M)
O'Brien, E. J. (SM)
Oehlke, A. E. (M)
Overton, C. B. (M)
Parker, N. F. (A)
Polder, J. H. (M)
Randall, G. M. (A)
Reed, R. C. (A)
Savant, C. A. (M)
Sawyer, H. F. (M)
Schmidt, F. W. (SM)

Schulz, K. S. (M)
Seymour, R. A. (A)
Shibuya, Y. (M)
Shutt, S. G. (A)
Soeberg, W. F. (A)
Stoney, W. E. (M)
Struve, L. M. (M)
Thomas, E. E. (A)
Tice, A. R. (SM)
Tjaden, L. L. (M)
Triman, E. L. (M)
Van Velzer, V. C. (M)
Vorie, I. N. (VA)
Wagner, E., Jr. (M)
Wanlass, C. L. (A)
Wolking, D. H. (SM)
Yetter, W. P. (A)
Yoder, A. A. (A)
Zemenick, C. J. (A)
Zoller, C. J. (M)

Wilmington (LA-7)
Harris, H. M. (A)
Jones, T. S. (A)
Massey, H. N. (A)

Woodland Hills (LA-SF-7)
Anderson, T. J. (SM)
Armer, P. (M)
Berman, H. (SM)
Blatchford, D. (A)
Bohl, R. J. (M)
Brennan, L. E. (M)
Callan, R. W. (A)
Coleman, H. B. (A)
Crowe, J. W. (A)
Davidson, E. D. (M)
Ellis, J. W., Jr. (M)
Eslinger, R. L. (M)
Hicks, A. R. (M)
Hirschl, L. (M)
Kanze, A. J. K. (M)
Kurtz, L. A. (M)
La Fetra, F. E. (A)
Mac Donald, I. T. (A)
Morgan, H. C. (A)
Nelson, R. S., Jr. (A)
Neuron, E. (M)
Ottinger, D. P., Jr. (A)
Owens, J. E. (A)
Payne, G. H. (A)
Perry, R. E. (M)
Peterson, F. V. (M)
Pratt, J. H. (SM)
Rosenbloom, A. (A)
Scott, L. W. (M)
Secretan, F. (A)
Smith, B. N. (A)
Squires, W. K. (M)
Staub, D. W. (M)
Strauss, D. J. (M)
Tinney, P. (M)
Williams, F. K. (SM)
Wilson, K. M. (A)
Woodson, W. L. (M)

Woodside (SF-PA-7)
Bauer, F. (M)
Braccini, S. M. (A)
Eldredge, A. L. (A)
Mathias, J. M. (M)
Ropa, R. L. (SM)
Ryland, B. G. (M)
Smith, H. W., Jr. (A)

Yosemite National Park (SF-7)
Emerson, R. W. (A)

COLORADO

Akron (DEN-6)
Cooley, H. M. (A)

Armel (DEN-6)
Shaver, J. W. (A)

Arvada (DEN-6)
Johler, J. R. (SM)
Loughart, C. C. (M)
Robertson, A. L. (M)
Sargent, R. E. (A)
Spano, A. J. (A)

Aurora (DEN-6)
Cook, D. E. (M)
Nicoloff, C. C. (M)
Wedekind, D. E. (M)
Woodin, V. E. (A)

Boulder (DEN-6)
Allred, C. M. (M)
Applegate, C. J. (M)
Axtell, J. C. (A)
Barclay, C. (A)
Barghausen, A. F., Jr. (A)
Barsis, A. P. (M)
Bean, B. R. (A)
Beatty, R. W. (SM)
Bowles, K. L. (A)
Brown, F. W. (A)
Bussey, H. E. (SM)
Byrne, W. J. (M)
Carlin, P. W. (A)
Cohen, R. S. (M)
Cook, C. C. (M)
Coon, R. M. (M)
Cottony, H. V. (SM)
Crichlow, W. Q. (SM)
Culshaw, W. (SM)
Dalke, J. L. (SM)
Daniels, W. H. (M)
Decker, M. T. (A)
De Gregorio, J. F. (M)
Ernl, J. B. (A)
Estin, A. J. (M)
Florman, E. F. (M)
Freudenberg, H. O. (A)
Fulton, F. F., Jr. (M)
Gatterer, L. E. (M)
George, W. D. (M)
Goble, R. W. (A)
Goerke, V. H. (M)
Greene, F. M. (M)
Haller, F. B. (A)
Harrington, R. D. (A)
Heaton, V. E. (SM)
Herbstreit, J. W. (SM)

Hornberg, K. O. (SM)
Hubbard, R. W. (A)
Janes, H. B. (M)
Jean, A. G., Jr. (M)
Jickling, R. M. (A)
Johnk, C. T. (M)
Johnson, D. S., Jr. (A)
Jones, R. N. (A)
Kirby, R. C. (SM)
Kirby, R. S. (M)
Krueger, R. E. (M)
Lance, H. W. (SM)
Larson, R. E. (M)
Longley, A. G. (A)
Maloney, L. J. (A)
Martinez, J. L. (A)
McGavin, R. E. (A)
McQuate, P. L. (M)
Miller, L. W., Jr. (M)
Morgan, A. H. (M)
Norton, K. A. (F)
Nyland, F. S. (M)
Ostrow, S. M. (SM)
Phelps, F. P. (A)
Posakony, G. J. (M)
Powell, R. C. (A)
Rice, P. L. (M)
Richardson, J. M. (SM)
Rogers, W. M. (M)
Russell, D. H. (A)
Schafer, G. E. (SM)
Selby, M. C. (SM)
Shoaf, J. H. (M)
Silberstein, R. (SM)
Simpson, P. A. (A)
Slutz, R. J. (A)
Smith, E. K., Jr. (SM)
Stacey, D. S. (SM)
Stroman, C. F. (M)
Stroud, J. C. (A)
Sugar, G. R. (M)
Sykes, J. A. (M)
Thompson, H. A. (M)
Thompson, M. C., Jr. (SM)
Todd, J. (A)
Twombly, J. C. (M)
Utlaut, W. F. (SM)
Viezbicke, P. P., Jr. (A)
Vogler, L. E. (A)
Wait, J. R. (SM)
Walters, L. C. (SM)
Waters, D. M. (M)
Watt, A. D. (SM)
Watts, J. M. (M)
Wells, P. I. (A)
Wilson, A. C. (M)
Winbigler, W. K. (M)
Wolzien, E. C. (M)
Woodward, M. W. (SM)
Worcester, W. G. (SM)

Brighton (Den-6)
Daniel, F. T. (M)

Colorado Springs (DEN-6)
Behnke, A. O. (SM)
Broen, J. H., Jr. (A)
Clancy, J. W. (A)
Donegon, R. E. (M)
Elliott, H. R. (M)
Farrell, R. J. (A)
Holmgren, W. A. (A)
Hornby, D. A. (M)
Jacks, S. T. (M)
Lanxon, R. C. (A)
McCallen, P. M. (SM)
McMenomey, J. M. (M)
Merk, R. V. R. (A)
Miller, J. R. (VA)
Mohr, D. B. (A)
Peterson, C. F. (M)
Quinn, T. J. (A)
Russell, J. D. (M)
Stees, H. S., Jr. (A)
Utterback, W. J. (M)
Victoreen, J. A. (SM)
Weiner, J. H. (M)
Wilber, R. W. (M)
Young, J. S. (M)
Zobel, F. J., Jr. (M)

Delta (DEN-6)
Pace, R. A. (M)

Denver (DEN-6)
Anderson, C. R. (A)
Anderson, M. F. (M)
Beaver, H. E. (A)
Bishop, H. L., Jr. (M)
Blanchard, R. R. (M)
Blankenship, L. F. (M)
Bowen, R. G. (M)
Bradt, A. J. (M)
Bromberger-Barnea, B. (A)
Brownell, F. P., Jr. (A)
Burner, L. C. (A)
Butts, J. H. (A)
Capehart, M. E. (M)
Chapman, J. M. (M)
Cateora, J. V. (M)
Coil, E. A. (A)
Cole, A. E., Jr. (A)
Coombs, W. C. (SM)
Cottrell, D. E. (M)
Crawford, G. N. (A)
Creacy, J. N. (M)
Cunningham, J. A. (A)
Davis, D. A. (M)
Davis, I. F. (M)
Davis, V. M. (SM)
Detwiler, W. L. (M)
Deutsch, K. T. (M)
Dosch, E. L. (M)
Edwards, H. T. (M)
Farrell, J. W. (M)
Ferketich, G. (A)
Fingado, F. H. (M)
Flaharty, C. L. (A)
Fleming, C. W. (A)
Foley, W. V. (SM)
Fuqua, C. (M)
Gage, N. C. (A)
Garretson, H. W. (M)
Gatlin, B. R. (M)
Goddard, A. A., Jr. (A)
Grace, J. R. (SM)

Grigsby, T. N. (A)
Guild, C. P. (M)
Gyger, C. E. (M)
Hardy, F. S. (A)
Hart, W. G., Jr. (M)
Hastings, L. E. (SM)
Hathaway, C. M. (SM)
Hedberg, C. A. (SM)
Hedrick, W. M. (M)
Hodson, L. M. (A)
Howard, R. E. (A)
Hurlbut, J. F. (M)
Hyde, R. A. (A)
James, V. N. (SM)
Johnson, H. S. (A)
Kardos, M. (M)
Kemper, J. A. (A)
Kerver, N. E. (A)
Knight, S. J., Jr. (M)
Koch, R. C. (M)
Lahana, P. (M)
Lasnik, L. A. (M)
Leighou, R. O. (M)
Lyday, J. S. (A)
Markey, L. T., Jr. (A)
Maxwell, T. M., Jr. (M)
Messler, F. J. (M)
Meyer, D. E., Jr. (A)
Mielziner, W. (A)
Morris, W. L. (M)
Morrissey, T. G. (SM)
Morroni, D. J. (A)
Nelson, A. J. (A)
Norton, F. R. (SM)
Olson, C. G. (A)
Orenstein, E. D. (M)
Ostwald, L. T. (A)
Paige, A. E. (SM)
Parrish, V. L. (M)
Peterson, S. B. (M)
Petterson, W. N., Jr. (M)
Pieper, G. E. (SM)
Pyle, J. C. (A)
Raymond, K. N. (A)
Reaser, R. R. (A)
Rehbein, N. W. (A)
Reno, H. (M)
Revilla, A. G. (M)
Rhoden, V. C., Jr. (A)
Robinson, M. E. (A)
Rosine, L. L. (A)
Ruehle, R. A. (A)
Schafer, H. G. (M)
Shreve, T. S. (M)
Sjostrom, R. W. (M)
Smilley, J. D. (A)
Smith, P. E. (A)
Smith, W. F., Jr. (M)
Stewart, C. H. (A)
Stewart, L. H. (A)
Stewart, M. J. (A)
Streiff, J. P. (M)
Sturgill, C. L. (M)
Swanson, R. E. (M)
Todd, F. J. (M)
Trukken, H. R. (M)
Vance, E. F. (M)
Venditti, F. P. (M)
Walter, J. H. (M)
Wang, C. S. (M)
Watson, J. E. (M)
Webb, R. C. (SM)
Welborn, K. M. (A)
Willard, J. H. (A)
Williams, A. L., Jr. (M)
Zanboorie, M. H. (M)

Derby (DEN-6)
Slevin, R. F. (M)

Englewood (DEN-6)
Cobbs, D. M. (M)
Green, W. W. (M)
Hess, L. (A)
Moyer, F. I. (A)
Mueller, A. G. (A)
Thaxton, H. A. (M)
Vomund, L. E. (A)

Estes Park (DEN-6)
Shideler, E. M. (SM)

Fort Collins (DEN-6)
Britton, C. C. (M)
Dean, J. E. (M)
Hughes, R. M. (M)
Wilts, J. R. (M)

Fort Morgan (DEN-6)
Zambo, J. W. (M)

Gardner (DEN-6)
Sanborn, R. H. (A)

Glenwood Springs (DEN-6)
Baker, B. Z. (A)

Golden (DEN-6)
Fletcher, H. E. (SM)
Johnson, W. H. (A)
Lover, G. L., Jr. (M)
Maras, R. G. (M)
Mayberry, R. C. (M)
Vislisel, R. L. (A)

Grand Junction (DEN-6)
Bell, B. G. (M)
Lawton, K. G. (A)
Ludwig, R. I. (A)
Mc Cormick, C. E. (A)
Rinn, B. R. (A)
Van Houten, R. G. (M)

Greeley (DEN-6)
Balamonte, F. L. (A)

Lakewood (DEN-6)
Cook, G. V. O. (M)
Daniels, R. G. (A)

Littleton (DEN-6)
Danner, R. V. (SM)
Elam, T. W. (A)
Ellsworth, A. B. (A)
Jones, E. R., Jr. (A)
Rice, R. B. (A)

Stewart, S. J. (A)
Washburne, B. P. (M)
Wilson, D. L. (A)

Loveland (DEN-6)
Kelley, E. K. (SM)

Lowry AFB (DEN-6)
Fair, E. G. (A)

Montrose (DEN-6)
Weir, T. T. (M)

Pueblo (DEN-6)
Middleton, D. S. (M)
Williams, R. G. (A)

Salida (DEN-6)
Peay, L. W., Jr. (SM)

Sedalia (DEN-6)
Carter, F. W. (A)

Westminster (DEN-6)
Dougherty, H. T. (M)
Meller, W. R. (M)

Wheatridge (DEN-6)
Clyne, W. E. (SM)
Forsman, F. H. (M)
Haase, A. H. (A)
Marshall, G. B. (M)
Wedge, T. E. (A)
Winters, J. D. (M)

CONNECTICUT

Ansonia (CV-1)
Fitzpatrick, J. J. (A)

Avon (CV-1)
Boehm, A. R., Jr. (M)
Reilly, J. R. (M)
Stoddard, J. E. (A)

Bethel (CV-1)
Pearlman, L. S. (M)
Tuska, J. W. (M)
Warner, F. C. (M)

Bloomfield (CV-1)
Hendrickson, H. S. (A)
Lowderback, C. J. (M)
Von Kummer, F. G. (M)
Whitney, D. J. (M)

Branford (CV-1)
Tustin, W. (M)

Bridgeport (CV-1)
Arnold, K. F. (A)
Bruntil, I. M. (M)
Duncan, E. T. (M)
Hartman, R. B., II (M)
Irvine, G. W. (A)
Jensen, H. T. (A)
Kloster, D. E. (A)
Kocsor, J. A. (A)
Lapinski, C. S. (A)
Lemkin, H. J. (A)
Lolacono, J. V. (M)
Mike, J. G. (A)
Mikusky, C. J. (A)
Nelson, R. A. (A)
Perez, M. (A)
Ragonese, F. L. (A)
Rauffer, W. M. (A)
Rosenberg, H. A. (A)
Schneider, E. J. (M)
Sweet, R. D. (A)
Toffolo, L. J. (A)
Von Behren, W. P. (SM)
Winquist, R. T. (M)
Zahn, E. (A)
Ziller, M. A. (A)

Bristol (CV-1)
Goclowski, C. F. (M)
Jones, M. C. (M)
Kavanaugh, R. J. (A)
Nelson, A. B. (SM)
Scherff, L. S. (M)
Snowdon, A. E. (SM)
Vaughan, E. W. (SM)

Brookfield (CV-1)
Gordon, T. M., Jr. (M)

Brooklyn (CV-1)
Halford, J. H., Jr. (M)
Vroom, E. (SM)

Central Village (CV-1)
Poremba, J. J. (M)

Chaplin (CV-1)
Young, W. H., Jr. (A)

Cheshire (CV-1)
Gagnon, W. J. (A)
Hoffmann, G. O. (A)
Perrins, A. R. (M)
Thomas, A. R. (A)
Wilson, S. L., Jr. (M)
Martin, D. (SM)

Clinton (CV-1)
Warhurst, J. S. (A)

Colchester (CV-1)
Steg, R. C. (A)

Cos Cob (CV-1)
Bukowski, C. P. (M)
Caldwell, O. H. (F)

Danbury (CV-1)
Arendt, E. J. (A)
Boesch, A. H. (A)
Breden, W. W. (M)
Campbell, C. A. (M)
Concelman, C. W. (M)
Elion, H. A. (M)
Henry, E. A. (M)
Johns, N. H. (M)
Moran, J. H. (A)

Olha, W. R. (M)
Quattrocchi, V. F. (A)
Rahal, N. S. (M)
Van Valkenburg, H. E. (A)
Webb, R. H. (M)

Darien (CV-1)
Bartram, J. F. (M)
Bowley, R. J. (M)
Bozak, R. T. (SM)
Flower, G., Jr. (A)
Goodnow, A. C. (VA)
Jacobson, L. (M)
Kunkel, B. M. (M)
Mac Gregor, R. R. (M)
Mack, C. L. (M)
McElrath, G. (F)
Moffat, W. H. (SM)
Smith, P. B. (A)

Derby (CV-1)
Riccio, L. A. (A)

Durham (CV-1)
Schilling, C. R. (M)

East Hartford (CV-1)
Aas, H. G. (M)
Gorton, R. E. (A)
Mohr, W. L. (A)
Paquette, G. A. (A)
Searle, P. C. (M)

East Hartland (CV-1)
Neill, G. W. (M)

East Haven (CV-1)
Maki, C. E. (M)

East Lyme (CV-1)
Barrila, F. L. (A)

East Norwalk (CV-1)
Bloomquist, W. B. (A)
Hamme, R. D. (M)
Karlson, E. L. (M)
Theall, C. E., Jr. (A)
Warner, E. J. (SM)
Yellin, H. (M)

Easton (CV-1)
Cummings, C. S., II (A)

East Woodstock (CV-1)
Dixon, E. O. (SM)

Elmwood (CV-1)
Marchese, J. H. (M)

Fairfield (CV-1)
Autuori, V. A. (M)
Bishop, N. (SM)
Di Mattia, A. L. (A)
Gilchrist, E. S. (M)
Johnson, K. W. (A)
Mitchell, W. F. (A)
Paneyko, M. (M)
Roberts, F. W. (SM)
Torras, F. (M)

Farmington (CV-1)
Wood, R. H. (M)

Forestville (CV-1)
Forman, J. (M)

Gales Ferry (CV-1)
Henry, W. O. (A)

Glastonbury (CV-1)
Barnes, D. B. (M)
Dutton, F. L., Sr. (M)
Humphrey, C. D. (A)
Miller, R. A. (M)
Swain, R. S. (A)
Taylor, D. S. (M)
Waterman, A. (M)

Granby (CV-1)
Brockett, R. I. (A)

Greenwich (CV-1)
Anderson, A. E. (A)
Anderson, W. C. (SM)
Burroughs, G. (M)
Fetherolf, J. M. (M)
Hallenbeck, R. A. (M)
Hollywood, J. M. (SM)
Kimes, R. A. (SM)
Mallory, H. R. (SM)
Marchand, N. (SM)
Michel, P. C. (SM)
Mills, C. A. (M)
Paine, B. B. (M)
Peterson, E. F. (M)
Petrucelly, V. J. (A)
Stockman, W. E. (M)
Williams, J. B., Jr. (M)

Groton (CV-1)
Blaisdell, K. L. (SM)
Bowes, H. N. (SM)
Brooks, F. A., Jr. (M)
Comiskey, J. M. (A)
Fanelli, F. A. (M)
Jennings, J. L. (A)
Krulish, R. C. (A)
Latham, W. S. (M)
Leuze, W. F. (A)
Mall, P. (A)
Martinson, C. D. (A)
Matthews, C. I. (A)
Miller, K. K. (M)
Murphy, R. E., Jr. (A)
Perry, D. P. (M)
Rose, A. E., Jr. (A)

Guilford (CV-1)
Fisher, E. H. (M)
Kelsey, P. C. (M)
Wilcox, E. J. (M)

Haddam (CV-1)
Smith, H. A. (A)

Hamden (CV-1)
Bogan, S. C. (M)

Davidson, R. B. (A)
Dunklee, W. F. (M)
Goldenthal, S. (M)
Hewitt, C. D. (A)
Hovey, D. P. (A)
Johnstone, P. N. (M)
Lyons, W. J., Jr. (M)
Mapes, T. J. (A)
McNamara, F. T. (M)
Meier, A. S. (M)
Quackenbush, E. C. (A)
Smith, R. E. (A)
Smoko, J. F. (A)
Stancliff, V. A. (M)
Van Lieshout, L. J. A. (SM)
White, C. B. (SM)

Hartford (CV-1)
Britton, R. C. (A)
Broderick, H. M., Jr. (A)
Capasso, G. F. (A)
Coleman, G. A. (A)
Doolittle, F. M. (F)
Dorschug, H. A. (SM)
Dungan, L. B. (A)
French, E. C. (M)
Fulton, O. H., Jr. (M)
Holland, J. H. (A)
Intagliata, S. J. (A)
Latina, M. S. (A)
Lee, W. K. F. (M)
Lescarbeau, R. F. (M)
Mazurkiewicz, R. J. (A)
Moffitt, G. R., Jr. (M)
Moses, S. (M)
Piskor, J. (M)
Proctor, D. K. (A)
Roth, W. (M)
Seville, A. R. (M)
Shefrin, D. S. (M)
Shor, N. (M)
Tuttle, R. W. (M)
Waffle, W. M. (M)
Woodward, R. W. (SM)

Hazardville (CV-1)
Kelly, G. E., Jr. (M)

Jewett City (CV-1)
Beckwith, W. B. (M)
Rawicz, L. (A)

Kensington (CV-1)
Dickon, A. J. (M)
Sokoloski, J. T. (A)

Lebanon (CV-1)
Smith, A. G. (M)
Stocking, M. H. (A)

Litchfield (CV-1)
Palmer, H. H. (A)
Zurich, W. G. (A)

Long Hill (CV-1)
Kaiser, A. (M)

Manchester (CV-1)
Anderson, E. J. (M)
Anton, R. F. (A)
Bagby, R. B. (M)
Baker, R. G. (A)
Billmyer, C. M. (A)
Cronin, C. E. (M)
Dean, C. M. (M)
Martin, H. E. (A)
Nicola, R. N. (M)
Russell, A. A., Jr. (A)
Schettler, R. B. (A)
Stanek, W. F. (A)
Torrance, J. H. (M)
Warren, J. A. (M)

Meriden (CV-1)
Lavin, H. (M)
Rettenmeyer, P. F. (M)
Schiesel, E. E. (A)
Wrinn, E. C., Jr. (M)

Middlebury (CV-1)
Fulliero, R. (A)

Middletown (CV-1)
Heinzmann, J. D. (A)
Sanstrom, W. S. (M)
Snow, C. A., Jr. (M)
Thompson, L. (SM)
Tuccio, M. S. (A)
Van Dyke, K. S. (F)

Milford (CV-1)
Baldwin, A. L., Jr. (M)
Brackmann, W. J. (SM)
Cutler, L. H. (A)
Jamison, A. P. (A)
Kelly, T. F. (A)
Loeffler, T. F. (M)
Lyman, H. T. (SM)
Machover, C. (M)
Sable, A. J. (M)
Schweitz, E. P. (A)
Weinberg, D. I. (M)
Willing, H. A. (A)

Milldale (CV-1)
Fontana, J. A. (M)

Monroe (CV-1)
Tavella, R. P. (A)

Mount Carmel (CV-1)
Pagano, E. L. (M)

Mystic (CV-1)
Cook, D. R. (A)
Kirby, T. H. (SM)
Stephanz, G. H. (M)

New Britain (CV-1)
Rathbun, W. F. (M)

New Canaan (CV-1)
Bancroft, C. (A)
Bliss, W. R. (M)
Canepa, M. (A)
Castle, D. H. (SM)

Couron, W. H. (SM)
Johnson, G. R. (M)
Johnson, J. K. (F)
Lebel, J. D. (M)
Offenhauser, W. H., Jr. (A)
Sutherland, E. F. (A)
Tisdale, G. E. (M)

New Haven (CV-1)
Bergmann, H. M. (M)
Black, D. G., Jr. (M)
Bobak, E. T. (A)
Bradley, K. M. (A)
Breit, G. (F)
Bridges, W. S. (A)
Cannon, J. F. (M)
Conrad, A. G. (SM)
Cunningham, W. J. (M)
Curtis, R. C. (SM)
Genera, V. A. (A)
Gibson, J. E. (A)
Grew, L. B. (SM)
Hall, B. A. (M)
Hon, E. H. G. (M)
Izenour, G. C. (M)
Jacobson, E. R. (M)
Kelly, H. S. (A)
Krauss, H. L. (SM)
Macdonald, K. J. (M)
Mauro, A. (A)
May, J. C. (SM)
Millard, A. M. (SM)
Ordung, P. F. (SM)
Pryor, W. L., Jr. (SM)
Reich, H. J. (F)
Rohloff, H. E. (SM)
Roth, R. S. (A)
Rubin, H. B. (VA)
Schultheiss, P. M. (M)
Shank, R. R. (M)
Shlank, W. I. (A)
Sibley, H. W., Jr. (A)
Skalnik, J. G. (M)
Sundis, H. W. (SM)
Thomas, L. E., Jr. (A)
Turner, H. M. (F)
Tuteur, F. B. (M)
Utting, G. R. (M)
Wogrin, C. A. (A)
Zweig, F. (A)

Newington (CV-1)
Bliss, P. (SM)
Johnston, R. E. (M)

New London (CV-1)
Adams, W. S., Jr. (A)
Cohen, M. H. (M)
Cole, P. P. (M)
Dugan, D. J. (M)
Hazard, W. R. (M)
Hoag, J. B. (SM)
Horton, J. W. (F)
Ide, J. M. (SM)
Jucksch, W. J. (M)
Kamens, B. R. (SM)
Merrill, J. (M)
Nash, H. E. (SM)
Newlin, T. G. (A)
Pulliam, S. B. (A)
Rager, G. T. (M)
Ryssy, J. W. (M)
Sussman, H. (SM)
Turner, R. W. (M)
Westervelt, R. A. (M)
Woollett, R. S. (A)

New Milford (CV-1)
Rowley, W. E., Jr. (A)

Newtown (CV-1)
Du Bois, R. O., Jr. (A)
Finch, W. G. H. (F)

Niantic (CV-1)
Bishop, H. M. (M)
Saars, W. F. (M)
Sunega, E. M. (A)
Von Winkle, W. A. (A)
Wilkes, R. C. (A)

Noroton (CV-1)
Mason, H. L. (A)

Noroton Heights (CV-1)
Horan, J. J. (M)

North Branford (CV-1)
Stone, F. A. (M)

Northford (CV-1)
Baker, R. R. (A)

North Haven (CV-1)
Barker, R. C. (M)

North Madison (CV-1)
Fountain, H. F. (M)

North Stamford (CV-1)
Doolittle, H. D. (M)
Rabin, R. (M)

North Woodbury (CV-1)
Petit, F. W. (M)

Norwalk (CV-1)
Barr, F. M. (A)
Bassett, J. E., Jr. (A)
Bertram, J. J. (A)
Buckley, R. E. (A)
Coutermash, L. E. (A)
Curtiss, R. H. (A)
Darnsteadt, A. L. (M)
Georgi, E. A., Jr. (A)
Grimstad, E. J. (A)
Gulland, G. R. (SM)
Henrich, W. H. (M)
Kay, M. (A)
Le Fevre, P. E. (M)
Levy, E., Jr. (M)
Mehr, M. H. (M)
Miller, T. W. (M)
Muchnick, P. (M)
Neuman, G. J. (M)
Polak, R. (A)

Poland, W. L. (A)
Rodgers, L. M. (SM)
Satter, H. W. (A)
Scherer, B. L. (M)
Schulz, H. R. (SM)
Smith, P. J. (M)
Smith-Vaniz, W. R., Jr. (M)
Stein, H. S. (M)
Williamson, R. G. (M)
Wines, W. R. (A)
Woolcock, E. L. (SM)

Norwich (CV-1)
Anson, Y. (A)
Dolan, O. F. (M)
Keltonic, F. J. (A)

Oakdale (CV-1)
Whannel, R. L. (M)

Old Greenwich (CV-1)
Allen, R. G. (A)
Cassidy, J. J., Jr. (M)
Fenn, W. W. (A)
Harrington, R. H., Jr. (A)
Harris, J. S. (SM)
Janik, C. L. (A)
Lot , A. L. (M)
Murphy, J. L. (SM)
Palmer, J. H. (A)

Old Lyme (CV-1)
Haglund, B. R. (A)

Old Saybrook (CV-1)
McBrian, J. E. (M)
Radom, R. (M)

Pawcatuck (CV-1)
Crandall, C. P., Jr. (M)

Plainville (CV-1)
Cutler, M. A. (A)

Plantsville (CV-1)
Thayer, D. C. (A)

Pomfret (CV-1)
Ferguson, D. A. (A)

Poquonock Bridge (CV-1)
Brown, H. H., III (A)
Brown, R. A. (A)

Portland (CV-1)
Pulda, A. H. (A)

Prospect (CV-1)
Koren, S. (SM)

Putnam (CV-1)
Bernier, E. J. (A)
Bosworth, C. D. (A)
Bove, R. G. (M)
Roller, E. R. (A)

Quaker Hill (CV-1)
Coogan, E. A. (M)
Gubin, S. (SM)
Pallange, E. P. (A)
Scannell, E. H., Jr. (A)
Sentell, F. N. (M)
Wilkinson, C. W. (M)

Redding Ridge (CV-1)
Rand, P. S. (SM)

Ridgefield (CV-1)
Baker, J. H., Jr. (M)
Becker, H. R. (A)
Darois, P. F. (A)
De Chambrier, P. (M)
Delany, E. B. (M)
Doll, H. G. (SM)
Duerig, W. H. (A)
Ferre, M. C. (M)
Harry, J. B. (A)
Heller, J. H. (A)
Hering, K. W. (M)
Kunz, K. S. (M)
Maguin, J. P. (M)
Miller, G. K. (SM)
Ott, O. J. (M)
Runyan, R. A. (M)
Segesman, F. F. (M)
Sloughter, G. S. (SM)
Sloughter, W. J. (SM)
Stewart, T. E., Jr. (A)
Weiss, H. R. (M)

Riverside (CV-1)
Baake, D. W. (A)
Burns, R. F. (A)
Didriksen, J. B. (A)
Ellsworth, W. C. (SM)
Fingerle, W., Jr. (SM)
Ryan, W. R. (M)
Service, C. W. (M)

Rockville (CV-1)
Schneider, R. W. (A)
Weston, F. B. (VA)

Rowayton (CV-1)
Davis, R. H. (A)
Frederick, R. E., Jr. (M)
Mac Phee, J. (A)

Saugatuck (CV-1)
Van Der Veen, H. (VA)

Seymour (CV-1)
Fryncko, P. (M)
Gross, E. D. P., Jr. (A)

Shelton (CV-1)
Rhein, G. W. (M)
Zaskalicky, J. J. (M)

Simsbury (CV-1)
Ogle, J. D. (A)
Somers, B. A. (M)

Southington (CV-1)
Perkins, R. W. (A)
Raymond, G. H. (SM)

South Norwalk (CV-1)
Agule, G. J. (A)
Beltz, G. E. (M)
Benson, K. B. (M)
Bernard, P. (A)
Duncan, H. S. (SM)
Flores, I. (M)
Jacobs, B. (M)
Karg, L. C. (A)
Kolin, S. T. (A)
Lamb, J. J. (F)
Norton, C. A. (SM)
Randmer, J. A. (SM)
Rothlein, B. J. (SM)
Slaker, F. A. (A)
Youden, R. H. (A)

Southport (CV-1)
Armstrong, C. W. (A)
Bachman, W. S. (F)
Evans, R. E. (M)
Lowdenslager, J. R. (A)

Springdale (CV-1)
Buegler, R. J. (M)
Couch, W. M., Jr. (M)
Klyce, B. H. (SM)
Lefeson, J. (A)
Newman, R. W. (M)
Schmidt, E. (M)
Sourek, R. F. (A)
Weden, C. V., Jr. (M)
Yanagisawa, S. T. (SM)

Stamford (CV-1)
Allen, T. F. (M)
Anderson, J. L. (A)
Artuso, N. F. (M)
Bailey, E. M. (A)
Baker, G. W. (M)
Barrett, E. T. (M)
Basim, D. S. (SM)
Branson, N. G. (M)
Brown, W. J. (SM)
Brunhart, W. (A)
Chen, W. W. (M)
Couturier, R. A. (M)
Devaney, R. I. (A)
Edmondson, R. H. (SM)
Eisenbeis, G. W. (A)
Evans, J. (A)
Feldman, S. I. (M)
Feldner, L. (A)
Flynn, T. F. (M)
Gabor, W. D. (M)
Geist, H. J. (SM)
Ghirardi, A. A. (SM)
Grayson, G. (M)
Greenwood, I. A., Jr. (M)
Gutterman, A. Z. (M)
Halperin, H. S. (M)
Helterline, L. L., Jr. (M)
Higgins, J. N. (A)
Hoehn, A. F. (A)
Holloway, H. R. (M)
Jackson, M. L. (M)
Kaufman, A. L. (A)
Kiser, J. L. (SM)
Kramer, A. (A)
Krausz, R. (A)
Krayzanowski, S. P. (A)
Leftwich, R. F. (A)
Lent, E. L., Jr. (A)
Lewis, S. M. (M)
Magida, N. H. (M)
Maloney, T. C. (A)
Mann, M. (A)
Maple, T. G. (M)
McCarroll, J. F., Jr. (M)
Miller, M. H. (A)
Oefinger, H. C. (A)
Ostendorf, B. (M)
Peters, F. H. F. (A)
Plehaty, S. L. (A)
Pratt, H. (F)
Ramage, W. W. (A)
Reinhart, J. (M)
Rendell, G. (M)
Roggenstein, E. O. (M)
Rosenblatt, P. (M)
Rudlock, W. F. (A)
Sackler, A. A. (M)
Salzman, C. F., Jr. (M)
Schlesinger, E. R. (A)
Schwarz, F. (M)
Seidler, S. W. (M)
Shapiro, J. M. (SM)
Silver, N. (A)
Singer, E. (M)
Skehan, J. W. (M)
Sontheimer, C. G. (M)
Spirer, H. F. (M)
Sprague, R. E. (A)
Steinberg, E. R. (SM)
Trott, B. S. (SM)
Vercakis, C. (A)
Wachowski, H. P. (A)
Wahlberg, E. O. (A)
Ward, J. S. (A)
Weeks, J. T. (A)
Weiner, S. L. (M)
Wesley, C. A. (M)
Wilder, M. P. (SM)
Wischnia, H. F. (M)
Wright, R. E. (A)
Yaeger, V. M. (M)

Stepney (CV-1)
Weller, B. L. (M)

Stonington (CV-1)
York, E. P. (A)

Storrs (CV-1)
Crompton, R. H. (M)
Dowdle, J. F. (M)
Ferris, C. C. (M)
Haas, W. B., Jr. (M)
Knauss, H. P. (M)
Kochenburger, R. J. (SM)
Lindorff, D. P. (M)
Lof, J. L. C. (SM)
Lucal, H. M. (M)
Schultz, C. W. (M)
Sherman, J. (A)
Timoshenko, G. S. (SM)

Stratford (CV-1)
Andrukevich, G. J. (A)
Bernard, F. A. (M)
Craig, G. F. (SM)
Detar, D. R. (SM)
Fox, F. J. (M)
Hubbard, R. G., Jr. (A)
Kojalowicz, A. M. (M)
Simko, R. S. (A)
Vena, A. C. (A)

Talcottville (CV-1)
Howard, L. L. (A)

Terryville (CV-1)
Krenicki, J. (M)
Parry, W. W. (A)
Piantoni, G. L. (M)

Thomaston (CV-1)
Reynolds, A. C., Jr. (M)

Thompsonville (CV-1)
Liuci, C. A. (A)
Tavidian, E. (M)
Vesce, A. J. (A)

Torrington (CV-1)
Gerbl, H. S. (M)
Gilman, W. L. (M)
Silver, L. (A)

Trumbull (CV-1)
Balogh, J. J., Jr. (A)
Dresser, W. R. (SM)
Howard, N. S. (A)
Schiro, A. J. (A)

Wallingford (CV-1)
Brazee, J. A. (M)
Davis, R. B., Jr. (A)
De Bruyn, P. R. (M)
Hoff, P. T. (M)
Mac Donald, D. H. (A)
Palmero, A. (M)
Schaefer, R. W. (A)

Wapping (CV-1)
Stoker, W. C. (SM)

Waterbury (CV-1)
Baltrush, J. J., Jr. (A)
Boisvert, G. R. (M)
Bryson, R. W. (A)
Busby, A. E. (A)
Cannizzaro, M. (M)
Hales, F. B. (M)
McLeod, K. A. (A)
Migliaro, B. J. (A)
Pannullo, F. T. (A)
Peace, W. J. (A)
Pichard, L. A. (SM)
Platt, F. L., Jr. (A)
Quinn, Q. O. (M)
Sollie, S. A. (SM)
Somers, D. L. (M)
Staneseki, W. (M)
Winchell, A. M. (M)

Waterford (CV-1)
Dunn, C. M. (M)
Haefner, S. J. (SM)
Hendry, E. F. (M)
Henrikson, F. T. (A)
Jellerson, F. R. (SM)
Smith, R. H. (M)
Stevens, A. M., Jr. (A)
Versov, I. R., Jr. (M)
Videberg, J. I. (M)
Weatherley, H. R. (A)
White, D. M. (M)
Wilms, H. J., Jr. (A)

Watertown (CV-1)
Getsinger, W. J. (M)

Westogue (CV-1)
Hildebrandt, W. J. (M)
Kaprelian, E. K. (A)

West Cheshire (CV-1)
Warren, R. E. (A)

West Hartford (CV-1)
Andersen, W. A. (M)
Bourret, C. J. (M)
Chase, A. E. (A)
Dorenus, J. (SM)
Ferin, S. J. (M)
Frame, N. R., Jr. (M)
Galin, J. L. (M)
Grammer, G. (A)
Hall, G. M. (SM)
Handy, F. E. (M)
Harris, D. J. (M)
Hutton, A. T. (A)
Holt, H. W. (SM)
Jopson, J. E. (A)
Lalanne, R. L. (A)
Lerner, I. S. (M)
Rich, L. G. (M)
Smith, N. F., Jr. (SM)
Southworth, M. F. (M)
Stanley, P. F. (M)
Suiters, C. W. (A)
Warner, S. E. (SM)
White, J. A. (A)
Williams, H. W. (A)
Zaslow, J. (M)

West Haven (CV-1)
Corvari, J. (M)
Coxeter, G. W. (M)
Kricek, J. V. (A)

West Mystic (CV-1)
White, C. E. (M)

Weston (CV-1)
Chadwick, M. P. (SM)
O'Hare, E. F. (SM)
Warren, C. W. (M)

Westport (CV-1)
Ammerman, D. W. (SM)
Brumbaugh, G. M., Jr. (A)
Copp, W. C. (M)
Ettinger, L. (SM)
Gaffney, F. J. (F)
Haggott, J. C. (A)
Levine, S. (M)
Mason, F. G. (A)
Northrop, R. B. (M)
Rackey, C. A. (SM)
Roshkind, H. (M)
Steinhardt, L. (A)
Van Delft, R. N. (M)

Wethersfield (CV-1)
Beal, E. W. (M)
Bernard, D. T. (A)
Cox, N. W. (M)
Harden, L. R. (A)
House, L. G. (M)
Manganelli, F. D., Jr. (M)
Mitchell, J. A. (M)
Quayle, G. (M)
Santucci, A. H. (M)

Willimantic (CV-1)
Obsharsky, P. (M)

Wilton (CV-1)
Erstad, J. (M)
Levick, H. (M)
Lyuta, G. R. (A)
Riley, A. J. (M)
Ruckstuhl, C. E., Jr. (M)
Van Collie, H. A. (A)

Windham Center (CV-1)
Miller, A. C. (SM)

Windsor (CV-1)
Deranian, M. (A)
Harrington, C. F., Jr. (M)
Nelson, G. E. (M)
Van Vliet, W. G. (A)

Windsor Locks (CV-1)
Gray, N. L. (A)
Henry, W. L. (M)
Kidwell, N. E. (M)
Pearson, D. D. (A)

Winsted (CV-1)
Bolus, J. J. (M)

Woodbridge (CV-1)
Korper, G. W., Jr. (M)
Montgomery, R. H., Jr. (A)
Tyler, V. M., II (M)

Woodbury (CV-1)
Harris, W. T. (SM)
Nye, J. R. (SM)
Shaw, N. C. (M)
Watson, R. R. (A)

Woodmont (CV-1)
Cottam, R. W. (A)

DELAWARE

Camden (PHI-3)
Curtis, V. L. (A)

Claymont (PHI-3)
Da Grosa, V. (A)
McKowen, J. R. (M)

Dover (PHI-3)
Mankiewicz, E. J. (A)

Greenville (PHI-3)
Tribou, P. W. (M)

Harrington (PHI-3)
Horne, W. J., Jr. (M)

Hockessin (PHI-3)
Morris, J. M. (SM)

Lewes (PHI-3)
Bierwirth, R. A. (M)

Marshallton (PHI-3)
Hill, C. A. (A)

Milford (PHI-3)
Drummond, W. D. (A)

Newark (PHI-3)
Bolgiano, L. P., Jr. (M)
Dell, C. G. (M)
Hellerman, H. (M)
Lutz, H. C. (M)
McClure, R. W. (A)
Van Name, F. W., Jr. (SM
Young, M. G. (SM)

New Castle (PHI-3)
Hampton, L. R. (A)
Powers, E. N. (M)

Newport (PHI-3)
Myette, N. F. (A)
Rick, C. E. (A)

Wilmington (PHI-3)
Albright, C. M., Jr. (M)
Bauman, M. C. (M)
Carter, E. P. (M)
Conner, H. G. (A)
Cushing, C. J. (M)
Dilis, W. L. (M)
Faulhaber, M. E. (M)
Gallagher, G. J. (A)
Hughes, R. M. (A)
Hyatt, T. H. (M)
Jubin, T. A. (A)
Kaylow, M. J. (A)
Kelly, N. B. (M)
Liddicoat, C. A. (M)
Lovett, R. S. (M)
Mandas, J. J. (M)
McDaniel, F. (M)
McMillen, R. C. (SM)
Meyer, G. E. (A)
Moore, J. T., Jr. (A)
Noonburg, W. L., Jr. (A)
Owens, J. E. (A)
Paris, R. (A)
Pastell, D. L. (M)
Perkins, J. R. (SM)
Seer, H. G. (A)
Smith, J. W. (M)
Taylor, E. S. (M)
Walsh, R. R. (A)
Whitmore, J. H. (M)
Yetter, E. W. (M)

DISTRICT OF COLUMBIA

Anacostia (W-DC-3)
Riccobono, S. (VA)

Washington (W-DC-3)
Abel, R. L. (M)
Abraham, G. (M)
Adair, G. P. (F)
Adams, R. J. (SM)
Albertson, F. W. (SM)
Aldrich, J. L. (A)
Alexander, L. K. (A)
Algor, M. M. (M)
Allaveun, R. (M)
Allen, J. H. (M)
Allman, F. L. (VA)
Altman, W. A. (M)
Altomare, R. E. (M)
Ament, W. S. (SM)
Anderson, D. J. (SM)
Anderson, L. D. (M)
Anderson, R. V. (M)
Anderson, W. H. (M)
Anderson, W. R. (A)
Andrews, W. M. (M)
Andrias, J. (M)
Ansell, R. E. (A)
Antonov, A. F. (A)
Apuli, J. C. (SM)
Armstrong, J. M. (A)
Arnett, H. D. (SM)
Attmore, R. G. (M)
Atwell, R. G. (M)
Austad, L. W. (M)
Awramik, J., Jr. (M)
Bagg, T. C. (M)
Bailey, S. O. (A)
Bailey, S. P. (F)
Bailderson, W. M., Jr. (A)
Ball, N. T. (SM)
Bank, W. J. (M)
Barnes, L. L. (A)
Barry, W. F., III (A)
Barsky, N. (A)
Bass, C. A. (M)
Bauer, P. S. (VA)
Bearce, L. S. (A)
Beasley, A. L. (SM)
Beck, C. L. (A)
Beck, H. M. (M)
Beelar, D. C. (A)
Beers, R. H. (M)
Begue, G. C. (M)
Behrens, W. V. (M)
Belcher, H. P. (A)
Bell, R. R. (M)
Bengston, P. S. (A)
Benjamin, V. E. (M)
Benns, W. E., Jr. (M)
Berg, W. B., Jr. (M)
Bergman, C. E. (A)
Bernard, W. B. (SM)
Bernkopf, W. C. (M)
Bethge, G. (M)
Beyer, C. H. (SM)
Birmingham, H. P. (SM)
Black, C. J. (M)
Black, R. R. (SM)
Blake, L. J. (M)
Blasiel, F. G., Jr. (M)
Blumberg, W. J. (A)
Boesch, P. W. (A)
Bohnert, J. I. (M)
Bolick, H. C. (M)
Bonham, L. L. (M)
Booth, R. M., Jr. (M)
Bortniker, E. (A)
Bostick, B. E. (M)
Boutelle, L. T. (SM)
Boyle, J. A. (M)
Boymel, B. R. (SM)
Brady, F. B. (SM)
Brantley, W. W. (M)
Breen, J. A. (M)
Breetz, L. D. (SM)
Bremner, E. G. (A)
Brenner, M. (M)
Brester, W. A. (VA)
Britt, T. C. (A)
Brittle, D. F. (A)
Britton, D. D. (M)
Brody, H. I. (A)
Brodzinsky, A. (M)
Broglen, J. W. (SM)
Brown, H. E. (A)
Brown, S. R. (M)
Brown, T. H. (VA)
Bruton, F. B. (SM)
Bryant, F. B. (A)
Buck, C. U., Jr. (A)
Buckberg, M. L. (M)
Bull, W. I. (SM)
Bullock, G. M. (M)
Bullock, R. N. (M)
Bundy, C. W. (SM)
Burkett, J. A. (A)
Burns, R. C. (SM)
Butt, H. R. (A)
Byers, J. N. (A)
Callahan, J. G. P. (SM)
Callaway, H. D. (SM)
Campagna, H. (SM)
Campanella, S. J. (A)
Campbell, J. K. (A)
Campbell, W. B. (SM)
Cannon, J. W. (A)
Cantor, J. (M)
Carnes, W. T., Jr. (SM)
Carney, J. A. (M)
Carpenter, H. E., Jr. (M)
Carter, R. A. (A)
Cauffman, J. A. (M)
Celander, R. (A)
Chait, H. N. (A)
Chan, W. K. W. (A)
Chin, J. W. (A)
Chrzanowski, P. (SM)
Clark, G. L. (M)
Clark, H. L. (M)
Clark, J. F. (SM)
Clark N. M. (M)
Clarke, A. S. (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)
Cofiel, M. (M)
Colmar, P. V. (SM)
Conrad, G. T., Jr. (M)
Conroy, R. J. (A)
Cook, H. B. (SM)
Coplein, G. D. (M)
Corkill, J. F. (M)
Cosby, L. A. (M)
Cotton, A. F. R. (M)
Countryman, G. L. (SM)
Cranshaw, R. H. (A)
Craven, T. A. M. (F)
Crenca, J. J. (M)
Creveling, C. J. (SM)
Cronkin, J. A. (M)
Cude, H. H. (A)
Culver, R. H. (M)
Cumings, R. G. (M)
Cummings, J. J. (SM)
Cunningham, J. A. (M)
Cushing, R. E. (M)
Daigle, E. J., Jr. (M)
Dalkiewicz, E. B. (M)
Dance, A. M. (A)
Damelin, J. (A)
Darne, F. R. (M)
David, P. B. (SM)
Davies, R. C. (M)
Davis, D. L. (SM)
Davis, G. C. (SM)
Davis, L. B. (M)
Davis, T. M. (F)
Davis, W. J. (A)
De Benedictis, D. J. (M)
Decker, K. M. (M)
Dellinger, J. H. (F)
De Milia, J. (A)
De Vore, C. (SM)
Dickinson, P. C. (M)
Dillard, E. L. (A)
Di Masso, R. T. (A)
Dinger, H. E. (SM)
Dimick, G. M. (M)
Donne, J. E. (SM)
Dodrill, G. E. (SM)
Dohne, C. F. (M)
Donovan, P. F. (M)
Doong, L. (M)
Doring, R. C. (A)
Dorrell, R. E. (SM)
Dorsey, H. G. (F)
Dressin, S. A. (M)
Dropkin, H. A. (M)
Dubois, H. F. (A)
Dulin, W. E. (M)
Dumas, K. L. (M)
Duncan, F. B. (M)
Duncanson, A. B. (A)
Easton, R. L. (M)
Edgin, F. R. (M)
Elbourn, R. D. (M)
Ellerman, K. E. (A)
Elliott, H. H., Jr. (M)
Ellis, B. J. (M)
Emery, N. (M)
Engleman, C. L. (F)
Ennis, A. G. (M)
Falk, M. B. (A)
Feminano, D. J. (A)
Fetridge, R. V. S. (A)
Fine, H. (M)
Finney, W. J. (SM)
Fischman, M. (A)
Fisher, R. H. (M)
Fleming, H. D. (M)
Fleming, J. J. (M)
Floegel, M. E. (A)
Flores, R. A. (M)
Fluhr, R. M. (M)
Flynn, J. E. (A)
Fogelman, A. H. (M)
Ford, R. R. (A)
Foutz, D. F. (A)
Francis, C. J. (SM)
Franklin, P. J. (SM)
Franks, H. J., Jr. (A)
Franta, A. L. (M)
Fratianni, S. V. (M)
Fraumann, J. W. (A)
Frazier, H. S. (SM)
Freeman, J. J. (SM)
Friedman, D. C. (A)
Friedman, G. E. (M)
Fuller, J. W., Jr. (M)
Fulper, R., Jr. (M)
Gabriel, W. F. (M)
Galanc, I. B. (SM)
Gall, J. E. (VA)
Gallant, C. J. (A)
Gancie, J. J. (A)
Garcia, S. C. (M)
Gautney, G. E. (M)
Gaylord, R. E. (M)
Gebhard, L. A. (F)
Gentry, K. M. (SM)
George, S. F. (SM)
Gerber, H. (M)
Gerharz, R. J. (M)
Gerlach, H. W. A. (SM)
Germain, E. G. (A)
Gieseler, W. L. (A)
Gignoux, F. E., Jr. (A)
Gikas, G. N. (M)
Gilbert, L. H. (VA)
Gillette, K. G. (M)
Ginsburg, G. S. (A)
Gladin, J. (A)
Gleason, R. F. (M)
Gnau, D. V. (A)
Goldberg, H. (F)
Golden, F. S., Jr. (SM)
Goodman, A. E. (M)
Gordon, S. H. (M)
Graettinger, W. F. (A)
Graham, H. U. (SM)
Greathouse, D. E. (A)
Grebenkemper C. J. (SM)
Green, W. C. (VA)
Greene, R. M. (M)
Greer, J. W. (SM)
Griffith, K. E. (M)
Grimm, R. E. (M)
Grobowski, Z. V. (M)
Groverman, A. B. (M)
Guarino, P. A. (SM)
Gulnac, R. D. (M)
Gulledge, D. B. (A)
Gumina, L. V. (A)
Gunn, R. (F)
Gustafson, C. E. (A)
Guthrie, F. P. (SM)
Guthrie, R. C. (M)
Hagen, J. P. (F)
Haines, J. A. (A)
Hall, H. (SM)
Hamilton, C. R. (SM)
Hanley, T. E. (SM)
Hannon, J. R. (A)
Hare, C. M. (A)
Harris, F. D. (A)
Harris, W. P. (M)
Harrison, J. H. (A)
Harter, J. R. R. (M)
Hastings, J. F. (SM)
Haynes, A. P. (A)
Hays, N. P. (M)
Head, H. T. (SM)
Hearn, O. E. (SM)
Hedge, J. B. (M)
Hemenway, D. F. (M)
Hense, W. N. (A)
Henson, R. F. (A)
Hepler, D. S. (M)
Herbert, C. S. (M)
Herbert, T. O. (A)
Herman, H. (M)
Herman, J. (SM)
Herndon, P. H., Jr. (SM)
Herring, R. A., Jr. (M)
Herson, J. L. (M)
Hicks, J. M. (M)
Hill, J. H. (M)
Hill, T. L. (M)
Hobbis, C. E. W. (M)
Hodges, M. F. (SM)
Hoekje, J. W. (A)
Hoggarth, K. G. (A)
Holt, A. W. (M)
Hooker, R. H. (A)
Horman, F. L. (M)
Howard, D. D. (M)
Howard, E. G. (M)
Howe, J. W. W. (M)
Hunt, C. M. (SM)
Hunter, M. A. (M)
Huntoon, R. D. (F)
Hurvitz, H. (M)
Hymowitz, E. W. (M)
Iglehart, D. L. (M)
Ihnat, J. (M)
Ingles, H. C. (SM)
Inscoe, R. A. (M)
Irons, H. R. (A)
Isely, F. C. (SM)
Jacocks, T. B. (SM)
Jansky, C. M., Jr. (F)
Jansky, M. M. (M)
Jensen, H. R. (M)
Jessuron, A. J., Jr. (A)
Joffe, N. (M)
Johansen, G. N. (SM)
Johnson, C. Y. (M)
Johnson, R. M. (A)
Johnson, S. F. (M)
Johnson, W. C. (M)
Johnston, G. I. (M)
Jones, C. T. (A)
Jones, H. S., Jr. (M)
Jones, W. G. (A)
Julian, O. K. (M)
Kaiser, E. E. (A)
Kaiser, H. F. (A)
Kales, M. L. (M)
Kalnins, H. P. (F)
Kapust, L. A. (M)
Kaputa, E. J. (M)
Katzin, M. (F)
Kaufman, J. (SM)
Kaufman, M. G. (SM)
Keachie, J. H. (SM)
Killian, T. J. (F)
King, A. F. (A)
King, M. M. (M)
King, E. S. (M)
Kinsey, L. F. (M)
Kirby, P. S. (A)
Kirshner, J. M. (A)
Klamm, G. E. (A)
Kear, F. G. (F)
Keating, T., Jr. (M)
Keller, J. E. (A)
Kellerman, K. F. (SM)
Kelly, J. J. (A)
Kennedy, R. L. (SM)
Kershner, S. W. (M)
Khougaz, E. G. (A)
Klein, M. (M)
Knox, C. B. (A)
Kohler, H. W. (SM)
Kolkedy, J. G. (M)
Koppenhaver, J. T. (A)
Kouchnerkevich, T. A. (M)
Kozak, A. S. (A)
Kraker, D. I. (M)
Kramer, E. R. (A)
Kramer, E. (A)
Kroll, W. M. (A)
Krupen, P. (M)
Kube, H. D. (A)
Kuch, B. L. (M)
Kuder, M. L. (A)
Kuhnle, R. C. (A)
Kullback, S. (A)
Kunetz, G. J. (A)
Kurner, C. J. (M)
Kyser, R. H. (M)
Laker, E. F. (A)
Lantz, P. A. (SM)
Lapham, E. G. (SM)
Larison, J. F. (A)
Larrangga, G. (M)
Larsen, J. (SM)
Lawsine, L. (M)
Lay, L. L. (M)
Leavitt, W. E. (M)
Lee, F. M. (A)
Lee, R. E. (SM)
Leftwich, L. L. (M)
Leidy, K. L. (M)
Leinbach, H. J., Jr. (M)
Leiner, A. L. (M)
Leiphart, J. P. C. (M)
Leppert, M. L. (M)
Lesko, N. J. (A)
Levine, I. (SM)
Levy, I. J. (M)
Light, L. (M)
Llimatainen, T. (M)
Link, J. C. (M)
Lipscomb, J. L. (A)
Liss, F. T. (A)
Little, R. P. (M)
Locher, C. W. (SM)
Lohnes, G. M. (SM)
Looney, C. H., Jr. (M)
Lorentz, E. F. (M)
Lorenzen, H. O. (M)
Loucks, P. G. (M)
Lowe, M. J., Jr. (A)
Lucid, J. (SM)
Luecker, G. (M)
Luttrell, N. H., Jr. (A)
Mabry, J. H. (A)
MacLeod, D. S. (A)
Macnelli, R. K. (A)
Maddox, C. H. (SM)
Maiden, R. M. (SM)
Mallinson, F. C. (SM)
Mantek, P. A. (A)
Marsh, J. W., Jr. (A)
Marinl, J. W. (A)
Markell, J. H. (SM)
Marsden, C. P., Jr. (M)
Martin, J. F. (M)
Martin, K. L. (A)
Martin, P. J. (M)
Marzullo, S. (A)
Mash, J. T., Jr. (A)
Maskaleris, C. (M)
Mason, R. M. (A)
Masterson, J. P. (M)
Mathes, R. H. (M)
Mayer, C. H. (M)
Mayer, E. E. (SM)
Mayo, R. D. (M)
Mayo-Wells, W. J. (SM)
McCallum, J. D. (M)
McCarthy, F. M. (VA)
McCarthy, L., Jr. (M)
McClain, E. F. (SM)
McClenon, D. (SM)
McGowan, J. E. (M)
McGregor, C. F. (A)
McIntosh, F. H. (M)
McKay, R. L. (SM)
McKenna, J. A., Jr. (A)
McKinney, J. C. (M)
McLaughlin, D. J. (SM)
McMann, I. H. S. (SM)
McNary, J. C. (M)
Meads, S. K. (M)
Meares, C. W. (A)
Medrow, K. R. (M)
Melton, G. H. (M)
Merez, G. E. (SM)
Merritt, E. A. (A)
Metz, H. I. (SM)
Metzger, E. E. (A)
Metzger, G. (A)
Miles, D. D. (SM)
Miller, J. M. (F)
Minor, R. E. (A)
Miranda, R. T. (A)
Mitek, C. B. (SM)
Mischler, E. F. (SM)
Misner, R. D. (SM)
Mitchell, F. T., Jr. (SM)
Mitchell, F. O. (A)
Mitchell, G. J. (M)
Mitchell, M. B., Jr. (M)
Montgomery, G. F. (SM)
Montgomery, G. T. (A)
Moore, A. C. (M)
Moore, C. G., Jr. (A)
Moore, H. N. (M)
Moore, W. J. (A)
Morgan, E. D. (M)
Morris, H. (SM)
Moss, J. F. (A)
Muchmore, T. F. C. (M)
Muncy, C. F. (A)
Muncy, J. H. (M)
Murray, A. F. (F)
Naugle, J. B., Jr. (M)
Navarro, R. C. (M)
Neely, G. M. (VM)
Neumann, A. J. (M)
Niedbalski, N. B. (A)
Nordenberg, H. M. (M)
Nowakoski, D. B. (M)
Nunley, L. J. (M)
Obenchain, L. (SM)
O'Brien, J. R. (SM)
O'Connell, J. D. (F)
Odarenko, T. M. (SM)
Oelke, H. J. (M)
Oertel, M. F. (A)
Olin, W. C. (M)
Ornstein, E. (M)
Osborn, M. E. (A)
Otto, E. D. (SM)
Ould, R. S. (M)
Owens, R. B. (SM)
Packert, D. E. (A)
Page, E. C. (SM)
Page, I. H. (SM)
Page, R. M. (F)
Paine, H. G. (M)
Palik, F. (M)
Palmer, C. E., Jr. (A)
Parker, R. A. (SM)
Parrott, J. H., Jr. (M)
Peacock, J. T. (A)
Pease, C. H. (A)
Penland, C. H., Jr. (A)
Perineau, M. C. (M)
Perrino, S. R. (A)
Perritte, J. L. (A)
Peselnick, L. (A)
Peterlin, E. W. (M)
Peters, C. W. (SM)
Peterson, H. L. (SM)
Petrini, A. A. (A)
Petry, C. A. (SM)
Pickar, A. D. (M)
Pitsenberger, J. W. (A)
Plawnicky, E. (A)
Plummer, C. B. (SM)
Plummer, W. E. (SM)
Polak, H. (M)
Poland, W. B., Jr. (A)
Pontious, C. E. (A)
Ports, D. C. (SM)
Potter, R. S. (M)
Powers, W. F. (A)
Powles, F. E. (SM)
Powley, A. T. (M)
Pratt, H. A. (M)
Pulvari, C. F. (SM)
Puttcamp, R. R. (M)
Pynn, G. W. (M)
Quarles, D. A. (F)
Queen, F. D. (M)
Rabinow, J. (F)
Radkowsky, L. (M)
Raker, S. K. (M)
Rambo, L. W. (M)
Ramos, E. (M)
Ramos, P. A. L. (A)
Randall, C. R. (A)
Rannenberg, A. (M)
Rasmussen, A. R. (M)
Raymond, C. G. (A)
Read, A. H. (SM)
Redcay, P. M. (M)
Reed, D. W., Jr. (SM)
Reed, S. F. (M)
Reese, J. S. (VA)
Regarth, C. G. B. (A)
Renner, J. (M)
Reynard, A. L. (SM)
Reynolds, D. E. (M)
Reynolds, J. H., Jr. (A)
Richardson, W. M. (SM)
Richelderfs, C. L. (M)
Rickerson, D. M. (A)
Rietzke, E. H. (SM)
Riley, L. A. (A)
Ringler, D. H. (A)
Rivers, W. (M)
Robinson, C. A., Jr. (M)
Robinson, H. H. (SM)
Robson, A. B. Jr. (M)
Roblfs, J. C. (M)
Rohrer, R. E. (SM)
Rohrich, G. J. (VA)
Rollo, R. T. (A)
Rosen, H. H. (A)
Rosenberg, A. (A)
Rosenthal, S. (A)
Rothenberg, N. B. (A)
Rouse, R. E. (A)
Rovang, R. J. (A)
Rowe, H. A. (M)
Rozak, D. T. (A)
Rubin, S. (M)
Ruscus, P. V. (A)
Russ, J. A. (M)
Russell, P. H., Jr. (A)
Ryan, W. B. W. (F)
Safford, L. F. (SM)
Salerno, J. (M)
Salisbury, L. L., Jr. (M)
Samuel, J. (A)
Sanborn, G. D. (A)
Sands, W. C. (M)
Sarbacher, G. W., Jr. (A)
Sarbacher, R. I. (SM)
Savage, J. W. (M)
Schairer, N. J. (M)
Schleter, G. C. (M)
Schmalbach, S. (M)
Schmidt, R. F. (A)
Schooley, A. H. (F)
Schrack, R. A. (M)
Schrenk M. H. (F)
Schuyler, W. E., Jr. (M)
Schwartz, R. J. (M)
Schwarz, F. (SM)
Seaman, E. F. (SM)
Segal, M. (M)
Segal, P. M. (SM)
Segal, R. L. (A)
Sergent, R. C. (SM)
Shamp, D. J. (A)
Shapiro, G. (SM)
Sharp, N. S. (A)
Sheets, G. (A)
Sherman, W. C. (SM)
Sherwood, R. M. (SM)
Shuck, L. G. (A)
Shumaker, J. F., Jr. (M)
Sigman, M. (A)
Silling, P. F. (F)
Silins, A. (A)
Silliman, R. M. (SM)
Silver, S. H. (M)
Simes, V. R. (SM)
Simmonds, T. H., Jr. (A)
Simmons, A. J. (A)
Simpson, T. L. (M)
Singer, C. H. (SM)
Singer, J. R. (M)
Skramstad, H. K. (SM)
Small, C. F. (M)
Smith, E. R. (A)
Smith, F. A. B. (M)
Smith, J. E. (SM)
Smith, P. L. (SM)
Smith, S. T. (SM)
Snow, R. F. (A)
Snyder, S. S. (A)
Soler, A. (M)
Southall, T. W. (M)
Spalding, J. P. (SM)
Spears, R. E. (A)
Spencer, E. G. (SM)
Spitz, D. C. (M)
Spool, J. (M)
Spriggs, A. J. (SM)
Sreb, J. H. (M)
Stahl, B. E. (VA)
Stair, R. (SM)
Stansbury, C. (SM)
Stanwick, T. (SM)
Steel, D. L., Sr. (M)
Steier, H. P. (SM)
Stein, R. S. (M)
Stephey, H. M. (M)
Stewart, R. B. (SM)
Stine, P. T. (M)
Stinson, I. P. (M)
Stitch, B. D. (A)
Stoddard, C. W. (M)
Stoleson, H. N. (A)
Stone, H. B. (A)
Story, V. V. (SM)
Stratton, J. C. (M)
Stump, W. D., Jr. (M)
Sturm, P. J. (SM)
Sumoski, A. W. (M)
Suski, H. M. (SM)
Svendsen, R. C. (M)
Swafford, L., Jr. (A)
Swan, N. C. (A)
Swanekamp, J. E. (A)
Sweeney, J. (A)
Sweet, R. A. (M)
Swierczek, W. L. (A)
Talshoff, S. J. (A)
Talkin, A. I. (M)
Tall, R. E. (M)
Talmadge, H. G., Jr. (M)
Tanke, H. P. (VA)
Tasaka, F. (A)
Taylor, W. T. (SM)
Temple, F. B. (A)
Tersoff, A. I. (M)
Thomas, L. W. (SM)
Thompson, R. J. (M)
Thompson, R. L., Jr. (A)
Thrift, S. R., Jr. (SM)
Titcomb, F. C. (A)
Toth, E. (SM)
Town, G. R. (F)
Tozzi, L. M. (

FLORIDA

Bellair Beach (F-WC-3)
Andrews, E. F. (VA)

Belle Garde (MIA-3)
Clemans, C. S. (SM)

Bradenton (F-WC-3)
Brand, P. M. (SM)
Hauber, E. N. (M)
Lampkin, G. F. (VA)
Schnell, F. H. (SM)
Whitehead, C. C., Jr. (M)

Brandon (F-WC-3)
Brodie, W. A. (A)

Casselberry (CF-3)
Morrison, H. E. (A)

Clearwater (F-WC-3)
Adkisson, W. M. (M)
Ainsworth, F. W. (M)
Bozardt, W. R. (A)
Bromander, G. C. (M)
Brown, P. F. (M)
Burnside, D. G. (SM)
Dubendorff, H. H. (M)
Fleischer, K. M. (M)
Gor, L. D. (M)
Macomber, G. R. (A)
Pentman, J. B. (M)
Reynolds, G. E., Jr. (M)
Taylor, J. R. (A)
Voissem, N. H. (M)

Cocoa (CF-3)
Adams, R. N. (A)
Amundson, F. A. (A)
Anderson, J. P. (M)
Atherly, D. H. (A)
Barnett, B. E. (A)
Benn, D. G. (A)
Bethel, H. W. (A)
Black, F. R. (M)
Blake, J. T. (M)
Borders, C. R. (SM)
Bower, C. E. (M)
Bowman, J. V. (M)
Burgen, J. G., Jr. (M)
Burquez, E., Jr. (A)
Cox, H. C. (A)
Childers, F. S. (A)
Damme, M. C. (A)
Dillon, J. D. (M)
Eckenrode, A. H. (A)
Elam, O. R., Jr. (M)
Finley, J. D. (M)
Fowler, C. D. (M)
Friedland, M. S. (SM)
Gasparovitch, S. (A)
Ginn, R. (M)
Gould, M. J. (SM)
Grilley, D. H. (M)
Guelzow, C. W. (A)
Haberhern, W. J. Jr. (A)
Hain, J. L. (A)
Hart, C. L. (A)
Hatchett, C. (M)
Henry, J. L., Jr. (M)
Hiers, K. G. (A)
Hohenhaus, H. A. (A)
Hopper, A. L. (SM)
Horchler, F. W., III (M)
Keifer, L. F. (A)
Kilbith, D. W. (A)
Kjellburg, R. L. (M)
Leal, C. V. (A)
Lietzan, A. A. (M)
Mackey, A. J., Jr. (M)
McMath, D. C., Jr. (A)
Mead, M. C., Jr. (A)
Means, P. S. (M)
Mattox, C. E. (SM)
McCoy, S. E. (M)
Miller, J. S. (M)
Moody, R. B. (M)
New, C. H. (A)
Noone, J. R. (A)
Orman, L. M. (SM)
Peterson, R. A. (M)
Rehwinkel, J. A., Jr. (M)
Rosson, J. W. (A)
Schum, E. J. (A)
Sharpe, B. K. (A)
Sinclaire, L. W. (A)
Smallwood, W. O. (M)
Spontak, J. (M)
Strinkowski, N. W. (A)
Summer, C. F., Jr. (M)
Sundberg, G. A. (A)
Terek, A. A. (A)
Thoman, C. A. (M)
Thomas, D. H. (M)
Tomberlin, J. L. (M)
Varson, W. P. (A)
Wentzel, M. G. (A)
Werth, A. M. (M)
Wever, L. R. (M)
White, J. R. (A)
Williams, F. B. (M)
Williams, R. O. (M)
Wright, E. A. (M)
Wrye, W. F., Jr. (M)
Yatauro, P. (A)
Young, L. L. (A)
Zinn, T. B. (A)

Coconut Grove (MIA-3)
Rosenson, A. H. (A)

Coral Gables (MIA-3)
Birch, R. S., Jr. (M)
Christophel, G. H. (M)
Craig, P. H. (SM)
Eubanks, J. M. (M)
Hailey, W. M. (A)
Lang, L. B. (A)
Montcalm, M. T. (A)
Roberts, F. G., Jr. (VA)
Ryan, C. M. (SM)

Daytona Beach (CF-3)
Emmons, A. W. (M)
George, E. M. (M)
Siegel, J. (A)
Valentine, E. (A)

De Land (CF-3)
Kelsey, E. L. (A)

Delray Beach (MIA-3)
Smith, S. B. (M)

Destin (NWF-3)
Hamm, H. W. (A)
Najarian, Z. (M)

Dunedin (F-WC-3)
McLaren, D. C. (M)
Roberts, M. R. (A)
Zinn, W. H. (SM)

Eau Gallie (CF-3)
Beach, A. R. (SM)
Bean, H. T. (M)
Bivans, R. W. (M)
Bridges, D. B. J. (M)
Chestnut, E. H. (A)
Coapman, J. W. (SM)
Cook, R. M. (A)
De Mars, S. A. (M)
Dibble, H. L. (M)
Doane, H. J. (M)
Downs, J. W. (SM)
Duryee, J. B. (M)
Fogle, R. L., Jr. (A)
Harris, B. E., Jr. (M)
Harris, C. F. (A)
Hickman, R. S. (A)
Hill, D. R. (M)
Hines, W. S. (A)
Holmes, T. G. (M)
Johnson, S. A. (SM)
Jones, A. E. (M)
Kaeser, J. M. (M)
MacGregor, W. R. (SM)
McCarthy, E. A. (A)
Miller, T. F. (A)
Mills, L. W. (A)
Morton, L. H. (A)
Muller, R. M. (M)
Neff, R. R. (A)
Nordbusch, J. L. (A)
Pierce, J. R. (M)
Reber, J. H. (M)
Rector, C. V. (M)
Rivera, C. R. (A)
Simpson, E. M., Jr. (M)
Spooner, J. E. (A)
Stoklas, F. P. (M)
Theodore, R. J. (M)
Thibodeau, R. A. (M)
Tolson, W. A. (F)
Turley, R. N. (M)
Vice, V. W. (M)
Votava, V. (M)
Weiss, L. J. (M)
Wesp, L. H. (M)
West, K. A. (SM)
Williard, M. W. (M)
Wynn, J. B., Jr. (M)

Eglin AFB (NWF-3)
Allmon, E. C. (A)
Baxter, W. D. (M)
Buskirk, J. F. (M)
Eberhard, R. C. (A)
Forkner, E. G. (M)
Lanford, H. W., Jr. (SM)
Mechling, E. P. (SM)
Moore, E. (A)
Pitts, G. G. (A)
St. Germain, A. A. (A)
Shanks, F. B. (M)
Somerset, R. D. (M)
Stoffel, B. L. (M)
Waldrop, J. E., Jr. (M)

Floral City (F-WC-3)
Paika, F. M. (M)

Fort Lauderdale (MIA-3)
Bassett, R. E., Jr. (VA)
Breland, M. H. (A)
Burt, J. M. (A)
Canaday, H. T. (A)
Castor, A. H. (M)
Cummings, M. M. (M)
Gordet, L. O. (A)
Granucci, F. P. (A)
Needs, W. R. (A)
Pritchard, W. S. (M)
Schmidt, F. G. (A)
Schwartz, H. C. (A)
Stetson, H. T. (M)
Thompson, H. V. (SM)
Van Arsdale, L. H., JR. (SM)
Wisner, F., Jr. (A)
Young, J. W. (M)

Fort Myers (MIA-3)
Dashiell, R. V. (SM)
Weber, D. C. (M)

Fort Walton (NWF-3)
Bloomquist, J. C. (A)
Brown, M. J. (M)
Falkenberg, H. R. (M)
Fowler, L. O. (M)
Howard, F. E., Jr. (M)
Patti, V. C. (A)

Fort Walton Beach (NWF-3)
Atkinson, R. L. (M)
Butler, F. M., Jr. (A)
Christofferson, A., Jr. (A)
Coe, R. B. (M)
Combs, J. W. (A)
Crenshaw, H. J. (M)
Crumly, F. D. (M)
Duchek, H. W. (A)
Elmore, H. J. (M)
Felleman, P. G. (M)
Fleming, G. C. (M)
Gardner, D. L. (M)
Hammack, J. W. (M)
Huntley, K. L. (M)
Keenan, E. L. (M)
Kirlin, W. F. (A)
Lewis, R. E. (M)
Long, C. E., Jr. (M)
Lucas, H. B. (A)
Mantey, W. F. (M)
Marsh, R. E. (A)
Mefford, C. W. (M)
Pranitch, J. (A)
Severance, F. D. (A)
Waldron, R. C. (A)
Walker, L. C. (M)
Walker, R. V. (M)
Wilson, L. L. (M)
Zwaska, J. F. (M)

Gainesville (CF-G-3)
Barylski, M. W. (A)
Bean, E. W., Jr. (A)
Blanton, J. E. (M)
Brenner, J. C. (SM)
Chen, W. H. W. (M)
Clark, J. M. (M)
Day, W. R., Jr. (A)
Eadie, D. (SM)
Eisenberg, M. F. (A)
Elfe, T. B. (SM)
Erickson, E. E. (M)
Forsman, M. E. (M)
George, R. T., Jr. (M)
George, T. S. (SM)
Greenman, L. R. (M)
Hatch, R. H. (SM)
Jones, M. H. (A)
Koning, R. E. (M)
Kundel, T. (SM)
Langston, C. A. (M)
Latour, M. H. (SM)
Lear, W. E. (SM)
Nelders, J. H. (SM)
Peterson, W. W. (A)
Reichert, K. R., Jr. (M)
Rhoads, A. S., Jr. (A)
Rich, C. E. (SM)
Rolfe, F. R. (A)
Rose, J. J. (M)
Rosier, N. E. (A)
Schrader, G. F. (SM)
Searles, C. B. (M)
Shaffer, C. V. (SM)
Silas, F. R., Jr. (M)
Sterling, R. W. (A)
Studstill, H. F. (A)
Sutherland, A. D. (M)
Swearingen, J. D. (M)
Veronda, C. M. (SM)
Walters, J. H. (M)
Weil, J. (P)
Wing, A. H., Jr. (SM)
Winters, B. C. (A)
Zetrouer, W. F., II (M)

Graham Air Base (CF-3)
Bell, W. D. (M)

Gulfport (F-WC-3)
Lindtner, J. (A)

Hialeah (MIA-3)
Scrivener, L. A. (M)

Hollywood (MIA-3)
Hieronymus, T. G. (SM)
Lane, H. K. (A)
McWilliams, L. C. (A)

Holly Hill (CF-3)
Bodnar, J. M. (M)

Homestead (MIA-3)
Eyring, J. W. (A)

Indialantic (CF-3)
Gilbreath, R. E., Jr. (A)

Jacksonville (CF-3)
Asenlorf, J. A. (M)
Beers, W. T. (A)
Brand, C. W. (M)
Dandelake, J. (M)
Ficke, H. C. (A)
Ffoulkes, C. E. (M)
Gardiner, R. S. (M)
Helmsing, L. C. (A)
Hill, A. L. (A)
Kray, J. F., Jr. (A)
Martindale, N. B. (A)
Osmundsen, G. A. (A)
Padgett, E. T., Jr. (A)
Parker, C. F. (M)
Randles, W. C. (M)
Simpson, W. E. (M)
Tisdale, W. G. (A)
Trainum, D. A. (M)
Vordermark, E. B. (M)

Jacksonville Beach (CF-3)
Niles, R. O. (A)

Key West (MIA-3)
Anderson, B. G., Jr. (M)
Brooks, J. F. (SM)
Cobb, A. D. (M)
Davis, J. J. (A)
Dillon, J. C., Jr. (A)
Fischer, W. H. (A)
Kush, L. J. (M)
Lane, J. P. (A)
McMasters, P. A. (SM)
Meyers, C. B. (A)
Payne, V. E. (M)
Phelps, R., Jr. (A)
Small, D. G. (M)
Thomas, T. M. (A)
Yowell, G. M., Jr. (M)

Kissimmee (CF-3)
Hagen, G. D. (M)

La Belle (MIA-3)
Williamson, H. L. (A)

Lakeland (F-WC-3)
Polskin, L. J. (A)

Lake Wales (F-WC-3)
Kimbrel, G. M. (M)

Lake Worth (MIA-3)
Elam, L. A. (A)
Larkin, J. P. (M)

Largo (F-WC-3)
Abernathy, T. C. (M)
Balley, R. L. (M)
Denison, J. W. (A)
Shaw, H. S. (F)

Laurel Hill (NWF-3)
Eddy, H. C. (A)

LEESBURG (CF-3)
Ball, I. D. (SM)

Lutz (F-WC-3)
Wallace S. K. (A)

Mac Dill AFB (F-WC-3)
Logsdon, H. E. (A)
Randell, R. R. (M)

Mary Esther (NWF-3)
De Florio, G. P. (A)
Rush, O. A., Jr. (A)
Todd, M. A. (M)

Melbourne (CF-3)
Apriletti, C. A. (A)
Bishop, R. P. (M)
Blasingame, J. J. (M)
Brown, W. H. (M)
Cahill, W. J. (M)
Campbell, C. A. (SM)
Cauthen, I. L. (M)
Clarke, R. L. (A)
Cockerham, F. E. (A)
Cohen, P. (SM)
Conerly, P. (M)
Culver, L. R. (SM)
Davenport, F. S. (M)
Davis, H. B. O. (M)
Denius, H. R. (SM)
Detweiler, J. E. (A)
Dickenson, J. P., Jr. (M)
Dodgson, W. W., Jr. (A)
Dorf, H. (M)
Doughty, S. D. (M)
Eddins, W. T. (M)
Evans, W. B. (M)
Falls, M. P. (SM)
Farabee, L. B. (M)
Fickett, E. A. (A)
Fraustro, B. (A)
Griffin, F. S., Jr. (M)
Grover, D. W. (M)
Hall, W. H. C. (M)
Hartley, J. T., Jr. (M)
Hartzog, G. R., Jr. (M)
Hazel, W. M. (M)
Herring, R. W., Jr. (M)
Hoeppner, C. H. (SM)
Hoover, R. W. (M)
Howard, D. C., Jr. (M)
Howard, T. B. (M)
Jackson, C. H. (M)
Jaffe, A. P. (M)
Knight, J. P. (A)
Lenke, R. H. (M)
Leonard, S. E. (SM)
Madrid, D. C. (M)
Marquand, R. E. (M)
Martin, J. W. (A)
McIntyre, R. T. (M)
McKee, J. P. (A)
McLamb, F. D. J. (M)
McMillian, L. S., Jr. (M)
Mead, W. L. (M)
Miller, L. S. (A)
Pace, A. J. (M)
Pettijohn, R. E. (M)
Pickover, H. (M)
Plaisted, R. D. (M)
Quinlivan, W. F. (M)
Rawnsley, J. A. (M)
Reynolds, F. N. (SM)
Robinson, W. A. (A)
Rogers, R. E. (A)
Sander, M. H. (M)
Sanford, R. C. (M)
Scharla-Nielsen, H. (SM)
Schisler, C. W. (A)
Searcy, J. H. (A)
Shaw, G. S. (SM)
Shem, I. (M)
Steele, S. L. (M)
Stumpe, L. W. (M)
Talbot, D. C. (M)
Thurston, P. H. (A)
Vansant, F. T. (M)
Walter, J. M., Jr. (M)
West, C. F. (M)
White, K. M. (M)
Widerquist, V. R. (SM)
Wiener, W. A. (M)
Williams, A. G. (M)
Williams, L. E. (SM)
Wilt, R. E. (M)
Winter, H. A. (A)
Wooded, K. M. (M)
Work, R. A., Jr. (A)
York, L. M. (A)
Young, J. (A)
Young, P. D. (A)

Melbourne Beach (CF-3)
Fox, R. A. (SM)
Sheridan, E. W. (A)
Wren, A. W., Jr. (A)

Melrose (CF-G-3)
Gano, O. R. (M)

Merritt Island (CF-3)
Arnold, N. R. (A)
Cooper, W. H. (SM)
Daniher, C. E. (A)
Engel, A. (M)
Griffith, M. E. (SM)
Metts, L. W. (A)
Morris, H. N. (M)
Pfeiffer, D. A. (M)
Shupe, P. G. (A)
Winward, K. B. (A)

Miami (MIA-3)
Adcock, S. E. (SM)
Alter, J. E. (M)
Bernard, H. F. (M)
Brookes, K. E. (A)
Bryant, C. S. (A)
Buckler, D. R. (M)
Cheng, K. Y. (M)
Dale, K. N. (A)
Danielsen, D. A. (M)
Drexel, A. (A)
Driest, C. W. (A)
Easterbrook, L. J., Jr. (M)
Embree, L. O. (M)
Epperson, W. H. (SM)
Evans, H. (A)
Femenias, H. R. (A)
Fossler, D. E. (M)
Francis, J., Jr. (M)
Goetz, O. E. (A)
Gordon, L. L. (SM)
Greene, A. N. (M)
Hart, O. P., Jr. (M)
Hellings, F. J. (M)
Henry, W. O. (A)
Herrmann, W. P. (M)
Johnson, W. H., Jr. (M)
Johnson, W. L., Jr. (M)
Jones, R. M. (M)
Jones, T. J. (M)
Jorgenson, E. (A)
Keller, J. W., Jr. (M)
Kiebert, M. V., Jr. (SM)
Kimball, E. W. (SM)
Kinney, V. E. (M)
Larkin, G. L., Jr. (M)
Lehfeldt, H. J. (A)
Leshan, J. J. (A)
Lewis, E. W. (VA)
Lockwood, E. C. (SM)
Manaus, G. (A)
Mazzeo, R. A. (M)
McLeod, B. F. (SM)
Middleton, T. F., Jr. (A)
Miller, M. C. (SM)
Nairn, J. B. (A)
Palmer, R. P. (A)
Perkinson, J. A. (A)
Pollack, B. (M)
Pollack, M. (M)
Rathbone, W. M. (M)
Reid, T. D. (M)
Richards, R. E. (M)
Rider, F. E. (SM)
Rondel, V. D. (A)
Sanders, S. (A)
Saunders, E. N. (A)
Scott, M. C., Jr. (SM)
Shamblin, H. E. (M)
Sharwin, N. S. (A)
Shattuck, J. C. (M)
Shay, J. A. (M)
Smith, R. L. (M)
Snyder, A. D. (A)
Spragg, L. A. (M)
Stephens, F. H., Jr. (A)
Ware, P. (SM)
Weber, G. (M)
Wicks, E. (A)
Wilmotte, R. M. (F)
Wright, A. (M)
Yeager, H. R. (SM)
Young, P. A. (M)
Zahniser, K. W. (M)

Miami Beach (MIA-3)
Boundy, G. G. (SM)
De Haas, T. H. (A)
Lurie, E. M. (M)
Myers, S. J. (A)
Richter, H. L. (A)
Senauke, A. (SM)
Shropshire, A. W. (VA)

Miami Shores (MIA-3)
Shearer, S. L. (A)

Miami Springs (MIA-3)
Atkins, G. T. (SM)
Chen, H. C. (M)
Cook, C. (A)
Mehrling, H. W. (M)
Morgan, W. R., Jr. (A)
Murr, V. E. (VA)
Pitkin, R. S. (M)

Milton (NWF-3)
Bengtson, P. F. (M)
Ellis, R. J. (M)

Monticello (NWF-3)
Groves, C. L. (A)

North Fort Myers (MIA-3)
Lynch, A. H. (SM)

North Miami (MIA-3)
Castle, C. X. (M)
Magee, T. T. (A)
Sawyer, J. L. (A)

Orange Park (CF-3)
Newberry, D. A. (M)

Orlando (CF-3)
Anderson, G. F. (A)
Bain, W. F. (M)
Barber, F. A. (A)
Benfield, C. W. (M)
Bobber, R. J. (A)
Bodin, B. H. (A)
Bradbury, L. D. (A)
Browder, L. P. (A)
Brown, C. K. (M)
Chasteen, J. W., Jr. (SM)
Cullman, F. A. (SM)
Damm, G. W. (A)
Dickinson, R. H. (SM)
Flaherty, J. B., Jr. (M)
Garrard, J. T. (M)
Godlewski, V. J. (A)
Hawley, D. T. (M)
Hill, G. R. (SM)
Horton, W. H. (SM)
Hughes, E. A. (SM)
Kaplan, S. M. (SM)
Kelth, C. E. (M)
Le Grand, H. R. (M)
McDirmit, E. L. (M)
Mesa, A. M., Sr. (A)

Moss, B. B. (A)
Nelson, L. (M)
Norman, L. S., Jr. (M)
Sheffield, T. W. (M)
Smith, G. S. (M)
Suganuma, P. K. (A)
Townsend, B. N. (M)
Turner, R. E. (M)
Weaver, H. R. (M)
Wilson, J. J., Jr. (A)
Yarbrough, J. E. (SM)

Palm Bay (CF-3)
Mesa, J. O. (SM)

Panama City (NWF-P-3)
Aucremann, R. C. (M)
Ault, J. F. (M)
Barry, C. J. (M)
Bell, L. W. (M)
Bennett, A. L. (SM)
Cartwright, C. C. (M)
Davis, A. J. (M)
De Coutouly, G. C. (SM)
Galloway, R. T. (M)
Gobel, L. J. (A)
Good, C. A., Jr. (M)
Guglotta, A. J. (A)
Hagemann, J. (SM)
Haulman, C. A. (SM)
Herold, R. (M)
Jones, L. F. (M)
Koesy, C. B. (M)
Lloyd, B. H. (M)
Lowry, R. C. (M)
Marley, S. B. (M)
Mathis, G. P. (A)
Moody, J. G. C. (M)
Murphree, F. J., Jr. (M)
Myers, J. C. (SM)
Naseeth, M. H. (A)
Penton, H. H. (A)
Sanchez, H. M. (M)
Tedesco, J. R. (M)
Wheeler, R. H. (M)
White, P. K. (M)
Whittaker, C. A. (M)

Pensacola (NWF-3)
Barps, E. W. (A)
Fisher, D. E. (M)
Haskell, H. B. (M)
Hixson, W. C. (M)
Kohr, C. M. (A)
Kuyper, D. M. (M)
Manke, J. A. (M)
Moore, B. G., Jr. (A)
Simpson, E. S., Jr. (A)
Spinner, C. (A)
Wintriss, G. V. (A)

Pinecastle AFB (CF-3)
Duvoisin, P. F. (A)

Plant City (F-WC-3)
Cockrell, J. H. (A)
Kendrick, F. D. (M)

Plymouth (CF-3)
Channey, H. L. (M)

Port Canaveral (CF-3)
De Agro, R. P. (A)
Huffman, R. E. (A)
Mazur, D. G. (SM)
Moline, J. C. (M)
Sanders, A. W. (A)
Sheppard, D. C. (M)

Riviera Beach (MIA-3)
Lefka, M. (M)

Rockledge (CF-3)
Dunham, K. D. (A)
Knowles, D. M. (M)
Rawle, C. B. (A)
Shaw, L. R. (A)

Safety Harbor (F-WC-3)
Legg, H. F. (A)

St. Augustine (CF-3)
Berger, M. (A)

St. Petersburg (F-WC-3)
Back, G. L. (F)
Codding, W. J. (M)
Cooper, C. B. (A)
Dyer, J. H. (M)
Feldhusen, R. L. (A)
Felton, L. E. (M)
Gray, F. (M)
Hart, W. F. (A)
Horner, G. F. (A)
Parsons, E. G. (M)
Kent, R. (SM)
Lindtner, R. G. (A)
Link, L. J. (SM)
Lodge, J. (A)
Ludwick, C. A. (A)
Miller, M. P. (A)
Parvin, R. H. (M)
Peacock, W. T., Jr. (A)
Rea, J. K. (A)
Reichard, R. W. (M)
Schieferstin, R. W. (A)
Spearman, J. C. (A)
Versteeg, D. A. (A)
Walker, G. (M)
Webber, J. T. (A)
Willert, A. F. (A)
Wilson, R. F. (M)
Koechel, W. P. (VA)

Sanford (CF-3)
Farrell, C. (M)
Nolde, R. C. (M)
Taylor, J. C. (M)
Woodruff, M. W. (M)

Sarasota (F-WC-3)
Peck, W. D. (A)
Ulrey, D. (F)

Seffner (F-WC-3)
Stralt, G. E. (A)

Shady Grove (CF-3)
Bailey, J. W. (A)

Shallmar (NWF-3)
Bonner, J. R. (M)
Gamel, W. W. (M)
Little, W. E. (A)
Marcinko, F. C. (A)
Niedrauer, J. J. (A)
Null, F. E. (A)
Overton, B. H. (SM)
Reierson, V. L. (M)
Roth, A. Q. (M)
Von Wegern, F. C. (A)

Sharpes (CF-3)
Malcolm, A. (A)
Olson, R. E. (M)

South Miami (MIA-3)
Andres, L. J. (SM)
Grafe, R. W. (A)
Rich, R. S. (A)

Summerland Key (MIA-3)
Douglass, W. A. (A)

Tallahassee (NWF-3)
Clifton, C. L. (M)
Kronhout, O. M. (A)
Whitehurst, C. H., Jr. (A)

Starke (CF-3)
Mathews, B. E. (A)

Tampa (F-WC-3)
Abremski, M. C. (A)
Bailey, D. C. (M)
Begue, E. (M)
Bell, H. W., Jr. (A)
Bellavia, L. J. (A)
Boyd, R. M. (A)
Brice, J. R. (M)
Brown, W. R. (M)
Cypher, V. M. (A)
Farina, J. S. (M)
Ferguson, H. S. (A)
Goldberg, H. L. (A)
Hartman, C. J. (A)
Jean, R. P. (M)
King, C. J. (M)
Landry, E. P. (A)
Mattes, E. H. (A)
May, T. W. (A)
McDaniel, C. B. (A)
Meksraitis, J. J. (A)
Mitchell, J. H. (M)
Moor, W. L. (M)
Moore, W. P. (SM)
Murphy, R. (M)
Neeb, C. H. (A)
Pope, R. L. (A)
Prendes, J. R. (A)
Quinones, D. E. (A)
Rich, J. C. (A)
Rosenzvaig, J. E. (M)
Schnurman, J. D. (M)
Schugel, J. A. (A)
Smith, D. H. (SM)
Stoutenburg, A. H. (A)
Straubel, E. P. (M)
Turner, R. D. (A)
Uranga, E. (A)

Titusville (CF-3)
Davidson, J. K. (A)
Diehl, D. J. (A)
Gilmore, Q. E. (M)
Herndon, W. F. (A)
Hickey, J., R. (A)
Jackson, K. J. (A)
Melton, B. R. (M)
Morford, T. H. (A)
Pittman, J. W. (A)
Siemen, H. A., Sr. (SM)
Slauson, J. L. (A)

Tyndall (NWF-P-3)
Wallner, F. S. (M)

Umatilla (CF-3)
Vossberg, C. A. (M)

Valparaiso (NWF-3)
Sapp, E. F., Jr. (A)
Vermillion, K. K. (A)

Vero Beach (CF-3)
Chorpening, C. M. (M)
Paddock, D. G. (M)
Van Dyck, A. F. (F)

Warrington (NWF-3)
Bush, L. A. (A)

West Hollywood (MIA-3)
Quackenbush, F. R. (A)

West Miami (MIA-3)
Speirs, G. E. (A)

West Palm Beach (MIA-3)
Conklin, R. N. (M)
Edleman, V. W. (A)
Field, J. S., Jr. (M)
Holdren, E. H. (M)
Lewis, T. F. (A)

Trailer Garden (CF-3)
Ducker, J. D. (A)

Winter Haven (F-WC-3)
Ahern, H. G. (A)
Craig, L. O. (M)

Winter Park (CF-3)
Dryden, R. E. (SM)
Gable, M. L. (A)
Gimon, E. E. (M)
Hawkins, W. E. (M)
Haydon, R. E. (SM)
Luckock, W. J. (M)
Palmter, P., Jr. (SM)
Romano, G. F. (M)

Yukon (CF-3)
Walter, E. R. (A)

GEORGIA

Albany (AT-3)
McClung, W. C. (M)
Melland, B. T. (A)
Senneville, L. O. (A)

Athens (AT-3)
Graham, E., Jr. (M)

Atlanta (AT-3)
Adamson, H. D. (A)
Aderhold, H. J. (M)
Akerman, B. (SM)
Badgett, A. F. (M)
Bangs, P. C. (M)
Benison, R. D. (A)
Berry, G. C. (A)
Bezaire, W. A. (A)
Bivins, W. P. (M)
Blakely, G. E. (M)
Blaine, W. E. (A)
Bondy, H. A. (VA)
Boyd, J. E. (SM)
Boyd, J. E. (A)
Bradley, W. H. (M)
Branch, B. S. (M)
Buchanan, D. B. (M)
Carr, R. L. (A)
Chick, E. B. (M)
Clayton, L., Jr. (M)
Corriher, H. A., Jr. (M)
Craddock, H. C., Jr. (M)
Crowe, W. H. (M)
Dasher, B. J. (M)
Daugherty, C. F. (M)
Dean, H. G., Jr. (M)
Duggan, R. S., Jr. (M)
Ellis, R. L., Jr. (M)
Fauvell, F. (SM)
Ferris, R. C. (A)
Fielder, D. C. (SM)
Finn, D. L. (M)
Flynt, E. R. (SM)
Foster, H. O. (M)
Glenn, L. E. (M)
Gradick, L. E. (A)
Griffin, E. F. (A)
Hammel, R. A. (M)
Hammond, J. L., Jr. (A)
Hawthorne, G. B., Jr. (M)
Hayes, R. D. (M)
Holbrook, R. A. (M)
Holley, J. (A)
Hollis, J. S. (M)
Holmes, E. G. (M)
Holmes, G. A. (A)
Hurd, F. K. (M)
Hutchison, P. T. (M)
Jenkins, S. P., Jr. (M)
Johnson, R. C. (M)
Jones, C. T. (M)
Kleinman, R. L. (A)
Krohn, C. A. (M)
Lenoir, S. P., Jr. (M)
Lindsey, E. B., Jr. (M)
Long, M. W. (SM)
Lord, C. R. (M)
McCorvey, A. (M)
McKinley, H. L. (SM)
Meadows, H. E., Jr. (A)
Meek, R. F. (M)
Miller, W. B., Jr. (SM)
Montgomery, B. E. (SM)
Morris, C. S. (A)
Morris, K. G. (M)
Nilson, M. N. (A)
Olson, C. O. (M)
Opie, A. (SM)
Parkins, F. E. (M)
Penney, A. T. (A)
Ragsdale, H. W. (SM)
Randall, T. M. (A)
Reeves, D. S. (M)
Reid, H. L. (VA)
Rivers, T. A. (A)
Robinette, S. L. (M)
Robinson, G. P., Jr. (SM)
Skelly, P. G. (A)
Smith, J. B. (A)
Smith, S. R. (SM)
Sorensen, R. J. (M)
Strain, C. E. (M)
Taylor, J. (SM)
Teegardin, H. H. (A)
Turner, C. J., Jr. (A)
Turvey, F. P., Jr. (A)
Vaughn, C., Jr. (SM)
Walsh, J. R., Jr. (M)
Warren, W. B., Jr. (M)
Weimer, R. H. (A)
White, T. M., Jr. (M)
White, W. H. (M)
Witt, S. N., Jr. (A)
Worley, J. F. (A)
Wright, W. W. (M)
Young, R. L., Jr. (A)

Augusta (AT-3)
Cook, L. H., Jr. (A)
Dunlap, C. R. (SM)
Favre, R. M., Jr. (A)
Salaman, R. G., Jr. (A)
Swink, J. E. (A)
Tarpley, M. W. (M)
Wright, J. T. (M)

Austell (AT-3)
Bowles, M. K., Jr. (M)

Bainbridge (AT-3)
Haire, D. E., Jr. (M)

Brunswick (AT-3)
Smith, J. E. (M)

Carrollton (AT-3)
Crawford, E. W. (M)

Chamblee (AT-3)
Baran, M. (SM)
Carter, R. C. (M)
Duncan, C. L. (SM)
Halstead, W. R. (M)
Prince, M. D. (SM)
Wallace, J. M., Jr. (M)

College Park (AT-3)
Billings, R. H. (M)
Kahrs, E. R. (M)
Schell, J. H. (M)

Columbus (AT-3)
Hogencamp, H. C. (SM)
Mann, M. E., Jr. (A)

Dalton (AT-3)
Andrews, J. S. (A)

Decatur (AT-3)
Alexander, J. E. (M)
Currie, C. H. (A)
Robertson, D. W. (A)
Sorelle, J. L. (M)
Tolan, J. H. (SM)
Wilson, J. C. (M)

Doraville (AT-3)
Chupp, E. W. (M)
Goodwin, J. P., Jr. (M)
Shockley, T. D., Jr. (M)

Dunwoody (AT-3)
Northen, W. C. (M)

East Point (AT-3)
Brewer, R. V. (A)

Emory University (AT-3)
Fattig, W. L. (M)

Fayetteville (AT-3)
Day, J. T., Jr. (M)

Gillsville (AT-3)
Storm, K. W. (M)

Hawkinsville (AT-3)
Barker, D. E. (M)

Hunter AFB (AT-3)
Conner, B. C. (A)

Kennesaw (AT-3)
Borman, A. P. (A)

Macon (AT-3)
Farber, E. (M)
Hildreth, H. J. (A)

Marietta (AT-3)
Burleson, C. T. (M)
Crews, C. G. (A)
Dunphey, H. B., Jr. (M)
Garrett, W. O. (SM)
Griffin, C. H., Jr. (M)
Haley, D. C. (A)
Hobler, F. P., (SM)
Holliday, F. S. (M)
Jackson, J. C. (M)
Moseley, R. E. (M)
Ridenour, S. (A)
Stebbins, C. W. (M)
Toole, P. C. (SM)
Whitten, M. C. (A)
Wrigley, W. B. (SM)

Moultrie (AT-3)
Bie, E. W. (M)
Cramond, W. R. (M)

North Atlantic (AT-3)
Gunson, D. O. (M)

North Decatur (AT-3)
Bradburn, R. C., Jr. (A)

Powder Springs (AT-3)
Luedtke, A. (M)

Rome (AT-3)
Starr, R. A. L. (M)
Stowers, J. S. (A)

Savannah (AT-3)
Baker, F. E. (A)
Chambers, D. T. (A)
Evans, R. L. (A)
Goodman, K. E. (M)
Nilsson, W. H. (A)
Wagner, F. D., Jr. (A)

Smyrna (AT-3)
Ehrhart, E. H. (M)
Hurd, P. A. (M)
Hurst, H. C. (A)
Reagh, W. L. (M)
Speer, T. K. (M)
Spencer, J. M., Jr. (M)
Wilkinson, L. E. (A)

Stone Mountain (AT-3)
Tueni, J. A. (M)

Thomasville (AT-3)
Totman, S. (M)

Thomson (AT-3)
Dozier, W. A. (M)

Turner AFB (AT-3)
Edmonds, A. H., Jr., (A)

Valdosta (AT-3)
Bishop, A. N. (A)
Loftus, W. E. (A)

Warner Robins (AT-3)
Bugg, K. W. (SM)
Dozier, E. C. (A)
Dyer, S. M. (M)
Gilfillen, L. J. (M)
Parris, R. D. (A)
Watts, E. B. (A)

West Point (AT-3)
Hogg, J. C., Jr. (A)
Strother, F. P. (A)

IDAHO

Bayview (SLC-7)
Huckte, D. R. (M)

Blackfoot (SLC-7)
Judge, H. (M)

Boise (SLC-7)
Oberbillig, D. D. (M)
Ryman, J. L. (M)
Sternling, A. J. (M)

Bonners Ferry (SEA-7)
Hoaby, E. A. (M)

Coeur D'Alene (SLC-7)
Lovell, W. A. (M)

Hagerman (SLC-7)
Tucker, M. (A)

Idaho Falls (SLC-7)
Cochran, U. E. (A)
Criddle, C. B. (M)
Erickson, P. B. (M)
Marsden, R. S., Jr. (M)
McCollom, K. A. (M)
Meichle, F. A. (A)
Purcell, R. B. (M)
Schloemer, R. D. (A)
Thompson, J. B. (A)

Kimberly (SLC-7)
Watkins, P. E. (M)

Lewiston (SLC-7)
Neumann, W. E. (M)
Olin, R. W. (M)

Pocatello (SLC-7)
Barkley, H. B., Jr. (M)
Gilmour, G. A. (M)

Rigby (SLC-7)
Allen, K. J. (A)

Rockford Bay (SLC-7)
Webb, H. J. (M)

St. Anthony (SLC-7)
Rudd, F. S. (M)

Twin Falls (SLC-7)
Foss, M. L. (A)

Weiser (SLC-7)
Miller, E. C. (M)

ILLINOIS

Addison (CHI-5)
Lindsay, W. R. (M)
Roberts, E. L. (A)
Swentek, M. R. (A)

Algonquin (CHI-5)
Peterson, W. G. (SM)

Alton (SL-6)
Ullrich, D. P. (A)

Antioch (CHI-5)
Balsamello, J. (A)
Pechousek, T. W. (A)

Argo (CHI-5)
Pickens, D. H. (SM)

Arlington Heights (CHI-5)
Bez, R. O. (A)
Bonnell, D. W. (M)
Brown, J. O. (A)
Gerlach, A. A. (SM)
Hampel, W. J. (M)
Heisig, G. J. (M)
Kelly, J. W. (M)
Kopp, C. J. (M)
Lee, W. (A)
McCarty, J. M. (A)
Melvin, D. K. (A)
Mueller, A. A. (M)
Panec, D. C. (M)
Patterson, W. S. (VA)
Remley, H. L. (M)
Robinson, B. H., Jr. (A)
Ross, E. O. (M)
Seefeldt, H. C. (SM)
Stecker, J. W. (A)
Stout, E. R. (M)
Wallace, H. S. (M)
Wegweit, J. (

Bellwood (CHI-5)
Baltezore, R. C. (A)
Belville, J. R. (A)
Castor, R. W. (M)
Graham, J. M. (M)
Lafferty, V. C. (M)
Marik, E. (A)
McGann, W. E. (M)
Molzahn, H. W. (M)
Norris, C. H. (M)
Novy, C. A. (M)
Sellen, D. E. (A)

Bensenville (CHI-5)
Borm, W. H. (M)
Druz, W. S. (SM)
Haines, D. G. (SM)
Hilton, F. L. (A)
Jorgensen, N. A. (A)
Ozarka, R. J. (A)
Peterson, W. J. (M)
Sullivan, E. F. (M)
Swanson, C. W. (A)
Whiting, R. F. (M)

Berkeley (CHI-5)
Drot sh, R. W. (A)
Novick, F. D. (A)

Berwyn (CHI-5)
Benetka, K. E. (A)
Brazda, J. C. (M)
Cermak, C. W. (M)
Fanta, F. A., Jr. (M)
Glozer, A., Jr. (A)
Jarrette, V. (SM)
Johnston, R. H. (M)
King, C. N. (A)
Kovar, G. F. (M)
Long, J. F., Jr. (A)
Mares, G. J. (M)
Mickey, G. N. (A)
Mrazek, W. F. (M)
Niman, G. J. (M)
Prentiss, J. G. (SM)
Russ, W. E. (M)
Schimpf, R. G. (M)
Shemanske, R. (M)
Sladek, N. J. (A)
Valihora, S. M. (A)
Veverka, G. C. (M)
Vitous, J. P. (A)
Vokoun, R. C. (A)
Zboran, L. (A)

Bloomington (CHI-5)
Moulic, W. E., Jr. (M)
Schweikert, W. R. (M)

Blue Island (CHI-5)
Damm, G. J. (A)
Lamcha, F. J. (A)

Bonfield (CHI-5)
Demmer, L. T. (A)

Broadview (CHI-5)
De Both, R. F. (A)
Gago, W. J. (A)
Gray, R. O. (SM)
Paillmard, J. W. (A)
Ross, H. M. (M)
Wood, R. D. (M)

Brookfield (CHI-5)
Blanchard, M. A. (A)
Collins, E. A. (M)
Davis, C. J. (A)
Foeste, W. E. (SM)
Holpuch, D. J. (M)
Miller, J. O. (A)

Calumet City (CHI-5)
Oprisko, A. F. (A)

Caseyville (SL-6)
Poston, H. J. (A)

Centralia (SL-6)
Fulton, D. S. (A)

Champaign (CHI-5)
Albright, W. G. (SM)
Brunn, K. R. (A)
Coleman, P. D. (M)
Harlan, J. R. (M)
Johnson, M. S. (M)
Kirkwood, A. D. (A)
Kreer, J. B. (A)
Leichner, G. H. (M)
Leifheit, S. E. (A)
Leone, J. M. (M)
Lo, V. T. (A)
Mayes, P. E. (A)
Meagher, R. E. (M)
Neal, J. P., III (M)
Nelson, A. W. (M)
Rumsey, V. H. (SM)
Sirkin, M. D. (A)
Skaperdas, D. O. (M)
Slottow, H. G. (M)
Smith, R. S. (M)
Suh, D. U. (A)
Wainscott, J. M. (M)
Zakhaim, M. (A)

Chanute AFB (CHI-5)
Palmer, L. N. (M)

Chester (SL-6)
Pyle, H. S. (A)
Rockwell, D. A. (A)

Chicago (CHI-5)
Abraham, J. (M)
Adamson, A. C. (A)
Addison, W. G. (M)
Adler, R. (F)
Affrunti, A. J. (M)
Ahring, F. E. (A)
Akerman, S. (A)
Allibone, F. L. (A)
Alspaugh, K. E. (A)
Ambos, C. (M)
Anderson, C. J. (M)
Anderson, D. L. (A)
Anderson, M. E. E. (A)
Anderson, R. C. (M)
Anderson, R. S. (A)
Anderson, T. W., Jr. (M)
Argall, G. J. (M)
Arndt, R. J. (M)
Arnow, C. L. (M)
Aronson, H. A. (M)
Arsem, A. D. (SM)
Attard, A. E. (A)
Austin, H. R. (M)
Backstrom, E. F. C., Jr. (A)
Balikov, M. H. (A)
Ban, G. R. (A)
Bard, R. E. (SM)
Barlow, J. T. (A)
Barrow, D. M. (A)
Bartimes, G. F. (A)
Basko, A. (A)
Bates, W. J. (M)
Baum, J. W. (A)
Bean, J. A. (A)
Becker, H. W. (M)
Beier, L. W. (M)
Beneke, E. H. (M)
Bennett, A. H. (M)
Bennett, G. T. (SM)
Berg, A. A. (M)
Berger, J. (SM)
Berkowitz, H. (A)
Bernat, L. (M)
Bialek, S. T. (M)
Biberman, L. M. (SM)
Biernat, W. M. (M)
Bihl, E. H. (A)
Blahna, C. (SM)
Blinoff, W., Jr. (A)
Blomberg, R. C. (A)
Bloomenthal, S. (M)
Bloomquist, L. A. (A)
Bluzat, C. R. (A)
Bodoh, A. G. (SM)
Bonny, M. S. (M)
Borg, A. N. (M)
Bormarth, D. M. (M)
Borovik, D. I. (M)
Borth, J. W. (M)
Bowen, J. L. (VA)
Boyd, G. M. (A)
Boyll, L. O. (A)
Brabec, R. J. (A)
Bracha, M. F. (A)
Branscome, E. O. (A)
Brant, L. D. (A)
Brauer, H. H. (SM)
Bristol, S. M. (M)
Brock, W. R. (M)
Brodkowicz, J. S. (M)
Brown, S. (SM)
Brown, L. E. (M)
Bruce, C. R. (M)
Brunsting, A. W. (A)
Buchholz, F. G. (M)
Buckler, R. A. (A)
Buckley, J. K. (A)
Bull, R. W. (M)
Burgwald, G. M. (M)
Burmeister, M. A. (M)
Buschke, H. A. (M)
Buzzard, C. R. (M)
Callanan, J. A. (SM)
Camillo, C. (SM)
Canning, T. B. (A)
Cappels, J. L. (SM)
Carlson, D. A. (A)
Carpenter, M. M., Jr. (M)
Carter, A. J., Jr. (A)
Carter, R. (A)
Carlson, G. I. (M)
Cederberg, R. D. (A)
Cesario, D. 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)
Choon, G. C. (A)
Christensen, R. T. (M)
Christensen, R. E. (M)
Chulsky, L. (M)
Cinelli, G., Jr. (M)
Claras, C. W. (M)
Clardy, L. (M)
Clark, D. E. (SM)
Clark, R. A., Jr. (M)
Clavier, P. A. (SM)
Cleveland, V. K. (A)
Cohen, L. M. (M)
Cohen, A. (SM)
Cohn, C. M. (A)
Cohn, G. I. (SM)
Cohn, J. (M)
Cololan, J. (A)
Conton, C. (A)
Contri, A. (A)
Conwell, M. E. (M)
Cook, R. H. (M)
Cord, J. H. (M)
Cortright, R. D. (M)
Costello, L. B. (M)
Coulter, W. H. (M)
Cox, C. R. (SM)
Craine, W. P. (M)
Crampton, G. W. (M)
Crites, A. B. (A)
Cromer, E. G. (M)
Cunningham, J. E. (A)
Currier, M. G. (M)
Cushman, E. A. (A)
Dahlin, E. K. (M)
Dalling, J. L. (A)
Dalleton, S. A. (A)
Daniels, H. B. (A)
Davidson, P. (A)
Decho, K. R. (M)
Deck, G. J. (A)
De Haan, J. (A)
Del Ciello, R. R. (A)
Del Vento, J. M. (M)
Demasy, J. (A)
Del Moraes, J. L. S. (M)
Dempsey, T. J. (A)
Dennis, R. J. (M)
De Rose, R. A. (M)
Desmares, P. C. J. (M)
Dezettel, L. M. (A)
Dickens, W. D. (A)
Dimmer, R. P. (SM)
Doland, G. D. (M)
Dolce, S. L. (M)
Donaldson, R. J. (SM)
Droxt, P. (A)
Du Chatellier, R. (M)
Duke, A. D. (M)
Du May, E. C. (A)
Duncan, C. W. (M)
Ebstein, B. (M)
Eisenberg, H. (A)
Ellett, A. (SM)
Ellis, C. O. (M)
Elsner, R. F. (A)
Elsgroth, M. J. (SM)
Endo, C. M. (A)
Enesa, O. M. (M)
Ensign, R. L. (A)
Epstein, M. (A)
Erlandson, P. M. (SM)
Ernst, E. W. (SM)
Faklis, J. J. (A)
Faulkner, A. H. (SM)
Faullin, R. R. (M)
Ferris, W. T. (VA)
Fetterman, D. M. (VA)
Fields, T. (SM)
Figel, W. G. (M)
Filips, R. P. (A)
Finley, G. E. (A)
Fischer, A. J. (A)
Fischer, J. (A)
Fisher, H. A. (SM)
Fisher, H. J. (A)
Fix, W. G. (M)
Flesher, G. T. (M)
Flocken, L. H. (SM)
Flower, W. (M)
Fluskey, C. J. (A)
Foecking, D. A. (M)
Foley, R. R. (A)
Fonte, G. (M)
Foss, H. (A)
Foster, G. E. (M)
Frank, R. B. (M)
Franklin, C. W. (M)
Franklin, H. B. (M)
Franklin, W. S. (SM)
Freeman, R. L. (SM)
Freymodsson, J. B. (A)
Friedman, E. (A)
Friedman, L. B. (M)
Fuglestad, R. K. (A)
Fujimoto, J. J. (A)
Fujimoto, K. K. (A)
Fukuhara, K. K. (A)
Funk, J. W. (A)
Galejs, J. (M)
Gallagher, F. H. (A)
Gamache, L. J. (SM)
Gardberg, J. (M)
Gassner, E. W. (A)
Gawel, E. W. (A)
Gayes, F. J. (M)
Gee, G. E. (M)
Gehmlich, A. P. (A)
Genovese, N. N. (A)
Gens, H. J. (M)
Gerber, H. L. (M)
Gerken, G. M. (M)
Germain, J. (SM)
Gershon, J. (SM)
Getter, C. M. (A)
Giacchetti, A. C. (M)
Gifford, G. D. (A)
Giolitto, A. P. (A)
Giertsen, E. J. (A)
Glentzer, K. V. (SM)
Glyptis, N. (A)
Godawski, T. J. (A)
Goggio, E. C. (SM)
Goldman, H. J. (A)
Goldstein, M. (M)
Goldsworthy, W. T. (A)
Goodrich, P. D. (M)
Gordon, F. (A)
Gottmer, G. W. (A)
Graf, A. W. (F)
Gray, D. (VA)
Greenberg, C. J. (M)
Greene, R. (M)
Greenebaum, E. N., Jr. (A)
Greenspan, P. (M)
Grossman, W. S. (A)
Gruen, H. E. (M)
Gruenich, G. J. (A)
Gudmundson, R. R. (A)
Guzzey, J. E. (M)
Haas, Z. A. (A)
Hallinton, L. (M)
Halligan, W. J. (A)
Hamilton, F. A. (M)
Hamre, H. G. (M)
Hanan, J. P. (A)
Hanberg, J. R. (A)
Hancock, J. R. (A)
Handler, J. E. (M)
Hanik, P. (M)
Hankin, R. B. (A)
Hansen, D. (A)
Hansen, W. H. (VA)
Harding, R. L. (A)
Hardy, H. C. (SM)
Harrigan, G. S. (SM)
Harris, E. F. (M)
Harvey, J. R. (M)
Harvey, S. C. (M)
Haslett, J. W. (M)
Hassel, K. E. (SM)
Hassler, E. B. (SM)
Hay, E. (A)
Hayes, H. D. (SM)
Haynes, J. G. (A)
Heal, E. (M)
Hedvig, T. L. (M)
Henkle, H. H. (A)
Happner, D. R. (M)
Hercher, E. J. (A)
Hessler, W. G. (M)
Higgins, D. P. (A)
Higgins, P. W. (A)
Hill, R. G. (A)
Himes, S. F. (A)
Himmel, I. (A)
Himmelstein, S. (M)
Hiraiwa, D. S. (A)
Hjermstad, H. (VA)
Hoffman, H. E. (M)
Hoffman, S. (M)
Holley, M. V. (M)
Holonyak, N., Jr. (A)
Holpuch, C. J. (M)
Holubow, H. (M)
Homer, W. F. (M)
Hooper, W. D. (A)
Horde, J. W. (A)
Horl, S. (A)
Horn, L. H. (SM)
Hovinen, R. W. (M)
Howe, J. K. (M)
Hunt, G. J. (A)
Huston, F. D. (A)
Hynes, E. A. (M)
Ihde, W. M. (SM)
Imerson, H. E. (A)
Indra, J. J. (A)
Ingram, C. (A)
Innman, J. F. (SM)
Isenson, R. S. (M)
Iverson, F. A. (M)
Iwaoka, I. S. (M)
Jablonski, R. E. (A)
Jackson, J. (A)
Jacob, F. N. (SM)
Jacobsen, I. (A)
Jacobsohn, D. H. (A)
Jacobson, L. (M)
Jager, G. E., Sr. (A)
Jahnigen, F. W. (A)
Jauniskis, K. P. (M)
Jeschke, D. R. (M)
Johnson, H. A. (A)
Jones, A. H. (A)
Jones, A. H. (A)
Jones, T. L. (M)
Jurriaans, B. (A)
Kale, G. W. (A)
Kamys, J. E. (A)
Kane, J. R. (M)
Kantner, H. H. (M)
Kapoun, R. (M)
Kapteyn, P. (A)
Karantzis, J. (A)
Karow, K. A. (A)
Karr, R. J. (A)
Katzer, D. L. (A)
Kazel, S. (A)
Kehm, C. H. (M)
Keller, W. P. (A)
Kelly, E. P., Jr. (M)
Kelly, J. J. (M)
Kelsey, L. C. (A)
Kemnitz, W. F. (A)
Kendron, J. H. (M)
Kennedy, J. P. (SM)
Kennedy, J. A. (M)
Kenney, I. W. (SM)
Kiefer, J. C. (SM)
Kietzer, J. E. (A)
Kilburn, A. (M)
Kingwill, H. S., Jr. (A)
Klapperich, A. J. (M)
Kloga, P. J. (M)
Kmiec, W. J. (A)
Koerner, F. A. (SM)
Kohn, E. B. (M)
Kolberg, E. G. (M)
Kortright, F. U. (A)
Kott, W. O. (SM)
Kotter, A. S. (A)
Kowlta, A. E. (SM)
Kowoln, G. J. (A)
Kraitsik, N. I. (A)
Krakora, J. J., Jr. (SM)
Kravitz, S. (A)
Krc, P. S. (A)
Krefft, H. H. (M)
Krehbiel, K. O. (M)
Kroll, J. (A)
Kretenansky, J. S. (A)
Krueger, R. M. (SM)
Krueger, W. F. (M)
Kulosa, A., Jr. (A)
Kundrotas, A. P. (A)
Kuniyuki, R. M. (M)
Kurlinsky, J. S. (M)
Kusack, W. P. (A)
Kutrumanes, C. P. (A)
Kvitek, K. L. (A)
Lakowski, F. A. (M)
Lambrou, C. (A)
Lamons, R. P. (A)
Lang, H. K. (A)
Langstaff, R. H. (M)
Lapin, S. P. (SM)
Larsen, K. W. (A)
Larson, R. J. (M)
Larson, W. L. (SM)
Leatherman, J. E. (A)
Leedy, H. A. (SM)
Leitich, A. J. (M)
Lencioni, C. C., Jr. (A)
Lenehan, J. M. (A)
Lenox, W. S. (A)
Leonhardt, J. O. (M)
Leopold, L. (M)
Lesko, L. W. (M)
Lesnick, R. N. (SM)
Levadi, V. S. (M)
Levandis, J. J. (A)
Levi, J. S. (M)
Levine, J. (A)
Levine, M. B. (A)
Lewin, N. L. (A)
Lewis, W. A. (SM)
Leyanth, W. O. (A)
Liberman, A. (SM)
Liepold, R. B. (M)
Link, A. W. (A)
Luecke, G. N. (M)
Lundberg, E. J. (M)
Luttgens, H. C. (SM)
Ma, J. Y. (A)
Malinowski, S. (M)
Mangold, R. R. (A)
Mansfield, R. (M)
Marable, H. E. (M)
Margala, A. J. (M)
Marinakos, L. C. (A)
Markarian, M. V. (A)
Marshall, B. O., Jr. (M)
Marsland, H. W. (A)
Marszalek, H. L. (A)
Martin, C. B. (SM)
Martini, R. G. (M)
Martin, W. S. (M)
Marx, A. C. (M)
Marx, A. F. (M)
Masters, E. W. (SM)
Mateja, E. V. (A)
Matthews, L. E. (M)
May, R. L. (A)
Maximoff, B. S. (M)
McCarrell, S. G. (M)
McClelland, W. B. (M)
McDonnell, J. P. (A)
McDougall, D. S. (M)
McGrail, J. G. (A)
McManus, J. E. (M)
Meagher, E. (M)
Meehan, E. L. (A)
Meisner, E. J. (M)
Messinger, H. P. (M)
Meuer, A. (M)
Meyer, A. (A)
Meyers, F. (A)
Mikos, E. J. (M)
Miller, C. G. (A)
Miller, C. H. (M)
Miller, E. L. (M)
Minkus, F. (M)
Mitchell, F. R. (M)
Mitchell, L. W. (M)
Mitchell, R. M. (A)
Mitchell, T. (A)
Mittelmann, E. (F)
Miyasaki, J. K. (A)
Moga, J. (A)
Molnar, L. (SM)
Molyneaux, R. J. (A)
Moon, R. J. (SM)
Morgan, G. M. (M)
Morris, L. P. (VA)
Mueller, E. L. (M)
Mueller, F. (M)
Mueller, R. W. (M)
Munn, R. J. (A)
Murnick, A., Jr. (M)
Murphy, L. J. (M)
Murphy, C. (A)
Myers, W. D. (A)
Myse, A. G., Jr. (A)
Nail, J. J. (SM)
Nakata, C. (SM)
Neben, H. M. (SM)
Nelson, J. E. (SM)
Nerwin, H. N., Jr. (M)
Neumark, J. (A)
Newman, J. (A)
Niederman, B. (SM)
Nierman, L. G. (M)
Niklas, W. F. (M)
Noble, D. E. (F)
Noble, D. G. (A)
Novak, J. F. (M)
Obog, L. F. (M)
O'Brien, E. (VA)
O'Connor, J. F., Jr. (A)
Offner, F. (SM)
O'Grady, J. J. (M)
Oldfield, R. L. (A)
Olshan, S. (M)
Olson, C. L. (A)
Olson, G. A. (A)
O'Neill, R. M. (M)
Orr, B. B. (A)
Owen, A. (M)
Padva, P. D. (A)
Palm, H. A., Jr. (M)
Panec, G. A. (SM)
Pankos, J. F. (A)
Pape, L. W. (A)
Paraliise, M. E. (SM)
Parchim, N. J. (M)
Park, G., Jr. (M)
Parker, G. S. (A)
Parkinson, L. (M)
Pavela, H. W. (M)
Pawlus, J. (M)
Peach, L. C. (A)
Pedersen, M. (M)
Pennella, M. O. (A)
Petersen, R. P. (SM)
Peterson, C. D. (M)
Peth, R. (A)
Petzing, E. W. (M)
Pfaff, R. (SM)
Phinney, T. W. (A)
Pipes, C. P. (A)
Pinnell, R. M. (A)
Plait, A. (M)
Plamondon, A. D., Jr. (SM)
Plus, L. (M)
Podlusky, M. V. (SM)
Pohl, R. G. (SM)
Pollack, H. (M)
Popp, J. V. (M)
Potocki, E. A. (M)
Powell, C. S. (M)
Powell, J. M. (A)
Prince, R. T. (M)
Proctor, D. E. (A)
Pryat, T. S. (M)
Pshaenich, A. L. (M)
Puldak, H. (A)
Purvis, M. T. (A)
Quateman, M. H. (SM)
Quinn, B. O. (A)
Quinn, J. L. (M)
Rabowsky, I. (M)
Race, R. (A)
Radcliffe, A. J., Jr. (A)
Raemer, H. R. (M)
Rahmel, H. (SM)
Ramires, L. (A)
Rasins, W. L. (A)
Ratliff, C. D., Jr. (A)
Rattray, A. I. (M)
Rauscher, W. I. (A)
Read, C. T. (M)
Rebeschini, I. C. (M)
Redfield, S. I. (A)
Rees, W. L. (M)
Reichart, E. C. (M)
Reiling, G. E. (M)
Reinhold, W. D. (A)

Rekowski, M. J. (A)
Rennick, J. L. (SM)
Rett, H. C. (M)
Ribner, M. (M)
Rice, L. (A)
Rice, P. (A)
Richter, F. A. (M)
Riddel, O. A. (VA)
Robertson, M. A. (M)
Robins, H. M. (A)
Rockwood, C. C. (A)
Rodriquez, A. E. (VA)
Roenitz, R. K. (A)
Rogers, G. F. (SM)
Rohr, W. E. (M)
Ronning, H. (A)
Rosanes, A. P. (M)
Roschke, E. M. (SM)
Rose, J. K. (M)
Rosencranz, R. (M)
Ross, E. H. (SM)
Ross, K. B. (VA)
Rossetti, A. (A)
Rossi, C. V. (M)
Roth, T. A. (A)
Rotter, A. (A)
Rounsaville, G. D. (M)
Rous, W. H. (A)
Rowe, C. R. (SM)
Rowe T. L. (SM)
Roszkowski, G. J. (A)
Rubinfien, D. (M)
Rusnak, M. (M)
Ryan, L. J. (M)
Rymas, S. J. (A)
Saffro, Y. L. (M)
Saltzberg, T. (A)
Sances, G., Jr. (A)
Sandimaitis, E. (A)
Savage, L. E. (M)
Saxe, R. E. (A)
Scardina, V. (A)
Scharding, R. M. (M)
Schinski, D. L. (A)
Schlesinger, W. A. (M)
Schlueter, A. W. (A)
Schmans, R. H. (A)
Schmidt, M. A. (A)
Schmidt, W. E. (A)
Schranz, R. J. (M)
Schrot, E. H. (SM)
Schulz, R. (A)
Schulz, R. H. (M)
Schur, R. C. (M)
Schurak, K. M. (M)
Schwartz, B. S. (A)
Schwartz, J. (A)
Schwarzenbach, E. E. (M)
Sclaky, A. M. (M)
Segal, A. A. (M)
Shaffer, C. W., Jr. (A)
Shallcross, G. F. (M)
Shapira, F. M. (M)
Shapiro, E. B. (A)
Shapiro, L. (A)
Shea, G. J. (M)
Shevlick, F. (M)
Shonerock, R. C. (M)
Shulman, A. (M)
Shutock, J. (A)
Steinkelwicz, S. V. (M)
Sieth, H. P. (M)
Siff, A. W. (A)
Silberbauer, J. A. (A)
Silberg, S. (M)
Sinclair, D. C. (A)
Sivin, L. (A)
Skrip, E. D. (A)
Sloan, A. C. (A)
Slugoizki, K. (VA)
Slusser, W. S. (A)
Smith, R. H., Jr. (M)
Smithana, D. R. (M)
Smoots, C. W. (M)
Solfert, M. L. (M)
Sokolov, J. (A)
Solomon, J. L. (SM)
Soma, R. (M)
Soria, R. M. (SM)
Soufal, F. H. (A)
Spano, A. (A)
Splaak, G. C. (A)
Spitz, H. (A)
Spliff, F. G., Jr. (A)
Sprayberry, F. L. (VA)
Stadler, R. (A)
Stan, J. (A)
Staral, R. (A)
Stauverman, R. J. (A)
Steen, W. J. (SM)
Steinberg, E. E. (A)
Steinberg, P. S. (M)
Stemm, R. E. (M)
Stenerson, C. K. (M)
Stengel, C. W. (A)
Stern, M. (M)
Sternlicht, L. (M)
Stettler, C. O. (A)
Stone, C. H. (SM)
Stone, R. S. (A)
Stonevic, V. R. (M)
Suson, I. (A)
Sussman, M. (A)
Suzuki, E. (A)
Swain, J. E., Jr. (A)
Swan, L. L. (A)
Swanson, W. G. (A)
Swanstrom, N. C. (A)
Swenson, K. A. (A)
Swinyard, W. O. (F)
Switzenberg, E. A. F. (M)
Sydejko, J. F. (A)
Szeghy, C. S. (F)
Tarlo, S. T. (A)
Tanner, D. J. (A)
Teler, H. (M)
Tempka, J. A. (A)
Tesilk, J. A. (M)
Thomas, C. B. (A)
Thomas, G. E. (M)
Thompson, J. E. (M)
Thompson, O. I. (M)
Thurston, E. G. (M)
Timmings, G. H. (SM)
Tlapa, J. A. (M)
Todd, S. R. (SM)
Tong, F. F. (M)
Toy, T. G. (A)
Trimarco, F. J. (A)
Trittenbach, J. M. (SM)
Tsao, P. V. S. (M)
Turner, J. M. (A)
Tutle, E. G. (A)
Uelsmann, W. G. (A)
Uhl, M. H. (A)
Unger, E. E. (M)
Upadhyaya, S. P. (M)
Urban, R. F. (A)
Uyeda, M. M. (M)
Uyetani, B. (M)
Vaccaro, A. C. (A)
Valcik, L. (A)
Vanderwerf, J. L. (A)
Van Zeeland, W. A. (M)
Varone, R. A. (SM)
Verbanec, W. R. (M)
Vernon, R. R. (M)
Viskantu, V. Z. (M)
Vitt, R. J. (A)
Vlach, G. (A)
Von Pahlen-Fedoroff, G. (A)
Vuchetich, J. B. (A)
Whitmer, M. H. (A)
Yahalom, Y. (M)
Wajda, J. F. (M)
Wakabayashi, G. J. (M)
Walding, E. C. (M)
Walker, L. G. (SM)
Wallin, G. (M)
Waltman, E. J., Jr. (M)
Walsh, T. J. (A)
Warnke, G. F. (M)
Warren, W. H. (M)
Watkins, D. M. (A)
Wayne, H. A. (SM)
Waslo, C. J. (A)
Webb, E. M. (A)
Weber, L. J. (SM)
Weber, L. L. (VA)
Webstg, K. H. (M)
Weinberg, M. (A)
Weisberg, A. M. (A)
Weise, D. (A)
Weisenburger, F. M. (M)
Weishar, W. J. (M)
Weissman, R. M. (SM)
Welker, J. J. (M)
Wellestad, C. E. (A)
Weninger, F. L. (M)
Wexler, J. S. (M)
Whinna, E. W. (A)
Whitmore, R. C. (A)
Whitney, S. D. (A)
Wickline, B. D. (M)
Wiecek, E. J. (M)
Wiedro, S. B. (A)
Williams, J. (M)
Winner, B. A. (M)
Witte, T. H. (M)
Wittkop, C. F. (A)
Wlassow, S. (M)
Wolfe, F. R., Jr. (SM)
Wolff, J. R. (M)
Wolken, L. L. (M)
Wollack, N. J. (M)
Wood, C. (M)
Woodruff, A. E. (M)
Woods, A. A. (VA)
Wray, P. G. (A)
Yefsky, S. A. (M)
Yuen, P. C. (M)
Zaida, W. L. (A)
Zilis, G. S. (M)
Zimbler, F. B. (M)
Zimmerman, D. A. (A)
Zitkus, A. J. (A)
Zurick, V. J. (M)
Zusman, D. (A)

Chicago Heights (CHI-5)
Easterwood, H. W., Jr. (A)
Stead, K. G., Jr. (A)

Cicero (CHI-5)
Duhauskas, S. (M)
Hajek, A. F. (M)
Herling, D. L. (M)
Jezek, J. E. (A)
Julius, S. W. (M)
Nielsen, M. I. (M)
Padgett, W. J. (A)
Pecina, R. J. (M)
Romanelli, J. (M)
Slad, G. F. (M)
Tanana, E. J. (M)
Wein, F. (A)

Clarendon Hills (CHI-5)
Casey, P. J. (A)
Dawson, J. W. (A)
Everitt, B. W. (M)
Hargis, R. N. (M)
Hessler, O. G. (SM)
Knox, J. G. (M)
Marks, M. (SM)
Sayles, H. L. (A)
Silberg, W. F. (M)

Collinsville (SL-6)
Bakula, T. W. (A)
Roschke, T. H., Jr. (A)
Sobotka, H. J. (A)

Crete (CHI-5)
Clements, L. D. (M)
Russell, J. W. (A)

Crystal Lake (CHI-5)
Falk, B. (A)
Friend, H. H. (SM)
Hawkins, B. C. (M)
Hupp, C. E. (A)
Smith, G. B. (A)

Danville (CHI-5)
Booth, R. C. (M)
Furst, U. R. (M)

Decatur (CHI-5)
Abfalter, H. F. (SM)
Andrasak, J. W. (A)
Cupp, E. W. (M)
Enthauer, G. H. (SM)
Koenig, H. G. (A)
Sarikas, R. H. (M)

Deerfield (CHI-5)
Clough, K. (VA)
Phillips, W. E. (M)

Des Plaines (CHI-5)
Adams, E. C. (A)
Beeson, W. E. (A)
Boyd, D. M., Jr. (SM)
Brooks, W. L. (M)
Bushman, S. F. (M)
Carr, R. W. (A)
Collins, F. V. (SM)
Coolidge, J. E. (M)
Doering, J. H., Jr. (A)
Gardner, B. H. (M)
Githens, T. A. (SM)
Henrich, C. A. (A)
Himebrook, F. C. (M)
Lassila, A. A. (A)
Lauffenburger, H. A. (A)
Loughran, R. H. (A)
Marco, F. (SM)
McDonald, W. H. (M)
Meyers, K. W. (M)
Naslund, R. S. (VA)
Otto, F. W. (A)
Payne, R. A. (A)
Revor, R. J. (M)
Stanonis, A. F. (M)
Smith, P. A. (A)
Steele, A. J. (M)
Sundt, E. V. (SM)
Swanson, C. R. (M)
Utter, R. A. (A)

Dixon (CR-5)
Albright, L. E. (A)

Dolton (CHI-5)
Jezewski, J. E. (M)

Downers Grove (CHI-5)
Bateman, L. A. (A)
Brookshier, W. K. (M)
Cape, H. J. (A)
Courchene, H. R. (SM)
Eddy, W. L. (M)
Fitzsimmons, W. L. (A)
Goertz, R. C. (M)
Harder, R. R. (M)
Hess, D. C. (M)
Johnson, A. R. (A)
Kampf, H. A. (SM)
McDonell, W. J. (SM)
Miller, E. A. (SM)
Peckhart, M. A. (M)
Richards, H. K. (VA)
White, R. F. (M)
Wood, R. E. (SM)

Dwight (CHI-5)
Seabert, F. (A)

East St. Louis (SL-6)
Barnard, G. E. (M)
Joseph, E. L. (A)
Mutchek, J. H. (A)
Naseef, P. (A)
Wise, H. G. (SM)

Effingham (SL-6)
Delong, W. A. (A)

Elgin (CHI-5)
Chodl, C., Jr. (A)
Crago, P. H. (M)
Eme, K. J. (A)
Frankel, S. K. (A)
Irelan, H. F. (M)
Kercher, M. K. (A)
Kohout, R. J. (A)
Lang, G. W. (M)
Peterson, E. K. (SM)
Soper, G. T. (A)
Walters, P. M. (A)

Elmhurst (CHI-5)
Aberer, J. C. (M)
Anderson, W. J. (A)
Arnold, G. G. (A)
Bajars, E. (A)
Beaver, F. A. (A)
Beck, V. R. (SM)
Beier, M. G. (SM)
Berg, H. (M)
Block, A. F. (M)
Bockelheide, A. W. (A)
Burrichter, L. L. (A)
Canfield, H. H. (A)
Chelgren, A. E. (SM)
Cox, B. O. (A)
Curry, A. A. (SM)
Davis, J. (SM)
De Shong, J. A., Jr. (SM)
Deterville, R. J. (M)
De Vries, A. (M)
Disney, V. H. (SM)
Fink, J. G. (M)
Foot, N. J. (M)
Geib, R. L. (M)
Gula, H. E. (M)
Gurtz, V. J. (M)
Hissong, A. L. (M)
Holliday, T. B. (A)
Horsch, J. R. (A)
Kasmar, R. A. (M)
Kearney, L. E. (M)
Keranen, E. W. (M)
Kroger, M. G. (M)
La Taste, G. D. (A)
Liston, K. L. (A)
Marshall, F. R. (A)
McGee, C. G. (M)
Nettiflee, G. R. (M)
Peltegrew, J. B. (A)
Probeck, C. (SM)
Ramler, W. J. (M)
Ronzheimer, S. P. (SM)
Russell, W. W. (M)
Sandberg, E. L. (M)
Schultz, C. J. (M)
Smith, L. L., Jr. (A)
Starek, R. A. (M)
Swisher, C. F. (M)
Thanos, H. (M)
Thielen, L. R. (A)
Torode, S. W. (A)
Troesl, R. E. (A)
Vogt, A. L. (M)
Von Frestersdorf, G. C. (A)
Webster, S. K. (M)
Williams, J. T. (M)
Winemiller, H. R. (M)

Elmwood Park (CHI-5)
Balsamello, J. (M)
Beischel, J. R. (A)
Coon, W. R. (A)
D'Orio, A. F. (A)
Griffith, F. W., II (M)
Hilbert, F. H. (M)
Lindeman, R. J. (A)
Pakan, J. J. (M)
Parmet, B. S. (SM)
Wurzburger, R. R. (M)

Elwood (CHI-5)
Black, A. M. (M)

Evanston (CHI-5)
Aagaard, J. S. (A)
Beam, R. E. (F)
Bennett, R. E. (M)
Berceaw, O. M., Jr. (M)
Brown, A. C. L. (M)
Busch, A. E. (M)
Childe, A. F. (M)
Christian, H. S. (M)
Clark, J. T. (SM)
Cozzens, W. B. (SM)
Crimp, J. G. (SM)
Crossley, (SM)
Cudahy, M. J. (M)
Deal, H. B. (SM)
Diederichs, J. K. (A)
Dirsa, E. F. (M)
Flan, A. (M)
Frank, W. K., Jr. (A)
Goodrich, E. W. (A)
Gregory, E. C. (SM)
Haase, J. A. (M)
Hammond, C. R. (M)
Hollander, A. (M)
Hooper, P. B. (A)
Horwitz, S. J. (M)
Hunter, T. C. (M)
Huxtable, C. K. (SM)
Jenness, R. R. (SM)
Jones, R. W. (SM)
Kalman, J. (M)
Kao, L. (M)
King, G. A., Jr. (A)
Lanphere, J. E. (A)
Lyon, J. A. M. (SM)
Maltby, A. J. (A)
Needle, J. S. (M)
Noges, E. (M)
Nolte, L. W. (M)
Orner, R. J. (M)
Peugh, W. E. (M)
Pickering, T. A. (A)
Potter, J. D. (A)
Prell, G. A. (A)
Prince, M. B. (SM)
Randlev, P. L. (A)
Rockwood, C. H. (M)
Rollefson, K. E. (SM)
Saberson, C. J. (A)
Sabin, E. R. (A)
Shure, S. N. (M)
Stewart, C. H., II (SM)
Thacher, L. A. (A)
Toth, W. S. (M)
Vanlemmond, H. K. (A)
Van Ness, J. E. (SM)
Voss, C. H., Jr. (M)
Ziegler, G. E. (SM)

Evergreen Park (CHI-5)
Goedeke, R. C. (M)
Hirsch, A. (A)
Kostyal, S. P. (M)

Fairbury (CHI-5)
Eilers, C. G. (M)

Flossmoor (CHI-5)
Caywood, T. E. (M)

Forest Park (CHI-5)
Armes, C. F. (M)
Easick, R. C. (SM)
Grove, R. (SM)
Hrbek, G. W. (A)
Olson, E. L. (M)

Fort Sheridan (CHI-5)
Sneddon, J. H. (M)

Fox Lake (CHI-5)
Johnson, G. A. (M)

Franklin Park (CHI-5)
Brewster, F. C. (SM)
Brockett, D. F. (A)
Brumbach, J. F. (M)
Lucas, D. T. (M)
Passow, L. F. (A)
Reges, A. (A)
Schlote, R. H. (A)
Schoeneck, W. H. (A)

Freeport (CHI-5)
Barker, V. S. (SM)
Coleman, J. J. (M)
Ebert, F. C. (M)
Greene, K. D. (A)
Harden, O. C. (A)
Lincoln, J. R. (A)
O'Connell, G. (VA)
Wincovitch, D. (A)

Geneva (CHI-5)
Junkins, A. H. (M)
Prescott, F. H., Jr. (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)
Miller, H. N. (M)
Spiegel, G. W. (M)

Glen Ellyn (CHI-5)
Christensen, A. (M)
Cisne, L. E. (M)
Harris, B. J. (A)
Kidd, W. E. (SM)
Kleker, J. H. (A)
Knowles, H. S. (F)
Krieg, B. E. (M)
Lincicome, J. R. (SM)
Managan, W. W. (M)
Mohler, R. D. (A)
Pozdol, A. J. (M)
Shelton, E. D. (M)
Tingley, E. M., Jr. (M)
Whiteside, J. R. (A)
Woolsey, R. J. (M)

Glenview (CHI-5)
Burns, G. K. (VA)
Byrnes, W. P. (M)
Casciotti

ILLINOIS

Joliet (CHI-5)
Novy, J. F. (SM)
Sperelakis, P. (M)
Szegda, A. (M)
Whalen, J. P. (M)

Kankakee (CHI-5)
Cyrier, L. A. (A)
Palermo, P. A. (A)
Shumaker, M. J. (A)

Kansas (CHI-5)
Lacy, L. V. (SM)

La Grange (CHI-5)
Allen, H. E. (SM)
Brodie, G. H. (M)
Hagey, W. C. (SM)
Hemminger, D. H. (M)
Kikta, J. M. (A)
Knouf, R. J. (SM)
Medill, J. W. (M)
Miller, J. M. (SM)
Read, R. A., Jr. (M)
Schlesinger, K. (F)
Schulz, E. H. (SM)
Snelling, E. A. (SM)
Unroe, J. L. (A)

La Grange Highlands (CHI-5)
Lubin, M. (M)

La Grange Park (CHI-5)
Burtness, R. W. (SM)
Frihart, H. N. (M)
Prokes, P. H. (M)
Vogele, F. C. (A)
Bouska, J. F. (A)
May, F. D. (M)
Orwin, R. J. (M)
Wehrle, R. (A)
Whitelaw, A. J. (A)

Lake Bluff (CHI-5)
Glasel, W. B. (A)
Johansen, E. L. (A)
Kramer, A. W. (M)
La Rose, A. P. (M)

Lake Forest (CHI-5)
Barrett, A. M., Jr. (M)
BeekVonPeccoz, S.G.W.(M)
Byrne, W. C., Jr. (M)
Faulks, H. R. (M)
Gallitz, R. J. (A)
Samelson, L. R. (A)

Lake Villa (CHI-5)
Schultz, J. E., Jr. (A)

Lake Zurich (CHI-5)
Ives, R. D. (M)

Lansing (CHI-5)
Brunke, R. E. (A)
Burdeau, J. R. (A)

La Salle (CHI-5)
Kobold, J. W. (A)

Lebanon (CHI-5)
King, C. B. (M)
Moore, R. W. (A)

Lemont (CHI-5)
Brar, S. S. (M)
Brill, T. (SM)
Connor, D. W. (M)
Frigerio, N. A. (A)
Glover, D. (M)
Lovoff, A. (SM)
Mochizuki, K. (A)

Lensburg (SL-6)
Mueller, R. P. (M)

Libertyville (CHI-5)
Bottorff, P. A. (M)
Bruna, R. F. (M)
English, W. C. (M)
Welrich, H. P. (A)

Lincoln (CHI-5)
Waters, J. I. (M)

Lincolnwood (CHI-5)
Dervishian, E. (M)
Fenton, M. J. (A)
Goldfine, S. M. (SM)
Herst, R. J. (M)
Kaluzna, I. J. (M)
Reynolds, P. J. (A)
Roberts, E. A. (SM)
Unick, J. (M)
Waterman, H. C. (M)

Lisle (CHI-5)
McMahon, D. W. (A)
Yeoman, S. J. (A)

Lombard (CHI-5)
Addy, J. R. (M)
Austin, G. E. (M)
Bartha, S. J. (A)
Berry, R. E. (M)
Borchardt, R. L. (M)
Caldwell, J., Jr. (SM)
Canell, G. F. (A)
Carney, D. A. (M)
Curtis, R. H. (A)
Doerner, R. C. (A)
Dunbar, E. A. (A)
Fyler, G. W. (SM)
Grimalla, A. G. (M)
Grisanti, J. L. (A)
Gronemeier, H. J. (A)
Gunn, D. L. (A)
Hotchkiss, C. S. (M)
Jackson, W. C. (SM)
Laub, R. W. (A)
Lomasney, J. M. (SM)
Martino, L. J. (A)
Mattingly, L. J. (A)
McCreary, H. J. (SM)
Patrick, W. S. (SM)
Pomon, J. D. (M)
Puhalski, D. (A)
Sebastian, R. W. (A)
Slayton, R. D. (SM)
Smith, G. R. (A)
Tschannen, R. F. (SM)
Williams, P. B. (SM)
Witt, C. E. (M)

Lyons (CHI-5)
Albert, A. A. (A)

Marengo (CHI-5)
Arnold, R. M. (VA)
Lewis, H. A. (A)
Parnell, R. A. (A)

Marion (SL-6)
Kenyon, F. R. (M)

Marissa (SL-6)
Church, C. J. (M)

Mascoutah (SL-6)
Harbison, J. L. (M)
Levesque, J. J. (A)

Matteson (CHI-5)
Feehery, J. T. (A)

Maywood (CHI-5)
Del Canno, S. M. (M)
Forst, P. P., Jr. (M)
Hale, G. R. (A)
Komm, P. M. (VA)
Laube, W. C., Jr. (A)
Little, T. P. (M)
Mages, L. J. (M)
Richards, H. F. (A)

McHenry (CHI-5)
Carver, R. L. (M)
Palmer, F. J. (M)

Melrose Park (CHI-5)
Bachhuber, R. A. (M)
Backman, K. E. H. (A)
Carson, G. B. (A)
Early, J. M. (A)
Eckmann, L. G. (A)
Fetzner, R. W. (M)
Fligel, F. J. (A)
Jaster, D. R. (A)
McNabb, L. A. (SM)
Meyer, R. B. (A)
Nemcek, G. M. (A)
Pape, A. E. (A)
Rutka, E. P. (M)
Sorensen, E. M. (M)
Whitman, R. L. (A)
Wolf, J. P. (A)
Zimmerman, J. (M)

Metropolis (EO-5)
Chick, D. R. (M)

Mokena (CHI-5)
Bock, E. G. (M)
Collins, L. R. (A)

Moline (CR-5)
Johannes, R. P. (M)
Parkhurst, J. E. (A)
Steffes, R. M. (A)

Monee (CHI-5)
Turner, J., Jr. (VA)

Monmouth (CHI-5)
Ekblaw, W. E., Jr. (M)

Morrison (CHI-5)
Harrington, D. J. (M)
Van Oadel, R. L. (M)

Morton Grove (CHI-5)
Ackerman, N. A. (M)
Axelrod, L. R. (M)
Azelickis, A. N. (A)
Buri, F. J. (M)
Burns, R. P. (A)
Dal Corobbo, B. V. (M)
Gould, E. (A)
Langer, W. W. (M)
Neukucknitz, A. (A)
Rahnert, R. G. (A)
Trowbridge, P. (A)
Weber, J. P., Jr. (M)

Mt. Prospect (CHI-5)
Bastian, E. (A)
Berg, H. O. (A)
Bernin, V. M. (M)
Goldstein, R. (M)
Halverson, S. L. (M)
Huber, R. H. (M)
Kennedy, J. D. (A)
Krempel, F. M. (M)
Mac Askill, R. B., Jr. (SM)
Mann, R. W. (A)
Medal, R. J. (M)
Mokate, C. M. (M)
Prohaska, D. (M)
Ralph, J. T. (M)
Schumacher, J. H. (SM)
Weill, A. E. (M)

Mt. Vernon (SL-6)
Howell, J. E. (M)

Mundelein (CHI-5)
Chudd, R. G. (M)
Mitchell, C. A. (M)
Musal, H. M. (A)
Nation, J. E. (A)
Nienaber, F., Jr. (M)
Pacholke, F. (SM)

Naperville (CHI-5)
Bouwman, B. J. (M)
Pancher, J. R. (M)
Hayworth, D. P. (SM)
Johnson, M. C. (M)
Myers, J. J. (SM)

Neoga (SL-6)
Carruthers, C. M. (A)

Niles (CHI-5)
Barrick, W. E. (M)
Borman, W. M. (A)
Bourget, J. A. (M)
Brugliera, F. A. (A)
McMullen, C. W. (A)
Pulles, J. H. (SM)
Tappan, P. W. (M)

Normal (CHI-5)
Ewald, E. R. (M)
Johnston, J. L. (M)

North Aurora (CHI-5)
Mellvaine, O. T. (A)

Northbrook (CHI-5)
Amdursky, M. E. (A)
Cohen, C. B. (M)
Conway, P. W. (A)
De Liban, R. (M)
Grunwald, R. (M)
Hill, C. F. (A)
Hoffman, R. V., Jr. (M)
Knackstedt, G. (A)
Pospisil, J. F. (A)
Shapiro, M. D. (M)
Sherrick, D. C. (M)
Story, H. O. (M)
Theisinger, L. P. (A)
Waller, E. E. (M)

North Chicago (CHI-5)
Harris, H. E., Jr. (M)
Hudson, T. B., Jr. (A)

Northfield (CHI-5)
Clark, R. V. (M)
Fender, F. G. (A)
Green, L. F. (A)
Jones, A. H. (M)

North Lake City (CHI-5)
Cawthon, F. F. (M)
Rathbun, F. R., Jr. (M)
Dolhar, J. L. (A)
Romano, S. S. (A)

North Riverside (CHI-5)
Laban, J. (M)
Sklom, G. M. (A)

Norwood Park (CHI-5)
Conke, K. R. (A)

Norwood Park Twp. (CHI-5)
Casey, E. A. (A)
Correia, F., Jr. (A)
Wisnowski, W. C. (A)

Oak Lawn (CHI-5)
Blevins, E. L. (A)
Hansen, L. H. (M)
Harnew, F. R. (A)
Hultberg, R. M. (M)
Kasper, F. S. (M)
Marsh, E. N. (M)
Martin, R. B. (A)
Montoya, J. R. (A)
Sukup, J. P. (M)

Oak Park (CHI-5)
Alliot, E., Jr. (M)
Anderson, C. M. (A)
Armstrong, M. M. (M)
Badger, A. H. (A)
Bauer, B. B. (A)
Beane, E. A. (M)
Beggs, W. C. (A)
Beltz, R. E. (M)
Benzuly, H. J. (M)
Bryan, R. H. (M)
Carroll, P. F. (M)
Cotsworth, A., III (SM)
Davis, R. H. (M)
Duffy, E. J. (M)
Dunlap, J. F. (M)
Fitch, W. M., Jr. (M)
Forkens, P. (A)
Goebel, E. S. (M)
Gooch, M. W. (M)
Graziano, V. (SM)
Hartley, R. L. (A)
Hecht, R. K. (M)
Hoinke, T., Jr. (M)
Jann, E. G. (M)
Jeffery, T. H. (M)
Larson, K. P. (M)
Le Baron, F. (M)
Leiner, F. C. (A)
Linell, C. S. (A)
Maier, R. H. (SM)
Marsh, W. F. (A)
Martin, J. W., Jr. (M)
May, H. E. (SM)
Mchaffey, W. R. (SM)
Miller, R. E. (M)
Morawetz, F. (M)
Oddason, I. G. (A)
Peterson, R. M. (M)
Pye, H. C. (VA)
Robinson, D. E. (A)
Rypkema, I. N. (SM)
Sinninger, D. V. (SM)
Smith, A. P. (A)
Sprunger, R. W. (M)
Staunton, J. J. (SM)
Tamburo, S. (A)
Van Bosse, J. G. (A)
Van Scoyoc, J. N. (SM)
Voorhaar, F. R., Jr. (M)
Wise, G. H. (M)
Yoder, R. S. (SM)
Zender, R. G. (A)

O'Fallon (SL-6)
Chamberlain, P. E. (M)
Hartmann, D. W. (M)
Schaefer, R. J. (A)

Orland Park (CHI-5)
Green, R. E. (M)
Morrison, P. (A)
Yang, R. F. H. (SM)

Ottawa (CHI-5)
Connor, J. A. (SM)
Fracek, J. (A)
Meyer, C. H. (A)

Palatine (CHI-5)
Currey, C. H. (M)
Gildart, J. F., Jr. (A)
Medek, J. D. (M)
Powers, J. S. (M)
Ryan, R. J. (SM)
Schreiner, L. W. (SM)
Thompson, R. T. (M)
Timberlake, F. A. (SM)
Warner, T. R. (A)

Palos Heights (CHI-5)
Brown, M. H. (A)
Lindquist, J. R. (A)
Scheldorf, M. W. (SM)
Sommeria, M. R. (A)
Woodbury, H. L. (M)

Palos Park (CHI-5)
Cairnes, W. E. (SM)

Pana (CHI-5)
Morris, J. K. (A)

Park Forest (CHI-5)
Aklinski, M. J. (A)
Benson, R. W. (M)
Chang, B. (M)
De Horn, C. E. (M)
Heffner, R. W. (A)
Kozel, M. S. (A)
Maravich, R. (A)
McGuire, J. P. (M)
Mirkin, M. (M)
Schwartz, E. S. (M)
Van Horn, J. W. (M)
Vogt, A. R. (A)

Park Ridge (CHI-5)
Ashby, A. T. (M)
Betz, C. R. (M)
Boesen, G. F. (M)
Bridges, J. E. (SM)
Brown, J. M. (M)
Brown, W. (M)
Coss, W. L. (M)
Crow, R. P. (M)
De Cola, R. (F)
De Vore, L. T. (F)
Dymond, C. (M)
Edwards, F. W. (M)
Erwood, J. (SM)
Farley, J. E. (M)
Farnsworth, G. W. (M)
Figlewicz, R. C. (A)
Fredine, E. L. (M)
Griffith, B. G. (SM)
Hansen, J. A. (SM)
Holmes, D. D. (A)
Middleton, R. G. (SM)
Mroz, M. (SM)
Mueller, A. J. (M)
Nitschke, G. (M)
Passow, E. B. (SM)
Schumacher, H. W. (A)
Shaw, J. R. (A)
Silver, J. F. (M)
Smith, P. S. (SM)
Thrun, A. G. (VA)
Vrooman, D. H. (A)
Zenner, R. E. (SM)

Pecatonica (CHI-5)
Van Antwerp, M. C. (VA)

Peoria (CHI-5)
Ferre, G. E. (M)
Weinberg, P. (M)
Wright, W. R. (M)

Peru (CHI-5)
Hall, H. R. (A)

Philo (CHI-5)
Hohn, F. E. (A)

Plainfield (CHI-5)
Hartong, H. H. (A)

Plano (CHI-5)
Beetham, R. B. (M)

Pleasant Plains (CHI-5)
Boesdorfer, C. L. (A)

Prairie View (CHI-5)
Liepelt, E. (M)

Prospect Heights (CHI-5)
Bergman, E. J. (A)
Carlson, E. V. (A)
Dickson, D. C., Jr. (M)
Kongable, L. S. (M)

Quincy (CHI-5)
Fricke, K. M. (A)
Hackbarth, H. R. (M)
Hoyt, W. A. (M)
Stratman, H. G. (M)
Webber, C. T. (SM)
Worsley, C. C. (A)

Renault (SL-6)
Widenhoefer, N. C. (A)

Ringwood (CHI-5)
Thompson, A. C. (M)

River Forest (CHI-5)
Cusack, J. A. (A)
D'Orio, P. A. (SM)
Gustafson, G. R. (F)
Horn, K. H. (A)
Hupert, J. J. (SM)
Maclaszewski, A. H. (SM)
Schultz, A. A. (M)

River Grove (CHI-5)
Augustine, A. F. (A)
Bousky, S. (SM)
Green, L. H. (A)
Henke, W. G. (SM)
Tarantur, S. (M)
Thake, R. F. (M)
Wolf, M. (SM)

Riverside (CHI-5)
Brooks, R. D. (SM)
Chak, W. E. (A)
Davis, G. L. (A)
Fligel, W. P. (M)
Hajek, R. J. (M)
Kean, W. F. (SM)
Wesselman, E. (VA)

Rochester (CHI-5)
Kessler, W. D. (A)

Rockford (CHI-5)
Berglund, D. B. (A)
Bullen, C. V. (M)
Campbell, R. H. (A)
Conrad, R. S. (SM)
Hand, C. A. (M)
Hausvick, L. L. (M)
Johnson, T. W. (M)
Kyburz, U. L. (M)
Marcollini, V. H. (M)
Massey, J. (A)
Montalbano, V. (A)
Morreal, J. A. (A)
Peck, R. E. (M)
Quinn, J. R. (M)
Steiner, J. E. (A)
Tveit, T. (M)
Ward, L. A. (M)

Rock Island (CR-5)
Sinnett, R. J. (SM)

Roselle (CHI-5)
Callahan, B. E. (M)

Round Lake (CHI-5)
Steffee, J. W. (A)

Roxana (SL-6)
McSherry, J. H. (A)

Saint Anne (CHI-5)
Bernier, V. A. (A)

Saint Charles (CHI-5)
Nelson, D. A. (A)
Supitilov, M. C. (SM)
Taylor, E. H. (SM)
Wohlert, A. M. (A)

Savanna (CHI-5)
Smith, D. A. (A)

Savoy (CHI-5)
Hassler, S. S. (A)

Scott AFB (SL-6)
Dora, G. L. (A)
Evans, E. J. (A)
Hartnett, R. M. (A)
Herrst, L. R. (M)
Huska, J. (A)
Kounler, R. H. (A)
Lucio, M. G. (A)
Moizeau, C. J. (A)
Monroy, F. (A)
Parsons, J. (A)
Phillips, W. F. (M)
Ramsey, R. G. (A)
Silva, R. F. (M)
Strate, K. E. (M)
Warnshuis, A. P. (A)

Shirley (CHI-5)
Alley, R. P. (M)

Skokie (CHI-5)
Adler, H. J. (SM)
Alessio, S. A. (A)
Carter, R. W. (A)
Cooper, M. (M)
Duvall, T. E. (A)
Everett, J. E. (M)
Frantz, N. (A)
Fruth, H. F. (SM)
Gallagher, J. A. (A)
Gerlach, A. B. (A)
Gillespie, N. R. (A)
Gimpel, D. J. (A)
Glasby, W. E. (M)
Greenfield, H. (A)
Huntoon, V. J. (A)
Kahover, C. R. (A)
Kandisky, L. M. (M)
Keller, E. A. (SM)
Loizzo, V. J. (A)
Michals, R. A. (M)
Moskow, H. J. (M)
Moss, J. L. (A)
Nitchals, J. L. (A)
O'Callaghan, J. J. (SM)
Osborn, R. L. (M)
Pawlowski, F. L. (A)
Perlin, H. (A)
Pierce, C. B. (M)
Rosenman, L. (M)
Royston, M. F. (SM)
Rutkowski, C. (A)
Sabel, A. R. (M)
Siegel, D. T. (M)
Stiefel, P. (M)
Sussman, M. (M)
Thomas, R. E. (A)
Toback, P. L. (M)
Weisz, W. J. (M)
Whitman, M. R. (A)
Wickstrom, S. T. (M)
Woods, H. (A)

South Chicago (CHI-5)
Kahn, L. (VA)

Sparta (SL-6)
Richard, C. W. (SM)

Springfield (CHI-5)
Clements, L. C. (A)
Hem, R. J. (A)
Jonaitis, R. J. (A)

Leach, E. A. (SM)
McCormick, J. E. (M)
McGee, K. (SM)
Oram, D. K. (VA)
Pline, R. A. (M)
Schwarz, E. W. (A)
Stock, B. L. (A)
Thomas, C. C. (M)
Wilcox, S. R. (A)

Sterling (CHI-5)
Drane, R. L. (M)

Streator (CHI-5)
Gotch, J. X. (A)
Pozniak, J. H. (A)

Summit (CHI-5)
Berberek, W. J. (A)

Trenton (SL-6)
Eisenmayer, A. L. (A)

Urbana (CHI-5)
Avizienis, A. A. (M)
Bailey, A. D. (SM)
Bauman, P. A. (M)
Becker, R. C. (M)
Bidlack, C. S. (SM)
Bielawa, F. R. (A)
Brown, R. M. (M)
Chatterjee, A. K. (M)
Crothers, M. H. (SM)
Cruz, J. B., Jr. (M)
Dougal, A. A. (A)
Duncan, J. W. (A)
Dyson, J. D. (A)
Emery, W. L. (SM)
Everitt, W. L. (F)
Fett, G. H. (SM)
Goldstein, L. (F)
Gooch, J. D. (M)
Hayden, E. C. (M)
Hendricks, C. D., Jr. (M)
Holshouser, D. F. (M)
Hudson, P. K. (SM)
Isbell, D. E. (A)
Jensen, R. S. (M)
Jordan, E. C. (F)
Kenyon, R. J. (M)
Knoebel, H. W. (A)
Longacre, A. (SM)
Mahrous, H. (M)
Mast, P. E. (M)
McVay, M. S. (SM)
Mikulski, J. J. (A)
Muerle, J. L. (A)
Murrell, T. A. (M)
Myers, R. (M)
Pantell, R. H. (A)
Poppelbaum, W. J. (A)
Ray, S. R. (A)
Ricketts, L. W. (M)
Robertson, J. E. (M)
Ruina, J. (M)
Sandquist, J. W. (A)
Schwarzlose, P. F. (M)
Snubler, H. A. (M)
Swenson, G. W., Jr. (SM)
Swerling, P. (M)
Trogdon, R. L. (A)
Tykociner, J. T. (SM)
VanValkenburg, M. E. (SM)
Voltaggio, F., Jr. (A)
Warfield, J. N. (M)
Wax, N. (M)
Webb, H. D. (SM)
Weeks, W. L. (A)
Wei, L. Y. (M)
Weidlund, C. D. (SM)
Wood, W. W. (M)
Yu, H-N (M)

Verona (CHI-5)
Dix, F. W. (A)

Villa Park (CHI-5)
Gorbunoff, A. (SM)
Nerberg, L. R. (M)
Sparf, W. H. (M)
Toberman, A. J. (SM)
Walters, A. R. (M)
Zaruba, E. J. (SM)

Virden (CHI-5)
Carr, H. E. (A)

Warren (CHI-5)
Townsend, H. D. (M)

Warrensburg (CHI-5)
Levy, S. L. (M)

Washington (CHI-5)
Overley, J. P. (A)
Planck, R. M. (M)

Watseka (CHI-5)
Cox, L. H. (M)

Waukegan (CHI-5)
Anderson, C. A. (M)
Bentivegna, J. T. (A)
Cashman, D. J. (A)
Jensen, G. (M)
Kimmel, N. (A)
Krasovec, A. C. (A)
Nevin, M. E. (A)
Tucker, G. L. (M)

Waverly (CHI-5)
Michel, R. L. (A)

Westchester (CHI-5)
Floyd, E. C. (SM)
Frankart, W. F. (M)
Gabriel, R. R. (M)
Hencke, J. M. (A)
Kikta, D. D. (A)
Morgan, R. E. (M)
Stones, A. E. (M)

West Chicago (CHI-5)
Hummel, H. J. (M)
Karas, W. P. (SM)
Merda, W. R. (A)
Rullman, E. E., Jr. (A)
Scandora, A. E. (A)

Western Springs (CHI-5)
Bracken, J. F. (M)
Cottrell, B. P. (SM)
Dontanville, R. V. (SM)
Duncan, D. C. (M)
Gray, G. E. (SM)
Hungerford, N. C. (A)
Kramer, K. (SM)
Levy, G. F. (SM)
Scott, W. S. (A)
Swanson, B. E. (M)
Turke, B. A. (M)
Valach, C. F. (M)
Whitney, M. E. (SM)

West Melrose Park (CHI-5)
Dietz, L. A. (A)

Wheaton (CHI-5)
Batts, R. L. (SM)
Calobrisi, P. (A)
Frank, C. (M)
Gaskins, S. M. (A)
Gouverneur, M. F. H. (A)
Hausten, D. R. (A)
Jensen, R. E. (M)
Jepson, M. R. (M)
Matthews, G. D. (M)
McNicol, F. R. (A)
Olson, R. H. (SM)
Parker, N. W. (A)
Quist, W. G. (M)
Rohrer, C., Jr. (M)
Squires, E. G. (M)
Thompson, D. C. (M)
Upton, C. C., Jr. (M)
Van Slyck, W. S. (SM)
Venema, H. J. (SM)
Ward, A. G. (SM)
Willyard, C. H. (A)
Witte, R. (M)

Wheeling (CHI-5)
Naber, J. S. (M)

Wilmette (CHI-5)
Bell, J. F. (SM)
Bosshart, R. F. (M)
Crossley, R. C. (M)
Cudlip, S. B. (M)
Di Cecio, S. A. (M)
Edens, G. E. (M)
Geiges, K. S. (SM)
Joy, W. F. (M)
Kline, L. M., Jr. (SM)
MacLean, N. W. (M)
McJohnston, C. A. (A)
Nordby, R. M. (SM)
Papier, J. H. (A)
Pionkowski, E. F. (M)
Schnell, W. J. (SM)
Shuey, L. S. (A)
Smith, E. L. (M)
Sorsen, S. L. (A)
Steel, R. R., Jr. (A)
Stott, H. G. (A)
Thomas, L. R. (M)
Warshawsky, J. (M)
Waterfall, F. E. (SM)

Winfield (CHI-5)
Feske, H. O. (A)

Winnetka (CHI-5)
Carlson, G. R. (A)
Hart, J. W. (M)
Howell, E. R., Jr. (A)
Jarvis, K. W. (F)

Wood Dale (CHI-5)
Mahlak, A. M. (A)
Noskowicz, T. S. (M)

Woodstock (CHI-5)
Kliclak, C. J. (A)
Longley, J. K. (A)

Worth (CHI-5)
Moore, D. W. (A)

Zion (CHI-5)
McDowell, J. L. (M)

INDIANA

Anderson (IND-5)
Brooks, L. C. (M)
Gardner, R. A. (A)
Hart, J. M. (A)
Heller, R. E. (A)
Holt, D. L. (M)
Phlegar, C. L., Jr. (M)
Reynolds, B. G. (A)
Soeller, A. L., Jr. (M)

Angola (FT-W-5)
Artman, R. L. (M)
Ax, L. S. (M)
Bush, D. E. (A)
Hanson, L. G. (A)
Neu, J. D. (A)
O'Connell, J. V. (A)
Southern, C. D. (A)
Westenhaver, M. E. (A)
Worden, L. E. (A)
Yanko, R. J. (A)

Arcadia (IND-5)
Nightenhelser, K. W. (M)

Auburn (FT-W-5)
Capen, G. A. (M)
Wallace, C. E., Jr. (M)

Aurora (FT-W-5)
Achatz, R. V. (M)

Beech Grove (IND-5)
Gary, A. H. (M)

Bloomington (IND-5)
Bahr, W. B. (A)
Dixon, L. W. (SM)
Gribben, J. C., Jr. (A)
Kreppa, J. E., Jr. (A)
McNeil, J. F. (A)
Neal, J. D. (M)
Preati, B. (M)
Siddons, G. F. (A)
Smith, C. C. (M)
Strain, R. J. (A)
Svanascini, A. L. (SM)
Tarzian, S. (SM)

Bluffton (FT-W-5)
Wolfgang, L. G. (A)

Bremen (SB-M-5)
Spencer, R. L. (M)

Bridgeport (IND-5)
Hubbard, J. W. (A)

Bristol (CHI-5)
Paulson, E. E. (M)

Cambridge City (CIN-4)
Rea, R. C. (A)

Chalmers (IND-5)
Banes, D. E. (A)

Chesterton (CHI-5)
Olson, E. H. (A)

Clarksville (LOU-5)
Yochem, J. F. (A)

Clayton (IND-5)
Winton, H. J. (M)

Columbia City (FT-W-5)
Montague, L. L. (A)

Columbus (IND-5)
Harden, R. D. (A)
Silva, A. D., Jr. (M)
Silva, L. F. (A)
Stambaugh, D. W. (M)

Naval Ammunition Depot (EO-5)
Thornton, J. W. (M)

Crown Point (CHI-5)
Penovich, F. J. (A)

Danville (IND-5)
Miller, W. E. (A)

Dayton (IND-5)
Yost, K. E. (M)

Decatur (FT-W-5)
Bont, R. M. (M)

East Chicago (CHI-5)
Nesbitt, E. P. (A)

East Gary (CHI-5)
Haack, W., Jr. (A)

Elkhart (SB-M-7)
Best, J. G. (A)
Budd, W. H. (M)
Daily, A. M. (M)
Doty, J. S. (M)
Houck, H., Jr. (A)
Kent, E. L. (SM)
Kieffer, G. H., Jr. (A)
Klingler, J. E. (A)
Krauss, S. L. (M)
Lindahl, H. C. (M)
McDonald, L. J. (A)
Menges, W. A. (A)
Moore, C. C. (M)
Nicely, W. A. (A)
Osburn, C. M. (M)
Smith, R. A. (A)
Turner, B. S. (M)
Vukevik, A. J. (M)

Evansville (EO-5)
Caraway, J. B. (SM)
Custer, M. S. (A)
Fischer, N. C. (A)
Flackbert, W. D. (M)
Gehres, F. A. (SM)
Gordon, J. A. (M)
Greeson, J. H. (A)
Hatfield, P. E. (M)
Hennel, J. R. (M)
Herendeen, O. V. (A)
Joest, R. L. (M)
Kappes, A. V. (A)
Miegl, A. K. (SM)
Miles, K. G. (M)
Quirk, J. A. (A)
Schoene, R. L. (SM)
Schoeny, E. P. (A)
Schultz, W. F. (A)
Stoltz, G. F. (M)
Williams, W. A. (SM)

Fort Wayne (FT-W-5)
Ackworth, D. L. (M)
Allaback, W. (A)
Allen, J. S. (M)
Bardonner, W. J., Jr. (A)
Bates, E. L. (A)
Beach, H. W. (M)
Beaulieu, P. B. (A)
Belinz, T. E. (A)
Bendel, S., Jr. (A)
Bendell, C. B. (M)
Bennett, E. V., Jr. (A)
Bireley, R. L. (M)
Blake, J. A. (A)
Blake, N. A. (A)
Bliss, R. W. (A)
Brady, F. H. (A)
Broseghini, B. L. (A)
Busse, C. A. (A)
Carpenter, D. L. (A)
Cawein, M. (F)
Clark, J. R. (SM)
Clements, L. E. (M)
Coatney, A. E. (M)
Collins, G. E. (SM)
Conway, J. F., Jr. (SM)
Cramer, L. F. (SM)
Crockett, G. R. (M)
Cronkwright, R. E. (A)
Davis, D. W. (A)
Dean, W. A. (A)
Dees, J. W. (M)
Dehmlow, L. L. (A)
Diell, S. A. (A)
Diklnis, D. V. (M)
Dimond, J. (M)
Dreisbach, R. H. (M)
Dye, N. E. (M)
Eastland, F. M. (M)
Ecker, J. L. (A)
Emery, R. C. (A)
Ervin, H. D. (M)
Farnsworth, P. T. (F)
Fisher, D. E. (A)
Folks, R. C. (A)
Fong, S. G. (SM)
Freimann, F. (A)
Friedman, S. (M)
Furth, F. R. (SM)
Gaither, E. E. (SM)
Gazella, M. S. (A)
Gillin, G. S. (A)
Goetz, R. K. (A)
Goss, C. B. (M)
Gotschall, W. O. (M)
Gough, L. E. (SM)
Gramer, E. E., Jr. (M)
Grant, R. L. (SM)
Green, W. L. (M)
Grosvenor, H. D. (A)
Halcomb, J. L. (M)
Hambrock, H. E. (M)
Hardwick, C. L. (M)
Harmer, R. L. (A)
Harris, A. S. (M)
Harrison, R. E. (M)
Hawkins, E. S. (M)
Hawkins, W. G. (SM)
Hedeen, F. D. (A)
Helderman, T. E. (A)
Helmreich, L. W. (M)
Henderson, J. A. (A)
Herke, F. H., Jr. (A)
Hertzog, W. K. (M)
Hessler, J., Jr. (SM)
Hine, S. H. (A)
Hively, R. R. (SM)
Hocketra, C. E. (SM)
Holmquist, J. A. (M)
Houser, N. W. (M)
Howe, D. R. (A)
Humphries, R. G. (M)
Jensen, C. W. (M)
Jimenez, G. L. (M)
Joehlin, N. C. (M)
Johnson, D. L. (A)
Johnson, L. (M)
Jones, R. R. (M)
Jordal, V. M. (A)
Kaat, S. L. (M)
Kalish, J. H. (A)
Kaplan, R. (A)
Kelleher, W. J. (M)
Keller, V. L. (M)
Kendall, P. E. (SM)
Killion, D. G. (A)
Kittle, O. (M)
Kleist, R. A. (A)
Klemmer, A. E. (M)
Klingler, E. H. (M)
Knarr, C. E. (M)
Knauer, P. E. (M)
Koenig, E. W. (M)
Kuffel, L. A. (M)
Lawburgh, R. H. (M)
Lennard, J. R. (M)
Leu, T. W. (M)
Lockwood, W. J. (A)
Lovegren, P. B. (M)
Lukas, J. M. (A)
Lyet, L. F. (M)
Major, T. (SM)
Marcinko, A. M. (A)
Martin, D. W. (SM)
Martin, R. F. (A)
Mason, C. F. (A)
Mast, P. L. (M)
Mathews, R. H. G. (SM)
Matzinger, J. R. (M)
Maughmer, R. W. (M)
Mayle, M. T., Jr. (SM)
Mayle, L. F. (SM)
McFadden, J. H. (A)
McGregor, R. B. (M)
McKenna, R. W. (A)
Meadow, H. R. (A)
Monda, S. M. (A)
Moore, K. F. (A)
Mount, E. V. (A)
Myers, E. E. (A)
Nelson, G. L. (M)
Newman, D. R. (A)
Noll, F. R. (M)
Norris, B. J. (M)
O'Connor, R. A. (A)
Onia, J. (A)
Orange, E. S. (M)
Pantazin, T. (A)
Pavlik, T. J. (M)
Poole, R. F. (M)
Pritchard, H. T. (M)
Pufahl, E. R. (M)
Raduziner, D. M. (A)
Rankin, J. A. (SM)
Rasley, D. R. (SM)
Regis, L. J. (A)
Richards, C. A. (M)
Richards, G. A. (A)
Richeson, W. E. (A)
Robertson, G. D. (SM)
Rodgers, P. D. (A)
Rogers, G. E. (A)
Rogers, M. A. (A)
Roy, W. R. (M)
Russell, R. S. (M)
Rust, M. F. (A)
Ryan, H. T. (A)
Sabo, J. (M)
Salinger, H. W. G. (F)
Sanders, R. W. (SM)
Schwartz, E. R. (A)
Scott, H. B. (A)
Seaman, D. L. (M)
Sessler, J. G. (A)
Sharp, J. W. (SM)
Silvey, J. O. (A)
Sinish, R. D. (SM)
Slattery, J. J. (F)
Slick, E. F. (M)
Sloan, W. R. (A)
Smith, F. P. (A)
Solomon, R. M. (M)
Spanier, B. (M)
Sparrow, E. L. (M)
Statler, S. W. (A)
Stewart, C. W. (A)
Stoakes, W. L. (M)
Sutton, J. R. (A)
Swanson, E. S. (A)
Swartwout, R. E. (SM)
Teetor, J. S. (A)
Thoman, R. E. (M)
Thompson, J. L. (A)
Toobig, M. F. (M)
Torzyn, N. T. (M)
Trimarchi, J. (M)
Valentine, F. C. (M)
Vene, J. M. (M)
Watkins, G. C., Jr. (M)
White, E. A. (SM)
Whitworth, W. C. (M)
Wible, P. E., Jr. (A)
Williams, E. E. (A)
Williams, W. L., Jr. (M)
Wolk, T. E. (M)
Young, D. R. (M)
Zbacnik, E. V. (A)
Zwaver, B. E. (A)

Frankfort (IND-5)
Dossett, W. A. (A)
Stuart, W. D. (M)

Gary (CHI-5)
Baranczyk, V. (A)
Berry, B. O. (A)
Biro, D. J. (A)
Buccirone, V. S. (M)
D'Arcy, E. W. (M)
Donahey, H. E. (A)
Frazier, W. R. (A)
Ireland, R. P. (M)
Isolampi, G. E. (A)
Mundell, E. E. (A)
Ratkay, S. (A)
Shirk, K. C. (VA)
Vedo, J. B. (A)

Goshen (SB-M-5)
Corporon, R. P. (M)

Grabill (FT-W-5)
Bickel, S. O. (A)
Phillips, T. H. (M)

Greencastle (IND-5)
Behymer, D. E. (M)

Greensburg (IND-5)
Sheese, O. C. (A)

Greentown (IND-5)
Harrison, E. F. (A)
Wright, H. E. (M)

Greenwood (IND-5)
Marshall, C. L. (M)

Griffith (CHI-5)
Vereb, A. J. (A)

Hammond (CHI-5)
Dwyer, R. J. (M)

Hebron (SBM-5)
Fisher, R. M. (A)

Hoagland (FT-W-5)
Gabrielsen, F. T. (M)

Hobart (CHI-5)
Spangler, R. (A)
Stearns, C. F. (A)

Hudson (FT-W-5)
Fressler, J. B. (M)

Huntertown (FT-W-5)
Bryn, S. L. (A)
Ordas, A. F. (M)

Huntington (FT-W-5)
Ball, R. H. (A)
Brenton, W. C. (A)
Chambers, W. A. (A)
Cozad, J. W. (A)
Fisher, C. C. (SM)
Kaufman, A. R. (A)
Kuth, B. A. (M)
Lundy, C. (SM)
Smart, R. E. (A)
Stroud, R. W. (M)
Terry, C. B. (M)

Indianapolis (IND-5)
Albon, R., Jr. (A)
Alden, E. E. (M)
Alley, P. D. (M)
Anderson, S. R. (M)
Arvin, M. J. (SM)
Astholz, P. F. (M)
Aust, R. J. (M)
Barrelle, J. A. (A)
Bechtel, B. (A)
Begeman, R. H. (M)
Bell, D. L. (A)
Berntsen, W. H. (M)
Beltz, C. D., Jr. (M)
Braunagel, M. V. (M)
Braunlin, R. J. (A)
Brockway, R. M. (M)
Butts, C. B. (A)
Car

INDIANA

Crawford, R. A. (M)
Cross, K. K. (A)
Cunningham, R. W. (A)
Da Prato, B. F. (M)
Davis, C. B. (A)
De Voe, L. M. (M)
Drilling, N. G. (M)
Evans, A. G. (M)
Evans, R. A. (SM)
Fagg, W. M. (A)
Fallowes, R. W. (A)
Fenimore, G. E. (A)
Fives, J. J. (M)
Flint, R. B. (A)
French, A. B. (A)
French, B. V. K. (SM)
Gamble, M. E. (SM)
Goodlet, G. N. (A)
Grafton, D. F. (M)
Gresham, S., Jr. (SM)
Hall, J. M., Jr. (M)
Harden, J. G. (SM)
Hiorns, N. M. (A)
Hufeld, J. G. (M)
Holland, H. A. (A)
Hostetler, W. E. (M)
Hrorvada, J. C. (SM)
Huetten, G. (SM)
Hurley, H. C. (M)
Jackson, W. E. (F)
Justus, J. R. (A)
Kennedy, W. H. (M)
Kniph, C. W. (M)
Kraft, R. W. (A)
Liddle, W. C. (M)
Macnabb, V. C. (M)
Manning, W. L. (SM)
Maraseo, F. A. (M)
Marshall, L. C. (SM)
Maxwell, J. W. (SM)
Middleton, A. E. (A)
Miles, W. (A)
Miller, F. (A)
Moyer, R. C. (SM)
Myers, W. D. (M)
Nelson, J. B. (A)
Peden, J. E. (A)
Phillips, R. M. (M)
Purgett, L. J. (SM)
Raub, R. D. (A)
Ray, J. (A)
Reager, A. M. (VA)
Reynolds, J. H. (M)
Rosser, T. N. (SM)
Roys, H. E. (F)
Schafer, G. E. (M)
Schager, R. J. (M)
Schultz, A. J. (SM)
Schulz, E. A. (A)
See, C. J. (A)
Seibert, W. L. (M)
Skinner, G. M. (M)
Slater, I. M. (SM)
Sorensen, R. L. (M)
Speck, L. P., Jr. (M)
Stanley, E. R. (A)
Stemkel, J. E. (M)
Strole, E. F. (A)
Stuart, D. M. (SM)
Taggart, S. E. (M)
Tague, B. D. (SM)
Thomas, J. W. (A)
Thorn, W. D. (M)
Trout, C. C. (M)
Tudor, E. C. (M)
Tulanskas, L. (SM)
Van Keuren, E., III (M)
Viere, A. J. (M)
Walker, R. S. (A)
Weaver, R. J. (A)
Whitaker, R. O. (A)
White, B. J., Jr. (A)
Willey, V. E. (M)
Wisner, H. L. (SM)
Wolff, H. R. (SM)
Wulfekuhl, R. J. (M)
Wuster, W. L. (A)
Young, E. A. (A)

Jonesboro (IND-5)
Konrad, R. J. (A)

Kenosha (CHI-5)
Hoehm, R. F., Jr. (A)
Heide, S. M. (A)
Kovachik, E. (A)
Neumann, H. J. (A)
Osterlund, S. G. S. (M)
Reich, E. A. (M)
Thiel, W. (A)

Kokomo (IND-5)
Atkinson, J. R. (M)
Baird, D. R. (A)
Brandon, W. S. (M)
Brinkerhoff, D. E. (A)
Buehler, E. R. (A)
Bunch, D. L. (M)
Carlson, E. C. (A)
Carr, W. F. (M)
Cory, C. D., Jr. (M)
Cory, N. L. (A)
Dibble, J. W. (M)
Doversberger, K. W. (A)
Ford, G. M. (M)
Gaiser, M. W. (VA)
Gerhardt, B. J. (M)
Guyton, J. H. (M)
Heckert, W. F. (M)
Jenkins, R. L. (M)
Khan, F. R. (A)
Laitinen, L. K. (M)
Manahan, M. J. (SM)
Martin, D. W. (M)
Mason, J. M. (M)
McCaughan, H. M. (A)
Naylor, M. W. (M)
Nellans, K. L. (M)
Prewitt, T. A. (M)
Pyle, H. (M)
Richardson, T. W. (M)
Rittmann, A. D. (SM)
Ruff, D. O. (M)
Schaffner, J. S. (SM)
Schwarz, H. A. (F)
Scott, L. E. (M)
Siefken, R. M. (M)
Vogt, K. S. (M)
Voiwa, C. J. (M)
Zeps, H. (A)

Lafayette (IND-5)
Bogard, J. R. (M)
Evans, H. R. (M)
Freeman, S., Jr. (M)
Friedlaender, F. J. (A)
Halsey, M. R. (M)
Hammond, S. B. (SM)
Johnson, J. S. (SM)
Oorthuys, H. J. (SM)
Sage, A. P., Jr. (M)
Schultz, F. V. (SM)
Siskind, R. P. (SM)
Todd, A. C. (SM)

La Porte (SB-M-5)
McKinney, J. W. (A)

Lawrence (IND-5)
May, C. W. (A)

Lawrenceburg (CIN-4)
Beehler, J. (M)

Lebanon (IND-5)
Cook, K. S. (A)

Logansport (IND-5)
Harrell, D. H. (M)
Munson, A. L. (A)

Marion (IND-5)
Ballard, D. C. (SM)
Benway, R. E. (A)
Saunders, R., Jr. (SM)

Michigan City (SB-M-5)
Alinsky, J. W. (SM)
Demercurio, C. D. (M)
Hillman, R. E. (A)
Honda, M. (A)
Horvath, J. W. (A)
Kolster, W. K. (A)
Meadows, F. D. (SM)
Pangborn, J. C. (A)

Mishawaka (SB-M-5)
Bregantini, J. S. (M)
Breit, R. T. (M)
Cooney, J. J. (A)
Crosby, E. L., Jr. (M)
Cunningham, D. L. (M)
Delker, A. G., Jr. (M)
De Ruyck, A. R. (M)
Dewaelsche, D. R. (A)
Downham, H. A. (M)
Ewing, R. D. (M)
Garrow, S. H. (M)
Hansen, A. G., Jr. (M)
Heckman, H. T. (M)
Jacks, J. T. (M)
Johnson, W. S. (A)
Koch, W. J. (A)
Lancaster, R. G. (M)
Marshall, R. E. (M)
Miller, A. E. (A)
Neff, L. (A)
Norris, C. B. (A)
North, R. L. (A)
Ohlemacher, R. F. (A)
Omberg, A. C. (SM)
Pitcher, R. M. (A)
Pless, L. C. (M)
Sprouse, P. J. (A)
Thomas, W. A. (A)
Trippel, W. G. (A)
Vogtmann, H. W. (M)
Webb, W. L. (F)
Whiffen, R. E. (SM)
Wilson, C. H. (M)
Wilson, S. J. (A)
Wright, C. R. (M)

Muncie (IND-5)
Budd, M. A. (M)
Burton, D. A. (A)
Hayes, M. E. (A)
Simpson, M. E. (M)

Munster (CHI-5)
Miner, J. H. (A)
Roedel, J. (M)
Sane, J. M. (A)
Stevens, R. E. (A)

Nashville (IND-5)
Connell, J. L. (M)

New Albany (LOU-5)
Morris, K. L. (M)

New Carlisle (SB-M-5)
Evancich, E. (M)

New Haven (FT-W-5)
Babcock, L. V. (M)
Gerrish, C. R. (M)
Gutchard, R. S. (M)
Hallmark, C. E. (SM)
Jones, W. B. (M)
Miller, R. A. (A)
Murphy, F. J. (M)
Rexroad, R. A. (A)
Swank, G. D. (A)

New Palestine (IND-5)
Wilkins, R. A. (A)

North Terre Haute (IND-5)
Ogborn, L. L. (A)

Notre Dame (SB-M-5)
Coomes, E. A. (SM)
Foecke, H. A. (A)
Kempf, K. R. (M)
Ross, A. E. (SM)
Stauder, L. F. (M)

Orestes (IND-5)
Gilliam, D. W. (A)

Oriole (EO-5)
Frakes, S. E. (A)

Osceola (SB-M-5)
Cox, P. G. (M)
Ludwig, A. R. (M)
Moulton, G. E. (A)

Pendleton (IND-5)
Hallenbeck, S. M. (A)

Peru (IND-5)
Murray, W. B. (M)
See, W. E. (A)

Plymouth (SB-M-5)
Kennedy, P. R. (A)

Princeton (EO-5)
Cropsey, D. V. (M)
Smith, Z. R. (M)

Ray (FT-W-5)
Pierce, R. M. (SM)

Richmond (CIN-4)
Howe, L. W. (A)
Maddox, R. D. (M)
Young, K. W. (A)

Roanoke (FT-W-5)
Yoder, L. E. (M)

Rockville (IND-5)
McFann, H. L. (M)

Russiaville (IND-5)
Fred, J. A. (M)

St. Meinrad (EO-5)
Ringeman, O. E. (M)

Seymour (IND-5)
Cupp, J. C. (A)

Sheridan (IND-5)
Neal, S. M. (M)

South Bend (SB-M-5)
Bardell, P. H., Jr. (M)
Baumbach, E. J. (M)
Bedford, E. S. (M)
Beazell, H. L. (M)
Bellows, R. K. (M)
Bernstein, J. M. (M)
Borkowski, J. A. (A)
Cole, H. G. (M)
Colten, J. L. (SM)
Deranek, P. T. (A)
Diehl, J. G. (M)
Durbin, H. M. (M)
Falco, M. F. (M)
Firner, J. F. (M)
Goodwin, W. V. (SM)
Grant, J. B. (M)
Harry, H. E. (SM)
Hoffman, C. H. (M)
Hollis, R. H. (M)
Hunt, A., Jr. (A)
Jaffe, B. (A)
James, D. C. (SM)
Jones, W. V., Jr. (A)
Kaiser, P. F. (M)
Kunz, W. J., Jr. (SM)
La Salle, E. (M)
La Vean, G. E. (M)
Lindemann, N. L. (A)
Link, A. G. (M)
Mageoch, N. H. (M)
Mansfield, K. I. (A)
McKee, T. A. (M)
McWhorter, W. F. (M)
Metsker, W. E. (SM)
Miller, R. B. (M)
Modesitt, M. B. (M)
Mossman, R. B. (SM)
Nymberg, R. J., Jr. (M)
O'Neil, A. R. (M)
Patterson, J. M. (A)
Puen, Q. J. (M)
Quigley, A. J. (M)
Root, R. E. (M)
Secor, R. K. (M)
Snyder, L. J. (A)
Soleta, G. S. (M)
Solomon, P. (A)
Swisher, P. E. (SM)
Voss, J. R. (M)
Walton, P. E., Jr. (A)
Weiler, G. (M)
Weissert, R. K. (M)
Wilcox, M. L. (M)
Wooldridge, A. L. (M)

Speedway (IND-5)
Child, R. W. (M)
Wacker, K. F. (A)

Spiceland (IND-5)
La Rue, J. S. (A)

Tell City (EO-5)
Groves, S. K. (SM)
Hammond, R. F. (SM)

Terre Haute (IND-5)
Mason, P. R. (M)
McCrocklin, R. E. (M)
Moench, H. A. (SM)
Smith, P. D. (M)
White, J. (M)

Valparaiso (CHI-5)
Brown, J. W. (A)
Bullis, E. E. (A)
Cox, W. C. (A)
Dillon, C. R. (A)
Gast, D. A. (A)
Maynard, C. A. (SM)
Packman, M. E. (VA)
Patton, R. C. (A)
Shewan, W. (M)

Vincennes (EO-5)
Blevins, L. G. (A)

Wabash (IND-5)
Thurlow, M. P. (A)

Waldron (IND-5)
Miller, D. C. (A)

Washington (EO-5)
Boring, W. D. (M)

Waterloo (FT-W-5)
Hamman, H. L. (A)

Waynedale (FT-W-5)
Slater, T. L. (M)

West Lafayette (IND-5)
Bolle-Kramer, D. M. (M)
Cooper, G. R. (M)
Donovan, R. F. (A)
George, R. H. (SM)
German, J. P. (SM)
Happell, G. E. (SM)
Hardesty, G. A. (M)
Hayt, W. H., Jr. (SM)
Heim, H. J. (SM)
Heuelberth, W. M. (M)
Kemmerly, J. E. (M)
Kenyon, R. R. (M)
Masnaghetti, R. K. (A)
Pitt, P. E. (A)
Rupp, E. W., Jr. (M)
Sabbagh, E. M. (SM)
Samuels, J. C. (M)

Whiting (CHI-5)
Bell, J. E. (A)
Oster, W. (A)
Slivka, F. P. (A)

Winslow (EO-5)
Vaughan, J. D. (A)

Woodburn (FT-W-8)
Bertsche, G. (M)

IOWA

Algona (CR-5)
Barnes, R. E. (M)

Ames (DMA-5)
Albin, H. L. (A)
Boast, W. B. (M)
Cassell, W. L. (SM)
Coover, M. S. (SM)
Evans, W. H. (M)
Frewaldt, E. W. (A)
Griffin, J. E. (A)
Haahr, K. (A)
Hughes, W. L. (M)
Loupee, B. J. (M)
Mattson, R. H. (M)
McMechan, J. D. (M)
Pekarek, L. (A)
Read, A. A. (M)
Richardson, G. A. (SM)
Rickey, F. B. (A)
Schauer, R. F. (M)
Sharpe, R. A. (A)
Sparks, D. (A)
Sraders, G. (M)
Stattelman, A. J. (A)
Stewart, R. M., Jr. (M)
Townsend, C. L. (M)
Triska, C. J. (A)

Ankeny (DMA-5)
Johnston, D. H., Jr. (A)

Atkens (CR-5)
Schminke, R. E. (A)

Bettendorf (CR-5)
Campbell, D. B. (M)
Fischer, L. A. (A)
Hutchison, R. P. (A)

Burlington (CR-5)
Allen, J. W. (M)
Anderson, W. W. (M)
Applegate, J. A. (SM)
Bogart, P. M. (M)
Eck, E. J. (A)
Ertz, C. S. (A)
Graham, W. F. (M)
Havens, J. D. (M)
Keser, P. D. (A)
Loomis, G. L. (SM)
Miller, F. C. (SM)
Mullin, M. L. (M)
Musolino, J. M. (M)
Olson, B. (M)
Sanders, J. E. (M)
Simmons, C. A. (M)
Swygard, G. F. (M)
Taylor, D. L. (M)

Cedar Falls (CR-5)
Carson, D. N. (A)

Cedar Rapids (CR-5)
Abrams, H. T. (A)
Anderson, A. B. (M)
Anderson, W. G. (M)
Andrade, E. A. (SM)
Antrim, G. H. (A)
Arens, R. P. (A)
Arnold, D. C. (SM)
Ashby, W. O. (A)
Babillus, J. (SM)
Ball, J. K. (M)
Beehler, L. A. (A)
Bellville, W. H. (M)
Benning, G. L. (A)
Berry, D. G. (M)
Bettin, R. (M)
Biggs, J. A. (SM)
Bishop, G. E. (M)
Bolle, V. W. (M)
Born, A. S. (SM)
Bousek, R. J. (A)
Bowles, C. H., Jr. (A)
Bradford, F. H. (A)
Bray, W. E. (M)
Brega, L. B. (A)
Britton, R. W. (SM)
Broadhead, S. L., Jr. (SM)
Brower, H. P. (M)
Brown, H. R. (M)
Bruce, R. A. (M)
Bruene, W. B. (SM)
Burdick, L. R. (M)
Burton, R. E. (A)
Cain, R. F. (M)
Caldwell, K. M. (M)
Caquelin, M. W. (M)
Carlson, K. L. (A)
Cattol, R. L. (A)
Celsi, C. J. (M)
Christensen, A. A. (M)
Cleary, R. E. (M)
Cloonan, C. B. (M)
Coble, R. B. (SM)
Collins, A. A. (F)
Collins, J. J. (M)
Conrad, E. R. (M)
Couillard, L. W. (SM)
Cowan, C. D. (M)
Cox, R. T. (SM)
Craft, L. M. (M)
Craiglow, R. L. (M)
Cramer, R. L. (M)
Crandell, E. L. (M)
Cribbs, R. D. (A)
Croft, W. S. (A)
Cummings, F. M. (M)
Dalton, J. L. (SM)
Davison, W. (M)
Dawson, S. L. (M)
Decker, D. L. (M)
De Long, V. R. (M)
Devoll, C. W. (M)
Duff, R. E., Jr. (M)
Duhamel, R. H. (A)
Dunn, R. S. (A)
Eilers, L. J. (M)
Elliott, W. S. (A)
England, L. C. (A)
Erickson, G. A. (A)
Essig, R. D. (SM)
Fedde, C. D. (A)
Felhauer, H. E. (A)
Finger, P. R. (M)
Fisher, R. J. (A)
Fletcher, K. L. (SM)
Follensbee, W. M. (A)
Ford, D. W. (M)
Frey, H. B. (M)
Friedrichs, J. P. (A)
Fritze E. H. (M)
Fuller, R. C. (M)
Gallagher, P. C. (A)
Gates, R. S. (M)
Gerks, I. H. (SM)
Goetz, J. L. (SM)
Goldman, R. M. (A)
Graham, C. (M)
Graves, W. H. (M)
Green, D. H. (A)
Greenwell, R. E. (A)
Griswold, J. E. (M)
Habeger, E. A. (M)
Halvorson, R. L. (M)
Hancock, R. I. (A)
Hanna, G. W. (A)
Hawley, A. A. (A)
Heath, J. W. (M)
Hedgcock, W. T., Jr. (A)
Henrici, C. (SM)
Hern, H. D. (M)
Hime, N. S. (SM)
Hirsch, H. D. (M)
Hixenbaugh, G. H. (M)
Hodgin, D. M., Jr. (M)
Hoeft, R. H. (A)
Holec, V. P. (A)
Hollister, R. H. (A)
Holmes, D. W. (M)
Hotchkiss, J. H. (A)
Hubbard, M. R. (SM)
Hudek, V. R. (SM)
Hungerford, L. D. (M)
Hunt, J. L. (M)
Hykes, G. R. (A)
Jaycox, R. L. (A)
Jessen, M. F. (M)
Johnson, F. W. (A)
Johnson, L. E. (A)
Kennedy, C. L., Jr. (A)
Kintzel, C. K. (M)
Kirkpatrick, C. H. (M)
Klehfoth, W. C. (M)
Kopp, R. W. (M)
Krantz, K. B. (A)
Krebs, D. W. (M)
Lieske, E. W. (M)
Loop, D. E. (A)
Long, W. G., Jr. (M)
Ludvigson, M. T. (M)
Majerus, J. B. (M)
Mansur, G. F., Jr. (M)
March, G. W. (M)
Marshall, F. C. (M)
Martin, E. L. (SM)
Martin, R. L. (SM)
Martz, F. W. (A)
Mc Connell, T. E. (SM)
McCoy, D. O. (SM)
Mc Creary, R. L. (SM)
McDaniel, I. V. (M)
McElroy, J. C. (A)
McGraw, R. C. (M)
McKinley, P. A. (SM)
McManis, D. L. (M)
Meier, J. C. (A)
Miedke, R. W. (M)
Mitchell, D. (VA)
Mitchell, R. M. (SM)
Moody, J. M. (M)
Morrison, S. M. (SM)
Moseman, J. (A)
Mott, N. S. (M)
Myhre, P. K. (SM)
Nelson, J. H. (M)
Nestinq, J. W. (A)
Newell, D. E. (A)
Olson, R. L. (A)
Ore, F. R. (A)
Paluka, J. R. (M)
Pappentus, E. (SM)
Payne, W. T., Jr. (A)
Perry, R. A. (M)
Perry, V. G. (M)
Peterson, D. L. (A)
Pickering, R. F. (A)

Pierce, R. J. (SM)
Plotkin, L. E. (SM)
Price, J. F. (M)
Rapp, R. N. (A)
Read, E. F. (M)
Rector, J. D. (A)
Reiser, W. (A)
Rennekamp, E. E. (M)
Repp, D. E., Jr. (A)
Rhodes, M. H. (M)
Ringland, J. F. (A)
Ringoen, R. M. (SM)
Rockwell, C. A. (M)
Rollert, C. R. (M)
Rowley, R. J. (A)
Schuster, H. E. (A)
Schwittek, E. W. (A)
Scott, A. J. (A)
Sellers, G. W. (M)
Senti, E. C. (SM)
Sherwood, J. R. (SM)
Shove, N. D. (A)
Skar, R. C. (M)
Smith, J. W. (SM)
Snyder, R. E. (M)
Spencer, D. D. (M)
Sprengeler, J. H. (SM)
Stambaugh, E. D. (A)
Stansbury, R. H. (A)
Stewart, C. (SM)
Stillwell, H. F. (SM)
Stimson, L. R. (A)
Stockwell, G. M. (A)
Stover, H. A. (M)
Stryker, E. M., Jr. (A)
Styers, J. (M)
Taylor, R. C. (A)
Thoennes, E. O. (A)
Thompson, P. (M)
Thompson, W. J. (M)
Thran, D. P. (M)
Tinch, C. S., Jr. (A)
Tollefson, R. D. (A)
Truesdell, R. M. (A)
Uhrik, R. L. (A)
Ulstad, M. S. (M)
Vander-Hamm, R. L. (A)
Van Der Wal, E. A. (A)
Vanous, J. A. (SM)
Vaughn, K. E. (M)
Vick, L. K. (SM)
Viterisl, D. P. (A)
Vrbik, J. (A)
Wainwright, L. F. (M)
Wales, G. A. (M)
Weber, D. W. (SM)
Weber, V. F. (A)
Weeks, R. R. (SM)
Weich, J. D. (A)
Westcott, J. L. (SM)
Western, R. E. (M)
Wetzel, G. N. (M)
White, R. C. (M)
White, R. T. (SM)
Wilson, M. F. (A)
Windus, W. A. (M)
Winkie, S. E. (A)
Winter, L. E. (A)
Wollan, R. W. (SM)
Wright, K. F. (M)
Wulfsberg, A. H. (SM)
Wulfsberg, P. G. (SM)
Zinkus, J. V. (A)

Central City (CR-5)
Hart, R. W. (M)

Council Bluffs (OM-L-5)
Copeland, J. H. (M)
Davidson, S. (M)
Kreger, K. W. (M)
Meyermann, G. W. (A)
Moss, T. L. (VA)
Petersen, W. P. (A)
Stewart, A. C. (M)
Stutzman, H. C. (A)

Crawfordsville (CR-5)
Cherryholmes, C. D. (A)

Cresco (CR-5)
Polashek, E. J. (A)

Davenport (CR-5)
Arvidson, P. G. (M)
Brown, G. G. (M)
Dickey, C. W. (A)
Prater, G. A. (M)
Hayes, C. W. (A)
Petersen, V. L. (M)
Schebler, B. J. (A)
Synder, E. F. (A)

Denver (CR-5)
Schumacher, M. W. (A)

Des Moines (DMA-5)
Eastman, J. W. (M)
Gilman, E. L. (A)
Harris, V. M. (A)
Loyet, P. A. (SM)
Luther, R. E. (A)
McCasland, G. R. (A)
Miller, O. M. (A)
Parrott, A. D. (M)
Price, R. E. (M)
Quentin, C. F. (A)
Kissler, H. D. (VA)
Sharp, R. R. (A)
Sparks, W. J., Jr. (A)
Stauffer, R. E. (VA)
Tennant, O. A. (M)

Dubuque (CR-5)
Walsh, W. J. (M)

Fort Dodge (DMA-5)
Tunwall, C. S. (A)

Grinnell (DMA-5)
Cox, C. L. (A)
Denny, W. B. (M)

Hawarden (OM-L-5)
Otis, J. C. (A)

Hiawatha (CR-5)
Curley, R. E. (A)
Low, S. T. (A)

Independence (CR-5)
Blank, W. A. (M)

Iowa City (CR-5)
Alton, E. D. (M)
Edberg, R. A. (M)
Fankhauser, J. E. (M)
Garrett, E. T. (M)
Hunter, T. A. (F)
Leiting, M. C. (A)
Lowenberg, E. C. (M)
Marner, G. R. (SM)
Menzer, C. H. (SM)
Sauer, H. H. (A)
Ware, L. A. (SM)

Lake City (CR-5)
Clow, R. E. (A)

Le Claire (CR-5)
Keefe, J. W. (A)

Manson (CR-5)
Richards, G. L. (A)

Marion (CR-5)
Bergemann, G. T. (A)
Blair, R. O. (M)
Breed, W. M. (A)
Canfield, R. E. (A)
Carney, C. S. (M)
Chihak, F. P. (M)
Damm, F. (SM)
Dill, F. J. (M)
Frye, E. O. (M)
Hanson, H. L. (A)
Hartsock, R. D. (M)
Herzig, M. E. (M)
Hofferber, H. E. (M)
Hulock, E. (A)
Krogh, S. S. (A)
Lehman, H. W. (SM)
Leverington, R. D. (M)
Mayer, A. F. (A)
Moorhead, P. E. (M)
Newhouse, V. L. (A)
Rodes, W. D. (A)
Rooks, H. B. (M)
Searl, E. P. (M)
Smith, M. S. (SM)
Strelec, C., Jr. (A)
Tuthill, E. G. (M)
Van Tilburry, J. D. (SM)
Wise, R. S. (M)

Mechanicsville (CR-5)
Bates, L. D. (M)

Morning Sun (CR-5)
Sheafor, J. D. (M)

Mount Vernon (CR-5)
Fetig, J. E. (M)

Muscatine (CR-5)
Havercamp, R. P. (M)

Oelwein (CR-5)
McGinnis, S. E. (M)
McMurray, D. D. (M)
Sawvelle, E. V. (A)

Robins (CR-5)
Bebee, M. G. (M)

Sioux City (OL-5)
Call, G. R. (A)
Chaput, R. L. (M)
De Lung, D. O. (A)
King, E. E. (A)
Lindemann, W. W. (M)
Scott, L. D. (A)
Smith, A. H. (M)

Tama (CR-5)
Penhollow, J. O. (M)

Toddville (CR-5)
Baldwin, L. G. (M)
Blackwell, W. C. (A)
Dicken, H. K. (M)
Vance, A. G. (M)

Waterloo (CR-5)
Kirksey, T. W. (M)

West Burlington (CR-5)
Edwards, C. E. (M)
Faulkner, H. E. (A)
Gallino, J. F. (M)
Jones, M. E. (M)

West Liberty (CR-5)
Albin, J. F. (M)

Wheatland (CR-5)
Bentrott, D. W. (A)

KANSAS

Bethel (KC-6)
Barnes, O. C. (M)
Stupica, V. A. (A)
Willis, D. D. (A)

Boicourt (KC-6)
Witcher, J. F. (M)

Chanute (WIC-6)
Patrick, D. J. (A)

Cherryvale (WIC-6)
McGinness, C. C. (M)

Colby (WIC-6)
Unruh, S. W. (A)

Derby (WIC-6)
Hickey, L. F. (A)
Knowlton, R. F. (M)

Dodge City (WIC-6)
Graves, J. D. (A)

El Dorado (WIC-6)
Hegler, B. E. (M)

Forbes AFB (KC-6)
Ward, V. E., Jr. (A)

Fort Learenworth (KC-6)
Brobst, J. D. (M)

Fort Riley (WIC-6)
Boatright, B. C. (M)

Frontenac (KC-6)
Humphreys, J. L. (A)

Gardner (KC-6)
Gault, W. E. (M)
Gay, W. D. (M)
Lobb, C. W. (M)
Reed, D. M. (M)

Haysville (WIC-6)
Rhoten, C. J. (A)

Hiawatha (KC-6)
Legler, H. E. (A)

Hutchinson (WIC-6)
Ayers, D. C. (A)
Cook, K. H. (M)

Independence (WIC-6)
Bennett, H. L. (A)
Jarboe, R. A. (M)
Stedman, J. D. (A)
Swartz, G. A. (A)
Thornton, J. A. (M)

Kansas City (KC-6)
Ayres, R. C. (SM)
Chop, W. J., Jr. (A)
Dearness, J. L. (A)
Donohue, J. W. (A)
Fischer, J. (A)
Fisher, G. F. (A)
Hoover, W. C. (A)
Livingston, W. D. (M)
Mathews, V. M., Jr. (SM)
Monroe, W. J. (M)
Pusch, J. H. (A)
Richards, A. (A)
Stillson, J. W. (A)
Watt, E. M. (A)
Wilson, D. R. (A)

Lawrence (KC-6)
Bland, F. K. (A)
Breyfogle, L. D., III (M)
Ellermeier, R. D. (A)
Hill, R. D. (A)
Landstown, W. D. (M)
Montgomery, H. R. (M)
Nahman, N. S. (A)
Robb, D. D. (M)
Rummer, D. I. (M)
Shirer, H. W. (A)
Van Artsdalen, J. W. (M)

Liberal (WIC-6)
Chapman, D. C. (M)

Manhattan (KC-6)
Bookwalter, E. C. (A)
Boyer, J. W. (A)
Buntte, L. A., Jr. (A)
Halijak, C. A. (M)
Kerchner, R. M. (SM)
Kloeffler, R. G. (F)
Reister, K. W., Jr. (M)
Whan, D. F. (A)

McPherson (KC-6)
Hedquist, T. G. (M)

Merriam (KC-6)
Payman, D. L. (A)

Mission (KC-6)
Broiers, E. L. (A)
Curtis, G. L. (M)
Eisminger, C. I. (A)
Grey, T. G. (A)
Guthrie, J. E. (M)
Jones, M. R. (SM)
Omer, C. L. (SM)
Robb, L. S. (A)
Wearth, A. W. (M)
Wilson, R. G. (A)

Mulvane (WIC-6)
Persels, D. M. (A)
Ruppe, K. E. (M)

Oltmitz (WIC-6)
Gleissner, B. F. (A)

Overland Park (KC-6)
Betros, L. A. (M)
Buglewicz, N. J. (A)
Christy, J. O. (M)
Doyle, R. E. (A)
Evans, W. E. (M)
Fetter, R. W. (SM)
Files, C. O. (M)
Fleming, L. A. (A)
Hyer, F. K. (A)
Lipin, B. (M)
Otto, H. G. (M)
Peppel, T. R. (A)
Rauch, E. L. (M)
Shipe, J. J. (A)
Shirley, J. N. (A)
Wagner, F. R. (M)
Welter, N. E. (M)

Parsons (KC-6)
Tierney, P. V. (A)

Prairie Village (KC-6)
Babbitt, E. B. (M)
Brenner, B. A. (M)
Chester, W. G. (M)
Dalton, R. C. (A)
Findley, L. D. (M)
Gessert, E. C., Jr. (M)
Hadley, J. F. (A)
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. (VA)
Milberger, W. E. (M)
Nigg, D. J. (M)
Sommerville, D. L. (A)
Tyler, S. R. (SM)
Van Zant, R. R. (M)

Severy (WIC-6)
Delk, F. T. (M)

Shawnee (KC-6)
Goll, W. E. (A)
Jaedicke, E. R. (M)

Topeka (KC-6)
Breithaupt, R. C. (M)
Brown, E. B. (M)
Costelow, J. A. (A)
Dickensheets, L. (A)
Francis, M. C. (M)
Frazee, J. W. (M)
Fulcher, J. A. (A)
Grantham, R. B. (M)
Joy, I. L. (A)
Mannell, L. H. (M)
Soper, G. T. (A)
Thompson, J. D. (A)
Totten, G. (A)
Voiles, G. E. (A)

Valley Center (WIC-6)
Cord, C. E. (A)
Depew, H. H. (A)

Wichita (WIC-6)
Ayres, W. R. (SM)
Bereman, E. V. (A)
Black, H. E. (M)
Bowen, M. J. (A)
Bridges, D. K. (A)
Brown, J. W. D. (M)
Byers, H. O. (M)
Callihan, E. S. (M)
Cunningham, J. C. (A)
Davis, H. C. (A)
Duchesneau, B. E. (M)
Dunlap, M. E. (M)
Finnell, J. T., Jr. (M)
Francis, J. W. (M)
Gamm, C. J. (A)
Gozinsky, L. R. (A)
Hardesty, R. D. (M)
Harper, J. M. (M)
Hay, R. E. (A)
Hink, K. G. (M)
Hinshaw, W. G. (A)
Hudson, O. K. (M)
Hutton, L. I. (M)
Johnson, V. N. (M)
Johnson, W. R. (M)
Keene, A. W., Jr. (M)
Kinnaman, R. L. (A)
Klatt, W. K. (M)
Kraus, D. R. (A)
Leighton, C. P. (M)
Loman, J. W. (A)
Louie, W. G. (M)
Lundgren, P. L. (M)
Matz, M. L. (A)
McMearney, P. H. (A)
McDonald, F. W. (M)
McKay, R. A. (M)
McNabb, R. E. (M)
Miller, H. G. (SM)
Murphy, A. T. (A)
Newby, H. H. (M)
Patterson, D. L. (M)
Patterson, J. W. (M)
Patton, P. G. (A)
Piper, E. (M)
Pyle, K. W. (M)
Robinson, C. S. (A)
Rogers, L. W. (A)
Schrag, R. L. (M)
Sheppard, G. E. (M)
Strain, R. A. (A)
Studebaker, J. E., Jr. (A)
Swift, H. G. (M)
Thiel, J. E. (M)
Vandegrift, A. E. P. (M)
Walsh, J. (A)
Welch, C. R. (A)
Wenzel, M. L. (M)

KENTUCKY

Anchorage (LOU-5)
Gordon, J. F. (A)

Ashland (CIN-4)
Patton, T. N., Jr. (M)

Bellevue (CIN-4)
Rohrer, R. S. (M)

Covington (CIN-4)
Munch, W., Jr. (M)
Odenthal, L. H. (M)
Schraer, L. (A)
Taglauer, E. R. (M)

Fairdale (LOU-5)
Beam, L. W. (A)

Fern Creek (LOU-5)
Henson, C. E. (M)
Thompson, R. D. (A)

Fordsville (EO-5)
Matthews, W. V. (A)

Fort Knox (LOU-5)
Sicherl, C. R. (A)
Thomas, D. H. (A)
Winterberger, H. P. (A)

Fort Thomas (CIN-4)
Fischler, P. E. (M)
Flowler, N. B. (SM)
Kolo, R. E. (SM)
Sims, T. W. (A)
Werrmann, C. A. (A)

Glasgow (LOU-5)
Sadler, C. C. (A)

Harlan (LOU-5)
Johnson, M. E. (A)

Henderson (EO-5)
Rothrock, H. B. (M)

Independence (CIN-4)
McGraw, H. E. (M)

Jeffersontown (LOU-5)
Hewitt, L. G. (M)
Lyle, I. W., Jr. (M)

Lexington (LOU-5)
Allison, N. B. (A)
Curry, J. W. (A)
Daily, H. J. (M)
Gilliart, L. W. (A)
Helt, S. (M)
Koppius, O. G. (M)
Pray, E. B. (M)
Roberts, L. R. (M)
Yount, W. R. (A)

Louisville (LOU-5)
Covert, J. L. (M)
Fife, S. I. (SM)
Fitzmayer, L. H. (M)
Gates, S. H. (A)
Givin, H. H., Jr. (M)
Harmon, R. (A)
Hill, E. C. (M)
Hope, C. R. (M)
Hudson, W. E. (M)
Kimmel, E. J. (A)
Koller, O., Jr. (A)
Kwo, T. (SM)
La Vielle, W. R. R. (M)
Logston, H. E. (A)
Marven, E. L. (M)
McAfee, S. S. (A)
Mills, R. W. (M)
Morrison, W. J. (M)
Neher, R. (A)
Nevitt, R. G. (M)
Palmer, R. (A)
Probst, M. C. (M)
Ross, W. H. (M)
Ryan, W. J. (M)
Ryckman, W. D., Jr. (A)
Skaggs, E. P. (A)
Snyder, F. R. (M)
Sprowls, P. H. (M)
Sweets, F. M. (M)
Towner, W. (SM)
Underwood, S. W. (A)
Weigel, F. W., Jr. (M)

Ludlow (CIN-4)
Reynolds, D. J. (M)

Middletown (LOU-5)
Williams, L. A. (M)

Newport (CIN-4)
Fields, G. S. (A)

Olive Hill (CIN-4)
Barker, E. E. (M)

Owensboro (EO-5)
Albrecht, C. E. (SM)
Bertke, H. J. (M)
Boeckman, J. F. (A)
Bond, E. G. (A)
Bowin, W. S. (SM)
Boxx, J. P. (M)
Bristow, S. C. (SM)
Bryant, J. A. (A)
Byars, W. F. (M)
Campbell, J. D., Jr. (A)
Carl, W. L. (A)
Carter, F. M. (A)
Carter, M. G. (SM)
Connelly, J. M. (A)
Coomes, P. S. (M)
Davies, J. A. (M)
Davis, L. B. (SM)
Dickerson A. F. (SM)
Dillon, L. C. (M)
Dorris, R. M. (A)
Edwards, M. W. (SM)
Ellis, L. C. (A)
Fitts, S. M. (SM)
Freeman, H. H. (A)
Graves, M. B. (M)
Haase, A. P. (SM)
Hayes, F. L. (M)
Hopper, C., Jr. (A)
Horne, O. P. (A)
Horton, C. E. (SM)
Hughes, R. M. (A)
Jackson, J. E. (M)
Johnson, K. D. (SM)
Lammers, D. E. (M)
Lattin, W. J. (M)
Le Clear, M. W. (A)
Lemaster, S. W. (M)
Lemaster, W. H. (M)
Madole, J. F. (SM)
Maginn, L. J. (M)
Martin, J. E. (

KENTUCKY

Stephens, J. F. (A)
Stephenson, E. L. (SM)
Taylor, C. L. (M)
Tucker, J. G. (A)
Voeller, R. L. (M)
Walker, R. J. (A)
White, R. G. (M)
Wofford, D. R. (A)
Wood, G. C. (A)

Paducah (EO-5)
Richards, W. W. (A)

Paris (LOU-5)
Miller, L. W. (A)

Richmond (LOU-5)
Turner, J. T., Jr. (M)

Salvisa (LOU-5)
Gritton, D. M. (A)

South Fort Mitchell (CIN-4)
Baker, L. L. (A)
Hughes, J. B. (M)
Schipper, R. J. (M)
Wayne, W. C., Jr. (A)

Southgate (CIN-4)
Stratman, J. W. (M)

Stanley (EO-5)
Jackson, S. G. (M)

Valley Station (LOU-5)
Hedgecock, R. G. (M)

Woodburn (LOU-5)
Morris, C. R. (M)

LOUISIANA

Alexandria (NO-6)
Giaco, V. J. (A)
Rath, G. A. (M)

Arabi (NO-6)
Pechon, A. J. (A)

Barksdale AFB (DAL-S-6)
Booth, J. E. (M)
Longino, D. R., Jr. (A)
Moreland, H. H. (M)
Thomas, O. D., Jr. (A)

Bastrop (NO-6)
Green, W. M., Jr. (M)

Baton Rouge (NO-6)
Case, E. E. (A)
Heine, A. E. (M)
McLean, L. V. (SM)
Owens, W. E. (M)
Perry, G. H. (M)
Raborn, R. L. (M)
Stracener, R. M. (A)
Vergez, J. P., Jr. (M)

Bossier City (DAL-S-6)
Culling, E. J. (M)
Martin, W. C. (M)
Ott, W. F. (M)
Wilcox, C. R. (M)

Buras (NO-6)
Denton, T. L. (A)

Gretna (NO-6)
Landry, W. T. (A)
Range, M. A. (M)

Harahan (NO-6)
Drake, R. L. (M)

Harvey (NO-6)
Karney, T., Jr. (A)

Houma (NO-6)
Honeycutt, T. E. (M)

Jennings (BPA-6)
Bailey, C. L. (A)

Lacombe (NO-6)
Rust, J. J. (A)

Lafayette (NO-6)
Bliss, G. B. (SM)
Prejean, J. C. (A)

Lake Charles (B-PA-6)
Ashley, C. L. (M)
Burkett, A. C. (A)
Maas, R. R. (M)
McKee, C. W. (VA)
Moses, E. C. (A)
Parks, W. B. (A)
Powers, T. G. (M)
States, D. M. (A)
Vincent, L. P., Jr. (M)
Vincent, R. S. (M)
White, R. A. (A)

Lake Rose (NO-6)
Brady, J. A., Sr. (A)

Mangham (NO-6)
Duncan, H. P. (A)

Maplewood (B-PA-6)
O'Shaughnessy, C. A. (M)

Metairie (NO-6)
Adkins, J. M. (M)
Kirkley, D. E., Jr. (M)
Melancon, N. J. (A)
Scroggins, C. M. (M)

Monroe (NO-6)
Boyd, R. L. (M)

Natchitoches (DAL-S-6)
Bailey, B. H., Jr. (M)

New Orleans (NO-6)
Allen, G. (A)
Atkins, R. E. (A)
Barcena, E. A. (M)
Becker, H. C. (M)
Bloom, J. D., Jr. (SM)
Bordenave, L. R. (A)
Chapin, M. F. (M)
Cronvich, J. A. (SM)
Delhom, L. A. (M)
Dowe, R. J. (A)
Dufelch, L. N. (M)
Dureau, L. D. (M)
DuTreil, L. J. N. (SM)
Fahrmeier, M. L. (A)
Freeland, W. T. (M)
Freeman, G. A., Jr. (A)
Fuhr, W. H. (A)
Gadsden, C. P. (A)
Gordon, C. K. (M)
Hammett, R. B. (A)
Hart, W. S. (A)
Hero, G. A., III (A)
Heymann, H. (A)
Hulteen, C. K. (A)
Landry, A. P. (A)
Landry, N. R. (M)
Laughlin, W. L. (A)
Lebde, P. E. (F)
Lobman, J. S. (A)
Louapre, M. E. (M)
Lund, J. E. (A)
Mahn, J. F. (A)
Martin, G. L. (SM)
Mayoral, G. A. (SM)
Morris, J. C. (M)
Nicaet, R. T. (SM)
Often, C. G. (A)
Otto, L. G. (A)
Pelree, G. H. (VA)
Polchow, W. F. (A)
Reid, P. Z., Jr. (M)
Riddle, L. G. (SM)
Roussel, G. A. (M)
St. Romain, J. B. (A)
Savole, L. P. (A)
Seybold, L. C., Jr. (M)
Spencer, J. C. (SM)
Sperry, C. J., Jr. (SM)
Talbot, W. S. (A)
Tong, E. (M)
Whitaker, W. A. (M)
Woods, T. D. (M)
Yacich, P. J. (M)

Opelousas (NO-6)
Williams, H. M. (M)

Pollock (NO-6)
Foster, J. W. (A)

Ruston (DAL-S-6)
Cole, C. F., Jr. (A)
Johnson, D. L. (SM)
Johnson, M. R., Jr. (SM)
Steere, R. M. (SM)
Tarbutton, J. S. (SM)

Shreveport (DAL-S-7)
Amaitis, E. J. (A)
Bains, L. W. (M)
Barton, M. C., Jr. (A)
Benson, M. C. (SM)
Craig, W. H. (M)
Friedman, H. G. (A)
Garrett, E. D. (A)
Gordon, E. (M)
Hitt, J. E. (A)
Hurley, L. (M)
Long, F. V. (SM)
Lowe, B. W. (A)
Maddox, C. H. (VA)
Murray, J. W. (M)
Nuttall, E. D. (SM)
Porter, H. R. (M)
Randolph, A. M. (M)
Smith, R. A. (M)
Strickland, E. C. (M)
Thatcher, F. P., II (M)
Turley, J. R. (M)
Walters, R. J. (A)
Watt, R. L. (A)
Williams, L. T. (M)

Sulphur (B-PA-6)
Albright, A. L. (M)
McNamara, J. E. (M)

West Monroe (NO-6)
Steele, R. M. (A)

MAINE

Augusta (BOS-1)
Graves, P. P. (M)
Parker, R. H. (M)

Bangor (BOS-1)
Creamer, W. J. (SM)
Goodell, R. C. (A)

Biddeford (BOS-1)
Deters, A. A. (A)

Brunswick (BOS-1)
Callaghan, E. P. (A)
Little, N. C. (M)
Nans, E. A., Jr. (M)
Sauer, G. R. (M)

Calais (BOS-1)
Reynolds, J. C. (M)

Camden (BOS-1)
Tibbetts, G. C. (M)

Caribou (BOS-1)
Bell, L. H., Jr. (M)

Dover-Bancroft (BOS-1)
Schide, C. C., Jr. (M)

Dow AFB (BOS-1)
Lauver, R. M. (M)
Riordan, E. R. (M)

Freeport (BOS-1)
Hall, R. T. (M)

Gorham (BOS-1)
Chandler, V. H. (SM)

Harrison (BOS-1)
Carlson, A. W. (A)

Kittery Point (BOS-1)
Cyr, J. P. A. (M)

Limerick (BOS-1)
Brackett, H. H. (M)
Erlandsen, C. F. (M)

Limestone (BOS-1)
Jones, C. L. (A)
Pickett, R. A. (A)

North Leeds (BOS-1)
D. F. Littlefield (M)

Ocean Park (BOS-1)
Anderson, D. D. (A)

Oldtown (BOS-)
Moulton, A. B. (M)

Orono (BOS-1)
Blake, C. (A)
Bowles, L. W. (M)
Brown, C. M. (A)
Mac Farland, H. T. (A)

Portland (BOS-1)
Brewer, L. F. (SM)
Chandler, J. (A)
Cyr, P. E. (M)
Gallimore, J. W. (A)
Hodgkins, R. W. (SM)
Kozinoski, W. (A)
Sterling, G. E. (F)

Presque Isle (BOS-1)
Gefvert, D. R. (M)
Ignatowicz, J. B. (M)
Prescott, C. W. (A)

Randolph (BOS-1)
Newell, G. R. (A)

Raymond (BOS-1)
Marshall, J. R. (M)
Shively, E. H. (M)

Saco (BOS-1)
Kozloff, J. (M)

Sebago Lake (BOS-1)
Browning, G. H. (F)

South Portland (BOS-1)
Achard, F. H., Jr. (M)
Harris, R. G. (A) (M)

Springvale (BOS-1)
Weil, G. M. (A)

Union (BOS-1)
Whitney, L. E. (M)

Waldoboro (BOS-1)
Cooney, J. R. (M)

Yarmouth (BOS-1)
Brown, C. R. (M)

MARYLAND

Aberdeen (BAL-3)
Bergman, R. L. (A)
Busler, J. C. (A)
Byrod, R. B. (M)
Conley, J. M. (M)
Flottmann, E. R. (M)
Hallman J. L. (A)
Hartnett, J. D. (A)
Haskin, R. H. (M)
Hodge, A. H. (M)
Howard, W. G. (A)
Hunsicker, J. E. (A)
Leeder, J. (A)
Roark, G. L. (M)
Schultz, R. H. (A)
Seewald, E. C. (M)
Stoller, M. D. (M)
Teradal, T. (A)
Wallin, C. H. (A)
Wrublewski, M. (M)
Zancanaro, H. W. (M)

Aberdeen Prov. Ground (BAL-3)
Humes, R. M. (A)
McGuire, H. G. (M)
Olson, W. R. (A)
Smith, C. L. (SM)
Sohl, L. H. (M)
Wadsworth, G. B., Jr. (A)

Accokeek (WA-3)
Harris, F. H. (M)
Thornhill, A. F. (M)

Adelphi (WDC-3)
Hott, R. D. (M)
Knodle, R. L. (M)
Marchetta, P. (M)
Wood, C. R., Jr. (M)

Annapolis (BAL-3)
Albright, E. L. (M)
Behrends, P. O. (A)
Carter, W. G. (A)
Daley, J. L. (M)
Dalrymple H. C. (M)
Dickey, L. L. (M)
Feik, R. L. (SM)
Goodhue, W. W. (M)
Hemmick, K. S. (M)
Johnson, N. C. M., Jr. (A)
Leydorf, G. E. (M)
Lindow, I. L. (M)
Mulling, H. F., Jr. (M)
Miller, T. L. (M)
Mumford, E. R. (M)
Quinn, F. S., Jr. (M)
Ray, H. B. (SM)
Scheible, W. B. (M)
Schuttig, L. A. (SM)
Sinex, C. H. (SM)
Terrill, F., Jr. (A)
Tiunn, R. S. (M)
Wylde, R. J. (SM)

Arnold (BAL-3)
Allard, L. C., Jr. (A)
Gould, G. T., Jr. (SM)
Gregory, L. W. (SM)
Heazel, V. M., Jr. (A)
Humiston, H. A. (SM)
Kellam, J. C., Jr. (A)
Parnell, W. S. (A)
Poston, M. H. (M)
Spink, P. G. (A)
Swanson, K. T. (A)

Bainbridge (BAL-3)
Polgar, M. S., Jr. (M)

Baldwin (BAL-3)
Church, G. W. (SM)
Morgan, R. H. (M)

Baltimore (BAL-3)
Abel, A. E. (SM)
Albright, J. D. (M)
Allen, J. E. (M)
Alpert, J. S. (A)
Amato, W. P. (A)
Andersen, A. (M)
Anderson, C. F. W. (SM)
Aprahamian, J. (A)
Armstrong, J. E., Jr. (M)
Ashmead, H. E. (SM)
Ausfresser, H. D. (A)
Aviles, H. N. (A)
Baida, S. (M)
Bailey, R. T. (M)
Baker, A. L. (M)
Baker, C. E. (A)
Baker, R. H. (M)
Ballentine, R. (A)
Baltbis, D. L. (M)
Barbour, C. W., Jr. (SM)
Barlow, A. D. (M)
Barnes, A. E. (M)
Baron, S. (M)
Barthel, D. R. (A)
Bartling, P. B. (M)
Barton, C. H. (M)
Basil, I. J. (M)
Bath, C. C. (SM)
Batterman, S. (A)
Beatty, B. M. (M)
Becker, C. H. (M)
Beckman, N. W. (A)
Bellman, B. M. (M)
Bender, W. W. (A)
Bender, W. W. (SM)
Bennett, J. W. (M)
Benoit, E. E. (SM)
Bentley, F. C. (A)
Berke, L. C. (A)
Berry, A. E. (M)
Betsh, K. W. (M)
Bigelow, R. P. (A)
Billin, W. V. (A)
Bingham, R. J. (A)
Blassaig, H. (SM)
Bloom, L. (A)
Bloomer, T. M. (SM)
Bonham, R. E. (M)
Booth, J. D. (VA)
Bosse, M. L. (A)
Botha, D. G. (A)
Bovill, W. (M)
Bowers, T. N. (A)
Boykin, J. R. (SM)
Brach, J. P., Jr. (M)
Briggs, M. R. (F)
Broadwell, B. L. (M)
Brodwin, M. E. (M)
Brown, D. (M)
Buccilero, J. (A)
Burk, J. C. (M)
Bulik, C. (A)
Burn, J. M., Jr. (A)
Byerly, E. H. (A)
Caldwell, E. E. (M)
Carter, C. G. (SM)
Casserly, E. S., Jr. (A)
Center, M. (SM)
Cerva, C. H. (A)
Chapkovich, A. J. (A)
Chapman, R. W. (A)
Check, R. C. (M)
Chiswell, E. (M)
Choksy, N. H. (M)
Cichanowicz, H. J. (A)
Clark, C. C. (A)
Clark, F. K., Jr. (M)
Clark, M. C. (M)
Claus, O. R., Jr. (A)
Cleaves, W. E. (SM)
Clemson, D. B. (M)
Clifford, R. W. (M)
Clifford, R. P. (A)
Cochran, G. C. (M)
Cockaday, L. M. (M)
Cohen, H. A. (M)
Cohn, M. (M)
Cole, E. B., Jr. (M)
Collins, A. D. A. (M)
Conklin, W. S. (M)
Conley, P. (M)
Cook, H. A. (M)
Cooper, G. (M)
Coppel, J. M. (M)
Corrigan, J. P. (M)
Cosman, A. (M)
Covington, M. B., Jr. (A)
Crane, J. D. (M)
Crane, J. F. (M)
Cropely, J. A. (M)
Dailing, C. J. (M)
Dalle Mura, P. H. (A)
Darr, J. E. (M)
Davidson, G. G. (M)
Davies, E. R. (A)
Davis, J. M., Sr. (A)
Davis, J. W. (M)
Deise, L. F. (M)
De La Cova, P. V. (SM)
Der, C. F. (M)
Derda, J. A. (A)
Desi, G. R. (M)
De Socio, G. (SM)
Disney, J. G., Jr. (A)
Dondelinger, R. W. (M)
Donsbach, W. R. (SM)
Doroshow, S. R. (SM)
Drager, C. A. (M)
Duddy, E. M., Jr. (A)
Dudley, W. A. (A)
Duff, J. S. (A)
Durfee, G. H. (M)
Durman, B. H. (M)
Easson, G. S. (A)
Eckels, A. E. (VA)
Egger, C. P. (A)
Ellert, C. A. (M)
Elliott, L. (M)
Erb, D. R. (M)
Esterson, G. L. (M)
Evans, G. E. (M)
Evans, R. E. (A)
Evans, R. C. (A)
Fallon, G. P. (SM)
Farkas, J. (A)
Farmer, W. J., Jr. (A)
Fell, T. T. (M)
Fellerman, K. D. (M)
Fenichel, I. (M)
Ferg, A. P. (A)
Ferris, H. (M)
Fialkowski, F. A. (M)
Finlnyson, J. A. (M)
Foerster, Roy P. (A)
Fox, R. C. (M)
Franchi, A. (A)
Frankenfield, C. C. (A)
Frattali, F. A. V. (M)
Frazier, R. M., Jr. (M)
Friedman, D. (M)
Friedmann, D. C. (A)
Fucci, E. A. (A)
Funck, E. V. (M)
Gambrill, R. D. (M)
Garrison, C. P., Jr. (M)
General, J. (SM)
Gershberg, D. N. (A)
Gilbert, G. B., Jr. (M)
Giordano, J. R. (M)
Gisriel, F. W., Jr. (A)
Glaser, E. M. (M)
Glucksman, R. M. (SM)
Gogolinski, J. A. (A)
Goldsmith, J. N. (A)
Goodman, S. (A)
Gore, W. C. (SM)
Gott, E. (A)
Graf, H., Jr. (VA)
Graulling, C. H., Jr. (M)
Gray, A. E. (SM)
Green, B. A. (M)
Green, E. E. (A)
Green, R. E., Jr. (A)
Greppler, A. F., Jr. (A)
Griffith, B. H., Jr. (SM)
Griffiths, W. W., Jr. (A)
Grimes, J. S. (M)
Grizzel, R. W. (M)
Grossman, I. (A)
Gunn, T. L. (M)
Gunter, F. B. (SM)
Gunter, J. F. (A)
Hagelgans, E., Jr. (A)
Halio, M. (A)
Hall, O. C. (A)
Hall, R. J. (A)
Haller, E. J. (A)
Ham, C., Jr. (A)
Hamburger, J., Jr. (F)
Hamby, J. O. (M)
Hanks, H. C., Jr. (A)
Hanley, N. B. (M)
Harper, J. T. (A)
Harris, B. (A)
Harris, H. N. (M)
Harris, J. F. (SM)
Hartka, J. J. (M)
Hartwigsen, C. S. (M)
Hauck, V. D. (SM)
Hauf, J. C., III (A)
Hayden, H. P. (A)
Haynes, F. B. (SM)
Heck, J. R. (SM)
Heisler, W. D. (A)
Hemphill, A. (M)
Henderson, R. J. (SM)
Hennessey, J. R. (M)
Henry, G. (M)
Henry, R. M., Jr. (A)
Henthorn, J. E. (SM)
Herring, H., Jr. (SM)
Herwald, S. W. (SM)
Hill, D. D. (M)
Hoffman, P. A. (M)
Hoge, H. H. (M)
Hogge, C. B., Jr. (A)
Hollis, T. W., Jr. (A)
Holman, J. G. (A)
Holzgang, W. F. (M)
Horrigan, J. S. (A)
Horsman, J. O. (A)
Hotz, M. (M)
Houck, J. W. (A)
House, J. F. (A)
Houston, G. P., III (SM)
Houston, J. A. (M)
Hsu, C. C. (M)
Hucke, H. M. (SM)
Huckins, C. E. (M)
Hudgins, J. L., Jr. (M)
Huggins, W. H. (F)
Hume, J. D. (M)
Humphrey, A. L., Jr. (A)
Hunt, V. R. (A)
Hunt, W. W. (M)
Jackson, H. L. (SM)
Jenkins, J. L. (M)
Jenks, J. C. (A)
Jensen, J. (M)
Jett, E. K. (F)
Johnson, M. P. (M)
Johnson, P. S. (M)
Jones, G. R. (A)
Jones, L. G. F. (M)
Jones, M. L. (SM)
Kahl, F. A. (SM)
Kammerman, P. E. (A)

Kampmeyer, R. A. (A)
Karns, L. W. (M)
Karpa, P. (A)
Kasser, R. N. (A)
Katis, C. W. (A)
Katz, M. (A)
Keary, H. F. (M)
Kegel, A. G. (SM)
Kelly, L. J. (A)
Kempf, R. A. (M)
Kenny, B. C. (M)
Kernan, P. (M)
Kerr, D. E. (VA)
Khoury, N. (M)
Kiley, W. H., Jr. (M)
Kimball, L. L. (M)
King, T. J. (M)
Kinn, T. P. (SM)
Kircher, C. J. (M)
Kirkley, E. L., Jr. (A)
Kitces, S. (M)
Klaasen, B. J. (A)
Klitsch, L. L. (A)
Knight, R. M. (M)
Knox, P. C. (M)
Konigsberg, R. L. (M)
Kott, M. A. (M)
Kovaznay, L. S. G. (SM)
Krukan, W. S. (A)
Kravetz, H. T. (M)
Kraxberger, G. S. (A)
Kraybill, M. E., Jr. (M)
Kreitzer, H. M. (A)
Krentzberg, L., Jr. (M)
Kroman, E. J. (M)
Kronlage, R. B., Jr. (A)
Kudo, F. M. (M)
Kuegler, G. K. (A)
Kumm, W. H. (M)
La Bree, C. T. (A)
Lamb, W. G. (M)
Laing, J. T. (M)
Lanza, T. (SM)
Lau, C. B. (A)
Lauderdale, L. K. (M)
Lavin, H. D. (M)
Lawson, E. J. (M)
Leahy, N. (A)
Leap, G. A. (A)
Lecfere, J. (M)
Lee, F. G. (M)
Lee, R. F. (A)
Lees, R. E. (A)
Leish, J. (A)
Lennert, A. E. (M)
Leone, H. A. (A)
Levy, J. (A)
Levy, D. S. (A)
Lindemann, H. B. (M)
Linder, H. S. (A)
Linsenbardt, A. E. (M)
Lisbin, D. M. (M)
Lisiecki, M. (A)
Little, D. G. (F)
Logan, W. F. (A)
London, C. (SM)
Long, B. (M)
Lord, P. H. (M)
Louk, G. V. (A)
Lubbert, G. L. (M)
Lydick, J. D. (M)
Lynch, D. S. (SM)
Lyon, W. T. (M)
MacKenzie, J. E. (SM)
Macker, J. E. (A)
Mackes, D. V. (M)
Mackey, J. (M)
Mann, W. C. (M)
Manner, C. E. (A)
Manson, P. S. C. (M)
Markham, A. S. (SM)
Marshall, P., Jr. (A)
Martin, G. M. (M)
Martin, J. A. (A)
Martinelli, A. A. (A)
Masters, H. M. (A)
Matysek, J. (A)
Mauro, E. A. (A)
Maxwell, D. J. (M)
Maxwell, R. F., Jr. (A)
May, H. A. (A)
Mayer, R. H. (M)
McAdie, C. H. (M)
McCarthy, C. J. (M)
McClure, C. B., Jr. (M)
McCombe, D. H. (A)
McDonald, D. C. (SM)
McIver, D. A. (A)
McLeod, B. C. (A)
McMahon, R. F. (M)
McMullen, C. G. (SM)
McNabb, J. S. (A)
McNally, H. R., Jr. (A)
McPherson, L. G. (A)
Mealey, R. M. (A)
Medlin, R. O., Jr. (A)
Meier, W. M. (M)
Merrill, R. E. (M)
Messner, R. W. (M)
Mester, J. C. (A)
Middleton, F. H. (M)
Miller, C. F. (M)
Miller, L. A. (M)
Miller, W. H., Jr. (M)
Minkiewicz, R. P. (M)
Missy, J. J. (M)
Mockus, J. M. (M)
Molz, K. F. (SM)
Mongold, G. E., Jr. (M)
Moore, C. R., Jr. (A)
Moore, W. H., IV (M)
Morris, E. W. (M)
Morris, V. B., Jr. (M)
Mott, O. B. (M)
Mueller, E. J. (A)
Mullins, F. G., Jr. (SM)
Mundell, K. C. (M)
Murphy, R. E. (M)
Murray, J. B. (A)
Mutch, J. J. (M)
Myers, F. G. (SM)
Mysing, J. O. (M)
Nace, P. E. (A)
Newcomb, W. H., Jr. (A)
Newton, C. E., Jr. (M)
Nickerson, P. E. (A)
Nims, A. A., Jr. (SM)
Nobles, C. E. (SM)
Nolen, J. C. (M)
Noll, R. E. (M)
Nopper, C. S. (A)
Norris, R. N. (A)
Norris, V. L. (A)
Nugent, J. A. (A)
O'Connor, W. A., Jr. (A)
O'Donnell, R. J. (SM)
Offermann, F. B. (M)
Ogg, F. C., Jr. (M)
Ogland, J. W. (SM)
O'Hare, W. S. (M)
Orr, R. V. (M)
Oster, E. W., Jr. (A)
Otto, W. C., Jr. (M)
Owen, J. Q., (M)
Page, E. T. (M)
Palmer, W. D. (A)
Panzitta, J. (A)
Park, A. R. (A)
Park, J. H., Jr. (A)
Parks, H. L. (A)
Parrish, W. F. (M)
Parsons, D. W. (A)
Paska, R. A. (A)
Pearce, J. M. (SM)
Penabad, J., Jr. (A)
Pereda, E. F. (M)
Perlin, A. I. (M)
Phillips, B. E. (SM)
Pierson, C. D., Jr. (SM)
Pincoffs, P. H. (M)
Pipkin, J. E. (M)
Plank, P. E. (A)
Platt, J. E., Jr. (A)
Poehler, T. O. (M)
Powell, C. (M)
Pratt, A. (SM)
Pridgen, W. L. (M)
Pulford, W. M. (M)
Quigley, W. W. (M)
Rakoske, D. T. (A)
Ralston, G. (SM)
Rambo, S. I. (SM)
Ramer, J. F. (M)
Rasch, C. F., Jr. (A)
Raudsep, I. G. (M)
Raynes, H. D. (M)
Real, P. (A)
Reen, J. V. (A)
Reichert, D. G. (M)
Reis, H. J. (M)
Renwick, R. L. (M)
Rhodes, W. B. (A)
Rich, G. H. (A)
Richard, R. H. (A)
Richards, J. (M)
Richardson, E. C. (M)
Richardson, W. R. (M)
Richmond, I. D. (A)
Riley, R. N. (M)
Ripnitz, A. (M)
Roberts, H. D. (A)
Roedel, S. (A)
Rogers, M. (M)
Rohner, A. J. (M)
Rood, R. S. (M)
Rose, G. C. (M)
Rosenblum L. P. (M)
Rossi, A. D. (A)
Rothar, D. E. (M)
Roush, R. G. (SM)
Royce, H. W. (M)
Ruebenstein, E. (A)
Rueggeberg, W. (M)
Ruehl, G. C., Jr. (M)
Rutstein, H. S. (A)
Ryan, C. C. (M)
Sample, D. (A)
Sander, W. E. (M)
Sanford, R. W. (M)
Sanner, G. E. (M)
Sargent, C. R. (M)
Sarris, R. A. (A)
Sauceman, J. A. (A)
Scattergood, R. (A)
Scheffel, A. G. (M)
Scheiner, S. R. (SM)
Schemman, E. E. (SM)
Schillo, T. B. (SM)
Schleider, N. (A)
Schmid, O., Jr. (A)
Schreuer, W. (SM)
Schreyer, S. D. (M)
Schubert, C. J., Jr. (M)
Schullery, E. D. (A)
Schulmeyer, R. L. (M)
Schutt, V. L. (M)
Schutz, H. (SM)
Schwab, J. H. (A)
Scott, D. M. (A)
Scott, J. E. (M)
Seifrit, H. B., Jr. (A)
Seman, A. E., Jr. (A)
Seymour, C. F. (M)
Shagman, E. M. (A)
Shaw, G. D. (M)
Shawker, C. H. (M)
Sherwin, L. W. (A)
Sichelstiel, R. A. (A)
Siedband, M. P. (M)
Sieron, E. M. (M)
Silva, C. (A)
Silverman, L. (A)
Sima, R. L. (M)
Siavin, M. (M)
Smith, C. E., Jr. (M)
Smith, E. G., Jr. (M)
Smith, H. E. (M)
Smith, J. W. (M)
Smith, W. B., Jr. (M)
Smoot, W. L. (A)
Solley, J. D. (M)
Sones, W. K. (M)
Soroka, B. (M)
Sparks, J. F. (A)
Spencer, P. H. (A)
Spicer, W. T. (M)
Spiegel, S. S. (M)
Starr, F. E. (A)
Staschke, R. A. (A)
Stefan, R. S. (M)
Stein, E. F. (A)
Stelene, L. H., Jr. (A)
Stephenson, J. O. (M)
Sternbach, S. J. (A)
Stiblard, H. R. (A)
Stout, G. P. (SM)
Stout, J. V. (M)
Strandberg, P. R. (M)
Stull, K. S. (M)
Sukhia, D. E. (M)
Sullivan, J. D. (M)
Tabisz, S. C. (M)
Taragin, S. (M)
Tashjian, D. R. (SM)
Taylor, J. S. (M)
Taylor, M. (M)
Telep, E. (VA)
Thomas, A. G. (A)
Thomas, J. F. (M)
Thompson, E. H. (A)
Thompson, J. E. (M)
Tischler, M. (M)
Tisdale, S. E. (A)
Titen, H. (M)
Titus, C. K. (M)
Todes, R. S. (M)
Toler, B. L. (A)
Toll, H. D. (M)
Trinter, V. E. (M)
Turtle, L. (M)
Tylor, H. L. (SM)
Ulman, L. J. (M)
Urbanski, E. F. (M)
Valenzuela, G. R. (M)
Vanderlipp, R. R. (M)
Van Meter, J. L. (M)
Vaughan, C. H. (M)
Veazie, C. E. (A)
Vergara, W. C. (SM)
Vest, S. E. (M)
Vierling, H. D. (M)
Vogt, G. L. (M)
Vore, M. P. (M)
Wagner, J. L. (M)
Walch, R. C., Jr. (M)
Waldorf, S. K. (SM)
Wallace, H. E. (A)
Walls, A. B. (A)
Warner, H. V. (A)
Waters, R. H. (A)
Watson, T. E. (M)
Watts, H. M. (SM)
Webb, G. N. (M)
Weems, C. M., Jr. (M)
Weingarten, M. (M)
Welsted, L. G. (A)
Wentworth, F. L. (A)
Werner, S. A. (A)
Wexler, M. F. (M)
Wheeler, M. S. (M)
Whitcomb, M. F. (A)
Whitney, A. (SM)
Wilkes, L. D. (M)
Wilkins, R. P. (A)
Willey, R. E. (M)
Williams, A. D. (A)
Williams, R. A. (A)
Williams, R. L. (M)
Wilner, J. T. (SM)
Wiltse, J. C., Jr. (A)
Winner, A. C., Jr. (SM)
Winsley, W. H. (A)
Wittman, R. C. (A)
Wolf, F. H. (M)
Wolf, H. S. (A)
Wolfe, B. (M)
Wolfe, B. F. (M)
Wolfe, R. E. (M)
Wolfe, R. E. (M)
Wolpert, M. L. (M)
Wolsey, L. G. (M)
Wong, J. B. (A)
Wood, K. E. (M)
Wood, W. R. (A)
Woodard, W. W. (SM)
Woolyard, R. H. (A)
Woppman, G. E. (A)
Worrell, E. A. (M)
Wulff, L. H. (A)
Yaffe, T. H. (SM)
Yarbrough, H. B. (M)
Yeh, L. T. (M)
Yeich, V. B. (A)
Young, L. (SM)
Zacharia, H. (M)
Zamoyta, J. A. (A)
Zeisler, W. E. (A)
Zimmerman, R. (A)
Zindler, G. F. (A)
Zins, W. A. (M)
Zukauskas, P. J. (A)
Zweier, I. (M)
Zwerling, M. (A)

Bel Air (BAL-3)
Bunda, F. E. (M)
Haney, D. W. (M)
Hendrickson, J. R., Sr. (M)

Beltsville (WA-3)
Beyer, G. L., Jr. (M)
Biggerstaff, W. F. (M)
Davies, G. L. (SM)
Hayth, W. D. (A)
Klischer, G. A. (M)
Newman, A., Jr. (A)
Reukauf, D. C. (M)

Berwyn Heights (WA-3)
Walton, W. W. (M)

Bethesda (WA-3)
Affelder, C. (SM)
Andelson, R. F. (A)
Apstein, M. (SM)
Arsem, C. (M)
Astin, A. V. (F)
Baluta, R. E. (M)
Baxter, J. L. (A)
Bedford, P. L. (M)
Blanks, R. T., III (M)
Bode, G. F. (A)
Boese, W. C. (SM)
Bowman, R. L. (SM)
Bush, G. P. (SM)
Cacheris, J. C. (SM)
Cahn, L. (M)
Cahn, R. H. (M)
Calhoun, T. G. (M)
Cannon, R. E., Jr. (M)
Carley, W. S. (SM)
Clair, J. D. (M)
Cullen, F. H. (A)
Delort, R. (M)
Diehl, L. G. (A)
Distad, M. F. (SM)
Dougherty, J. G., Jr. (M)
Doyle, E. M. (M)
Eidson, R. A. (M)
Fong, L. B. C. (SM)
Frederick, C. L. (M)
Fryer, W. T. (M)
Gerwin, H. L. (SM)
Goumas, N. P. (A)
Grant, C. R. (SM)
Grantham, R. E. (SM)
Hartz, J. E. (SM)
Haydon, G. W. (A)
Hedrich, A. L. (SM)
Held, J. C. (A)
Hobbs, E. V. (A)
Hoff, R. S. (SM)
Jacobs, D. H. (M)
Jenkins, M. (M)
Jervis, F. R. (SM)
Jolun, F. (A)
Johnston, R. W. (SM)
Jordan, S. A., Jr. (SM)
Kreery, W. J. (M)
Klima, W. M. (M)
Landis, F. E. (SM)
Laynor, J. E. (M)
Leeraw, R. C. (A)
Lehman, J. E. (M)
Levy, J. E. (M)
Liddel, D. (F)
Lilly, J. C. (M)
Lusted, L. B. (SM)
Mahaffey, G. N. (M)
Matthews, S. S. (M)
McElhiney, H. R. (M)
McDowell, W. E. (M)
Meisner, P. (M)
Melton, B. S. (SM)
Mrill, R. L., Jr. (M)
Mickey, L. (M)
Miller, P. G. (M)
Moore, J. W. (SM)
Nigro, J. P. (A)
Noble, F. W. (M)
Pearce, H. U. (A)
Pepper, W. H. (A)
Pfund, C. E. (M)
Portmann, P. A. (M)
Quren, L. (M)
Ream, D. L. (A)
Richards, A. P. (SM)
Ring, A. D. (A)
Rist, A. E. (SM)
Roddy, V. S. (VA)
Rudigier, J. L. (A)
Rutz, E. M. (SM)
Saunders, W. K. (A)
Sawitz, P. H. (M)
Seymour, G. B. (A)
Shaull, J. M. (SM)
Shultz, R. S. (M)
Smith, K. A. (M)
Sommer, H. (A)
Sommer, J. G., Jr. (M)
Stewart, J. L. (M)
Stinchfield, J. M. (SM)
Trinn, A. E. (A)
Vann, I. M., Jr. (M)
Ware, R. S. (A)
Webster, E. (M)
Weinschel, B. O. (SM)
Wenzinger, C. J., Jr. (M)
Wheeler, L. R. (M)
Whittaker, D. A. (M)
Wilson, C. A. (M)
Winter, C. W., Jr. (M)
Wolfand, D. (M)

Bladensburg (WA-3)
Crabill, P. F., Jr. (A)

Brandywine (WA-3)
Conner, L. M. (M)

Burtonsville (WA-3)
Claypool, W. S. (VA)
Waltz, W. R. (A)

California (WA-3)
Dogantzis, B. E. (A)
Wilder, J. M. (A)

Cambridge (BAL-3)
Holdt, D. H. (A)
Orr, G. M. (A)

Camp Springs (WA-3)
Schmid, P. E., Jr. (A)

Cascade (WA-3)
Gutsmuth, H. R. (M)
Stevens, C. L. (A)

Catonsville (BAL-3)
Behler, R. J. (SM)
Boenning, C. B. (M)
Bowen, J. R. (A)
Burnside, C. J. (SM)
Calhoun, C. D., Sr. (M)
Chapin, E. W. (SM)
Chudleigh, W. H., Jr. (SM)
Cole, D. P. (A)
Des Lauriers, E. L. (A)
Francis, J. P. (M)
Goulden, D. E. (A)
Hicks, C. S. (M)
Hoddinott, E. V. (A)
Hoffman, H. C., Jr. (SM)
Jacob, M. I. (SM)
Johnson, H. W. (M)
Johnson, J. L. (SM)
Kinsman, W. D. (M)
Mattern, J. (M)
Meyer, A. W. (M)
Phelps, G. H. (SM)
Pfitz, F. (A)
Ruth, H. O. (M)
Senator, R. S. (A)
Singel, J. B. (SM)
Smith, H. B. (M)
Whatley, E. C., Jr. (SM)
Zamites, C. J. (M)

Chase (BAL-3)
Schultz, R. L. (A)

Chesapeake Beach (BAL-3)
Grosvenor, A. C. (SM)

Cheverly (WA-3)
Beegle, D. H. (SM)
Davis, R. E. (M)
Gill, A. B. (A)
Gipe, R. C. (A)
Juchno, E. A. (A)
Mehrbach, E. (M)
Sly, R. D. (A)
Waldo, G. V. (VA)
Weaver, C. E. (A)
Whitney, F. G. (M)

Chevy Chase (WA-3)
Ainsworth, E. F. (A)
Alexander, S. N. (F)
Blumberg, M. (M)
Brady, J. B. (SM)
Caldwell, C. M. (SM)
Caporale, P. (SM)
Carlson, P. N. (M)
Carter, H. J. (SM)
Clapper, H. T. (A)
Engel, F. H. (SM)
French, J. C. (M)
Gager, W. B. (M)
Gebhart, J. H. (M)
Gordon, D. I. (SM)
Hall, E. L. (SM)
Hansen, C. B. (M)
Henry, J. H. (M)
Hill, L. P. (SM)
Ikelman, G. J. (A)
Jenkins, J. L. (M)
Kambouris, G. N. (M)
Kelley, G. W., Jr. (VA)
Kirsch, R. A. (M)
Larsen, P. J. (SM)
Lavier, E. C. (M)
Lee, P. H. (SM)
Linvill, W. K. (M)
Little, J. L. (M)
Mills, M. H. (SM)
Molander, A. B. (A)
Neal, P. L. (SM)
Ohleson, A. (A)
Parkhur

MARYLAND

Edgewater (BAL-3)
Bremer, J., Jr. (A)
Rosenberry, W. W. (SM

Edgewood (BAL-3)
Frasher, M. M. (A)

Ednor (WA-3)
Dinunno, J. J. (A)

Elkridge (BAL-3)
Clark, T. H. (SM)
Fegely, W. D. (M)
Loux, P. B., Jr. (A)

Ellerton (WA-3)
Alexander, F. C. (SM)

Ellicott City (BAL-3)
Barnhart, E. F. (A)
Briggs, R. H. (A)
Crocker, G. M., Jr. (M)
Fischer, F. W. (SM)
Goldbach, A. C. (A)
Hutchinson, J. O. (M)
Leister, R. E. (SM)
Mabry, F. S. (SM)
McDonough, J. T. (A)
Thaus, N. B. (SM)
Ziegler, R. E. (M)

Fallston (BAL-3)
Marcroft, H. C. (SM)

Ferndale (BAL-3)
Neau, O. T. (A)
Smith, K. W. (A)

Fort Meade (BAL-3)
Bordicker, D. J. (M)
Kuntz, H. A., Jr. (A)
Lockwood, R. L. (M)
Roof, J. L. (A)
Kerr, J. L. (M)
Levine, A. (M)
Montella, D. T. (M)
Wells, F. D. (M)

Frederick (WA-3)
Alexander, N. E. (SM)
Corcoran, J. W. (A)
Daugherty, E. J. (M)
Kolsrud, E. R. (M)
Lockwood, E. H. (SM)
Miller, L. F. (A)
Price, O. L., Jr. (M)
Price, O. L. (M)
Roughan, J. V. (M)
Walker, D. H. (A)

Fulton (BAL-3)
Kroft, H. M. (A)

Gaithersburg (WA-3)
Adams, J. T. (M)
Campbell, W. S. (M)
Freiemuth, W. L. (M)
Johnson, R. N. (M)

Garrett Park (WA-3)
Aylor, R. P., Jr. (VA)

Glen Arm (BAL-3)
Jones, O. L., Jr. (SM)
Lee, R. A. (A)
Packard, R. F. (A)
Spiker, R. A. (M)
Wood, L. E. (M)

Glen Burnie (BAL-3)
Aasen, M. D. (M)
Andreatta, J. H. (A)
Arnold, D. E. (M)
Asaki, G. G. (A)
Bartlett, P. G. (M)
Bauman, R. E. (A)
Bevan, W. R. (A)
Booth, T. L. (M)
Borchers, N. L. (M)
Boyles, C. W. (A)
Brannon, D. L. (M)
Brown, E. A. (M)
Buchan, J. F. (A)
Burr, W. E. (M)
Chauvin, D. M. (A)
Cluny, M. C. (A)
De Andraide, W. C. (M)
Demougeot, G. M. (A)
Driggers, R. H. (A)
Eckstein, G. (M)
Edwards, J. D. (M)
Ewanus, W. (M)
Fiege-Kollmann, H. (M)
Filipowsky, K. (A)
Forget, T. W. (M)
Frame, T. E. (M)
Gedance, A. R. (A)
Gildenberg, D. I. (M)
Girtunas, J. J. (M)
Hacker, P. S. (A)
Hedgecock, D. M. (M)
Hockett, S. H., Jr. (M)
Jones, E. E. (M)
Koether, G. H., Jr. (M)
Lawton, H. D. (M)
McBride, J. F. (A)
Merchant, S. A., Jr. (M)
Mooney, D. H., Jr. (SM)
Moskowitz, C. (M)
Musk, H. A. (M)
Neyhart, P. L. (M)
Parris, W. J. (A)
Pearson, J. L. (A)
Prasger, W. C. (M)
Rey, T. J. (SM)
Rogers, C. L., Jr. (A)
Schubert, E. J. (SM)
Shafer, M. W. (A)
Shepherd, S. G., Jr. (A)
Sorrell, P. A. (M)
Stebbins, W. J. (M)
Stewart, N. H. (SM)
Svensson, E. L. (A)
Thompson, J. E. (M)
Tomlinson, C. C. (SM)
Weinstein, E. M. (A)
West, J. P. (M)
White, J. E. (M)
Willis, A. H. (M)
Wilson, H. C. (M)

Glencoe (BAL-3)
Raboy, B. (A)

Greenbelt (WA-3)
Hanyok, A. (A)
Justman, S. (M)
O'Connor, T. M. (A)
Parkison, E. R. (A)
Petkof, B. (M)

Hagerstown (WA-3)
Davidson, H. K. (M)
Fuller, B. K. (A)
Maycock, J. C. (M)
McIntire, G. W. (A)
Philpott, J. W., Jr. (M)
Pitzer, H. B. (M)
Spencer, D. K. (A)

Halethorpe (BAL-3)
Becker, J. A. (SM)
Jentilet, A. (M)

Hanover (BAL-3)
Groszer, A. J., Jr. (A)

Havre De Grasse (BAL-3)
Arnold, N. W. (M)
Kintner, P. M. (A)
Paul, H. F. (A)
Putnam, R. E. A. (M)
Richard, V. W. (M)
Weik, M. H., Jr. (A)

Hillandale (WA-3)
Eckert, J. E. (SM)

Hillcrest Heights (WA-3)
Lynch, D. W. (M)

Hollywood (WA-3)
Young, C. H. (M)

Huntingtown (BAL-3)
Voisich, J. (A)

Hyattsville (WA-3)
Adams, T. E. (M)
Arnold, J. B. (M)
Beardsley, H. S. (A)
Bell, B. D. (M)
Berry, J. E. (A)
Blum, H. E. (A)
Breeden, S. D. (M)
Burns, J. C. (A)
Campbell, L. E. (M)
Chu, Y. (M)
Cirincione, G. V. (M)
Cohen, C. L. (M)
Collier, W. W. (M)
Crawford, G. D. (M)
Didra, W. E. (A)
Farkas, C. E. (M)
Farkas, L. (M)
Fulcher, C. S. (A)
Gager, F. M. (SM)
Garner, W. E. (M)
Gran, R. W. (A)
Graybeal, W. E. (A)
Greenwald, S. (M)
Harris, G. T. (M)
Hausman, A. H. (M)
Hengesh, J. G., Jr. (M)
Hoffman, M. (M)
Holden, S. E. (A)
Hutchinson, E. M. (A)
Izard, C. B. (M)
Jones, J. J. (M)
Josephson, G. C. (A)
Keller, T. B., Jr. (A)
Khu, E. B. (A)
Kulikowski, E. F. (SM)
Lambidakis, P. G. (A)
Landfried, H. H. (M)
Lefkowitz, H. (M)
Lyon, H. H. (VA)
Marcotte, P. G. (M)
Marcus, M. A. (M)
Masching, R. G. (M)
Messenheimer, A. D. (M)
Moseley, J. C., Jr. (A)
Oscar, J. S. (A)
Palasky, E. C. (M)
Pamphilon, L. E. (M)
Paris, A. A. (A)
Pendleton, T. A. (A)
Pielmeier, G. R. (M)
Pike, W. N. (M)
Porreca, G. (M)
Reuss, M. L., Jr. (M)
Richie, S. M. (SM)
Roberts, P. M. (M)
Ryals, J. W. (A)
Silverstein, A. (A)
Sorensen, G. L. (M)
Starobin, A. F. (A)
Stuntz, J. W. (M)
Summers, C. R. (A)
Tal, J. H. Y. (M)
White, J. W. (A)

Hydes (BAL-3)
Sturtevant, C. E. (SM)

Indian Head (WA-3)
Henderson, J. E. (M)
Ryon, J. C. (M)
Squire, R. K. (M)

Keedysville (WA-3)
Lent, F. E. (A)
Nakamura, D. S. (A)

Kensington (WA-3)
Ahern, C. R. (M)
Alldredge, L. R. (M)
Batten, J. C., Jr. (M)
Becker, W. E., Jr. (M)
Bell, W. S. (M)
Burcham, D. P. (M)
Butenhoff, R. L. (M)
Carpenter, R. C. (M)
Compton, R. D. (A)
Cooperman, J. L. (A)
Crone, F. L. (M)
Gray, W. M. (M)
Hekimian, N. C. (M)
Hiltz, F. F. (A)
Horton, B. M. (A)
Jenkins, K. A. (M)
Joseph, H. M. (SM)
Kaiser, J. A., Jr. (M)
Kaiser, O. C. (A)
Lilly, K. G. (M)
Mac Quivey, D. R. (M)
Meadows, L. A. (SM)
Miller, F. B. (A)
Mitoma, E. Y. (M)
Moore, E. C. (A)
Morey, F. C. (M)
Morse, A. O. (A)
Myrick, J. C. (M)
Notz, W. A. (M)
Ostaff, W. A. (SM)
Peters, M. W. (M)
Petrie, G. W., III (SM)
Pincus, S. (M)
Radabaugh, E. L. (M)
Redmond, J. J. (SM)
Riblet, H. B. (SM)
Ridgley, N. R., Jr. (M)
Rosenberg, R. S. (M)
Sheppard, W. J. (M)
Spinks, A. W. (M)
Spriggs, J. O. (M)
Sprinkle, M. C. (M)
Sulzer, P. C. (A)
Waters, W. E., Jr. (M)
Wears, L. R. (A)
Webster, E. M. (F)
Whipple, L. G. (A)
Woodside, G. E., Jr. (A)
Yaffee, P. (SM)

Kingsville (BAL-3)
Davis, H. P. (M)
Pullen, K. A., Jr. (SM)

Landover Hills (WA-3)
Stromwall, C. W. (VA)
Moltrup, G. R. (M)

Lanham (WA-3)
Apfelbeck, R. J. (A)
Stoops, C. W. (M)
Yuill, S. J. (M)

Lansdowne (BAL-3)
Travers, J. F., Jr. (A)

Laurel (WA-3)
Campbell, D. L. (A)
Craig, A. G. (M)
Kimble, A. (A)
Mobley, M. C. (M)
O'Connor, S. S. (A)
Roberts, W. K. (M)
Shinn, E. N. (A)
Straughn, J. B. (M)

Lexington Park (WA-3)
Bartels, W. S. (SM)
Browne, W. M. (SM)
Leopard, G. W. (SM)
Lynch, J. F. (M)
Russell, C. M. (SM)
Wilson, R. T. (SM)

Linthicum (BAL-3)
Dunn, J. E. (M)
Hrybyk, W. L. (A)
Kuehn, H. S. (SM)
Petrou, N. V. (SM)
Ramsay, J. H. (M)
Rustad, L. W. (M)
Soboleski, W. P. (A)

Linthicum Heights (BAL-3)
Ap Rhys, T. L. (M)
Bastow, J. G., Jr. (M)
Blas, G. H., Jr. (M)
Holt, C. A., Jr. (A)
Collins, Z. L. (M)
Dempsey, M. E. (A)
Garrett, C. L. (A)
Goetz, L. P. (SM)
Hill, W. W., III (M)
Holman, F. P. (A)
Kraeger, G. W. (M)
Lee, R. E. (M)
Lee, R. (F)
Lungo, A. J. (A)
Newhouse, P. D. (A)
Rogers, C. H. (A)
Seldon, W. Z. (M)
Tellier, J. (M)
Wolf, S. (A)
Worster, J. R. (M)

Lutherville (BAL-3)
Albin, F. I. (M)
Brockway, A. L., Jr. (M)
Carpenter, L. B. (A)
Claborn, K. D. (A)
Eby, J. T. (M)
Esher, J. R., Jr. (SM)
Freeland, A. F. (M)
Gebgardt, R. C. (A)
Henck, E. D. (M)
Horn, W. R. (M)
Jackson, J. H. (M)
Kent, L. L. (A)
Rausa, G. J. (M)
Rice, C. I. (SM)
Scanga, W. A. (A)
Schoenwetter, H. K. (M)
Senger, F. A. (M)
Tewksbury, J. M. (M)
Walter, R. J. (A)

Mayo (BAL-3)
Williams, W. S. (M)

Middle River (BAL-3)
Cook, A. R. (A)
Purner, R. C. (A)
Millersville (BAL-3)
Horn, R. E. (A)
Huddleston, F. J. (SM)
Valenta, M. F. (SM)

Monkton (BAL-3)
Barnett, F. M., Jr. (A)
Puckett, D. W. (M)
Thompson, F. J. (A)

Mount Airy (BAL-3)
Nikirk, H. S. (A)

Mount Rainier (WA-3)
Bush, J. E. (M)
Flanagan, J. D. (A)
Gouge, J. R., Jr. (M)
Kurtzman, S. P. (A)
Sheltelman, H. D. (M)
Slominski, T. V. (A)

North Beach (BAL-3)
Fliss, A. D. (A)
Touchette, H. J., Jr. (A)

North Chevy Chase (WA-3)
Redler, W. M. (SM)

North Linthicum (BAL-3)
Albright, R. K. (A)
Axelby, G. S. (SM)
Butala, E. F. (A)
Coulter, E. L. (M)
Fisher, S. G. (M)
Hamer, E. G. (SM)
Houston, D. R. (M)
James, C. L. (A)
Mack, K. M. (M)
Temple, J. M. (SM)

North Linthicum Heights (BAL-3)
Kaaz, F. W. (M)

North Serverna Park (BAL-3)
Christie, C. J. (A)

Odenton (BAL-3)
Haughey, J. W. (A)

Pasadena (BAL-3)
Miller, C. J. (SM)

Patuxent River (WA-3)
Allmandinger, E. F. (SM)
Benson, W. J. (A)
Braddy, J. A. (A)
Hannah, G. B. (A)
Holman, J. C. (M)
Martin, A., Jr. (A)
Nelson, C. E. (M)
Robbins, J. H. (A)
Thunder, L. C. (M)
Walsh, J. S. (A)
Yulo, C. (A)

Phoenix (BAL-3)
Bennighof, R. H. (A)
Davis, R. J. (SM)
Gryder, W. L. (M)
Munson, L. A. (M)
Rantfall, M. W. (M)
Wells, R. W. (SM)

Pikesville (BAL-3)
Barrack, C. M. (M)
Gilbert, E. M. (A)
Lambert, J. (M)
Marie, C. S. (M)
McDade, J. G. (A)
Schrank, H. E. (SM)
Thomas, C. V. (M)
Wright, R. E. (M)
Younginger, E. J. (M)

Point of Rocks (WA-3)
Loucks, I. H. (SM)

Potomac Heights (WA-3)
Bissett, E. B. (M)

Prince Frederick (BAL-3)
King, B. (A)

Randallstown (BAL-3)
Broady, S. N. (M)
Burns, J. E. (A)
Deitz, J. H. (A)
Doknas, J. J. (A)
Mannel, W. M. (A)

Reisterstown (BAL-3)
Duncan, R. S. (A)

Relay (BAL-3)
Reynolds, D. W. (A)

Riderwood (BAL-3)
Ellen, S. T. (M)

Riverdale (WA-3)
Nye, J. W. (A)
Powers, M. L. (A)
Stout, C. M. (M)
Tullerico, A. (A)
Withrow, W. E. (M)

Rockville (WA-3)
Beecher, D. W. (M)
Benjamin, R. P. (A)
Biser, M. H. (SM)
Anderson, B. E., Jr. (A)
Auermanne, M. J. (M)
Austin, J. H. (A)
Barnard, G. L. (A)
Bowman, J. E. (A)
Brodie, A. H. (M)
Brush, J. W. (A)
Burnside, E. D. (M)
Carpenter, R. J. (M)
Cohen, G. S. (M)
Cole, W. M., Jr. (A)
Coneland, A. L. (A)
Dellasanta, O. (M)
Dozier, J. J., Jr. (A)
Dye, J. E. (A)
Elam, F. E. (M)
Fitzgerald, R. T. (M)
Gardenhour, A. J., Jr. (A)
Geranis, A. J. (M)
Gilliand, H. W. (A)
Gleason, R. J. (SM)
Grady, T. J. (A)
Haltiwanger, J. C. (A)
Hardin, C. D. (M)
Heilprin, L. B. (M)
Hoffman, L. (M)
Holtman, C. P. (A)
Jones, W. N. (M)
Koenig, P. E. (SM)
Lahu, F. C. (M)
Le Febre, D. C. (A)
Mathieu, R. E. (M)
McClellan, C. E. (SM)
McKechnie, J. S. (SM)
Mooney, M. J. (A)
Reeder, J. R. (M)
Strong, M. E. (A)
Van Duzer, K. W., Jr. (M)
Wascavage, S. A. (A)
Winter, C. W. (M)
Young, A. F. (M)

Silver Spring (WA-3)
Abramovich, M. N. (SM)
Aide, R. C. O. (A)
Allen, U. L., Jr. (M)
Anderson, H. C. (M)
Anderson, H. W. (SM)
Andrews, W. J. (A)
Andrick, C. A. (A)
Anspacher, W. B. (SM)
Applebaum, A. (M)
Bacon, E. J. (M)
Baldini, B. P. (A)
Barnard, E. H. (M)
Barse, G. R. (A)
Bassett, R. S. (M)
Beach, E. H. (M)
Beaulieu, A. J. (M)
Beck, E. (M)
Bernstein, B. (M)
Blosca, L. F. (M)
Blackburn, C. A. (M)
Blair, C. E. (A)
Bond, H. A. (SM)
Bonwit, K. S. (A)
Bowman, H. A. (M)
Bond, M. L. (SM)
Bonwit, S. E. (M)
Bradford, W. C. (A)
Braum, C. M. (SM)
Brimberg, M. M. (SM)
Brown, J. (SM)
Bryan, S. (SM)
Buckingham, S. A. (M)
Buehler, J. H. (A)
Burger, R. M. (M)
Burlingame, C. W. (A)
Bunis, A. G., Jr. (M)
Bush, G. B. (M)
Butler, P. (A)
Byer, D. L. (M)
Cancro, C. A. (M)
Carleton, H. (M)
Chambre, C. S. (M)
Cheston, T. C. (SM)
Chwastyk, A. M. (M)
Cohen, J. (M)
Collins, J. R. (M)
Collins, J. (M)
Cook, F. W. (VA)
Cook, T. B (M)
Cooper, H. W. (SM)
Coscarelli, E. (M)
Costrell, L. (SM)
Cote, A. J., Jr. (A)
Cotts, A. C. (SM)
Crabill, W. B. (A)
Craig, P. M., Jr. (M)
Danner, B. L. (M)
Davis, G. W. (M)
Davis, W. L. (M)
Dawley, J. R., Jr. (M)
Dean, F. A. (A)
Deitz, J. (SM)
Diambra, H. M. (A)
Dippell, R. E., Jr. (A)
Dobbins, B. D. (M)
Doud, R. D. (M)
Dunn, W. F. (M)
Durkovic, J. E. (SM)
Dye, R. E. (M)
Early, D. M. (A)
Ellis, R. T., Jr. (M)
Emch, G. F. (A)
Eskowitz, A. (A)
Evans, R. J. (A)
Ewing, J. H. (M)
Fallon, C. (A)
Faram, H. D. (M)
Fink, C. (M)
Finkel, A. (M)
Fischer, W. (A)
Fisher, E. M. (M)
Flato, M. (M)
Flyer, I. N. (SM)
Freeburger, B. P. (A)
Friedman, S. N. (M)
Fullen, W. E. (M)
Fund, S. R. (SM)
Funkhouser, R. E., Jr. (M)
Gale, M. (A)
Gammill, R. A., Jr. (A)
Garberson, J. R. (A)
Garver, R. V. (M)
Gaynor, N. (M)
Gessner, R. J. (A)
Gilbert, J. N. (SM)
Gillean, M. E. (A)
Glassco, P. B. (SM)
Glorioso, A. R. (M)
Goldstein, G. D. (M)
Goodman, S. I. (M)
Gordon, H. L. (M)
Gossard, W. H. (M)
Gould, W. L., Jr. (A)
Grant, E. C. (A)
Greene, E. E. (M)
Griaamore, N. T. (A)
Haley, I. (SM)
Halvorsen, H. W. (A)
Hamblen, J. W. (M)
Hardy, A. O. (A)
Harrison, H. (SM)
Heller, A. (M)
Henry, R. L., Jr. (M)
Herider, E. D. (M)
Hermach, F. L. (M)
Hibbard, W. D., Jr. (M)
Hickley, T. J. (SM)
Hickok, C. H. (A)
Hillstrom, W. B. (M)
Hiltner, R. P. (A)
Hirschel, L. R. (M)
Hoadley, J. C. (SM)
Hoffman, C. W. (A)
Hogan, D. L. (SM)
Holbrook, R. O. (SM)
Hollis, J. L. (SM)
Hooper, E. T. (M)
Hosea, M. E. (M)
Huber, C. E. (M)
Hurlburt, E. H. (SM)
Jacobs, G. (SM)
James, J. L. (M)
Jaques, A. T. (SM)
Jesurun, M. M. (M)
Johnston, T. F. (M)
Joslow, J. (A)
Kanter, G. (M)
Katz, I. (SM)
Kerney, R. W. (M)
Kiebler, J. W. (M)
King, W. P. (M)
Kirkland, G. I. (M)
Klink, G., Jr. (A)
Knowles, R. B. (M)
Knox, A. A. (M)
Koutsandreas, J. D. (M)
Kraus, D. G. (M)
Kraus, R. W. (M)
Krebs, W. N. (VA)
Kreis, A. L. (VA)
Kreitzer, H. M. (M)
Kuck, J. H. (SM)
Laine, R. O. (M)
Larson, R. C. (M)
Latson, F. W. (M)
Laughlin, C. R., Jr. (A)
Lawrence, J. T. (SM)
Leach, J. H. (M)
Lee, J. D. (M)
Le Gare, J. M. (SM)
Leibowitz, R. C. (M)
Leonard, F. M. (M)
Leslie, C. B. (M)
Levine, S. (A)
Lieberman, G. (A)
Looney, H. L., Jr. (A)
Lord, J. R. (A)
Love, R. G. (M)
Lun, M. J. (M)
Lundquist, G. A. (M)
Machlin, A. (M)
Mader, L. W. (A)
Mallin, J. A. (M)
Marsh, D. S. (M)
Marshburn, C. E. (SM)
Martin, K. H. (SM)
McCall, T. D. (M)
McDonald, L. W. (A)
McDuffie, G. E., Jr. (M)
McKeel, P. D. (SM)
Meister, R. (A)
Melvin, E. A. (M)
Mengel, J. T. (SM)
Merchant, W. J. (SM)
Merkel, M. A. (A)
Michelsen, P. F. (A)
Montgomery, J. D. (M)
Moser, E. B. (A)
Munson, H. B. (SM)
Nagrant, J., Jr. (A)
Nagy, A. W. (SM)
Nathanson, F. E. (M)
Newman, N. (A)
Nucci, E. J. (SM)
Oakes, J. B. (M)
Ober, H. E. (SM)
O'Hara, J. J., Jr. (M)
Oittinen, K. E. (A)
Oliver, M. E. (M)
Page, C. H. (F)
Palca, J. C. (A)
Parachini, L. F. (A)
Parks, J. N. (A)
Pear, C. B., Jr. (M)
Pendleton, E. E. (A)
Petersen, J. A. (A)
Petritz, R. L. (A)
Phelps, R. W. (A)
Plotkin, G. N. (M)
Plotkin, J. (M)
Poritzsky, S. B. (M)
Preisman, A. (F)
Proudley, R. E. (A)
Pugh, M. E. (A)
Raber, S. (M)
Randolph, J. P., Jr. (SM)
Rappaport, G. (F)
Ray, H. A., Jr. (SM)
Reagen, E. J. (M)
Reinhart, S., Jr. (M)
Prugh, T. A. (SM)
Reed, H. Z. (M)
Regnier, R. C. (A)
Rice, L. W. (A)
Robel, R. B. (SM)
Robertson, T. M. (SM)
Robinson, R. O., Jr. (SM)
Rogers, A. L. (A)
Roman, W. R. (M)
Rosenberg, J. D. (M)
Ross, R. R. (M)
Rotkin, I. (SM)
Rowland, R. W. (M)
Rueger, L. J. (SM)
Sanders, W. E. (A)
Sasse, J. (M)
Sayler, A. W. (A)
Saylor, W. R. (SM)
Schroeder, J. (A)
Schuchard, E. A. (M)
Schulman, J. R. (M)
Scillian, G. L. (SM)
Seaton, J. W. (M)
Seneenbaugh, D. W. (M)
Sera, F. (M)
Shade, K. E. (A)
Shaw, H. F. (A)
Shawe, M. E. (A)
Sheppard, T. W. (M)
Shreckengost, R. C. (A)
Silverman, H. M. (M)
Silverman, S. (SM)
Simms, A. (A)
Simon, A. (M)
Slagal, R. P. (M)
Slife, J. F. (A)
Smith, C. N. (A)
Smith, R. W. (A)
Smollett, R. J. (M)
Snow, C. E. (M)
Solow, M. (M)
Sorrows, H. E. (A)
Spenser, C. W. (M)
Spetner, L. M. (SM)
Staake, D. B. (SM)
Star, J. (A)
Stein, M. (A)
Street, H. W. L. (A)
Stroble, R. R. (M)
Sullivan, J. J. (A)
Sures, A. H. (SM)
Swanson, E. E. (M)
Taylor, R. E. (SM)
Terrell, R. L. (VA)
Tims, E. F. (SM)
Toense, E. R. (M)
Toense, R. A., Jr. (A)
Totah, E. J. (M)
Tregidga, A. C. (SM)
Trout, P. A. (A)
Udelson, B. (M)
Uglow, K. M., Jr. (SM)
Upchurch, L. M., Jr. (M)
Urban, W. D. (M)
Valkenburg, E. P. (M)
Van Hoeen, R. W. (A)
Vann, W. L. (M)
Varhus, H. H. (M)
Vilas, E. T. (M)
Wales, R. G. (M)
Walsh, G. W. (M)
Walters, F. M., III (A)
Walters, L., Jr. (M)
Watson, R. D. (SM)
Webster, E. R. (A)
Weichbrod, J. (SM)
Weinstein, M. S. (M)
Weitzel, R. L. (M)
Westerfield, E. E. (A)
Wetmore, G. B. (A)
Weyler, G. M., Jr. (M)
White, N. (SM)
White, P. E. P. (A)
Whybrew, J. W. (M)
Williams, C. M. (SM)
Williams, V. L. (M)
Williams, W. E., Jr. (SM)
Willis, F., Jr. (SM)
Wilson, R. R., Jr. (A)
Wise, J. W. (M)
Witte, J. J. (M)
Witow, M. I. (M)
Worsley, G. (SM)
Wyman, R. C. (M)
Yates, W. A. (SM)
Young, J. D. (SM)

Simpsonville (BAL-3)
Hogue, G. E. (M)
Jones, L. S. (M)
Solomons (BAL-3)
Morris, A. D. (M)

Sparks (BAL-3)
Macnichol, E. F., Jr. (M)
Wegener, A. F. (M)

Spencerville (WA-3)
Smith, W. L. (SM)

Stevenson (BAL-3)
Caplan, N. (SM)

Stevensville (BAL-3)
Wise, H. J. (SM)

Timonium (BAL-3)
Baker, D. A. (M)
Birge, W. A. (A)
Dawson, S. R. (M)
Duquet, E. A. (M)
Faber, D. C. (A)
Franz, W. J. (A)
Hart, A. C. (M)
Pribble, N. F. (M)
Reel, G. M. (M)
Shelor, E. G., Jr. (M)
Singer, L. M. (M)
Smeltzer, R. F. (A)
Smith, W. J. (A)
Towles, W. B. (SM)
Visher, W. A. (A)
Weidner, E. J. (A)
Wild, T. A. (M)

Towson (BAL-3)
Ackerman, W. W. (A)
Allinder, R. H. (M)
Allison, D. M., Jr. (SM)
Andrews, W. R. (M)
Armstrong, J. H. (M)
Bang, B. A. (M)
Barclay, A. S. (M)
Barnhill, R. B. (M)
Bracken, W. H. (M)
Campbell, R. R. (A)
Campbell, W. O. (M)
Carpenter, J. W. (M)
Chrisman, D. W. (SM)
Colvin, J. W. (M)
Cope, R. W. (A)
Cosby, J. R. (M)
Delaney, R. P. (A)
Diersing, C. B., Jr. (M)
Drake, J. E. (M)
Dullinger, A. G., Jr. (A)
Eaton, T. T. (SM)
Edwards, R. B. (M)
Flaag, D. G. (A)
Forbes, N. A. (M)
Frazier, R. V. (M)
Gage, D. D. (SM)
Germain, R. C. (M)
Gibson, R. L. (A)
Graffis, L. F. (SM)
Greene, W. H. (M)
Hall, H. S. (A)
Hammond, J. W. (SM)
Hanna, R. E. (M)
Hatcher, J. H. (M)
Hatfield, G. I. (M)
Hoft, W. L. (A)
Hulce, R. L. (M)
Jackson, E. L., Jr. (M)
Kaltenbacher, D. M. (M)
Killion, R. H. (SM)
King, E. J. (M)
Kochever, H. J. (M)
Lamblin, W. S. (SM)
Laning, W. A. (M)
Larkins, E. B. (M)
Markwalter, J. L., Jr. (SM)
Meador, A. B., Jr. (M)
Millar, R. L., Jr. (M)
Phalen, F. W. (A)
Phillips, W. D. (M)
Purinton, H. (M)
Quinn, T. J., Jr. (A)
Randolph, G. W. (M)
Ransom, J. R. (M)
Riggs, R. N. (A)
Riley, C. L., Jr. (M)
Rockett, F. H., Jr. (SM)
Rowley, R. C. (A)
Ruth, J. K. (M)
Sartorio, D. D. (A)
Seiberlich, J. S. (M)
Silbert, W. C. (M)
Sinclair, A. L., III (M)
Slager, D. M. (A)
Smith, W. C. (A)
Staulk, H. R. (SM)
Steele, R. C. (A)
Strickroth, G. J. (SM)
Sudia, A. T. (A)
Taylor, J. H. (SM)
Thomas, C. E., Jr. (A)
Thomas, R. K. (SM)
Vana, C. J. (M)
Wallace, E. E., Jr. (M)
Walter, G. M. (M)
Wells, L. C. (M)
White, G. R. (SM)
Wilkinson, R. L. (A)
Woodrow, G. V., Jr. (SM)
Woodward, R. M. (M)
Yates, L. R. (A)
Zutkoff, A. I. (A)

Uniontown (BAL-3)
Buffington, C. T. (A)

University Park (WA-3)
Burke, J. K. (A)
Coker, R. H. (M)
Krason, H. C. (M)

Upper Falls (BAL-3)
Meara, V. T. (M)

Upper Marlboro (WA-3)
Davis, E. H. (A)
Parker, R. R. (M)

Walkersville (WA-3)
Carstensen, E. L. (SM)
Welcome (WA-3)
Lamm, C. M., Jr. (A)

West Hyattsville (WA-3)
Bitz, E. A. (M)
Dawson, W. C. (A)
Ferrara, A. A. (A)
Gorozdos, R. E. (A)
Harrison, B. H. (M)
Haynes, J. M. (A)
Horowitz, L. (M)
Kennedy, E. D. (M)
Kessler, S. (A)
La Pointe, J. C. (SM)
Mackenzie, C. M. (A)
Marzetta, L. A. (M)
Poynter, L., Jr. (A)
Puckett, R. E. (M)
Young, H. D. (M)

West Severna Park (BAL-3)
Cowan, K. D. (A)
Wojcicki, F. J. (A)

Wheaton (WA-3)
Gragnani, O. J. (A)
Patton, R. E. (A)
Petes, J. (M)

Wheaton Heights (WA-3)
Baechtel, A. R. (M)

White Marsh (BAL-3)
Francis, J. P. (A)
Friesser, J. M. (M)
Lindenthal, M. W. (A)
Nesbitt, W. E. (SM)

Woodbine (BAL-3)
Mullinix, N. E. (M)

Woodmoor (WA-3)
Smith, C. B. (M)

Woodstock (BAL-3)
Glover, F. N. (M)

MASSACHUSETTS

Abington (BOS-1)
Mielke, E. S. (A)
Pihl, G. E. (SM)

Acton (BOS-1)
Packard, L. E. (F)
Sawyer, C. E. (A)
Searle, R. W. (A)
Sletten, C. J. (M)

Adams (CV-B-1)
Owczarski, W. A. (M)
Zabawa, E. P. (A)

Agawam (CV-1)
Rackliffe, R. J. (A)

Allston (BOS-1)
Allen, D. F. (A)
Belkin, A. (A)
Davis, M. C. (M)
Futran, S. M. (M)
Land, H. R. (M)
Levy, L. S. (M)
Plumb, D. R. (M)
Shekel, J. (SM)
Thompson, E. D. (M)
Vafiades, B. C. (A)
Washburn, W. K. (A)

Amesbury (BOS-1)
Hambleton, P. N. (SM)

Amherst (CV-1)
Langford, J. W., Jr. (M)

Andover (BOS-1)
Finley, A. D. (M)
Garfield, O. R. (SM)
Gearin, J. H., Jr. (A)
Heistein, J. T. (A)
King, R. A. (M)
Short, H. H. (A)
Strauss, A. (M)
White, J. R. (M)
Wilson, R. S. (A)
Word, J. A. (SM)

Arlington (BOS-1)
Adams, W. L. (M)
Alonso, R. L. (A)
Ames, B., Jr. (M)
Antul, J. J. (SM)
Astuli, S. O. (A)
Benkley, F. C. (M)
Bogart, R. M. (M)
Bunker, W. M. (M)
Buick, W. P. (M)
Cairns, H. E. (A)
Carlson, W. A. (A)
Carroll, T. J. (M)
Chang, S. H. (SM)
Chisholm, V. T. (M)
Clark, W. A., Jr. (A)
Cohen, G. (M)
Cohen, M. S. (A)
Cole, B. R. (M)
Collins, W. E. (M)
Cosman, B. J. (A)
Cox, G. C. (A)
Defandorf, J. P. (M)
De Lisle, J. E. (M)
Drew, D. B. (A)
Favaloro, C. J. (A)
Galopin, A. (A)
Gano, J. J. (SM)
Gardella, C. E. (M)
Graham, J. W. (A)
Granlund, J. (M)
Gustaff, A. J. (M)
Hallock, C. F. (SM)
Hanson, G. (A)
Hawkins, R. S. (A)
Hiatt, R. E. (M)
Hovannesian, A. S. (M)
Jeffrey, R. F. (M)
Kiesling, P. W., Jr. (A)
Laughlin, M. J. (M)
Levy, A. O., Jr. (M)
Lin, C. S. (M)
Lovenstein, A. J. (SM)
Lusc, J. D. (M)
Lutz, L. E. (M)
Maserian, L. (M)
McCabe, H. P. (M)
McCann, J. F. (A)
McKee, D. A. (SM)
Michaelis, H. P. (M)
Mills, A. L., Jr. (M)
Morrow, W. E. (M)
O'Brien, A. F., Jr. (M)
Pasciuto, R. D. (A)
Perry, R. D. (M)
Perry, K. E. (A)
Pierce, J. A. (F)
Plotts, E. L. (SM)
Principia, M. A. (M)
Riska, G. G. (M)
Robinson, W. H. (M)
Rowe, A. J. (A)
Ruzz, J. (SM)
Sachs, R. (SM)
Sawyer, P. B. (M)
Sheridan, W. F. (A)
Smith, W. B. (M)
Smoll, A. E. (M)
Soron, H. I. (M)
Stevens, H. C. (A)
Stutt, C. A. (M)
Tassinari, S. P. (A)
Thornton, R. D. (M)
Tilton, C. S. (SM)
Torrey, B. M. (SM)
Trunfio, A. P. (M)
Twicken, S. (M)
Von Recklinghausen, D. R (A)
Voutselas, T. (A)
Walsh, W. P. (M)
Warren, R. M. (A)
Wellons, R. S. (SM)

Arlington Heights (BOS-1)
Cleveland, L. (M)
Lamson, H. W. (F)

Ashby (BOS-1)
Coleman, D. L., Jr. (M)

Ashland (BOS-1)
Chase, D. G. (M)
Pathe, J. F. (SM)
Tanigawa, G. (M)
Zeller, H. R., Jr. (M)

Attleboro (BOS-1)
Channing, W., Jr. (A)
Daniel, F. H. (A)
Gustafson, D. W. (A)
Logan, C. A. (A)

Auburn (BOS-1)
Beschle, R. G. (M)

Auburndale (BOS-1)
Bishop, P. (M)
Day, P. F. (A)
Finneran, W. J. (A)
Ingalls, R. P. (M)
Janis, P. (SM)
Meier, H. R. (A)
Ryan, C. E. (M)
Sheppard, L. E. (M)
Westbrook, E. P. (M)
Zimbel, N. S. (M)

Avon (BOS-1)
Chappell, I. C. (A)
Edwards, E. W. (A)

Babson Park (BOS-1)
Horton, W. P. (M)
Riblet, H. J. (M)

Ballard Vale (BOS-1)
Zink, A. J., Jr. (SM)

Barre (BOS-1)
Cronin, J. F. (A)

Beachmont (BOS-1)
Mastromarino, J. A. (A)

Bedford (BOS-1)
Acton, D. J. (M)
Altschuler, S. (M)
Andersegg, J. S. (A)
Angus, R. B., Jr. (SM)
Armstrong, G. R. (M)
Baker, R. H. (A)
Barker, H. R., Jr. (M)
Barnes, J. W. (A)
Barrett, R. M. (M)
Bean, R. H. (A)
Bishop, W. B. (M)
Blacksmith, P., Jr. (M)
Brown, D. M. (M)
Brown, R. B., III (M)
Buzzard, R. D. (A)
Canty, W. J. (A)
Capen, E. H. (M)
Carruthers, C. W. (M)
Chitouras, C. G. (A)
Claflin, R. E., Jr. (M)
Crandell, P. A. (A)
De Vita, A. J. (A)
Difford, L. A. (A)
Emanowsky, A. E. (M)
Fernald, R. A. (A)
Field, W. G. (M)
Fischer, H. L. (A)
Frewald, W. J. (A)
Fricks, R. E. (M)
Friedman, M. (M)
Gerhardt, R. H. (M)
Gerrand, F. (A)
Gleen

Harrison, J. R. (M)
Harwood, A. (M)
Hawes, A. R. (SM)
Healy, B. H. (A)
Herrera, J. C. (M)
Hickey, H. G. (A)
Hinckley, K. M. (M)
Ingber, L. K. (A)
Ivanov, A. (M)
Johnson, P. C. (M)
Jones, G. C. (M)
Jurgielewicz, S. S. (A)
Kent, A. J. (A)
Koehler, R. L. (M)
Konkle, K. H. (A)
Lee, J. H. (A)
Lovell, R. W. (M)
Mack, C. L., Jr. (A)
Madle, E. J. (M)
McCurley, E. P. (M)
McMurthrie, D. L. (SM)
Miccoli, A. R. (M)
Moore, D. D., Jr. (M)
Morganstern, R. L. (M)
Morin, J. O. (M)
Morris, R. V. (A)
Morrison, C. D. (A)
Mudgett, W. L. (A)
Munz, R. (M)
Nagy, F., Jr. (M)
Peeler, G. D. M. (M)
Perkins, J. F., Jr. (A)
Petrucci, S. J. (M)
Pickene, N. N. (M)
Prom, G. J. (A)
Pugh, A. L., III (M)
Renecke, H., Jr. (M)
Richardson, D. A. (M)
Rodman, A. K. (M)
Roediger, F. E. (M)
Rudolph, H. W., Jr. (M)
Schwarzkopf, D. R. (M)
Seltfridge, J. J. (A)
Sen, H. K. (SM)
Shapiro, M. L. (A)
Sheldon, E. J., Jr. (A)
Sherburne, A. E. (M)
Smith, C. L. (M)
Stevens, R. T. (M)
Stone, N. (M)
Vance, W. H., Jr. (M)
Watson, J. C., Jr. (M)
Wulfsberg, K. N. (M)
Zuckerman, V. N. (A)

Belmont (BOS-I)
Albert, B. (A)
Barry, J. G. (SM)
Benulon, J. L. (M)
Blackburn, J. F. (M)
Blaeser, G. H. (A)
Coolidge, C. A., Jr. (A)
Cox, W. W. (M)
Crapo, S. T. (M)
Crosby, R. C. (M)
Davidson, D. (M)
Dolbear, B. L. (SM)
Dudley, B. (SM)
Duncan, N. L. (M)
Edgerton, H. E. (F)
Elliott, C. L. (M)
Fall, P. L. (A)
Foster, R. P. (A)
Gray, H. L. (A)
Handy, R. A. (A)
Haus, H. A. (A)
Hellenbrand, C. M. (A)
Hildebrand, J. G., Jr. (M)
Hughes, A. M. (A)
Hunt, F. V. (F)
Klemperer, H. (A)
Kohler, H. M. (M)
Kondl, S. E. (A)
Macrakis, M. S. (A)
McCarthy, D. J. (M)
Mercer, W. R. (SM)
Murphy, J. E. (M)
Naylor, T. K. (M)
O'Day, M. D. (M)
O'Hara, F. J. (A)
Phaneuf, C. A. (M)
Reed, J. (SM)
Reintjes, J. F. (SM)
Restaino, A. J. (M)
Rhyins, R. W. (M)
Richardson, A. S. C. (M)
Rines, R. H. (SM)
Robinson, J. A. (M)
Rona, T. P. (SM)
Saunders, A. C. W. (M)
Simons, J. C., Jr. (SM)
Smith, B. H. (M)
Stein, J. (A)
Vogan, E. L. (A)
Wagner, C. A. (A)
Wagner, R. W. (M)
Woodward, R. H. (M)

Berkshire (CV-B-I)
Lord, R. W. (M)

Berlin (BOS-I)
Krackhardt, R. H. (A)

Beverly (BOS-I)
Biggs, O. H. (M)
Brown, N. J. (A)
Cahlly, J. A., Jr. (A)
Dillahay, F. F. (SM)
Ferris, P. A. (A)
Finneault, W. L. (M)
Foss, D. W. (M)
Giles, W. R. (A)
Hangstefer, J. B. (M)
Heffernan, J. C. (A)
Heins, H. (A)
Karcher, R. W. (M)
Kraemer, L. D. (M)
Krinsky, B. D. (A)
Lesch, F. A. (A)
Martin, J. E. (M)
Perron, R. R. (M)
Pierce, D. H. (M)
Prescott, G. A. (A)
Richardson, L. D. (M)
Rudenberg, H. G. (M)
Ryan, H. G. (M)
Safran, L. (M)
Schramm, J. A. (A)

Billerica (BOS-I)
Arbuckle, W. L. (M)
Benjamin, C. R. (M)
Branking, B. M. E. (A)
Heiser, W. W. (M)
Kirshner, H. J. (A)
Lyden, J. A., Jr. (M)
Martin, E. O. (M)
Mason, C. D. (M)
Mohr, M. C. (M)
Murano, L. (M)
Nickless, H. C. (A)
O'Brien, W. F. (M)
Parker, E. O., Jr. (M)
Sacks, D. M. (M)

Bolton (BOS-I)
Granstein, W. W., Jr. (M)
Mechlin, R. N. (M)
Slade, C. B. (A)
Wilson, H. M. (SM)

Boston (BOS-I)
Alford, A. (F)
Almquist, M. L., Jr. (M)
Anderson, C. W. (M)
Babin, R. S. (SM)
Bailey, R. B. (A)
Bairnsfather, R. R. (A)
Bakalar, D. (M)
Bardfield, M. L. (M)
Barnes, R. P., Jr. (M)
Blitz, D. (M)
Bress, C. (M)
Breuer, B. J. (M)
Brodheard, W. M. (M)
Brooks, P. R., Jr. (M)
Burdick, G. E. (M)
Charest, R. J. (A)
Cheatham, T. P., Jr. (SM)
Chin, B. M. (A)
Christian, J. W., Jr. (M)
Chung, V. T. (M)
Clements, P. S. (A)
Cole, A. D. (M)
Collins, J. L. (SM)
Collins, R. B., Jr. (M)
Cowperthwait, F. N., Jr. (A)
Creighton, J. E. (A)
Dantas, G. F. (M)
Decker, R. O. (A)
De Wolf, N. (M)
Diornp, R. S. (M)
Dolansky, L. O. (SM)
Downes, A. B. (A)
Durieux, C. W. (A)
Eaton, L. G. (M)
Engel, P. F. (M)
Epstein, H. D. (M)
Erwin, H. P., Jr. (M)
Essigmann, M. W. (SM)
Farnsworth, E. P. (SM)
Faulkner, W. H., Jr. (SM)
Feunles, G. J. (M)
Fricker, S. J. (M)
Friedman, A. L. (A)
Gernesbausen, K. J. (SM)
Glanoukos, W. A. (A)
Goldberg, H. B. (A)
Gordon, B. M. (M)
Grossmon, H. P. (A)
Guterman, S. S. (SM)
Haberstroh, A. (SM)
Hellenstein, N. A. (M)
Harben, L. A. (M)
Hastings, T. M., Jr. (SM)
Hearn, K. F., Jr. (M)
Heinz, J. M. (M)
Highstrete, B. A. (A)
Hobson, J. E. (F)
Irons, F. H. (M)
Jung, P. (M)
Kalisewski, T. (A)
Kelner, R. C. (A)
Kerk, C. T. (A)
Kilroy, H. P. (M)
Kim, Y. S. (M)
Klein, R. D. (M)
Kletsky, E. J. (M)
Kostecki, W. (A)
Lee, R. C. (M)
Lewis, G. A. (M)
Little, E. P. (A)
Lipke, D. W. (M)
Littlehoy, H. S. (M)
Loewenthal, M. (M)
Macdonald, C. J. (A)
McLaughlin, P. J. (A)
Mead, F. M. (A)
Micol, R. L. (A)
Millen, S. G. (A)
Moon, R. F. (M)
Newman, B. R. (M)
Nugent, W. R. (A)
Onyshkevych, L. S. (M)
Palmer, R. T. (M)
Perloff, G. (M)
Phelps, L. T. (A)
Priestley, D. M. (M)
Pryor, J. G. (M)
Ramler, D. A. (A)
Randall, D. S. (A)
Redpath, D. C. (M)
Rigby, S. (M)
Rines, D. (M)
Roberts, L. W. (SM)
Roeber, F. W. (M)
Rose, J. E. (M)
Rubin, L. (A)
Scher, N. (M)
Schindler, J. A. (A)
Schwartz, S. (SM)
Sciegienny, J. (M)
Seaver, W. H. (M)
Segal, R. J. (M)
Sell, W. R. (SM)
Sherman, P. (A)
Shortell, A. V., Jr. (M)
Smith, R. D. (SM)
Sokal, N. O. (SM)
Stone, S. G. (A)
Strimling, W. E. (M)
Sussman, S. M. (M)
Talambiras, R. P. (M)
Teachman, A. E. (SM)
Thomas, A. S. (A)
Topczer, R. S. (M)
Wagner, P. S. (M)
Waite, S. (VA)
Warren, J. R. (A)
Wayne, G. H. (SM)
Weingarten, J. (M)
Woodward, J. H. (SM)
Wozencraft, J. M. (M)
Young, F. M. (SM)
Zabludowsky, A. (A)

Boxford (BOS-I)
Fulton, R. O. (A)
Kuczun, C. G. (M)

Braintree (BOS-I)
Brennan, J. E. (M)
Myrbeck, R. E. (SM)
Polachowski, B. A. (A)

Bridgewater (BOS-I)
Trocchi, R. F. (M)
Wilber, L. C. (M)

Brighton (BOS-I)
Anfenger, E. (M)
Chan, M. C. H. (M)
Feigenson, A. (A)
Gaeta, N. (M)
Gillis, J. E. (M)
Globus, L. A. (M)
Goldman, S. (A)
Hanopol, E. (M)
Haroules, G. G. (M)
Huggan, A. J. (S)
Jacob, F. (M)
Katz, L. D. (M)
Larkin, J. D. (M)
Lerner, H. A. (A)
Lowenstein, H. L. (A)
MacGregor, N. (A)
Margolin, A. C. (M)
McDougall, J. C. (M)
Miller, M. M. (M)
Montanari, R. E. (M)
Riteman, E. A. (M)
Riegelhaupt, N. H. (M)
Rotman, W. (M)
Rubinovitz, J. L. (M)
Talley, W. K. (A)
Wolf, S. M. (A)
Worth, G. E. (M)
Yurt, X. (VA)

Brockton (BOS-I)
Fortier, O. V. (A)
James, P. G., Jr. (A)
Mac Leod, A. D. (M)
Marshall, A. R. (M)
Rubin, H. L. (A)
Sampson, E. (A)
Ward, A. G. (M)

Brookline (BOS-I)
Ackerman, R. L., Jr. (M)
Bartzoff, B. (A)
Bartzoff, B. (A)
Bartzoff, J. S. (A)
Bentley, A. W. (A)
Bergmann, S. M. (M)
Bloom, J. R. (A)
Bow, B. H. (A)
Bradley, C. L. (M)
Cohler, E. U. (A)
Crystal, M. (M)
Doctor, D. E. (A)
Garber, T. A. (A)
Gerber, I. B. (M)
Golembe, S. N. (M)
Hagan, T. G. (A)
Hart, W. H. (M)
Howard, C. F. (M)
James, G. E. (SM)
Kaminow, I. P. (A)
Korlis, R. D. (SM)
Krieger, L. V. (M)
Lorant, C. R. (M)
Miller, A. (SM)
Neumann, H. D. (A)
Owen, S. (M)
Parkhill, D. F. (M)
Parks, J. T. (M)
Peluso, D. J. (A)
Plousios, G. (M)
Polaven, M. B. (A)
Rappaport, M. R. (M)
Reichner, A. J. (M)
Salow, S. R. (A)
Sebestyen, G. S. (M)
Segel, H. P. (A)
Spira, H. (M)
Tsao, C. K. H. (M)
Waltzer, B. (A)
Weiner, G. (M)
Weiner, M. M. (M)
Weinstein, I. J. (M)
White, D. H. (M)
Wong, G. W. (M)

Burlington (BOS-I)
Borton, J. T., Jr. (A)
Clougherty, J. J. (M)
Lally, R. J. (M)
Markow, E. W. (SM)
Neidorf, E. (M)
Nevins, J. L., Jr. (M)
Peterson, D. E. (M)
Sandholm, R. G. (M)
Schorr, M. G. (M)

Buzzards Bay (BOS-I)
Engstrom, H. T. (SM)

Cambridge (BOS-I)
Adams, G. J. (SM)
Adler, R. B. (SM)
Aiken, H. H. (SM)
Alexander, R. M. (A)
Applegate, C. E. (SM)
Arthure, E. (A)
Ashenhurst, R. L. (M)
Austin, H. A. (M)
Babb, D. D. (M)
Baghdady, E. J. (M)
Bagley, P. R. (M)
Baker, G. T. (M)
Ball, J. H. (M)
Barlow, C. E. (M)
Barrow, B. B. (M)
Baruch, J. J. (M)
Batchelder, L. (F)
Baumann, A. (A)
Beecher, A. E. (A)
Benfield, A. E. (SM)
Berg, R. S. (M)
Bergstad, P. A. (A)
Bera, A. (A)
Bertolini, A. (M)
Bevensee, R. M. (A)
Bixby, H. O. (SM)
Blankenbaker, J. V. (A)
Blood, H. E. (A)
Boehme, R. M. (M)
Bolt, R. H. (SM)
Booton, R. C. (M)
Bourland, H. M. (M)
Bousquet, A. G. (SM)
Bouyoucos, J. V. (M)
Bowles, E. L. (F)
Bradspies, S. (A)
Brady, J. P., Jr. (A)
Brady, M. M. (M)
Brennan, D. G. (M)
Bridge, H. P. (A)
Brindley, G. W. (M)
Brown, S. S. (F)
Broxmeyer, C. (M)
Buckley, E. F. (SM)
Bumpus, W. W. (M)
Burke, C. F. (F)
Burkhart, W. H. (M)
Busegang, J. J. (M)
Cady, C. A. (SM)
Calingaert, P. (M)
Campbell, C. K. (M)
Canna, L. (A)
Carpenter, C. H. (M)
Carr, C. E. (A)
Carr, C. E. (A)
Carr, J. W. (M)
Chaffee, E. L. (F)
Chamberlain, L. J. (M)
Chang, C. M. (A)
Chao, S. C. (M)
Chu, T.-H. (M)
Clapp, J. K. (F)
Clapp, R. E. (M)
Clayton, J. M. (SM)
Comstock, D. F., Jr. (M)
Cook, J. H. (SM)
Corey, B. W. (A)
Craven, R. B. (M)
Crawford, C. H. (M)
Crooke, C. W. (A)
Cunniff, J. F. (A)
Davidson, G. A. (M)
Dawes, H. H. (M)
De Blois, S. W. (M)
De Marco, V. R. (M)
Donovan, A. C. (M)
Draper, C. S. (F)
Dunn, B. C., Jr. (M)
Dyett, E. G., Jr. (M)
Eames, A. M., Jr. (M)
Eastham, M. (F)
Easton, I. G. (SM)
Ellis, P. (M)
Fallows, E. M. (A)
Fano, R. M. (F)
Faughnan, B. W. (M)
Ferguson, D. R. (M)
Field, M. D. (M)
Fischer, D. G. (M)
Fitzgerald, J. J. (M)
Fock, H. W. (A)
Fox, H. M. (A)
Frank, R. W. (SM)
Freimer, M. L. (M)
Fremdberg, R. L. (A)
Gardoff, I. M. (A)
Gilman, M. A. (M)
Glassmaker, L. G. (A)
Goldstein, B. S. (M)
Goldstein, I. (M)
Goldstein, M. H., Jr. (M)
Gray, D. A. (M)
Gray, J. C. (M)
Gray, T. S. (SM)
Greene, D. (A)
Greenough, H. V., Jr. (M)
Grim, W. M., Jr. (M)
Gross, E. E., Jr. (SM)
Guillemin, A. (F)
Hase, K. H. (M)
Hall, H. P. (M)
Hamilton, D. H., Jr. (A)
Hanley, L. D. (A)
Harmer, D. (A)
Harney, F. J. (M)
Hathaway, G. M. (A)
Hazen, H. L. (SM)
Heart, F. W. (M)
Heller, P. N. (A)
Hersh, J. F. (M)
Herskovitz, S. B. (M)
Hickman, R. W. (SM)
Hieken, C. (A)
Hieken, R. E. (SM)
Hillman, H. D. (M)
Hirshfield, J. L. (A)
Hogan, W. D. (M)
Holmquist, C. A. (M)
Hom, R. N. G. (M)
Hughes, G. W. (A)
Hulburt, H. J., Jr. (M)
Humphrey, W. M. (M)
Iverson, K. E. (A)
Jackson, W. D. (A)
Jayne, A. W. (M)
Johnson, E. P., Jr. (A)
Johnson, K. R. (A)
Johnston, R. C. (M)
Joyce, C. C., Jr. (M)
Karplus, E. (F)
Kasvand, T. (A)
Kay, A. F. (M)
Kaye, M. G. (M)
Keller, C. C. (A)
Kellner, R. (M)
Kent, G. (M)
Kent, P. (M)
Kerwin, E. M., Jr. (A)
Kessler, J. A. (SM)
Kingston, R. H. (A)
Knight, G. J., Jr. (M)
Kobaira, N. (M)
Kohlenberg, A. (SM)
Lahanas, C. J. (SM)
Laspina, C. A. (A)
Lee, V. W. (SM)
Leon, B. J. (A)
Levine, W. E. (M)
Levy, D. M. (M)
Lewis, F. D. (SM)
Lisky, A. H. (M)
Littlejohn, H. C. (M)
Long, J. H. (A)
Luscher, R. W. (A)
Lyman, E. J. (M)
Mack, R. B. (A)
Maling, G. C., Jr. (A)
Malme, C. I., Jr. (A)
Margolin, R. (M)
Martin, T. F. (A)
Mason, S. J. (SM)
Matz, C. H. (SM)
McCulloch, W. S. (SM)
McElroy, W. K. (F)
McGowan, E. A. (A)
McKeon, T. M. (M)
Medoff, J. L. (A)
Menzel, D. H. (SM)
Michaelis, A. (SM)
Middleton, D. (SM)
Mimno, H. R. (M)
Minnick, R. C. (A)
Minsky, M. L. (M)
Moritz, C. (M)
Morrers, C. N. (M)
Morris, R. J. (M)
Myers, J. M. (M)
Nakasato, J. (A)
Narud, J. (M)
Neiline, F. W., Jr. (M)
Nottingham, W. B. (F)
Nygard, J. C. (M)
Oettinger, A. G. (M)
Olsson, E. A. (M)
Pastan, H. L. (M)
Peterson, A. P. G. (SM)
Peterson, R. K. (M)
Pomper, V. (SM)
Pompian, S. D. (M)
Pople, H. E., Jr. (M)
Popp, F. G. (A)
Pote, A. J. (SM)
Powers, D. A. (M)
Prickett, R. J. (M)
Quint, A. S. (M)
Radford, W. H. (F)
Randell, T. (M)
Randolph, R. V. (A)
Reis, J. H. (M)
Relyea, J. R. (A)
Richmond, H. B. (F)
Richmond, J. B. (SM)
Robinson, K. W. (M)
Rochrig, J. R. (SM)
Ronat, E. E. (M)
Roth, C. H., Jr. (M)
Rubenstein, A. H. (A)
Ruplenas, R. J. (M)
Saito, S. (SM)
Sarles, F. W., Jr. (M)
Scheidenheim, R. (M)
Schwab, C. (M)
Semon, W. L. (A)
Shannon, C. E. (F)
Shapiro, L. D. (M)
Shapiro, R. (M)
Shrimpell, D. H. (M)
Sheppard, E. M. (M)
Sherry, M. E. (M)
Siebert, W. M. (M)
Silver, S. (M)
Sinclair, D. B. (F)
Slade, H. L. (M)
Sly, W. G. (M)
Smith, M. T. (SM)
Smullin, L. D. (F)
Soderman, R. A. (SM)
Spencer, R. H. (M)
Sponsler, J. W. (A)
Stoddart, H. F. (M)
Storer, J. E. (A)
Strandberg, M. W. P. (SM)
Stratton, J. A. (F)
Stuart, R. W. (A)
Susskind, A. K. (M)
Susskind, E. P. (A)
Thiessen, A. E. (SM)
Thurston, W. R. (SM)
Tierney, J. (M)
Trantham, H., Jr. (M)
Tucker, C. E. (SM)
Tucker, J. A. (M)
Turnbull, J. M., Jr. (M)
Vander Velde, W. E. (M)
Van Meter, D. (SM)
Verma, J. K. D. (M)
Verzuh, F. M. (M)
Vilbig, F. (SM)
Wantuch, E. (M)
Ward, J. E. (M)
Wargo, J. J. (A)
Wasserman, R. (A)
Webb, H. A. J. (M)
Webster, F. A. (A)
Webster, W. G. (SM)
Wentworth, A. M. (A)
Westphal, W. B. (M)
Wetherell, M. L. (M)
Wheatland, D. E. (M)
Whelan, C. R. (M)
White, S. A. (A)
Wiener, F. M. (SM)
Wiesner, J. B. (F)
Wildermuth, J. L., Jr. (M)
Wilden, K. L. (SM)
Willenbrock, F. K. (M)
Wingate, S. A. (M)
Wissmann, H. (A)
Woodson, H. H. (M)
Woodward, C. A., Jr. (SM)

Worthen, C. F. (SM)
Yamron, J. (M)
Youngblood, W. A. (M)
Voutz, P. (M)

Canton (BOS-I)
Burgoyne, C. L. (M)
Cuming, W. K. (M)
Dionne, J. H. (M)
Dorlan, J. M. (A)
Dunbravey, F. S. (A)
Keller, A. L. (A)
Wissenbach, F. O. (A)

Carlisle (BOS-I)
Davis, J. C. (M)
Gillette, J. S. (A)
Hague, W. M., Jr. (M)
Macmillan, R. R. (M)
Parke, N. G., III (M)
True, W. A. (SM)

Chelmsford (BOS-I)
Coulombe, R. A. (SM)
Lin, H. C. (M)
Manalian, J. P. (M)
Manty, W. A. (SM)
Martin, R. A. (M)
McCormack, T. L. (M)
Palmer, W. F. (A)
Wade, C. E. (SM)

Cheshire (CV-B-I)
Leonard, S. C. (SM)
Luoma, R. A. (M)

Chelsea (BOS-I)
Barabush, A. (M)
Chernyshov, V. N. (M)
Fishman, D. S. (A)
Johnson, H. K. (M)

Chestnut Hill (BOS-I)
Altman, N. G. (A)
Beuszka, S. J. (M)
Blanchard, R. L. (SM)
Frank, W. I. (A)
Lewis, M. C. (A)
McFarlan, R. L. (SM)
Richards, P. I. (A)

Chicopee (CV-I)
Bravin, C. (A)
Zdeb, S. E. (A)
Dulchinos, J. (M)

Clinton (BOS-I)
Surprenant, A. H. (A)

Cochituate (BOS-I)
Bean, O. E. (M)
Faigen, I. M. (SM)
Humphrey, W. S. (SM)
Johnson, S. L. (A)
Krasnick, R. (M)
Kurth, H. H. (SM)
Locher, J. P., III (M)
Sharaf, H. M. (A)
Smith, A. H., Jr. (A)

Cohasset (BOS-I)
Lippitt, K. H. (SM)
Mann, E. A. (SM)
Mass, F. (M)
Rowland, H. J. (SM)
Taft, E. A., Jr. (A)
Winter, J. W. (A)

Concord (BOS-I)
Anderson, H. E. (A)
Blernson, G. A. (A)
Bonin, W. J. (A)
Brennan, J. X. (M)
Burley, R. M. (A)
Buxton, E. T., Jr. (A)
Cayouette, R. L. (A)
Connelly, M. E. (M)
Craig, J. W., Jr. (M)
Daniels, R. (A)
Davenport, W. B., Jr. (SM)
Dickson, A. W. (M)
Donnelly, F. J., Jr. (A)
Edelberg, S. (M)
Ehrenfried, A. D. (SM)
Enticknap, R. G. (SM)
Fischer, R. F. (M)
Fitzmorris, M. J., Jr. (M)
Forrester, J. W. (F)
Fritsch, P. C. (M)
Gunn, S. C. C. (M)
Haywood, W. J. (A)
Heuchling, T. P. (SM)
Hollingsworth, L. M. (SM)
Kilham, L. F., Jr. (SM)
Kline, I. (SM)
Logemann, H. Jr. (SM)
Lush, M. I. (M)
Macdonald, W. S. (M)
Mack, R. A. (A)
MacMillan, A., Jr. (M)
Marsh, H. S. (M)
Martin, L. H. (A)
Newman, P. (SM)
Penfield, H. (M)
Roberts, G. F. (M)
Scott, R. E. (M)
Seamans, I. O. (M)
Spare, N. F., Jr. (A)
Strang, D. B. (M)
Slade, M. G. (M)
Stacey, J. M. (M)
Sullivan, D. L. (A)
Temme, D. H. (M)
Tuttle, W. N. (F)
Vance, P. R. (A)
Walen, R. S. (M)
Walworth, W. V. (M)
Weill, G. R. (M)
Wescott, V. C. (M)
Zerfas, G. J. (A)

Dalton (CV-B-I)
Franks, R. E. (M)

Danvers (BOS-I)
Bewitt, W. D. (M)
Birnie, B. A. (M)
Carter, G. E., Jr. (M)
Carter, G. W. (M)
Dominick, F. J. (M)
Franzen, G. H. D. (A)
Frohock, W. S. (M)
Hecht, B. P. (M)
Hull, J. A. (A)
Knuders, E. (A)
Koen, F. T. (M)
Record, F. A. (M)
Segelstrom, C. V. (A)
Sokoloy, D. A. (M)
Spillotis, P. J. (A)
Straney, K. O. (M)
Van Horne, J. L. (A)
Weinburg, E. F. (A)
Wroblewski, T. (SM)
Zack, A. (A)

Dedham (BOS-I)
Acides, J. A. (A)
Donovan, C. (A)
Helm, G. D. (SM)
Smith, R. W. (M)

Dennis (BOS-I)
Zopatti, R. C. (A)

Dorchester (BOS-I)
Berman, J. (M)
Czechowski, E. W. (M)
Deerfield, A. J. (A)
Ellins, V. (A)
Epstein, M. A. (A)
Fox, R. M. (A)
Goldstein, D. S. (A)
Guay, A. J. (M)
Herzberg, R. F. (M)
Kalakowsky, C. B. (M)
Krauss, B. J. (A)
Labitt, B. H. (A)
Lenson, S. (M)
Linney, F. J., Jr. (A)
McDonough, M. P. (M)
Morley, H. B. (M)
Morris, J. P. (A)
Nackley, J. F., Jr. (M)
Oais, J. N. (M)
Renner, W. (M)
Shapiro, J. M. (M)
Shnitzler, R. K. (M)
Siedlecki, J. C. (M)
Silberberg, R. W. (A)
Sims, B. S. (M)
Tessari, V. P. (M)
Tursky, B. (A)
Whelan, W. J. (M)
Yallen, S. (A)

Dover (BOS-I)
Hermans, M. E. A. (M)
Melancon, L. (A)

Dudley (BOS-I)
Swana, M. R. (A)

East Boston (BOS-I)
Orfano, R. D. (A)

East Brookfield (BOS-I)
Houlihan, R. P. (M)

Easthampton (CV-I)
Gaucek, W. J. (M)
Mesh, T. J. (A)

East Longmeadow (CV-I)
Landers, T. P. (M)

East Lynn (BOS-I)
Gibson, R. E. (A)
Kazules, A. J. (M)

Eastondale (BOS-I)
Ray, K. B. (A)

East Weymouth (BOS-I)
Fulton, L. G. (A)
Hickok, F. A. (A)
Karaian, E. (A)

Egypt (BOS-I)
Frank, L. G. (M)
Salsgiver, J. P. (A)

Everett (BOS-I)
Clark, N. M. (M)
Cosentino, A. V. (A)
Gaulit, E. D. (A)
Murphy, T. F. (A)
Salerno, J. (M)
Solano, J. (M)

Fairhaven (BOS-I)
Remillard, W. J. (A)
Robinson, W. M. (SM)
Spence, T. M. (M)
Sylvia, L. M. (M)

Fall River (BOS-I)
Boulay, R. R. (A)
Buchan, R. (A)
Buchanan, J. R. (A)
Buckley, A. E., Jr. (A)
Cardozo, D. I. (A)
Ryan, J. E. (A)
Wilkinson, E. J. (A)

Falmouth (BOS-I)
Canadeo, G. N. (A)
Johnston, A. T. (M)

Fayville (BOS-I)
Dunnet, W. J. (A)

Feeding Hills (CV-I)
Call, S. S. (A)

Fitchburg (BOS-I)
Arthur, G. M. (M)
Dallin, E. B. (SM)
Maillet, A. J. (A)
Moran, J. M. (SM)
Panuliacio, A. A. (M)
White, D. A. (A)

Fort Devens (BOS-I)
Farrah, H. R. (M)

Foxboro (BOS-I)
Soderstrom, R. E. (A)
Sturgeon, S. S. (M)
Terrell, G. C. (A)
Wells, C. H. (A)

Framingham (BOS-I)
Abdun-Nabi, Z. (A)
Appleman, M. A. (M)
Bond, E. E. (SM)
Breitbord, J. L. (M)
Daly, R. H. (A)
Callahan, R. J. (A)
Doyle, J. W. (A)
Earl, R. J. (M)
Ellinthorpe, A. W. (A)
Falkowitz, M. (A)
Fangmann, G. (A)
Finnegan, F. J. (M)
Floridia, M. S. (M)
Forglone, E. A. (A)
Ginsberg, I. (A)
Guy, S. A. (A)
Hoogasian, H. (A)
Irish, F. E., Jr. (A)
Kallin, R. L. (A)
Kokilko, A. (A)
Kopeloff, B. G. (A)
Kross, V. (A)
Krulee, R. L. (A)
Lacey, N. F. (A)
Levy, M. R. (A)
Lindberg, J. E. (M)
Mellen, G. L. (SM)
Mercurio, J. F., Jr. (M)
Michelson, M. (M)
Palughi, J. F., Jr. (A)
Preo, J. M. (A)
Rosen, L. (SM)
Salzberg, E. (A)
Sysecurka, S. (A)
Sherman, D. (A)
Sklar, H. (M)
Sonnabend, J. S. (A)
Tenenholtz, R. (M)
Traub, A. C. (A)
Ungvary, R. L. (M)
Vartanian, V. (M)
Weisman, J. S. (A)
Williams, R. (A)
Yalen, S. (A)

Framingham Center (BOS-I)
Alexander, R. (M)
Danforth, W. C., Jr. (A)
Driscoll, W. G. (SM)
Gerdes, J. W. (A)
Hadfield, B. M. (SM)
Hurlbut, W. A. (A)
Ifland, J. L. (SM)
Kelcher, A. E., Jr. (M)
Lucas, E. J. (M)
Riel, R. W. (M)

Gardner (BOS-I)
Neunherz, R. K. (M)

Georgetown (BOS-I)
Earle, N. E. (A)
Gammie, J. (M)
Nunan, K. W., Sr. (A)
Quimby, K. S., Jr. (A)

Gloucester (BOS-I)
Bowman, J. W. (A)
Hammond, J. H., Jr. (SM)
Kistes, P. J. (M)
Olson, A. J. (A)
Purington, E. S. (SM)
Short, J. A., Jr. (A)

Great Barrington (CV-B-I)
Allison, R. F. (M)
Hemmes, R. T. (M)

Greenbush (BOS-I)
Brooks, G. W. (M)

Greenwood (BOS-I)
Newcombe, D. A. (M)
Wheeler, D. R. (M)

Groton (BOS-I)
Farrall, G. A. (M)
Woolsum, S. P. (M)
Young, K. A. (SM)

Groveland (BOS-I)
Bradley, H. L. (A)

Hamilton (BOS-I)
Bosse, W. F. (SM)
Hamlin, W. O. (A)
Nichols, H. F., Jr. (A)
Street, E. L. (A)

Hanover (BOS-I)
McGrath, J. L. (M)

Harvard (BOS-I)
Burton, G. L. (M)
Coburn, R. W. (A)
Hammett, T. P. (M)
Osborn, A. (M)
Strang, D. B. (M)
Whitfield, W. D. (A)

Haverhill (BOS-I)
Atwood, D. J., Jr. (A)
Feldman, E. J. (A)
Halloran, T. F. (A)
Heath, R. R. (M)
Hlavacek, A. R. (A)
Nichols, N. P. (M)
Rounds, W. A. (A)

Haydenville (CV-I)
Curtis, L. F. (M)

Hingham (BOS-I)
Broster, G. S. (M)
Cary, T. R., Jr. (M)
Dougherty, J. D. (A)
Hall, I. A. (M)
Hyland, R. C. (A)
Kennedy, D. S. (M)
Munzig, A. L., Jr. (M)
Pratt, F. (VA)
Wood, J. O. (M)

Holbrook (BOS-I)
Stone, I. M. (A)
Wisneski, W. F. (M)

Holden (BOS-I)
Wilder, F. H., Jr. (A)
Wise, D. P. (SM)

Holliston (BOS-I)
Gordon, R. R. (M)
Ivesdal, T. A. (M)
Nobles, F. L. (A)
Peters, J. D., Jr. (A)
Thomas, H. J., Jr. (M)
Valpey, R. S., Jr. (A)
Wyckoff, R. L. (M)

Holyoke (CV-I)
Hampson, F. W. (A)
Junkins, C. E., Jr. (A)
Kennedy, D. J. (A)
King, F. H. (M)
Marek, L. W. (A)
Marek, M. B. (A)
Palmer, E. B. (A)
Stafford, B. H. (M)
Wernick, H. (A)

Hopedale (BOS-I)
Samole, R. F. (M)
Tinkham, M. E. (A)

Hudson (BOS-I)
Dobrowolski, E. P. (A)
Erickson, D. H. (A)
Paupils, L. M. (M)

Hull (BOS-I)
Watts, D. E. (A)

Hyde Park (BOS-I)
Burke, W. T. (A)
Dukes, E. F., Jr. (A)
Nucefora, M. A. (M)
Stanney, W. J. (M)
Talanian, W. B. (A)

Ipswich (BOS-I)
Chu, G. Y. (M)
Cowart, B. E. (M)
Dwerk, L. E. (SM)
Gholson, A. H. (M)
McMillan, E. B. (SM)
Plaisted, A. H. (A)
Sweetser, L. R. (M)
White, H. B. (A)

Indian Orchard (CV-I)
Aykanian, A. A. (M)

Islington (BOS-I)
Hedlund, D. A. (M)
Root, W. L. (SM)

Jamaica Plain (BOS-I)
Arenberg, D. L. (M)
Beaudette, C. G. (M)
Moore, G. M., Jr. (M)
Petraitis, A. J. (A)
Root, W. F. (M)

Kinston (BOS-I)
Sullivan, D. R. (M)

Lawrence (BOS-I)
Ameen, S. J. (M)
Augeri, J. J. (M)
Barcroft, R. W. (M)
Blanchette, C. P. (A)
Callahan, J. F. (M)
Czukrasz, Z. P. (A)
Edwards, P. G. (SM)
Gilliam, D. (M)
Hallenbeck, F. J. (SM)
Hanley, J. J. (A)
Kennedy, W. F. (M)
King, F. H. (M)
Langberg, E. (A)
Lieber, N. (M)
Limanni, M. A. (A)
Pappas, J. (M)
Perkins, E. H. (SM)
Talbot, R. R. (A)

Leicester (BOS-I)
Day, L. R. (M)

Lenox (CV-B-I)
Hartwell, R. L. (A)

Leominster (BOS-I)
Testarmata, N. R. (M)

Lexington (BOS-I)
Abel, W. G. (M)
Aldrich, F. W., Jr. (M)
Arsenault, J. R. (A)
Bailey, D. L. (M)
Barker, D. B. (M)
Best, R. L. (M)
Bragar, P. (M)
Brantley, F. A. (M)
Brick, D. B. (SM)
Brown, C. J. (A)
Burgess, L. M. (M)
Burwen, R. S. (SM)
Bustel, P. E. (A)
Byers, W. F. (M)
Carmichael, R. L. (A)
Chu, L. J. (F)
Chute, D. H. (M)
Clark, A. (M)
Clark, D. L. (M)
Clough, J. F. (A)
Cohen, S. H. (A)
Corwin, G. (M)
Crane, J. D., Jr. (A)
Czeropski, W. P., Jr. (M)
Daggett, N. L. (M)
Dalrymple, G. F. (A)
Dearborn, F. K. (M)
Demetrick, J. S. (SM)
Dentler, C. K. (M)
Dinozzi, A. D. (M)
Dougherty, R. L. (A)
Dunnanian, J. A. (M)
Eisenstadt, B. M. (M)
Fatlick, C. E. (A)
Farley, R. G. (M)
Farr, C. W. (A)
Forgie, J. W. (M)
Fraser, G. R. (SM)
Freeman, L. D. (M)
Galvin, A. A. (M)
Gardner, O. K. (M)
Gee, F. A., Jr. (A)
Globe, S. (SM)
Goldberg, S. (M)
Goldberg, S. H. (M)
Gray, H. L., Jr. (M)
Grayzel, A. I. (M)
Hale, R. C. (M)
Hall, W. M. (SM)
Halpern, J. (SM)
Harrington, J. V. (SM)
Harris, J. N. (A)
Hauser, W. H. (M)
Hazel, F. P., Jr. (M)
Hogan, C. A. (SM)
Holmes, L. G. (M)
Houston, E. E., Jr. (M)
Huffman, D. A. (M)
Hutton, C. D. (M)
Hughes, A. D. (A)
Hukney, P. A., Jr. (M)
Huseland, N. (M)
Hutchins, W. R. (SM)
Jacobs, H. P. (M)
Jenkinson, J. V. (A)
Jervis, E. W., Jr. (M)
Jones, N. T. (M)
Karabats, C. (M)
Kates, W. A. (A)
Kendall, R. (SM)
Keren, D. (A)
Key, E

Zitso, P. (A)
Zraket, C. A. (SM)
Zucker, F. J. (A)

Lincoln (BOS-1)
Atchley, D. W., Jr. (M)
Haworth, L. D. (M)
Scott, H. H. (F)
Wang, A. (SM)

Littleton (BOS-1)
Gaither, T. B. (M)
Hollis, C. C. (M)
Houghton, R. W. (M)
McElroy, T. R. (M)
Nixon, N. E. (A)
Taylor, H. P. (M)
Ursch, R. R. (M)
Williams, D. G. (M)

Littleton Common (BOS-1)
Paquette, N. A. (A)
Wall, R. B. (M)

Longmeadow (CV-1)
Bassett, E. D. (M)
Cohen, M. (M)
Dorshimer, R. C. (M)
Gostyn, E. (M)

Northampton (CV-1)
Ciaffardini, A. N. (A)
Comble, A. A. (A)
King, A. D. (M)

Lowell (BOS-1)
Alexander, B. H. (SM)
Arlinsky, M. L. (A)
Aslanian, A. (A)
Carroll, I. (M)
Dukakis, S. G. (M)
Giddis, Rose G. (A)
Jolly, J. B. (M)
Kirwin, G. J. (M)
Landry, L. H. (VA)
Marcotte, A. G. (A)
McFarland, F. H. (A)
Michaels, A. G. (M)
Mingins, C. R. (SM)
Simmons, W. J., Jr. (A)

Lynn (BOS-1)
Ajootian, G. (A)
Ardys, J. (M)
Duffy, J. M. (A)
Eklund, A. M. (M)
Morgan, D. R. (M)
Murphy, M. F. (M)
Sampson, E. N. (A)
Somers, L. (M)
Whittaker, H. F., Jr. (M)

Lynnfield Center (BOS-1)
Cronburg, C. I., Jr. (M)
Gray, D. J. (A)
Kremheller, W. G. (M)
Brown, O. C., Jr. (A)
Clapp, C. W. (M)
Nettleton, E. L. (A)
Perkins, K. C. (M)
Schmidt, R. A. (M)

Malden (BOS-1)
Clements, W. S. (A)
Cook, C. G. (M)
Cutler, C. I. (M)
Fast, S. (SM)
Frusztajer, B. B. (M)
Goldberg, D. (A)
Hook, C. R. (M)
Kriensky, J. (M)
Linell, A. E. (A)
Mackowiak, J. K. (M)
Oxman, M. H. (M)
Ross, T. C. (A)
Rutledge, P. D. (A)
Saret, J. (M)
Schwarzlander, H. (A)
Shelton, C. H. (M)
Sloan, E. L., Jr. (M)
Tortorella, A. (A)
Walsh, J. F. (A)
Williams, E. E. (M)
Zantos, N. G. (A)

Manchester (BOS-1)
Falconer, S. (A)
Juhola, C. (SM)
Wolfe, R. W. (M)
Sabin, E. A. (M)

Marblehead (BOS-1)
Chun, H. H. (M)
Copithorne, A. R. (A)
Grant, E. F. (SM)
Hallett, J. L., Jr. (M)
Hubbard, M. M. (SM)
Kilham, R. E. (SM)
Lezan, G. R. E. (M)
Mills, E. D. (M)
Olbrych, J. E. (A)
Roberts, F. B. (SM)
Stromeyer, C. F. (M)
Stuart, R. M. (M)

Marion (BOS-1)
Francis, S. A. (M)
Warriner, R. R. (SM)

Marlboro (BOS-1)
Clark, F. E. (M)
Ellis, W. R. (A)
Fay, F. H. (A)
Graham, J. S. (A)
Perrero, G. A. (M)
Smith, R. V. (A)
Watson, W. H. (A)

Mattapan (BOS-1)
Arabian, J. H. (M)
Bello, P. A. (A)
Fertig, K. (M)
Krinsky, M. L. (M)
Pengeroth, P. P. (A)
Slawsby, N. (A)
Wilkie, L. E. (A)

Maynard (BOS-1)
Chapell, H. F. (M)
Cleary, R. W. (A)
Dworshak, F. G. (M)
Hettich, R. E. (M)
Lund, R. T. (A)
Mong, R. C. (M)
Seay, W. B. (M)
Walker, J. R. (A)
Walsh, J. J. (A)

Medfield (BOS-1)
De Clue, J. L. (M)
Glauberman, M. H. (A)
Jacobs, C. E., Jr. (M)
Jewell, R. L., Jr. (M)
Marcille, R. E. (M)
Waddell, R. B. (A)

Medford (BOS-1)
Anderson, A. F. (A)
Belinski, A. M. (A)
Brady, J. T. (M)
Butcher, S., Jr. (A)
Fiorello, E. A. (M)
Frost, A. D. (M)
Greenberg, I. D. (A)
Hobbs, C. F. (SM)
Honrek, H. C. (A)
Howell, A. H. (SM)
Lofgren, F. W. (M)
Lyon, R. E. (M)
Menzies, R. W. (A)
Morelli, A. (M)
Murphy, P. J. (M)
Pennelli A. P. (M)
Pike, A. L. (M)
Pote, W. J. (A)
Quinn, W. T., Jr. (A)
Rago, K. A. (M)
Rollins, J. A. (M)
Rosato, F. J. (SM)
Rosato, G. (M)
Smith, R. L. (A)
Stevens, W. J. (SM)
Twombly, B. B. (M)

Melrose (BOS-1)
Berg, R. (M)
Chapin, R. B. (A)
Gradijan, J. R. (M)
Greene, C. D. (M)
Harrington, E. W. (M)
Klane, C. H. (M)
Lewis, E. W. (A)
Mac Dowell, R. F. (M)
McConubrey, A. O. (SM)
McGeoch, C. R., Jr. (M)
Meader, R. B. (M)
Nichols, R. P. (A)
Orenberg, A. (M)
Peterson, J. W. (A)
Radnor, R. R. (M)
Rogers, W. S. (A)
Rowell, W. G. (M)
Slusher, W. E. (M)
Snell, G. C. (M)
Thornton, W. M., Jr. (A)
Wong, W. G. (M)
Young, N. H. (A)

Melrose Highlands (BOS-1)
Braden, R. S. (A)

Methuen (BOS-1)
Buck, R. E. (M)
Chontos, P. (M)
Dinsmore, C. H. (M)
Ryan, J. W., Jr. (A)
Woodburn, E. S., Jr. (A)

Middleton (BOS-1)
Hayden, P. C. (A)

Milford (BOS-1)
Kurlansky, S. (A)

Millis (BOS-1)
Biagiotti, R. J. (A)
Sanders, E. W. (SM)

Milton (BOS-1)
Arnold, C. E. (M)
Bradshaw, D. B. (M)
Day, W. J. (M)
Gerber, A. (A)
Hall, J. S. (A)
Jeffries, D. (SM)
Metcalfe, L. J. (M)
Moats, R. R. (M)
Mullen, J. A. (SM)
Scheffler, E. C. (M)
Smith, W. A., Jr. (SM)
Spitz, H. S. (A)
Sternick, S. H. (M)
Tucker, J. E., Jr. (M)

Natick (BOS-1)
Bastow, W. R. (M)
Benoit, G. F. (A)
Bittel, M. M. (SM)
Blaisdell, A. A. (M)
Burke, E. P. (A)
Devane, M. E. (A)
Dicarlo, V. J. (A)
Dixon, R. A. (M)
Driscoll, J. F. (A)
Driscoll, V. (A)
Fishbein, S. B. (SM)
Friedman, B. L. (M)
Geier, L. W. (SM)
Good, L. F. (M)
Greim, R. E. (A)
Harden, C. M. (M)
Heaton, R. G. (M)
Holmes, K. O. (A)
Hunt, D. G. (M)
James, F. E. (A)
Jameson, B. W. (M)
Kessel, B. (M)
Korn, S. J. (M)
Lockhart, H. H. (M)
Long, R. G. (M)
Luftman, A. S. (M)
McCullough, J. H. (A)
Meyer, M. A. (M)

Miller, H. A. (M)
Morrice, J. B. (A)
Nye, J. H. (M)
Platt, H. J. (SM)
Powers, D. M. (M)
Pughe, E. W., Jr. (M)
Repella, N. (SM)
Rosenthal, M. L. (A)
Rubin, R. (M)
Schontzler, J. G. (A)
Topol, S. (A)
Wachendorf, F. A. (M)
Walker, C. E. (A)
Washington, L., Jr. (M)
Weiss, B. J. (M)
Weiss, H. R. (M)
Whitcraft, W. A., Jr. (SM)
White, D. J. (M)
White, M. M. (A)

Needham (BOS-1)
Adams, H. E. (A)
Alden, J. M. (A)
Alessi, P. A. (M)
Alpert, E. (M)
Arnesen, R. E. (M)
Baldwin, P. K. (SM)
Bullard, A. H., Jr. (A)
Crocker, C. F. (SM)
Cross, H. H. (SM)
Dean, F. R. (M)
De Bettencourt, J. (M)
Dench, E. C. (SM)
Dinowitz, E. (M)
Eckhardt, D. L. (SM)
Ewen, H. I. (SM)
Feuerstein, E. (M)
George, G. F. (M)
Goldberg, O. D. (A)
Hadge, E. (M)
Handly, E. J. (M)
Henry, J. M. (VA)
Higgins, W. F. (M)
Hinckley, G. A. (A)
Hurd, W. H. (M)
Keay, D. M. (A)
Lally, V. E. (A)
Lees, J. W. (A)
Lowe, M. E. (SM)
Mahoney, T. F. (M)
Mayer, D. F.
Paananen, R. A. (A)
Pease, M. C., III (SM)
Rattunan, W. J. (M)
Rote, W. A. (M)
Sargent, H. P., Jr. (A)
Shelton, E. J., Jr. (M)
Smith, J. (M)
Stacy, J. E. (SM)
Tiffany, G. B. (A)
Turner, J. L. (M)
Whittemore, H. B. (M)
Wolfe, J. A. (M)
Wyke, A. A. (M)

Needham Heights (BOS-1)
Colbourne, R. H. (M)
Crowley, D. J., Jr. (M)
Dolan, F. J. (A)
Fuller, H. W. (M)
Harris, H. C., Jr. (M)
Jones, R. C., Jr. (M)
Mork, R. P. (M)
Purcel, R. A. (M)
Smith, H. A. (A)
Strum, P. D. (SM)
Works, A. R. (M)

New Bedford (BOS-1)
Bailey, W. M. (SM)
Collins, E. D. (A)
Da Cruz, A. M. (M)
Klemm, E. H. (A)
Levin, J. K. (A)
Milner, J. J. (A)
Picard, H. E. (A)
Pickett, J. H. (M)
Ponte, A. G. (A)
Pray, G. E. (SM)
Silva, C. C., Jr. (A)

Newbury (BOS-1)
Christiansen, D. (M)

Newburyport (BOS-1)
Adams, J. R., Jr. (M)
Fyler, N. F. (A)
Hadley, W. C. (A)
Hodge, T. P. (M)
Lemnios, W. Z. (M)
Lynch, R. E. (A)
Wright, M. E., III (A)

Newton (BOS-1)
Aarons, J. (A)
Arnold, W. F. (M)
Balmuth, N. (M)
Beedle, R. H. (A)
Bram, J. M. (M)
Burgarella, J. P. (A)
Burnett, R. F. (A)
Carey, W. M., Jr. (M)
Dean, W. B. (A)
Diblase, A. F. (M)
Eachus, J. J. (SM)
Fine, N. M. (M)
Fritz, M. G. (M)
Gillix, E. L. (A)
Golahny, V. (A)
Gutman, A. S. (A)
Haley, J. (M)
Kadet, J. (SM)
Kennedy, D. P. (A)
Kraemer, J. H. (M)
Lourie, N. M. (M)
Malone, M. H. (A)
McCormack, R. L. (SM)
Meyrowitz, P. E. (A)
Mitchell, W. B. (M)
Morse, C. H. (A)
Plaisance, S. P. (M)
Plumridge, R. F. (A)
Rockwood, A. C. (SM)
Rubin, M. D. (M)
Rugg, S. H. (M)
Smith, M. D. (A)

Urbanetti, J. J. (A)
Wexler, H. T. (SM)
Whelden, J. W. (M)
Wilson, R. D. (SM)

Newton Centre (BOS-1)
Burke, A. W. (M)
Hill, D. C. (M)
Jacobs, B. S. (M)
Kellner, R. L. (M)
Krim, N. B. (M)
Linsky, A. B. (M)
Lippincott, S. (M)
Low, W. C. (M)
Mandell, A. (SM)
Mintzer, L. (A)
Riesman, S. (M)
Robinson, S. (A)
Segal, S. (A)
Stein, S. (SM)
Wheeler, G. J. (SM)
Wolfson, J. A. (M)
Woo, W. D. (SM)
Zottu, P. D. (F)

Newton Highlands (BOS-1)
Cudlitz, S. (M)
Cummings, S. J. (M)
Fadden, J. J. (M)
Fallows, R. C. (M)
Fisher, S. E. (A)
Friree, F. L. (M)
Hoist, W. F. (M)
Jacobson, R. E. (M)
Leonard, R. K. (M)
McCarthy, J. F. (M)
Muckenhoupt, F. W. (M)
Osman, M. S. (M)
Sheingoll, L. S. (SM)
Singer, T. (M)
Ward, W. W. (A)
Wise, N. (M)
Yamins, H. G. (M)

Newtonville (BOS-1)
Dokken, G. O. (M)
Smith, L. C. (SM)
Baker, T. E., Jr. (M)
Berkeley, E. C. (A)
Blanchard, E. E. (SM)
Bloom, M. I. (M)
Galagan, S. (SM)
Hawley, D. E. (M)
Heavisides, M. G. (SM)
Kaufmann, P. (M)
Merrill, B. (M)
Ozzy, A. J. (M)
Pearson, A. L. (A)
Phillips, R. E. (M)
Roosain, N. (M)
Tittle, C. W. (SM)
Ward, J. H. R., III (A)
Woodward, C. A. (A)
Wright, B. D. (M)

North Adams (CV-B-1)
Allison, W. M. (SM)
Bashford, H. L. (A)
Brafman, J. E. (M)
Cushman, N. (M)
Devy, G. B. (M)
Dorst, S. (A)
Fabrichus, J. H. (M)
Geiser, D. T. (M)
Henry, A. L. (A)
Hooks, A. K. (A)
Lamoureaux, R. A., Jr. (A)
Lazier, W. A. (A)
Lehovec, F. (M)
Novacek, W. G. (M)
Peterson, R. C. (A)
Purpura, E. (A)
Robinson, P. (M)
Sprague, R. C. (SM)
Stoneham, C. E. (A)
Tremblay, G. V. (M)
Tyler, R. H. (A)
Woodley, G. V. (M)
Zuleeg, R. (M)

North Andover (BOS-1)
Banton, W. E. (A)
Berger, U. S. (SM)
Collins, R. M. (M)
Custer, C. J. (M)
Eberhart, E. K. (SM)
Friis, R. W. (SM)
Kerwien, E. B. (SM)
Mischler, W. D. (M)
Monell, F. B. (SM)
Owens, C. D. (SM)
Penick, D. B. (SM)
Pomeroy, A. F. (SM)
Sagaser, D. D. (M)
Smith, R. S. (M)
Stansel, F. R. (SM)
Surenian, J. (M)
Taylor, R. R. (M)
Thulin, C. W. (SM)
White, E. F. (A)
Yeutter, C. S. (M)

North Attleboro (BOS-1)
Scanlon, W. C. (A)

North Beverly (BOS-1)
Briggs, R. S. (M)

North Billerica (BOS-1)
Bosch, F. M. (M)
Sloan, G. H. (M)

Northboro (BOS-1)
Chenez, R. D. (A)
Hardsog, H. N. (SM)

North Chelmsford (BOS-1)
Gregorio, A. S. (A)
Hathaway, S. W. (SM)
Rideout, H. A. (M)

North Dartmouth (BOS-1)
Kahn, L. (SM)
Simmons, F. A. (M)

North Easton (BOS-1)
Allen, L. W. (M)
Ames, D. (M)
Anderson, A. L. (M)

Dudley, T. C. (M)
Goveia, J. F. (A)

North Hanover (BOS-1)
Vachon, B. J. (A)

North Quincy (BOS-1)
Hourihan, A. M. (A)

North Randolph (BOS-1)
Flaherty, F. E., Jr. (A)

North Reading (BOS-1)
Millen, J. (VA)
Rubin, S. (A)
Weber, R. (M)

North Scituate (BOS-1)
Creaser, C. W., Jr. (M)

North Truro (BOS-1)
Arons, L. D. (M)

North Weymouth (BOS-1)
Alter, A. C. (SM)

North Wilmington (BOS-1)
Buck, D. A. (M)
Elowe, E. N. (M)
Sibley, R. C. (M)
Zaino, A. L. (A)

North Woburn (BOS-1)
Goldberg, W. P. (M)
McCarthy, F. J. (M)

Norwell (BOS-1)
Harris, C. C. (SM)
Hills, W. L. (M)
Maglathlin, R. N. (M)

Norwood (BOS-1)
Arnstein, P. B. (M)
Benson, R. A. (M)
Burns, H. S. (M)
Glynn, J. J. (M)
Gronroos, E. (A)
Johnson, L. A. (A)
Kleps, E. W. (A)
Larsen, R. L. (M)
Martinson, R. M. (A)
Stone, I. C. (A)
Vuozzo, A. J. (A)

Otis AFB (BOS-1)
Sheehan, W. J. (A)

Osterville (BOS-1)
Magnuson, J. E. (A)

Palmer (CV-1)
Calkins, D. F. (M)

Paxton (BOS-1)
Alexander, D. C. (M)
Stannard, G. E. (M)

Peabody (BOS-1)
Alexander, H. C. (M)
Anderson, V. H. (A)
Dodge, R. B. (A)
Gagnon, R. L. (M)
Gates, E. K. (A)
Guiffrida, J. (M)
Maguire, W. L. (SM)
O'Brien, E. J., Jr. (M)
Osepchuk, J. M. (M)
Senges, W. (M)

Pepperell (BOS-1)
Dyer, J. W. (M)
Wood, R. (SM)

Pittsfield (CV-B-1)
Abboushi, A. K. (A)
Ayer, W. T. (A)
Boyajian, A. (SM)
Broverman, H. L. (A)
Burkart, H. H. (SM)
Canfield, E. B. (A)
Chertok, S. (M)
Ciaschini, W. (M)
Forman, A. H., Jr. (SM)
Hardy, E. R. (A)
Hesse, M. H. (M)
Hucko, H. (M)
Jeter, W. C. (A)
Landers, J. J. (A)
McCoy, E. C. (A)
Neff, J. W. (M)
Neubert, W. E. (A)
Pack, E. L. (A)
Pierce, J. L. (M)
Podolsky, L. (F)
Ringlee, R. J. (M)
Ruiz, A. L. (SM)
Velkers, G. D. (A)
Wood, L. A. (M)
Wright, J. B. (A)

Provincetown (BOS-1)
Valentine, L. F. (M)

Quincy (BOS-1)
Brown, R. S. K. (A)
Burak, M. (M)
Burr, G. S. (A)
Dewey, W. P. (A)
Grass, A. M. (M)
Hudson, H. K. (SM)
Jokinen, R. A. (M)
Kramer, R. W. (M)
Langelier, G. P. (A)
Mastico, R. A. (A)
McLaughlin, W. G. (M)
Murphy, L. (A)
Osgood, R. C. (A)

Randolph (BOS-1)
Edwards, L. C. (M)
Mann, A. M. (M)
McMarin, W. B. (M)
St. Andre, G. O. (A)
Shannon, P. D. (A)
Wolf, S. H. (A)

Reading (BOS-1)
Ayer, R. S. (M)
Baer, J. (M)
Benson, E. D. (A)
Black, P. B. (SM)
Blood, L. R. (M)
Blottman, J. B., Jr. (A)
Caywood, R. W. (SM)
Chess, R. B. (SM)

Conary, W. R. (A)
Danehy, R. T. (M)
Dratch, J. E. (A)
Guy, H. D. (SM)
Hagan, R. A. (M)
Leslie, M. B. (M)
Loesch, B. (M)
Mariel, C. W. (SM)
Morrison, D. A. (M)
Parsons, R. L. (M)
Pfister, G. H. (M)
Robbins, L. W. (A)
Rosenthal, R. E. (A)
Skitzki, P. (M)
Smith, W. R. (M)
Spongberg, R. C. (A)
Taylor, N. H. (SM)
Vant, L. M. (SM)
Zitzow, H. P. (M)

Revere (BOS-1)
Abel, F. (A)
Carrabes, M. J. (M)
Haas, E. W. (A)
Harwood, E. (A)
Hutton, V. E. (M)
Romano, L. P. (A)
Rosenbaum, B. (M)
Siegel, M. (M)
Storin, M. L. (A)
Tranfaglia, T. E. (A)
Williams, A. H. (M)

Rockland (BOS-1)
Porrazzo, R. J. (SM)

Rockport (BOS-1)
Wendell, E. N. (F)

Roslindale (BOS-1)
Amante, J. J. (A)
Catalano, A. L. (A)
Doyle, F. A. (A)
Di Giorgio, J. A., Jr. (M)
Goodway, J. T. (M)
Palmer, P. J. (M)
Parrington, H. R. (A)
Thornton, F. J. (M)

Rowley (BOS-1)
Potts, T. J., Jr. (SM)

Roxbury (BOS-1)
Ellis, B. E. (M)
Goldman, H. N. (A)
Gray, E. L. (A)
Levin, M. H. (A)
Metten, W. H. (M)
Swanson, G. W. (A)
Walker, R. M. (SM)

Salem (BOS-1)
Cannon, J. H. (M)
Coggins, D. I. (M)
Rainville, L. P. (A)
Rotstein, J. (M)
Solodiuk, A. (M)
Wiederhold, P. R. (A)

Saugus (BOS-1)
Bradbury, R. A. (M)
Marie, C. G. (A)
Trenholme W. M. (M)
Williams, A. R. (M)

Saxonville (BOS-1)
Brunton, R. H., III (A)
Distler, H. (M)
Engman, G. E. (M)
Haley, J. T. (A)
Kern, D. R. (A)
Mannette, R. T. (M)
Rocheleau, G. S. (M)
Weygandt, P. A. (M)

Scituate (BOS-1)
Lemmon, W. S. (SM)
Williams, H. G. (SM)

Seekonk (BOS-1)
Bliss, W. W. (A)

Sharon (BOS-1)
Bresnick, H. L. (M)
Cushman, R. W. (A)
Gault, R. M. (M)
Laschever, N. L. (SM)
Lawlor, J. A. (A)
Rochefort, J. S. (M)
Rosenthal, M. H. (A)
Sallen, M. J. (A)
Winitzer, A. J. (A)

Sheffield (CV-B-1)
Carter, J. A. (A)

Sherborn (BOS-1)
Rockwell, C. F. (M)

Shrewsbury (BOS-1)
Harrington, E. W. (A)

Somerset (BOS-1)
Ironfield, R., Jr. (M)
Wardle, W. F. (A)

Somerset Center (BOS-1)
Chatterton, E., Jr. (A)

Somerville (BOS-1)
Fitzgerald, W. D. (M)
Gallagher, E. F. (M)
Kehr, J. E. (M)
Kolster, C. C. (SM)
Martini, R. F. (A)
Matthewson, A. (M)
McNamara, W. E. (A)
Norvell, J. B. (M)
Pantazelos, P. G. (A)
Richter, G. H. (A)
Rubino, C. F. (A)
Solomon, A. N. (A)
Thomas, K. J. (M)
Vaccaro, P. (M)
Zullo, W. J. (M)

South Acton (BOS-1)
Janvrin, W. A., Jr. (SM)
Pfeiffer, H. F. (M)
Rand, J. C. (A)

South Berlin (BOS-1)
Beauregard, W. G. (A)

Southboro (BOS-1)
Boyle, D. A. (M)
Sharpe, D. (A)

South Boston (BOS-1)
Spellios, J. S., Jr. (A)
Stevens, E. F. (A)
Vitkus, P. L. (A)

South Braintree (BOS-1)
Goodwin, R. C. (M)
Hirtle, A. C. (M)
MacEwan, A., Jr. (M)

Southbridge (BOS-1)
Chace, H. E. (M)
Craig, R. B. (M)
Frey, H. B., Jr. (M)
Johnston, J. E. (A)
Lindsay, G. A. (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. (A)
Golenpaul, C. (A)
Hoover, H. H., Jr. (A)
Schell, A. C. (M)

South Egremont (CV-B-1)
Borg, W. N. (M)

South Hamilton (BOS-1)
Collier, F. E. (M)
Peck, S. C. (SM)
Silverman, D. M. (M)
Wolfskill, J. R. (SM)

South Lincoln (BOS-1)
Bochmer, H. W. (SM)
Brown, D. R. (M)
Drisko, B. B. (M)
Faran, J. J., Jr. (SM)
Fullerton, A. L., Jr. (SM)
Gibbs, N. E. (M)
Gross, T. A. O. (M)
Jorgensen, S. W. (M)
Rew, R. V. (A)
Shansky, D. (M)
Stevens, F. R. (M)
Wilson, M. S. (M)

South Natick (BOS-1)
Brundage, E. J. (M)
Horan, W. H. (A)

South Hadley Falls (CV-1)
Davey, H. J. (A)

South Sudbury (BOS-1)
Armstrong, D. G. (M)
Bennett, R. L. (A)
Blanchard, J. M. (M)
Bobroff, D. L. (M)
Boole, R. A. (A)
Brown, K. E. (A)
Caldwell, R. J. (SM)
From, W. H. (M)
Keith, W. W. (A)
Kirkland R. E. (M)
Mackin, R. N., III (M)
McAleer, T. T. (A)
McCoy, A. M., Jr. (M)
Ostroff, E. D. (M)
Coblenz, A. (SM)
Cohen, H. (A)
Duncan, K. W. (A)
Emerson, W. P. (A)
Fickett, M. M. (M)
Forbes, G. D. (M)
Fraim, F. G. (M)
Partridge, G. R. (M)
Petrishen, J. (A)
Pritchard, W. L. (SM)
Reach, R. W., Jr. (A)
Rich, E. E. (M)
Senseman, R. W. (M)
Teich, W. W. (SM)
Thomas, E. K. (A)
Throckmorton, K. L. (M)
Waters, R. A. (SM)

South Weymouth (BOS-1)
Aronson, J. H., Jr. (M)
Cook, M. M. (M)
Hill, H. F. (VA)
Kilburne, J. W. (A)
Nolde, L. V. (M)
Stefanowicz, S. S. (A)

Spencer (BOS-1)
Dennis, L. F. (M)

Springfield (CV-1)
Andrews, W. J. (A)
Bookman, R. E. (SM)
Cameron, J. A. (M)
Carlson, E. A. (M)
Cushing, T. F. (VA)
Dewey, C. S. (M)
Dideum, M. A. (A)
Fratar, F. J. (M)
Harvey, D. E. (A)
Hellenday, F. W. (M)
Hettinger, S. (A)
Houck, S. C. (A)
Kitty, F. J. (M)
Lyman, J. R. (A)
Mercen, F. E. (A)
Norkin, H. (M)
Richardson, H. M. (SM)
Salame, G. (A)
Townsend, G. R. (M)
Zinchuk, M. (A)

Squantum (BOS-1)
Jones, T. F., Jr. (SM)

Stoneham (BOS-1)
Bassett, J. D. (SM)
Boyd, H. R. (SM)
Burke, N. W. (M)

De Agazio, E., Jr. (M)
Gardner, H. A. (M)
Halchak, J. R. (A)
Jamgochian, E. (SM)
Lucy, R. F. (M)
Lund, F. H. (M)
Puorro, T. A. (M)
Sorbye, K. E. (M)
Stone, M. L. (A)
Waters, M. L. (A)
Wexler, R. K. (M)
Williams, J. J. (M)

Stoughton (BOS-1)
Croxville, W. B. (M)
Dolan, R. P., Jr. (A)
Emery, R. H. (A)
Lang, K. T. (A)
Litchfield, P. O. (A)
McDonnell, J. Q. (A)
McGarvey, J. P. (A)
Scripture, F. R. (SM)

Stow (BOS-1)
Shoemaker, P. B. (A)

Sudbury (BOS-1)
Bradley, E. G. (M)
Hand, S. E. (SM)
Stromsted, E. A. (M)

Swampscott (BOS-1)
Berman, L. (SM)
Ludlam, W. A. (A)
Manna, E. E. (A)
Williamson, R. J. (A)
Zimmermann, H. J. (SM)

Taunton (BOS-1)
Silvia, E. R. (A)

Tewksbury (BOS-1)
Cohen, A. (A)
Green, L. M. (M)
McCarthy, J. D. (A)
Wholey, L. T. (A)

Topsfield (BOS-1)
Burnett, K. N. (A)
Goddard, C. T. (SM)
Harrington, E. C. (M)
Roche, T. F. (A)
Wimpy, E. K. (SM)

Tyngsboro (BOS-1)
Spindell, F. A. (SM)

Upton (BOS-1)
McCully, R. G. (A)

Waban (BOS-1)
Antman, M. A. (SM)
Berg, A. L. (A)
Berner, A. S. (M)
Fillis, R. H. (M)
Hall, R. E. (M)
Hunter, W. H. (M)
Mofenson, J. (SM)
Morrison, L. H. (SM)
Pakfal, F. E. (M)
Salzer, E. (M)
Spencer, P. L. (F)
Ward, A. E. (SM)

Wakefield (BOS-1)
Bianco, J. F. (SM)
Brown, E. O. (M)
Buckland F. A. (M)
Clark, N. F. (A)
Bienacher, P. L. (M)
Gallagher, P. (A)
Howe, S. E. (A)
Lynch, E. E. (SM)
Rich, E. S. (SM)
Schunk, D. A. (A)
Stein, H. (SM)

Walpole (BOS-1)
Austin, C. S. (M)
Estabinter, W. F. (M)
Lord, J. S. (A)
Purdy, W. E. (A)

Waltham (BOS-1)
Abate, A. (M)
Ackley, R. M. (A)
Aoyama, H. T. (A)
Arnum, M. (M)
Aron, N. (SM)
Baker, A. (A)
Bartlett, R. P. (M)
Bickford, W. J. (M)
Block, A. V. (M)
Bowe, J. J. (A)
Bowers, W. B. (M)
Brody, G. H. (A)
Brown, D. F. (M)
Brunton, D. A. (A)
Callahan, T. T. (A)
Casanave, C. L. (M)
Chernosky, E. J. (M)
Chittenden, K. M. (M)
Colten, B. (SM)
Conway, J. W. (M)
Cooperstein, M. (M)
Coroniti, S. C. (SM)
Crosby, R. E., Jr. (M)
Crosthwait, J. L. (M)
Debski, J. M. (M)
Delano, A. B. (M)
Devereux, J. G. (A)
Drake, W. W., Jr. (M)
Drury, W. H. (A)
Dukat, F. M. (SM)
Dunbar, E. E. (M)
Dunn, A. G. (M)
Dusault, A. J. (M)
Ehrlich, S. L. (A)
Elkind, J. I. (A)
Engelberger, J. K. (A)
Englund, F. T. (A)
Fitzz, R. D., Jr. (A)
Fraleigh, R. V. (A)
Francis, E. A. (A)
Getting, J. A. (F)
Gibson, S. K. (M)

Gillen, R. M. (A)
Glick, A. L. (M)
Gostenhofer, G. (M)
Gregory, J. G. (M)
Grey, R. (M)
Grund, J. B. (SM)
Guiney, R. J. (A)
Hall, R. P. (M)
Hamant, D. (M)
Hannon, S. (M)
Harper, R. (M)
Hartley, M. S. (SM)
Hines, P. D. (A)
Hobby, J. L. (A)
Hosmer, B. E. (A)
Hovnanian, H. P. (SM)
Hughes, G. E. (A)
Hull, D. R. (F)
Huntley, W. F. (M)
Jackson, S. R. (M)
Jones, R. V., Jr. (A)
Keilson, J. (SM)
Kelly, T. J. (A)
Koszinen, G. K. (M)
La Haise, C. A., Jr. (M)
Langdon, D. H. (M)
Lehr, C. G. (SM)
Lester, D. F. (M)
Leverton, W. F. (SM)
Lewis, P. M., II (A)
Macgregor, D. F. (A)
Macmaster, G. H. (A)
Manley, H. J. (A)
Marcley, W. E. (A)
Mark, R. B. (A)
Marino, A. S. (M)
Mathews, K. C. (M)
Melanson, W. W. (A)
Moore, T. A. (M)
Morey, R. F. (A)
Mount, R. C. (M)
Mussali, M. E. (A)
Nichols, N. B. (SM)
Parise, J. D. (A)
Parkinson, G. B. (A)
Pearlman, A. R. (M)
Peters, A. J. (M)
Peterson, A. H. (A)
Peters, C. J. (A)
Pick, G. G. (M)
Pollack, D. (SM)
Porter, A. D. (M)
Price, B. F. (M)
Price, R. A. (A)
Primpas, L. V. (M)
Ratts, B. H. (SM)
Reed, R. D. (M)
Reifel, H. (M)
Ricciardi, F. (M)
Rickey, R. G. (A)
Rittenburg, S. E. (M)
Rodimon, C. C. (M)
Rogers, T. F. (SM)
Ruhman, S. (SM)
Saad, T. S. (SM)
Sallen, R. P. (A)
Salter, W. (SM)
Santa, M. M. (M)
Santangelo, J. (SM)
Schrimpf, H. W. (A)
Seamans, R. C., Jr. (SM)
Sear, H. (A)
Shaw, G. J. (M)
Sievers, W. E. (M)
Skowron, J. F. (A)
Smith, D. W. (M)
Soltes, A. S. (M)
Square, A. L. (A)
Stauffer, F. K. (M)
Stockman, H. (SM)
Sutro, L. J. (M)
Taylor, K. A. (M)
Tryon, L. E. (M)
Vacca, R. H. (SM)
Wallace, G. S. (VA)
Webster, A. L. (M)
Welles, S. B. (SM)
Welte, J. (A)
Werman, M. S. (M)
Wilson, E. F. (M)
Windsor, R. B. (SM)
Winsor, D. L. (M)
Winters, W. J. (M)
Zettler, W. R. (A)
Zimmer, J. T. (A)

Ware (CV-1)
Krystek, M. E. (M)

Watertown (BOS-1)
Altman, J. L. (A)
Aronow, S. (M)
Bagnall, J. J., Jr. (SM)
Belounge, L. W. (A)
Byington, R. E. (A)
Champeny, J. C. (M)
Clements, D. F. (M)
Crosby, R. L. (SM)
Decof, D. N. (M)
De Shon, H. C. (M)
Epstein, D. J. (M)
Field, R. F. (F)
Fulton, D. A. (A)
Giallongo, S. J. (A)
Gitelman, E. (M)
Gordon, C. R. (A)
Haas, D. L. (M)
Hampson, E. R. (A)
Huang, C. (SM)
Jeter, I. E. (M)
Kahain, C. H. (M)
Kasparian, K. D. (A)
Kotowski, J. P. (M)
Lambert, T. A. (M)
Lechner, R. J. (A)
Lenhardt, L. J. (M)
Leonard, M. V. (A)
Mallumian, L. (A)
Meeker, J. L. (M)
Petersen, N. E. (M)
Read, V. H. (A)
Robinson, M. P. (M)
Salvo, R. A. (M)
Samson, E. W. (SM)
Schiess, G. (A)
Schotten, H. G. (M)
Sharpe, W. P., Jr. (M)

Skolnik, M. I. (SM)
Terzian, Y. V. (A)
Toman, K. (A)
Wang, S. C. (M)
Whelpton, J. P. (A)
Whittier, R. J. E. (M)
Wood, R. M. (A)

Wayland (BOS-1)
Allen, D. C. (A)
Alstad, N. J. (M)
Anderson, F. J. (M)
Black, K. C. (F)
Borts, M. B. (A)
Conard, R. W. (A)
Davis, L., Jr. (SM)
Dutton, R. H. (A)
Gillespie, C. N. (M)
Hodgkinson, W. S. (M)
Hough, H. O. (M)
Humphrey, G. S. (A)
Jenks, F. A. (SM)
Johnson, A. H. (M)
Jordan, C. E. (M)
Kather, E. N. (M)
Letaw, H., Jr. (SM)
Lowery, W. E. (SM)
Mac Kenzie, K. (A)
Mathis, G. (M)
McNally, I. L. (SM)
Naugler, A. W. (M)
O'Donoghue, H. J., Jr. (M)
Phillips, T. L. (M)
Pontecorvo, P. J. (SM)
Proctor, H. E., Jr. (A)
Rider, D. V. (M)
Serotta, N. C. (M)
Smulowicz, B. (A)
Soorsoorian, S. A. (M)
Staiano, A. J. (M)
Stewart, R. F. (A)
Stiles, F. H. (M)
Tandy, P. C. (M)
Tanner, W. E. (M)
White, A. D. (M)
Whiteside, H. (M)
Whitham, G. E. (A)

Webster (BOS-1)
Chapin, R. S. (SM)
Lanman, T. W. (A)

Wellesley (BOS-1)
Bedford, W. S. (M)
Berger, R. (M)
Brainerd, H. B. (SM)
Bristol, H. B. (M)
Buckbee, J. A. (M)
Churow, W. J. (M)
Frelich, R. F. (M)
Hart, H. M. (SM)
Jones, B. R. (M)
McDowell, L. S. (SM)
Newton, G. C., Jr. (M)
O'Donnell, A. J., Jr. (SM)
Pease, W. M. (M)
Pierce, G. B. (A)
Plouffe, R. H. (A)
Plough, C. T., Jr. (A)
Reed, W. G. (M)
Th

MASSACHUSETTS

James, J. D., Jr. (A)
Johnson, G. O. (M)
Lyon, W. W. (A)
Nelson, R. R. (A)
Patton, J. E. (M)
Pilkington, D. W. (M)
Reem, G. M., II (SM)
Robinson, M. P., Jr. (M)
Romaine, G. E. (A)
Whitman, J. A. (M)

West Falmouth (BOS-1)
Austin, J. F. (A)
Bierman, C. W. (A)

Westford (BOS-1)
Chace, W. G. (M)

West Granville (CV-1)
Hudson, J. S. (A)

West Lynn (BOS-1)
Laurent, J. A., Jr. (M)
Mayo, H. L. (A)
White, A. (A)

West Medford (BOS-1)
Lanciani, D. A. (M)
Memishian, J. (M)
Stevens, C. A. (SM)

West Natick (BOS-1)
Sessions, A. E. N. (SM)

West Newbury (BOS-1)
Fidler, R. R. (A)

West Newton (BOS-1)
Apelbaum, J. H. (A)
Brown, B. D. (A)
Clymas, G. (A)
Cooper, G. (A)
D'Argento, F. R. (A)
Dixon, R. K. (M)
Eakman, S. L. (M)
Elkan, J. (M)
Farrington, J. F. (F)
Freedman, N. J. (SM)
Hadley, G. W. (M)
Hergenrother, R. C. (F)
Horrigan, J. B. (A)
Johnson, B. F. (M)
Jones, W. J. (SM)
Kolinle, A. P., Jr. (M)
Kosowsky, D. I. (A)
Lukianov, R. E. (A)
Mac Dowell, K. M. (M)
Madegson, A. H. (A)
Manning, C. J. (A)
Myers, H. L. (M)
Pekin, H. T. (SM)
Robertson, A. S. (M)
Smith, J. E. (F)
Teixeira, N. A. (M)
Wilcox, R. B. (M)
Woo, W. G. (SM)
Wyckoff, P. H. (M)

Weston (BOS-1)
Bark, A. (M)
Brown, W. C. (M)
Burt, W. G., Jr. (M)
Crowley, A. H. (M)
Dairiki, S. (M)
Dewey, O. L. (M)
Eames, R. D. (M)
Erickson, P. W. (SM)
Fellows, G. E. (SM)
Hinson, H. J. (M)
Green, P. E., Jr. (SM)
Gross, F. A. (VA)
Hills, C. E., Jr. (M)
Holt, R. B. (SM)
Kahler, R. C. (A)
Kelly, T. J. (M)
McKenney, H. F. (SM)
Saunders, N. B. (SM)
Searle, C. L. (M)
Sedik, J. (M)
Stoffel, F. T. (M)
Underhill, B. B. (SM)

Westover AFB (CV-1)
Ahern, W. C. (M)
Goldberg, A. S. (M)
Michels, R. E. (A)
Rasmuson, J. E. (M)

West Peabody (BOS-1)
Bovarnick, M. L. (M)
Grant, J., Jr. (A)
Lewin, I. (M)
Miller, R. A. (M)
Simon, E. (M)
Snow, S. D. (A)

West Roxbury (BOS-1)
Bonica, J. S. (A)
Cahill, T. C. (A)
Downing, J. T. (M)
Durosa, C. J. (M)
Fay, S. (M)
Haddad, S. G. (M)
Keane, L. M. (M)
McCarthy, J. G. (M)
Parsons, A. (M)
Sullivan, P. A. (A)
Tahan, E. N. (SM)
Thomas, J. E. (A)

West Somerville (BOS-1)
Noonan, J. T. (A)
Tringale, S. R. (A)

West Springfield (CV-1)
Burnett, K. H. (M)
Sheehan, J. J. (A)

Westwood (BOS-1)
Abrahamsen, F. H. (M)
Arlin, M. N. (M)
Brock, G. W., Jr. (M)
Gere, A. J. (SM)
Hildebrant, B. M. (A)
Lane, C. R. (SM)
Paddock, R. B. (A)
Staples, E. R. (SM)
Wasley, R. L. (A)
Westbom, A. C., Jr. (SM)
Wilson, R. T. (M)

Weymouth (BOS-1)
Hamm, G. M. (SM)
Tufts, W. M. (A)

Whitman (BOS-1)
Simmons, E. C. (M)

Wilbraham (CV-1)
Webber, F. G. (SM)

Williamstown (CV-B-1)
Allmacher, A. M. (M)
Curry, J. R. (M)
Galbraith, J. S. (M)
Hansen, R. C. (A)
Hardy, H. G. (A)
Ness, O. A. (A)
Peck, D. B. (A)
Postle, A. H. (M)
Powell, R. F. (M)
Richardson, T. F., Jr. (M)
Rowland, W. H. (A)
Scarborough, F. S. (A)
Schenker, B. (M)
Schimmel, J., III (M)
Sheehan, R. P. (M)
Stabler, H. F. (SM)
Welcome, F. L., Jr. (M)
White, J. A. (M)

Wilmington (BOS-1)
Hartwell, H. G. (M)
Hooper, W. G., Jr. (M)
Mercuda, F. S. (M)
Montgomery, J. L. (SM)

Winchester (BOS-1)
Babakian, J. (M)
Benkus, P. D. (M)
Beranek, L. L. (F)
Blakely, J. R. (SM)
Blanchard, J. T. (M)
Carle, P. J. (M)
Chandler, G. E. (M)
Corderman, C. L. (SM)
Dawson, J. W. (F)
De Young, L. A. (SM)
Dieterich, E. J. (A)
Freedman, J. (SM)
Fritch, D. J. (SM)
Glendon, R. E. (M)
Hanson, C. R. (M)
Heft, E. J. (A)
Heyck, H. D. (M)
Holdam, J. V., Jr. (SM)
Ivers, J. H. (SM)
Jackson, W. E. (A)
Jeffery, L. R. (A)
King, R. W. P. (F)
Larson, C. O. (SM)
Leach, H. H. (A)
Mainberger, W. A. (M)
Marino, D. J. (A)
Metsker, J. H. (A)
McFarlane, D. J. (SM)
McVicar, K. E. (M)
Metzgar, K. J. (M)
Otto, F. B. (M)
Parks, F. B. (SM)
Purrington, R. L. (M)
Rice, D. H. (A)
Robinson, T. B. (M)
Sawyer, D. S. (A)
Schlenz, J. E. (A)
Schroeder, R. K. (A)
Segerstrom, C. A., Jr. (SM)
Slack, C. B. (A)
Tunnicliffe, W. W. (M)
Unger, D. M. (A)
Watts, C. B., Jr. (M)
Withington, A. (A)

Winthrop (BOS-1)
Altshuler, E. E. (M)
Diaz, L. V. (A)
Esakov, D. A. (M)
McDonald, F. J. (A)
Nardone, L. J. (M)
Newton, D. J. (M)
Peterson, D. G. (M)
Rivers, R. A. (M)
Williamson, J. H. (M)
Wing, J. (M)

Woburn (BOS-1)
Bandes, H. (SM)
Bayliss, R. E. (M)
Bettencourt, J. P. (M)
Briana, A. M. (M)
Brown, H. E. (A)
Chang, H. (A)
Chrusciel, M. R. (M)
Ferrante, D. (M)
Gehrke, F. E. (SM)
Hosterman, C. W. (M)
Katz, L. (SM)
Kolp, J. S., (M)
Mac Donald, K. J. (A)
Mead, D. C. (SM)
Molica, A. J. (A)
Murachver, J. (M)
O'Connor, L. J. (M)
Phillips, R. L. (A)
Ray, G. H., Jr. (A)
Scholz, P. A. (SM)
Seifert, W. W. (SM)
Steen, J. R. (F)
Turgiss, W. W. (M)
Uhu, E. H. (M)
Walters, S. H. (SM)
Wang, S. (M)
Yelter, M. R. (A)

Wollaston (BOS-1)
Bixby, W. L. (M)
Despathy, R. G. (M)
Di Loreto, A. A. (A)
Edmonston, A. S. (M)
Kliman, G. B. (M)
McNamara, T. J. (M)

Woods Hole (BOS-1)
Hervey, J. P. (M)
Smith, M. K. (A)

Worcester (BOS-1)
Anderson, R. M. (A)
Bronwell, A. B. (F)
Browning, E. A. (M)
Connolly, J. (M)
Diffio, R. E. (A)
Edinburg, M. W. (A)
Engelsted, J. (A)
Eteson, D. C. (M)
Hirvi, H. E. (A)
Hoogasian, L. (M)
Howe, D. W., Jr. (M)
Howes, D. E. (M)
Karazia, R. J. (A)
Kasper, J. P., Jr. (M)
Kee, R. C. (M)
Manoog, J. C. (M)
Millias, E. (M)
Morgan, T. H. (SM)
Moruzzi, R. L. (A)
Newell, H. H. (SM)
Newman, H. C. (A)
Noll, P. W. (M)
O'Brein, H. F. (A)
Petit, A. F. (M)
Sawyer, D. E. (M)
Shulman, L. (A)
Stoupis, T. (M)
Wadsworth, W. B. (M)
Wolniewicz, R. S. (A)
Zieper, H. S. (M)

MICHIGAN

Alger (DET-4)
Ernst, C. E. (A)

Allegan (DET-4)
Borst, P. E. (A)
Malilla, W. A. (M)

Allen Park (DET-4)
Bailey, K. V. (SM)
Bazydlo, H. J. (A)
Bledsoe, J. A. (A)
Caffrey, T. J. (A)
Hogle, R. C. (M)
Jackson, T. R. (A)
Klingler, D. E. (M)
Tosh, W. M. (M)

Alma (DET-4)
George, E. E. (M)

Ann Arbor (DET-4)
Attwood, S. S. (SM)
Bartman, F. L. (M)
Barton, H. F. (M)
Bernhard, H. A. (A)
Black, J. R. (M)
Blythe, R. (M)
Boggess, R. L. (M)
Boyd, J. A. (M)
Bozoian, M. (A)
Browder, J. C. (M)
Brown, J. S. (SM)
Brown, R. K. (M)
Bublitz, A. T. (A)
Burns, J. A. (A)
Butler, T. B., Jr. (A)
Carlsen, R. A. (A)
Carr, J. W., III (M)
Carson, R. D. (M)
Chaney, L. W. (M)
Chubb, W. B. (A)
Cohen, G. S. (M)
Crane, R. B. (SM)
De Hart, W. R. (M)
Dombrowski, G. E. (M)
Dow, W. G. (F)
Dute, J. C. (M)
Early, H. (SM)
Earshen, J. J. (M)
Elliott, W. C. (M)
Farrin, H. W. (M)
Frese, R. E. (A)
Friedberg, I. S. (M)
Garner, H. L. (A)
Gaskill, R. E. (M)
Gilbert, E. O. (A)
Gilbert, E. G. (A)
Goode, H. H. (SM)
Goodrich, R. H. (M)
Greenwood, D. T. (M)
Haddock, F. T. (M)
Hall, G. O. (M)
Halsted, L. R. (A)
Hansen, R. J. (A)
Harmon, S. T. (M)
Hazeltine, B. (M)
Henry, E. E. (A)
Hok, G. (F)
Holland, L. N. (SM)
Howe, R. M. (M)
Johnston, R. W. (M)
Kaufman, L. (M)
Kazda, L. F. (M)
Kilmer, W. L. (M)
Kock, W. E. (F)
Larson, R. W. (A)
Larson, R. W. (M)
Lawrence, W. H. (M)
Lawson, A. C., Jr. (A)
Liang, D. Y. (M)
Limansky, I. (M)
Lindsay, W. J. (A)
Macnee, A. B. (SM)
Martin, E. A. (M)
Mason, D. R. (M)
Masten, S. C. (A)
McMillan, S. H. (A)
McNabb, J. W. (A)
McPherson, R. R. (M)
Metzelaar, P. N. (A)
Miller, M. H. (M)
Monroe, K. E. (A)
Mouzon, J. C. (SM)
Nakagawa, N. (A)
Nichols, A. D. (A)
Nunn, W. M., Jr. (SM)
O'Neal, R. D. (SM)
Orr, L. W. (A)
Otterman, J. (M)
Pantek, H. R. (M)
Peterson, G. E. (SM)
Petrowski, J. P., Jr. (M)
Pool, M. H. (A)
Potter, W. H. (A)
Rauch, L. L. (SM)
Reiher, H. F. (A)
Remley, F. M., Jr. (M)
Ristow, H. E. (M)
Robinson, G. H. (M)
Rock, A. L. (M)
Rollin, R. A., Jr. (A)
Roth, P. F. (M)
Rothschild, D. R. (A)
Rowe, J. E. (M)
Rupke, E. (M)
Sattinger, I. J. (SM)
Schaefer, E. J. (M)
Schulte, H. F., Jr. (A)
Schupp, A. R., Jr. (A)
Scott, N. R. (SM)
Sharpe, C. B. (A)
Soudeen, P. (M)
Spencer, N. W. (SM)
Spengos, A. (M)
Steinmann, W. L. (SM)
Stout, M. B. (SM)
Strand, J. (M)
Sutton, D. C. (A)
Tarlouix, J. G. (SM)
Theofil, D. V. (M)
Thomassen, N. E. (M)
Tieng, K-V. (M)
Waldman, A. (A)
Welch, H. W., Jr. (SM)

Auburn (DET-4)
Ayers, E. D. (M)

Battle Creek (DET-4)
Arrowsmith, R. (M)
Burton, E. T. (SM)
Mah, L. (M)
Saunders, E. R., Jr. (M)
Summerford, D. C. (SM)

Bay City (DET-4)
Malzahn, D. F. (A)
Sackett, W. T., Jr. (A)
Volk, M. C. (A)
Woody, F. (A)

Belleville (DET-4)
Benner, B. (M)
Kranz, H. E. (SM)

Benton Harbor (SB-M-5)
Fiebich, E. C. (A)
Martz, A. F., Jr. (M)
Phillips, G. D. (M)

Berkley (DET-4)
Norris, W. J. (A)

Berrien Springs (SB-M-5)
Lashier, H. M. (M)

Birmingham (DET-4)
Adams, R. L. (M)
Armil, R. A. (A)
Benaglio, R. V. (M)
Burge, F. L. (M)
Chapman, F. W. (SM)
Clayton, G. H. (A)
Egger, R. J. (M)
Fahringer, W. H. (A)
Fisk, R. H. (M)
Gudaitis, W. V. (M)
Harokopus, W. P. (A)
Hawley, G. H. (M)
Holmes, W. E. (M)
Kuba, R. E. (M)
Leydorf, G. F. (SM)
McDonnell, W. F. (M)
Michaels, C. L. (SM)
Mika, H. S. (SM)
Morgan, H. K. (F)
Olson, D. R. (M)
Ragsdale, W. H. (M)
Roggenbuck, R. A. (SM)
Sanderson, A. G. (M)
Scherba, M. B. (SM)
Somerville, A. (M)
Thompson, R. H. (M)
Wendt, F. S. (M)

Bridgeport (DET-4)
Smith, R. P. (A)

Buchanan (SB-M-5)
Beaverson, W. A. (M)
Burrouglis, L. R. (A)
Hagey, L. F. (M)
Kopp, A. R. (A)
Pawlowski, R. J. (A)
Tomcik, D. J. (M)
Wiggins, A. M. (SM)
Wood, J. F. (A)

Burt (DET-4)
Hrivnak, A. (A)

Byron Center (DET-4)
Jager, A. J. (A)

Cass City (DET-4)
Douglas, J. W. (A)

Center Line (DET-4)
Craig, J. P. (M)
Jensen, S. D. (M)

Charlotte (DET-4)
Fox, M. L. (A)
Rypstra, B., Jr. (M)

Clawson (DET-4)
Dougherty, R. H. (M)
Fleming, H. A. (M)
Gambill, C. C. (M)
Machwart, R. J. (A)
Quin, W. J. (A)

Climax (DET-4)
Griffin, R. E. M)

Coldwater (FT-W-5)
Munn, E. H., Jr. (M)

Dearborn (DET-4)
Boltz, H. A. (SM)
Calladine, G. T. (M)
Emery, R. R. (A)
Ference, M., Jr. (SM)
Franke, W. C. (A)
Giacoletto, L. J. (SM)
Higgins, N. S. (A)
Huber, P. (M)
Krug, E. G. (A)
Lien, C. E. (VA)
Liskiewicz, W. T. (M)
Lombardo, A. (A)
Olson, R. G. (M)
Patraiko, J. (A)
Popkiewicz, F. (A)
Roberts, G. A. (M)
Saigeon, N. D. (M)
Sims, R. C. (A)
Stoner, M. J. (A)
Stretanski, P. A. (A)
Toton, E. J. (A)
Urban, L. R. (A)

Detroit (DET-4)
Alimpich, N. (M)
Almas, S. L. (M)
Amick, R. E. (A)
Andrews, G. H. (M)
Artens, E. (M)
Averill, E. W. (A)
Baldini, E. A. (M)
Bandoian, P. (M)
Banhiget, E. W. (A)
Barich, T. J. (M)
Blett, E. B. (VA)
Brabant, C. E. (A)
Brauning, T. W. (M)
Brelie, E. F. (A)
Brosch, H. T. (A)
Brosman, H. A. (A)
Buchanan, A. R. (SM)
Burley, A. A. (M)
Butchart, R. D. (A)
Butcher, J. H. (M)
Cannon, R. C. (A)
Capron, R. W. (M)
Chow, H. (M)
Chute, G. M. (SM)
Clark, E. H. (A)
Colalanni, J. V. (M)
Cotton, R. J. (SM)
Cowles, E. D. (A)
Craig, A. D. (A)
Curran, J. H. (A)
Currie, J. H. (M)
Da Roza, F. G. (M)
Davis, C. (M)
Degen, A. (A)
Denstaedt, E. C. (SM)
De Tar, J. B. (M)
Diem, C. W. (A)
Donelson, L. E. (A)
Donovan, R. (M)
Drane, H. (A)
Dubois, R. C. (A)
Duda, E. M. (A)
Dunlap, W. C., Jr. (SM)
Eilefsen, N. E. (F)
Erhart, D. L. (A)
Ferguson, D. R. (A)
Fisk, N. C. (SM)
Fontaine, A. V. (SM)
Forguer, L. L. (SM)
Forsythe, E. H. (M)
Franklin, R. M. (M)
Friedenthal, A. (M)
Gardner, D. D. (M)
Gareltz, C. (A)
Genzlinger, V. (A)
Goldstone, G. H. (A)
Goodman, G. (A)
Griffith, W. (M)
Griffith, W. A. (SM)
Gundersen, R. E. (A)
Hafatad, L. R. (F)
Haigh, J. B. (A)
Hall, A. C. (SM)
Hartz, F. M. (M)
Hein, D. W. (M)
Heiser, E. S. (SM)
Hess, H. M. (M)
Hill, F. R. (M)
Ho, V-C. (M)
Hocking, L. J. (A)
Howard, L. R. (M)
Hubbard, W. J. (A)
Jeskin, D. (M)
Johnson, K. E. (A)
Jones, C. W. (A)
Kahle, F. L. (A)
Kanun, V. C. (A)
Kato, Z. (A)
Kattoua, I. E. (A)
King, L. E. (VA)
Kivimaki, V. C. (A)
Kocher, C. (SM)
Konopka, E. P. (A)
Kossuth, A. K. (M)
Kropp, G. W. (A)
Krulikoski, S. J., Jr. (M)
Kubala, A. (M)
Kudela, A. F. (A)
Lawrence, S. C. (M)
Lax, B. (A)
Leese, J. R. (A)
Le Fevre, H. P. (M)
Leggatt, G. E., Jr. (A)
Lenhardt, R. W. (M)
Lesinsky, F. (M)
Licht, G. L. (A)
Lipkin, L. E. (SM)
Lippmann, S. A. (M)
Longerich, E. P. (M)
Loughridge, D. H. (SM)
Love, E. J. (SM)
Luzer, H. J. (M)
Macewka, N. (M)
Madgett, W. H. (A)
Malafouris, T. (A)
Marshall, J. (A)
Mathamel, F. A. (M)
McCartin, L. M. (A)
Schafer, R. H. (M)
Thomsen, T. R. (A)

Ferndale (DET-4)
Amman, E. A. (A)
Erickson, E. A. (A)
Ludwig, C. J. (A)
Nutter, H. G. (A)
Payne, D. V. (A)
Seleno, A. A. (A)
Wagoner, C. E., Jr. (M)

Flint (DET-4)
Anderson, H. J. (M)
Bridgen, G. A. (M)
Colosi, A. (A)
Communy, C. A. (A)
Driver, J. P. (M)
Evans, H. L. (A)
Filkins, L. D. (M)
Hoop, R. E. (A)
Johnson, R. R. (A)
Jones, M. N. (M)
Linn, D. L. (A)
McBride, W. J. (M)
McGillem, C. D. (M)
Murphy, E. F. (A)
Parker, W. J. (A)
Pendleton, A. D. (A)
Stewart, J. A. (A)
Welker, C. M. (A)

Flushing (DET-4)
Clark, P. R. (A)
Loshbough, P. A. (A)

Fraser (DET-4)
Hoehn, A. M. (A)

Garden City (DET-4)
Harrigan, P. M. (M)
McGregor, A. D. (M)
Newell, C. J. (M)
Taplin, L. B. (A)
Ward, D. B. (A)

Grand Junction (DET-4)
Krieger, H. C. (M)

Grand Marais (MIL-5)
Doran, T. F. (A)

Grand Rapids (DET-4)
Anderson, T. G. (M)
Bailey, D. C. (A)
Barfuss, J. D. (M)
Bateman, G. H. (SM)
Berg, R. C. (A)
Bergenroth, L. C. (A)
Braverman, R. (M)
Brown, C. S. (M)
Calahan, L. F. (M)
Costanzo, P. A. (M)
Cummins, D. L. (M)
Davis, R. L. (M)
Florman, L. W. (SM)
Gaydos, G. J. (M)
Giardina, J. F. (A)
Gorton, E. D. (M)
Hekker, T. L. (A)
Kesner, H. W. (A)
Lundberg, R. L. (M)
Mort, V. A. (A)
Picked, F. E. (M)
Sanders, W. T. (A)
Schulte, F. E. (A)
Stevens, R. R. (SM)
Troll, W. C. (A)
Van Ort, G. W. (A)
Van Zwet, C. (A)
Voice, C. G. (M)
Waldner, R. G. (M)
Zoerner, J. R. (M)
Zwiep, T. C. (M)

Grandville (DET-4)
Peterson, C. E. (A)

Grass Lake (DET-4)
James, F. M. (M)

Greenville (DET-4)
Marquis, A. (M)

Grosse Pointe (DET-4)
Mac Kenzie, E. P. (A)

Grosse Pointe Farms (DET-4)
Brock, F. (A)
Smale, V. E. (A)

Grosse Pointe Park (DET-4)
Logan, M. F. (A)

Grosse Pointe Woods (DET-4)
Forbess, R. L. (M)
Dacken, L. L. (M)
Delmege, A. H. (M)
Hamman, P. E. (A)
Jones, T. N. (A)
Stahl, T. H., Sr. (A)
Sullivan, R. P. (M)

Hamtramck (DET-4)
Kozinski, R. E. (A)
Maslowski, R. S. (M)
Szewczyk, Z. I. (M)

Hancock (MIL-5)
Hirvela, R. J. (M)

Harper Woods (DET-4)
Anderson, J. B. (M)

Haslett (DET-4)
Hedges, H. G. (M)

Hastings (DET-4)
Branch, R. (VA)

Hazel Park (DET-4)
Erway, P. B. (M)
Schonbring, N. W. (A)
Thomas, T. (A)

Highland Park (DET-4)
Gould, H. S. (M)
Stinson, R. C. (VA)

Hillsdale (DET-4)
Zaiser, J. E. (A)

Holland (DET-4)
Tysse, H. L. (VA)

Holt (DET-4)
Hennuye, J. H. (A)

Houghton (MIL-5)
Gray, E. E. (M)
Jones, R. J. (M)
Lind, M. S. (A)
Oswald, J. A. (A)

Huntington Woods (DET-4)
Conrath, L. R. (SM)
Van Dusen, H. J. (M)
Wilton, V. A. (M)

Inkster (DET-4)
De Camillis, M. (M)
Le Baron, G. M. (M)
Nilsen, O. K. (M)
Rheanne, R. O. (M)
White, O. (M)
Wood, T. A. (A)

Ironwood (MIL-5)
Carpenter, D. P. (M)

Jackson (DET-4)
Arasim, J., Jr. (A)
Baker, F. J. (A)
Braddock, R. C. (M)
Bradln, J. S. (A)
Devereaux, R. N. (A)
Fisk, H. V. (A)
Foy, S. (A)
Grimm, R. A. (A)
Hungerford, R. S. (M)
Klem, R. F. (SM)
Longman, E. R. (M)
Nissim, S. (M)
Norwood, W. R. (A)
Paprocki, C. R. (M)
Pedersen, F. C. (M)
Probert, D. C. (M)
Taylor, L. A. (SM)
Troup, E. O. (M)
Wegman, C. J. (M)
Westrate, M. C. (M)
Wiener, G. (A)
Zieger, C. H. (M)

Kalamazoo (DET-4)
Fetzer, J. E. (SM)
Harchen, A. J. (M)
Lee, C. E. (A)
Llepa, L. V. (A)
Marburger, W. G. (M)
Woods, O. R. (M)

Lansing (DET-4)
Bennett, C. T. (A)
Brooke, C. E. (A)
Carter, G. E. (M)
Hawkins, J. R. (A)
Hewitt, J. E. (A)
Kruger, C. (A)
Light, J. E., Jr. (M)
Mann, D. W. (M)
Whitacre, J. W. (A)
Winters, L. C. (A)
Wyble, J. J. (M)

Leslie (DET-4)
Redman, D. A. (M)
Stansfield, S. J. (M)

Lincoln Park (DET-4)
Bradley, R. W. (A)
Tank, H. F. (VA)

Livonia (DET-4)
Barsamian, A. S. (A)
Hamilton, R. E., Jr. (M)
Mallison, R. E. (M)
Michaels, P. A. (A)

Manistique (MIL-5)
Babladelis, G. (M)

Ludington (DET-4)
Petters, J. F. (A)

Manchester (DET-4)
Walker, R. C. (M)

Marshall (DET-4)
Brownell, G. F. (SM)

Melvindale (DET-4)
Ziniuk, M. A. (M)

Midland (DET-4)
Adler, S. E. (M)
Bause, H. H. (A)
Culver, M. N. (M)
Grebe, J. J. (SM)
McAllister, C. L. (M)
Mendel, F. S. (M)
Woodland, P. C. (A)

Milford (DET-4)
Stark, M. K. (M)

Monroe (DET-4)
Stearns, G. D. (A)

Morenci (DET-4)
Cottrell, M. (M)

Mount Clemens (DET-4)
Bolston, L. (A)
Brunais, E. G. (A)
Gilmore, R. M., Jr. (A)
Henry, R. E. (M)
Miller, C. E. (M)
Morrison, D. O. (A)
Pfannkuche, T. E. (M)
Swartz, E. E. (A)

Muskegon (DET-4)
Castenholz, F. E. (M)
Hammer, R. V. (M)
Man, J. C. (M)
Saums, H. L. (A)
Schreter, C. W., Sr. (A)
Tsaggaris, J. N. (M)

New Boston (DET-4)
Niswonger, B., Jr. (A)

Niles (SB-M-5)
Corey, F. B. (A)
Hammond, R. J. (M)
Kennedy, R. L. (A)
Miller, J. M., Jr. (SM)
Ramsey, R. C. (M)
Wesel, G. K. (A)
Wise, D. R. (A)

North Street (DET-4)
Wood, E. E. (M)

Oak Park (DET-4)
Barens, R. (M)
Hutchinson, R. W. (M)
Le Barre, S. D. (M)
Nichols, A. C. (M)
Rosen, P. J. (M)
Theodoroff, T. J. (A)
Zimmerman, W. A. (M)

Petoskey (DET-4)
Horniman, N. L. (M)

Pinckney (DET-4)
Beattie, L. A. (A)

Pleasant Ridge (DET-4)
Boothroyd, D. C. (A)
Degenhardt, R. N. (M)

Plymouth (DET-4)
Baumgartner, W. H. (M)
Chapelle, W. E. (A)
Smith, E. H. (M)
Town, H. W. (A)

Pontiac (DET-4)
Cook, W. N. (A)
De Haan, R. F. (M)
Fisher, M. R., Jr. (M)
Lima, E. J. F. (M)
McCall, W. A. (M)
Sanders, W. J. (A)
Smith, L. G., Jr. (A)

Port Huron (DET-4)
Assaf, E. J. (M)
Cheney, J. O. (M)

Pullman (DET-4)
Robinson, G. D. (M)

Rapid River (MIL-5)
Scott, K. J. (M)

Ravenna (DET-4)
Korson, A. W. (A)

River Rouge (DET-4)
Scrimshire, J. B., Jr. (A)
Shepley, L. (A)

Rives Junction (DET-4)
Gillam, J. R. (A)
Monroe, D. G. (M)

Rochester (DET-4)
Allured, R. B. (SM)
Collier, A. F. (A)
Hart, D. E. (M)
Jouppi, A. (A)
Oxford, C. L., Jr. (A)
Pennanen, C. W. (A)
Robinson, R. C. (M)

Roscommon (DET-4)
Klemett, R. O. (A)

Roseville (DET-4)
Bartell, V. T. (M)
Cumeralto, Q. C. (M)
Hunter, J. S., Jr. (A)
Murvin, A. L., Jr. (M)
Melvedt, H. (M)

Royal Oak (DET-4)
Ansorge, H. W. (M)
Barber, L. E. (M)
Beck, E. R. (A)
Boyd, D. R. (A)
Brown, L. R. (A)
Chadwick, R. T. (M)
Chiavarini, E. W. (M)
Coates, A. L. (VA)
Edwards, C. M. (SM)
Grundberg, R. K. (A)
Hanyzz, E. A. (M)
Johnson, A. C. (M)
Johnson, E. C., Jr. (SM)
Kreglow, G. L. (M)
Lambert, J. R. (M)
Larime, L. H. (SM)
Lindberg, E. E. (A)
Mackenzie, W. G. (A)
Miller, P. T. (M)
Montross, R. A. (A)
Reinhold, H. W. (M)
Robinson, D. F. (M)
Satullo, A. R. (M)
Schooley, M. H. (A)
Salley, S. W. (A)
Tuksal, M. A. (M)
Walker, J. C. (M)
Wanttaja, G. E. (A)
Wilmot, W. R. (M)

Saginaw (DET-4)
Hummer, J. L. (M)
Loucks, J. W. (A)
Van Voorhies, A. J. (M)

St. Clair Shores (DET-4)
Adkins, H. T. (M)
Jones, H. E. (M)
Membery, A. H. (A)
Szajna, E. F. (A)
Weagel, K. D. (A)
Wooster, A. F. (M)

St. Joseph (SB-M-5)
Bergen, H. A. (M)
Moore, D. G. (SM)
Wennerberg, A. L. (A)
Wilson, D. L. (M)

Saline (DET-4)
Brace, L. H. (A)

Sault Ste. Marie (MIL-5)
Klingler, R. R. (A)

Selfridge AFB (DET-4)
Hepner, F. E. (A)
Melendez, R. A. (A)

Spring Lake (DET-4)
Heckel, W. (M)

Stevensville (SB-M-5)
Gaarder, K. M. R. (M)

Three Rivers (FT-W-5)
Fife, D. W. (M)
Perkins, M. L. (VA)

Trenton (DET-4)
Buehler, F. A. (M)
Mills, G. L. (A)
Rosbury, F. H. (A)
Thornton, C. H. (A)

Utica (DET-4)
Albert, A. H. (M)
Alwine, H. S. (A)
Donovan, M. A., Jr. (A)
Green, H. V. (A)

Southfield (DET-4)
Bryant, J. H. (SM)

Traverse City (DET-4)
Biederman, L. M. (M)

Van Dyke (DET-4)
Schreiber, C. L. (M)

Vermontville (DET-4)
Mochring, W. D. (M)

Waldron (DET-4)
Spray, S. D. (A)

Wallace (MIL-5)
Anderson, E. W. (M)

Walled Lake (DET-4)
Beltrez, G. R. (M)
Hart, A. D. (M)
Jacke, S. E. (A)
Sink, W. C. (A)

Warren (DET-4)
Hall, J. R. (M)
McKee, J. M. (M)

Wayne (DET-4)
Haddad, M. T. (M)
Pappas, J. (A)
Tackett, R. W. (A)

Whitmore Lake (DET-4)
Podewils, N. R. (A)

Wyandotte (DET-4)
Blowers, R. C. (A)
Moore, J. B. (A)
Wesser, C. H. (SM)
Wesser, C., Jr. (A)
Workman, W. B. (A)

Ypsilanti (DET-4)
Amble, H. A., Jr. (SM)
Augustus, L. M. (M)
Blikken, W. A. (M)
Breymaier, R. W. (A)
Collard, R. S. (M)
Doll, R. E. (M)
Ebersole, H. R. (M)
Harding, W. G. (M)
Harwood, F. E. (M)
Hoaglin, J. E. (M)
Jeffrey, H. S. (M)
King, L. G. (A)
Kroll, R. T. (A)
Lartowe, H. F. (A)
Mars, R. F., Jr. (M)
Miller, R. E. (M)
Morita, Y. (M)
Ohlsson, R. I. (M)
Sherman, H. W. (M)
Smith, D. F. (A)
Smith, N. (F)
Smith, W. (M)
Van Valkenburg, E. S. (A)
Wemett, H. R. (A)
Wheatley, W. A. (M)
Wilbur, E. T. (M)
Wilcox, G. A. (A)
Williams, R. O. (SM)
Wood, A. E. (A)
Yeh, C. (SM)

Zeeland (DET-4)
Wolters, D. G. (M)

MINNESOTA

Anoka (TC-5)
Collier, G. N. M. (VA)
Kimberly, H. D. (M)
Longfellow, R. C. (SM)

Champlin (TC-5)
Lautzenheiser, R. W. (A)

Crystal Bay (TC-5)
Ketchum, J. R. (M)
Garee, J. A., Jr. (M)

MINNESOTA

Duluth (TC-5)
Bolger, A. E. (A)
Johanson, E. H. (A)
Johnson, C. D. (A)
Moore, H. I. (M)
Peirce, T. F. (A)

Edina (TC-5)
Carlson, K. J. (M)
Quinn, R. D. (M)

Ely (TC-5)
Persons, C. B. (SM)

Excelsior (TC-5)
Free, W. G. (M)

Faribault (TC-5)
Folsom, D. E. (M)

Farwell (TC-5)
Turnquist, R. D. (M)

Fergus Falls (TC-5)
Collin, W. R. (M)

Finland AFS (TC-5)
Owen, J. K. (A)

Forest Lake (TC-5)
Bolenbaugh, J. E. (M)

Glen Lake (TC-5)
Biltz, F. J. (M)

Grand Rapids (TC-5)
Taylor, K. A. (M)

Hopkins (TC-5)
Aske, V. H. (M)
Bearinger, V. W. (A)
Johnson, R. G. (M)
Larsen, F. J. (SM)
Levitas, A. (M)
Marshall, J. F. (M)
McWilliams, R. R. (M)
Nussbaum, A. (A)
Stucky, N. P. (A)
Stuetzer, O. M. (SM)
Trent, J. E. (A)

Mankato (TC-5)
Robertson, A. J. L. (M)

Marshall (TC-5)
Ahmann, R. M. (A)

Minneapolis (TC-5)
Adams, G. E. (SM)
Alderson, R. C. (M)
Alterman, F. J. (M)
Anderson, E. M. (A)
Anderson, G. P. (M)
Anderson, L. I. (A)
Anderson, P. M. (M)
Anderson, R. E. (A)
Andra, W. L. (M)
Angle, S. L. (A)
Ault, J. C. (A)
Bakken, E. E. (A)
Baller, H. (SM)
Berg, O. H. (M)
Bergan, K. N. (SM)
Blais, P. D. (A)
Bolmgren, L. N. (M)
Bonde, R. L. (M)
Bonrud, L. O. (A)
Branstad, D. H. (M)
Brunetti, C. (F)
Brunker, L. A. (M)
Bulleyment, K. J. (M)
Burrell, W. P. (M)
Callen, M. W. (A)
Casey, T. J. (M)
Christenson, V. E. (A)
Clark, R. N. (M)
Clark, N. Jr. (M)
Clifford, D. E. (A)
Cohen, A. (SM)
Cooley, P. (M)
Corbett, J. A. (M)
Cray, S. R. (M)
Croze, M. W. (M)
Cummings, K. C. (M)
Disser, C. J. (M)
Dolid, W. A. (A)
Dornoh, M. (A)
Dubbe, R. F. (A)
Dundovic, J. F. (A)
Eckstein, E. A. (A)
Eller, A. H. (M)
Engelman, C. W. (M)
Erickson, V. M. (M)
Featherstone, R. P. (M)
Field, B. W. (A)
Fink, J. S. (M)
Flaskerud, K. A. (A)
Fontenot, J. A. (M)
Fossceu, I. J. (M)
Frohbach, H. F. (M)
Gannett, A. C. (A)
Gelck, G. H. (SM)
Gergen, J. L. (A)
Glae, F. G., Jr. (A)
Gleanes, R. W. (A)
Gottlieb, D. C. (A)
Grabowski, J. H. (A)
Green, S. S. (M)
Grindheim, E. A. (A)
Grosz, W. S. (M)
Gustafson, H. A. (M)
Hansen, G. F. (A)
Harding, E. W. (M)
Hartig, H. E. (F)
Harvey, P. O. (M)
Haxby, B. V. (A)
Headen, H. V. (M)
Herrmann, F. W. (M)
Hill, B. M. (A)
Hinz, D. I. (SM)
Hirashima, H. K. (M)
Hird, F. S. (M)
Hogie, W. I. (M)
Hutton, W. L. (SM)
Inman, T. F. (SM)
Iverson, M. W. (M)
Jacobsen, E. L. (M)
James, W. (A)
Johnson, G. H. (M)
Johnson, J. A. (M)
Johnson, K. R. (A)
Johnson, R. R. (A)
Kalb, R. M. (SM)
Kamena, J. G. (A)
Kanda, A. F. (M)
Karpen, R. L. (A)
Keeler, R. J. (SM)
Kelar, J. (SM)
Kellough, S. H. (M)
Kelsey, J. R. (A)
Kershaw, J. A. (M)
Kiene, R. C. (M)
Kinsman, R. B. (M)
Knox, M. E. (M)
Kober, C. L. (A)
Kruse, J. E. (A)
Kubicek, W. G. (M)
Laegreid, N. (A)
Lahtinen, W. R. (M)
Lambert, R. F. (A)
Langille, L. O. (A)
Lasarsky, S. G. (M)
Lehnert, W. E. (M)
Lindberg, D. W. (A)
Lingvall, J. R. (M)
Lode, T. (A)
Lorenz, R. (A)
Ludwig, J. T. (A)
Lundstrom, D. E. (M)
Mauss, C. A. J. (A)
Markusen, D. L. (M)
Martin, A. L., Jr. (A)
Matthys, R. J. (A)
McElroy, W. J. (M)
McGinnis, W. J. (M)
McInerny, J. W. (A)
McShane, J. P. (M)
Mellon, G. E. (A)
Michels, T. D. (M)
Mogen, D. C. (M)
Morrish, A. H. (SM)
Muckenhirn, O. W. (SM)
Murphy, G. J. (M)
Museus, H. U. (M)
Nelson, E. J. (A)
Nelson, R. H. (M)
Nelson, W. G. (M)
Nevenux, R. J. (A)
Newman, M. M. (M)
Nichols, R. F. (M)
Nunn, E. C. (M)
O'Brien, H. G. (A)
Olsen, M. R. (M)
Olson, K. A. (M)
Ormsby, R. D. (A)
Osborn, A. J. (M)
Ostberg, E. H. (M)
Ott, J. (A)
Palmer, D. R. (M)
Pearson, R. E. (M)
Pedersen, I. C. (SM)
Pence, C. J. (A)
Persson, E. K. (M)
Peterson, C. K. (M)
Phelps, B. (A)
Pitcock, R. E. (M)
Premack, J. (M)
Prince, J. P. (M)
Rehne, H. K. (M)
Reed, E. W., Jr. (A)
Reid, J. (SM)
Reidel, R. L. (A)
Reinke, J. A. (M)
Reinke, R. F. (M)
Renk, B. J. (M)
Rohle, A. R. (A)
Rodgers, D. L. (M)
Roeschlein, E. R. (A)
Rohner, T. G. (A)
Runkle, L. D. (M)
Saprana, A. G. (M)
Saxton, A. W., Jr. (A)
Schindler, R. P. (M)
Schmitt, O. H. (F)
Schott, O. A. (M)
Schuck, O. H. (F)
Schulz, D. G. (M)
Schulz, S. W. (M)
Sells, H. A. (M)
Sell, R. L. (M)
Senstad, P. D. (M)
Shabatura, D. P. (A)
Sharp, J. C. (M)
Shelquist, M. G. (M)
Shepherd, W. G. (F)
Sherman, J. M. (SM)
Shoquist, M. C. (M)
Smerach, C. K., Jr. (A)
Spencer, W. H. (M)
Sprecher, N. D. (M)
Stankowsky, J. J. (M)
Stone, N. T. (M)
Storm, J. F. (A)
Summerfield, A. R. (A)
Thoen, R. L. (M)
Thompson, V. L. (A)
T-Kach, H. V. (M)
Tobin, R. D., Jr. (A)
Toth, D. H. (A)
Van Der Ziel, A. (F)
Vegemast, R. G. (M)
Warhol, N. (M)
Weber, R. G. (A)
Wehner, G. K. (M)
Werner, W. (A)
Weyrauch, H. E. (M)
Wicks, A. A. (M)
Wilder, J. E. (A)
Wilson, W. R. (M)
Woll, L. J. (M)
Zimmerman, S. L. (A)
Zirkle, R. E., Jr. (A)
Zobel, E. R. (M)

New Brighton (TC-5)
Halverson, R. P. (A)
Karsten, J. P. (A)
Lind, A. L. (M)
Petersen, J. F. (M)
Schwanter, R. C. (M)

Northfield (TC-5)
Jensen, M. C. (M)

North St. Paul (TC-5)
Hill, J. L. (M)

Owatonna (TC-5)
Eccles, W. J. (M)

Princeton (TC-5)
Sanford, D. C. (M)

Red Wing (TC-5)
Jelatis, D. G. (M)
Lee, G. M. (M)
Rickett, R. J. (M)

Richfield (TC-5)
Arnold, D. E. (M)
Carlson, R. A. (M)
Doherty, R. P. (M)
Minto, E. W. (A)
Vikla, A. M. (A)
Vint, J. L. (A)

Robbinsdale (TC-5)
Pettigrew, J. L. (M)

Rochester (TC-5)
Anderson, J. A. (M)
Badaker, H. (M)
Brown, L. M. (M)
Cross, R. W. (A)
Farrall, W. R. (M)
Floyd, R. A., Jr. (M)
Herrick, J. F. (M)
Isaacson, J. (M)
Jacobsen, H. J. (M)
Jones, R. E. (SM)

Rosemont (TC-5)
Geronime, R. L. (A)

St. Paul (TC-5)
Alman, J. (A)
Alton, J. (A)
Anderson, D. E. (M)
Anderson, E. A., Jr. (M)
Anderson, H. W. (A)
Anderson, S. E. (A)
Arndt, R. B. (M)
Baldy, G. A. (M)
Balzart, E. J., Jr. (M)
Bang, R. L. (M)
Barbour, K. E. (A)
Barker, J. H. (A)
Barnes, J. C. (SM)
Bartlett, V. W. (A)
Beck, V. W. (A)
Beckler, H. E. (M)
Benassi, D. A. (M)
Bergman, R. J. (M)
Berry, H. W. (SM)
Block, E. J. (M)
Bouschart, K. A. (M)
Bratschi, R. W. (A)
Campbell, R. N. (A)
Chapin, G. G. (M)
Chen, R. K. (M)
Clark, J. F., III (M)
Coawette, R. T. (A)
Coil, N. B. (SM)
Compton, C. G. (M)
De Vir, J. F. (M)
Dubbel, W. C. (A)
Dunwell, R. D. (M)
Dyal, J. O., Jr. (A)
Edam, D. M. (M)
Ethlund, A. A. (A)
Enyeart, T. L. (A)
Erickson, R. S. (M)
Fernane, J. (M)
Foreman, J. L. (M)
Fullwiler, K. (M)
Gehring, R. D. (M)
Gille, W. H. (SM)
Gist, W. W. (M)
Glewwe, C. V. (M)
Glick, A. D. (M)
Gravel, C. L. (M)
Hanson, G. N. (M)
Hardenbergh, G. A. (A)
Harrington, D. (M)
Harrison, W. F., Jr. (A)
Hawley, C. I., Jr. (M)
Hendry, A. J. (M)
Herzfeld, V. E. (A)
Hilker, B. L. (M)
Hill, B. F. (M)
Holdaway, D. R. (M)
House, E. A. (M)
Hulstrand, B. E. (A)
Jallen, G. A. (A)
Jensen, W. (M)
Jestlee, A. L. (A)
Johnson, H. W. (M)
Johnson, R. E. (M)
Kahnke, J. (M)
Keefer, D. E. (A)
Kerrins, R. K. (A)
Khambata, A. J. (A)
Kidder, H. F. (M)
Kimlinger, J. A. (A)
Kjeer, C. P. (A)
Kleason, D. B. (M)
Knapp, H. L. (M)
Knoblauch, A. F. (M)
Knox, W. B. (A)
Koenig, J. D. (M)
Koschmann, A. H. (A)
Kucera, F. M. (A)
Kuller, E. E. (M)
Lahue, P. M. (M)
Lanzkron, R. W. (M)
Larson, J. A. (A)
Lewis, R. E. (M)
Lillo, C. L. (M)
Macaulay, M. (A)
Malone, R. J. (M)
Mayo, P. M. (A)
Maze, R. O. (M)
McDonald, R. E. (M)
McLane, R. C. (A)
Mellus, F. G. (M)
Mellis, J. G. (A)
Mellis, J. G. (A)
Miller, C. B. (A)
Miller, L. B. (A)
Moe, W. J. (M)
Moen, J. W. (A)
Moerke, R. W. (M)
Mullaney, P. C. (SM)
Murray, D. A. (M)
Navoichick, C. (M)
Nellis, W. M. (M)
Nygaard, G. M. (M)
Oen, J. A. (A)
Oman, R. M. (A)
Osofsky, H. (M)
Overas, R. E. (M)
Pallas, C. E. (M)
Paup, R. E. (M)
Pearson, R. P. (A)
Peterson, N. C. (M)
Pierce, A. J. (A)
Povelda, H. (M)
Priebe, N. F. (M)
Raabe, H. P. (SM)
Roberts, J. O. (A)
Rogers, J. R. (SM)
Root, M. R. (A)
Rowan, T. D., Jr. (M)
Rowland, C. A., Jr. (M)
Sabine, L. E. (M)
Sanders, R. M. (M)
Schley, D. D. (M)
Sedin, J. W. (A)
Shekels, H. D. (SM)
Sheriff, D. R. (M)
Smith, A. J., Jr. (M)
Smythe, G. R. (M)
Somermeyer, H. F. (A)
Stahmann, J. R. (M)
Stevens, W. T., Jr. (A)
Strandberg, K. R. (A)
Sundry, G. J. (A)
Swyryd, M. (A)
Taylor, E. L. (A)
Thews, R. F. (M)
Thompson, P. E. (A)
Thurnauer, H. (M)
Tufte, R. C. (A)
Vidro, E. F., Jr. (M)
Von Behren, R. A. (M)
Wegman, L. J. (M)
Weil, D. S. (A)
Wells, W. S. (M)
Wesman, C. (A)
Wesslund, E. (M)
Wiedman, R. E. (A)
Williams, G. I. (M)
Wilson, D. L. (M)
Winget, W. F. (M)
Wychor, W. (A)
Yeager, R. L. (M)
Youngquist, R. J. (M)
Yu, S. P. (M)
Zimmer, E. D. (A)
Zuercher, D. H. (A)

Savage (TC-5)
Retzlaff, E. E. (A)

Waseca (TC-5)
Childs, G. M. (M)
Hager, F. M., Jr. (SM)
Johnson, E. F. (M)
Kozan, F. J. (A)

Wayzata (TC-5)
Johnson, L. E. (M)
Wagner, F. C. (M)
Young, S. B. (VA)

West St. Paul (TC-5)
Haselhorst, (M)

White Bear Lake (TC-5)
Crampton, W. M. (M)
Edstrom, C. A. (A)
Pool, K. C. (M)

Winona (TC-5)
Haas, I. J. (M)
Schmidt, D. G. (A)

MISSISSIPPI

Biloxi (NO-6)
Blacquier, J. R. (A)
Brewer, L. R. (M)
Davison, R. E. (A)
Gillis, D. J. (A)
Ingling, T. M. (M)
Lester, V. R. (M)
Peterson, T. W. (A)
Shoemaker, W. J. (A)
Van Loon, R. M. (A)
Williams, E. A. (M)

Columbus (HUN-3)
Jones, J. F. (A)
Pittman, W. C. (A)
Stewart, D. E. (SM)

Greenville (HUN-3)
Hall, R. F. (M)

Greenwood (HUN-3)
Johnson, H., Jr. (M)

Gulfport (NO-6)
Wallis, J. C. (A)

Hattiesburg (NO-6)
Parish, J. P. (M)

Indianola (HUN-3)
Blount, J. F. (M)

Jackson (NO-6)
Bates, F. E. (A)
Benson, G. G. (M)
Courteenay, J. A., (SM)
Sparger, H. T., Jr. (A)
Stietenroth, J. D. (M)

Keesler (NO-6)
Benedict, D. F. (M)
Huebsch, J. M. (A)
Vaughan, D. G. (A)

Laurel (NO-6)
Wright, W. W., Jr. (M)

Leland (HUN-3)
Shelton, D. F. (A)

McComb (NO-6)
Burkhalter, W. R. M. (M)

Natchez (NO-6)
Bowers, D. E. (M)

Pass Christian (NO-6)
Helwick, E. A. (A)

Poplarville (NO-6)
Dreyer, R. F. E. (A)

Saltillo (HUN-M-3)
Peach, A. E. (M)

Sledge (HUN-M-3)
Parnell, C. C., Jr. (A)

Starkville (HUN-3)
Guyton, R. D. (A)
Hull, J. E. (M)

State College (HUN-3)
Ball, B. J. (M)
Fitzgerald, D. F. (A)
Hall, R. L. (M)
McCown, H. H. (A)
Murray, M. P. (M)
Simrall, H. C. (SM)

Tupelo (HUN-M-3)
Spain, F. K. (A)

University (HUN-M-3)
Cullen, A. B., Jr. (A)

Vicksburg (NO-6)
Hanes, F. P. (A)

MISSOURI

Affton (SL-6)
Apel, C. K. (M)
Brickler, B. B. (M)
Mueller, E. A. (A)
Nurre, H. H., Jr. (M)
Rodenroth, R. D. (A)
Shirling, G. E. (M)
Wullmeyer, J. A. (M)

Altenburg (SL-6)
Fischer, F. E. (M)

Belton (KC-6)
Howard, R. M. (A)
Verploegen, A. W. (A)

Berkeley (SL-6)
Crowe, E. W. (A)
Esker, A. T. (M)
Hawley, M. M. (A)
Tedeschi, A. (A)

Brentwood (SL-6)
Cave, J. H. (A)
Droege, R. F. (A)
Gilterman, L. (M)
Hollandsworth, W. J. (A)
Kuhlman, E. A. (A)
McPherson, W. R. (A)
Mullins, M. L. (M)
Sneed, J. D. (M)
Wiese, A. H. (M)
Wolf, C. P. (M)

Cape Girardeau (SL-6)
Hirsch, O. C. (M)
Hirsch, R. O. (A)
Lynch, J. A. (M)
Poe, H. E. (A)
Vandeven, D. W. (M)
Walter, D. R. (M)

Clayton (SL-6)
Fiedler, G. J. (SM)

Columbia (SL-6)
Barman, J. E., Jr. (A)
Benninghield, L. M. (A)
Hogan, J. C. (M)
Lago, G. V. (M)
Lamb, J. F. (M)
McAdams, H. T. (A)
Randall, J. E. (M)
Tudor, J. (M)
Waldelich, D. L. (SM)
Wallis, C. M. (SM)

Crestwood (SL-6)
Boman, W. T., Jr. (M)

Creve Coeur (SL-6)
Frankowski, A. P. (M)
Lechtreck, L. W. (M)
Tucker, M. F. (M)

Deepwater (KC-6)
Shaffner, L. D. (A)

Doniphan (SL-6)
Rice, G. M. (M)

Farmington (SL-6)
Meyer, G. L. (M)
Milster, J. L. (A)

Ferguson (SL-6)
Davis, R. T., Jr. (M)
Henderson, H. W. (M)
Hobbs, E. W. (SM)
Miller, G. L. (M)
Reed, D. L. (M)
Rekart, A. F. (VA)
Sudfield, C. C. (A)

Flordell (SL-6)
Meyer, G. A. (A)

Florissant (SL-6)
Bell, J. H. (A)
Cherer, M. Jr. (A)
Du Charme, M. D. (M)
Eckess, W. S., Jr. (M)
Fenton, R. J. (A)
Hamilton, R. H. (A)
Huss, J. W. (M)
Jacobsmeyer, H. T. (M)
Mahoney, G. L. (M)
McNeal, G. E. (A)
Menasco, L. C. (A)
Olson, C. B. (A)
Payne, J. E. (M)
Pectol, J. L. (M)
Rokes, N. W. (A)
Rowton, E. F. (M)
Withington, J. G. (A)
Varian, E. L. (A)

Fulton (SL-6)
Nickles, R. W. (M)

Glendale (SL-6)
Hill, R. D., Jr. (SM)
Malsbary, J. S. (M)
Rustemeyer, G. L. (A)

Grandview (KC-6)
Dressler, J. W. (M)
Frogge, W. F. (A)
Hopp, H. W. (M)
Peeples, J. W., Jr. (A)
Schlesselman, L. A. (A)
Ware, J. F. (M)
White, D. C. (A)

Hickman Mills (KC-6)
Grimmett, L. J. (M)
Habayeb, A-R. M. (M)
Hailey, W. (A)
Joiner, E. R. (M)
King, E. J., Jr. (SM)
Long, E. D. (A)
Mayfield, B. D. (A)
Parks, J. V. (M)
Scrivener, O. E. (A)
Smith, F. M. (M)
Witte, W. E. (M)

Independence (KC-6)
Beck, R. (A)
Beebe, J. A. (A)
Canning, D. C. (A)
Denman, E. D. (M)
Forristal, J. A. (A)
Hanaway, P. R. (M)
Leibold, F. H. (A)
McCall, E. A. (M)
McDole, M. M. (A)
Riegle, G. W. (A)
Shortle, J. W. (M)
Slatten, C. E. (A)

Jennings (SL-6)
Lawson, R. G. (A)
Litton, V. M. (A)
Vieth, R. V. (M)

Kansas City (KC-6)
Aines, F. G. (M)
Anderson, R. W. (M)
Anderson, T. V. (A)
Ashley, W. H., Jr. (M)
Beatty, D. L. (A)
Benzon, C. G. (M)
Bergren, A. L. (SM)
Berry, F. M. (M)
Bettis, M. E. (A)
Bishop, G. W. (M)
Boutros, O. L. (M)
Boyles, J. O. (M)
Braidwood, D. W. (A)
Brink, D. K. (M)
Butler, R. W. (SM)
Camden, K. E. (A)
Catalano, S. J. (M)
Chinn, F. T. (A)
Clark, J. S. (M)
Clarke, R. L. (M)
Cleer, F. C. (A)
Constant, P. C., Jr. (SM)
Curl, R. W. (A)
Davis, S. E. (A)
Devine, W. F. (SM)
Dillon, R. B. (M)
Easterday, M. R. (M)
Epstein, S. (A)
Few, F. A. (M)
Finlay, R. S. (A)
Foster, C. L. (SM)
Fouts, A. L. (M)
Fry, W. E. (A)
Frye, G. J. (M)
Garrett, W. A. (A)
Glass, A. H. (M)
Goldinberg, H. E. (M)
Hall, W. H. (M)
Hamilton, S. (A)
Hanson, D. K. (A)
Harris, J. B. (M)
Hart, L. D. (A)
Hathhorn, W. R. (A)
Hearson, L. T. (A)
Hefflefinger, J. R. (SM)
Heydle, C. (M)
Hill, R. D. (A)
Hoefer, J. J. (M)
Howe, R. E. (A)
Jensen, L. J. (A)
Johnson, L. R. (M)
Jones, F. S. (M)
Kabrick, A. J. (M)
Karns, K. B. (M)
Kay, J. R. (A)
Kay, J. P. (A)
Keith, J. M. (A)
Kerbs, W. A. (A)
Kidd, C. D. (A)
Kimball, C. N. (F)
Kolen, N. (A)
Lane, C. A. (M)
Lane, J. W. (A)
Lanier, W. T. (A)
Lewis, W. R. (SM)
Lutes, R. K. (M)
Lutz, J. W. (SM)
Marks, W. A. (A)
Martin, E. J., Jr. (M)
Mayse, R. L. (M)
McAllister, M. J. (A)
McCaffrey, E. J. (A)
McDowell, J. E. (A)
Meador, B. M. (SM)
Middleton, E. R. (A)
Miller, C. V. (M)
Minnick, O. H. (M)
Moore, H. H. (M)
Modrein, M. R. (A)
Nail, P. L. (M)
Neidenberger, T. A. (A)
Newton, K. V. (SM)
Pierce, C. H. (M)
Powell, K. W. (A)
Pulliam, C. S. (A)
Rathke, J. E. (A)
Redlingshafer, R. A. (A)
Rowlands, E. R. (M)
Rubali, I. H. (M)
Salzer, C. E. (VA)
Schell, R. H. (A)
Schwerin, E. B. (SM)
Scrilner, N. (M)
Shapiro, E. (A)
Schontz, L. A., Jr. (SM)
Slusher, R. W. (A)
Smeltzer, V. J. (M)
Smith, C. R. (A)
Somers, R. M. (SM)
Spies, F. A. (A)
Stone, J. B. (A)
Stout, H. L. (SM)
Swafford, J. H. (A)
Taylor, G. L. (SM)
Tomcak, J. F. (A)
Troeglen, K. (SM)
Uhrig, R. B. (M)
Van Hoan, J. H. (SM)
Van Gundy, C. G. (VA)
Vasen, G. (A)
Verhyden, L. C. (A)
Villander, N. E. (A)
Walter, G. W. (M)
Watson, J. F. (A)
Welborn, D. L. (A)
Werner, W. T. (A)
White, D. Sr. (A)
White, R. N. (SM)
Wilcox, J. V. (SM)
Williams, L. E. (A)
Wolfskill, R. F. (SM)
Young, C. D., Jr. (A)
Young, R. W. (A)

Kirksville (SL-6)
Porter, B. L. (A)

Kirkwood (SL-6)
Barnes, J. A. (M)
Binzel, M. S. (M)
Bubb, F. W., Jr. (M)
Dubuque, T. J. (M)
Herman, R. (M)
Laws, C. R. (A)
McAllister, J. C. (M)
Phillips, J. B. (A)
Risk, J. E. (M)
St. Vrain, W. E. (M)
Susek, J. F., Jr. (A)
Winter, D. F. (SM)
Yount, T. L. (SM)

La Due (KC-6)
Zak, S. J. (SM)

Lee's Summit (KC-6)
Gordon, J. M. (M)
Heisey, W. H. (A)

Liberty (KC-6)
Hilton, W. A. (M)
Lovan, J. E. (M)

Macon (SL-6)
Rogers, H. D. (A)

Manchester (SL-6)
Keil, E. W. (A)

Maplewood (SL-6)
Earley, J. M. (M)
Frieke, L. H., Jr. (A)

Mexico (SL-6)
Kaiser, R. L. (M)

Moscow Mills (SL-6)
Withers, C. E. (M)

Neosho (KC-6)
Bolinger, N. C. (A)

Newburg (SL-6)
Brown, P. O. (M)

Normandy (SL-6)
Murty, E. H. (M)
Stephens, E. T. (A)
Volk, J. A. (SM)

North Kansas (KC-6)
Bishop, W. T., Jr. (SM)

Northwoods (SL-6)
Bossert, J. A. (A)

Olivette (SL-6)
Schwarz, R. M. (SM)

Overland (SL-6)
Dean, J. W. (M)
Iwan, R. D. (M)
Mosley, C. E. (SM)
Nordling, W. K., Jr. (A)

Pacific (SL-6)
Spillman, R. M., Jr. (M)

Parkville (KC-6)
Clark, W. B. (M)

Perry (SL-6)
Davis, C. L. (SM)

Perryville (SL-6)
Short, L. E. (A)

Raytown (KC-6)
O'Neal, W. O. (M)
Repper, O. C. (A)

Richmond (KC-6)
Basham, R. (M)
Kirkland F. B. (A)

Richmond Heights (SL-6)
Cummings, G. M. (SM)
Harris, R. L., Jr. (M)
Luedke, W. J. (A)
Lynch, F. R. (M)

Robertson (SL-6)
Hall, R. S. (M)

Rock Hill (SL-6)
Frazier, R. L. (M)
Keeney, W. J., Jr. (A)
Pallorola, M. F. (A)
Wilson, L. V. (M)

Rolla (SL-6)
De Woody, R. T. (M)
Mitchum, M. M. (M)
Mulleraman, F. H. (A)
Nolte, R. E. (SM)
Rivers, J. L. (A)
Severson, M. L. (A)
Skitek, G. G. (M)
Thompson, D. (M)
Tingley, F. T. (M)

St. Ann (SL-6)
Devereux, J. (A)
Estes, B. H. (M)
Goolly, E. H., Jr. (A)
Schepflin, D. J. (A)

St. Charles (SL-6)
Finke, H. G. (M)
Hommes, H. E. (M)
Rice, R. B. (M)
Wagner, F. R. (A)

St. Clair (SL-6)
Meyer, R. L. (M)

St. Joseph (KC-6)
Carroll, J. C. (M)
Koch, J. W. (M)
Koelling, A. J., Jr. (M)
Lux, K. E. (A)
Turner, J. G. (A)

St. Louis (SL-6)
Alkemeier, L. R. (M)
Adams, C. B. (A)
Agnitch, J. (A)
Andersen, A. R. (A)
Apolenis, C. J. (M)
Appleton, E. R. (A)
Augustine, R. J. (A)
Babka, F. J. (M)
Beller, E. H. (A)
Bennetsen, W. L. (M)
Betzold, E. J., Jr. (A)
Bitzer, R. J. (M)
Black, D. R. (M)
Brent, L. L. (SM)
Bundschuh, W. A. (M)
Burke, W. G., Jr. (M)
Cramer, D. W. (M)
Gaglia, A. J. (A)
Cassidy, E. S. (M)
Chambers, R. M., Jr. (M)
Chenoweth, J. A. (M)
Clement, C. F. (A)
Condon, E. U. (F)
Connell, J. B. (M)
Cornell, J. I. (SM)
Cox, J. R., Jr. (A)
Crosby, H. A. (M)
Darwin, F. S. (SM)
Decker, D. D. (M)
Detchemendy, J. A. (M)
Deutschmann, F. C. (M)
Dickneite, A. J. (A)
Dowdle, J. E. (M)
Dreifke, G. E. (M)
Efthim, C. (M)
Ellis, G. A. (A)
Faust, C. W. (M)
Fennewald, R. W. (A)
Fiedler, R. A. (A)
Fillmore, F. A. (SM)
Fordyce, S. W. (M)
Fox, G. W. (SM)
Furline, A. L. (M)
Gahn, E. H. (M)
Gessley, D. (M)
Griffiths, G. H. (M)
Hannon, J. P. (M)
Hardison, C. W. (M)
Harris, H. H. (M)
Harrison, C. E. (SM)
Hazelwood, S. (M)
Haywood, O. G. (SM)
Heitzeberg, C. H. A. (SM)
Herchenreiler, H. (M)
Herries, D. G. (M)
Hicks, H. T. (M)
Hoffman, H. T. (M)
Honnell, P. M. (SM)
Huhenschmidt, W. E. (A)
Jefferis, R. A. (A)
Kathrimus, A. W. (A)
Keiser, B. E. (A)
Kling, N. (A)
Koenig, M. (A)
Lenkerd, J. P.
Little, G. R. (A)
Lowell, B. W. (A)
Lowell, T. B. (A)
Mayer, D. S. (M)
Mayer, M. F., Jr. (M)
McAninch, C. H. (M)
McDaniel, O. S. (SM)
McGary, W. T. (A)
McHorney, L. M. (SM)
Meyer, R. J. (M)
Michelswirth, C. M. (A)
Million, T. E. (A)
Mohrman, R. F. (A)
Mollman, L. A. (M)
Norman, C. F. (M)
O'Neill, H. W. (A)
Ordinachev, M. D. (A)
Orment, R. (A)
Polk, G. D. (M)
Pollard, W. A. (A)
Putman, L. (M)
Quick, J. R. (A)
Rebman, W. H. (M)
Reed, P. J. (M)
Roberts, E. M., Jr. (M)
Rosenkoetter, L. A. (M)
Ross, D. K. (M)
Russell, N. E. (SM)
Sack, V. M. (M)
Sayer, J. D. (M)
Schaeperkoetter, L. C. (A)
Scheer, M. L. (M)
Scherz, C. J. (M)
Schettler, D. A. (M)
Schwarz, C. J. (SM)
Sevett, R. (M)
Sheehan, J. S. (M)
Shepard, W. D. (M)
Siepman, A. R. (A)
Small, F. R. (SM)
Stanhope, R. D. (A)
Steenhausen, D. R. (A)
Steinmeyer, D. J. (A)
Stertmann, W. E. (A)
Stokely, B. J. (A)
Tash, M. (M)
Taylor, J. J. (M)
Thielen, H. H. (A)
Thomas, R. M. (A)
Twombly, J. W., Jr. (M)
Upton, L. (A)
Van Horn, J. F. (M)
Vogel, E. H. (M)
Volpe, S. J. (A)
Walton, E. D. (M)
Waterstreet, I. A., Jr. (A)
White, C. E. (A)
Withers, J. S. (A)
Wolf, N. J. (M)
Zaborszky, J. (SM)
Zehr, N. J. (SM)
Zurbriggen, J. H. (M)

Sappington (SL-6)
Schillinger, E. J. (M)

Sedalia (KC-6)
Swift, W. H., Jr. (M)

Springfield (KC-6)
Curry, W. F. (A)
Gentges, F. H. (A)
Summers, O. H., Jr. (M)
Trotter, E. E. (M)
Wheat, W. M. (M)

University City (SL-6)
Braten, M. B. (A)
Butler, J. G., Jr. (M)
Doll, J. W. (M)
Frager, A. M. (A)
Hieken, M. H. (M)
Macklin, R. J. (A)
Motchan, H. L. (M)
Szukalski, D. J. (M)
Watson, S. E., Jr. (A)

Webster Groves (SL-6)
Ceries, R. E. (M)
Hole, W. G. (M)
Schroer, C. F. (A)
Sigman, H. M. (M)
Smith, H. N. (M)

MONTANA

Billings (SEA-7)
Kitchll, J. A. (M)
Lundquist, F. E. (M)
Mills, N. W. (A)
Porter, H., Jr. (A)

Bozeman (SEA-7)
Nickerson, J. F. (M)
Seibel, R. C. (M)
Weaver, D. K., Jr. (M)

Butte (SEA-7)
Kerns, R. L. (A)
McCourt, A. R. (M)

Drummond (SEA-7)
Foskins, R. E. (A)

Great Falls (SEA-7)
Hoefer, J. A. (A)
Lopuch, A. J. (M)
Parker, J. E. (VA)
Rymling, J. L. (M)

Missoula (SEA-7)
Hodgskiss, W. L. (M)
Taylor, A. S. (M)

Sidney (SEA-7)
Meyer, B. W. (A)

NEBRASKA

Albion (OM-L-5)
Kluge, M. E. (M)

Alliance (OM-L-5)
Klesner, J. L. (A)

Beatrice (OM-L-5)
Emerson, W. R. (M)

Columbus (OM-L-5)
Risk, G. (A)

Crete (OM-L-5)
Schuder, J. C. (M)

Geneva (OM-L-5)
Urschel, A. K. (A)

Gering (OM-L-5)
Brandaway, D. W. (A)

Grand Island (OM-L-5)
Lynch, U. L. (M)
Maunder, E. R. (M)

Hastings (OM-L-5)
Allison, D. B. (M)

Hayes Center (OM-L-5)
Seide, J. H. (M)

Hebron (OM-L-5)
Uphoff, R. D. (A)

Kearney (OM-L-5)
Heshore, P. S. (VA)

Lincoln (OM-L-5)
Bashara, N. M. (M)
Church, A. K. (A)
Davis, B. E. (SM)
Dealy, M. E. (A)
Douglass, W. D., Jr. (M)
Ebel, A. J. (SM)
Elwell, W. G. (M)
Estes, J. F. (A)
Ferguson, R. E. (A)
Ferris, W. C., Jr. (A)
Jensen, J. C. (F)
Jirousek, J. K. (M)
Marts, B. C. (M)
Michal, L. V. (M)
Norris, F. W. (SM)
Robison, W. C. (M)
Rook, C. W. (M)
Savells, A. (M)
Soderholm, L. H. (M)
Watson, G. W. (A)
Winkler, C. W. (VA)

McCook (OM-L-5)
Lenwell, L. W. (M)

La Platte (OM-L-5)
Griffin, D. C. (A)

Ogallala (OM-L-5)
Pestel, T. L. (A)
Wainwright, R. M. (SM)
Wiles, Q. T. (A)

Omaha (OM-L-5)
Bartlett, J. E. (A)
Bates, A. G. (M)
Becker, H. W. (SM)
Beenken, H. G. (M)
Blanchard, B. E. (M)
Borcher, E. J. (A)
Chamberlain, I. J. (M)
Curry, H. D. (M)
Dunbar, B. L. (M)
Flynn, G. (M)
Follmer, G. C. (A)
Garland, W. J. (A)
Hadsell, G. C. (SM)
Hagrman, C. O. (A)
Hansen, C. L. (A)
Hill, R. L. (M)
Hower, P. A. (M)
Johansen, H. M. (A)
Kelley, J. (M)
Kotera, W. J. (M)
Kozicki, L. J. (A)
Krogstad, M. O. (A)
Kuklin, H. S. (A)
McGeehan, M. L. (M)
Peterson, L. P. (M)
Petrik, J. S. (M)
Poole, J. A. (A)
Ralls, R. H. (M)
Ridley, M. L. (A)
Rogers, J. A. (M)
Ryba, F. J. (A)
Sellak, L. J. (A)
Smith, F. R. (A)
Strathacker, R. A. (M)
Thompson, P. H. (A)
Wayne, J. W., III (A)
Zink, R. L. (A)

Overton (OM-L-5)
Wycoff, K. H. (M)

Pilger (OM-L-5)
Nelson, D. (A)

Seward (OM-L-5)
Snyder, E. H. (M)

Silver Creek (OM-L-5)
Barker, D. W. (M)

Sutherland (OM-L-5)
Townsend, J. G. (M)

Weeping Water (OM-L-5)
Olive, D. W. (M)

York (OM-L-5)
Siemonelt, E. (A)

NEVADA

Fallon (SAC-7)
Franchell, W. R. (A)
Jorge, C. D. (A)

Las Vegas (LA-7)
Clair, F. F. (M)
Ingersoll, C. E. (M)
Patten, R. B. (A)
Peckham, V. D. (A)
Rollins, D. F. (A)
Shrock, J. B. (SM)
Stephenson, P. L. (A)
Tidwell, R. M. (M)

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NEVADA

Tonopah (SAC-7)
Pickles, S. (SM)
Yeager, R. J. (M)

NEW HAMPSHIRE

Amherst (B-NH-1)
Martin, P. E. (M)
Wenzel, J. H. (A)

Berlin (B-NH-1)
Coulombe, J. N. (A)

Brookline (B-NH-1)
Sommers, D. J. (A)

Canterbury (B-NH-1)
Grace, G. M. (M)

Chester (B-NH-1)
Minks, F. A. (SM)

Concord (B-NH-1)
Brew, R. A. (M)
Evans, C. B. (M)
Kelly, B. M. (SM)

Derry (B-NH-1)
Dollinger, K. (M)

Dover (B-NH-1)
Armitage, P. E., Jr. (A)
Hesse, H. R. (M)
Immen, G. H. (M)
Mulcher, G. J. (SM)
Youngblood, I. J. (SM)

Durham (B-NH-1)
Blanchard, F. A., Jr. (M)
Hellar, M. W., Jr. (A)
Winn, A. L. (M)

East Rochester (B-NH-1)
Ashton, D. (M)

Exeter (B-NH-1)
Carbonneau, V. J. (M)

Francestown (B-NH-1)
Bailey, A. B. (SM)

Gilmanton (B-NH-1)
Wilkens, W. B. (SM)

Goffstown (B-NH-1)
Rust, W. F., Jr. (SM)

Greenland (B-NH-1)
Lynn, F. M. (A)

Greenville (B-NH-1)
Wellman, B. (M)

Hampton (B-NH-1)
Leoutsakos, G. N. (M)

Hanover (B-NH-1)
Curtis, H. W. (M)
Morgan, M. G. (SM)
Pratt, B. (A)

Hopkington (B-NH-1)
Fermanian, A. (M)

Laconia (B-NH-1)
Campbell, R. H., Jr. (M)
Hadden, G. H. (M)

Lakeport (B-NH-1)
Pattison, W. L., Jr. (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)
Axelrod, A. (A)
Baer, R. H. (M)
Barr, P. (A)
Bean, F. E. (M)
Brous, D. W. (SM)
Cahn, R. L. (M)
Casey, R. J. E. (A)
Dabrowski, S. A. (M)
Drescher, D. C. (M)
Dugre, M. L. (A)
Halle, C. F. (A)
Hamilton, E. F. (A)
Lamere, B. E. (A)
Nadeau, R. U. (A)
Obreza, W. S. (A)
Schoenberger, W. J. (SM)
Spector, M. S. (M)
Tilton, D. S. (M)
Westlake, N. L., Jr. (A)
Wilkinson, H. W. (M)

Milford (B-NH-1)
Rommey, E. (A)

Nashua (B-NH-1)
Ayer, D. R. (M)
Bales, C. W. (A)
Bradley, D. J. (M)
Butler, J. L. (A)
Comstock, D. C. (A)
Dickinson, R. V. C. (A)
Gagne, F. W. (M)
Gill, M. S. (A)
Gilligan, L. H. (M)
Goodwin, R. O. (A)
Goulder, M. E. (M)
Grenier, C. A. (A)
Huntington, W. J., Jr. (M)
Jacobi, R. L. (M)
Le Blanc, R. A. (A)
Le Van, J. D. (M)
Low, R. C. (A)
Lowe, W. R., Jr. (M)
Manoogian, H. (M)
Misek, V. A. (M)
Morgan, W. E., Jr. (M)
Newsom, E. G. (A)
Newton, L. W. (SM)
Nozick, S. (M)
O'Neil, J. F., Jr. (A)
Rathje, E. (M)
Rich, D. A. (A)
Richmond, M. R. (M)
St. Jean, L. E. (SM)
Sanders, R. C., Jr. (M)
Shefcelman, E. H. (M)
Sweentz, G. C. (M)
Uhrich, W. J. (SM)
Wilson, J. E. (A)
Woodruff, T. E. (M)
Woods, R. E. (A)

Newcastle (B-NH-1)
Palmer, W. F. (M)

Penacook (B-NH-1)
Brock, J. M. (M)

Plaistow (B-NH-1)
Rackard, M. J. (M)
Fiore, M. (A)
Minnich, E. L. (M)

Portsmouth (B-NH-1)
Dale, T. M. (A)
Gilbert, J. J. (SM)
Molla, J. J. (A)
Schweizer, E. G. (M)
Zymaris, M. (M)

Somersworth (B-NH-1)
Widmann, L. C. (M)

South Merrimack (B-NH-1)
Pothier, R. G. (M)

NEW JERSEY

Brookside (NNJ-2)
Adams, E. W., Jr. (M)
Dean, F. C. (A)

Brooklawn (PHI-3)
Neudorfer, W. L. (M)

Brigantine (PHI-3)
Feldkamp, L. P. (A)

Brielle (NY-M-2)
Eason, C. R. (A)
Schor, H. (M)

Breton Woods (NY-M-2)
Rottner, A. W. (M)

Bradley Beach (NY-M-2)
Brown, M. A. (M)
Caparn, C. (M)
Jayson, E. L. (A)
Levy, S. J. (SM)
Macallister, A., Jr. (A)
Rosmovsky, F. (M)

Bordentown (PHI-3)
Di Costanzo, J. A. (M)
Meier, D. J. (M)

Boonton (NNJ-2)
Afferton, P. C. (A)
Bailey, H. (M)
Benning, H. H. (SM)
Braun, C. G. (M)
Christensen, H. (M)
Cook, L. (VA)
Downsbrough, G. A. (M)
Drake, F. H. (F)
Enger, G. W. (M)
Erickson, L. E. (M)
Grimm, E. M. (M)
Houlroyd, G. F. (M)
Hull, C. J. (A)
Hull, L. (F)
Jacobus, W. M. (A)
Jones, J. J. (A)
Kenney, C. M. (A)
King, P. L., Jr. (SM)
Mannik, G. (A)
March, P. S. (VA)
McCouch, G. P. (SM)
McMillan, D. M. (A)
Merish, H. J. (A)
Montealm, S. R. (SM)
Newell, R. A. (M)
Parkes, A. W., Jr. (SM)
Pittenger, A. W. (M)
Pittenger, R. C. (A)
Plahn, R. W. (M)
Redington, J. H. (SM)
Rheams, C. J. B. (M)
Richardson, A. G. (F)
Richardson, S. A. (M)
Sanderson, A. E. (M)
Schanz, W. H. (M)
Urbach, K. (SM)
Weinberg, J. (A)
White, W. F. (M)
Zayne, F. R. (M)
Zieger, J. A. (A)

Bogota (NNJ-2)
Berl, S. (M)
Gilcher, V. (A)
Hafenmaier, H. F. (M)
Sargeant, C. E. (VA)

Bloomfield (NNJ-2)
Accardo, N. A. (M)
Anderson, C. E. (M)
Ashbrook, J. M. (A)
Atkins, C. E. (SM)
Bates, J. K., Jr. (A)
Bell, R. W. (A)
Bitinas, J. (M)
Brooks, R. E. (M)
Cerone, J. R. (M)
Coon, C. E. (M)
Crowley, J. F. (A)
Everett, L., Jr. (SM)
Fisher, J. B. (A)
Fortin, B. C. (SM)
Frey, A. F. (A)
Garrahan, P. G. (A)
Grandmont, P. E. (M)
Greenfield, G. (M)
Hacker, S. J. (A)
Hansen, J. A. (M)
Hawk, W. H. (M)
Hayes, W. A. (M)
Heberling, W. W., Jr. (M)
Heney, J. F. (M)
Hobbs, J. (A)
Hoch, F. W. (M)
Ivey, H. F. (SM)
Jarmick, R. J. (A)
Johnson, V. I. (M)
Katz, A. J. (M)
Kelso, R. J. (M)
Kennedy, J. B. (M)
Kerwin, B. D. (A)
Kreer, J. G., Jr. (SM)
McNall, J. W. (SM)
Menne, R. S. (A)
Meyers, K. F. (M)
Mitchell, A. V. (A)
Mitchell, C. D. (SM)
Moltz, A. J. (M)
Mongeau, R. A. (M)
Pike, D. E. (A)
Polkinghorn, F. A. (F)
Przywozny, W. C. (A)
Quickel, F. E. (A)
Quinn, R. F. (M)
Rhodes, H. A. (M)
Schotland, R. M. (A)
Schulke, G. F. (M)
Sloan, F. M. (A)
Sporn, M. (A)
Sturtevant, H. B., Jr. (A)
Sullivan, J. F. (M)
Tresnak, R. F. (M)
Wallace, P. A. (M)
Weber, R. R. (A)
Wetzel, K. C. (A)
Whell, E. G. (SM)
Williams, N. T. (SM)
Wilmarth, R. W. (SM)
Wood, G. R., Jr. (M)
Zelen, H. J. (A)

Blairstown (NNJ-2)
Widenor, P. E., Jr. (SM)

Blackwood (PHI-3)
Kaufmann, D. C. (M)
Swedloff, B. (A)

Beverly (PHI-3)
Cottone, C. V. (A)
Taylor, D. M. (A)
Wolcott, R. G. (M)

Bernardsville (PRI-2)
Coddington, G. H. (M)
Levine, S. (M)
Murphy, J. A., Jr. (M)
Shomer, E. C. (A)
Uphegrove, H. N. (A)

Berlin (PHI-3)
Ball, J. W. (M)
Erichsen, H. K. (M)

Berkeley Heights (NNJ-2)
Ambos, R. G. (A)
Andrews, H. W. (A)
Austin, J. E. (M)
Chruney, M. (M)
Estoppey, R. F. (M)
Hall, R. E. (M)
Lewis, L. M., III, (M)
Maher, T. P. (M)
Mann, H. (A)
McDowell, H. L. (M)
Olson, H. M. (M)
Ounte, C. F. (M)
Robinson, D. M. (A)
Rowe, H. C. (SM)
Shapiro, L. (A)
Williams, C. E. (M)

Bergenfield (NNJ-2)
Abend, I. J. (M)
Anolik, B. S. (M)
Bigelow, E. C. (M)
Bright, T. F. (A)
Colman, L. (A)
Crawford, A. R. (M)
Fee, D. R. (M)
Frimtzis, H. (M)
Jones, M. E. (A)
Lloring, L. W. (A)
Losher, M. I. (A)
Meadow, S. (M)
Musselman, H. (A)

Belvidere (NNJ-2)
Dymek, V. S. W. (A)
Focht, L. R. (M)

Belmar (NY-M-2)
Boxer, V. (M)
Gartner, W. W. (M)
Jaremia, E. D. (M)
Kamplinsky, A. (M)
Krueger, T. C. (M)
Lee, A. S. J. (SM)
Stone, H. A. G. (A)
Stone, M. V. H. (A)
Townes, W. D. (SM)
Wagner, H. M. (SM)

Belleville (NNJ-2)
Altman, H. (A)
Bagno, S. M. (SM)
Bernstein, B. (M)
Blake, R. F. (A)
Boyce, W. F. (A)
Campbell, R. T. (A)
Coen, R. T. (M)
Cohen, R. M. (SM)
Gallay, H. (M)
Holley, J. J. (A)
Jaworowski, P. A. (M)
Jones, C. E., Jr. (A)
Lebleboojian, G. (A)
Mock, W. C., Jr. (SM)
Polkosnik, C. F., Jr. (A)
Reilly, R. A. (A)
Rocloffs, E. H. (A)
Rymer, R. H. (A)
Schenck, H. P. (A)
Scherer, M. (A)
Senio, N. (M)
Sherman, V. W. (SM)
Singer, F., Jr. (A)
Spiro, N. J. (M)
Steers, W. F. (SM)
Sussman, E. B. (M)
Taylor, A. R. (A)
Wallace, F. C. (SM)
Warren, J. E. (M)
Winship, T., Jr. (M)

Bellmawr (PHI-3)
Balchaitis, A. V. (M)
Kret, D. B. (M)

Belle Mead (PRI-2)
Pressey, C. W. (A)

Belford (NY-M-2)
Glendinning, W. B. (A)
Motsek, M. (A)

Bedminster (PRI-2)
Dinzik, D. J. (M)

Bayonne (NNJ-2)
Angelari, R. D. (A)
Eager, G. S., Jr. (M)
Gotz, J. T. (M)
Levine, M. W. (M)
Pettegrove, G. G. (A)
Pfeffer, P. (M)
Schnipper, A. (M)
Skilnecki, C. E. (M)
Szmerda, R. J. (A)

Basking Ridge (PRI-2)
Engelbrecht, R. S. (A)
Farmer, W. B. (M)
Ford, G. T. (SM)
Glauber, J. J. (SM)
Hagner, D. B. (A)
Hasley, A. D. (SM)
Hedel, K. K. (M)
Hull, R. W. (M)
Jacobus, H. R. (SM)
Power, T. W. (SM)
Talpey, T. E. (M)
Uhler, K. W. (M)

Barrington (PHI-3)
Carter, G. W. (SM)
Fisher, C. D. (M)
Lund, R. C. (M)
Pickus, L. C. (A)

Barnegat (NY-M-2)
Morrison, J. G. (A)

Avon (NY-M-2)
Egley, T. H. (A)

Avon-By-The-Sea (NY-M-2)
Child, T. M. (SM)

Avenel (PRI-2)
Seward, D. T. (A)
Shuskus, J. M. (A)

Atlantic Highlands (NY-M-2)
Barrett, L. C., Jr. (A)
Burr, J. K., Jr. (A)
Durrer, J. H. (A)
Jacobsen, T. L. (M)
Knauss, D. L. (A)
Petersen, P. B. (M)
Popovich, R. G. (A)

Audubon (PHI-3)
Beers, R. A. (SM)
Broadwell, H. S. (M)
Carrell, R. M. (M)
Davidson, J. J. (A)
Evans, L. L. (M)
Haluline, H. E. (M)
Hassett, F. C. (A)
Johnson, E. (M)
Kozanowski, H. N. (SM)
Lewis, R. J. (SM)
Masnari, J. P. (A)
McCollor, R. L. (M)
Morita, J. T. (M)
Noakes, G. L. (A)
Rolf, T. E. (M)
Rutherford, R. O. (M)
Shahbender, R. A. (A)
Slate, M. W. (M)
Smalts, P. W. (M)
Stasz, C. E. (M)
Weisbecker, J. A. (M)

Atlantic City (PHI-3)
Cogan, S. (M)

Atco (PHI-3)
Liebold, F. A. (A)
Stanko E. (SM)

Ashland (PHI-3)
Harmon, G. B. (A)
Helbig, W. A. (A)

Asbury Park (NY-M-2)
Acker, M. (M)
Bauer, P. S., Jr. (M)
Belmont, E. (M)
Cantor, I. (M)
Crivello, A. A., Sr. (M)
Dravneek, W. R. (M)
Dworzak, D. C. (A)
Ercolino, M. D. (A)
Jones, J. D. (M)
Kolchin, R. I. (M)
Reilly, V. E. (M)
Resnick, A. (A)
Sakatos, M. J. (M)
Sarlo, L. M. (M)
Scholowski, S. S. (A)
Singer, E. M. (M)
Stampil, R. A. (A)
Steinberg, J. (A)
Strasser, S. (M)
Weltz, S. (M)

Arlington (NNJ-2)
Dunn, R. F. (M)
Durie, J. C., Jr. (A)

Andover (NNJ-2)
Ostlund, E. M. (SM)

Alpha (NNJ-2)
Schaefer, J. B. (SM)

Allwood (NNJ-2)
Koch, S. J. (A)

Allenhurst (NY-M-2)
Greer, W. R., Jr. (SM)
Haddock, J. W. (M)
Wiener, A. (M)

Allendale (NNJ-2)
Fosher, W. A. P. (M)
Havstad, H. (VA)
Robinson, A. S. (M)

Adamston (NY-M-2)
Mangold, E. J. (A)

Browns Mills (PHI-3)
Kannawin, W. I. (A)

Budd Lake (NNJ-2)
Peil, W. (M)

Butler (NNJ-2)
Gradlelick, T. J., Sr. (A)
Grassia, C. C. (A)
Hoagland, K. A. (SM)
Manning, V. R. (M)
Wild, R. F. (SM)

Burlington (PHI-3)
Cole, D. A. (A)
Dubrow, W. (A)

Caldwell (NNJ-2)
Cook, E. G. (M)
Friedman, S. L. (M)
Hotopp, A. H., Jr. (SM)
Hotopp, K. A. (A)
Janes, A. W. (M)
McBrair, T. C. (M)
McKeeby, R. W. (M)
Meixell, O. S. (SM)
Neu, E. C. (M)
Powers, S. J. (M)
Schoenbaum, J. R. (SM)
Spelle, T. F. (A)
Sur, J. D. V. (M)
Sutherlin, L. (SM)
Vogel, W. H., Jr. (M)
Webb, C. E. (M)
Whitley, E. G. (A)
Williams, W. J., Jr. (A)

Camden (PHI-3)
Adler, B. (A)
Aitken, K. M. (SM)
Annus, L. E. (A)
Arthur, G. R. (M)
Baker, R. H. (SM)
Barber, F. H. (M)
Bartfeld, R. A. (M)
Batsel, M. C. (F)
Berg, C. O. (M)
Bergman, R. (M)
Berry, E. W., Jr. (M)
Biegauski, W. J. (A)
Blair, B. D. (M)
Boenecke, C. M. (M)
Bonshick, S. N. (M)
Booth, A. T., Jr. (M)
Bowen, D. C. (SM)
Brownfield, L. B. (M)
Butler, E. G. (M)
Caron, J. (SM)
Chandler, C. H. (SM)
Chen, D. B. (A)
Ciarrocchi, J. A. (M)
Cichon, H. P. (M)
Cimerman, I. (A)
Clay, B. R. (SM)
Colton, R. M. (A)
Corrington, M. S. (F)
Cramer, R. E., Jr. (M)
Crosby, D. R. (SM)
Dickens, B. L. (A)
Dion, D. F. (A)
Domin, F. J. (A)
Dzwonczyk, J. G. (M)
Eagan, J. F., jr. (A)
Edwards, N. E. (M)
Felbel, R. L. (M)
Feyerherm, M. P. (M)
Fink, W. R. (M)
Finkelstein, M. B. (SM)
Flomenhoft, M. (A)
Foley, A. A. (A)
Fricke, R. H. (M)
Frosch, J. A. (M)
Garber, H. N. (M)
Gelchis, M. V., Jr. (A)
Gloates, E. (A)
Gross, J. (M)
Gunther, C. A. (F)
Haraldsen, H. P. (M)
Harris, S. J. (SM)
Harris, W. A. (SM)
Hasenberg, W. (SM)
Heacock, D. P. (SM)
Herbst, P. J. (F)
Hills, V. E. (M)
Hjortzberg, A. B. (M)
Hollabaugh, J. F. (M)
Johnson, E. O. (SM)
Jones, L. F. (SM)
Kasowski, S. E. (A)
Katelia, A. J. (A)
Kidd, M. C. (SM)
Radcliffe, F. E. (SM)
Rehrig, E. S. (M)
Rohn, W. B. (A)
Rose, R. H., II (M)
Rupp, O. R. (A)
Smoot, A. W. (M)
Southworth, G. C. (F)
Sproul, P. L. (SM)
Stirfel, K. E. (M)
Sweeny, C. P. (SM)
Taylor, P. H. (M)
Thal, H. L., Jr. (A)
Vaughan, H. E. (SM)
Vaugan, V. N., Jr. (SM)
Volopia, S. N. (A)
Wintringham, W. T. (F)
Wirsz, N. C. (A)

Chester (NNJ-2)
Hill, G. V. (A)
Hubbell, B. (M)

Clark (NNJ-2)
Backer, C. M. (SM)
Basarab, J., Jr. (A)
Beeny, L. S. (A)
Hafemeister, E. F. (M)
Hall, R. W. (A)

Clementon (PHI-3)
Connelly, J. J. (M)
Hollenback, H. G. (A)

Cliffside Park (NNJ-2)
Lefebvre, R. E. (A)
Weibten, R. E. (M)

Clifton (NNJ-2)
Arditi, M. (SM)
Arp, R. H. (A)
Ault, C. F. (M)
Battel, F. A. (A)
Bellman, H. C. (A)
Berman, H. (A)
Brady, J. F. (SM)
Brockel, E. P. (A)
Brown, R. I. (M)
Casabona, A. M. (M)
Dolan, F. J. (A)
Dumont, A. B. (F)
Dzula, B. (M)
Elbert, G. H. (M)
Feldt, R. (SM)
Foster, H. (M)
Foster, J. E. (A)
Glomb W. L. (M)
Goldstein, R. L. (A)
Gordon, P. (SM)
Gralner, H. (A)
Green, M. W. (M)
Grey, A. J. (M)
Haefeli, J. E. (A)
Haines, H. (M)
Hamer, W. A. (A)
Harrison, C. J. (SM)
Hayman, W. H. (M)
Herbin, L. (A)
Hogan, M. J. (A)
Hval, H. N. (M)
Jeans, J. R. (M)
Katzmann, F. L. (A)
La Plant, W. P. (A)
Lappin, C. (A)
Librizzi, P. N. (SM)
Mills, H. J. (M)
Morrow, R. A. (A)
Murphy, G. C. (M)
Nunrich, F. H. (SM)
Oglesby, J. D. (SM)
Oswald, R. L. (A)
Pollack, L. (SM)
Pontal, R. H. (A)
Salzer, R. M. (M)
Sanford, E. E. (A)
Schneider, A. E. (M)
Schnellerman, M. (A)
Schwartz, P. L. (M)
Smith, C. B., Jr. (A)
Snadye, A. M. (SM)
Snell, P. A. (M)
St. Louis, R. A. (M)
Stelle, S. (M)
Trim, M. E. (A)
Trivelas, A. C. (M)
Winsch, P. G., Jr. (A)
Yarwhko, P. (A)
Zweibel, J. (A)

Closter (NNJ-2)
Bender, W. G. (M)
Lawrence, R. J. (M)
Metzger, J. E. (SM)
Slawson, W. J. (M)
White, L. E. (A)

Collingswood (PHI-3)
Ackerman, M. J. (SM)
Andrews, D. R. (M)
Aron, S. (M)
Aronson, L. (A)
Aurand, J. A. (M)
Avella, N. R. (A)
Baker, L. (M)
Baker, W. W. (M)
Bauer, W. R. (M)
Beauchemin, A. (M)
Beaulieu, D. E. (A)
Bender, E. R. (M)
Booth, G. W. (M)
Boutwell, E. D. (M)
Brotzman, E. S. (SM)
Brown, E. M. (M)
Bryson, H. C., Jr. (SM)
Buck, D. G. (M)
Buder, S. H. (M)
Burooiy, T. J. (A)
Caldwell, H. R. (M)
Campanella, M. J. (M)
Capek, S. J. (M)
Chin, G. D. (M)
Clark, E. L. (SM)
Cook, W. R. (A)
Crawford, R. D. (M)
Davidson, R. A. (M)
Davis, C. E. (M)
Day, J. B. (A)
Dehm, R. E. (A)
Di Russo, E. (M)
Dolson, D. B. (A)
Dougherty, J. P. (A)
Duffin, J. D. (M)
Eiselein, J. E. (SM)
Endres, R. O. (SM)
Erdmann, R. G. (A)
Farnett, E. C. (A)
Fast, H. (A)
Field, G. R. (A)
Freedman, D. D. (A)
Genetta, T. L. (A)
Gilmore, J. P. (SM)
Ghyas, T. M., Jr. (SM)
Goodrich, H. C. (SM)
Hall, J. R. (M)
Himmel, R. N. (M)
Hobbs, C. A., jr. (M)
Honda, H. (M)
Houck, G. S. (A)
Hurford, W. L. (M)
Hwang, Y. C. (A)
Katz, E. S. (M)
Kolar, R. F. (M)
Kolelin, L. (A)
Kouns, W. D., Jr. (M)
Kowal, A. (A)
Kreitzberg, S. B. (A)
Krugman, L. M. (SM)
Landies, H. W. (M)
Lauer, H. (M)
Lefczik, S. W. (A)
Levy, A. S. (M)
Lynch, F. T. (M)
Lynn, S. (SM)
Mac Innes, N. A. (M)
Maldoon, L. M. (M)
Meeker, W. F. (M)
Milkie, R. W. (A)
Muggleworth, J. C. (A)
Mulie, W. A. (M)
Myers, B. D., Jr. (A)
Neuhauer, J. K. (SM)
O'Donnell, J. J. (M)
Olson, C. L. (M)
Palmer, J. R., Jr. (M)
Pettengill, G. W. (M)
Phillips, L. B. (M)
Planakis, L. N. (A)
Polk, C. (SM)
Purvis, R. E. (M)
Ray, P. R. (A)
Rezek, G. (A)
Roe, J. H. (SM)
Rojko, R. M. (M)
Sable, J. D. (M)
Samartino, R. F. (A)
Selby, E. O. (M)
Shelton, C. T. (A)
Shelton, J. A. (M)
Sheaf, J. R., II (SM)
Sloeum, G. E. (M)
Southworth, W. T. (M)
Stanislzewski, J. R. (A)
Stupp, R. W. (VA)
Talmage, F. E. (SM)
Theiss, J. B. (A)
Thelen, H. M. (M)
Thompson, E. E. (M)
Thomsen, C. M. (A)
Turner, A. H. (M)
Underwood, J. F. (SM)
Vareos, S. G. (M)
Ver Wys, G. A. (M)
Wang, T. (A)
White, R. (SM)
Woodward, B. J. (VA)
Yin, H.-B. (A)

Colonia (PRI-2)
Anderson, E. C. (A)
Click, C. L. (M)
Sheffield, B. (SM)
Zeier, A. J. (A)

Coytesville (NNJ-2)
Hammerstein, H. A. (M)
Koskos, A. (M)
Levy, B. (M)
Schnall, E. (M)
Sullivan, H. W. (A)

Cranford (PRI-2)
Insdee, J. A. (M)
Morgan, A. M. (M)
Shankweiler, R. G. (SM)
Backinoff, B. (M)
Gaffney, J. E., Jr. (M)
Hillyer, C. (M)
Lanford, L. D. (A)
Madan, R. W. (A)
Massey, R. P. (A)
Rearick, C. C. (M)
Rearwin, E. H. (A)
Sansalone, F. T. (M)
Shenk, J. J. (A)
Silverman, D. (A)
Sullivan, J. J. (M)
Taris, C. M. (M)
Widmann, E. (M)

Crescent Park (PHI-3)
Zusman, A. G. (A)

Cresskill (NNJ-2)
Bearman, A. L. (A)
Bunn, H. L. (M)
Langan, J. E. (A)
Lippner, B. (A)
Smith, W. G. (A)
Stebbins, M. D. (A)

Deal (NY-M-2)
Bennett, H. S. (SM)
Klayton, M. H. (SM)
Orr, J. E. (M)

Deans (PRI-2)
Petermann, L. A. (M)

Delanco (PHI-3)
Hermann, P. E. (M)
Phillips, J. W. (A)
Potter, E. H. (SM)
Delawanna (NNJ-2)
Klein, M. S. (M)

Demarest (NNJ-2)
Foster, J. D. (M)
Furrer, C. G. (A)
Janes, C. W. (SM)
Thompson, R. G. (A)

Denville (NNJ-2)
Conneilman, C. L. (SM)
Farbanish, E. (A)
Gilbert, E. A. (M)
Koch, H. J. (M)
Kodner, J. L. (A)
Mindes, A. S. (M)
Pelrine, D. E. (M)
Plip, A. T. (A)
Porter, E. A. (M)
Renwick, E. B., Jr. (M)
Vanek, L. J. (M)
Van Winkle, D. (A)
Walker, R. G. (M)
Wolf, D. A. (A)

Dover (NNJ-2)
Benson, R. K. (M)
Glass, L. H. (M)
Harn, R. E. (A)
Mc Corry, J. R. (M)
Peretko, H. T. (M)
Pierce, W. L. (M)
Postman, M. H. (M)
Wadler, D. (SM)
Wright, N. E. (A)
Zenk, G. E. (A)

Dumont (NNJ-2)
Apfel, G. J. (A)
Bland, P. D. (M)
Finch, J. B. (A)
Garrison, R. J. (M)
Hammond, M. L. (A)
Kerner, S. J. (M)
Kompass, E. J. (M)
Schwerin, P. (SM)
Strain, M. (A)
Sundberg, A. (A)

Dunellen (PRI-2)
Helenek, A. R. (A)
Longo, C. V. (SM)
Ross, A. J. (SM)

East Newark (NNJ-2)
Mader, P. M. (A)
Unruh, G. E. (M)

East Orange (NNJ-2)
Bowlds, V. J. (A)
Brockhuysen, W. C. (SM)
Carlat, B. (SM)
Conrad, T. E., Jr. (M)
Durage, A. H. (M)
Forman, J. A. (M)
Fultz, N. E. (A)
Gawler, H. C. (SM)
Geiss, G. K., jr. (M)
Gonzalez, C. (M)
Greenberg, M. R. (A)
Guppy, J. W., Jr. (A)
Hackert, W., Jr. (A)
Harris, A. (M)
Hodowanec, G. (M)
Kafalas, C. (M)
Kantrowitz, W. (A)
Kass, H. A. (M)
Kass, J. S. (A)
Kendall, B. W. (SM)
Lachocki, E. (A)
Lardieri, G. (A)
Lehman, G. C. (A)
Leonard, T. H. (M)
Lindon, J. (A)
Lunney, R. E. (M)
Maguire, J. T. (M)
Marshall, B. O. (A)
Mead, L. H., III (M)
Meyers, S. T. (SM)
Mitchell, M. E. (A)
Most, D. (A)
Nelson, R. S. (M)
Newman, R. J. (SM)
Rutson, J. (M)
Sandretto, P. C. (F)
Schwalbe, M. I. (SM)
Scott, F. L., Jr. (M)
Smith, H. (M)
Smith, M. A. (M)
Smith, W. P. (A)
Spies, D. (A)
Stalker, F. B. (M)
Stoughton, M. D. (M)
Van Brunt, L. B. (M)
Waskiewicz, L. R. (A)
Weible, N. R. (VA)
Wiggins, J. D. (M)
Worthington, R. L. (A)

East Paterson (NNJ-2)
Arfessolin, E. R. (M)
De Falco, N. J. (M)
Gangemi, R. (M)
Graff, E. S. (A)
Grosbaum, E. (M)
Hatchwell, J. A. (M)
Hesse, H. R. (SM)
Hoffman, P., Jr. (A)
Koenig, J. A. (A)
Krell, J. (A)
Maron, M. (M)
Miner, W. A., Jr. (SM)
Rabb, M. (A)
Schwartz, A. M. (A)
Wolfish, H. (M)

East Rutherford (NNJ-2)
Keegen, E. V. (M)
Luh, J. S. (A)
Skalski, W. A. (M)

East Vineland (PHI-3)
Debbi, H. (A)
Konrad, L. (M)

Eatontown (NY-M-2)
Abercrombie, G. D. (A)
Bartow, J. E. (A)
Benanti, M. A. (A)
Burkhard, H. F. (M)
Caffrey, J. V., Jr. (M)
Certer M. M. (M)
Chabot, R. C. (A)
Chi, A. R. (M)
Curtis, M. W. (M)
Deblasio, C. (A)
Donaldson, R. V. (M)
Feehan, J. D. (M)
Fentress, F. D., Jr. (SM)
Gaskell, R. J. (A)
Goubau, G. J. E. (F)
Hathaway, W. E. (A)
Heinlein, J. V. (A)
Kane, B. P. (A)
Kelley, L. C. (M)
Kesselman, W. A. (A)
Landberg, A. (M)
Lee, W. (M)
Lupinski, A. M. (M)
Marantz, D. R. (A)
McAnani I. P. (M)
Oechsgrosso, L. (M)
Osborne, J. M. (SM)
Petrillo, S. E. (F)
Price, H. J. (A)
Schulke, J. R., Jr. (A)
Shanahan, J. C. (M)
Shirley, T. L. (M)
Smilowicz, F. Z. (M)
Voelcker, H. B., Jr. (A)

Edgewater (NNJ-2)
Harris, C. D. (A)
West, T. J. (A)

Edgewater Park (PHI-3)
Seidenberg, P. N. (A)

Edison (PRI-2)
Olin, I. D. (M)

Elberon (NY-M-2)
Bady, I. (SM)
Blum, M. S. (A)
Burke, M. H. (M)
Gould, W. B., III (A)
Hatkin, L. (M)
Hill, J. F. (M)
Jacob, D. (M)
Mac Brov, A. P., Jr. (A)
Malkin, S. (M)
Pankowski, B. J. (M)
Prichard, A. C. (SM)
Schafer, L. P. (SM)
Skobel, M. (SM)
Sussdorff, R. R. (M)
Tanzman, H. D. (A)
Woodworth, D. (M)
Wynne, W. M. (VA)
Ziegler, H. K. (SM)
Trauben, W. (M)

Elizabeth (NNJ-2)
Bellis, V. L. (A)
Blaisdell, W. C. (SM)
Bronstein, N. (A)
Chasek, M. (A)
Cooper, C. G. (A)
Frank, L. H. (A)
Glassman, S. H. (A)
Green, L. S. (A)
Heinen, J. (M)
Ivory, H. (A)
Jakub, J. J. (A)
Kiss, M. F. (M)
Klein, J. (A)
Kowalersyk, R. R. (A)
Kvedaras, A. P. (M)
Langford, R. C. (SM)
Marina, N. A. (A)
Medway, A. D. (M)
Nellis, S. (A)
Nelson, D. E. (M)
Pecina, R. G. (A)
Peterson, T. A., Jr. (SM)
Pinto, R. (M)
Rinker, C. R. (A)
Scaturo, C. (A)
Von Urff, C. A., Jr. (M)
Walsh, L. (SM)
Weinberg, M. (A)
Weintraub, N. (SM)

Elmer (PHI-3)
Tipton, W. F. (M)

Emerson (NNJ-2)
Axtelle, G. E. (SM)
Boyens, R. D. (M)
Dorney, P. E. (SM)
Freid, J. (M)
Geiger, R. H. (A)
Herk, R. F. (A)
MacVeety, R. C., Jr. (M)
Reeves, J. J. (M)
Rubino, J. W. (SM)

Englewood (NNJ-2)
Anick, G. (A)
Borg, R. H. (A)
Craig, J. A. (M)
Dern, H. (SM)
Elders, D. S. (A)
Florant, L. E. (A)
Geduld, A. (M)
Hillman, L. (M)
Hughes, K. E. (M)
Judge, W. J. (A)
Parker, S. R. (M)
Press, M. (SM)
Rosedl, D. J. (A)
Sallen, G. (SM)
Smith, P. C. (A)
Thomas, E. R. (M)

Englewood Cliffs (NNJ-2)
Savory, W. A. (M)

Erlton (PHI-3)
Benner, R. H., II (SM)
Blaisdell, H. L. (SM)
Carignan, R. J. (M)
Casolaro, R. N. (M)

D'Amato, E. J. (A)
Dennis, J. (M)
Foley, T. U. (M)
Hanson, R. E. (M)
Horowitz, L. A. (M)
Mahler, J. (A)
Mechler, E. A. (SM)
Merrill, R. B. (M)
More, C. C. (M)
Mullen, C. V. (A)
Nangle, F. J., Jr. (A)
Pearson, R. W. (M)
Schottenfeld, I. A. (A)

Erskine Lakes (NNJ-2)
Cosgrove, T. (SM)

Essex Fells (NNJ-2)
Blancke, T. B. (A)
Henneberger, T. C., Jr. (A)

Fair Haven (NY-M-2)
Aronoff, M. (SM)
Chappell, J. F. (A)
Corkran, D. H. (SM)
Dickson, F. H. (M)
Evans, E. D., Jr. (M)
Hanley, J. F. (SM)
Harrison, D. J. H. (A)
Kolar, E. F. (SM)
Lartaud, H. R. (SM)
Laugeun, T. C. (A)
Loud, V. F. (A)
Ohl, R. S. (F)
Priebe, F. K. (M)
Puzio, P. S. (A)
Russell, W. J., Jr. (M)
Ruthroff, C. L. (M)
Scheidlbauer, C. M. (SM)
Seiler, N. C. (M)
Triolo, F. J. (M)
Van Deusen, G. L. (SM)
Young, J. A., Jr. (M)
Zahl, H. A. (F)

Fairlawn (NNJ-2)
Bawer, L. I. (SM)
Bradburd, E. M. (M)
Bradford, D. C. (M)
Brodsky, J. L. (M)
Carlin, H. (M)
Cooper, B. (M)
Diepeveen, N. (M)
Felt, L. (A)
Fischer, L. O. (VA)
Friedman, D. (M)
Fruchter, C. L. (M)
Gaines, R. I. (M)
Perry, M. A. (M)
Podell, R. L. (A)
Rizzo, J. E. (M)
Rosenberg, L. (A)
Rosett, E. (M)
Sachs, H. S. (A)
Scarr, H. F. (SM)
Schacher, D. L. (M)
Schaner, F. A. (SM)
Schwartz, E. I. (M)
Silver, M. (M)
Simoni, F. R. (A)
Grabois, B. (M)
Gulick, J. G. (SM)
Guthrie, T. F. (A)
Smolen, A. (M)
Spector, M. (A)
Stein, E. (M)
Thomas, G. N. (M)
Zerkin, M. (A)
Hetzel, G. L. (A)
Hill, E. (M)
Huberman, M. J. (M)
Johnson, A. C. (M)
Kaylin, R. R. (M)
Kuhn, R. W. (A)
Lafferty, R. E. (SM)
Le Vine, D. J. (SM)
Levitsky, J. (M)
Lupo, F. J. (A)
Maloy, M. (A)
Mansberg, L. (M)
Morner, M. W. (M)
Moulton, J. H. (M)

Fairview (NNJ-2)
Maurici, J. M. (A)
Meo, M. (A)
Nunziata, A. (A)
Pattan, B. A. (A)

Fanwood (NNJ-2)
Brossok, W. C. (A)
Cooke, J. P. (A)
Henley, E. J. (A)
Hower, M. M. (A)
Isaacson, A. M., Jr. (A)
Libes, S. (A)
Stilley, J. C. (M)
Thomas, A. W. (A)
Walter, R. A. (A)

Far Hills (PRI-2)
Grissler, H. W. (M)
Peery, W. E. (M)
Serig, H. W. (SM)

Farmingdale (NY-M-2)
Crowell, M. H. (M)
Rock, F. E. (A)

Fayson (NNJ-2)
Duncombe, W. M. (A)

Flanders (NNJ-2)
Johnson, J. R. (M)

Flemington (PRI-2)
Hoffman, K. G. (A)
Toth, S., Jr. (A)

Florham (NNJ-2)
Chapman, C. M. (M)
Coonce, H. E. (A)
Greenwood, T. S. (A)
Littell, J. G. (M)
Mahr, M., Jr. (M)
Rawson, H. B. (M)
Sullivan, M. V. (A)
Wells, H. G., Jr. (M)

Fords (PRI-2)
Glickman, V. (M)
Gumbs, J. (A)
Helm, R. J. (A)
Hoedemaker, R. W. (M)
Kalista, S. A. (A)
Lo, A. W. (SM)
Zapotocky, A. C. (M)

Fort Lee (NNJ-2)
Cynamon, J. J. (A)
Darrison, J. (M)
Frisch, F. W. (M)
Goldberg, S. R. (M)
Grant, M. S. (M)
Marcus, J. A. (M)
Unold, R. W. (M)

Fort Monmouth (NY-M-2)
Bechmann, R. (SM)
Bond, F. L. (SM)
Brazee, G. (SM)
Cook, E. F. (SM)
Davitt, J. H. (SM)
Dorwitt, S. J. (M)
Flewelling, J. D. (SM)
Garber, J. F., Jr. (SM)
Hershkowitz, A. I. (M)
Hill, L. E. (M)
Holmes, C. H. (A)
Inafuku, R. H. (M)
Kates, R. (M)
Langguth, P. O. (SM)
Mitchell, J. D. (M)
Townsend, R. L., Jr. (M)
Witt, F. J. (A)

Franklin (NNJ-2)
Segarra, J. (A)

Franklin Lakes (NNJ-2)
Craft, B. G. (M)
Houghton, T. F. (M)
Piccoli, P. E. (A)
Pulchlopek, E. S. (A)
Scoskie, A. T. (A)

Franklin Park (PRI-2)
Moore, T. H. (A)

Freehold (NY-M-2)
Bastian, C. W. (A)
Buck, D. T. (M)
Cherry, M. (M)
Herah, H. J. (SM)
Kaiser, E. J. (M)
Katz, S. (M)
Lawn, P. (M)
Poehnerski, D. (M)
Slobodin, L. (M)

Garfield (NNJ-2)
Cangialosi, A. (M)
Dalkiewicz, J. M. (A)
Kasper, H. W. (A)
Mayurnik, G. (A)
Mihal, J. (A)
Paradise, R. V. (M)
Sukich, W. J. (A)

Gibbsboro (PHI-3)
Neely, W. J. (A)
Nikolayuk, N. (A)

Gillette (NNJ-2)
Kannenberg, W. F. (SM)
Rystedt, T. (M)
Schwenker, J. E. (A)
Szczebak, E. J. (M)
Turrin, R. H. (M)

Glassboro (PHI-3)
Deml, A. J. (M)
Katinos, L. J. (A)

Glen Ridge (NNJ-2)
Brubaker, P. M. (M)
Dorff, L. A. (SM)
Hamilton, G. E. (SM)
Heinzeling, E. W. (M)
Hill, A. L. (M)
Hoffman, R. B. (SM)
Hopgood, R. C. (SM)
Laport, E. A. (F)
Mastell, M. (M)
Olsen, E. U. (M)
Polyzou, J. (M)
Reveal, F. A. (M)
Ritter, E. W. (SM)
Schenck, A. K. (M)
Tambling, R. L. (A)
Waite, G. F. (A)

Glen Rock (NNJ-2)
Abrams, I. (M)
Ballou, F. M. (M)
Becken, E. D. (M)
Browne, R. (M)
Clark, L. E. (VA)
Fischer, L. G. (SM)
Green, R. C. (A)
Lukas, W. (M)
McGovern, J. J. (M)
Ringer, R. L., Jr. (M)
Sanger, R. B. (A)

Gloucester (PHI-3)
Chong, C. F. (A)
Cornet, E. (M)
Fisher, D. M. (A)
Li, K. (A)
Martin, G. H. (M)
Quan, K-K. (M)

Gloucester City (PHI-3)
Krupa, J. E. (A)

Great Notch (NNJ-2)
Berkley, C. (A)
Godley, P. F. (VA)
Godley, P. F., Jr. (M)
Goldman, H. (A)

Grenloch (PHI-3)
Henuset, F. V., III (A)

Guttenberg (NNJ-2)
Brackett, J. J. (A)

Hackensack (NNJ-2)
Arcidiacono, J. (M)
Gambuti, P. F. (A)
Helwege, G. (A)
Hodde, F. W. (M)
Keliher, J. K. (M)
Maasik, C. (A)
Mate, H. (M)
McKenzie, A. A. (SM)
Poinli, B. A. (M)
Rauch, L. R. (M)
Roemisch, J. L. (SM)
Samuelson, C. D. (SM)
Schentes, M. J. (SM)
Wertman, R. C. (M)
Wylie, W. N. (M)

Hackettstown (NNJ-2)
Dinzl, R. A. (A)
Glass, J. F. (A)
Ouellette, L. A. (A)

Haddonfield (PHI-3)
Achenbach, L. C. (SM)
Allen, J. J. (M)
Alperin, N. N. (A)
Amlinger, P. R. (M)
Anderson, T. E. (A)
Andrews, K. E. (M)
Anlage, J. J. (A)
Armbruster, G. J. (A)
Ashton, H. A. (M)
Bailey, R. E. (M)
Baker, A. B. (M)
Barton, D. K. (M)
Beard, A. D. (A)
Beck, F. X., Jr. (M)
Beers, G. L. (M)
Benner, A. H. (SM)
Bensimon, J. C. (M)
Binzer, C. (A)
Blodgett, E. D. (SM)
Boardman, H. B. (M)
Boerner, L. J. (SM)
Bothwell, T. P. (A)
Bowen, O. N. (M)
Braddock, E. (M)
Brandt, M. M. (M)
Breckman, J. (M)
Brewer, H. D. (A)
Brooks, C. L., Jr. (A)
Bullock, J. L. (A)
Canavan, T. P. (M)
Case, C. W. (M)
Cederbaum, L. R. (M)
Cheetham, R. P. (M)
Chlabranda, J. C. (A)
Chiei, F. D., Jr. (M)
Chittick, K. A. (F)
Coburn, G. S. (M)
Cole, D. D. (SM)
Coleman, J. B. (F)
Coleman, L. (M)
Cooper, R. M., III (M)
Cooper, S. (M)
Covely, F. D., III (SM)
Cunningham, O. B. (SM)
Daniels, A. L. (M)
Denton, B. E. (SM)
Dewitt, C. C. (A)
Diehl, D. W. (M)
Douma, T. (A)
Drenick, R. (SM)
Dye, R. C. (A)
Ehrich, W. G. (A)
Elliott, H. M. (M)
Engler, C. G. (M)
Facer, R. S. (M)
Feiertin, H. M. (M)
Felix, E. H. (SM)
Fink, M. (A)
Fiore, R. E. (M)
Fitzpatrick, A. G. (A)
Fladman, L. J. (SM)
Forrester, C. A. (A)
Forte, S. R. (M)
Fox, E. D. (A)
Frankenberg, A. J. (M)
Frederick, L. G. (M)
Frost, C. R. (M)
Funk, K. A. (M)
Furnstahl, J. S. (M)
Gallo, L. (M)
Garden, M. (A)
Gerrig, E. (A)
Gibson, R. E. (M)
Glenn, A. B. (SM)
Gloystein, E. E. (M)
Gray, F. D. (M)
Grever, J. L. (M)
Groff, J. H. (M)
Gross, D. T. (M)
Guerber, H. P. (A)
Guertin, R. J. (M)
Halpern, H. M. (A)
Hannan, W. J. (M)
Hans, M. F. (A)
Haynes, H. E. (SM)
Heizer, J. T. (M)
Herrmann, F. J. (SM)
Hill, N. R. (A)
Hillman, E. L. (A)
Hoffman, W. H. (M)
Holshouser, J. R., Jr. (A)
Horton, J. B. (M)
Housey, L. J. (M)
Hubbard, R. L. (M)
Hymas, D. G. (M)
Jacobs, R. M. (M)
Joffe, I. (M)
Johnson, E. J. (M)
Johnson, R. V. (A)
Joyner, A. A. (SM)
Kalkman, E. C. (M)
Katz, A. (M)
Keefe, J., Jr. (A)
Kellom, B. K. (A)
Kerfoot, B. P., Jr. (SM)
Kessler, B. L. (M)
Kingan, J. (M)
King, R. E. (M)
Kirkwood, L. R. (SM)
Kita, R. K. (M)
Knouse, C. H. (M)
Kolesnik, M. (A)
Koros, L. L. (SM)
Krasney, S. (A)
Landeman, L. (M)
Lev, S. N. (M)
Le Vezu, C. G. (A)
Levy, L. G. (M)
Lind, A. H. (M)
Lindner, G. H. (A)
Linhardt, R. J. (SM)
Linhart, D. J. (M)
Lowe, M. H. (M)
Luddy, E. N. (M)
Lundgren, D. L. (SM)
Lundon, J. J. (M)
Lyndon, W. L. (SM)
Maine, R. E. (M)
Mannino, A. J. (SM)
Maron, I. (M)
Mascoll, V. J. (A)
Matson, L. E., Jr. (M)
Mayer, D. B. (M)
Mayo, A. L. (A)
McCoy, J. F. (M)
McGaughey, P. C. (SM)
Meisenheimer, R. L. (SM)
Mertz, H. W. (M)
Milewski, C. A. (M)
Moule, W. N. (M)
Munson, I. K. (M)
Muolo, A. W. (A)
Murakami, T. (SM)
Murdock, W. G. (A)
Nahay, L. P. (M)
Ness, J. W. (M)
Neasmith, J. T., Jr. (M)
Newhouse, W. L. (M)
Nicholson, H. E. (M)
Nishimura, G. H. (M)
Noel, R. V. M. (A)
Nossen, E. J. (A)
Obenland, D. K. (M)
Oberle, G. W. (SM)
Ohler, A. E. (M)
Paley, L. I. (A)
Perry, S. V. (VA)
Peterson, C. E. (A)
Peterson, R. A. (SM)
Petri, W. H., Jr. (M)
Pfeiffer, J. H., Jr. (A)
Poehls, V. J. (A)
Poorte, C. E. (M)
Porter, J. W. (M)
Potts, J. B. (A)
Pratt, D. (SM)
Pritchard, E. M. (SM)
Propster, C. H., Jr. (A)
Pyle, M. O. (M)
Reimertz, R. R. (M)
Reinert, D. O. (A)
Rester, G. F. (M)
Rettig, A. S. (M)
Richards, E. S. (A)
Rocamora, R. L. (M)
Rose, H. E. (M)
Ross, G. T. (M)
Roth, J. H. (SM)
Rudner, M. A. (SM)
Ryan, V. F., Jr. (M)
Rydz, J. S. (M)
Ryerson, C. M. (SM)
Sander, S. (M)
Sattler, W., Jr. (A)
Schrader, H. J. (F)
Schwartz, B. R. (M)
Seelig, G. (SM)
Shapiro, L. (M)
Sheetman, N. (M)
Sidnam, R. D. (M)
Smith, J. N. (M)
Sonnenfeldt, R. W. (SM)
Spiegel, S. (M)
Spoelstra, R. J. (M)
Squire, H. H. (A)
Stafford, R. H. (A)
Stanford, C. E. (M)
Starner, C. J. (M)
Starr, S. C., Jr. (M)
Staton, M. G. (M)
Stockton, E. M. (M)
Stokes, I. (SM)
Stone, F. B. (SM)
Strickland, K. T. (A)
Sublette, I. H. (M)
Sullivan, J. L. (A)
Sweeney, J. L. (M)
Taylor, J. P. (A)
Taylor, W. E. (A)
Teasdale, R. D. (SM)
Thomas, L. P. (M)
Thomas, R. A., Jr. (M)
Toscano, P. M. (M)
Trachtenberg, R. (SM)
Trouant, V. E. (SM)
Turecki, A. (M)
Turner, R. R. (M)
Wahlstrom, R. N. (A)
Wald, S. (SM)
Warren, W. L. (A)
Watson, S. H. (SM)
Webb, R. B. (A)
Weidemann, R. F. (A)
Weir, W. T. (A)
Weiss, M. V. (M)
Welsh, R. E. (SM)
Welsher, C. E. (VA)
Wentworth, J. W. (M)
Westwood, D. H. (SM)
Wetzel, L. D. (A)
Wheeler, R. (SM)
Widmann, F. W. (SM)
Wilcox, R. C. (SM)
Wilder, M. K. (A)
Willman, R. C. (SM)
Wilson, H. S. (A)
Wiseman, P. E., Jr. (M)
Witt, L. A. (A)
Wolf, L. J. (SM)
Wood, M. H. (SM)
Wooten, L. B. (A)
Wuerffel, H. L. (SM)
Zoltan, I. N. (M)

Haddon Heights (PHI-3)
Aitel, M. L. (A)
Arrowood, W. E. (M)
Auerbach, B. (M)
Barger, J. R. (A)
Boehm, P. P. (A)
Burke, A. M. (A)
Carlson, D. J. (M)
Cohen, K. J. (A)
Conroy, G. J. (M)
Darnell, W. E. (SM)
Deuitch, D. E. (M)
Eulo, G. R. (M)
Farr, C. E. (M)
Franke, J. L. (SM)
Goodman, G. H. (SM)
Gunter, D. L. (M)
Hartmann, H. (A)
Hill, D. L. (A)
Hong, J. C. T. (A)
Hoyle, W. E. (M)
Latham, N. D. (M)
Link, J. M. (M)
McKee, D. M. (A)
McMorrow, C. F. (M)
Pan, W. Y. (SM)
Parker, J. R. (M)
Phillips, C. R. (M)
Renfrow, R. J. (A)
Skidmore, G. C. (M)
Solomon, K. (M)
Warren, C. S. (A)
Wolf, L. (SM)
Woll, H. J. (SM)

Hainesburg (NNJ-2)
Bird, H. H. (A)

Harrington Park (NNJ-2)
Aron, M. (SM)
Petersen, H. J. (A)
Tomey, J. G. (M)
Kaufman, A. S. (M)
Vieth, W. G. (M)

Hamilton Square (PRI-2)
Edwards, L. M. (A)

Hammonton (PHI-3)
Reber, P. W. (A)

Harbourton (PRI-2)
Reed, R. D. (A)

Harrison (NNJ-2)
Adair, R. P., Jr. (M)
Ayer, R. B. (SM)
Bahls, W. E. (SM)
Bertin, E. P. (M)
Brown, B. B. (M)
Brown, R. E. (M)
Burnap, R. S. (F)
Cimorelli, T. (SM)
Eberly, H. L. (SM)
Freedman, N. S. (SM)
Fuller, K. H. (M)
Heleth, H. (M)
Hirlinger, J. F. (SM)
James, W. M. (SM)
Kauzmann, A. P. (SM)
Kelly, R. L. (SM)
Kurys, C. J. (A)
McElwee, E. M. (SM)
McFarland, J. F. (A)
Meyer, C. A. (SM)
Morris, C. M. (SM)
Novak, G. (M)
Nowogrozicki, M. (M)
Perkins, T. B. (M)
Poch, S. (M)
Rose, G. M., Jr. (F)
Scholz, L. C. (M)
Shaw, G. R. (F)
Shuttleworth, E. (A)
Talpey, R. G. (SM)
Wanchow, J. J., Jr. (M)

Hasbrouck Heights (NNJ-2)
Green, N. H. (M)
Lasch, W. H. (M)
Lazos, N. J. (A)
Norton, E. A. (M)
Watts, C. (M)
Zoref, A. S. (A)

Haskell (NNJ-2)
Ryan, H. J. (M)

Haworth (NNJ-2)
Croyle, J. C. (M)
Guy, R. F. (F)
Osborn, P. H. (M)
Terry, F. B. (A)

Hawthorne (NNJ-3)
Carlson, E. S. (A)
Constantin, L. L. (M)
Greenleaf, J. L. (M)
Mayhew, J. A., Jr. (A)
Strole, J. C. (M)

Hazlet (NY-M-2)
Harries, W. (M)

Hewitt (NNJ-2)
Wells, F. C. (M)
White, R. E. (SM)

Highland Park (PRI-2)
Bocchieri, A. J. (A)
Braun, M. (A)
Gaul, W. L. (A)
Molony, D. A. (M)
Pike, N. (A)
Van Derveer, E. J. (M)

Highlands (NY-M-2)
Rohrle, T. A. (A)

Hightstown (PRI-2)
Bowker, J. D. (A)
Lugannani, R. (M)
Miller, H. L. (M)

Hillsdale (NNJ-2)
Marriner, A. W. (M)

Marsh, C. O., Jr. (M)
Sullinger, W. B. (SM)

Hillside (NNJ-2)
Cohen, H. (M)
Kahant, C. G. (A)
Maffenbefer, J. B. (M)
Rosenman, D. (A)
Sinnott, D. J. (M)
Wilner, G. (A)
Zentmaier, K. H. (M)

Hoboken (NNJ-2)
Ficken, W. H. (M)
Gilmore, A. C., Jr. (M)
Hauser, E. B. (M)
Merrill, L. L. (SM)
Perenic, L. J. (SM)
Rossi, S. (A)
Simberkoff, J. A. (A)
Simberkoff, S. W. (A)
Stapleton, R. J. (A)
Vaishampayan, R. K. (M)

Hohokus (NNJ-2)
Ebersol, E. T., Jr. (M)
Markus, J. (M)
Saul, E. R. (M)
Spaulding, H. K. (A)

Holmdel (NY-M-2)
Budenstein, P. P. (M)
De Lange, O. E. (M)
Marcatili, E. A. J. (M)
Morgan, K. L. (M)

Hopewell (PRI-2)
Heffernan, H. J. (A)
Robertson, G. C. (M)
Townsend, C. C., Jr. (M)

Hudson Heights (NNJ-2)
Assadourian, F. (SM)
Sigman, M. (M)

Interlaken (NY-M-2)
Hanel, R. A. (A)
Todd, W. (M)

Ironia (NNJ-2)
Markle, R. E. (A)
Weiss, A. A. (A)

Irvington (NNJ-2)
Albanese, D. F. (M)
Baker, D. (A)
Bizon, M. J. (A)
Caspar, C. W., Jr. (M)
Goldshine, A. D. (M)
Kosmaczewski, I. (M)
Malkin, I. I. (M)
Mommo, E. J. (VA)
Nesselroth, M. D. (A)
Shurley, R. M. (A)
Sutton, R. H. (A)
Walters, W. L. (M)
Szulczynski, Z. J. (M)

Iselin (PRI-2)
Austin, F. H. (M)
Fryer, W. R. (M)

Jersey City (NNJ-2)
Balter, L. (M)
Brogan, J. M. (M)
Caputo, W. R. (M)
Dobrowolski, R. M. (M)
Dzula, G. (M)
Engelberg, C. (M)
Faber, M. L., Jr. (A)
Israel, D. D. (F)
Kulik, V. A. (M)
Lahey, P. J. (M)
Leonard, D. J. (M)
Leslie, F. (M)
Lolterman, L. (M)
Mayor, R. (A)
Parrillo, V. J. (M)
Polcyn, S. J., Jr. (M)
Putt, D. R. (A)
Renwick, F. B. (M)
Scherzer, K. (M)
Seel, M. (A)
Staloff, C. (M)
Tenten, R. C. (A)
Walker, D. J. (A)
Wormeske, W. (M)
Ynworsky, Y. J. (M)

Keasbey (PRI-2)
Snyder, C. L. (SM)

Kearny (NNJ-2)
Belamarich, J. P. (A)
Bondon, L. A. (SM)
Gerulat, T. G. (A)
Golding, L. N. (M)
Helwig, W. J. (A)
Koljane, D. F. (M)
Lewis, R. F. (M)
McKeon, E. F. (M)
Percival, W. R. (SM)
Stark, A. C., Jr. (A)

Kenilworth (NNJ-2)
Brown, I. (A)
Gams, T. C. (M)
McCarroll, A. K. (A)

Keyport (NY-M-2)
Angel, K. W. (M)
Blumberg, L. (A)
Ehrlich, W. E. (A)
Goldin, S. M. (M)
Griffiths, R. J. (SM)
Schlaack, N. F. (SM)
Tetreault, N. E. (M)

Kinnelon (NNJ-2)
Gaw, N. W. (M)

Lake Hiawatha (NNJ-2)
Bremer, H. A. (VA)
Dinwiddie, E. W. (M)
Rosenbusch, F. (A)

Lakehurst (NY-M-2)
Joseph, D. A. (A)

Lake Parsippany (NNJ-2)
Chapman, R. C., Jr. (A)
Nasto, S. N. J. (A)

Lake Pine (PHI-3)
Gavinski, V. A. (M)

Lakewood (NY-M-2)
Bell, J. (A)
La Cava, E. (A)
Meyerson, M. (SM)

Laurel Springs (PHI-3)
Klamo, A. E. (A)
Smith, W. J. (A)

Laurelton (NY-M-2)
Vorwerk, F. A. (A)

Lawrenceville (PRI-2)
Kihn, H. (SM)
Olive, G. A. (A)
Snedeker, E. K., Jr. (M)

Lebanon (PRI-2)
Mortimer, A. J. (M)
Schooley, R. W., Jr. (A)

Leonia (NNJ-2)
Burger, F. J. (A)
Christie, F. W. (M)
Dietsch, C. G. (SM)
Gonzalez, V. M. (M)
Kennedy, T. R., Jr. (SM)

Lincoln Park (NNJ-2)
Fazio, F. (A)
Quinlan, D. E. (A)

Lincroft (NY-M-2)
Bawden, H. G. (M)
Novick, W. (M)
Sher, H. T. (M)

Linwood (PHI-3)
Stone, R. C., Jr. (M)

Linden (NNJ-2)
Allen, M. R. (A)
Braun, L. (A)
Garshelis, I. J. (A)
Gladden, C. J. (A)
Jordan, C. J. (M)
Meyer, S. F. (M)
Pincus, L. (M)
Riley, G. B. (SM)
Tkach, G. D. (M)

Little Falls (NNJ-2)
Bluhm, R. W. (A)
Bondy, J. O. (A)
De Ryder, H. (VA)
Edwards, R. A. (M)
Hunttner, O. A. (M)
Nord, H. H. (M)
Pacini, H. P. (M)
Talamini, A., Jr. (SM)
Turkheimer, P. M. (M)

Little Ferry (NNJ-2)
Gartner, J. J. (M)
Sacco, V. (M)

Little Silver (NY-M-2)
Borgeson, C. A. (SM)
Bracken, J. R. (M)
Brueckmann, H. L. (SM)
Butler, H. (M)
Craig, L. H. (SM)
Fox, K. H. (SM)
Garoff, K. (M)
Hahnel, A. (SM)
Havel, J. M. (M)
Huebner, D. L. (M)
Jensen, A. M. (M)
Kilgore, G. R. (F)
King, H. D. (SM)
Klenk, L. M. (SM)
Krevsky, S. (SM)
Lowry, L. R. (SM)
Mack, A. (M)
Meyer, H. F. (SM)
Meyer, J. C. (M)
Miller, L. (SM)
Mond, L. I. (M)
Morris, M. M. (SM)
Paschetto, E. J. (M)
Pick, L. A. (M)
Potect, D. P. (VA)
Sharp, C. E. (A)
Shive, S. L. (SM)

Livingston (NNJ-2)
Augenblick, H. A. (M)
Bishop, J. B. (SM)
Cunningham, F. M. (M)
Feinstein, J. (M)
Gifford, J. S. (M)
Gray, G. E. (M)
Hatch, R. W. (A)
Hemmer, F. A., Jr. (A)
Houghton, H. V., Jr. (M)
Jandoli, L. R. (M)
Markosian, V. (SM)
Meier, W. L. (M)
Mennig, J. H. (M)
Newman, L. (A)
Nordlin, H. G. (SM)
Normando, N. J. (M)
Plouffe, R. L., Jr. (SM)
Post, D. B. (M)
Prawdzik, C. A. (M)
Safford, F. J. (SM)
Sanger, D. M. (A)
Steinhoff, R. (M)
Stinehelfer, H. E., Sr. (M)
Treuhaft, M. A. (SM)
Ussery, P. W. (M)
Zacharais, E. M., Jr. (M)

Locust (NY-M-2)
Andrews, M. B. (M)
Massell, E. (SM)
Doniger, J. (M)
Gage, L. W. (A)
Glacken, R. E. (A)
Howard, E. J., Jr. (A)
Meyer, R. W. (M)
Sidari, P. J. (A)
Thompson, W. T. (M)
Weidman, B. (A)

Long Branch (NY-M-2)
Ackerman, H. L. (M)
Adamson, A. L. (SM)
Allen, J. A. (M)
Balton, L. A. (M)
Barbour, T. M. (M)
Barr, H. (M)
Berman, G. (M)
Bradley, T. D. (A)
Brown, A. (SM)
Caldwell, W. C. (SM)
Chernow, M. (M)
Christianson, L. F. (SM)
Clay, W. C. (A)
Durgin, T. R. (A)
Dwan, D. (A)
Gelernter, B. (M)
Greenspan, S. (M)
Grubman, S. (M)
Gulin, L. L. (A)
Hamer, H. (SM)
Inslerman, H. E. (M)
Kardauskas, E. (M)
Kent, C. E. (M)
Kiernan, D. R. (M)
Kravitz, M. L. (M)
Libby, M. E. (A)
Maddox, R. G. (M)
Marsh, C. J. (M)
Martinson, F. L. (SM)
Meijer, R. R. (SM)
Meyers, M. M. (A)
Perlman, S. (SM)
Pfaff, L. (A)
Portantino, A. (M)
Reder, F. H. (A)
Russell, W. D. (A)
Sacks, P. A. (A)
Schwab, D. (M)
Silberman, A. (M)
Silva, A. A. (M)
Sumpter, P. B. (M)
Swan, R. A. (A)
Sweet, A. J., Jr. (M)
Vieweger, A. L. (SM)
Weinstock, M. (A)
White, E. L. (F)
Yettito, P. R. (A)

Lyndhurst (NNJ-2)
Di Stadio, D. (M)
Domanico, P. T. (M)
Friberg, V. (A)
Horbach, S. (M)
Kelmis, K. J. (A)
La Medica, K. O. (A)
Mumford, D. L. (A)
Robinson, G. D. (A)

Madison (NNJ-2)
Alexander, E. J. (M)
Aster, A. K. (M)
Barclay, J. C. (M)
Barney, H. L. (SM)
Cadden, W. J. (M)
Carter, H. T. (M)
Clark, O. (SM)
Coultas, R. A. (A)
Crowley, T. H. (M)
D'Asaro, L. A. (M)
Diederich, P. A. (M)
Dimock, P. V. (SM)
Doll, W. E. (M)
Elcock, G. C. (A)
Ellis, B. T., Jr. (SM)
Fogarty, L. L. (A)
Grantges, R. F. (A)
Gross, J. (M)
Hartzell, J. W. (M)
Howard, E. J. (SM)
Kudlich, R. A. (A)
Livera, A. L. (M)
Lundin, J. A. (M)
Marble, F. (SM)
McKersie, A. D. (M)
Mearns, A. B. (A)
Neuadiz, R. C. (A)
Ossanna, J. F., Jr. (A)
Oster, F. J. (M)
Phillips, W. E., Jr. (SM)
Reed, J. F., Jr. (M)
Roetken, A. A. (F)
Ross, A. T. (SM)
Ruckelshaus, J. G. (SM)
Skellett, A. M. (F)
Smith, J. W. (SM)
Swain, R. G. (A)
Thompson, C. F. (A)
Van Dine, G. A. (M)
Vogelsong, J. H. (M)
Whitney, W. (SM)
Wilson, W. F. (M)

Magnolia (PHI-3)
Brock, F. M. (A)
Forbes, E. J. (M)

Mahwah (NNJ-2)
Brendle, F. A. (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)
Gibbons, D. R. (M)
May, M. M. (M)
Baganz, A. (A)

Manville (PRI-2)
Eshelman, C. R. (M)

Maple Shade (PHI-3)
Luskey, J. M. (M)
Matonak, L. A. (A)
McGee, A. K. (M)
Morgan, W. L. (A)
Nauberein, H. (M)
O'Donnell, J. J. (A)
Parmer, M. E. (A)
Pashcal, S. L. (M)
Scott, P. B. (M)
Singleback, G. W. (A)
Small, H. E. (A)
Sommer, W. G. (M)
Twinam, J. R. (A)
Warren, M. V. (A)

Maplewood (NNJ-2)
Barkley, H. F. (M)
Borden, D. C. (M)
Bown, R. (F)
Cohen, I. (M)
Dickey, D. W. (SM)
Fromer, M. (M)
Gardner, P. S. (A)
Grunberg, H. S. (A)
Hankinson, F. K. (A)
Hazeltine, A. L. (F)
Helfrich, J. H. (M)
Higgins, W. H. C. (SM)
Humphrey, H. G. (M)
Johnson, J. B. (F)
Murphy, W. F., Jr. (M)
Oswald, A. A. (F)
Prosser, T. C. (A)
Pruden, H. M. (SM)
Schulz, W. J. (A)
Shackelton, S. P. (SM)
Slppach, F. W., Jr. (A)
Vance, H. C. (SM)
Wilhelm, J. F. (SM)
Youngstrom, N. C. (M)

Margate (PHI-3)
Thron, B. K. (M)

Marlboro (NY-M-2)
Bernard, J. L., Jr. (VA)
Hindin, A. (A)

Marlton (PHI-3)
Anderson, R. F. (M)
Cochran, S. W. (SM)
Kentner, C. D. (M)
Shaffer, R. C. (M)
Thowless, E. A. (A)

Matawan (NY-M-2)
Kibler, L. U. (M)
Ronson, H. T. (A)

Maywood (NNJ-2)
Babcock, W. E. (M)
Benenson, C. A. (A)
Calafati, S. S., Jr. (SM)
Fichtl, R. R. (A)
Gaubeca, J. B. (M)
Koehler, A. (M)
Savisaar, A. (M)
Seibert, J. L. (SM)
Shapiro, S. (A)
Willis, R. L. (A)

McGuire AFB (PRI-2)
Bonsegneur, P. J., Jr. (A)

Medford (PHI-3)
Hess, W. J. (A)
Weise, D. S. (M)

Medford Lakes (PHI-3)
Burns, M. C. (SM)
Frazier, R. M. (M)
Liddle, R. W., Jr. (A)
Quillen, W. F. (M)

Mendham (NNJ-2)
Lewis, W. D. (F)
Ong, F. C. (SM)
Pocius, C. F. (A)
Schmied, J. W. (M)
Wilder, K. T. (A)
Wintermitz, T. W. (M)

Menlo Park (NNJ-2)
Schnebbe, A. D. (M)

Mercerville (PRI-2)
Cohen, S. (A)

Merchantville (PHI-3)
Alexander, J. R. (A)
Barkow, W. H. (A)
Brown, I. (M)
Carey, G. R. (M)
Combellack, E. M. (M)
Coston, H. E. (SM)
Curran, G. M., Jr. (M)
Darling, W. (M)
Dordick, H. S. (M)
Fell, W. F. (M)
Gainey, L. L. (M)
Gallo, P. (SM)
Gaynor, E. (M)
Gibring, H. E. (SM)
Gilmore, W. C. (A)
Goldman, L., Jr. (M)
Graham, R., Jr. (M)
Hamm, N. G. (SM)
Hoger, D. T. (A)
Hopkins, A. R. (SM)
Hoyt, C. W. (SM)
Kephart, E. T. (A)
Kimmel, J. (M)
Klavens, N. I. (A)
Knapschaefer, D. H. (M)
Lappin, L. S. (SM)
Law, C. J. (SM)
Lawler, J. (A)
Lawrence, W. L. (VA)
Layer, J. H. (A)
Lending, R. D. (A)
Lewis, E. S. (A)
Llewellyn, A. D. (M)
Long, K. G. (M)
Luther, A. C., Jr. (M)
Marsh, D. R. (M)
McKinney, R. S. (A)
Miller, J. P. (VA)
Mittelman, W. (M)
Musto, W. C. (M)
Oman, N. J. (M)
Orr, J. R. (A)
Patterson, E. B. (SM)
Pendred, C. R. (M)
Petry, G. F. (VA)
Quinn, W. H. (A)
Richter, R. (A)
Sanborn, J. W. (SM)
Schach, S. (A)
Schwartz, A. J. (M)
Shepherd, R. C. (A)
Sheppard, W. H. (A)
Story, T. H. (SM)
Swierczak, P. C. (SM)
Thompson, L. E. (F)
Uhland, J. C. (M)
Vonderschmitt, B. V. (A)
Washburn, E. M. (SM)
Watts, E. R. (M)
Young, J. E. (SM)

Metuchen (PRI-2)
Aderente, A. A. (M)
Bernstein, A. L. (A)
Brereton, C. H. (SM)
Bubb, A. H. (M)
Cook, R. W. (M)
Downie, D. E. (M)
Draneta, A. (M)
Feder, L. (M)
Ford, R. W. (M)
Ginsberg, L. H. (SM)
Grill, C. (A)
Hautzik, R. M. (M)
Heacock, B. E. (SM)
Hellstrom, M. J. (A)
Hensperger, E. S. (M)
Kasner, A. (A)
Kingsford-Smith, C. A. (M)
Kmosko, J. A. (A)
Kornetz, N. S. (SM)
Larson, G. C. (SM)
Lee, H. C. (M)
Lemelson, J. H. (A)
Lempert, I. E. (M)
Lerner, A. M. (M)
Ley, G. S. (SM)
MacDonald, A. F. (SM)
Mazur, S. (A)
Meyerhoff, A. A. (M)
Russell, G. H. (M)
Sampson, F. A. (A)
Sarpa, J. (A)
Scheer, F. H. (SM)
Schiffmayer, G. F. (M)
Schofield, C. R. (A)
Sienkiewicz, L. J. (M)
Sillman, D. (SM)
Stallin, R. (A)
Thomas, D. G. (M)
Toft, H. L. (M)
Wasserman, I. (A)
Weaver, B. M. (A)
Welkowitz, W. (M)
Whitney, G. H. (A)

Middlesex (PRI-2)

Kirchner, K. F. (SM)
Lane, F. A. (M)
Leighton, H. W. (M)
Maginnis, W. P. (SM)
Muller, C. R. (SM)
Nuttall, A. F. (A)
Peck, J. L. (M)
Razlow, A. (M)
Richard, C. A., Jr. (A)
Richardson, A. L. (A)
Rose, F. C. (M)
Seipel, A. J. (M)
Sherman, C. M. (A)
Sprague, V. G. (M)
Steinbrecher, E. E. (M)
Thomas, H. E. (SM)
Trackman, J. C. (M)
Vosburgh, M. C. (A)
Wallace, R. P. (SM)
Wheeler, C. M. (SM)
Wolff, F. M. (M)
Yamagami, V. (M)
Yates, C. R. (M)

Montvale (NNJ-2)
Corcoran, D. G. (M)
Hoyns, G. W., Jr. (A)
Taylor, H., Jr. (A)

Montville (NNJ-2)
Atwood, H., Jr. (M)
Griffin, W. F. (SM)
Higgins, L. A. (A)

Moonachie (NNJ-2)
Brown, C. S. (M)
Mason, H. J., Jr. (A)
Pettijohn, C. L. (M)

Moorestown (PHI-3)
Anderson, W. G. (A)
Andros, L. R. (A)
Baker, H. F. (M)
Ballentine, E. C. (SM)
Baumgardner, P. E. (M)
Breitwieser, G. F., Jr. (SM)
Brough, J. R. (SM)
Brown, E. R., Jr. (M)
Bucher, T. T. N. (M)
Bushnell, R. H. (M)
Cantalio, L. J. (A)
Coddington, J. L. (M)
Colby, N. C. (M)
Colligan, J. A. (M)
Corum, D. R. (M)
Curtin, W. A. (M)
Curtis, W. C. (A)
Dahms, D. F. (M)
Davis, R. S. (A)
Duszak, H. (M)
Fath, J. A., Jr. (A)
Fischbeck, K. H. (A)
Fisher, R. M. (A)
Foster, J. A. (M)
Gilio, E. (A)
Gillespie, H. C. (M)
Graham, M. L. (SM)
Greene, A. H. (M)
Greenwood, H. T., III (SM)
Hammel, D. G. (M)
Hanft, H. (M)
Hartnett, E. J. (M)
Hawley, M. E. (SM)
Herndon, R. A. (M)
Holmes, D. B. (SM)
Howard, D. V., Jr. (A)
Howery, R. W. (M)
Ireland, F. H. (SM)
Jackson, A. (A)
Jacobs, L. (M)
Jose, R. S. (M)
Kettler, A. H. (SM)
Kitchens, L. E. (M)
Korman, N. I. (M)
Kronpa, H. F. (M)
Ladol, L. G. (SM)
Lewis, W. P. (M)
Lindsay, J. E. (A)
Macqueene, P. H. (SM)
McCall, E. G., Jr. (M)
McCulley, J. M. (A)
Mertens, L. E. (A)
Mills, H. J. (M)
Nagle, J. J. (M)
Nisbino, H. (SM)
North, G. R. (A)
Palester, J. (M)
Palm, K. E. (M)
Perechnic, W. S. (M)
Poch, W. J. (F)
Price, J. F. (M)
Rawdin, E. (A)
Ray, R. H. (M)
Rettenmeyer, F. X. (F)
Robinson, J. E. (M)
Rodman, M. D. (M)
Rosenthal, R. E. (A)
Sapp, D. H. (M)
Schmit, D. F. (F)
Sheeler, A. M. (A)
Sherman, S. M. (SM)
Smith, R. M. (SM)
Snyder, R. L., Jr. (SM)
Sonntag, W. A. (M)
Tweet, B. O., Jr. (M)
Vance, D. H. (M)
Venters, D. C. (M)
Vick-Roy, J. W. (M)
Wege, H. R. (SM)
Whitemant, J. T. (SM)
Whitman, C. L. (A)
Williams, E. A. (M)
Wills, W. E. (SM)
Wirtz, E. L. (A)

Morganville (NY-M-2)
Lavoie, S. D. (A)

Morris Plains
Andrews, R. J. (A)
Brown, V. L. (M)
Campbell, M. E. (SM)
Dougherty, H. J. (M)
Fleming, H. M. (A)
Freeman, W. C., Jr. (SM)
Geils, J. W. (M)
Gretsch, W. R. (M)
Habib, N. (M)
Johannesen, J. D. (M)
La Manna, R. J. (A)
McFee, R. (M)
Oliwa, W. S. (A)
Raddin, F. M. (A)
Reynolds, R. B. (M)
Robertson, J. P. (M)
Stiles, M. C. (M)
Townley, R. C. (M)
Underwood, M. D. (A)
Waldhauer, F. D. (A)
Van Iderstine, A. (SM)
Vreeland, J. B. (A)
Wilde, A. E., Jr. (SM)

Morristown (NNJ-2)
Bell, W. L. (M)
Caprarola, L. J. (A)
Cooper, D. J. (SM)
Crater, T. V. (A)
D'Albora, J. B., Jr. (SM)
Davenport, J. E. (M)
Ehrlich, N. (M)
Evans, P. H. (F)
Filmer, W. L. (M)
Gatelia, F. A. (M)
Gerth, J. H. (SM)
Gillson, M. H. (SM)
Gilhuan, J. A. (M)
Goldfarb, S. (M)
Greene, J. F. (A)
Gulden, W. W. (M)
Hagelbarger, D. (M)
Hammer, H. (M)
Harkless, E. T. (A)
Harris, J. R. (M)
Howard, W. A. (M)
Huyck, W. L., Jr. (M)
Irvine, M. H. (M)
Jacobs, O. B. (M)
Jewell, A. G. (A)
Johnson, L. C. (A)
Kellogg, W. M. (SM)
Kelly, M. J. (A)
Kingsland, D. H., Jr. (A)
Larisch, R. W. (M)
Lennon, F. W. (A)
Levinson, J. (SM)
Lowell, R. J. (A)
May, C. J., Jr. (M)
McDaniel, W. J. (M)
McKechnie, K. H., Jr. (M)
Meltzer, A. H. (M)
Miessner, B. F. (F)
Minter, J. (M)
Mohr, A. E. (M)
Morrison, H. (SM)
Mortlock, C. E., Jr. (M)
Mowery, V. O. (A)
Murray, J. L. (M)
Peskin, E. (SM)
Peterson, R. B. (M)
Pierson, V. F. (M)
Poage, J. F. (M)
Poole, N. K. (A)
Potter, R. K. (F)
Priehe, J. F., Jr. (A)
Replogle, J. O. (A)
Ruff, J. A. (A)
Saltus, G. E. (A)
Shaw, H. M. (A)
Simons, C. F. (M)
Smith, G. W., Jr. (A)
Snyder, E. C., Jr. (M)
Spollen, F. J. (A)
Starrett, J. S. (SM)
Taylor, F. F. (M)
Thayer, P. H., Jr. (M)
Tillinger, H. I. (A)
Timm, W. C. (A)
Wakefield, P. K. (A)
Willet, R. J. (A)
Wittels, J. L. (M)

Mountain Lakes (NNJ-2)
Amos, B. (M)
Armstrong, J. H. (M)
Bareiss, M. (SM)
Beck, R. J. (M)
Black, W. L. (SM)
Brock, H. (A)
Estelle, W. E. (M)
Gabel, W. (M)
Naugle, R. B. (A)
Nordstrom, B. H. (SM)
Noyes, A., Jr. (SM)
Osterland, E. (SM)
Tyzzer, H. J. (SM)
Webster, F. D. (SM)
West, J. M. (SM)
Honnell, M. A. (SM)
Houck, H. W. (F)
Hughes, R. W. (SM)
Jackson, F. R., Jr. (SM)
Krist, H. K. (SM)
Leeb, G. R. (M)
Merriam, F. F. (SM)
Moore, W. C. (SM)

Mountainside (NNJ-2)
Anderson, T. N. (SM)
Browne, G. W. (M)
Knlazuk, M. (M)
Legendre, V. (M)
Sears, F. R. (M)
Vreeland, W. E. (A)
Wagner, S. J. (SM)

Mountain View (NNJ-2)
Dilatush, E. (M)
Kern, G. A. (M)

Mountain Ephrain (PHI-3)
Daiber, E. M. (A)
Lavender, W. E. (M)
Patterson, R. L. (A)
Steeger, J. E. (A)
Taylor, J. M., Sr. (M)

Mount Freedom (NNJ-2)
Dorros, I. (M)

Mount Holly (PHI-3)
Chittick, D. R. (M)
De Rose, J. F. (A)
Fogelberg, A. E., Jr. (SM)
Goldberg, E. (A)
Gorman, J. (M)
Griffith, B. D. (M)
Guhn, D. K. (A)
Heyer, E. M. (A)
Hinchee, A. E. (A)
Holden, W. E. (M)
Johnson, J. E. (M)
Johnson, M. C. (M)
Kaden, G. (A)
Langelo, V. A. (A)
Million, J. W., Jr. (SM)
Pruitt, D. L. (A)
Reid, J. G. (M)
Stepchiw, J. (A)
Sturm, F. L. (A)
Taylor, J. R. (A)
Vanis, E. M. (M)
Westcott, H. H. (A)

Mullica Hill (PHI-3)
Wright, T. O. (M)

Murray Hill (NNJ-2)
Aaron, M. R. (M)
Abrahams, R. P. (M)
Affel, H. A. (M)
Anderson, R. E. (M)
Andreatch, P. (A)
Andrews, F. T., Jr. (M)
Autrey, S. W. (A)
Badgley, H. H. (SM)
Baldwin, G. L. (M)
Baldwin, M. W., Jr. (F)
Bangert, J. T. (SM)
Barstow, J. (SM)
Bashkow, T. R. (M)
Becker, F. K. (SM)
Becker, G. E. (SM)
Bennett, W. R. (F)
Bissell, H. C. (A)
Black, D. M. (SM)
Bleisch, G. W. (M)
Bode, H. W. (F)
Bollwage, F. C. (A)
Boubil, E. J. (A)
Bowkers, M. W. (A)
Braga, F. J. (M)
Bridges, T. J. (M)
Bullington, K. (F)
Bullock, D. E. (M)
Burford, T. M. (M)
Busch, K. J. (A)
Butterly, F. J. (M)
Carbrey, R. L. (M)
Chisholm, D. A. (A)
Church, S. E. (M)
Ciccolella, D. F. (SM)
Cindric, G. T. (SM)
Cleveland, H. M. (M)
Cocker, J. (SM)
Cook, J. S. (A)
Cornell, W. A. (M)
Cutler, C. C. (F)
Dacey, G. (SM)
Daggett, E. H. (A)
Darlington, S. (F)
David, E. E., Jr. (M)
Dayem, A. H. (A)
Dennis, R. C. (M)
Depp, W. A. (SM)
Desoer, C. A. (A)
De Vine, J. A. (A)
Dickieson, A. C. (SM)
Doba, S. J. (SM)
Dollard, P. M. (M)
Drazy, E. J. (M)
Drexler, J. (M)
Dubosky, D. D. (A)
Dunlap, K. S. (M)
Ebbe, G. L. (M)
Eglin, J. M. (M)
Ehrbar, R. D. (SM)
Elmendorf, C. H. (SM)
Farney, G. K. (M)
Fay, C. E. (F)
Feher, G. (A)
Felker, J. H. (SM)
Ferrell, E. B. (F)
Finch, T. R. (M)
Fischer, H. B. (SM)
Fisher, H. J. (SM)
Fisk, J. B. (F)
Flanagan, J. L. (M)
Flegal, J. R. (SM)
Freeling, M. R. (M)
Giger, A. J. (SM)
Gilbert, R. W. (M)
Glass, M. S. (SM)
Goldey, J. M. (M)
Goodale, W. D., Jr. (A)
Graham, R. E. (SM)
Graham, R. S. (SM)
Gray, M. C. (M)
Greenman, R. R. (M)
Grossman, A. J. (M)
Hamming, R. W. (A)
Harker, K. J. (A)
Hartman, C. D. (VA)
Harvey, F. K. (M)
Hathaway, J. W. (A)
Heberlein, A. A. (SM)
Hefele, J. F. (SM)
Hempstead, C. F. (M)
Hill, L. O. (A)
Hittinger, W. C. (A)
Hohmann, L. A., Jr. (M)
Hopkins, H. F. (SM)
Hornbeck, J. A. (SM)
Horton, A. W., Jr. (SM)
Hudack, J. M. (SM)
Irvin, H. D. (A)
Israel, J. O. (SM)
Jansen, J. J. (M)
Jensen, A. G. (F)
Johanson, A. E. (M)
Julesz, B. (M)
Tutsun, R. P. (SM)
Kamentsky, L. A. (M)
Kammerer, F. W. (VA)
Karlin, J. E. (M)
Karnaugh, M. (M)
Keith, C. R. (SM)
Keller, W. H. (M)
Kelley, R. A. (M)
Kerney, J. (SM)
Kersta, L. G. (SM)
King, B. G. (M)
Kinsburg, B. J. (M)
Kinzer, J. P. (SM)
Kirkpatrick, W. E. (SM)
Kolding, A. R. (M)
Kompfner, R. (F)
Kretzmer, E. R. (SM)
Kummer, O. (SM)
Lebert, A. W. (M)
Leppert, J. H. (M)
Levin, S. A. (SM)
Lewis, H. A. (SM)
Light, T. B. (M)
Loar, H. H. (A)
Loman, G. T. (M)
Looney, D. H. (M)
MacPherson, D. H. (SM)
Madsen, R. L. (A)
Mallery, M. J.
Manasse, F. K. (M)
Manley, J. M. (SM)
Marrison, W. A. (SM)
Mason, W. P. (F)
Mathews, M. V. (A)
Matlack, R. C. (M)
Maunsell, H. I. G. (M)
McDavitt, M. B. (M)
McDonald, H. S. (M)
McGuigan, J. H. (M)
McKay, K. G. (M)
McLeod, B. A. (A)
McNally, J. O. (F)
Meacham, L. A. (F)
Mehring, A. C. (M)
Mendenhall, H. E. (SM)
Michaels, S. E. (SM)
Miller, R. A. (M)
Millman, S. (SM)
Mitchell, W. (M)
Moll, J. (M)
Moore, E. F. (A)
Moore, G. E. (M)
Morgan, S. P. (SM)
Morrison, B. A. (M)
Morton, J. A. (F)
Mottram, E. T. (SM)
Mounts, F. W. (A)
Myers, B. B. (M)
Newland, E., Jr. (M)
Nielsen, G., Jr. (M)
Noll, J. C. (M)
Norton, E. L.
Norwine, C. (SM)
Packard, G. N. (M)
Pardee, S. (M)
Perry, A. D., Jr. (M)
Pierce, J. R. (F)
Pietenpol, W. J. (M)
Pyle, E. L. (M)
Raisbeck, G. (SM)
Rea, W. F. (SM)
Reiling, P. A. (VA)
Rigrod, W. M. (M)
Riley, R. M. (M)
Robertson, G. H. (A)
Rose, A. C. (A)
Rosenthal, F. W. (M)
Rowen, J. H. (SM)
Runyon, J. P. (A)
Ryder, R. M. (F)
Saari, V. R. (A)
Sandsmark, I. I. (M)
Schelkunoff, S. A. (F)
Schimpf, L. G. (SM)
Schneider, H. A. (M)
Schott, L. O. (A)
Sears, R. W. (SM)
Segers, R. G. (M)
Shaffer, R. A. (A)
Sharp, W. O. (M)
Shive, J. N. (SM)
Simkins, Q. W. (A)
Sinsel, P. W. (A)
Slepian, D. (M)
Slonczewski, T. (SM)
Spencer, A. E., Jr. (M)
Stone, H. A., Jr. (SM)
Straube, H. M. (SM)
Sumner, E. E. (SM)
Thomas, D. E. (SM)
Thompson, W. S. (A)
Thrash, W. D. (M)
Thurston, R. N. (A)
Tien, P. K. (M)
Townsend, M. A. (SM)
Toy, W. N. (M)
Tucker, R. S. (SM)
Uhlir, A., Jr. (A)
Van Haste, W. (M)
Vary, W. J. (M)
Veazie, E. A. (SM)
Von Roesgen, C. A. (M)
Walsh, D. E. (A)
Wentz, J. F. (SM)
Wertz, H. S. (SM)
Wheeler, G. W. (SM)
White, L. D. (M)
Whitehead, H. G. (M)
Wickliffe, C. R., Jr. (M)
Williams, E. L. (A)
Williams, R. D. (M)
Wilson, J. R. (F)
Winter, H. F. (M)
Wolfe, R. M. (M)
Wood, E. H. (SM)
Yaeger, R. E. (A)
Young, C. H. (SM)
Young, L. G. (SM)

Neptune (NY-2)
Ackerman, J. C. (M)
Alexander, L. D. (A)
Armstrong, R. W. (SM)
Bauer, S. J. (A)
Daniels, T. E. (M)
Danko, S. F. (M)
Evers, J. T. (M)
Frevert, A. W. (M)
Gale, R. J. (A)
Hannon, L. (A)
Heath, W. H. (M)
Kegel, R. A. (M)
Klein, G. L. (M)
Lehner, L. L. (M)
Lipetz, N. (A)
Matthei, W. G. (M)
Pokorny, G. E. (A)
Speaker, B. (A)
Swingle, D. M. (M)
Warner, F. N. (A)
Woodyard, O. C. (M)

Neptune City (NY-2)
Adams, V. F., Jr. (A)
Kisko, R. P. (A)

Neshanic (PRI-2)
Kuthe, H. K. (VA)

Neshanic Station (PRI-2)
Kalish, I. H. (A)

Netcong (NNJ-2)
Reichard, W. C. (VA)

Newark (NNJ-2)
Abou-Taleb, N. M. (M)
Abrams, H. (M)
Ackerly, R. J. (A)
Acosta, F. B. (A)
Baker, R. A. (M)
Barabutes, T. (A)
Berger, J. (M)
Boyson, C. V. (A)
Bremer, F. V. (SM)
Bricker, C. H. (A)
Brunje, R. M. (M)
Butler, W. E. (A)
Bystrycky, W. (M)
Carluccio, J. (A)
Cerf, A. E. (A)
Cohen, H. (M)
Cohen, S. (SM)
Coppola, A. A. (A)
Davis, M. G. (A)
Farhi, S. (M)
Fernandes, J. G. (A)
Fishman, S. (SM)
Forshay, D. W. (A)
Frank, A. (A)
Fressola, B. C. (A)
Garfinkel, B. D. (M)
Gerardi, V. A. (M)
Glickman, M. N. (SM)
Giordano, A. F. (SM)
Glassman, N. (A)
Goldberg, D. L. (A)
Goldberg, M. I. (M)
Golding, J. (A)
Gray, W. H. (M)
Gross, J. (A)
Grover, A. C., Jr. (A)
Gudenschwager, P. F. (M)
Harris, M. (A)
Heidrick, C. P. (M)
Helmer, A. J. (M)
Henry, F. J. (SM)
Higgs, H. P. (A)
Holdman, M. (A)
Hooven, M. D. (SM)
Johnk, O., Jr. (A)
Kalisky, A. (A)
Kalnitsky, F. (A)
Klein, M. (M)
Koppelon, S. (SM)
Kosenocky, W. F. (M)
Kwast, V. B. (M)
Lamb, F. X. (M)
Lanning, H. E. (A)
Larson, B. C. (A)
Leff, M. (M)
Lender, A. (A)
Lorb, J. W. (A)
Martin, A. J. (A)
Mayo, J. S. (M)
McCormick, D. A. (M)
McIntyre, J. W. (A)
Mellen, E. R. (SM)
Membury, J. (A)
Miller, J. H. (F)
Moore, E. P. (A)
Morgan, W. H. (A)
Perna, P. J. (A)
Persons, C. O. (M)
Pfost, R. H. (M)
Pogoda, A. L. (M)
Ramsay, J. D. (M)
Ranger, R. H. (F)
Rosenthal, M. S. (M)
Ross, P. L. (M)
Russell, F. A. (SM)
Scharkss, H. (M)
Schwartz, S. L. (A)
Sennewald, C. A. (M)
Silvermann, M. L. (M)
Spengler, R. G. (M)
Steinkamp, W. H. (M)
Tiffin, C. M. (A)
Tilley, J. H. (M)
Turnbull, H. B. (A)
Waddell, R. E. (M)
Walker, R. D. (M)
Wallenstein, J. P. (M)
West, N. H. (M)
Wolfe, G. (SM)
Wolkstein, H. J. (A)
Zarbertski, E. L. (A)
Zilliger, W. H. (A)

New Brunswick (PRI-2)
Bohnstedt, C. E. (A)
Bonda, D. (A)
Butenko, J. W. (A)
Cahill, R. M. (M)
Claypool, H. W. (A)
Della-Torre, E. (M)
Fich, S. (M)
Friech, J. A. (A)
Haeseler, P. R. (M)
Hertz, K. L. (A)
Lebowitz, L. L. (M)
Potter, J. F. (F)
Rosenthal, L. (SM)
Ruble, G. B. (M)
Siekanowicz, W. W. (M)
Stefancic, K. (M)
Uphoff, E. C. (A)

Newfoundland (NNJ-2)
Goebel, R. J. (M)

New Milford (NNJ-2)
Alexander, S. B. (M)
Antonazzi, F. J. (M)
Ballin, R. C. (M)
Ewert, A. C. (M)
Franzel, I. H. (M)
Gardner, R. O. (M)
Hammerich, H. A. (A)
MacDermid, B. W. (A)
McLaughlin, T. (A)
Munday, T. W. (A)
Phelps, R. B. (M)
Reich, P. J. (M)
Roth, H. (M)
Shaw, A. B. (M)
Shaw, W. (M)
Sokol, S. (A)
Taris, J. (M)
Umles, M. S. (A)

New Monmouth (NY-2)
Brehm, J. H. (M)

New Providence (NNJ-2)
Griswold, D. M. (M)
Jordan, D. R. (A)
Keller, V. (M)
Kocan, J. (M)
Latter, R. F. (M)
Levenbach, G. J. (M)
Lindsay, M. H. A. (SM)
Malkhaner, W. A. (SM)
Nielsen, E. G. (A)
O'Brien, J. A. (M)
Poole, K. M. (A)
Sander, H. F. (M)
Sheetz, J. L. (A)
Simonds, R. E. (SM)
Susen, C. P. (A)
Weiber, I. (M)

New Shrewsbury (NY-2)
Govinsky, W. (A)
Nelson, M. (A)
Tavetian, H. E. (A)

Newton (NNJ-2)
Lamb, J. M. (A)

New Vernon (NNJ-2)
D'Heedene, A. R. (SM)

Nixon (PRI-2)
Cameron, J. A. (A)
McClane, C. T. (M)
Neidig, K. E. (M)
Seley, E. L. (M)
Thompson, V. D., Jr. (A)
Unger, R. J. (A)

Nixon Park (PRI-2)
Sable, A. A. (A)

North Arlington (NNJ-2)
Bliss, E. E. (A)
Bruning, J. M. (M)
McAdams, B. (SM)
Reusch, R. K. (A)
Sadvary, J. W. (A)

North Bergen (NNJ-2)
Churlin, E. (A)
Cox, J. (M)
Dunn, W. J. (A)
Feucht, R. E. (A)
Finkelstein, D. (A)
Fullington, H. J. (A)
Gesner, A. (A)
Harme, F. G. (A)
Heflich, G. B. (A)
Hollopeter, W. C. (A)
Horner, R. G. (M)
Kirsch, A. F. (M)
Leahy, G. F. (A)
Perlis, H. J. (M)
Pizzigoni, A. (A)
Shahin, E. S. (A)
Sherman, S. (A)
Sherwood, H. R. (SM)
Sparacio, F. J. (M)
Wolter, H. R. (M)

North Branch Depot (PRI-2)
Peldunas, A. P.

North Brunswick (PRI-2)
Morris, M. J. (A)

North Caldwell (NNJ-2)
Adamson, A. A. (SM)
Grieg, D. D. (SM)
Moore, E. B. (SM)
Poff, J. K. (M)
Rennenkampf, L. J. (M)
Schade, O. H., jr. (A)
Schneider, P. C. (A)
Siemens, R. H. (SM)
Smith, P. G. (A)

North Long Branch (NY-2)
Fedak, J. F., Jr. (A)

North Plainfield (NNJ-2)
Blicher, A. (A)
Deeley, P. M. (SM)
Eggerding, H. B. (A)
Elder, H. E. (A)
Fels, L. (A)
Foster, B. D. (M)
Frank, R. A. (A)
Jaffe, H. (M)
Ottobre, J. N. (M)
Schilling, W. A. (M)
Smith, R. F. (A)
Vergon, T. F. (SM)
Wehof, H. (M)
Williams, A. D. (M)

Norwood (NNJ-2)
Brick, F. R., Jr. (SM)
Haas, K. A. (A)

Nutley (NNJ-2)
Adams, R. T. (SM)
Alexander, B. (M)
Altman, F. J. (SM)
Bogner, I. (M)
Denney, J. M. (M)
Hardwick, F. (M)
Kahn, H. S. (A)
Kunkel, E. A., Jr. (A)
Lloyd, A. G. (A)
Masson, F. Y. (SM)
Maza, G. M. (M)
Pratt, H. J., Jr. (M)
Reiner, R. L. (A)
Shackelford, B. E. (F)
Suydam, C. H. (M)
Vaccaro, F. E. (M)
Yaeger, W. O. (A)

Oxford (NNJ-2)
Edson, J. O. (SM)

Packanack Lake (NNJ-2)
Bentley, A. V. (SM)
Bowles, L. T., Jr. (M)
Dyne, J. H. (A)
Eliason, M. C. (SM)
Foekler, W. G. (SM)
Nesterode, C. D., Sr. (A)
Phillips, A. H. (A)
Soldweisel, H. T. (SM)
Wixson, F. C. (SM)

Palisade (NNJ-2)
Andrews, E. (M)
Coppell, F. K. (A)
Rover, R. R., Jr. (M)

Palisades Park (NNJ-2)
Ackerman, B. F., Jr. (M)
Fassberg, M. (A)
Kazolkiewicz, D. J. (A)
Keller, E. F. (A)
Levine, O. W. (M)
Lima, T. F. (A)
Packer, S. S. (M)
Sherman, H. L. (A)
Takakjian, J. S. (A)

Palmyra (PHI-3)
Brewster, P. J. (M)
Davidson, R. C. (A)
Ennis, F. J. (A)
Fiacco, A. F. (A)
Foerster, W. (M)
Hilbourn, L. (M)
Rammer, C. A. (M)
Ringer, H. N. (M)
Robinson, H. A. (SM)
Smith, W. L. (A)
Waring, J. W. (M)
Woodward, C. P. (SM)
Yewdall, G. E. (SM)

Paramus (NNJ-2)
Ankenbrock, C. A. (A)
Bodeen, G. S. (A)
Braun, W. E. (M)
Brown, T. G. (SM)
Campanale, A. J. (A)
Chalmers, W. G. (M)
Chanes, H. (M)
Compton, M. E., Jr. (M)
Deiss, E. (A)
De Vincent, J. (A)
Evander, H. S. (M)
Feller, M. (M)
Hague, R. Z. (A)
Hamiser, P. M. (M)
Kashar, A. S. (A)
Komow, V. H. (A)
Kovarik, H. (A)
Levin, M. S. (M)
Lisanti, A. G. (A)
Manoly, A. E. (M)
Neu, W. J. (M)
Petrina, R. J. (A)
Rauch, J. V. (SM)
Reed, S. I. (M)
Sakate, F. S. (M)
Sapiro, A. M. (M)
Schenkel, P. W. (A)
Schmidt, L. D. (M)
Stahl, P. D. (SM)
Struck, H. E. (A)
Weber, G. A. (A)
Wehrlin, R. F. (A)
Werner, W. B. (A)
West, S. S. (A)
Woodward, R. J. (M)
Wotton, R. C. (A)
Young, J. (M)
Zitovsky, S. A. (A)

Park Ridge (NNJ-2)
Lambert, F. D. (A)
Murphy, A. W. (A)
Stansfield, F. H. (M)

Parlin (PRI-2)
Panos, R. J. (A)
Pike, G. W. (A)

Parsippany (NNJ-2)
Goeller, L. F., Jr. (M)
Greiner, T. J. (M)
Hendrickson, A. H. (M)
Hughes, T. A. (A)
Janik, J., Jr. (A)
Kalish, H. M. (M)
Krause, C. K. (M)
Lawton, B. E. (M)
Mandzik, M. M. (M)
Meola, R. R. (SM)
Stanton, S. W. (M)

Passaic (NNJ-2)
Backus, A. S. (A)
Bellis, H. (M)
Booth, W. C. (A)
Brussel, E. H. (M)
Campbell, D. R. (M)
Currier, P. (A)
De Bell, J. M., Jr. (M)
Delchert, R. W. (M)
Goldstein, H. (M)
Gordon, M. J. (M)
Hair, G. R., Jr. (A)
Leinkram, C. Z. (M)
Lieberman, H. (A)
Masavage, I. R. (A)
Muench, W. H. (A)
Schkolnick, H. (M)
Schmalz, H. H. (M)
Schumann, L. C. (A)
Seata, P. (A)
Sim, R. M. (A)
Sommermeyer, O. R. (A)
Stoi, F. R. (M)
Suszek, E. J. (A)
Wakeman, R. P. (SM)
Wehner, J. H. (M)
Yu, Y. P. (M)
Zavoda, J. P. (M)

Paterson (NNJ-2)
Armstrong, F. R. (M)
Binneveld, H. A. J. (A)
Brown, A. T., III (A)
Bruggeman, J. T. (M)
Butterworth, J. W. (SM)
Carlson, O. E. (M)
Dehoney, R. J. (M)
Diamond, J. E. (M)
Earnshaw, E. F., Jr. (M)
Ecklund, E. E. (SM)
Eckstein, N. A. (A)
Emaus, J. L. (A)
Evans, N. L., Jr. (M)
Gregory, L. A., Jr. (A)
Grimes, W. M., Jr. (A)
Grower, B. B. (M)
Haenichen, J. C. (A)
Hamlin, J. C. (A)
Lane, W. M. (M)
Janowsky, S. (M)
Kazuk, W. F. (A)
Kuehler, H. R. (M)
Levin, H. L. (A)
Lome, J. B. (M)
Lucas, E. F. (M)
Marshall, R. K. (A)
Pachuta, W. (A)
Papanou, D. S. (A)
Potash, J. (A)
Rich, P. A. (A)
Rusch, W. T. (M)
Sautner, J. (A)
Seergy, C. M. (A)
Sereno, C. A. (SM)
Shea, R. G. (SM)
Stern, M. M. (M)
Stornalolo, P. U. (A)
Streisand, J. L. (A)
Thlergartner, G. J. (A)
Underhill, E. M. (SM)
Weinberg, H. C. (M)
Wollenberg, W. I. (A)
Zahner, C. F. (M)

Paulsboro (PHI-3)
Gross, S. D. (A)

Pemberton (PHI-3)
Gutterson, M. A. (A)

Pennsaukenn (PHI-3)
Allen, C. D. (M)
Amort, D. L. (A)
Bauer, J. A. (SM)
Claeen, C. P. (M)
Connor, W. J., Jr. (A)
Eddy, K. C. (M)
Feltz, J. S. (M)
Fabbioli, L. F. (A)
Givens, R. C. (M)
Gleerup, R. E. (M)
Goldman, P. G. (M)
Heckler, C. H., Jr. (A)
Hobson, N. L. (A)
Homann, A. J. (M)
Kikuchi, N. (M)
Kolarek, E. T. (M)
Landis, J. V. (SM)
Maggio, A. F. (M)
Mayhew, T. R. (M)
Oberlander, F. M. (SM)
Obert, M. J. (SM)
Prywes, N. S. (M)
Rapp, R. C. (M)
Reeder, C. E. (A)
Rosenzweig, G. E. (M)
Rudd, R. B. (A)
Sarger, W. (A)
Seideman, I. M. (M)
Shock, W. R. (A)
Solomon, S. (SM)
Sprengeler, D. F. (M)
Stander, L. (M)
Trachtenberg, J. M. (A)
Troxel, D. E. (M)
Weisenfeld, S. (M)
Willey, J. R. (A)
Yates, D. E. (A)

Penns Grove (PHI-3)
Garrett, L. B., Jr. (A)

Pennsville (PHI-3)
Fisher, C. (A)
Parr, E. D. (A)

Pequannock (NNJ-2)
Altonji, R. R. (M)
Bergeron, W. F. (A)
Brown, W. G. (M)
Kearney, J. J. (A)
Schmidt, C. R. (M)

Perth Amboy (PRI-2)
Blake, R. E. (M)
Cerez, G. V. (A)
Houser, B. E. (A)
Thomas, G. W. (A)

Phillipsburg (NNJ-2)
Haring, D. R. (A)

Pine Hill (PHI-3)
Burns, D. C. (A)

Pitman (PHI-3)
Andrade, L. (A)
Brown, I. N. (SM)
Dishler, J. J. (A)
Fuller, J. R., Jr. (M)
Thomas, W. F. (A)
Plainfield (NNJ-2)
Boise, E. B. (A)
Budenbom, H. T. (F)
Cath, P. G. (M)
Cormier, R. J. (A)
Cowperthwait, W. I., Jr. (M)
Coxhead, H. B. (SM)
Evans, C. L. (M)
Ferrar, R. C. (SM)
Fisher, J. H. (M)
Flavin, M. A. (A)
Gleason, J. V. (A)
Hardin, L. L., Jr. (SM)
Harmon, L. D. (M)
Harris, W. T. (A)
Haydu, G. K. (A)
Hirsch, H. R. (M)
Hunsicker, R. K. (A)
Hunter, W. B. (A)
Kelly, H. P. (M)
Kettering, H. V. (M)
Kuchinsky, S. (SM)
Lyon, Z. G., Jr. (M)
Main, R. C. (SM)
Markantes, P. N. (A)
Methose, A. E. (M)
Perks, A. F. (A)
Renick, R. C. (M)
Rossig, E. W. (M)
Schneider, W. A. (A)
Schulz, F. J. (A)
Seibel, H. (M)
Siegel, J. R. (M)
Smith, A. E. (M)
Streeter, T. W., Jr. (A)
Stull, R. J. (SM)
Sweeney, H. E. (M)
Sweeney, W. R. (M)
Townsend, W. H., Jr. (A)
Wallace, R. L., Jr. (F)
Warren, C. A. (SM)
Wehrle, A. W. (A)
Weingarten, I. R. (A)
Wood, C. H., Jr. (M)
Woody, M. W. (A)

Pluckemin (PRI-2)
Bethke, J. R. (A)

Point Pleasant (NY-2)
Diebold, B. A. (M)
Scharmann, L. E. (A)

Point Pleasant Beach (NY-2)
Fernald, O. H. (M)
Szafranski, J. J. (M)

Pompton Lakes (NNJ-2)
Carlson, L. C. (M)
Chmiel, B. A. (A)
Gorman, R. T. (A)
McEwan, A. W. (SM)
Rodriguez, C. F. (A)
Romain, D. O. (A)
Solomon, K. (A)
Wachter, J. E. (M)

Pompton Plains (NNJ-2)
Arnold, A., Jr. (A)
Bruno, T. F. (M)
Casey, R. F. (A)
Cavanaugh, R. T. (SM)
Cohan, J. (M)
Dall, A. B. (A)
Engler, C. F. (M)
Hansen, N. W. (A)
Heins, P. N. (M)
Lynch, R. G. (A)
Millard, J. W. (M)
Muller, F. A. (SM)
Nielsen, A. H. (M)
Palmer, R. C. (M)
Pauloski, S. H. (M)
Sayer, W. H., Jr. (A)
Stern, W. (A)

Preakness (NNJ-2)
Bonazza, W. J. (M)
Schmidt, L. (A)
Williams, R. J. (A)

Princeton (PRI-2)
Allen, H. C. (SM)
Awschalom, M. (M)
Barco, A. J. (F)
Barton, L. E. (F)
Baugh, C. W., Jr. (M)
Beam, W. R. (M)
Bedford, A. G. (M)
Behrend, W. L. (SM)
Brown, G. H. (F)
Burns, L. L., Jr. (SM)
Burrill, C. M. (SM)
Bobohoubek, E. F. (M)
Binstock, W. I. (A)
Blattner, D. J. (M)
Bliss, W. H. (SM)
Bond, D. S. (F)
Borkan, H. (M)
Bowler, D. L. (M)
Braden, R. A. (SM)
Briggs, G. R. (A)
Carlson, W. L. (F)
Carreon, D. C. (A)
Chambers, F. T., III (M)
Chandler, H. M., Jr. (M)
Chaykowsky, O. J. (M)
Cheeseman, P. R. (A)
Clark, A. N. (A)
Clement, P. R. (M)
Connolly, T. W. (M)
Cooke, H. L. (M)
Cowan, E. J. (M)
Creager, F. L. (M)
De Vore, H. B. (SM)
Dickey, E. T. (SM)
Dodge, S. W. (SM)
Donal, J. S., Jr. (SM)
Donath, E. (SM)
Donley, H. L. (SM)
Dow, O. E. (SM)
Eichenbaum, A. (A)
Epstein, D. W. (F)
Epstein, J. (SM)
Ewing, D. H. (F)
Favreau, R. R. (M)

Fischer, J. T. (A)
Flory, L. E. (F)
Flory, R. E. (A)
Forgue, S. V. (SM)
Fredendall, G. L. (F)
Freedman, L. A. (M)
Garretson, E. B. (A)
George, R. W. (SM)
Gerson, I. V. (A)
Giulino, E. C., Jr. (A)
Gibson, W. G. (M)
Gottschalk, W. M. (M)
Greenblatt, M. H. (SM)
Grosz, P. M. (M)
Hackley, R. A. (M)
Haggal, F. F. (M)
Hart, H. C. (M)
Harvey, R. L. (SM)
Heald, M. A. (M)
Herkart, P. G. (M)
Herman, F. (M)
Herold, E. W. (F)
Herzog, G. B. (A)
Hillbrand, J. (M)
Hillier, J. (F)
Holmes, D. D. (M)
Holmes, R. S. (F)
Hook, H. O. (SM)
Houghton, W. D. (A)
Hoyler, C. N. (SM)
Hubbard, B. R. (M)
Hutter, E. C. (M)
Jenny, D. A. (M)
Jensen, A. S. (SM)
Johnson, E. O. (M)
Johnson, H. (SM)
Johnson, W. C. (SM)
Johnston, L. B. (A)
Jolliffe, C. B. (F)
Karns, M. E. (SM)
Katstad, K. (SM)
Kazan, B. (SM)
Keizer, E. O. (SM)
Kell, R. D. (F)
King, C. J., Jr. (SM)
Kingsley, B. (SM)
Klopfenstein, R. W. (SM)
Knechtil, R. C. (M)
Kroemer, H. (M)
Kurahun, J. (SM)
Landon, V. D. (F)
Law, H. B. (F)
Leverenz, H. W. (F)
Leyton, E. M. (SM)
Lindenblad, N. E. (F)
Linder, E. G. (F)
Lindgren, J. B. (A)
Lindsay, P. A. (A)
Loebner, E. E. (SM)
Lohman, R. D. (M)
MacLean, K. G. (SM)
Marshall, T. G., Jr. (A)
Martinelli, C. C. (SM)
Mather, N. W. (M)
McCormick, S. T., Jr. (A)
Mederos, T. S., Jr. (M)
Meaner, M. H. (SM)
Metzger, S. (SM)
Morrison, W. C. (SM)
Morton, G. A. (F)
Mueller, C. W. (SM)
Murphy, B. (M)
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'Connell, J. H. (A)
Olson, C. V. (M)
Olson, H. F. (F)
Panagos, P. (M)
Pankove, J. I. (SM)
Penzak, L. (SM)
Peter, R. W. (SM)
Peterson, D. W. (M)
Plummer, C. H. (M)
Powers, K. H. (M)
Pritchard, D. H. (M)
Pyne, I. B. (M)
Rajchman, J. A. (F)
Ranberg, L. G. (F)
Rankin, J. B. (A)
Roberts, T. C. W. (A)
Roberts, W. V. B. (F)
Robinson, J. G. (M)
Sanford, R. F. (A)
Schairer, O. S. (F)
Schwartz, J. W. (A)
Serrell, R. (SM)
Sewian, E. A. (M)
Shatzkin, J. (SM)
Sklansky, J. (M)
Smith, J. P. (SM)
Smith, P. T. (SM)
Snyder, R. P. (SM)
Sommer, A. H. (SM)
Staras, H. (SM)
Sternberg, S. (SM)
Surber, W. H., Jr. (M)
Thomas, J. B. (M)
Thompson, R. D. (M)
Trevor, B. (F)
Tults, J. (M)
Tuska, C. D. (F)
Van Wambeck, S. H. (SM)
Wallmark, J. T. (M)
Wilkinson, W. C. (SM)
Williams, T. R. (A)
Vose, C. H. (SM)
Wadlin, A. L. (M)
[illegible] M. (M)
[illegible] M. (SM)
[illegible] A. (F)
[illegible], Jr. (SM)
[illegible] E. (M)
[illegible], Jr. (SM)
[illegible] (A)
[illegible] (M)
[illegible] (M)
[illegible] (M

Fischer, J. T. (A)
Flory, L. E. (F)
Flory, R. E. (A)
Forgue, S. V. (SM)
Fredendall, G. L. (F)
Freedman, L. A. (M)
Garretson, E. B. (A)
George, R. W. (SM)
Gerson, L. V. (A)
Giulino, E. C., Jr. (A)
Gibson, W. G. (M)
Gottschalk, W. M. (M)
Greenblatt, M. H. (SM)
Grosz, P. M. (M)
Hackley, R. A. (M)
Haggai, T. F. (M)
Hart, H. C. (M)
Harvey, R. L. (SM)
Heald, M. A. (M)
Herkart, P. G. (M)
Herman, F. (M)
Herold, E. W. (F)
Herzog, G. B. (A)
Hillbrand, J. (M)
Hillier, J. (F)
Holmes, D. D. (M)
Holmes, R. S. (F)
Hook, H. O. (SM)
Houghton, W. D. (A)
Hoyler, C. N. (SM)
Hubbard, B. R. (M)
Hutter, E. C. (M)
Jenay, D. A. (M)
Jensen, A. S. (SM)
Johnson, E. O. (M)
Johnson, H. (SM)
Johnson, W. C. (SM)
Johnston, L. B. (A)
Jolliffe, C. B. (F)
Karns, M. E. (SM)
Karstad, K. (SM)
Kazan, H. (SM)
Keiser, E. O. (SM)
Kell, R. D. (F)
King, C. J., Jr. (SM)
Kingsley, B. (SM)
Klopfenstein, R. W. (SM)
Knechtli, R. C. (M)
Kroemer, H. (M)
Kurahan, J. (SM)
Landon, V. D. (F)
Law, H. B. (F)
Leverenz, H. W. (F)
Leyton, E. M. (SM)
Lindenblad, N. E. (F)
Linder, E. G. (F)
Lindgren, J. B. (A)
Lindsay, F. A. (A)
Loebner, E. E. (SM)
Lohman, K. D. (M)
MacLean, K. G. (SM)
Marshall, T. G., Jr. (A)
Martinelli, C. C. (SM)
Mather, N. W. (M)
McCormick, S. T., Jr. (A)
Mederos, T. S., Jr. (M)
Mesner, M. H. (SM)
Metzger, S. (SM)
Morrison, W. C. (SM)
Morton, G. A. (F)
Mueller, C. W. (SM)
Murphy, B. (M)
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'Connell, J. H. (A)
Olson, C. V. (M)
Olson, H. F. (F)
Panagos, P. (M)
Pankove, J. I. (SM)
Pensak, L. (SM)
Peter, R. W. (SM)
Peterson, D. W. (M)
Plummer, C. H. (M)
Powers, K. H. (M)
Pritchard, D. H. (M)
Pyne, I. B. (M)
Rajchman, J. A. (F)
Ranberg, L. G. (F)
Rankin, J. B. (A)
Roberts, T. C. W. (A)
Roberts, W. V. B. (F)
Robinson, J. G. (M)
Sanford, H. F. (A)
Schairer, O. S. (F)
Schwartz, J. W. (A)
Serrell, R. (SM)
Sewian, E. A. (M)
Shatzkin, J. (SM)
Sklansky, J. (M)
Smith, J. P. (SM)
Smith, P. T. (SM)
Snyder, R. F. (SM)
Sommer, A. H. (SM)
Staras, H. (SM)
Sternberg, S. (SM)
Surber, W. H., Jr. (M)
Thomas, J. B. (M)
Thompson, R. D. (M)
Trevor, B. (F)
Tults, J. (M)
Tuska, C. D. (F)
Van Wambeck, S. H. (SM)
Wallmark, J. T. (M)
Wilkinson, W. C. (SM)
Williams, T. R. (A)
Vose, C. H. (SM)
Wallin, M. L. (M)
Wallmark, M. (M)
Webster, W. M. (SM)
Weimer, P. K. (F)
Westnedt, A. S., Jr. (SM)
Wolff, I. (F)
Woodbridge, D. E. (M)
Woodward, O. M., Jr. (SM)
Wysocki, J. J. (A)
Young, C. J. (F)
Zworykin, V. K. (F)

Princeton Junction (PRI-2)
De Remer, K. R. (M)
Matheson, R. M. (M)
Stinson, P. B. (A)

Prospect Park (NNJ-2)
Serra, E. M. (A)

Radburn (NNJ-2)
Eaton, R. D. (M)

Rahway (NNJ-2)
Bellingham, L. C. (A)
Coler, B. A. (M)
Dipple, W. M. (A)
Gegenheimer, R. F. (M)
Gore, E. T. (A)
Jones, E. L. (A)
Lucier, O. S. (A)
Robinson, G. D. (A)
Rogers, R. E. (M)
Rymsha, A. F. (M)
Sarullo, M. J. (A)

Ramsey (NNJ-2)
Buyer, E. M. (SM)
Gray, L. F. (M)
Heiser, W. H. (SM)
Mason, R. S. (M)
Stryker, H. J. (M)
Yurasek, J. F. (M)

Raritan (PRI-2)
Barnard, D. F., jr. (M)
Brunelle, A. A. (A)
Pearson, D. B. (M)

Red Bank (NNJ-2)
Anderson, E. C. (SM)
Bagwell, C. E. (SM)
Barrios, A. A. (A)
Bassler, S. G. (M)
Beck, A. C. (SM)
Bernhartz, R. B. (M)
Billick, P. (M)
Budenkayc, A. C. (M)
Bush, J. A. (A)
Chasek, N. E. (A)
Courchene, E. E., Jr. (M)
Crawford, A. B. (F)
Daniels, F. B. (SM)
Dathe, L. C. (A)
Dawson, R. W. (M)
De Loach, R. C., Jr. (M)
Demko, J. G. (A)
Domidion, W. G., jr. (A)
Edwards, C. E. (M)
Egli, J. (SM)
Eisenberger, A. J. (M)
Fox, A. C. (F)
Fox, B. (SM)
Frankel, H. C. (SM)
Gerhold, R. A. (M)
Gioggia, A. E. (A)
Goodall, W. M. (F)
Gordon, L. (M)
Greenblum, C. (M)
Helbig, W. L. (M)
Hogg, D. C. (SM)
Hunt, D. W. (M)
Hunt, L. E. (SM)
Jakes, W. C., Jr. (SM)
Jakubowski, G. C. (M)
Johnson, G. D., Jr. (M)
Kelly, L. H. (A)
King, A. P. (SM)
Kullnyl, R. A. (M)
Kummer, W. H. (A)
Lacy, R. E. (SM)
La Marca, P. L. (M)
Lang, L. M. (SM)
Legg, W. E. (A)
Levine, R. H. (SM)
Lieblein, E. (M)
Lindner, H. G. (SM)
Maloney, T. E. (M)
Mancino, V. J. (A)
Marcy, S. P. (A)
Martin, J. E. (A)
Marx, D. H. (M)
Mattes, A. J. (A)
Menhennett, G. H. (M)
Moore, J. C., jr. (M)
Ohm, E. A. (A)
Perkins, O. D. (SM)
Pustelnyk, M. (A)
Rauch, A. (A)
Ring, D. H. (SM)
Rose, C. F., Jr. (SM)
Rothstein, J. (SM)
Rowe, H. E. (A)
Schelleng, J. C. (F)
Senn, G. F. (SM)
Sharpless, W. M. (SM)
Sherburne, F. B. (A)
Siderman, J. A. (M)
Stanley, H. T. (A)
Steinberg, S. (A)
Tillotson, L. C. (SM)
Turner, E. H. (SM)
Unger, H. G. (M)
Van Nostrand, A. W. (M)
Vogt, G. F. (SM)
Weiss, M. T. (M)
Wopat, J. W., Jr. (A)
Wright, D. S. (M)
Wurthmann, G. E. (A)
Zalesky, S. J. (M)

Ridgefield (NNJ-2)
Betlejewski, F. J. (A)
Dardano, L. B. (A)
Dean, H. F. (A)
Dolinko, L. (M)
Fristensky, C. A. (M)
Mgrdechian, R. (A)
Mittman, E. E. (SM)
Ricca, R. F. (A)
Ross, G. G. (M)

Ridgefield Park (NNJ-2)
Foster, R. M. (A)

Ridgewood (NNJ-2)
Bickel, R. C. (M)
Boldridge, A. G., Jr. (M)
Boyle, C. G. (M)
De Leon, J. (M)
Engel, G. C. (M)
Farrar, R. L. (A)
Fitts, W. F. (M)
French, H. A. (SM)
Holt, A. C. (SM)
Howite, R. (M)
Johnson, F. H. (M)
Klarman, K. J. (A)
Labagh, L. L. (M)
Mihalik, J. J. (M)
Mueller, J. F. (M)
Mulligan, J. H., Jr. (SM)
Puckette, C. M., Jr. (M)
Rogers, T. I. (SM)
Simpson, L. C. (SM)
Troell, R. E. (M)
Warsher, A. (SM)
Willis, J. S. (A)

Riverdale (NNJ-2)
Hegeman, B. L. (A)

River Edge (NNJ-2)
Balter, S. A. (A)
Baum, E. (M)
Biagi, A. D. (M)
Bochet, F. J. (A)
De Long, G. E. (M)
Ennis, F. T. (VA)
Gray, L. E., Jr. (A)
Grybowski, T. M. (A)
Howitt, G. (M)
Izzo, A. J. M. (A)
Kennedy, A. (SM)
Mazzola, J. R. (SM)
O'Connell, E. P., Sr. (M)
O'Connor, R. A. (M)
Schumacher, H. L. (A)
Slack, S. J. (A)

Riverside (PHI-3)
Gardner, R. K. (A)
Norcross, J. S., Jr. (A)

Riverton (PHI-3)
Benware, R. T. (SM)
Brown, L. (SM)
Chapman, L. J. (A)
Collings, F. C., Jr. (M)
Corr, J. J. (M)
Good, L. H. (M)
Gorski, A. A. (A)
Hunt, G. W., Jr. (M)
Pharces, R. L. (M)
Small, C. E. (A)
Smith, B. D. (M)
Vendeland, R. N. (M)

River Vale (NNJ-2)
Brain, B. (A)

Rochelle Park (NNJ-2)
Auerbach, A. (M)
Carroll, J. M. (A)
Farber, D. J. (M)
Feoranz, F. J. (A)
Hancock, P. L. (A)
Uzel, F., Jr. (M)

Rockaway (NNJ-2)
Acker, J. L. (A)
Donohoe, L. J. (A)
Kruger, H. A. (M)
Kurtz, D. P. (A)
Magel, A. C. (M)
Morgen, M. (M)
Santos, J. S. (M)
Uiga, E. (SM)

Rockaway Township (NNJ-2)
Kunnes, H. (M)

Roosevelt (NY-2)
Rips, E. M. (A)

Roseland (NNJ-2)
Nichols, P. A. (A)
Richardson, G. G. (A)

Roselle (NNJ-2)
Dixon, V. E. (M)
Hold, H. W. (A)
Perez, C. P. (SM)
Preuss, E. A. (A)
Richards, G. P. (M)
Saccente, J. C. (M)
Thompsen, T. F. (A)

Roselle Park (NNJ-2)
Cohen, E. (M)
Dargue, F. B. (A)
Hanselman, K. J. (M)

Rumson (NY-2)
Friis, H. T. (F)
Golay, M. J. E. (SM)
Gruol, J. W. (SM)
Kimmel, L. D. (M)
Koch, R. L. (M)
McDonald, C. K. (A)

Runnemede (PHI-3)
Copeland, W. O. (M)
Eckel, C. C. (M)
Haworth, R. F. (A)
Houston, R. S. (M)
Jones, G. C. (A)
Oda, D. J. (M)
Perilli, R. R. (M)
Williamson, W. H., Jr. (A)

Rutherford (NNJ-2)
Benamy, D. A. (A)
Benjamin, L. P. (A)
Dunn, J. G. (A)
Edmunds, J. J., Jr. (M)
Godlewski, L. J. (A)
Henzel, G. L. (A)
Keller, W. N. (A)
Lohrenz, C. (M)
Lo Presti, M. (A)
Metzger, F. W. (SM)
O'Neill, E. P. (A)
Orlando, A. J. (M)
Rau, A., Jr. (SM)
Reenstra, W. A. (M)
Rucki, D. H. (M)
Sammon, A. C. (A)
Scott, G. R. (M)
Simkovich, J. R. (A)
Simpson, W. F. (M)
Van Winkle, E. W. (SM)
Walter, C. W. P. (SM)
Wattson, H. B. (SM)

Saddle Brook (NNJ-2)
Stelte, J. J. (A)

Salem (PHI-3)
Bailey, L. W. (SM)
Morton, R. S. (VA)
Perlsweig, A. M. (M)

Sayreville (PRI-2)
Berkery, E. A. (A)

Scotch Plains (NNJ-2)
Ballinger, L. H. (M)
Bell, J. S. (M)
Boring, J. W. (A)
Cummins, R. L. (A)
Elwood, A. A. (SM)
Hergenhan, O. (M)
Jackson, W. H. (M)
Jensen, C. A. (M)
McLean, J. B. (M)
Montllor, J. A. (M)
Mueller, P. L. (M)
Phillips, A. (M)
Young, C. B., Jr. (M)

Sea Bright (NY-2)
Howe, J. W. (A)
Schnabolk, H. L. (A)

Seabrook (PHI-3)
Superior, W. J. (A)

Sea Girt (NY-2)
Marchand, O. P. (A)
Wachter, F. W., Jr. (A)

Seaside Heights (NY-2)
Myhre, R. (A)

Secaucus (NNJ-2)
Tonn, J. L. (A)

Sewell (PHI-3)
Gribble, R. F. (M)
Woodward, J. D. (SM)

Short Hills (NNJ-2)
Alexander, R. B. (SM)
Carroll, M. J. (SM)
Dabrowski, H. L. (A)
Dore, A. J. (A)
Huber, G. H. (SM)
Jones, H. B., Jr. (A)
Schisel, J. (M)
Tucker, J. P. (VA)
Vanderbilt, S. (A)
Wall, G. B., III (M)
Whittemore, L. B. (F)
Wright, A. K. (SM)
Ziegler, A. W. (SM)

Shrewsbury (NY-2)
Covici, W. (M)
Czerwinski, W. P. (M)
Edmunds, E. E. (SM)
Greene, K. (M)
Johnstone, J. H. (SM)
Keister, B. J. (M)
Layden, O. P. (A)
Rehm, W. L. (M)
Ross, A. H. (SM)

Sicklerville (PHI-3)
Ayres, J. J. (M)

Singac (NNJ-2)
Fetko, J. P. (A)

Skillman (PRI-2)
Hamner, L. H. (A)
Tompkins, B. E. (A)

Somerdale (PHI-3)
Howell, M. (M)
Kurchin, A. (M)
Mathwich, H. R. (M)

Somerville (PRI-2)
Ahrons, R. W. (A)
Armstrong, L. D. (M)
Barton, H. H. (M)
Cadra, V. J. (M)
Ditrick, N. H. (M)
Fournier, R. V. (M)
Glover, A. M. (F)
Greig, W. J., Jr. (A)
Hertz, R. G. (M)
Janes, R. B. (F)
Kestenbaum, A. L. (M)
Kleppinger, R. E. (M)
Long, W. T. (M)
Malter, L. (F)
Simons, S. C. (A)
Thorne, D. (M)
Wamsley, D. H. (SM)
Wells, D. H. (A)
Williams, W. D. (A)

South Amboy (PRI-2)
Beckman, D. L. (M)
Kaluzny, E. F. (A)
Rauth, R. G. (M)

South Belmar (NY-2)
Fimmel, R. O. (M)

South Hackensack (NNJ-2)
Krauss, E. (A)
Sherman, E. W. (A)

South Merchantville (PHI-3)
Lawson, T. C. (M)

South Orange (NNJ-2)
Benz, H. D. (M)
Bonanno, J. L. (SM)
Hale, L. C. (A)
Harris, W. A. (F)
Miller, H. J. (SM)
Nearry, J. F. (A)
Quinn, K. C. (M)
Robison, R. M. (M)
Royden, G. T. (F)
Stanwick, C. A. (VA)
Wooldridge, A. C. (SM)

South Plainfield (PRI-2)
Bellew, F. N. (M)
Griffiths, H. D. (M)
Hunter, F. L., Jr. (M)
Rogers, H. D., Jr. (A)
Soja, M. (M)
Tesno, R. R. (M)
Wolfe, R. W. (M)

South River (PRI-2)
Blanchard, C. K. (M)
Fisher, W. W. (M)
Griffee, F. M. (M)
Porter, H. D. (A)

Sparta (NNJ-2)
Hussey, L. W. (SM)
Lundstrom, A. A. (SM)

Springfield (NNJ-2)
Cunningham, F. W. (SM)
Emmel, L. L. (M)
Field, W. (VA)
Hartz, W. W. (A)
Jelen, M. J. (SM)
Kolts, R. C. (M)
Morse, J. L. (M)
Oxsyith, R. R. (M)
Pollacek, E. H. (A)
Rogers, A. W. (SM)

Spring Lake (NY-2)
Bozzelli, J. F. (A)
Godfrey, W. C. (M)
Huber, W. A. (SM)
Torpey, G. J. (A)
Voigt, G. (A)

Spring Lake Heights (NY-2)
Acker, R. E. (A)

Stewartsville (NNJ-2)
Belanger, E. D. (A)

Stirling (NNJ-2)
Dagostino, V. L. (A)
Esker, L. C. (M)
Hirmann, J. (SM)

Stockholm (NNJ-2)
Houldin, R. J. (A)

Stratford (PHI-3)
Carlyle, J. K. (A)
Shellock, J. C. (A)
Welman, W. W. (M)

Succasunna (NNJ-2)
Haugk, G. (A)
Martin, S. J. (M)
Morgan, T. W., Jr. (M)

Summit (NNJ-2)
Anderson, C. N. (F)
Baker, P. A. (A)
Bennett, A. F. (SM)
Bishop, J. D. (A)
Black, H. S. (F)
Brady, C. (M)
Brown, H. E. (M)
Carne, G. G. (SM)
Davis, R. E. (M)
De Costanzo, J. R. (A)
Dudley, H. (SM)
Early, J. M. (SM)
Evans, H. W. (SM)
Fewer, D. R. (A)
Foyer, D. R. (A)
Fulmer, R. J. (M)
Gilleo, M. A. (M)
Grierson, C. A. W. (SM)
Grieser, T. J. (M)
Hall, W. C. (M)
Hallline, E. G. (A)
Hammell, R. (M)
Hanchett, G. D., Jr. (SM)
Harley, J. B. (SM)
Hartley, R. L. G. (F)
Hasdorff, L. (M)
Hastinga, J. C. (A)
Hathaway, S. D. (M)
Haynie, C. D. (M)
Heising, R. A. (F)
Hensel, M. L. (M)
Higgins, R. H. (M)
Hirsch, A. E., Jr. (M)
Hoth, D. F. (SM)
Johnson, R. L. (M)
Kaiser, E. T. (SM)
Knowles, C. H. (M)
Koslov, S. (A)
Loo, K. (A)
Loumeau, R. F. (M)
Luce, R. C. (A)
Lundry, W. R. (SM)
Marshall, R. W. (M)
Mayhall, W. J. (M)
McMillan, J. D. (A)
Means, W. J. (SM)
Michael, F. R. (M)
Moore, R. F., Jr. (M)
Mosier, C. R. (M)
Nielson, J. (M)
Nordahl, J. G. (SM)
Oncley, P. B. (M)
Pain, D. H. (M)
Perry, I. D. (M)
Preston, K., Jr. (M)
Prysiak, N. E. (SM)
Quinby, E. J. (M)
Raynsford, C. K. (A)
Rice, L. P. (M)
Sauseng, O. G. (A)
Shepard, F. H., Jr. (M)
Steiger, B. F. (M)
Tendick, F. H., Jr. (M)
Thomas, G. B., Jr. (SM)
Thompson, T. H. (A)
Treitel, W. S. (M)

Varvel, W. M. (M)
Villare, C. (M)
Weppler, H. E. (M)

Sussex (NNJ-2)
Bliss, D. C. (A)
O'Brien, J. F., Jr. (A)

Taunton Lakes (PHI-3)
Wagoner, R. G. (A)

Teaneck (NNJ-2)
Atlas, Z. (A)
Bonner, J. T. (M)
Chin, E. (M)
Galbraith, J. E. (M)
Gannett, E. K. (SM)
Greenquist, R. E. (M)
Harris, W. E., Jr. (A)
Harrison, C. W. (M)
Jacobs, B. H. (M)
Kulesha, K. J. (M)
Luhrs, C. H. (M)
Rankin, B. (A)
Mezger, G. R. (SM)
Nestor, G. (M)
Pulley, A. A. (VA)
Quance, F. R. (M)
Sather, O. J. (SM)
Straub, W. W. (M)
Tsao, T. C. (SM)
Verseput, P. C. (A)

Tenafly (NNJ-2)
Anthony, R. L. (SM)
Border, B. (A)
Engel, J. S. (M)
Hull, R. E. (M)
Hutchinson, C. C. (A)
Iwahashi, K. K. (A)
Litsios, J. (A)
Sclorra, A. F. (M)
Shotliff, L. A. (SM)
Unger, W. H. (M)

Teterboro (NNJ-2)
Burnnow, E. L. (M)
Hughes, M. J. (M)
Keetch, W. A. (A)
Klein, M. S. (A)
McCarthy, B. R. (M)
McCaul, J. N. (A)
Nietsch, H. E. (A)
Robinson, C. S. (M)
Shangraw, C. C. (SM)
Sprung, R. A. (M)

Titusville (PRI-2)
Dilley, J. E. (A)

Tom's River (NY-2)
Clemenko, M. (A)
Mayer, J. H. (A)
Zelnick, S. (A)

Totowa (NNJ-2)
Le Vine, H. D. (SM)
Monsees, W. A. (A)

Totowa Boro (NNJ-2)
Cavelos, A. A. (M)
Gutleber, F. S. (A)
Heinis, F. W. (A)

Towaco (NNJ-2)
Falkinburg, R. (A)

Trenton (PRI-2)
Ballard, R. C. (SM)
Bozowski, S. (A)
Carver, L., A. (M)
Cole, W. Y. (A)
De Mott, J. (SM)
Faustini, C. (M)
Fireman, P. (M)
Fulmer, J. L. (M)
Gavenas, A. R. (M)
Glass, W. (A)
Grinoch, A. (A)
Harris, F. M. (M)
Kang, C. L. (M)
Lipinski, Z. J. (A)
Lorber, H. W. (M)
Marquardt, C. S. (A)
Miller, R. G. (M)
Molnar, J. G. (A)
Orendar, B. M. (A)
Power, J. B. (A)
Preisig, J. O. (A)
Pyle, H. D. (M)
Raner, E. G. (SM)
Rogers, A. E. (M)
Sher, A. (A)
Stobie, E. F. (M)
Strother, E. A. (A)
Strother, W. F. (A)
Szwedo, S. G. (A)
Thompson, W. M. (M)
Troxel, D. E. (M)
Wentzel, A. G., Jr. (M)
Whitehurst, J. D. (A)
Woolston, J. R. (M)
Yard, E. M. (M)
Zarzecki, F. S. (M)

Union (NNJ-2)
Anderson, N. E. (M)
Chartoff, M. (M)
D'Agostino, V. F. (M)
Davis, E. S. (M)
Edwards, J. B. (VA)
Faughnan, J. F. (M)
Frank, D. N. (A)
Hemmendinger, B. G. (M)
Lambert, G. W. (A)
Lapham, W. H. (M)
Metzler, R. (A)
Nagy, J., Jr. (M)
Nickless, W. H. (A)
Penk, C. (A)
Pettal, R. (A)
Sandoz, R. W. (M)
Sapoff, M. (A)
Snyder, V. A. (A)
Tebay, J. E. (M)

Union City (NNJ-2)
Bernstein, E. (A)
Campanaro, P. L. (A)
De Carlo, A. P. (A)
Delguidice, T. F. (M)
Di Giovanni, A. E. (A)
Huang, R. Y. (M)
Kettmann, H. W. (A)
Lakata, J. W. (A)
Lee, J. P. (A)
Markunas, J. P. (A)
Matto, V. G. (A)
Moller, E. E. (M)
Ollick, E. (A)
Vaughan, C. B. (A)
Worhach, R. (M)

Upper Montclair (NNJ-2)
Benner, L. A. (M)
Borden, E. W. (M)
Buck, T. F. (A)
Burnett, J. H. (M)
Clipp, R. D. (F)
Corson, D. E. (SM)
Daugherty, R. M. (SM)
De Rosa, L. A. (F)
Dorfman, J. (M)
Fawcett, D. G. (A)
Ferguson, J. G. (SM)
Goldsmith, T. T., Jr. (F)
Hallborg, H. E. (F)
Harries, W. L. (SM)
Hicks, B. A. (SM)
Hulst, G. D. (SM)
Humphrey, R. A. (SM)
Hunkins, R. H. (M)
McCune, R. J. (A)
Nelson, E. P. (SM)
Osborne, H. S. (F)
Patten, S. F. (SM)
Peer, G. C. (A)
Ruiter, J. H., Jr. (SM)
Siegel, R. (A)
Stanton, F. T., Jr. (A)
Sutton, L. E., III (A)
Terhune, H. R. (SM)
Warner, H. M. (A)

Upper Saddle River (NNJ-2)
Weiner, M. J. (M)

Vauxhall (NNJ-2)
Rundstedt, R. J. (A)

Verona (NNJ-2)
Baxter, C. L. (A)
Beltz, W. F. (SM)
Beste, H. E. (SM)
Boronow, F. S. (A)
Butler, H. R. (SM)
Curtis, L. B. (M)
Curtis, L. W. (M)
Gauthier, R. V. (A)
Hoops, H. W. (A)
Jacobs, G. W. (M)
Janoff, A. (A)
Kram, W. (A)
Lewinter, S. W. (SM)
McDonough, V. T. (M)
Nyberg, R. G. (SM)
Peet, E. C. (M)
Scheraga, M. G. (SM)
Smith, E. J. (M)
Smith, H. R. (M)
Tobler, C. R. (M)
Tompson, E. C. (A)

Vineland (PHI-3)
Waugh, J. R., Jr. (M)

Waldwick (NNJ-2)
Akin, I. (M)
Bailey, R. S. (SM)
Brennan, F. J. (M)
Broderick, N. E. (SM)
Certner, A. (A)
Gottfried, N. J. (M)
Johnson, R. L., Jr. (M)
Priest, R. B. (M)
Rollman, R. F. (M)
Seburger, L., Jr. (A)
Wallner, R. A. (M)

Wallington (NNJ-2)
Lisovicz, E. J. (A)
Savage, J. V. (M)

Wanamassa (NY-2)
Attwood, S. W. (M)
Carp, G. (M)
Goldberg, B. (SM)
Kuhnapfel, R. H. (A)
May, A. (A)
McEvilly, R. V., Jr. (A)
Miller, M. (M)
Reich, B. (SM)
Steelman, K. C. (A)
Tobias, W. T. (M)
Treston, P. (M)

Washington (NNJ-2)
Aten, D. C. (M)
Feindel, A. (M)
Fichter, W. C., Jr. (M)
Schmidt, A. F., Jr. (A)

Watchung (NNJ-2)
Walters, G. E. (A)

Weehawken (NNJ-2)
Armstrong, D. T. (A)
Mahony, J. P. (M)
Meitzner, A. C. (A)

Wenonah (PHI-3)
Eldridge, G. C., Jr. (A)
Sterner, J. F. (SM)
Trilling, T. R. (A)

West Allenhurst (NY-2)
Brockel, H. W. (A)
Friedrich, V. L. (SM)
Lewis, H. M. (SM)
Sugarman, R. H. (SM)
Swenarton, E. W. (A)

West Belmar (NY-2)
Eisenbach, J. (M)

West Berlin (PHI-3)
Trimble, J. E. (A)

West Caldwell (NNJ-2)
Brundage, J. H. (SM)
Capodanno, R. T. (SM)
Clark, T. G. (M)
Cobb, W. A. (M)
Crump, E. E. (M)
Eberhard, L. E. (VA)
Hampshire, R. A. (M)
Knight, M. B. (M)
Knoop, W. A., Jr. (SM)
Levine, S. R. (A)
Lynn, P. R. (M)
Miller, H. P., Jr. (SM)
Myers, R. H. (A)
Riegel, R. B. (M)
Schade, O. H. (F)
Toepel, W. A. (A)
Wilson, L. F. (M)
Woodin, E. A. (A)

West Collingswood (PHI-3)
Daly, G. M. (SM)
Dodson, J. W. (M)
Hackett, C. M., Jr. (M)
Orth, R. B. (M)
Perry, R. A. (A)
Riggs, D. L. (M)
Rosenberg, N. (A)
Tannenbaum, D. A. (M)
Truesdell, R. L. (A)

West Deal (NY-2)
Berger, R. M. (SM)

West End (NY-2)
Chubb, W. R., Jr. (A)
Edgerton, R. D. (M)
Epstein, M. (M)
Feigenbaum, I. A. (M)
Ikrath, K. (A)
Kahn, D. (M)
Matarc, H. F. (SM)
Segner, S. M. (A)
Winters, A. L. (A)

West Englewood (NNJ-2)
Bitner, R. E. (M)
Boehm, G. W. (A)
Gelling, H. F. (M)
Godofsky, M. (M)
Goldberg, A. A. (SM)
Klein, M. E. (M)
Kralnin, S. (M)
Kuss, P. W. (M)
Schnoll, N. (SM)
Scott, D. A. (A)
Sheuk, E. R. (SM)
Walsh, A. A. (SM)
Wilbur, E. C. (VA)

Westfield (NNJ-2)
Augustadt, H. W. (SM)
Bachrach, H. E. (A)
Bacon, D. R. (M)
Barker, R. A. (M)
Blonder, I. S. (M)
Bresson, J. (M)
Bumiller, G. B. (M)
Cafarelli, N. J., Jr. (M)
Carr, G. W. (M)
Chandler, R. D., Jr. (M)
Cox, A. L. (A)
Cunniff, W. V. (M)
Edwards, R. (SM)
Follingstad, H. G. (M)
Foster, R. M. (F)
Goldsmith, B. M. (SM)
Grieser, T. F. (M)
Hammond, R. A. (SM)
Hayward, W. S., Jr. (A)
Hutchinson, H. F. (SM)
Ingalls, D. (M)
Jensen, F. F. (A)
Knights, J. E., Jr. (SM)
Leeds, M. (A)
Margill, L. T., Jr. (A)
Moons, A. G., Jr. (M)
Nein, H. R. (M)
O'Keilly, J. P. (M)
Peterson, L. J. (M)
Poarch, M. F. (M)
Pulley, L. A. (VA)
Sarratt, E. R. (M)
Shepard, R. M. (A)
Siegelin, C. O. (SM)
Smith, K. D. (SM)
Stillwell, A. L. (SM)
Tongue, B. H. (M)
Van Tassel, E. K. (SM)
Warner, H. K. (M)
Wier, J. M. (M)
Wohlgemuth, A. J. (M)
Wolf, B. H. (SM)

West Keansburg (NY-2)
Nailler, M. (A)

West Long Branch (NY-2)
Abeyta, I. (M)
Anderson, B. S. (SM)
Conti, T. L. (M)
Deisinger, D. A. (SM)
Doxey, W. L. (M)
Eichel, M. R. (M)
Farlee, R. J. (A)
Gerber, E. A. (SM)
Gikow, E. (SM)
Gore, T. S., Jr. (M)
Gormley, R. S. (SM)
Griffith, P. E. (SM)
Guttwein, G. K. (M)
Kublin, V. J. (M)
Kullback, I. (M)
Lippel, H. (M)
Lipton, M. H. (A)
McKenna, F. A. (SM)
O'Brien, J. F. (M)
O'Dwyer, M. S. (M)
Salvano, D. P. (A)
Spergel, J. (M)
Vogler, J. G. (A)
Winn, W. F. (M)
Wolinsky, A. (A)

West Millington (NNJ-2)
Jamison, H. M. (A)

Westmont (PHI-3)
Beecer, J. E. (A)
Burke, T. J. (A)
Castleberry, J., Jr. (M)
Cox, R. L. (M)
Dennison, R. C. (M)
Erwin, G. E. (M)
Garabedian, H. B. (A)
Grundmann, G. L. (SM)
Hauser, G. G. (A)
Heidgen, B., Jr. (M)
Janz, D. W. (M)
Leidy, H. W. (A)
Mozzi, E. J. (M)
Newman, J. J. (M)
Pierce, D. L. (A)
Pierce, J. G. (A)
Sinnett, C. M. (F)
Wolf, R. E. (M)

West New York (NNJ-2)
De Paola, G. E. (A)
Karn, E. W. (A)
Koemm, K. H. (A)
Lang, C. W. (A)
Larena, S. F. (A)
Mercure, A. J. (M)
Parrott, R. D. (M)

West Norwood (NNJ-2)
Griffin, A. T. (A)

West Orange (NNJ-2)
Adler, A. W. (A)
Blanchard, W. A. (A)
Booth, R. F. (SM)
Crowley, H. L. (SM)
Edison, T. M. (M)
Garten, L. A. (M)
Goldstein, M. K. (SM)
Grady, C. B., Jr. (M)
Grayson, E. L. (M)
Hess, R. C. (M)
Hetherington, G. V. (A)
Hoerner, E. F. (M)
Huie, W. (M)
Kishpaugh, A. W. (SM)
Lander, F. (A)
Light, H. A. (M)
Milner, C. M. (M)
Neumann, K. L. (M)
Overpeck, J. P. (A)
Padalino, J. J. (SM)
Painter, P. F. (SM)
Puder, R. K. (A)
Reed, E. D. (M)
Reise, H. A. (SM)
Riemenschneider, N. L. (M)
Robinson, W. A. (A)
Ryan, F. M. (F)
Schottland, F. D. (SM)
Shamis, S. S. (M)
Smith, J. F. (A)
Snow, H. A. (F)
Tulchin, H. (SM)
Wagner, R. L. (M)
Zmuda, E. J. (M)

West Paterson (NNJ-2)
Knight, R. T. (M)
Mozek, G. G. (M)
Schratchley, W. P., Jr. (A)
Woncik, M. (A)

West Trenton (PRI-2)
Kunicki, H. R. (M)

Westville (PHI-3)
Moore, E. E. (A)

Westwood (NNJ-2)
Dunn, W. J. (A)
Duschka, W. A. (M)
Elwell, H. G., Jr. (M)
Gregory, C. S. (SM)
Hammerschmidt, A. L. (SM)
Nagy, L., Jr. (M)
Spanos, W. M. (M)
Warden, F. W. (SM)
Zangenberg, H. E. (M)

Whippany (NNJ-2)
Albersheim, W. J. (F)
Alsberg, D. A. (SM)
Anderson, A. B. (M)
Anderson, G. M. (SM)
Andrews, E. G. (M)
Bachman, W. J. (SM)
Bacon, R. A. (A)
Baird, J. A. (M)
Balash, F. J. (A)
Baldwin, E. G. (M)
Barstow, J. M., Jr. (M)
Bedell, E. H. (M)
Beeler, T. L. (A)
Belford, J. F. (A)
Blair, R. R. (SM)
Bohren, A. K. (SM)
Bower, M. M. (M)
Boyhan, J. W. (A)
Boysen, A. P., Jr. (M)
Breniernan, D. (M)
Brown, D. J. (M)
Brown, L. O., Jr. (M)
Bryan, G. E. (A)
Budlong, W. A. (A)
Burger, M. J. (SM)
Cagle, W. B. (A)
Carretta, P. M. (M)
Churchill, L. S. (M)
Clark, H. R. (M)
Clement, A. W. (SM)
Clutts, C. E. (M)
Cocchiaro, M. (A)
Collier, R. W., Jr. (A)
Compton, H. B. (M)
Coulter, D. M. (M)
Croney, K. A. (A)
Dale, G. V. (M)
Daly, I. W. (A)
Darnell, P. S. (SM)
De Graaf, D. A. (A)
De Motte, F. E. (M)
Dietzold, R. L. (F)
Dintenfass, J. (A)
Dominick, J. (M)
Dora, R. J. (A)
Dudek, S. J. (M)
Dungan, M. R. (M)
Elias, L. G. (SM)
Engstrom, O. D. (SM)
Fagen, M. D. (SM)
Fair, I. E. (M)
Fairweather, B. A. (M)
Favin, D. L. (A)
Fleckenstein, W. O. (M)
Fleming, C. C. (M)
Franke, H. C. (M)
Frantz, D. R. (SM)
Frantz, G. R. (SM)
Gallant, R. J. (A)
Gamble, G. L. (M)
Ghiron, H. (A)
Giloth, P. K. (A)
Haase, W. D. (A)
Haber, K. H. (A)
Haines, A. B. (M)
Hamerman, L. M. (M)
Hammann, P. L. (SM)
Harding, P. A. (A)
Haya, F. R. (M)
Heber, E. (A)
Helm, H. A. (M)
Hewitt, W. H., Jr. (SM)
Hibbert, J. J. (M)
Hoffmann, F. H. (M)
Hohenstein, N. H. (A)
Hohmann, G. D. (M)
Homic, S. G. (A)
Hough, R. E. (SM)
Hunter, R. A. (A)
Jackson, D. A. (A)
Jacobs, I. (M)
Janiszewski, F. A. (M)
Jenny, H. K. (SM)
Jensen, H. R. (A)
Joel, A. E., Jr. (A)
Johnson, G. D. (SM)
Jones, L. W. (M)
Kindberg, E. V. (A)
Kirkwood, L. W. (SM)
Koenig, W., Jr. (A)
Koerner, L. F. (M)
Kovach, L. (M)
Krieger, R. W. (A)
Kuck, B. M. (M)
Lane, R. F. (SM)
Larsen, L. F. (M)
Lee, C. Y. (

Tidd, E. D. (A)
Tidd, W. H. (SM)
Tinus, W. C. (F)
Touw, C. C. (A)
Townley, R. K. (SM)
Tryon, J. G. (M)
Ulrich, W. (A)
Von Aulock, W. H. (A)
Warner, A. W., Jr. (SM)
Weeks, G. E. (M)
Welsh, M. M. (M)
Willson, F. E. (M)
Winans, R. C. (M)
Wise, R. O. (SM)
Woolmansee, B. S. (SM)
Wright, S. B. (SM)
Yokelson, B. J. (M)
Yostpille, J. J. (A)
Younker, E. L. (M)
Zimmerman, L. (A)

White House Station (PRI-2)
Berkowitz, M. D. (A)

White Meadow Lake (NNJ-2)
Goldstein, M. (M)

Wickatunk (NY-2)
Grubb, W. C., Jr. (SM)

Wildwood (PHI-3)
Eberle, H. (A)
Malin, R. F. (M)
Pacciuti, R. A. (M)
Wouters, A. P. (A)

Wildwood Crest (PHI-3)
Barrett, C. S. (M)

Willamstown (PHI-3)
Roberts, M. J. (A)
Walecki, V. (A)

Woodbridge (PRI-2)
Melnick, R. (M)
Morgenson, E. G., Jr. (A)
O'Toole, J. J. (M)
Rugg, D. A. (A)

Woodbury (PHI-3)
Beckenstein, M. (A)
Billstein, R. W. (A)
Comninos, D. A. (M)
De Credico, R. J. (A)
Frank, A. J. (A)
Garcia, A. (M)
Halket, D. R. (A)
Jack, D. E. (M)
Neubert, H. A., Jr. (M)
Poitras, D. J. (M)
Seeberger, L. M. (SM)
Sharp, R. F. (M)
Skinner, R. L. (M)
Stark, J., Jr. (A)
Torre, A. (SM)
Watson, H. M. (A)

Woodbury Heights (PHI-3)
Small, C. R. (M)

Woodcliff Lake (NNJ-2)
Swanson, C. A. (M)

Woodlynne (PHI-3)
Slukola, M. (A)

Wood-Ridge (NNJ-2)
Legrand, J. S. (M)
Robinson, K. P. (M)
Yockel, A. P. (M)

Wrightstown (PHI-3)
Dobkowski, J. T. (A)

Wyckoff (NNJ-2)
Baasch, H. C. (M)
Chambers, A. B. (A)
Foley, R. M. (A)
Menes, H. (M)
Oesterle, A. G., Jr. (M)
Samson, R. L. (M)
Troast, W. H. (A)
Watson, W. E. (A)
Zomber, G. L. (M)

NEW MEXICO

Alameda (A-LA7)
Hopkins, L. A., Jr. (M)

Alamogordo (ALA-H-6)
Allie, C. L. (M)
Arnold, N. E. (A)
Berg, B. V. (M)
Brown, A. E. (M)
Clark, C. E. (A)
Crews, R. B. (A)
Crowther, E. E. (A)
Dann, J. A. (M)
Dodd, S. C. (M)
Eckert, H. R. (A)
Ehnl, P. P. (A)
Forester, J. R. (A)
Green, M. C. (M)
Guenthner, F. K. (A)
Hagler, L. H. (A)
Hammer, W. H. (A)
Harrington, M. W. (A)
Harris, L. M. (A)
Hibben, A. T. (A)
Hodgson, D. J. (M)
Huston, E. E. (M)
Juenke, M. G. (A)
Johnson, R. R. (M)
Jones, M. W. (M)
Kiefer, C. F., Jr. (M)
Kuerschner, H. (A)
Lane, L. M. (M)
Lovell, R. E. (SM)
Lux, M. O. (M)
Lynch, A. J., Jr. (M)
Lynch, V. J. (M)
Martin, W. T. (A)
Muehlner, J. W. (M)
Nicholson, T. T. (M)
O'Neal, C. R. (A)
Padgitt, K. W. (M)
Polking, U. H. (M)
Preece, B. P. (A)
Preece, R. G. (M)
Rudy, C. E., Jr. (M)
Sage, R. M. (M)
Saylor, R. R. (M)
Sharp, E. F., Jr. (M)
Staples, Z. B. (A)
Steele, O. A. (M)
Stotts, W. S. (A)
Tantzen, R. G. (A)
Taylor, H. V. (M)
Tuttle, J. B. (M)
Warnock, R. L. (A)
Webb, R. C. (M)
Weber, M. E. (M)
Wells, B. D. (A)
Wiant, R. C. (M)
Yarter, B. P. (M)

Albuquerque (A-LA-7)
Aas, E. A. (SM)
Abeyta, G. A. (M)
Adams, R. E. (A)
Aden, R. D. (A)
Allen, B. O. (A)
Allen, L. J. (M)
Alls, C. R. (A)
Ames, J. R. (M)
Arnett, W. (SM)
Arnot, G. A., Jr. (M)
Arquette, D. W. (M)
Bachand, G. (SM)
Ball, K. E. (SM)
Banks, T. G., Jr. (SM)
Basore, B. L. (SM)
Berner, R. R. (M)
Bidwell, C. H. (SM)
Biggs, L. G. (M)
Bircher, P. H. (M)
Bittner, B. J. (M)
Black, H. (M)
Bloomquist, J. L. (A)
Boatwright, L. T., Jr. (M)
Boettcher, G. E. (A)
Boling, P. T. (M)
Boor, R. A. (M)
Bourgeois, N. A., Jr. (M)
Bradley, W. A. (A)
Bray, W. M. (M)
Brooks, E. P. (M)
Brown, E. A. (A)
Brown, M. W., Jr. (A)
Brown, W. E., Jr. (A)
Bueffel, B. H., Jr. (SM)
Bunker, G. B. (A)
Burk, P. O. (M)
Burley, F. E. (SM)
Burns, W. W. (A)
Caldes, W. E. (SM)
Calvery, H. L. (A)
Canute, A. (A)
Carman, W. H. (SM)
Carr, B. J. (M)
Carrick, D. S. (M)
Chapp, J. M. (M)
Checkette, E. L. (A)
Childs, C. W. (M)
Chouinard, J. R. (A)
Church, A. B. (M)
Church, T. S. (SM)
Cnare, E. C. (A)
Cockrill, J. T. (M)
Cole, L. L. (M)
Commons, D. W. (A)
Connell, J. C. (M)
Cordova, N. A. (M)
Coulden, D. V. (SM)
Courtney, J. M. (SM)
Creveling, R. (SM)
Daly, W. J. (A)
Daniels, R. E. (M)
Dankworth, J. F. (A)
Darugh, F. H. (M)
Daughterty, T. J. (M)
Davis, C. (M)
Davis, G., Jr. (M)
Davis, W. B. (M)
De Lorenzo, R. J. (A)
De Pew, R. T. (A)
Dike, S. H. (SM)
Dodds, L. F. (A)
Dossey, J. L. (M)
Drake, K. W. (M)
Drummond, F. A. (A)
Durham, H. B. (A)
Durkee, R. W. (M)
Edmonds, S. C. (A)
Ehrman, L. (A)
Elkins, E. P. (M)
Ellingson, A. C. (M)
Elliott, N. J. (M)
Ellis, R. M. (SM)
Engquist, A. R. (A)
Fannin, B. M. (SM)
Finch, H. D. (M)
Findlay, J. H. (SM)
Fletcher, E. E. (M)
Fligner, O. M. (M)
Fortman, K. R. (SM)
Fossum, D. E. (SM)
Foster, C. E. (M)
Fowler, G. A. (SM)
French, L. E. (SM)
French, R. R. (A)
Frenkel, L. J. (SM)
Gablehouse, R. H. (M)
Gallo, L. F. (A)
Given, F. J. (SM)
Glass, R. E. (SM)
Glaze, E. W. (M)
Goldenberg, H. B. (SM)
Goss, F. A., Jr. (SM)
Grannemann, W. W. (M)
Gregson, D. E. (M)
Griffith, R. D. (M)
Gross, J. E. (SM)
Grover, R. K. (M)
Guilford, R. P. (A)
Gutscher, W. D. (M)
Hagedorn, J., Jr. (M)
Halliday, J. R. (M)
Hampy, R. E. (M)
Hanchey, L. A. (M)
Hankins, D. K. (M)
Hansen, V. W. (M)
Hanson, R. E. (M)
Hardin, K. D. (M)
Hart, A. S., Jr. (A)
Harvey, W. M., Jr. (M)
Henry, D. E. (A)
Henry, W. E. (M)
Herrmann, R. W. (M)
Hicks, C. W. (SM)
Hight, S. C. (F)
Higgins, P. B. (A)
Hilleary, H. W. (A)
Hinde, J. E. (A)
Hock, E. A. (A)
Hodges, E. M. (M)
Hogue, L. H. (A)
Hunter, A. L. (A)
Hunter, W. C. (SM)
Hurford, A. F. (SM)
Huters, A. F. (M)
Hyde, W. L. (A)
Ingham, S. A. (A)
Ingledue, E. F. (M)
Iverson, M. M. (A)
Jackson, H. J. (A)
Jean, F. H. (M)
Jenkins, W. S. (A)
Jeske, H. O. (M)
Jessen, P. L. (M)
Johnson, G. S. (M)
Johnson, R. E. (A)
Jones, M. C. (M)
Jones, R. D. (M)
Jorgensen, R. W. (M)
Kaff, L. E. (M)
Kail, R. F. (A)
Katzenstein, J. (M)
Keagy, R. B. (M)
Keck, L. J. (M)
Kendall, R. N. (A)
Kennedy, M. J. (M)
Kimball, G. S. (M)
King, J. L. (A)
Kinoshita, G. S. (A)
Klink, E. J. (M)
Komen, P. J., Jr. (A)
Kudrna, K. L. (A)
La Cose, W. D. (M)
Lambert, R. P. (M)
Lareau, J. G. (M)
Lathrop, L. L. (M)
Lawrence, A. F. (M)
Lawrence, B. J. (SM)
Lewis, C. E. (M)
Liebman, R. I. (A)
Lincoln, R. A. (M)
Lindsay, L. D. (A)
Lodge, L. L. (A)
Lommasson, T. E. (M)
Long, B. J. (A)
Long, C. M. (M)
Luchter, D. (A)
Lytle, C. W. (SM)
MacKenzie, D. R. (A)
Madlener, M. J., Jr. (A)
Marker, T. F. (SM)
Mason, H. (M)
Maxon, J. S. (M)
Max, A. J. (SM)
McAlexander, D. S. (M)
McCamphell, C. B. (M)
McCann, R. P. (SM)
McCord, W. O., Jr. (SM)
McDowell, J. K. (M)
McGehee, R. M. (A)
McIntyre, M. V. (M)
McKinney, H. F. (A)
McLay, L., Jr. (SM)
McKae, J. W. (F)
Mellish, A. W. (SM)
Miller, E. G., Jr. (SM)
Mills, G. S. (A)
Milton, O. (M)
Minnear, L. H. (A)
Moffat, W. T. (A)
Montoya, E. K. (A)
Moore, R. K. (SM)
Morgan, G. E. (M)
Morton, W. B. (M)
Myers, V. V., Jr. (M)
Naley, N. C. (M)
Newlin, G. C. (M)
Newsom, M. M. (M)
Noble, J. C. (M)
Noble, R. P. (M)
Nowlin, D. K. (A)
Nylander, R. F. (A)
Olson, D. M. (M)
Oltman, H. G., Jr. (M)
O'Nan, R. L. (A)
Opperman, R. H. (M)
Ouverson, C. D. (M)
Pace, E. C. (A)
Pace, T. L. (M)
Paddison, L. J. (M)
Padilla, D. J. (A)
Pafford, W. B. (M)
Palmer, J. E. (SM)
Palmer, P. R. (A)
Patterson, H. H., Jr. (SM)
Pepmueller, A. D. (A)
Petty, W. E. (M)
Peuriloy, R. L., Jr. (A).
Phinney, E. S. (M)
Piele, G. H. (M)
Poole, R. E. J. (SM)
Pope, A. E. (M)
Poulsen, H. L. (A)
Purdue, C. H. (A)
Quinlan, R. E. (SM)
Ray, B. M. (SM)
Read, G. R., Jr. (M)
Rehberg, J. C. (M)
Reineke, R. G. (A)
Reintjes, I. C. (M)
Remaley, C. W. (M)
Reynolds, R. S. (SM)
Riggins, G. L. (A)
Rinker, E. A. (A)
Robertson, D. C. (SM)
Robie, D. D. (A)
Roby, E. M. (A)
Rogers, L. (A)
Rogers, W. J., Jr. (A)
Ross, W. C. (M)
Rudolph, R. J. (M)
Rust, R. F. (M)
Sander, H. H. (A)
Scharff, J. H. (A)
Scharrer, R. G. (M)
Schauer, J. D. (SM)
Scheele, F. E. (A)
Schiess, M. C. (M)
Schroeder, E. F. (A)
Scott, J. H. (M)
Scranton, W. A. (M)
Seavey, R. W. (M)
Sellack, B. F. (A)
Senter, C. H., (SM)
Shoemaker, W. F. (M)
Shoup, J. P. (SM)
Sibold, A. P., Jr. (M)
Singleton, H. A. (A)
Sirwinski, V. (M)
Sisbe, C. F. (A)
Skinner, F. L. (M)
Skinrood, D. A. (SM)
Smart, J. L. (M)
Smith, H. F., Jr. (A)
Smith, J. D. (M)
Smith, V. K. (M)
Smith, V. M. (A)
Smoll, L. A. (M)
Snyder, J. G. (A)
Spence, R. C. (SM)
Stearns, W. P. (A)
Stiegelmar, L. R. (A)
Stockley, T. M., Jr. (A)
Stone, T. E. (A)
Swain, R. R. (M)
Szeman, P. (A)
Taylor, C. (M)
Thomas, J. A. (M)
Thurston, C. D. (A)
Tillman, J. E. (SM)
Trogdon, F. H. (A)
Van Every, A. (M)
Vulgan, J. (A)
Walker, H. E. (SM)
Ward, B. S. (A)
Washburn, B. W. (M)
Watkins, L. C., Jr. (SM)
Watley, O. D. (M)
Watson, D. E. (A)
Weber, M. (SM)
Weimer, R. E. (A)
Wentz, J. L. (A)
West, R. E. (A)
Westcott, H. S. (M)
Westman, W. W., Jr. (A)
Weston, B. J. (M)
Whaley, W. (M)
Williams, C. S., Jr. (A)
Williams, R. H. (A)
Wood, E. E. (A)
Wright, O. L. (M)
Wright, P. H. (M)

Belen (A-LA-7)
Douglass, T. F. (M)

Bloomfield (A-LA-7)
Manigold, F. E. (A)

Carlsbad (EP-6)
Battison, J. H. (SM)
Smith, M. E. (A)

Cedar Crest (A-LA-7)
Miller, G. L. (A)
Roeschke, C. W. (SM)
Urquhart, K. J. (M)

Cloudcroft (ALA-H-6)
Benton, C. U. (M)
Cielinski, T. (M)
Trexler, W. E. (A)

Clovis (A-LA-7)
Isemann, L. W. (A)

Farmington (A-LA-7)
Bowles, M. E. (M)
Johnson, D. W. (A)

High Rolls (ALA-H-6)
Billups, E. E. (M)
Willard, D. S. (M)

Holloman AFB (ALA-H-6)
Armstrong, R. A. (A)
Bauman, E. J. (M)
Boughton, E. M. (M)
Carlson, H. A. (A)
Cummings, L. J. (M)
Datwyler, W. F. (A)
Farmer, G. R., Jr. (A)
Fix, O. W. (M)
Gee, L. S. (A)
Glenn, L., Jr. (A)
Godbey, W. C. (A)
Hall, T. F. (A)
Johnson, W. H. (M)
Jones, G. D. (A)
Kleinman, R. B. (M)
Koellner, K. H. (A)
Levin, K. L. (M)
Liston, D. H. (M)
Lopez, O. C. (A)
MacDonald, H. J. (M)
Mahaffey, R. F. (M)
Marlow, H. C. (A)
Miller, J. C. (A)
Nolte, U. C. (A)
Paulos, P. L. (M)
Small, P. (M)
Thomas, E. C. (M)
Vicek, D. H. (M)
Waterman, A. (A)
Whitley, G. E. (M)
Yanick, K. J. (A)
Zimmerman, A. P. (M)

Kirtland AFB (A-LA-7)
Baker, D. A. (M)

Las Cruces (EP-WS-6)
Bennett, A. O. (M)
Boone, B. B. (A)
Davlis, D. A. (M)
De Pasquale, N. D. (A)
De Rosa, A. L. (A)
Evitt, W. B. (A)
George, J. E. (A)
Goldin, M. (M)
Hemingway, F. S., Jr. (M)
Johnson, G. E. (M)
Keys, D. D. (A)
Kimball, V. L., Jr. (M)
Kreitler, C. E. (M)
Lisle, H. H. (M)
McCalla, T. M., Jr. (M)
Miller, V. L. (A)
Morrow, C. P. (M)
Petitjean, A. E. (A)
Pierson, J. L. (A)
Semmes, D. R. (A)
Smith, H. D. (M)
Stickle, R. L. (A)
Wagner, N. (A)
Welch, C. M. (SM)
Williamson, C. A. (A)

Los Alamos (A-LA-7)
Aiello, W. P. (M)
Boyd, T. J., Jr. (A)
Briscoe, W. L. (SM)
Brown, C. J. (M)
Carlson, W. F. (M)
Clemens, J. K. (M)
Connell, J. W. (M)
Crew, W. H. (SM)
Deal, J. B., Jr. (M)
Dollar, L. L. (SM)
Doremire, F. E. (SM)
Fagan, P. (SM)
Freyman, R. W. (SM)
Glore, J. P. (A)
Grant, L. P. (M)
Greenwood, A. H. (A)
Harrington, D. C. (M)
Hayes, B. (M)
Helgeson, B. E. (A)
Helmer, R. J. (A)
Hiebert, R. D. (M)
Hull, D. E. (SM)
Jennings, H. K. (M)
Kemp, L. F. (M)
Koelle, A. R. (M)
Lacey, H. F. (A)
Lamb, J. K. (SM)
Landahl, C. P. (M)
Lang, H. J. (M)
Lilienthal, J. R. (SM)
Malmberg, A. F. (M)
McCloud, B. J. (A)
Michell, A., Jr. (M)
Nutter, R. V. (SM)
Partridge, K. E., Jr. (A)
Peck, R. C. (M)
Rawcliffe, A. S. (SM)
Rudnick, P. (SM)
Schulze, H. T. (M)
Smith, D. A. (SM)
Standring, H. A. (M)
Stephenson, D. L. (M)
Tesche, F. R. (SM)
Trexler, V. L. (M)
Wagner, R. G. (A)
Watts, R. J. (SM)
Weber, W. (M)
Weintraub, J. (A)
Wieneke, J. R. (SM)
Wilson, A. E. (M)
Winston, J. G. (M)

Mountain Park (ALA-H-6)
Rothman, M. I. (M)

Roswell (EP-6)
Cox, D. D. (M)
Slee, J. E. (M)

Roy (A-LA-7)
Proctor, B. M. (A)

Sandia (A-LA-7)
Vearout, D. K. (A)

Sandoval (A-LA-7)
Smith, W. T. (SM)

Santa Fe (A-LA-7)
Angevine, A. R. (M)
Doles, A. E. (M)
Ford, W. R. (M)
Heyman, H. (SM)
Martin, C. F. (VA)
Wilcoxon, H. O. (M)

State College (EP-WS-6)
Brown, H. A. (SM)
Carbine, L. L. (A)
Feldmann, S. (A)
Hans, H. W. (M)
Lee, E. D. (M)
Noda, T. T. (A)
Sherburne, R. K. (A)

Tierra Amarilla AFB (A-LA-7)
Moskowitz, S. (M)

Tigeras (A-LA-7)
Middleton, A. D. (SM)
Stout, K. D. (M)
Wilson, G. Q. (M)

Tularosa (ALA-H-6)
Crom, G. C. (SM)
Lecrone, J. G. (A)
Suska, J. T., Jr. (M)

White Sand Proving Ground (EP-WS-6)
Andelin, D. R. (M)
Crocker, B. G. (A)
Day, R. T., Jr. (M)
Enright, D. J. (M)
Frel, J. (M)
Gerwig, C. H., Jr. (A)
Hubbell, P. G. (M)
Hubiak, D. D. (M)
Jensen, W. V. (M)
Kidwell, R. P. (A)
Lipnke, B. R. (M)
Lowry, P. E. (M)
Moore, T. E. (A)
Moss, E. C. (M)
Newbold, R. F. (M)
Pappas, J. S. (A)
Paul, R. H. (A)
Pyle, C. A. (A)
Roth, F. P. (M)

NEW YORK

Accord (NY-MH-2)
Pagel, R. W. (M)
Yarbrough, K. A. (A)

Akron (BN-1)
Neubauer, R. A. (M)

Albany (SCH-1)
Anastas, D., Jr. (M)
Bloomsburg, R. A. (M)
Bogosslan, Z. (M)
Dewire, D. S. (M)
Gandler, R. R. (M)
Gengarelly, T. (A)
Marin, I. L. (SM)
Muth., J., Jr. (M)
Pino, J. F. (M)
Portanova, M. C. (A)
Rosner, C. H. (M)
Schwedock, R. (A)
Torre, R. C. (A)
Wilbur, D. A. (SM)
Ward, W. C., Jr. (M)

Albertson (LI-2)
Corrado, V. M. (A)
Kelvin, W. (M)
McLinden, J. E., Jr. (SM)
Robinson, D. L. (SM)
Shlmer, R. (M)
Straus, R. (M)
Sullivan, G. D. (M)
Westman, H. P., Jr. (M)

Alden (BN-1)
Champness, N. A. (SM)

Alfred (ELM-C-1)
Burzycki, M. (M)

Alplaus (SCH-1)
Robinson, D. (M)

Altamont (SCH-1)
Bleichner, C. W. (SM)
Fortington, W. H. (M)
Hannam, H. J. (M)
Hutchinson, D. F. (A)
McNary, R. D. (M)
Pennoyer, R. T. (SM)
Taylor, D. H. (M)
Washburn, F. L., Jr. (M)

Amityville (LI-2)
Barone, S. A. (SM)
Brockner, C. E. (SM)
Chadwick, J. H., Jr. (A)
Cosmas, A. (M)
Frank, F. P. E. (A)
Isherwood, H. (A)
Krayer, G. (A)
Palmer, W. (F)
Pearsall, C. H., Jr. (M)
Schabbehar, E. A. (M)
Sixbey, S. R. (M)
Stuart, A. F. (M)

Amsterdam (SCH-1)
Bohanske, T. A. (M)
Dillon, J. E. (A)
Garratt, P. M. (M)
Ulisse, T. J. (A)

Ancramdale (NY-MH-2)
De Witt, D. (SM)

Angola (BN-1)
Olney, V. W. (M)

Apalachin (BING-1)
Bird, C. M. (M)
Doolittle, G. V. (A)
Jones, R. W. (M)
Schaaf, F. W. (A)
Stilwell, G. R., Jr. (M)
Sweet, M. E. (A)
Welsh, J. H., Jr. (M)

Ardsley (NY-W-2)
Busharis, J. G. (M)
Graveson, R. T. (M)
Prestholdt, O. (M)
Sutherland, C. M. (M)

Armonk (NY-W-2)
Hector, L. G. (SM)
Lawton, L. M., Jr. (M)
Porterfield, E. A. (M)

Arverne (LI-2)
Meyer, W. C. (A)

Astoria (LI-2)
Ammundsson, E. (A)
Benesch, E. J. (M)
Berlly, E. (A)
Breitzer, D. I. (M)
Chittick, C. (A)
Gettner, D. A. (M)
Iversen, R. J. (SM)
Lanzisero, N. T. (A)
Odabashian, H. (A)
Perini, H. R. (A)
Perreira, D. G. (A)
Petrocelli, V. (A)
Phanos, S. (A)
Pighi, L. H. (A)
Spirakis, P. (M)
Strahlberg, K. (A)
Strauss, H. J. (A)
Tackel, H. W. (SM)
Termini, F. A. (A)

Atlantic Beach (LI-2)
Harvey, A. J. (A)

Auburn (SVR-1)
Read, O. M., III (A)
Veley, H. N. (SM)
Vize, J. F. (M)
Wagner, B. F. (M)
Wolf, G. T. (A)
Yost, D. E. (A)
Blanchard, J. W. (M)
Driskill, R. D. (M)
Hood, C. N., II, (SM)
House, H. J. (A)
Neppel, W. C. (A)
O'Connor, C. R. (A)

Averill Park (SCH-1)
Montross, J. G. (M)

Avon (ROC-1)
Malone, W. J. (A)

Babylon (LI-2)
Anderson, R. G. (M)
Biggs, E. M., Jr. (M)
Bleil, F. J. (SM)
Gollhofer, P. J. (M)
Lory, J. (M)
Lott, J. C. (M)
Morfin, H. W. (A)
Picone, J. D. (M)
Rafferty, W. G. (A)
Siegel, L. I. (A)
Spillane, L. R. (A)
Turnage, R. E., Jr. (M)
Walsh, C. (SM)

Baldwin (LI-2)
Browning, S. D. (M)
Calatabianca, J. V. (M)
Candido, J. V. (SM)
Constable, R. C. (M)
Dayton, F. R. (M)
De Valve, R. H. (A)
Fitzgerald, J. F. (A)
Fogelberg, J. E. (A)
Fraser, R. M. (SM)
Herrburger, E. C. (A)
Hinsdale, E. M., Jr. (SM)
Hults, F. H. (M)
Lautenberger, H. W. (M)
Plotkin, A. A. (A)
Rhodes, B. S. (A)
Sall, C. W. (SM)
Seide, L. M. (A)
Shelton, F. W. (A)
Solbrig, A. L. (A)
Storey, A. E. (A)
White, C. E. (A)

Baldwinsville (SYR-1)
Blodgett, A. R. (M)
Bloomquist, R. G. (M)
Cockburn, C. D. (M)
Connolly, T. E. (M)
Cottle, D. W. (M)
Cowan, F. C. (A)
Custin, T. G. (M)
Dodge, P. A. (A)
Downey, R. L. (M)
Fish, E. A. (A)
Gutt, A. J. (M)
Hildebrandt, H. J. (M)
Jensen, R. C. (SM)
Jones, D. V. (M)
Jones, W. H. (A)
Lavin, H. P. (M)
Lester, B. R. (SM)
Myers, R. T. (M)
North, S. M. (M)
Rhodehamel, A. J. W. (M)
Vahle, J. (M)
Wilder, R. L. (A)
Winchester, D. S. (M)
Wood, R. F. (M)
Young, G. G. (SM)

Ballston Lake (SCH-1)
Beattie, C. L. (A)
Blume, A. E. (SM)
Bristol, T. R. (SM)
Coffey, W. N. (M)
Ipchynn, T. M. (M)
Krueger, D. H. (A)
Ward, D. D., Jr. (M)
Whitten, J. R. (M)

Ballston Spa (CH-1)
Hancock, W. L. (M)
Harrison, C. L. (A)
O'Donohue, J. P. (M)
Storer, T. S. (M)

Batavia (ROC-1)
Drummeter, W. (A)
Henry, F. T. (M)
Kwit, C. J. (A)
Kowalczyk, S. J. (A)

Bath (ELM-C-1)
Barney, W. H., Jr. (M)
Evon, J. (A)
Fink, J. H. (M)
Fox, K. A. (A)
Haley, A. J. (A)
Massey, W. F. (M)
Mechas, M. G. (A)
Payne, W. J. (A)
Pridmore, T. C. (SM)
Szilasi, A. (SM)

Bayshore (LI-2)
Gaenzle, J. B. (M)
Koch, E. J. (M)
Kopp, R. E. (A)
Melliger, A. W. (M)
Rosenthal, R. F. (M)
Sears, R. A. (A)

Bayside (LI-2)
Adler, L. L. (M)
Antman, H. S. (A)
Averett, S. S. (A)
Baasch, T. L. (A)
Battaglia, C. V. (A)
Battle, R. P. (M)
Bernstein, J. L. (M)
Blickstein, M. J. (M)
Bloom, L. R. (SM)
Bracco, D. J. (M)
Brown, G. C. (A)
Caffiaux, J. A. (SM)
Cawood, D. W. (M)
Chang, W. H. K. (M)
Cohen, B. (A)
Cohen, J. J. (M)
Coleman, A. H. (M)
Cortizas, A. P. (A)
Costa, T. A. (M)
De France, J. J. (SM)
Doyle, E. J. (M)
Ellefson, B. S. (F)
Elliott, W. A. (M)
Engle, D. C. (M)
Feltzin, A. (A)
First, D. (SM)
Gardiner, C. E. (M)
Gatti, W. (M)
Gauger, R. H. (M)
Gellert, J. (M)
Gittleman, R. (A)
Golick, S. (A)
Gorowitz, M. (A)
Grazda, E. E. (M)
Gross, J. (A)
Gross, L. (M)
Gross, V. (A)
Hagen, A. A. (A)
Harrison, R. L. (M)
Harrison, S. W. (SM)
Hayes, K. V. (A)
Herman, J. H. (A)
Hurley, E. T. (M)
Jacob, G. W. (M)
Jacobson, N. (M)
Katelansky, P. (M)
Kellerman, D. (M)
Kleinberg, H. (A)
Laufman, T. D. (A)
Lepic, R. E. (M)
Levine, S. (SM)
Lieber, S. (M)
Lewis, B. F. (A)
Livingston, D. C. (SM)
Lowenschuss, O. (A)
Luhlin, S. (SM)
Lynch, J. A. (A)
Maffei, E. V. (A)
Martin, E. L. (M)
Marx, J. (SM)
Mazzochi, J. J. (A)
Mealy, J. F. (M)
Melnick, H. (M)
Mesecher, M. G. (A)
Michalski, E. H. (M)
Nadler, B. D. (M)
O'Neill, G. D. (F)
Paulisen, H. (M)
Podeyn, G. J., Jr. (A)
Peteracke, J. L. (M)
Relis, M. J. (M)
Ressler, H. C. (SM)
Reynolds, M. R. (A)
Rosenstein, M. (A)
Salz, N. P. (SM)
Schaetzl, R. J. (A)
Shaler, G. J. (M)
Shipley, D. W. (M)
Smith, H. H. (SM)
Smith, M. (A)
Sopchick, F. J. (A)
Spero, W. L. (A)
Staechover, L. (M)
Statsinger, J. (SM)
Suito, T. (A)
Sussman, N. (M)
Taylor, A. (M)
Taylor, I. R. (M)
Trinkaus, J. W. (M)
Troxler, L. J. (SM)
Tullius, A. B. (M)
Tyllnski, F. V. (A)
Villafane, F. (M)
Weersing, N. O. (A)
Whalley, W. B. (SM)
Winson, P. (A)
Winterhalter, D. B. (A)
Zwack, H. W. (M)

Bayville (LI-2)
Bartolomei, G. G. (M)
Dunn, B. B. (M)
Finn, E. C. (A)
Forker, L. W. (A)
Grimes, E. S., Jr. (A)
Krumbein, J. (A)
Maffei, R. O. (A)
O'Connor, J. F. (M)
Vee, H. (M)

Beacon (NY-MH-2)
Conover, D. G. (A)
Craft, J. L. (M)
Cummings, C. E. (M)
Mazure, A. (A)

Beaver Dams (ELM-C-1)
Marshall, D. E. (A)

Bedford (NY-W-2)
Rosenberg, H. J. (SM)

Bedford Hills (NY-W-2)
Vogeler, R. A. (M)

Beechhurst (LI-2)
Coundjeris, A. (SM)
Plofker, M. H. (A)

Bellaire (LI-2)
Cataldi, J. T. (M)

Belle Harbor (LI-2)
Schure, A. (M)
Williamson, R. T. (A)

Bellerose (LI-2)
Altman, D. (A)
Berge, P. J. (M)
Biss, R.-E. P. (A)
Bolton, G. E. (A)
Burger, J. H. (A)
Colbert, R. P. (A)
Czina, R. H. (M)
Delore, G. E. (A)
Drogin, E. M. (A)
Farber, H. (M)
Fialkov, H. (M)
Frey, H. E. (M)
Greenberg, D. R. (M)
Homeyer, W. (M)
Kline, R. M. (M)
Lewis, M. B. (M)
McGinn, J. F. (A)
McKenna, K. F. (M)
Miller, R. S. (A)
Oliver, O., Jr. (A)
Schulkind, D. (A)
Soohoo, E. L. (A)
Tramposch, W. J. (M)
Wengryn, M. (M)
Zibiatt, R. (A)

Bellerose Manor (LI-2)
Buchsbaum, W. H. (SM)

Bellmore (LI-2)
Deller, P. P. (A)
Glaser, E. M. (SM)
Jackson, C. H. (M)
Krinsky, S. S. (A)
Parke, H. G. (M)
Ruggi, A. G. (M)
Russo, A. J. (A)
Tocci, D. F. (M)
Wellman, F. C. (A)

Bellport (LI-2)
Madey, R. (M)

Bethpage (LI-2)
Algase, L. I. (SM)
Bartowe, M. (A)
Biloon, R. F. (SM)
Bogner, R. D. (M)
Bronstein, F. (A)
Cashman, H. W. (A)
Cullen, F. P. (A)
Dorman, D. (A)
Fried, G. (A)
Gamble, J. H. (M)
Jones, M. W. (A)
Kushner, D. (M)
Madigan, J. P. (A)
Marrara, C. (A)
Martin, M. B. (M)
Nosal, P. (M)
Rice, J. (M)
Rinkel, S. A. (M)
Russell, D. H. (M)
Schenck, H. F. (A)
Schoenfeld, R. L. (M)
Staller, J. J. (SM)
Van Nostrand, P. B. (A)
Yarnall, W. M. (A)

Big Flats (ELM-C-1)
Howe, L. H. (M)

Binghamton (BING-1)
Barowsky, I. (M)
Batcholy, F. (M)
Beausoleil, W. F. (M)
Burton, W. E. (M)
Carpenter, M. I. (A)
Carr, F. P., Jr. (A)
Corderman, A. A. (A)
Crow, E. O. (M)
Day, R. C. (M)
Decker, D. M. (M)
Decker, G. A. (A)
Dickinson, M. M., Jr. (A)
Egan, S. H. (A)
Foss, F. A. (M)
Gilbert, H. G. (SM)
Hajko, H. J. (A)
Hallinan, C. (M)
Hematrect, H. S. (SM)
Hicken, J. (SM)
Higgs, P. T. (A)
Hunt, J. M. (SM)
Ivy, R. C. (M)
Johnson, H. R. (A)
Jones, R. A. (M)
Klinko, E. H. (A)
Klotz, H. J. (SM)
Kornbluh, A. J. (A)
Lavender, R. W. (M)
Lawe, L. C. (A)
Ling, O. T. (SM)
Lockhart, B. W. (M)
Mailhot, P. J. (M)
Mason, R. K. (A)
McPheeters, D. W. (A)
Merchant, J. H. (M)
Nash, R. W. (M)
New, R. F. (M)
Peterson, R. F. (M)
Reed, G. G. (A)
Ricciardelli, G. (M)
Rivera, E. R. (A)
Rowley, R. A. (M)
Saunders, W. F., III (A)
Schwarm, E. G. (SM)
Shatz, J. R. (A)
Sitterlee, L. J. (SM)
Stantz, L. H. (SM)
Toth, W. E. (A)
Vignos, J. P. (M)
Wagenseller, G. W. (A)
West, J. L. (SM)
Wilson, G. D. (M)

Black Creek (ELM-C-1)
Lewis, R. M. (M)

Bloomington (NY-MH-2)
Lockie, O. J. (A)

Blossvale (RIU-1)
Vogel, G. J. (A)

Blue Point (LI-2)
Field, P. L. (M)

Bohemia (LI-2)
Hosek, M. J. (A)

Boston, (BN-1)
Drankhan, V. C. (M)

Breesport (ELM-C-1)
Scullin, C. H. (M)

Brentwood (LI-2)
Day, S. M. (A)
Gould, G. B. (M)
Panzen, W. (A)

Brewerton (SYR-1)
Beighley, E. G., Jr. (A)
Tooley, C. E. (A)

Brewster (NY-2)
Dunford, W. (A)
Hemming, C. B. (M)
Hill, T. W. (M)
Murtha, J. F. (A)

Briarcliff Manor (NY-W-2)
Brooks, L. P. (M)
Burditt, W. F. (A)
Ellen, N. A. (SM)
Grossman, R. (M)
Kruse, J. R., Jr. (M)
Urban, C. (M)

Briarwood (LI-2)
Luber, L. (M)
Nemeroff, I. (A)
Ney, A. L. (M)

Bridgehampton (LI-2)
Chatfield, B. H. (A)

Brightwaters (LI-2)
Becker, S. (M)
Faltin, J. W. (SM)
Geiger, J. M. (M)
Kramer, S. T. (SM)
Lang, J. G. (VA)
Margolin, J. (A)

Bronx (NY-2)
Abbot, G. F., Jr. (M)
Abrahami, I. (A)
Abrevaya, E. (M)
Ackerman, D. D. (A)
Adelsberg, J. (A)
Adler, C. (A)
Anapol, J. (M)
Anaya, F. J. (M)
Andrade, P. L. (A)
Aronowitz, L. (M)
Aubrey, G. (A)
Barjian, H. (A)
Barkey, R. (M)
Barosin, S. (M)
Baumuel, D. (A)
Berger, L. (A)
Besner, A. (M)
Bickel, H. J. (M)
Blumstein, S. E. (A)
Binmenstock, A. (M)
Boles, S. (M)
Bolum, D. R. (A)
Brownstein, N. (A)
Byrne, J. P. (A)
Byrnes, I. F. (F)
Callanan, W. F. (M)
Campbell, G. M. (A)
Caracenl, J. S. (M)
Carnevale, M. D. (A)
Carnevale, V. D. (A)
Carroll, J. J. (A)
Cash, W. I. (M)
Chanrit, L. (M)
Cheil

Kirschner, M. (A)
Klipper, H. (A)
Klose, R. C. (A)
Knapp, J. Z. (M)
Knowles, R. D. (M)
Kraft, B. (A)
Kram, B. (M)
Kuhn, C. W. (A)
Lampert, L. (A)
Lannary, J. (M)
Laos, J. P. (A)
Lefkowitz, E. (A)
Leichtman, J. A. (A)
Lerman, H. (A)
Linder, A. (M)
Littenberg, W. (M)
Low, F. (A)
Lupano, E. L. (A)
Malitz, E. (A)
Manniere, N. E. (A)
Marchesano, J. F. (M)
Marks, G. J. (A)
Mascetti, B. J. (M)
Matarese, J. (M)
Mazzella, S. A. (A)
McDonald, D. F. (M)
McKnight, R. W. (M)
Meyers, J. G. (CM)
Miller, M. P. (M)
Moss, A. M. (A)
Munt, I. (A)
Murphy, J. J. (M)
Muscolino, J. V. (M)
Newman, J. J. (M)
Olsen, L. R. (M)
O'Hara, T. F. (M)
Oisher, J. (M)
Oken, S. (A)
Olick, J. (A)
O'Sullivan, T. J. (M)
Oujevolk, G. B. (A)
Palatinus, A. C. (A)
Partner, A. L. (A)
Pechter, B. J. (A)
Perlman, D. J. (M)
Philactos, C. J. (A)
Pintell, R. H. (SM)
Pizzicara, D. J. (A)
Portnoy, A. (M)
Putterman, H. (M)
Raiti, J. J. (A)
Reiss, E. V. (A)
Repsin, E. (A)
Rieders, A. T. (A)
Rimai, E. (M)
Roberts, H. (A)
Rogal, S. J. (A)
Rooney, W. V. (A)
Rosenfeld, A. (M)
Rosenheck, B. M. (A)
Rossnick, M. (M)
Roth, R. F. (M)
Rothbart, A. (M)
Rush, M. (M)
Sachs, G. I. (A)
Sales, M. (M)
Salit, M. (M)
Salomone, L., Jr. (M)
Sambuco, A. J. (M)
Saudler, A. (M)
Schachter, H. (M)
Schapiro, R. (A)
Schick, W. (A)
Schneider, G. (A)
Schneider, S. (M)
Seidman, H. A. (A)
Selden, N. (M)
Shalvoy, R. E. (M)
Shegirian, P. (M)
Sherman, D. (M)
Slavin, M. J. (M)
Smith, G. J. (A)
Spector, G. (A)
Spielberg, I. R. (A)
Spitz, I. S. (M)
Sporty, S. (A)
Steinberg, I. (M)
Stiefel, A. A. (A)
Sullivan, E. (A)
Teitler, A. (SM)
Trampel, K. M. (M)
Trott, G. G. (A)
Victor, H. W. (SM)
Vogel, S. (A)
Wald, A. S. (M)
Waxler, B. (M)
Weinshanker, J. (M)
Weinstein, J. M. (A)
Weisman, I. (M)
Weiss, S. R. (A)
Weiss, S. (M)
Weissman, S. (A)
Wittels, I. M. (M)
Woelgeav, J. D. (M)
Wolfson, R. B. (M)
Worthen, G. B. (M)
Zadanowsky, L. (A)
Zaslavsky, S. (M)
Zebrowitz, A. R. (M)
Zechnowitz, A. L. (A)
Zenchoff, P. (M)
Zettler, S. G. (M)
Zinn, A. W. (M)
Zoln, M. J. (A)
Zupan, B. (M)

Bronxville (NY-W-2)
Bein, W. (M)
Bowyer, K. M. (A)
Grossman, H. (SM)
Halsall, M. (A)
Hauptmann, M. (M)
Langley, R. H. (F)
McCoy, R. D. (M)
Ossoff, A. (A)
Pastoriza, H. G., Jr. (M)
Rie, C. L. (A)
Tomaino, M. F. (M)
Waldron, R. E. (M)
Whittemore, D. B. (A)
Woods, B. L. (M)

Brookhaven (LI-2)
Handloser, J. S. (M)

Brooklyn (NY-2)
Abilock, S. (M)
Abrams, S. J. (A)
Adams, H. G. (M)
Adams, J. C. (M)
Adelman, N. (A)
Ainbender, N. K. (A)
Albanese, A. P. (M)
Albanese, P. (A)
Allen, A. (M)
Allen, T. (A)
Alperin, N. E. (M)
Altomare, V. A. (A)
Amling, J. L. (A)
Annunzio, S. (A)
Amster, G. S. (A)
Anderson, C. L. (A)
Angelastro, S. P. (A)
Angelo, E. J., Jr. (SM)
Antun, N. G. (F)
Anzalone, A. T. (M)
Arkus, H. (A)
Arntsen, A. P. (M)
Aronoff, M. (M)
Arzt, G. D. (A)
Ascione, N. R. (M)
Ascione, R. (A)
Ashley, H. R. (A)
Autiero, H. J. (M)
Aymar, E. (VA)
Baade, E. C. (A)
Bader, H. (M)
Baggia, M. E. J. (M)
Baggia, R. J., Jr. (M)
Baker, L. C. (A)
Balas, P., Jr. (A)
Ball, I. R. (A)
Baluta, H. J. (M)
Bambara, J. E. (SM)
Baron, A. R. (M)
Barth, A. M. (A)
Bashe, I. (M)
Basilico, A. (A)
Baskin, H. B. (M)
Bauman, M. (M)
Baumel, I. D. (A)
Bayer, I. (M)
Beach, R. (SM)
Beaver, M. W. (M)
Becker, L. (A)
Beidler, I. (M)
Belluck, R. E. (A)
Belove, C. (A)
Berger, M. (M)
Bergstein, L. E. (A)
Berkowitz, B. V. (SM)
Berkowitz, B. (A)
Berlin, J. (A)
Berliner, J. M. (M)
Beriucchi, E., Jr. (M)
Bernfeld, M. (M)
Bernstein, M. H. (A)
Berridge, G. J. (A)
Besmertnik, J. (A)
Bessen, A. S. (A)
Bialkowski, M. (M)
Birnbaum, J. (M)
Blauvelt, A. J. (A)
Blecher, F. (A)
Bligh, E. J. (A)
Bloomberg, H. (M)
Bollen, I. (M)
Bologovsky, G. (M)
Borowski, E. (A)
Bower, J., Jr. (VA)
Boyle, B. (A)
Brathwaite, A. (A)
Bressi, N. P. (M)
Bressner, G. (A)
Briskman, R. D. (A)
Bridgeman, T. H. (SM)
Brill, H. A. (M)
Broman, H. F. (M)
Brower, J. D. (M)
Brown, I. A. (A)
Brown, P. R. (A)
Brown, S. J. (M)
Brownstein, M. (A)
Brubaker, A. E. (M)
Bruckmann, F. E. (A)
Brunone, D. A. (A)
Burt, C. A. (A)
Calabrese, A. (A)
Caligiuri, H. J. (M)
Cammer, H. R. (M)
Candell, R. L. (M)
Candiloti, J. (A)
Cane, P. (M)
Canfora, A. E. (M)
Cannliff, C. J. (A)
Caplan, N. (M)
Capon, J. (M)
Carbona, R. (A)
Caretto, H. L. (A)
Carlin, H. J. (F)
Cassidy, F. T. (M)
Castagnaro, D. (SM)
Cataldo, T. J. (M)
Catanese, J. P. (A)
Catenaro, R. D. (A)
Chaikind, S. L. (A)
Chays, S. (SM)
Chomet, M. (M)
Cinque, A. J. (A)
Cipolla, A. P. (A)
Cohen, C. L. (A)
Cohen, E. (M)
Cohen, H. (A)
Cohen, L. A. (A)
Cohen, L. D. (A)
Cohen, L. (A)
Cohen, M. (A)
Cohen, M. (A)
Coleman, G. E. (A)
Colton, L. (A)
Comminos, R. (A)
Conroe, A. H. (A)
Cooper, N. (M)
Coppola, A. S. (M)
Crawford, J. J. (M)
Crofford, M. (A)
Curran, R. J. (M)
D'Amato, R. J. (SM)
D'Angelo, F. (A)
Danziger, A. (M)
Davidson, S. R. (M)
Davis, I. J. (A)
Day, G. (SM)
Defilippis, L. S. M. (M)
De Grande, R. S. (A)
De Muria, V. J. (M)
Demy, J. C. (M)
Deoul, N. (M)
De Satnick, S. (M)
Deutsch, L. (M)
Deutsch, S. (A)
Diamond, J. M. (M)
Dickman, B. G. (M)
Di Fusco, F. J. (M)
Doulos, N. P. (A)
Doundoulakis, G. J. (A)
Dover, B. M. (A)
Drosin, A. B. (M)
Drum, W. A. (A)
Dudgeon, D. E. (A)
Dzingelis, V. F. (A)
Eckstein, B. V. (M)
Edwards, D. S. (A)
Egolf, R. S. (SM)
Eisenstein, A. M. (M)
Elkin, B. P. (A)
Elovic, A. (M)
Engelson, B. (A)
Engelson, I. (A)
Englander, B. A. (A)
Epstein, S. (A)
Feibish, H. L. (A)
Feigenbaum, H. (M)
Fein, A. (M)
Feinland, S. (A)
Feldman, S. (M)
Felsen, L. B. (SM)
Fetsch, J. T. (SM)
Fillisii, L. P. (A)
Finke, H. A. (M)
Finkel, J. (A)
Finnegan, E. T. (A)
First, M. H. (A)
Fisher, T. (A)
Fishman, T. (M)
Fleischer, V. (M)
Fleischman, M. (A)
Forman, I. (A)
Frank, D. (M)
Frank, J. (A)
Frank, L. M. (A)
Freed, L. E. (M)
Freed, R. M. (A)
Freedman, L. M. (A)
Friedman, H. (M)
Friedman, L. (M)
Frisch, A. J. (A)
Frisch, E. S. (A)
Fuller, H. (A)
Gagliano, A. F. (A)
Galligan, T. J. (A)
Garbato, S. F. (M)
Gardner, S. (A)
Gatzke, F. W. (A)
Geismar, G. G. (A)
George, D. E. (M)
Gershen, B. J. (A)
Gershuny, M. A. (A)
Giampiccolo, P. M. (A)
Gianoplus, A. S. (M)
Ginsburg, L. (M)
Giordano, A. B. (SM)
Giordano, J. J. (A)
Giordano, P. J. (A)
Gladstone, W. (A)
Glantz, H. T. (M)
Glantz, L. M. (SM)
Glickman, M. (A)
Glist, S. (A)
Gloor, B. T. (A)
Gluck, J. (A)
Godfrey, P. (M)
Goetz, H. (A)
Goetz, W. H. (A)
Goldberg, G. (M)
Goldberg, R. J. (M)
Golden, D. (M)
Golden, R. K. (M)
Goldman, I. (M)
Goldstein, A. (A)
Goldstein, I. (A)
Goldstein, J. D. (A)
Goldstein, S. (A)
Goldstein, S. F. (A)
Goodman, A. (A)
Gorecki, E. (M)
Goronin, A. (M)
Gottlieb, A. W. (A)
Gray, G. A. (A)
Greiber, M. (A)
Green, E. H. (M)
Green, M. (A)
Greene, E. (A)
Greenidge, G. (A)
Greenspan, J. (M)
Greenwald C. (A)
Greick, H. L. (M)
Griffin, W. J. (A)
Gross, J. (M)
Grundan, A. I. (M)
Grunberg, E. L. (SM)
Guarding, R. C. (M)
Gurian, S. D. (M)
Guthart, H. (M)
Haas, M. F. (A)
Hachemeister, C. A. (SM)
Hammer, R. M. (SM)
Hanson, E. D. (A)
Harnack, W. P. (A)
Harris, H. H. (M)
Harris, L. (SM)
Harrison, G. S. (A)
Hart, G. K., Jr. (M)
Haviland, R. T. (M)
Hawkins, R. (A)
Heller, J. I. (SM)
Heller, O. (M)
Hembrooke, E. F., Jr. (VA)
Hershkowitz, P. (M)
Hessel, A. (M)
Hirschman, H. (A)
Hoberman, I. (A)
Holmes, A. J. (M)
Honig, W. M. (M)
Hopkins, E. J. (VA)
Horn, A. M. (A)
Horn, I. (M)
Horowitz, I. M. (A)
Horowitz, J. (M)
Horowitz, M. (M)
Howard, R. W. (M)
Hsieh, T. T. H. (A)
Huang, H. (A)
Hunt, D. F. (M)
Hutson, L. S. (M)
Iacono, V. C. (A)
Isaacson, A. (M)
Israel, D. (M)
Jacobowitz, A. (A)
Jacobs, D. M. (A)
Jacobs, M. G. (A)
Jacobson, A. G. (M)
Jagodowski, S. J. (M)
Janhsen, H. K. (A)
Jarschauer, I. (A)
Jaworski, A. M. (A)
Jazwa, E. C. (M)
Jekic, W. W. (A)
Jensen, H. S. (M)
Johnson, A. E., Jr. (M)
Johnson, B. F. (A)
Johnson, W. H. (A)
Jones, A. B., Jr. (SM)
Jongberg, J. B. (A)
Joryez, A. (M)
Joyce, M. V., Jr. (M)
Kadin, J. (M)
Kagan, H. (A)
Kahn, W. K. (M)
Kanton, L. B. (A)
Kantor, D. J. (M)
Kaplun, G. L. (M)
Kaplun, I. (A)
Kaplun, J. (M)
Kaplowitz, M. (A)
Kassel, A. (A)
Katz, G. M. (M)
Katz, J. (A)
Katz, M. D. (M)
Katz, S. (A)
Kaufer, G. E. (M)
Keefe, G. (A)
Keely, J. F. (A)
Kerman, M. (A)
Kerdock, A. M. (M)
Kessler, A. (A)
Kipperman, W. (A)
Kirdahy, E. (M)
Kirshbaum, B. D. (M)
Kirtman, F. (A)
Klapper, J. (M)
Klawanik, F. (SM)
Kline, A. (M)
Kline, M. (M)
Klipper, S. (A)
Klug, S. H. (M)
Knowles, C. C. (A)
Koffer, M. (M)
Korkes, H. (A)
Korrol, C. R. (M)
Kozitzky, W. J. (M)
Kramarenko, P. (M)
Kramer, M. (A)
Krieger, P. (M)
Krimsky, W. J. (M)
Kuras, H. (M)
Kurtz, J. (VA)
Lacher, D. (M)
Laifer, E. (M)
Landow, I. S. (A)
La Presti, P. (A)
Laskin, H. J. (M)
Lawrence, S. (SM)
Leadbeater, C. J. (A)
Lebowitz, R. A. (M)
Ledereich, A. (M)
Lederhandler, S. R. (A)
Lederman, S. (A)
Leibowitz, M. R. (M)
Leight, J. (M)
Leonard, J. P. (M)
Lerner, D. (A)
Letzter, A. O. (A)
Levey, (M)
Levin, S. (M)
Levine, E. L. (M)
Levine, I. (A)
Levine, S. (A)
Levy, B. (A)
Levy, S. Y. (M)
Liebman, P. M. (A)
Liebreich, E. (A)
Ligorner, M. M. (M)
Likel, H. C. (SM)
Linker, M. E. (M)
London, M. M. (M)
Loshin, A. M. (A)
Lowen, L. B. (A)
Lynch, T. J. (M)
MacLean, W. (M)
Malina, M. (A)
Mancini, U. S. (M)
Manoukian, D. N. (A)
Marantz, S. A. (M)
Marcinkowski, C. J. (A)
Marderstein, S. (A)
Marolda, E. A. (A)
Marshall S. L. (A)
Mattisinko, N. S. (M)
Mauro, A. (A)
Mazziotti, I. J. (A)
McCormick, L. P. (A)
McCoy, R. J. (A)
McGuire, T. J. (A)
McKeown, F. J. (A)
McNelis, P. J. (M)
Mednick, S. (A)
Meisner, R. P. (A)
Messina, A. S. (A)
Meth, I. (M)
Meyer, S. (SM)
Milazzo, S. (M)
Miller W. A. (M)
Milotta, S. S. (A)
Mindell, M. I. (A)
Minkin, E. (M)
Mitchell, S. L. (A)
Mittman, S. A. (A)
Moderacki, E. J. (A)
Montuori, A. V. (M)
Moore, J. B. (SM)
Morakis, J. C. (M)
Mordkowitz, I. (M)
Morgan, E. K. (A)
Morris, A. A. (A)
Morton, A. R. (SM)
Moses, A. I. (A)
Moskowitz, N. (A)
Multari, A. M. (M)
Musacchio, A. A. (A)
Myers, H. S. (A)
Nachtigall, S. (SM)
Naps, S. (M)
Nelson, B. C. (M)
Nelson, E. G. (A)
Nelson, H. C. (M)
Nelson, W. (A)
Nelson, W. F. (M)
Nervik, J. M. (A)
Neveroski, Y. J. (A)
Newdorf, A. S. (A)
Nicolosi, J. P. (M)
Nirenberg, A. (A)
Nisteruk C. J. (M)
November, F. D. (A)
O'Donnell, J. F. (A)
Ogoniak, T. J. (A)
Okean, H. C. (M)
Oliner, A. A. (SM)
Ost, S. B. (M)
Ostrov, B. (M)
Oswald, H. (M)
Oxley, J. E. (M)
Pajak, A. W. (A)
Papoulis, A. (SM)
Pealman, J. (M)
Pecoraro, C. J. (M)
Peillow, L. M. (M)
Pelitsch, E. J. (M)
Pelner, N. (M)
Penikas, A. (A)
Perlman, I. (M)
Pesca, F. J. (A)
Petroulakis, S. G. (A)
Piccione, N. A. (M)
Pitrelli, P. (A)
Pivnik, S. I. (A)
Pizzirusso, A. J. (M)
Platzman, M. M. (M)
Plawsky, W. I. (M)
Polen, E. (M)
Pollack, P. (A)
Poor, L. D. (A)
Popper, J. N. (A)
Posklensky, G. (A)
Posner, W. (A)
Posternak, H. (A)
Prensky, S. D. (M)
Publiese, L. (A)
Ralidis, W. (A)
Rall, H. L. (M)
Ramirez, E. V. (M)
Rappoport, J. F. (M)
Reader, M. (M)
Reichfield, G. (A)
Reid, J. J. (M)
Reinhardt, G. (A)
Reinish, G. B. (M)
Rente, F. A. (M)
Richardson, R. J. (A)
Richmond, J. F. (A)
Ritter, R. E. (A)
Roberts, R. P. (M)
Rock, G. G. (A)
Rogers, F. A. (A)
Rohnik, J. A. (M)
Romano, S. A., Jr. (M)
Romeo, D. F. (A)
Rose, M. (M)
Rose, S. I. (M)
Rosen, A. (A)
Rosenberg, E. (M)
Rosenberg, M. (A)
Rosenthal, M. P. (M)
Ross, C. J. (M)
Roth, H. A. (M)
Rowe, J. (M)
Roy, R. J. (M)
Rubin, A. (M)
Rubin, I. S. (M)
Rudner, B. S. (SM)
Rudofsky, B. I. (M)
Rudofsky, R. (M)
Ryan, E. H. (M)
Ryan, J. J. (A)
Sackman, D. A. (M)
Sackson, M. M. (A)
Sadowski, H. (A)
Salmon, F. A. (A)
Salz, H. (M)
Sandler, M. (A)
Sandler, S. A. (A)
Savary, D. L., Jr. (M)
Savino, R. T. (A)
Sawelson, A. L. (SM)
Schaten, J. (A)
Schermer, D. (A)
Schlatter, W. J. (A)
Schlenger, J. L. (M)
Schmeltzer, R. A. (M)
Schneider, H. K. (A)
Schneider, I. (M)
Schornstein, M. L. (M)
Schwartz, J. H. (A)
Schwartz, S. (A)
Schwartz, R. (A)
Schwartz, S. (M)
Scinto, L. L. (A)
Seewald, E. J. (M)
Segal, J. B. (A)
Segreto, A. J. (A)
Sezack, S. K. (A)
Sferrino, V. J. (M)
Shafiroff, H. (SM)
Shakun, M. F. (M)
Shaller, A. (M)
Shapiro, F. (A)
Sheridan, T. R. (A)
Sherman, H. (A)
Shinnerer, S. M. (A)
Shivack, I. M. (M)
Shmoys, J. (SM)
Shubel, E. J. (M)
Siclari, V. (A)
Sigona, J. F. (M)
Silver, B. L. (VA)
Silverberg, A. (A)
Silverberg, M. (A)
Silversmith, G. B. (M)
Simon, H. (A)
Simon, L. H. (A)

Simonelli, N. A. (A)
Siskind, S. G. (M)
Sistino, F. J. (A)
Sitomer, A. A. (A)
Skeltved-Jensen, E. (A)
Sklar, S. (M)
Slatic, G. A. (A)
Smilen, L. I. (M)
Smith, E. J. (M)
Smith, R. H. (M)
Smykowski, C. P. (M)
Snyder, J. B. (M)
Sobel, A. (SM)
Sokol, L. E. (A)
Solomon, S. M. (A)
Sontag, H. M. (M)
Sorney, E. V. (A)
Spector, L. (M)
Spencer, G. D. (A)
Sperling, I. (A)
Steinman, S. (M)
Sterman, I. I. (M)
Stiel, J. (M)
Stone, A. P. (A)
Sturiale, P. J. (A)
Summerville, R. W. (A)
Sutkin, S. (M)
Sweet, L. O. (A)
Swift, W. C. G. (A)
Szydlowski, G. J. (A)
Talley, D. (SM)
Tambasco, J. F. (M)
Tashjian, A. (M)
Tesman, G. H. (A)
Teitelbaum, M. (A)
Teitelbaum, M. G. (A)
Tellerman, J. (A)
Temkin, W. J. (A)
Templeman, L. I. (A)
Thomas, R. O. (M)
Thompson, M. A. (A)
Tierney, T. J. (M)
Topper, L. (A)
Trendowski, C. R. (A)
Troiano, A. (A)
Truxal, J. G. (SM)
Turczyn, W. A. (M)
Urevitch, S. J. (A)
Uslan, S. D. (M)
Vallese, L. (SM)
Veder, A. (A)
Vetrano, J. (M)
Viola, R. D. (M)
Viola, V. (A)
Vitrogan, D. (SM)
Waas, G. J. (M)
Wagner, R. C. (M)
Wallace, V. L. (M)
Wambold, R. F. (M)
Ward, W. P. (M)
Watine, M. N. (A)
Watstein, L. (A)
Weil, J. L. (A)
Weinberger, K. C. (M)
Weiner, L. H. (A)
Weiner, W. (M)
Weingarten, A. (M)
Weinman, M. M. (A)
Weinstein, D. C. (M)
Weinstein, H. M. (A)
Weintraub, S. (A)
Weiss, A. A. (A)
Weissman, B. (A)
Weissman, E. (M)
Weitz, M. K. (A)
Werman, H. M. (M)
Wern, D. W., Jr. (A)
Williams, J. H. M. (M)
Willis, P. A. (M)
Wilson, S. I. (A)
Wilson, F. B. (A)
Wishna, S. (M)
Wiss, G. (A)
Witlin, J. J. (A)
Wolf, E. M. (M)
Wolff, E. J. (A)
Wolff, G. (A)
Wolfire, K. H. (A)
Wolk, N. (SM)
Wolsky, M. (M)
Yellen, S. (A)
Yudin, B. (M)
Zadro, A. P. (A)
Zarctsky, A. (M)
Zaruni, A. (M)
Zauderer, J. (A)
Zecca, A. (A)
Zeiger, L. B. (M)
Zetzkoff, A. (M)
Zimet, M. M. (A)
Zitzmann, F. R. (M)
Zivitofsky, F. (A)
Zouridies, V. G. (M)
Zupnick, I. N. (M)

Brooktondale (ITH-1)
Hall, R. E. (M)
Jacomini, O. J. (A)
Parker, R. R. (M)

Buffalo (BN-1)
Albert, C. J. (M)
Allen, J. K. (A)
Ames, R. W. (A)
Anderson, R. T. (M)
Arrison, G. R., Jr. (A)
Barcaya, D. A. (A)
Bargman, M. (A)
Barrowcliff, T. A. (A)
Bartnik, J. C. (A)
Bauer, L. H. (A)
Bauman, N. C. (M)
Beach, J. B. (M)
Becker, H. D. (A)
Bennett, J. E. (A)
Brantley, J. Q., Jr. (SM)
Buettner, R. B. (A)
Carlson, A. R. (M)
Chapman, S. (SM)
Chimera, A. J. (M)
Clausen, E. B. (A)
Clune, E. F. (M)
Cuthill, W. R. (M)
Cutler, R. H. (A)
Davis, J. E. (A)
De Joseph, A. (M)
Dowdell, V. L., Jr. (M)
Doyle, W. C. (M)
Dybowski, A. J. (VA)
Earl, H. D. (M)
Eckert, E. H. (M)
Erdman, B. K. (M)
Everingham, L. R. (SM)
Fahling, W. C. (M)
Farber, M. (A)
Fischer, F. P. (SM)
Flood, W. A., Jr. (A)
Fogel, C. M. (M)
Frank, L. E. (A)
Freeman, R. W. (A)
Freund, H. G. (M)
Fryer, W. D. (M)
Gavin, R. F. (A)
Gibbons, H. M. (A)
Gillespie, J. B. (A)
Gross, A. M. (A)
Harriman, T. J. (M)
Hayman, R. A. (A)
Hettinger, M. (A)
Hoffman, K. B. (SM)
Holfelder, R. G. (M)
Holmes, W. S. (SM)
Horton, A. B., Jr. (A)
Horvath, J. G. (A)
Hoyler, E. T. (A)
Huber, C. W. (VA)
Hunting, R. A. (A)
Iddings, H. G., Jr. (SM)
Jackson, R. W. (A)
Jocoy, E. H. (M)
Johnson, R. C. (A)
Jondle, J. J. (M)
Kahn, D. A. (M)
Kelly, R. E. (M)
Kingsley, R. J. (M)
Kitchin, H. W. (SM)
Lauer, C. A. (A)
Lautz, C. F., Jr. (M)
Lenfest, G. C., Jr. (M)
Lenz, H. G. (A)
Lerner, T. (A)
Lindberg, E. (A)
Martin, P. C. (A)
McDonough, S. L. (M)
Meese, H. F. (A)
Michnik, L. (M)
Milscher, R. W. (A)
Moncton, H. S. (M)
Morrison, H. V. (M)
Nazon, J. S. (A)
Newton, D. J., Jr. (M)
Olden, R. B. (A)
Okonski, C. B. (M)
Okonski, E. S. (A)
Orlowski, C. J. (A)
Phillips, J. (M)
Powell, R. W. (A)
Pritchard, F. E. (A)
Puttick, A. W. (A)
Raney, J. J. (SM)
Ratajczak, A. A. (A)
Reisch, L. P. (A)
Rhodes, D. R. (SM)
Ridgeway, F. B. (M)
Rinaldi, L. D. (M)
Rotman, W. R. (M)
Rusnak, W. (M)
Schultze, W. J. (A)
Schwartz, E. C. (A)
Siegel, V. H. (M)
Spoon, G. E. (M)
Spooner, M. G. (M)
Stafford, W. F., Jr. (A)
Steger, D. J. (A)
Stengel, C. J., Jr. (A)
Stevens, H. V. (A)
Stieber, A. (A)
Taylor, F. E. (M)
Thalner, R. R. (SM)
Toth, G. L. (A)
Unger, W. J. (M)
Van Allen, J. W. (A)
Van Every, B. (A)
Wagner, R. W. (M)
Watson, W. H (M)
Waud, E. C. (VA)
Welch, J. P. (SM)
Weppner, B. H. (M)
Welch, D. P. (M)
Wightman, C. W., Jr. (A)
Wilder, L. D. (M)
Wilson, J. E. (M)
Wrobel, R. E. (M)
Zimmerman, E. A. (A)

Burnt Hills (SCH-1)
Hamren, S. D. (A)
Reynolds, M. T. (M)
Welch, D. I. (M)

Caledonia (ROC-1)
Allen, S. E. (M)
Angevine, O. L., Jr. (SM)
Lawson, H. W., Jr. (M)

Calverton (LI-2)
Herbig, A. J. (A)

Cambria Heights (LI-2)
Koenig, R. H. (A)
Pyros, E. (M)
Smith, P. (M)
Zelnes, B. (A)

Camden (RU-1)
Hickey, J. B. (A)

Camillus (SYR-1)
Best, R. C. (M)
Gordon, R. T. (A)
Olivier, R. M. R. (M)
Peppiatt, H. J. (M)
Petrie, A. F. (A)
Place, J. F. (M)
Schweers, O. H. (SM)
Strawn, R. K. (A)

Campbell Hall (NY-MH-2)
Martin, G. B., Sr. (A)

Canastota (SYR-1)
Albanese, A. A. (M)

Carle Place (LI-2)
Barbaccia, A. J. (A)
Bossinger, A. L. (M)
Drasney, G. C. (A)
Hekaros, J. S. (A)
Lincoff, W. (M)
Matthews, L. M. (M)
Rector, L. V. (M)
Vadus, J. R. (M)

Carmel (NY-2)
Fredrick, A. H. (M)
Lewinski, J. (SM)
Rath, G. J. (A)

Castleton-on-Hudson (SCH-1)
Bradley, B. F., Jr. (M)

Catskill (NY-MH-2)
Gardner, C. B. (A)

Cazenovia (SYR-1)
Chamberlain, P. L. (A)
Hodges, G. W. (A)
Kinsey, R. R. (M)
Learned, J. J. (M)
White, J. E. (M)
Winslow, W. R. (M)

Cedarhurst (LI-2)
Dick, T. M. (M)
Mercier, A. E. (SM)
Merlin, A. G. (A)
Norris, S. (M)

Cementon (NY-MH-2)
Krisniski, S. V. (M)

Centereach (LI-2)
Clark, M. J. (A)
Engel, L. (M)

Centerport (LI-2)
Dergane, W. (M)
Monsees, F. (A)
Pichert, J. (A)

Central Islip (LI-2)
Monsees, F. (A)
Samoluk, P. (A)

Chadwicks (RU-1)
Kupfer, V. C. (A)

Chappaqua (NY-W-2)
Buttolph, J. D. (A)
Deltenbaugh, F. S., III (M)
Kellogg, D. S. (SM)
Novak, W. D. (M)
Speller, J. B. (SM)
Taggart, C. E. (A)
Vladimir, L. O. (SM)
White, R. A. (A)

Cheektowaga (BN-1)
Frazer, A. W., Jr. (A)
Lewicki, W. M. (A)
Slater, R. H. (M)
Walbesser, W. J. (M)

Chenango Bridge (BING-1)
Carpenter, J. F. (A)
Jones, H. E. (A)

Chittenango (SYR-1)
Bray, T. E. (A)

Churchville (ROC-1)
Chapin, D. W. (A)

Churubusco (SCH-1)
Decosse, D. N. (A)

Clarence (BN-1)
Curtis, R. E. (A)
Doolittle, J. H. (SM)
Greatbatch, W. (M)
Kellerman, R. E. (M)
Mott, R. H. (M)
Nuckolls, R. G. (SM)
Pelton, F. M. (M)

Clay (SYR-1)
Brady, D. J. (M)
Carlson, E. R. (SM)
Dalton, W. D. (A)
Flood, J. L. (A)
Sahi, G. K. (M)
Stark, J. A. (A)
Zito, A. J. (M)

Cleverdale (SCH-1)
Mead, M. S., Jr. (SM)

Clinton (RU-1)
Baldwin, G. F. (SM)
Battey, H. B. (SM)
Mayer, H. F. (F)
McMillan, R. E. (SM)
Oberg, A. C. (M)
Sears, C. B. (M)
Turner, M. L., Jr. (A)

Clinton Corners (NY-MH-2)
Brooks, F. P., Jr. (M)

Clyde (ROC-1)
Dyer, R. F., Jr. (A)
Hauge, K. (A)
Ritter, V. H. (A)
Schall, R. R. (A)
York, R. A. (SM)

Cold Spring Harbor (LI-2)
Burr, R. P. (SM)
Tyndall, R. M. (M)

Cold Spring-on-Hudson (NY-2)
Lawrence, G. (A)

College Point (LI-2)
Belock, H. D. (SM)
Dubin, L. (M)
Fury, A. E., Jr. (A)
Hoffman, R. A. (A)
Rilling, J. C. (A)
Shostak, M. (A)
Sleven, M. O. (A)
Stiepel, G. W. (A)
Wappler, A. C. (A)

Commack (LI-2)
Duval, A. N. (A)
Levine, B. (SM)
Loss, M. B. (M)
Matylewich, T. D. (A)

Congers (NY-2)
Levy, G. (A)

Constantia (SYR-1)
Day, R. G. (SM)
Elhoff, W. C. (A)

Copiague (LI-2)
Buda, P. V (A)
Mautner, R. S. (SM)

Corfu (ROC-1)
Jennings, R. W. (M)
Mech, H. D. (A)

Corning (ELM-C-1)
Allen, R. E. (M)
Bell, A. N. (M)
Brouneus, H. A. (M)
Cammen, M. M. (M)
Craumer, H. S. (A)
Davis, J. K. (SM)
Dawson, A. W. (M)
Degan, C. M. (M)
Griest, E. M. (M)
Guyer, E. M. (SM)
Hamjian, R. V. (M)
Hocker, J. P. (M)
Houghton, A. Jr. (A)
Hunt, M. H. (M)
Knysh, W. J. (A)
La Dieu, F. A. (A)
Lineweaver, J. L. (M)
Mann, R. H. (A)
Marafioti, J. J. (A)
McKnight, W. H. (A)
Muller, J. S. (M)
Munier, J. H. (M)
Nitsche, J. E. (M)
Pinkston, J. C., III (M)
Sackinger, J. P. (M)
Schelby, F. (M)
Shaver, W. W. (M)
Shaw, M. R., Jr. (M)
Sheldon, J. L. (F)
Smith, G. P. (M)
Southworth, G. H. (M)
Splahan, M. T. (A)
Wetmore, W. L. (A)
Wight, H. M. (M)

Cornwall-on-Hudson (NY-MH-2)
Hollberg, R. W. (A)
Peck, N. D. (A)

Corona (LI-2)
Balacki, S. J. (A)
Boychenko, O. (M)
Germano, G. (A)
McGovern, F. X. (M)
Milano, J. (A)
Pafundi, M. F. (A)
Ruffino, L. V. (M)
Silbar, J. I. (A)
Spatz, S. (A)
Vallades, W. (A)

Cortland (SYR-1)
Ciccoricco, F. A. (M)

Crestwood (NY-W-2)
Gehrig, J. W. (A)
Krauer, O. (A)

Croton-on-Hudson (NY-W-2)
Crawford, F., Jr. (M)
Fisher, S. (M)
Lescarboura, A. C. (SM)

Cuba (ELM-C-1)
Griffin, S. J. (M)
Miller, E. A. (M)

Dansville (ROC-1)
Blum, R. J. (A)

Deer Park (LI-2)
Buff, C. (SM)
Levine, A. M. (M)
Schindwolf, R. (A)

Delmar (SCH-1)
Rechnitzer, B. W. (A)

Depew (BN-1)
Diener, H. C., Jr. (M)
Hatok, W. (A)
Trabka, E. A. (M)
Whitbeck, R. F. (M)

De Witt (SYR-1)
Briggs, A. S. (M)
Clark, H. T. (SM)
Copp, J. H. (SM)
Coulbourn, J. M. (M)
Davis, R. J. (M)
Dean, W. W. (SM)
Dickey, F. R., Jr. (SM)
Gifford, R. P. (M)
Harnett, D. E. (F)
Heiden, C. M. (SM)
Hyde, H. I. (A)
Jackson, C. H. (SM)
Kovacs, F. M. (M)
Lowry, H. R. (A)
Perkins, D. W. (M)
Records, J. K. (M)
Simon, C. J. (M)
Taylor, F. W. (M)
Watts, D. E. (SM)

Dobbs Ferry (NY-W-2)
Crawford, R. V. (SM)
Espersen, G. (F)
Ham, D. L. (A)
Miller, D. H. (M)
Newman, L. (M)
Rose, A. J. (M)
Shein, S. (A)
Siegall, B. (A)

Douglaston (LI-2)
Agree, L. (M)
Barth, J. E. (M)
Batcher, R. R. (F)
Bush, F. J. (A)
Cohen, S. A. (M)
Dumaresq, J. (A)
Dunn, S. B. (A)
Hertzberg, R. E. (A)
McClellan, G. B. (SM)
Neeck, J. E. (A)
Pollack, A. S. (SM)
Shanck, R. B. (SM)
Sherman, P. (A)
Todd, P. G. (A)
Tyson, B. F. (SM)
Weinstein, G. (A)

Dunkirk (BN-E-1)
Houser, H. D. (A)

East Amherst (BN-1)
Lund, T. J. (A)

East Aurora (BN-1)
Benecke, J. (A)
Booth, K. V. (M)
Frazier, R. E. (M)
Hopkins, J. E. (M)
Menagh, F. H. (SM)
Roess, L. G. (M)
Weise, R. W. (SM)

East Bloomfield (ROC-1)
Munson, B. (M)

Eastchester (NY-2)
Bomeisler, R. E. (A)
Masucci, C. (M)
McGinnis, F. (SM)

East Durham (NY-MH-2)
Van Bergen, H. (M)

East Elmhurst (LI-2)
Elser, A. C. (A)
Gordon, S. M. (A)
Immarco, A. E. (A)

East Hempstead (LI-2)
Fay, A. H. (M)

East Irvington (NY-W-2)
Kaskon, L. J. (A)

East Meadow (LI-2)
Basil, A. (M)
Brownman, H. L. (M)
Byron, M. (A)
Cerino, R. (M)
Duggan, J. R. (SM)
Farber, B. (M)
Feerking, H. W. (M)
Frost, S. (M)
Garrett, B. R. (A)
Giulianelli, R. M. (M)
Glasser, H. (A)
Gould, L. M. (SM)
Grob, B. (M)
Grodzinsky, S. (M)
Gruber, P. (M)
Kaplan, M. (M)
Kunz, A. B. (A)

Greenberg, J. G. (SM)
Wind, M. (SM)

East Setauket (LI-2)
Chaffee, M. A. (M)

East Syracuse (SYR-1)
Bachmann, A. E. (A)
Downie, J. W. (SM)
Haynes, J. S. (M)
Johnson, M. A. (M)
Johnson, G. L. (A)
Juhlin, J. A., Jr. (M)
Krackhardt, E. M. (A)
Kraiman, H. (M)
Krenitsky, P. (A)
Morrison, R. H. (M)
Mueller, W. J. (M)
Phillips, A. B. (M)
Pinkstaff, L. R. (A)
Raillard, H. (M)
Rosen, C. A. (SM)
Shain, E. (A)
Shaskey, E. N. (M)
Sherman, J. H., Jr. (M)
Smith, W. E., Jr. (A)
Smith, W. F., Jr. (A)
Sutton, R. B. (A)
Wilkenhunt, J. A. (A)
Wilson, G. G. (M)

East Williston (LI-2)
Doucette, A. R. (M)
Galella, P. F. (SM)
Lyness, H. J. (M)
McProud, C. G. (M)
Packer, L. (M)
Rebeck, C. S. (A)
Rothstein, M. (SM)

Eden (BN-1)
Pontius, J. C. (M)

Eddyville (LI-2)
Vaulman, R. M. (M)

Edgemere (LI-2)
Bernstein, S. S. (M)
Musketos, A. (M)
Schwartz, A. (A)

Eggertsville (BN-1)
Horkowski, C. J. (M)
Caserta, J. N. (A)
Hardy, L. H. (M)
Harvey, H. F. (M)
McCord, W. M. (SM)
Mezger, C. C. (M)
Reinnagel, R. E. (SM)
Rizzo, S. J. (A)
Rosenfelder, G. S. (M)
Schneeberger, R. F. (A)
Steele, K. P. (A)

Ellenville (NY-MH-2)
Green, J. (M)
Schwartz, J. (M)

Elma (BN-1)
Hunt, R. A. (M)

Elmhurst (LI-2)
Adamthwaite, F. V., Jr. (M)
Alsberg, H. (A)
Berendsen, C. G. (M)
Blumenstock, N. R. (M)
Carides, T. (M)
Emillo, G. A. (A)
Erlichson, H. (M)
Erman, A. (A)
Findlay, D. A. (A)
Francoeur, G. R. (M)
Holmer, W. J. (A)
Kenneth, V. (M)
Kestenbaum, H. S. (A)
Leonard, J. P. (M)
Morrone, J. J. (M)
Page, A. E. (A)
Pelzer, B. (A)
Perliss, R. E. (A)
Perzezaty, T. S. (A)
Rebel, G. L. (A)
Scheuermann, R. J. (M)
Shapiro, L. C. (SM)
Stern, M. L. (M)
Stuhler, R. E. (A)
Tamasi, A. P. (A)
Tomberg, V. T. (SM)
Toufexis, S. (M)

Elmira (EL-M-C-1)
Abney, R. K. (M)
Aldrich, D. F. (SM)
Alexander, J. J. (A)
Antonlou, M. T. (M)
Anway, H. E. (A)
Argyle, L. C. (A)
Baxter, F. C., Jr. (A)
Bisko, T. (A)
Buck, D. C. (M)
Cherry, S. J. (SM)
Dart, H. F. (SM)
Dahl, J. E. (M)
Elane, B. (A)
Freggens, R. A. (M)
French, A. F. (A)
Gillis, W. (M)
Greene, T. A. (M)
Hayter, W. R., Jr. (A)
Hostetler, C. L. (M)
Husson, C. (M)
Johnson, W. C. (SM)
Keeton, T. G. (M)
Kilpatrick, H. B. (A)
Knochel, W. J. (SM)
Knowles, D. D. (SM)
Lederer, E. A. (F)
Lempert, J. (SM)
Lindequist, P. T. (M)
Link, V. F. (A)
Long, E. D. (M)
Long, P. D. (M)
Lucy, C. J. (A)
Mack, M. C. (SM)
Martin, L. (SM)
Miller, C. F. (SM)
Millett, R. G. (A)
Moran, W. G. (A)
Mulligan, J. M. (M)
Okress, E. C. (SM)
Oleson, D. R. (M)
Orth, R. T. (SM)
Ramich, C. E. (SM)
Rial, W. S. (M)
Riggen, T. K. (M)
Riggs, J. O. (A)
Rogell, P. S. (M)
Sheehe, J. J. (A)
Simpson, K. R. (M)
Stoddard, R. N. (A)
Sturges, R. P. (M)
Sziklai, G. C. (F)
Ushaw, V. (SM)
Vogt, F. C. (M)
Washburn, G. W. (A)
White, L. E. (M)

Elmira Heights (ELM-C-1)
Bortkiewicz, J. (A)

Elmont (LI-2)
Ballard, F. (A)
Blumenfeld, A. S. (A)
Chapel, I. J. (SM)
Coniglio, P. J. (A)
Dong, J. G. (M)
Dressler, R. (SM)
Franceschini, J. B. (M)
Gould, S. (M)
Griffen, K. A. (A)
Griffing, W. W. (M)
Hanover, A. M. (A)
Hasenfus, R. G. (A)
Kuck, G. P. (M)
Kuhn, J. J. (M)
Lee, S. (A)
Lutz, C. J. (A)
Rhodes, M. L. (A)
Riemenschneider, W. W. (A)
Seidman, A. H. (M)

Elmsford (NY-W-2)
Carlisle, R. W. (SM)
Chaudhuri, D. (M)
Greenbaum, W. H. (M)
Myers, H. W. (M)
Pearson, H. A. (M)
Von Baudissin, J. (M)

Endicott (BING-1)
Akmenkalns, I. G. (M)
Allen, G. W. (M)
Bachman, D. F. (M)
Baldauf, D. R. (A)
Boylan, R. P. (M)
Brannen, P. M. (M)
Branning, H. F. (M)
Briggs, C. R. (M)
Brooke, A. W. (A)
Cheng, T.-H. (M)
Damron, D. H. (A)
Draskar, K. I. (A)
Dorrell, C. E. (A)
Droege, F. J. (A)
Frizzell, J. H. (M)
Fruci, N. A. (M)
Hamburgen, A. (M)
Haskins, R. J. (A)
Herzig, J. F. (M)
Higley, R. J. (A)
Hyde, P. L. (A)
Johnson, R. M. (A)
Johnston, W. H., (M)
Kepner, L. C. (M)
Kilmer, F. G. (M)
Knight, D. E. (M)
Kostyshyn, B. (A)
Kovalchick, N. (M)
Kramer, N. H. (M)
Lloyd, J. W., Jr. (A)
Lohman, I. H., Jr. (M)
Lord, P. A. (M)
Lorscheider, E. B. (M)
Mathers, H. W. (A)
Miller, W. C. (M)
Mulock, L. E. (M)
Pasternak, E. (M)
Pawletko, J. P. (M)
Potts, R. (A)
Pratt, R. E. (M)
Pratt, R. L. (M)
Pratt, W. H. (M)
Pyle, C. L. (M)
Remond, F. X. (A)
Roehm, F. J. (M)
Sculley, G. A., Jr. (M)
Shell, E. F. (M)
Shield, C. F., Jr. (M)
Smalto, F. A. (M)
Southard, C. D. (A)
Stott, C. B. (A)
Strup, C. F., Jr. (M)
Wood, E. W. (M)
Yurgartis, W. C. (A)

Endwell (BING-1)
Bloom, E. M. (M)
Danek, W. L., Jr. (M)
Holderman, C. C. (M)
Hutchison, H. W. (M)
La Joie, Z. A. (M)
Mac Donald, R. M. (A)
Maslak, M. (M)
Sullivan, D. L. (M)
Wagner, J. L. (SM)
Yeager, C. J. (A)
Zehner, W. J. (M)

Fairport (ROC-1)
Hamlin, N. B. (A)
Van Lunen, R. D. (M)

Farmersville Station (BN-1)
Wiley, V. H. (A)

Farmingdale (LI-2)
Anderson, D. K. (M)
Bernstein, H. (M)
Cap, S. T. (A)
Clothier, C. M. (A)
Dannals, H. J. (M)
Dery, G. F. (M)
Dispigna, F. (M)
Gueses, M. J. (A)
Harder, J. F. (M)
Kauper, L. T. (A)
Maguire, J. P. (SM)
Niewenhous, J. H. (M)
Pagano, K. J. (A)
Ragni, V. F. (M)
Schwab, C. E. (M)
Seitz, S. S. (M)
Sheffield, W. B. (SM)
Sicuranza, A. J., Jr. (A)
Spector, A. (M)
Tchiunis, M. P. (A)
Theroux, E. J. (A)
Thorne, H. W. (A)
Winton, H. M. (A)
Wolfe, M. L. (A)
Woodward, A. E. (M)

Far Rockaway (LI-2)
Haynes, N. M. (M)
Liegey, P. H. (A)
Mentcher, L. (M)
Weiner, G. (A)

Fayetteville (SYR-1)
Campbell, C. M. (M)
Costas, J. P. (SM)
Doolittle, W. T., Jr. (M)
Doxey, G. A. (A)
Eliot, A. B. (M)
Eye, R. P. (A)
Gangberg, F. (M)
Gethmann, R. B. (M)
Haller, G. L. (F)
Hannah, W. M. (A)
Hartman, D. K. (A)
Hassel, E. W. (M)
Heartz, R. A. (M)
Johnson, A. B. (A)
Jones, J. L. (SM)
Kordalewski, A. P. (M)
Liddle, W. A. (A)
Messer, H. G. (SM)
Mushrush, R. S., Jr. (M)
Nash, C. C., Jr. (M)
Perry, E. V., Jr. (SM)
Prestwich, G. D. (M)
Reinsmith, A. M. (M)
Russell, J. B., Jr. (SM)
Ryerson, J. D. (A)
Sinback, W. R. (M)
Thomas, H. P. (F)
Totten, H. O. (M)
Trotter, G. C. (M)
Varlaxz, A. J. (SM)
Varga, J. A. (M)
Waugh, G. T. (M)
Woodward, G. F. (A)

Fernwood (SYR-1)
Manwarren, T. E. (M)

Fishkill (NY-MH-2)
Curtis, R. T. (A)
Farrell, A. C. (A)
Hallock, D. G. (M)
McQuaid, W. K. (M)
Stahl, W. L. (SM)
Templeton, H. S. (A)
Thompson, R. L. (M)

Floral Park (LI-2)
Axel, A. J. (M)
Barbera, R. R. (M)
Becchetti, F. J. (A)
Buble, F. L. (A)
Campbell, J. B. (M)
Chaimowitz, I. (M)
Cosonas, C. (A)
Eberle, E. E. (M)
Ely, F. E. (M)
Fabbricatore, L. (A)
Flax, M. J. (M)
Garrand, L. W. (SM)
Gunnell, G. T. (VA)
Hallden, F. C. (SM)
Hill, K. J. (M)
Hittner, G. (SM)
Imholen, G. J. (A)
Kerbel, S. J. (M)
Lalty, I. A., Jr. (M)
Loynes, O. H. (VA)
Malchman, F. C. (A)
Marshall, T. A. (M)
McPhail, J. H. (A)
Meyer, J. W. (M)
Mooney, V. J. (SM)
Moss, D. G. (M)
Nixon, G. M. (SM)
Peaceman, H. T. (M)
Schuldein, C. M. (M)
Sion, E. (M)
Snitzer, M. S. (M)
Spittal, W. R. (M)
Swanteck, R. (A)
Swartzel, K. D. (SM)
Toomey, J. F. (M)
Troupp, L. B. (A)
Tuerck, W., Jr. (A)
Viadella, J. W. (A)
Weidmann, L. J. (M)
Wolf, E. (A)
Zopf, V. R. (M)

Flushing (LI-2)
Adolph, A. R. (M)
Altmann, S. (A)
Amberger, D. J. (M)
Arany, D. M. (SM)
Ashinsky, M. (M)
Auerbach, L. (A)
Auerbach, M. (SM)
Aull, W. (SM)
Barber, A. W. (SM)
Barron, K. F. (M)
Barry, S. (A)
Batista, W. C. (A)
Berkowitz, M. W. (M)
Bernhardt, C. A. (M)
Bettan, M. L. (M)
Blass, J. (M)
Boltan, M. (A)
Boyd, C. H. (A)
Boyer, J. M. (SM)
Brody, J. (M)
Carlan, L. B. (M)
Castro, S. J. (A)
Chako, N. (A)
Chaskin, H. (A)
Chin, H. C. (A)
Clinton, L. J. (M)
Cohn, N. M. (M)
Collins, J. V., Jr. (A)
Cubert, J. S. (A)
Czernysz, A. (A)
Dawson, H. E. (A)
De Clerck, C. E. (A)
Del Giorno, A. E. (M)
Demarest, C. J. (A)
De Piola, F. J. (A)
Dick, A. L. (M)
Di Franco, J. V. (A)
Dzik, A. (A)
Elefant, J. (A)
Feinman, G. (M)
Feldman, L. L. (M)
Frangoulis, S. I. (SM)
Fredricks, I. (M)
Fugazzi, C. (M)
Galanter, M. (A)
Gallagher, M. L. (M)
Gerber, M. M. (SM)
Gold, N. (M)
Goon, R. (M)
Granoff, H. W. (M)
Granoff, N. H. (A)
Guarino, P. A. (A)
Hatfield, L. N. (SM)
Hebel, E., Jr. (A)
Hershler, C. (M)
Hertz, S. (A)
Hille, P. F., Jr. (M)
Hillman, K. (M)
Hoffmann, R. R., Jr. (M)
Holloman, E. M. (A)
Horvath, W. J. (SM)
Huebscher, H. (SM)
Jasik, H. (SM)
Johan, P. (A)
Juhas, L. A. (M)
Kaufman, L. (M)
Kiessling, C. E. (A)
King, M. (M)
Klein, H. (M)
Kleinberger, R. (M)
Krasnick, S. (M)
Kupferberg, K. M. (M)
Laighton, A. K. (A)
Lang, R. M. (A)
Langer, P. L. (M)
Laskin, R. (M)
Leavitt, L. E. (M)
Lee, T. K. (A)
Leibowitz, B. (M)
Lenczowski, T. M. (A)
Ley, B. J. (M)
Lipperman, L. (M)
Loverman, B. D. (M)
Lustig, H. E. (M)
Lynch, W. J. (A)
Lyons, W. (SM)
Mahnken, W. J. (A)
Marsocci, V. A. (A)
Martin, P. S. (M)
McGovern, M. J. (M)
Medici, N. (A)
Melmed, A. (A)
Merantda, J. (M)
Milliman, J. (SM)
Monroe, J. (A)
Murphy, T. J. (A)
Natchipolsky, M. (A)
Nelson, J. (M)
Nesenoff, N. (A)
Nigro, A. F. (A)
Nistal, G. E. (A)
Paradin, B. (A)
Parker, H. W. (F)
Pater, D. C. (A)
Pearl, S. L. (M)
Pilliinger, L. (A)
Randall, J. E. (M)
Ranky, B. (SM)
Roberto, S. N. (M)
Rosen, B. (M)
Rosin, A. (A)
Rothman, B. J. (A)
Rubin, S. (A)
Russ, B. H. (VA)
Salkind, E. (A)
Sandock, J. (A)
Santal, A. J. (SM)
Scherer, R. L. (M)
Schlegel, R. A. (M)
Schneiderman, S. (A)
Schroter, R. G. (A)
Schutzman, A. (A)
Schwartz, E. (M)
Seda, L. E. (A)
Siegmann, M. J. (A)
Sienilwski, E. (SM)
Sifre, R. A. (A)
Silberlicht, J. W. (M)
Silverman, S. (M)
Silvermetz, D. (M)
Skovholt, R. L. (M)
Small, B. (M)
Smilowitz, S. N. (A)
Smith, L. (A)
Sohne, G. C. (A)
Solzberg, S. (M)
Sonnenschein, A. H. (SM)
Sorensen, S. E. (A)
Stitzer, J. (M)
Strauss, L. (A)
Stump, J. W. (M)
Tangreli, G. F. (M)
Taub, J. J. (M)
Tepper, R. H. (M)
Tucker, M. H. (A)
Valente, J. G. (M)
Walrath, D. J. (A)
Wasserman, J. (M)
Weiland, G. H. (A)
Weisman, L. S. (M)
Weissman, J. G. (SM)
Williams, G. W. (M)
Wolf, F. E., Jr. (M)
Youdin, M. (M)
Zadoff, S. A. (A)
Zion, H. (M)
Zunitch, D. M. (A)
Zuroff, C. A. (M)

Flushing Manor (LI-2)
Beiser, L. (A)
Grumet, A. (A)

Forest Hills (LI-2)
Abbot, E. A. (A)
Altman, R. B. (A)
Baloyannis, G. M. (A)
Baum, S. H. (SM)
Berkin, A. M. (A)
Berman, D. C. (A)
Canavaciol, F. E. (SM)
Cheng, B. K. (A)
Chun, B. (M)
Cohen, E. (M)
Dietz, H. G. (M)
Eng, J. (M)
Feldman, S. (M)
Fonseca, A. P. (M)
Frankfort, M. J. (M)
Freeman, E. E. (SM)
Fridshal, R. (A)
Friedlander, E. (A)
Garfinkel, A. R. (M)
Geller, M. (M)
Gleimer, L. (M)
Goldstein, W. (A)
Goodman, I. (M)
Gray, I. (M)
Grayson, K. B. (M)
Greenberg, E. (M)
Gunzenhauser, A. (A)
Gutman, J. H. (A)
Halpern, S. (M)
Hellerman, M. I. (M)
Hogan, J. V. (SM)
Horowitz, B. (A)
Hultmark, R. S. (A)
Jacobson, J. (M)
Julie, J. (A)
Kearny, D. H. (M)
Kent, J. S. (M)
Keogh, R. J. (A)
Krelk, J. F. (M)
Kustin, S. (M)
Laudon, H. (M)
Leach, G. S. (A)
Loomis, S. A. (M)
Margosian, J. W. (SM)
Mariotti, P. G. (SM)
Martin, A. L., II (A)
Mitchell, W. M. (SM)
Newton, A. (A)
Oeheren, R. (M)
Ohman, B. V. (A)
Parzen, P. (SM)
Pavane, M. M. (M)
Pelavin, M. H. (M)
Petrossian, G. (M)
Rich, M. W. (A)
Ross, A. (A)
Rothenberg, N. (A)
Sandor, A. (SM)
Saphin, H. N. (M)
Schiffres, P. (M)
Schindler, J. P. (M)
Scott, J. E. (A)
Shaham, W. J. (M)
Simon, R. I. (M)
Skidmore, D. B. (A)
Smith, G. J. (A)
Smith, F. W. (M)
Spiegel, C. P. (M)
Teltscher, E. S. (M)
Tevonian, R. B. (M)
Vivenzio, L. J. (A)
Weiss, E. (A)
Wills, A., Jr. (A)
Winzemer, A. M. (SM)
Wu, W. I. L. (SM)
Wyle, H. (M)
Yieh, T.-T. (M)
Zuckerberg, H. (M)

Fort Edward (SCH-1)
Grahame, F. W. (M)

Fort Tilden (LI-2)
McClatlin, F. L. (A)

Franklin Square (LI-2)
Affias, I. M. (SM)
Avallone, A. (M)
Balogh, J. (M)
Berinsky, M. (M)
Biberaer, R. (A)
Daskam, E., Jr. (M)
Dresner, A. (M)
Goldstein, R. (M)
Greeley, J. J. (M)
Hallisey, W. J. (M)
Harris, S. M. (M)
Kirby, M. I. (M)
Klerk, R. H. (A)
Kraemer, F. H. (M)
Lee, V. (M)
Lipson, W. (M)
Mahler, L. J. (A)
Margulies, F. (M)
McNealus, A. L., (A)
Meyer, F. (M)
Norton, R. S. (SM)
Richards, J. A. (A)
Schmerler, S. (M)
Schwathe, J. H. (M)
Schwartz, L. J. (M)
Tarantino, T. C. (M)
Winer, J. D. (M)

Fredonia (BN-1)
Blohm, C. F. (A)

Freeport (LI-2)
Agopian, A. (A)
Beck, G. S. (M)
Belderok, H. C. (A)
Campani, L. M. (A)
Carlson, W. A. (M)
Dolphy, E. L. (VA)
Fitzgerald, T. J., Jr. (A)
Furst, R. E. (M)
Gottlieb, H. B. (A)

Henke, G. W. (M)
Kahn, L. R. (SM)
Knox, R. W. (M)
Prichard, J. S (M)
Russell, G. A. (M)
Salz, J. S. (M)
Smedes, R. L. (M)
Sparro, J. S. (A)
Stephenson, G. E. (SM)
Tricamo, V. A. (M)

Fresh Meadows (LI-2)
Barash, L. F. (M)
Carpenter, J. J., Jr. (M)
Chanko, P. N. (A)
Cohen, M. J. (M)
Eaton, J. E. (M)
Feingold, W. (A)
Gebhardt, J. W. (M)
Kaswen, M. (A)
Koppel, A. U. (SM)
Mulholland, E. J. (A)
Phillips, A. (A)
Pirone, C. (M)
Richman, D. (SM)
Stern, D. L. (M)

Fulton (SYR-1)
Gilmore, D. A. (M)

Galway (SCH-1)
David, W. R. (M)

Garden City (LI-2)
Allen, H. E. (SM)
Allen, W. F. (M)
Barnes, R. H. (M)
Beck, A. J. (A)
Behn, E. R. (SM)
Berglund, E. B. (SM)
Bernsley, J. T. (M)
Berrell, E. J. (A)
Blasbalg, S. (A)
Boop, W. E. (M)
Cardon, J. (SM)
Carroll, J. M. (M)
Chatterton, J. B (M)
Chow, W. T. (SM)
Collins, K. (A)
Cowgill, D. E. (SM)
Crowder, H. A. (A)
Dulzell, C. W. (A)
Davis, C. W. (M)
Davy, S. J. (SM)
Dean, W. N. (M)
Derr, E. H., Jr. (M)
Dertlinger, E. F. (M)
Dong, H. L. H. (M)
Duffy, M. P. (SM)
Dunn, L. J. (SM)
Edwards, R. S. (M)
Eriksen, E. M., Jr. (A)
Fisher, D. L. (SM)
Fricker, J. N. (M)
Fuller, E. J. (A)
Galante, S. F. (A)
Gemmill, F. Q (M)
Gittens, E. D. (SM)
Gregson, A. C. (M)
Grobben, E. C. (A)
Grunsky, C. E. (SM)
Hancock, J. R. (A)
Heins, J. L. (VA)
Hesse, A. N. (M)
Hinds, J. W. (M)
Hollis, W. C. (SM)
Huntington, A. (M)
Johnston, W. A., Jr. (M)
Keim, D. Y. (M)
King, W. E., Jr. (A)
Kroeger, R. D. (M)
Learned, V. (F)
Lee, K. O. (M)
Leeds, D. (M)
Lester, J. M. (SM)
Lutz, C. H. (SM)
Magilligan, F. X. (A)
McHenry, J. J. (A)
McKesson, A. J. (SM)
Meaney, M. H., Jr. (M)
Mellor, W. N. (VA)
Menke, W. W. (M)
Monfort, R. A. (SM)
Mundo, C. J., Jr. (M)
Niemela, R. J. (A)
O'Connell, R. J. (A)
Olson, O. F. (M)
Pelino, W. M. (M)
Rauhael, M. S. (M)
Rau, D. S. (SM)
Ruth, E., III (SM)
Saretti, D. P. (A)
Seay, P. A. (M)
Shaper, H. B. (M)
Shepherd, J. E. (F)
Shute, E. R. (SM)
Terry, H. P. (A)
Trilleen, E. R. (SM)
Tweeddale, J. E. (SM)
Vodak, A. W. (M)
Voigt, D. C. (M)
Webb, R. A. (A)
White, W. T. (SM)
Wies, G. (M)
Winchell, W. H. (VA)

Garden City Park (LI-2)
Braun, L., Jr. (M)
Fitzgerald, J. E. (A)
Frank, K. F. (M)
Leslie, R. E. (A)

Garnerville (NY-2)
Ten Eyck, R. A. (A)

Garrison (NY-2)
Elmore, W. B. (A)

Geneseo (ROC-1)
Ganlard, R. W. (A)

Geneva (ROC-1)
Benda, D. (M)
Fairbanks, D. I. (M)
Harrold, G. B. (A)
Smith, C. L. (A)
Smith, S. S. (M)

Glen Cove (LI-2)
Aiello, V. S. (M)
Andrews, D. H. (SM)
Bahia, D. M. (M)
Buchtenkirch, A. J. (M)
Davis, W. M. (M)
Donovee, G. (A)
Duffy, D. F. (M)
Eguuss, E. M. (M)
Firth, L. G., Jr. (M)
Franzisco, G. (A)
Getz, H. (A)
Giovanni, C. S., Jr. (M)
Glassman, S. (M)
Grabbe, D. (A)
Green, W. (M)
Hunt, H. W. (M)
Jablonski, E. R. (M)
Jorge, A. (M)
Kiser, W. L. (SM)
Kuskowski, L. J. (A)
Lang, H. J. (M)
Magagnos, W. F. (M)
McDonough, J. A. (SM)
Papas, J. (A)
Peck, H. E. (M)
Proulfit, A. (M)
Richter, F. G. (A)
Scott, G. G. (A)
Shapiro, S. (M)
Souder, C. W. (SM)
Wheatly, J. E. (SM)
Wu, A. C. (A)

Glendale (LI-2)
Bell, R. A. (A)
Capellupo, F. V. (M)
Chapman, R. F. (M)
Gomes, C. N. (M)
Knothe, C. H. (M)
Merkel, K. (A)
Muth, R. N. (M)
Sperber, A. O. (M)
Trelewicz, E. R. (M)
Veit, F. (M)
Vought, N. F. (SM)
Walsh, J. J. (A)
Wirfel, W. M., Jr. (M)

Glen Head (LI-2)
Cetrone, V. C. (M)
Cooke, W. T. (SM)
Dow, J. B. (F)
Hanson, G. N. (SM)
Kenneth, J. A. (A)
Kliman, M. (A)
Martin, E. E. (A)
O'Brien, T. H. (M)
Reed, F. C., Jr. (M)
Rumrill, H. J. (M)
Swanson, E. H. (SM)
Thomason, J. F. (M)
Timms, R. J. (M)
Wilener, M. D. (M)
Zylla, H. R. (A)

Glen Oaks (LI-2)
Barber, E. (A)
Barry, H. F., Jr. (M)
Bee, R. E. (A)
Binder, D. I. (M)
Bloom, G. M. (M)
Botta, A. J. (A)
Brady, J. P. (M)
Broler, A. (M)
Bruce, G. B. (SM)
Coleman, C. H. (A)
Danner, F. G. (M)
Di Nardo, A., Jr. (A)
Dreksler, H. L. (M)
Dungey, M. N. (M)
Elliott, R. G. (M)
Farkas, Z. D. (A)
Ginsberg, M. P. (SM)
Goldsmith, K. G. (M)
Hansen, H. R. (A)
Hastings, D. F. (M)
Jackson, A. R. (M)
Jones, J. P. (A)
Jung, C. W. (A)
Karatlas, M. (A)
Kos, S. M. (A)
Leeb, D. E. (A)
Middlebrook, V. S. (A)
Moss, L. A. (M)
Orth, C. A. (M)
Pollack, P. (M)
Prasinos, T. (M)
Ross, H. (M)
Roth, A. M. (M)
Sanderson, G. H. (A)
Shizume, P. K. (M)
Stewart, J. J. (M)
Weiner, M. L. (A)
Vanoschak, V. (A)
Zetkov, G. A. (M)

Glen Oaks Village (LI-2)
Davis, W. J. (A)
Norman, R. H. (A)
Wallace, R. A. (M)

Glens Falls (SCH-1)
Humphrey, T. R. (A)
Tiezzi, A. M. (SM)
Wells, H. D., Jr. (M)

Glenwood Landing (LI-2)
Gaylor, R. (A)

Goshen (NY-MH-2)
McClean, J. F. (SM)

Gowanda (BN-1)
Allen, M. B. (M)

Grand Island (BN-1)
Barnes, J. A. (M)
Bidell, F. W. (A)
Knapp, W. H. (A)
Plummer, D. K. (M)
Prast, J. W. (A)

Great Neck (LI-2)
Adler, H. H. (M)
Anderson, W. M. (M)
Astrow, M. (M)
Bachman, H. L. (M)
Bassett, W. H., Jr. (A)
Beck, D. H. (SM)
Becker, J. E. (M)
Bender, A. (M)
Benjamin, J. N. (SM)
Bittman, L. R. (A)
Blumkin, R. (A)
Botwin, L. (SM)
Brown, A. R. (M)
Browning, J. H. (A)
Butt, R. J. (A)
Campion, S. F. (A)
Chaikin, M. (A)
Chisdow, J. H. (M)
Chubb, C. F., Jr. (M)
Coe, M. R. (SM)
Colistra, W. P. (M)
Cook, C. E. (SM)
Cooper, L. F. (M)
Crawford, J. D. (SM)
Croly, J. W. (A)
Crosby, R. W. (M)
De Fries, H. A. (A)
Dettinger, D. (SM)
Dostal, F. X. (A)
Drosses, J. (M)
Dryostern, J. (SM)
Dunlap, O. E., Jr. (SM)
Ettenberg, M. (SM)
Evans, R. A. (A)
Fischer, E. (A)
Foley, T. P. (A)
Frank, R. L. (SM)
Frantz, W. P. (SM)
Freeman, H. (SM)
Frische, G. A. (F)
Gery, S. W. (M)
Green, W. F. (M)
Halperin, A. (M)
Halpern, W. (M)
Handling, J. D. (M)
Hannan, P. W. (M)
Hanratty, R. J. (A)
Harris, H., Jr. (M)
Hauser, A. A., Jr. (M)
Helf, W., Jr. (A)
Henning, R. E. (M)
Holcomb, P., Jr. (SM)
Holmboe, L. W. (M)
Hronek, R. L. (SM)
Huber, W. J. (M)
Isbister, E. J. (F)
Jaffe, D. L. (SM)
Jahn, D. M. (M)
Jwik, C. (SM)
Johanson, E. W. (M)
Jung, A. P. (A)
Kahn, M. B. (SM)
Katzelnick, H. J.
Kenny, M. F. (SM)
Koch, J. F. A. (M)
Koffman, I. (M)
Korn, I. I. (A)
Kudo, V. (M)
Landauer, W. E. (SM)
Lavisman, D. I. (A)
Larick, S. H. (M)
Lazar, E. F. (SM)
Leary, R. W. (M)
Leeds, G. G. (A)
Lerz, O. M., Jr. (SM)
Levers, E. O. (A)
Light, G. (A)
Link, W. J. (M)
Macallum, J., Jr. (A)
Mac Lean, W. D. (M)
Maloney, R. T. (M)
Marcovitz, N. (SM)
Mayerson, M. I. (M)
McClure, R. E. (A)
Meirowitz, R. L. (M)
Messner, W. S. (M)
Meyer, E. G. (SM)
Miller, C. R. (M)
Milton, J. (A)
Milton, L. (A)
Moerman, N. A. (M)
Mulligan, J. R. A., Jr. (M)
Naidamast, D. (SM)
Onyskin, M. (A)
Padovano, R. J. (M)
Paley, W. P. (M)
Palter, N. H. (SM)
Philipps, L. E. (SM)
Planteroth, J. A. (M)
Poppe, C. W. (A)
Popplesen, D. J. (M)
Potter, J. T. (A)
Powell, T. (A)
Rasmussen, J. M. (M)
Redlien, H. W., Jr. (M)
Rentner, D. W. (A)
Roake, W. C. (M)
Robin, N. (A)
Rosenberg, S. L. (M)
Rothman, H. S. (A)
Rutman, S. M. (A)
Sailer, L. R. (M)
Saladna, J. C. (M)
Schimmel, H. (M)
Schmidt, F. R. (A)
Schneider, R. M. (M)
Schwartz, L. S. (SM)
Seabury, E. M. (M)
Shutterly, H. J. (A)
Sieven, R. L. (M)
Spector, N. (A)
Sperling, J. G. (M)
Spero, R. E. (A)
Stark, E. W. (M)
Steber, W. C. (SM)
Stekert, J. J. (A)
Stone, S. M. (A)
Strauner, J. N. (A)
Sturgeon, W. S. (M)
Sussman, H. (SM)
Swern, L. (SM)
Taffet, M. S. (M)
Tanenbaum, M. S. (SM)
Tenenbaum, F. (M)
Toll, P. A. (A)
Trochesset, H. J. (M)
Van Davelaar, F. S. (A)
Vaupel, G. E. (A)
Velslage, E. P. (M)
Wathen, R. L. (M)
Welch, T. J. (A)
Wheeler, H. A. (F)
Whipple, G. D. (M)
Whitfield, E. W. (M)
Widenberg, H. I. (A)
Williams, F. H. (SM)
Winter, N. L. (M)
Wohl, R. J. (M)
Wright, G. B (A)
Zaghi, J. P. (A)
Zbar, P. B. (M)
Zellers, J. E., Jr. (A)

Great Neck Plaza (LI-2)
Bryant, B. L., Jr. (A)

Greenlawn (LI-2)
Eisele, J. G., Jr. (M)
Nelson, R. J. (SM)
Scheblein, G. M., Jr. (A)
Schoenfeld, K. (M)

Greenvale (LI-2)
Hansel, P. G. (F)
Harrison, A. E. (SM)
Siegmund, E. L. (M)

Griffiss AFB (RU-1)
Castellucci, A. H. E. (A)
Guercio, A. M. (M)
Guffey, H. F. (M)
Igou, J. M. (M)
Knauf, G. M. (M)
Losh, S. J. (M)
Nicholson, C. L. (M)

Groton (ITH-1)
Clark, M. M. (M)

Halesite (LI-2)
Warner, W. V. (A)

Hamburg (BN-1)
Fiedler, L. (M)
Mohlie, N. G. (A)
Prybyl, R. P. (M)

Hamilton Beach (LI-2)
Pihl, R. L. (A)

Hampton Bays (LI-2)
Rothman, R. H. (A)
Shattuck, C. (M)
Turner, F. T. (M)

Harpursville (BING-1)
Friedlander, A. T. (M)
Lawrence, N. S (M)

Harrison (NY-W-2)
De Pasquale, R. H. (SM)
Gallone, W. J. (A)
McIntyre, F. P. (M)

Hartsdale (NY-W-2)
Bonney, H. W. (M)
Byrne, R. M. (M)
Daly, R. T. (SM)
Engelhardt, G. B. (SM)
Gillette, D. (A)
Hennessy, C. W. (A)
Robertson, H. E. (M)
Simon, M. L. (A)
Vagt, H. T., Jr. (M)

Hastings-on-Hudson (NY-W-2)
Batchelor, J. C. (SM)
Penaughty, A. L. (M)
Hohberger, H. P. (A)
Lodge, W. B. (F)
Schaefer, L. E. (M)
Vavoudis, S. N. (A)

Hawthorne (NY-W-2)
Dickstein, S. R. (A)
Hales, E. B. (M)

Hempstead (LI-2)
Bellmar, C. L. (M)
Boxer, R. (M)
Bradley, J. J. (A)
Chernikoff, L. (A)
Cornes, R. W. (SM)
Dahlberg, A. W. (A)
Dannals, E. W. (SM)
Diorio, J. (A)
Dobson, D. A. (M)
Fener, H. (M)
Girodias, R. M. (A)
Gould, G. A. (A)
Hing, K. M. L. (A)
Johnson, H. E. (A)
Lesser, J. (SM)
Lockwood, R. C. (SM)
Mandl, G. P. (SM)
Miehr, W. W. (F)
Mobille, G. J. (M)
Morse, R. V. (M)
Peters, J. L. (SM)
Polakowski, W. G. (A)
Schreitmueller, R. F. (M)
Skirrow, J. E. (A)
Stewart, J. W. (A)
Terrel, W. T. (A)
Ury, G. A., Jr. (A)
Verton, M. P. (A)
Weber, R. L. (A)
Westover, T. A. (SM)

Henrietta (ROC-1)
Carey, J. J. (M)
Jud, H. G. (M)

Hicksville (LI-2)
Abjanich, G. S. (M)
Amoleo, C. F. (A)
Bendett, R. M. (M)
Cady, R. T. (M)
Cazanjian, R. S. (M)
Chaber, R. K. (M)
Cralb, J. F. (SM)
Crosby, M. G. (F)
Dolin, M. (A)
Feinstein, J. (M)
Figlia, J. R. (M)
Fink, A. (SM)
Freier, M. (M)
Fry, W. H. (M)
Gahn, D. E. (A)
Hagedorn, H., Jr. (A)
Hall, J. D. (M)
Haller, K. A. (M)
Hartman, A. (A)
Hayes, W. A. (A)
Herman, S. (A)
Hershoff, L. (SM)
Jacobs, S. M. (M)
Kaufman, W. (M)
Kawaller, J. (M)
Kennedy, J. B. (A)
Kievez, J. K. (A)
Kimball, L. R. (A)
Kretzing, J. C. (M)
Loth, P. A. (SM)
Miller, F. J. (A)
Molloy, R. A. (A)
Murray, P. C. (A)
Noland, J. A. (M)
Noneman, F. A. (M)
Oberlies, J. L. (M)
Pavalow, G. (SM)
Popik, M. J. (M)
Rabin, G. C. (M)
Rattner, J. (M)
Rudich, I. (M)
St. John, K. M. (A)
Schwartz, P. (A)
Seckel, J. P. (M)
Segal, B. (M)
Sefton, A. (M)
Sherman, E. H. (SM)
Sherry, L. I. (M)
Shisly, A. R., Jr. (M)
Sicuranza, C. J. (M)
Simon, I. A. (M)
Smith, W. F. (M)
Spence, H. W. (M)
Sposato, F. J. (A)
Strong, J. J., Jr. (M)
Tilly, V. F. (M)
Variano, V. V. (M)
Waller, H. H (M)
Wasson, I. (M)
Wolk, B. (M)
Zampino, F. J. (A)
Zimmerman, S. (M)

Highland (NY-MH-2)
Jenny,

Huntington (LI-2)
Alber, J. D. (M)
Beers, M. I. (SM)
Bennett, A. L. (M)
Berg, C. H. (A)
Billhimer, R. D. (A)
Bostwick, L. S., Jr. (M)
Burke, E. W., Jr. (SM)
Caswell, J. N. (SM)
Comstock, G. E., III (M)
Copel, M. (SM)
Dosch, T. J. (M)
Duryea, J. C. (M)
Eicher, H. G. (M)
Evans, T. L. (M)
Feltham, C. F. (M)
Ferrier, D. T. (SM)
Forsberg, K. E. (A)
Fraser, H. B. (A)
Gretz, R. W. (M)
Hansen, C. A. (SM)
Hansen, J. A. (SM)
Hartman, L. A. (M)
Hinchey, R. L. (M)
Hollister, D. G. (SM)
Howell, S. N. (A)
Hoxie, I. R., Jr. (A)
Hutchison, T. C. (A)
Irick, J. (SM)
Joss, E. T. (M)
Kenyon, D. E. (SM)
Krescholleck, F. W. (A)
Kulik, H. S. (A)
Lally, P. M. (M)
Lippke, J. A. (M)
Loecher, G. S. (A)
Lyons, R. C. (M)
Mac Donald W. W. (SM)
Mayer, F. N. (M)
Mc Coy, J. H. (SM)
Nehrbas, T. C. (A)
Oswald, L. H. (M)
Packard, K. S., Jr. (SM)
Perry, J. S. (M)
Roel, E. L. (M)
Rosar, M. T. (M)
Russell, J. A., III (M)
Safran, M. (A)
Sard, E. W. (M)
Search, R. W. (A)
Setaro, J. E. (M)
Simons, R. F. (SM)
Stengel, J. F., Jr. (A)
Suske, C. C. (A)
Swenson, W. J. (A)
Thompson, T. E. (M)
Uzzo, A., Jr. (A)
Venaglia, E. J. (M)
Vogel, E. (SM)
Weaver, S. E. (M)
Wheeler, R. B. (M)
Winslow, R. G. (M)
Yamamoto, G. H. (A)

Huntington Station (LI-2)
Abourezk, W. (A)
Amura, G. M. (M)
Bellew, R. W. (A)
Bernay, R. A. (M)
Bostrom, R. C. (M)
Buehrle, W. E., Jr. (M)
Chubbuck, E. L. (M)
Connor, W. E., Jr. (A)
Dasher, P. M. (SM)
Driscoll, F. X. (A)
Emerson, J. (SM)
Fastenau, F. H., Jr. (M)
Fraser, R. (M)
Freundlich, M. M. (SM)
Gilmartin, J. J., Jr. (M)
Goldstein, A. (M)
Grib, B. F. (M)
Gross, S. H. (SM)
Joline, E. S. (A)
Kerzner, N. A. (M)
Klebl, H. J. (M)
Knecht, R. A. (SM)
Krusos, D. A. (M)
Lane, J. J. (A)
Lehr, D. (SM)
Liguori, A. (SM)
Meichner, F. T. (M)
Morrow, A. J. (A)
Nelson, C. P. (A)
Newdale, E. I. (M)
Noji, T. T. (SM)
Noyer, R. O. (SM)
Olson, C. W. (A)
Orford, R. J. (M)
Papamarcos, G. (M)
Parmentier, J. C. (M)
Richardson, C. M. (M)
Ritchey, N. H. (SM)
Roberts, F. G. (A)
Roller, W. P. (A)
Rosen, M. (M)
Sammis, S. L., Jr. (M)
Schwaninger, J. W. (M)
Schwartz, B. (A)
Small, H. (M)
Stokes, B. C. (M)
Strazzulla, R. L. (M)
Tressa, F. J. (M)
Uriling, H. R. (M)
Vandenburgh, A. A. (A)
Vetter, W. F. (M)
Walker, A. C. (A)
Wanty, B. G. (M)
Williams, R. J. (SM)

Hurley (NY-MH-2)
Bandel, R. D. (A)

Hyde Park (NY-MH-2)
Arnfield, A. E. (M)
Coopper, R. A. (A)
Dettling, A. K. (A)
Digan, G. E. (A)
Doolin, F. L. (M)
Eckelman, P. F. (A)
Hart, D. M. (A)
Henle, R. A. (A)
Jacob, W. P. (M)
Kauffmann, J. A. (A)
Mazziotti, F. (M)
Muenzer, B. M. (A)
Pattl, M. J. (A)
Plummer, R. W. (A)
Rodriguez, L. H. (A)
Swanson, E. L., Jr. (M)
Trimble, L. F. (M)
Whitenack, R. M. (A)

Ilion (RU-1)
D'Hoostelaere, A. C. (A)
Momberger, P. E. (A)
Pierce, D. C. (M)

Irvington (NY-W-2)
Duffendack, O. S. (F)
Havinga, J. C. (A)
La Plante, R. A. (M)

Irvington-on-Hudson (NY-W-2)
Auerbacher, W. F. (SM)
Hipple, J. A. (SM)
Kelton, G. (M)
Kohler, T. R. (SM)
Krakauer, S. M. (A)
Wolsey, D. (A)

Island Park (LI-2)
Marino, P. J. (M)
Preisler, M. (M)

Islip (LI-2)
Daubaras, E. J. (M)

Ithaca (ITH-1)
Ankrum, P. D. (M)
Blair, W. W. (A)
Bolgiano, R., Jr. (A)
Booker, H. G. (F)
Bryant, N. H. (A)
Bullock, A. J., Jr. (A)
Charton, P. W. (SM)
Clark, P. S. (A)
Cohen, M. H. (M)
Colbert, S. M. (M)
Dalman, G. C. (SM)
De Claris, N. (M)
Eastman, L. F. (A)
Ferris, E. E. (A)
Ford, L. H. (M)
Gold, R. D. (A)
Gordon, W. E. (M)
Greer, D. L. (A)
Hazebrook, H. (A)
Hedt, H. L. (M)
Holden, W. D. (A)
Hollar, M. E. (A)
Howland, I. R. (SM)
Ingalls, C. E. (SM)
Jackson, A. S. (M)
Jankowski, H. (M)
Johnson, E. M. (M)
Kantor, G. (M)
Kascha, G. E. (A)
Lipp, J. P. (M)
Luck, A. J. (M)
Maresca, T. J. (A)
Matt, S. (M)
May, J. C. (A)
McGaughan, H. S. (SM)
McLean, T. (SM)
Murray, W. H. (A)
Nichols, B. (SM)
Nitzberg, R. (A)
Perry, F. M. (SM)
Pressly, W. H., Jr. (M)
Rayl, G. J. (M)
Rehmann, W. H. (M)
Rider, L. S. (M)
Roberts, C. R. (M)
Rogers, R. G. (A)
Rooney, T. J. (M)
Sample, G. A. (M)
Schiffmacher, E. R. (M)
Symour, M. E. (M)
Shuner, F. (A)
Smith, F. G., Jr. (SM)
Smith, H. G. (M)
Stanton, J. W. (A)
Sylvan, T. P. (M)
Teegarden, W. M. (A)
Travis, J. B., Jr. (A)
Wagner, L. S. (M)
Ward, S. A. (M)
Warr, R. E. (M)
Webb, J. S. (SM)
Young, M. C. (M)
Zimmerman, S. W. (SM)

Jackson Heights (LI-2)
Anastos, E. G. J. (M)
Bertan, L. L. (M)
Blazek, H. F. (A)
Breyman, G. J. (A)
Cagney, W. M. (A)
Cole, W. J., Jr. (A)
Dermit, G. (M)
Donegan, E. V. (A)
Dorato, P. E. (M)
Duckstein, S. (A)
Dudek, J. J. (A)
Dugot, R. S. (A)
Dzik, S. (M)
Feay, D. I. (A)
Flum, E. (M)
Gommo, F. J. (M)
Grunwald, P. S. (A)
Hall, R. C. (M)
Hevesi, C. F. (A)
Hollabaugh, M. G. (SM)
Kelley, L. A. (M)
Kenney, J. F. (A)
Komuves, R. E. (A)
Kozicki, H. (A)
Lalim, G. P. (A)
Lavan, D. A. (A)
Levy, D. T. (M)
Luhkin, Y. J. (M)
Machlis, R. I. (M)
Mahler, R. J. (A)
Malang, A. W. (A)
Mavromatis, A. (A)
Michaelson, H. B. (M)
Mount, T. E. (A)
Nemchuk, W. J. (M)
Paterno, P. M. (M)
Pleasure, M. (SM)
Prihar, Z. (SM)
Rehberg, C. F. (M)
Roeloffs, E. (A)
Rogich, S. G. (M)
Rudis, M. (A)
Schaefer, A. E. (M)
Scholer, R. M. (A)
Striednig, L. J. (A)
Terleckyj, J. (A)
Torian, I. T. (SM)
Tulgan, S. S. (A)
Weli, K. (M)
Weinstein, W. (A)
Wood, S. (A)
Zisselman, A. (A)

Jamaica (LI-2)
Baldwin, T. W. (M)
Bernstein, G. (M)
Bodow, J. (M)
Bruch, R. (A)
Carter, B. S. (M)
De Cote, R., Jr. (M)
Deloi, D. J. (M)
Dooley, E. G. (M)
Farren, R. W. (A)
Flynn, M. J. (M)
Fuchs, H. B. (A)
Gordon, J. J. (M)
Greenberg, H. (A)
Hanousek, R. A. (A)
Hargrave, E. T. (A)
Havel, J. F. (A)
Herron, G. C. (A)
Hochman, S. (M)
Holland, B. S. (A)
Horta, R. M. (M)
Howard, E. P. (A)
Hutter, L. E. (F)
James, A. V. (A)
Johnson, R. (A)
Lee, H.-T. (M)
Lewinstein, M. (SM)
Mehlman, J. G. (SM)
Moos, A. M. (M)
Mourier, G. (SM)
Nash, D. A. (M)
Nlezky, T. (M)
Novick, M. (M)
Olsen, R. T. (A)
Ottenberg, E. C. (A)
Ottenberg, L. A. (M)
Paledes, T. P. (M)
Pan, J. W. (M)
Peck, C. L. (A)
Robbins, A. (M)
Roberts, G. (A)
Robinson, C. L. (M)
Robinson, J. H. (A)
Seelig, K. V. (A)
Sherman, S. (M)
Shottenfeld, R. (M)
Smikle, L. R. (A)
Stepper, L. H. (A)
Theodoseau, T. (A)
Varza, G. (A)
Weichardt, H. H. (M)

Jamaica Estates (LI-2)
Bernstein, J. (SM)
Selbmann, R. W. (M)

Jamestown (BN-E-1)
Anderson, S. E. (A)
Crissey, D. L. (A)
Heston, W. S. (M)
Rullison, R. R. (A)

Jamesville (SYR-1)
Jacobson, I. J. (M)
Pugsley, D. W. (F)

Jericho (LI-2)
Barbella, A. M. (M)
Hartel, R. (A)
Houseworth, G. H. (M)
Jacobson, N. (M)
Levinson, E. (M)
Locker, M. H. (M)
Miller, G. E. (A)
Pincus, M. (M)
Torgow, N. L. (SM)
Trevisin, R. F. (M)

Jewell (RU-1)
Markham, I. F. (M)

Johnson City (BING-1)
Ayers, J. G., Jr. (M)
Betts, F. (M)
Black, T. L. (M)
Bosman, E. H. (M)
Cantwell, R. J. (M)
Carros, J. R. (A)
Caulfield, J. T. (M)
Demer, F. M. (A)
Forbes, R. E. (M)
Fuchick, R. J. (M)
Ingram, J. J. (M)
Kaufmann, J. (A)
Mahoney, R. G. (A)
Miller, H. T., Jr. (A)
Pittsley, E. L. (M)
Powell, M., Jr. (M)
Rudwick, B. H. (A)
Rusnak, M. E. (M)
Sirowatka, J. C. (A)
Upham, S. W. (M)
Wheeler, N. D. (M)

Johnstown (SCH-1)
Vunk, A. C. (M)

Katonah (NY-W-2)
Hilliard, W. P. (M)
Wallace, R. W. (A)

Keeseville (SCH-1)
Bezio, B. R. (A)

Kenmore (BN-1)
Allberg, D. C. (M)
Archibald, W. R. (M)
Arthur, R. J. (M)
Bachman, C. G. (M)
Bachman, W. S., Jr. (M)
Bechtel, M. E., Jr. (M)
Brown, R. M. (A)
Browne, J. F. (M)
Clark, D. C. (A)
Constantino, J. C. (A)
Dunklin, R. A. (M)
Fleming, R. W. (A)
Franclemont, H. J. (A)
Halsted, G. P. (M)
Hill, L. L. (A)
Kaushagen, W. M. (SM)
Knorr, W. G., Jr. (M)
Kohman, E. J. (M)
Lamy, R. H. (M)
Laufer, E. A. (M)
Leggiere, D. D. (A)
Le Van, W. L. (A)
Myers, J. F. (SM)
Okun, A. M. (SM)
Oxley, V. C. (A)
Riggs, J. H. (SM)
Roess, T. L. (A)
Shub, L. (SM)
Stephenson, H. B. (M)
Swartzlander, D. E. (A)
Vanacore, T. (M)
Warrent, F. H. (M)
Weimers, E. T. (SM)
Wills, R. H. (A)

Kerhonkson (NY-MH-2)
Greenberg, H. (M)

Kew Garden Hills (LI-2)
Absatz, S. L. (M)
Devine, J. H., Jr. (M)
Hersh, M. (A)
Horcher, A. P. (A)
Kaplan, S. J. (A)
Rivera-Cardona, B. A. (A)
Weber, I. J. (M)

Kew Gardens (LI-2)
Acheson, M. A. (F)
Appel, H. G., Sr. (M)
Auld, J. S. (A)
Bartram, R. H. (A)
Berman, H. M. (M)
Bidner, H. (A)
Burgess, E. G., Jr. (M)
Campoli, C. N. (M)
Cassidy, M. E. (A)
Devito, M. F. (A)
Espenschied, L. (F)
Goodwin, V. D. (M)
Gordon, K. (A)
Jacobs, M. (M)
Jensen, A. J. (M)
Kent, L. I. (M)
Kiel, A. (M)
Kratsch, P. H. (A)
Lakshmanan, T. K. (M)
Landauer, A. (A)
Leibman, M. H. (A)
Levine, M. (M)
Levine, J. (M)
Liss, M. (M)
Lurye, J. R. (M)
Marantz, S. B. (A)
Mazzei, A. L. (SM)
Niemind, W. V. (A)
Palmer, R. N. (SM)
Poletti, G. (A)
Regis, R. (M)
Reuter, P. J. (SM)
Roberts, A. K. (SM)
Saunders, C. L. (M)
Seliger, V. H. (SM)
Sierminski, P. J. (A)
Smith, C. R. (SM)
Smith, C. L. (M)
Spett, H. (M)
Stock, D. C. (A)
Taylor, J. M. (A)
Warner, C. J. (A)
Wiener, W. R. (M)
Wiesner, L. (M)
Wilson, A. L. (M)
Wishner, M. I. (A)

Kingston (NY-MH-2)
Barile, T. M. (M)
Bartel, R. S. (A)
Baxter, D. W. (A)
Bliss, B. (M)
Breiding, E. J. (M)
Brennan, R. J. (M)
Burawski, J. A. (M)
Byman, E. C. (M)
Cooley, H. E. (M)
Crago, R. P. (M)
Dann, R. (M)
Dolan, P. A. (A)
Downing, G. (M)
Dumas, A. M. (M)
Dunn, C. E. (M)
Ellsworth, J. L. (M)
Fuller, R. S. (M)
Glass, D. H. (M)
Groce, J. L. (M)
Hackenberg, F. U. (A)
Hampshire, J. R. (M)
Heassler, R. A. (M)
Jackman, W. L. (M)
Kaufman, H. B. (M)
Kenney, R. C. (M)
Kloepping, J. (A)
Kutcher, M. M. (M)
Lawrence, W. A. (A)
Luigai, R. H. (A)
Magnino, J. J., Jr. (A)
Malden, A. E. (M)
Mine, G. D. (A)
Olliver, J. F. (A)
Onysyk, J. (A)
Polone, R. W. (A)
Schaaf, S. (A)
Schlan, D. (A)
Schoch, D. L. (A)
Schrufer, H. J. (A)
Schwartz, N. (A)
Scott, W. A. (A)
Siphers, J. W. (M)
Stapleton, W. D. (A)
Surdi, M. (M)
Trombly, R. L. (M)
Tutwiler, K. E. (M)
Waldenmayer, D. W. (M)
Washburne, J. R., Jr. (M)
Watkins, D. L. (M)
Whalen, R. J. (A)

Kirkville (SYR-1)
Byle, B. J. (A)
Stiver, J. W. (A)
Winfield, W. S. (M)

Lagrangeville (NY-MH-2)
Stuckert, P. E. (M)

Lake George (SCH-1)
Strempel, E. L. (A)

Lake Katrine (NY-MH-2)
Lewis, A. G. (A)

Lake Mahopac (NY-2)
Milllicker, D. J., Jr. (A)

Lake Success (LI-2)
Barnes, R. S. (M)
Barrow, W. L. (F)
Delany, F. J. (M)
Litton, J., Jr. (M)

Lancaster (BN-1)
Neprud, R. N. (SM)

Larchmont (NY-W-2)
Adler, B. (SM)
Adler, J. (A)
Auditore, C. J. (SM)
Cammer, M. (M)
Downey, E. F. (A)
Gordon, J. E. (A)
Jones, G. L. (SM)
Kerby, G. A. (M)
McVity, L. H. (A)
Mullenger, K. E. (M)
Nichols, D. (M)
Plowman, F. R. (A)
Rudd, W. C. (M)
Schneider, J. R. (A)
Viebranz, A. C. (M)
Watson, E. F. (SM)

Latham (SCH-1)
Fitzgibbons, J. J. (M)

Laurelton (LI-2)
Antin, J. (M)
Epstein, M. (M)
Forman, P. (A)
Glaser, M. (SM)
Groner, P. S. (A)
Josepher, A. (A)
Kellner, A. S. (M)
Marin, F. L. (M)
Parry, J. F. (A)
Ratner, A. (M)
Robinson, R. J. (M)
Shapiro, D. L. (M)
Shulman, I. (A)
Zelkowitz, L. J. (A)

Lee Center (RU-1)
Brunette, G. E. (M)
De Minco, A. P. (SM)
Kunze, A. A. (SM)

Le Roy (ROC-1)
Jackson, R. W. (A)
Lapp, R. S. (M)
Lapp, S. P. (A)
Unger, J. W. (M)

Levittown (LI-2)
Arfin, B. (SM)
Bargeski, A. J. (M)
Beamer, E. (A)
Bolnick, F. I. (A)
Burns, R. C. (SM)
Clune, W. T. (M)
Connors, J. J., Jr. (A)
Cooke, E. F. (M)
Cooney, J. A. (A)
Corwin, J. J. (M)
Craig, A. F. (M)
Crane, R. C. (M)
Crush, J. F. (A)
D'Agostino, J. V. (M)
Davis, E. W. (M)
De Simone, P. G. (A)
Di Matteo, P. C. (M)
Di Meglio, E. (A)
Dixon, D. R. (M)
Drescher, N. W., Jr. (A)
Dumas, E. G. (A)
Evans, A. P., Jr. (M)
Figge, E. E. (A)
Fishel, J. I. (A)
Flynn, W. J. (M)
Friedman, E. D. (SM)
Gassler, J. H. (M)
Gotthelm, E. (M)
Graham, C. B. (A)
Haussig, L. (A)
Heacock, C. E., Jr. (M)
Hughes, F. J. (SM)
Kahn, G. (A)
Leavitt, B. W. (SM)
Lehr, O. A. (A)
Levine, R. (A)
McMurrough, R. W. (A)
Mehr, A. (A)
Mohr, M. T. (M)
Moreira, N. M. (A)
Morenz, P. W. (A)
Morris, J., Jr. (M)
Nickel, W. S. (A)
Olthuis, R. W. (M)
Orlando, R. A. (M)
Pentlecllo, J. A. (M)
Postel, H. (A)
Poulos, B. J. (A)
Retzger, L. I. (A)
Reynolds, L. G. (A)
Rich, A. L. (SM)
Rigby, R. T. (A)
Rubenstein, C. F. (A)
San Angelo, M. A. (M)
Savalli, F. P. (A)
Schwartz, S. (M)

Shepherd, L. P. (M)
Sinnott, J. (M)
Solol, J. (M)
Sprinsock, M. (A)
Steinberg, W. A. (M)
Sudinsky, L. (A)
Tatz, A. (SM)
Triantafelloz, W. (A)
Walker, C. M. (A)
Wels, B. G. (A)
Wengenroth, R. D. (M)
White, J. D., Jr. (VA)

Lewiston (BN-1)
Buranich, G. F. (SM)
Jachlewski, R. H. (M)

Liberty (NY-MH-2)
Mauer, W. V. (A)

Lincolndale (NY-W-2)
Bruns, W. H. (M)

Lindenhurst (LI-2)
Church, T. A. (A)
Ferrantelli, J. (A)
Mayerhofer, S. R. (A)
Morgenstern, O. A. (A)
Rohner, G. J. (SM)
Suchanek, C. F. (A)

Little Neck (LI-2)
Balley, W. F. (F)
Barry, J. C. (M)
Binns, R. (SM)
Clark, D. P. (M)
Collard, C. A. (A)
Cosby, J. C. (M)
Dean, C. E. (SM)
Erickson, C. (A)
Fox, (SM)
Hana, T. C. (M)
Hershkowitz, B. (A)
Hirsch, C. J. (F)
Kapp, C. (A)
King, W. F. (M)
Kunicky, B. F. (M)
Lane, C. C. (A)
Lesser, P. A. (M)
Levin, H. L. (A)
Loughlin, B. D. (F)
MacDonald, W. A. (F)
Nagel, K. H. (A)
Nielsen, P. (M)
Novick, R. (M)
Page, C. E. (SM)
Peters, G. J. (A)
Pressman, R. (M)
Tillman, L. (M)
Tobin, M. W. (M)
Tucker, S. A. (SM)
Weinberg, S. (SM)
Wilson, W. H. (A)
Woodard, G. F. (A)
Young, V. J. (SM)
Zimmer, E. W. (M)

Liverpool (SYR-1)
Allen, A. E. (A)
Angus, A. C. (M)
Arnold, R. D. (M)
Applebaum, S. P. (SM)
Bakeman, O. R. (A)
Benfey, R. L. (M)
Biggs, J. P. (A)
Bowman, D. C. (A)
Boyce, H. K. (A)
Brown, W. W. (SM)
Browne, D. E. (M)
Clark, M. E. (SM)
Crine, C. W. (A)
Demaree, G. A. (M)
Doty, J. C. (M)
Fisk, T. (M)
Fogle, V. (M)
French, R. W. (M)
Goetter, W. F. (M)
Grabowski, S. J. (M)
Hansen, R. J. (SM)
Hart, J. E. (M)
Henry, G. V., Jr. (M)
Hoefling, J. E. (A)
Hoverman, W. G. (M)
Jordan, J. P. (SM)
Junken, L. H. (SM)
Kassler, R. (A)
Klous, G. A. (M)
Kluender, E. C. (SM)
Knight, W. W. (A)
Larosche, J. R. (A)
Lee, A. E. (A)
Lewis, R. V. (SM)
Liggett, W. E. (A)
Locke, J. R., Jr. (SM)
McCoy, D. R. (A)
Milham, R. L. (M)
Miner, C. R. (SM)
Neese, J. (M)
Nester, W. H. (M)
Noyes, J. E. (M)
Pfisterer, F. (A)
Pfueller, A. W. (M)
Platts, G. F. (SM)
Pollock, A. H. (M)
Smith, J. M. (M)
Swing, M. (SM)
Vanderlaan, H. J. (M)
Walker, O. F. (SM)
White, J. J. (A)
Williamson, J. C. (M)
Young, J. D., Jr. (M)
Zeiser, M. D. (M)

Lockport (BN-1)
Bulmore, H. R. (A)
Malvin, M. A. (M)
Martin, C. E. (A)
Rupp, R. B. (A)

Locust Valley (LI-2)
Barber, R. G. (A)
Bouteiller, C. E. (A)
Matuszek, F. A. (A)
Shaw, R. F. (SM)
Varnum, A. M. (M)
Vale, W. H. (M)

Long Beach (LI-2)
Bernstein, E. (M)
Caras, B. (A)
Ciskanik, M. J. (A)
Feiner, H. A. (A)
Hauptman, G. (M)
Kelm, A. (M)
Levine, B. I. (A)
Mondschein, M. (A)
Pace, R. A. (A)
Welnstein, I. (M)
Wurman, G. (M)

Long Island City (LI-2)
Albicocco, S. P. (M)
Amatneck, K. V. (M)
Balamuth, L. (M)
Bukofzer, R. (M)
Burrows, C. R. (F)
Catterson, W. A. (M)
Chao, J. (A)
Como, A. (A)
Copeland, D. E. (M)
De Franco, J. J. (M)
De La Parra, A. F. (M)
Douglas, D. A. (A)
Feuer, M. K. (A)
Fleishman, G. (A)
Fletcher, R. (A)
Gambino, F. S. (M)
Geen, W. E. (A)
Gilleran, F. M. (M)
Ginters, F. A. (A)
Goodman, H. (A)
Haring, L. L. (A)
Harris, H. I. (A)
Horvath, J. J. (A)
Jurison, J. (A)
Kelly, J. J. (A)
Kessler, F. (A)
Kirwan, J. P. (M)
La Manna, R. (A)
Lewyt, A. M. (SM)
Liebert, F. R. (M)
Maixner, F. C. (A)
McConnell, J. H. (SM)
Montuno, J. B. (A)
Morse, F. (M)
Mulder, H. E. (A)
Olessey, P. H. (M)
O'Donnell, E. J. (M)
Oeste, R. A. (A)
Osherowitz, J. M. (A)
Ostroff, A. (A)
Pagano, C. N. (M)
Palmieri, C. A. (A)
Pasquier, C. J. (M)
Rich, L. C. (M)
Rubin, S. W. (M)
Rufus, D. (A)
Salij, Z. B. (A)
Saltman, R. G. M)
Shaler, D. (SM)
Simmonds, J. (A)
Skwarek, F. J. (SM)
Slabicki, W. (A)
Spera, R. L. (A)
Stahl, A. S. (SM)
Vignali, J. J. (M)
Wald, D. (A)
Zeldner, S. (A)

Loudonville (SCH-1)
Gisser, D. (M)
Jernakoff, G. (A)
Rullson, J. P. (M)

Ludlowville (ITH-2)
Deutch, H. M. (M)
Sherman, R. G. (A)

Lynbrook (LI-2)
Anelli, R. L. (M)
Backus, C. H. (A)
Carpenter, J. J. (A)
Davidoff, F. (M)
Dixon, L. C. (M)
Duttera, W. S. (SM)
Ebert, J. E. (SM)
Fuchs, G. W. (A)
Harnett, L. T. (M)
Kirchner, C. W. (A)
Koch, R. F. (M)
Lee, L. H. (M)
Lett, A. S. (A)
Masin, J. J. (M)
Richardson, K. (A)
Rogers, R. D. (A)
Rossoff, A. L. (SM)
Ruppel, A. E. (M)
Shmurak, B. (M)
Smith, J. S. (SM)
Surette, W. E., Jr. (A)
Teommey, G. H., Jr. (SM)
Traver, H. R. (M)

Lyons (ROC-1)
Gentry, F. E. (A)

Mahopac (NY-2)
Black, G. R. (A)
Renke, A. (M)

Malba (LI-2)
Lindberg, R. (A)

Malden-on-Hudson (NY-MH-2)
Gaito, K. W. (M)

Malverne (LI-2)
Bahnsen, R. J. (A)
Beck, A. T. (M)
Deans, W. L. (A)
Hepburn, J. C. (A)
Kelly, F. J. (M)
Pollack, I. (M)
Rojas, F. R. (SM)
Schneider, R. E. (M)
Shanney, W. I., Jr. (A)
Sharpe, L. E. (M)
Spencer, B. F. (SM)
Tanck, H. (M)
Van Rosenbergh, W. (M)
Vetter, R. F. (M)

Mamaroneck (NY-W-2)
Carlisle, S. F., Jr. (M)
Johnson, R. K. (M)
Powell, A. E. (A)
Reid, W. (A)
Robbins, L. M. (A)
Romero, R. F. (M)
Scher, S. M. (A)
Vollenweider, A. D. (M)

Manhasset (LI-2)
Bowie, R. M. (F)
Brown, H. A. (SM)
Brown, R. W. (M)
Della-Corte, J. P. (SM)
Friebele, E. J. (M)
Gorrill, W. S. (SM)
Hamlett, R. T. (SM)
Hathaway, J. L. (SM)
Hobbs, M. (SM)
Jackson, B. A. (M)
Kaelber, J. C. (A)
Meyer, H. E., Jr. (M)
Nickel, F. J. (VA)
Philpott, L. R. (SM)
Rimmler, F. F. (A)
Scott, R. (A)
Traenkle, J. W. (M)
Weibel, G. E. (SM)
Woods, W. C., Jr. (M)

Manlius (SYR-1)
Baxter, L. M. (M)
Kinney, R. V. (A)

Manorhaven (LI-2)
Best, R. A. (M)

Marathon (SYR-1)
Wilson, R. M. (A)

Marcellus (SYR-1)
Devine, G. F. (SM)

Marcy (RU-1)
Williams, H. A., Jr. (M)

Maspeth (LI-2)
Brecht, G. L. (A)
Guttroff, G. H. (M)
Howard, R. F. (A)
Jaworowski, B. R. (A)
Kay, L. M. (SM)
Leibholz, S. W. (A)
Pataki, E. (M)

Massapequa (LI-2)
Antony, C. (M)
Ashin, A. (A)
Bartsch, R. T. (M)
Baunach, E. L. (VA)
Biegen, A. J. (A)
Bouner, W. A., Jr. (A)
Brennan, J. J. (M)
Bylock, N. (A)
Capasso, L. V. (M)
Chapman, P. W. (M)
Coffman, B. C. (SM)
Darden, R. R., Jr. (SM)
Davidson, S. (M)
Di Toro, M. J. (SM)
Elliott, J. O. (M)
Enlow, P. M. (A)
Gold, J. J. (M)
Goldstone, L. L. (A)
Hammond, R. J. (A)
Haneman, F. G. (A)
Harris, M. R. (M)
Karas, J. P. (A)
Katz, S. H. (SM)
Kaye, M. (A)
Krueger, A. C. (M)
Lee, C. B. (M)
Leibfried, T. F., Jr. (A)
Macovski, A. (SM)
Marcinkowski, E. R. (M)
Martin, J. L. (M)
Morris, W. E. (M)
Rigdon, C. A. (M)
Ruvin, A. E. (M)
Sail, A. H. (M)
Spangler, S. T. (SM)
Staros, B. (SM)

Massapequa Park (LI-2)
Arfin, A. D. (M)
Balle, G. E. (A)
Bubbers, J. C. (A)
Cahan, L. C. (M)
Cronauer, E. A. (M)
Eckert, G. F. (A)
Feerst, I. (M)
Finken, K. R., Jr. (A)
Gallagher, J. H. (A)
Goodman, J. (M)
Hermelin, L. S. (SM)
Johnson, F. L. (A)
Mansfield, E. C. (A)
Ogden, D. R. (M)
Sartory, J. L. (A)
Scharf, E. (M)
Smith, H. D. (M)
Swearingen, T. J. (M)
Virgadamo, F. (M)
Yutkowitz, C. K. (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)
Baer, J. A. (SM)
Fiedlerer, J. A. (M)
Humphrey, J. G. (M)
Noble, M. L. (A)
Portz, H. G. (M)

Mechanicville (SCH-1)
Belmonte, A. P. (M)

Merrick (LI-2)
Baird, J. E. (A)
Bronstein, S. H. (M)
Casale, D. R. (M)
D'Amico, S. P. (M)
Dodd, F. L. (SM)
Hirsch, R. B. (M)
Knight, P. (A)
Lindenfelser, W. A. (M)
Paul, I. (M)
Randall, G. A. (SM)
Sahm, E. J. (M)
Spittieri, A. (M)
Woodbury, C. P. (M)

Middle Island (LI-2)
Adams, T. H. (A)

Millbrook (NY-MH-2)
Newman, E. G. (M)
Wroblewski, E. J. (A)

Miller Place (LI-2)
Watson, C. W. (M)

Milton (NY-MH-2)
Mueller, D. C. (M)

Minoa (SYR-1)
Ernst, E. C. (M)
Hagnauer, R. A. (A)

Mineola (LI-2)
Arams, F. R. (SM)
Avery, R. E. (SM)
Berger, R. G. (SM)
Bisby, J. F. (SM)
Brack, W. (M)
Briggs, E. Z. (A)
Brooks, M. S. (A)
Brown, L. L. (A)
Caddell, R. (A)
Cahill, F. C. (SM)
Canning, J. H. (SM)
Close, R. N. (SM)
Comstock, G. C. (F)
Cramer, S. (M)
Crist, P. W. (SM)
Decker, S. M. (M)
Exley, L. (M)
Fellendorf, G. W. (M)
Fromm, W. E. (SM)
Fubini, E. G. (F)
Funk, R. W. (M)
Fyme, M. G. A. (A)
Godfrey, E. R. (SM)
Graef, R. L. (M)
Haag, E. J. (A)
Heindler, A. J. (A)
Hockenjos, R. M. (A)
Hoffman, E. J. (SM)
Ihrig, L. C. (M)
Johnson, J. H. (M)
Jones, B. F., Jr. (VA)
Jordan, D. B. (A)
Kanthack, I. H. (A)
Karpen, E. W. (A)
Kearney, J. W. (SM)
Kezer, C. F. (M)
King, L. H. (SM)
Knocklein, H. P. (A)
Larson, R. A. (M)
Lebenbaum, M. T. (SM)
Lemanczyk, J. C. (M)
Lethin, J. E. (SM)
Lombardi, M. W. (A)
Lombardo, P. P. (A)
Loughren, A. V. (F)
Lowman, R. V. (M)
Lynch, W. A. (SM)
Malech, R. G. (A)
McFarland, J. E. (SM)
McGregor, J. C. (SM)
Merten, D. J. S. (SM)
Meyer, G. E. (A)
Miller, D. M. (SM)
Morton, G. W. (M)
Mueller, F. J. (A)
Newhall, F. A. (A)
Pasqua, L. (A)
Richter, H. E. (M)
Robertson, D. J. (M)
Rosenthal, M. (M)
Rubenson, J. G. (SM)
Sauer, H. E. (A)
Sawyer, H. S. (M)
Schrader, L. W., Jr. (M)
Schweber, S. C. (A)
Schwenk, H. R. (M)
Simonton, L. J. (M)
Skifter, H. R. (F)
Skrobisch, A. (M)
Smith, W. G. (A)
Smyth, F. J. (M)
Snoke, C. E., Jr. (SM)
Sommers, C. E. (A)
Speh, K. C. (SM)
Stephenson, J. G. (SM)
Stewart, S. W. (M)
Theroux, G. L. (M)
Tiger, H. S. (A)
Tionaytis, C. J. (A)
Tolles, W. E. (SM)
Torn, L. J. (SM)
Wang, C. C. (F)
Whaley, W. W. (M)
White, W. D. (F)
Wille, R. A. (A)
Williams, A. L., Jr. (M)
Woodward, J. E. (M)

Mitchel AFB (LI-2)
Hinrichs, C. A. (A)

Monroe (NY-MH-2)
Sperr, A. E. (M)
Vollkommer, W. A. (VA)

Monsey (NY-2)
Humphrey, R. M. (A)
Selender, H. (M)

Monticello (NY-MH-2)
Fleischer, A. P. (A)

Mount Kisco (NY-W-2)
Athey, S. W. (SM)
Cervantes, H. T., Jr. (A)
Doyle, R. J. (A)
Halstead, W. S. (SM)
Stewart, J. A. (M)

Mount Marion (NY-MH-2)
Collins, M. (A)
Eickhorn, C. R., Jr. (M)
Foley, J. H. (A)
Holler, J. J. (A)
Murad, R. V. (M)
Oldani, C. M. (M)
Pasquariello, C. J. (A)
Skatrud, R. O. (A)

Mount Vernon (NY-W-2)
Achtellik, G. (M)
Augustine, R. O. (M)
Bloom, F. J. (A)
Bohmer, T. E. (A)
Brenner, B. (M)
Callahan, J. P. (M)
Campbell, C. H. (M)
Desmores, W. B. (A)
Douglas, R. H. (M)
Dowling, T. J. (A)
Gayet, P. J. (A)
Gruss, R. F. (M)
Gurdius, H. W. (A)
Herz, H. L. (A)
Hineline, H. D. (M)
Hochman, R. J. (M)
Hoffmann, W. H. (M)
Kaplan, M. (A)
Kumble, A. S. (M)
Lang, H. M. (A)
Miller, D. C. (M)
Paribello, J. J. (A)
Pestone, A. A. (A)
Piell, W. (M)
Pinz, B. M. (A)
Rampel, G. G. (A)
Redstone, C. W. (M)
Rosenbaum, A. H. (VA)
Rosenberg, P. (SM)
Samuels, D. S. (A)
Sonkin, D. (SM)
Spiteri, J., Jr. (A)
Stone, C. G., Jr. (M)
Strongin, J. (M)
Sturm, N. (A)
Thorley, R. V. (M)
Wallace, M. (SM)
Weber, E. (F)
Wines, A. L., Sr. (A)
Zang, T. (A)

Munsey Park (LI-2)
Heindel, H. J. (SM)

Nanuet (NY-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. (

Warrick, A. C. (M)
Watts, P. M. (A)
Wood, R. H. (A)
Yoder, D. F. (A)
Zachary, R. A., Jr. (M)

New Hyde Park (LI-2)
Angevine, R. A. (M)
Berger, M. (M)
Berkowitz, B. (M)
Biscoe, G. W. (A)
Blackstone, H. (SM)
Borgelt, W. E. (M)
Borlwick, G. E. (M)
Bruns, E. A. (M)
Camp, S. N. (M)
Collins, W. G. (A)
Contrastan, D. P. (A)
Detwiler, S. P. (M)
Dittenhoefer, H. F. (M)
Dovey, H. N. (M)
Duffy, A. F. (A)
Eisenhauer, P. E. (A)
Ellis, F. W. (M)
Farber, R. J. (SM)
Fishbein, M. (SM)
Friedman, I. (M)
Garnar, R. L. (A)
Gaveuman, E. H. (M)
Gelfand, G. (A)
Goebeler, W. H., Jr. (M)
Greene, G. F. (M)
Helmer, R. L. (M)
Hevesh, A. H. (M)
Hudelson, R. L. (M)
Isaacs, P. J. (M)
Jackson, F. S. (M)
Kaplan, M. (A)
Kelley, R. J. (A)
Leahy, W. F. (M)
Leary, M. T. (M)
Lehtonen, E. W. (M)
Lemefsky, S. (M)
Lohkemper, O. A. (A)
Loughlin, R. G. (SM)
Madrick, S. A. (M)
McDonald, J. F. (SM)
McLean, R. C. (M)
McMeekin, J. J. (A)
Mediatore, R. E. (A)
Moretti, W. W. (M)
Odom, C. H. (A)
Orazio, A. F. (M)
Polak, H. L. (A)
Potter, R. E. (A)
Prosein, P. A. (M)
Radzake, B. (SM)
Richter, H. H. (A)
Ries, C. A. (SM)
Rowinski, S. J. (A)
Sherbin, L. E. (SM)
Sherry, R. S. (SM)
Shooman, M. L. (M)
Stamps, G. M. (M)
Vanaman, F. P. (A)
Vinarub, M. E. (M)
Wimmer, A. A. (M)
Wittenberg, R. C. (M)
Wolf, E. G. (M)
Yorinks, A. (SM)

New Paltz (NY-MH-2)
Beeby, P. A. (A)
Ebaugh, D. F. (A)
Gay, T. W., Jr. (A)
Keeley, J. F. (A)
Reid, G. M., Jr. (M)

New Rochelle (NY-W-2)
Andraud, R. J. (A)
Appelbaum, G. (A)
Baker, L. S. (A)
Benjamin, S. S. (M)
Bower, C. M. (M)
Brownell, H. R. (M)
Burnell, L. G. (SM)
Burnett, L. J., Jr. (M)
Busch, W. R. (M)
Carter, W. F. (A)
Costa, M. J. (A)
Faup, J. J. (M)
Feldman, E. F. (M)
Fisher, S. G. (A)
Goldberg, M. I. (A)
Goldfischer, L. L. (SM)
Goodale, E. D. (SM)
Gourley, R. T. (A)
Grand, B. (M)
Greibach, E. H. (SM)
Hanchrow, J. J. (A)
Harris, C. M. (A)
Hirsch, J. D. (M)
Kilsheimer, R. L. (M)
Larkin, J. D. (M)
Lurie, W. R. (SM)
Mathis, C. E. (A)
Parker, R. H. (A)
Pels, E. (M)
Reed, J. (SM)
Rosenberg, A. E. (A)
Schwartz, H. E., JR. (M)
Shapiro, H. (A)
Shelley, E. F. (SM)
Taylor, E. R., Jr. (A)
Temple, D. L. (M)
Trautmann, J. H. (A)
White, F. E., Jr. (VA)
Williams, J. E. (A)

New York City (NY-2)
Abraham, L. G. (F)
Abrahamsen, A. (A)
Abruzzi, P. W. (M)
Adams, G. G. (A)
Adams, H. J. (A)
Adams, J. F., Jr. (A)
Adams, M. D. (SM)
Addamo, J. A. (A)
Aghib, E. G. (A)
Aguilar, A. (A)
Alderman, E. L. (M)
Aldor, E. (A)
Alexander, L. (M)
Alexandro, F. J., Jr. (M)
Alfieri, G. J. (A)
Allen, M. H. (M)
Allen, P. S. (M)
Alley, J. W. (M)
Almquist, M. L. (SM)
Altschuler, H. M. (SM)
Amatnick, E. (M)
Amy, E. V. (SM)
Anagnost, A. L. (A)
Anderson, A. G. (A)
Andrasko, J. P. (VA)
Andres, R. K. (M)
Appel, H. W. (SM)
Arani, R. A. (A)
Archbald, R. W. (SM)
Arguello, R. J. (M)
Arm, M. (M)
Arm, W. (M)
Armstrong, C. A. (SM)
Armstrong, G. S. (M)
Arnold, J. W. (SM)
Arnson, L. (SM)
Arons, E. L. (A)
Arrington, J. L., II (SM)
Asen, R. (A)
Atwood, S. (SM)
Austein, E. E. (A)
Austin, J. B., Jr. (M)
Avlus, J. (F)
Aviv, G. G. (M)
Backus, J. W. (M)
Baker, W. R. (A)
Barasch, H. P. (M)
Barash, S. A. (A)
Barkley, W. J. (F)
Barr, S. M. (SM)
Barron, L. (A)
Baer, T. M. (M)
Baerst, L. R. (A)
Bailey, A. (F)
Bailey, G. W. (F)
Bailey, J. E. (M)
Baker, G. H. (M)
Bartlett, T. L. (M)
Baruch, S. N. (M)
Batcheller, A. (SM)
Bates, A. K. (A)
Batson, J. A. (M)
Battich, E. L. (M)
Baum, L. (M)
Baum, M. C. (A)
Baum, R. P. (M)
Baumann, R. H. (A)
Baumgartner, J. G. (A)
Beard, E. M. (A)
Bederman, S. (A)
Bednar, F. J. (A)
Beeh, R. C. M. (M)
Beers, V. (M)
Belli, J. L. (M)
Bell, J. W. (A)
Beller, A. C. (M)
Bemis, E. W. (SM)
Benedikt, J. (A)
Bennett, H. W. (M)
Bennett, L. (A)
Bensinger, C. (A)
Berber, J. (A)
Bereza, A. (M)
Berger, J. (M)
Berger, L. (M)
Bergherst, W. (A)
Berkner, L. V. (F)
Berman, M. (M)
Berman, R. (A)
Bernard, N. (A)
Bernstein, R. (SM)
Bertero, E. P. (A)
Bertram, J. E. (A)
Best, F. G. (M)
Betts, F. (M)
Bettz, F. H. (SM)
Bevan, R. K. (A)
Bever, K. H. (A)
Beverage, H. H. (F)
Beveridge, R. W., Jr. (A)
Bibbero, R. J. (SM)
Bigelow, S. C. (M)
Birenbaum, L. (M)
Bishop, W. M. (A)
Bitner, R. C. (A)
Black, E., Jr. (SM)
Blackman, R. B. (M)
Bland, G. F. (A)
Blomquist, E. A. (M)
Blume, R. J. (A)
Blumenthal, H. W. (M)
Blye, P. W. (SM)
Bocharoff, G. M. (M)
Bodin, M. (A)
Bodle, D. W. (M)
Boehm, W. R. (SM)
Boguslawski, H. A. (SM)
Bohn, J. T. (M)
Bohn, W. C. (M)
Bolton, A. (V)
Bomba, J. S. (A)
Bomberger, D. C. (M)
Bonner, M. K. (M)
Borner, R. C. (M)
Borst, J. M. (VA)
Bose, J. H. (M)
Bostwick, L. G. (M)
Boughtwood, J. E. (M)
Boule, W. (M)
Bovy, C. (A)
Bowler, J. A. (M)
Boychuk, B. (M)
Boyd, R. C. (M)
Brady, T. D. (A)
Bradley, F. R., Jr. (M)
Brady, T. J., Jr. (M)
Bramhall, F. B. (SM)
Braunfeld, M. T. (M)
Braverman, M. (A)
Brayman, P. J. (A)
Bregman, M. W. (A)
Breitenbach, F. J. (M)
Bremmer, L. F. (SM)
Brender, D. M. (M)
Brenner, A. (A)
Brenner, E. (SM)
Bresler, A. D. (M)
Brigham, J. C. (M)
Bright, R., Jr. (SM)
Brillouin, L. N. (F)
Briner, C. D. (A)
Bristol, R. W. (M)
Brociner, V. (M)
Brodheim, E. (A)
Brodie, R. B. (M)
Bromberg, J. J. (A)
Brookner, E. (A)
Brown, G. B. (SM)
Brown, F. L. (M)
Brown, J. T. L. (M)
Brown, P. M. (A)
Brunet, M. (SM)
Buck, H. W. (A)
Buck, W. A. (A)
Buckles, R. A., Jr. (M)
Buckley, R. O. (A)
Buehler, G. V. (M)
Buffo, B. (SM)
Bugnolo, D. S. (A)
Bulkley, D. D. (M)
Burghard, G. E. (SM)
Burke, J. F. (M)
Burstein, I. (A)
Busch, A. (A)
Butterworth, J. S. (A)
Buttner, H. H. (F)
Buxbaum, S. J. (A)
Byam, L. A., Jr. (M)
Bzdusek, J. S. (A)
Cadek, J. (M)
Calabrese, J. P. (M)
Calderone, M. L. (M)
Callahan, J. L. (F)
Callais, R. T. (M)
Cambridge, C. G. (SM)
Camnarasis, J. (A)
Campana, G. R. (A)
Campbell, E. A. (A)
Campbell, R. D. (F)
Carlebach, W. J. (VA)
Carlson, L. C. (A)
Carreau, G. (M)
Cartwright, R. H. (A)
Caruthers, R. S. (SM)
Cassell, J. L. (A)
Cedarholm, J. P. (A)
Chaffee, J. G. (F)
Chamberlain, D. B. (F)
Chandler, J. A. (A)
Chaney, W. L. (M)
Chang, S. S. L. (SM)
Chapman, G. H. (M)
Chapman, P. W. (M)
Chen, T.-S. (M)
Cheranis, S. (M)
Chesnes, A. A. (SM)
Chinn, H. A. (F)
Chirlian, P. M. (M)
Chisholm, T. L., Jr. (A)
Christensen, C. W. (SM)
Christian, H. K. (M)
Cifu, J. L. (M)
Cinelli, H. L. (M)
Claassen, F. S. (M)
Clark, G. L., III (A)
Clark, R. G. (A)
Clarke, K. K. (M)
Clements, G. J. (M)
Clewell, D. H. (F)
Clinton, P. J. (M)
Clothier, E. L. (A)
Coggeshall, I. S. (F)
Cohen, A. J. (A)
Cohen, J. B. (A)
Cohen, M. M. (A)
Cohen, M. (M)
Cohn, E. M. (A)
Cohn, I. H. (M)
Coleman, J. R. (M)
Coleman, S. F. (M)
Coleman, S. T. (A)
Coles, F. A. (SM)
Collins, J. (A)
Comunale, E. A. (A)
Conable, J. H. (M)
Connelly, J. H. (M)
Connelly, J. J. (A)
Connor, L. C. (VA)
Cook, W. W. (A)
Cooley, A. G. (F)
Cooper, F. S. (M)
Cooper, M. (A)
Corbell, P. L., Jr. (M)
Corbin, J. E. (M)
Corey, H. E., Jr. (SM)
Correa, H. A. (A)
Corwith, H. P. (F)
Cosentino, A. (M)
Costello, A. W. (M)
Cotter, M. A. (M)
Counts, S. T. (M)
Cowan, F. A. (F)
Cowan, S. R. (A)
Cox, W. A. (A)
Crane, P. H. (A)
Crane, R. B. (A)
Crenshaw, R. L., Jr. (A)
Cravis, H. (M)
Crawford, W. J. (SM)
Creel, J. D. (M)
Creps, R. H. (A)
Crews, F. H. (M)
Crone, W. R. (M)
Cronin, D. (A)
Crowson, F. B. (SM)
Cumber, W. G. (A)
Cumming, L. J. (SM)
Curry, G. R. (M)
Curtis, R. B. (M)
Curtis, R. W. (SM)
Cutler, S. N. (A)
Cutting, F. (F)
Dahlbom, C. A. (SM)
Davey, J. R. (M)
Davidovits, M. (A)
Davies, R. H. (SM)
Davis, R. F. (M)
De Beer, B. C. (M)
De Bragga, J. W. (A)
Deland, T. (A)
Delgado, R. (A)
Demarest, F. E. (A)
De Mello, W. (SM)
Demin, A. N. (A)
De Muro, T. M. (M)
De Neuf, D. K. (SM)
Denny, C. R. (M)
Deschamps, G. A. (SM)
De Simone, D. V. (M)
Dietrich, E. S. (A)
Dietrich, F. (VA)
Digiulio, E. M. (A)
Dillow, J. C. (M)
Dilson, J. (M)
Dixon, L. F. (A)
Dixon, T. O. (SM)
Doherty, W. H. (F)
Dolle, W. C. (A)
Dombro, L. (A)
Donald, D. D. (SM)
Donaldson, W. G. (SM)
Donkvan, W. E. (SM)
Dorchak, C. J. (M)
Dorf, R. H. (M)
Dorogusker, B. (A)
Dowds, H. M. (M)
Doyle, W. T. (M)
Dressel, H. O. (M)
Drzewicki, D. D. (A)
Dubiller, W. (F)
Dubs, E. E. (A)
Duffy, J. J. (A)
Dunn, E. J., Jr. (A)
Durker, A. L. (M)
Desnoes, A. B. (M)
Deutsch, E. M. (M)
Devine, J. J. (A)
Devine, J. M. (A)
Devine, J. J. (M)
Dewey, G. C. (M)
De Witt, R. G. (M)
Diamond, E. H. (A)
Diamond, S. (M)
Dickson, J. F. (M)
Diebold, J. (A)
Durkee, C. H. (M)
Durocher, J. D., Jr. (A)
Duskis, E. F. (A)
Early, C. D., Jr. (M)
Easley, W. A., Jr. (A)
Eason, L. (A)
Eaton, W. W. (SM)
Eberhardt, F. J. (M)
Echtman, C. (M)
Edmonds, R. H. (M)
Edson, M. C., Jr. (A)
Egan, T. R. (M)
Egert, S. S. (M)
Eggert, J. (SM)
Ehmborg, A. V. (A)
Ehrlich, C. N. (A)
Eichwald, B. (SM)
Eisenberg, I. (M)
Eisenberg, L. (M)
Eisenstein, N. I. (A)
Elderkin, C. J. (M)
Ellersick, F. W. (M)
Elliott, S. J. (M)
Ellis, A. E., Jr. (M)
Ellis, R. (M)
Ellison, B. (M)
Ellwood, W. B. (SM)
Elsea, L. W. (M)
Emberson, R. M. (SM)
Emmons, G. T. (A)
Endsley, G. T. (A)
Eng, J. W. (SM)
Engle, L. K. (M)
Engle, V. M. (M)
Engstrom, E. W. (F)
Eoyang, T. T. (SM)
Ernst, R. C. (M)
Ettlinger, A. B. (M)
Evans, T. P. (SM)
Exselsen, R. M. (A)
Facey, J. W. (VA)
Fagin, L. (M)
Faige, M. D. (SM)
Fairchild, S. M. (A)
Fales, D., III (M)
Falknor, F. B., Jr. (A)
Farber, S. S. (M)
Farello, F. A. (M)
Farkas, F. S. (SM)
Farley, J. (A)
Fells, W. E. (M)
Feng, S. C. (A)
Fernstrom, C. H. (M)
Ferrell, O. P. (A)
Feyer, H. (M)
Fifer, S. (SM)
Finch, A. L. (F)
Finger, T. A. (M)
Fingerhood, S. A. (M)
Finkelstein, M. J. (M)
Fiorletta, A. A. (A)
Firth, P. H. (M)
Fish, P. (SM)
Fishberg, S. (M)
Fisher, A. (A)
Fisher, C. J. (M)
Fisher, J. E. (A)
Fisher, K. (M)
Fitch, W. A. (SM)
Fitzgerald, P. J. (A)
Fleischer, P. E. (M)
Fleming, F. L. (M)
Fletcher, M. W. (M)
Foran, R. P. (A)
Forman, A. J. (M)
Formon, M. (M)
Fox, P. A. (A)
Fox, S. (A)
Franchina, M. A. (A)
Franke, G. S. (M)
Franklin, E. F. (A)
Freed, L. (A)
Freed, R. D. (A)
Freeman, O. S., Jr. (M)
Fregan, E. J. (A)
Freiberg, R. (A)
Freiman, C. V. (M)
Freudenberg, B. (SM)
Frezzolini, D. (VA)
Friedland B. (A)
Friedman, L. (A)
Frimet, S. H. (A)
Frishauf, S. H. (M)
Fritsche, A. J. (A)
Fritz, C. E. (M)
Fruchauf, M. C. (M)
Fruhner, E. T. (SM)
Furedi, J. E. (A)
Fury, A. E. (A)
Gabel, R. J. (M)
Gaillard, R. L. (M)
Gala, D. C. (M)
Gallup, G. B. (A)
Galluppi, P. B. (A)
Galyean, M. W. (A)
Gancher, L. (A)
Gandolph, A. A. (A)
Gannett, D. K. (SM)
Gardner, K. S. (M)
Garrish, G. G. (A)
Garthwaite, J. L. (A)
Gast, R. W. (SM)
Gauvenet, A. J. (A)
Geigel, A. A. (M)
George, W. P. (M)
Gerard, D. R. (A)
Gerb, B. (M)
Gersch, W. M. (A)
Gerstein, M. G. (A)
Gestring, G. F. (A)
Geyer, A. J. (A)
Gibbons, J. (A)
Gibson, C. (A)
Gibson, O. B. (SM)
Gichtin, A. L. (A)
Giese, R. C. (SM)
Gignoux, D. (M)
Giguere, F. E. (SM)
Gillette, E. H. (A)
Gilman, G. W. (F)
Gipple, H. W. (M)
Gipsis, P. W. (A)
Girdwood, M. (M)
Gister, S. (M)
Gittelman, A. I. (M)
Gladston, H. (M)
Glaser, J. L. (SM)
Glass, M. B. (A)
Glasser, H. (A)
Glasser, L. J. (M)
Glazer, B. G. (A)
Glick, H. (A)
Glickstein, J. G. (A)
Gold, P. J. (A)
Goldberg, H. (M)
Goldberg, H. D. (A)
Goldfarb, A. T. (M)
Goldman, B. S. (A)
Goldmark, P. C. (F)
Goldmuntz, L. A. (A)
Goldschmidt, K. (M)
Goldsmith, A. E. (F)
Goldsmith, A. S. (M)
Gonen, B. (A)
Goodman, S. J. (M)
Goodstein, L. P. (SM)
Gordon, (A)
Gordon, S. (A)
Gore, J. H. (M)
Gorton, R. M. (M)
Gourgey, A. A. (A)
Goyal, K. G. (A)
Jackson, H. (A)
Grace, F. C. (M)
Jacobs, A. B. (M)
Graham, H. D. (A)
Jacobs, B. (A)
Graham, V. M. (F)
Jacobson, E. (M)
Graham, W. (M)
Jacobson, T. R. (A)
Grigoraki, N. M. (A)
James, J. V. (A)
Grimme, H. J. (M)
Jansky, C. M. (SM)
Griswold, F. B. (M)
Jarecky, J. L. (A)
Groder, M. L. (SM)
Jarvis, A. B. (M)
Groginsky, L. (A)
Jatlow, J. L. (SM)
Gross, R. D. (M)
Javid, M. (A)
Grosselfinger, W. H. (SM)
Javitz, A. E. (M)
Grossman, F. J. (A)
Jeerg, E. A. (M)
Grossman, H. W. (M)
Johnson, H. L. (A)
Grossman, H. (SM)
Johnson, H. W. (SM)
Grossner, N. R. (M)
Johnson, W. C. (A)
Grosso, G. A. (A)
Johnson, W. D. (M)
Grover, H. G. (SM)
Johnston, H. C. (SM)
Gruber, A. E. (A)
Jones, D. D. (A)
Grunenthal, F. W. (A)
Jones, H. S. (SM)
Grundfest, H. (SM)
Jones, H. W. (SM)
Grundy, A. R., Jr. (A)
Jones, T. A. (A)
Gryb, R. M. (M)
Jones, W. (A)
Guaragna, L. F. (M)
Joller, L. (A)
Guest, W. (SM)
Javiler, P. H. (M)
Guild, B. (SM)
Kadonaga, H. (A)
Gunderson, R. W. (M)
Kahn, A. (SM)
Gunn, D. W. (M)
Kahn, A. (M)
Guterman, P. H. (M)
Kahn, I. (A)
Gutermuth, C. G. (SM)
Kalman, R. E. (A)
Guyer, E. (A)
Kalthaun, H. E. (SM)
Haas, H. H. (M)
Kamen, (SM)
Haase-Dubosc, A. A. (M)
Kamp, E. A. (M)
Hack, G. E. (A)
Kampschoer, J. F. (M)
Hackenberg, J. H. (M)
Karda, W. O. (M)
Haddad, J. A. (M)
Karlsruher, G. W. (M)
Haenschke, D. G. (M)
Karmiol, E. D. (M)
Hager, D. N. (A)
Karp, R. (SM)
Hagerty, G. E. (M)
Kassan, J. D. (M)
Hahn, J. (A)
Kassel, E. D. (A)
Hahn, J. H. (M)
Katz, L. (M)
Hahn, S. (M)
Katz, S. (A)
Halbt, L. H. (A)
Katz, S. (M)
Hallett, J. (A)
Kaufman, D. (M)
Hamburger, T. (A)
Kaufman, G. L. (A)
Handelman, R. B. (M)
Kaufmann, H. A. (A)
Hanson, O. B. (F)
Kaye, J. (A)
Hara, B. (VA)
Kaylor, R. L. (M)
Harder, D. (M)
Keith, R. S. (A)
Hardwick, A. H. (SM)
Keth, A. J. (M)
Hare, V. C. M., Jr. (M)
Kevit, B. (SM)
Harger, R. O. (M)
Keller, C. (SM)
Harkavy, H. A. (M)
Keller, E. W. (M)
Harmatz, G. J. (M)
Kelly, J. H. (SM)
Harmon, R. N. (F)
Kelly, M. J. (F)
Harris, C. M. (SM)
Kendall, J. A. (A)
Harris, E. A. (A)
Kent, G. (SM)
Harrison, C. E. (M)
Kern, R. H. (M)
Hartley, S. H. (M)
Kerner, T. (M)
Hartman, R. K. (M)
Klain, M. A. (A)
Hartmann, Z. (M)
Klevit, B. (SM)
Hartog, E. (M)
Killian, L. H. (A)
Harty, L., T. (A)
Kilmer, D. E. (A)
Harvey, W. W. (A)
Kimons, E. (A)
Hata, J. H. (A)
King, F. (SM)
Hatch, M. M. (M)
King, F. N. (M)
Kinn, L. M., Jr. (M)
Kirlloff, A. (SM)
Kirschenbaum, J. (M)
Klass, P. J. (A)
Klein, R. M. (SM)
Kleinman, B. (M)
Klugman, A. I. (M)
Knowlton, A. D. (SM)
Koehler, A. O. (M)
Koeppl, G. R., Jr. (A)
Koff, R. M. (A)
Kofler, E. J. (M)
Konig, W. F. (M)
Korman, J. (M)
Kost, M. (A)
Koszyn, A. I. (A)
Kotik, J. (A)
Kowalchik, J. (A)
Kraemer, G. T. (M)
Kramer, B. H. (A)
Krane, G. (A)
Krelsberger, S. (A)
Kremidas, W. S. (M)
Kritter, E. L. (M)
Kuhn, A. S. (SM)
Kunz, F. (M)
Kundler, H. H. (A)
Kunik, I. J. (M)
Kurrelmeyer, B. (SM)
Kurzrok, R. M. (M)
Kuzmyak, M. G. (M)
Kyser, F. S. (A)
Laas, I. E. (A)
Lack, F. R. (F)
Ladner, G. (SM)
Lairmore, G. E. (A)
Lamb, R. U. (A)
Lamneck, W. J. (M)
Landis, M. (SM)
Lanzaro, J. A. (A)
Lapatine, S. (SM)
Lavit, V. (A)
Layton, H. M. (M)
Lebel, C. J. (SM)
Lebowitz, F. (M)
Ledbetter, A. (SM)
Lee, E. H. I. (SM)
Lee, R. H. (M)
Leed, D. (SM)
Lemly, F. W. (A)
Lenel, J. (M)
Lennon, T. J. (M)
Lentz, J. J. (M)
Leonard, W. L. (A)
Lesnick, R. (A)
Lessert, D. (A)
Leveus, L. M. (SM)
Levey, L. (A)
Levin, H. S. (M)
Levin, M. J. (A)
Levin, L. (M)
Levit, M. (A)
Levy, M. G. (A)
Lewis, F. C. (A)
Lewis, P. A. W. (M)
Lewis, R. K., Jr. (M)
Liang, W. W. L. (A)
Lida, S. (M)
Liebell, E. (M)
Lieberman, D. (M)
Ligori, J. (M)
Lindner, N. J. (M)
Lipsky, J. E. (M)
Litton, J. (A)
Littner, G. H. (M)
Liverios, D. T. (M)
Llewellyn, F. B. (F)
Llewellyn, R. C. (M)
Lockwood, F. W. (M)
Loesing, J. R., Jr. (A)
Lokomowitz, L. I. (M)
London, F. H. (A)
Long, M. L. (M)
Loomis, A. L. (F)
Looser, J. A. (A)
Louderback, H. W., Jr. (M)
Lovitt, S. A. (A)
Lowrem, M. (A)
Luchi, R. D. (M)
Lueders, L., Jr. (A)
Lukashewitz, P. (A)
Luntz, J. D. (SM)
Lurie, E. S. (M)
Lynch, J. B. (A)
Ma, L. N. (M)
Mabuch, O. (A)
Mabuchi, K. K. (M)
Macey, J. G. (A)
MacKenzie, D. J. (A)
Mackenzie, R. P. (A)
Madsen, J. F. (M)
Marwlet, G. F. (SM)
Maggio, J. B. (SM)
Magid, A. (M)
Maitra, K. K. (M)
Malamud, A. D. (A)
Maltiss, W. E. (SM)
Mandl, H. J. (M)
Manley, T. M. (M)
Manner, A. E. (A)
Mansky, L. (A)
Manes, C. M. (SM)
Maps, C. E. (A)
Marcinkowski, H. L. (M)
Marolda, J. (M)
Martin, A. E. (SM)
Martin, C. E. (M)
Martin, H. B. (SM)
Martin, J. A. (M)
Marts, M. P. (M)
Marvin, P. R. (SM)
Marx, E. A. (SM)
Marx, F. L. (SM)
Maser, H. (SM)
Massy, F. M. (M)
Mastraundrea, R. J. (M)
Match, I. (M)
Mateer, K. W. (M)
Matilla, P. A. (A)
Matilla, P. E. (A)
Mattison, G. H. (M)
Mausler, R. (M)
Mauzey, P. T. T. (M)
May, E. S. (A)
Mayer, R. O. (M)
McClelland, H. (A)
McCluskey, V. (M)
McConnell, K. R. (SM)
McCutchen, B. S. (F)
McDavid, J. A. (SM)
McGiffert, S. V. (SM)
McGrath, J. J. (M)
McGuire, J. P. (M)
McLeod, M. G. (M)
McManus, T. J. (M)
McMillan, B. (SM)
McMurdie, T. E. (A)
McNally, W. P. (M)
McNelly, A. D. (A)
McPadden, G. E. (M)
McPherson, J. C. (SM)
McSweeny, R. (SM)
Mekelites, E. W. (M)
Mengani, C. M. (A)
Merkler, F. T. (M)
Merl, K. C. (M)
Merrigan, M. T. (A)
Merrill, R. G. (A)
Merson, L. (A)
Mertz, P. (F)
Meslener, G. J. (A)
Meyer, R. (M)
Meyer, J. H. (M)
Meyerson, A. H. (M)
Milenbach, H. (A)
Millais, W. G. (A)
Millar, J. (F)
Miller, C. M. (M)
Miller, H. G. (SM)
Miller, K. S. (M)
Miller, T. S. (A)
Mills, R. (SM)
Minoura, E. (A)
Misenheimer, H. N. (SM)
Mitchell, C. W. (M)
Mitchell, D. (SM)
Mitchell, J. A. (VA)
Mitchell, L. B. (A)
Mitchell, T. H. (SM)
Mohr, H. F. (M)
Mohsen, A. (A)
Molloy, H. R. (M)
Molnar, R. J. (A)
Monahan, G. W. (A)
Monk, N. (SM)
Monshaw, I. H. (A)
Moore, C. E. (SM)
Moore, J. E. (A)
Moore, J. H. (SM)
Moore, S. F. (M)
Moran, T. G. (A)
Morel, P. (A)
Moreno, M. R. (M)
Morgan, C. L. (M)
Morgan, L. F. (M)
Morgenstern, K. H. (SM)
Morillo, M. A. (A)
Morris, W. P. (M)
Mower, C. P. (A)
Moyan, L. D. (M)
Moynahan, G. F., Jr. (SM)
Muller, J. H. (SM)
Murbach, J. F. (A)
Murino, C. J. (A)
Murphy, O. J. (SM)
Murphy, W. J. (M)
Myer, D. A. (SM)
Myers, M. C., Jr. (M)
Myers, P. (M)
Nalhaulan, J. H. (SM)
Napoli, A. E. (A)
Nash, A. (M)
Nashman, A. E. (SM)
Nathan, A. M. (M)
Neary, J. A. (M)
Nedell, E. (A)
Nelson, C. W., Jr. (M)
Nelson, M. D. (M)
Nemerdrip, P. (SM)
Nevitt, H. F. B. (SM)
Nexon, V. J. (A)
Nicholides, F. C. (M)
Nidermeyer, A., Jr. (A)
Nidus, L. S. (A)
Nielsen, H. V. (M)
Nissen, J. H. (M)
Norman, N. C. (M)
Novik, W. (A)
Nussbaum, E. (M)
Obinger, G. H., Jr. (A)
O'Brien, D. M. (A)
O'Brien, R. S. (SM)
O'Bryan, H. M. (SM)
O'Keefe, W. C. (A)
Okorontwo, K. (A)
Olcott, E. W. (M)
O'Leary, D. F. (A)
Olson, D. B. (A)
Olson, R. E. (M)
Onder, K. (SM)
O'Neill, L. H. (SM)
Oppenheimer, F. W. (M)
Oppenheimer, H. N. (A)
Oslatinsky, L. (SM)
Ostheimer, F. R. (A)
Ostlund, A. (SM)
Ostrolenk, S. (M)
Ostrow, H. (M)
Otis, A. N., Jr. (A)
Ottensmeyer, R. M. (M)
Owen, C. H. (M)
Owen, S. F., Jr. (M)
Oxer, H. (A)
Ozolins, I. (M)
Paley, W. S. (A)
Palmer, C. C. (M)
Palmer, R. L. (SM)
Palmisano, G. A. (A)
Paniagua, R. (A)
Pansch, H. (A)
Parisier, M. (A)
Parker, D. G. (M)
Parker, G. (A)
Parker, J. D. (SM)
Parsons, H. A. (A)
Paskin, M. (M)
Pasquale, F. A. (A)
Passavant, C. A. (M)
Paul, G. S. (M)
Payne, F. (A)
Pearson, H. (A)
Peborde, R. L. (A)
Peckins, S. (M)
Pegler, H. M. (A)
Pegler, J. A. (A)
Pegram, G. B. (M)
Pellegrinelli, G. L. (A)
Pelton, R. C. (M)
Perlman, R. R. (A)
Pernick, H. L. (M)
Peterson, E. (SM)
Petranek, L. (A)
Petrides, T. (SM)
Pettit, O. F. (M)
Pezza, A. T. (A)
Pfleger, K. W. (SM)
Phillbin, S. H. (A)
Phillips, S. C. (M)
Phinney, E. D. (M)
Pickholtz, R. L. (A)
Pilnick, C. (SM)
Pincus, R. M. (A)
Pinheiro, U. B. (A)
Piore, E. R. (F)
Pippenger, C. R. (M)
Pittik, H. (M)
Pitre, V. H. (A)
Pizzuti, F. D. (M)
Plame, S., Jr. (SM)
Plesset, K. (A)
Plishner, P. J. (M)
Polin, H. S. (A)
Pollak, J. P. (SM)
Pollack, R. H. (M)
Ponemon, R. D. (M)
Ponsolle, W. J. (A)
Popaduk, G. E. (M)
Porter, R. W. (SM)
Poss, E. (A)
Post, R. D. (M)
Poulsen, J. E. (A)
Predmore, E. E. (M)
Preston, J. G. (M)
Price, G. W. (M)
Quinn, J. C., Jr. (A)
Quintal, R. J. (A)
Quirk, W. B. (M)
Rabinowitz, S. J. (A)
Racker, J. (SM)
Radner, M. A. (M)
Rahrig, P. L. (M)
Ragazzini, J. R. (F)
Ragland, R. M. (A)
Ralston, A. (M)
Ramond, K. (A)
Randolph, G. C. (A)
Rankin, R. L. (SM)
Rapaport, H. (SM)
Rappoport, H. S. (M)
Raritz, J., Jr. (M)
Read, O. (A)
Reamer, E. D. (A)
Redisch, M. S. (M)
Reens, L. H. (M)
Rehm, M. F. (M)
Reich, S. M. (A)
Reicher, M. D. (M)
Reiner, D. G. (M)
Reiner, F. (A)
Reiner, M. (M)
Reiss, L. (A)
Reisz, E. (F)
Rella, J. D. (A)
Relson, M. (M)
Renaud, H. G. (A)
Renne, H. S. (SM)
Revzin, A. E. (A)
Revzin, S. (M)
Reynolds, G. (A)
Rice, S. O. (F)
Richardson, H. W. (M)
Richardson, H. L. (SM)
Richeimer, P. L. (M)
Rider, J. F. (VA)
Ridings, G. H. (M)
Rigogliosa, A. B. (M)
Rinder, R. M. (A)
Rios, E. Q. (A)
Rish, J. F. (M)
Rittenhouse, P. T. (A)
Rivera, J. J. (A)
Rizzuti, F. M. (A)
Robbins, G. J. (A)
Robertson, C. B. (M)
Robinson, F. F. (A)
Robinson, W. C. (M)
Rock, M. H. (A)
Rocke, A. J. (A)
Rockey, G. H. (SM)
Rodgers, S. M. (A)
Rogan, J. J. (SM)
Rogers, R. N. (M)
Rogoff, J. B. (A)
Romnes, H. I. (SM)
Rooney, J. D. (M)
Rosaler, R. C. (SM)
Rose, A. F. (SM)
Rose, T. T. (A)
Rosenberg, H. J. (A)
Rosenberg, N. A. (M)
Rosenblatt, A. (A)
Rosenheim, D. E. (SM)
Rosner, I. S. (M)
Ross, B. R. (M)
Ross, K. F. (A)
Ross, R. D. (M)
Roth, J. E., Jr. (M)
Rothenstein, E. M. (A)
Rothschild, R. S. (M)
Rothschild, R. S. (M)
Rothschild, R. F. (M)
Rougelot, R. S. (M)
Rowe, J. J. (A)
Rubenstein, A. L. (A)
Rubin, J. (M)
Rubin, M. (A)
Rubinstein, B. (M)
Rudin, S. (M)
Ruff, J. A. (A)
Rugge, R. A. (SM)
Runyon, C. R., Jr. (VA)
Rupprecht, E. G. (M)
Rush, C. J. (M)
Rusinow, K. (M)
Ruth, R. L. (M)
Ruttenberg, S. (A)
Rymer, R. W. (M)
Sa, M. A. M. (A)
Saito-Agami, J. C. (A)
Sadenwater, P. O. (M)
Safir, R. (A)
Sage, I. M. (M)
Sager, N. (A)
Sahud, L. R. (A)
St. Clair, B. W. (A)
Salin, J. A. (M)
Saltzberg, B. R. (M)
Saltzberg, I. M. (M)
Samuel, R. (M)
Samuels, M. (A)
Sanders, R. G. (A)
Saporta, L. J. (A)
Sarasohn, H. M. (M)
Sarnoff, D. (F)
Saunders, H. M. (M)
Saunders, H. O., Jr. (M)
Sawka, R. J. (A)
Saxton, R. C. (A)
Schaller, J. (A)
Schapiro, W. M. (A)
Schauffler, E. A. (A)
Schechter, G. (A)
Schetzen, M. (M)
Schillinger, A. G. (A)
Schlaikjer, J. E. (M)
Schlechter, L. (A)
Schlegel, H. G. (A)
Schlenger, S. B. (A)
Schlesinger, S. P. (M)
Schlig, E. S. (M)
Schmertz, R. C., Jr. (M)
Schmidt, H. (A)
Schneider, C. R. (A)
Schneider, P. (A)
Scholz, C. E. (F)
Schooley, C. (SM)
Schreiner, K. E. (M)
Schreyer, F. J. (M)
Schroeder, G. (M)
Schultz, M. L. (A)
Schumacher, G. B. (A)
Schwartz, H. T. (M)
Schwartz, L. (M)
Schwartz, M. J. (A)
Schwartz, M. (SM)
Schwartz, M. L. (M)
Schwarz, R. J. (SM)
Schweitzer, M. P. (A)
Schwenzeiger, E. E. (A)
Sebasky, G. (M)
Seckleman, R. S. (A)
Segel, P. A. (VA)
Shamos, M. H. (M)
Shapiro, D. I. (A)
Shapiro, I. (A)
Shapiro, M. H. (M)
Shappet, J. J. (A)
Shaw, B. (M)
Shea, J. F. (A)
Sheckler, G. F. (A)
Sheldon, E. E. (A)
Sheldon, M. (A)
Shepard, W. H. (A)
Sher, F. D. (M)
Sherman, I. B. (SM)
Sherman, M. (A)
Shew, W. W. (A)
Shey, P. F. (M)
Shirrer, E. M. (SM)
Shipman, W. A. (SM)
Short, V. (A)
Shuck, T. L. (A)
Shulman, C. (SM)
Silber, A. (A)
Silva, B. (A)
Silverberg, B. H. (M)
Silverman, R. A. (M)
Simms, J. T. (A)
Simon, E. I. (F)
Simon, F. F. (A)
Simon, W. C. (SM)

Strack, W., Jr. (M)
Strauss, L. (A)
Streich, R. J. (M)
Streifus, C. A. (M)
Strickland, H. A., Jr. (SM)
Striker, R. G. (M)
Struyk, C. (M)
Sugimoto, J. Y. (M)
Sussman, A. B. (A)
Sverdlik, S. S. (A)
Swatek, P. W. (A)
Szekely, Z. (A)
Szuchy, N. C. (A)
Szucs, A. S. (A)
Tabor, J. H. (A)
Taishoff, J. (M)
Talley, T. J., III (M)
Taub, H. (A)
Taylor, C. H. (F)
Taylor, E. C. (A)
Taylor, K. A. (M)
Taylor, R. M. (M)
Taylor, W. H., Jr. (SM)
Temple, L. M. (SM)
Tetley, W. H. (M)
Thatcher, T. W., Jr. (M)
Thayer, G. N. (F)
Thieblemont, A. H. (VA)
Thomas, J. E. (A)
Thomas, L. (A)
Thompson, R. G. (SM)
Tierney, W. L. (SM)
Tilley, H. H. (SM)
Tillistrand, C. O. (A)
Timmerman, F. (M)
Tint, G. (A)
Tompos, A. (M)
Traver, H. A. (M)
Trevor, J. B., Jr. (M)
Trucksess, D. E. (SM)
Trutter, J. A. (A)
Tschanen, W. (A)
Tuckerman, L. S. (M)
Turchiano, M. W. (A)
Turner, L. D. (A)
Tutoli, J. G. (A)
Tuttle, C. W. (A)
Tykulsky, A. (M)
Unger, S. H. (M)
Uttal, J. A. (M)
Uttendorfer, E. A. (SM)
Valge, J. (A)
Van Cott, J. M. (M)
Van Note, R. P. (M)
Van Valkenburgh, R. P. (A)
Van Wynen, K. G. (SM)
Vehling, R. H. (M)
Velitchko, W. A. (M)
Velonis, C. (A)
Vincent, C. J. (M)
Vorhes, D. M. (M)
Vought, T. B. (A)
Vrattos, G. P. (M)
Wales, N. B., Jr. (M)
Walker, J. B. (M)
Walker, R. M. (SM)
Wallace, A. (M)
Walsh, A. L. (A)
Walsh, J. B. (A)
Walton, J. S. V. (A)
Wappler, F. C. (M)
Wascher, M. A. (A)
Watkins, J. E. (M)
Watkins, S. R. (A)
Watlington, F. W. (M)
Watts, G. J. (A)
Watts, W. W. (A)
Weaver, A. (M)
Weber, J. V. (M)
Weber, J. H. (A)
Weber, L. A. (M)
Weigert, H. A. (M)
Weil, R. T., Jr. (SM)
Weinberger, J. (F)
Weinman, M. (A)
Weinshenker, T. J. (M)
Weiss, G. D. (M)
Weiss, S. I. (SM)
Weindling, F. (M)
Weiss, M. R. (M)
Weitz, G. (A)
Welch, C. L. (M)
Welsh, C. A. (M)
Wenglin, S. (M)
Werner, R. L. (SM)
Wernick, J. I. (A)
Wernlein, C. E., Jr. (M)
Westheimer, M. (M)
Westman, H. E. (M)
Wexler, P. S. (A)
Whalen, B. F. (A)
White, S. D. (SM)
Whitehurst, W. R. (M)
Wiberg, H. J. (M)
Wichtendahl, W. J. (A)
Wiesendanger, M. U. (A)
Wilby, E. W. (M)
Wilder, E. J. (A)
Willett, E. (M)
Williams, D. G. (A)
Williams, E. L., Jr. (A)
Williams, J. N. (A)
Williams, L. D. (A)
Willis, F. H. (M)
Willner, P. (M)
Wilson, I. G. (SM)
Wilson, W. W. (M)
Win, U. S. (A)
Wing, O. (A)
Winkler, A. (A)
Winner, L. (M)
Winters, A. (A)
Wise, R. J. (SM)
Wise, W. H. (SM)
Wojciechowski, B. M. (SM)
Wold, D. C. (A)
Wolf, H. (SM)
Wolff, J. H. (A)
Wolfson, R. (M)
Wolfthal, D. A. (M)
Wolters, J. T. (A)
Wong, N. F. (A)
Wood, C. R. (A)
Wood, J., Jr. (M)
Wood, M. R. (SM)
Woodward, D. E. (M)
Woodward, W. E. (M)
Woodworth, F. B. (SM)
Wooten, J. R. (A)
Worley, A. R. (M)
Worthing, F. L. (A)
Wouk, V. (M)
Wright, S. E. (M)
Wunderlich, N. E. (M)
Wuorinen, J. H., Jr. (M)
Wurdemann, W. H., Jr. (SM)
Wyatt, K. S. (A)
Yamasaki, A. A. (M)
Yarmus, L. (A)
Young, H. H. (A)
Young, R. O. (M)
Young, W. R., Jr. (SM)
Yu, E. K. C. (M)
Yusem, S. (M)
Zachariou, H. (M)
Zak, M. A. (A)
Zeamans, H. R. (VA)
Zeigler, K. I. (A)
Zeiter, W. E. (M)
Zelinski, F. P. (A)
Zemanian, A. H. (M)
Zernoske, D. (A)
Zipper, I. (A)
Zippler, W. N. (M)
Zuckerbraun, J. (M)
Zumwalt, B. C. (A)
Zurich, M. (A)
Zwiren, H. (A)

Niagara Falls (BN-1)
Bhatta, E. K. (A)
Bottorf, R. J. (M)
Bowman, D. S. (M)
Carter, C. S., Jr. (A)
Collins, D. F. (A)
Davis, H. M. (A)
Emes, H. R. (M)
Gleason, M. H. (M)
Haney, C. A. (A)
Howells, W. B., Jr. (A)
Leming, J. G. (M)
Leonard, D. J. (M)
McNair, R. J. (M)
Paterniti, A. R. (A)
Potter, C. E. (A)
Rowe, R. G. (SM)
Sarkees, V. T. (A)
Shulman, H. (A)
Teal, H. E. (A)
Weller, C. E. (A)
Wilson, P. H. (A)

Niskayuna (SCH-1)
Mayer, C. B. (SM)
Shea, R. F. (F)

North Babylon (LI-2)
Burmeister, W. W. (M)
Leesemann, W. B., Jr. (SM)
Millar, W. M. (A)
Olseewski, W. R. (A)
Revere, R. W. (A)

North Baldwin (LI-2)
Kappelmann, G. E. (A)

North Bellmore (LI-2)
Beckhardt, T. (M)
Bischoff, J. J. (A)
Brook, R. H. (M)
Carlstrom, R. A. (M)
Dolin, R. (M)
Dvorak, C. J. (M)
Lipkin, W. (M)
Shaw, D. (M)
Tenenbaum, E. (M)

North Chatham (NY-MH-2)
Ray, G. T. (M)

North Chili (ROC-1)
Franco, G. A. (M)

North Massapequa (LI-2)
Johnson, J. H., Jr. (A)
Kaelin, B. A., Jr. (A)
Kornbluth, A. E. (A)
Price, D. (M)
Prunty, P. F. (M)
Quinn, J. A. (M)
Salerno, A. (M)
Schwartz, M. (M)
Sokol, A., Jr. (A)
Sonntag, L. (M)

North Merrick (LI-2)
Branker, H. E. (M)
Leggio, J. (SM)
Schneiderman, W. (M)
Takach, A. (M)
Thogersen, G. O. (A)

Northport (LI-2)
Chubb, E. (M)
Davis, F. S. (A)
Guido, L. A. (A)
Litchford, G. B. (SM)
Lockwood, M. D. (M)
Stodola, E. K. (SM)
Watson, R. F. (M)

North Rockville Centre (LI-2)
Melman, I. J. (SM)

North Syracuse (SYR-1)
Apple, L. S. (M)
Baker, D. W. (A)
Baker, V. L., Jr. (A)
Bartley, W. P. (M)
Bear, D. R. (A)
Beckwith, R. W. (M)
Besenfelder, E. R. (M)
Blackstock, R. S. (M)
Bochem, H. P. (M)
Bockstiegel, R. B. (M)
Bostick, G. (M)
Bough, C. F. (A)
Broughall, H. S. (M)
Brown, S. R. (M)
Bunger, J. W. (M)
Burroughs, E. H. (A)
Cadwell, E. B., Jr. (M)
Carr, J. K. (M)
Carson, R. E. (SM)
Chynoweth, W. R. (SM)
Clark, R. E. (M)
Cleary, C. J., Jr. (M)
Cole, F. G. (SM)
Colley, L. E. (A)
Corbell, I. T., Jr. (SM)
Cornelius, W. B. (A)
Coullard, J. B. (SM)
Craig, E. L. (M)
Crandall, C. L. (M)
Curtiss, G. R. (M)
Deitzler, R. P. (M)
Dickson, W. H. (A)
Dominguez, M. J. (A)
Donegan, J. H. (M)
Eachus, E. D. (M)
Eaton, R. C. (SM)
Elbeck, A. C. (A)
Elkins, R. A. (M)
Ellis, C. R. (M)
Ellis, C. L. (SM)
Ellis, S. S. (A)
Felice, J. J. (A)
Fiet, J. H., III (A)
Fincher, J. C. (M)
Flashner, G. (M)
Forney, J. F. (A)
Fowler, A. K. (M)
Freestone, H. T. (A)
Frieling, E. (A)
Garrett, D. E., Sr. (SM)
Gerling, H. B. (SM)
Geyer, B. H., Jr. (SM)
Gibson, V. R., Jr. (SM)
Ginder, M. E. (M)
Grauberger, W. E. (M)
Grimm, H. H. (M)
Hinkelman, T. D. (A)
Hundstad, C. E. (M)
Jenkins, W. M. (M)
Johnson, W. G., Jr. (M)
Jones, M. E. (SM)
Kenyon, R. W. (M)
Kirkpatrick, G. M. (SM)
Koprowski, E. M. (SM)
Krause, L. O. (SM)
Kuecken, J. A. (M)
Kuhn, D. H. (M)
Leppanen, K. E. (M)
Maloney, W. J. (A)
Marcum, D. (A)
Markes, R. T. (A)
May, R. W. (M)
McClure, R. C. (M)
McGee, A. A., Jr. (M)
McNeill, H. N. (A)
Meehan, J. A. (A)
Merriam, R. H. (A)
Michalek, A. R. (A)
Muschamp, R. A. (SM)
Ostrowski, R. E. (A)
Palladino, M. J. (SM)
Penn, W. A. (M)
Pickard, L. A. (M)
Plavcan, C. T. (A)
Popejoy, I. J. (M)
Powell, B. O., Jr. (A)
Putschi, H. N. (M)
Rausch, R. H. (M)
Reibert, F. A. (M)
Relyea, R. A. (M)
Revercomb, H. E. (SM)
Roberts, E. G., Jr. (SM)
Ruhl, W. T., Jr. (M)
Schulz, E. R. (M)
Shumway, N. R. (M)
Smee, P. G. (SM)
Smith, J. (M)
Smith, J. S. (SM)
Spencer, G. W. (M)
Stasior, R. A. (A)
Stewart, N. J. (M)
Stokes, C. L. (M)
Stone, R. F. (M)
Svitek, G. A. (M)
Thompson, D. F. (M)
Tidwell, B. B. (A)
Tillman, J. T., Jr. (A)
True, T. T. (M)
Vest, C. R. (M)
Voth, N. D. (A)
Walker, B. G. (M)
Wassilak, E. J. (M)
Wich, H. C. (M)
Wintle, H. C. (SM)
Zenon, Z. (M)

North Tarrytown (NY-W-2)
Akin, R. M. (VA)
Palmquist, C. A. (M)
Vavra, J. M. (A)

North Tonawanda (BN-1)
Arnts, F. D., Jr. (M)
Cappon, A. M. (M)
Dumas, R. E. (A)
Dunn, J. L. (SM)
Janowsky, R. H. (A)
Johnston, G. D. (M)
Koncsol, A. E. (A)
Marshall, J. F. (M)
Schmidt, F. M. (SM)
Sears, R. A. (M)
Taber, R. F. (A)

North Valley Stream (LI-2)
Sodaro, J. A. (A)

North White Plains (NY-W-2)
Asch, B. (A)

Norwich (BING-1)
Bates, W. R. (M)
Hamilton, O. M. (A)
Knudson, L. I. (M)

Nunda (ROC-1)
Short, D. S. (A)

Nyack (NY-2)
Koulomzin, N. J. (A)
Miller, H. M. (A)
Murphy, R. P. (SM)

Oceanside (LI-2)
Diamond, G. H. (M)
Eisenberg, A. J. (M)
Gleimer, B. (M)
Kronengold, M. (M)
Levenstein, H. (M)
Schrader, W. A. (M)
Silken, H. (A)
Smith, F. B. (A)
Suttenberg, S. (A)
Urbanik, J. G. (M)

Olcott (BN-1)
Ketcham, W. R. (A)

Olean (BN-1)
Bosworth, O. T. (A)
Jenner, W. C. (M)
Taylor, W. D. (M)
Zakrewski, J. E. (M)

Old Bethpage (LI-2)
Bach, R. G. (A)
Kenny, M. (M)

Old Westbury (LI-2)
Curtis, R. C. (VA)
Feldmann, H. (SM)

Oneonta (SCH-1)
Hannay, B. E. (A)

Onondaga (SYR-1)
Corman, D. (M)

Orchard Park (BN-1)
MacDonald, R. D. (A)

Oriskany (RU-1)
Thomas, K. W. (M)

Ossining (NY-W-2)
Boyce, J. (M)
Brown, R. D. (M)
Campbell, J. P. (SM)
Levine, R. J. (M)
Ruedisueli, R. W. (M)
Smith, L. A. (SM)
Stavis, G. (SM)
Trifari, F. R. (SM)
Wood, H. W., Jr. (M)

Oswego (SYR-1)
Arcoraci, L. J. (M)
Gill, L. R. (A)

Owego (BING-1)
Giroux, P. H. (M)
Knox, L. A. (M)
Martin, A. G., Jr. (M)
Stalma, J. F. (M)
Vance, V. G. (M)

Oyster Bay (LI-2)
Bartelt, J. E. (A)
Bumstead, J. J. (A)
Dyer, J. N. (F)
George, B. A. (A)
George, H. A. (A)
Pogust, F. B. (M)

Oyster Bay Cove (LI-2)
Harges, M. T. (M)

Ozone Park (LI-2)
Cassidy, J. J. (M)
Heller, P. (A)
Mellard, J. (A)
Mulholland, G. T. (A)
Rook, S. (A)
Schuster, D. (A)
Sierer, P. (A)
Stone, K. A. (M)
Tiernan, F. V. (M)
Watson, W. C. (A)

Painted Post (ELM-C-1)
Coolidge, J. C. (A)
Frazier, J. F. (M)

Palisades (NY-2)
Ward, B. R. (M)

Patchogue (LI-2)
Wise, A. (M)

Pattersonville (SCH-1)
Dodge, A. O. (SM)
Oakes, W. S. (M)

Pawling (NY-MH-2)
Coughlin, J. J. (M)
Kubacky, F. A., Jr. (A)

Pearl River (NY-2)
Feinerman, B. (M)
George, R. E. (M)
Hastings, L. S., Jr. (A)
Porter, H. A. (A)
Weiss, M. (A)

Peekskill (NY-W-2)
Arcate, J. A. (M)
Carter, W. S., Jr. (A)
Cloud, P. R. (M)
Foin, W. C. (A)
Foxe, M. (M)
Goldstrohm, W. J. (A)
Holder, C. R., Jr. (A)
Hyde, A. E. (M)
Juanillo, J. J. (M)
Leitner, M. (A)
Lewis, E. J. (M)
Milinowski, A. S. (M)
Schreiner, R. J. (M)
Stein, V. J. (M)
Todd, S. E. (A)
Walder, B. (M)
Winkelstein, R. A. (M)

Pelham (NY-2)
Aaltonen, T. K. (A)
Kruse, L. C. (M)
Skinner, F. J. (SM)

Pelham Manor (NY-W-2)
Callan, J. M. (M)
Diehl, R. T. (A)
Stein, D. R. (M)
Zadeh, L. A. (SM)

Penfield (ROC-1)
Atwood, B. E. (SM)
Berch, W. H. (A)
Chipman, J. R. (A)
Cohen, G. H. (M)
Hafstrom, W. F. (M)
Heit, J. C. (M)
Huie, J. A. (M)
Nugent, J. A. (M)

Phoenix (SYR-1)
Czirr, L. R. (A)
Smith, D. L. (SM)

Pine Bush (NY-MH-2)
Mattern, P. E. (M)

Pine City (ELM-C-1)
Andrews, R. W. (M)

Pittsford (ROC-1)
Busby, L. A. (M)
Coleton, J. W. (M)
Ferry, R. N. (M)
Nelson, J. A. (M)
Ross, L. A. (A)
Stephenson, E. D. (M)
Strachl, R. N. (M)
Whittall, M. D., Jr. (A)

Plainview (LI-2)
Heiss, W. H. (A)
Heller, Z. H. (A)
Helms, M. E. (A)
Ingram, R. H. (A)
Intraub, J. (A)
Jacobson, R. I. (SM)
Jones, A. J. (M)
Klein, R. C. (M)
Kogan, M. A. (A)
Abramson, J. (A)
Altschul, E. R. (A)
Barna, G., Jr. (M)
Bedoian, B. (A)
Berens, J. (A)
Brodek, W. J. (A)
Case, S. W. (A)
Chatterton, E. L. (SM)
Cilluffo, J. S. (A)
Cohen, B. C. (A)
Crane, R. (M)
Cretella, S. A. (M)
Dalessandro, J. A. (A)
Dembinski, L. J. (M)
Dickman, A. (M)
Dinbart, M. (M)
Elson, A. C. (A)
Fine, A. M. (M)
Fox, E. I. (A)
Fucci, S. (SM)
Gewirtz, A. (A)
Gold, I. (M)
Greenwald, M. S. (M)
Halpern, M. (A)
Heichlinger, C. L. (A)
Lanning, W. C. (M)
Latham, G. R., IV (A)
Leahy, R. E. (M)
Lesser, D. (M)
Levine, S. (M)
Lieberman, E. (M)
Linden, A. E. (SM)
Marsden, W. Y. (A)
Mosolgo, R. E. (A)
Okwit, S. (A)
Palamenghi, T. J., Jr. (A)
Perzley, W. (A)
Pignataro, F. P. (M)
Pollack, H. W. (M)
Prew, H. E. (M)
Purdy, R. L. (A)
Rifkin, M. S. (M)
Rivman, J. (A)
Rudiger, T. F. (M)
Sayer, G. (A)
Schwint, K. F. (A)
Shaw, D. (A)
Simkins, R. S. (A)
Stern, E. (M)
Thompson, J. P. (M)
Tramposch, A. F. (M)
Trock, R. (M)
Turner, E. (A)
Vasilos, M. G. (M)
Weber, H. J. (A)
Weiser, S. (A)
Wexler, H. (M)
Zaremba, C. J. (A)
Zinaman, H. J. (M)

Plandome (LI-2)
Blackwell, O. B. (F)
Di Blasi, J. (SM)
Dunning, O. M. (F)
Spellman, F. C. (M)

Pleasant Valley (NY-MH-2)
Allen, C. A. (M)
Benson, A. B. (M)
Pfaff, R. J. (A)
Swallow, D. S. (M)
Taylor, O. P. (SM)
Wilson, R. F. (M)

Pleasantville (NY-W-2)
Berger, F. B. (SM)
Dewhirst, T. P. (VA)
Dieter, N. H., Jr. (A)
Eisele, W. A. (A)
Finkler, R. A. (M)
Flynn, W. J. (A)
Forrest, J. C. (A)
Fraser, J. T. (M)
Freud, E. L. (M)
Gamertsfelder, G. R. (SM)
Garman, R. L. (SM)
Gillette, F. N. (A)
Glueckler, E. J. (M)
Hannahs, W. H. (M)
Holley, J. S. (A)
Honig, A. R. (M)
Keenan, M. J. (A)
King, G. W. (A)
Kleckner, C. C. (M)

Kolb, O. J. (M)
Kowalsky, J. (M)
Kranz, F. W. (SM)
Lee, R. W. (SM)
Lehman, W. (A)
Lehr, S. (A)
McGuire, E. C. (A)
McKendry, J. K. (M)
Miller, A. G. (A)
Motchok, E. P. (M)
Pourciau, L. L. (M)
Reed, H. J., Jr. (SM)
Rifkin, M. (M)
Sakson, P. J. (A)
Saltzman, H. (M)
Schick, F. T. (A)
Swain, W. H. (A)
Tull, W. J. (SM)
Ward, J. C. (M)
Wood, A. G. (M)
Ziolkowski, A. (SM)

Port Byron (SYR-1)
Webb, T. E. (M)

Port Chester (NY-W-2)
Barker, D. R. (M)
Houck, G. B., Jr. (M)
Kalt, C. G. (M)
Luedtke, P. R. (A)
Romanello, A. C. (A)
Stone, E. S. (M)
Toman, J. J. (A)
Tripodi, C. (M)
Woloschak, K. (SM)

Port Ewen (NY-MH-2)
Menard, E. A. (M)

Port Jefferson (LI-2)
Carter, P. S. (F)
Hansell, C. W. (F)
Munzer, L. F. (M)

Port Jefferson Station (LI-2)
Giordano, S. (A)
Kolarick, J. J. (A)

Port Jervis (NY-MH-2)
Weill, R. L. (A)

Port Washington (LI-2)
Aitken, R. K. (A)
Anderson, E. I. (F)
Baston, W. M. (M)
Bicknese, F. H. (M)
Burroughs, H. A. (SM)
Buzzell, E. R. (A)
Carduner, W. (VA)
Craig, D. R., Jr. (M)
Davidson, W. F. (SM)
Doersam, C. H., Jr. (SM)
Duncan, B. J. (M)
Edgerly, J. J. (SM)
Gabor, A. (A)
Garbarini, G. S. (M)
Grebe, A. H. (M)
Halenbeck, A. D. (A)
Henderson, N. C. (A)
Herzog, A. W. (M)
Hickey, J. H. (SM)
Hoag, O. (SM)
Hudgins, W. D. (SM)
Hylas, A. E. (M)
Kearney, R. J. (M)
King, R. W., Jr. (M)
Knights, C. F. (M)
Lazich, B. (SM)
Leffingwell, W. B. (A)
Leonard, E. V. (M)
Little, D. S. (SM)
Marion, J. F. (M)
Marshall, J. H. (M)
Merrill, J. L., Jr. (M)
Murdoch, A., Jr. (SM)
Murphy, C. H. S. (SM)
Naybor, E. V. (M)
Nelson, E. L., Jr. (M)
Okrent, J. J. (SM)
Pacent, H. C. (M)
Page, F. E., Jr. (M)
Pasek, D. M. (SM)
Paulson, C. R. (M)
Podlesny, R. F. (A)
Robberson, E. L. (A)
Spencer, N. A. (M)
Strawbridge, R. B. (M)
Striffler, F. L. (M)
Thayer, G. H. (M)
Weston, S. (SM)
Witmer, F. S. (M)
Witten, A. L. (SM)

Potsdam (SYR-1)
Reed, G. W. (A)
Sanford, R. S. (A)
Strong, W. J. (M)

Poughkeepsie (NY-MH-2)
Albanes, N. J. (A)
Anderson, R. L. (A)
Arneth, A. P., Jr. (M)
Averyt, R. W. (A)
Backman, F. F. (A)
Bahret, R. W. (M)
Baldwin, J. M. (M)
Barber, A. E. (A)
Barnes, D. E. (M)
Bashe, C. J. (M)
Bauer, E. W. (A)
Beattie, H. S. (SM)
Beatty, H. J., Jr. (A)
Beesley, J. P. (A)
Bendazzi, A. (A)
Bender, R. R. (A)
Berger, A. W. (A)
Beverly, N. E. (M)
Blaauw, G. A. (A)
Blessing, R. R. (A)
Bloch, E. (A)
Blust, C. D. (A)
Boden, R. C. (M)
Brandt, W. E. (M)
Branin, F. H., Jr. (SM)
Brennemann, A. E., Jr. (M)
Brock, J. P. (A)
Brosseau, E. F. (M)
Bruce, G. D. (M)
Brunschweiger, A. (A)
Buchholz, W. (SM)
Buck, R. D. (A)
Buley, T. L. (A)
Burke, E. J. (M)
Buton, E. C., Jr. (A)
Button, C. H. (M)
Carpenter, E. J., Jr. (M)
Carroll, W. N. (A)
Carrothers, G. H. (A)
Christiansen, C. L., Jr. (M)
Coats, W. H. (A)
Cobb, R. W. (A)
Constantine, G., Jr. (M)
Cook, D. J. (A)
Coombs, J. M. (M)
Counihan, R. G. (M)
Courtois, J. R. (A)
Cox, T. C. (M)
Crane, A. E. (M)
Crawford, D. J. (M)
Crawford, J. K. (A)
Crawford, W. A. (A)
Credle, A. B. (M)
Cypser, R. J. (M)
Davis, C. M. (A)
Davison, R. D. (A)
Deabler, L. T. (M)
Dean, K. W. (M)
Deerhake, W. J. (SM)
De Lano, R. B., Jr. (M)
Demuth, H. B. (M)
Di Rocco, J. V. (M)
Disney, J. V. (A)
Dix, D. S. (A)
Doody, D. T. (M)
Douglas, R. M. (A)
Dundatscheck, E. P. (A)
Dunwell, S. W. (M)
Edwards, N. P. (M)
Einolf, C. W. (A)
Ellis, I. T., Jr. (M)
Farrell, J. F. (M)
Fleisher, H. (M)
Fletcher, R. P. (A)
Fontaine, A. B. (A)
Forsberg, H. A. (A)
Fox, P. E. (SM)
Fredericks, C. F. (A)
Fritz, E. L. (A)
Frizzell, C. E. (SM)
Frontiero, P. A. (A)
Fry, W. A., Jr. (A)
Furth, E. (A)
Gayle, A. (M)
Genser, M. (A)
Gmeiner, P. (M)
Goble, A. S., III (M)
Goldman, E. H. (SM)
Goldstein, A. G (A)
Grace, F. (SM)
Grecco, J. A. (A)
Greene, N. E. (A)
Greer, F. G. (M)
Griffin, J. F., Jr. (M)
Griffith, J. E. (A)
Groce, D. C. (M)
Hamlin, J. E. (M)
Harrington, D. G. (A)
Hartman, F. B. (M)
Hartwig, A. D. (M)
Hasbrouck, L. J. (A)
Hawkins, G. V. (A)
Hayden, H. P. (M)
Haynes, M. K. (A)
Heath, H. F., Jr. (A)
Heermans, J. W. (M)
Heineck, A. W. (A)
Hennis, R. B. (A)
Hnat, S. (M)
Holtman, L. S. (A)
Hornick, J. C. (M)
Hotchkiss, G. L. (M)
Housman, B., Jr. (A)
Hughes, M. W. (M)
Huibregtse, E. J. (M)
Hulse, H. E. (A)
Hunter, L. P. (SM)
Isole, J. J., Jr. (M)
Jackamonis, G. (A)
Jackson, F. J. (M)
Jackson, P. W. (M)
Jensen, R. A. (A)
Johnson, E. L. (M)
Johnson, J. R. (M)
Joyal, H. J. (M)
Kanter, L. E. (A)
Karan, C. (SM)
Kim, W. H. (M)
King, L. E. (M)
Kippenhan, B. W. (A)
Koelsch, A. C., Jr. (A)
Kronick, H. E. (M)
Kurtz, J. A. (M)
Lalumandier, A. J. (M)
Lampe, A. W. (M)
Lamy, R. C. (M)
La Porte, G. L. (M)
Lauer, E. K. (M)
Lawrence, D. G. (A)
Lawrence, D. H. (A)
Lawrence, W. W., Jr. (M)
Layden, E. C. (M)
Lazarus, J. P. (M)
Leeds, B. (M)
Levitre, E. J. (M)
Ligon, G. C. (M)
Lind, J. H. (M)
Lindsay, R. L. (M)
Lippel, B. (M)
Little, J. B. (SM)
Logue, J. C. (M)
Longo, P. (M)
Lorenz, E. J. (A)
Lowrie, R. W. (M)
Luhn, H. P. (M)
Lyon, J. R. (M)
Mackay, J. B. (A)
Mac Sorley, O. L. (SM)
Mangan, B. A. (A)
Marcotte, R. A. (M)
Marshall, J. G., Jr. (M)
Marshall, M. R. (A)
Martin, J. B. (A)
Martin, R. R. (M)
Mascarenhas, A. C. (M)
Matthews, E. G. (A)
McMillan, E. C. (A)
Merwin, R. E. (M)
Mico, G. (A)
Moore, J. W. (A)
Morey, G. A. (A)
Morgan, J. C. (A)
Murtha, G. A. (A)
Mussell, H. A. (A)
Mutter, W. E. (SM)
Myers, A. S., Jr. (M)
Nanes, M. (M)
Neason, S. J. (A)
Necol, J. C. (M)
Nelson, V. A. (A)
Newton, J. D. (A)
Nordyke, H. W., Jr. (M)
Northrup, C. D. (A)
Nortman, J. J. (M)
Nutter, E. H. (M)
O'Farrell, J. J., Jr. (M)
Oliva, F. J. (M)
O'Neill, G. R. (M)
Ordemann, F. A., Jr. (A)
Ostapkovich, P. L. (M)
Pearson, K. A. (A)
Peil, E. F. (M)
Penoyer, R. F. (M)
Perkins, N. K. (A)
Perlini, R. (A)
Phelps, B. E. (M)
Phillips, F. G., Jr. (A)
Pietras, C. M. (M)
Pipkorn, J. H. (A)
Pomerene, J. H. (M)
Porter, J. R. (A)
Poslensky, D. (A)
Post, F. L. (M)
Rainville, R. A. (A)
Raser, E. J. (A)
Raunick, D. A. (M)
Ress, T. I. (A)
Reynolds, D. J. (A)
Richard, S. J. (M)
Robinson, J. D. (A)
Rochester, N. (SM)
Rocket, F. A. (M)
Ross, H. D., Jr. (M)
Rubin, S. (M)
Russell, G. E. (M)
Russell, L. A. (A)
Rutz, R. F. (M)
Sabo, J. D. (M)
Sampere, R. D. (A)
Samuel, A. L. (F)
Santino, L. (A)
Sarahan, B. L. (A)
Schiavone, R. N. (M)
Schmookler, M. S. (M)
Schulman, F. D. (A)
Scott, A. E. (M)
Shelford, L. L. (A)
Short, W. P. (SM)
Shultz, G. L. (M)
Sih, K. Y. (M)
Simmons, R. G. (A)
Sindelar, F. J. (A)
Singer, D. F. (A)
Skarshinski, L. (M)
Skerritt, J. W. (A)
Skov, R. A. (A)
Slade, B. N. (SM)
Standeven, J. D. (M)
Stephens, C. E. (M)
Stern-Montagny, F. H. (A)
Stetler, I. H. (A)
Stoughton, P. N. (A)
Swanson, R. E. (A)
Taub, S. (M)
Thompson, D. B. (A)
Thompson, L. J. (A)
Slonaker, R. D. (A)
Smith, J. W. (A)
Smith, W. J. (M)
Smoyer, C. K. (M)
Spatz, P. (A)
Spencer, F. J. (M)
Spencer, G. W., II (M)
Staciokas, L. J. (M)
Stallard, L. B. (M)
Thorpe, R. A. (M)
Tomasulo, R. M. (M)
Townsend, R. L. (A)
Trachy, R. A. (M)
Tung, F. F. C. (M)
Ulfsparre, L. O. (A)
Underhill, G. H. (M)
Van Winkle, H. W., Jr. (M)
Verven, S. J. (M)
Vislocky, J. (M)
Wagner, E. G. (A)
Wajda, E. S. (M)
Walsh, J. L. (A)
Walston, C. E. (A)
Walters, L. R. (M)
Ward, R. H. (A)
Ward, R. L. (M)
Wenner, J. W. (A)
West, R. L. (M)
Whalen, R. M. (M)
Whitmore, D. C. (M)
Williams, B. W. (A)
Wilson, E. S. (SM)
Windes, F. V. (A)
Winkler, V. D. (A)
Wittenberg, W. M. (A)
Witt, V. R. (SM)
Wolensky, W. (M)
Wolff, H. P. (SM)
Wood, E. C. (M)
Wood, J. R. (M)
Wortzman, D. (M)
Wright, R. G., Jr. (A)
Yang, G. C. C. (M)
York, J. J. (A)
Yourke, H. S. (A)
Zucker, M. S. (A)

Poundridge (NY-W-2)
Tingley, G. R. (A)

Prattsburg (ELM-C-1)
Carlton, M. D. (M)

Queens (LI-2)
Mullin, J. F. (A)
Peters, W. G. (A)

Queens Village (LI-2)
Abrahams, S. (M)
Alcott, E. H. (A)
Amato, J. A. (M)
Anderson, D. H. (A)
Bracken, T. C. (A)
Brierton, E. K. (A)
Bulwin, E. B. (A)
Digilio, R. C. (A)
Friedman, R. (M)
Gerych, W. E. (M)
Glasheen, R. W. (M)
Goldstone, L. O. (SM)
Gould, N. (M)
Griemsmann, J. W. E. (SM)
Hansen, E. L. (SM)
Hill, E. B. (A)
Hoffer, L. H. (A)
Hyman, A. (M)
Kleinoder, J. (A)
Kronenberg, M. H. (SM)
Lielbriedis, K. (M)
McCabe, R. A. (A)
O'Connor, J. L. (M)
Schmidt, H. P. (A)
Schramm, R. A. (A)
Selvaggio, N. J. (A)
Shulman, A. (A)
Sirota, N. (SM)
Sullivan, D. J. (M)
Tennis, J. E. (M)
Tripp, J. R. (M)
Vaher, E. (M)
Yeager, J. R. (M)
Zimmerman, L. (A)

Rego Park (LI-2)
Bogner, B. F. (M)
Finn, P. L. (M)
Fleig, W. J. (M)
Gedney, A. G. (M)
Green, P. S. (A)
Gross, S. B. (A)
Hannwacker, J. (M)
Martin, R. E. (SM)
Metzner, J. J. (A)
Rabinovici, B. (M)
Rosenthal, S. A. (M)
Schiller, H. H. (SM)
Smith, W. J. (A)
Terris, I. (M)

Rensselaer (SCH-1)
Brown, W. L. (M)
Stuarts, A., Jr. (M)
Vogl, N. G., Jr. (M)

Rexford (SCH-1)
Cobine, J. D. (F)
De Witt, J. S. (M)

Rhinebeck (NY-MH-2)
Howe, C. K. (A)

Richmond Hill (LI-2)
Arnell, E. B. (A)
Clark, A., Jr. (A)
Egan, W. G. (M)
Fees, H. W. (A)
Ferrantino, S. J. (M)
Foley, J. J. (A)
Hofmann, E. J. (A)
Johannesen, W. (A)
Marek, J., Sr. (A)
Milukas, V. V. (A)
Oswald, H. (A)
Roche, M. J. (A)
Rolinski, A. J. (A)
Rousselet, C. A. (A)
Schenkerman, S. (A)
Simmons, C. H. (A)
Turnow, W. F. (M)
Yellen, A. F. (A)
Zanichkowsky, M. (M)

Ridgewood (LI-2)
La Via, J. (M)
Sceles, R. C. (A)

Riverdale (NY-2)
Baker, J. R. (M)
Danuff, M. L. (A)
Froehlich, C. (SM)
Heizman, C. L., Jr. (M)
Karlan, J. H. (A)
Lambert, L. B. (A)
Martinson, O. M. (A)
Rosenthal, S. W. (SM)
Stahl, C. (A)
Vogel, R. P. (M)

Riverhead (LI-2)
Atwood, J. B. (SM)
Brandinger, J. J. (M)
Goddard, D. R. (SM)
Goldman, S. (M)
Hansell, G. E. (SM)
Hogston, C. R. (A)
Leis, W. S. (M)
Loughridge, W. A. (A)
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. (A)
Wickizer, G. S. (SM)

Rochester (ROC-1)
Agel, C. W. (A)
Andzer, A. (A)
Antonio, J. (A)
Arao, R. S. (SM)
Ash, A. (A)
Auer, J. H., Jr. (M)
Babcock, T. R. (M)
Baker, A. A., Jr. (M)
Baldwin, L. D. (A)
Balling, A. W. (VA)
Baron, E. A. (M)
Barr, E. M. (M)
Baxter, C. W. (M)
Bellor, W. F. (M)
Benedict, C. F. (M)
Bergeson, A. H. (SM)
Biggar, R. A. (SM)
Blow, A. W. (M)
Boehly, M. A. (A)
Bouchard, G. O. (A)
Boyd, R. K. (M)
Bradley, J. K. (SM)
Braggins, R. D. (A)
Brewer, W. L. (SM)
Broutman, C. A. (A)
Brown, G. A. (M)
Brown, L. W. (SM)
Brumley, C. H. (A)
Bryzinski, T. F. (A)
Burrows, H. R. (M)
Carlson, D. V. (M)
Ceranowicz, H. N. (M)
Cerefin, D. C. (A)
Chesna, J. (A)
Clement, M. A. (M)
Clickner, G. M. (M)
Close, S. W. (M)
Cogswell, W. P. (SM)
Coombs, W. F., Jr. (M)
Cotter, W. F. (SM)
Cumley, R. L. (M)
Cunningham, G. E. (A)
Curtis, S. R. (SM)
Czora, W. G. (A)
Dahl, A. H. (M)
Dailor, F. E. (M)
Dasburg, A. V. (M)
Dawson, C. H. (SM)
Dobson, H. R. (M)
Dudek, S. J. (A)
Dutcher, B. C. (M)
Edighoffer, E. A. (A)
Eisaman, L. C. (M)
Ellis, J. R. (M)
Ellis, T. E., Jr. (M)
England, W. B. (SM)
Enslein, K. (SM)
Ertman, R. J. (M)
Evans, J. E. (M)
Fine, L. (A)
Fink, E. J. (M)
Fleisher, M. D. (M)
Fondrk, J. S. (A)
Forbes, E. J. (A)
Formicola, A. F. (A)
Foster, G. C. (A)
Fox, R. S. (A)
Frechafer, J. E. (M)
Frielinghaus, K. H. (A)
Gardner, K. J. (M)
Georgalas, E. C. H. (A)
Glandon, A. E. (M)
Gooding, D. J. (M)
Grammer, R. A., Jr. (M)
Greenwald, H. (M)
Guenther, J. H. (SM)
Gussak, M. (A)
Halles, W. D. (SM)
Haskell, J. W. (M)
Haupt, G. H. (SM)
Hausler, W. B. (M)
Hecht, N. E. (M)
Herbeck, A. E. (M)
Herrman, R. F. (M)
Hewitt, C. G. (M)
Hodges, H. T. (SM)
Holmes, L. C. (F)
Holstrom, A. (SM)
Houde, R. A. (A)
Huntington, M. B. (VA)
James, C. L. (M)
Johnson, R. M. (M)
Johnstone, N. J. (A)
Jorgensen, O. A. (M)
Karker, E. C. (M)
Kay, R. H. (A)
Keane, J. E. (A)
Kiernan, F. J. (A)
Kendall, H. C. (SM)
Kende, G. (SM)
Kennedy, R. P., Jr. (M)
Klumb, H. J. (M)
Kohlman, O. C., Jr. (A)
Ladd, J. H. (M)
Lake, A. E., Jr. (A)
Lankes, L. R. (SM)
Laythe, R. F. (M)
Le Brun, R. L. (M)
Lee, J. M. (A)
Lyke, E. F. (M)
Manson, R. H. (F)
Mateyk, W. (M)
Mavis, G. W. (M)
Lins, H., Jr. (M)
Mazel, L. G. (M)
McArdle, B. L. (SM)
McKendree, J. D. (M)
Merle, C. W. (SM)
Merrill, J. B. (M)
Mitchell, F. A. (M)
Morken, D. A. (M)
Morris, G. F. (M)
Morrison, R. F., Jr. (A)
Morse, J. E. (M)
Mosher, R. M. (A)
Mott, G. R. (M)
Mumma, H. A., Jr. (SM)
Murphy, W. L. (M)
Neff, W. H. (M)
Nelson, D. E. (M)
Nelson, R. L. (M)
Newitt, J. W. (A)
Numann, G. W. (A)
O'Brien, B. C. (SM)
Orlowski, J. S. (M)
Ossmann, E. A. (M)
Pelham, K. F. (SM)
Pendergrass, H. L. (A)
Porter, G. C. (A)
Porter, J. H. (M)
Potter, F. J. (A)
Powers, R. L. (M)
Prasil, A. (M)
Proctor, T. (M)
Ramos, A. S. (A)
Raymond, R. S. (M)
Richards, J. B. (A)

Richards, W. H., Jr. (A)
Richter, W. (M)
Robbins, R. E., Jr. (A)
Rodgers, J. A. (SM)
Rohde, R. E. (M)
Roman, R. J. (SM)
Ronbeck, J. E. (A)
Royalty, M. C. (M)
Rubega, R. (A)
Saell, J. J. (A)
Sage, F. D. (A)
Samuelson, J. R. (A)
Sass, L. J. (M)
Savchuk, V., Jr. (SM)
Schiff, S. (M)
Schifino, A. G. (M)
Schneider, G. O. K. (A)
Schwertz, F. A. (M)
Searcy, C. E. (M)
Sedor, W. J. (A)
Shalloway, A. M. (M)
Sheehan, J. F. (A)
Sheve, H. C. (A)
Shook, C. G. (M)
Slaymaker, F. H. (M)
Smith, L. D. (SM)
Stachiewicz, B. R. (M)
Stern, M. A. (A)
Stevenson, H. (M)
Stolze, W. J. (SM)
Stone, D. J., Jr. (A)
Stoutz, C. O., Jr. (A)
Strack, H. O. (A)
Szabo, J. A. (A)
Tapernoux, P. J. (A)
Tholstrup, H. (SM)
Ticknor, J. M. (A)
Timm, O. C. A. (A)
Traino, C. (M)
Traub, R. A. (A)
Trott, M. (M)
Troutman, J. E. (A)
Turner, W. (M)
Tyrlick, W. V. (M)
Van Deloo, P. A. (M)
Vandervoort, O. D. (M)
Veal, T. G. (M)
Velie, J. L. (A)
Vincent, A. W. (MS)
Walker, W. F. (M)
Whitman, R. N. (M)
Wilcox, D. D., Jr. (M)
Wolbig, W. H. (M)
Worden, O. L. (A)
Yeaton, E. C. (A)
Young, E. A. (A)
Young, F. C. (SM)
Young, J. W. (A)
Zefting, A. H. (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)
Gilman, B. S. (M)
Hinners, F. A. (F)
Hopkins, J. J. (SM)
Lee, R. L. (A)
Leuteritz, H. C. (M)
Lyons, J. F., Jr. (M)
Margolin, P. C. (M)
McCartney, E. (A)
Meehan, J. D. (M)
Nuebling, C. A. (A)
Phelps, R. J. (A)
Potter, N. (A)
Quatraro, W. (A)
Rich, E. M. (M)
Rutstein, I. (SM)
Singer, F. J. (SM)
Sinsheimer, W. J. (A)
Stotz, C. C. (M)
Uzmann, J. G. (SM)
Warren, S. D. (A)
White, H. A. (A)

Rocky Point (LI-2)
Aird, A. W. (M)
Goldstine, H. E. (SM)
Martin, C. A. (SM)
Peterson, L. E. (M)
Sanford, V. M. (A)

Rome (RU-1)
Abell, G. R., Jr. (M)
Appleberry, T. K. (A)
Barreto, J. M. (SM)
Bayless, H. A. (M)
Beauchamp, A. J. (M)
Bendlizky, E. (M)
Benoit, R. C., Jr. (SM)
Berliner, J. (M)
Bigelow, R. W. (A)
Bilnn, W. J. (M)
Blymiller, A. L. (A)
Breckner, C. N. (M)
Brendlar, D. E. (M)
Bromley, J. E. (M)
Brooks, R. M. (M)
Brownstein, H. S. (M)
Carney, P. G. (M)
Chappuis, C. K. (SM)
Colangelo, L. P. (M)
Coppola, A. (M)
Corey, S. A. (M)
Corgnati, E. S. (A)
Craiglow, L. H. (M)
Crowley, H. J. (M)
Cruickshank, J. E. (SM)
Dakan, D. L. (MS)
Darrow, F. M. (A)
Davis, H. (F)
Davis, H. (M)
Dayton, W. F. (M)
De Lisle, A. B. C. (A)
De Mesme, T. A. (A)
Diamond, F. J. (M)
Diff, T. O. (A)
Dyce, R. B. (M)
Eannarino, J. M. (SM)
Eitches, I. (M)
Engels, R. O. (A)
Erndl, W. J. (A)
Fallik, J. (M)
Falvey, T. L., Jr. (M)
Feiner, A. (A)
Ferlo, O. F. (A)
Fishner, S. (A)
Forte, M. P. (A)
Friedman, H. (SM)
Frohlich, A. J. (M)
Gabelman, I. J. (SM)
Giles, G. R. (A)
Graham, R. C. (M)
Handelsman, M. (SM)
Hartofil, P. E. (A)
Harvey, D. M. (M)
Hatfield, J. P. (A)
Hill, B. E. (A)
Hofmockel, D. L. (A)
Hollberger, R. R. (M)
Holliday, R. H. (SM)
Horan, E. F. (A)
Horowitz, S. (M)
Jaeger, M. (M)
Jeffery, S. (A)
Johnson, B. F. (M)
Kabrisky, M. J. (A)
Kelly, W. S. (A)
Kerns, G. P. (A)
Kirshner, D. R. (SM)
Knight, T. G. (M)
Krupinski, J. A. (A)
Lay, C. A., Jr. (A)
Leney, H. G. (M)
Levy, G. (A)
Libby, R. L. (M)
Lindeman, B. (SM)
Lloyd, C. E. (A)
Long, G. A. (A)
Loreto, D. R. (M)
Maggio, T. (M)
Magyarics, R. F. (A)
Malowicki, E. (A)
Marks, R. L. (SM)
Mazzola, F. D. (A)
McFee, J. E. (A)
Meyer, C. H., III (A)
Miller, C. R (M)
Mirman, I. (SM)
Moore, F. (A)
Moran, J. G. (M)
Morelli, M. (A)
Moskowitz, F. (SM)
Munzer, E. N. (M)
Myers, G. H. (A)
Naresky, J. J. (M)
Neeley, A. C. (A)
Parker, L. W. (M)
Pomroy, R. A. (A)
Pope, W. T., Jr. (M)
Pranke, J. A. (A)
Pulido, G. G., Jr. (M)
Quanrud, O. G. (M)
Ratynski, M. V. (SM)
Redwine, C. H. (M)
Richter, H. (A)
Roberts, W. L. (M)
Rodriguez, P. T. (M)
Rodriguez, R. A. (M)
Rosenberg, S. (SM)
Rudensey, M. B. (M)
Sacra, G. H. (M)
Schlegelmilch, R. O. (SM)
Schwartz, S. S. (A)
Scott, E. C. (A)
Shapiro, H. (M)
Sharki, P. (M)
Sharp, E. D. (A)
Shiner, G. A. (A)
Storrs, E. N. (M)
Strom, C. A., Jr. (SM)
Swana, J. J. (A)
Szalach, E. E. (A)
Taffel, B. R. (M)
Tallman, O. G. (SM)
Tanenhaus, A. M. (M)
Taschler, E. J. (A)
Tenney, R. F. (M)
Tepper, S. J. (M)
Thompson, J. M. (SM)
Thompson, R. J. (SM)
Vaccaro, J. (A)
Vincent, J. G. (A)
Vogelman, J. H. (SM)
Ward, J. W. (M)
Warner, M. (M)
Webb, H. E. (M)
Wells, W. B. (M)
Whiteside, J. S., Jr. (A)
Whyland, W. P. (A)
Williams, A. C. (A)
Winkler, E. H. (SM)
Worthington, D. T. (M)
Worthington, J. W., Jr. (SM)
Wisniewski, S. J. (M)
Wright, R. O. (M)
Young, W. D. (M)

Ronkonkoma (LI-2)
Gold, T. (M)

Roosevelt (LI-2)
Adachi, W. Y. (VA)
Baugher, J. D. (M)
Brown, E. M. (SM)
Charitoff, P. (M)
Collins, D. H. (A)
Comitz, P. (M)
Darch, N. S. (M)
Forster, E. E. (A)
Fragola, C. F. (SM)
Kushner, J. (M)
Popkin-Clurman J. R. (SM)
Randazzo, J. J. (A)

Rosedale (LI-2)
Bailey, J. W. (M)
Cohen, D. (M)
Mott, H. A., Jr. (A)
Weiner, F. (A)
Zang, G. R. (A)

Roslyn (LI-2)
Doerschuck, J. (M)
Enston, A. (SM)
Hicks, W. M. (A)
Leibfried, W. P. (M)
Match, M. J. (M)
Rod, R. L. (SM)
Sturdevant, J. W. (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)
Minc, A. (M)

Roslyn Heights (LI-2)
Andersen, A. H. (M)
Anstett, F. D. (M)
Applebaum, S. J. (M)
Ashley, A. (A)
Azzapetian, G. (SM)
Barney, K. H. (SM)
Bordiga, B. (A)
Bourke, W. A. (M)
Brown, L. E. (M)
Corwin, A. (SM)
Daelemans, G. L., Jr. (M)
Day, W. B. (M)
Deutsch, S. (M)
Dumey, A. I. (A)
Feldmann, F. (SM)
Fidelman, D. (A)
Froehlig, G. M. (M)
Gray, J. E. (A)
Jackson, T. T. (SM)
Johnston, H. (A)
Kohn, S. A. (M)
Marshall, R. H. (M)
Martin, R. W. (M)
Michelson, P. A. (M)
Pride, D. W. (A)
Roth, H. H. (M)
Schulz, R. F. (M)
Seeley, S. W. (F)
Skipper, L. C. (SM)
Slaughter, G. K. (SM)
Spielberger, S. C. (SM)
Star, J. (SM)
Sterling, J. (M)
Weinmann, R. H. (M)
Wiltenbecher, J. F. (SM)
Willey, F. G. (M)
Winship, L. T. (A)
Yelsey, B. (M)

Rush (ROC-1)
Finnigan, C. W. (SM)
Kohl, W. B. (A)

Rye (NY-W-2)
Borck, C. A. (SM)
Davis, D. (A)
Derl, H. B. (A)
Eaves, A. J. (SM)
Haselton, M. L. (M)
Lamargue, J. W. (VA)
Paul, C. H. (A)

St. Albans (LI-2)
Behr, J. (A)
Ceccanti, L. P. (A)
Froh, R. W. (A)
Heller, R. C. (A)
Kelcher, R. J. F. (M)
Kirsch, W. A. (SM)
Klein, H. M. (A)
Krieger, K. C. (M)
Marx, H. W. (A)
Moritz, F. G. (M)
Parker, H. L. (A)
Ritter, L. M. (A)
Rothenberg, S. M. (SM)
Sessions, R. W. (A)
Thomasson, D. L. (A)

St. James (LI-2)
Jolas, G. C. (M)
Kehoe, A. V. (A)
Samson, G. C. (A)

St. Remy (NY-MH-2)
Brown, W. J. (A)

Sanborn (BN-1)
Bates, R. D. (A)

Sands Point (LI-2)
Deakin, G. (VA)
Hayward, G. H. (A)
Langerman, H. (A)
Moore, F. H. (SM)

Saratoga Springs (SCH-1)
Ant, E. B. (A)
Cavenaugh, D. E. (M)
Samsky, B. S. (SM)
Saslow, S. (M)

Saugerties (NY-MH-2)
Allen, G. W. (M)
Boos, F. H., Jr. (M)
Bunyar, P. A. (M)
Cart, R. E. (A)
Gaglianello, J. W. (A)
Georgallis, G. C. (M)
Gield, G. R. (M)
Goldberg, M. (A)
Hennessey, T. J. (M)
Jones, H. L. (M)
Jones, R. L. (M)
Lewis, T. B. (M)
Loggie, T. W. (A)
Martello, A. S. (M)
Moynihan, J. D. (SM)
Newcomb, C. E. (A)
Nitschke, N. E. (M)
Patterson, D. A. (A)
Peculyko, P. N. (M)
Rholes, R. (M)
Vincent, R. M. (A)
Wayman, R. L. (M)
Young, F. G. (M)

Sauquoit (RU-1)
Belby, M. (A)
Krusemark, K. A. (M)
La Forte, J. T. (A)
Otis, G. E. (A)
Sayville (LI-2)
Sprague, R. M. (M)

Scarborough (NY-W-2)
Garretto, L. A., Jr. (M)

Scarsdale (NY-W-2)
Alpert, N. (SM)
Carlson, R. E. (SM)
Di Stefano, R. T., Jr. (A)
Dubbs, B. (M)
Fein, M. J. (SM)
Fox, W. C. O. (M)
Goodfriend, L. S. (SM)
Heller, S. (M)
Karron, G. A. (M)
Knox, W. E., Jr. (A)
Love, G. V. (M)
Marcy, H. T. (M)
McKirdy, R. W. (M)
Montoe, R. B. (SM)
Nowell, R. E. (M)
Seitz, P. A. (VA)
Shaybaugh, C. W. (SM)
Stephens, M. C. (A)
Turner, A. (M)
Van Bemmelen, H. M. (M)

Schenectady (SCH-1)
Abraham, L. G., Jr. (A)
Acton, E. S. (M)
Adams, G. E. (A)
Alexanderson, E. F. W. (F)
Alexander, N. W. (M)
Allen, C. C. (SM)
Amoth, V. W. (SM)
Anderson, J. M. (A)
Anderson, R. E. (SM)
Anspach, K. E. (M)
Baird, J. (SM)
Baker, G., Jr. (A)
Barlow, J. W. (F)
Beggs, J. E. (F)
Bentley, A. D., Jr. (A)
Billingsley, F. C. (SM)
Borner, E. F. (A)
Bouton, D. M. (M)
Bowne, W. L. (M)
Boyd, M. R. (A)
Branch, G. M., Jr. (SM)
Brandes, P. D. (M)
Brate, D. C. (A)
Broughton, W. G. (M)
Buchhold, T. A. (SM)
Buscher, R. G. (M)
Chernoch, J. (A)
Chestnut, H. (SM)
Coates, C. L., Jr. (A)
Coghill, H. D. (A)
Cohen, A. (A)
Cohoon, R. L. (M)
Concordia, C. (SM)
Craig, E. J. (M)
Cruger, B. W. (A)
Dabul, A. (M)
Davidson, D. S. (A)
Day, H. R. (SM)
Debiase, R. G. (M)
Dehn, R. A. (SM)
Delson, J. E. (A)
De Santis, V. J. (SM)
De Valt, K. C. (SM)
Dickey, F. E. (SM)
Dickinson, T. M. (M)
Dodson, G. C., Jr. (M)
Duckwald, C. S., Jr. (M)
Dunham, S. B. (M)
Ender, R. C. (A)
Ehlbach, J. R. (A)
Feiker, G. E., Jr. (M)
Fick, G. (F)
Fink, L. R. (F)
Flowers, R. B., Jr. (A)
Ford, W. A. (SM)
Frick, C. W. (SM)
Fritsch, E. H. (SM)
Frost, I. F. (A)
Fry, L. D. (M)
Gable, A. C. (SM)
Garr, D. E. (SM)
Goldman, R. G. (SM)
Gravel, J.-P. J. (M)
Griffin, G. J., Jr. (M)
Grover, F. W. (F)
Hall, R. N. (F)
Hann, J. D. (A)
Hawkins, D. W. (SM)
Henyan, G. W. (M)
Herrmann, G. M. (SM)
Hess, P. E. (M)
Hickey, J. S., Jr. (SM)
Hilbert, E. A. (A)
Hilts, H. D. (A)
Hoffman, T. R. (SM)
Jallonski, R. W. (A)
Jakowatz, C. V. (M)
Jensen, A. O. (M)
Johnson, R. E. (M)
Kamen, W. J. (A)
Kaufmann, R. H. (A)
Keenan, P. P. (M)
Kessler, G. W. (M)
King, F. E. (M)
Kipp, K. J. (A)
Kirchmayer, L. K. (M)
Kirk, R. L. (M)
Koch, A. R. (SM)
Kohl, H. F. (A)
Koskos, P. (SM)
Kowalczyk, A. C. (A)
Lafferty, J. M. (F)
Lang, J. M. (M)
Larson, R. W. (SM)
Lawson, J. L. (SM)
Lee, E. S. (SM)
Lemmond, C. O. (M)
Lippitt, D. L. (A)
Lippitt, M. W., Jr. (M)
Maginnis, F. J. (M)
Manfredi, R. E. (M)
Mason, P. R., Jr. (A)
McArthur, E. D. (F)
McKeehan, W. F. (A)
Meahl, H. R. (SM)
Mihran, T. G. (SM)
Milfrod, R. E. (A)
Milton, R. T. (A)
Moles, F. J. (SM)
Morgan, R. E. (M)
Morrison, A. (SM)
Numrych, E. C. (M)
Owens, O. G. (M)
Pashler, P. E. (SM)
Patterson, F. G. (VA)
Paxton, E. B. (A)
Pester, R. F. (SM)
Peters, P. H., Jr. (SM)
Pickert, C. E. (M)
Pravda, M. F. (M)
Preschel, K. S. (M)
Prince, D. C. (SM)
Pritchard, R. L. (SM)
Purcell, W. J. (M)
Ranklin, A. E. (SM)
Rashchke, R. R. (A)
Reed, R. L. (SM)
Reque, S. G. (M)
Rich, J. A. (SM)
Roark, G. L. (M)
Rocha, H. A. F. (A)
Rodbell, D. S. (A)
Root, A. A. (M)
Rothe, F. S. (M)
Russ, R. B. (SM)
Rustay, R. C. (A)
Sampson, E. S. (SM)
Samuel, J. J. (M)
Schaffer, A. (M)
Schussele, J. H. (M)
Schwarzhaupt, P. J. (VA)
Shelton, W. F. (M)
Shuey, R. L. (SM)
Smith, R. L. (SM)
Smith, R. T. (M)
Speray, M. R. (A)
Stein, H. H. (A)
Stupp, R. R., Jr. (SM)
Suits, C. G. (F)
Summerhayes, H. R., Jr. (SM)
Taylor, J. E. (M)
Taylor, L. A. (M)
Teare, W. H. (SM)
Thayer, R. W. (A)
Thibodeau, L. E. (A)
Thorson, H. L. (SM)
Turrentine, R. E. (SM)
Verzilli, J. U. (A)
Waldron, W. K. (M)
Wargo, P. (M)
Watkins, K. P. (M)
Watson, R. C. (SM)
Watters, R. L. (M)
Webber, S. E. (SM)
White, W. C. (F)
Wilson, V. C. (A)
Wolfe, J. E. (SM)
Young, C. M. (SM)
Younger, C., Jr. (A)

Scipio Center (SVR-1)
Matuzich, J. D. (A)

Scotia (SCH-1)
Bondley, R. J. (SM)
Brougham, J. W. (M)
Carleton, E. O. (A)
Chambers, D. E. (F)
Cook, E. D. (F)
Coolidge, A. H., Jr. (M)
Curtis, T. P. (SM)
Elder, T. A. (SM)
Fraenckel, V. H. (M)
Gaines, W. M. (SM)
Gardiner, P. C. (SM)
Gardiner, G. F. (VA)
Gauper, H. A., Jr. (SM)
Hanrahan, L. R. (A)
Harris, L. A. (M)
Iler, G. W. (M)
Kramer, K. S. (A)
Little, D. W. (M)
Merwin, R. L., Jr. (SM)
Miglore, C. (A)
Roberts, S. (M)
Sendzuk, G. T. (M)
Travis, E. F. (SM)
Volkers, W. K. (SM)
Wade, E. J. (A)
Wagoner, A. (SM)
Wellinger, R. P. (M)

Scottsville (ROC-1)
Benin, Z. (SM)

Sea Cliff (LI-2)
Beer, A. E. (A)
Busching, H. L. (M)
Flackbert, C. (SM)
Hine, E. A. (M)
Hulland, B. L. (M)
Shameson, L. (M)
Shane, D. C. (M)
Singleton, C. M. (M)

Seaford (LI-2)
Battle, F. H., Jr. (A)
Beckham, C. L. (SM)
Cornetz, W. (M)
Englert, H. E. (A)
Erath, R. L. (A)
Gilbert, R. C. (M)
Kaufman, I. (M)
Krutman, J. M. (A)
Lurch, E. N. (M)
McEvoy, H. G. (M)
McPherson, D. L., III (M)
Myers, E. N. (M)
Stanklewicz, S. (SM)
Walker, A. S. (M)

Seaford Harbor (LI-2)
O'Maley, J. B. (M)

Seneca Falls (ROC-1)
Burroughs, F. L. (SM)
Cowden, D. G. (M)
Dangremond, J. L. (A)
Dickinson, W. A. (SM)
Dowse, E. C., Jr. (M)
Faust, A. C. (A)
Fogg, G. E., Jr. (M)
Gessford, R. K. (SM)

Haas, P. (VA)
Holcumb, W. A. (A)
Jans, J. T. (M)
Kahl, M. I. (SM)
Keen, A. W. (SM)
Krawitz, M. (SM)
Loughlin, J. H. (SM)
Markey, 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)

Sherburne (BING-1)
Adolph, E. H. (A)
Brown, H. H. (M)
Leitner, R. T. (M)
Lundahl, T. (SM)
Sleeper, G. B., Jr. (M)
Voorhaar, F. R. (M)

Sherman (BN-E-1)
Pulinski, F. A. (A)

Shrub Oak (NY-W-2)
Medon, R. R. (A)

Sidney (BING-1)
Schumann, G. H. (M)
Struble, R. C. (A)

Silver Creek (BN-E-1)
Barris, H. A. (A)
Gull, R. A. (SM)

Skaneateles (SVR-1)
Eisengrein, R. H. (A)
Ewing, L. M. (SM)
Hackley, C. L. (M)
MacHill, J. (SM)
Rigby, D. F. (M)
Wiggin, I. C. (M)

Singerlands (SCH-1)
Bowie, W. G. (SM)
Dillenback, G. V., Jr. (M)
Longley, J. F. (SM)

Sloatsburg (NY-2)
Stevenot, H. A. (A)

Smithtown (LI-2)
Chupp, J. W. (A)
Pawelko, M. J. (A)

Snyder (BN-1)
Balint, A. T. (SM)
Breeden, F. C. (M)
Carson, R. E. (A)
Herr, J. R. (A)
Hultberg, C. A. (SM)
Lawton, J. G. (M)
Richmond, G. E., Jr. (M)
Robins, B. W. (SM)
Sanders, E. R. (SM)
Schantz, J. D. (SM)
Tittle, H. C. (M)
Wilkins, F. W. (M)
Whyman, E. W. (SM)

Solvay (SVR-1)
Shofstall, N. F. (SM)
Wagner, Z. G. (A)

Southampton (LI-2)
Buckingham, W. D. (M)
Hildreth, A. E., Jr. (M)
Lamar, R. E. (M)
Lush, W. G. (SM)

South Farmingdale (LI-2)
Saur, R. D. (M)

South Hempstead (LI-2)
La Rosa, R. (SM)
McMenamin, J. M. (M)

South Landing (ITH-1)
Bray, D. W. (M)
Sanford, J. R. (M)
Swanseen, H. W. (A)

South Ozone Park (LI-2)
Gamrat, S. (A)
Herzner, C. W. (A)
Lizzio, J. (A)
McDonald, F. J. (A)
Morris, R. L. (A)
Pitkowsky, S. (M)
Neiland, A. C. (A)

Spencerport (ROC-1)
Sibley, H. C., Jr. (M)

Springfield Gardens (LI-2)
Davey, D. F. (A)
Martin, A. R. (A)
Stiles, A. P. (M)

Spring Valley (NV-2)
Cook, S. (M)
Faist, C. A. (A)
Rosenbaum, J. (M)
Staniloff, S. A. (A)
Welan, I. (M)

Staatsburg (NV-MH-2)
Brockington, H. F. (M)
Norian, R. (M)

Staten Island (NY-2)
Anderson, A. L. (A)
Arne, O. R. (M)
Auriema, R. C. (M)
Bellis, R. P. (M)
Bender, D. J. (M)
Bridge, J. A. (M)
Culicetto, P. J. (M)
De Martinis, J. R., Jr. (A)
De Rosa, H. M. (M)
Donovan, T. F. (A)
Droste, G. T. (M)
Embrechts, A. C. (SM)
Goretsky, L. M. (A)
Gunther, F. A. (SM)
Klein, W. T. (A)
Kopecky, G. F. (M)
Koushouris, J. L. (SM)
Lala, A. (A)
La Penna, F. W. (A)
Levine, M. E. (M)
Lilenfeld, J. (M)
Loesch, C. A. (M)
Martenson, R. B. (A)
Mathewson, R. F. (A)
Miller, S. S. (M)
O'Connell, D. J. (A)
Paniccllo, T. B. (A)
Ponterio, F. V. (A)
Radgowski, S. P. (M)
Reeves, J. F. (M)
Reinhardt, N. J. (M)
Robinson, M. (A)
Rodwin, G. (SM)
Shanley, J. J. (A)
Shen, J. W. (A)
Small, L. (M)
Smith, B. M. (A)
Taleporos, A. D. (M)
Turner, W. C. (A)
Weinberg, T. L. (A)
Weinmann, R. W. (A)
Zucker, S. M. (A)

Stewart AFB (NY-MH-2)
Burritt, E. J. (A)

Stewart Manor (LI-2)
Garrigan, T. E. (A)
Quell, C. H. (M)
Ruddy, W. R. (M)

Stittville (RU-1)
Mason, W. F. (SM)
Sullenger, J. E., Jr. (M)

Stone Ridge (NY-MH-2)
Darrell, R. D. (A)

Stony Brook (LI-2)
Medd, J. S. (SM)

Suffern (NY-2)
Frachtman, H. E. (M)

Sunnyside (LI-2)
Castrignano, R. A. (SM)
Clemens, R. W. (A)
Friel, S. J. (M)
Mailling, A. (M)
Ross, G. F. (M)
Stein, E. (M)

Syosset (LI-2)
Abrams, C. F. (A)
Barlam, T. (A)
Barton, G. R. (M)
Beardsworth, R. (A)
Berg, R. S. (A)
Bergman, S. I. (SM)
Briskin, H. B. (M)
Campbell, T. A. (A)
Carruthers, F. P. (M)
Casper, S. (M)
Charlton, I. (M)
Dagavarian, H. O. (SM)
D'Avino, R. F. (A)
Davis, M. (A)
De Bolt, H. E. (A)
Dominy, J. F., Jr. (A)
Ely, P. C., Jr. (M)
Erickson, J. S. (SM)
Espenlaub, W. C. (M)
Fisch, J. (A)
Forrest, G. E. (M)
Freed, A. (A)
Freeman, S. M. (A)
Freiman, A. J. (M)
Glixon, H. R. (A)
Greenleaf, F. D. (SM)
Hess, J. C., III (A)
Hodgson, K. (SM)
Jagow, W. (M)
Klein, M. M. (M)
Knight, R. W. (M)
Lazarchik, R. E. (A)
Lovell, J. A. (M)
Lublin, I. (M)
Marcus, D. H. (M)
Nittoli, A. J. (M)
Pace, F. A. (A)
Perry, J. W. (M)
Rainey, E. A. (A)
Rein, C. A. (A)
Reisch, R. P. (M)
Schroeder, K. R. (M)
Smith, R. A. (A)
Sornberger, E. A. (A)
Stella, R. (A)
Thomas, E. U. (SM)
Wachapresse, M. H. (M)
Weinberg, M. (M)
White, R. C. (M)
Wylie, T. F., Jr. (A)

Syracuse (SVR-1)
Abrahams, I. C. (SM)
Ackley, E. H. (M)
Adams, W. H. (A)
Allen, J. E. (SM)
Altes, S. K. (M)
Anderson, A. F. (A)
Andrews, P. D. (SM)
Ares, M. (M)
Aronson, C. A. (SM)
Ashcroft, D. L. (A)
Ashley, R. B. (A)
Bachman, C. H. (F)
Baker, L. T. (A)
Baker, W. R. G. (F)
Balabanian, N. (SM)
Baldwin, C. F. (SM)
Barhydt, C. R. (SM)
Barker, W. M. (A)
Barlow, L. C. (A)
Barnhart, H. D. (M)
Barton, L. M. (SM)
Beard, C. E. (A)
Beguin, F. P. (SM)
Bentivegna, M. J. (M)
Berge, R. I. (A)
Berlin, R. D. (A)
Bias, F. J. (SM)
Bieging, G. P. (M)
Biele, R. J. (SM)
Blumberg, D. (A)
Boop, J. H. (A)
Borski, G. K. (A)
Bradbury, B. (M)
Brain, A. E. (SM)
Brearley, H. C., Jr. (M)
Brodersen, L. L. (M)
Brown, J. S. (SM)
Budell, L. A. (A)
Caffrey, T. P. (A)
Campbell, V. C. (SM)
Caputo, S. A. (A)
Carrillo, E. B. (M)
Carroll, J. C. (A)
Casselberry, R. L. (M)
Chafaris, G. J. (A)
Chapman, J. K. (SM)
Cheng, D. K. (SM)
Chivers, C. C. (M)
Chow, W. F. (SM)
Cisler, M. C. (SM)
Clark, P. B. (A)
Cleary, J. F. (A)
Clement, R. R. (M)
Clinton, T. G. (M)
Clippard, R. W. (A)
Cochran, N. B. (M)
Conger, W. H. (A)
Coniber, G. A. (A)
Connelly, D. C. (A)
Covkendall, J. C. (SM)
Crissey, K. L. (M)
Crosby, H. M. (SM)
Cross, K. B. (M)
Curcarese, E. A. (A)
Culnan, D. J. (M)
Cummings, A. P. (M)
Cunningham, J. H. (M)
Dahl, F. J., Jr. (A)
Davids, H. (SM)
Davis, E. L. (SM)
Davis, M. M., Jr. (SM)
De Dufour, W. F. (A)
Derr, R. J. (M)
Dienst, F. F. (M)
Donne, R. B. (F)
Earls, H. G. (SM)
Eaton, A. W. (M)
Eber, L. O., Jr. (A)
Eckert, T. A. (M)
Edwards, K. A. (A)
Egtvedt, M. D. (M)
Eicholzer, A. J. (M)
Eriksen, R. K. (A)
Estes, R. M. (A)
Evans, H. J. (SM)
Face, G. D. (M)
Fancher, H. B. (SM)
Farrell, J. J. (F)
Field, B. (M)
Fields, H., Jr. (A)
Fisch, E. A. (A)
Fitzmorris, S. R. (M)
Fleischer, (A)
Fong, K. (A)
Foster, R. F. (SM)
Friedman, H. J. (A)
Fritschel, P. G. (A)
Frost, R. R. (M)
Gage, G. H., Jr. (M)
Galbraith, R. A. (SM)
Gannett, G. L. (A)
Garber, S. J., Jr. (A)
Gardner, D. R. (SM)
Garry, G. A. (M)
Ghandhi, S. K. (SM)
Gibbons, E. H., Jr. (A)
Gilchrist, B. (A)
Gildersleeve, R. E. (SM)
Glasford, G. M. (SM)
Goldman, S. (F)
Golubiatnikov, O. (M)
Good, W. E. (SM)
Gottlieb, E. (M)
Graeter, R. J. (M)
Graydon, A. (M)
Greenbaum, J. R. (M)
Greenhalgh, K. D. (M)
Greenlese, C. B. (M)
Gruenberg, H. (M)
Guckenheimer, E. A.
Habeck, G. L. (A)
Habermann, R., Jr. (SM)
Haedecke, A. D. (SM)
Haertig, M. M. (M)
Hagen, D. L. (M)
Hall, W. H. (SM)
Hamlett, J. G. (A)
Harrington, R. F. (A)
Harris, D. S. (M)
Hartman, D. W., Jr. (M)
Heartz, L. C. (M)
Heaton, H. T. (M)
Heckelman, R. W. (M)
Heil, H. (SM)
Heller, L. J. (A)
Hendrix, E. R. (M)
Herzog, E. E. (M)
Hoefer, W. G. (M)
Hooper, H. B. (A)
Holland, J. T., Jr. (A)
Holtz, R. E. (A)
Holtzclaw, B. L. (M)
Howells, P. W. (SM)
Hu, M.-K. (SM)
Hunter, N. E. (M)
Hurley, D. T. (M)
Hutchins, C. M. (M)
Hutyler, L. E., Jr. (A)
Intrator, A. M. (A)
Jeffers, W. M. (A)
Jobes, S. S., Jr. (M)
Johnson, C. W. (M)
Johnson, R. A. (A)
Johnson, R. M. (M)
Johnson, S. O. (M)
Jones, R. L. (M)
Jost, J. W., Jr. (A)
Jurla, H. J. (M)
Jutila, S. T. (M)
Kahal, R. (SM)
Kall, W. F. (M)
Katz, H. W. (M)
Keister, J. E. (F)
Kelly, G. M. (A)
Kenefake, E. W. (SM)
Kenyon, S. W. (A)
Kenyian, E. (SM)
Kim, J. C. S. (A)
Kinzle, M. E. (M)
Knickerbocker, L., Jr. (M)
Knox, R. L. (A)
Korolenko, A. V. (A)
Kosso, E. V. (M)
Krentel, W. D. (M)
Kunz, L. C., Jr. (M)
Latker, A. C. (M)
Lederer, E. H. (SM)
Leeder, H., Jr. (M)
Leeds, L. M. (F)
Leinweber, L. F. (M)
Lepage, W. R. (SM)
Leak, I. A. (M)
Levitt, R. S. (M)
Lewis, D. H. (A)
Linker, J. B., Jr. (M)
Linnertz, R. C. (A)
Lippert, H. B. (M)
Lloyd, C. G. (SM)
Lombard, W. A. (A)
Long, E. E. (M)
Lothes, R. N. (M)
Lucas, V. M. (M)
Lynch, I. F. (M)
Lynn, L. H. (SM)
Lytel, A. (M)
Mac Leod, W. R. (M)
Maier, L. C., Jr. (M)
Maicher, C. L. (A)
Mavkey, A. G. (SM)
Martin, H. R. (A)
Marvin, H. B. (F)
Masnik, M., Jr. (M)
Mather, D. L. (M)
Mathis, V. F. (SM)
Maxwell, D. E. (SM)
Mayo, B. R. (A)
McAllister, J. F., Jr. (SM)
McConnaughey, S. R. (M)
McGiffney, D. Z. (A)
Merrigan, C. F. (M)
Merrithew, R. F. (M)
Michaelson, W. (A)
Mikulian, M. (A)
Miller, H. J., Jr. (M)
Millman, G. H. (SM)
Miner, A. R., Jr. (A)
Morlock, W. J. (F)
Moy, R. G. (A)
Muir, D. A. (SM)
Mullen, E. B. (M)
Mullin, L. A. (SM)
Neelands, L. J. (M)
Nonnekens, J. C. (SM)
Norton, C. T. (SM)
Oberrender, G. F., Jr. (M)
Oeko, R. (SM)
Ostergard, P. R. (A)
Ovesta, M. V. (A)
Paganelli, T. I. (SM)
Page, E. R. (A)
Pan, P. M. (M)
Pardee, O. D. (M)
Passarelli, W. F. (M)
Pattat, H. M. (A)
Pavetto, J. C. (A)
Perreault, D. A. (A)
Peterson, E. O. (M)
Peterson, E. H., Jr. (M)
Peterson, G. R. (SM)
Phillips, J. M., Jr. (A)
Pickerton, D. C. (SM)
Polisse, L. F. (M)
Poppe, J. R. (M)
Powell, F. E., Jr. (A)
Priest, C. A. (F)
Prosser, A. M. (A)
Putman, R. E. (M)
Pyle, S. H. (M)
Quinn, H. H., Jr. (M)
Rabell, W. C. (A)
Randall, D. P. (SM)
Rauer, J. A. A. (A)
Reale, J. D. (A)
Requeiro, W. R. (A)
Reilly, L. W. (A)
Reynolds, F. M. (M)
Reza, F. (M)
Richardson, R. L. (A)
Rives, T. C. (F)
Roelofs, S. R. (A)
Roesch, R. G. (A)
Rojak, F. A. (A)
Romey, L. M. (M)
Rose, G. D., Jr. (M)
Rubin, I. E. (M)
Ryaning, A. (M)
Sadowsky, S. S. (M)
Schick, N. E. (SM)
Schlecht, M. F. (M)
Schultz, R. E. (SM)
Schupp, G. A., Jr. (SM)
Schwager, R. A. (M)
Schwarz, E. G. (A)
Segale, R. O. (M)
Seshu, S. (A)
Shannon, H. H. (M)
Shaw, C. A. (M)
Shepherd, N. H. (SM)
Shepp, R. E. (M)
Shetler, R. L. (M)
Shuart, O. H. (M)
Silverman, B. (M)
Smith, A. E. (A)
Smith, B. J. (A)
Smith, E. E. (A)
Smith, L. D. (A)
Somers, L. E. (M)
Spitzer, C. F. (SM)
Starkey, G. M. (M)
Stearns, H. F. (M)
Steeg, G. F. (A)
Stern, A. P. (SM)
Stillwell, H. R. (A)
Stone, E. W. (A)
Stone, W. R. (M)
Sullivan, H. M. (SM)
Sullivan, P. E. (M)
Sun Hu, Y.-V. (SM)
Suran, J. J. (SM)
Swank, W. B. (M)
Swanson, R. W. (M)
Swedlund, L. E. (SM)
Taira, W. C. (M)
Taylor, J. M. (M)
Teich, P. J. (M)
Thies, C. H. (SM)
Thomas, W. P., Jr. (M)
Thor, R. C. (M)
Todd, C. D. (M)
Towlson, H. G. (SM)
Tymann, T. J. (A)
Van Aken, H., Jr. (A)
Villeneuve, A. T. (A)
Von Fange, E. K. (M)
Wakefield, W. F. (A)
Warren, R. A. (M)
Wayne, C.

NEW YORK

Servis, W. A. (A)
Truax, C. J. (M)

Trumansburg (ITH-1)
Beers, R. B. (M)
Hyde, C. M. (M)

Tuckahoe (NY-W-2)
Austin, K. B. (M)
Avaklan, E. A. (M)
Bollari, L. (A)
Collison, P. B. (SM)
Drew, C. E. (SM)
Dunn, C. J. (A)
Gallos, G. C. (M)
Grillo, J. (SM)
Jurafsky, A. J. (M)
King, K. L. (SM)
Lundgren, P. R. (A)
Schimmel, H. (A)
Steinberg, M. I. (A)
Walsh, J. V. (M)

Union (BING-1)
Morgan, W. A. (M)

Uniondale (LI-2)
Aha, R. S. (M)
Bass, H. W. (M)
Biagiotti, R. V. (M)
Brand, R. (A)
Brenner, M. (A)
Delligatti, S. F. (A)
England, J. W. (A)
Gould, R. V. (SM)
Guinan, T. P., Jr. (A)
Johl, M. J. (A)
Kalbfleisch, A. M. (A)
Keen, H. S. (M)
Levinson, S. (M)
Mann, A. (M)
Schiff, R. M. (A)
Sumrell, F. N. (SM)

Upton (LI-2)
Adams, R. R. (A)
Bittner, J. W. (A)
Blewett, J. P. (SM)
Chase, R. L. (M)
Cowan, F. P. (M)
Graham, M. (SM)
Highbotham, W. A. (SM)
Kiesling, J. D. (A)
Kuper, J. B. H. (F)
Plotkin, M. (SM)
Bankowitz, S. (M)
Rheaume, R. H. (M)
Spinrad, R. J. (M)
Tucker, S. M. (M)

Utica (RU-1)
Abere, E. J. (A)
Ainsworth, M. G. (A)
Antonucci, P. (A)
Athas, A. P. (M)
Augustine, J. A. (A)
Baran, A. S. (M)
Barker, J. (SM)
Baris, A. J. (M)
Beall, R. B. (A)
Beams, C. E. (M)
Benvenga, F. T. (M)
Bickelhaupt, M. H., Jr. (M)
Blum, H. (A)
Bonin, G. C. (A)
Brown, R. J. (A)
Buckman, S. L. (A)
Campbell, W. J. (M)
Carney, J. W. (M)
Chase, R. H. (A)
Civin, C. J. (M)
Clark, A. D. (M)
Colin, L. (M)
Comer, J. L. (M)
Cornine, J. (A)
Corwin, M. H. (M)
Crossman, C. R. (A)
Darnall, E. B. (M)
Demick, D. (A)
De Zonia, W. J. (M)
Diab, M. A. (M)
Dondero, R. L. (A)
Dowdell, J. T. (A)
Doyle, C. M. (A)
Dunlap, I. J., Jr. (A)
Duran, F. A., Jr. (SM)
Everett, T. D. (A)
Feldman, I. (A)
Fournier, L. E. (M)
Glaser, G. J. (M)
Godwin, C. J., Jr. (A)
Gorman, M. J. (A)
Gubbins, L. J. (A)
Hansell, P. D. (M)
Haushalter, C. H. (M)
Hautaniemi, B. W. (M)
Hiatt, W. R. (M)
Hogel, A. (A)
Holstead, A. J. (A)
Homan, R. E. (M)
Horner, R. E. (A)
Hudgens, J. E. D. (M)
Hurlburt, R. C. (A)
Husk, W. J. (M)
Hynes, W. J. (M)
Jacobs, D. W. (M)
Jeanne, C. E. (A)
Johnson, M. R. (SM)
Johnson, W. R. (M)
Kane, A. W. (A)
Kelley, G. J. (M)
Kinsley, R. B. (A)
Konig, H. F. (A)
Korbin, A. D. (A)
Krajewski, S. J. (A)
Kroenert, J. T. (SM)
Kuehl, W. J. (SM)
Ludwig, H. A. (M)
Layton, D. T., Jr. (A)
Lemmo, T. J. (M)
Lemon, S. G. (A)
Leveseque, R. W. (M)
Martin, R. H. (A)
Maynard, A. F. (SM)
McCabe, L. E. (M)
McCann, G. R., Jr. (A)
McLain, T. E. (M)
Miletello, S. J. (A)
Miller, R. L. (A)
Mitchell, E. E. (A)
Moldoff, S. (M)
Neely, J. C. (A)
Nelson, C. B. (M)
North, F. J. (A)
McComb, D. S. (M)
Oot, R. F. (A)
Panasiewicz, J. J. (M)
Pearlman, J. (M)
Pelowski, E. H. (M)
Peterpaul, C. A. (A)
Philip, R. M. (M)
Phillips, J. N. (SM)
Phillips, K. G. (M)
Pietrafesa, D. (A)
Plehn, J. G. (SM)
Potter, H. C. (A)
Puopolo, J. W. (M)
Reimer, J. (A)
Reynolds, R. H., Jr. (SM)
Richera, L. (A)
Romanelli, P. A. (M)
Rosenberg, M. W. (A)
Ross, P. C. (SM)
Ross, R. J. (A)
Rothermel, R. S. (M)
Ruggles, P. R. (A)
Sallus, G. M. (A)
Satinoff, D. (A)
Schenk, P. J. (SM)
Schiffman, M. (M)
Schiffman, M. M. (A)
Shelton, G. L., Jr. (M)
Shibata, A. M. (A)
Siegel, G. H. (SM)
Smith, A. E. (M)
Smith, J. (M)
Smith, M. J. (M)
Snider, G. L., Jr. (M)
Spear, E. D. (SM)
Sperling, L. (A)
Stratton, L. N., III (M)
Uren, D. E. (A)
Wagner, R. A. (SM)
Walls, G. R. (M)
Webb, J. K. (M)
Weigel, R. L. (M)
Wendt, R. F. (A)
Werner, W. F. (M)
Wexler, C. H. (M)
Willard, C. H. (M)
Wolfe, G. M. (M)
Zawada, J. D. (A)
Zielinski, C. A. (M)

Vails Gate (NY-MH-2)
Simek, R. L. (A)

Valhalla (NY-W-2)
Dworetzky, L. H. (SM)
MacAdam, W. K. (SM)
Parr, A. F. W. (M)

Valley Stream (LI-2)
Agress, M. C. (M)
Albanese, V. J. (SM)
Barnell, E. J. (A)
Beaton, C. R. (M)
Cass, J. (A)
Cooney, F. A. (M)
Craft, C. J. (M)
Davis, S. (M)
Durbin, E. (M)
Edelstein, H. N. (SM)
Faden, R. J. (M)
Farkas, R. D. (A)
Gangale, F. S. (A)
Goodstein, J. (M)
Grieaan, G. F. (M)
Hanse, W. E. (A)
Holmes, R. P. (A)
Jackson, D. E. (A)
Jarva, W. (A)
Jeffreys, P. R. (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)
Miller, G. (A)
Minneman, M. J. (SM)
Morgenstern, A. (A)
Peyser, W. P. (SM)
Pihell, L. J. (A)
Platt, S. (M)
Redding, J. D., Jr. (A)
Rokosz, A. J. (A)
Sandler, P. L. (A)
Schaaf, W. K. (A)
Schlang, A. (M)
Schlanger, S. M. (A)
Schwarz, H. E. (A)
Shaw, W. J. (M)
Temple, K. A. (A)
Weatlecher, F. W. (M)
Woerner, R. G. (A)
Woodbury, W. F. (M)
Ziegler, G. W. (A)
Zwarico, P. F. (A)

Vernon (RU-1)
Boothroyd, G. A. (A)

Verona (RU-1)
Miller, T. A. (A)

Vestal (BING-1)
Adams, L. R. (M)
Aldrich, D. H. (M)
Baron, R. G. (A)
Barrentine, W. M. (M)
Bernstein, R. (M)
Bertelsen, B. L. (A)
Betts, R. (M)
Bolton, W. D. (M)
Breedlove, R. H. (M)
Bussey, R. L. (A)
Calkins, G. T. (M)
Carpenter, L. C. (M)
Coleman, M. J. (M)
Cooper, A. E. (M)
Cooper, J. V. B. (M)
Daykin, D. R. (M)
Farr, L. E., Jr. (A)
Gibson, R. G. (M)
Grace, C. H. (M)
Greene, J. E. (M)
Johnson, C. I. (M)
Johnson, G. W. (A)
Kadel, J. E. (A)
Keely, A. W. (A)
Koranye, T. D. (M)
Kuljian, R. L. (M)
Lawson, E. R. (A)
Leimer, J. J. (A)
Lozier, W. B., Jr. (A)
McDermid, W. L. (M)
Nuss, H. C. E. (A)
Oates, K. H. (A)
Pape, E. W., Jr. (A)
Porterfield, F. B. (M)
Purcell, J. A. (A)
Rogers, M. D. (M)
Ruest, N. R. (M)
Smyrk, C. E., Jr. (A)
Summers, W. F. (M)
Trest, L. S., Jr. (A)
Tutty, J. E. (M)
Vacca, L. N. (M)
Weisser, D. R. (A)
Wright, W. F. (M)

Voorheesville (SCH-1)
Le Clair, J. E. (M)

Wallkill (NV-MH-2)
Parker, R. G. (A)

Wantagh (LI-2)
Ahman, A. J. (A)
Alter, J. (SM)
Arndt, W. R. (SM)
Bauer, W. C. (A)
Behringer, N. C. (A)
Bloom, L. (M)
Breese, H. R. (A)
Breese, M. E. (M)
Brown, C. J. (A)
Burt, R. F. (M)
Caligiuri, J. F. (A)
Delngoli, F. A. (M)
Fitzgerald, W. J. (M)
Gibbs, E. D. (M)
Greene, J. C. (M)
Goodman, D. M. (SM)
Greene, S. J. (M)
Herring, F. G. (M)
Hickman, W. C. (A)
Holcombe, P. G. (A)
Horton, G. L. (A)
Hughes, J. G. (M)
Jacobson, R. S. (SM)
Jauck, R. H. (SM)
Kesney, E. S. (A)
Leib, L. G. (A)
Levey, A. W. (M)
Losee, W. B., Jr. (A)
McBee, W. D. (SM)
McManus, J. T. (A)
Mills, N. B. (M)
Nelson, R. P. (M)
Osder, S. S. (M)
Osterndorf, J. F. (A)
Pate, G. W., Jr. (A)
Price, C. R. (A)
Ratner, M. (M)
Rawitz, H. (M)
Riker, W. E. (M)
Rutlerfer, M. (M)
Sachar, H. N. (M)
Salzberg, A. (A)
Sarfaty, J. (A)
Schleher, D. C. (A)
Schroeder, R. P. (A)
Seckler, P. J. A. (A)
Sferrazza, P. J. (M)
Shulman, A. R. (M)
Stateman, M. J. (SM)
Steen, D. R. (M)
Sunder, J. E. (M)
Vang, J. P. (A)
Weinstein, M. (M)
Weiss, L. M. (M)
Weiss, M. (M)
Wolfson, T. M. (M)

Water Mill (LI-2)
Delbert, C. R. (M)
Luke, R. O. (A)

Wappingers Falls (NY-MH-2)
Abrath, C. E. (A)
Agusta, R. (M)
Breault, N. A. (M)
Brodd, W. D. (A)
Buelow, F. K. (M)
Bullard, R. L. (A)
Bundy, L. M. (M)
Carlson, J. W. (M)
Case, P. W. (M)
Christian, J. L. (M)
Councill, W. D. (M)
Demmer, W. R. (M)
Di Marco, A. F. (M)
Domenico, R. J. (A)
Donohue, D. C. (A)
Ewing, J. E. (A)
Feiller, J. (M)
Fernekees, J. E. (M)
Geisler, H. J. (M)
George, G. A. (A)
Graff, W. S. (M)
Grossnickle, J. R. (M)
Hahn, E. F. (M)
Hand, F. R. (M)
Headrick, L. L. (A)
Hickerson, J. E. (M)
Hipp, J. A. (M)
Holmes, F. J., Jr. (M)
Howard, P. H. (A)
Johnson, J. D. (M)
Keller, R. E. L. (A)
Kerr, G. L. (M)
Knapp, C. H. (A)
Kusnick, A. A. (SM)
Lear, E. F. (A)
Medla, E. (M)
Millstein, S. (A)
Monroe, G. R. (A)
Moran, W. R., Jr. (A)
Moyer, J. J. (M)
Murphy, J. J. (M)
Nervik, A. E. (A)
Nienburg, R. E. (M)
O'Brien, H. A. (M)
Ohlhorst, W. R. (M)
Paul, A. J., Jr. (A)
Pfirman, W. S. (A)
Platz, E. F. (M)
Plonsky, A. T. (M)
Preiss, R. J. (A)
Richards, R. K. (M)
Roberts, W. (A)
Robins, R. D. (A)
Rudy, G. J. (M)
Sanders, J. J. (A)
Schaffer, W. S. (M)
Seimes, M. S. (A)
Smith, G. H. (M)
Unger, G. G. (A)
Verdibello, A. A. (A)
Warner, J. H., III (A)
Widmar, J. H. (M)
Wild, H. K. (M)
Williams, J. J. (M)
Winger, W. D. (A)

Warners (SYR-1)
Walsh, L. F. (A)

Washingtonville (NY-MH-2)
Brown, D. W. (M)

Waterford (SCH-1)
Michon, G. J. (A)

Waterloo (ROC-1)
Allen, R. J. (A)

Watertown (SYR-1)
Bonadio, G. (A)
Vaughan, J. A. (M)

Waterville (RU-1)
Carr, E. O. (M)
Cooper, F., Jr. (SM)
Ellis, H. J., Jr. (M)
Seiler, R. T. (A)

Watervliet (SCH-1)
Lavoo, N. (M)
McCarron, D. J. (M)

Waverly (BING-1)
Owen, F. D. (M)

Webster (ROC-1)
Beetz, H. J. (A)
Burns, D. W. (A)
Livingstone, J. K. (M)
Matteson, R. G. (M)
Ozone, K. (SM)
Piotraschke, C. F. (M)
Reinke, R. V. (A)
Sienkiewicz, A. H. (A)
Stymer, T. L. (A)
Vosteen, E. (M)
Wheeler, J. L. (M)

Weedsport (SYR-1)
Jeffords, J. M. (M)

West Albany (SCH-1)
Maurer, J. W. (M)

West Babylon (LI-2)
McMullin, R. E. (M)

West Branch (RU-1)
Ricketts, P. E. (SM)
Rush, S. (SM)

Westbury (LI-2)
Abajian, H. B. (M)
Adler, W. (M)
Becker, N. (M)
Beley, E. G., Jr. (A)
Bergdahl, L. A. (A)
Berkoff, S. (M)
Borken, A. (A)
Chin, J. H. S. (A)
Cohen, S. B. (M)
Dorne, A. (M)
Douglas, W. S. (A)
Ellis, P. H. (M)
Friedman, J. (A)
Gitlin, S. A. (M)
Gledhill, A. P. (M)
Graber, L. J. (SM)
Haagens, D. (M)
Harjes, F. W. (A)
Hellmann, R. K. (M)
Hoffman, G. (SM)
Hoffman, H. L. (M)
Kelleher, R. L. (SM)
Kenny, J. A. (SM)
Kritz, J. (M)
Levine, S. W. (SM)
Le Von, M., Jr. (M)
Liguori, M. A. (A)
Linke, K. W. (A)
Logan, R. W. (M)
Luce, P. P. (A)
Mankin, A. E. (M)
Margolin, J. (M)
Marston, R. S. (M)
Mesch, R. M. (M)
Moscarello, M. A. (SM)
Napolin, S. (A)
Oldmixon, R. (A)
O'Meara, T. J. (M)
Pinkham, G. E. (M)
Price, R. C. (SM)
Procop, L. W. (A)
Proskauer, R. (M)
Richards, G. F. (M)
Rickert, H. H. (M)
Rush, S. (M)
Savet, P. H. (A)
Schumacker, A. L. (VA)
Schwiebert, H. (A)
Sege, T. D. (M)
Senseney, G. T. (A)
Shostak, R. B. (SM)
Simon, J. M. (M)
Smith, H. M. (A)
Speakman, E. A. (F)
Stein, D. B. (A)
Stitch, M. (M)
Sweeney, D. J. (A)
Tate, R. (A)
Tichy, B. W. (M)
Troop, J. (A)
Truhlar, G. (M)
Volpe, C. D. (A)
Walcule, D. (M)
Waller, W. E. (M)
Whitford, J. R. (M)
Wilkerson, J. R. (SM)
Wilson, L. B. (M)
Wingen, J. H. (A)
Witt, C. J. (M)

Westernville (RU-1)
Clawson, G. T. (A)
Mackey, C. L. (M)

Westhampton Beach (LI-2)
Allison, C. H. (A)
King, D. C. (A)
Whalen, A. D. (M)

West Hempstead (LI-2)
Aveney, R. J. (M)
Bifano, V. J. (A)
Cohen, H. (A)
Cohen, N. L. (M)
Dean, M. A. (M)
Erdhelm, W. (M)
Fairweather, R. W. (M)
Karasz, J. (M)
Levine, A. (SM)
Lorch, J. (M)
Saffitz, I. M. (M)
Seisler, M. (M)
Shnitkin, L. (A)
Simmons, J. C. (M)
Thiede, F. C. W. (VA)
Voelpel, J. (A)
Weintraub, I. A. (M)
Westman, H. P. (SM)

West Hurley (NY-MH-2)
Bading, C. E. (M)

West Islip (LI-2)
Bell, R. W. (A)
Bushor, W. E. (M)
Collock, H. (A)
Damast, M. A. (M)
Eglit, W. F. (M)
Erickson, H. H. (A)
Gager, C. H. (A)
Hermida, R. J. (A)
Schecker, E. (A)
Steneeker, R. G. (A)

West Point (NY-MH-2)
Cutler, E. C., Jr. (A)
Friend, H. C. (A)
Gillette, E. C., Jr. (M)
Green, J. W., Jr. (SM)
Monahan, L. P., Jr. (M)
Ross, J. A. (M)
Strohm, W. E. (M)

West Seneca (BN-1)
Nowicki, J. J. (A)

West Webster (ROC-1)
Hattersley, T. E., Jr. (M)

White Plains (NY-W-2)
Aslan, E. E. (M)
Atlee, R. Y. (M)
Bernardi, A. R. (A)
Bloom, W. E. (A)
Bolsey, E. J. (M)
Borden, E. D. (A)
Bralley, M. L. (M)
Brown, R. L. (M)
Cohn, E. (A)
Cuccia, F. (M)
Enoch, D. G. (A)
Fearing, J. L. (VA)
Flower, R. A. (M)
Friedensohn, A. (A)
Fulmer, C. C. (M)
Gano, A. S. (SM)
Gazzigli, J. J. (A)
Gilbert, J. (M)
Glancy, R. C., Jr. (SM)
Greske, J. J. (M)
Gronner, A. (SM)
Guttman, J. (M)
Hackett, A. J. (M)
Halpern, W. (M)
Harris, E. R. (M)
Heizler, M. M. (A)
Higgins, R. W. (A)
Ikeda, T. (A)
Jenkins, R. C. (M)
Jurgen, K. (M)
Kaye, H. W. (M)
Lake, J. R. (M)
Lambert, F. C. (A)
Lebid, J. (A)
Lewis, J. R. (M)
Lisk, H. H. (M)
Lombardi, B. J. (A)
MacDonald, W. D. (A)
Merritt, N. A. (M)
Metcalfe, D. (SM)
Mountain, J. D. (M)
Oess, F. G. (M)
Parry, C. A. (SM)
Preston, F. S. (SM)
Reiner, S. (M)
Rolfs, J. C. (M)
Ruta, M. (A)
Sansevero, V. J. (A)
Scheiner, M. L. (M)
Schleicher, M. (A)
Schmitt, J. W. (M)
Shaw, D. B. (SM)
Shea, J. E. (M)
Sioles, G. W. (M)
Spitalny, A. (M)
Strysko, W. J. (A)
Warnick, G. H. (M)
Zierman, M. (SM)
Zuzolo, P. R. (M)

Whitesboro (RU-1)
Benman, E. J. (SM)
Davis, D. M. (A)
Edgett, R. S. (M)
Erwin, R. L., Jr. (M)
Faulkenberry, B. K. (M)
Giles, J. W. (SM)
Girismen, M. F. (A)
Grimm, R. S. (A)
Hannell, F. D. (M)
Hartnett, G. C. (M)
Kenyon, H. P., Jr. (A)
Ketchum, P. M. (SM)
Kulmus, R. J. (M)
Mills, J. B. (A)
Moffat, D. (A)
Orear, E. R. (M)
Pashby, C. A. (M)
Pfefer, B. L. (SM)
Piepho, J. B. (A)
Power, H. J. (A)
Riddle, P. (A)
Schaaf, M. W. (A)
Schatz, F. W. (SM)
Schultz, J. L. (SM)
Sill, D. B. (M)
Slaughter, J. E. (M)
Steel, J. W. (M)
Stitz, R. P. (M)
Watson, D. E. (M)
White, R. L. (A)
Winn, O. H. (SM)
Woods, C. R. (A)

Whitestone (LI-2)
Alexander, W. R. (M)
Ballinger, R. F. (M)
Berenberg, G. (M)
Buchbinder, M. M. (SM)
Crowhurst, N. H. (SM)
Dunefsky, M. (M)
Gottlieb, G. J. (M)
Greene, L. (M)
Hunter, E. M. (M)
Long, J. H. (SM)
O'Connell, T. P. (A)
Pedowicz, J. M. (M)
Piller, S. E. (M)
Pokorny, J. S. (M)
Pollak, F. (M)
Pomerantz, M. (M)
Rotker, W. (M)
Rubin, W. L. (M)
Sachs, M. (M)
Sandler, H. (M)
Schachter, J. (M)
Sobel, I. J. (A)
Steckler, I. (A)
Von Kunits, P. (M)
Weida, R. L. (M)

Whitney Point (BING-1)
Read, L. P., Jr. (M)

Williamsville (BN-1)
Bergerson, C. W. (A)
Corp, D. E. (M)
Giori, F. A. (M)
Hart, W. E. (M)
Ilmelar, S. L. (A)
Laurien, L. M. (M)
Mandale, W. R. (M)
Maylott, C. F. (SM)
Maynard, H. M. (M)
Nevo, R. B. (M)
Pifer, M. J. (SM)
Snyder, W. W. (SM)
Tanguay, A. (SM)
Tona, C. J. (M)
Wood, F. S. (M)

Williston Park (LI-2)
Busby, J. W. (SM)
Flattau, T. (A)
Gillespie, C. H., Jr. (A)
Hopkins, G. C. (M)
Lerch, Q. A., Jr. (M)
Losow, H. C. (M)
Parsons, D. L. (M)
Perkowski, T. F. (M)
Ploss, A. G. (M)
Weidle, C. M., Jr. (A)
Zaklad, S. (A)
Zwick, G. (M)

Woodbury (LI-2)
Hanulec, J. D. (A)
Oxholm, J. M. (A)

Wilson (BN-1)
Schneider, R. J. (M)

Windsor (BING-1)
Nielsen, R. S. (A)

Woodhaven (LI-2)
De Size, L. K. (M)
Jacobs, F. (SM)
Michel, C. A. (A)
Reitlinger, A. (M)
Sloan, R. R. (M)
Sweetland, J. G. (M)
Winter, D. W. (A)

Woodmere (LI-2)
Bach, H. M. (M)
Cohen, A. L. (M)
Cohan, H. R. (A)
Crystal, F. H. (A)
Kuhgan, J. J. (M)
Ozarin, J. (A)
Zweifler, I. (M)

Woodside (LI-2)
Cabot, J. H. (A)
Carey, E. D. (A)
Culver, A. R. (A)
Gautherin, G. A. (M)
Johnston, W. F. (A)
Julich, H. (M)
Keith, W. S. (M)
Maisto, N. S. (A)
Newman, S. (M)
Parzen, B. (SM)
Paschetto, D. D. (M)
Perle, R. C. (M)
Rabinowitz, M. H. (A)
Rafferty, J. J. (A)
Reese, R. E. (A)
Reuman, W. H. (A)
Tucker, A. G. (A)
Vopat, R. W. (M)
Walsh, W. J. (A)
Wetzler, C. E. (M)

Woodstock (NV-MH-2)
Forney, F. E. (A)
Heck, N. A. (A)
Lawson, H. C. (A)
McCarter, G. B. (M)
Mirick, H. L., Jr. (A)
Seelbach, W. C. (M)
Shaw, F. E. (A)
Spencer, D. L. (M)
Van Rijn, J. C. (SM)
Weir, K. O. (M)

Wyandanch (LI-2)
Kishinsky, L. S. (M)
Miller, J. Z., IV (A)

Yonkers (NY-W-2)
Arbuthnott, J., Jr. (A)
Avtutik, R. F. (M)
Balletta, A. G. (A)
Bartlett, S. C. (SM)
Bastian, A. L. (A)
Belchis, S. (M)
Bergen, A. R. (A)
Bernardi, U. A. (M)
Blanco, A. A. (M)
Bodin, M. (M)
Bolz, R. A. (M)
Buchalter, M. (M)
Burger, E. (M)
Burnell, N. (A)
Butler, G. L., Jr. (M)
Campbell, J. A. (A)
Cano, J. R. (A)
Caro, U. F. (A)
Castriota, L. J. (M)
Close, S. W., Jr. (M)
Cugliari, N. (M)
Daly, W. P. (A)
Davidoff, S. (M)
Defloria, R. N. (A)
Edwards, H. M. (A)
Findeis, W. J. (M)
Fliderblum, D. D. (A)
French, C. C. (A)
Friedman, S. N. (A)
Gala, C. (M)
Genz, W. F. (M)
Giovanni, G. (A)
Goetzl, M. (M)
Gomberg, C. (M)
Grabowski, J. L. (A)
Greenwald, M. H. (M)
Hesse, G. L. (A)
Hillman, P. L. (SM)
Hoffman, F. H. (A)
Husenita, J. (A)
Knauert, W. F. (M)
Korewick, J. (M)
Landry, A. W. (A)
Lichtenstein, M. J. (SM)
Lisewski, E. E. (A)
Loebl, W. W. (M)
Looney, L. A. (M)
Lynch, D. F., Jr. (A)
Lynch, H. G. (M)
Morse, M. (A)
Namerow, V. C. (A)
Orefice, G. T. (A)
Perelman, I. B. (A)
Regan, H. T. (A)
Richter, J. G. (A)
Rodrigues, A. N. (A)
Roth, S. S. (A)
Sachs, H. L. (A)
Schachat, T. (M)
Schreiber, W. B., Jr. (A)
Sheeter, S. (M)
Shere, S. (SM)
Shirley, G. (A)
Siegert, R. R. (M)
Solins, R. (M)
Sperranza, A., Jr. (A)
Staudt, W. (A)
Stein, R. S. (SM)
Sterk, A. A. (M)
Sverlitch, P. (A)
Taffet, W. (A)
Tarowsky, H. (A)
Troster, M. (A)
Webb, W. J. (A)
Weller, L. (M)
Yablonsky, D. M. (A)
Zatorsky, E. F. (VA)

Yorktown Heights (NY-W-2)
Arenud, A. T. (A)
Diebold, A. E. (A)
Guros, F. S. (M)
Saslovsky, S. (A)
Teschmacher, H. W. (SM)

Yorkville (RU-1)
Pankiewicz, C. L. (A)

NORTH CAROLINA

Asheboro (NC-3)
Stephens, T. L. (M)

Asheville (NC-3)
Kennedy, R. A. (M)
McConnel, W. G. (SM)
Morgan, Z. K., Jr. (A)
Smith, I. A., Jr. (M)
Wade, R. A. (A)

Beaufort (NC-3)
Slater, R. C. (M)

Black Mountain (NC-3)
Huffman, J. C. (A)
Boone (NC-3)
Isenhour, C. N. (A)
Littleton, W. W. (M)

Brevard (NC-3)
Jackson, R. K. (M)

Burlington (NC-3)
Apple, H. L. (M)
Barlow, J. E. (A)
Birdsey, G. J. (M)
Casey, J. B. (M)
Cobb, H. E. (M)
Craft, A. M. (M)
Davis, C. C. (M)
Day, J. L. (M)
Fox, M. L. (A)
Hastings, C. L. (SM)
Hood, W. B. (A)
Jennette, J. E., Jr. (M)
Jones, J. W. (M)
Kelly, L. E. (M)
Miller, A. R. (A)
Miller, O. R. (M)
Nance, R. L. (A)
Nimmeke, F. E. (SM)
North, T. C., Jr. (M)
Pomerantz, E. L. (A)
Sees, J. H. (M)
Smith, C. P. (M)
Smith, H. O. (M)
Stone, J. L., III (M)
Thomas, B. J. (M)
Thorne, J. C. (M)
Trousdoff, G. B. (SM)
Waite, A. C., Jr. (M)

Burton (NC-3)
Baker, J. D. (M)

Camp Lejeune (NC-3)
Brady, C. L. (SM)

Candler, (NC-3)
Brown, J. R. (A)

Cary (NC-3)
Dawkins, L. L. (SM)

Chapel Hill (NC-3)
Forrest, L. A., Jr. (A)
MacIntyre, A. B. (M)

Charlotte (NC-3)
Anderson, F. C. (A)
Barron, J. I. (M)
Bateman, F. F. (M)
Brown, F. R. (A)
Bush, T. (M)
Caldwell, H. S. (A)
Carey, J. G. (SM)
Carr, L. O. (M)
Caudle, L. L., Jr. (M)
Chaney, A. L., Jr. (M)
Covington, N. J. (M)
Dycus, R. W. (A)
Hardin, L. H. (A)
Hicklin, W. H., Jr. (A)
Howard, T. E. (M)
Kickler, E. M. (A)
Livingston, T. C. (M)
McCray, H. R., Jr. (A)
Meadows, W. E. (M)
Minor, M. J. (SM)
Mullis, C. B. (M)
Murphy, B. (M)
Ramsey, R. W. (VA)
Scoggin, W. G., Jr. (A)
Townsend, D. W. (A)
Walker, L. L. (A)
Watts, L. T., Jr. (A)
Xenakis, S. N. (A)

Clemmons (NC-3)
Dearing, M. (A)

Durham (NC-3)
Browning, P. L. (A)
Chenery, P. J. (SM)
Cook, J. G. (A)
Cronin, H. C. (M)
Edwards, F. D. (M)
Fullen, R. E. (A)
Moore, H. C., Jr. (M)
Owen, H. A., Jr. (M)
Rudisill, J. A., Jr. (M)
Seeley, W. J. (SM)
Young, D. B. (M)

Elizabethtown (NC-3)
Baird, J. W. (A)

Elon College (NC-3)
Baynard, J. S., Jr. (M)
Welsh, W. A. (SM)

Fayetteville (NC-3)
Buck, J. H. (M)
Snipes, W. C. (A)

Fort Bragg (NC-3)
Bell, W. S. (A)

Gastonia (NC-3)
Mills, C. W. (M)

Germantown (NC-3)
Long, E. S. (A)

Goldsboro (NC-3)
Trueblood, D. B. (M)

Graham (NC-3)
James, H. C. (SM)
Rountree, R. H. (M)

Greensboro (NC-3)
Adams, T. N. (M)
Aitkenhead, J. (M)
Alexander, M. T. (A)
Allred, R. R. (M)
Annas, P. D. (M)
Atcheson, S. E. (M)
Beacherer, E. A. (SM)
Best, R. H. (A)
Bezera, G. (M)
Coble, R. P., Jr. (M)
Gardiner, J. G. (SM)
Grubb, J. W. (M)
Harmon, W. R., Jr. (M)
Hunter, J. R. (M)
Hurt, C. V. (M)
Johnson, W. H. (M)
Joseph, F. T. (M)
Marteena, J. M. (M)
Monroe, J. E. (A)
Morris, R. E. (M)
Porter, G. R. (M)
Pratt, T. B., Jr. (M)
Schaffer, L. T. (M)
Shore, E. B. (A)
Smith, F. S. (M)
Stanton, G. L. (SM)
Strandberg, C. F. (M)
Stuart, J. C. (M)

Guilford College (NC-3)
Coordsen, J. F., Jr. (M)

Havelock (NC-3)
Cooper, H. K. (A)
Lindeman, W. D. (A)
Schuler, J. R. (M)

Hendersonville (NC-3)
Hawks, J. D. (M)
Herman, L. R. (M)
Howell, E. K. (M)
Jones, H. T. (A)
Kelley, H. P., Jr. (M)

Hickory (NC-3)
Long, T. E. (A)

High Point (NC-3)
Bivins, J. F. (SM)
Portaro, S. A. (A)
Russell, J. G. (A)

Horse Shoe (NC-3)
Kemic, C. S. (A)

Jacksonville (NC-3)
Brandes, N. J. (A)
McClendon, J., Jr. (A)
Sanderson, J. J. (A)

Jamestown (NC-3)
Caldwell, D. J. (SM)
Moore, R. L. (M)

Kernersville (NC-3)
Conklin, J. L. (M)
Farrington, O. M. (M)

Kinston (NC-3)
Hurt, A. B., Jr. (M)

Laurinburg (NC-3)
Phillips, G. W. (A)

Manteo (NC-3)
Shannon, B. F. (A)

Mars Hill (NC-3)
Thompson, R. C. (A)

McLeansville (NC-3)
Freund, J. A. (M)

Mebane (NC-3)
Mincey, J. H. (M)

Mount Airy (NC-3)
Epperson, R. H. (A)

New Bern (NC-3)
Haire, B. G. (M)
McKnight, V. J. (A)

Newport (NC-3)
Modlin, C. J. (M)

Oxford (NC-3)
Tippett, J. T. (M)

Pfafftown (NC-3)
Garrison, W. H. (M)

Raleigh (NC-3)
Baldwin, C. M., Jr. (A)
Barclay, W. J. (SM)
Carson, V. S. (F)
Colvert, F. T. (A)
Corns, R. B. (M)
Duncan, V. D. (M)
Goetze, A. J. (A)
Higgins, J. F. (A)
Handley, G. B. (SM)
Howard, J. (M)
Hulick, H., Jr. (SM)
Idol, C. A. (M)
Jenkins, H. Jr. (A)
Kahn, S. H. (M)
Lamonds, H. A. (M)
Manning, E. G. (M)
McArthur, C. S., Jr. (M)
Moore, C. H. (M)
Mott, H. (M)
Neuse, D. H. (A)
Padunchewit, L. (M)
Parkin, H. C. (A)
Randolph, H. D. (A)
Rothstein, R. I. (A)
Sanford, B. E. (A)
Sloop, W. B. (A)
Speed, W. J. (M)
Stevens, R. H. (M)
Sugg, C. H. (A)
Thorne, M. G. (A)
Tommerdahl, J. B. (M)
Tompkins, E. H., Jr. (M)
Wurster, D. E. (M)

Rural Hall (NC-3)
Helms, C. M. (M)

Sanford (NC-3)
Buchanan, T. B. (A)

Shelby (NC-3)
Mathis, J. E. (A)
Swannanoa (NC-3)
Swiggett, W. O. (A)

Tarawa Terrace (NC-3)
Bain, R. A. (A)

Wendell (NC-3)
Todd, M. C. (M)

Wilmington (NC-3)
Kondracki, J. J. (A)
Peebles, N. A. (M)

Wilson (NC-3)
Velverton, W. M. (A)

Winston-Salem (NC-3)
Adkins, F. L., Jr. (M)
Anderson, F. B. (SM)
Applegate, I. D. (SM)
Arnold, H. H. (SM)
Artesani, J. H. (M)
Aykens, E. W. (M)
Baity, A. C., Jr. (M)
Belden, J. M. (A)
Barnett, H. A., Jr. (A)
Beard, C. E. (M)
Bertie, C. E. (SM)
Boatwright, J. H. (M)
Bunney, E. (M)
Cantrell, M. E. (M)
Carlisle, H. C., Jr. (A)
Caskey, L. F. (M)
Clabough, E. M. (A)
Coan, J. O., Jr. (A)
Corderman, R. C. (SM)
Corn, M. (A)
Cox, C. W. (M)
Craddock, G. L. (M)
Crissman, L. R. (M)
Dague, G. L. (A)
Daly, J. A., Jr. (A)
Disher, R. S. (A)
Estes, F. B. (VA)
Evans, R. D. (A)
Feeney, C. (A)
Fisher, R. W. (M)
Fox, E. D. (M)
Gegenheimer, W. C. (SM)
Giorgi, D. A. (A)
Glenn, H. L. (A)
Hamilton, R. D. (A)
Hanks, W. R. (A)
Heard, B. E. (M)
Hedrick, P. F. (SM)
Hege, A. (A)
Heineman, J. T. (M)
Herb, J. W. (M)
Hirner, J. A. (M)
Hoffman, W. K. (VA)
Hopper, F. L. (SM)
Hunter, P. H. (M)
Ivester, H. E. (M)
King, L. C. (A)
Knowles, C. U. (M)
Lanford, W. E. (M)
Laughter, F. H. (A)
Lee, R. E., Jr. (M)
Leonard, B. B. (M)
Libby, V. A. (A)
Lumley, R. M. (A)
Lyerly, E. E. (A)
Lyle, D. (A)
Malone, W. H. (M)
McAvoy, W. G. (SM)
McFarland, R. T. (M)
McMillin, D. L. (A)
Moore, W. C. (M)
Morgan, G. T. (A)
Mueller, H. W. (M)
Needham, D. P. (M)
Noriega, J. R. (M)
Norwood, C. A. (M)
Oliver, C. W. (A)
Palmer, C. W. (SM)
Parlee, G. N. (SM)
Pfohl, J. T. (A)
Powell, L. H. (VA)
Reisenweaver, W. B. (M)
Reynolds, C. W. (SM)
Ridgill, J. R. (A)
Roley, E. (A)
Rudroff, M. G. (A)
Sharpe

NORTH DAKOTA

Grand Forks (TC-5)
Thomforde, C. (M)

Minot (TC-5)
Haeusler, H. (A)
Main, J. F. (A)

Valley City (TC-5)
Amoo, L. R. (M)

OHIO

Ada (TOL-4)
Nau, R. H. (SM)

Akron (AKR-4)
Arkwright, L. P. (A)
Armstrong, R. H. (A)
Baker, E. E., Jr. (M)
Barnett, C. B. (M)
Batchelder, W. E. (A)
Beardsley, R. R. (M)
Bentley, D. E. (A)
Berkey, R. H. (A)
Bock, A. W. (A)
Bock, E. D. (A)
Bosomworth, G. P. (F)
Buck, S. E., Jr. (A)
Buxton, A. C. (SM)
Caulkins, F. A. (M)
Chimera, V. J. (SM)
Ciocca, P. J. (A)
Collett, N. (M)
Di Caudo, V. J. (A)
Eddey, E. E. (A)
Eishen, D. E. (A)
Emery, W. S. (A)
Foley, J. S. (M)
Forman, H. L. (A)
Guthrie, F. W. (M)
Hegbar, H. R. (F)
Hill, M. W. (A)
Holler, J. R. (SM)
Horowitz, M. (SM)
Huffman, D. L. (A)
Huffman, E. B. (A)
Ifland, H. L. (A)
Isear, J. A., Jr. (M)
Jonard, H. A. (M)
Kime, J. M. (M)
Knopp, L. L. (M)
Kostolansky, V. A. (A)
Kubilius, A. A. (M)
Lambert, C. O. (SM)
Leibowitz, S. (M)
Link, T. V. (A)
McCarty, J. R. (A)
McClary, D. A. (A)
McMahon, W. D. (SM)
Mounce, C. O. (A)
Mulholand, T. C. (A)
Nank, W. A. (A)
Nellis, R. E. (A)
Nerhood, H. E. (A)
Neuwirth, R. R. (A)
Noffz, H. C. (M)
Obermeier, J. A. (M)
Oplinger, J. N. (A)
Paden, H. R. (M)
Pake, F. G. (M)
Papaloan, I. M. (M)
Peden, M. (A)
Perrin, H. J. (M)
Phares, D. P. (A)
Pressel, P. I. (M)
Redmond, J. F. (M)
Roberts, L. H. (A)
Roskos, R. G. (A)
Ryburn, P. W. (M)
Selover, E. E. (A)
Shingler, D. F. (A)
Shively, H. C. (M)
Shoemaker, J. R. (SM)
Silkman, H. G. (M)
Singer, J. E. (M)
Smith, P. C. (SM)
Strang, J. R. (SM)
Strowig, K. W. (A)
Sues, L. B. (A)
Takacs, J. A. (M)
Vaughan, R. L. (A)
Veit, N. J. (A)
Walker, R. D. (A)
Watkins, W. H. (A)
Weinsheimer, W. E. (A)
Weyrick, R. C. (A)
Winkler, M. A. (M)
Winters, R. K. (A)
Wright, D. M. (A)
Yanase, H. Y. (A)
Yarosh, N. P. (SM)
Zimbardi, C. B. (A)

Alliance (AKR-4)
Foulks, E. D. (M)
Smith, A. E. (A)

Alpha (Day-4)
Hall, J. J. (A)

Amlin (COL-4)
Rife, W. E. (SM)

Arcanum (DAV-4)
Weber, S. E. (M)

Ashtabula (BN-E-1)
Mickach, J. E. (A)
Morrison, H. F. (A)

Athens (COL-4)
Cartland, F. W. (M)
Green, D. B. (M)

Atwater (AKR-4)
Meilander, W. C. (M)

Avon Lake (CLE-4)
Dobosy, J. F. (SM)

Barberton (AKR-4)
Austin, A. O. (F)
Cooper, G. P. (M)
Kane, C. G., Jr. (M)
Kelley, J. B. (M)
Klever, W. O. (A)
Miller, D. A. (M)
Tompkins, F. G. (M)
Whitchurch, N. E. (M)

Batavia (CIN-4)
Kay, E. D. (M)

Bay Village (CLE-4)
Day, J. W. (A)
Friswold, F. A. (M)
Gunderman, R. J. (M)
Smith, C. W. (A)
Smith, T. H. (M)

Beachwood (CLE-4)
Ulmer, R. M. (M)

Bedford (CLE-4)
Howard, W. R. (A)
Jerome, W. R. (VA)
Kessler, J. C. (A)
Washko, F. H. (M)

Bellefontaine (TOL-4)
Berry, W. P. (A)
Bridges, B. D. (A)
Cammack, H. F. (M)
Wallace, H. L. (A)

Berea (CLE-4)
Blackman, C. P. (A)
Epperson, J. B. (SM)
Sanderson, R. B. (A)
Sharp, E. M. (M)

Bethel (CIN-4)
Krody, J. L. (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. (A)

Boardman (AKR-4)
Dustman, H. C. (M)

Bowling Green (TOL-4)
Synnamon, J. H. (M)

Brecksville (CLE-4)
Brooks, R. C. (A)
Butler, A. H. (M)
Cegusich, J. E. (A)
Cull, R. R. (M)
Hopwood, A. M., Jr. (VA)
La Moreaux, D. D. (A)
Nace, A. S. (SM)
Stelig, S. V. (M)
Ulrich, J. F. (SM)
Weaver, J. H. (M)

Brooklyn (CLE-4)
Andrews, F. C. (A)

Brookville (DAV-4)
King, H. B. (SM)

Cambridge (PIT-4)
Zumkehr, J. L. (A)

Campbell (AKR-4)
Klimko, C. A. (A)

Canton (AKR-4)
Arnold, E. N. (SM)
Becher, W. D. (M)
Burtner, R. L. (SM)
Coppock, R. A. (M)
Greene, F. L. (M)
Greenham, R. L. (M)
Jameson, W. B. (A)
Koenig, J. (M)
Lacey, H. L. (A)
Leist, L. G. (M)
Lobb, R. V. (A)
Penniman, I. B. (M)
Rudolph, R. H. (M)
Walker, N. S. (VA)

Cedarville (DAV-4)
Marshall, R. C. (M)

Centerville (DAV-4)
Gulden, E. V. (SM)
Rineer, I. (A)

Chagrin Falls (CLE-4)
Berlincourt, D. (M)
Bird, J. R. (SM)
Dornbos, L. J. (M)
Gehman, J. B. (M)
Kilroy, J. W. (M)
McConnell, H. M. (M)
Saint-Amour, J. D. (A)
Shields, E. T. (A)

Chardon (CLE-4)
Frenk, D. R. (A)
Saint-Amour, P. M. (A)

Chesterland (CLE-4)
Mette, R. J. (M)
Sallach, M. E. (SM)

Cheviot (CIN-4)
Spinner, L. N. (M)

Chillicothe (CIN-4)
Bain, T. D., Jr. (A)
Friedman, D. W. (M)
Pulliam, P. E. (M)

Cincinnati (CIN-4)
Adams, M. M. (M)
Ahrends, S. W. (M)
Apgar, R. R., Jr. (M)
Ashman, A. B. (M)
Ayers, N. E.(M)
Baird, C. W. (A)
Banan, F.B. (A)
Bass, H. (SM)
Bass, L. (SM)
Bauer, H. A. (M)
Baylor, A. D. (SM)
Berberich, R. J. (A)
Bereskin, A. B. (SM)
Berg, D. F. (M)
Bielka, R. P. (SM)
Bingham, T. V. (A)
Blair, D. (A)
Bolt, A. T., Jr. (A)
Boothe, A. M. (SM)
Bopp, C. (SM)
Bowling, J. C. (M)
Bradtmiller, R. W. (A)
Bratt, M. J. (A)
Brent, P. (A)
Breunig, W. H. (A)
Briles, W. F. (M)
Brouse, H. L. (SM)
Browde, A. (M)
Brown, D. L. (A)
Brown, H. K. (A)
Burnett, L. A. (M)
Burrer, G. J. (M)
Burton, F. E. (A)
Bussard, E. J. H. (SM)
Butterworth, G. S. (A)
Campbell, D. J. (A)
Campisano, F. J. (M)
Carlton, E. O. (A)
Carver, J. G. (M)
Cavanaugh, H. D. (A)
Charlton, A. E. (A)
Chope, R. E. (A)
Clemens, J. F. (SM)
Cobb, R. B. (A)
Collins, J. T. (A)
Congdon, K. P. (M)
Conklin, H. A., Jr. (M)
Cook, H. L., Jr. (M)
Dale, W. (A)
Dalins, I. (M)
Dapper, J. C. (M)
Darling, R. E. (A)
Davison, F. A. (M)
Decker, H. (M)
De Lorenzo, V. H. (A)
De Voll, J. L. (M)
Diehl, J. A. (A)
Diltz, A. E., Jr. (M)
Doctor, B. (M)
Doerr, W. H. (A)
Dooley, E. B., Jr. (M)
Durnell, R. S. (A)
Dutton, C. E. (VA)
Eichenberger, N. F. (M)
Einbinder, L. W. (A)
Emmerling, E. J. (M)
Engelmann, R. H. (SM)
Fenstermacher, A. L. (M)
Fleishman, W. S., Jr. (M)
Fortier, R. E. (M)
Frommer, J. C. (SM)
Gamble, E. H. (SM)
Garvin, C. W. (A)
Geoghegan, J. P. (A)
George, P. H. (A)
Georger, L. J. (A)
Gieringer, C. K. (SM)
Ginn, C. R. (M)
Glaser, P. F. (M)
Goode, J. P. (M)
Graves, J. A. (M)
Grosse, R. H. (A)
Gruber, J. R. (SM)
Haehnle, C. G. (SM)
Harmon, C. J. (M)
Hartel, W. R. (M)
Hayflick, R. M. (M)
Heinzelman, G. J. (M)
Helsing, C. R. (A)
Heller, E. A. (A)
Helmlieckel, T. A. (M)
Hentz, E. G. (A)
Herb, A. P. (A)
Herrin, C. B. (M)
High, L. A. (A)
Himes, H. D. (M)
Hoeltge, E. J. (A)
Hogan, C. M. (SM)
Holst, P. G. (SM)
Holub, P. E. (A)
Hosea, R. A. (M)
Humphrey, W. R. (A)
Hundley, T. C. (M)
Hunter, W. F. (M)
Inderhees, J. A. (M)
Jenkins, R. A., Jr. (M)
Johnson, C. W. (A)
Johnson, P. C. (M)
Johnson, W. C. (M)
Johnston, J. B., Jr. (M)
Jones, E. M. (M)
Joyce, K. J. (M)
Kaesemeyer, W. W. (M)
Kamp, F. S. (M)
Kaufman, B. A. (A)
Kelling, D. G. (M)
Kennedy, D. D. (M)
Kibby, J. R. (A)
Kidwell, E. W., Jr. (A)
King, F. W., Jr. (SM)
Kiss, J. S. (M)
Kline, A. J. (A)
Knoblaugh, A. F. (SM
Koehring, N. G. (A)
Lambert, R. (SM)
Lambert, V. L. (M)
Lathrem, L. R. (A)
Lehman, R. H. (A)
Lehnhoff, R. G. (M)
Lenk, H. H. (M)
Lepple, H. (M)
Linblad, T. N. (M)
Lorah, P. W. (M)
Luhn, P. J. (A)
Lynn, G. A. (A)
Martin, D. W. (F)
Mast, C. E. (M)
Mather, T. S. (M)
McDonald, J. M. (SM)
McGregor, M. A. (A)
Mentink, A. F. (M)
Mesel, E. (M)
Meyer, A. (SM)
Meyer, B. W. (M)
Meyers, D. V. (A)
Mika, J. J. (M)
Miles, V. J., Jr. (M)
Montgomery, W. D. (SM)
Murray, J. W. (M)
Myers, R. D. (A)
Nason, D. B. (SM)
Nathan, R. (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)
Syberg, L. V. (A)
O'Connell, R. E. (A)
Ohmart, P. E. (M)
Osterbrock, C. H. (M)
Overman, J. (A)
Paluthe, W. F. S. (M)
Plogsteit, A. E. (M)
Pohlman, R. A. (A)
Price, H. J. (SM)
Quitter, J. P. (SM)
Ragen, J. R. (A)
Rakel, R. H. (A)
Ransom, G. B. (M)
Raso, F. A. (M)
Reardon, R. A. (A)
Reher, R. R. (A)
Richelieu, C. C. (M)
Rockwell, R. J. (F)
Rowe, S. (M)
Ruppel, D. (A)
Sanders, H. E. (A)
Sanneman, R. W. (M)
Sasser, T. (A)
Schenck, R. L. (M)
Schimmer, R. P. (M)
Schmittou, C. J. (M)
Schneider, W. M., Jr. (M)
Schroeder, W. R. (VA)
Schumacher, T. J. (A)
Schutz, G. C. (SM)
Schwarz, H. G. (M)
Scott, V. L., Jr. (M)
Selchter, K. R. (A)
Seward, G. J. (M)
Seyfried, J. E. (A)
Shadley, F. C. (A)
Shaw, C. B., Jr. (M)
Sheridan, C. J. (M)
Shirk, W. B. (SM)
Sinclair, R. R. (A)
Smith, T. J. (A)
Smith, D. L. (M)
Spayth, J. (M)
Staab, P. C. (A)
Stacy, R. A. (SM)
Stegman, T. E. (A)
Stephens, T. C. (SM)
Stewart, A. (M)
Stuhlbarg, S. M. (M)
Stupp, R. L. (M)
Taylor, G. O. (SM)
Taylor, W. S., Jr. (M)
Thompson, J. E. (M)
Timperman, E. J. (M)
Topmiller, C. H. (VA)
Tupman, L. M. (M)
Turrell, R. M. (M)
Tyberg, A. H. (M)
Vandoch, S. C. (A)
Verkley, R. M. (M)
Ward, D. L. (M)
Weaver, C. W. (M)
Weber, C. E. (M)
Wedig, F. L., Jr. (SM)
Westerland, K. I. K. (M)
Wetz, R. H. (SM)
Whatley, R. L. (M)
White, N. (A)
Whitney, R. L., Jr. (A)
Whittington, R. C. (M)
Williamson, G. F. (M)
Wilson, H. J. (A)
Wilson, J. W. (M)
Winkle, L. (M)
Winter, C. F. (M)
Wisner, R. M. (SM)
Wissel, F. A. (SM)
Woestman, J. W. (M)
Wood, J. J. (A)
Woodcock, C. A. (M)
Wyzenbeek, A. (A)
Zimov, L. R. (SM)
Zohar, S. (A)

Circleville (COL-4)
Welsh, R. D. (A)

Cleveland (CLE-4)
Ackerman, E. K. (SM)
Anderson, C. R. (M)
Anderson, F. D. (A)
Banshak, W. G. (A)
Begun, S. J. (F)
Bickley, E. B. (A)
Bletcher, A. L. (M)
Bolz, R. W. (A)
Braschwitz, H. J. (M)
Briggs, R. F. (M)
Brincka, J. J. (M)
Broudy, R. M. (M)
Buchspice, J. E. (A)
Burhans, R. W. (A)
Campbell, L. H. (M)
Carson, J. W. (A)
Caskey, H. B. (M)
Cerveny, W. J. (SM)
Chakerian, R. (M)
Chapa, J. (A)
Chase, W. H. (SM)
Christiansen, M. E. (A)
Chulick, C. M. (M)
Cleary, R. E. (A)
Cobb, H. F. (A)
Crows, H. (M)
Crozier, R. W. (A)
Dambach, R. A. (SM)
Dambach, T. F. (M)
Dannemiller, J. R. (M)
Davison, B. (M)
De Lany, R. H. (SM)
De Paradowsky, T. (M)
Deunk, R. K. (A)
Didinger, G. H., Jr. (M)
Dittenberger, R. J. (A)
Dittoe, R. E., Jr. (M)
Dowling, E. C. (A)
Edstrom, B. G. (A)
Elmendorf, D. E. (M)
El-Sabbagh, H. H. (M)
Ewashinka, J. W. (M)
Farr, H. J., Jr. (M)
Fisher, H. F. (VA)
Frankel, B. L. (M)
Frederico, B. D. (M)
Freeze, R. C. (A)
Friedberg, M. R. (SM)
Gardiner, R. A. (SM)
Gardner, W. H. (A)
Gelirke, E. P. (M)
Geiger, D. L. (A)
George, E. W. (A)
Gerhan, C. F. (M)
Germano, C. P. (SM)
Gerner, R. J. (M)
Gibson, C. B., Jr. (A)
Gilbert, L. J. (M)
Gogia, J. K. (A)
Goodman, R. (M)
Gotschall, G. D. (M)
Grace, C. H. (A)
Granger, L. V. (M)
Grasson, W., Jr. (A)
Grossman, H. (A)
Haas, M. L. (M)
Hamann, K. R. (M)
Heller, H. H. (SM)
Henkel, G. R. (A)
Hickok, R. D. (SM)
Hill, J. S. (SM)
Hotchkin, E. E. (M)
Howard, R. M. (A)
Humphrey, A. J. (M)
Inada, G. (A)
Jackson, W., Jr. (M)
Jaffe, H. (SM)
Jira, J. W. (M)
Karalukas, J. (A)
Kazarian, K. (M)
Kennedy, E. D. (SM)
Kinkaid, J. C. (A)
Kilvans, N. R. (M)
Klock, H. F. (M)
Krall, W. F. (M)
Krasnican, M. J. (A)
Krausz, A. (SM)
Kres, A. J. (M)
Ladlen, H. N. (M)
Lannan, P. E. (SM)
Leemon, W. (A)
Little, H. (A)
Lomaz, J. (A)
Louis, W. B. (M)
Ludwig, S. (M)
Luehring, E. L. (A)
Lund, W. E. (A)
Lungo, A. (M)
Lynch, T. E. (M)
Marsal, P. A. (M)
Martin, E. E. (M)
Martin, J. R. (M)
Mazur, E. F. (A)
McCollister, D. R. (M)
McCormick, J. R. (M)
McNeel, E. L. (A)
Melkonian, H. A. (M)
Mentzer, P. K. (M)
Mergler, H. W. (M)
Misek, A. F. (M)
Molnar, S. (A)
Monaghan, K. J. (A)
Moravek, E. J. (A)
Morrow, L. A. (M)
Murray, J. (A)
Myers, J. F. (M)
Nash, H. C. (M)
Naylor, A. F. (M)
Newborg, D. (M)
Oestermeyer, C. F. (A)
O'Hearn, W. F., Jr. (A)
Pearson, D. M. (M)
Pettus, R. (A)
Piwonka, G. (M)
Plakadis, A. P. (VA)
Plalsted, R. J. (M)
Post, R. H. (M)
Potter, N. M. (VA)
Praglin, J. (A)
Pulaski, M. E. (A)
Reash, C. W. (SM)
Reiches, S. L. (SM)
Rittenhouse, J. W. (SM
Rodgers, C. V. (M)
Roeger, R. E. (M)
Saby, J. S. (SM)
Saltzer, C. (M)
Sanders, N. D. (A)
Sanderson, J. K. (M)
Schneider, F. (A)
Schuler, R. G. (SM)
Schwager, A. C. (M)
Seaton, G. (A)
Seelig, S. F. (M)
Seldner, K. (M)
Semenhuk, M. H. (A)
Seybold, J. F. (A)
Sharp, F. R. (M)
Sherman, K. S. (SM)
Sindelar, E. E. (A)
Snedeker, M. L. (SM)
Sollock, L. (A)
Sommer, C. J. (A)
Spears, W. F. (SM)
Stafford, K. E., Jr. (M)
Stoffel, L. L. (A)
Thayer, J. W. (M)
Thomas, G. E. (M)
Till, W. C. (M)
Todd, A. W. (A)
Tonelch, S. V. (M)
Uguccini, O. W. (M)
Wagenhals, E. R. (M)
Wells, M. (M)
Whalen, J. A. (A)
Whalen, P. P. (A)
Whittaker, B. H. (M)
Wickenden, H. R. (A)
Wilson, W. H. (A)
Wise, D. S. (SM)

Wood, R. M. (M)
Wozniak, A. J. (A)
Zelle, J. F. (SM)
Zschock, B. W. (A)

Cleveland Heights (CLE-4)
Baerwald, H. G. (SM)
Cohen, D. Z. (M)
David, B. W. (SM)
Edling, E. A. (A)
Froelich, R. W. (M)
Gibson, J. L. (M)
Glauberman, L. (A)
Hooper, J. R., Jr. (M)
Hudson, A. E. (M)
Kochlitz, W. E. (M)
Lewis, A. M. (M)
Manring, J. M. (M)
Mattiat, O. E. (SM)
Newman, H. B. (M)
Paston, R. G. (M)
Pierce, D. E. (A)
Scott, E. P. (M)
Shearer, R. L. (M)
Shepherd, B. R. (M)
Smith, C. E. (F)
Tame, J. S. (M)
Westbrook, R. D. (M)

Columbus (COL-4)
Anthony, G. E. (M)
Antonevich, J. N. (M)
Bacon, J. (M)
Baeumler, H. W. (M)
Bailey, R. J. (A)
Bauer, W. (M)
Beer, A. C. (M)
Benedict, G. R. (A)
Berkovec, J. W. (A)
Blessing, H. L. (A)
Bohannan, R. C. (M)
Boone, E. M. (F)
Boyers, J. S. (SM)
Bulman, W. E. (SM)
Carr, M. G. (M)
Carter, C. J. (M)
Chapman, C. M. (M)
Chope, H. R. (SM)
Chope, W. E. (SM)
Clymer, A. B. (M)
Cohen, D. (M)
Conlon, R. J. (M)
Cook, E. E. (M)
Cooper, R. S. (A)
Cornetet, W. H., Jr. (A)
Cosgriff, R. L. (SM)
Crow, W. F. (M)
Damon, E. K. (A)
Dawirs, H. N. (SM)
Derrick, W. A. (M)
Dietzlweig, F. J. (M)
Dukes, J. R. (A)
Eastwood, W. J. (A)
Ellis, R. E. (A)
Emerling, R. A. (M)
Falkenbach, G. J. (SM)
Fragglotti, J. (A)
Francisco, G. E., Jr. (A)
Freundlich, J. J. (M)
Gahm, W. L. (M)
Gay, J. W. (M)
Guernsey, E. D. (M)
Habermann, C. L. (A)
Handel, N. E. (M)
Harcarufka, J. F. (M)
Harnar, R. K. (M)
Hayden, J. R. (M)
Higgy, R. C. (SM)
Hines, J. N. (M)
Hood, W. L. (M)
Hover, P. B. (A)
Hunter, H. H. (A)
Iwanowsky, A. (M)
Jacoby, G. R. (A)
Jaeger, J. H. (SM)
James, R. B. (A)
Jastram, P. S. (M)
Johnson, E. W., Jr. (M)
Jones, E. A. (M)
Kennaugh, E. M. (A)
Kennedy, P. (M)
Kirschbaum, H. S. (A)
Ko, H. C. (M)
Kouyoumjian, R. G. (A)
Kraus, J. D. (F)
Kreager, C. R. (A)
Kreis, R. J. (M)
Lackey, R. B. (A)
Larsen, W. L. (M)
Lawrence, G. M. (M)
Leonard, J. D. (M)
Levine, R. B. (M)
Levis, C. A. (M)
Linsk, L. (A)
List, B. H. (M)
Litterer, J. E. (A)
Masters, R. W. (SM)
Matyas, J. A. (A)
McFarland, R. S. (A)
McNichols, H. B. (A)
McPherson, G., Jr. (M)
Mendenhall, W. S., Jr. (A)
Merrill, R. L. (M)
Mitchell, J. P. (A)
Mochel, R. S. (A)
Moll, M. (A)
Mueller, G. E. (SM)
Muldowney, J. F. (A)
Myers, O. C. (M)
Nash, R. T. (A)
Orr, W. (A)
Pang, T. C. (A)
Paskell, E. (A)
Pattee, H. E. (A)
Perry, R. C. (A)
Peters, L., Jr. (A)
Plenkowski, E. C. (A)
Pierzchala, L. C. (M)
Radley, S. A. (M)
Reed, T. W. (M)
Rice, D. R. (M)
Richmond, J. E. (M)
Roehm, J. D. (A)
Schmidt, E. C., Jr. (M)
Schwartz, A. J. (M)
Sherwood, E. M. (M)
Sianti, W. (A)
Sloan, C. B. (M)
Spergel, P. (M)
Spero, A. F. (M)
Stapf, M. R., Jr. (A)
Stein, T. G. (M)
Stember, L. H., Jr. (A)
Stoutenburg, D. V. (A)
Tamplin, G. R. (M)
Thompson, H. E. (A)
Thurston, M. O. (SM)
Tice, T. E. (SM)
Tischer, F. J. (SM)
Tracy, R. C. (A)
Troyan, J. F. (A)
Truxall, F. W. (M)
Uenohara, M. (A)
Verbance, A. (A)
Walter, C. H. (M)
Ward, R. C. (A)
Warren, C. E. (SM)
Webster, R. E. (A)
Weimer, F. C. (M)
Williams, J. C. (M)
Wolf, F. A. (M)
Wright, R. B. (A)
Yaw, D. F. (M)
Young, D. A. (VA)
Young, G. W. (A)

Conneaut (BN-E-1)
Dvorsky, A. L. (M)
Friedner, G. E. (A)
Keskinen, A. R. (SM)
Morrell, C. A., Jr. (M)
Sanfield, W. (A)

Cuyahoga Falls (AKR-4)
Barkett, F. T. (M)
Bechtell, R. S. (M)
Burke, J. T. (SM)
Buynak, G. R. (M)
Chuma, N. (A)
Schultz, R. E. (A)
Corbett, H. W. (A)
Crosley, E. W., Jr. (A)
Davis, H. P. (A)
Diamantides, N. D. (M)
Dunn, H. (M)
Evans, D. C. (A)
Fanwick, C. (SM)
Flowers, H. L. (SM)
Fordham, C. E. (M)
Fromm, K. N. (M)
Geopfert, T. J. (M)
Glancy, D. R. (M)
Greene, H. R. (M)
Gnethlen, V. J. (A)
Hakes, T. H. (M)
Hellman, B. H. (A)
Hermann, P. J. (M)
Horwitz, G. (A)
Hurley, W. A. (M)
Ingalls, R. S. (M)
Kachurchak, C. (A)
Kelly, C. M. (SM)
Kult, M. L. (SM)
Lanier, H. F. (SM)
Machan, R. D. (A)
Manson, D. F. (M)
McCauley, C., Jr. (M)
Meneley, C. A. (SM)
Miller, R. F. (M)
Miller, W. W. (A)
Morrill, C. D. (M)
Olseen, E. E. (A)
Paxton, R. K. (A)
Powers, G. D. (SM)
Robinson, G. E. (M)
Rose, W. A. (A)
Schwarz, A. C. (M)
Shackelford, W. T., III (M)
Silitia, K. F. (SM)
Steiner, W. L. (M)
Sterling, F. M. (A)
Stringer, R. B. (M)
Toman, W. J. V. (M)
Trutko, J. M. (A)
Van Buskirk, W. J. (A)
Waldvogel, J. (M)
Welch, G. H. (M)
Yochelson, S. (M)

Dayton (DAY-4)
Adams, E. L. (SM)
Adamson, L. B. (M)
Agins, B. R. (A)
Ahalt, C. A. (M)
Aleo, J. (M)
Allen, F. W. (A)
Allison, G. R. (A)
Althouse, J. M. (SM)
Auriheim, O. C. (A)
Anderson, J. R. (M)
Anderson, J. R. (A)
Andrew, G. W. (SM)
Anselin, D. (M)
Arbuckle, R. D. (A)
Archer, R. F. (A)
Arenstein, G. H. (SM)
Arment, J. R. (A)
Ashby, G. L. (M)
Augustin, O. E. (M)
Aulbach, C. E. (A)
Bahret, W. F. (M)
Bange, D. A. (A)
Banta, F. D. (A)
Barker, W. J. (M)
Barkley, M. M. (SM)
Barrett, R. F. (A)
Bartman, H. M. (A)
Bebow, R. W. (M)
Becker, R. H. (A)
Belitz, H. G. (A)
Bernier, L. E. (M)
Blaier, M. (A)
Biddle, W. G. (M)
Birochak, E. (A)
Bissonette, A. G. (A)
Boarlo, W. R. (A)
Bockenstedt, P. J. (A)
Boedeker, H. F. (M)
Boehme, C. D. (A)
Boettcher, B. K. (M)
Bordewisch, J. F. (M)
Borgelt, E. H. (M)
Bornhorst, K. F. (M)
Botzong, W. B. (A)
Boyle, H. G. (A)
Braden, P. F. (A)
Braun, W. G. (M)
Braverman, N. (SM)
Brooks, M. (A)
Brothers, A. L., Jr. (M)
Brown, G. T., Jr. (A)
Brunnelly, J. J., Jr. (A)
Bruns, C. R. (M)
Bryan, C. R., Jr. (A)
Bryson, V. E. (M)
Budde, E. V. (A)
Buhl, W. T. (VA)
Burneka, C. R. (A)
Buxton, R. W. (A)
Byrd, E. W. (M)
Calhoun, R. P. (A)
Call, S. W. (A)
Carney, J. J. (A)
Carothers, F. S., Jr. (M)
Carpantier, V. J. (SM)
Carter, J. M. (A)
Caskey, O. G. (A)
Castanias, J. E. (SM)
Catanzarite, F. J. (A)
Catlett, L. (A)
Charbonneaux, W. A. (SM)
Charnock, L. J. (SM)
Cherpeski, R. P. (M)
Chong, B. (A)
Christianson, L. L. (M)
Clark, A. H. (M)
Clark, P. H. (SM)
Clark, R. R. (M)
Close, P. B. (A)
Clute, D. G. (M)
Cochran, E. V. (A)
Combs, J. A. (M)
Conrad, C. G. (M)
Coombs, C. C., Jr. (A)
Coons, R. J. (A)
Cooper, E. H. (SM)
Cooper, R. E., Jr. (M)
Copp, R. S. (M)
Correll, G. G. (M)
Couch, L. J. (M)
Couch, P. W. (A)
Courtney, R. L. (M)
Coy, R. J. (A)
Creyts, H. S. (M)
Curp, W. C. (A)
Cushing, W. J. (A)
Daugherty, D. J. (M)
Davis, C. H. (A)
Day, J. G. (A)
Decker, E. E. (M)
Deeken, J. W. (M)
De Fries, W. G. (A)
De Lung, J. G. (M)
Dennis, J. L. (SM)
Desch, J. R. (M)
Deyerle, C. D. (A)
Dicke, A. H. (M)
Dryden, E. H. (M)
Duckwitz, W. G. (SM)
Dunn, V. E. (M)
Easley, L. E. (M)
Eckert, C. C. (SM)
Elcan, W. C. (M)
Englert, R. W. (A)
Espers, W. C., Jr. (M)
Falk, D. B. (A)
Falkowski, A. J. (SM)
Falvey, J. L. (M)
Fassett, J. (A)
Fedotin, L. S. (A)
Feist, W. E. (SM)
Fensler, W. E. (M)
Ferguson, J. L. (M)
Finnigan, R. E. (M)
Finochiaro, J. J. (M)
Fischer, R. W. (A)
Fisher, P. A. (A)
Flaningam, L. A. (A)
Foreman, J. F. (M)
Fouse, G. F. (SM)
Framme, R. J. (SM)
Franklin, C. S. (SM)
Fraser, J. A. (A)
Fried, W. R. (A)
Friedman, H. (M)
Fulenwider, J. E. (M)
Fulton, W. L., Jr. (M)
Garling, H. R. (M)
Gauvey, M. P. (M)
Geis, J. H. (M)
Georgi, J. P. (SM)
Gerdes, C. C. (A)
Getty, J. N. (A)
Gibbs, L. L. (M)
Gibson, J. D. S. (M)
Giesecke, R. (A)
Gillis, E. L., Jr. (A)
Gilbert, D. F. (M)
Glan, G. (SM)
Glidewell, J. J. (M)
Glowa, D. S. (M)
Glushko, W. (A)
Godwin, S. J. (A)
Goldfarb, B. J. (SM)
Goldman, A. (SM)
Goldman, C. C. (A)
Goldsberry, P. E. (A)
Graebner, M. S. J. (M)
Gray, W. W. (M)
Greene, C. C. (A)
Griffing, B. L. (SM)
Grillmeier, E. J. (A)
Gross, E. H. (A)
Grove, H. M. (M)
Gusak, P. D. (A)
Hallman, L. B., Jr. (F)
Harmon, W. L. (M)
Harned, J. W., III (A)
Harnett, R. J. (A)
Harris, F. (SM)
Harris, J. E., Jr. (M)
Harrison, J. F. (M)
Hausen, D. K. (M)
Hauser, P. D. (SM)
Hayes, T. J. (M)
Hazen, R. R. (A)
Heffner, P. V. (A)
Helber, C. A. (M)
Helldoerfer, C. S. (M)
Hemler, C. E. (A)
Henderson, A. R. (SM
Henry, E. W. (M)
Hepler, J. W. (A)
Herzog, W. F. (A)
Heyd, J. W. (SM)
Hill, M. A. (M)
Hillabeck, D. M. (M)
Hilt, W. M. (SM)
Hines, H. H. (M)
Hirschfield, G. A. (M)
Hobstetter, J. P. (A)
Hoefle, R. R. (M)
Hollander, J. M. (M)
Hollinger, E. C. (A)
Holloway, F. L. (SM)
Horton, C. D. (A)
Hovey, W. J. (A)
Howard, D. F. (A)
Huckaby, J. H. (SM)
Huff, J. E., Jr. (M)
Hull, R. S. (SM)
Hunt, M. L. (A)
Husmann, F. W. (M)
Huster, L. W. (M)
Hutchinson, J. H. (A)
Ittelson, R. W. (SM)
Jacobs, M. (SM)
Jacobs, Y. (SM)
Jahren, A. S., Jr. (M)
James, R. R. (SM)
Javorsky, J. J. (A)
Jellison, K. A. (M)
Johannes, J. M. (SM)
Johnson, J. T. (M)
Johnson, D. A. (A)
Johnson, R. A. (M)
Johnston, E. F., Jr. (M)
Jones, H. L., Jr. (M)
Kaelding, D. (M)
Karabaich, F. (A)
Keans, J. H., III (A)
Hern, J. J. (M)
Kester, C. K. (A)
Kessler, C. W. (A)
Kester, W. C. (M)
Kester, R. E. (SM)
Keto, J. E. (F)
Kidd, G. H. (M)
Kienker, J. E. (M)
Killheffer, L. D. (SM)
Kimball, G. W. (M)
Kinnally, J. W. (M)
Kistner, R. (A)
Klein, W. (A)
Knight, A. R. (SM)
Kohler, E., Jr. (M)
Kohls, G. F. (M)
Kouri, F. G. (SM)
Kravitz, L. C. (A)
Kreitzburg, H. L., Jr. (M)
Krenzer, B. A. (M)
Kress, O. C. (M)
Kurtz, A. W. (M)
Ladd, E. L. (A)
Landreman, G. R. (A)
Langston, G. A. (M)
Lawson, S. A. (SM)
Leland, H. E. (A)
Lemmen, R. M. (M)
Lewis, D. E. (M)
Liska, R. W. (M)
Lisowski, E. M. (M)
Littell, C. C., Jr. (M)
Litwin, S. (A)
Lloyd, L. H. (SM)
Lockwood, G. C. (M)
Long, G. A., Jr. (M)
Long, R. E. (M)
Lord, A. S. (M)
Magill, J. J. (M)
Marcus, G. H. (M)
Marshall, C. J. (F)
Martl, N. F. (A)
Mawdsley, R. L. (SM)
McCormick, R. E. (SM)
McIlrath, R. J. (A)
McLaughlin, C. E. (M)
McLennan, M. A. (SM)
McKee, A. H. (SM)
Mehron, M. E. (A)
Mendelson, D. A. (A)
Metzger, J. A. (A)
Meuche, C. H. (M)
Meyer, G. B. (M)
Midgley, V. E. (A)
Miller, A. (M)
Moon, J. F. (A)
Moore, J. M. (M)
Morgan, D. E. (A)
Morrison, D. W. (SM)
Morse, B. K. (A)
Mountz, T. P., Jr. (M)
Moyer, D. F. (SM)
Mumma, R. E. (SM)
Munkasey, P. F. (M)
Murray, P. R. (SM)
Myers, R. P. (A)
Nelson, N. A. (SM)
Nierratheimer, P. H. (M)
Nordstrom, D. R. (M)
O'Connor, M. A., Jr. (M)
Ogar, G. W. (M)
Osborn, C. R. (A)
Ostrem, R. E. (A)
Overholser, W. E. (M)
Overholt, R., Jr. (SM)
Owen, H. W. (SM)
Pappas, M. J. (A)
Parker, A. J. (M)
Pasek, J. (A)
Pastori, D. F. (A)
Pennington, P. J. (A)
Perdzock, R. C. (M)
Peters, A. J., Jr. (SM)
Petit, A. H. (SM)
Pierce, W. R. (A)
Pirie, F. E. (M)
Pitinsky, L. (M)
Planchak, E. (M)
Pleshek, L. J. (SM)
Pokorny, J. J. (SM)
Porter, C., Jr. (A)
Quinn, R. E. (M)
Rawhouser, R. (M)
Regnier, L. A. (M)
Reinhard, E. E. (A)
Rezroat, L. D. (M)
Rice, K. J. (A)
Richards, E. L. (M)
Richards, M. V. (M)
Richard, P. R. (A)
Richmond, L. F. (SM)
Rogers, A. J. (SM)
Root, L. W. (M)
Root, R. A., Jr. (A)
Roschl, J. W., Jr. (A)
Rose, L. H. (SM)
Rothammer, W. H. (SM)
Rottenberg, M. J. (A)
Rounds, J. M. (A)
Ruble, H. E. (M)
Ruddell, E. E. (A)
Russ, F. J. (SM)

Deer Park (CIN-4)
Perry, G. W. (A)

Defiance (TOL-4)
Sherbno, J. C. (A)

Delaware (COL-4)
Poast, L. M. (M)

Doylestown (AKR-4)
Nuss, R. J. (A)

East Cleveland (CLE-4)
Howard, G. T. (A)
Serota, R. M. (SM)
Viton, E. J. (M)
Ward, D. O. (M)

East Lake (CLE-4)
Sawyer, B. (A)
Wassum, R. E. (A)

Elmore (TOL-4)
Bay, R. J. (A)

Elyria (CLE-4)
Finegold, I. (A)
Melli, E. J. (A)

Enon (DAY-4)
Hornseth, J. P. (M)
Jeffries, C. E. (A)
Garman, D. F. (A)
Makinson, G. E. (M)

Euclid (CLE-4)
Beaver, A. R. (A)
Biesla, S. J. (A)
Borland, R. P. (A)
Businger, K. A. (M)
Calderhead, H. J. (M)
Elze, R. P. (A)
Lewis, J. R. (M)
Mason, N. O. (A)
Nurmi, L. O. (M)
Schunemann, C. F. (M)
Stevko, P. J. (A)
Tapp, N. P. (A)
Trinkle, F. J. (M)
Wittlinger, H. A. (M)

Evendale (CIN-4)
Coe, G. J. (A)

Ewington (CIN-4)
Terry, L. B. (A)

Fairborn (DAY-4)
Anderson, H. L. (A)
Anderson, J. G. (A)
Archer, C. J. (SM)
Basham, R. S. (A)
Behane, D. (A)
Biales, K. (A)
Bowker, I. H. (A)
Carnahan, K. R. (A)
Chin, W. Y. (A)
Conway, B. B. (M)
De Camp, P. W. (A)
De Jonghe, J. J. (M)
Ebert, H. P. (A)
Emrick, B. S. (M)
Etheridge, L. R. (M)
Faust, R. L. (A)
Froehner, D. A. (A)
Green, W. M. (A)
Groszewski, D. J. (M)
Harlan, W. E. (A)
Haynes, G. L. (A)
Hines, C. A. (M)
Hybskmann, V. L. (A)
Johnson, G. L. (M)
Kohlmann, H. P. (A)
Lazur, E. (A)
Magee, T. H. (M)
Mayer, I. S. (SM)
McElroy, G. A. (M)
McLaughlin, I. L. (M)
Miller, F. P. (SM)
Miller, G. S. (M)
Milliron, J. R. (M)
Peterson, L. S. (M)
Price, L. R. (M)
Pyle, J. L. (A)
Rizos, J. G. (SM)
Sandefur, J. E. (M)
Schivley, G. W. (M)
Scott, J. E. (SM)
Skinner, E. E. (SM)
Smith, F. A. (A)
Sparks, R. S. (A)
Spengler, J. R. (A)
Stimson, J. S. (A)
Taylor, P. B. (SM)
Terrell, J. H., Jr. (M)
Turner, W. P. (A)
Vanderpool, H. D. (A)
Varga, M. J., Jr. (A)
Whitlock, R. S. (A)
Wilson, J. W. (M)
Wolaver, L. E. (A)
Woodka, C. J. (M)

Fairview Park (CLE-4)
Atkisson, E. A. (A)
Carne, E. B. (A)
Dailey, R. (A)
Dennison, G. L. (A)
Hoff, H. B. (M)
Rynkamp, J. H. (M)
Williamson, C. R. (M)

Findlay (TOL-4)
Smith, E. C. (M)
Veilleux, R. M. (M)

Foster (DAY-4)
Porter, J. R. (M)

Fostoria (CLE-4)
Leggett, E. P. (A)
Schalk, E. N. (M)

Fremont (TOL-4)
Leite, R. C. (M)
Swartzlander, G. W. (A)

Franklin (DAY-4)
Bryant, V. D. (M)

Gahanna (COL-4)
Daugherty, W. M. (M)

Galion (AKR-4)
Blashfield, W. H. (M)
Bledsoe, R. E. (M)
Brenton, G. P. (M)
Celsinger, W. W. (M)
Earley, N. B. (M)
Haferd, F. H. (M)
Kay, H. L. (M)
Kraepelien, H. V. (M)
Law, J. M. (A)
McQuade, E. J. (M)
Murphy, C. E. (M)

Galloway (COL-4)
Burgess, L. D. (M)

Garfield Heights (CLE-4)
Lind, R. P. (A)

Genoa (TOL-4)
Nitschke, N. C. (A)
Spencer, N. K. (M)

Germantown (DAY-4)
Burns, J. H. (A)

Glendale (CIN-4)
Deveney, J. D. (A)
Goff, K. W. (A)

Granville (COL-4)
Clark, J. V. (M)
Taylor, L. L. (M)

Greenhills (CIN-4)
Nelson, W. D. (M)

Grove City (COL-4)
Barbee, V. A. (A)
Birk, E. V. (A)

Hamilton (CIN-4)
Bange, J. B. (M)
Purdy, J. A. (A)
Stump, A. M. (M)
Sutphen, K. A. (M)
Wear, J. (M)
Willsey, R. H. (M)
Winkeljohann, A. (M)

Hicksville (TOL-4)
Applegate, H. E. (SM)
Culler, D. M. (SM)

Hilliards (COL-4)
Burgener, R. C. (A)

Holland (TOL-4)
Holmes, H. R. (A)

Hubard (AKR-4)
Baug, M. W. (SM)

Hudson (AKR-4)
Telcha, C. K. (A)

Huron (CLE-4)
Ellis, R. R. (M)
Wilber, B. E. (A)

Independence (CLE-4)
Jacques, G. E. (A)
Scott, R. J. (A)

Ironton (CIN-4)
Loftis, H. J. (M)

Kent (AKR-4)
Jarusek, R. D. (A)
Johnson, R. E. (M)
Kapur, K. N. (M)
Mathis, H. F. (SM)
Wightman, E. E. (M)

Kettering (DAY-4)
Plety, E. W. (SM)
Simopoulos, N. T. (A)
Strasser, R. A. (M)
Yoshida, H. (A)

Kingston (CIN-4)
Leasure, R. B. (M)

Lakemore (AKR-4)
Douglas, D. R. (A)

Lakewood (CLE-4)
Auth, L. V., Jr. (A)
Benkelman, G. F. (SM)
Christen, A. L. (M)
Flack, S. G. (M)
Hamman, G. B. (M)
Haner, L. (A)
Hart, C. E. (A)
Hodge, J. D. (A)
Mattern, R. M. (M)
Mokryzki, B. (M)
Phillips, W. E., Jr. (A)
Seetoo, T. F. (A)
Seielstad, H. D. (SM)
Tasch, A. (A)
Torsch, C. E. (SM)
Tudbury, C. A. (M)
Wagener, J. S. (SM)
Webner, R. D. (M)

Lancaster (COL-4)
Daubenmire, R. L. (A)
Good, J. A. (M)
Hudson, R. S. (A)
Magestro, J. C. (M)
Rado, J. A. (SM)

Lima (TOL-4)
Butler, J. A. (A)
McIlvaine, D. K. (M)
Ruck, G. T. (A)
Swiderski, E. F. (A)

Lisbon (PIT-4)
Catanzarite, V. O. (M)

Lockbourne AFB (COL-4)
Kindt, N. O. (M)

Londonderry (CIN-4)
Dearth, G. E. (M)

Lorain (CLE-4)
Coffe, S. A. (M)
Frost, E. C. (A)
Goodell, W. A. (M)
Heisner, D. A. (M)
Herrick, R. H. (SM)
Huge, H. M. (M)
Kauffman, H. C. (M)
Romoser, P. E. (M)
Yarmack, J. E. (SM)

Louisville (AKR-4)
Boudler, A. G. (A)

Loveland (CIN-4)
Hancock, H. E. (SM)
Kleinman, J. M. (M)
Loutzenhiser, C. F. (M)
Rabe, W. A. (A)

Lowell (PIT-4)
Farson, R. F. (A)

Lyndhurst (CLE-4)
Connell, M. (A)
Dalasta, F. (M)
Kammill, C. W. (M)
O'Gara, J. J. (A)
Spiller, H. A. (M)
Stevens, H. E. (M)

Madeira (CIN-4)
Ficek, J. A. (M)
Jacobs, A. (M)
Schneider, C. A. (M)

Mansfield (AKR-4)
Cassidy, R. J. (M)
Lamb, J. T. (M)
Miller, K. W. (M)
Stevens, W. C. (M)
Vadersen, C. W. (M)

Mantua (AKR-4)
Watson, R. D. (A)

Maple Heights (CLE-4)
Crail, A. C. (M)

Marietta (PIT-4)
Clark, C. E. (A)

Marion (AKR-4)
Davis, J. S., Jr. (M)
Jenkins, D. B. (M)

Martins Ferry (PIT-4)
Daubenmeyer, H. L., Jr. (A)

Mason (DAY-4)
Lantzer, F. N. (M)
Van Horn, J. E. (M)

Massillon (AKR-4)
Kish, J., Jr. (A)

Maumee (TOL-4)
Buannic, D. W. (A)
Molloy, G. P. (SM)

Mayfield Heights (CLE-4)
Karbo, D. J. (M)
Reilly, E. J. (A)
Yeager, J. R. (M)

Medway (DAY-4)
Glancy, C. H. (M)
Gunning, M. E. (A)
Ridenour, P. W. (M)
Soorin, A. J. (M)

Mentor (CLE-4)
Miller, E. O. (M)
Ryan, W. J. (A)
Wermelskirchen, L. M. (M)

Miamisburg (DAY-4)
Ballard, J. W. (SM)
Georgia, A. (M)
Gnagey, L. B. (M)
Schreiber, P. W. (A)

Middletown (CIN-4)
Crist, L. S. (A)
Wills, T. C. (A)

Milford (CIN-4)
Marsh, J. H., Jr. (A)

Minerva (AKR-4)
Dieringer, W. K. (A)

Mogadore (AKR-4)
Brown, D. L. (M)
Hall, W. S. (M)
Hann, D. D. (A)

Montpelier (TOL-4)
Ansley, W. G. (A)

Mount Vernon (COL-4)
Woodward, R. O. (M)

Monroe Falls (AKR-4)
Nickson, R. W. (A)

Napoleon (TOL-4)
Roessing, E. F. (M)

New Bremen (TOL-4)
Jung, D. H. (A)

New Carlisle (DAY-4)
Croner, A. J. (M)
Jeffers, G. N. (M)
Lewis, L. F. (A)
Lower, R. (SM)
Maxim, W. A. (A)
Wenger, F. E. (A)

New Washington (AKR-4)
Kreim, W. J. (M)

North Canton (AKR-4)
Gray, D. W. (M)
Haas, D. L. (A)
Miller, J. H. (M)
Stahl, M. D. (M)
Zurcher, L. A. (SM)

Northfield (AKR-4)
Parker, J. E. (A)

North Olmsted (CLE-4)
Bossard, G. L. (M)
Mull, H. R. (SM)

North Royalton (CLE-4)
Hulme, W. P. (A)
Hutton, W. G. (SM)

Norwood (CIN-4)
Brandenburg, P. J. (A)
Jordan, D. M. (VA)
Sang, W. W. (M)

Novelty (CLE-4)
Tucker, S. L. (M)

Oak Harbor (TOL-4)
Wott, H. W. (A)

Oakwood (FT-W-5)
Colwell, R. E. (SM)

Oberlin (CLE-4)
Gilford, S. R. (M)
Howe, C. E. (M)
Lawall, R. M. (M)
Young, M. L. (A)

Olmsted Falls (CLE-4)
Downer, E. W. (M)
Thomas, B. M. (A)
Wolfe, A. R. (M)

Ottawa (TOL-4)
Goodkin, S. S. (M)
Schoonover, D. J. (M)
Weideman, R. J. (M)

Oxford (CIN-4)
Teetzel, F. M. (M)

Parma (CLE-4)
Brainard, R. R. (A)
Dombrady, S. E. (M)
George, W. C. (SM)
Guild, E. G. (A)
Kyfes, V. (A)
Lippert, G. R. (SM)
Meiter, R. (A)
Oliverio, A. D. (M)
Rhodes, P. G. (M)
Schindler, R. W. (M)
Sommer, R. A. (M)
Tuma, W. S. (M)
Tunder, S. (A)

Parma Heights (CLE-4)
Brinkman, H. A. (M)
Chandler, J. A. (SM)
Ewart, J. M. (M)
Franks, C. V. (M)
Maciag, E. T. (M)
Schneider, R. F. (A)

Perrysburg (TOL-4)
Griss, C. H. (M)
Nalowski, J. G. (A)
Wilson, D. H. (M)

Phillipsburg (DAY-4)
Share, G. E. (SM)

Portage, (TOL-4)
Klopfenstein, L. R. (M)

Port Clinton (TOL-4)
Edwards, D. E. (A)
Morgan, W. O. (A)
White, W. L. (A)

Portsmouth (CIN-4)
Ryan, P. A. (M)

Ravenna (AKR-4)
Braden, W. V. (A)
Cory, R. W. (A)
Montgomery, W. M. (A)
Morton, R. F. (A)

Rawson (TOL-4)
Shumaker, R. E. (M)

Reading (CIN-4)
Ross, C. W. (SM)
Westmark, J. E. (A)

Rocky River (CLE-4)
Byrd, H. F. (A)
Craig, R. T. (M)
Stover, F. J., Jr. (A)

Roseville (PIT-4)
Allen, J. N. (A)

Rossford (TOL-4)
Perch, D. F. (M)

St. Clairsville (PIT-4)
Skoff, J., Jr. (A)

Sandusky (CLE-4)
Conlin, H. T. (A)
Fraser, R. J. (A)
Freyberg, J. A. (A)
Hummer, E. W. (A)
Kenyon, H. S. (SM)
Searle, L. M. (M)
Wild, J. H. (SM)

Shaker Heights (CLE-4)
Fields, I. L. (A)
Jones, A. F. (A)
Keithley, J. F. (SM)
Miller, H. J. (M)
Nunan, J. K. (M)
Pfaff, R. W. (M)
Seidman, S. M. (M)
White, G. M. (M)

Sharonville (CIN-4)
Gorker, G. E. (A)
Kerhulas, A. T. (A)
Woodbeck, R. J. (A)

Sidney (TOL-4)
Ulman, W. H. (M)
Wibel, D. (A)

Silverton (CIN-4)
Bertram, M. A. (A)

Smithville (AKR-4)
Amstutz, S. R. (M)

Springfield (DAY-4)
Baer, C. E. (SM)
Beedy, R. M. (A)
Bell, A. L. (SM)
Carey, R. M. (M)
Castillo, H. T. (M)
Cunningham, H. W. (A)
Davis, C. R. (M)
Hockman, P. E. (M)
Jones, T. G., Jr. (M)
Mims, J. H. (A)
Parker, A. J. (SM)
Pingel, N. D. (M)
Smith, L. A. (A)

Spring Valley (DAY-4)
Cunningham, R. F. (SM)
Hearsum, D. R. (M)
Horst, W. R. (M)

Solon (CLE-4)
Chevron, R. R. (A)

South Euclid (CLE-4)
Baskin, R. F. (M)
Louden, W. C. (M)
Monroe, R., Jr. (A)
Peterson, W. V. (A)

Steubenville (PIT-4)
McFeely, H. H. (SM)

Stow (AKR-4)
Andresen, G. J. C. (A)
Blocki, W. G. (A)
Donze, R. J. (A)
Fauss, G. C. (A)

Swanton (TOL-4)
Cunningham, T. R. (A)
Fabik, R. H. (A)

Sylvania (TOL-4)
Forman, H. R. (A)
Myers, O. J. (A)
Williams, R. B., Jr. (M)

Talmadge (AKR-4)
Farnsworth, N. B. (M)
Greenwood, R. E. (M)
Joost, A. E. (M)
Porter, D. D. (A)

Terrace Park (CIN-4)
Hudnall, J. U. (A)
Jordan, J. F. (F)

Tiffin (TOL-4)
Hartman, R. E. (A)

Tipp City (DAY-4)
Brodie, R. L. (SM)
Johns, M. W. (A)

Toledo (TOL-4)
Ambrose, J. (A)
Aufderheide, J. H. (A)
Beins, J. K. (M)
Bell, R. E. (M)
Benaman, R. W. (M)
Bitter, A. R. (SM)
Blomberg, P. E. (A)
Boudouris, A. (M)
Brillhart, M. F. (A)
Brown, W. W. (A)
Cameron, D. F. (M)
Chapman, L. B. (M)
Childers, R. F. (A)
Comer, J. W. (M)
Cousino, E. E. (M)
Diehn, R. J. (A)
Drescher, L. L. (M)
Dunne, C. J., Jr. (M)
Eash, G. H. (A)
Ewing, D. L., Jr. (A)
Galambos, J. G. (M)
Gramlich, H. F. (A)
Hanna, R. N. (A)
Hawley, F. S. (A)
Hedler, R. C. (A)
Herrick, K. P. (A)
Josenhans, J. G. (M)
Kearney, J. P. (SM)
Keck, M. (M)
Ketcham, A. R. (M)
Kirchenbauer, C. C. (SM)
Kitchen, F. J. (M)
Laker, F. J., Jr. (M)
Larson, G. (M)
Leuck, D. D. (M)
Lippmann, R. J. (M)
Marsh, R. H. (A)
Martin, O. J. (M)
Meeker, J. G. (A)
Melcher, R. J. (A)
Morrison, E. (A)
Murley, E. M., Jr. (M)
Netermyer, R. L. (A)
Neuert, H. L. (VA)
Patay, J. J. (A)
Petty, D. E. (A)
Pickens, H. V. (A)
Pierce, E. W. (M)
Rees, V. C. (A)
Reynolds, F. L. (A)

Rosencrantz, M. E. (M)
Rowe, H. N. (M)
Rynder, L. S. (M)
Schnell, W. S. (A)
Schoor, V. M. (M)
Sheckler, L. D. (M)
Shodiss, H. F. (M)
Simands, C. S. (M)
Spademan, C. F. (M)
Spring, L. K. C. (A)
Stringfellow, W. M. (SM)
Szymkowiak, E. (A)
Thorpe, C. R. (A)
Vincent, H. B. (SM)
Weeber, R. E. (M)
Wooster, W. H. (A)

Trotwood (DAY-4)
Helbig, E. M. (A)
Sadow, R. M. (A)

Troy (DAY-4)
Benedict, D. E. (A)
Schmidt, H. J. (M)
Sutton, G. L. (M)

Union (DAY-4)
Apple, R. C. (M)
Learish, H. B. (SM)

University Heights (CLE-4)
Brown, L. H. (A)
Goldfarb, J. (A)
Roth, M. S. (M)
Williams, H. C. (M)

Vandalia (DAY-4)
Davis, K. A. (A)
Dunn, F. S. (A)
Jakus, L. A. (SM)
Mayer, J. M. (A)
Park, J. P. (A)
Patrie, J. D. (A)

Van Wert (FT-W-5)
Conley, W. H. (M)
Lindsay, J. T. (M)

Vienna (AKR-4)
Williams, W. C. (A)

Wadsworth (AKR-4)
Jankowski, J. A. (M)
Rudolph, J. A. (M)
Stelgerwalt, O. L. (M)
Vaughan, T. J. (M)

Walbridge (TOL-4)
Corathers, C. N. (A)

Warren (AKR-4)
Atwood, W. L. (SM)
Ensall, T. (M)
Parlas, J. L. (SM)

Waterville (TOL-4)
Harris, E. L. (A)

Waverly (CIN-4)
Kinker, D. E. (A)

Waynesville (DAY-4)
Puterbaugh, W. H., Jr. (A)

Wellston (CIN-4)
Dye, F. R. (M)

West Carrollton (DAY-4)
Sonnanstine, E. H., Jr. (A)
Springer, L. D. (A)

West Chester (CIN-4)
Forbes, H. R. (M)

Westerville (COL-4)
Autery, R. M. (A)
Hodge, R. M. (A)
Pack, B. L. (M)

Westlake (CLE-4)
Albrecht, W. (M)
Fletcher, E. S. (SM)
Odell, M. P. (SM)

West Richfield (AKR-4)
Bear, N. (A)

Wickliffe (CLE-4)
McNeill, T. J. (A)
Schwaller, F. A. (M)

Willoughby (CLE-4)
Ferber, L. W. (M)
Petrarca, T. (M)
Sacha, R. J. (A)

Willoughby Hills (CLE-4)
Blauvelt, R. C. (SM)

Willowick (CLE-4)
La Joe, J. (M)
Martin, T. J. (M)
Mason, R. F. (A)
Rowe, L. R. (A)

Wilmington (CIN-4)
Gemmill, H. C. (A)

Wooster (AKR-4)
Mullen, H. P., Jr. (A)
Strock, R. E. (A)

Worthington (COL-4)
Clutter, E. C. (A)
Crane, N. B., Jr. (M)
Crooks, R. K. (SM)
Davis, W. C. (M)
De Vore, R. V. (M)
Kean, P. M., Sr. (A)
Martin, R. E. (M)
Roode, R. J. (A)
Van Buskirk, R. C. (A)
Wyler, E. N. (M)

Wright-Patterson AFB (DAY-U-4)
Baker, R. E. (M)
Bowker, R. F. (M)
Bretthauer, L. G. (M)
Brittain, J. F. (A)
Buckman, A. R. (M)
Burrus, W. R. (M)
Byrne, E. R. (M)
Chamberlain, W. S. (M)
Coward, R. W. (M)
Deegan, T. J. (A)
Donovan, P. R. (M)
Eiler, G. H. (A)
Ellopoulos, A. J. (A)
Ettredge, V. L. (M)
Francis, L. G. (M)
Gallagher, J. J. (M)
Garlington, A. R., Jr. (A)
Granville, R., Jr. (M)
Gregory, J. W. (A)
Gruber, C. W. (M)
Haneman, V. S., Jr. (M)
Hayes, R. L. (M)
Herman, J. H. (M)
Hesse, A. W. (M)
Hill, J. H. (A)
Hollander, K. W. (A)
Houpis, C. H. (M)
Hyer, H. C. (M)
Israel, L. J. (SM)
James, W. G. (M)
Janer, R. (M)
Jent, J. H. (M)
Jones, E. D., Jr. (M)
Jones, W. D. (M)
Kennedy, J. V. (A)
Kercher, R. B. (M)
King, J. D. (A)
Kram, W. P. (M)
Kuras, A. C. (M)
Lambert, J. P. F. (M)
Landon, R. B. (M)
Laycock, H. S. (M)
Lewis, C. H. (A)
Little, T. D. (A)
Lundquist, G. J. P. (A)
Macpherson, G. W. (A)
Martino, J. P. (M)
Matthews, A. R. (SM)
McCarthy, J. P. (M)
Mc Lean, M. H. (M)
Miller, S. K. (A)
Mulica, A. R. (M)
Nakamura, C. M. (M)
Netherwood, D. B. (M)
Oliveros, C. G., Jr. (A)
Peot, H. G. (A)
Reed, R. C. (M)
Reiss, M. H. (M)
Rice, B. J. (A)
Robertson, G. M. (A)
Rohlinger, D. J. (A)
Savino, L. J. (A)
Schulherr, R. M. (SM)
Schwartz, D. M. (M)
Shankland, D. G. (M)
Stern, T. E. (M)
Tom, H. (M)
Urbanski, L. J. (A)
Van Wechel, R. J. (A)
Walsh, J. D. (A)
Warner, E. R. R. (M)
Wilson, W. B. (A)
Winter, H. (SM)
Wright, R. K. (A)
Wright, T. O. (A)

Wyoming (CIN-4)
Bolenbaugh, R. K. (M)
Brueck, G. (SM)
Wahl, A. C. (M)
Walcher, J. F. (A)
Zupansky, M. (A)

Xenia (DAY-4)
Anderson, C. W. (VA)
Cox, H. L., Jr. (A)
Doran, R. J. (SM)
Doyle, C. E. (A)
Gearhart, J. J. (A)
Holt, T. (A)
Knight, L. B. (M)
Michaelson, B. L. (A)
Myszko, R. (A)
Noble, H. V. (SM)
Nordlund, R. J. (SM)
O'Brien, W. R. (M)
Waugh, R. E. (M)

Yellow Springs (DAY-4)
Aschbacher, S. J. (M)
Carr, D. L. (A)
Colbert, C. (SM)
Nosker, P. W. (SM)

Youngstown (AKR-4)
Carmichael, P. D. (M)
Cherpack, J., Jr. (M)
Conroy, M. J. (A)
Dieringer, F. A. (VA)
Hirt, A. J. (A)
Kikta, E. J. (M)
Nyberg, W. C. (A)
Phillips, R. G. (A)
Ross, N. V., Jr. (A)
Sauber, J. W. (M)
Small, J. P. (A)
Umbach, L., Jr. (M)
Wallen, A. C. (A)
Williamson, W. P., III (A)

Zanesfield (TOL-4)
Snyder, H. D. (A)

Zanesville (PIT-4)
Hatfield, F. A. (A)
Hunt, W. A. (M)
Thompson, C. O. D., Jr. (M)

OKLAHOMA

Ada (OC-6)
Dvorak, C. J., Jr. (A)

Altus (OC-6)
Braman, M. D. (M)

Anadarko (OC-6)
Hayes, J. T. (M)

Ardmore (OC-6)
Burke, B. (A)
Pryga, J. F. (A)

Bartlesville (OC-6)
Bondurant, J. E. (A)
Brashear, R. T. (M)
Dale, H. C. (M)
Freeman, L. R. (A)
Greening, J. P. (A)
Hensley, W. A. (M)
Johnson, E. W. (A)
Kindred, R. L. (A)
Owen, J. D. (A)
Piety, R. G. (M)
Walker, J. F. (M)

Bethany (OC-6)
Hill, W. M. (M)

Broken Arrow (TUL-6)
Crow, M. W. (A)
Smith, D. (A)
Tompkins, H. S. (A)

Coweta (TUL-6)
Higgins, H., Jr. (A)

Coyle (OC-6)
Shellhammer, O. K. (M)

Duncan (OC-6)
Copland, G. V. (M)
Hulme, J. R. (M)

Enid (OC-6)
Tennison, D. B. (A)

Fay (OC-6)
Conner, J. B. (M)

Fort Sill (OC-6)
Brown, B. W. (A)
Donaghy, J. F. (A)
Laprad, O. C. (A)
Margraf, W. A. (A)
Scott, G. C. (M)

Frederick (OC-6)
Jones, J. D., Jr. (SM)

Kinta (TUL-6)
Stowell, N. J. (M)

Lawton (OC-6)
Anderson, R. V. (A)
Jones, A. H. (M)
Wilson, H. D. (M)

Midwest City (OC-6)
Bierach, K. F., Jr. (M)
Boyd, W. L. (M)
Davis, A. C. (M)
De Rosa, G. D. (A)
Ferguson, J. W. (A)
Frey, W. A. (A)
Hansen, E. N. (A)
Headstrom, R. L. (M)
Hedson, H. D. (A)
Hutton, J. E. (M)
McDonald, T. K. (SM)
Melton, R. E. (M)
Moser, J. (M)
Rauscher, A. I. (M)
Raben, H. (A)
Villines, F. S. (M)
Weaver, T. H., Jr. (M)
Weisiger, J. M. (M)
Whybark, D. L. (M)
Wood, R. L. (M)

Muskogee (TUL-6)
Kring, C. I. (M)

Nicoma Park (OC-6)
Johnson, L. W. (M)

Norman (OC-6)
Brewster, A. H., Jr. (A)
Challenner, A. P. (SM)
Cook, K. W. (A)
Dorsett, L. G. (A)
Edwards, O. L. (A)
Farrar, C. L. (SM)
Green, B. B. (M)
Grubbs, C. E. (M)
Harp, C. E. (SM)
Puckett, T. H. (M)
Simmons, G. J. (M)
Tuma, G. (SM)
Vlay, J. (M)
Warren, J. D. (M)

Oklahoma City (OC-6)
Ashby, R. H. (M)
Asnicar, D. V. (A)
Barker, M. W. (M)
Barnett, J. E. (A)
Bastian, L. R. (M)
Battenburg, N. (M)
Black, E. (M)
Bolay, C. E. (A)
Bowen, L. M. (A)
Brown, R. W., Jr. (A)
Cherry, R. B. (A)
Clifton, J. L. (M)
Clinkenbeard, H. A. (M)
Costellow, L. H. (M)
Crippen, E. G. (M)
Cross, C. C. (M)
Daniels, C. L. (M)
Delbridge, J. D. (M)
Eastman, C. W. (M)
Easum, C. M. (M)
Ebner, W. H. (M)
Edlund, R. W. (M)
Faux, W. H., Jr. (M)
Fish, R. L. (A)
Foster, E. W. (M)
Gilmore, E. H. (A)
Glover, B. W. (M)
Graham, W. L. (A)
Hall, C. M. (A)
Hart, C. O. (M)
Herriott, J. K., Jr. (A)
Herrmann, F. (M)
Hilsabeck, D. A., Jr. (M)
Hines, J. W. (M)
Holaday, D. F. (M)
Holt, G. W. (SM)
Hurst, K. J. (M)
Jackson, F. L. (M)
Jackson, J. H., Jr. (M)
Kruger, K. W. (M)
Kuelne, A. (A)
Ledbetter, R. P. (M)
Lyons, E. F. (M)
Martinan, H. J. (M)
Martin, M. M. (M)
McGowan, C. W. (A)
McKinley, H. W. (SM)
Miller, I. S. (M)
Moore, R. E. (M)
Mueller, C. W. (SM)
O'Brien, E. G. (A)
O'Neal, R. K. (A)
Park, R. K. (M)
Phillips, H. E. (M)
Ramsey, O. B., Jr. (M)
Redding, P. B. (A)
Reynolds, J. (M)
Ricciotti, S. (M)
Rogers, A. L. (A)
Sheaffer, C. F. (VA)
Sober, V. (M)
Spooner, A. J. (M)
Sroufe, J. C., Jr. (A)
Stevens, T. W. (A)
Swenson, H. T. (M)
Sypherd, R. S. (M)
Thomas, M. W. (SM)
Wright, T. E. (M)
Zelinger, F. F. (M)
Zuhn, W. E., Jr. (M)

Okmulgee (TUL-6)
Miller, W. A. (A)

Paula Valley (OC-6)
Williams, F. G. (M)

Ponca City (TUL-6)
Brown, G. L. (M)
Conger, N. L. (A)
Doty, W. E. N. (A)
Fair, D. W. (M)
Flucard, W. B. (A)
Gray, R. T. (A)
Hall, M. L. (A)
Hewitz, L. G. (SM)
Moxley, S. D., Jr. (A)
Overall, G. J. (A)
Wann, L. D. (A)

Sand Springs (TUL-6)
Goatcher, H. Z. (A)
Koop, L. H. (A)
Stulken, R. D. (A)

Shawnee (OC-6)
Wells, E. W. (M)
Wood, G. J. (A)

Stillwater (TUL-6)
Buck, R. F. (M)
Cairns, T. W. (M)
Cameron, C. F. (M)
Fristoe, H. (SM)
Jones, H. L. (SM)
Kelly, R. D. (A)
Kobos, F. (A)
Koepsel, W. W. (M)
Labarthe, L. C. (M)
Lingelbach, D. D. (M)
Varbrough, L. A. (M)

Sulphur (OC-6)
Lewis, R. E. (A)

Tulsa (TUL-6)
Alexander, W. A. (A)
Allen, J. (A)
Atchison, R. L. (M)
Austin, R. A. (A)
Barnes, E. M., Jr. (A)
Biggs, M. A. (A)
Blackman, B. A. (A)
Born, W. T. (F)
Bowman, D. C. (M)
Broding, R. (SM)
Buck, J. H. (SM)
Buffum, C. E. (SM)
Burns, K. N. (A)
Burton, R. G. (M)
Bushnell, J. W., Jr. (A)
Care, W. G. (A)
Casey, J. L. (M)
Cheney, J. F. (M)
Childress, J. C., Jr. (A)
Cooper, J. R. (SM)
Cordell, L. B. (M)
Cordell, R. L. (M)
David, W. O. (A)
Davis, D. R. (A)
Day, C. E. (M)
Deming, J. M. (A)
Dennis, J. R. (A)
Dikmen, B. (M)
Donley, M. M. (A)
Drahelm, L. H. (M)
Dunn, C. S. (M)
Durham, E. R. (A)
Earthman, J. C. (M)
Elder, J. D. (SM)
Ewing, T. N. (M)
Favors, E. L. (A)
Ferguson, H. B. (M)
Ferguson, P. M. (M)
Field, H. S. (A)
Finn, R. S. (M)
Fisher, J. L. (A)
Fisher, R. B. (M)
Flury, H. E. (A)
Fouts, C. G. (A)
Freeman, F. R. (M)
Giles, C. S. (A)
Gilmartin, T. (SM)
Gladson, G. G. (M)
Green, G. C. (A)
Hadley, C. F. (SM)
Harper, F. N. (M)
Hart, R. N. (M)
Harts, W. G. (M)
Hawkins, J. E. (SM)
Hearn, D. F. (M)
Hibbard, H. C. (A)
Hollingsworth, R. B. (A)
Hooker, L. H. (A)
Hopkinson, E. C. (A)
Howell, W. R., Jr. (M)
Huber, A. J. (A)
Hunsicker, W. R. (M)
Hussey, C. V., Jr. (A)
Hutchinson, H. M., Jr. (A)
Irvin, R. G. (A)
Jacobs, G. G. (A)
Kammerzell, C. E. (A)
Kartman, D. J. (M)
Keller, B. H. (A)
Kenton, J. K. (A)
Kirby, R. A. (A)
Klemm, H. L. (M)
Koeppel, R. W. (M)
Laird, J. A., III (M)
Lang, H. M. (SM)
Lash, C. C. (SM)
Lippman, L. (M)
Lopez, J. (A)
Luong, V. B. (A)
Lynn, R. D. (M)
Mac Laughlan, G. S. (A)
Mahoney, E. H. (A)
Marshall, B. R. (A)
Martin, H. H., Jr. (A)
McCoy, B. F. (A)
McFarland, R. L. (M)
Miller, J. W. (SM)
Miller, R. A. (A)
Mitchell, R. W., Jr. (M)
Moon, C. L. (A)
Morrow, J. E. (M)
Newton, G. R. (SM)
Nichols, R. L. (A)
Norris, W. F. (A)
North, R. C., Jr. (M)
O'Brien, D. C. (M)
O'Reilly, G. A. (SM)
Orsak, A. J. (A)
Peterson, G. (SM)
Phillips, H. W. (SM)
Robinson, P. (A)
Roe, E. O. (A)
Schaefer, R. A. (M)
Shelton, H. C. (A)
Silverman, D. (F)
Smith, L. H. (A)
Sorge, W. A. (M)
Stover, E. B., Jr. (M)
Sutherlin, R. F. (M)
Sweeny, A. C., Jr. (A)
Swift, G. (M)
Sykora, G. E. (A)
Watson, R. E. (A)
Weinroth, S. A. (M)
Weir, J. R. (A)
Weldon, W. J. (A)
Westervelt, J. C. (A)
Whitlock, J. R. (A)
Wilcox, R. L. (A)
Willits, G. N. (A)
Wilson, B. F. (A)
Wolkov, D. (A)
Wood, G. A. (A)
Worley, W. C., Jr. (A)
Zenor, H. M. (SM)
Zimmermann, C. W. (M)
Zongker, R. C. (A)

Yukon (OC-6)
Rice, P. G. (M)

OREGON

Beaverton (POR-7)
Bishop, A. R. (M)
Calnon, D. C., Jr. (M)
Cooper, R. L. (M)
Gasser, C. D. (A)
Griffith, J. W. (A)
Jenkins, R. W. (M)
Kladke, W. F., Jr. (M)
Kobbe, J. H. (M)
Macpherson, C. H. (M)
Polits, W. J. (A)
Rice, R. G. (A)
Schmitt, W. L. (M)
Tinker, F. B. (A)

Condon (POR-7)
Hall, C. C. (M)

Corvallis (POR-7)
Albert, A. L. (F)
Ballard, B. J. (M)
Felkert, G. S. (SM)
Hunnicutt, A. L. (M)
Jensen, L. C. (A)
Michael, R. R. (M)
Stone, L. N. (M)
Stone, S. A. (A)
Toole, W. F. (M)
Yunker, E. A. (SM)
Weber, L. J. (M)

Eagle Point (POR-7)
Arens, W. E. (M)

Eugene (POR-7)
Balint, J. E. (SM)
Hoppe, P. R. (A)
Marchner, T. C. (A)
Surdam, E. L. (M)

Gresham (POR-7)
Nichols, J. S. (M)

Hebo (POR-7)
Barlow, R. F. (A)

Hillsboro (POR-7)
Scott, H. D. (A)

Hood River (POR-7)
Beauchamp, F. A. (A)
Morioka, P. K. (A)

OREGON

Klamath Falls (POR-7)
Cramer, K. H. (A)

Lake Grove (POR-7)
Peringer, P. (A)

Lakeview (POR-7)
Strong, D. E. (A)

McMinnville (POR-7)
Anderson, C. M. (M)
Bennett, S. D. (SM)
Brock, E. G. (SM)
Dyke, W. P. (M)
Sleeth, J. D. (M)
Strayer, R. W. (M)
Swarm, H. M. (SM)

Medford (POR-7)
Walker, V. G. (VA)

Oretech (POR-7)
Orrell, D. B. (M)

Oswego (POR-7)
Smith, D. E. (SM)

Philomath (POR-7)
Plunkett, D. T. (A)

Portland (POR-7)
Austin, L. C. (A)
Bailey, K. L. (A)
Bartch, H. (A)
Belusko, J. V. (A)
Bookwalter, L. S. (VA)
Broms, B. H. (A)
Brown, B. L. (A)
Brown, F. M. (M)
Carpenter, C. B. (SM)
Crayeraft, H. T. (A)
Cutting, W. A. (M)
Dallas, W. K. (SM)
Dannenmann, J. E., Jr. (M)
Davis, K. E. (A)
Davis, R. J. (A)
Day, J. E. (A)
Deardorff, R. W. (F)
Deer, J. W. (M)
Deford, J. F. (SM)
Doel, D. (M)
Donoghue, J. J. (M)
Easterday, R. B. (A)
Eastlund, L. C. (M)
Ellis, D. G. (A)
Ellis, P. V. (M)
Ellison, G. C., Jr. (M)
Erwin, J. A. (M)
Gard, J. J., Jr. (M)
Gert, E. B. (A)
Goard, R. W. (A)
Grossenbacher, A. C. (A)
Gotcher, A. W. (A)
Harmer, H. S. (A)
Hashizume, G. S. (M)
Heath, H. W. (A)
Hedrick, L. C. (SM)
Henderson, J. E. (A)
Hepp, D. F. (A)
Herren, R. A. (M)
Hollingsworth, K. M. (A)
Holtzman, M. (M)
Hood, F. D. (M)
Horseman, T. E. (M)
Jackson, F. E. (A)
James, T. W. (M)
Johnson, D. E. (SM)
Keyser, K. E. (A)
Koroch, L. R. (A)
Krausse, J. B. (A)
Leech, B. R. (A)
Liedtke, J. A. (A)
Looney, J. C. (M)
Lund, C. W. (SM)
Marihart, D. J. (A)
Marsh, W. E. (M)
McCann, F. H. (SM)
McFarland, B. N. (M)
McLennan, J. D. (A)
Meissner, E. R. (SM)
Mendora, D. C. (M)
Miller, F. E. (SM)
Miller, V. F. (A)
Morey, A. M. (M)
Morgan, M. L. (A)
Morin, L. A. (M)
Moulton, C. H. (M)
Murdock, M. J. (M)
Nelson, D. E. (A)
Newhouse, D. R. (A)
Nolan, C. A. (M)
Norby, M. E. (M)
Paul, B. R. (VA)
Peterson, R. M. (M)
Pittard, P. L. (M)
Pooley, R. R. (M)
Poulin, R. A. (M)
Quinn, A. C. (M)
Raupach, R. C. (A)
Reilly, J. A. (A)
Rhiger, R. R. (M)
Richardson, W. E. (M)
Riley, J. C. (M)
Ritter, H. C. (A)
Roberts, J. M. (SM)
Roberts, M. L. (A)
Rogers, E. J. (M)
Ropiequet, R. L. (SM)
Schiller, J. D. (A)
Schmitt, G. W. (A)
Scott, E. D. (SM)
Shantz, C. J. (A)
Single, E. P. (M)
Stell, J. L. (M)
Strain, D. C. (M)
Sweeney, P. M. (M)
Tabshy, S. J. (A)
Thompson, W. S. (A)
Thomson, A. (M)
Trump, W. E. (A)
Tunturi, A. R. (A)
Tyle, A. B. (M)
Vassallo, W. H. (A)
Vollum, H. (F)
Warchol, E. J. (M)
Weiss, L. S. (A)
White, L. C. (M)
Wilhelm, D. L. (M)
Winkler, L. R. (VA)
Worden, A. E. (A)

Salem (POR-7)
Purbrick, R. L. (M)
Stangland, D. E. (A)
Wane, W. M. (A)

Sherwood (POR-7)
Long, L. A. (M)

The Dalles (POR-7)
Curtis, H. T. (M)
Stuart, C. J. (M)

Tigard (POR-7) /
Kidd, D. E. (M)
Webber, W. B. (M)

PENNSYLVANIA

Abington (PHI-3)
Adams, K. (M)
Booker, R. W. (M)
Cramton, F. N. (A)
Dittrich, W. A. (A)
Forsyth, W. A., Jr. (A)
Gumas, G. (A)
Lounsberry, E. P. (M)
Remich, J. E. (A)
Schellenberg, P. J. (A)
Tarzian, V. (A)
Tait, W. F. (A)
Vantine, H., Jr. (SM)
Young, C. P. (SM)

Aldan (PHI-3)
Gahagan, J. R. (M)
Heacock, R. J. (A)

Allentown (P-LV-3)
Amron, I. (A)
Bolez, E. C. (A)
Bollman, J. H. (SM)
Bradford, C. E. (M)
Brydle, J. R. (A)
Buehler, P. R. (M)
Chaplin, N. J. (A)
Cordaro, C. F. (A)
French, L. F. (M)
Hansen, E. (M)
Hanson, F. E. (SM)
Herbert, N. J. (M)
Hines, M. E. (M)
Le Lacheur, R. M. (M)
Lisicky, A. J. (M)
Morton, W. B., Sr. (M)
Newhard, C. E. (M)
Paulsen, J. F. (A)
Purcell, R. H. (SM)
Roncl, V. L. (SM)
Savadelis, L. C. (M)
Simpson, A. D. (SM)
Stubner, F. W. (M)
Sutter, D. M. (A)
Szabo, W. (M)
Taylor, E. W. (M)
Taylor, R. R. (VA)
Tooker, H. A. (SM)
Von Ohlsen, L. H., Jr. (M)
Waltz, M. C. (SM)
Watson, H. A. (M)
Wetzburg, R. W. (A)
Young, C. S. (SM)
Zuk, P. (A)

Allison Park (PIT-4)
Joller, C. R. (A)
Mink, R. E. (M)

Altoona (PIT-4)
Burgoon, G. R. (A)
Cassidy, J. J. (M)
Erhard, J. L. (M)
Schwartz, E. (M)

Ambler (PHI-3)
Clark, G. F. (M)
Colussi, E. J. (A)
Conroy, J. F. (A)
Davidson, D. R. (A)
Dosch, V. F. (M)
Fanu, N. M. (A)
Gehman, P. A. (M)
Grablec, J. J. (M)
Hunicke, R. L. (M)
Kuzma, P., Jr. (A)
Loev, D. (A)
O'Meara, W. J. (M)
Reeves, W. E. D. (A)
Schoenberg, J. P. (M)
Simmons, C. D. (A)
Sommer, E. H., Jr. (M)
Swift, M. E. (SM)
Voorhoeve, E. W. (A)

Ambridge (PIT-4)
Djordjevic, M. Z. (M)

Andreas (PHI-3)
Zimmerman, E. A. (A)

Ardmore (PHI-3)
Brookfield, R. F. (A)
Cheng, T. (A)
Chu, J. C. (M)
Churchill, H. L. (M)
Fuller, L. C., Jr. (M)
Meyer, C. B. (M)
Norton, R. (A)
Oliver, G. A. (M)
Rothenheber, N. (A)
Zentgraf, J. A. (A)

Ardsley (PHI-3)
Schweiss, W. W. (M)

Ashley (PHI-3)
Barsdytis, A. F. (A)

Bakerstown (PIT-4)
Mag, A. (VA)

Bala-Cynwyd (PHI-3)
Baron, R. C. (M)
Callender, E. M. (M)
Eachus, L., Jr. (SM)
Friend, A. W. (F)
Kushner, E. E. (A)
Sunstein, D. E. (SM)
Steinberg, B. D. (A)

Bedminster (P-LV-3)
Moyer, L. K. (VA)

Bellefonte (CP-4)
De Barber, J. P. (M)
Glass, W. F. (M)
Holter, D. H., Jr. (M)
Lyon, C. M. (A)
Stevenson, F. R. (M)

Bentleyville (PIT-4)
Vertar, J. A. (A)

Bernville (PHI-L-3)
Gantert, A. (A)

Berwyn (PHI-3)
Andrews, B. I. (A)
Ballew, H. W. (SM)
Barnes, G. H. (A)
Brown, L. R. (SM)
Bullard, H. (A)
Caldwell, R. P. (A)
Deutsch, J. (A)
Hoberg, C. G. (SM)
Xenosian, H. (M)
Michaels, C., Jr. (A)
Murray, K. W. (M)
Phelan, L. T. (A)
Reid, C. R. (SM)
Schultz, M. A. (M)
Taylor, C. A. (SM)
Williams, K. J., III (M)
Youtceff, J. S. (M)

Bethel Park (PHI-L-3)
Ross, C. W. (M)

Bethlehem (PL-V-3)
Downing, H. L. (VA)
Embree, M. E. (A)
Gardner, E. E. (M)
Hattery, W. V. (M)
Karakash, J. J. (SM)
Larky, A. L. (M)
Lisle, J. (M)
McCracken, L. G., Jr. (SM)
Neith, E. F., Jr. (A)
Posivak, J. S., Jr. (M)
Stauffer, R. E. (M)
Wagner, R. E. (M)
Wahl, A. (M)
Williams, D. E. (A)

Blawnox (PIT-4)
Belinsky, O. A. (A)

Blue Bell (PHI-3)
Kieslich, W. G. (M)
Parnell, J. (M)
Van Name, J. M. (M)

Blue Ridge Summit (PHI-3)
Child, J. W. (M)

Boalsburg (CP-4)
Bennett, P. E. (M)
Harris, D. E. (SM)
Kaprocki, F. E. (A)
Smitley, C. R. (A)

Brackenridge (PIT-4)
Monnier, H. E. (M)

Braddock (PIT-4)
Zygmunt, H. J. (M)

Bradford (EMP-4)
Biss, M. W. (A)
Johns, S. E., Jr. (M)
McCann, R. W. (A)
McKnight, G. P. (SM)
Schermerhorn, F. G. (A)

Bridgeport (PHI-3)
Attarian, R. T. (M)
Cohen, M. (SM)
Dempster, B. W. (A)
Dix, T. S., Jr. (SM)
Galbraith, J. R. (A)
Gibson, H. C., Jr. (M)
Hand, G. C., Jr. (M)
Holeczy, A. A. (A)
Krell, A. I. (A)
Kutner, N. H. (M)
Longo, J. F. (A)
Meng, D. R. (M)
Millet, M. R. (M)
Payne, R. E. (SM)
Rosen, H. H. (SM)
Selinsky, J. J. (M)
Sweigart, A. S. (A)
Wellard, C. L. (A)

Bridgeville (PIT-4)
Le Loup, T. E. (SM)
Tury, S. F. (A)

Bristol (PHI-3)
Annett, M. E. (A)
French, C. G. (M)

Brookville (EMP-4)
Calvert, R. B. (M)
Emerick, L. C. (M)
Englehardt, W. K. (M)
Georgek, S. C., Jr. (M)
Porsch, A. W. (M)
Say, D. L. (M)

Broomall (PHI-3)
Beehy, E. W. (A)
Benn, R. E. (M)
Boonin, N. B. (M)
Dixson, S. B. (M)
Eells, W. A. (M)
Graham, R. W. (SM)
Gray, R. L., Jr. (A)
Mason, E. A. (A)
Mercado, P. D. (A)
Muroff, J. M. (A)
Picus, F. (M)
Presaedo, D. J. (M)
Streater, A. L. (M)
Thompson, L. G. (M)
Walkling, R. W. (A)
Wylen, J. (M)
Zechter, S. (SM)

Bryn Athyn (PHI-3)
Gyllenhaal, P. R. (A)
Simons, K. A. (M)

Bryn Mawr (PHI-3)
Bartlett, F. P. (M)
Bayer, W. L. (SM)
Brearley, W. H., Jr. (SM)
Dinackus, H. G. (A)
Gardiner, F. J. (SM)
Harman, G. E., Jr. (A)
Hertzberg, J. M. (M)
Kimp, H. D. (SM)
Marshall, J. N. (M)
Masterson, E. (M)
Peck, C. D. (SM)
Rawle, J., III (A)
Reich, A. L. (M)
Sumerlin, W. T. (SM)
Wu, H. H. (A)

Bustleton (PHI-3)
Just, G. A. (A)

Butler (PIT-4)
Hertz, K. L. (A)
Olmsted, R. W. (M)
Wakeman, C. B. (M)

Camp Hill (PHI-L-3)
Austin, R. C. (A)
Berry, J. D. (A)
Eisenhard, S. E., Jr. (M)
Green, R. H. (A)
Henry, A. T. (A)
Morris, G. W. (M)
Jolkovski, J. (M)
Peterson, R. K. (M)
Reisman, E. (M)
Sellers, R. E. (A)
Sponeybarger, J. O. (SM)

Canonsburg (PIT-4)
Sulkowski, E. L. (M)
Surman, G. R. (M)

Carbondale (PHI-3)
Finlon, J. J. (M)

Carlisle (PHI-L-3)
Fourlas, N. J. (A)
Hill, B. C., Jr. (SM)

Carlisle Barracks (PHI-L-3)
Hoffman, P. R. (SM)
Mann, C. W. (A)
Meyers, K. D. (M)
Rycsky, S. (M)
Samuelson, W. H. E. (M)
Spease, G. E. (A)
Van Gayree, R. L. (A)
Burke, A. L. (SM)

Carnegie (PIT-4)
Kinney, J., Jr. (A)
La Sota, L. S. (A)
Varussi, F. P. (A)

Chalfont (PHI-3)
Brenner, W. F. (A)
Curtis, C. T. (M)
Epperly, W. F., Jr. (M)
Rexon, L. (M)
Whallon, W. P., Jr. (M)

Cheltenham (PHI-3)
Beltramo, J. R. (A)
Gero, B. C. (A)
Himmer, F., Jr. (SM)
Hoagland, C. C. (SM)
Pinter, P. J. (M)
Sheldon, H. W. (SM)

Chester (PHI-3)
McLaughlin, J. A. (M)
Thorpe, W. H. (A)

Cheswick (PIT-4)
Hartley, R. R. (M)
Murray, D. W. (A)
Peters, J. E. (M)

Churchville (PHI-3)
Kirk, D., Jr. (M)
Sysko, S. J. (M)
Uphoff, F. B. (A)

Clarendon (EMP-4)
Haines, H. M. (M)

Clarks Summit (PHI-3)
Decino, A. (SM)
Franke, A. E. (M)
Thomas, J. E. (A)

Clearfield (EMP-4)
Bolton, S. W. (M)
Boyd, J. C. (SM)
Diehl, W. F. (F)
Hosoda, J. (A)

Clifton Heights (PHI-3)
Allen, G. P. (A)
Bradley, W. E. (A)
Eckersley, A. (A)
Lombardini, P. P. (A)
Merrihew, H. W. (M)
Werbickas, J. P. (A)

Coatesville (PHI-3)
Bell, W. I. (A)
Maris, E. H., Jr. (M)

Collegeville (PHI-3)
Burleigh, R. P. (M)
Kurgan, G. J. (A)
Messenger G. C. (A)
Collingdale (PHI-3)
Bass, S. (A)
Fritz, C. H. (A)
Thompson, G. H., Jr. (A)

Conemaugh (PIT-4)
Buriak, G. (A)

Conestoga (PHI-L-3)
Landis, C. G. (M)

Connellsville (PIT-4)
Sodano, R. D. (A)

Conshohocken (PHI-3)
Blumenthal, E. L. (M)
Florino, J. A. (M)
Gambone, L. A. (M)
McKenna, J. R. (A)
Milliken, E. N. (A)

Coopersburg (P-LV-3)
Hanson, G. H. (M)

Corapolis (PIT-4)
De Lutis, T. (M)
Williams, H. P., III (A)

Cornwells Heights (PHI-3)
Baskin, E. B. (A)

Coudersport (EMP-4)
Du Bois, A. F. (M)

Creighton (PIT-4)
Sherwin, G. W. (A)
Umbel, F. K. (A)

Croydon (PHI-3)
Erickson, M. L. (A)

Crum Lynne (PHI-3)
Dale, J. D. (A)

Curwensville (EMP-4)
Bowman, D. P. (M)

Cynwyd (PHI-3)
Follensbee, W. R. (A)
Polhemus, G. C. (A)

Dalton (PHI-3)
Knapp, A. J. (A)

Delphi (PHI-3)
Richard, C. D., Jr. (M)

Derry (PIT-4)
Shaffer, R. E. (A)

Devon (PHI-3)
Denk, W. E. (M)
Hauptli, J. T. (A)

Dickson City (PHI-3)
Ewanick, A. A. (A)
Syp, C. J. (M)

Dillsburg (PHI-L-3)
Zerby, A. B. (M)

Donora (PIT-4)
Grant, D. (A)

Downingtown (PHI-3)
Bittmann, E. E. (M)
Schwartz, B. (A)

Doylestown (PHI-3)
Benecke, H. O. (SM)
Biggs, J. A. (M)
Davis, R. W., Jr. (M)
Doelp, W. L., Jr. (A)
Gerlach, G. (SM)
Mulherin, E. M. (M)
Olson, E. G. (A)
Schweitzer, R. W. (M)
West, H. (M)

Dresher (PHI-3)
Ellis, W. G. (SM)
Spielman, H. (M)

Drexel Hill (PHI-3)
Berg, N. E. (M)
Boyajian, M. M. (A)
Brennan, J. B., III (M)
Dimmler, H. F. (A)
Ditkofsky, H. (M)
Enfiejian, E. A. (A)
Farrelly, R. J. (A)
Free, A. L. (M)
Geaney, K. E. (A)
Gensel, W. L. (A)
Haber, F. (M)
Leisenring, J. G. (A)
Ludwig, S. C., Jr. (A)
Marcovitz, M. W. (M)
Moore, W. L. (A)
Mural, F. (M)
Patch, R. J. (M)
Perna, F. J. (A)
Pitts, W. L. (SM)
Reickord, A. W. (M)
Rosenberg, H. (A)
Stobbart, A. J. (A)

Dubois (EMP-4)
Bley, L. H. (M)
Kunst, A. F. (M)
McGarvey, H. J. (M)

Duncannon (PHI-L-3)
Bryan, J. S. (A)

Dunlo (PIT-4)
Cimba, J. (A)

Dunmore (PHI-3)
Kelly, J. F. (A)
Reiner, C. (A)

Duquesne (PIT-4)
Laycak, J. F. (M)

East Lansdowne (PHI-3)
Clark, W. A. (A)

Easton (P-LV-3)
Berk, D. M. (A)
Conover, L. J. (SM)
Slavica, J. W. (A)
Smith, F. W. (SM)

East Petersburg (PHI-L-3)
Morrell, A. M. (M)

East Pittsburgh (PIT-4)
Coles, D. K. (SM)
Crawford, R. G. (M)
Malmberg, P. R. (M)
McDonald, J. (A)
Osbon, W. O. (M)
Rowe, W. D. (A)
Schneeberger, R. J. (SM)
Smith, C. H., Jr. (M)

East Plymouth (PHI-3)
Lee, F. F. (SM)

Eddington (PHI-3)
Uslin, L. T. (M)

Edgewood (PIT-4)
Beth, E. W. (A)

Elizabethtown (PHI-L-3)
Alger, P. B. (M)
Anderson, A. W. (M)
Boylan, R. T. (A)
Custer, H. M. (M)
McGowan, T. C. (A)
Orr, R. W. (VA)
Roland, C. E. (A)

Elkins Park (PHI-3)
Allen, M. M. (A)
Beck, C. (M)
Biernbaum, J. W. (A)
Block, E. (M)
Brown, H. B. (M)
Butt, S. P., Jr. (A)
Chang, S. Y. (M)
Gilman, H. (M)
Gollub, R. (M)
Gruen, H. (A)
Herrmann, J. E. (A)
Kansas, R. (SM)
Kirsch, A. L. (M)
Kraus, M. H. (M)
Krutter, H. (SM)
Nordlahl, J. G. (M)
Porter, H. F. (SM)
Rath, H. B. (M)
Rojas, R. R. (A)
Rothschild, L. L., Jr. (M)
Simon, W. (A)
Sink, J. A. (A)
Suckle, B. W. (A)
Vallfere, E. G. (A)

Elwood City (PIT-4)
Powell, K. F. (A)

Emmaus (P-LV-3)
Burcham, N. P. (A)
Ebers J. J. (SM)

Emporium (EMP-4)
Ackman, C. W. (A)
Ackman, H. E. (SM)
Baldwin, A. V. (SM)
Beeney, D. W. (M)
Bergdahl, R. F. (A)
Bisso, R. J. (M)
Boden, E. H. (SM)
Boots, W. K. (SM)
Brunner, G. V. (SM)
Buescher, W. E. (SM)
Burwell, A. C., Jr. (SM)
Campbell, V. H. (SM)
Cannizzaro, F. (A)
Carlstrom, T. H. (SM)
Clark, J. H. (M)
Clausen, R. P. (SM)
Cooley, R. M. (SM)
Curry, C. T. (SM)
Dander, D. A. (M)
Detweiler, J. E. (A)
Dolnick, A. L. (SM)
Douglass, C. F. (SM)
Dreuer, S. R., Jr. (M)
Erdle, P. J. (SM)
Fisher, L. R. (M)
Fromell, H. J. (A)
Gausman, C. R. (A)
Golin, E. F. (M)
Goodman, H. L. (M)
Gorman, V. R. (A)
Grubbe, V. P. (M)
Guild, R. D. (M)
Heitner, A. J. (M)
Hench, H. S., Jr. (M)
Hendrickson, C. C. (SM)
Herbert, H. W. (A)
Hesser, C. B. (M)
Humphreys, R. A. (M)
Kackauskas, J. J. (A)
Kamler, H. V., Jr. (M)
Keenan, C. H. (A)
Klineativer, G. H. (SM)
Lambert, R. L. (SM)
Lantzy, W. E. (A)
Maguire, L. R. (M)
May, W. L. (M)
McKain, J. L. (SM)
McNaughton, R. A. (M)
Meizer, H. (M)
Metzler, F. A., Jr. (A)
Mueller, W. P. (SM)
Murphy, W. A. (M)
Neuber, R. E. (SM)
Northrup, R. M. (A)
Overmier, E. E. (SM)
Palen, H. D. (M)
Palmateer, R. E. (SM)
Pawlikowski, S. L. (M)
Peterson, A. W. (SM)
Pope, L. A. (A)
Quint, G. L. (A)
Reitz, N. J. (SM)
Rishell, G. L. (SM)
Robbins, J. D. (SM)
Rolf, W. R. (SM)
Sassaman, P. H. (SM)
Schultz, A. J. (SM)
Sember, W. J. (M)
Simon, P. R. (M)
Slinkman, R. W. (SM)
Snyder, V. D. (M)
Songer, L. J. (M)
Stengel, E. S. (SM)
Tate, J. B. (M)
Teno, E. (A)
Vergason, D. L. (M)
Walsh, R. J. (M)

Erie (B.N.-E-1)
Anderson, R. H. (M)
Blakeley, F. J. (A)
Ciacchini, R. (M)
Davidson, A. R. (M)
Ehrman, P. B. (M)
Foster, J. H. (SM)
Gluck, F. (SM)
Gray, R. B. (SM)
Heibel, J. D. (M)
Herrick, H. S. (M)
Hestor, K. L. (M)
Hughes, W. E. (M)
Johnson, C. R. (M)
Klevans, W. L. (M)
Minnium, B. B. (SM)
Murray, W. J. (A)
Nedreski, R. J. (A)
Page, R. S. (M)
Palmer, J. E. (A)
Petroff, F. (A)
Presutti, B. D. (A)
Raub, L. A. (VA)
Rochin, D. W. (A)
Smith, D. H. (M)
Sterner, P. E. (M)
Steward, H. E. (A)
Taylor, G. P. (M)
Troy, P. L. (A)
Tuzmik, R. H. (M)
Van Arsdell, J. C., Jr. (M)
Werner, G. L. (M)
Windsor, R. T. (A)
Wolfskill, J. M. (M)

Export (PIT-4)
Jones, G. F., Jr. (M)
Kadak, E. (M)

Exton (PHI-3)
Reisener, W. C., Jr. (M)

Fairless Hills (PHI-3)
Prather, R. E. (M)

Farrell (PIT-4)
Perich, M. (A)

Feasterville (PHI-1)
Delling, H. W. (A)
Lofton, J. H. (M)
Thompson, R. L. (A)

Flourtown (PHI-3)
Bartels, H. C., Jr. (A)
Bruno, A. (M)
Chase, B. G. (A)
Spindler, C. W., Jr. (SM)

Folcroft (PHI-3)
Cunningham, W. G. (A)

Forest City (PHI-1)
Cawley, W. F. (M)

Fort Washington (PHI-3)
Brooks, F. E. (M)
Price, R. (A)
Schantz, J. S. (VA)

Frackville (PHI-3)
Cooper, E. J. (M)
Troyanoski, W., Jr. (A)

Fredericksburg (PHI-L-3)
Troutman, B. C. (A)

Freedom (PIT-4)
Swartz, F. E. (A)

Fullerton (P-LV-3)
Bartholomew, C. V., Jr. (M)

Gibsonia (PIT-4)
Haube, J. C. (A)

Gladwyne (PHI-3)
Dever, J. A. (M)
Eckert, J. P., Jr. (F)
Owings, J. L. (M)

Glassport (PIT-4)
Leib, F. E. (M)

Glen Mills (PHI-3)
De Prisco, C. F. (A)

Glenolden (PHI-3)
Killion, R. E. (A)
Stott, H. B. (M)
Teetsel, W. P. (A)
Tidd, T. J. (A)

Glenshaw (PIT-4)
Bruce, K. C. (M)
Horlbeck, W. E. (M)
King, P. F. (A)
Konnar, J. C. (M)
Suter, S. G. (M)
Van Nice, R. I. (M)

Glenside (PHI-3)
Anton, A. (M)
Bamford, H. S. (SM)
Benge, J. R. (VA)
Bobb, L. J. (M)
Bowman, J., Jr. (A)
Brown, D. G. (A)
Chedaker, J. (A)
Cooper, D. T. (VA)
Irwin, R. R. (A)
McCoskrie, D. (A)
Montgomery, A. P. (SM)
O'Neal, C. D. (M)
Stein, H. B. (SM)
Taylor, J. R. (M)
Wilson, H. R. (M)

Green Lane (PHI-3)
Rabb, J. W. (M)

Greensburg (PIT-4)
Baldwin, C. H. (SM)
Posted, N. P. (A)
Brown, R. E. (M)
Courty, C. H. (M)
Hornstein, M. B. (M)
Lannorte, M. F. (A)
Laskin, R. S. (M)
Little, D. R. (M)
Lynch, R. D. (M)
Weber, E. V. (A)

Gouldsboro (PHI-3)
Pelick, J., Jr. (A)

Gwynedd Valley (PHI-3)
Robinson, R. R. (A)

Hanover (PHI-L-3)
Rohrbaugh, P. A. (A)

Harrisburg (PHI-L-3)
Cothron, W. C. (SM)
Cramer, B. G. (M)
Harris, T. R. (A)
Heist, H. E., Jr. (A)
Holcombe, M. M. (SM)
Kelley, O. C. (A)
Middleton, W. W. (M)
Moretz, L. A. (M)
Peffer, R. M. (A)
Perry, C. L. (M)
Reitzel, C. I. (A)
Strickland, J. L. (M)
Whitley, J. H. (A)
Wiley, L. G. (M)

Hartsville (PHI-3)
Frekot, J. J. (M)
Herrmann, D. C. (M)
Snook, J. E. (M)
Wullert, J. R. (SM)

Hatboro (PHI-3)
Anderson, J. E. (A)
Ayers, J. E. (M)
Barry, J. (VA)
Bartik, W. J. (M)
Bristow, F. E. (M)
Brooks, C. E. (M)
Buscher, D. G. (M)
Butterfoss, E. J. (A)
Cole, W. G. (A)
Dietz, W. J. (M)
Doerfel, H. V. (A)
Fedde, G. A. (M)
Foley, T. J. (A)
Gelardi, M. (VA)
Gleiter, W. (M)
Godley, W. P. (A)
Greenfield, A. (SM)
Harrison, R. K. (M)
Hastings, J. A. (A)
Johnson, E. C. (SM)
Karevi, J. J. (M)
Knouse, R. H. (A)
Koos, E. E. (M)
Lichtenfels, J. L. (M)
Long, M. J., Jr. (SM)
Martin, H. B. (M)
Massey, T. J., Jr. (M)
McWilliams, C. R. (M)
Miles, T. J. (M)
Miller, R. L. (M)
Noll, E. M. (A)
Patterson, T. A., Jr. (A)
Penfield, A. W. (A)
Roechen, J. A. (M)
Sabor, J. (M)
Senulis, R. E. (M)
Spacle, R. W. (A)
Steele, E. R. (M)
Suter, H. (SM)
Swanson, C. I. (A)
Tiley, J. W. (SM)
Twist, G. A. (M)
Williams, G. C. (M)

Hatfield (PHI-3)
Insinger, R. H., Jr. (A)
Smith, D. J. (A)
Trinkle, W. S. (M)

Haverford (PHI-3)
Benham, T. A. (SM)
Carr, J. J. (M)
Crawford, A. L., Jr. (SM)
Schwennesen, D. (M)
Trotter, H., Jr. (SM)

Havertown (PHI-3)
Beck, J. J. (SM)
Bedrosian, S. D. (SM)
Chen, T. C. (SM)
Cole, C. T., Jr. (M)
Connalvi, A. L. (A)
Crawford, C. S., Jr. (A)
Crockett, J. G. (M)
Currie, A. H. (A)
Dearon, N. E. (M)
Devenny, C. F., Jr. (A)
Dougherty, J. W. (M)
Dytrt, L. F. (M)
Erdmanis, E. J. (A)
Eschner, A. H. (M)
Fink, E. A. (M)
Fulmer, J. W. (M)
Kanders, R. M. (M)
Kesar, O. A. (M)
Koch, J. F., Jr. (SM)
Koss, N. A. (M)
Ladenson, M. (A)
Lund, G. E. (A)
Margulies, H. H. (A)
Meyer, S. (M)
Miehle, W. (M)
Mustico, J. (A)
Palmer, G., Jr. (SM)
Rauscher, H. C. (A)
Robinson, C. W. (M)
Sabaroff, S. (M)
Sachs, A. F. (M)
Solon, H. (SM)
Titus, C. H. (A)
Wise, B. (A)
Witherspoon, J. M. (A)
Woll, C. F. (SM)
Zappacosta, A. D. (M)

Hazelton (PHI-3)
Campbell, H. L., III (M)
Gans, J. S. (A)
Steckert, J. W. (M)

Hellam (PHI-L-3)
Megargel, L. R., Jr. (M)
Swengel, R. C. (A)

Hershey (PHI-L-3)
Smith, E. C. (M)

High Spire (PHI-L-3)
Matthew, T. B. (M)
Miller, P. M. (M)
Wallis, C. L. (A)

Hilliards (PIT-4)
Boyd, D. B. (A)

Holicong (PHI-3)
Dulberger, L. H. (A)

Hollidaysburg (PIT-4)
Kilgore, W. (M)

Holmes (PHI-3)
Warner, H. (M)

Homer City (PIT-4)
Kenly, T. F. (M)
Ramaley, C. W. (M)

Homestead (PIT-4)
Cauley, T. K. (A)

Horsham (PHI-3)
Bucks, R. M. (A)
Christensen, H. E. (A)
Tremblay, H. G. (A)

Huntingdon Valley (PHI-3)
Angell, J. B. (M)
Boothroyd, W. P. (F)
Brady, P. B. (SM)
Erie, S. D. (M)
Freeland, E. C. (SM)
Greenwood, R. W. (M)
Hayward, J. W. (M)
Jensen, R. O. (A)
Matthews, A. C. (SM)
Moore, R. C. (F)
Munster, A. C. (SM)
Oliver, W. G. (M)
Riebman, L. (M)
Riester, H. A., Jr. (M)
Ruehlemann, H. E. (SM)
Thompson, M. L. (SM)
Vallette, C. N. (M)
Williams, M. A. (SM)

Indiana (PIT-4)
Collard, J. R. G. (M)
Graziadio, S. J. (M)
Hitchcock, R. C. (SM)

Irwin (PIT-4)
Brook, A. (A)
Heess, E. L. (A)
Kinder, H. R. (M)
Place, W. P. (M)
Rowe, I. (A)
Wagner, H. A. (SM)
Wissman, A. J. (A)
Wright, E. B. (M)

Ivyland (PHI-3)
Lee, W. S. (M)
Rogers, D. H. (A)

Jamison (PHI-3)
Fuchs, A. M. (M)

Jeanette (PIT-4)
Kilchel, O. D. (M)

Jeddo (PHI-3)
Kallessar, J. J. (A)

Jenkintown (PHI-3)
Barclay, F. T. (M)
Clark, W. R. (SM)
Cook, M. E. (M)
Drenchko, J. D. (A)
Frear, W. (SM)
Husband, R. E. (M)
Koehler, J. F. (SM)
Lanagan, J. G. (A)
Laurent, G. J. (SM)
Liebscher, A. (SM)
McClarren, R. H. (SM)
Overdeer, R. H. (M)
Peltz, W. J. (SM)
Stewart, G. H., III (M)

Jermyn (PHI-3)
Leonard, D. A. (A)

Jersey Shore (WIL-4)
Waite, G. C. (M)

Johnstown (PIT-4)
Campbell, T. E. (A)
Friedman, M. I. (A)
Kocsan, E. S. (M)
Lopresti, P. V. (A)
Podrasky, R. W. (M)
Shostek, R. E. (M)
Straub, N. L. (A)
Wood, J. E., Jr. (M)

Johnsville (PHI-3)
Benson, J. W., Jr. (A)
Collins, C. C. (A)
Nupp, W. D. (A)
Packard, A. C. (SM)
Vasaka, C. S. (SM)
Walker, H. R. (A)

Keiser (WIL-4)
Rainal, A. J. (M)

Kennerdell (PIT-4)
Smith, S. A. (A)

Kennett Square (PHI-3)
Taylor, E. J. (M)

Kersey (EMP-4)
Kirkpatrick, D. N. (SM)

Kingston (PHI-3)
Korlishin, L. (A)
Sakoski, C. (A)

Kutztown (PHI-L-3)
Sparacino, R. R. (M)
Tawney, G. L. (SM)

LaFayette Hill (PHI-3)
Anzalone, P. J. (M)
Bloomaburgh, R. A., Jr. (M)
Clifford, M. L. (M)
Halmowitz, B. (M)
Pitman, J. E. (M)
Scott, C. H., Jr. (A)
Zuck, R. A. (A)

Lake Ariel (PHI-3)
Grimditch, W. H. (SM)

Lake Lynn (PIT-4)
Shibler, W. (A)

Lampeter (PHI-L-3)
Damon, P. P. (A)

Lancaster (PHI-L-3)
Almond, W. R. (A)
Bedrosian, P. G. (A)
Beidler, R. T. (SM)
Bennett, W. P. (SM)
Bixler, R. T. (SM)
Block, F. G. (M)
Brackbill, C. R. (SM)
Brett, G. F. (M)
Burnett, C. E. (SM)
Burton, N. H. (A)
Class, J. S. (A)
Comins, A. W. (SM)
Craig, M. E. (M)
Doner, C. E. (M)
Dreyer, K. (SM)
Dyall, W. T. (SM)
Edel, R. R. (M)
Enck, F. D. (SM)
Engstrom, R. W. (SM)
Evans, J. (M)
Fendley, J. R., Jr. (A)
Forman, J. M. (M)
Free, J. J. (A)
Freund, W. H. (M)
Gadbois, G. S. (A)
Grimm, A. C. (SM)
Hagmann, R. W. (M)
Hammersand, F. G. (M)
Handel, R. R. (M)
Hansell, G. E. (A)
Hatzikyriakos, P. P. (M)
Headrick, L. B. (F)
Hershenson, L. H. (A)
Hillegass, H. N. (A)
Hoover, M. Y. (M)
Johnson, J. K. (SM)
Kaseman, P. W. (A)
Kazanowski, H. F. (M)
Kistler, R. J. (A)
Kolostyak, J. (M)
Kuzminski, H. W. (A)
Lemeshka, M. B. (M)
Mandell, G. E. (A)
Mark, J. T. (A)
Mathiot, J. E. (M)
McClure, D. E. (M)
McLaughlin, J. M. (SM)
McNees, S. G. (M)
McNickle, R. E. (M)
Mengle, L. I. (A)
Metzger, P. A. (A)
Miller, L. D. (A)
Moodley, H. C. (SM)
Morgan, M. B. (A)
Nekut, A. G. (SM)
Parker, W. N. (SM)
Powell, A. (M)
Quinn, J. L., Jr. (M)
Ransom, D. J. (M)
Reed, R. E. (A)
Rotow, A. A. (SM)
Schumacher, R. T. (M)
Scott, G. W., Jr. (SM)
Seelen, H. R. (SM)
Siegler, H. B. (A)
Smith, C. P. (SM)
Spitzer, E. E. (F)
Stone, R. P. (SM)
Stoudenheimer, R. G. (SM)
Sweet, A. P., Jr. (M)
Trytko, E. F. (A)
Turba, T. J. (A)
Uyeda, V. (M)
Van Ormer,

Gray, C. R. (A)
Ishler, H. K. (SM)
Levy, S. L. (M)
Lyle, A. E. (SM)
Malotte, D. W. (A)
McCotter, J. D., Jr. (A)
Misra, R. P. (SM)
Moll, W. H. (M)
Pratt, G. W. (M)
Schmitz, C. F., Jr. (A)
Sellani, M. A. (A)
Smith, W. E. (M)
Spencer, G. R. (M)
Tague, C. B., Jr. (M)
Thornton, C. G. (SM)
Wells, R. J. (M)

Lansdowne (PHI-3)
Ambrogi, J. N., Jr. (A)
Brumbaugh, J. M. (SM)
Felton, W. W. (SM)
Fetters, C. M. (M)
Foster, W. P. (M)
Holdsworth, R. M., Jr. (A)
Pappas, C. (M)
Satterthwaite, W. F. (M)
Tullar, R. J. (M)
Weiss, H. R. (A)

Lansford (PHI-3)
Pispeky, S. (M)

Latrobe (PIT-4)
Albert, D. E. (A)
Guidos, B. W. (A)
Monari, A. J. (A)

Laureldale (PHI-L-3)
Franz, R. C. (A)
McLaughlin, J. F. (A)
Montone, L. J. (M)
Simpson, J. E. (M)

Lemoyne (PHI-L-3)
Kneer, G. R. (A)
Smiley, W. A. (VA)

Lenoxville (PHI-3)
Martin, V. C. (M)

Levittown (PHI-3)
Abrams, J. J. (M)
Aires, R. H. (M)
Azaren, D. (M)
Barnes, W. L. (A)
Barnette, W. E. (A)
Beaumariage, D. C. (M)
Beerman, S. D. (A)
Bell, C. V. (A)
Bensky, L. S. (M)
Bernbaum, L. M. (M)
Bernstein, F. (A)
Boys, H. N. (A)
Boys, J. A. (SM)
Bradshaw, G. V., Jr. (M)
Busby, J. W. (M)
Charton, S. (M)
Cilyo, F. F., Jr. (M)
Colodny, S. H. (SM)
Darling, D. C. (M)
Dixon, G. P. (A)
Dunn, T. E. (M)
Eby, J. A. (M)
Eigner, H. (SM)
Epstein, H. (M)
Espig, M. A. (A)
Etkin, H. A. (SM)
Ewald, W. J. (A)
Fernandez-Rivas, L. A. (A)
Furstein, R. A. (M)
Given, W. H., III (A)
Gleason, H. H. (SM)
Goldstone, B. J. (M)
Greenfield, M. (A)
Haneman, W. J. (M)
Heinaman, H. B., Jr. (M)
House, H. V. (A)
Hueh, C. V. (A)
Jackson, W. K. (M)
Jessen, F. A., Jr. (M)
Junker, E. S. (M)
Jurkevich, I. (A)
Kaskey, G. (SM)
Kraus, M. (A)
Krawitz, L. J. (A)
Krieg, S. (A)
Lamnin, M. (A)
Lange, H. A., Jr. (A)
Lathrop, P. A. (M)
Lavin, R. D. (A)
Levine, S. A. (A)
Maddox, J. A. (A)
Mitchell, W. T. (M)
Nachman, M. W. (M)
Palmquist, E. B. (A)
Potosky, M. (A)
Powell, W. E., Jr. (M)
Rosen, B. H. (A)
Sailor, R. W., Jr. (SM)
Samuelson, D. S. (M)
Selikson, B. (A)
Shucker, S. (SM)
Silverman, M. (SM)
Stern, S. (A)
Sullivan, F. J. (M)
Susskind, I. N. (A)
Szumila, A. D. (A)
Tall, M. (M)
Terrell, R. L. (M)
Titefsky, E. J. (M)
Turner, R. J. (M)
Walberg, A. G. (M)
Weinberg, A. D. (A)
Weinheimer, F. E. (A)
Weisman, S. M. (M)
Weisler, H. J. (M)
Wernlund, R. F. (A)
Wilcox, J. E. (A)
Wong, S. Y. (A)
Wood, R. F., Jr. (SM)
Woolf, J. (A)
Wydro, W. S. (A)
Wye, R. E. (A)
Zimmer, L. J., Jr. (A)

Lewisburg (WIL-4)
Iriland, G. A. (M)
Mathias, J. P. (A)
Webb, H. E. (A)

Lewistown (WIL-4)
Gardner, G. F. (M)

Liberty (ELM-C-1)
Frutiger, W. A. (M)

Library (PIT-4)
Donahue, R. O. (A)
Pudlak, A. (A)
Ramey, R. A. (M)

Lionville (PHI-3)
Lynch, J. T. (M)

Lititz (PHI-L-3)
Grosh, J. B., III (M)
Sheffy, H. J. (M)

Lock Haven (WIL-4)
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)
Dowds, T. A. (A)
Grafinger, A. B. (SM)
Innes, F. T. (M)
Lane, J. H. (M)
Lannutti, A. P. (M)
Pedersen, J. H. (A)
Reiss, H. K. (M)
Schwartz, C. J. (A)
Skinner, N. W. (A)
Wachter, W. J. (M)

Manor (PIT-4)
Anderson, J. W. (A)

Marcus Hook (PHI-3)
Alexander, F. C., Jr. (SM)
Imboden, H. B. (SM)
Martin, P. T. (M)
Smith, O. J., III (M)

Mars (PIT-4)
Berninger, J. W. (A)

McAdoo (PHI-3)
Burcak, T. (M)

McKeesport (PIT-4)
Andrews, F. J. (M)
Baker, J. D. (A)
Levine, M. (M)
Morrison, E. L., Jr. (A)
Vogt, W. G. (A)

McKees Rocks (PIT-4)
Vargo, M. S. (M)
Zellner, F. L., Jr. (A)

Meadowbrook (PHI-3)
Bingley, F. J. (F)
Dolberg, C. E. (SM)
Fink, D. G. (F)
Lukens, R., Jr. (SM)
Reynolds, V. F. (M)
Speed, D. K. (M)
Walker, H. (VA)

Meadville (PIT-4)
Brown, R. L. (M)

Mechanicsburg (PHI-L-3)
Hertzler, P. H. (A)
Miller, H. E. (A)
Russell, J. D. (M)
Sprinkle, R. E. (M)

Mechanicsville (PHI-3)
Brown, H. W. (A)

Media (PHI-3)
Chaffin, R. B. (M)
Conant, L. C., Jr. (M)
Gray, H. J., Jr. (M)
Haney, F. (M)
Miller, A. F. (M)
Rhea, H. E. (M)
Salati, O. M. (SM)
Schlipp, J. W. (M)
Woerner, L. G., Jr. (A)

Mendenhall (PHI-3)
Stinger, H. J. (M)

Merion Station (PHI-3)
Adamson, R. G. (M)
Colehower, C. H., Jr. (M)
Emurian, A. D. (SM)
Bonn, T. H. (SM)
Shapp, M. J. (SM)

Middletown (PHI-L-3)
Fritz, W. B. (A)
Johnson, D. E. (A)
Mazzarese, N. J. (M)
Pettersen, E. S. (A)
Riker, C. E. (A)

Millersville (PHI-L-3)
Smith, E. M. (A)
Weaver, J. E. (A)

Mill Hall (WIL-4)
Schnering, C. J. (M)

Mohnton (PHI-L-3)
Fister, T. J. (A)

Monessen (PIT-4)
Ferencz, F. (A)
Vezerinac, J. C. (A)

Monongahela (PIT-4)
Mucci, G. (A)
Rockwell, R. R. (A)

Monroeville (PIT-4)
Coleman, W. E. (M)
Gibson, H. D. (M)
Kardos, L. F. (A)
Lyman, R. C. (M)
Robl, R. F., Jr. (A)
Utt, O. L. (A)
Wright, W. L. (A)

Mont Clare (PHI-3)
Kaufmann, H. W. (M)

Montoursville (WIL-4)
Wellendorf, J. J. (M)

Montrose (PHI-3)
Fiore, W. V. (M)
Henry, R. F. (A)

Morrisville (PHI-3)
Bootherstone, F. B. (A)

Morton (PHI-3)
Bargelliui, I. P. L. (SM)
Gaschnig, G. R. (M)
Olken, H. (A)

Mount Carmel (WIL-4)
Schneider C. P. (A)

Mount Joy (PHI-L-3)
Dock, S. J., Jr. (A)

Murrysville (PIT-4)
Baker, W. H. (M)
Caywood, W. P., Jr. (SM)
Uphoff, R. L. (SM)

Myerstown (PHI-L-3)
Sando, G. G. (M)

Nanticoke (PHI-3)
Cancellari, N. J. (M)
Pensyl, J. F. (A)

Narberth (PHI-3)
Brustman, J. A. (SM)
Clapp, R. G. (SM)
Forstall, E. L. (SM)
Jeffries, S. (A)
Massey, M. M. (M)
Tabor, L. P. (SM)
Williamson, J. F. (VA)

Nazareth (P-LV-3)
Kilpatrick, W. M. (M)

Neffsville (PHI-L-3)
Karsh, M. D. (M)

New Brighton (PIT-4)
Lapic, J. R. (A)

New Cumberland (PHI-L-3)
Hanemann, H. A., Jr. (A)
Houck, G. R. (A)

Newfoundland (PHI-3)
Wohlfart, E. (A)

New Hope (PHI-3)
Ansley, A. C. (VA)
Chadwick, P. S. (A)
Goodwin, W. N., Jr. (F)
Karaczan, W. W. (M)

New Kensington (PIT-4)
Howe, E. R., Jr. (A)
Merritts, T. D. (M)
Signorella, J. E. (A)
Zubek, J. (M)

Newtown (PHI-3)
Beck, K. H., Jr. (M)
Cushman, R. W. (M)
Dawson, J. A., Jr. (M)
Ghebeles, G. C. (A)
Gould, D. F., II (A)
Lambert, C. R. (M)
Small, H. E. (M)

Newtown Square (PHI-3)
Bachofer, H. L. (A)
Caplan, D. I. (A)
Gariano, W. F. (M)
Gregory, T. R. (M)
Horwitz, J. D. (A)
Johnson, F. L. (M)
Livesay, R. (A)
Nones, R. A. (M)
Schneider, S. (A)
Shawhan, E. N. (M)

Newville (PHI-L-3)
McElwain, J. L. (M)

Noble (PHI-3)
Hilliard, D. M. (M)

Norristown (PHI-3)
Anders, R. D. (M)
Anderson, D. C. (A)
Boscia, S. J. (A)
Briggs, T. H. (SM)
Eisenmann, J. F. (A)
Heltemes, R. B. (M)
Jacoby, M. (M)
Kilpatrick, D. G. (M)
Looper, C. J. (A)
McCallister, J. P. (M)
Merritt, J. E. (A)
Middleton, R. J., Jr. (M)
Nurnberg, R. K. (A)
Paxson, R. F. (M)
Reardon, P. A. (M)
Roberts, F. R. (A)
Rogers, R. F. (A)
Thomas, J. K., II (M)
Webb, D. T. (SM)
Yeaton, R. B. (M)
Zern, R. T. (M)

North East (BN-E-1)
Challstrom, K. I. (M)

North Hills (PHI-3)
Moore, W., Jr. (M)
Stahl, R. A. (M)
Stahl, R. W. (M)

North Wales (PHI-3)
Burkart, D. P. (M)
Guzewicz, J. F. (A)
Henderson, F. C. (M)
Sinall, T. W. (M)

Oakford (PHI-3)
Hoffman, N. N. (M)

Oakmont (PIT-4)
Dimasi, L. A. (M)
Fitterer, C. E. (M)
Mattes, F. J. (M)
Muffly, G. (SM)

Oaks (PHI-3)
Carroll, C. F., Jr. (SM)

Oley (PHI-L-3)
Deysher, J. B. (A)

Olyphant (PHI-3)
Hricko, R. M. (A)

Orefield (PHI-3)
Allerton, G. L. (SM)

Oreland (PHI-3)
Altemus, W. C. (A)
Clark, E. G. (M)
Comeau, C. P. (A)
Halsted, C. P. (A)
Hargens, C. W., III (SM)
Isaacs, R. A. (A)
Jackson, R., Jr. (A)
Jacobs, E. J. (A)
Kamsler, W. F. (SM)
Keener, C. E. (SM)
Keiper, F. P., Jr. (M)
Lawrence, J. D., Jr. (M)
Lockhart, J. C. (M)
Nelson, F. H. (M)
Preston, G. W. (SM)
Westcott, J. P. (SM)
Zwart, C. (M)

Oxford (PHI-3)
Mallalieu, F. R. (SM)

Palmerton (PHI-3)
Kannapel, W. A. (A)
Swanson, H. E. (M)

Paoli (PHI-3)
Auerbach, I. L. (SM)
Billerd, G. A. (M)
Bratley, R. E. (M)
Collier, D. M. (SM)
Dahlberg, R. S., Jr. (SM)
Eble, B. B. (A)
Engelman, J. H. (M)
Epstein, H. (SM)
Fasko, E. A. (M)
Fegley, K. A. (M)
Fissell, C., Jr. (M)
Gluck, S. L. (M)
Goodman, H. C. (M)
Gottschalk, J. M. (M)
Greene, A. A. (M)
Hamill, R. V. (M)
Ivins, W. A. (A)
Jones, R. E. (M)
Landrey, L. R. (SM)
Lohse, E. (SM)
McIlwain, S. (F)
Overmiller, C. M. (M)
Pugh, A. L., Jr. (SM)
Rowland, A. L. (A)
Saunders, R. (A)
Starr, D. A., Jr. (A)
Taylor, H. W. (M)
Travis, I. (F)
Weisenberger, A. J. (M)

Paxinos (WIL-4)
Farr, K. E. (SM)

Peckville (PHI-3)
Kline, K. H. (SM)

Perkasie (P-LV-3)
Soltau, R. H. (A)

Philadelphia (PHI-3)
Aberth, O. (A)
Adams, D. A. (M)
Adamson, P. R. (M)
Affel, H. A., Jr. (SM)
Afker, M. J. (M)
Albright, R. B. (SM)
Alexander, E. M. (M)
Alpert, D. (M)
Alter, A. R. (SM)
Ames, M. E., Jr. (M)
Amodei, J. J. (M)
Anderson, J. C. (M)
Anderson, P. G. (M)
Andrese, P. M. (M)
Arian, L. (A)
Armstrong, R. M. (M)
Asenlero, W. L. (M)
Ashmead, D., III (M)
Aurelius, P. (A)
Azoff, I. (M)
Bacon, J. R. (M)
Baconnet, J. (M)
Bailey, C. W., Jr. (A)
Balogn, J. J. (M)
Banks, J. (A)
Bash, I. F. (M)
Batey, R. W. (A)
Baumann, J. A. (A)
Bazan, S. J. (A)
Beane, T. E. (M)
Beardwood, J. T., III (A)
Bechler, W. C., Jr. (VA)
Beckman, C. (M)
Beggs, G. E., Jr. (SM)
Benima, D. (A)
Benjamin, J. M., Jr. (SM)
Bennon, M. (A)
Benson, S. E. (M)
Berger, D. (M)
Bergstrom, C. J. (A)
Berkowitz, R. S. (M)
Berman, C. D. (M)
Berry, R. L. (A)
Best, D. T. (M)
Beter, R. H. (M)
Biberman, L. S. (M)
Bigelow, J. F. (SM)
Birx, D. L. (M)
Bixler, D. A. (M)
Bloemker, L. J. (A)
Bloss, R. C. (M)
Blynn, M. S. (M)
Boandl, J. S. (A)
Boghosian, W. H. (M)
Bogusz, J. F. (M)
Bohn, J. L. (SM)
Bonaccorsi, J. R. (A)
Bonanni, O. A. (A)
Borden, C. C. (A)
Boreen, H. I. (M)
Bose, A. (M)
Bossi, E. W. (A)
Bowe, C. E., Jr. (M)
Boyd, W. L. (A)
Brachman, R. J. (M)
Bradley, W. E. (F)
Bradshaw, J. L. (M)
Brainerd, J. G. (F)
Brandimarte, N. C. (M)
Brisk, H. L. J. (M)
Broomall, J. M. (SM)
Brothers, J. T. (SM)
Brown, G. M. (M)
Brown, R. B. (A)
Brown, T. (A)
Brucklacher, J. E., Jr. (M)
Brunner, D. H. (M)
Buchanan, J. P. (M)
Buggy, R. V. (SM)
Burger, A. F. (M)
Burgett, M. I., Jr. (SM)
Buzby J. A. (A)
Bycer, B. B. (SM)
Byers, A. C. (SM)
Caldwell, W. H. (SM)
Campbell, E. R., Jr. (A)
Candell, G. W. (M)
Carapellotti, L. T. (SM)
Carlson, E. S. (M)
Castillo, P. S., Jr. (A)
Cathers H. W. (A)
Cattafesta, W. M. (M)
Cavileer, F. E. (A)
Chamberlin, L. K. (M)
Chambers, C. C. (SM)
Chambers, D. R. (A)
Chamow, M. F. (A)
Chance, B. (F)
Chapline, J., Jr. (M)
Chase, C. T. (SM)
Chatten, J. B. (M)
Cheney, E. A. (A)
Chesavage, A. J. (M)
Chressanthis, A. G. (A)
Ciancelo, D. J. (M)
Ciletti, V. J. (M)
Clark, F. R. (A)
Clark, L. P. (SM)
Closson, C. E. (SM)
Coburn, J. M. (M)
Cockrell, J. L. (SM)
Cohen, B. H. (A)
Cohen, I. (A)
Cola, T. F. (M)
Cola, R. A. (A)
Coles, R. V. (SM)
Colocousis, J. (SM)
Conrad, M. (SM)
Copestakes, J. E. (A)
Cottingham, J. H. (A)
Cotton, R. V. (M)
Creamer, E. M., Jr. (M)
Creed, W. F. (A)
Crew, B. L. (M)
Cummings, E. J. (M)
Daniels, J. H. (M)
Dectrow, T. C. (M)
De Coatsworth, C. G. (M)
De Fiorio, R. A. (M)
De Marr, J. D. (M)
Denzler, P. R. (M)
Diamond, R. L. (M)
Dilbell, W. (M)
Diem, G. W. (M)
Diem, S. H. (M)
Dobren, S. (A)
Dorfman, J. C. (M)
Dorsay, T. A. (A)
Doto, N. J. (M)
Douthwaite, W., Jr. (A)
Dove, J. B. (A)
Doviak, R. J. (M)
Dry, D. N. (M)
Dugan, N. G. (M)
Dunn, E. B. (M)
Earnshaw, D. P. (SM)
Eckert, J. F., Jr. (A)
Edelman, R. D. (M)
Edelman, S. Z. (M)
Elchert, E. S. (SM)
Eisenschmied, M. D. (M)
Elliott, L. D. (M)
Emerson, K. H. (SM)
Emery, E. J. (A)
Estersohn, H. (A)
Ett, A. H. (M)
Evalds, E. H. (A)
Evans, W. R., Jr. (A)
Eynon, J. U. (M)
Fang, J.-C. (A)
Farmar, F. A. (M)
Faulk, D. R. (A)
Faust, A. C. (M)
Feller, M. S. (A)
Fenton, F. H., Jr. (M)
Fernbach, M. (M)
Fidler, R. D. (A)
Fierstein, J. H. (A)
Fink, L., III (M)
Fisher, E. J. (A)
Fisher, F. (A)
Fitz-Hugh, C. D., Jr. (SM)
Flood, F. T. (A)

Fogarty, J. D. (M)
Foley, G. M. (SM)
Ford, H. P., Jr. (M)
Forster, W. H. (SM)
Fortini, M. M. (M)
Fow, B. F. (M)
Fowler, C. J. (SM)
Frank, A. I. (M)
Frank, J. S. (M)
Freeman, S. (A)
Friedman, M. (A)
Friedman, M. (M)
Froggatt, J. W., Jr. (A)
Frum, A. (A)
Gelb, H. A. (A)
Gelder, J. G. (A)
Gelfand, R. (A)
Gelles, A. J. (A)
George, M. E. D. (A)
Geselowitz, D. B. (A)
Gilbert, W. E. (SM)
Gillies, J. H. (SM)
Gilman, H. D. (M)
Giordano, M. J. (A)
Gittens, V. S. (A)
Glace, K. (M)
Glassman, I. (M)
Goldberg, M. L. (A)
Goldich, N. (A)
Goldis, B. A. (A)
Goldman, R. L. (M)
Goldstein, I. E. (SM)
Goldstein, P. (A)
Gonzalez-Correa, E. (M)
Goodman, J. H. (M)
Goodman, R. M. (SM)
Goodwin, D. P. (A)
Gottlieb, M. (A)
Grandge, F. M. (M)
Gravel, A. J. (A)
Gray, R. K. (A)
Greenberg, S. B. (A)
Greenfield, J. D. (M)
Griffith, H. (A)
Groon, J. G. (A)
Gross, I. (M)
Gross, L. S. (A)
Gross, M. A. (M)
Grossman, S. (A)
Gudis, R. S. (A)
Haas, N. V. (M)
Hackenyos, C. W. (A)
Hadley, A. M. (SM)
Haines, B. P. (SM)
Halprin, J. (A)
Hamilton, S. (SM)
Hardiman, E. R. (A)
Harding, L. P. (A)
Harel, A. (A)
Harrap, V. (A)
Harris, H. H. (SM)
Harris, J. E. (A)
Hazeltine, A. V. (M)
Hebert, E. J., Jr. (M)
Heck, J. C. (M)
Heckelman, T. J. (M)
Hendrie, C. (M)
Hendrixson, L. H. (M)
Henninger, J. H. (M)
Herscher, M. B. (A)
Hershfield, L. L. (M)
Hewitt, E. C. (M)
Hilman, J. (M)
Hinds, J. L., Jr. (A)
Hirsch, M. (A)
Hitt, J. L. (A)
Hock, R. E. (A)
Hockeimer, H. E. (M)
Hoffman, E. (A)
Holdridge, G. R. (M)
Hollander, G. L. (SM)
Holm, R. M. (A)
Hopper, G. M. (M)
Horowitz, R. B. (A)
Howard, W. A. (SM)
Hunter, R. D. (A)
Hyams, I. (M)
Inose, I. (M)
Jacobowitz, J. (A)
Jacobson, L. J. (M)
Jacquish, W. W. (M)
Janda, F. J., Jr. (A)
Jednacz, J. E. (M)
Johnson, N. (SM)
Jones, A. G. (A)
Jones, J. T., Jr. (A)
Joseph, D. (M)
Joshi, A. K. (A)
Joyce, S. B. (M)
Jung, J. P. (M)
Jurskis, A. (M)
Kaferle, J. G. (M)
Kali, A. R. (M)
Kalos, S. (A)
Kanal, L. M. (A)
Kappeler, W. H. (A)
Kashtan, S. (A)
Kass, S. (M)
Katz, S. (M)
Kauffmann, R. A. (M)
Kaufman, E. J. (A)
Kaufmann, H. L. (M)
Kell, O. C., Jr. (M)
Keister, F. F. (M)
Kelly, P. J. (M)
Kenny, H. W. (A)
Keroes, H. L. (A)
Kessler, F. L. (M)
Kimels, H. (M)
King, S. M. (A)
King, W. C. (SM)
Kinzinger, W. C. (A)
Kirk, D. B. (M)
Kirkaldy, A. J., Jr. (A)
Kishpaugh, A. W. (A)
Klein, S. (M)
Knipe, W. T. (M)
Koblenz, A. M. (M)
Kocher, W. J. H. (M)
Koenigsberg, D. (A)
Kolodner, M. (M)
Korsen, M. (M)
Kosich, R. J. (A)
Kovach, J. F. (A)
Kowalski, L. E. (A)
Kozak, M. J. (A)
Kranton, J. (M)
Kraus, F. A. (M)
Kraus, G. R. (SM)
Kritikos, H. N. (A)
Kropp, C. W. (M)
Ku, Y. H. (SM)
Kubanoff, J. H. (M)
Kugler, F. (M)
Kusner, D. B. (M)
Kuter, J. J. (M)
Kyne, T. (M)
Lamontagne, R. S. (SM)
Lancaster, W. W. (A)
Lande, A. J. (A)
Lane, A. L. (M)
Langer, G. O. (M)
La Vergnetta, F. E. (M)
Lazinski, R. H. (M)
Leader, R. (A)
Lee, D. H. (M)
Leibovitz, P. T. (M)
Leitch, J. G. (SM)
Leonard, J. F. (M)
Levene, M. (M)
Levin, B. B. (M)
Lewis, G. (M)
Lieb, A. B. (A)
Lieberman, F. (M)
Linden, D. A. (A)
Lindinger, J. L. (A)
Linsky, E. F. (M)
Liss, M. (M)
Livezey, F. M. (A)
Lobel, D. J. (A)
Loftus, J. A. (A)
Loginow, S. (SM)
Losew, W. S. (A)
Lovejoy, E. W. (SM)
Lui, G. G. (A)
Lukoff, H. (M)
Lundberg, C. F., Jr. (M)
Lynch, T. J. (A)
Mac Donald, H. E. (M)
MacFadden, W. C. (M)
Machlin, R. C. (SM)
Mac Williams, J. E. (M)
Maddox, J. L., Jr. (A)
Magasiny, I. P. (M)
Maguire, H. T. (A)
Major, R. P. (M)
Malcomson, J. A. (A)
Malkin, T. A. (M)
Malta, S. V. (M)
Manser, J. E. (A)
Mapp, H. S. (A)
Marcus, H. M. (A)
Markowitz, R. S. (A)
Marks, E. L. (M)
Marple, M. O. (A)
Marsele, I. (A)
Marshall, D. E., Jr. (A)
Marsten, J. (F)
Martin, J. L. (M)
Martin, J. A. (A)
Martire, J. A. (A)
Maser, B. (A)
Masurat, G. (M)
Matthews, L. L., Jr. (A)
Mauchly, J. W. (F)
Mauger, R. S. (A)
May, K. S. (M)
McCarron, F. J. (A)
McCarty, F. (A)
McDowell, A. P., Jr. (M)
McEnroe, J. M., Jr. (A)
McGarrity, R. P. (M)
McKee, G. R., Jr. (M)
McKnight, C. F. (A)
McLeod, W. K. (A)
McNally, F. C., Jr. (A)
Medkeff, R. J. (M)
Meeds, D. S. (M)
Meehan, F. J. (A)
Meinken, K. C. (A)
Metcalf, G. F. (F)
Mikolajczyk, W. J. (M)
Miller, B. L. (A)
Mina, V. C. (M)
Mode, D. E. (SM)
Mooney, J., Jr. (M)
Moore, W. H. (M)
Moritz, K. C. (M)
Morris, L. C. (M)
Moskowitz, N. (M)
Mouradian, H. (VA)
Mozenter, M. J. (M)
Murphy, G. G. (M)
Murphy, J. S. (M)
Murray, R. E. (M)
Myers, A. S., Jr. (SM)
Namaroff, J. F. (SM)
Natkin, H. B. (M)
Nelson, C. R. (SM)
Neuber, H. K. (M)
Neumann, L. R. (A)
Newman, E. L. (A)
Newmeyer, D. R. (M)
Nichol, A. V. (SM)
Nicholson, V. (A)
Nickel, G. C., Jr. (M)
Nishimura, J. Y. (A)
Nolan, J. J. (A)
Novik, J. (M)
Nussbaum, M. (A)
Nye, D. D., Jr. (A)
O'Brien, J. F., Jr. (A)
O'Hara, J. J. (SM)
Olevsky, B. (A)
Ollis, J. H. (M)
O'Malley, M. (A)
Packer, W. H. (A)
Partin, M. E. (M)
Pasicznyk, I. (A)
Patterson, G. W. (SM)
Paul, H. J. (A)
Pearce, C. T. (SM)
Peghiny, J. W. (M)
Perkins, C. C. (A)
Perkins, G. O. (M)
Peters, A. E. (M)
Peterson, E. F., Jr. (M)
Pezely, S. J. (M)
Plontkowski, J. S. (A)
Platt, B. E. (A)
Podell, E. J. (A)
Poellnitz, F. D. (A)
Popowsky, W. J. (M)
Porter, T. J. (M)
Porter, V. J. (M)
Pressman, A. (M)
Procopio, L. W., Jr. (M)
Pryor, R. L. (M)
Queen, G. S., Jr. (M)
Raburn, L. E. (SM)
Rachlin, M. (A)
Raffa, P. E. (M)
Randall, N. C. (A)
Rapp, A. K. (M)
Ratawki, C. P. (SM)
Ratner, A. (A)
Reel, W. R. (A)
Revere, G. (M)
Reyers, R. R. (M)
Richman, R. R. (A)
Richter, F. (M)
Robertson, R. E. (M)
Robinson, G. W. (A)
Robinson, L. R. (A)
Rohr, J. G. (M)
Rohrick, M. A. (A)
Roman, A. F. (M)
Romano, V. J. (A)
Romanofsky, N. K. (M)
Roseman, H. M. (M)
Rosenstein, G. (M)
Rosenthal, I. P. (M)
Rostrom, R. W. (A)
Roth, T. J. (A)
Rothwarf, F. (A)
Rovins, J. J. (M)
Rubeu, I. (SM)
Rubenstein, H. (M)
Rudin, B. (M)
Rudnick, J. J. (A)
Rudofsky, S. (A)
Ruthledge, J. E., Jr. (M)
Safren, H. G. (M)
Salzar, D. E. (A)
Santamaria, S. (A)
Sarkisian, J. (A)
Schaefer, H. W. (A)
Schifreen, C. S. (A)
Schmechel, D. M. (M)
Schock, H. G., Jr. (A)
Scholes, W. R. (A)
Scholtes, P. W. (A)
Schrader, R. H. (A)
Schutzbank, A. J. (A)
Schwan, H. P. (SM)
Schwartz, I. (A)
Schwartzberg, H. L. (M)
Scott, E., Jr. (A)
Seawell, W. M. (M)
Secor, G. (SM)
Seif, E. (A)
Sepahban, A. H. (A)
Sheffler, W. J. (M)
Shelton, R. M. (M)
Sheppard, C. B. (M)
Sherman, A. (A)
Sherr, S. I. (A)
Shienbloom, H. M. (A)
Showers, R. M. (SM)
Shulman, M. B. (A)
Sichel, A. T. (VA)
Siegel, P. (M)
Siklina, T. V. (M)
Silverman, M. (M)
Simkins, H. (M)
Simonetti, A. (M)
Singer, W. T. (M)
Skolnick, A. M. (M)
Slade, D. E. (SM)
Slaughter, L. (M)
Smith, A. E. (M)
Smith, A. W. (A)
Smith, B. J. (A)
Smith, D. B. (F)
Smith, R. C. (M)
Smith, R. V. (SM)
Smock, W. W. (M)
Smollar, G. D. (A)
Smyton, S. A. (A)
Solomon, H. (A)
Songster, G. F. (M)
Soorenko, T. (M)
Sorius, A. (M)
Sorkin, C. S. (A)
Spady, R. J. (A)
Spandorfer, L. M. (M)
Spector, E. N. (A)
Spencer, R. W. (A)
Spiegel, R. M. (M)
Spieler, A. (A)
Spielman, S. C. (SM)
Stambaugh, J. C. (M)
Stangler, D. M. (A)
Stanley, S. M. (M)
Stanton, L. (M)
Stanwood, R. H. (A)
Starks, W. H. (M)
Steagall, W. F. (M)
Steelman, A. T., Jr. (M)
Stefkovits, P. (A)
Stein, M. (A)
Steigelmann, W. H., Jr. (M)
Stein, S. J. (SM)
Steinruck, C. F., Jr. (A)
Stephenson, J. M. (A)
Stern, F. (M)
Stern, J. M. (A)
Stevens, A. J. (A)
Stitz, K. W. (M)
Stovall, J. R., Jr. (M)
Stratton, C. H. (A)
Strauss, H. E. (M)
Stubbs, G. S. (A)
Stuffleheam, C. E. (A)
Sullivan, H. B. (A)
Sun, H.-H. (A)
Talbot, G. S. (M)
Tarpley, R. E. (SM)
Tatarsky, B. (M)
Teacher, P. F. (A)
Teare, E. H., Jr. (M)
Tellier, J. C. (SM)
Ten-Cate, W. L. (A)
Throckmorton, C. L. (M)
Tobe, S. S. (M)
Told, C. R. (M)
Tom, J. (M)
Tomar, R. M. (A)
Tonik, A. B. (A)
Tonooka, S. (M)
Torrey, R. D. (M)
Tou, J. (SM)
Trachtenberg, B. M. (M)
Trachtman, J. (M)
Trocky, E. V. (A)
Turtil, J. F. (M)
Ungerleider, R. R. (A)
Urkowitz, H. (SM)
Ussler, W., Jr. (A)
Van Bastelaere, L. J. (M)
Van Horn, J. C. (SM)
Varallo, F. A. (M)
Vasilevskis, H. S. (M)
Vetack, J. E. (A)
Waltunas, J. S. (M)
Warner, E. H. (M)
Warren, S. R., Jr. (SM)
Warshaw, C. H. (M)
Watson, R. (A)
Weber, H. C. (A)
Weidknecht, C. J., Jr. (M)
Weilerstein, I. M. (M)
Weinberg, I. (A)
Weiner, J. R. (SM)
Weiner, M. (M)
Weinstock, W. W. (SM)
Weise, R. C. (VA)
Weise, S. (A)
Welling, A. J. (M)
Welsh, P. J. (A)
West, W. P. (SM)
Whitby, L. S. (A)
White, F. L. (M)
White, J. F. (M)
Wieder, E. J., Jr. (A)
Wightman, R. R. (M)
Willenborg, E. J. (A)
Williams, A. J., Jr. (F)
Williams, J. R. (SM)
Wilsker, O. (M)
Wilson, L. D. (SM)
Witkin, E. (SM)
Wojciehowski, E. T. (M)
Wojcik, J. J. (SM)
Wolf, A. A. (M)
Wolfson, R. P. (M)
Wolin, D. (A)
Wolin, L. (SM)
Wolin, S. (SM)
Wood, H. O. (SM)
Wood, W. (M)
Woodcock, V. E. (M)
Woods, L. J. (SM)
Wyeth, F. H. (M)
Yacyk, J. (M)
Yamala, H. (A)
Yang, T. (M)
Yarbrough, S. L. (SM)
Young, R. T. (A)
Zappacosta, J. A. (M)
Zaslav, B. (A)
Zebrowitz, S. (SM)
Zeid, L. (M)
Zimmerman, B. L. (A)
Zimmerman, M. S. (A)

Philipsburg (CP-4)
Crain, H. M. (SM)

Phoenixville (PHI-3)
Hicks, J. J. (A)
Thomas, T. R. (M)

Pine Grove (CP-4)
Pharo, L. C., Jr. (M)

Pineville (PHI-3)
Gallagher, V. C. (A)
Schreiner, W. A. (M)

Pitcairn (PIT-4)
Buckler, P. F. (A)
Jones, C. I. (M)
Kaufman, W. M. (A)
Keener, E. L. (SM)
Kroko, L. J. (A)
McGinley, G. W. (M)

Pittock (PIT-4)
Shyhalla, N. (A)

Pittsburgh (PIT-4)
Allen, J. G. (SM)
Allen, S. D. (M)
Altmire, H. D. (A)
Anderson, A. E. (M)
Aronson, M. H. (M)
Baierbach, R. I. (M)
Barron, F. E. (SM)
Baughman, G. W. (SM)
Bean, W. C. (A)
Benjamin, C. E. (M)
Bennett, A. L., Jr. (A)
Biel, D. T. (A)
Blair, H. A., Jr. (A)
Bowman, J. R. (SM)
Booker, C. A., Jr. (M)
Bossart, P. N. (F)
Boyer, J. L. (M)
Brinda, J., Jr. (M)
Broome, P. W., Jr. (M)
Browder, F. E. (M)
Bush, N. E. (M)
Busse, C. C. (M)
Callahan, J. B. (M)
Calvert, J. F. (SM)
Caplan, H. M. (A)
Castner, R. J. (A)
Cepol, J. (M)
Chamberlin, J. C. (A)
Chandler, A. M. (A)
Chen, K. (A)
Chick, R. F. (A)
Chin, T.-H. (A)
Coates, R. S. (A)
Colker, J. (M)
Coltman, J. W. (F)
Conry, W. T. (M)
Coombs, S. H. (M)
Crapotta, F. C. (M)
Curry, T. F. (M)
Dean, W. C. (A)
Delgado, R. H. (M)
Deplan, L. (SM)
Diamond, H. (M)
Dodd, A. E. (M)
Dollens, D. J. (A)
Duckett, E. J. (SM)
Dugan, J. F. (A)
Eash, J. J. (M)
Eiter, W. F. (A)
Engel, F. A., Jr. (M)
England, R. R. (M)
Fahleman, P. W. (M)
Evans, K. (A)
Fairey, T. E. (M)
Fitzsimmons, D. P. (SM)
Flaherty, J. M. (M)
Ford, D. J. (A)
Forrester, A. L. (SM)
Franz, J. P., Jr. (M)
Friedman, A. B. (A)
Fryling, C. V. (M)
Gannon, G. F., Jr. (A)
Gates, A. F. (A)
Germann, J. D. (A)
Gibson, F. C. (M)
Gill, H. A. (SM)
Gogniat, T. (M)
Goldstein, R. P. (A)
Grace, J. N. (M)
Graul, T. A. (M)
Greenwood, J. H. (SM)
Hager, R. E. (A)
Hamilton, W. H. (SM)
Hanna, C. R. (SM)
Hansen, J. R. (SM)
Hayes, J. A. (A)
Hollandbeck, R. F. (M)
Holzman, G. R. (A)
Hooper, E. H. (M)
Hoover, D. B. (A)
Huggler, L. R. (M)
Hutcheson, J. A. (F)
Jackson, A. H. (A)
Jacobs, J. E. (M)
Jarvis, P. H. (A)
Jergel, R. F. (A)

Sheker, E. B. (M)
Shonpp, W. E. (F)
Silverman, R. (A)
Sims, D. S. (SM)
Sines, W. U., Jr. (A)
Skinner, D. D. (A)
Steplan, J. (F)
Smith, L. E. (M)
Smith, R. E. (M)
Snefsky, E. A. (M)
Sparrow, R. F. (A)
Stapp, I. P. (A)
Staublitz, E. J. (M)
Steinback, R. T. (M)
Stepka, A. J. (A)
Stott, W. R. (A)
Strasser, A. (M)
Strull, G. (M)
Stuart, H. D. (A)
Stuart, R. A. (A)
Suozzi, J. J. (A)
Sykes, R. T. (A)
Wei Sze, T. (A)
Taylor, M. E. (M)
Taylor, W. (A)
Teare, B. R., Jr. (F)
Thompson, F. T. (A)
Thompson, J. H. (SM)
Tindall, H. D. (A)
Toulon, P. M. G. (SM)
Tunell, R. H. (A)
Twaska, V. M. (A)
Uleman, T. (SM)
Unger, E. J. (M)
Vogeley, C. E., Jr. (SM)
Wagner, R. J. (A)
Wilson, W. A. (M)
Wolfe, P. N. (M)
Wood, J. E. (M)
Woodford, J. B., Jr. (SM)
Wyckoff, R. D. (F)
Young, F. J. (M)
Zionts, S. (A)
Walchli, H. E. (SM)
Wei, Y.-M. (M)
Wells, J. D. (M)
Werst, M. C. (M)
Wieczorkowski, E. A. (M)
Williams, E. M. (F)

Pittston (PHI-3)
Loughney, T. M. (M)
Miller, A. N. (A)
Moceyunas, A. J. (M)

Plymouth Meeting (PHI-3)
Applegarth, A. R., Jr. (SM)
Ginsberg, E. M. (M)
Jensen, C. L. (M)
Krantz, F. H. (M)

Port Matilda (CP-4)
Seeley, R. M., Jr. (A)

Pottstown (PHI-3)
De Berardis, A. J. (M)
Mellon, R. E. P. (VA)
Oister, G. K. (A)
Ottolini, D. F. (A)

Prospect Park (PHI-3)
Sagan, E. R. (A)

Quakertown (P-LV-3)
Anderson, A. E. (M)
Bartholomew, R. G. (M)
Cole, W. P. (SM)
Hendricks, P. S. (VA)
Moose, L. F. (M)
Pomeroy, R. C. (SM)
Saloom, J. A. (M)

Quehanna (PHI-3)
Cornell, J. A. (SM)

Reading (PHI-L-3)
Bennett, W. F. (A)
Brobst, A. K. (A)
Close, J. N. (A)
Feicht, R. B. (M)
Hauck, H. S. (M)
Henrich, G. R. (A)
Lipscomb, R. F. (M)
Mill, A. F. (A)
Rose, T. L. (A)
Schilling, R. G. (A)
Schnable, G. L. (A)

Ridgway (EMP-4)
Cowles, R. J. (M)
Ross, V. C. (A)

Ridley Park (PHI-3)
Jamison, J. S. (M)
McWilliams, G. R. (A)
Parris, S. R. (M)
Tompkins, H. E. (SM)

Rockwood (PIT-4)
Henkles, H. W. (M)

Ronks (PHI-L-3)
Perry, H. E. (M)

Rosemont (PHI-3)
Halstead, W. K. (SM)
Shinn, C. E. (SM)
Starr, J. E. (M)

Roslyn (PHI-3)
Barnett, G. F. (M)
Beaver, J. A., Jr. (M)
Douglass, F. W. (M)
Gage, L. S. (M)
Grove, L. R. (A)
Hartshorne, F. A. (M)
Sayer, T. C. (M)
Shirley, R. C. (M)
Silverman, J. R. (A)
Yutz, R. W. (A)

Rutledge (PHI-3)
Kozikowski, J. L. (M)

Rydal (PHI-3)
Clarke, J. A. (M)
Ferrill, T. M., Jr. (SM)
Herr, R. F. (SM)
Lagore, J. A. (SM)

St. Davids (PHI-3)
Gabriel, E. Z. (M)
Gadsis, A. H. (A)

St. Marys (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)
Ing, E. F. (M)
Neff, A. K. (A)
Pierson, I. S. (M)
Snowdon, T. L. (SM)
Sorg, F. X. (M)
Speer, J. S., II (M)

Salfordville (PHI-3)
Archer, G. R. (A)

Salona (WIL-4)
Hamby, C. W. (M)

Saxonburg (PIT-4)
Cooper, R. W. (A)
Stuebgen, W. F. (A)

Sayre (ELM-C-1)
Hall, M. (A)
Franklin, B. A. (A)

Scranton (PHI-3)
Brown, R. J. (A)
Cooke, K. R. (A)
Corwin, N. J. (M)
Kaplan, M. (SM)
Miller, W. A. (A)
Oschmann, R. G. (M)
Quinn, J. M. (M)
Ringland, R. S. (SM)
Risse, J. A. (M)
Sanzillf, R. A. (A)
Schiller, J. (M)
Smith, G. (SM)
Wint, D. (M)
Witkowski, J. F. (VA)

Secane (PHI-3)
Kranzley, A. S. (A)

Sewickley (PIT-4)
Edwards, J. L. (A)
Taylor, J. K., Jr. (M)

Shamokin (WIL-4)
Thompson, W. B. (M)

Sharon (PIT-4)
Clotworthy, J. H. (M)
Schatz, R. A. (A)
Zahniser, R. M. (A)

Sharon Hill (PHI-3)
Eckert, E. R. (M)
Gorelick, A. P. (M)
Hood, C. E. (M)
Rubinoff, M. (M)

Shiremanstown (PHI-L-3)
Wentz, J. L. (A)

Smethport (EMP-4)
Francisco, S. G. (M)
McKay, A. H. (A)

Solebury (PHI-3)
Algeo, B. C., Jr. (SM)

Souderton (PHI-3)
Smith, H. B. (M)

Southampton (PHI-3)
Barkay, H. S. (SM)
Grzywacz, W. (M)
Lex, R. G., Jr. (M)
Ogletree, W. A. (M)
Schroeder, A. C. (F)
Smith, F. E. (M)

South Williamsport (WIL-4)
Feehrer, M. R. (A)
Lavo, H. J. (M)

Spring City (PHI-3)
Clevenstine, W. M. (A)

Springdale (PIT-4)
Duris, M. W. (A)
Shaw, J. B. (M)

Springfield (PHI-3)
Brinton, J. H., Jr. (M)
Carrick, G. R. (A)
Cornelius, H. J. (A)
Di Cammil, B. A. (M)
Ebling, W. F., Jr. (M)
Hoepfner, K. B. (M)
King, G. W. K. (M)
Laiming, H. J. (SM)
Mackey, E. F. (M)
Marcott, C. M. (A)
Metzger, A. C. (M)
Miller, M. N. (M)
Mitchell, W. J., Jr. (A)
O'Neill, J. F. (A)
Osbahr, B. F. (SM)
Schwartz, R. F. (SM)
Simpson, O. (SM)
Snyder, C. M. (A)
Sylvester, R. A. (M)
Wagenseller, J. E. (A)
Warshaw, J. (M)
Weiss, E. (M)

Spring House (PHI-1)
Sims, J. C., Jr. (M)

State College (CP-4)
Ammerman, C. R. (SM)
Baker, W. L. (SM)
Barber, K. F. (A)
Bastuscheck, C. P. (SM)
Binstock, L. (A)
Blair, W. L. (SM)
Bogar, J. E. (M)
Bringman, J. M. (M)
Brown, D. H. (M)
Callaghan, J. W. (M)
Campanella, A. J. (M)
Cannon, J. B., Jr. (M)
Carey, D. E. (M)
Cranston, H. J., Jr. (M)
Crossley, G. L. (SM)
Dale, J. A. (A)
Dean, J. C. (A)
Diamant, H. B. (A)
Doerr, C. W. (A)
Dole, L. H. (M)
Ebaugh, P. (M)
Eck, R. C. (M)
Fessler, A. L. (M)
Files, W. D. (SM)
Finlon, F. P. (M)
Freed, P. J. (SM)
Geronimo, M. B. (A)
Hall, F. T., Jr. (M)
Harbolis, S. S., Jr. (A)
Harris, V. E. (A)
Harvey, H. B. (M)
Hemman, R. J. E. (M)
Herlt, B. G., Jr. (M)
Herman, E. B. (A)
Higdon, R. V. (SM)
Houser, W. G. (M)
Hunter, R. P. (SM)
John, F. T. (A)
Key, C. L., Jr. (M)
Key, J. T., Jr. (M)
Knausenberger, G. E. (M)
Lawther, J. M. (A)
Lee, L. (M)
Leiss, W. J. (SM)
Lemley, L. W. (M)
Lopez, A. F. (SM)
Marcus, R. B. (M)
McConaughy, R. L. (M)
McGinley, J. H. (M)
McLucas, J. L. (SM)
Mentzer, J. R. (SM)
Miller, N. B. (M)
Minor, L. J. (A)
Mitra, R. (M)
Musser, G. L. (SM)
Norris, R. S. (M)
Oblinger, J. T. (M)
O'Connor, H. C., Jr. (M)
Palmer, R. R. (SM)
Passow, R. L. (SM)
Richardson, E. (M)
Scheetz, H. A. (M)
Scheuer, H. F. (M)
Schneider, H. L. (A)
Shaffer, J. D. (M)
Siewers, D. C. (A)
Skipper, R. E. (SM)
Skudrzyk, E. J. (M)
Smith, J. P. (M)
Snyder, N. (SM)
Stavely, E. B. (M)
Thompson, F. C. (A)
Tomlinson, J. M. (A)
Traugott, R. D. (M)
Walker, J. C. F., III (A)
Walker, J. P., Jr. (M)
Wavnick, A. H. (F)
Wolfe, R. E. (M)

Stafford (PHI-3)
Mathes, R. E. (F)
Jacobs, G. B. (M)

Sunbury (WIL-4)
Weber, J. O. (A)
Young, R. H. (M)

Swarthmore (PHI-3)
Barus, C. (SM)
Johnson, F. M. (M)
Little, R. V., Jr. (M)
Roberts, G. A. (M)
Rodgers, G. M. (A)

Sykesville (EMP-4)
Lesko, J. (M)

Tarentum (PIT-4)
Chantler, G. D. (A)
Harbaugh, J. R. (M)

Telford (P-LV-3)
Price, H. K. (A)
Robinson, S. A. (SM)

Throop (PHI-3)
Goodman, J. J. (A)
Yatsko, F. P. (A)

Tobyhanna (PHI-3)
Fuqua, H. G. (SM)
Jarecki, S. J. (A)

Towanda (ELM-C-1)
Engisch, R. A. (A)

Trafford (PIT-4)
Breakey, G. A. (A)

Trevose (PHI-3)
Bess, T. J., Jr. (M)
Edwards, A. H. (A)
Fath, J. P. (A)
Gorny, D. S. (M)
Hanson, L. B. (A)

Trexlerton (P-LV-3)
Tabor, C. J., Jr. (A)

Trooper (PHI-3)
Sandoval, J. (A)

Tunkhannock (PHI-3)
Hoffman, G. R. (M)
Inman, A. D. (A)

Turtle Creek (PIT-4)
Christensen, B. (A)
Tyrone (PIT-4)
Gwin, J. D. (M)
Kearney, H. B., Jr. (M)

Union City (BN-E-1)
Gregor, J. E. (A)

University Park (CP-4)
Bowhill, S. A. (M)
Holub, J. (M)
Nearhoof, H. J. (A)
Ross, W. J. (M)
Sechrist, C. F., Jr. (A)
Smith, R. M. (M)
Walker, E. A. (M)

Upper Darby (PHI-3)
Bush, B. A., Jr. (A)
Cecal, J. A. (A)
Charn, S. (SM)
Garkav, E. (M)
Gerry, M. E. (SM)
Gilligan, T. E., Jr. (M)
Gumacos, C. (M)
Jensen, D. W. (M)
Je Schmek, A. A. (A)
Mackey, J. J. (A)
Mankoff, L. L. (M)
McCoy, C. T. (SM)
Pope, R. A. (M)
Santaguida, C. (A)
Scalzetti, M. R. (M)
Stirman, J. P. (A)
Weinberg, H. M. (A)
Wendt, R. H. (A)

Valencia (PIT-4)
Findley, R. W. (M)

Vandergrift (PIT-4)
Soska, M. L. (M)

Verona (PIT-4)
Bartholomew, R. R. (M)
Hollobaugh, R. C. (M)
New, T. C. T. (M)
Viener, A. H. (M)

Villanova (PHI-3)
Dilks, U. C. S. (M)
Klekotka, J. A. (M)
Sentner, P. J. (A)
Stineman, J. W., Jr. (A)

Wallingford (PHI-3)
Howard, J. H. (SM)
Jayne, F. B. (A)
Remortoske, M. S. (A)
Robinson, L. E. (M)
Shallcross, D. H. (A)

Warminster (PHI-3)
Bicking, H. P. (M)

Warren (EMP-4)
Barre, W. E. (M)
Wanner, L. R. (M)

Warrington (PHI-3)
Clarance, A. L. (M)
McGlone, J. M. (M)
Glaser, R. G., Jr. (A)

Washington (PIT-4)
Elder, R. C. (A)
Loffredi, A. J. (A)
Paul, D. R. (M)
Spriggs, L. A., Jr. (M)

Wayne (PHI-3)
Blakely, R. T. (SM)
Bowman, D. F. (SM)
Collins, H. B., Jr. (A)
Davis, H. U. (M)
De Wolf, J. B. (M)
Libby, E. C. (A)
Lolli, L. M. (A)
McFall, R. W. (SM)
McSorley, S. L. (A)
Nasonk, D. E. (A)
Niemann, E., Jr. (A)
Okada, R. H. (A)
Reagan, W. E. (M)
Samsel, R. W. (M)
Shepard, B. R. (SM)
Stern, D. M. (A)
Tate, H. J. (M)

Waynesboro (PHI-3)
Diller, D. S. (A)
Grove, G. W., Jr. (A)
Marlow, W. C., Jr. (VA)
Wassenberg, J. F. (M)

Weatherly (PHI-3)
Carlson, R. F. (SM)
Kiser, N. L. (SM)

Wesleyville (BN-E-1)
Brown, P. A. (M)
Larson, K. E. (M)

West Chester (PHI-3)
Craig, R. C. (M)
Darnowsky, M. (A)
Green, R. E., Jr. (M)
Hauer, L. P. (SM)
Hayes, H. J. (M)
Kieselbach, R. (M)
Kolderup, L. E. (A)
Markarian, H. (A)
Veldhuis, I. A. C. (M)

West Lawn (PHI-L-3)
Shaffer, R. E. (A)

West Middlesex (PIT-4)
Herr, C. E. (A)

West Pittston (PHI-3)
Bruno, A. R. (M)
Melvin, J. T. (A)
Phillips, E. L. (M)
Ripple, J. W. (A)
West Reading (PHI-L-3)
Davis, W. J. (M)
Easterday, J. L. (A)

Wexford (PIT-4)
Metz, E. W., Jr. (A)

Wilkes-Barre (PHI-3)
Epstein, J. W. (M)
Kingston, W. J. (A)
Shuster, E. F. (VA)
Ziegler, I. A. (M)

Wilkinsburg (PIT-4)
Thompson, B. L. (M)

Williamsport (WIL-4)
Amey, G. B. (A)
Anderson, L. F. (M)
Bresee, W. H. (M)
Conrad, R. E., Jr. (A)
Harvey, N. L. (F)
Petts, R. (M)
Pony, R. H. (M)
Richart, D. H. (M)

Willow Grove (PHI-3)
Bigelow, H. L., Jr. (M)
Borman, S. H. (A)
Fisher, M. K. (M)
Florence, V. H. (M)
Fraser, R. S. (M)
Koon, W. S., Jr. (A)
Kornfeld, M. (A)
Lewis, J. R. (M)
Mason, E. C. (A)
Saltzman, A. R. (A)
Silverman, E. (M)
Speights, M. T. (M)
Thomson, D. N. (M)
Tillman, R. M. (M)
Zohn, R. L. (M)

Woodlyn (PHI-3)
Kashmar, E. J. (M)
Russo, L. J. (M)

Wyncote (PHI-3)
Bernbaum, B. (M)
Craig, P. M. (F)
Dorris, R. C. (M)
Fox, B. (M)
Hardy, N. (A)
Kinnier, D. (M)
Kusma, D. (SM)
Lilly, G. (A)
Sher, N. (M)

Wyndmoor (PHI-3)
Everett, F. C. (M)

Wynnwood (PHI-3)
Blum, C. M. (A)
Dohan, W. R. (M)
Fisher, J. F. (SM)
Fulton, L. H. (A)
Leas, J. W. (SM)
Meyerhoff, A. J. (M)
Thompson, E. C. (A)

Wyoming (PHI-3)
Casterlin, A. N. (A)

Wyomissing (PHI-L-3)
Bunnell, N. R. (A)
Emery, L. D., Jr. (M)
Gehris, J. P. (M)
Huyett, W. I. (M)

Yardley (PHI-3)
Emslie, N. M. (A)
Follmer, W. C. (M)
Schwartz, N. J. (M)

Yeadon (PHI-3)
Dillon, T. P. (A)
Donecker, R. R. (A)
Merrill, J. H. (M)
Moleri, J. T. (A)
Myers, L. F. (A)
Ransler, R. (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 Voll, R. L. (SM)
Dodge, P. O. (M)
Feder, J. H., Jr. (A)
Frost, E. L. (A)
Gardner, R. W. (A)
Glesecke, H. W. (M)
Goodling, G. G., Jr. (M)
Haas, W. I. (M)
Kiger, L. L. (A)
Kudlich, K. H. (M)
Lease, D. A. (A)
Lowe, F. B. (A)
Pueschner, H. (M)
Schutt, R. O., Jr. (A)
Sims, W. H., Jr. (M)
Staub, J. R. (A)
Sullivan, A. H., Jr. (SM)
Tinkham, R. W. (A)
Todd, H. H. (M)
Umpleby, K. F. (SM)
Walker, H. (SM)
Wildermuth, J. R. (M)

Youngwood (PIT-3)
Angello, S. J. (SM)
Bright, R. L. (M)
Stein, F. S. (M)
Stelmak, J. P. (SM)

RHODE ISLAND

Ashaway (BOS-1)
Hill, R. F. (M)
Young, R. W. (M)

Barrington (BOS-1)
Carmody, T. P. (M)
McGlashan, K. W. (M)
Prior, T. K. (A)

Bristol (BOS-1)
Tingley, F. M. (M)

Centerdale (BOS-1)
Leath, C. W. (A)

Central Falls (BOS-1)
Boivin, P. B., Jr. (A)
Onoyan, G. G. (A)

Cranston (BOS-1)
Abbenante, N. (M)
Bennett, H. W. (SM)
Cardillo, A. (A)
Monopoli, R. V. (A)
Salk, D. (A)
Soscia, B. L. (A)

East Greenwich (BOS-1)
Bingham, R. C. (A)
Kimble, C. B. (M)
Leopold, J. M. (A)
Smith, P. W. (A)
Tyler, E. M. (M)
Wong, G. J. (M)

East Providence (BOS-1)
Bishop, B. F. (M)

Gaspee Plateau (BOS-1)
Arnold, W. J. (M)

Hoxsie (BOS-1)
Kunz, G. A. (A)

Kingston (BOS-1)
Haas, R. S. (A)
Prince, M. J. (M)
Richards, D. B. (A)

Manville (BOS-1)
Lavellee, M. L. (A)

Middletown (Bos-1
Bailey, E. S. (M)
Higgins, J. T. (A)
Koeritz, L. (M)
Wilson, R. E., Jr. (M)

Narragansett (BOS-1)
Mowbray, W. H. (A)

Newport (BOS-1)
Baer, E. W., III (A)
Barry, D. T. (A)
Bell, A. E. (M)
Bowerman, R. H. (A)
Brown, L. C. (A)
Craig, A. G., Jr. (M)
Fleming, J. H. (M)
Mathison, W. W. (M)
Murphy, E. J. (M)
Ridenour, H. E. (A)
Ripple, E. G. (M)
Sellars, R. F. (M)
Soliozy, C. S. (M)
Vincent, G. D. (A)
Zisk, S. H. (A)

Pawtucket (BOS-1)
Farrell, C. L., Jr. (A)
Nichols, A. J. (A)

Peace Dale (BOS-1)
Birch, W. B. (A)

Point Judith (BOS-1)
Merriam, R. W. (M)

Providence (BOS-1)
Anderson, G. P. (M)
Angulo, C. M. (SM)
Barlow, H. B., Jr. (M)
Bliss, Z. R. (A)
Dandreta, W. (VA)
Davies, K. (M)
Farrell, F. X. (M)
Fine, S. (A)
Halton, E. B. (M)
Kotlis, R. D. (SM)
Kornhauser, E. T. (SM)
Markey, J. T. (A)
McKinley, J. J. (A)
Murtaugh, W. A. (M)
Nordquist, P. L. (M)
Regan, J. V., Jr. (A)
Remington, R. C. (M)
Rizzi, P. A. (M)
Stabler, E. P. (A)
Testa, E. (A)
Truell, R. (SM)
Verrecchia, T. A. (M)

Quonset Point (BOS-1)
Huff, M. S. (M)

Riverside (BOS-1)
Bushnell, R. R. (A)

Rumford (BOS-1)
Chick, B. B. (M)
Prior, T. C. J. (M)

Tiverton (BOS-1)
Lizotte, O. A. (M)

Valley Falls (BOS-1)
Bailey, L. E. (M)

Wakefield (BOS-1)
Fraser, D. W. (SM)

Warren (BOS-1)
Bowen, H. C. (M)

Warwick (BOS-1)
Kleiner, B. H. (M)
Thoresen, J. C. (A)

West Barrington (BOS-1)
Coppolino, L. S. (M)

Westerly (BOS-1)
Finocchiaro, E. C. (M)
Sardelli, H. A. (A)
Sardelli, W. G. (A)

SOUTH CAROLINA

Aiken (ATL-C-3)
Clawson, L. F., Jr. (A)
Le Geros, J. P. (M)
Mankin, L. B. (M)
Meiselbach, A. W. (A)
Mix, P. E. (M)
Ramsey, R. W., Jr. (M)
Ross, J. D. (A)
Studley, R. V. (M)

Anderson (ATL-3)
Glaser, H. I. (M)

Charleston (ATL-C-3)
Bailey, J. H. (M)
Birchfield, W. P. (A)
Cormack, J. G. (A)
Dawson, O. D. (A)
Goldberg, H. S. (M)
Gremer, C. E. (M)
Hamilton, W. T. (M)
Hancock, G. H. (A)
Hart, R. N., III (M)
Herring, O. L., Jr. (M)
Jefferies, D. W. (M)
Sanderson, R. F. (M)
Sarco, J. (A)
Schachte, W. L. (SM)
Schleppegrell, J. R. (A)
Smith, F. A. (M)

Charleston Heights (ATL-C-3)
Griffin, W. G., Jr. (A)

Chester (ATL-3)
Craig, M. J. (M)

Clemson (ATL-3)
Adams, L. C. (A)
Long, J. T. (A)
Martin, J. C. (M)
Thurston, J. N. (SM)

Columbia (ATL-C-3)
Fellers, R. G. (SM)
Ferris, W. R. (F)
Foster, L. W. (SM)
Lambert, R. D., Jr. (SM)
Landes, H. S. (M)
Lowman, B. L. (M)
Pringle, J. J., III (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)
Warr, G. H. (M)

Donaldson (AFB-3)
Baischer, D. H. (A)

Florence (ATL-C-3)
Beamer, G. T. (A)
Helms, C. W. (A)
Herring, M. J. (A)
Kitson, J. E., Jr. (A)
Moore, B. E. (M)
Sellars, R. A. (A)
Townsend, A. P. (A)

Greenville (ATL-3)
Fernandez, M. (SM)
Garrison, W. E. (M)
Greer, P. A. (M)
James, J. E. (M)
Pace, M. W. (A)
Wearn, W. C. (A)
White, J. H. (M)

Irmo (ATL-C-3)
Flood, F. R. (M)
Moore, S. F., Jr. (M)

Moncks Corner (ATL-3)
Volf, L. F. (A)

Naval Base (ATL-C-3)
Flynn, L. A. (A)

North Augusta (ATL-C-3)
Gill, J. P., Jr. (M)
Michael, L. E. (A)

North Charleston (ATL-C-3)
Gatch, C. E. (A)
Jonas, A. (M)
Martin, J. A. (A)
Pelley, A. D. (M)
Reid, J. R. (A)
Rogers, C. L. (M)
Thomason, J. G. (M)

Orangeburg (ATL-C-3)
O'Cain, W. L. (A)
Smith, C. R. (M)

Pendleton (ATL-3)
Pippin, R. F., Jr. (M)

Rock Hill (ATL-3)
Hughes, H. K. (M)

Seneca (ATL-3)
Bailey, J. M. (M)

Shaw AFB (ATL-C-3)
Doxtator, R. H. (A)
Edwards, H. J., Jr. (M)
Michaels, G. (A)

Sumter (ATL-C-3)
Grace, E. H., Jr. (A)
Meyer, B. H. (M)

West Columbia (ATL-C-3)
Hafely, C. H. (A)

SOUTH DAKOTA

Arlington (TC-5)
Dill, E. C. (M)

Brookings (TC-5)
Cheadle, J. N. (M)
Keating, D. J. (M)
Nold, F. D. (M)

College Station (TC-5)
Easler, W. O. (M)

Henry (TC-5)
Haigh R. B. (M)

Pierre (TC-5)
Jones, M. G. (A)

Rapid City (TC-5)
Mayer, F. (A)
Nelson, E. A. (M)

Sioux Falls (TC-5)
Bunday, G. F. (A)
Froke, L. C. (A)
Granberg, M. L. (M)
McKenna, W. E. (M)
Nelson, V. R. (A)
Pierce, M. E. (M)
Sikorski, J. W. (A)
Warren, L. C. (A)

Springfield (TC-5)
Bedwell, T. H. (M)

Wagner (TC-5)
Kucera, A. T. (M)

Tyndall (TC-5)
Kostal, L. R. (M)

Vermillion (TC-5)
Graf, S. J. (M)

TENNESSEE

Alcoa (AT-3)
Jenkins, P. M. (A)
Warren, M. Jr. (M)

Bristol (AT-3)
Bradfute, G. A., Jr. (A)
Franevsky, M. (M)
Gray, C. S. (SM)
McClain, W. J. (M)
Powers, E. W. (M)
Smith, B. Jr. (SM)

Chattanooga (AT-3)
Barnes, B. B. (A)
Bohr, E. T. (M)
Briscoe, H. R., Jr. (A)
Campbell, G. S. (A)
Crozier, H. W. (M)
Hochdorf, A. (M)
Hoffstetter, G. E. (M)
King, T. R. (A)
Meagher, A. W. (A)
Smith, R. T. (A)
Terrell, J. M., Jr. (M)
Young, B. A. (A)

Clarksville (HUN-3)
Bailey, J. H. (A)

Concord (AT-3)
Reyling, P. M. (M)

Cordova (HUN-3)
Downs, H. I. (A)

Donelson (HUN-3)
Green, N. (M)
Pearsall, S. H. (M)

Fayetteville (HUN-3)
Thompson, A. W. (M)

Fountain City (ATL-3)
Evans, E. C. (M)
Oakes, L. C. (A)

Franklin (HUN-3)
Holabs, R. V. (M)
Ragsdale, S. P. (A)

Greenville (ATL-3)
Brent, C. H., Jr. (A)
Roberts, L. L. (M)

Huntington (HUN-3)
Ward, E. B. (M)

Kingsport (AT-3)
Devaney, R. G. (M)
Henry, J. W. (SM)
Phillips, T. (M)
Rigg, R. W. (M)

Kingston (AT-3)
Hanauer, S. H. (M)
Kelley, G. G. (M)

Knoxville (ATL-3)
Affel, R. G. (M)
Bradshaw, R. L. (M)
Chambers, W. M. (A)
Eckel, J. R., Jr. (A)
Evans, R. C. (A)
Horton, J. R. (M)
Limberg, A. C. (A)
Morris, R. B. (A)
Peifer, W. A. (A)
Pierce, J. F. (SM)
Rangitsch, E. L. (M)
Schetle, R. W. (M)
Snyder, J. F. (A)
Stanbery, J. F. (SM)
Tillman, J. D., Jr. (M)

Lake City (ATL-3)
Byerly, J. W. (A)
Rocca, W. B., Jr. (M)

Lawrenceburg (HUN-3)
Beckham, R. H. (M)

Manchester (HUN-3)
Chapek, H. T. (M)
Kingery, M. K. (M)
McAdams, E. E., Jr. (A)

Maryville (ATL-3)
Detweiler, D. C. (A)
Levisay, D. H. (M)

Memphis (HUN-3)
Babb, E. L. (A)
Bodry, W. A., Jr. (A)
Boyd, I. H. (M)
Boyle, J. K., Jr. (M)
Branyan, C. A. (A)
Brasch, W. E. (A)
Browning, J. W. (M)
Busler, L. F., Jr. (A)
Christian, O. R. (M)
Clark, R. N. (M)
Conitra, R. C. (A)
Deininger, C. R. (M)
Ecoff, F. A., Jr. (A)
Fenn, R. W. (M)
Fitzgerald, G. M., Jr. (A)
Greene, M. A. (A)
Harbison, R. T. (A)
Holbrook, T. C., Jr. (A)
King, R. E. (A)
Logan, E. W., Jr. (A)
Marsh, W. (M)
McLin, J. T. (A)
Pippenger, D. E. (A)
Robertson, W. H. (A)
Stewart, E. B. (A)
Tu, J. C. (M)
Viser, J. H., Jr. (A)
Walker, J. A. (A)

Millington (HUN-3)
De Noon, N. L. (A)
McKnight, D. R. (A)

Nashville (HUN-3)
Arnold, T. G., Jr. (M)
Bricht, F. W. (M)
Broden, R. W. (A)
Brtch, C. E. (A)
Campbell, J. S. (M)
Daddario, A. S. (M)
Dewitt, J. H., Jr. (F)
Dicker, P. E. (M)
Dorris, C. G. (M)
Duke, C. R. (M)
Ewing, A., Jr. (M)
Genung, N. W. (M)
Goodloe, R. R. (A)
Greenhouse, H. M. (M)
Hucaby, R. L. (M)
Irby, H. C. (A)
Johnson, L. E., Jr. (M)
Keene, W. E. (M)
Kincheloe, P. P., Jr. (A)
King, J. L. (A)
Montgomery, L. H., Jr. (SM)
Rawls, L. E. (M)
Reynolds, G. A. (M)
Schumann, F. (SM)
Stifler, W. W., Jr. (SM)
Sutton, A. T. (M)
Wetterau, L. C., Jr. (M)

Oak Ridge (AT-3)
Anderson, J. L. (A)
Banta, H. E. (SM)
Donaldson, M. R. (SM)
Fairstein, E. (SM)
Fort, W. G. S. (M)
Gerhard, W. J. (M)
Green, F. P. (A)
Groothuis, S. E. (A)
Henry, K. M., Jr. (A)
Holt, G. A. (M)
Judish, J. P. (M)
Knowles, D. J. (SM)
Manning, F. W. (M)
Marks, J. E. (M)
Miller, J. W. (M)
Morrison, C. L. (M)
Niehaus, D. J. (A)
Pidgeon, R. E., Jr. (A)
Pigg, J. C. (M)
Porter, F. M. (M)
Reynolds, J. W. (A)
Ritter, R. C. (A)
Shipley, E. D. (M)
Southern, A. L. (A)
Stone, R. S. (A)
Van Sickle, G., Jr. (A)
Zachry, D. S., Jr. (M)
Ziegler, N. F. (A)

Powell (ATL-3)
Allen, J. W., Jr. (A)

Sparta (ATL-3)
Haston, C. W. (M)

Tullahoma (HUN-3)
Cortner, A. H. (M)
Fitzhugh, H. S., II (M)
Gillman, T. L. (A)
Greer, E. H. (M)
Harper, F. M. (M)
Henderson, R. P. (M)
Holmes, W. R. (M)
Johnson, M. D. (M)
Kalsner, R. W. (M)
Pope, R. H. (A)

TEXAS

Abilene (FW-6)
Alford, A. R. (A)
Henley, R. D. (A)
Visser, A., Jr. (A)

Amarillo (LUB-6)
Farmer, P. E. (M)
Harris, H. W. (M)
Martin, I. L. (M)
Torrey, W. H. (A)
Williams, A. M. (M)

Arlington (FW-6)
Bohner, R. O. (A)
Bondy, M. A. (M)
Bushart, G. J., Jr. (M)
Calvin, C. C., Jr. (A)
Clanton, J. D., Jr. (A)
Drennan, J. B. (A)
Dunaway, R. M. (M)
Fischer, J. N. (M)
Grimes, J. W., Jr. (M)
Hodge, K. B., Jr. (M)
Howard, J. E. (M)
Hutcheson, G. C. (SM)
Lanier, R. E. (M)
Linehan, R. J. (M)
Murry, R. W. (A)
Prior, R. R. (M)
Purcell, W. E. (A)
Raymond, W. D. (M)
Reynolds, G. N. (M)
Sandlin, G. L. (M)
Terbush, H. W. (A)
Thayer, E. A. (M)
Troutman, P. G. (A)
Wendlandt, C. W. (A)

Austin (SA-6)
Adams, R. M. (M)
Anderson, C. D. (A)
Baltzer, O. J. (SM)
Barclay, J. N. (SM)
Bostick, F. X. (M)
Brandt, W. L. (M)
Britt, C. G. (M)
Brooks, F. E., Jr. (SM)
Crain, C. M. (SM)
Darmento, J. (M)
Davis, A. (SM)
Dean, A. P. (M)
Dolan, B. A. (A)
Downes, C. L. (A)
Duesterhoeft, W. C., Jr. (SM)
Dyer, J. A. (M)
Evans, J. D. (A)
Freund, G. J. (A)
Garner, W., Jr. (A)
Glenn, A. (M)
Hackett, R. E. (M)
Hart, W. M., Jr. (A)
Hartwig, W. H. (SM)
Hixson, E. L. (M)
Huggins, L. L. (M)
Hytin, T. M. (A)
Kreuz, L. B. (SM)
La Coste, L. J. B. (A)
Lagrone, L. E. (A)
Lane, R. N. (SM)
Lauderdale, D. M. (M)
McClure, R. M. (M)
McKinney, C. M. (SM)
McQueen, A. N. Jr. (A)
Mollenhauer, H. H. (A)
Opiela, A. D., Jr. (A)
Owen, T. E. (M)
Pease, L. A. (A)
Reinhard, E. A. (M)
Ripperger, E. A. (A)
Rummel, E. C. (M)
Severin, J. A. (A)
Smith, H. W. (SM)
Smith, S. E. (M)
Stocks, D. R., Jr. (A)
Stone, C. S. (M)
Straiton, A. W. (F)
Thorn, D. C. (M)
Tolbert, C. W. (SM)
Wallace, R. H. (A)
Wallis, W. R. (A)
White, G. E. (SM)
Wright, J. R. (M)
Wukasch, E. O. (M)

Ballinger (FW-6)
Kelley, W. C. (M)

Bastrop (SA-6)
Douglas, J. H. (A)

Baytown (HOU-6)
Jordan, R. W. (A)
Suttle, A. D., Jr. (SM)

Beaumont (B-PA-6)
Andrews, F. E. (A)
Ballard, B. J. (A)
Bordeman, M. H. (A)
Burgess, C. H. (M)
Bush, C. R. (M)
Cherry, L. B. (SM)
Coburn, E. D. (M)
Crum, F. M. (M)
Cunningham, R. E. (M)
Davis, A. G., Jr. (M)
Davis, V. E. (A)
Eckles, W. W., Jr. (M)
Ferguson, J. D. (A)
Hughes, B. (M)
Laughlin, C. E. (M)
Lawrence, T. H. (M)
McDaniel, L. W. (M)
Montague, L. E. (A)
Morgan, J. G. (M)
Moseley, J. S., Jr. (A)
Musick, A. L., Jr. (A)
Normand, A. J. (A)
Ott, L. G. (A)
Petkovsek, J., Jr. (SM)
Shane, Z. G. (A)
Smith, H. K. (A)
Southwell, J. D. (SM)
Stockard, J. C. (M)
Straughn, W. L., Sr. (M)
Warner, R. A. (A)
Wearden, P. L. (M)
Whitmeyer, L. F., Jr. (A)
Wilder, E. H. (M)

Beeville (SA-6)
Collins, J. O. (M)
Godfrey, B. L., Jr. (A)

Bellaire (HOU-6)
Arbogast, J. L. (A)
Badger, A. S. (SM)
Baker, L. E. (A)
Ball, D. F. (M)
Barnette, L. A. M. (SM)
Borden, R. R. (A)
B

Crook, T. N. (M)
England, L. T. (A)
Easterling, M. P. (M)
Fleming, L. (SM)
Frobese, C. W. (M)
Granberry, H. W. (M)
Hager, C. K. (M)
Herzog, G. (F)
Hicks, F. M. (A)
Hudgins, W. T., Jr. (A)
Hudson, J. L. (A)
Huhndorff, E. P. (M)
Hutchens, R. L. (A)
Loolbourrow, B. J. (SM)
Mann, R. W. (SM)
Mazzagatti, R. P. (A)
Nance, B. J. (M)
Owen, W. W. (M)
Pennington, M. S. (A)
Schafer, E. L. (A)
Stafford, J. A. (M)
Stanley, R. S. (M)
Stelzer, R. B. (SM)
Tickell, E. B. (M)
Waldie, A. D. (M)
Wheeler, H. T. (M)

Benbrook (FW-6)
Hall, T. B., Jr. (M)
Looney, G. R. (A)
Maes, W. J. (M)
Mitchell, D. B. (M)

Big Spring (LUB-6)
Dahse, C. A. (M)

Blooming Grove (DAL-6)
Crocker, J. A. (M)

Borger (LUB-6)
McGrath, H. E. (A)

Brownfield (LUB-6)
Spear, R. B. (M)

Brownsville (SA-6)
Braud, J. J. (M)
Janik, J. L. (M)
Maring, C. T. (M)
Martin, G., Jr. (A)

Bryan (HOU-6)
Druce, A. J. (M)
Hansen, P. G. (M)
Sosolik, F. J. (A)
Wensley, D. C. (M)

Canyon (LUB-6)
Thompson, C. E. (M)

Castroville (SA-6)
Burges, E. G., Jr. (M)

Center (B-PA-6)
Riley, H. E. (A)

China (B-PA-6)
Seaberg, I. (A)

Cleburne (FW-6)
Gardner, A. H. (M)
Graham, H. L. (A)
Ryter, R. L. (M)

College Station (HOU-6)
Hettenhausen, L. H. (M)
Hlard, J. R. (M)
Dillingham, H. C. (SM)
Hallmark, G. D. (M)
Jonas, L. K. (M)
Matzen, W. T. (M)
Navarro, S. O. (M)
Osborn, W. F. (M)
Richman, R. L. (M)
Roots, E. N., Jr. (M)

Commerce (DAL-6)
Sparkman, W. A., Jr. (M)

Corpus Christi (SA-6)
Darack, O. C. (A)
Dunn, E. C. (A)
Lockhart, H. B. (A)
Mayberry, J. H. (A)
McHugh, E. L. (A)
Mosher, C. C. (A)
Roberts, J. D. (A)
Segrest, B. C. (M)
Taylor, P. (M)
Zazvorka, J., Jr. (SM)

Corsicana (DAL-6)
Jackson, M. L. (A)

Dallas (DAL-6)
Adcock, W. A. (SM)
Albano, J. (SM)
Alessi, V. J. (M)
Anderson, A. A. (M)
Ankele, E. T., Jr. (M)
Ariail, H. E., Jr. (M)
Aymond, E. F., Jr. (A)
Bailey, R. W. (M)
Bailey, W. R. (M)
Baker, H. C. (M)
Bandy, G. C. (A)
Barnett, M. L. (M)
Bebak, V. F. (A)
Becker, G. G. (M)
Beckhoff, G. (A)
Becklund, O. A. (SM)
Bentley, E. M. (A)
Bickel, R. L. (A)
Bigger, W. H. (SM)
Bowling, W. P. (M)
Brachman, M. K. (SM)
Branham, D. W. (A)
Brannon, E. C. (M)
Branum, M. C. (A)
Brawner, C. A., Jr. (SM)
Brister, B. (A)
Brock, F. A. (M)
Broodo, A. (M)
Brower, W. C. (M)
Brown, L. E. (M)
Brown, R. L., Jr. (SM)
Brown, R. A. (A)
Bruland, R. V. (M)
Buchanan, D. L. (M)
Buchmeyer, H. W. (SM)
Buckner, R. P. (M)
Bullock, M. W. (SM)
Bunday, D. L. (SM)
Burg, K. E. (M)
Buzard, R. S. (M)
Calkins, W. R. (M)
Call, P. D. (M)
Campbell, J. R. (M)
Carlton, L. A., Jr. (M)
Carman, J. N. (A)
Carr, W. B. (A)
Carroll, J. M. (M)
Carter, N. B. (A)
Carter, T. F. (M)
Cash, F. L. (M)
Chandler, N. M. (M)
Chapin, R. C. (M)
Chapman, A. B. (M)
Chenault, H. P. (A)
Childress, C. B. (A)
Coats, R. P. (A)
Collins, F. (SM)
Congdon, R. L. (SM)
Cooper, J. W. (SM)
Cornelison, B. (SM)
Coursey, J. R. (M)
Crandell, C. F. (M)
Cullum, A. E., Jr. (F)
Daniell, C. M. (SM)
Deaderick, G. E. (M)
De Weese, C. R. (M)
Dimick, C. V. (M)
Dimock, B. F., Jr. (A)
Doherty, J. E. (M)
Donald, B. E. (M)
Donovan, J. J. (M)
Dowell, K. P. (M)
Dubose, G. P. (M)
Dunlap, R. H. (M)
Dutton, C. G. O. (A)
Dyer, F. C. (M)
Dyke, E. (SM)
Earhart, C. E. (SM)
Eddleston, J. H. (M)
Edwards, T. S. (M)
Eikenburg, R. B. (M)
Elkins, C. C., Jr. (M)
Elmore, C. M., Jr. (M)
Evans, A. D. (SM)
Farrell, T. A., Jr. (M)
Fenner, R. G. (M)
Findley, L. K. (SM)
Finley, C. G. (M)
Fisher, L. M. (A)
Fisk, W. J. (M)
Flath, E. H., Jr. (M)
Flynn, J. G., Jr. (SM)
Fox, C. H. (M)
Frauman, C. I. (M)
Funke, W. G. (M)
Garrison, H. G. (A)
Gela, A. J. (M)
Geisel, F. J. (SM)
Geissinger, E. L. (A)
Gilder, E. E. (A)
Gill, R. M. (M)
Gluck, L. D. (A)
Godbey, J. K. (SM)
Gragert, W. J. (M)
Granberry, D. S. (SM)
Green, G. F., Jr. (M)
Green, J. A. (SM)
Green, P. M. (M)
Greenberg, L. H. (M)
Griffin, E. H. (M)
Gudzin, M. G. (M)
Haahn, F. J. (SM)
Haefele, D. M. (M)
Haggerty, P. E. (SM)
Hagood, W. N. (A)
Hall, D. B. (A)
Hall, J. R. (SM)
Hallford, B. R. (M)
Hanford, R. W. (SM)
Hardtacker, D. C. (M)
Harmon, F. I. (M)
Head, C. D., III (M)
Headington, N. L. (A)
Hedeman, W. R., Jr. (SM)
Helzer, R. W. (M)
Hensley, M. C. (A)
Hertel, P., Jr. (A)
Hewlett, T. N. (M)
Higginbotham, H. L. (M)
Hirschberg, J. K. (A)
Holt, I. D. (M)
Hood, B. J. (A)
Hooker, B. C. (A)
Horak, F. A. (SM)
Horne, K. M., Jr. (A)
Howard, G. M. (SM)
Howes, R. B., Jr. (M)
Humke, F. O., Jr. (M)
Hunt, J. T. (A)
Hutchinson, N. D. (M)
Ince, N. S. (A)
Ingram, J. H. (M)
Irwin, C. B., Jr. (M)
Jenkins, E. A. (M)
Johns, J. H. (A)
Jones, T. L. (SM)
Johnson, G. D. (M)
Johnston, J. J. (A)
Jones, R. W. (M)
Joyce, W. F. (SM)
Jurek, W. M. (SM)
Kay, L. (A)
Kearney, R. I., Jr. (M)
Kearse, G. P. (SM)
Keener, R. F. (M)
Kelly, C. P. (M)
Kelly, J. J. (A)
Kelsay, W. D. (M)
Kennedy, F. H., Jr. (SM)
King, L. E. (SM)
Kitchens, L. G. (M)
Knight, J. H. (A)
Knellmann, G. D. (A)
Kuehne, W. (SM)
Kunde, W. W., Jr. (M)
Lawrence, L. J. (A)
Lebanoff, L. (A)
Ledford, R. E., Jr. (A)
Lee, C.-C. (M)
Leedom, J. N. (M)
Leinfelder, E. J. (A)
Levelle, A. S. (M)
Levy, R. A. (M)
Lewis, M. T. (M)
Lincoln, C. F., Jr. (A)
Lineback, J. T. (A)
Linker, C. L. (A)
Lipscomb, R. W. (SM)
Londenberg, E. F., Jr. (A)
Long, F. (A)
Loper, G. B. (M)
Loposer, T. L. (SM)
Loras, J. (SM)
Lowery, R. O. (M)
Lowry, J. H., Jr. (M)
Lucas, C. H. (M)
Lupfer, W. C. (A)
Luthans, R. L. (M)
Macdonald, J. R. (SM)
Mace, J. W. (M)
Martin, D. O. (M)
Martin, E. B. (A)
Mason, A. E., Jr. (A)
Mathis, J. D. (SM)
Maxwell, J. W. (A)
Maxwell, K. D. (M)
McAnally, D. G. (M)
McClellan, J. C., Jr. (A)
McConnell, D. K. (M)
McCord, A. R. (M)
McDermott, E. (M)
McDonald, D. D., Jr. (A)
McDonald, J. E. (A)
McDonald, M. (A)
McKinney, R. C. (M)
McMillin, J. M., Jr. (A)
McMullin, J. (M)
McNeely, J. S. (SM)
Meinholdt, D. W. (A)
Michaelis, L. P. (M)
Miller, J. C., Jr. (A)
Miller, W. D. (M)
Mills, R. L. (M)
Minton, J. A., Jr. (A)
Mitchell, H. L. (M)
Mitchell, J. W. (M)
Morton, H. W. (A)
Moseley, T. B. (SM)
Moss, H. (SM)
Mut, S. C. (M)
Naab, P. (M)
Nastasiak, J. J. (M)
Neitzel, E. B. (M)
Nelson, T. J. (A)
Newell, B. J. (A)
Nichols, C. (M)
Nickel, W. L. (M)
Nilson, O. J. (A)
Norkus, B. S. (M)
Norvell, E. W. (A)
Norvell, R. A. (M)
Ocnaschek, F. J. (SM)
Oster, R. E. (M)
Owens, H. L. (SM)
Packard, D. (M)
Paslay, L. C. (M)
Paxton, T. N. (A)
Peacock, R. M., Jr. (A)
Penn, W. D. (SM)
Peterson, D. A. (SM)
Pettler, P. R. (M)
Pittman, P. D., Jr. (M)
Potter, W. (M)
Prickett, T., Jr. (SM)
Prier, H. W. (A)
Radcliffe, J. C. (SM)
Ratti, J. N. (A)
Read, J. (M)
Reed, B. S. (M)
Reese, J. R. (M)
Renegar, D. D. (M)
Renner, D. S. (M)
Riser, H. W. (M)
Ritchey, L. C., Jr. (A)
Roberts, E. L. (M)
Robinson, G. C. (M)
Robinson, J. C. (M)
Rogers, H. H., Jr. (M)
Rogers, T. E. (M)
Rosentreter, E. W. (SM)
Rountree, J. G. (SM)
Runyan, J. (M)
Rutherford, C. R. (M)
Sarrafian, G. P. (A)
Sartor, J. O., Jr. (M)
Scanlon, P. J. (M)
Schafer, N. C. (A)
Schwalm, C. M. (A)
Scott, K. L. (M)
Seay, C. F., Jr. (SM)
Sharpe, T. W. (M)
Shepherd, M. M., Jr. (SM)
Shook, E. M. (M)
Shuffler, R. M. (SM)
Simmons, A. C., Jr. (M)
Simonds, F. W. (M)
Sloan, B. O. (A)
Smallwood, J. L. (M)
Smith, C. E. (A)
Smith, D. L. (M)
Smith, H. L. (SM)
Smith, J. E. (A)
Smith, J. H. (M)
Smith, F. G. (A)
Smith, G. A., Jr. (M)
Smith, H. E. (SM)
Smith, J. D. (M)
Snipes, R. W. (A)
Songayllo, A., Jr. (M)
Sorkin, S. A. (M)
Spaulding, G. B. (M)
Spencer, H. L. (M)
Spencer, L. P. (A)
Spieker, L. J. (M)
Stanford, J. A. (M)
Sterner, E. L. (A)
Stewart, R. F. (A)
Stewart, W. E. (M)
Stinson, L. W. (A)
Storey, B. (M)
Stover, J. S. (M)
Strauss, R. E. (A)
Stroup, R. M., Jr. (M)
Sullivan, O. J. (A)
Sullivan, W. A., Jr. (A)
Summers, G. C. (M)
Tatum, F. W. (SM)
Taylor, J. H. (A)
Teal, G. K. (F)
Teddlie, E. A. (A)
Thompson, J. H., Jr. (SM)
Thomson, J. R. (M)
Thornhill, J. W. (SM)
Thurmond, F. S., Jr. (A)
Tracy, T. J. R. (M)
Trent, R. L. (M)
Trewitt, M. B. (M)
Tucker, D. J. (SM)
Tullius, R. F. (M)
Underbrink, G. P. (M)
Vilbig, J. L., Jr. (SM)
Wadel, L. B. (SM)
Waite, H. M. (A)
Walker, M. C. (M)
Wallace, R. M. (M)
Wallis, T. F., Jr. (A)
Walters, C. P. (M)
Waltz, D. M. (M)
Walz, R. F. (M)
Wanja, L. F. (M)
Waters, W. F. (M)
Watkins, V. D. (M)
Watson, C. D., Jr. (A)
Watson, J. M. (A)
Waugh, J. H., Jr. (M)
Weaver, T. H. (A)
Webster, R. R. (SM)
Wedel, E. L. (A)
Weedfall, W. W. (A)
Weeks, R. M. (M)
Weinhouse, N. P. (A)
Weinreich, G. F., Jr. (A)
Welch, A. B. (A)
Welch, O. R. (A)
Weldon, J. M. (M)
Weldon, L. O. (F)
Wenger, W. D. (SM)
Werner, C. T. (M)
West, H. B., Jr. (A)
White, C. A., Jr. (M)
White, J. A. (A)
Whitson, D. R. (M)
Whittemore, P. B. (SM)
Wilhelm, E. S. (SM)
Wilkinson, J. D. (M)
Willard, R. S., Jr. (M)
Williams, C. S. (SM)
Wiman, L. (M)
Wissemann, H. J. (SM)
Witty, W. M. (SM)
Wolk, I. F. (A)
Wolff, E. A. (A)
Wood, H. A. (A)
Woods, R. B. (SM)
Wright, A. A. (M)
Yancey, J. D., Jr. (A)
Yarbrough, A. D. (M)
Yeagley, F. W. (SM)
Zeinaneh, J. R. (M)
Ziemer, C. J. (M)
Zimmerman, M. (M)

Del Rio (SA-6)
Baker, J. A. (A)

Denison (DAL-6)
Hunsuck, J. D. (M)
Knight, J. D. (A)
Zombolas, G. O. (A)

Denton (FW-6)
Douglass, C. W. (M)

El Campo (HOU-6)
Copeland, T. J. (M)

Ellington (HOU-6)
Fada, C. V. (M)
Gunther, W. J. (A)
MacDonald, C. O. (A)
Polk, I. D., Jr. (M)

El Paso (EP-6)
Alexander, W. R. (A)
Anders, J. V. (A)
Anderson, K. E. (A)
Baird, J. K. (M)
Barnes, T. G. (SM)
Beymer, E. H. (M)
Brereton, T. B. (A)
Brown, C. W., Jr. (A)
Brown, J. S. (A)
Bullock, R. H. (M)
Burkholder, C. C. (M)
Cadman, A. O. (A)
Clark, H. D. (M)
Clatfelter, A. C. (SM)
Crosson, J. W. (M)
De Busk, W. H. (A)
Dingman, E. H. (M)
Dryden, E. R., Jr. (A)
Dukes, J. D. (A)
Dye, W. G. (M)
Fischer, D. W., Jr. (A)
Frary, R. S. (M)
French, C. E. (M)
Fulkerson, T. E. (M)
Galentin, L. J. (A)
Gavaldon, A. L. (A)
Hudson, B. E. (M)
Johnson, R. E. (M)
Kotovsky, S. K. (A)
Krivanich, M. A. (M)
La Fon, H. A., II (A)
Lane, L. O., Jr. (M)
Leiman, L. E. (M)
Lentz, W. H. (M)
Licon, O. G. (A)
Lowther, F. E. (M)
Lubke, G. W. (A)
Lutener, O. C. (M)
Marcum, W. F. (A)
Marshall, S. V. (M)
Maury, J. H. (M)
McGill, W. T. (M)
McGraw, J. E. (SM)
McKennon, L. W. (A)
Miller, W. E., Jr. (SM)
Mitchell, R. D. (A)
Murphy, J. J. (A)
Myre, W. C. (M)
Nelson, C. C. (A)
Newberg, I. L. (A)
Nielsen, L. M. (A)
Nook, J. C. (M)
Olsen, H. G. (M)
Provenzano, J. M. (A)
Reeves, T. M. (M)
Ridgeway, P. S. (A)
Rojas H., A. M. (M)
Rusche, C. L. H. (A)
Santa Ana, L. T. (A)
Sarge, A. E. (A)
Saxe, H. A. (A)
Sauvie, W. J. (A)
Shores, D. D. (A)
Sloan, J. E. (M)
Smarr, G. D. (A)
Smith, K. W. (M)
Sobolewski, F. (A)
Stewart, J. C. (M)
Stimpson, E. C., Jr. (A)
Stuart, J. F. (SM)
Talbott, E. P. (SM)
Taylor, A. D. (A)
Taylor, L. S. (M)
Toland, W. A. (M)
Torres, H. S. (A)
Walton, K. J. (SM)
Wasser, N. (M)
Watkins, R. I. (M)
Wilder, G. E. (M)

Fort Bliss (EP-6)
Aurin, R. N. (M)
Dillon, J. R. (SM)
Kajiwara, Y. (A)
Ludwig, M. J. (A)
Margulies, I. (A)

Fort David (EP-6)
Goldstein, S. J., Jr. (M)

Fort Hood (FW-6)
Dambrauskas, V. (M)

Fort Worth (FW-6)
Abshier, D. G. (M)
Absolom, R. H. (A)
Allen, C. A., Jr. (M)
Anderson, R. D. (M)
Aronson, M. J. (A)
Baird, H. S. (M)
Barney, J. M. (SM)
Barr, E. W. (A)
Barrett, L. S. (A)
Barton, J., Jr. (M)
Baswell, C. C., Jr. (M)
Bateman, J. W. (M)
Baumgarte, P. H. (M)
Baxley, W. C. (A)
Bean, R. (M)
Beckman, W. R. (M)
Bernath, W. A. (M)
Best, R. N. (A)
Blum, S. (SM)
Bordelon, C. (A)
Bosquez, R. D., Jr. (M)
Bowerman, R. S. (M)
Brock, W. P. (M)
Bronson, R. D. (M)
Brooker, G. G., Jr. (M)
Brooks, J. L. (M)
Brothers, J. E. (A)
Brust, M. F. (A)
Bryan, K. W. (M)
Bunch, B. D. (A)
Cantrell, W. E. (M)
Carmouche, C. L. (M)
Carr, P. J. (M)
Chandler, S. B. (A)
Charvoz, P. L. (M)
Clardy, D. E. (M)
Clark, J. E., Jr. (M)
Clark, T. (A)
Clutterham, D. R. (M)
Coffman, R. R. (M)
Collup, D. E. (SM)
Cone, J. H. (M)
Cook, A. B. (M)
Cox, E. D. (M)
Crittenden, L., Jr. (M)
Crotty, J. V. (SM)
Crumb, S. F. (SM)
Cyr, L. P. (M)
Daggett, D. H. (M)
Danner, O. G. (M)
Darwin, A. J. (M)
Davis, H. F. (M)
Deakins, G. E. (M)
Deering, C. S. (M)
Delaney, J. S. (M)
Dinsmore, J. T. (A)
Dodd, J. E. (A)
Drennan, L. E. (A)
Egan, D. G. (SM)
Elliott, J. E. (M)
Ellis, H. G. (M)
Errants, W. J. (M)
Evans, P. L. (M)
Falk, B. (A)
Fink, W. L. (M)
Fisher, M. C. (A)
Fletcher, C. H. (M)
Fowler, J. (M)
Frazier, J. B. (A)
Gallaher, J. R. (A)
Gaston, C. T. (M)
Gordon, M. J. (M)
Green, G. M. (M)
Green, P. C. (M)
Greenlee, D. R. (M)
Grubb, C. E. (A)
Hair, U. R. (A)
Hardin, B. A. (M)
Harman, D. G. (SM)
Hartel, B. (M)
Hawkins, W. K. (A)
Hawthorne, M. M. (M)
Hay, G. W. (M)
Hearne, S. M. (M)
Helzer, L. E. (A)
Hickman, D. A. (M)
Hicks, R. D. (M)
Hill, D. L. (A)

Hines, R. L. (A)
Hiltes, W. H. (M)
Hix, F. W. (M)
Hogue, W. T. (M)
Hopkins, J. H. (M)
Horn, C. E. (A)
Hurst, E. (A)
James, B. O. (A)
Iles, C. W. (M)
Jones, D. M. (M)
Jordan, C. F. (M)
Jordan, W. E., Jr. (M)
Joyal, M. W. (M)
Keesee, J. Q. (M)
Kelly, B. A. (M)
Kent, A. H., Jr. (A)
Keplinger, M. (M)
Keppler, C., III (M)
Kidd, L. H. (SM)
King, J. J. (A)
Knight, D. G. (M)
Koogle, J. F. (A)
Koskl, L. (SM)
Kroh, H. C. (A)
Lairmore, W. J. (M)
Landers, J. W., Jr. (M)
Langston, J. W. (A)
Lanier, J. (M)
Lattier, E. E., Jr. (M)
Law, P. F. (M)
Lowrie, G. M. (A)
Lyles, J. F. (M)
Macune, C. W. (M)
Mallory, V. L. (SM)
Manuel, J. (M)
Martin, W. E. (M)
Mayfield, S. A. (M)
McBeath, H. M., Jr. (A)
McCasland, R. S. (M)
McCown, J. R. (M)
McDuff, B. G. (A)
McKenzie, J. R., Jr. (M)
McLean, J. W. (SM)
Meredith, K. M., Jr. (M)
Miglicco, P. S. (A)
Miles, V. G. (M)
Moore, W. F. (A)
Morgan, R. L. (M)
Neher, H. T. (M)
Neshyba, S. J. (M)
Nethken, R. T. (M)
Norman, T. J., Jr. (M)
Obenhaus, R. E. (M)
Pace, R. L. (M)
Palmer, J. E. (VA)
Peets, G. E., Jr. (M)
Pickens, F. T., III (A)
Pollmerou, L. G. (A)
Porter, F. K. (M)
Posey, K. C. (M)
Puckett, G. W. (A)
Rankin, L. T. (A)
Rea, R. W. (M)
Redman, P. J. (A)
Robertson, D. R. (M)
Robertson, G. H. (M)
Roderick, R. (SM)
Ross, C. C. (VA)
Roy, F. J. (M)
Rushing, G. F. (M)
Salls, A. E. (SM)
Scarborough, W. T. (A)
Seale, I. A. (M)
Shafer, L. (M)
Shell, W. H. (M)
Shepherd, M. F. (M)
Shipman, H. P. (A)
Shirvis, R. A. (A)
Shoptaugh, J. R., Jr. (A)
Simmons, D. J. (M)
Sissom, A. W. (SM)
Sivernell, R. B. (A)
Slagle, G. M., Jr. (A)
Slaughter, R. G. (A)
Smith, W. D. (A)
Snethen, J. A. (A)
Soniat, E. (M)
Spears, M. F. (M)
Spradlin, J. D. (M)
Stanford, E. G. (M)
Stanach, H. C. (A)
Steele, E. F. (M)
Stewart, G. W. (M)
Stinson, R. C., Sr. (SM)
Strack, L. W., Jr. (M)
Straiton, J. W. (SM)
Stribling, J. L., Jr. (M)
Sumner, G. C. (SM)
Taulman, D. C. (M)
Terrell, J. B. (M)
Theriot, I. J. (SM)
Thompson, A. C. (A)
Travis, C. M. (M)
Vancil, B. I. (M)
Van Hoozer, C. H. (M)
Voldez, J. E. (A)
Walker, J. V. (M)
Wallis, C. L. (A)
Watkins, O. E. (M)
Weeks, W. A., Jr. (M)
Wentworth, G. E. (M)
Whipple, A. J. (M)
Wolanksi, H. S. (A)
Wood, G. K. (A)
Young, F. W. (M)
Yows, P. W. (M)

Freeport (HOU-6)
Brown, H. K. (M)
Coker, S. G. (M)
Kothman, E. B. (A)

Friendswood (HOU-6)
Havard, W. L. (A)

Galveston (HOU-6)
Benson, W. H., Jr. (M)
Lee, J. L. (M)
Pearson, E. A. (A)

Garland (DAL-6)
Andreassen, H. N. (M)
Brandt, I. L. (A)
Buie, J. G. (A)
Cawood, J. L. (A)
Davis, P. D., Jr. (SM)
Forster, M. C. (M)
Fuller, W. D. (SM)
Furnell, W. W., Jr. (M)
Granger, F. P., Jr. (M)
Griffith, B. W., Jr. (SM)
Harton, P. L. (M)
Lynn, J. C. (M)
McCrum, K. W. (M)
Mitchell, W. D. (SM)
Peterson, W. T. (A)
Sandefer, S. R. (A)
Sanford, A. L. (A)
Spilman, J. S. (M)
Stanton, A. N. (SM)
Tackett, H. A. (SM)
Tipton, C. D. (M)
Williams, B. M. (SM)
Yeager, D. L. (A)

Gatesville (FW-6)
Davidson, E. F. (M)

Grand Prairie (DAL-6)
Askew, W. J., Jr. (M)
Blanning, R. B. (M)
Buehrle, C. D. (M)
Dell, C. C. (M)
Fabijan, F. M. (A)
Howell, J. S., Jr. (A)
Morris, B. V. (M)
Shuler, J. C. (M)
Tharp, C. U. (A)
Urquhart, T. L., Jr. (M)
Wells, E. R. (M)

Harlington (SA-6)
Bills, A. E. (M)
Fobair, R. H. (A)
Kennedy, T. A. (M)
Porter, E. M. (A)
Revay, W. W., Jr. (M)
Williamson, E. P. (M)

Hempstead (HOU-6)
Sherron, R. J., Jr. (M)

Henderson (DAL-6)
Daniels, T. E. (SM)

Houston (HOU-6)
Ahrens, G. W. (M)
Albertson, J. N. (A)
Anderson, W. L. (M)
Anthony, J. P. (M)
Armett, R. A. (SM)
Arthur, M. A. (SM)
Asbury, R. T. (M)
Atkinson, C., Jr. (M)
Attall, G. (M)
Austin, F. M. (SM)
Baker, R. L. (A)
Ball, J. D. (M)
Beeman, C. R. (M)
Bender, J. C. (M)
Beyer, A. R. (A)
Beyer, F. (A)
Beyer, J. A. (A)
Blanchard, A. (SM)
Bobbitt, J. T. (M)
Bolden, A. L., Jr. (A)
Booker, J. L. (A)
Bost, M. E. (A)
Bowen, B. R. (A)
Bravenec, F. R. (M)
Brougher, R. M. (M)
Brown, C. R. (A)
Buck, H. M. (M)
Buckner, G. O., Jr. (M)
Bucy, J. F., Jr. (M)
Buechner, R. H. (SM)
Bullhon, J. J. M. (M)
Burrows, R. C., Jr. (A)
Busacker, J. W. (A)
Bush, R. S. (SM)
Byers, E. G. (SM)
Calhoun, C. W. (A)
Campbell, J. R. (M)
Canup, R. E. (M)
Capers, J. L. (A)
Caplan, R. S. (SM)
Carter, W. H., Jr. (SM)
Chapman, C. W. (M)
Childers, H. E. (SM)
Chinski, G. R. (SM)
Chin, M. E. (SM)
Cisneros, I. (M)
Clerc, M. C. (M)
Cormier, R. E., Jr. (M)
Cornett, R. (M)
Crews, T. B. (M)
Crossland, O. C. (A)
Cummings, L. C., Jr. (M)
Curry, C. P. (A)
Curry, W. L. (A)
Dady, W. E. (M)
Davison, B. D. (A)
Dewan, J. T. (M)
Dixon, T. K., Jr. (M)
Dosher, R. T., Jr. (M)
Douglas, J. E. (A)
Drisdale, T. B. (A)
Dupree, E. M. (SM)
Du Rapau, J. J. (A)
Eads, R., Jr. (A)
Eaton, F. M. (M)
Edwards, W. H. (A)
Ekeroot, S. J. (A)
Emerson, S. F. (A)
Erath, L. W. (M)
Feagin, F. J. (SM)
Flatow, T. (SM)
Francis, C. A. (M)
Franklin, P. E. (M)
Frazier, L. J. (A)
Frosch, A. (M)
Gardner, D. H. (VA)
Geddes, L. A. (M)
Geery, P. W. (A)
Gillespie, T. F. (A)
Girala, A. S. (M)
Godfrey, R. M. (M)
Goltwitzer, L. H. (A)
Green, J. W. (M)
Green, L. M. (A)
Greenwood, H. M. (M)
Greer, W. J. (SM)
Gundlach, E. E. (M)
Hagen, H. B. (M)
Hale, E. M. (M)
Hallenburg, J. K. (M)
Hanlon, E. G. (A)
Hanus, F. J. (A)
Hargett, J. T. (M)
Harrison, P. L. (M)
Hawkins, D. W. (M)
Hefer, F. W. (M)
Hegar, D. T. (M)
Heintz, K. O. (SM)
Helken, E. W. (M)
Herrod, R. A., Jr. (M)
Hickman, D. M. (M)
Hill, H. B. (A)
Hiner, T. L. (A)
Holloway, M. R. (A)
Hoover, M. C. (A)
Hougen, H. C. (M)
Hubbard, C. E. (M)
Huffman, C. H. (M)
Hunt, C. J. (A)
Hurlbert, L. L. (M)
Huston, O. H. (M)
James, W. B. (M)
Jameson, J. P. (A)
Johnson, H. L. (A)
Johnstone, C. W. (SM)
Jones, H. J. (SM)
Kannensteine, F. M. (M)
Karamberis, G. (M)
Kaufman, S. (SM)
Keating, L. M. (A)
Keeling, R. W. (M)
Keep, H. A. (A)
Kelly, R. W. (M)
King, G. L. (A)
Kilcpyra, M. F. (A)
Kokesh, F. P. (M)
Lee, B. D. (M)
Liben, W. (SM)
Limb, L. K. (M)
Locke, R. V., Jr. (A)
Loveland, H. D. (A)
Madeley, P. E. (M)
Marsh, G. E. (M)
Martin, S. A., Jr. (M)
Masterson, H. F. (M)
Matteson, L. W., Jr. (A)
Matthews, C. R. (A)
Maul, L. L. (M)
McArthur, H. K. (M)
McCabe, L. L. (SM)
McConnell, H. E. (VA)
McKay, G. C., Jr. (M)
McLin, W. R. (A)
McManis, B. (SM)
McNatt, W. E. (M)
Melton, D. P. (M)
Melton, G. F. (A)
Menger, W. M. (M)
Millar, H. D. (M)
Millis, E. G. (A)
Milton, D. F. (A)
Mims, A. J. (M)
Minton, R. B. (M)
Mitchell, J. L. (A)
Mitchell, J. L. (M)
Monkhouse, J. R. (M)
Monteith, R. (A)
Moore, A. M. (M)
Moore, R. D., Jr. (A)
Mullan, L. A. (M)
Murphy, T. R. (A)
Nall, A. E., Jr. (M)
Nelsen, H. H. (A)
Neuenschwander, E. F. (M)
O'Brien, D. D. (A)
Olson, R. W. (SM)
Ording, J. R. (A)
Otis, D. C. (M)
Palmer, C. C. (M)
Palmer, O. M., Jr. (M)
Parsons, R. W. (A)
Pearson, J. B. (M)
Pecot, V. D. (A)
Phillips, F. S. (M)
Pierson, A. L., III (M)
Pittman, R. M. (M)
Pixton, J. R. (M)
Rank, W. B. (M)
Ransome, L. L. (M)
Reynolds, R. C. (A)
Rhodes, H. A. (M)
Rice, L. S. (A)
Richardson, J. G. (A)
Robidoux, F. T. (M)
Robinson, J. C. (A)
Roby, J. W., Jr. (M)
Roid, F. R. (M)
Rust, W. M., Jr. (F)
Salter, R. E. (M)
Sasseen, J. H. (M)
Savage, K. D. (A)
Sawyer, W. G. (M)
Schmidt, H. (A)
Schmuck, R. H. (M)
Schneider, W. P. (M)
Schoellkopf, A. J., Jr. (M)
Schuster, N. A. (SM)
Schutz, T. C. (M)
Scott, R. W. (A)
Sears, H. A. (M)
Seixas, A. D. (A)
Shampee, R. M. (A)
Sharpe, M. O. (SM)
Shawver, E. F. (M)
Sims, J. P. (A)
Skellie, A. C. (M)
Smith, D. B., Jr. (A)
Smith, F. C., Jr. (M)
Smith, O. R. (SM)
Steward, W. B. (SM)
Stickley, D. F. (A)
Stotler, D. E. (A)
Sundt, P. C. (M)
Swearingen, J. E. (A)
Swift, R. R. (M)
Tanguy, D. R. (M)
Taylor, A. D. (A)
Teal, E. E. (M)
Thomas, C. C., Jr. (A)
Thompson, R. R. (SM)
Thomson, W. E. (A)
Thornton, L. C. (A)
Trimmier, W. W. (M)
Tullos, F. N. (M)
Turner, C. G. (SM)
Ulmer, J. G. (A)
Unger, J. H. (M)
Vogel, C. B. (M)
Walker, H. O., Jr. (A)
Walters, W. T. (A)
Washburn, W. M. (A)
Waters, J. S. (M)
Watson, A. L. (M)
Watson, J. S. (A)
Watt, J. S. (SM)
Weidner, C. P. (A)
Weis, W. C. (M)
Wenzel, G. E. (A)
Whitaker, T. N. (SM)
Wickham, W. S. (A)
Widerstrom, F. W. (A)
Williams, A. P. (M)
Williams, C. E. (M)
Williams, C. R. (A)
Williamson, W. W. (A)
Wilson, C. V., Jr. (A)
Winston, A. W. (M)
Wischmeyer, C. R. (SM)
Woehst, K. H. (A)
Wofford, J. H. (M)
Wofford, W. D., Jr. (A)
Wright, J. L. (A)
Wright, R. H. (A)
Wrye, W. C., Jr. (M)
Zapalac, R. (A)
Zill, F. W. (M)

Irving (DAL-6)
Adams, J. E. (M)
Baker, T. J. (M)
Brethaupt, J. J. (A)
Buzbee, J. M. (M)
Carter, R. C. (M)
Cleveland, A. R. (M)
Curtis, G. D. (M)
Dennard, R. H. (A)
Dillon, F. (M)
Hampton, J. W. (SM)
Harris, H. F. (M)
Haskins, D. E. (M)
Heithecker, L. F. (M)
Herriott, A. H. (A)
Holly, L. C. (M)
Keeth, J. K. (M)
Le Gette, J. L. (M)
Leming, T. L. (A)
Logan, J. J. (M)
Lollar, H. C. (M)
MacDonald, F. H. (A)
Mayberry, K. L. (M)
Merington, R. N. (A)
Nelson, S. R. (A)
Nichols, L. A. (A)
Ohler, G. M. (A)
Penn, T. C. (M)
Price, W. E. (SM)
Raits, E. J. (M)
Roberts, B. W. (A)
Seals, R. B. (M)
Skelton, C. W. (SM)
Smith, C. H. (M)
Smoot, R. L., Jr. (A)
Standill, J. R. (M)
Stone, R. M. (SM)
Swafford, T. W., Jr. (M)
Thomas, C. R. (M)

Kelly AFB (SA-6)
Hirsch, C. O. (A)

Killeen (FW-6)
Sikoryak, W. J. (A)

Kingsville (SA-6)
Guinn, J. R., Jr. (M)
Kruse, O. E. (M)
Rawls, H. F. (A)
Patton, A. D. (M)

Lake Jackson (HOU-6)
Bills, E. S. (M)
Williams, W. E. (A)

Lamesa (LUB-6)
Gray, T., Jr. (A)
Leiter, W. R. (A)
Massengale, D. W. (M)
Massengale, W. B. (A)

Laredo (SA-6)
Joyce, R. E. (A)
Steele, E. M. (A)

Lewisville (FW-6)
Reed, J. E. (M)

Longview (DAL-S-6)
Bean, R. N. (M)
Maness, J. H. (M)
Webb, E. E. (M)

Lubbock (LUB-6)
Bryant, R. S. (A)
Charlesworth, L. M. (A)
Criswell, J. J. (A)
Donaldson, C. A. (M)
Easter, B. H. (A)
Edwards, D. J. (A)
Fagan, J. R. (A)
Houston, C. E. (SM)
Joiner, J. B. (M)
Jones, L. B., Jr. (A)
Key, B. P. (M)
Kilcrease, E. F. (M)
Lankford, I. C., Jr. (A)
Lee, R. F. (SM)
Lewis, R. H. (M)
Paul, C. A. (A)
Smith, G. H. (A)
Storch, H. R. (A)
Welch, H. E. (A)

Lufkin (B-PA-6)
Hill, F. C. (M)
Saxon, M. (SM)

Marble Falls (FW-6)
McDonald, C. J. (M)

Marshall (DAL-S-6)
Sellers, T. H. (A)

McAllen (SA-6)
Bergh, F. H. (A)
Nold, D. E. (A)

McKinney (DAL-6)
Flynn, J. G., III (A)

McLean (LUB-6)
Patterson, J. M. (M)

Mesquite (DAL-6)
Anderson,

TEXAS

Gower, S. G. (A)
Graf, C. R. (A)
Gunkel, W. A. (M)
Hallam, J. T. (M)
Hamm, W. J. (SM)
Harrell, R. D. (A)
Hasbrook, A. F. (SM)
Hornbrook, F. W. (M)
Ing, G. W. (SM)
Jackson, W. J. (SM)
Jeffers, C. L. (SM)
Johnson, C. R. (A)
Jones, R. L., Jr. (A)
Jones, W. T. (M)
Kelly, R. W. (M)
King, J. D. (A)
Kuehn, R. J. (M)
Lampl, M. B. (A)
Laster, C. C., Jr. (M)
Lawrence, W. G. (M)
Liberto, E. A. (A)
Lincoln, J. P. (M)
Lusk, E. C. (A)
Matthews, K. B. (A)
Mayne, W. H. (SM)
Mellin, J. A. (A)
Milam, R. W. (A)
Morrison, G., Jr. (A)
Ohman, J. (SM)
Paris, H. B., Jr. (M)
Parr, J. O., Jr. (SM)
Pawkett, L. E. (M)
Payne, G. W. (A)
Pomy, H. J. (M)
Pool, E. B. (M)
Porter, J. B. (M)
Prucha, M. J., Jr. (M)
Puppe, R. (A)
Reeves, H. L., Jr. (A)
Rhodes, M. H. (A)
Rives, J. B. (SM)
Roher, N. J. (A)
Sears, D. (M)
Siegel, H. A. (A)
Simpson, S. H., Jr. (SM)
Slagle, W. C. (A)
Smith, M. T. (M)
Smith, R. J., Jr. (M)
Stokes, P. B. (M)
Sullivan, M. C. (M)
Tarrodaychik, P. (SM)
Travers, D. N. (M)
Trevillian, R. A. (A)
Turner, H. C. (A)
Wangler, R. B. (M)
Watson, J. T. (A)
Watson, R. J. (M)
Watz, N. P. (A)
Weber, L. C. (A)
Wilkes, C. P. (M)
Williams, G. W., Jr. (M)
Wines, C. B., Jr. (A)

Seguin (SA-6)
Zuehl, W. R. (A)

Seminole (LUB-6)
Tomlinson, Z. G. (A)
Venters, J. B. (A)

Sheppard AFB (FW-6)
Kite, A. E., Jr. (A)

Sherman (DAL-6)
Johnson, C. L. (A)
Moss, K. S., Jr. (M)

South Houston (HOU-6)
Lathrop, W. A. (A)

Sunray (LUB-6)
Perkins, C. S. (M)

Temple (FW-6)
Martin, B. A. (M)

Texarkana (DAL-6)
Atkinson, W. R. (M)
Dickinson, M. A. (A)
McFarland, J. H. (A)

Texas City (HOU-6)
Combs, J. F. (A)
Gotthilf, E. M. (A)

Tyler (DAL-6)
Grice, C. F. (M)
Hays, J. W. (A)
Thompson, O. E. (M)

Uvalde (SA-6)
Mason, A. F., Jr. (M)

Victoria (SA-6)
Feucht, R. W. (M)

Waco (DAL-6)
Erdman, A. L. (A)
Fulwiler, R. J. (A)
Schwetman, H. D. (SM)

Wellington (LUB-6)
Coleman, S. D. (M)

West Columbia (HOU-6)
Blair, R. S. (M)

Wharton (HOU-6)
Obenchain, T. I. (A)

Wichita Falls (FW-6)
Adams, J. (A)
Simpson, R. H. (A)
Wiley, H. T. (M)

Wills Point (DAL-6)
Riley, J. H. (A)

UTAH

Bountiful (SLC-7)
Anderton, C. W. (M)
Barneck, C. A. (A)
Richardson, F. L. (M)
Willhard, W. J. (A)

Cedar City (SLC-7)
Gardner, T. W. (A)

Clearfield (SLC-7)
Kartchner, K. A. (M)

Deweyville (SLC-7)
Blackham, D. K. (M)

Hill AFB (SLC-7)
Dobbs, W. (A)
Scott, S. D. (A)

Hyrum (SLC-7)
Brown, F. R. (M)

Layton (SLC-7)
Loomis, F. E. (A)

Lehi (SLC-7)
Wing, G. J. (M)

Logan (SLC-7)
Clark, C. (SM)
Cole, L. S. (SM)
Jones, W. L. (SM)

Murray (SLC-7)
Hales, D. B. (A)

Ogden (SLC-7)
Lee, G. F. (M)
Lone, R. S. (M)
Urie, H. G. (A)
Van Vliet, W. H. (A)
Wardleigh, G. R. (M)
Woods, F. W. (A)

Provo (SLC-7)
Bartholomew, D. (M)
Hurlbut, P. R. (M)

Rockville (SLC-7)
Fawcett, C. D. (M)

Roy (SLC-7)
Arrington, A. C. (M)

St. George (SLC-7)
Squire, R. W. (A)

Salt Lake City (SLC-7)
Adams, B. L. (M)
Ahearn, J. M. (M)
Allen, J. K. (A)
Baldwin, J. M. (SM)
Bedford, S. M., Jr. (M)
Berger, E. G. (M)
Carman, P. C. (M)
Carney, H. K. (A)
Clark, D. B. (A)
Clayton, V. E. (SM)
Cozzens, W. D. (M)
Davidson, R. A. (A)
Diehl, C. E. (M)
Elkins, R. (A)
Evans, C. R. (M)
Gates, F. V. (M)
Gehmlich, D. K. (M)
Glantz, R. H. (A)
Grover, R. C. (M)
Gunderson, A. L. (M)
Haegele, R. W. (SM)
Hall, J. E. (A)
Haycock, O. C. (SM)
Higgins, R. N. (M)
Hoggan, M. J. (A)
Hooper, J. S. (M)
Hubbard, J. J. (A)
Hunt, M. J. (A)
Laird, R. R. (M)
Larsen, R. R. (A)
Leavitt, R. F. (A)
Murphy, L. C. (M)
Nielsen, R. D. (A)
Noffsinger, D. T. (A)
Pound, E. F. (A)
Reid, H. J. (M)
Robinson, W. H. (A)
Skinner, R. L. (M)
Tew, D. E. (A)
Trinnaman, R. R. (A)
Walsh, K. S. (A)
Wright, J. W. (SM)

Sandy (SLC-7)
Atwood, K. W. (M)
Johnson, D. Q. (M)

Spanish Fork (SLC-7)
Hone, S. J. (M)

Tooele (SLC-7)
Malter, R. H. (A)

VERMONT

Bennington (BOS-1)
Lillie, D. F., Jr. (A)

Burlington (BOS-1)
Bender, D. R. (M)
Borah, D. F., III (A)
Burbo, J. H. (M)
Durdevoir, W. G. (M)
Eckels, A. R. (SM)
Frisby, W. L. (M)
Kilcrease, D. L. (A)
Leonard, C. E. (M)
Low, P. F. (M)
Martin, S. T. (SM)

Essex Junction (BOS-1)
Browne, R. W. (A)
Irwin, R. W., Jr. (A)

Jamaica (BOS-1)
Heffion, A. (A)

Montpelier (BOS-1)
Davis, L. C. (A)

Northfield (BOS-1)
Marsh, R. F. (M)
Seal, P. M. (SM)

Rutland (BOS-1)
Lyman, R. P. (SM)

St. Albans (BOS-1)
Wright, H. E. (M)

St. Johnsbury (BOS-1)
Edgerton, J. F. (A)

South Burlington (BOS-1)
Horvath, C. (M)
Jones, C. R. (A)
Kotlewski, J. P. (M)

South Woodstock (BOS-1)
Garceau, L. (M)

Springfield (BOS-1)
Bloomfield, B. (M)
Carpenter, D. J. (M)
Churchill, D. W. (A)
Luce, D. W. (M)

Waterbury (BOS-1)
Chase, W. C. (M)

West Brattleboro (BOS-1)
Weatherhead, W. R. (M)

Weston (BOS-1)
Boothby, L. W. (M)

Winooski Park (BOS-1)
Fennell, T. R. (M)

VIRGINIA

Alexandria (W-DC-3)
Andrus, A. M. (M)
Ashenden, G. K., Jr. (M)
Ashley, D. S. (M)
Bahlay, A. (SM)
Balwanz, W. W. (SM)
Bauer, R. E. (M)
Bawer, R. (A)
Behme, A. E. (A)
Besancon, M. (SM)
Blakley, D. H. (M)
Blau, W. (A)
Bradley, E. H. (SM)
Branch, G. E. (SM)
Bridge, W. H. (A)
Carroll, L. O. (A)
Carter, M. B. (M)
Carterette, A. A., Jr. (M)
Christman, J. (M)
Cole, R. I. (SM)
Colton, R. B. (F)
Corey, J. F. (A)
Courtney, R. E., Jr. (M)
Cowan, A. W. (SM)
D'Antonio, R. G. (A)
Darcey, R. J. (M)
Dixon, J. T. (SM)
Dupree, W. F. (A)
Everhard, F. U., Jr. (A)
Favret, A. G. (M)
Filzen, J. N. (A)
Fraedrich, D. K. (M)
Fullerton, G. R. (M)
Gabrielson, H. C. (M)
Gallihugh, J. T. (A)
Garafola, J. (A)
Garrigus, N. L. (M)
Gills, L. C. (A)
Goeser, J. N. (A)
Gonzalez, W. (A)
Goutos, A. (M)
Graves, C. J. (M)
Hagaman, B. G. (SM)
Harper, H. (M)
Hedrick, C. E. (M)
Heister, C. F. (SM)
Henerhot, L. R. (A)
Hicks, W. S. (A)
Hill, M. E. (A)
Hopkins, A. F., Jr. (SM)
Hornung, J. L. (SM)
Jenkins, J. W. (A)
Kelleher, K. S. (SM)
Kiebach, C. D. (A)
Kings, L. (M)
Kirby, H. L. (A)
Kisieleski, J. M. (A)
Knoer, H. (A)
Kochendarfer, D. C. (A)
Lewis, R. D. (M)
Littlejohn, H. S. (M)
Littlepage, C. M. (A)
Long, A. (A)
Longfellow, B. S. (M)
Lorenz, R. J. (M)
Lourenco, M. J. (M)
Love, F. B. (M)
Martin, R. W. (M)
McCall, C. F. (M)
McElroy, J. (M)
McEwan, A. J. (A)
McGinnis, L. F., Jr. (A)
Melville, J. E. (A)
Menius, W. M. (A)
Messer, A. M. (M)
Miller, J. W. (M)
Mittelman, L., Jr. (A)
Montague, H., III (A)
Moore, H. S. (M)
Morell, C. S. (M)
Morrow, C. M. (M)
Murrell, R. G. (M)
Nabell, E. G. (A)
Parent, V. V. (A)
Park, L. L. (A)
Parker, C. V. (SM)
Passman, A. J., Jr. (A)
Paterson, R. C. (A)
Peake, H. L. (SM)
Percy, R. W. (M)
Pichetin, P. B. (M)
Post, M. D. (SM)
Price, H. W., Jr. (M)
Pritting, W. (A)
Ramm, H. F. (A)
Raudenbush, J. E. (M)
Rayborn, H. C. (M)
Raybuck, C. B. (SM)
Reid, J. G., Jr. (SM)
Reiser, D. (M)
Ringwalt, D. L. (M)
Rochelle, R. W. (A)
Romer, W. J. (M)
Rouiller, C. A., Jr. (A)
Royce, R. K. (M)
Scull, R. C. (A)
Seldon, J. C. (SM)
Shea, J. H. (A)
Shepard, D. H. (SM)
Smith, T. J. (A)
Spencer, C. L. (M)
Stewart, C., Jr. (SM)
Strother, J. F. (M)
Stuckert, E. M. (SM)
Sumpter, E. J. (A)
Taylor, W. B. (M)
Thompson, L., Jr. (SM)
Tidball, F. E. (SM)
Toole, W. W. (M)
Tucker, J. W. (M)
Tucker, W. K., Jr. (A)
Underwood, R. W. (A)
Varela, A. A. (SM)
Von Alven, W. H. (M)
Von Dohlen, H. W. (M)
Welhe, W. K. (SM)
Weinstein, A. (M)
West, J. S. (M)
White, D. R., Jr. (SM)
Williams, A. F., Jr. (A)
Williams, H. M. (SM)
Wiewara, E. J. (M)
Wise, J. (M)
Wunderley, R. H. (A)
Yoder, R. A. (A)
Young, M. P. (SM)

Annandale (W-DC-3)
Beecher, G. L. (A)
Black, L. (M)
Bramhall, E. H. (SM)
Cervenka, F. J. (SM)
Eadie, G. G. (A)
Garlan, H. (M)
Lindsay, J. C. (M)
Richman, H. R. (M)
Willis, H. W. (SM)

Arlington (W-DC-3)
Abbitt, C. W. (M)
Albee, C. (M)
Altman, S. S. (M)
Anderson, R. J. (A)
Ankenbrandt, F. L. (F)
Atkinson, E. E. (M)
Banks, C. R. (SM)
Bankson, H. D. (M)
Barr, L. V. (M)
Baumunk, J. F. (M)
Beecher, W. C. (M)
Bennett, E. (F)
Bernstein, H. E. (SM)
Blaustein, P. H. (A)
Blickstein, B. D. (M)
Bodenhamer, R. B. (M)
Boggs, G. E. (M)
Borsody, B. F. (SM)
Bradley, M. R. (M)
Bridges, J. M. (SM)
Brobst, P. E. (M)
Brown, D. F. (M)
Buchanan, O. R. (A)
Buckley, J. E. (M)
Bunting, J. H. (A)
Burkhardt, R. H. (M)
Burleson, M. M. (A)
Burris-Meyer, H. (SM)
Busch, C. R. (M)
Butts, R. S. (M)
Cain, R. J. (M)
Campbell, J. S. (A)
Campbell, W. H. (SM)
Castle, R. A. (M)
Chapman, A. K. (M)
Charmatz, A. W. (A)
Chasnov, B. (SM)
Child, A. A. (A)
Clark, G. E., Jr. (A)
Clark, L. (SM)
Clark, S. F. (M)
Colsh, C. A. (M)
Cobb, M. W. (A)
Cochran, J. L. (M)
Cohen, J. (SM)
Collins, W. H. (M)
Cook, D. C. (A)
Coppola, G. J. (A)
Corderman, W. P. (SM)
Cowan, B. (A)
Coyle, R. J. (A)
Craver, J. N. (M)
Crigler, T. B., Jr. (A)
Cromack, J. C. (M)
Darline, R. S. (A)
Davis, C. H. (A)
Davis, F. E. (A)
Davis, T. R. (A)
Deal, D. L. (M)
Dennison, B. H., Jr. (SM)
Dettra, J. E., Jr. (A)
Dew, N. R. (A)
Dickson, E. L. (A)
Dingley, E. N., Jr. (F)
Dixon, G. C. (SM)
Dodge, J. E. (A)
Dove, P. S. (M)
Durkee, J. D. (M)
Dutton, W. P. (M)
Etter, W. A. (M)
Falkowski, E. H. (M)
Freedman, L. M. (A)
Freeman, J. T. (A)
Furest, R. J. (M)
Gago, F. J. (A)
Gandy, C. L. (M)
Gauss, H. (M)
Gibson, G. B. (SM)
Gieseler, L. F. (A)
Giles, R. C. (M)
Gillenwater, T. M. (M)
Girard, E. J. (SM)
Gleason, D. H. (A)
Goen, G. F. (SM)
Good, D. C. (SM)
Gregory, C. A. (SM)
Gridley, C. J. (M)
Griffin, L. L. (M)
Grubb, D. S. (M)
Hackman, M. J. (A)
Hafer, F. L. (M)
Hall, O. E. (A)
Hall, R. W. (A)
Harding, G. C. (M)
Harkins, P. B. (SM)
Hens, R. J. (A)
Hershberger, W. O., Jr. (M)
Hilgedick, W. C. (SM)
Hoeke, F. W. (M)
Horne, C. P. (M)
Hutton, D. B. (A)
Israel, F. (M)
Johnston, E. C. (A)
Jones, G. H., Jr. (A)
Karagiorgis, N. D. (A)
Kefalas, G. P. (M)
King, L. H. (M)
Kinyon, R. (A)
Koditek, G. W. (A)
Kreek, J. A. (SM)
La Fevre, L. M. (A)
Lane, T. B., Jr. (M)
Laula, R. E. (SM)
Lawson, A. A. (SM)
Lee, J. M. (SM)
Levin, A. (A)
Levonian, E. V. (A)
Lincleone, D. C. (A)
Little, S. (M)
Loda, C. J. (SM)
Louer, P. E. (M)
Lynch, J. M. (M)
Lyons, K. E. (A)
Mack, S. J. (A)
Martin, D. K. (SM)
Martin, E. (SM)
Martin, O. L. (M)
Martin, R. D. (SM)
Maryeski, W. P. (M)
Masison, C. J., Jr. (A)
Mason, J. (A)
Mawhood, S. A. (M)
McCachren, W. S. (SM)
McClurg, G. H. (SM)
McConnell, J. L. (M)
McLeod, J. S. (M)
McMurtray, H. W. (A)
McNulty, J. L. (A)
Meader, G. S., Jr. (A)
Messick, V. D. (A)
Metzger, W. (A)
Miller, J. L. (M)
Millies, F. G. (M)
Moffet, J. A. (M)
Montgomery, J. N., III (M)
Morrison, J. (A)
Morscher, L. N., Jr. (SM)
Pederson, J. A. (A)
Perrott, T. A. (M)
Peyton, P. B., Jr. (A)
Pittard, G. S., Jr. (M)
Poling, A. C. (M)
Nash, P. E. (SM)
Noble, J. S. (A)
Nyhen, E. M. (M)
Page, V. E. (M)
Parker, M. L., Jr. (M)
Parris, D. S. (M)
Potts, B. (M)
Preasnall, J. R. (A)
Price, E. G. (M)
Price, M. A. (SM)
Puro, W. O. (SM)
Quinn, R. B. (M)
Racine, R. F. (A)
Ransone, J. T., Jr. (M)
Reed, A. C. (M)
Reid, H. J. (M)
Rice, J. E. (SM)
Richers, E. E. (A)
Rider, C. C. (VA)
Rourke, C. R. (M)
Roy, L. B. (M)
Sargent, C. J. (M)
Schaaf, R. H. (M)
Schmidt, B. H. (M)
Scholetzky, J., Jr. (A)
Scholl, G. S. (A)
Schwarz, G. R. (M)
Selfert, F. F. (M)
Selby, H. A. (A)
Sheets, M. T. (M)
Shelton, J. P., Jr. (M)
Sherer, L. M. (SM)
Smith, E. L., Jr. (M)
Smith, J. C., Jr. (A)
Smith, L. G., Jr. (M)
Smith, R. O. (SM)
Sowell, J. B. (M)
Spencer, S. W. (M)
Spies, M. C. (M)
Stastny, C. (SM)
Stec, C. L. (SM)
Stephan, H. W. (VA)
Stephenson, L. (M)
Stewart, J. M. (SM)
Stinson, E. C. (A)
Strasser, T. J. (A)
Strothers, H. (M)
Sutton, B. L. (M)
Swallow, C. E. (A)
Swanson, M. W. (SM)
Taylor, J. P., Jr. (A)
Taylor, P. G. (M)
Taylor, R. L. (A)
Tennant, H. R. (M)
Thomasson, H. B. (M)
Tieman, C. R. (SM)
Trotter, B. E. (M)
Tucker, E. A. (SM)
Van Arsdol, F. L. (M)
Van Valkenburgh, R. A. (M)
Veatch, J. P. (SM)
Volk, C. M. (A)
Vosen, B. (SM)
Wallace, P. R. (M)
Ware, M. (M)
Webb, P. L. (A)
Weihe, V. I. (SM)
Weiss, R. A. (SM)
Wheeler, F. K. B. (M)
White, C. E. (SM)
Whitney, R. J. (A)
Willard, J. M. (M)
Williams, R. T. (M)
Wilson, L. M. (A)
Wilson, R. E. (M)
Yates, W. A., Jr. (A)

Ashburn (W-DC-3)
Alberts, W. S. (SM)

Bayside (NC-HR-3)
Bailey, A. B. (M)
Enright, R. E. (M)

Bealeton (W-DC-3)
Wahle, J. J. (M)

Bedford (NC-VA-3)
Shawl, W. C. (M)

Bena (NC-VA-3)
Hogge, E. C. (A)

Blacksburgh (NC-VA-3)
Baker, V. H. (M)
Ebert, H. K. (M)
Holt, C. A. (M)
Lee, C. (SM)
Miller, R. H. (M)
Wright, R. R. (SM)

Bristol (NC-VA-3)
Perry, W. T., Jr. (M)
Shackelford, H. L. (M)

Bumpass (NC-VA-3)
Kramer, A. W. (SM)

Charlottesville (NC-VA-3)
Albee, R. B. (M)
Anderson, R. V. (M)
Ankney, S. M. (A)
Ballard, L. L. (A)
Brown, B. T., Jr. (M)
Butler, A. A., Jr. (M)
Carpentier, R. A. (M)
Clevenger, J. E. (M)
Colby, K. G. (M)
Fleming, R. F., Jr. (A)
Fuller, H. P., Jr. (M)
Gouldman, H. O., Jr. (A)
Grymes, J. R., Jr. (M)
Harris, O. R. (SM)
Harvey, G. L. (SM)
Hughes, F. W. (M)
Humphris, R. R. (A)
Lindgren, W. A. (A)
Lupton, W. H. (M)
Moss, F. E. (M)
Purnell, L. S. (SM)
Quarles, L. R. (F)
Ramey, R. L. (A)
Redfield, D. D. (A)
Roberts, J. M. (SM)
Roberts, W. W. (A)
Siegel, C. M. (M)
Smith, A. G. (A)
Snead, C. R. (M)
Stavitski, L. N. (M)
Teague, D. L. (M)
Tolsch, L. H. (M)
Updike, O. L., Jr. (M)
Walker, W. P. (M)
Ward, J. W. (M)
Wilson, E. M. (A)

Chincoteague (NC-VA-3)
Brackeen, T. W. (M)
Selby, S. L. (A)

Clifton (W-DC-3)
Clark, V. C. (A)
Duncan, R. L. (SM)

Colonial Beach (NC-VA-3)
Brooks, F. E. (M)

Cradock (NC-HR-3)
Shepherd, J. F. (M)

Dahlgren (NC-VA-3)
Gros, J. R. (M)
Jones, T. E. (A)
Maxwell, M. S. (M)
Payne, J. N. (M)
Potter, R. R. (M)
Ryland, R. T., Jr. (M)
Sawyer, R. S. (A)
Schultz, L. R. (A)
Tharp, T. H. (M)

Danville (NC-VA-3)
Lea, H. D. (M)
Motley, L. C. (A)

Denbigh (NC-HR-3)
Morton, R. W. (M)
Stubblefield, R. L. (A)

Dunn Loring (W-DC-3)
Griffin, P. W. (M)

Ellerson (NC-VA-3)
Spratley, J. B. (M)

Fairfax (W-DC-3)
Aasen, C. L. (A)
Ambrose, T. J. (M)
Bergen, S. (SM)
Bowie, D. M. (M)
Bradford, H. K. (M)
Campbell, D. O. (M)
Christie, C. B. (M)
Edwards, B. E. (M)
Eggerton, W. H. (M)
Finneran, R. J. (A)
Gartzke, F. J. (M)
Hannan, G. V., III (A)
Hays, C. (A)
Holland, F. S. (A)
Hook, G. E. (A)
Lancioni, P. (M)
Lee, F. N. (A)
McGinnis, C. E. (M)
Millbrodt, P. E. (A)
Norton, M. H. (M)
Pettingill, S. A. (M)
Purple, W. C., Jr. (M)
Roth, M. C. (M)
Scott, W. G. (M)
Sears, J. F. (SM)
Sharp, D. W. (A)
Thornwall, J. C. (A)
Ward, H. T., Jr. (M)
Weeton, W. E. (A)
White, G. T. (M)
Williams, R. E. (SM)
Worden, H. W. (M)

Falls Church (W-DC-3)
Alexander, H. R. (M)
Allen, D. A. (A)
Allen, E. W., Jr. (F)
Anderson, R. A. (A)
Anderson, W. L. (M)
Andrew, R. T. (M)
Ankers, R. E., Jr. (M)
Ballard, A. H. (SM)
Barkman, R. N. (A)
Barnes, H. R. (M)
Bartlett, G. W. (M)
Bartlett, O. H., Jr. (M)
Bateman, R. (M)
Baylor, W. R. (A)
Baystone, T. E. (A)
Bernhard, C. J. (A)
Billheimer, C. R. (M)
Bloch, M. W. (M)
Bohl, L. H., Jr. (M)
Boland, C. E. (A)
Boland, J. N. (M)
Bouchey, S. H. (M)
Bouvy, J. W. (M)
Bowman, W. E. (A)
Brady, R. F. (SM)
Breen, M. T. (A)
Brown, H. B. (M)
Brown, L. (A)
Bull, J. (M)
Campbell, S. V. (M)
Carland, E. (A)
Carr, S. O. (M)
Cattermole, G. B. (M)
Clark, J. L. (SM)
Cleckner, D. C. (SM)
Colby, P. R. (SM)
Combs, D. D. (A)
Connelly, E. M. (A)
Courtis, R. P. (VA)
Crenshaw, A. N., Jr. (M)
Crowley, J. J. (SM)
Croy, J. R. (M)
Curtis, C. V. (M)
Dadant, P. M. (M)
Davie, M. C. (SM)
Davis, C. B. (SM)
Davis, D. (A)
Davis, J. O. (M)
Day, W. R. (M)
Deeter, C. R. (M)
Dickinson, W. T. (M)
Diehl, E. J. (SM)
Disenhaus, N. (SM)
Dresser, P. L. (M)
Dula, A. M. (A)
Dula, J. N. (M)
Dwyer, J. (M)
Eadie, F. E. (A)
Ernst, A. A. (M)
Evans, W. J. (A)
Fama, C. S. (A)
Farago, J. P. (A)
Feild, S. C., Jr. (M)
Fivel, M. J. (M)
Garrett, L. F. (A)
Gosney, W. J. (M)
Gordon, H. L. (A)
Grumich, J. (SM)
Hart, J. E. (M)
Haskins, R. L. (SM)
Hawkins, H. D. (M)
Hensell, R. L. (A)
Hice, L. C. (A)
Hill, A. G. (F)
Hill, R. B. (A)
Hinman, W. S., Jr. (F)
Hixson, J. D. (M)
Hoffmann, G. E. (M)
Hohos, J. A. (A)
Holmes, H. H., III (M)
Hoopes, R. D. (A)
Houseman, E. O., Jr. (M)
Irby, R. F. (A)
Jaboila, J. R. (M)
Jahr, E. F. (M)
James, F. B. (M)
James, W. G. (SM)
Johnson, J. G. (SM)
Johnson, M. (M)
Johnson, W. R. (M)
Johnston, E. L. (M)
Keating, T. J. (M)
Kindell, F. E. (M)
Kramer, A., Jr. (A)
Knight, C. R. (SM)
Knutson, H. C. (M)
Koffsky, D. N. (M)
Kornfeld, G. R. (A)
Kovski, J. J. (SM)
Lepkowski, M. J. (A)
Lerner, L. (A)
Levine, A. (M)
Levine, S. (M)
Livingston, J. L. (M)
Livingstone, R. H. (M)
Marsh, E. V. (M)
Marshall, E. L. (VA)
Maston, J. (A)
Maton, G. L. (M)
May, C. D., Jr. (M)
McBride, G. H. (M)
McDermott, E. P. (A)
McDonnell, J. E. (M)
McDowell, R. B. (SM)
McLaurin, T. S. (A)
McMahon, J. H. (M)
McNemar, C. W. (A)
Mead, O. J., Jr. (SM)
Meloy, T. (SM)
Miller, R. E. (M)
Montague, N. C. (A)
Mullin, J. H. (A)
Murray, P. C. (A)
Neal, R. B. (A)
Norman, S. W. (SM)
O'Hea, J. T. (M)
Oliver, G. E. (SM)
Oyster, D. E. (M)
Pachuta, J. R. (M)
Parker, C. F., Jr. (SM)
Paterson, H. R. M. (A)
Patterson, K. P. (SM)
Prier, R. L. (A)
Proferes, N. J. (A)
Quin, K. H. (A)
Randall, H. (SM)
Renton, R. J. (M)
Ricciardelli, (SM)
Rock, P. (A)
Rogers, C. J. (A)
Rogers, G. J. (A)
Rogers, W. H., Jr. (A)
Rowland, E. T. (M)
Rumble, A. R. (SM)
Saunders, C. H., Jr. (A)
Savarese, R. T. (A)
Scott, R. M. (M)
Scott, S. R. (SM)
Seccombe, W. T. (VA)
Sherman, W. R. (SM)
Sisholm, E. M. (A)
Skriveth, A. G. (SM)
Smith, B. D., Jr. (M)
Smith, W. M. (SM)
Sotak, J. W. (A)
Stevens, R. L. (A)
Stewart, J. P. (A)
Stiles, R. G. (SM)
Sunde, D. H. (A)
Swallow, J. D. (M)
Sybenaa, P. M. (M)
Tanner, D. A., Jr. (A)
Thompson, H. H. (A)
Thrasher, P. M., Jr. (M)
Toolan, W. W. (A)
Turner, J. S. (SM)
Vandivere, E. F., Jr. (A)
Vernon, A. W. (A)
Vignali, J. A. (A)
Walker, F. C. (M)
Wallace, J. F. (A)
Walsh, J. P. (A)
Wanselow, R. D. (M)
Weidl, A. C. (M)
Welborn, J. B. (M)
Whiting, W. K. (M)
Wickenkamp, F. W. (M)
Wilcox, H. E. (M)
Winick, A. B. (M)
Wooten, A. D. (A)
Yee, D. K. (M)
Young, A. H. (A)

Fort Belvoir (W-DC-3)
Knopf, A. J. (A)
Lindgren, T. D. (M)

Fort Eustis (NC-HR-3)
McKim, W. J. G. (M)

Hampton (NC-HR-3)
Babcock, R. A., III (M)
Boyer, W. J. (M)
Bradbury, J. T. (M)
Burton, W. G., Jr. (M)
Dial, E. W. (M)
Ferguson, J. K. (M)
Franklin, L. F. (A)
Hastings, C. E. (SM)
Holup, A. C. (M)
Lee, C. Q. (A)
Martone, F. P. (A)
Morris, R. (M)
Passera, A. L. (M)
Pitts, W. C., Jr. (M)
Redford, J. W. (A)
Russell, J. A., Jr. (M)
Satterfield, J. M. (M)
Sibul, L. H. (A)
Titterington, R. J. (A)
Vavra, P. H. (M)
Wood, R. M., Jr. (M)

Harrisonburg (NC-VA-3)
Braun, W. L. (SM)
Foley, J. M. (M)
Jackson, R. C. (M)
Jones, T. B., Jr. (A)

Herndon (W-DC-3)
Groff, E. M. (A)
Martin, W. L. (A)

Langley AFB (NC-HR-3)
Andrae, P. H., II (M)
Dvorak, F. J. (A)
Harvey, C. C. (M)
Johnson, C. K. (SM)
Klucarich, S. (A)
Konkel, A. J., Jr. (M)
Lee, T. C. (M)
Moyers, R. K. (M)
Myers, R. T. (M)
Sprinkle, J. F. (A)
Taylor, M. L. (M)

Leesburg (W-DC-3)
Carr, L. H. (M)
Martin, W. H. (M)
Whitmore, W. C., Jr. (A)

Lexington (NC-VA-3)
Alley, R. E., Jr. (M)
Kwei, M. W. (M)

Lynchburg (NC-VA-3)
Ball, R. M. (M)
Breazeale, W. M. (SM)
Cardwell, B. B., Jr. (A)
Mayo, J. J., Jr. (M)
Orth, J. T. (M)
Pickett, R. T., III (A)

Lynnhaven (NC-HR-3)
Stoddert, T. M. (M)
Whitley, J. E. (A)

Manassas (W-DC-3)
Barber, W. S. (M)
Goatley, C. (A)
Simms, R. J. (M)
Stogsdill, M. R. (A)

McLean (W-DC-3)
Creutz, J. (M)
Dee, H. E. (A)
Gumb, D. F. (A)
Heckel, R. D. (M)
Shoemaker, R. F. (A)
Smith, A. E. (SM)
Smith, J. M. (M)
Stokes, H. S. (SM)
Stoneifer, R. A. (A)
Swafford, J. H. (A)

Mount Vernon (W-DC-3)
Phillips, M. L. (SM)

Naval Mine Depot (NC-HR-3)
Gustafson, A. J., Jr. (A)

New Alexandria (W-DC-3)
Hein, J. E. (A)

Newport News (NC-HR-3)
Bjerke, J. O. (M)
Comstock, A. L. (M)

Norfolk (NC-HR-3)
Alderman, J. M. (A)
Bacon, F. W. (M)
Berghoefer, F. G. (M)
Camp, W. W. (M)
Carruth, D. C. (A)
Clemente, J. R. (A)
Cofland, A. E. (A)
Councill, J. W. (M)
Cowie, D. G. (M)
Davis, E. E. (A)
De Troy, B. A. (A)
Doby, W. C. (M)
Dryer, H. M. (A)
Faust, D. W. (M)
Finley, A. G. (M)
Fosnum, T. T. (M)
Gladding, E. B. (M)
Graham, D. A. (M)
Hirst, W. B., Jr. (M)
Hutt, C. E. (A)
Kaserman, F. S. (M)
Keast, P. M. (M)
Kercher, T. C. (M)
King, S. O. (A)
Kirby, J. F. (M)
Koontz, C. E. (M)
Kuun, A. (A)
Lauriat, P. R. (M)
Lawless, J. H. (M)
Lindell, R. L. (M)
Linder, I. W. (M)
Mann, D. O. (SM)
Peffer, J. C. (SM)
Pollock, L. E. (M)
Pulliam, W. M., Jr. (A)
Roach, F. L. (A)
Roman, R. (A)
Ryscuck, J. (M)
Savedge, G. S., Jr. (A)
Seyffer, H. C. (A)
Skilling, J. K. (A)
Slaughter, W. R. (A)
Soyer, R. T. (A)
Stallworth, A. W., Jr. (A)
Talmage, G. E. (A)
Thompson, L. H. (A)
Thumm, H. L., Jr. (A)
Trahadias, P. N. (A)
Vallandigham, W. W. (A)
Varn, S. P., Jr. (A)
Ward, B. L., Jr. (A)
Weiss, J. (M)
Williams, W. K. (M)
Williamson, K. A. (A)
Wilson, R. V., Jr. (A)
Wiseman, R. C. (A)

North Springfield (W-DC-3)
Smith, A. W. (A)

Oakton (W-DC-3)
Pineo, V. C. (A)
Wood, W. H.

Orange (NC-VA-3)
Bossieux, E. V., Jr. (M)

Petersburg, (NC-VA-3)
Kluge, C. V. (A)

Phoebus (NC-HR-3)
Cooper, W. N. (A)

Poquoson (NC-HR-3)
Burlock, J. (M)

Portsmouth (NC-HR-3)
Bell, J. S., Jr. (SM)
Busby, E. S., Jr. (M)
Clubb, R. D. (A)
Corkran, R. L., Jr. (M)
Cox, J. C. (A)
Eller, J. E., Jr. (M)
Harrell, S. K. (M)
Hobbs, L. A. (A)
Miller, C. L. (A)
Shaw, W. R. (M)
Williams, B. D., Jr. (M)

Proffit (NC-VA-3)
Farrar, J. H. (A)

Quantico (W-DC-3)
Massey, J. L. (M)

Radford (NC-VA-3)
Gannaway, T. C. (M)
McGahey, E. W., Jr. (M)

Richmond (NC-VA-3)
Bailey, R. C. (SM)
Batte, R. B. (M)
Clark, W. J. (A)
Conte, T. M. (SM)
Dickinson, J. O. (M)
Galeski, J. S., Jr. (A)
Golding, R. M. (A)
Gregory, C. A., Jr. (M)
Hobbs, W. E. (M)
Jewell, H. H., Jr. (M)
Kyle, J. W. (M)
Leaghty, C. D. (M)
Lee, W. M. (M)
Miller, A. G. (A)
Pettus, W. W., IV (M)
Thorpe, R. A. (M)
Toms, E. C. (M)
Vellines, W. E., Jr. (M)
Wilson, R. C., Jr. (M)
Wolfe, I. P. (A)
Woods, D. C. (M)
Wrisley, J. C. (A)

Roanoke (NC-VA-3)
Branscom, G. A. (M)
Briggs, J. P. (A)
Guill, G. M., Jr. (A)
Hodgin, R. M., Jr. (A)
Newman, J. E. (A)

Salem (NC-VA-3)
Wheeler, L. P. (F)

Sandston (NC-VA-3)
King C. W. (A)
Rowland, G. E. (A)

South Arlington (W-DC-3)
Thompson, F. J. (M)

Springfield (W-DC-3)
Alderson, W. S. (SM)
Baird, L. I. (M)
Bargh, P. F. (M)
Beraquist, P. (M)
Botten, D. I. (A)
Chatfield, G. F. (A)
Coulter, D. C. (M)
Gale, M. (M)
Grain, R. (A)
Hamilton, E. E. (M)
Harrison, A. E. (SM)
Keigher, J. P. (M)
Kennedy, W. J. (M)
Keys, C. A. (A)
Klotz, J. W. (M)
McAndrews, F. C. (SM)
Parker, C. R. (A)
Peake, F. E., Jr. (A)
Probert, L. J. (A)
Ragsdale, R. G., Jr. (A)
Rose, J. (M)
Stansberry, C. L. (A)
Stetler, L. R. (M)
Tucker, W. J., Jr. (M)
Wells, E. H. (A)
Wigington, R. L. (M)
Winter, R. E. (M)
Wright, C. S. (SM)

South Norfolk (NC-HR-3)
Tusinski, J. (A)
Yates, Z. (A)

Staunton (NC-VA-3)
Hermansdorfer, J. E. (M)

Sterling (W-DC-3)
Richardson, R. M. (A)

Suffolk (NC-HR-3)
Bangley, J. H., Jr. (A)

Triangle (W-DC-3)
Calfee, R. W. (M)
Stapleton, G. F. (M)

Vienna (W-DC-3)
Aceto, L. J. (A)
Cooke, N. M. (SM)
Duty, D. M. (M)
Fairchild, I. J., Jr. (M)
Gaze, R. H. (M)
Gibbs, D. R. (M)
Gray, W. A. (SM)
Hall, J. N. (SM)

Evans, J. T., Jr. (A)
Hansen, W. O. (M)
Klann, P. A. (A)
Palmer, H. L. (M)
Swann, C. H. (M)
Thuresson, R. G. (A)
Torrance, J. W. (M)
Wilson, T. M. (M)
Zaluski, J. P. (M)

Williamsburg (NC-HR-3)
Meretsky, P. L. (M)

Woodbridge (W-DC-3)
Costanza, F. V. (M)
Healy, C. C., Jr. (M)
Kiblinger, W. H. (A)

WASHINGTON

Aberdeen (SEA-7)
Walker, J. (A)

Auburn (SEA-7)
Hall, J. W. (A)
Lidovitch, S. B. (A)

Bellevue (SEA-7)
Ausec, R. C. (A)
Banks, R. B. (M)
Birch, J. S. (M)
Black, J. C. (M)
Bush, B. E., Jr. (A)
Chewing, W. H. (A)
Ciccanti, A. D. (M)
Cockrill, M. S. (M)
Crane, W. K. (SM)
Downing, G. (M)
Fairfield, H. R. (A)
Ferguson, R. C. (A)
Gellert, M. E. (M)
Gibson, G. A. (M)
Goddess, E. D. (SM)
Hamilton, W. R. (M)
Harms, R. G. (M)
Herr, M. D. (M)
Jones, L. E. (SM)
Kearl, J. A. (A)
Kendall, E. L. (M)
Lerchenmueller, W. (A)
Majeau, H. L. (A)
McCarthy, D. W. (A)
Montgomery, R. A. (M)
Olson, J. H. (M)
Palmer, V. L. (M)
Pigott, W. H. (M)
Pipher, R. W. (A)
Rehnke, E. E. (A)
Robinson, R. B. (M)
Shuck, D. O. (A)
Slippy, H. V. (A)
Smith, C. R. (SM)
Sullivan, J. K. (M)
Thompson, A. G. (M)
Turko, D. A. (A)
Wilson, P. F. (A)
Wright, W. E. (M)

Bellingham (SEA-7)
Harper, E. E. (M)
Price, J. W. (M)
Rodgers, V. P., Jr. (M)

Blaine (SEA-7)
Thornton, R. R. (A)

Bothell (SEA-7)
St. John, I. S. (M)
Vermillion, E. E. (M)

Bremerton (SEA-7)
Carlsten, E. E. (M)
Eustace, R. I. (M)
Gruwell, F. N. (M)
Heimark, H. A. (A)
Levin, R. J. (A)
Linkletter, R. L. (M)
Lyngstad, E. O. (M)
Mason, J. E. (M)
Metcalfe, J. D. (M)
Milden, C. W. (A)
Mills, T. L. (M)
Pitts, H. L. (SM)
Thorne, C. M. (M)
Tufts, W. F. (A)

Centralia (SEA-7)
Lippincott, E. W. (M)

Clarkston (SEA-7)
Rastovich, M. (A)

College Place (SEA-7)
Brown, R. H. (M)

Dash Point (SEA-7)
Boze, J. L. (A)

Deer Harbor (SEA-7)
Tippery, M. W. (M)

Des Moines (SEA-7)
Berntsen, D. G. (A)
Perkins, L. C. (M)

East Stanwood (SEA-7)
Smistad, O. (A)

Edmonds (SEA-7)
Grinnell, C. W. (M)
Gunderson, H. A. (A)
Kirkpatrick, R. L. (M)

Enumclaw (SEA-7)
Stedman, C. K. (SM)

Ephrata (SEA-7)
Bowen, D. A. (M)

Fairchild AFB (SEA-7)
Clinkinbeard, W. S. (A)
Green, E. H. (A)

Federal Way (SEA-7)
Hartwell, S. A. (M)

Friday (SEA-7)
Taylor, C. C. (M)

Gig Harbor (SEA-7)
Berkheimer, R. H. (M)
Bice, M. H. (M)
Bouffiou, C. L. (M)

Hoquiam (SEA-7)
Smading, R. E. (A)

Kennewick (SEA-7)
Cannon, T. W. (M)
Hinshaw, R. M. (A)
Schilling, R. D. (M)

Kent (SEA-7)
Heine, W. (M)
Miller, G. E. (M)
Tyras, G. (M)

Keyport (SEA-7)
Anderson, R. J. (M)

Kirkland (SEA-7)
Bohn, A. L. (M)

Lakeside (SEA-7)
Hatch, J. A. (A)

Longview (POR-7)
Collins, E. H. (M)
Sundberg, R. A. (M)

Mercer Island (SEA-7)
Biggs, J. D., Jr. (A)
Caldwell, R. R. (A)
Casey, K. T. (M)
Fitch, J. L. (A)
Foster, J. H. (A)
Harris, R. E. (A)
May, E. L. (M)
Maynard, J. E. (SM)
Porad, B. L. (M)
Rosenberry, W. J. (M)

Mineral (SEA-7)
Rowe, V. G. (M)

Moses Lake (SEA-7)
Danielson, F. H. (M)

Mountlake (SEA-7)
Gallwey, K. L. (A)
Quirk, W. J. (A)

Oak Harbor (SEA-7)
Baker, N. C. (M)

Olympia (SEA-7)
Carvo, R. F. (M)
Christensen, A. B. (VA)
Guiberson, M. D. (M)
Rummens, W. S. (A)

Pasco (SEA-7)
Crumb, D. F. (M)
Driver, G. E. (M)

Port Angeles (SEA-7)
Keller, N. E. (A)
Niemi, R. I. (A)
Oakes, G. K. (A)

Port Blakely (SEA-7)
McCarty, E. W. (M)

Port Townsend (SEA-7)
Grant, J. T. (M)

Pullman (SEA-7)
Betts, A. L. (SM)
Craine, L. B. (M)
Harbour, R. D. (M)

Ravensdale (SEA-7)
Cockrill, W. C. (A)

Renton (SEA-7)
Elfers, P. L. (M)
Hood, L. L. (A)
Nelson, J. K. (M)
Vaughn, A. L. (A)

Richland (SEA-R-7)
Althoff, P. C. (M)
Barcroft, J. R. (M)
Brebrick, R. J. (M)
Brown, P. E. (A)
Clark, R. G. (M)
Cone, R. R. (M)
Connally, R. E. (M)
Forsberg, J. I. (A)
Frederick, C. L. (M)
Glass, C. E. (A)
Harvey, R. A. (M)
Hower, G. L. (M)
Klingler, G. R. (M)
Libby, H. L. (M)
Pleasance, C. L. (M)
Powell, R. W. (M)
Ratcliffe, C. A. (A)
Rising, F. L. (A)
Simsen, C. A. (M)
Smith, M. L. (M)
Spear, W. G. (M)
Van Den Berg, W. J. (A)
Waldkoetter, G. L. (A)
Wood, E. C. (M)
Wood, M. R., Jr. (M)
Zeitler, G. A. (M)

Seattle (SEA-7)
Abend, D. L. (A)
Aburano, P. F. (M)
Adair, J. M. (M)
Appleford, L. R. (A)
Arlowe, H. H. (SM)
Armour, R. B. (M)
Armstrong, C. W. (M)
Bach, R. O. (SM)
Bahr, L. A. (A)
Baker, J. C. (A)
Balazic, J. J. (M)
Ballieu, H. L. (M)
Barger, S. D. (A)
Bark, R. S. (M)
Barrea, R. A. (M)
Barrett, T. B. (M)
Baumgartner, D. L. (M)
Beals, E. L. (A)
Behrens, R. G. (M)
Belch, F. R. (M)
Bergseth, F. R. (M)
Berzin, J. G. (M)
Billingsley, J. D. (M)
Bindner, J. T. (SM)
Bishop, D. J. (M)
Bjorkman, F. D. (M)
Bjorkstam, J. L. (A)
Blanchard, D. I. (A)
Bland, J. G. (A)
Bloomfield, J. A. (M)
Boileau, D. C., Jr. (M)
Bradburn, W. C. (M)
Brock, R. L. (M)
Brown, R. W. (M)
Brudwig, A. H. (M)
Brune, F. A. (M)
Bull, W. A. (SM)
Bushman, F. W. (M)
Bystrom, A., Jr. (A)
Campbell, B. (A)
Campbell, G. R. (A)
Carlyle, J. W. (M)
Cary, J. W., III (A)
Cavanaugh, J. T. (A)
Chaba, P. (M)
Chamberlin, W. C. (M)
Chase, R. F. (M)
Clark, L. G. (A)
Cockran, J. B. (SM)
Consego, B. J. (A)
Cooley, W. W. (A)
Corpus, A. R. (M)
Coughlan, G. B. (A)
Craig, D. (A)
Curtis, W. L. (M)
Dalby, T. G. (A)
Davie, W. C. (A)
Davies, W. R. (A)
Dennis, D. L. (A)
Dorband, A. E. (M)
Dorratcague, P. E. (M)
Dorwart, R. J. (M)
Drummond, W. D. (A)
Duncan, J. A. (M)
Dunham, P. N. (M)
Duryee, P. A. (A)
Duvall, L. L. (A)
Early, E. W. (A)
Eastman, A. V. (F)
Ebken, A. F., Jr. (M)
Eckton, W. H., Jr. (M)
Eisenbach, M. E. (A)
Eklund, G. A. (M)
Eliander, H. F., Jr. (M)
Ellerbeck, K. H. (M)
Embree, R. R. (A)
Engstrom, D. E. (A)
Erwin, E. V. (M)
Erwin, R. L. (M)
Erwood, R. G. (M)
Eason, R. C. (A)
Evenson, H. J. (M)
Fancher, V. M. (M)
Fantin, P. J. (M)
Fargo, R. E. (A)
Farris, W. E. (M)
Felber, J. F. (M)
Feldstein, S. (A)
Ferguson, R. E. (M)
Fisher, K. C. (SM)
Flagler, R. H. (M)
Flint, D. C. (M)
Fluke, J. M. (M)
Follis, G. R. (M)
Fonda, K. A. (M)
Foss, R. N. (M)
Foster, N. H. (SM)
Friedland, R. R. (M)
Frost, E. N. (M)
Frost, R. D. (M)
Galloway, W. C. (SM)
Gee, P. S. (M)
Gelbach, H. R. (A)
Gibson, J. (M)
Gilbertson, S. R. (M)
Gill, C. C. (A)
Glaser, R. A. (M)
Goldberg, P. A. (A)
Gregory, W. W., Jr. (A)
Haislip, D. T. (M)
Halstead, F. H., Jr. (A)
Hammer, E. D. (M)
Harrold, W. T. (SM)
Hass-rdjian, G. K. (M)
Hatfield, J. B. (M)
Havens, J. D. (A)
Hayashi, M. (A)
Heilberg, R. W. (M)
Heindsmann, T. E. (SM)
Heinzinger, J. P. (A)
Held, G. (A)
Hermanson, K. P. (A)
Hermstad, J. A. (M)
Hill, A. P. (M)
Hill, W. R., Jr. (SM)
Hillesland, C. B. (M)
Hoard, G. L. (SM)
Hoard, R. F. (M)
Hoffman, J. (M)
Hogan, J. R. (A)
Hoglund, R. H. (SM)
Hokenson, H. S. (M)
Holladay, G. (A)
Holman, F. S. (A)
Hopkins, C. (SM)
Horn, H. T. (M)
Hove, R. G. (M)
Hulse, B. T., Jr. (M)
Ikstrums, I. (M)
Illman, R. W. (M)
Ingman, J. F. (M)
Janes, H. P., Jr. (M)
Johansen, K. D. (M)
Johnson, J. F. (SM)
Johnson, K. L. (M)
Jones, B. J. (A)
Jones, E. A. (A)
Jones, W. L. (M)
Judson, H. H., Jr. (M)
Kalviste, A. (A)
Kaminoff, M. (M)
Katayama, T. T. (A)
Kellar, J. B. (A)
Kensler, H. A. (M)
Kieburtz, R. B. (A)
Kimbark, D. W. (M)
Kindall, E. W. (A)
King, T. H. (M)
Kiskaddon, W. V. (M)
Kohl, P. H. (A)
Kostrey, M. J. (A)
Kuzela, C. (M)
Lang, E. A. (A)
Larson, L. A. (A)
Leader, R. E. (A)
Lee, H. P. (A)
Lehtone, L. L. (A)
Lennstrom, C. O. (A)
Leonard, P. W. (A)
Lewis, L. J. (SM)
Harrison, A. E. (F)
Libby, T. M. (F)
Lillie, W. A. (A)
Lind, P. C. (A)
Linder, W. J. (M)
Litot, P. A. (A)
Litten, G. A. (SM)
Loule, D. (A)
Lucey, W. E. (M)
Lum, J. S.-C. (A)
Lundberg, R. M. (A)
Marsolan, V. C. (SM)
Maxwell, R. L. (M)
McGuire, C. B. (A)
McIlroy, F. W. (A)
McKay, W. M. (M)
McKenna, B. D. (A)
McPherson, E. L. (M)
Mears, R. J. (M)
Michelsen, P. W. (A)
Miller, C. E. (A)
Miller, D. (M)
Mitchell, G. W. (A)
Morgan, W. R. (A)
Morris, C. R. (M)
Moses, H. (A)
Mossman, F. B. (SM)
Munson, S. A., Jr. (A)
Murray, W. A. (A)
Nation, A. W. C. (A)
Neal, E. T. (A)
Nelson, P. (M)
Nelson, R. H. (M)
Nichols, W. R. (SM)
Noland, L. J. (A)
Numrich, H. J. (A)
Nutting, D. C. (M)
Ogasawara, T. B. (M)
Oliver, R. B. (M)
Olson, B. V. (A)
Olson, D. (A)
Olson, D. S. (A)
Omoth, M. J. (A)
Orth, J. W. (A)
Ostrom, C. W. (M)
Paisley, M. R. (A)
Parris, J. A. (M)
Parrott, J. E. (M)
Pascual, R. A. (M)
Paterson, J. M. (M)
Payne, R. S. (A)
Pearson, R. (A)
Pedersen, M. E. (M)
Peedo, E. (M)
Perry, F. E. (M)
Perry, R. E. (M)
Petrich, R. O. (M)
Peyton, E. E. (M)
Pierce, W. E. (SM)
Polcuch, A. F. G. (M)
Poppe, R. F., Jr. (A)
Porter, B. C. (A)
Post, M. O. (A)
Powell, J. W. (M)
Powell, J. R. (A)
Pratt, L. M. (M)
Puckette, J. H. (A)
Quantz, R. G. (A)
Randall, H. L. (M)
Reid, R. D. (A)
Renfro, H. (VA)
Renhard, J. A. (SM)
Reynolds, D. K. (SM)
Ritchey, O. W. (M)
Robbins, F. D. (A)
Roberts, B. J. (M)
Rogers, W. E. (SM)
Rotta, E. A. (M)
Salzer, J. E. (A)
Sander, C. M., R. (A)
Sando, J. (A)
Sauber, P. T. (A)
Schmidt, C. (A)
Seidmore, D. L. (M)
Scott, C. V. (A)
Scovill, M. (M)
Sharp, B. M. (A)
Sheppard, J. J., Jr. (M)
Shipek, R. H. (M)
Shirrod, L. (A)
Shook, W. A. (A)
Shubert, H. N. (M)
Siddons, W. J. (M)
Sigelmann, R. A. (A)
Simmons, J. T. (M)
Simons, R. J. (A)
Siverts, R. D. (A)
Small, R. E. (A)
Smith, K. C. (M)
Smith, M. R. (M)
Snyder, P. O. (A)
Sowa, C. P. (M)
Speir, F. H. (SM)
Stampalia, E. L., Jr. (M)
Stapleton, E. K. (M)
Stark, D. R. (M)
Stefanowicz, M. R. (A)
Strauss, B. (M)
Strohecker, J. P. (M)
Sutherland, L. C. (M)
Swain, C. W. (M)
Swindlehurst, W. C. (A)
Swisher, B. F. (A)
Talcott, M. S. (M)
Tate, J. A. (A)
Ten Zeldam, H. J. (A)
Thomas, J. R. (M)
Thomasson, L. T. (M)
Thompson, K. J. (M)
Todaro, C. N. (M)
Todd, H. C. (A)
Tolmie, J. R. (F)
Traub, L. A. (M)
Triplett, H. W. (M)
Turner, R. L., Jr. (A)
Voss, J. M. (A)
Wagner, W. J. (SM)
Walker, R. T. (M)
Wall, R. E., Jr. (M)
Wallace, J. E. (M)
Warshawsky, J. (A)
Waterman, H. B. (M)
Weiland, W. A. (M)
Weinstein, G. (M)
Weist, W. R., Jr. (A)
Whipple, M. M. (A)
Whitman, J. R. (M)
Willard, H. R. (M)
Williams, C. E. (F)
Williams, H. A. (M)
Williams, T. G. (M)
Willson, A. R. (SM)
Willson, K. R. (SM)
Winder, D. E. (A)
Wood, F. P. (M)
Woodbury, J. W. (M)
Woodhouse, G. H. (A)
Wright, C. P. (M)
Wright, J. M. (M)
Wyatt, E. L. (M)
Yamauchi, T. (M)
Yoshinaka, K. (M)

Snohomish (SEA-7)
Short, R. C. (M)
Sterley, R. R. (M)

Spokane (SEA-R-7)
Brookman, C. F., Jr. (A)
Caruana, J. (A)
Coates, F. M. (M)
Gorman, D. P. (M)
Green, D. I. (M)
Green, W. L. (M)
Hadley, C. E. (M)
Kennedy, J. E., Jr. (A)
MacLean, T. W. (M)
Mead, H. W. (M)
Sparling, A. G. (SM)
Storms, H. H. (VA)
Switzer, W. H. (A)
Trebby, F. J. (M)

Sumner (SEA-7)
Breakey, E. P. (M)

Suquamish (SEA-7)
Byer, E. D. (SM)

Tacoma (SEA-7)
Backman, J. A. (A)
Finney, B. W. (A)
Kelley, J. L. (M)
Kukowski, J. F. (M)
Lund, R. E. (M)
Mann, J. W. (A)
McClamrock, J. M. (M)
McDonough, D. M. (SM)
Morrill, D. W. (A)
Perkins, M. G. (M)
Robertson, J. T. (M)
Rybon, J. C. (A)
Shiplett, K. E. (M)

Tumwater (SEA-7)
Nielsen, R. G. (M)

Vancouver (POR-7)
Roesler, R. W. (A)
Wohlgemuth, D. G. (A)

Vashon (SEA-7)
Bey, W. I. (M)
Irish, L. A. (A)
Sundstrom, L. C. (A)
Caproni, G. A. (A)

Walla Walla (SEA-R-7)
Parmenter, W. G. (M)
Wilken, B. W. (A)

Wenatchee (SEA-7)
Wallace, J. (SM)

Yakima (SEA-7)
Forgey, J. A. (A)
Root, M. W. (M)
Watkinson, J. B. (M)

WEST VIRGINIA

Beckley (PIT-4)
Klaus, C. R. (M)

Bluefield (PIT-4)
Hammer, A. C. (A)
Lienhard, O. W. (A)

Charleston (PIT-4)
Brick, G. R. (A)
Brown, T. M. (A)
Dixon, W. E. (A)
Helgeson, G. T. (A)
Johnson, E. M. (SM)
Kish, F. (A)
Wolford, J. E. (A)
York, D. E. (A)

Charles Town (W-DC-3)
Stone, S. H., Jr. (A)

Clarksburg (PIT-4)
Hough, R. D. (M)

Cowen (PITT-4)
Frame, R. H. (A)

Dunbar (PIT-4)
Bowen, H. R. (A)
Mitchell, S. E. (A)

Huntington (PIT-4)
Bromley, R. A. (A)
Clay, J. P. (M)
Hawes, J. G. (M)
Kilpatrick, L. E. (SM)
Marshall, D. F. (A)
Roberts, V. B. (A)
Tanner, J. E. (M)

Martinsburg (W-DC-4)
Boland, E. J. (SM)

Middlebourne (PIT-4)
Nichols, G. C. (A)

Morgantown (PIT-4)
Barbe, E. C. (M)
Colwell, R. C. (SM)
Seibert, C. B. (M)
Weiland, F. A. (A)
Williams, S. D. (A)

Moundsville (PIT-4)
Jones, J. W. (M)
Rulong, C. P. (M)

Nitro (PIT-4)
Rogers, L. J. (M)

Oak Hill (PITT-4)
Thomas, R. R., Jr. (M)

Ona (PIT-4)
Pitts, M. J. (A)

Parkersbourg (PIT-4)
Spence, R. C. (A)

Ravenswood (PIT-4)
Ellison, B. P. (M)

St. Albans (PIT-4)
Counts, D. C. (A)
Fertig, R. B. (A)

Wheeling (PIT-4)
Levenson, D. W. (M)
Rollins, E. A. (A)
Sneed, W. K. (A)

White Sulphur Springs (PIT-4)
Arnold, W. R. (A)

Whitesville (PIT-4)
Salamy, A. E. (M)

WISCONSIN

Antigo (TC-5)
Parfitt, R. J. (M)
Rupcich, J. N. (A)
Wallenfels, W. B. (M)

Ashland (TC-5)
Johnson, G. A. (M)

Belgium (MIL-5)
Ehlers, G. M. (SM)

Brookfield (MIL-5)
Luna, A. L. (M)
Morin, D. C., Jr. (M)

Burlington (MIL-5)
Holmbeck, J. D. (A)

Butler (MIL-5)
Hernday, R. H. (M)

Canton (TC-5)
Kendzior, G. A. (A)

Cashton (TC-5)
Strand, H. D. (M)

Chippewa Falls (TC-5)
Buchanan, K. J. (A)

Colfax (TC-5)
Lundberg, C. F. (M)

Cudahy (MIL-5)
Patrick, P. J. (A)

Eau Claire (TC-5)
Jorgenson, T. O. (M)

Elm Grove (MIL-5)
Bailey, T. J. (A)
Evans, J. A. (M)

Fond du Lac (MIL-5)
Jensen, K. S. (SM)

Fort Atkinson (MIL-5)
Anthes, J. (A)

Fox Point (MIL-5)
Howard, J. R. (M)

Grafton (MIL-5)
Konig, V. A. Y. (A)
Rubinstein, H. W. (M)

Greendale (MIL-5)
Gillett, R. L., Jr. (A)

Hales Corners (MIL-5)
Jacobs, J. E. (M)
Stone, D. W. (M)

Hartland (MIL-5)
Harry, W. R. (VA)

Janesville (MIL-5)
Brandt, R. W. (SM)
Gates, C. E. (M)
Glander, H. H. (M)
Middleton, J. A. (A)
Petranek, D. J. (M)
Pollard, W. J. (A)
Weckwerth, H. A. (M)
Williams, C. R. (M)
Ziehlke, R. J. (A)

La Crosse (TC-5)
Hemker, J. B. (M)
Krizanosky, A. (A)
Leeman, A. (M)
Steele, T. S. (M)

Lake Nebagamon (TC-5)
Caspers, G. E., Jr. (M)

Madison (MIL-5)
Asmuth, J. L. (M)
Bergman, R. E. (A)
Clark, D. K. (M)
Davidson, C. H. (A)
Emerson, R. E. (M)
Gilson, W. E. (SM)
Graham, J. D. (A)
Gritzmacher, D. E. (M)
Groenier, R. S. (M)
Hahn, N. G. (M)
Hariu, W. R. (M)
Haxby, R. O. (SM)
Ishii, K. (M)
Kelley, W. V. (VA)
Koehler, G. (F)
Lange, J. R. (A)
Lind, E. R. (M)
Mack, H. A. (A)
McGilvra, G. E. (A)
Ottum, R. W. (A)
Parent, R. J. (M)
Peterson, H. A. (SM)
Reitan, D. K. (SM)
Rekoff, M. G., Jr. (A)
Retherford, R. C. (M)
Rideout, V. C. (SM)
Sadler, L. S. (M)
Scheibe, E. H. (SM)
Schlimore, A. K. (M)
Scott, T. M. (A)
Skiles, J. J. (M)
Snyder, L. S. (A)
Stephan, R. R. (A)
Swift, W. B. (M)
Uhrig, A. F. (A)
Van Bladel, J. G. (SM)
Vanko, J. A. (A)
Wickhem, R. J. (A)
Young, C. E. (A)

Manitowoc (MIL-5)
Heinzen, R. A. (M)

McFarland (MIL-5)
Pierce, R. L. (M)

Menasha (MIL-5)
Selig, T. R. (M)

Merrill (TC-5)
Bartelt, C. H. (A)

Milltown (TC-5)
Williamson, W. R. (M)

Middleton (MIL-5)
Miller, J. B. (M)

Milton (MIL-5)
Harris, R. J. T. (M)
Haugen, M. G. (M)

Milwaukee (MIL-5)
Alpert, W. I. (M)
Appleman, C. G. (M)
Atwood, A. R. (A)
Bailey, J. E. (M)
Baird, J. T. (M)
Barrett, R. O. (M)
Baumeister, E. A. (M)
Beaudoin, L. W. (A)
Behagen, E. L. (M)
Bernstein, S. (SM)
Bischoff, A. F. H. (SM)
Biwer, M. M. (M)
Boyd, B. (M)
Brandt, H. F. (A)
Buday, R. R. (M)
Budy, J. J. (A)
Burchardt, R. R. L. (A)
Burkett, L. E. (A)
Burkhalter, E. (A)
Butler, W. (M)
Calhoun, M. C. (A)
Camell, D. M. (A)
Carlson, A. W. (M)
Casper, R. (M)
Chaniga, J. A. (A)
Cooke, E. R. (A)
Cordes, E. L. (M)
Cork, H. A. (M)
Corrino, C. (M)
Cottle, H. O. (A)
Das Gupta, A. K. (A)
De Block, E. T. (A)
Delfield, F. R. (M)
Deisinger, J. J. (M)
Dobnick, O. X. (A)
Doyen, R. G. (A)
Doylen, D. H. (M)
Du Pore, R. N. (M)
Dunn, J. R. (A)
Dunn, J. V. (M)
Durand, E. L. (M)
Eckert, F. A., Jr. (VA)
Edwards, M. A. (F)
Eisele, E. J. (A)
Elliot, W. H. (M)
Erb, J. J. (A)
Evans, E. (M)
Fritz, E. W. (A)
Gainer, W. P. (M)
Ganiere, H. C. (M)
Garstang, W. W. (SM)
Gebhard, R. F. (A)
Geiger, L. C. (M)
Gellerup, D. W. (SM)
Gennrich, A. (M)
Gessner, U. (A)
Goodman, P. H. (A)
Harrison, R. E. (M)
Hebal, W. H. (M)
Helgeson, V. L. (M)
Hetchler, L. F. (M)
Hoffmann, P. F. (M)
Hogan, H. A. (M)
Horvath, A. E. (M)
Jacobi, T. (M)
James, R. A. (A)
Janusz, J. S. (A)
Jensen, M. W. (A)
Kaetel, H. C. (M)
Kaiser, E. H. (A)
Kane, E. W. (M)
Kark, R. H. (A)
Kaslorf, G. R. (M)
Kelly, D. S. W. (SM)
Kelly, D. V. (M)
Keppert, G. D. (M)
Khouri, A. S. (M)
Kilby, J. S. (M)
Knopow, H. S. (A)
Koch, M. E. (A)
Kokalj, F. P. (M)
Kordes, R. R. (A)
Krug, R. E. (A)
Kunde, P. J. G. (A)
Laeser, P. B. (M)
Landin, D. R. (A)
Lecus, C. M. (A)
Limpel, E. J. (M)
Lindemann, A. W. (M)
Little, C. W., Jr. (M)
Lyon, T. L. (M)
Makela, L. V. (A)
Maklary, J. R. (A)
Makowski, J. J. (M)
Malmleaf, W. R. (M)
Master, W. R. (M)
Matthews, R. B. (M)
Matthias, L. H. (M)
McCarter, O. T. (A)
McCarthy, R. R. (A)
Mederer, S. J. (M)
Mereen, D. E. (M)
Mezger, J. P. (A)
Michalak, E. M. (A)
Miller, E. R. (A)
Millunzi, F. T. (A)
Monleone, J. (A)
Mrazek, D. A. (A)
Mueller, E. H. (A)
Naughton, G. J. (VA)
Neitzke, G. G. (A)
Norman, O. A. (M)
Ollenburg, M. A. (A)
Olson, R. C. (A)
Pfeifer, J. W. (VA)
Phillips, R. A. (M)
Plehn, A. D. (M)
Plummer, L. A. (A)
Pooler, E. J. (A)
Popp, R. J. (A)
Quam, D. L. (A)
Queever, L. (M)
Rapp, R. L. (M)
Regis, R. (M)
Ribbens, W. F. (M)
Richardson, M. S. (M)
Richter, W. (F)
Ricketts, J. B., Jr. (A)
Rodewald, M. V. (M)
Roethle, R. H. (A)
Rutkowski, J. A. (A)
Saari, L. V. (M)
Sackett, R. W. (A)
St. John, J. D. (M)
Sauerland, E. W. (M)
Schaack, R. J. (A)
Schaffer, J. E. (A)
Schimmel, K. J. (A)
Schlager, K. J. (M)
Schlaefer, G. A. (M)
Schlehlein, G. J. (A)
Schlicke, H. M. (SM)
Schoenfuss, A. F. (SM)
Schwartz, J. R. (M)
Seiy, M. E. (SM)
Sherwood, E. T. (SM)
Sitzwohl, J. F., Jr. (M)
Smith, C. C. (A)
Smith, O. H. (M)
Snowdon, A. C. (M)
Spaeth, C. A. (A)
Sparacino, B. J. (A)
Sperber, D. J. (A)
Srolovitz, H. R. (A)
Starzec, F. J. (M)
Steffe, W. C. (M)
Steffen, R. V. (A)
Stumpf, H. W. (M)
Sutinen, C. P. (SM)
Talbot, V. R. (M)
Taus, H. G. (M)
Taylor, F. H. (M)
Theiss, M. C. (A)
Torkildsen, R. A. (A)
Tschantz, L. G. (A)
Valo, H. L. (A)
Van Zeeland, F. J. (SM)
Vebber, W. O. (M)
Veerkamp, N. B. (M)
Wagner, W. O. (M)
Wahlig, R. L. (M)
Walter, C. G. (M)
Weigel, E. (M)
Weller, D. A. (SM)
West, B. M. (M)
Wille, E. A. (M)
Williams, C. L. (M)
Williams, S. B. (M)
Wittke, R. F. (A)
Woelffer, R. M. (A)
Woldt, F. R. (M)
Wolff, R. L. (M)
Wolniakowski, L. L. (A)
Woods, K. C. (A)
Wulliman, J. C. (A)
Young, R. G. (M)
Zoesch, A. C. (A)
Zolin, F. H. (A)
Zwarra, H. J. (M)

Minocqua (TC-5)
Martin, H. T. (A)

Mukwonago (MIL-5)
Brown, H. W. (A)

Neenah (MIL-5)
Zabel, L. W. (M)

Oshkosh (MIL-5)
Williams, N. (M)
Peshtigo (TC-5)
MacLaughlin, D. C. (A)

Racine (MIL-5)
Arcand, R. T. (M)
Briedis, G. (A)
Due, R. C. (A)
Johnson, W. H. (M)
Kohner, M. (SM)
MacDowell, G. E. (A)
Salvat, R. F. (M)
Slater, O. C. (A)
Zelazo, N. K. (SM)

St. Francis (MIL-5)
Howell, J. F. (M)

Saukville (MIL-5)
Nunn, E. D. (M)

Sheboygan (MIL-5)
Mayer, H. J. (A)

South Milwaukee (MIL-5)
Clinkenbeard, C. R. (A)

Sparta (TC-5)
Heasty, C. N. (A)

Thiensville (MIL-5)
Barthel, E. A. (A)
Cummings, D. G. (M)
Runft, A. J. (A)
Sielicki, A. J. (M)

Tomahawk (TC-5)
McGinnis, H. J. (M)

Trempealeau (TC-5)
Berbe, C. W. (A)

Trevor (CHI-5)
Dippold, W. J. (A)

Waterford (MIL-5)
Cummings, H. R. (M)
Swain, A. T. (M)

Waukesha (MIL-5)
Koenig, E. C. (M)
Randall, A. E. (M)

Waupaca (TC-5)
Danielsen, A. C. (M)

Wausau (TC-5)
Burns, S. S. (M)
Zielesch, B. E. (M)

Wauwatosa (MIL-5)
Bartol, T. J. (A)
Pinnow, R. L. (M)
Schuppner, H. W. (M)
Schwartz, E. B. (SM)
Tait, R. B. (M)
Watts, W. E. (M)
Wollaeger, L. A. (A)

West Allis (MIL-5)
Houle, T. H. (A)
Lofy, F. J. (M)
Paulu, A. (M)
Rand, K. A. (A)
Reinke, H. J. (M)
Sullivan, P. (A)
Taylor, E. D. (A)

West Depere (MIL-5)
Stangel, W. (M)

Whitewater (MIL-5)
Rumbalek, J. E. (A)

WYOMING

Casper (DEN-6)
Anderson, F. C. (M)
Hathaway, D. L. (SM)

Cheyenne (DEN-6)
Grove, W. C. (M)
Hallen, E. (M)
Klessig, R. J. (M)
Nakano, O. (A)
Shelton, J. T. (M)

Cody (DEN-6)
Behrendt, R. T. (A)

Laramie (DEN-6)
Crissman, P. C. (A)
Long, F. M. (A)
Lonsdale, E. M. (SM)

Newcastle (DEN-6)
Anderson, S. D. (A)

Sheridan (DEN-6)
Stanton, J. M. (M)

Torrington (DEN-6)
Sparks, J. E. (M)

Upton (DEN-6)
Rinehart, B. H. (VA)

ALASKA

Anchorage
Baker, H. O., Jr. (A)
Bieber, H. P., Jr. (A)
Borisky, A., Jr. (M)
Brodigan, H. F. (A)
Burke, H. E. (M)
Duncan, J. G. (M)
Gay, G. L. (A)
George, R. C. (M)
Gray, C. M. (A)
Hajek, S. J. (A)
Hannon, G. A. (M)
Hart, B. H. (SM)
Hutchinson, R. E. (A)
Johnson, C. A. (M)
Johnson, R. L. (A)
Little, J. T. (A)
McKee, W. H. (A)
Park, R. L. (M)
Phipps, W. O., Jr. (A)
Silven, J. W. (M)
Smith, C. H. (M)
Southall, A. M. (A)
Surowiec, D. S. (M)
Svarczkopf, G. J. (A)
Walden, J. M. (M)
Walker, R. E. (M)
Warren, K. A. (A)
Watson, W. A. (M)
Wheaton, T. H. (A)
Whittaker, G. A. (A)
Williams, R. E. (A)
Zwart, R. (A)

Barrow
Wanbaugh, W. C. (M)

College
Busch, S. D. O. (M)
Leonard, R. S. (A)
Little, C. G. (M)
Merritt, R. P. (M)
Owren, L. (M)
Stanley, G. M. (M)

Fairbanks
Dougherty, J. J. (M)
Edens, J. A. (A)
Rosser, B. M. (A)
Shurtleff, C. H. (A)

Juneau
Ordonia, J. M. (A)

King Salmon
Campbell, W. O. (A)

Petersburg
Pierce, E. R. (M)

Spenard
Rogers, D. C. (M)
Wayer, C. F., Jr. (M)
Wright, M. E. (M)

Yakutat
Long, J. E. (A)

ADEN COLONY

Aden
Hudson-Davies, J. (M)

ARGENTINA

Bahia Blanca (BA)
Paez-Segul, J. C. (A)

Banfield (BA)
Tufro, A. (SM)

Buenos Aires (BA)
Alzona, A. (A)
Andrews, G. J. (SM)
Arbo, O. (A)
Baldwin, E. V. (M)
Barbieri, M. (M)
Barcala, J. M. (SM)
Barros, N. R. (A)
Baumann, C. (SM)
Benjamin, M. (A)
Bermudez, J. (A)
Bertola, J. (M)
Bilotti, A. (A)
Blon, J. L. (SM)
Blusiewicz, E. (A)
Brandt, L. (M)
Cassiet, A. H. (M)
Cole, T. J. (A)
Conle, H. O. (A)
Cook, W. A. (SM)
Diamand, M. (M)
Dickson, A. R. K. (M)
Di Marco, A. (SM)
Di Stanzio, P. (A)
Escribano, J. M. (A)
Feinstein, J. (A)
Fernandez, O. C. (SM)
Flint-Halpern, G. (A)
Galliverti, M. A. (A)
Gamba, D. W. (A)
Gayoso, R. A. (M)
Giron, D. G. (A)
Gluckmann, A. (A)
Grant, I. C. (SM)
Ingrao, H. C. (A)
Kirksecther, E. J. (M)
Lacenca, F. (A)
Maget, R. V. X. (SM)
Marelli, R. V. (A)
Pardo, E. M. (A)
Martinez, J. (A)
Mazzeo, R. (A)
Miyara, J. (A)
Noireux, P. J. (F)
Novillo, H. L. (A)
Penin, R. L. (A)
Perfillo, L. M. (A)
Picard, A. (M)
Pinasco, S. F. (M)
Pluss, C. P. (SM)
Pulver, M. (A)
Rubio, J. M. (SM)
Rueda, J. V. (M)
Schwartz, O. (A)
Schweimer, K. P. (M)
Scott, R. H. (SM)
Sitkovsky, V. (A)
Steiner, J. L. (M)
Steube, E. R. (A)
Tappata, H. N. (A)
Thomae, M. A. (A)
Trench, C. E. (A)
Valo, C. A. (A)
Valdes, S. A. (A)
Valentinuzzi, M. E. (M)
Van Der Lee, A. C. (M)

Florida (BA)
Leunis, J. (M)
Noviks, B. (M)

ARGENTINA

Hurlingham (BA)
Cosentino, A. T. (F)
Dallocchio, H. S. (M)

La Plata (BA)
Poncetta, J. E. (A)

Mar del Plata (BA)
Espina, H. E. (A)

Olivos (BA)
McCallum, C. A. (A)
Peirano, A. (A)

Rio Negro (BA)
De Haro, F. O. (A)

Rio Tercero (BA)
Callisen, F. I. (A)

San Isidro (BA)
Coriat, J. L. (A)
Marco-Del Pont, A. (A)
Van Spankeren, G. H. (SM)

San Miguel De Tucuman (BA)
Lopez de Zavalia, R. J. (A)

Vincente Lopez (BA)
Collazo, J. A. (A)
Iglesias, H. B. (A)
Kagel, I. J. (M)
Manifesto, H. D. (A)

ASCENSION ISLAND

Ascension Island
Bruce, J. R. (VA)

AUSTRALIA

NEW SOUTH WALES

Ashfield
Honnor, W. W. (SM)

Beecroft
Hope, R. S. (M)

Bexley
Wardale, A. H. (M)

Burwood
Builder, G. (F)

Canberra
Carden, P. O. N. (A)
Graf, G. R. (M)
Hibbard, L. U. (M)
Robertson, D. S. (A)

Chippendale
Cooper, B. F. (M)
Dobbie, L. G. (SM)
Kerr, F. J. (SM)
Lampard, D. G. (M)
Minnett, H. C. (M)
Ryan, R. D. (M)

Cremorne
Chandler, G. A. (A)

Five Dock
Cansick, N. V. C. (A)

Kennsington
Laisk, E. (M)

Longueville
Beard, M. (M)
Swire, B. E. (M)

Mosman
Wyles, D. G. (SM)

Neutral Bay
Stevenson, M. H. (SM)

Orange
Crouch, E. C. (A)

Punchbowl
Hansen, I. C. (M)

Roseville
Fisk, E. (F)

Sydney
Bean, L. P. R. (SM)
Bushby, T. R. W. (SM)
De Lacy, E. M. F. (M)
Fowler, A. (M)
Gutmann, F. (SM)
Hall, G. G. (M)
Hall, L. S. (SM)
Hirschl, H. P. (M)
Hooke, L. A. (AM)
Kirkham, P. (M)
Mingay, O. F. (SM)
Munro, G. H. (SM)
Parish, H. C. (VA)
Shaw, R. H. (M)
Thom, F. W. P. (SM)
Wade, C. F. N. (SM)
Warner, J. (M)
Weston, P. E. (M)

West Ryde
Benson, J. E. (SM)

NORTHERN TERRITORY

Alice Springs
Jackson, L. J. (M)

QUEENSLAND

Brisbane
Ham, G. (VA)
Oliver, E. (M)
Webster, H. C. (M)

SOUTH AUSTRALIA

Adelaide
D'Assumpcao, H. A. (M)
Ellesworth, C. (SM)
Pybus, A. W. L. (SM)
Treharne, R. F. (A)
Willoughby, E. O. (M)

Elizabeth
Beck, H. M. (A)

Millswood Estate
Wadsworth, B. F. P. (M)

Plympton
Davies, R. J. C. (M)

TASMANIA

Hobart
Wyett, D. J. (A)

Launceston
Moore, L. (A)

VICTORIA

Ballarat
McCulloch, G. R. (A)

Balwyn
MacDonald, J. A. (A)

Beaumaris
Murphy, W. T. (M)

Brighton
Warner, G. A. (M)

Canterbury
Coate, E. F. (A)

East Malvern
Cox, L. V. (M)

Ivanhoe
Chakanovskis, E. (A)

Melbourne
Brodribb, M. I. (M)
Brownless, S. F. (M)
Caro, D. E. (A)
Faudell, C. L. (SM)
Glover, A. J. G. (M)
Hooper, E. M. (VA)
Jacoby, A. (A)
Mair, R. B. (SM)
Rubenstein, S. J. (VA)
Skelton, T. H. (SM)
Kennewell, E. M. (A)

Richmond
Webb, A. L. C. (VA)

Sunshine
Blakeley, W. C. (M)

WEST AUSTRALIA

Bellevue
Simrod, R. (A)

Perth
Hayman, W. G. (M)

South Perth
Hatton, G. H. T. (A)

AUSTRIA

Vienna
Watson, P. C. (A)
Zemanek, H. (M)

BELGIUM

Antwerp
Van Dyck, E. A. (M)

Brussels
Beresford, H. E., Jr. (A)
Bernaert, A. L. J. (A)
Hoffmann, J. A. J. L. (A)

Charleroi
Desirant, M. C. (A)

Eupen
Fettweis, A. L. M. (M)

Ghent
Buys, W. L. (M)
Vanden Meersche, A. J. (VA)

Kortrijk
Vanwormhoudt, M. C. (M)

Putte
Liekens, A. F. (A)

Mons
Harmegnies, P. A. (M)

Uccle-Brussels
Belevitch, V. (SM)
Marique, J. (M)

Wezembeek
Tavernier, G. C. (M)

Zwevegem
Deschuytere, L. C. (M)

BERMUDA

Hamilton
Hillier, R. J. (M)
Spershott, J. H. (M)

Warwick
Owen Harries, J. H. (SM)

BOLIVIA

La Paz
Glaubach, N. (A)
Well, R. B. (M)

BRAZIL

Porto Alegre
Beick, H. B. (M)
Muller, F. R. (A)
Peixoto, E. S. (SM)
Ritter, G. (A)

Rio de Janeiro
Amarante, A. J. D. (A)
Aquimo, J. T. (A)
Bonapace, H. (M)
Bosinelli, F. (M)
Braga, L. L. F. (A)
Brandao, N. C. (A)
Chamoun, H. V. (A)
Coelho, C. A. B. (A)
Costa, H. (M)
Costa, P. S. (A)
Coutinho, E. O. (A)
De Britto-Pereira, M. P. (M)
De Campos-Correa, A. (M)
De Mattos, H. C. (M)
De Medeiros, L. A. (M)
Di Tavani, V. C. (M)
Do Carmo, A. C., Jr. (A)
Farmer, F. H. (M)
Franco, A. (A)
Frederico, J. C. B. (A)
Fuzeti, Z. (M)
Grant, F. W. (A)
Guedes, H. O. P. (M)
Guimaraes, G. S. C. (M)
Helminger, W. L. (SM)
Kahl, C. A. B. (A)
Lacombe, C. G. (A)
Lienhard, J. W. (M)
Marcondes, D. (A)
Menezes de Oliveira, A. (SM)
Mesiano, C. (A)
Miranda, E. D. S. (A)
Neto, A. P. (A)
Paraga Nina, J. (M)
Pereto Neto, L. V. (VA)
Obermuller, W. F. (M)
Pedrosa, H. B. (A)
Pereira, J. (A)
Perisse, G. L. C. (M)
Portella, S. M. (A)
Ribeiro, H. S. G. (A)
Ribeiro, O. C. V. L. (A)
Santos, L. J. (A)
Schenck, H. H. (SM)
Schreyer, H. T. (M)
Vianna, A. C. (A)

Santos
Waeny, J. C. C. (M)

Sao Paulo
Altschul, E. O. (A)
Barreto, L. A. D. (A)
Beaman, W. G. (A)
Benchimol, A. (M)
Borda, J. A. (M)
Caicoya, J. I. (M)
Christian, W. (A)
Dantine, W. A. (M)
Da Rosa, A. V. (M)
De Arruda, P. R. (A)
Guimaraes, B. Q. (M)
De Macedo, A., Jr. (M)
De Mello, G. H. (A)
Fanta, P. (M)
Girardelli, L. R. L. (A)
Goldberger, N. (A)
Goldmann, R. D. (A)
Greis, W. F. (A)
Kubelka, W. (M)
Langdon, G. G. (M)
Levy, G. I. (M)
Lignon, J. R. (A)
Meyer, L. V. (A)
Moreira, J. S. (A)
Nepomuceno, L. X. (A)
Perini, J. (A)
Rittmeister, H. (M)
Rocha, E. (A)
Rubin, L. (SM)
Sherman, F. L. (M)
Silva, C. D. S. E. (M)
Smit, J. (M)
Stamopulos, C. D. (SM)
Tai, C. T. (SM)
Woelz, A.L. (M)

BRITISH EAST AFRICA

KENYA

Nairobi
Pegrume, S. A. (M)
Talbot-Jones, R. V. (M)

BRITISH GUIANA

Georgetown
De Freitas, J. F. (A)

BRITISH WEST AFRICA

NIGERIA

Lagos
Fenton, W. A. (M)
Griggs, I. C. (M)
Rowe, J. M. (M)

BRITISH WEST INDIES

BAHAMAS

Eleuthera
Crabtree, T. H. (A)

Nassau
Ingraham, K. R. (M)

BARBADOS

Christ Church
Tibbits, A. E. (A)

GRENADA

Windward Island
Smith, R. A. (A)

JAMAICA

Kingston
Gauntlett, G. A. R. (M)
Hoyes, V. V. (M)
Thomson, A. G. (M)

TRINIDAD

Port-of-Spain
Borde, E. H. (A)
Fung, J. H. (A)
Kerr, J. L. (M)
Vanderhoek, E. F. (A)

San Fernando
Bell, R. J. (M)

BURMA

Chauk
Porter, A. H. (M)

Rangoon
Ba'Hli, F. (M)
Doe, U. P. (M)
Lwin, M. (M)
Maung, U. A. (A)
San, P. T. (M)
Seymour, J. W. (SM)
Su, B. (A)
Swe, M. T. (M)
Than, M. P. (A)

CANADA

ALBERTA

Beaver Lodge (NA-8)
Gerdes, W. A. (A)

Bowness (SA-8)
Carlson, C. V. (A)
McDougall, S. B. (A)

Bruderheim (NA-8)
Kittlitz, R. S. (A)

Calgary (SA-8)
Allan, W. K. (M)
Ball, E. T. (A)
Baxter, S. (A)
Beck, F. F. (M)
Blank, J. A. (M)
Burtch, N. A. (A)
Caldwell, L. W., Jr. (A)
Connor, E. C. (A)
Cook, R. E. (M)
Davis, A. P. (M)
Dubber, W. G. (A)
Evans, P. R. N. (A)
Farrell, J. T. (A)
Freek, W. L. (A)
Gill, A. L. (A)
Goodman, C. J. (M)
Griswold, A. L. (A)
Handford, G. H. (M)
Hansen, C. H. (A)
Heffring, H. H. (M)
Hemming, G. (A)
Hill, R. F. (A)
Hopkins, R. A. (A)
Johnson, C. M. (A)
Johnston, C. W. (M)
Kittlitz, N. E. (M)
Lamb, R. W. H. (M)
Larson, V. C. (M)
Luchinsky, S. (M)
Lundrigan, E. G. (A)
MacIsaac, G. M. (A)
Marion, G. E. (A)
Merry, H. C. (A)
Moore, A. M. (A)
Moore, J. D. (M)
Morrison, W. A. (A)
Nawata, T. T. (A)
Norris, P. S. (A)
Orr, A. C. (A)
Partin, W. (M)
Peters, R. R. (A)
Pilchak, L. A. (A)
Sandrell, R. D. (A)
Smith, G. W. (M)
Smith, M. F. (A)
Smith, R. E. (M)
Stuart, A. J. (M)
Umbach, E. A. (A)
Upton, D. K. (A)
Watt, K. M. (A)
Webster, D. J. (A)
Wilson, T. M. (M)

Edmonton (NA-8)
Arksey, G. W. (M)
Bastock, D. W. (A)
Cable, R. B. (A)
Caldwell, A. (M)
Campbell, T. G. (A)
Cary, S. L. (A)
Close, A. H. (A)
Cooper, R. J. G. (A)
Davidson, O. J. (A)
Ducey, R. J. (M)
Earnshaw, A. (M)
Elwell, A. T. (A)
Few, E. J. (A)
Floyd, F. J. (M)
Hall, T. W. (M)
Harrow, A. E. (A)
Henderson, R. G. (M)
Hollingworth, F. (A)
Huget, W. J. (A)
Johnson, R. A. (A)
Kantautas, A. (A)
Kimball, W. H. (A)
Kiss, F. V. (M)
Lambert, R. F. (A)
Leitch, J. G. (A)
Letwin, A. (M)
Lines, E. G. (A)
MacDonald, D. L. (SM)
Nichol, A. C. (A)
Overton, A. (A)
Peterson, D. A. (M)
Phelan, J. L. (A)
Perteous, J. W. (SM)
Powley, R. K. (A)
Rice, G. R. A. (A)
Rodgers, J. P. (M)
Royer, D. P. (A)
Sacker, J. E. (M)
Saunders, L. E. (A)
Schafer, E. D. W. (A)
Scotten, E. C. (A)
Skutle, G. O. (A)
Smith, A. O. (A)
Smith, G. A. (A)
Smith, O. A. (M)
Teeuw, J. W. (A)
Whitley, W. M. (A)
Wylie, A. (A)
Zaharichuk, S. (M)
Zowtiak, J. (M)

Ponoka (NA-8)
Taylor, E. L. (M)

Ralston (SA-8)
Clink, W. L. (M)

Red Deer (NA-8)
Bartley, G. A. (SM)
Benner, F. D. (M)
McAlpine, R. A. (M)

St. Albert (NA-8)
Donovan, L. N. (M)
Usher, R. (M)

BRITISH COLUMBIA

Burnaby (VAN-8)
Reagh, D. M. (A)

Castlegar (VAN-8)
Thorp, W. W. (M)

Esquimalt (VAN-8)
Evans, D. J. (M)
Lokken, J. E. (M)
Madill, C. L. (M)
Milne, A. R. (M)
Nasmyth, P. W. (M)

Fernie (VAN-8)
Zelonka, F. A., Jr. (A)

Kelowna (VAN-8)
Bulman-Fleming, S. E. (A)
Davidson, M. H. (A)
Tamagi, T. T. (M)

Kimberley (VAN-8)
Vroom, D. R. (A)

Mission City (VAN-8)
Kyashko, W. (A)

Nanaimo (VAN-8) x
Macintyre, E. R. (A)
Pirart, M. A. (A)

New Westminster (VAN-8)
Ahrens, R. H. (M)
Turner, J. H. (A)

North Burnaby (VAN-8)
Bishop, D. L. (M)
Newton, W. K. (M)
Stump, L. W. (A)

North Vancouver (VAN-8)
Elliott, D. T. (A)
Fitzgerald, M. W. (A)
Goldie, H. J. (M)
Lynch, T. (M)
McDonald, R. C. (A)
Neveroski, F. (A)
Niblock, P. A. (M)
Payne, T. E. G. (A)
Reyda, D. C. (A)
Riddell, A. I. (A)
Wilson, C. M. (A)

Penticton (VAN-8)
Paton, I. W. (A)

Port Moody (VAN-8)
Chisholm E. (A)
Robson, E. E. (M)

Read Island (VAN-8)
Taylor, A. H. (SM)

Richmond (VAN-8)
Hepburn, J. T. (M)

South Burnaby (VAN-8)
Kay, D. H. J. (M)
Knight, A. M. (A)
Trainor, W. J. (M)
Tripp, H. H. (A)

Trail (VAN-8)
Baron, H. D. (A)
Gowans, W. K. (M)

Vancouver (VAN-8)
Alltree, R. C. (A)
Auld, B. A. (A)
Barron, K. E. (M)
Bealle, D. F. (A)
Black, D. T. (M)
Bohn, E. V. (A)
Breeze, J. E. (SM)
Burgess, R. E. (SM)
Carpenter, D. D. (SM)
Chandler, A. H. (A)

Chandler, G. C. (SM)
Clarkson, G. A. (M)
Cole, R. A. (SM)
Cringan, F. J. (M)
Cuddeford, R. A. (A)
Diamond, M. (M)
Eng, T. S. (A)
Fraser, F. S. (M)
Gray, J. S. (M)
Green, M. E. (SM)
Gruno, R. S. (M)
Guthoff, G. H. (A)
Hale, S. T. (A)
Hewit, H. O. (A)
Hilton, B. C. (A)
Hings, D. L. (VA)
Holmes, A. T. (M)
Horne, D. T. (A)
Hoyles, H. A. (M)
Humble, R. S. (A)
Kersey, L. R. (M)
Klaus, E. F. (A)
Klok, B. (A)
Knight, A. G. (A)
Kohler, P. H. (A)
Kokkila, R. E. (A)
Kolbeins, E. N. (M)
Manders, D. F. (SM)
Marsh, R. A. (M)
McCarter, W. L. (M)
McGrath, E. F. (A)
McLennan, D. E. (A)
Moore, A. D. (SM)
Nonkes, F. (M)
Norman, R. O. (M)
Ott, E. K. (A)
Phillips, G. E. (A)
Potvin, L. E. (A)
Prag, W. F. (A)
Pye, R. M. (A)
Ridsdale, R. E. (M)
Robinson, R. A. (M)
Seabrook, W. L. (M)
Smith, C. R. (A)
Smith, W. R. W. (A)
Spencer, R. E. (A)
Thompson, H. C. (A)
Thompson, W. H. (M)
Tracey, W. R. (A)
Tupper, B. R. (F)
Valde, G. E. (M)
Varah, L. A. (A)
Walley, B. C. (M)
Warren, G. D. R. (A)
Whiteside, R. L. (A)

Victoria (VAN-8)
Blyth, G. S. (A)
Hanslip, G. (M)
Johns, J. G. (A)
Lobb, R. H. M. (A)
Weir, R. C. (M)

West Vancouver (VAN-8)
Bennett, W. F. (M)
Bonnett, J. D. W. (A)
Kent, N. S. (A)

MANITOBA

Argyle (WIN-8)
Baranovsky, C. (M)

Beausejour (WIN-8)
Trencher, J. W. (M)

Brandon (WIN-8)
Roots, W. K. (SM)

Carman (WIN-8)
Hackett, F. J. (M)

Fort Garry (WIN-8)
Coish, H. O. (A)
Haakonsen, H. M. (M)

Lac Du Bonnet (WIN-8)
Uhlman, J. C. (A)

Norwood (WIN-8)
Barschel, E. (A)

St. Boniface (WIN-8)
Philpott, G. W. (M)

Steinbach (WIN-8)
Goossen, G. N. (M)

Transcona (WIN-8)
Royko, S. (A)

Winnipeg (WIN-8)
Adams, R. (M)
Aitken, R. (A)
Ardelian, T. E. (M)
Barnstable F. H. (M)
Body, H. T. (A)
Bridges, E. (M)
Buchmeier, H. P. G. (M)
Burgess, P. R. (M)
Cahoon, R. D. (F)
Campbell, D. C. (M)
Campbell, J. F. (A)
Charron, J. H. A. (A)
Cockle, E. S. (A)
Cohen, H. (M)
Collins, R. G. (A)
Crolly, J. A. (A)
Cross, I. F. (SM)
Denyer, J. H. N. (A)
Dickson, F. J. (A)
Dusang, E. B. (M)
Gartner, B. L. (M)
Grausdin, P. (A)
Hancharek, J. (A)
Hazleton, H. T. (A)
Hooper, A. W. (A)
Hooper, J. F. (M)
Hopper, C. J. (M)
Horner, S. G. L. (F)
Jex, J. F. (A)
Johnson, R. A. (M)
Kemp, J. R. (A)
Lexier, G. S. M. (A)
MacDonald, P. A. (SM)
McLaren, G. A. (A)
McQuaid, A. C. (A)
Mestery, S. J. (A)
Murphy, B. F. (M)
Mykytiuk, L. J. (M)
Naqvi, S. I. H. (A)
Nelson, L. E. (M)
Paquette, A. C. (A)
Petrie, L. E. (M)
Roulston, K. I. (M)
Royko, W. (M)
Sawka, M. H. (M)
Schuff, P. G. (A)
Searle, W. (A)
Shaver, H. B. (A)
Simister, R. M. (M)
Sloker, G. H. (A)
Tillotson, R. E. (A)
Tinkler, R. F. (M)
Wallace, G. R. (A)
White, T. J. (M)
Williams, S. A. (A)
Williamson, K. H. (M)
Windrick, P. F. (M)
Wormell, H. T. (M)
Yankewicz, W. W. (M)

NEW BRUNSWICK

Bathurst (MON-8)
Cote, J. A. (A)

Chartersville (MON-8)
Clerke, B. C. (A)

Fredericton (MON-8)
Bailey, C. O. C. (M)

Sackville (MON-8)
Hart, E. S. (A)
Smith, H. M. (SM)

St. John (MON-8)
Bishop, J. G. (M)
Jonkman, J. V. (A)

St. Margarets (MON-8)
Bogstad, F. O. (M)

NEWFOUNDLAND

Goose Bay, Labrador (NEW-8)
Lepine, C. A. (A)

St. John's (NEW-8)
Bishop, H. A. (M)
Au, G. D. (A)
Brisbar, P. (A)
Bunt, R. H. (M)
Clark, J. (A)
Coe, M. C. J. (M)
Courtney, C. R. (A)
Fisher, L. (A)
Gaskell, W. M. (A)
Gillard, K. J. R. (M)
Gladden, M. (M)
Haycock, A., Jr. (A)
Hierlihy, O. G. (M)
House, A. N. (M)
Jerrett, A. C. (M)
Lesperance, B. J. (A)
Lewis, R. (M)
Mac Gray, M. D. (M)
Marshall, D. R. J. (M)
Oliver, J. V. (A)
Olivero, M. A. (M)
Ryle, C. H. (M)
Sanders, R. J. (A)
Tibbett, J. E. (A)
Willis, J. A. (A)
Witherstone, E. D. (M)
Wolff, W. A. (A)

NOVA SCOTIA

Cornwallis (MON-8)
Pimenoff, V. J. (M)

Dartmouth (MON-8)
Cox, G. C. (M)

Halifax (MON-8)
Brown, J. S. (M)
Burchill, G. H. (M)
Fowlie, W. D. (M)
Grant, A. S. G. (M)
Greig, A. W. (M)
MacKinnon, M. D. (A)
Murray, C. W. (A)
Robertson, J. J. C. (VA)
Wilson, R. W. (M)
Wood, W. (A)

Middleton (MON-8)
Macleod, R. A. (A)

Spryfield (MON-8)
Pippy, G. A. (A)

Sydney (MON-8)
Inneza, J. J. (M)
Norton, R. J. (M)
Oulton, G. R. (A)

Wolfville (MON-8)
Tillotson, J. G. (M)

ONTARIO

Agincourt (TOR-8)
Butler, C. A. (M)
Cole, D. R. (A)
Collins, G. S. (M)
Davis, L. S. (A)
Liggans, C. E. (A)
Reesor, G. E. (M)
Sands, J. S. (M)

Ajax (TOR-8)
Bayly, B. D. F. (F)
Fischer, E. J. (M)
Perry, E. G. (M)
Philp, H. F. (A)

Almonte (OTT-8)
Maynard, L. A. (M)

Ancaster (HAM-8)
Fines, W. W. (A)
Gomard, P. (M)
Ratz, A. G. (M)
Ruse, E. (M)
Smith, C. J. (M)
Thomas, E. A. (M)

Appleton (OTT-8)
Le Grand, A. J. (A)

Armstrong (TOR-8)
Joss, J. W. (A)

Arnprior (OTT-8)
Boire, P. C. (A)
Montagnon, N. B. (M)
Papich, M. G. (M)
Turner, J. B. (A)
Wassink, B. J. (A)
Zuidhof, A. (A)

Ashburn (TOR-8)
Anderson, W. H. (M)

Belleville (BAY-8)
Barrie, W. H. (A)
Bateman, C. D. (M)
Benger, W. C. (SM)
Blacker, L. (M)
Burkett, K. V. (M)
Coombs, C. W. (M)
Cowan, D. J. (M)
De Paul, V. A. (M)
Desmond, N. T. (A)
Dryden, T. W. R. (A)
Duke, A. M. (M)
Fort, D. E. (A)
Frederick, H. V. (M)
Hanna, J. L. (A)
Hart, L. G. (A)
Hunt, C. A. (A)
Ives, W. J. (A)
Jarvis, J. A. (SM)
Johns, D. M. (A)
Johnson, M. E. (A)
Kostashuk, S. S. (M)
Lund, D. M. (A)
Martin, N. (M)
Moore, N. A. (A)
Punchard, J. C. R. (F)
Revill, A. D. (SM)
Rickards, C. E. (M)
Rywak, J. (A)
Sillitoe, V. (M)
Smith, R. L. (SM)
Swan, C. B. (A)
Tanner, R. (SM)
Wacker, A. G. (M)
Waller, M. J. (SM)
Wamboldt, G. L. (M)
Williamson, R. (SM)

Bells Corners (OTT-8)
Itenson, V. A. (M)

Bendale (TOR-8)
Davidson, J. W. (M)

Billings Bridge (OTT-8)
Johnson, E. F. (A)

Blenheim (LON-8)
Chase, G. A. (A)

Brampton (TOR-8)
Cooper, J. E. (M)
Dudeney, P. N. (M)
Keeping, K. J. (A)

Branchton (HAM-8)
Riley, D. (A)

Brantford (HAM-8)
Hastings, R. (M)
McConnachie, W. A. (A)
Muniz, R. (SM)
Olson, E. (SM)
Williams, J. K. (M)

Bridgeview Survey (HAM-8)
Gray, W. W. (A)

Britannia (OTT-8)
Blevis, R. C. (M)
Doucet, D. W. (M)
Nelms, G. L. (M)
Scott, J. C. W. (F)

Brockville (OTT-8)
Leeder, W. F. (A)
Radford, R. C. (M)

Bronte (HAM-8)
Ticknor, A. E. (M)

Burlington (HAM-8)
Beaumont, G. F. (M)
Davis, C. C. (A)
Duff, D. L. A. (M)
Elvidge, R. E. (A)
Evan-Jones, W. (A)
Hicks, E. P. (M)
Lomax, S. E. (SM)
Lower, W. M. (M)
Maskell, R. F. (A)
Moes, G. (M)
Musselman, J. A. (M)
Roberts, D. M. (A)
Vaughan, P. P. (M)
Wilkinson, S. (M)

Cardinal (OTT-8)
Brahan, J. W. (A)
Couzens, D. T. (M)

Carleton Place (OTT-8)
Britney, O. L. (M)
Kerr, G. O. (A)

Castleton (BAY-8)
Whittaker, J. A. (M)

City View (OTT-8)
Caton, W. A. (M)
Collins, W. C. (A)
Crouser, E. E. (A)
Hendry, A. (A)
Puttock, K. L. (A)
Smith, W. B. (M)
Thain, R. S. (M)

Clarkson (TOR-8)
Boerama, J. (A)
Sharf, W. A. (A)

Clinton (LON-8)
Biduleak, G. (M)
Brightwell, S. A. (M)
Lee, E. (M)
Pearse, C. D. (M)
Stinson, A. W. (M)
Stroud, E. L. (M)

Cobourg (BAY-8)
Mitchell, T. E. (M)

Coldwater (TOR-8)
Parker, D. L. (M)

Cooksville (TOR-8)
Game, L. C. (A)
Hastie, F. S. (A)

Copper Cliff (TOR-8)
Shaw, J. L. (SM)

Cornwall (OTT-8)
Brod, F. W. (A)

Corunna (LON-8)
Hoard, W. R. (A)

Deep River (OTT-8)
Drew, T. D. (A)
Dunlop, D. P. (A)

Don Mills (TOR-8)
Adams, R. L. (SM)
Breckenridge, A. G. (A)
Brown, R. W. (SM)
Collins, A. D. (A)
Dalzell, T. D. (M)
Gillies, G. A. (A)
Lew, A. R. (M)
MacDougall, J. S. (M)
Maine, A. E. (M)
Millen, T. I. (SM)
Pipe, G. E. (M)
Robinson, J. D. (A)
Semmelink, A. (SM)
Simoni, A. (M)
Stevens, A. (A)

Downsview (TOR-8)
Armstrong, H. D. (M)
Aylesworth, A. B. (M)
Geary, B. H. (A)
Hyde, G. (M)
Noble, D. E. (A)
Williams N. A. (SM)
Yablo, S. (M)

Dundas (HAM-8)
Anthes, R. G. (SM)
Bennett, H. W. (A)
Johnson, P. M. (M)
Kozak, W. S. (M)
Williamson, D. B. (SM)
Wynn, W. W. (M)

Dunnville (HAM-8)
Duffin, M. V. (A)
Gates, R. E. (M)
Hayles, O. J. (M)

Eastview (OTT-8)
Burtnyk, N. (A)
Terrell, D. S. (A)
Witt, H. R. (A)
Zambarelon, J. T. (A)

Edgar (TOR-8)
Stott, W. (A)

Etobicoke (TOR-8)
Knott, J. G. (M)

Forest Hill (TOR-8)
Van Dyk, T. (M)

Fort Erie (HAM-8)
Moratz, W. P. (A)

Fort William (TOR-8)
Andrews, G. R. (M)

Foymount (OTT-8)
Baxter, E. G. (M)

Galt (HAM-8)
Sweet, J. L. (A)

Gananoque (OTT-8)
Olive, G. W. (F)

Georgetown (HAM-8)
Bell, J. W. (F)
Matthies, J. G. (M)

Goderich (LON-8)
Higgins, G. S. (A)
Tiller, R. W. (A)

Guelph (HAM-8)
Brown, R. M. (A)
Irwin, G. J. (SM)
Mackay, F. S. (SM)
Robinson, C. A. (VA)

Hamilton (HAM-8)
Amis, C. W. (M)
Anderson, J. W. (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)
Farley, T. S. (SM)
Feltz, M. O. (SM)
Harris, L. R. (M)
Harris, O. E. (A)
Hayward, J. R. (M)
Heal, G. L. (A)
Heys, D. M. (M)
Hill, J. H. (M)
Hipp, T. M. (M)
Hore, H. B. (A)
Jazbutis, A. (A)
Jeynes, W. E. (M)
Kassner, J. (A)
Kelterborn, W. H. (SM)
Kennedy, H. G. (A)
Khanna, S. M. (A)
Litwin, J. D. (A)
Lucyk, J. (M)
Lyons, K. C. (M)
Mason, V. V. (SM)
Marzec, L. L. (M)
McConachie, B. S. (SM)
Merritt, H. J. (M)
Price, R. H. (A)
Rapp, E. (A)
Schneider, S. S. (SM)
Shenton, W. E. (M)
Shiels, P. B. (A)
Shutt, S. H. (A)
Sievert, A. H. (SM)
Slater, H. (A)
Smith, W. D. (A)
Sparrow, J. (M)
Staryk, M. (M)
Stauffer, R. L. (M)
Todd, H. F. E. (A)
Walker, M. L. (A)
Ward, G. V. (A)
Watts, T. O. (M)
Wilfin, R. F. (A)
Wilk, J. (A)
Wilson, G. L. (SM)

Haviland (TOR-8)
Baart, J. G. (A)

Hespeler (HAM-8)
Boose, W. H. (A)

Highland Creek (TOR-8)
Gladys, S. J. (A)

Iondale Heights (TOR-8)
Johnston, K. S. (A)

Jordan Station (HAM-8)
Pond, J. F. (M)

Keewatin (TOR-8)
Jones, A. W. (M)

King (TOR-8)
Stubbs, R. A. (A)

Kingston (BAY-8)
Blair, D. L. (A)
Campling, C. H. R. (M)
Chambers, R. G. (A)
Chisholm, R. M. (A)
Harrower, G. A. (M)
Hodkin, W. J. (M)
Mowbray, D. R. (A)
Ryan, W. D. (M)
Stewart, H. H. (SM)

Kitchener (HAM-8)
Banks, F. A. O. (M)
Bartelink, D. J. (M)
Borth, L. A. (M)
Clark, W. B. (SM)
Cox, G. M. (SM)
Dankwardt, R. W. (M)
Dufault, G. J. (M)
Duvall, J. M. (A)
Enns, E. G. (A)
Field, G. C. (M)
Haas, Z. K. (SM)
Marsland, J. W. (A)
McKee, W. H. (A)
Mosher, L. S., Jr. (A)
Pettersen, R. J. (A)
Ritz, E. A. (A)
Roseburgh, R. K. (A)
Smallwood, S. C. (A)
Taagepera, A. (A)

Lansing (TOR-8)
Fisher, G. W. (A)

Leaside (TOR-8)
Brereton, R. L. (M)
Brophy, R. M. (SM)
Crossan, G. W. (M)
Fitzallen, J. H., Jr. (M)
Hogan, J. F. (A)
Simmonds, L. C. (VA)
Stewart, G. L. (M)
Webster, C. G. (M)

Lively (TOR-8)
Leask, R. D. (A)

London (LON-8)
Bach, J. R. (SM)
Beninger, G. J. (A)
Blackwell, J. H. (SM)
Brouwer, J. J. (A)
Brule, R. J. (A)
Dearle, R. C. (SM)
Downs, E. E. (M)
Ferguson, A. F. (M)
Foster, G. L. (M)
Fulford, J. A. (A)
Graham, B. (SM)
Hosker, G. R. (M)
Hourigate, E. C. (A)
Jackson, N. B. (M)
Jarmain, E. R. (M)
Jeffery, J. (A)
Johnston, S. N. A. (A)
Kail, L. T. (M)
Luke, R. W. (M)
Moore, J. D. B. (M)
Oliver, W. L. (M)
Pepino, L. F. (A)
Peters, G. A. (M)
Prodger, A. (A)
Robitaille, G. A. (M)
Rumbold, D. G. (A)
Ruth, C. G. (M)

Sanders, G. E. (A)
Stokes, S. J. (A)
Suchard, D. G. (M)
Sullivan, R. E. (A)
Tull, E. H. (SM)
Warder, J. C. (M)
Warr, R. J. (M)
Wilton, R. (SM)

Long Branch (TOR-8)
Dmytrasz, W. (A)

Lorne Park (TOR-8)
Grossman, J. S. (M)

Lowbanks (HAM-8)
Moore, B. W. L. (A)

Malton (TOR-8)
Carley, R. R. (A)
Delbridge, W. A. (M)
Watts, R. V. (M)

Markham (TOR-8)
Dodge, A. (A)

Merlin (LON-8)
Fletcher, H. R. (A)

Millgrove (HAM-8)
Miedema, H. (SM)

Newmarket (TOR-8)
Posnikoff, P. W. (M)

New Toronto (TOR-8)
Boyd, R. S. (A)
Wood, L. R. (M)

Noble (TOR-8)
Pelhany, J. (A)
Signore, S. S. (M)

Nobleton (TOR-8)
Goodfellow, B. B. (A)

North Bay (TOR-8)
Rogers, J. A. (M)
Scott, C. R. (A)

Oak Ridges (TOR-8)
Samuels, K. V. (M)

Oakville (HAM-8)
Boerner, W. K. (A)
Dobbin, G. K. (M)
Wilburn, P. E. J. (A)

Oshawa (TOR-8)
Hunt, J. W. (A)
Jamroz, A. (M)
Marchand, W. C. (A)
Ridgen, E. C. (M)

O'Sullivan (TOR-8)
Cummings, V. J. (M)

Ottawa (OTT-8)
Adey, A. W. (A)
Aksim, V. E. (SM)
Anglin, F. M. (A)
Argyle, J. V. (A)
Armstrong, H. L. (M)
Ballard, B. G. (F)
Barry, A. L. (M)
Barton, F. S. (F)
Beauchesne, L. A. (M)
Belrose, J. S. (M)
Beneteau, P. J. (A)
Bennett, J. R. G. (SM)
Bennett, L. F. (M)
Boelman, P. M. (A)
Bradley, J. H. (A)
Breese, C. W. (M)
Broten, N. W. (A)
Brown, C. B. (M)
Brown, H. C. (A)
Brown, W. C. (A)
Bury, G. J. (M)
Cairns, F. V. (M)
Campbell, L. L. (M)
Carroll, D. V. (SM)
Castleman, D. H. (M)
Chapman, J. H. (SM)
Chown, B. F. (M)
Chrome, J. T. (M)
Chrzanowski, J. T. (M)
Clemence, C. R. (A)
Cole, W. (SM)
Conway, W. R. (M)
Cope, L. G. (A)
Cormack, G. D. (M)
Covington, A. E. (M)
Cox, L. G. (A)
Craven, J. H. (A)
Cumming, W. A. (M)
Dacey, M. J. (A)
Dashney, D. R. (A)
Davidson, D. W. (A)
Day, J. W. B. (M)
Des Brisay, A. W. Y. (M)
De Vinney, J. S. (A)
Doherty, L. H. (M)
Duston, R. F. (A)
Elliott, R. E. (A)
Ferguson, J. B. (M)
Field, G. S. (F)
Field, P. A. (SM)
Filipov, A. M. (M)
Filippino, J. F. (A)
Flynn, H. (M)
Foster, M. (A)
Freeman, R. E. (SM)
Galbriath, R. A. H. (SM)
Gilmore, J. F. (M)
Glinski, G. (SM)
Grainger, G. E. (M)
Grant, D. A. (M)
Hamilton, A. C. (A)
Haney, W. L. (M)
Hansen, D. R. (A)
Hatton, W. L. (M)
Hay, D. R. (SM)
Heal, J. A. (M)
Henderson, D. P. (M)
Henderson, J. P. (SM)
Henderson, J. T. (F)
Hood, R. T. (A)
Hudson, A. C. (M)
Hunt, F. R. (A)
Hurd, R. A. (M)
Jones, R. H. (A)
Jones, S. G. (M)
Jull, E. V. (M)
Kalra, S. N. (M)
Kendall, W. S. (M)
Kenney, J. R. (A)
Kenninger, A. (M)
Klein, E. J. (M)
Knights, S. F. (SM)
Kuhn, B. G. (M)
Kydd, J. G. (A)
Lacey, W. K. (A)
Lake, G. T. (A)
Langille, R. C. (A)
Lavrench, W. (M)
Laszcki, S. (M)
Lemay, R. B. (M)
Levy, M. M. (SM)
Lohr, D. (M)
Lomas, E. G. (SM)
Loutit, J. A. (M)
Luetchford, H. W. (A)
MacDonald, V. C. (M)
MacKay, J. G. (M)
Mac Kinnon, K. A. (F)
MacNair, E. A. (A)
Makow, D. M. (M)
Mattie, G. (M)
McBurney, R. E. (A)
McCormick, G. C. (A)
McCully, G. R. (M)
McGrail, J. J. (M)
McIntosh, J. A. (A)
McIntyre, B. J. (A)
McKendry, B. A. (M)
McKinley, D. W. R. (F)
McLeish, C. W. (M)
McNamara, A. G. (M)
Medd, W. J. (M)
Meek, J. H. (M)
Mervyn, G. (M)
Miller, G. A. (SM)
Mitchell, J. (A)
Modley-Jones, H. S. (A)
Moore, D. A. (A)
Muir, W. B. (A)
Myhill, D. A. (M)
Neale, M. J. L. (M)
Newton, K. G. D. (A)
Nikkel, R. F. (A)
Nixon, F. G. (A)
Norton, J. A. (M)
Outred, J. A. (F)
Park, F. R. (M)
Pattenson, C. F. (M)
Pedersen, B. O. (M)
Phillips, L. W. (A)
Prendergast, W. R. (M)
Price, M. (M)
Primich, R. I. (M)
Pulfer, J. K. (A)
Raine, H. R. (A)
Redhead, P. A. (SM)
Reiche, H. (SM)
Rempel, C. (M)
Richards, R. S. (M)
Richardson, W. G. (F)
Risteen, H. C. (M)
Robinson, H. (M)
Ross, C. W. (A)
Rowe, W. A. (M)
Rowlatt, J. H. (M)
Roy, O. Z. (M)
Ruedy, R. (A)
Seaman, E. A. (A)
Searle, W. M. (A)
Sheffield, A. G. (SM)
Shenerytycki, T. H. (A)
Sheppard, R. D. B. (SM)
Simpson, F. W. (M)
Smith, F. E. (A)
Smyth, H. R. (SM)
Snyder, J. S. (A)
Soucy, C. I. (SM)
Staniforth, A. (M)
Steele, K. A. (A)
Steennart, W. J. D. (A)
Stock, E. H. (A)
Stone, S. A. (A)
Sturrock, J. K. (M)
Tamowski, H. J. (A)
Taylor, A. L. (A)
Timmers, A. G. W. (M)
Trohon, B. L. (A)
Van Der Maas, G. J. (A)
Von Baeyer, H. J. (SM)
Wackid, C. B. (A)
Walker, D. A. S. (A)
Warnock, H. P. (M)
Watson, G. D. (A)
Webb, E. L. R. (SM)
Webb, P. R. W. (A)
Welsh, W. (M)
White, P. W. (M)
White, W. E. (SM)
Wilmot, R. D. (M)
Wilson, W. R. (SM)
Wittke, P. H. (M)
Wong, J. Y. (M)
Yurko, M. (M)

Paris (HAM-8)
Sinclair, G. D. (A)

Peterborough (BAV-8)
Fiemons, R. S. (SM)
MacKelvie, J. S. (SM)
Rose, D. L. (A)
Young, J. A. I. (M)

Picton (BAY-8)
Corbett, L. V. (M)

Port Arthur (TOR-8)
Hunter, W. C. (M)
Nattress, I. A. (M)

Port Colborne (HAM-8)
Turchan, P. J. (A)

Port Credit (TOR-8)
Eaton, G. F. (M)
Etches, E. D. (M)
Macumber, M. G. (A)
Sparks, B. B. (A)

Port Rowan (LON-8)
Martin, J. O. (M)

Prescott (OTT-8)
Andrews, A. G. (M)
Farvolden, E. (M)
Turski, S. (M)

Renfrew (OTT-8)
Luedicke, E. (M)

Rexdale (TOR-8)
Brown, J. C. (A)
George, J. N. S. (A)

Richmond (OTT-8)
Ford, W. J. (A)
Ling, T. G. (M)

Richmond Hill (TOR-8)
Burnie, W. A. (A)
Ford, F. A. (M)
Matheson, A. I. (A)

Riverside (LON-8)
Seidler, H. G. (A)

Rockcliffe (OTT-8)
Fawcett, G. M. (SM)

Roslin (BAY-8)
Hutson, G. E. (A)

Rouge Park (TOR-8)
Schokker, F. (A)

St. Catherines (HAM-8)
Gillard, W. H. (M)

St. Thomas (LON-8)
Mac Donald, R. D. (M)
Onn, W. R. (M)

Sarnia (LON-8)
Cox, R. E. (A)
Thomas, A. (M)

Sault Ste. Marie (TOR-8)
McRae, D. W. (A)

Scarborough (TOR-8)
Bacon, W. H. (M)
Bowmlee, B. P. (M)
Ceelen, P. A. J. (M)
Christensen, A. C. (M)
Eastwood, G. C. (M)
Flood, F. M. (A)
Hughes, J. K. (M)
Hull, S. E. (A)
Keen, W. (A)
Kerridge, E. L. (M)
Koster, J. A. (M)
Kuflik, A. (M)
McGovern, J. R. (M)
Murphy, W. L. (A)
Preziosi, F. W. (M)
Pugh, W. H. (A)
Rawley, J. W. (A)
Rethoret, R. H. (M)
Shurben, W. E. (A)
Turner, R. J. A. (SM)

Seaforth (LON-8)
Bowen, B. A. (M)
Stephenson, W. R. (M)

Selkirk (HAM-8)
Hoover, S. G. (A)

Simcoe (LON-8)
Seifert, W. J. (A)

South Mountain (OTT-8)
Graham, G. L. (A)

Stirling (BAY-8)
Glendinning, B. W. (A)

Stittsville (OTT-8)
Knowles, J. E. (A)
Rowe, G. C. (SM)

Stoney Creek (TOR-8)
Parker, H. J. (A)

Stouffville (TOR-8)
Dulmage, H. B. (A)

Streetsville (TOR-8)
Meredith, C. C. (M)
Meredith, C. J. (A)

Swansea (TOR-8)
Bow, A. (A)

Thistletown (TOR-8)
Harben, J. F. C. (M)
Smith, K. C. (A)
Thomson, J. M. (SM)

Thornhill (TOR-8)
Poulter, R. C. (SM)
Watson-Watt, R. (F)

Timmins (TOR-8)
Amendola, B. (A)
Mott, E. D. (A)
Stocco, S. L. (A)

Toronto (TOR-8)
Alexander, A. J. (M)
Alsop, J. W. (A)
Amis, T. E. (A)
Anto, H. (A)
Armstrong, A. T. R. (A)
Arnold, C. P. C. (A)
Aufleger, A. R. (A)
Bain, J. D. (SM)
Bain, J. R. (SM)
Baldwin, C. O. (M)
Baldwin, J. H. (SM)
Balmer, P. D. (SM)
Barclay, A. P. H. (SM)
Beaudoin, D. P. (M)
Beechey, D. F. (M)
Bell, A. R. (A)
Bell, H. C. (A)
Berling, G. P. (A)
Berry, F. G. (M)
Billedeau, V. A. (A)
Black, R. G. (A)
Bogora, G. F. (M)
Bokhari, T. A. (A)
Bond, S. (M)
Boundy, L. G. (M)
Bradbury, W. C. (M)
Bradley, R. T. (A)
Brammanis, A. (M)
Bratsberg, W. P. (A)
Breymayer, K. E. (M)
Bridgland, C. J. (SM)
Bridgman, J. M. (M)
Brillinger, R. F. (M)
Brodsky, S. (A)
Brunton, H. W. (M)
Buckles, F. G. (M)
Bull, T. R. (A)
Bullock, R. G. (M)
Bura, P. (SM)
Burke, A. C. (M)
Byers, H. G. (SM)
Byers, J. (SM)
Carew, S. J. H. (M)
Cary, F. C. (M)
Casciato, L. (A)
Casselman, W. G. B. (A)
Cass, R. S. (A)
Chambers, J. D. (M)
Chisholm, K. G. (M)
Choat, W. F. (M)
Clark, A. (A)
Coats, W. D. (M)
Cohen, H. A. (M)
Conway, J. C. (M)
Cook, R. M. (M)
Courtice, H. A. (A)
Cox, H. G. (A)
Coxall, N. (SM)
Dakin, O. C. (M)
Davis, G. W. L. (M)
Davis, K. J. (A)
Dawson, H. S. (SM)
Deacon, F. W. (A)
Dennett, L. J. (M)
Desjardins, A. A. (A)
Dmitrievsky, S. (M)
Donovan, J. (A)
Dudley, D. J. (A)
Dutton, I. R. (A)
Dworkin, A. E. (M)
Dynn, R. D. (SM)
Erakine, H. R. (A)
Evans, C. R. (A)
Evis, F. A. (M)
Farrell, G. L. (M)
Fine, S. (A)
Flynn, M. W. (M)
Forsyth, P. G. (SM)
Freen, P. (M)
Freund, K. M. (A)
Gallagher, G. E. (A)
Galpin, W. H. (A)
Gattoni, L. I. (A)
Geiger, D. G. (SM)
Giacoletto, J. P. (SM)
Godfrey, G. F. (A)
Goldberger, R. (A)
Gracey, T. G. (A)
Graham, H. E. (A)
Grant, H. S. (A)
Greenwood, R. E. (M)
Gregson, J. H. (M)
Grosso, J. E. (M)
Grzebien, B. (M)
Hallam, P. A. (A)
Hames, A. L. (M)
Hamilton, H. E. S. (M)
Hanna, F. M. (SM)
Hansen, B. C. (A)
Haralden, K. (M)
Harris, D. L. (M)
Hase, A. M. (M)
Heath, F. J. (SM)
Heenan, P. (A)
Henderson, V. L. (SM)
Herring, J. (A)
Hobbs, F. B. (VA)
Hobson, R. E. (A)
Holm, H. (A)
Hourgrave, A. G. (A)
Hugenholtz, E. H. (SM)
Humeniuk, P. (SM)
Hunter, J. B. (M)
Hynes, K. W. (M)
Ingram, G. R. (A)
Iserstedt, S. G. (M)
Jackson, C. M. (M)
Jackson, H. W. (SM)
Jagger, E. E. (M)
James, W. E. (M)
Johnston, H. S. (A)
Jones, R. (M)
Jung, G. (A)
Juzyca, M. S. (M)
Karnas, J. A. (M)
Karwin, P. R. (M)
Katchky, M. (M)
Kates, J. (A)
Kent, M. P. (A)
Kerfoot, J. H. (M)
Keyser, G. M. (A)
Knowlton, K. R. (M)
Korchinski, J. (M)
Kozak, R. V. (A)
Kravetz, A. J. (M)
Kupinsky, H. G. (A)
Kwan, B. (A)
Lang, G. R. (M)
Levitt, R. (M)
Lines, K. W. (A)
Liss, I. M. (M)
Lochanko, A. A. (M)
Loncarevic, B. D. (M)
Long, R. G. (M)
Longstaff, F. M. (A)
Longstaffe, J. R. (VA)
Love, S. F. (M)
Lowe, A. D. (A)
Lowry, C. A. L. (M)
Luke, L. M. (M)
MacDonald, C. F. (M)
Mac Gregor, H. D. (M)
Mac Kenzie, K. (A)
Mackie, A. S. (M)
Mahmud, M. (M)
Marshall, O. H. (M)
Martin, R. H. (A)
Mathers, F. F. (A)
Maxwell, J. (A)
McCloskey, K. P. (A)
McCurdy, G. E. (M)
McFadden, H. W. (M)
McIntyre, R. G. (A)
McKelvie, J. L. (M)
McLean, D. J. (M)
McVity, J. R. G. (A)
Meyer, W. H. (M)
Mitchener, H. G. (M)
Morfitt, D. C. (M)
Morris, D. V. (A)
Mortimore, J. B. (A)
Mosher, F. M. (A)
Muller, R. A. (SM)
Nakamachi, P. Y. E. (M)
Nawrocky, R. J. (M)
Naylor, R. W. (SM)
Neal, J. T. (A)
Newcombe, P. (A)
Newhall, E. E. (A)
Norlund, B. (M)
Norris, C. A. (SM)
Nylin, M. E. (M)
Ormiston, J. (M)
Otsukl, J. (M)
Paisley, S. R. (M)
Palin, E. L. (SM)
Paterson, S. G. (M)
Patterson, A. C. (M)
Pearce, R. G. (A)
Penner, R. J. (M)
Peprnik, D. O. (M)
Petrasek, A. C. (SM)
Pickering, J. N. (M)
Piechota, A. (M)
Pieck, H. (M)
Pointon, C. G. (A)
Pollock, H. L. (M)
Polly, J. (A)
Ponzo, L. S. (M)
Pounsett, F. H. R. (F)
Price, E. G. (M)
Price, L. M. (F)
Prosper, J. E. (A)
Pryzdial, E. F. (A)
Purvis, W. J. (M)
Putz, H. R. (M)
Qua, E. W. (M)
Quigley, G. T. (M)
Ratz, H. C. (M)
Renie, E. P. (M)
Rennie, J. C. (SM)
Richards, G. A. (M)
Richardson, R. J. (A)
Ridout, J. R. (A)
Riegler, K. L. (A)
Robinson, A. (M)
Rogers, H. Z. (M)
Rosamond, G. J. (A)
Rose, A. B., Jr. (A)
Rosenthal, A. L. (SM)
Rowland, H. L. (A)
Roy, D. R. (A)
Ryll, E. (A)
Sale, P. A. (M)
Sandison, A. A. (SM)
Sangster, R. (M)
Saville, H. G. (M)
Schmidt, R. L. (A)
Scholfield, W. D. (M)
Schultz, R. M. (A)
Schwegler, H. C. (A)
Scott, J. V. (M)
Secord, A. H. (M)
Seljak, A. A. (A)
Sharp, V. S. (A)
Shino, J. S. (A)
Shintani, R. S. (A)
Shoemaker, H. F. (SM)
Siddall, W. J. (M)
Sierzen, D. J. (SM)
Sinclair, G. (F)
Slemon, G. R. (M)
Smedmor, G. (A)
Smith, E. (M)
Smith, W. R. (M)
Smoke, W. A. (M)
Snowdon, G. R. (M)
Soanes, S. (M)
Speck, R. W. (A)
Spendlove, D. S. (M)
Steele, D. R. (A)
Stein, H. H. (M)
Steinberg, L. M. (A)
Stewart, A. C. (A)
Stoddart, T. W. H. (M)
Story, R. (M)
Stratton, B. L. (A)
Swan, E. O. (SM)
Taylor, A. K. (M)
Taylor, M. K. (SM)
Taylor, R. B. (A)
Thompson, R. S. (A)
Tipple, H. L. (M)
Tomcio, N. (A)
Toye, J. M. (M)
Tuchak, W. G. (A)
Turner, K. A. (M)
Tustin, F. C. (A)
Unger, J. H. W. (M)
Urquhart, D. A. (A)
Vennix, J. C. (A)
Verachuur, J. A. (M)
Vilcans, J. (M)
Vural, B. (M)
Wall, E. (M)
Ward, R. F. (A)
Watts, T. B. (A)
Wedgewood, R. S. (M)
Weedon, G. F. C. (A)
Wesson, N. J. (A)

Westcott, D. B. (M)
Western, C. (A)
Westrick, E. W. (M)
Wheelans, R. B. (A)
White, J. A. (A)
Whyte, J. R. (M)
Williams, A. R. (A)
Wilson, R. W. (M)
Wolff, E. R. (A)
Wray, D. P. (M)
Yen, J. L. (A)

Trenton (BAY-8)
Cartlidge, A. E. (A)
Dempsey, M. W. (A)
Elliott, L. W. (M)
Field, C. (A)
Holmes, W. H. (M)
Pfeiffer, J. T. (VA)
Turney, G. M. (A)

Wallaceburg (LON-8)
Lawson, R. (A)

Waterdown (HAM-8)
Chapman, C. N. (M)
Van Marle, J. C. (M)

Waterloo (HAM-8)
Fromanger, A. L. (M)
Kadish, J. E. (SM)

Welland (HAM-8)
Chernish, G. (SM)

Westboro (OTT-8)
Henshaw, C. H. (A)

Weston (TOR-8)
Kowalik, H. (M)
Beasley, B. C. (M)
Harris, K. B. (SM)
Muller, S. N. (A)
Williams, H. S. (A)

Whitby (TOR-8)
Matthews, R. P. (SM)
Mitchell, J. W. (M)
Vogt, G. A. (A)

Wiarton (LON-8)
Sit, J. K. J. (A)

Willow Cove (HAM-8)
Reader, W. R. (A)
Rogers, E. L. (A)

Willowdale (TOR-8)
Ainlay, A. (SM)
Armitage, G. G. (M)
Baldwin, J. O. (M)
Bedingham, G. M. (M)
Crouch, M. B. (A)
Davies, B. E. (A)
Eakins, J. R. (A)
Elliott, A. W. D. (M)
French, R. (A)
Hackbusch, R. A. (F)
Jordan, J. L. (A)
Kelk, G. F. (M)
Leaver, E. W. (M)
McDowell, G. E. (M)
McLaughlin, G. H. (A)
Mounce, G. R. (M)
Paulin, W. P. (M)
Penrose, E. M. (M)
Purdy, T. W. (M)
Walsh, G. J. (M)
Yachimec, P. (M)

Windsor (LON-8)
Barnes, E. M. (A)
Halas, E. (A)
Itiniant, L. (A)
Kiss, J. A. (A)
Mac Gregor, A. R. (A)
Parent, C. J. (M)
Rinn, E. J. (A)
Tuba, W. C. (A)
Virtue, G. L. (A)
Walker, G. B. (A)
White, B. H. (A)

Woodroffe (OTT-8)
Baker, C. L. (M)

PROVINCE OF QUEBEC

Aylmer, East (MON-8)
Wells, G. (A)

Bagotville (MON-8)
Lunn, H. L. (A)
Pearce, G. E. (A)

Baie D'Urfe (MON-8)
Booker, C. C. (A)
Sweeny, T. V. (M)
Whitmore, E. J. (SM)
Wighton, J. J. (A)

Beaconfield (MON-8)
Kipp, C. F. (A)
Paddon, J. W. (SM)

Beaurepaire (MON-8)
Lisle, J. R. D. (M)

Caughnawaga (MON-8)
Semple, E. R. (M)

Cartierville (MON-8)
Kelly, T. W. (A)
Lurion, E. (M)

Charny (MON-8)
Lapointe, J. (A)

Chateauguay Village (MON-8)
Skarbek, I. R. (M)

Chaudiere Bassin (MON-8)
Cote, J. P. (A)

Cote St. Luc (MON-8)
Pascal, J. (A)
Rudzitis, A. (A)

St. Genevieve de Pierrefonds (MON-8)
Bailey, P. H. G. (M)

Dorval (MON-8)
Arena, G. (A)
Coughlin, F. J. (A)
Peirce, R. W. (A)
Scott, R. (SM)
Tatlock, J. F. (A)
Weaver, J. H. (M)

Drummondville (MON-8)
Marceau, J. P. (VA)
McWilliam, E. A. (VA)
Millar, R. B. (A)
Payette, R. (M)

Dunham (MON-8)
Riordon, R. C. (A)

Granby (MON-8)
Jedrychowski, J. L. (SM)
Sterling, J. A. (A)

Halet (OTT-8)
Bellavance, F. (A)

Hampstead (MON-8)
Kingan, J. J. (SM)
Wallace, O. C. S. (A)

Hudson Heights (MON-8)
Summers, L. I. (A)

Hull (OTT-8)
Bulger, G. E. (A)
McDowell, W. J. (A)

Isle Bigras (MON-8)
Clarkson, L. (M)

L'Abord a Plouffe (MON-8)
Aston, J. P. (SM)
Weytze, D. W. (A)

Lachine (MON-8)
Clarke, J. L. (M)
Isaac, V. E. (A)
Kelsey, E. S. (SM)
Muirhead, C. R. (SM)
Walker, A. S. (M)
Wright, D. F. (M)

Lakeside (MON-8)
Anderson, D. A. (SM)
Livis, M. J. (A)
Shearer, C. W. (M)

Laprairie (MON-8)
Julien, M. J. R. (A)

Laval West (MON-8)
McClelland, W. R. (A)

Levis (MON-8)
Bernier, J. G. (M)

Longueuil (MON-8)
Kennedy, A. E. (A)
Paquette, A. (A)
Robillard, P. A. (M)

Longueuil City (MON-8)
Simard, L. R. (A)

MacDonald College (MON-8)
Blevis, E. H. (M)

Marieville (MON-8)
Bilocq, R. E. (A)

Mascouche (MON-8)
Dixon, G. L. (M)

Masson (OTT-8)
Wilcox, D. A. (A)

Mont Joli (MON-8)
Ruden, J. (A)

Montreal (MON-8)
Adkar, C. K. (M)
Agnew, J. A. (A)
Aikenhead, B. A. (M)
Allen, D. E. (A)
Allen, R. E. (A)
Archambault, G. (M)
Argue, T. A. (M)
Audet, H. A. (M)
Bachynski, M. P. (M)
Bailey, C. L. (A)
Baily, F. A. A. (M)
Bantin, W. F. (M)
Barrow, F. A. (VA)
Barry, A. (A)
Bartlett, W. F. (A)
Bar-Urian, M. (A)
Baudot, J. A. (M)
Baumans, H. W. (M)
Baylis, G. F. (M)
Beaulieu, W. R. (M)
Begley, R. G. (M)
Bellringer, C. C. E. (M)
Bernier, J. C. (SM)
Berube, R. (A)
Blanchard, R. J. (M)
Boisvert, C. (A)
Bond, D. W. (M)
Bonneville, S. (SM)
Bosisio, R. G. (A)
Bourbonnais, P. J. (M)
Bryden, J. L. (M)
Buck, L. G. (SM)
Burridge, M. V. (A)
Busby, B. F. (M)
Campbell, A. F. (M)
Campbell, J. A. (SM)
Cardella, O. (M)
Carr, E. (A)
Carty, D. G. (A)
Chadwick, S. (M)
Chaffey, R. (M)
Challis, W. L. (A)
Chapman, S. J. (A)
Chipman, R. A. (SM)
Chipps, G. E. (M)
Clapp, R. O. (A)
Clarke, H. W. (A)
Clement, L. J. J. (A)
Conroy, J. M. (SM)
Corbell, M. J. (M)
Cox, J. R. G. (M)
Cunha, S. H. (M)
Dasko, G. J. (A)
David, E. (M)
Demers, P. (A)
Derzal, M. (A)
Desser, M. S. (A)
Dewey, D. L. (M)
Elliott, G. (SM)
Faarnell, G. W. (A)
Fabiszewski, H. (M)
Ferenczy, M. (M)
Fiegehen, G. D. A. (A)
Fisher, C. B. (M)
Fisher, F. S. (M)
Fisher, S. T. (SM)
Flom, M. (M)
Dickson, J. B. (M)
Dinnin, A. J. (M)
Doiron, J. A. B. (A)
Douglas, J. C. (M)
Dube, J. (M)
Dubreuil, E. J. (M)
East, L. A. W. (SM)
Edmonds, A. (M)
Fodor, N. J. (A)
Forman, J. (SM)
Fortin, C. (A)
Fratkin, B. (M)
Frenette, C. (M)
Gaon, D. (M)
Gauthier, G. M. (M)
Germain, L. V. (A)
Gilles, D. (A)
Ginsberg, G. (A)
Ginsburg, I. (A)
Gorfinkel, G. G. (A)
Gould, S. (A)
Gravel, J. J. O. (A)
Groonie, G. R. (M)
Gruner, L. (M)
Haberl, J. F. (A)
Haddon, A. G. (M)
Hall, J. S. (A)
Hamel, Y. (A)
Hamilton, H. A. (A)
Hansard, H. H. (M)
Hatzidakis, K. (A)
Hayes, J. E. (F)
Heckman, G. L. (M)
Heybroek, C. J. (A)
Hildebrandt, A. E. (M)
Hings, H. J. (M)
Hobbs, N. M. (M)
Hodge, N. H. (M)
Howes, F. S. (F)
Hryhorijiw, W. (M)
Hudon, G. F. (A)
Hunt, A. B. (SM)
Junas, W. M. (M)
Jung, D. (M)
Kahan, J. G. (M)
Kahn, I. (A)
Kahn, J. P. (M)
Katz, L. (M)
Kaufman, H. (M)
Keyes, L. A. (A)
Klapach, P. (A)
Ingram, D. E. (M)
Inkster, V. A. (M)
Jackson, J. E. (SM)
Jackson, R. W. (M)
Jamieson, F. C. (M)
Jamshedji, J. S. (M)
Jewell, G. S. (M)
Johnston, R. F. (M)
Julien, G. J. C. (A)
Knitel, E. J. M. (M)
Knox, J. B. (F)
Koblin, S. (A)
Kubina, S. J. (A)
Kurients, H. (M)
La Ferriere, P. J. (M)
Lank, G. W. (M)
Laporte, J. M. (M)
Lavallee, P. (M)
Leftheris, J. P. (M)
Legault, E. G. (M)
Litchfield, J. P. (A)
Litwin, M. M. (M)
Lord, L. M. (A)
Luscombe, C. F. (M)
Mackenzie, D. L. (M)
MacKimmie, G. B. (M)
Macpherson, M. F. (M)
Malolepszy, V. (M)
Marcotte, J. M. (A)
Margolick, F. H. (M)
Marshall, G. K. (A)
Marshall, J. L. (M)
Martin, J. H. (M)
Martin, R. E. (A)
McDonald, D. J. (SM)
McGuire, C. H. (SM)
McIntosh, B. A. (A)
McNeil, B. T. (M)
Meunier, J. L. (M)
Middleton, L. (M)
Miroshnichenko, A. (A)
Minkiewicz, M. D. K. (M)
Mockler, T. P. (A)
Moen, H. P. (A)
Moore, E. J. (M)
Nachfolger, N. (M)
Nadon, L. (A)
Naing, H. M. (A)
Neville, A. H. (M)
Nichols, W. A. (F)
Nienaltowski, W. (M)
Olding, N. R. (SM)
Ornstein, W. (A)
Panneton, B. (M)
Patrick, K. R. (SM)
Patton, R. (M)
Pauch, J. E. (M)
Pavlasek, T. J. F. (M)
Pelchat, G. M. (M)
Penton, R. E. (M)
Pinnell, J. E. (M)
Pollock, B. N. (M)
Postema, G. B. (M)
Poznunski, Z. (M)
Presentey, S. M. (SM)
Prichodjko, A. (M)
Provost, P. (A)
Provost, Y. (A)
Pscheldt, K. (A)
Pugsley, J. D. (A)
Reeves, R. (A)
Rein, W. W. (A)
Riddell, R. S. (M)
Roberts, A. R. V. (M)
Rolland, S. F. (M)
Roth, S. (A)
Salmon, R. L. (A)
Sauchuk, J. M. (M)
Sawitzki, N. (M)
Schneider, R. S. (A)
Schoner, B. (M)
Schroeder, A. K. (A)
Schwartz, H. H. (M)
Scott, W. W. (A)
Sekell, P. (SM)
Serbyn, R. (M)
Sherman, B. N. (M)
Smith, F. A. (A)
Smith, G. C. (A)
Sophianopoulos, A. A. (A)
Stansbury, E. J. (A)
Steel, W. A. (F)
Steinmetz, N. (A)
Sutherland, J. G. (M)
Symbilsky, S. (M)
Tahirali, G. W. (A)
Taylor, K. J. (M)
Taylor, N. J. (M)
Thrasher, P. J. (A)
Turnbull, J. A. (A)
Vaux, L. J. (M)
Venn, B. A. (M)
Vincent, J. J. (M)
Wahbolz, E. (M)
Wallace, R. J. (SM)
Ward, M. M. (M)
Warner, G. (M)
Warren, F. G. R. (SM)
Wells, R. M. (M)
White, R. A. (A)
Whitehead, J. R. (SM)
Wilks, J. H. (M)
Willing, W. R. (A)
Wilson, S. S. (A)
Wiseman, R. T. (M)
Woodman, B. H. (A)
Woonton, G. A. (F)
Zakaib, L. J. (M)
Zelinger, G. (M)
Ziemelis, V. (M)

Outremont (MON-8)
Akerman, I. (M)
Blostein, M. L. (M)
Guevremont, J. U. (M)
Malina, B. (M)
Pinsky, C. (A)
Slaven, L. (A)

Pointe Clair (MON-8)
Aaronson, D. (A)
Bricout, P. A. (M)
Collins, J. A. (M)
Curtis, R. W. (M)
Davidson, G. K. (M)
Gissing, H. R. (SM)
Glegg, K. C. M. (A)
Gregory, A. H. (M)
Lee, F. B. (A)
McGuinness, N. W. (A)
Papouschek, F. (M)
Pierce, O. B. (A)
Wells, A. F. (M)
Williamson, R. B. (M)

Port Alfred (MON-8)
Gagnon, L. A. (M)

Quebec (MON-8)
Beaulieu, J. A. (M)
Boulet, J. (SM)
Caron, J. V. (M)
Chabot, M. A. (M)
Chinnick, R. F. (M)
Cote, L. J. A. (A)
Cummins, J. A. (M)
Dion, A. (A)
Frenette, R. H. (M)
Giguere, R. (M)
Gosselin, L. (A)
Guerbilsky, A. (M)
Humbert, V. J. (A)
Laflamme, A. K. (M)
Lefebvre, R. A. (A)
L'Heureux, L. J. (M)
Lortie, A. L. (M)
Meldrum, M. A. (M)
Morewood, H. W. (A)
Nadeau, A. G. (M)
Park, K. R. (A)
Paul, R. A. (A)
Porter, R. G. (A)
Poulot, J. A. (M)
Rhodes, A. J. (M)
Robichaud, L. P. A. (A)
Somers, H. (A)
Spindler, G. B. (M)
Stobo, J. D. (A)
Surtees, W. J. (M)
Thistle, W. G. (M)
Vaillancourt, R. M. (A)
Wall, W. R. (M)

Rimouski (MON-8)
Ouellet, A. (M)

Riviere du Loup (MON-8)
Lavoie, L. (M)

Rosemere Terrebonne (MON-8)
Cotton, T. D. (M)

Rosemont (MON-8)
Hooson, R. W. (A)
Robinson, M. R. (A)

Ste. Adele (MON-8)
Brown, F. A. (A)

Ste. Anne de Bellerue (MON-8)
Birman, G. (M)

St. Antoine de Tilly (MON-8)
Methot, F. R. (A)

St. Bruno (MON-8)
Davis, J. F. (M)

St. Eustache (MON-8)
Ennis, D. E. (A)

Ste. Foy (MON-8)
Baril, J. C. (A)
Bobyn, E. J. (M)
Cellin, R. E. (M)
Dumas, J. E. (M)
Fortin, G. J. E. (A)
Letarte, M. (A)
Regniere, J. P. (A)

Ste. Genevieve (MON-8)
Kassner, M. H. (M)

St. Hubert (MON-8)
Lindsey, G. R. (M)

St. Hyacinthe (MON-8)
Leclerc, J.-G. (A)

St. Jerome (MON-8)
Gascon, J. C. (A)
Rinfret, C. J. (M)

St. Lambert (MON-8)
Deegan, F. J., Jr. (M)
Despins, L. J. (A)
Ferris, H. A. (SM)
Hammond, R. E. (SM)
Lemke, M. F. (M)
Roach, C. L. (M)
Rousseau, M. (M)
Watson, D. J. (M)

St. Laurent (MON-8)
Aasgaard, P. U. (M)
Athersych, F. H. (M)
Bousfield, J. A. T. (SM)
Cahn, P. R. G. (M)
Dutkowski, W. (A)
Hanna, D. C. (M)
Leitch, D. H. (A)
Lumsden, R. B. (SM)
Steen, R. O. (M)

St. Paul L'Ermite (MON-8)
Dingwall, R. A. (M)
Malcolm, F. W. (SM)

Ste. Rose (MON-8)
Stewart, T. A. (M)
Robinson, H. A. (SM)

St. Sauveur des Montagnes (MON-8)
Jaderholm, H. W. (VA)

Ste. Therese de Blainville (MON-8)
Farmer, E. W. (SM)

Seven Islands (MON-8)
Berube, J. P. G. (A)
Popovich, C. D. (A)

Sillery (MON-8)
Boisvert, M. (M)
Du Berger, P. (M)
Gobeil, C. E. (A)
Macfarlane, J. T. (M)
Price, C. (A)
Randoin, R. A. (A)

Sorel (MON-8)
Lunan, H. S. (M)

Terrebonne (MON-8)
Dubuc, J. C. (A)

Town of Cote St. Luc (MON-8)
Pullan, E. (M)

Town of Mt. Royal (MON-8)
Borden, B. C. (A)
Desaulniers, R. R. (M)
Dobridge, R. W. (M)
Jackson, K. A. (SM)
Letts, R. (M)
Paley, A. B. (F)
Sproul, R. W. (M)

Trois Rivieres (MON-8)
Gagne, R. R. J. (M)

Valois (MON-8)
Rugg, H. H. (SM)
Russell, W. D. (M)

Verdun (MON-8)
Belanger, J. P. (A)
Dumas, L. (M)
Morrison, W. B. (M)
Parent, G. J. C. (A)
Redmond, G. W. (A)

Ville La Salle (MON-8)
Pinnell, S. E. A. (M)

Ville St. Laurent (MON-8)
Cooke, R. W. (SM)
Doucet, M. (A

CANADA

Westmount (MON-8)
Caswell, C. F. (M)
Christmas, W. I. (A)
De Halmy, A. (A)
Dorey, J. D. (A)
Raynsford, R. P., Jr. (M)
Richard, G. B. (A)
Smith, P. D. P. (M)
Ubbelohde, J. H. (A)

Yamachiche (MON-8)
Bird, C. H. R. (VA)

SASKATCHEWAN

Eldorado (REG-8)
Petrik, J. (A)

Regina (REG-8)
Anderson, C. A. (A)
Baker, K. D. (A)
Bartole, G. C. (A)
Brock, G. A. (A)
Bryanton, R. A. (A)
Chesters, B. H. (A)
Cozine, L. V. (A)
Dean, H. C. (A)
Drake, G. C. (A)
Drouin, O. E. (A)
Ferguson, G. E. (A)
Funk, J. A. (M)
Gibson, E. M. (A)
Giernes, E. M. (A)
Gracie, K. R. (A)
Grant, F. D. (A)
Hawley, K. T. (M)
Highet, W. C. (M)
Johnson, J. W. (A)
Kaldor, H. (M)
Kerr, H. (A)
Lee, S. F. (M)
Lewis, A. W. (A)
McBride, L. E. (M)
McEwen, W. D. (A)
McKay, W. (M)
McLeod, W. D. (A)
McNeil, J. M. (M)
Moyer, L. S. (M)
Norman, C. H. (A)
Odling, E. C. (A)
Off, F. X. (A)
Punshon, R. L. (M)
Savage, M. C. (A)
Smith, S. K. (M)
Sundeen, P. G. (M)
Vitorovich, N. (M)
White, A. M. (A)

Rowatt (REG-8)
O'Byrne, L. A. (A)

Saskatoon (REG-8)
Gordon, D. A. (A)
Hoskins, L. C. (M)
Kavadas, A. D. (M)
Michalenko, A. (M)

Semans (REG-8)
MacGregor, R. J. (A)

YUKON

Whitehorse (NA-8)
Parent, L. E. (M)

CANAL ZONE

Coco Zola
Brannan, F. T. (A)

Cristobal
Mason, J. L. (A)

Curundu
Adams, C. W. (A)

Fort Amador
Earl, E. O. (A)

Quarry Heights
Hamilton, G. H. (A)

CEYLON

Colombo
Gnanalingam, S. (M)
Hopps, J. A. (M)
McCarthy, A. A. (A)

Panadura
Adikaram, K. B. (A)

CHILE

Chuquicamata
Berrevoets, G. J. (A)

Potrerillos
Ribbeck, C. S. (A)

Punta Arenas
Pemenias, J. L. (A)

Rancagua
Collyer, J. H. (M)

Santiago
Bretignere, J. D. R. (A)
Vallarino, A. D. (M)

Vina Del Mar
Brito Infante, J. M. (A)

COLOMBIA

Medellin
Nassar, J. E. (M)

Bogota
Amore, I. (M)
Arboleda, C. E. (A)
Charfole, R. O. (A)
Cuevas, A. (M)
Estevez, C. L. (M)
Gabrunas, K. B. (A)
Garbrecht, F. S. (M)
Humberto, A. H. (M)
Lynch, D. J. (M)
Meek, T. L., Jr. (SM)
Neira-M., T. (A)
Reyes, J. H. (A)
Scott, C. B. (A)
Torres-Galvez, C. A. (M)
Villegas, A. (M)

Santa Marta
Owen, H. (A)

COSTA RICA

San Jose
Carazo, G. L. E. (A)
Craigie, S. M. (SM)
Reyes, C. M. (M)
Vargas, V. A. (A)

CUBA

Havana
Arnaud, J. P. (F)
Barranco, A. A. (M)
Bode, M. C. (A)
Condom, A. S. (SM)
De Cubas, J. D. (M)
Elizondo, E. L. (M)
Estrada-Castro, C. J. (A)
Harris, F. (SM)
Leonard, R. B. (A)
Magno, H. T. (SM)
Martinez, A. (A)
Miller, K. E. (M)
Montes, J. V. (A)
Pages, E. V. (A)
Pella, A. (A)
Peterson, W. E. (M)
Siddall, W. D. (A)
Smith, D. L. (A)
Torres-Ruiz, J. G. (A)
Valladares, J. A. (M)

Marianao
Guiral, R. L. (M)

Oriente
Reguera, J. J. (A)

CYPRUS

Kyrenia
King, F. N. (M)

Nicosia
Bloom, R. A. (A)
Katzelis, N. G. (M)

CZECHOSLOVAKIA

Prague
Bena, J. J. (M)
Havelka, G. (M)
Horna, O. A. (M)
Nadler, M. (M)
Savel, J. (A)

DENMARK

Bagsvaerd
Elnegaard, E. (A)

Birkeqd
Rasmussen, T. J. (A)

Copenhagen
Carstens, L. (A)
Fagt, B. (M)
Gronlund, M. P. S. (A)
Gudmandsen, P. E. (M)
Ingerslev, F. H. B. (SM)
Jacobsen, H. V. (M)
Larsen, B. F. (M)
Lund, C. O. (M)
Morch, V. H. (A)
Nielsen, B. A. (A)
Nielsen, J. O. (SM)
Pedersen, S. A. C. (SM)
Petersen, B. S. (A)
Sorensen, E. V. (A)

Gentofte
Pedersen, N. T. (A)
Svensson, R. (M)

Glostrup
Langgaard, E. (M)
Norgaard, A. K. (A)

Hellerup
Pedersen, G. (SM)
Ring, O. (M)
Rybner, J. (F)

Herlev
Hansen, G. K. F. (M)

Hillerod
Christensen, O. (A)
Ungstrup, E. E. (A)

Lyngby
Holten, C. U. (A)

Naerum
Kjaer, V. (A)

Roskilde
Christiansen, E. M. (A)

Struer
Christensen, K. H. (A)
Jensen, S. E. (M)

Vanlose
Nag, D. S. (A)

Virum
Bruun, G. (SM)
Christensen, C. L. (A)
Jorgensen, B. (M)

DUTCH GUIANA

Suriname
Conant, R. D. (M)

EAST CAROLINE ISLANDS

Truk Island
Hammons, E. G. (A)

ECUADOR

Quito
Jacobson, H. P., Jr. (SM)
Lintz, H. E. (M)
Rota, L. (M)
Tarr, L. H. (A)

EGYPT

Alexandria (EGY)
Kheireldin, A. M. (A)
Mostafa, A. E. (SM)

Cairo (EGY)
Abu-Kandeel, A. A. (M)
Abu-Zeid, M. M. (A)
Amer, S. (A)
Constantinidis, G. (A)
El-Ablad, A. H. (M)
El Harty, A. K. (M)
Elkashlan, E. I. (A)
El-Khanafly, M. M. Z. (A)
El Kotoury, A. S. (A)
El-Said, M. A. H. (SM)
Fahmy, A. I. (A)
Fahmy, M. N. (A)
Fathy, A. E. (A)
Fouad, M. E. (SM)
Grosseloff, L. (M)
Hussein, N. A. (A)
Ismail, M. A. W. (A)
Issa, E. E. M. (A)
Mahmoud, A. A. (M)
Mahmoud, H. M. (M)
Makar, R. T. (M)
Reda, M. S. (M)

EL SALVADOR

San Salvador
Richardson, A. S. (M)

ENGLAND

BEDFORDSHIRE

Luton
Dunn, S. C. (M)

BERKSHIRE

Abingdon
Fry, D. W. (A)
Wells, F. H. (SM)
Westwood, D. (M)

Bracknell
Stainthorpe, R. L. (M)
Wood, J. (M)

Longworth
Cooke-Yarborough, E. H (M)

Maidenhead
Barrett, J. (M)

Newbury
Brooke, H. A. (SM)

Reading
Patterson, T. C. (SM)

Sunningdale
Taylor, R. H. (M)

Wantage
Cox, R. J. (M)

Windsor
Cotty, W. F. (A)

BUCKINGHAMSHIRE

Bletchley
Deards, S. R. (M)
Eggestad, M. (A)
Welling, A. J. (A)

Gerrards Cross
Diver, F. G. (SM)
Morton, H. B. (M)

Great Missenden
Reyner, J. H. (SM)

High Wycombe
Simmonds, J. C. (A)

Iver
Rhys-Jones, J. E. (SM)

Newport Pagnell
Boswell, I. I. (A)

Marlow
Ludgate, W. F. E. (SM)

Slough
Wilkins, A. F. (SM)

Stoke Poges
McLean, F. C. (SM)

Taplow
Sharpe, G. E. (M)

CAMBRIDGESHIRE

Cambridge
Cope, J. E. (SM)
Dalgleish, J. W. (SM)
Edwards, B. J. (SM)
Germany, L. W. (M)
Havranek, W. C. R. (M)
Horne, R. W. (M)
Jones, J. D. (SM)
Karp, A. (SM)
Moullin, E. B. (SM)
Rao, J. (M)
Ratcliffe, J. A. (F)

Histon
Townsend, F. H. (SM)

CHESHIRE

Alsager
Pitman, D. A. (M)

Cheadle
Roberts, W. G. F. (SM)

Cheadle Hulme
Fielding, E. A. (M)

Helsby
Walker, H. (SM)

Knutsford
Bolton, D. (M)

Mellor
White, G. J. (M)

Timperley
Vernon, B. H. (M)

CORNWALL

Bude
Nobbs, W. J. (A)

CUMBERLAND

Maryport
Elliott, I. (A)

DERBYSHIRE

Derby
Buckland, V. (A)

DORSETSHIRE

Parkstone
Hooper, J. L. (A)

Portland
Glover, R. A. (A)

DURHAM

Jarrow
Younson, E. J. (M)

Peterlee
Angell, A. G. H. (SM)

ESSEX

Barking
Bulgin, A. F. (SM)

Brentwood
Gooday, R. A. H. (SM)

Burnham-on-Crouch
Jesty, L. C. (F)

Chelmsford
Amey, S. H. (A)
Anderson, E. W. (SM)
Cafferata, H. (M)
Churchman, A. (M)
Cooper, V. J. (A)
Deeley, A. R. (M)
Forte, S. S. (M)
Heladon, P. B. (M)
Latham, C. (M)
Lwin, M. M. (A)
Smith, F. L. (SM)

Clacton-on-Sea
Gentry, D. A. (A)

Colchester
Howe, F. R. (M)

Danbury
Eckersley, T. L. (F)
Young, A. J. (M)

Galleywood
Tiberghien, C. M. J., Jr. (M)

Hornchurch
Parker, J. W. (M)
Ringrose, J. W. (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)
Kannan, S. (M)
Parry, R. Y. (SM)

Waltham Abbey
Strafford, F. R. W. (SM)

GLOUCESTERSHIRE

Bristol
Ackroyd, J. (M)
Gardner, F. (M)

HAMPSHIRE

Andover
Cook, K. L. W. (A)

Bournemouth
Sieger, J. (SM)

Christchurch
Parnell, H. R. (M)

Cosham
Scott-Taggart, J. (F)

Farnborough
Dale, T. G. M. (M)
Holyday, S. W. (M)
Reid, D. G. (M)

Havant
Rzymowski, E. (A)

Portchester
Rouse, F. W. D. (A)

Portsmouth
Bettinson, S. F. (M)
Silvester, D. D. (M)

Southampton
Chapson, E. (A)
Fai Ho, C. (A)

Welwyn
Grenly, M. (A)
Khan, A. H. (M)

HEREFORDSHIRE

Aldenham
Johnston, D. L. (M)

Barnet
Capelli, M. P. (M)
Wrede, D. F. (M)

Boreham Wood
Laverick, E. (SM)

Bushey
Hume, C. R. (A)

By Tring Station
Silson, R. G. (A)

Cockfosters
Cattanes, E. (SM)

Hatfield
Millward, M. A. (M)

Hoddesdon
Lyons, C. L. (SM)

Letchworth
Cartwright, J. R. (M)

North St. Albans
Knight, D. J. (M)

Radlett
Hedges, T. C. (A)
Howse, H. A. G. (SM)

Rickmansworth
Montgomery, A. W. (F)

St. Albans
Hornby, F. R. (A)

Stevenage
Townsend, R. (A)

Ware
Hicks, B. W. (M)

Watford
Morgan-Voyce, A. M. (SM)

KENT

Beckenham
Crawley, H. J. (A)
Herdman, T. L. (M)

Bexleyheath
Brown, D. C. (M)

Broadstairs
Saunter, H. D. (A)

Bromley
Kiryluk, W. (A)
Stoner, C. R. (M)

Chatham
Terry, J. R. (A)

Dover
Sme-Rumsby, B. A. A. (M)

Farnborough
Sherman, M. B. (A)

Gillingham
Hammond, E. R. (M)
Vesly, L. G. (A)

Hayes
Binyon, B. (SM)

Keston
Graf, V. V. (M)

Longworth
Scully, C. T. (SM)

Orpington
Harrison, K. W. (SM)
Lawrence, E. (SM)
Saraga, W. (SM)

St. Mary Cray
Cook, C. A. (A)
Eckersley, P. P. (F)

Sevenoaks
Van Hasselt, M. (SM)

Sidcup
Ashbridge, N. (F)
Spagnoletti, P. H. (M)

Walmer
Kulght, S. G. (M)

Whitstable
Elvy, M. T. (SM)

LANCASHIRE

Accrington
Bleasdale, J. (A)
Bleasdale, W. W. (A)

Oldham
Brooks, G. R. (M)

Liverpool
Brown, A. G. (M)
Chalmers, D. (A)
Falcon, G. L. (M)

Manchester
Bowden, B. V. (SM)
Brown, R. H. (M)
Cutteridge, O. B. D. (M)
Dastidar, P. R. (A)
Jackson, W. (F)
Searby, N. H. (SM)
Tetley, J. W. (A)
Williams, F. C. (F)

Ormskirk
Panagakis, H. (A)

Prescot
Muir, L. M. (A)

Ulverston
Oxley, R. F. (SM)

LEICESTERSHIRE

Leicester
Ball, L. F. (M)

LONDON

London
Abel-Harry, C. B. (M)
Adorian, P. (SM)
Bargery, C. J. (A)
Barlow, H. M. (F)
Bearup, T. W. (SM)
Beck, A. H. W. (M)
Bedford, L. H. (F)
Bevan, P. A. T. (SM)
Biggar, H. P. (M)
Bird, L. T. (M)
Bishop, H. (F)
Boyle, H. (M)
Brown, A. C. (M)
Bruce, D. C. (M)
Bugeja, A. A. (M)
Chagla, H. K. (M)
Chrees, S. T. (M)
Crosfield, J. F. (M)
Dawes, E. J. (SM)
Deal, A. W. (M)
Dent, F. D. (A)
Dias, G. C. (A)
Earp, C. W. (SM)
Emery, E. J. (SM)
Faraday, B. P. (A)
Faulkner, H. (F)
Finney, R. (M)
Flack, W. I. (SM)
Fleming, P. A. (SM)
Fleming-Williams, B. C. (SM)
Foster, H. G. (SM)
Gagne, R. E. (M)
Godfrey, S. S. (A)
Goldup, T. E. (F)
Green, R. R. (SM)
Greig, J. (SM)
Griffiths, W. H. F. (SM)
Halsey, J. E. (A)
Hamilton, D. (M)
Hanson, J. V. (M)
Haq, S. S. (M)
Harris, K. E. (SM)
Hastings, D. J. (M)
Heaton-Armstrong, L. J. (SM)
Hirshman, C. L. (SM)
Hogg, F. L. (SM)
Honlatt, R. R. W. (M)
Jasper, P. H. C. (M)
Jezierski, E. C. J. (A)
Lamont, K. (M)
Lawson, C. J. V. (M)
Layzell, L. M. (M)
Lindsay, P. A. (M)
Meyer, L. W. (SM)
Miller, B. G. (M)
Minton, M. (SM)
Mirk, D. B. (SM)
Morgan, S. G. (M)
Nowicki, J. R. (A)
Oliphant, A. J. (A)
Page, D. F. (A)
Parker, J. D. (SM)
Parr, G. (SM)
Paynter, A. E. (M)
Pecorini, R. R. (M)
Pocock, H. S. (SM)
Prichakas, N. (A)
Ramachandra, M. (M)
Rantzen, H. B. (SM)
Rastorgoueff, V. (M)
Roberts, R. S. (SM)
Robertson, A. A. (M)
Rose, A. (M)
Rose, S. P. (A)
Ross, G. M. (M)
Ross, J. D. (M)
Schwarz, H. F. (M)
Simmons, B. D. (M)
Smith, C. W. (M)
Sodomsky, K. F. (M)
Starr, C. H. (SM)
Stewart, T. W. W. (A)
Straughan, J. A. (M)
Strong, C. E. (F)
Sutherland, J. G. A. (SM)
Taylor, R. W. (M)
Thomas, H. A. (SM)
Troutbeck, W. H. (VA)
Ullrich, E. H. (F)
Valder, F. L. (M)
Whitehouse, M. H. L. (M)
Wilson, A. G. (M)
Wynn, R. T. B. (SM)

MIDDLESEX

Enfield
Ash, E. A. (M)
Davidson, I. A. (M)
Golden, N. J. (SM)
Lee, E. M. (SM)
Oldham, C. A. (A)
Sly, R. J. (A)

Greenford
Mac Lachlan, V. D. (M)
Meakin, A. D. (M)

Harrow
Dawe, F. W. (M)

Heston
Williams, H. P. (SM)

Houndslow
O'Hanlon, D. M. V. (M)

Kenton
Bird, R. (A)

Potters Bar
Neill, S. F. M. (SM)

Staines
Parsons, A. N. (M)
Warr, H. J. J. (M)

Stanmore
Russell, C. R. (A)

Sunbury-on-Thames
Mayer, C. G. (SM)

Twickenham
Felton, N. F. (M)
Gill, A. J. (F)

Wembley
Eapley, D. C. (F)
Rubenstein, G. (M)

Wembley Park
Bray, W. J. (A)

Winchmore Hill
Payne, C. E. (M)

NORFOLK

Gorleston-on-Sea
Rayment, K. I. (A)

Great Yarmouth
Dyson, A. A. (M)

NORTHAMPTONSHIRE

Kingsthorpe
Kaye, J. B. (M)

NORTHUMBERLAND

Newcastle-on-Tyne
Hare, J. (M)
Hodgson, C. C. V. (M)

NOTTINGHAMSHIRE

Beeston
Freedman, A. L. (M)
Pollard, J. R. (M)

Radcliffe-on-Trent
Douglas, A. (M)

SOMERSETSHIRE

Burnham-on-Sea
Thomas, W. D. (A)

Easton-in-Gordano
Lane, R. G. (M)

Ilminster
Macnee, D. H. (SM)
Oliver, C. R. (M)

Saltford
Horrigan, E. W. (SM)

Southport
Fennessy, J. R. (M)

Weston-Super-Mare
McCall, D. R. (M)

STAFFORDSHIRE

Cheadle
Allen, W. S. (SM)

Heaton Mersey
Grimsdale, R. L. (M)

Stoke-on-Trent
Gautby, H. R. B. (A)

Walsall
Hardcastle, C. (M)

Wolverhampton
Taylor, D. H. J. (M)

SUFFOLK

South Lowestoft
Wiegerinck, H. T. J. (M)

SURREY

Banstead
Smith-Rose, R. L. (F)

Cheam
Bond, W. (SM)

Coulsdon
Clemett, C. J. (M)

Croydon
Booth, P. C. (M)
Carpenter, R. E. H. (SM)
Ringham, G. B. (SM)

East Molesey
Coursey, P. R. (A)

Esher
Reeves, R. (SM)

Farnham
Clarke, G. F. (A)
Dawes, T. J. (A)

Guildford
Williams, R. C. G. (SM)

Hindhead
Rowe, J. H. (M)

Kingston-on-Thames
Barrett, A. E. (SM)
Kinross, R. L. (M)

Kingswood
Thurnell, D. P. (SM)

Richmond
Head, J. E. (VA)
Jones, E. E. (M)

Surbiton
Kerr-Waller, R. D. (M)

Sutton
Higham, E. H. (M)
Mac Donald, B. (M)
Wool, H. R. A. (M)

Tadworth
Somerville, T. (SM)

Thames-Ditton
Hersch, W. (M)

Virginia Water
Hutcheson, P. (M)

Walton-on-Thames
Budge, R. K. (A)

Weybridge
Jackson, W. R. (SM)
Kelliher, M. G. (M)

Woking
Gabrie', R. P. (VA)

Worcester Park
Walker, T. R. (M)

Hastings
Mortloc:, V. (M)

Worthing
Payne, L. S. (F)

WARWICKSHIRE

Birmingham
Hoge, R. R. (M)
Jones, H. H. (A)
Montgomerie, G. A. (A)
Truscott, D. N. (M)
Whitehead, E. A. N. (M)

Coventry
Crocker, C. H. (A)
Sivagnanasunderam, T. (A)
Williams, I. J. S. (M)
Wilson, R. (A)

Kenilworth
Keen, A. W. (M)

Rugby
Hibberd, R. G. (SM)
Hulme, F. H. (M)
Kinman, T. H. (F)

Solihull
Maskell, W. A. C. (SM)

WILTSHIRE

Devizes
Savage, W. B. (M)

Malmesbury
Irvin, J. L. (A)

WORCESTERSHIRE

Evesham
Smith, C. (A)
Sturley, K. R. (SM)

Malvern
Carter, R. H. A. (SM)

YORKSHIRE

Bradford
Patchett, G. N. (M)

Catterick Camp
Fisher, E. C. (M)

Sheffield
Benson, F. A. (M)
Cullen, A. L. (M)
Holroyd, W. H. (M)

Yarm-on-Tees
Bloom, M. S. (M)

ETHIOPIA

Addis Ababa
Gouin, P. L. (M)

FEDERATION OF RHODESIA AND NYASALAND

NYASALAND

Zomba
Davies, K. J. (M)

NORTHERN RHODESIA

Lusaka
Reeves, J. M. (M)

SOUTHERN RHODESIA

Salisbury
Paterson-Jones, E. A. (SM)

FINLAND

Helsinki
Luoto, U. A. (M)

FORMOSA

TAIWAN

Tainan
Chang, T. (A)

Taipeh
Hian-Yao, O. (M)

Pan-Geo
Wang, C.-C. (A)

FRANCE

ALLIER

Bellerive Sur Allier
James, R. M. (M)

ALPES MARITIMES

Annecy
Friedrichs, G. (M)

ARDENNE

Tarze
Oudard, A. (A)

CORREZE

Brive
Roncier, R. (M)

COTE-DU-NORD

Wasquehal
Lemettre, R. J. (M)

JEUMONT

Dufossez
Ducastel, G. (M)

LOIRET

Orleans
Delvigne, A. F. (A)

LOT-ET-GARONDE

Bordeaux
Duhamel, J. P. (A)

RHONE

Lyon
Biolley, E. J. M. (A)
Comte, G. N. (M)
Dejardin, G. L. (SM)

SEINE

Antony
Fromageot, A. P. A. (SM)

Bagneux
Voge, J. P. (SM)

Bois-Colombes
Cosnard, F. F. (A)

Boulogne
Klein, G. J. P. (M)
Tricaud, J. B. (A)

Bourg-la-Reine
Brodin, J. (A)

Clamart
Blassel, P. P. (A)
Deschamps, R. (A)

Clichy
Warin, M. (A)

Fontenay Aux Roses
Grivet, P. A. (A)
Surdin, M. M. (SM)

Issy-Les-Moulineaux
Goudet, G. (SM)

La Garenne
Blachier, B. L. (A)

Lavallois
Gandin, P. (A)

Malakoff
Beason, P. (M)

Neuilly
Lebail, P. E. (M)
Lochard, J. C. (M)

Nogent-sur-Marne
Clavier, P. J. (M)

Pantin
Churg, E. (A)

Paris
Algrain, P. R. (A)
Alsberg, E. (M)
Angot, A. M. (SM)
Berthaud, M. C. (M)
Bloch, R. M. (A)
Bodez, P. M. (M)
Bricaud, J. M. (SM)
Carrus, P. A. (M)
Chauchat, J. N. (M)
Chauvierre, M. (SM)
Cohen, R. (A)
Courtillot, E. P. (SM)
Deloraine, E. M. (F)
De Thomasson, M. M. L. (M)
Dreyfus, P. L. (A)
Du Bourg De Bozas, G. (M)
Esculier, G. G. (M)
Fabricant, P. (VA)
Fain, W. W. (M)
Floquet, J. (A)
Fuks, A. (A)
Gaschi, J. F. (M)
Gerten, N. (M)
Ghertman, J. (A)
Giboin, E. (SM)
Girerd, J. L. M. (M)
Guyot, L. F. (A)
Halberstein, J. H. (M)
Hammer, A. P. (A)
Israel, R. (A)
Kelton, M. P. (M)
Kerbec, M. J. (A)
Labin, E. (SM)
Labin, E. (SM)
Lacarriere, C. (A)
Lehmann, G. J. (SM)
Levy, L. (M)
Lorb, J. M. (SM)
Mandel, P. (SM)
Maurice, F. (A)
Moisson, A. A. (SM)
Muller, J. (A)
Noiseres, H. (A)
Ortusi, J. A. (SM)
Paffas, E. D. (A)
Pernice, J. R. (SM)
Ponte, M. J. H. (F)
Robin, G. (M)
Samuel, S. (M)
Simon, J. C. (SM)
Sirel, M. (A)
Sokoloff, B. A. (A)
Sperring, F. E. (M)
Stevens, A. M. (F)
Touraton, E. R. (SM)
Vassy, E. J. (A)

Rosny Sous Bois
Ferrier, P. A. (A)

Villemomble
Warnecke, R. R. (F)

SEINE ET OISE

Brunoy
Thun, R. J. (M)

Chatou
Gilotaux, P. (M)

Charville
Baudin, J. A. (A)
Saintesprit, G. L. (SM)

Corbeil-Essonnes
Behm, L. F. (A)

Le Vesinet
Bussat, R. M. A. (A)
Piel, G. J. (M)

Marcil-Marly
Berline, S. D. (SM)

Marnes La Coquette
Nill, A. A. (M)

Montmorency
Doehler, O. (SM)

Orsay
Guenard, P. R. G. (F)
Leblond, A. F. (M)
Palluel, P. C. (SM)

Rueil-Malmaison
Sauvanet, M. M. (SM)

St. Cloud
Goublin, R. O. (A)

St. Germain-en-Laye
Raymond, F. H. (SM)

Sartrouville
Baron, J. (M)

Versailles
De Coligny, G. (M)
Durand, P. A. (M)
Prache, P. M. (M)

GERMANY, WEST

Aachen
Effertz, F. H. (M)

Backnang
Koch, E. L. (SM)

Bayern
Schuh, C. F. (A)

Berlin
Gundlach, F. W. (SM)
Heyne, H. H. (SM)
Hore, K. (M)
Pelzman, L. (M)
Ruhrmann, A. A. (SM)
Wiegand, E. P. (SM)
Zickermann, C. A. (M)

Bremen
Busch, C. W. (M)

Darmstadt
Moller, R. (F)
Walther, A. (SM)
Zinke, O. (SM)

Duesseldorf
Buetow, M. (A)

Friedburg-Breisgau
Beuche, G. R. (A)

Gevelsburg
Pachr, H. W. (SM)

Gottingen
Hayden, L. O. (M)
Meyer, E. W. (SM)
Severin, H. K. F. (SM)
Zukriegl, J. F. (A)

Graftshaft Schaumburg
Ackermann, E. G. (SM)

Hamburg
Borgnis, F. E. (SM)
Peters, J. F. (SM)
Von Randow, T. V. (A)

Hannover
Klotz, E. W. K. (SM)

Hessen
Stucken, H. (A)

Hohentwiel
Altenpohl, D. (M)

Hornberg
Thangavelu, K. S. (A)

Karlsruhe
Rothe, H. (SM)

Konstanz
Kleinsteuber, W. G. (SM)
Machain, L. R. (M)

Lampertheim
Phillips, R. H. (M)

Munich
Esten, P. W. (SM)
Fischer, K. (A)
Handleman, M. (M)
Joetten, K. K. F. (M)
Kleen, W. J. (F)
Knoll, M. (SM)
Mueller, R. A. (A)
Piloty, H. T. (SM)
Poehler, H. (A)
Rohde, L. (F)
Von Trentini, G. (SM)

Neuershausen
Hess, H. A. (M)

Nurnberg
Hecker, W. (M)

Porz
Riepka, H. C. (SM)

Siegen
Gontermann, A. (M)

Stuttgart
Piloty, R. (M)

Uber Mering
Zenneck, J. (F)

Ulm
Bruck, L. (SM)
Bruckmann, H. P. (SM)
Franz, K. O. (SM)
Kotowski, P. (A)
Runge, W. T. (SM)
Uhrmann, A. M. (M)

Wiesbaden
Heimann, W. (M)

GREECE

Athens
Antonacakis, G. I. (A)
Aristogenis, G. S. (A)
Basbas, L. T. (A)
Cassapoglou, C. B. (A)
Gogos, A. C. (M)
Hadjidemetriou, D. S. (A)
Kariambas, N. (A)
Kontaratos, A. N. (M)
Mazarakis, A. (A)
Myroyannis, A. J. (M)
Papadopoulos, D. A. (SM)
Perpinias, A. E. (M)
Soldatos, G. (M)
Tsintenis, G. S. (A)
Zaikos, D. N. (A)

Canea
Ichihakis, M. A. (A)

Corinthos
Sazakis, N. G. (A)

Piraeus
Dourvanas, S. A. (A)
Hairetakis, E. P. (A)

Salonica
Katsaounis, P. C. (A)
Klaffas, G. Z. (A)

GUAM

Agana
Goodwin, C. E. (A)
Handy, R. M. (A)

GUATEMALA

Guatemala
Engel, R. W. (A)

HAWAII

HAWAII

Hawi (TH-7)
Rotolo, N. V. (M)
Hilo (TH-7)
Izumi, G. Y. (A)
Neifert, K. G. (A)

KAUAI

Naalehu (TH-7)
Okuna, T. M. (A)

MAUI

Kihei (TH-7)
Honea, L. W. (M)
Lahaina (TH-7)
Nakamoto, M. (A)
Wailuku (TH-7)
Arveschoug, N. F. (M)
Burgh, A. J. (A)
Katahara, S. (M)

OAHU

Aiea (TH-7)
Hosokawa, K. (A)
Kelly, V. (M)
Honolulu (TH-7)
Alden, R. M. (M)
Anderson, J. W. (A)
Arrington, R. A. (A)
Asato, M. (A)
Atherton, J. B. (M)
Britton, J. R. (M)
Callahan, A. L. (M)
Chang, D. C. (M)
Chang, R. H. M. (M)
Ching, R. T. K. (M)
Chun, R. H. C. (M)
Edwards, N. R. (SM)
Ellison, J. L. (A)
Fenner, P. R. (A)
Frear, R. B. (A)
Fuchikami, A. H. (A)
Gilroy, R. B. (M)
Goo, J. F. S. (A)
Grubb, D. L. (M)
Harada, S. (M)
Harger, E. J., Jr. (A)
Higa, K. (M)
Hoag, D. S. (M)
James, F. L. (A)
Johnson, W. F. (M)
Jones, R. C., Jr. (A)
Kam, P. Y. T. (A)
Kang, Y. O. (M)
Kato, R. S. (A)
Kendall, L. B. (SM)
Kung, L. (A)
Lee, R. T. S. (A)
Leong, A. K. (A)
Lewbel, S. H. (M)
Lindemann, E. G. (A)
Mayfield, W. H. (M)
Mercer, I. G. (M)
Metzger, J. F. (A)
Miyake, I. (M)
Moseley, S. T. (SM)
Murphrey, I. G. (M)
Nakamura, O. S. (A)
Nishimura, K. K. (A)
Pang, D. L. (M)
Pietz, E. A. (M)
Sanders, J. R. (A)
Schoen, E. C. (A)
Schultz, J. E. (A)
Shak, H. K. Y. (A)
Shigetomi, S. S. (A)
Stagner, G. H. (M)
Takase, R. H. (VA)
Vaughan, V. (M)
Warren, H. E. (M)
Williams, F. E. (A)
Young, M. F. (M)
Yuen, C. M. F. (M)

Kahuku (TH-7)
Tamura, L. T. (A)

Kaneohe (TH-7)
Andrews, F. D. (A)
Dixon, F. C. (A)
Morse, N. A. N. K. (M)
Tanigawa, N. F. (M)
Turner, H. E. (M)

Lanikai (TH-7)
Brenessel, A. (A)
Browne, C. W. (A)
Clark, G. W. (SM)
Dashiell, D. H. (M)
Dawson, L. R. (SM)
Hill, R. R. (M)
Hughes, G. R. (M)
Hunter, G. H. (A)
Tittle, J. F. (A)
Vittum, M. S. (SM)

Pearl City (TH-7)
Maertz, W. A. (M)

Pearl Harbor (TH-7)
Mason, F. L. (SM)

Wahiawa (TH-7)
Grayson, R. R. (M)
Hahn, G. K. P. (A)
Janda, E. G. (A)
Nace, C. E. (A)
Sato, R. H. (A)

Wainae (TH-7)
Florez, H. (SM)

HONG KONG

Hong Kong
Braude, A. N. (M)
Cheng, C. C. (A)
Chui, T. Y. (M)
Hope, W. J. (A)
Hsu, H. (M)
Loutit, L. W. (A)
Luk, Y. K. (M)
Monfon, L. (M)
Shum, Y. S. (A)
Wu, R. S. (A)
Zinky, W. R. (M)

HUNGARY

Budapest
Egri, E. (A)

ICELAND

Hafnarfirdi
Halldorsson, T. J. (A)

Reykjavik
Halldorsson, S. (M)
Thorkelsson, S.(A)

INDIA

Ahmedabad
Aiya, S. V. C. (SM)
Kotadia, K. M. (M)

Allahabad
Banerji, K. C. (A)
Krishnaji (SM)

Ambala
Bhashyam, S. R. (SM)

Andhra State
Krishnamurti, T. (M)
Kurma, V. R. (A)
Rao, B. R. (M)
Rao, H. J. (M)
Rao, S. (A)
Rao, V. V. L. (SM)
Satyanarayanamurty, D.(A)
Subrahmanyam, G. (M)

Annamalainagar
Vijayaraghavan, K. (M)

Bangalore
Chatterjee, R. (M)
Nagaraja, N. S. (M)
Ramachandran, P. (M)
Rao, P. L. S. (M)
Sreenivasan, K. (SM)
Subramaniam, C. R. (M)

Belguam
Paramasivayya, G. S. (M)

Bihar
Neogy, S. C. (A)
Roy, K. M. (A)
Sastry, S. S. (M)
Sinha, N. K. (M)

Bombay
Antia, J. M. (M)
Bhatnagar, H. M. (M)
Bulsara, M. S. (A)
Chevil, N. A. (A)
Conesa, R. (M)
Daruvala, D. J. (M)
Dastur, J. B. (A)
Gillon, K. E. C. (A)
Gandhi, C. D. (A)
Gokarn, G. D. (SM)
Huang, G. T. C. (A)
Husein, A. E. (M)
Kamat, V. V. (M)
Kantebet, S. R. (F)
Katre, V. S. (A)
Kohli, F. C. (A)
Lakhanpal, D. D. (SM)
Merchant, V. V. (A)
Motwane, H. V. (A)
Pai, M. V. (A)
Phatak, R. K. (SM)
Shanker, M. V. (M)
Shroff, T. R. (A)
Telang, V. S. (M)
Toshniwal, G. R. (SM)
Vasantharajan, M. N. (M)
Venkatraman, M. P. (A)

Calcutta
Bhattacharyya, B. K. (A)
Chatterjee, S. D. (SM)
Correa, W. R. (M)
Ghosh, S. R. (A)
Mukerji, M. M. (SM)
Raha, H. N. (M)

Cochin
Nair, B. K. S. (A)

Cuttack
Misra, H. (M)

Delhi
Ramabhadran, S. (A)

Dharwar
Khot, C. G. (A)

Faridabad
Balasundaram, N. (SM)

Hyderabad
Razi, S. (M

Jabalpur
Ghose, A. (M)
Gupta, S. K. (A)
Mishra, N. K. (A)
Pal, P. C. (M)
Sarwate, V. V. (M)

Jaipur
Bhargava, R. P. (M)

Lucknow
Chakravarti, S. P. (SM)
Joshi, C. P. (SM)
Rama Varma Raja, M. V. (A)
Saxena, A. P. (M)
Sweet, C. M. (M)

Madras
Antharvedi, A. (A)
Belgamvala, M. K. (A)
Eugene, A. F. (A)
Krishnamurthy, K. (A)
Patel, S. N. (M)
Ramakrishnan, P. R. (M)
Rao, N. N. (A)
Salfuddin, (M)
Sastry, P. V. V. S. (M)
Sivaswami, R. S. (M)

Nagpur
Burmanray, P. N. (A)
Jain, P. L. (A)

Nepal
Baidya, N. R. (M)

New Delhi
Baliga, B. V. (SM)
Gadadhar, N. V. (M)
Ganguly, S. K. (M)
Ghose, A. K. (M)
Joshi M. V. (SM)
Kumar, V. (M)
Pattabiraman, J. (A)
Ponnappa, B. M. (M)
Ramamurthy, T. V. (A)
Rao, K. L. (M)
Singh, A. (SM)
Subrahmanyan, T. R. (M)
Subramanian, C. S. (A)
Tandan, R. K. (M)

Pilani
Bhatt, N. B. (SM)
Wadia, B. H. (A)

Pollachi
Iyer, S. K. (A)

Poona
Dere, G. B. (A)
Mirchandani, I. T. (A)
Mishra, S. (A)
Prabhakar, A. (M)
Row, D. P. (SM)
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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 three-page 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 four product directories.

THE COMPLETE DATA SPREAD SECTION (pages 1-150) 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 151-253) contains a list of 3,265 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 100 major products listed in the book (for quick reference to the meaning of the codes, use the questionnaire form on pages v-viii of the pink section).

THE FOUR DIRECTORIES OF PRODUCTS ARE:

1. Communications Equipment
2. Components
3. Controls and Instruments
4. Materials and Services

This breakdown into four 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!

100 MAJOR PRODUCTS are listed within these four 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 100, the last class in the book. This section contains a list of 1,425 manufacturers representatives, distributors and jobbers, grouped geographically. See page 605 for a more complete explanation of the use of this section.

ADVERTISER'S INDEX appears on pages 148-150, and on pages 635 and 636.

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 635-636.

Key to Products, Pink Section.

Index to Spreads, 1.

1	COMPLETE DATA SPREADS
151	ALPHABETICAL COMPANY LIST
255	DIRECTORY I COMMUNICATIONS
287	DIRECTORY II COMPONENTS
459	DIRECTORY III CONTROLS & INSTRUMENTS
521	DIRECTORY IV MATERIALS & SERVICES

Detailed Machol edge indexes will be found on the first page of the alphabetical Directory and each of the four major product Directories, pages 151, 255, 287, 459, and 521. 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!

LICENSE NO. 25
MACHOL EDGE INDEX PATENT #2680430

1958 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; Frank G. MacAloon, Research.

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1958
IRE DIRECTORY
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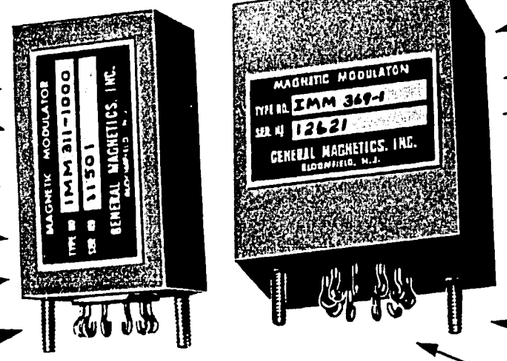

ACTUAL SIZE

OUTPUT INFORMATION

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RECORDER
MOTOR CONTROL
SPEED CONTROL
FLIGHT CONTROL
FIRE CONTROL
TEMPERATURE CONTROL
AUTO POSITIONING
VOLTAGE, CURRENT, FREQUENCY CONTROL

The MAGNETIC MODULATOR is designed to convert low level dual polarity DC signals into AC signals of corresponding amplitude and phase sense.

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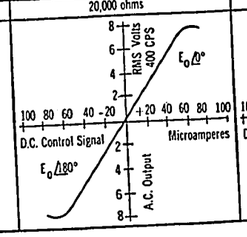
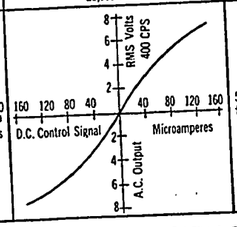
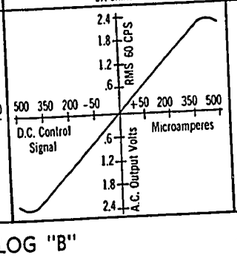
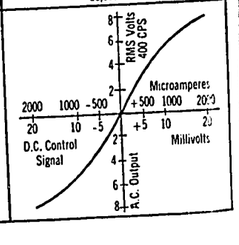
PARAMETER	INPUT MODULATORS			THERMOCOUPLE CONVERTERS
Type No.	IMM—336—1	IMM-311-1000	IMM-369-1	MTC-336-10
Excitation Frequency	360—440 CPS	360—440 CPS	60 CPS	360—440 CPS
Signal Winding DC Res.	9K ± 10%	1000 ohms	800 ohms ±10%	10 ohms ± 10%
AC Excitation Volts	115V	5.0 Volts RMS	3V RMS	6 Volts RMS @ 400 CPS
Input Signal Range	0—± 70 μA	0— ± 200 μA	0—± 500 μA	0—±20 Millivolts
AC Output	0—8V RMS Phase Rev. 400~	0—7V RMS 400 CPS Phase Rev.	0—2.4V RMS Phase Rev.	0—7.5V RMS Phase Rev.
Overall Dimensions	1" x 1 1/16" x 1¾"	1" x 1 1/16" x 1¾"	1¼" x 1¾" x 1¾"	1" x 1 1/16" x 1¾"
Null Amplitude	25MV RMS Maximum	30MV RMS Maximum	20MV RMS Maximum	20 Millivolts
Output Impedance	20,000 ohms	20,000 ohms	5K ohms	20,000 ohms
Response Curve				

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SHORT FORM CATALOG

1957

HEWLETT-PACKARD COMPANY • PALO ALTO, CALIFORNIA • U. S. A.

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-hp- Oscillators – 0.008 to 10,000,000 cps

Hewlett-Packard now offers 12 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.

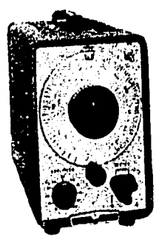
Instrument	Primary Uses	Frequency Range	Output	Price
-hp- 200AB	Audio tests	20 cps to 40 KC	1 watt/24.5 v	$130.00
-hp- 200CD	Subsonic through supersonic audio and ultrasonic tests	5 cps to 600 KC	160 mw or 10 v/600 ohms; 20 v open circuit	160.00
-hp- 200J	Interpolation, frequency measurements	6 cps to 6 KC	160 mw/10 v	275.00
-hp- 200T	Telemetry, carrier current tests	250 cps to 100 KC	160 mw or 10 v/600 ohms; 20 v open circuit	350.00
-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	465.00△
-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	440.00△
-hp- 206A	High quality, high accuracy audio tests	20 cps to 20 KC	+ 15 dbm	565.00△
-hp- 207A	Audio sweep generation	20 cps to 20 KC	160 mw or 10 v/600 ohms	275.00
-hp- 233A	Carrier oscillator—current tests	50 cps to 500 KC	3 w/600 ohms	475.00
-hp- 650A	Wide range video tests	10 cps to 10 MC	15 mw/3 v	490.00△

△ Rack mounted instruments available at $15.00 less.

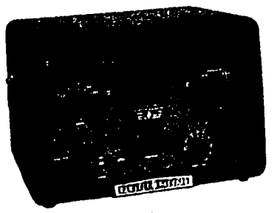
-hp- 200 Series Audio Oscillators

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, $130.00. *-hp-* 200CD, 5 cps to 600 KC, $160.00.

-hp- 207A Sweep Oscillator

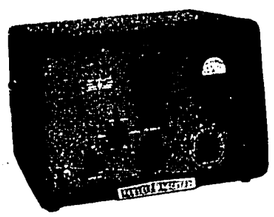


This new audio oscillator provides continuous single-sweep frequency coverage from 20 cps to 20 KC. No band switching is needed; dial accuracy is 4%, and the instrument also provides a flexible 10 v/600 ohm output usable balanced or with one side grounded. Frequency response is ±1.0 db full range, distortion and hum are less than 1%. *-hp- 207A may be swept by hand, motor driven, tuned remotely or coupled to a recorder.* -hp- 207A, $275.00.



-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, $465.00.

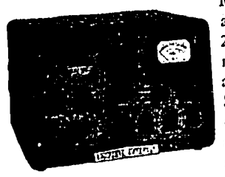


-hp- 650A Test Oscillator

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; stability ±2% to 100 KC. $490.00.

-hp- Distortion, Wave Form Analyzers – 20 cps to 20 KC

-hp- 330B Distortion Analyzer



Measures distortion as low as 0.1% from 20 cps to 20 KC; also measures noise voltages down to 100 μv. Sensitivity is high; distortions of 0.3% are measured full scale and levels of 0.1% are readable accurately. Frequency calibration accurate within ±2% full range. Includes a 20 db amplifier, oscilloscope terminals and precision 10 cps to 100 KC vacuum tube voltmeter usable separately. $410.00.

Instrument	Primary Uses	Frequency Range	Characteristics	Price
-hp- 300A	Wave form analyzer	30 cps to 16 KC	Variable selectivity; measuring range 1 mv to 500 v	$775.00
-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	455.00△

△ Rack mounted instruments available at $15.00 less.

For details, circle #3 on Reader Service Card.

-hp- Vacuum Tube Voltmeters – 10 to 700,000,000 cps

-hp- 400D Vacuum Tube Voltmeter

Best *-hp-* voltmeter ever built! Covers all frequencies 10 cps to 4 MC. Extremely sensitive, wide range, accurate within 2% to 1 MC, measures 0.1 mv to 300 v. Direct reading in dbm. 10 megohm input impedance insures negligible loading on circuits under test. New amplifier circuit with mid-range feedback assures utmost stability, freedom from change due to external conditions. $225.00.

Instrument	Primary Uses	Frequency Range	Voltage Range	Input Impedance	Price
-hp- 400AB	General purpose ac measurements	10 cps to 600 KC	0.003 to 300 v 11 ranges	10 megohms 25 μμf shunt	$200.00
-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- 410B	Audio, rf, VHF measurements; dc voltages; resistances	dc; ac—20 cps to 700 MC	0.1 to 300 v 7 ranges	dc—122 megohms; ac—10 megohms/ 1.5 μμf	245.00

-hp- 410B Vacuum Tube Voltmeter

All-purpose test instrument, range 20 cps to 700 MC. Also serves as dc VTVM with over 100 megohms impedance, or ohmmeter for measurements 0.2 to 500 megohms. Input capacity 1.5 μμf, 10 megohms input impedance; employs radical diode probe which virtually eliminates circuit loading. Industry's most versatile precision voltmeter. $245.00.

-hp- 400H Vacuum Tube Voltmeter

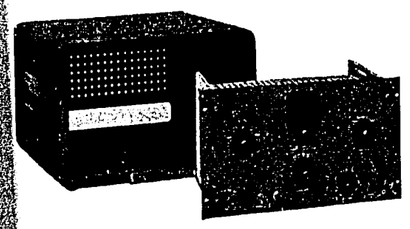
Need extreme accuracy of 1%? New *-hp-* 400H covers 10 cps to 4 MC, has 5" meter with mirror scale, measures voltages 0.1 mv to 300 v. 10 megohm resistance minimizes circuit loading, amplifier with 56 db feedback insures lasting stability. Direct reading in db or v. Extremely high quality throughout. $325.00.

-hp- 400AB Vacuum Tube Voltmeter

Utmost utility, dependability, dollar value. Covers 10 cps to 600 KC, measures from 0.3 mv to 300 v. High stability, sensitivity, accuracy ±2% full scale from 20 cps to 100 KC. High input impedance; meter reads direct in volts and dbm. $200.00.

Instrument	Features	Price
-hp- 452A Capacitive Voltage Divider	For all -hp- ac VTVM. 25 cps to 20 MC. Division 1000:1	$100.00
-hp- 452-95A Adapter	Connects -hp- 452A to -hp- 410B VTVM probe	10.00
-hp- 453A Capacitive Voltage Divider	For -hp- 410B VTVM only. Division 100:1	25.00
-hp- 454A Capacitive Voltage Divider	For -hp- 400D and 400H only. Division 100:1	25.00
-hp- 455A Probe Coaxial "T" Connector	For -hp- 410B VTVM. Measures voltages between conductor and sheath of 50 ohm transmission line.	35.00
-hp- 458A Probe Coaxial "N" Connectors	For -hp- 410B VTVM. Measures volts at open end of 50 ohm transmission line.	25.00
-hp- 459A DC Resistive Voltage Multiplier	For -hp- 410B VTVM. For measuring high dc voltages safely. Multiplies 1:100	25.00
-hp- 470 A to F Shunt Resistors	For -hp- 400 series VTVM. For measurement of current.	470A - 15.00 470B-F - 7.50

Cabinet, End Frame or Rack Mounting



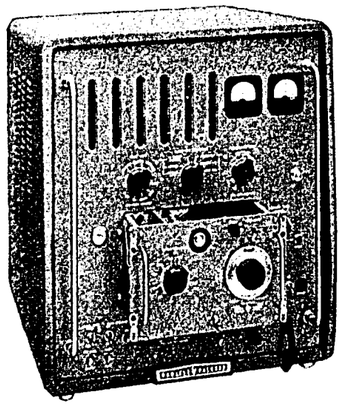
Most *-hp-* equipment with standard 19" panels can be mounted in lightweight, streamlined all metal cabinets. The same instruments are normally also usable with end frames. Smaller *-hp-* instruments such as 200 CD, 400D, 410B, 715A, etc., are also delivered normally in lightweight metal cabinets. However, many such instruments can be twin-mounted in *-hp-* AC-2A/B Dual Rack Mounts. See your *-hp-* field representative or write direct for details.

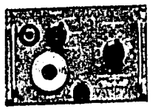
Data subject to change without notice. Prices f. o. b. factory.

For details, circle #4 on Reader Service Card.

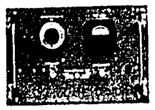
Precision Electronic Counter

frequency 10 cps to 220 MC
time interval 1 μsec to 100 days
period 0 cps to 10 KC

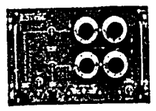




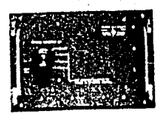
-hp- 525A
Frequency Converter
10 cps to 100 MC



-hp- 526A
Video Amplifier
10 cps to 10 MC



-hp- 526B
Time Interval Unit
1 μsec to 10^7 sec



-hp- 526C
Period Multiplier
0 to 10 KC

Add plug-in units to fill future measuring needs

-hp- 524B Counter with -hp- 525B Frequency Converter

Direct, instantaneous automatic readings, easy use by non-technical personnel, 0.1 microsecond resolution, accuracy 1/1,000,000 ±1 count, high sensitivity and high impedance—these are but a few of the unique quality and versatility features of *-hp-* 524B Counter and associated plug-in units.

With *-hp-* 524B, you buy only the counting facilities you need now; later add inexpensive plug-ins to triple or quadruple the usefulness of the instrument.

The basic *-hp-* 524B Counter reads frequency 10 cps to 10 MC over 5 selected periods. Display time is variable, counts are automatically reset, action is repetitive.

-hp- 525A Frequency Converter extends the 524B's direct-reading range to 100 MC with no loss in accuracy. *-hp-* 525B converts the 524B for direct readings 100 to 220 MC. *-hp- 526A Video Amplifier* increases sensitivity to 10 mv for low power frequency measurement.

Instrument	Primary Uses	Frequency Range	Characteristics	Price
-hp- 524B Frequency Counter	Frequency Period measurements	10 cps to 10 MC (Freq.) 0 cps to 10 KC (Period)	Direct reading, no interpolation, stability about 2/1,000,000/week	$2,150.00■
-hp- 525A Frequency Converter	Extends 524B's range to 100 MC; increases basic sensitivity	10 cps to 100 MC	Accuracy ±1 cps ± stability; 0.1 v rms min. input	250.00
-hp- 525B Frequency Converter	Extends 524B's range from 100 to 220 MC; high sensitivity	100 MC to 220 MC	Accuracy ±1 cps ± stability; 0.2 v rms min. input	250.00
-hp- 526A Video Amplifier	Increases 524B's sensitivity to 10 millivolts	10 cps to 10 MC	Accuracy same as basic counter; 10 mv rms min. input	150.00
-hp- 526B Time Interval Unit	Measures interval 1 μsec to 100 days	1 μsec to 10^7 sec	Accurate 0.1 μsec ±0.0001%	175.00
-hp- 526C Period Multiplier	Period measurement	Extends range of 524B to measure 10,000 periods	Greater accuracy in period measurement	225.00

■Rack mounted instrument available for $25.00 less.

-hp- 526B Time Interval Unit permits the 524B to measure interval 1.0 μsec to 100 days with accuracy of 0.1 μsec ±0.0001%; reads in seconds, msec or μsec. *-hp- 526C Period Multiplier* allows period average measurements in steps of 10 to a 10,000 period average; thus insuring greater accuracy of midrange frequency measuring.

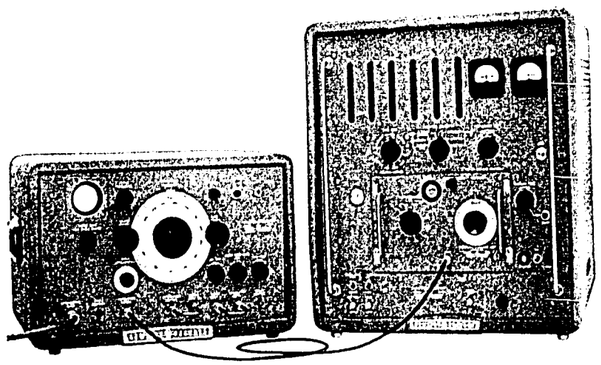
-hp- 540A Transfer Oscillator

Measure frequency to 12 KMC on pulsed, AM, FM, CW and noisy signals!

With just two instruments *-hp-* 540A Transfer Oscillator and 524B Counter (plus 525B converter) you measure to 12 KMC; get counter accuracy and amazing convenience. Complex instrument arrangements and tedious trial-and-error "guesstimates" are eliminated. Even when the approximate frequency of a test signal is unknown; a simple calculation employing two or more harmonics leads to swift and accurate measurement.

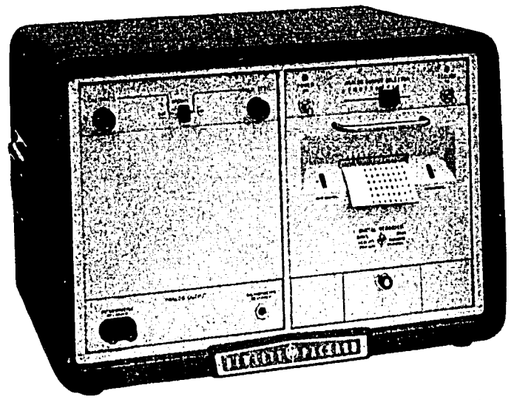
The 540A-524B system's accuracy approaches 1 part per 1,000,000 for stable CW signals. On pulsed signals, accuracy is governed by carrier frequency and pulse lengths. On noisy or intense AM signals, the transfer oscillator system with *-hp-* 540A often provides the only means of accurate measurement. Over-all system accuracy is better than 10 times that of the best microwave wavemeters. Model 540A, $615.00△.

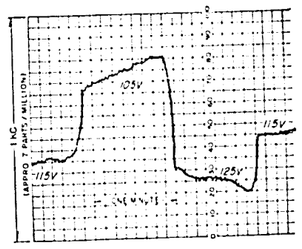
△Rack mounted instrument available at $15.00 less.



For details, circle #5 on Reader Service Card.

New -hp- 560A Digital Recorder





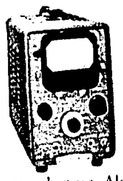
Frequency stability vs. line voltage; 150 MC oscillator

New *-hp-* 560A provides a continuous digital record for your *-hp-* frequency counter. Since 560A is a slave to its counter, it delivers accuracy identical with counter. Printing rate is five, 11-digit lines per second. Secondary or coding data may be printed on the same line as primary data. Instrument may be controlled by electronic or electro-mechanical devices; it includes an analog output for strip chart recorders; strip chart will never be driven off scale. Expanded scale recordings may be made with full scale sensitivity as great as $1/10^7$.

-hp- 560A, $1,390.00 (11-digit lines)
-hp- 560A, $1,265.00 (6-digit lines)

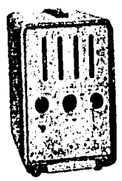
Other -hp- Frequency Measuring and Monitoring Equipment

-hp- 500B/C Frequency Meters



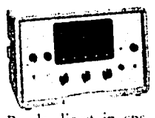
Directly measures frequency of voltages 3 cps to 100 KC; expanded scale allows any 10% or 30% of range to be measured full scale. Sensitivity 0.2 v rms (sine waves) 1 v peak for pulses. Input impedance 1 megohm with 40 μμf shunt; accuracy independent of line voltage changes. Also available as *-hp-* 500C, calibrated for direct reading in rpm. *-hp-* 500B/C, $285.00.

-hp- 521A/C Industrial Counters



Most useful, accurate, low cost industrial counter. Measures frequency, speed, rpm, random events, other phenomena. Direct readings 1 cps to 120 KC. Time of count 0.1 or 1.0 seconds; variable display time. Also offered as 521C, 5-place registration, three gate times, crystal-controlled time base. *-hp-* 521C, $650.00. *-hp-* 521A, $475.00.

-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 10/1,000,000 per week. Easily used by untrained personnel. $915.00△.

-hp- 523B Electronic Counter

Revolutionary all-purpose counter measures frequency 10 cps to 1.1 MC, time interval 3 μsec to 27.8 hours, period 0.00001 cps to 10 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 5 sec or indefinitely. Accuracy ±1 count plus crystal stability. 5 gate times, usable with 100 KC primary standard. $1,175.00.

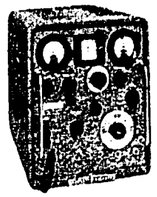
Instrument	Primary Uses	Frequency Range	Characteristics	Price
-hp- 130D Secondary Standard	Frequency, time measurements	100 KC, 10 KC, 1 KC, 100 cps, 10 cps	Stability 1/1,000,000 (short-time). Sine or rectangular output. Marker pips	$ 615.00△
-hp- 335E TV Monitor	Aural and visual carrier monitoring; black and white or color	Channels 2 to 83	Aural deviation ÷ 3 KC; video deviation ÷ 3 KC; accuracy ÷ 500 cps approx.	2,050.00
-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 Frequency Meter	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	100.00
-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 40,000 rpm	Output 100 cycles per revolution	100.00
-hp- 508C Tachometer Generator	Shaft speed measurement	15 to 40,000 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- 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 1.1 MC	Direct reading, accuracy ±1 count ±2/1,000,000	1,175.00

△Rack mounted instrument available for $15.00 less.

For details, circle #6 on Reader Service Card.

-hp- Signal Generators – 10 to 21,000 MC

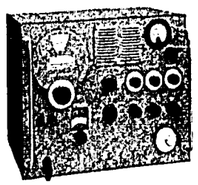
-hp- 608D vhf Signal Generator



10 to 420 MC. Highest stability. No 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. $1,050.00.

-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. $950.00.

-hp- 626/628A shf Signal Generators



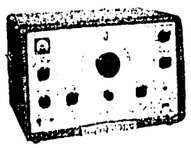
New instruments, bringing high power, wide range, convenience and accuracy to 10 to 21 KMC range. Frequencies, output voltage directly set and read. Output 10 to 20 db better than previous spot-frequency sets SWR better than 1.2 at 0 dbm and lower. Internal pulse, FM or square wave modulation; also external pulsing or FM'ing. *-hp-* 626A, 10 to 15.5 KMC, $3,250.00. *-hp-* 628A, 15 to 21 KMC, $3,000.00.

Instrument	Frequency Range	Characteristics	Price
-hp- 608C	10 to 480 MC	Output 0.1 μv to 1 v into 50 ohm load. AM, pulse, or CW modulation. Direct calibration	$ 950.00
-hp- 608D	10 to 420 MC	Output 0.1 μv to 0.5 v. Incidental FM 0.001% entire range	1,050.00
-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- 616A	1,800 to 4,000 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	5,925 to 7,725 MC	Outout 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 3.0 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.	3,000.00

△ Rack mounted instrument available for $15.00 less.

-hp- Swept Frequency Oscillators

-hp- 686A Electronic Sweep Oscillator

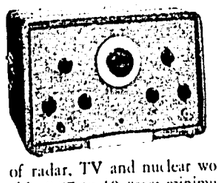


Totally new kind of backward-wave device eliminating sweep motors, tuning plungers, range limitations, etc. Covers all or part of X-band with flexible, *quiet* electronic sweep. Simple to operate, direct reading, continuously adjustable sweep width and rate, 10 mw output minimum, frequency sweep linear 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, $2,250.00.

Instrument	Frequency Range	Characteristics	Price
-hp- 670SM	2.6 to 4 KMC	Automatic adjustable motor-driven sweep, full frequency band coverage, output 10 mw full range, full modulation capabilities, direct-reading frequency dial.	$1,175.00 with motor
-hp- 670GM	4 to 6 KMC		1,175.00 with motor
-hp- 670JM	5.85 to 8.2 KMC		1,175.00 with motor
-hp- 670HM	7 to 10 KMC		1,175.00 with motor
-hp- 686A	8.2 to 12.4 KMC	Electronically swept; variable sweep width and rate. Output 10 mw to 0. Pulse, square wave, FM and AM modulation.	2,250.00

-hp- Square Wave and Pulse Generators

-hp- 212A Pulse Generator



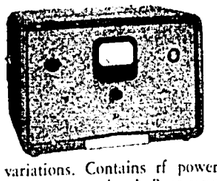
Provides continuously variable, high power "fast pulses" of superior wave form. Combines broad general usefulness with 0.02 μsec rise and decay time to meet requirements of radar, TV and nuclear work. Pulse length variable 0.07 to 10 μsec; minimum overshoot; 50 watt peak power (50 v to 50 ohms load). 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. $565.00△.

Instrument	Primary Uses	Frequency Range	Characteristics	Price
-hp- 211A	Square Wave Generator	1 cps to 1 MC	Output 7 v p-p across 75 ohms or 55 v p-p across 600 ohms	$265.00
-hp- 212A	Pulse Generator	50 to 5,000 pps. 0.02 μsec rise time	Pulse length 0.07 to 10 μsec, output 50 v to 50 ohm load	565.00△

△ Rack mounted instrument available for $15.00 less.

Microwave Impedance Measuring Equipment

-hp- 416A Ratio Meter

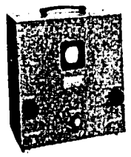


Automatically combines forward and reverse signals and displays their ratio directly, irrespective of amplitude variations. Contains rf power monitor indicating proper power level. Rear terminal signal available to operate oscilloscope or recorder. Suitable for single and swept frequency operation. $450.00△.

-hp- 415B Standing Wave Indicator

For all waveguide and coaxial slotted sections. Gives readings in SWR or db. Single frequency operation; 315 to 2,000 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. $495.00.

-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. $250.00.

Instrument	Primary Uses	Frequency Range	Characteristics	Price
-hp- 360A-D Low Pass Filters	Eliminates harmonic voltages from uhf systems	Cutoff 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	315 to 2,000 cps. Normal freq. 1,000 cps	0 to 70 db attn. Max. sensitivity 0.3 μv	200.00
-hp- 416A Ratio Meter	Reflection coefficient measurements	1,000 cps ± 40 cps	Continuous swept frequency presentation; accuracy ± 3%	450.00△
-hp- 417A vhf Detector	vhf bridge detector (for *-hp-* 803A)	10 to 500 MC	Approx. 5 μv sensitivity	250.00
-hp- 803A vhf Bridge	Measurement of vhf impedance, SWR	52 to 500 MC	2 to 2,000 ohms impedance —90° to +90° phase angle	495.00
-hp- 805A Coaxial Slotted Section	Measurement of SWR	500 to 4,000 MC	For Type N Connectors flexible cables	475.00
-hp- 805B Coaxial Slotted Section	Same as above	Same as above	For rigid 7/8" RG44/U line	475.00
-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, J, H, X and P 810 Waveguide Sections Supports 806B section, also		Accepts 442B, 444A probes	160.00
-hp- 814A Universal Probe Carriage	Supports P, K and R 815A Waveguide Slotted Sections		Accepts Untuned Probe 446A	225.00

△ Rack mounted instruments $15.00 less.

Microwave Power Measuring Equipment

-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. $250.00.

-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. $125.00.

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- 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	200.00
-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 18,000 MC	Full coverage of waveguide band	See Table page 8
-hp- 487B Waveguide Thermistor Mount	Measurement of rf power	3,950 to 26,500 MC	Full coverage, no tuning, 1.5 SWR except K487B, 2.5	See Table page 8
-hp- 764D Dual Directional Coupler	Reflectometer and rf power measurements	216 to 450 MC	Coupling attenuation* 20 db, directivity 30 db	125.00
-hp- 765D Dual Directional Coupler	Reflectometer and rf power measurements	450 to 945 MC	Coupling attenuation* 20 db, directivity 30 db	125.00
-hp- 766D Dual Directional Coupler	Reflectometer and rf power measurements	940 to 1,975 MC	Coupling attenuation* 20 db, directivity 26 db	125.00
-hp- 767D Dual Directional Coupler	Reflectometer and rf power measurements	1,900 to 4,000 MC	Coupling attenuation* 20 db, directivity 26 db	125.00

*Power handling capacity all 764/767 series couplers 50 watts CW, 10 Kw peak.

-hp- 477B Coaxial Thermistor Mount

For frequency range 10 MC to 10 KMC. SWR less than 1.5. Thermistor element is 200 ohm negative. $75.00 (including thermistor).

More -hp- Microwave Equipment ➡

-hp- Waveguide Test Equipment—2.6 to 40.0 KMC

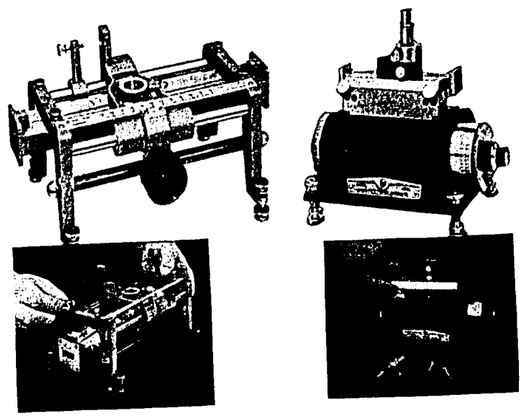
Basic, low-cost elements offer utmost flexibility for assembly of exact instrumentation required. Each unit covers entire range of its waveguide size. Careful engineering, simple, sturdy mechanical design, highest quality manufacture insures accurate, multi-purpose operation.

Instrument	Coaxial Type N Conn.	"S" 3" x 1½" 2.6 - 3.95 KMC	"G" 2" x 1" 3.95 - 5.85 KMC	"J" 1½" x ¾" 5.2 - 8.2 KMC	"H" 1¼" x ⅝" 7.05 - 10.0 KMC	"X" 1" x ½" 8.2 - 12.4 KMC	"P" .702"x.391" 12.4 - 18.0 KMC	"K" .500"x.250" 18.0 - 26.5 KMC	"R" .360"x.220" 26.5 - 40.0 KMC
Adapter, Waveguide to Coax		S281A $50	G281A $40	J281A $35	H281A $30	X281A $25			
Cover to Choke Flange		S290A $65	G290A $50	J290A $35	H290A $25	X290A $15	P290A $20		
Attenuators, Fixed 3, 6, 10, 20 db		S370A $75	G370A $65	J370A $65	H370A $60	X370A $55	P370A $60		
Flap, 25 db max.		S375A $120	G375A $110	J375A $100	H375A $90	X375A $65	P375A $80	K375A $60	R375A $70
Calibrated, precision		S380A $260	G382A $500	J382A $350	H382A $350	X382A $250	P382A $275		
Detector Mounts	420A $50				H421A $85	X421A $75	P421A $85		
	420B $75								
	440A† $85								
		S485D° $145	G485D $140	J485D° $135					
		S485A‡ $125	G485B† $95	J485B† $90	H485B† $85	X485B† $75	P485C■ $110		
						X365A $225			
Isolators			G487B $95	J487B $90	H487B $80	X487B $75		K487B $85	
Thermistor Mounts (Fixed tuned)■	477B $75			J530A/B**	H530A $120	X530A $120	P530A $150		
Frequency Meters, Reaction						X532A $150			
Waveguide									
Directional Coupler, Cross Guide: 20, 30 db		S750 $130	G750 $120	J750 $70	H750 $60	X750 $50			
Directional Couplers, Multi Hole: 3, 10, 20 db		S752 $375	G752 $250	J752 $140	H752 $120	X752 $75	P752 $100	K752 $100	R752 $120
Slotted Sections, Waveguide		S810A* $450	G810B§ $110	J810B§ $110	H810B§ $110	X810B§ $90	P810B§ $110		
Slotted Sections, Waveguide							P815A $200	K815A $200	R815A $200
Tuners, Slide Screw		S870A $225	G870A $185	J870A $150	H870A $130	X870A $125	P870A $130	K870A $140	R870A $140
E-H						X880A $130	P880A $135	K880A $155	R880A $170
Waveguide Phase Shifter				J885A $400		X885A $300	P885A $350		
Terminations, Low Power		S910A $45	G910A $35	J910A $30	H910A $25	X910A $20	P910A $25	K910A $30	R910A $35
Terminations, High Power		S912A $160				X912A $50			
Moving Load		S914A $100	G914A $75	J914A $70	H914A $60	X914A $50	P914A $55	K914A $65	R914A $75
Standard Reflections						X916A $100			
Adjustable Shorts		S920A $90	G920A $70	J920A $60	H920A $50	X920A $40	P920A $55	K920A $75	R920A $85
Waveguide Shorting Switch		All frequencies				X930 $60			
Broad Band Probe	442B§ $35	444A $35 2.6 to 12.4 KMC					446A $145 12.4 to 40 KMC		
Broad Band Probe, Untuned									
Waveguide Clamps, Stands									

†For use with barretter or crystal.
■ Includes Thermistor, installed.
‡For use with barretter only.
**J530A, 5.85 to 8.2 KMC, $120; J530B, 5.20 to 7.05 KMC, $150.
*Complete assembly including carriage.
° Includes barretter; checked for square law characteristics.
§Mounts in 809B Carriage.

-hp- Offers World's Most Complete Array of Microwave Equipment

-hp- 809B/814A Universal Probe Carriages



Models 809B and 814A are precision built mechanical assemblies operating, respectively, with -*hp*- 810B and 815A series slotted sections.

Combination of the 809B carriage and 810B slotted sections covers 2.6 to 18.0 KMC. Combination of 814A carriage and 815A series sections covers 12.4 to 40.0 KMC.

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 opposite page). -*hp*- 809B has a vernier scale reading to 0.1 mm and is equipped for dial gauge mounting. -*hp*- 814A has a cylindrical dial which may be read directly to 0.1 mm and interpolated at 0.01 mm.

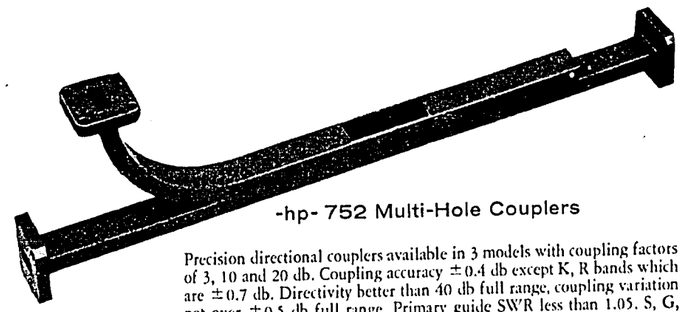
-hp- 810B Slotted Sections. -*hp*- 810B, for mounting in 809B carriage, is a flanged, waveguide section with accurately machined slot. Slot is tapered at ends to minimize reflection. Available in 5 waveguide bands, 3.95 through 18.0 KMC.

-hp- S810A. Complete slotted section assembly including probe carriage. In 2.6 to 3.95 KMC (s-band) size only.

-hp- 815A Slotted Sections. For mounting in 814A carriage. Available P, K and R bands, 12.4 to 40.0 KMC. To insure positive positioning when mounting in carriage, these sections seat on two eccentric rods. Rods are factory-adjusted so longitudinal plane of guide is always parallel to probe travel.

For details, circle #9 on Reader Service Card.

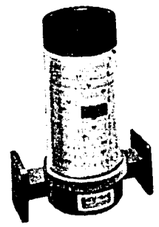
Equipment below available for most waveguide frequencies



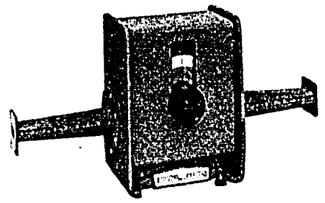
-hp- 752 Multi-Hole Couplers

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, X, P, K, R bands, 2.6 to 40.0 KMC. $75.00 to $375.00.

-hp- X532A Frequency Meters



Direct reading, 8.2 to 12.4 KMC X band wavemeter, highest quality at low cost. Reads direct in KMC, accuracy 0.08%. No interpolation or charts. No sliding contacts; approx. 1.5 db dip in transmitted power at resonance. Scale length approx. 77" calibrated every 5 MC. Resettability 0.01%. $150.00.



-hp- 382A Precision Attenuators

Precision broadband attenuation to 50 db. Completely independent of frequency; phase shift constant at all attenuations. Calibrated range 0 to 50 db, maximum error ±2% of db reading. G, J, H, X and P bands available covering 3.95 to 18.0 KMC. SWR less than 1.15 full range. $250.00 to $500.00.

-hp- 487B Thermistor Mounts

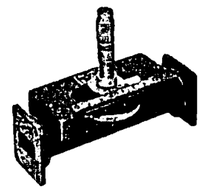
For fast, accurate waveguide power measurements. Each unit covers full range of its waveguide frequency. No tuning needed, SWR 1.5 max., except K487B, SWR 2.5 max. Max. power 10 mw. Rugged construction, high temperature coefficient thermistors virtually eliminate burnout. For G, J, H, X and K bands, 3.95 to 26.5 KMC. $75.00 to $95.00.

-hp- 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 -*hp*- 420B, $150.00 pair.

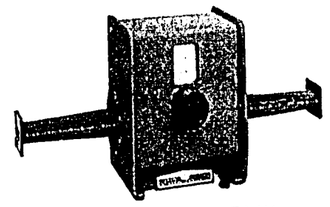
-hp- 281A Waveguide-Coax Adapters

For convenient transition between waveguide and coax systems. Each unit covers a full waveguide range with SWR less than 1.25. Type N coax plug, AN waveguide flange. For S, G, J, X and P bands, 2.6 to 12.4 KMC. $15.00 to $65.00.



-hp- 870A Slide Screw Tuners

For flattening waveguide systems, matching, etc. Probe position and penetration adjusts to set up SWR cancelling existing SWR. 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, J, H, X, P, K, R bands, 2.6 to 40.0 KMC. $125.00 to $225.00.



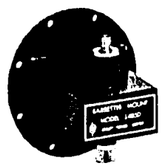
-hp- 885A Phase Shifters

Provide accurate, controllable phase variation throughout frequency band. Ideal for microwave impedance, transmission measurements, antenna and system design. Direct reading, low power absorption, 360° electrical range. For J, X and P bands, 5.3 to 18.0 KMC. $300.00 to $400.00.

-hp- 444A/446A Untuned Probes

-*hp*- 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 2.4 to 18 KMC; fits ¾" bore. *New -hp- 446A*, for -*hp*- 814 Probe Carriage, similar but covers P, K and R bands, 12.4 to 40.0 KMC. -*hp*- 444A, $35.00. -*hp*- 446A, $145.00.

-hp- 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 full range, 1N23, 1N21 or 821 element); *485D* for S, G, J bands (factory-installed 821 barretter). Also P485C, like 485B but for P band only, has installed 200 ohm 3 mw thermistor. $75.00 to $145.00.

-hp- 914A Moving Loads

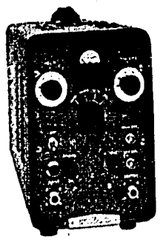
Waveguide section containing sliding, tapered low-reflection load. Plunger controls position of load; position is variable at least ½ wavelength at lowest frequency of given band. Residual reflection phase is thus reversed to separate from other minor reflection in the system. For S, G, J, H, X, P, K, R bands, 2.6 to 40.0 KMC. $50.00 to $100.00.

Data subject to change without notice. Prices f. o. b. factory.

For details, circle #10 on Reader Service Card.

Amplifiers for General Use and Fast Circuit Work

-hp- Travelling-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, $1,100.00. *-hp-* 492A/494A, $1,500.00.

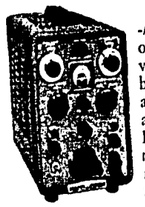
-hp- 460A/B Fast Pulse Amplifiers

-hp- 460A Wide Band Amplifiers, in cascade with *-hp-* 460B Fast Pulse Amplifiers, provide up to 90 db gain, 125 v open circuit. This permits direct connection to oscilloscope deflection plates. Rise time 0.0026 μsec. Will amplify millimicrosecond pulses. Over 100 MC band width for 'scopes. *-hp-* 460A, $185.00. *-hp-* 460B, $225.00.

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- 460A Amplifier, Wide Band	Wide band, pulse amplification	100 KC to 140 MC	20 db gain, rise time 0.0026 μsec	185.00
-hp- 460B Amplifier, Fast Pulse	Pulse amplification high output	100 KC to 140 MC	15 db gain, 125 peak volts	225.00
-hp- 490B Traveling-Wave Tube Amplifier	Amplification throughout "S" band	2 to 4 KMC	30 db gain; Millimicrosec rise time; 10 mw output	1,100.00
-hp- 491A Traveling-Wave Tube Amplifier	High power "S" band amplification	2 to 4 KMC	30 db gain; millimicrosec rise time; 1 watt output	1,100.00
-hp- 492A Traveling-Wave Tube Amplifier	Amplification through most of "G" and "J" bands	4 to 8 KMC	30 db gain; millimicrosec 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; millimicrosec rise time; 5 mw output	1,500.00

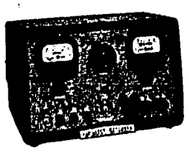
-hp- Regulated and Klystron Power Supplies

-hp- 715A Power Supply



-hp- 715A is a versatile source of regulated beam and reflector voltage for operating most test bench klystron tubes. Beam voltage 250 to 400 v; reflector voltage 0 to 900 v; 6.3 v filament. Internal, 1,000 cps square wave modulation, and 60 cps sine wave modulation of reflector voltage. $300.00.

-hp- 712B Power Supply

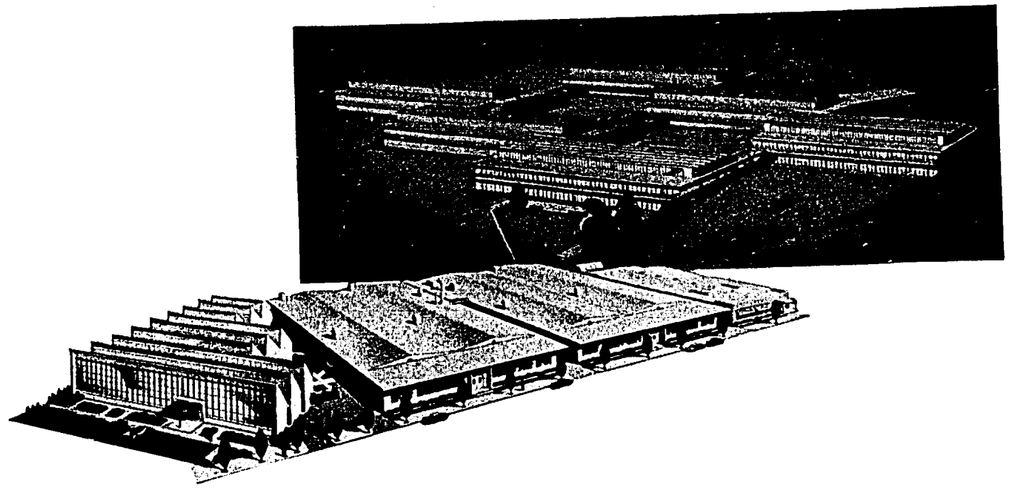


This *-hp-* instrument features high regulation of 50 mv no load to full load, 0.1 millisecond transient response, internal impedance 0.1 ohms in series with 25 μH; full-load maximum hum less than 500 μv, sealed transformers, chokes and condensers. 0 to 500 v, 200 ma supply and fixed —300 v tap providing a 50 ma, 300 to 800 v variable supply for klystron operation. $365.00△.

Instrument	Primary Use	Characteristics	Price
-hp- 710B Power Supply	General Purpose regulated dc supply for lab and field use	100 to 360 volts @ 75 ma	$100.00
-hp- 711A Laboratory Power Supply	Same as 710B	0 to 500 volts @ 100 ma	225.00
-hp- 712B Power Supply	Same as 710B	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- 717A Klystron Power Supply	Powering Type 5721 klystrons	800 to 1,000 volts @ 25 ma	375.00

△Rack mounted instrument available for $15.00 less.

For details, circle #11 on Reader Service Card.



COMPLETE COVERAGE

In 1957, *-hp-* will occupy the first two of six 80,000 square foot buildings forming a complete new laboratory and manufacturing plant. New site is approximately one mile west of previous plant on a 40-acre site just south of Stanford University. Your visit is invited.

Won't you agree it is simple and more time-saving when you can turn to one source for your test equipment needs?

-hp- engineers are continually working to produce new equipment that anticipates your future needs, yet functions smoothly with your existing *-hp-* instruments. Today, *-hp-* makes over 300 instruments; you can choose from the world's largest and most complete line just the equipment you need. In making this choice, you are assured of *-hp-* quality; today the standard of the world in electronic test instruments.

To give you personal help with measuring problems, you have available over 150 electronics specialists in every major U. S. metropolitan area, and around the world. These men, trained and annually re-trained by *-hp-*, are experts in applying as well as selling and servicing *-hp-* instruments. Call them when you can use personal, competent help, in your plant, today.

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HIlland 4-6744

Las Cruces, New Mexico
Neely Enterprises
126 S. Water Street
JAckson 6-2486

Los Angeles, California
Neely Enterprises
3939 Lankershim Blvd.
North Hollywood, Calif.
STanley 7-0721

New York 21, New York
R. M. C. Associates
236 East 75th Street
TRafalgar 9-2023

Philadelphia Area
Upper Darby, Pennsylvania
I. E. Robinson Company
7404 West Chester Pike
SHerwood 8-1294

Phoenix, Arizona
Neely Enterprises
641 East Missouri
CRestwood 4-5431

Pittsburgh 22, Pennsylvania
S. Sterling Company
Room 815, Park Bldg.
355 Fifth Avenue
ATlantic 1-9248

Portland 9, Oregon
ARVA (formerly Ron Merritt Co.)
1238 N. W. Glisan
CApitol 7-1281

Sacramento 14, California
Neely Enterprises
1317 - 15th Street
GIlbert 2-8901

San Diego 6, California
Neely Enterprises
1055 Shafter Street
ACademy 3-8106

San Francisco Area
San Carlos, California
Neely Enterprises
501 Laurel Street
LYtell 1-2626

Seattle 99, Washington
ARVA (formerly Ron Merritt Co.)
120 West Thomas Street
MUtdock 7337

St. Louis 17, Missouri
Harris-Hanson Company
2814 South Brentwood Boulevard
MIssion 7-4350

St. Paul 14, Minnesota
Crossley Associates, Inc.
842 Raymond Avenue
MIdway 5-4955

Syracuse 2, New York
J. D. Ryerson Associates, Inc.
412 East Genesee St.
GRanite 6-8344

Toronto 10, Ontario, Canada
Atlas Radio Corporation, Ltd.
50 Wingold Avenue
RUssell 1-6174

Tucson, Arizona
Neely Enterprises
232 So. Tucson Blvd.
MAin 3-2564

Washington 9, D. C.
Horman Associates, Inc.
2017 S Street, N. W.
DEcatur 2-5705

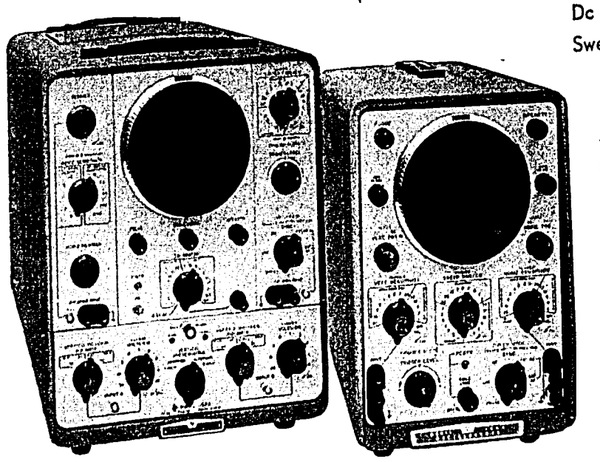
Winnepeg, Manitoba
Atlas Radio Corporation, Ltd.
505 McIntyre Building

For details, circle #12 on Reader Service Card.

-hp- Low Frequency, High Frequency Oscilloscopes

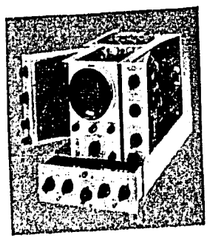
-hp- 150A High Frequency Oscilloscope

Dc to 10 MC. Plug-in pre-amplifiers.
Sweeps 0.02 μsec/cm to 15 sec/cm



-hp- 130A Low Frequency Oscilloscope

High sensitivity, dc to 300 KC.
Sweeps 1 μsec/cm to 12.5 sec/cm



Never before in -*hp*- history have two instruments gained such immediate and wide-spread usage as the all-new -*hp*- oscilloscopes.

Based on a completely fresh philosophy of oscilloscope design, new -*hp*- 130A and 150A establish new standards of oscilloscope usefulness, convenience, dependability. Important feature is universal automatic triggering arrangement where one preset adjustment provides optimum triggering for most conditions. Other appreciated features include direct-reading calibrated sweeps, brilliant, high resolution trace without halo or bloom, etched circuits with unitized construction, concentric, color-coded controls, highest quality components and ultra conservative design, twistoff bezel, easy CRT or filter interchange, tilt bail.

-*hp*- 150A, dc to 10 MC, has plug-in vertical amplifiers offering either high gain or dual trace. The instrument sweeps 0.02 μsec/cm to 15 sec/cm; there are 24 direct reading calibrated sweep ranges. May be triggered internally, by line voltage, or externally. Horizontal amplifier's magnification feature expands horizontal sweep 5, 10, 50 or 100 times. Vertical amplifier has rise time of less than 0.035 μsec; signal delay permits leading edge of triggering signal to be viewed. For maximum flexibility; 18 calibrating voltages in 2, 5, 10 sequence, 0.2 mv to 100 v peak-to-peak, are available at the front panel.

-*hp*- 130A, dc to 300 KC, has similar vertical and horizontal amplifiers with sensitivity 1 mv/cm to 50 v/cm. Instrument sweeps 1 μsec /cm to 12.5 sec/cm, may be triggered internally by line voltage, or by a 0.5 volt or larger external source. 21 sweep times may be directly set; no interpolation required. Includes input attenuator with calibrated ranges in 1, 2, 5, 10 sequence; continuous adjustment vernier between ranges. Attenuator, plus instrument's high stability, permits use of 130A as millivoltmeter or voltmeter accurate to within 5%.

-*hp*- Model 130AR is similar to the 130A but is designed specifically for rack mounting. This instrument has a x5 magnifier for all internal sweeps increasing the fastest sweep time to 0.2 μsec/cm.

Instrument	Primary Uses	Characteristics	Price
-*hp*- 130A	General laboratory and production testing	Dc to 300 KC—High sensitivity	$ 650.00
-*hp*- 150A	General laboratory high frequency and TV work	Dc to 10 MC—Plug-in vertical amplifiers	1100.00
-*hp*- 151A	High sensitivity—Plug-in for 150A	Dc to 10 MC—High sensitivity	200.00
-*hp*- 152A	Dual Trace—Plug-in for 150A	Dc to 10 MC—Presents two phenomena for simultaneous viewing	250.00

Registered Trademark of the Hewlett-Packard Company

HEWLETT-PACKARD COMPANY

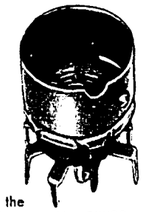
4277D PAGE MILL ROAD, PALO ALTO, CALIFORNIA, U. S. A.

CABLE "HEWPACK" DAvenport 5-4451

For details, circle #13 on Reader Service Card.

1958 IRE Directory

CINCH SOCKETS



No. 22920

NEW DEVELOPMENTS IN PRINTED CIRCUIT SOCKETS:

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.

EXP-9553

EXP-9553 — 8 contact button base subminiature molded, vertically mounted socket. Mica insulation. Silver plated beryllium copper contacts drop through .070" dia. clearance holes arranged on a .1" X and Y axis.

EXP-9553A—Same as above except insulation to withstand temperatures above 200° Centigrade.

No. 22024

No. 22024—7 contact flat press subminiature molded, vertically mounted socket for conventional wiring. Assembled with a special shield base to accept a subminiature shield with the "J" lock. Flat sided retaining nuts and screws are provided for mounting. Mica insulation. Silver plated beryllium copper contacts.

No. 22023—Same as above except insulation to withstand temperatures above 200° Centigrade.

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. 22021—Same as above except insulation to withstand temperatures above 200° Centigrade.

EXP-9542—7 contact miniature molded right angle mounted socket with JAN shield base. Mica insulation. Silver plated beryllium copper contacts drop through .062" dia. clearance holes arranged on a .1" X and Y axis.

EXP-9542

EXP-9561 — 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.

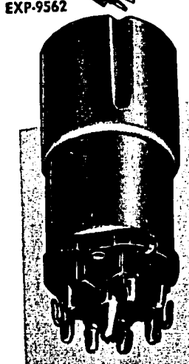
EXP-9561A—Same as above except insulation to withstand temperatures above 200° Centigrade.

EXP-9561

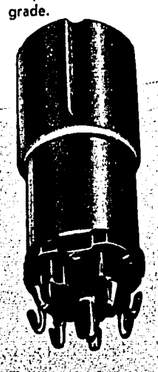
EXP-9562—8 contact button base subminiature molded, right angle mounted socket. Mica insulation. Silver plated beryllium copper contacts drop through .046" dia. clearance holes arranged on .1" X and Y axis.

EXP-9562A — Same as above except insulation to withstand temperatures above 200° Centigrade.

EXP-9562



24263 9 Pin with telescopic shield



24260 7 Pin with telescopic shield

24264 9 Pin with center post Mica

24261 7 Pin with center post Mica

24265 9 Pin with ground strap and center post Alkyd

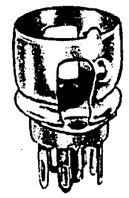
24262 7 Pin with ground strap and center post Alkyd

NEW MOLDED RIGID TAIL PRINTED CIRCUIT SOCKETS: Snap in type contact. Can be stacked for automatic assembly. Can be furnished with integral twist lock telescopic shield. General purpose Mica or Alkyd insulation.

For details, circle #14 on Reader Service Card.

MINIATURE SOCKETS

Saddles and shield bases of these Cinch miniature sockets are brass, nickel plated. All contacts are silver plated; tails are hot tin dipped. Molded castings are type MFE material; ceramic castings are grade L4B material or better.



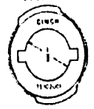
NOVAL SOCKETS

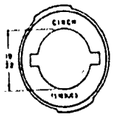
The saddles and shield bases of Cinch noval sockets are brass, nickel plated. Contacts are silver plated; tails are hot tin dipped. Molded castings are type MFE material; ceramic castings are grade L4B or better.

22384

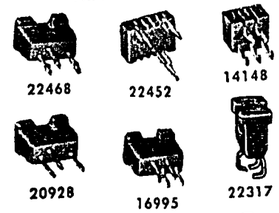
CINCH MIL SOCKETS MEET AND SURPASS RIGID MILITARY REQUIREMENTS.

MIL SHIELDS:





QUICK, EASY ASSEMBLY WITH CINCH TRANSISTOR SOCKETS:



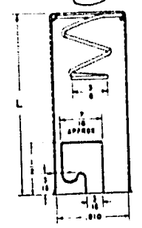
22468 22452 14148

20928 16995 22317

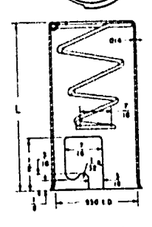
20248 14273 22674

22485 17431 20782

22455 22555



MINIATURE



NOVAL

Part No.	Type Designation	L
For Miniature Sockets		
13A22388	TS102U01	1 5/16
13A22389	TS102U02	1 9/16
13A22390	TS102U03	2 1/4
For Noval Sockets		
13822385	TS103U01	1 1/2
13822386	TS103U02	1 13/16
13822387	TS103U03	2 3/4

Descriptive circular with complete information on CINCH MIL sockets, shields and shield inserts available on request.

Cinch ELECTRONIC COMPONENTS

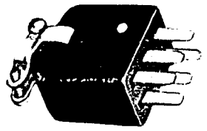
CINCH MANUFACTURING CORPORATION

1026 South Homan Ave., Chicago 24, Illinois

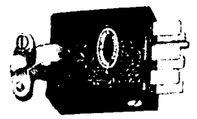
Subsidiary of United-Carr Fastener Corporation, Cambridge, Mass

JONES

JONES PLUGS AND SOCKETS



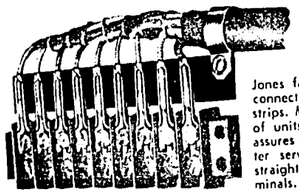
Jones 300 Series are small in size with good separation between contacts. Made in two to thirty three contacts. Plugs and sockets are polarized. A popular, inexpensive connector adaptable to a thousand uses. Phosphor bronze "knife switch" socket contacts engage both sides of heavy brass plug contacts for positive connections. Molded Bakelite insulation. Can also be supplied with contacts that will take the Faston or Quick Connect solderless terminals.



Jones 2400 Series are designed for highest electrical and mechanical efficiency. Ideal for Public Address, Radio, Electronic Controls, Vending Machines, or wherever a quality connector is required. Maximum creepage distances between contacts and contact to ground makes this series a must when Underwriter label is required. Made in 2, 4, 6, 8, 10 and 12 contact. Molded Bakelite insulation. Caps are of steel with black wrinkle finish.

Jones 202 Series: Shielded type low loss plugs and sockets for high frequency connections. Ideal for antenna connections, photo-cell work, microphone connections. Phosphor bronze knife-switch type socket contacts engage both sides of flat plug contact—double contact area. Plugs and sockets have molded Bakelite insulation.

JONES FANNING STRIPS



Jones fanning strips simplify connections to the barrier strips. Makes the replacement of units an easy matter and assures correct connections after servicing. Supplied with straight or right angle terminals.

The steadily expanding variety of plugs and sockets produced at the JONES Division has a wide range of the highest quality electrical and mechanical parts to efficiently fill every need.

JONES MEANS PROVEN QUALITY!

Hundreds of standard JONES terminal panels available; complete latest equipment for specials, send your specifications for prompt quotation.

No. 6-172

Jones 172 Series – A miniature barrier strip ⅜" wide with terminals mounted on ¼" centers. Screw size: 2-56 x ¼". Molded Bakelite insulation. Made in one to fourteen contacts. Also supplied in the ¾W and W types.

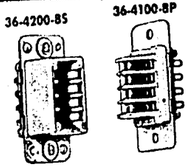
No. 6-173

Jones 173 Series—A small single contact barrier strip with terminals mounted on ⅜" centers. Made in one to eight contacts. Screw size: 4-40 x 5/16". Molded Bakelite insulation.

The components are shown here for variety, types and uses, and are not necessarily in comparative size.

HOWARD B. JONES DIVISION
CINCH MANUFACTURING CORPORATION

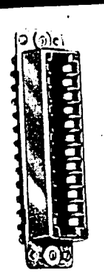
For details, circle #15 on Reader Service Card.



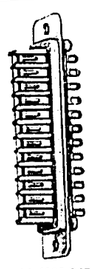
36-4200-BS

36-4100-BP

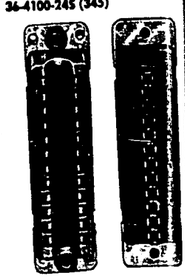
The ribbon contact principle, with dielectric guide and support eliminates the possibilities of damaged or bent contacts and prevents difficulties of plug-in. No dependence on contact arrangement or visual alignment is necessary.



36-4200-24S



36-4100-24P



36-4100-24S (34S)

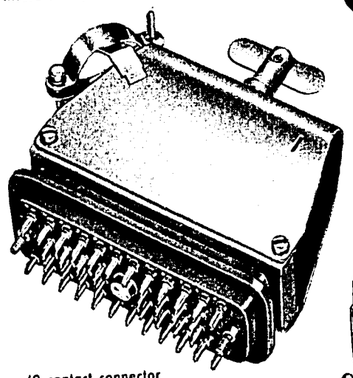
36-4100-24P (34

(Above) Improved Military Type; design of plug and socket casting eliminate any possible breakage.

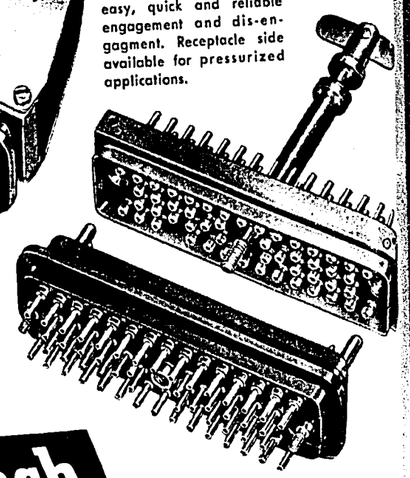
BLUE RIBBON CONNECTORS

Barrier Polarization Type Insure Quick Positive Contact With Ease

The Wedge principle with the strong spring action of the contacts holds the connector in positive contact, and provides ease of insertion and withdrawal. The protective barriers between ribbon contacts insure the spacing.



40 contact connector "A" style for applications where plug is "live voltage" side.

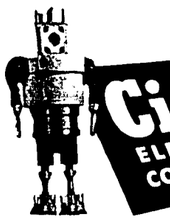


52 contact connector "B" style for applications where receptacle is "live voltage" side.

CINCH

COMPRESSION TYPE MICRO CONNECTOR

28, 32, 40, 48 and 52 contacts. Center engaging screw with wing nut or screw driver slot and spring action contacts — permit easy, quick and reliable engagement and dis-engagment. Receptacle side available for pressurized applications.



Cinch ELECTRONIC COMPONENTS

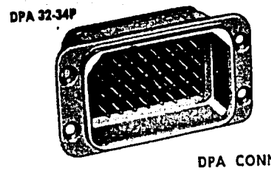
BARRIER TYPE TERMINAL STRIPS, PLUGS, SOCKETS, FANNING STRIPS

No. 2-141

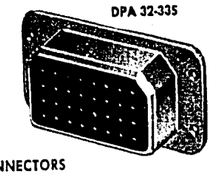
No. 2-141-Y

No. 2-141-¾-W

JONES Barrier Terminal Strips: I
creased insulation, better connec
tions. Leakage path is increased—
direct shorts from frayed termine
wires prevented by Bakelit
barriers placed between terminal
Binder screws and terminals bras
nickel plated. Insulation, blac
molded Bakelite. Finest constructio
Add much to equipment's effec

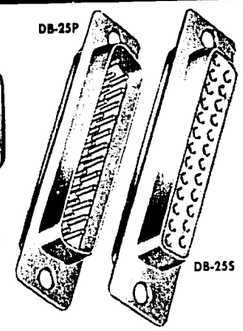


DPA 32-34P



DPA 32-33S

DPA CONNECTORS



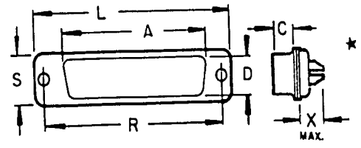
DB-25P

DB-25S

★CANNON D SUB-MINIATURE, DPA and DPX SERIES CONNECTORS

(Right) D Sub-Miniatures; Standard Pin and Socket Inserts:

Insert arrangements —5 plus coaxials in 9, 15, 25, 37 and 50 contacts. Insulation material—Zytel 101 or DIALL. Polarization — Keystone cornered shell. Operating temperature —67° to +310°F.



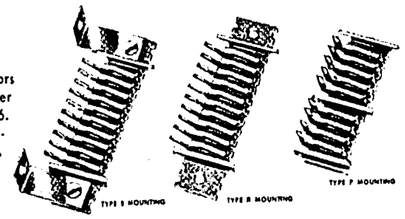
★ Manufactured by agreement with Cannon Electric Company

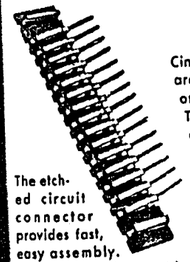
Send for illustrated Catalog No. 157 with details of "D" Sub-Miniature, "DPA" and "DPX" Series.

CONNECTORS

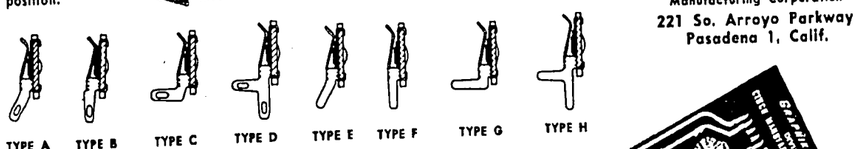
"50" EDGE CONNECTORS

Cinch 50M Edge Connectors are available in any number of contacts from one to 56. The contacts are on standard 5/32" centers. A polarizing guide may be assembled at any con tact position.

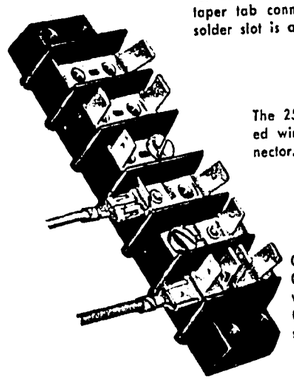




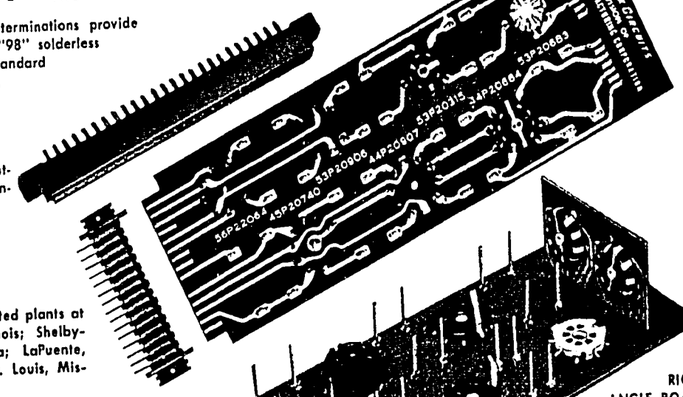
The etched circuit connector provides fast, easy assembly. Does not require precision tolerances on board thickness. Eliminates moisture trap. Allows greater flexibility of configuration. Lower cost.



Eight different contact tail terminations provide for use of A.M.P. "78" or "98" solderless taper tab connections. A standard solder slot is also provided.



The 25 contact printed wiring edge connector.

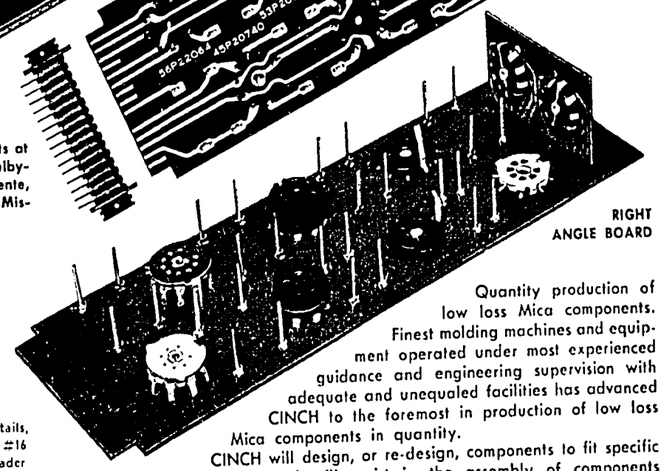


Centrally located plants at Chicago, Illinois; Shelbyville, Indiana; LaPuente, California; St. Louis, Missouri.

BARRIER STRIPS FOR SOLDERLESS TERMINALS.

The 164, 141 and 142 series are now available for the solderless "Faston" or "Quick Connect" terminals. Illustration shows various angles that the terminals can be supplied. The terminal is of the extruded type so that it can be tapped making the addition of screw terminals. A most flexible line of barrier strips for every requirement.

For details, circle #16 on Reader Service Card.



RIGHT ANGLE BOARD

Developed and produced for right angle application. The right angle board accommodates all of the CINCH socket sizes, and can be bonded with epoxy resin or snapped in and retained by newly developed CINCH hardware. All units meet or exceed Military Specifications.

Sockets, terminals and other hardware installed to customer specifications using the latest equipment in automatic assembly.

GRAPHIK CIRCUITS

Graphik Circuits Reduce Wiring Costs • Cut Down Assembly Time • Eliminate Errors • Miniaturize • Guarantee Uniformity

Solderless wrapped connections. CINCH Graphik Circuits is tooled to provide wire wrap terminals on etched circuit boards. Reduction in cost of component assembly is accomplished by speeding up production and the elimination of soldering.

Complete facilities for engineering production design, drafting, artwork, development, prototyping and manufacturing photo-printing, silk screen, etching, machining and punching, fabricating, mechanical assembly, electrical assembly, encapsulating, quality control, and fluoroscopic inspection.

GRAPHIK CIRCUITS
Division of Cinch Manufacturing Corporation
221 So. Arroyo Parkway
Pasadena 1, Calif.

Quantity production of low loss Mica components. Finest molding machines and equipment operated under most experienced guidance and engineering supervision with adequate and unequaled facilities has advanced CINCH to the foremost in production of low loss Mica components in quantity.

CINCH will design, or re-design, components to fit specific needs, and will assist in the assembly of components through proven automation technique.

Cinch ELECTRONIC COMPONENTS

CINCH MANUFACTURING CORPORATION

1026 South Homan Ave., Chicago 24, Illinois

Subsidiary of United-Carr Fastener Corporation, Cambridge, Mass.

BOMAC.... FIRST IN MICROWAVE

What do you need — a single tube — or 50,000? A modification? A completely new component?

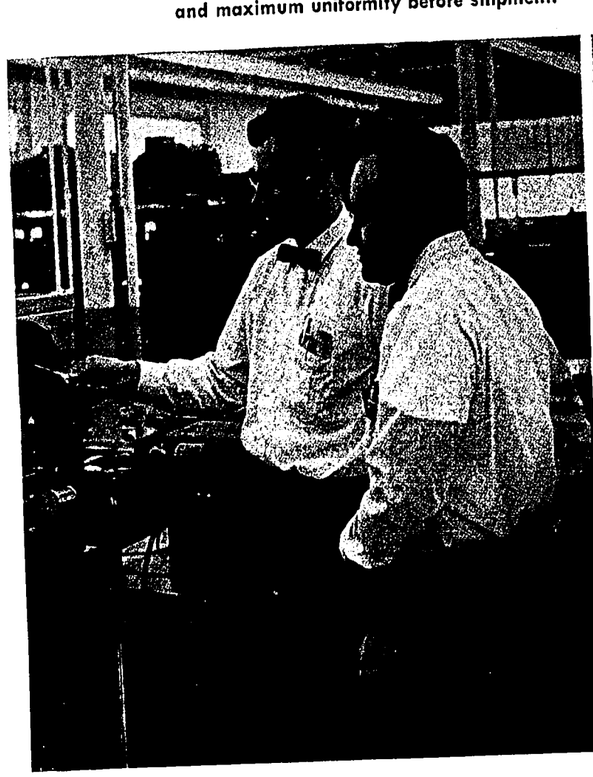
Bomac is capable of meeting your needs.

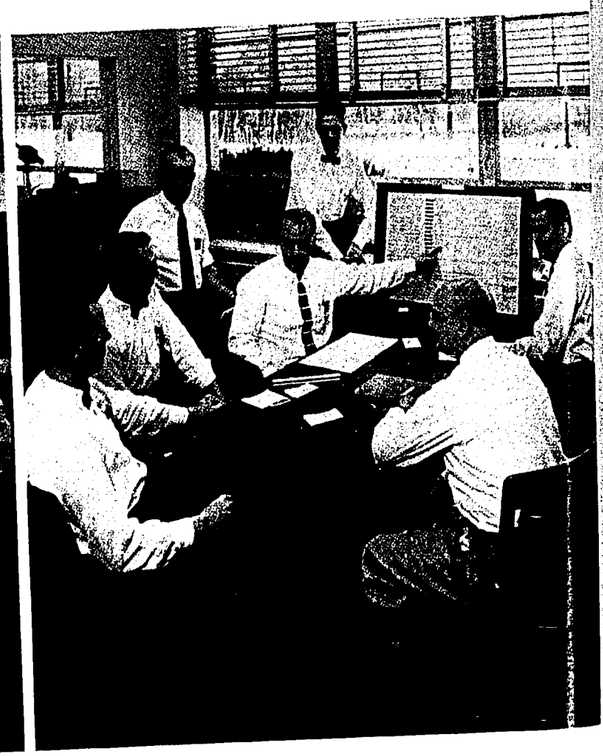
Buyers know Bomac as one of the nation's largest designers and manufacturers in the highly specialized field of microwave tubes and components.

They also know these 3 important facts about Bomac reliability:

Every tube, every component is 100% tested for peak performance and maximum uniformity before shipment.

Bomac's engineering and development service is complete in every detail.





Excellent reasons why you can count on Bomac to meet your most exacting requirements

REPRESENTATIVES

MR. BERTRAM D. AARON
12032 Wilshire Boulevard, Los Angeles, California,
Granite 8-2410, or Bradshaw 2-6785.

MR. PAUL BOCKENSTEDT
North Dayton Post Office Box 175
Dayton 4, Ohio,
Fulton 1322.

DICKISON SALES COMPANY
Main Office — 300 Broadway,
Camden, New Jersey,
Woodlawn 6-4081.

Branch Office,
107 York Road, Towson 4, Maryland,
Valley 3-0923.

JACK F. McKINNEY COMPANY
1330 No. Industrial Boulevard,
Dallas, Texas,
Riverside 1-1368.

W. E. FRY & COMPANY
V. F. W. Building, 406 West 34th St.,
Kansas City, Missouri,
Jefferson 1-5236.

HOWER & PRETAT
4 No. Cicero Avenue,
Chicago 44, Illinois,
Col. 1-3146 or 1-3147.

ROR ASSOCIATES LIMITED
290 Lawrence Avenue, West,
Toronto 12, Canada,
Russell 1-9391.

R. L. PFLIEGER CO.
1652 Laurel Street,
San Carlos, California,
Lytell 1-0396.

MR. DAVID SHAMP
1500 Massachusetts Avenue, N.W.,
Washington 5, D. C.,
Hudson 3-4167.

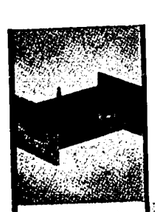
For details, circle #17 on Reader Service Card.

Export: MAURICE I. PARISIER, CO., 1860 Broadway, New York 23, New York, Circle 5-5700

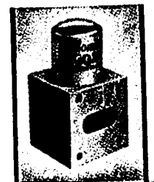
TUBES AND COMPONENTS

B

Bomac offers a complete line — over 750 different tubes and components.



ATR... All standard types. Many more developed in our laboratories. Fixed-tuned — highly specialized as required: low Q, or high Q, miniaturized, special shapes and mounts.



SILICON DIODES Themostsensitive, uniform and stable diodes (1N23D). Also available in matched pairs for X-band and S-band. Also supplied as mixer diodes with either normal or reverse polarity.

PRESSURIZING WINDOWS... for all wave guide sizes, broad band characteristics with low insertion loss, temperature range —55°C to 100°C and 30 lb./sq. in. gage pressure in either direction.

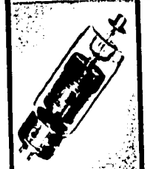
TR... A type for every known application — all bands — fixed-tuned or tunable — special types: shorted, dual and triple.

REFERENCE CAVITIES ... Detent with multiple frequencies and dual mode with fixed frequency. Temperature compensated to ±0.3 MC from 0°C to 100°C.

KLYSTRONS... Bomac offers a line of reflex klystrons. They offer maximum performance at high altitudes without pressurization.

HIGH FREQUENCY TRIODE OSCILLATOR ... This triode, for oscillator use at high frequencies, is extremely reliable and will withstand high shock and vibration.

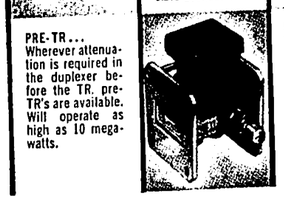
SHUTTERS... Bomac was first to develop shutter tubes and integral TR combinations for continuous crystal protection. All waveguide sizes available.



MAGNETRONS... High frequency, tunable and fixed-tuned magnetrons are a Bomac specialty. Frequencies from X band to classified millimeter bands. Special types designed to meet your requirements.

NOISE SOURCE TUBE ... A gas discharge tube for use as a noise generator in noise measuring test equipment.

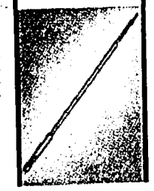
SURGE PROTECTORS... Bomac surge protectors are hold-off diode tubes. In a wide range of breakdown voltages: from 100 to 33000. Consult our engineering department for your applications.



PRE-TR... Wherever attenuation is required in the duplexer before the TR. pre-TR's are available. Will operate as high as 10 megawatts.

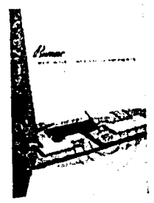
HYDROGEN THYRATRONS... Bomac thyratrons provide the following advantages: precise triggering — high repetition rates — high power levels — zero bias operation — electrical stability.

DUPLEXERS... Bomac will design, develop, and produce complete duplexers to customer specifications.



For more information . . .

Bomac LABORATORIES, INC.,
Beverly, Mass.

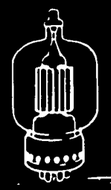


For details, circle #18 on Reader Service Card.

write for Bomac's free, 6-page file-size folder containing details and specifications on more than 500 different microwave tubes and components.

Eimac First for Reliability in power electron tubes

Continuing research and development adds constantly to the Eimac products list.
For latest information, contact our Technical Services Department.



TETRODES

4-65A	4W300B
4-125A	4W20000A
4-250A	4X150A
4-400A	4X150D
4-1000A	4X150G
4CX150G	4X250B
4CX250K	4X250F
4CX250M	4X500A
4CX300A	4X500F
4PR60A	4CX5000A

TRIODES

2C39A	75TL
2C39B	100TH
3C24	100TL
3CX100A5	152TH
3W5000A3	152TL
3W5000F3	250TH
3X100A5	250TL
3X2500A3	304TH
3X2500F3	304TL
3X3000A1	450TH
3X3000F1	450TL
6C21	592/3-200A3
25T	750TL
35T	1000T
35TG	1500T
75TH	2000T

PENTODE

4E27A/5-125B

RECTIFIERS

2-01C	253
2-25A	8020(100R)
2-50A	2CL40A
2-150D	2X1000A
2-240A	2X3000F
2-450A	KY21A
2-2000A	RX21A
250R	

KLYSTRONS

3K2500SG	3K50.000LK
3K3000LQ	3K50.000LQ
3KM3000LA	3KM50.000PA
3K20.000LA	4K50.000LQ
3K20.000LF	1K015CA
3K20.000LK	1K015CG
3K50.000LA	1K015XA
3K50.000LF	1K015XG

TETRODES

EIMAC TUBE TYPE	MAXIMUM RATINGS: Plate Dissipation Watts	Plate Voltage	Plate Current Milliamperes	Grid Dissipation Watts	Screen Voltage	Screen Dissipation Watts	ELECTRICAL CHARACTERISTICS: Filament, Volts	Filament, Amperes	Amplification Factor
4-65A	65	3000	150	5	400	10	6.0	3.50	...
4-125A	125	3000	225	5	400	20	5.0	6.50	...
4-250A	250	4000	350	10	600	35	5.0	14.50	...
4-400A	400	4000	350	10	600	35	5.0	14.50	...
4-1000A*	1000	6000	700	25	1000	75	7.5	21.00	...
4CX150G*	150	1250	250	2	300	12	2.5	6.25	...
4CX250K*	250	1250	250	2	300	12	6.0	2.60	...
4CX250M*	250	1250	250	2	300	12	26.5	0.57	...
4CX300A*	300	2000	250	2	400	12	6.0	2.55	...
4PR60A*	60	20,000	†	†	1500	8	26.0	2.20	...
4W300B**	300	2000	200	2	300	12	6.0	2.10	...
4W20000A**	20,000	8000	15,000	60	1500	200	10.0	30.00	...
4X150A*	150	1250	250	2	300	12	6.0	2.60	...
4X150D*	150	1250	250	2	300	12	26.5	0.57	...
4X150G*	150	1250	250	2	300	15	2.5	6.25	...
4X250B*	250	2000	250	2	300	12	6.0	2.10	...
4X250F*	250	2000	250	2	300	12	26.5	0.50	...
4X500A*	500	4000	350	10	500	30	5.0	13.50	...
4X500F*	500	4000	350	10	500	30	5.0	13.50	...
4CX5000A*	5000	7500	3000	75	1500	250	7.5	75.00	...

TRIODES

EIMAC TUBE TYPE	MAXIMUM RATINGS: Plate Dissipation Watts	Plate Voltage	Plate Current Milliamperes	Grid Dissipation Watts	Screen Voltage	Screen Dissipation Watts	ELECTRICAL CHARACTERISTICS: Filament, Volts	Filament, Amperes	Amplification Factor
2C39A*	100	1000	125‡	2	...	..	6.3	1.00	100
2C39B*	100	1000	125‡	2	...	..	6.3	1.00	100
3C24	25	2000	75	7	...	..	6.3	3.00	24
3CX100A5	100	1000	125‡	2	...	..	6.3	1.00	100
3W5000A3**	5000	6000	2500	150	...	..	7.5	51.00	20
3W5000F3**	5000	6000	2500	150	...	..	7.5	51.00	20
3X100A5	100	1000	125‡	2	...	..	6.3	1.00	100
3X2500A3*	2500	6000	2500	150	...	..	7.5	51.00	20
3X2500F3*	2500	6000	2500	150	...	..	7.5	51.00	20
3X3000A1*	3000	6000	2500	50	...	..	7.5	51.00	5
3X3000F1*	3000	6000	2500	50	...	..	7.5	51.00	5
6C21	300	30,000	†	†	...	..	8.2	17.00	30
25T	25	2000	75	7	...	..	6.3	3.00	24
35T	50	2000	150	15	...	..	5.0	4.00	39
35TG	50	2000	150	15	...	..	5.0	4.00	39
75TH	75	3000	225	16	...	..	5.0	6.25	20
75TL	75	3000	225	13	...	..	5.0	6.25	12
100TH	100	3000	225	20	...	..	5.0	6.30	38
100TL	100	3000	225	15	...	..	5.0	6.30	14
152TH	150	3000	450	30	...	..	5 or 10	12.50 or 6.25	20
152TL	150	3000	450	25	...	..	5 or 10	12.50 or 6.25	12
250TH	250	4000	350	40	...	..	5.0	10.50	37
250TL	250	4000	350	35	...	..	5.0	10.50	14
304TH	300	3000	900	60	...	..	5 or 10	25 or 12.50	20
304TL	300	3000	900	50	...	..	5 or 10	25 or 12.50	12
450TH	450	6000	600	80	...	..	7.5	12.00	38
450TL	450	6000	600	65	...	..	7.5	12.00	18
592/3-200A3	200	3500	250	25	...	..	10.0	5.00	25
750TL	750	10,000	1000	100	...	..	7.5	21.00	15
1000T	1000	7500	750	80	...	..	7.5	15.50	35
1500T	1500	8000	1250	125	...	..	7.5	24.00	24
2000T	2000	8000	1750	150	...	..	10.0	23.50	23

PENTODE

4E27A/5-125B	125	4000	200	5	750	20	5.0	7.50	5

KLYSTRONS

	Frequency Range Mc.	Collector Dissipation Watts	Beam Voltage	Beam Current Amperes	TV Peak Synchronizing Level	CW Power Amplifier
3K2500SG*	1700-2400	3000	7000	0.575	1500	1250
3K3000LQ*	700-1000	3000	9000	0.750	2700	2000
3KM3000LA*	375-540	3000	9000	0.750	2700	2000
3K20,000LA**	470-580	20,000	13,000	1.700	5500	3000
3K20,000LF**	580-720	20,000	13,000	1.700	5500	3000
3K20,000LK**	720-890	20,000	13,000	1.700	5500	3000
3K50,000LA**	470-580	50,000	19,500	2.560	12,000	6000
3K50,000LF**	580-720	50,000	19,500	2.560	12,000	6000
3K50,000LK**	720-890	50,000	19,500	2.560	12,000	6000
3K50,000LQ**	750-1000	50,000	20,000	2.500	12,000	6000
3KM50.000PA**	225-400	50,000	20,000	2.500	31,500	20,000
4K50,000LQ**	700-1000	50,000	20,000	2.500	12,000	6000

	D-C Resonator Voltage	Resonator Dissipation	D-C Cathode Current	D-C Repeller Voltage	Heater Voltage	Heater Current	Frequency Range
1K015CA	350	15	..	.....	6.3	0.80	5400-6000
1K015CG***	350	15	..	.....	6.3	0.80	5400-6000
1K015XA	350	15	45	0 to -500	6.3	0.80	8700-9600
1K015XG***	350	15	45	0 to -500	6.3	0.80	8700-9600

*Requires forced air cooling
**Water cooled
***Waveguide output connections
****Grid controlled

†Pulse modulator
+Liquid cooled
‡Cathode Current

1 Pulse clipper service
2 Grid-to-screen amplification factor

For details, circle #19 on Reader Service Card.

RECTIFIERS

TYPE	HIGH VACUUM TYPES: FILAMENT VOLTAGE	FILAMENT CURRENT AMPS.	PEAK INVERSE VOLTAGE	PEAK PLATE CURRENT AMPS.	AVERAGE PLATE CURRENT MA
2-01C	5.3	0.4	1,000	0.010	1
2-25A	6.3	3.0	25,000	1.0	50
2-50A	5.0	4.0	30,000	1.0	75
2-150D	5.0	13.0	30,000	3.0	250
2-240A	7.5	12.0	40,000	4.0	500
2-450A	7.5	26.5	25,000	8.0	1000
2-2000A	10.0	25.0	75,000	12.0	750
250R	5.0	10.5	60,000	2.5	250
253	5.0	10.0	15,000	2.5	350
8020(100R)	5.0	6.5	40,000	1.5	100
2CL40A	6.0	2.1	8,000 or 16,000+	10.0	120+
2X1000A*	26.5	2.25	25,000	25.0[1]	1250
2X3000F	7.5	51.0	25,000	12.0	3000
	MERCURY VAPOR TYPES				
KY21A****	2.5	10.0	11,000	3.0	750
RX21A	2.5	10.0	11,000	3.0	750

AIR SYSTEM SOCKETS & CHIMNEYS

SOCKETS (WITHOUT CHIMNEY)

SK-100 For Klystrons with oxide coated cathodes such as the 3K3000LQ.

SK-110 For Klystrons with bombardment heated cathodes such as the 3K50000LQ and 4K50000LQ.....

SK-200 Cathode end socket for klystrons such as the 3K2500SG.....

SK-300 4CX5000A (No Screen By-pass Capacitor).....

SK-400 4-400A, 4-250A, 4-125A.....

SK-500 4-1000A.....

SK-600 4X150A, 4X150D, 4X250B, 4X250F, 4W300B (Cathode Terminals Not Grounded).....

SK-602 4X150A, 4X150D, 4X250B, 4X250F, 4W300B (Modification of SK-600—Shield slotted between pins 1 & 2).....

SK-610 4X150A, 4X150D, 4X250B, 4X250F, 4W300B (Cathode Terminals Grounded).....

SK-620 4X150A, 4X150D, 4X250B, 4X250F, 4W300B (Cathode Terminals Not Grounded—Screen By-passCapacitorPlasticSealed)

SK-630 4X150A, 4X150D, 4X250B, 4X250F, 4W300B (Cathode Terminals Grounded—Screen By-pass Capacitor Plastic Sealed)..

SK-640 4X150A, 4X150D, 4X250B, 4X250F, 4W300B (Cathode Terminals Not Grounded — No Screen By-pass Capacitor).....

SK-700 4CX300A (Cathode Terminal Not Grounded).....

SK-710 4CX300A (Cathode & One Heater Terminal Grounded).....

CHIMNEYS

SK-406 (For use with SK400 Air System Socket).....

SK-506 (For use with SK-500 Air System Socket).....

SK-606 (For use with SK-600 series and SK-700 series Air System Sockets).....

HEAT DISSIPATING CONNECTORS

TYPE	HOLE DIA.
HR-1	.052
HR-2	.062
HR-3	.070
HR-4	.102
HR-5	.125
HR-6	.359
HR-7	.125
HR-8	.570
HR-9	.570
HR-10	.510

SK-601 TUBE EXTRACTOR

SK-601

A spring steel extractor for use with the 4X150 series and 4X250 series.

For details, circle #20 on Reader Service Card.

VACUUM SWITCH

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 DC switching will handle approximately 1.5 Amps. at 5 Kv.

Type	Coils
VS-2	12V
VS-5	24V
VS-6	

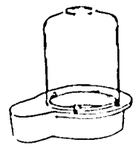
PREFORMED CONTACT FINGER STOCK

A prepared strip of spring material slotted and formed into a series of fingers designed to make sliding contact.

Single Edge	Width	Double Edge	Width
CF-100	17/32	CF-200	13/16
CF-300	31/32	CF-400	1-17/32
CF-500	1-3/8	CF-600	2-1/4

Klystron Types	Width
CF-700	17/32
CF-800	13/32 x 5/16

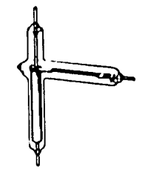
Used as contact between klystrons and klystron amplifier circuit assemblies.



AIR SYSTEM SOCKETS

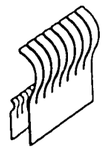
SK-100	SK-600	SK-700
SK-110	SK-602	SK-710
SK-200	SK-610	SK-406
SK-300	SK-620	SK-506
SK-400	SK-630	SK-606
SK-500	SK-640	

HR HEAT DISSIPATING CONNECTORS



VACUUM SWITCH

VS-2, 5, 6



17/32	13/16
31/32	1-17/32
1-3/8	2-1/4

TUBE EXTRACTOR

SK-601

*Grid Controlled

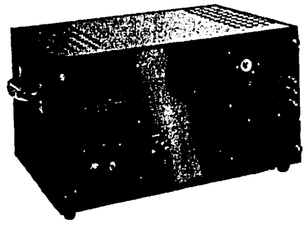
Eimac

EITEL-McCULLOUGH, INC.
SAN BRUNO, CALIFORNIA

SIE SOUTHWESTERN INDUSTRIAL ELECTRONICS CO.

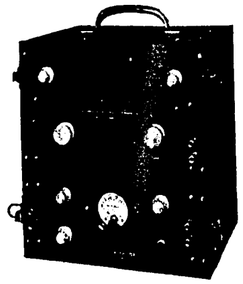
THE MODEL R-1 VOLTMETER is intended for precise voltage measurements in circuit design work. It offers accuracy, reliability, and convenience. In addition to its wide range AC and DC scales, it includes a precision ohmmeter, a D-C pre-amplifier for driving oscilloscopes and recording devices, a built-in standard cell for instant calibration, and provision for expanding the DC voltage scales.

SPECIFICATIONS:
Range: 1 mv. to 1000 volts, full scale AC and DC
Frequency response: 0 to 100 kc
Accuracy: DC, 1½%. AC, 3%
Input impedance: 10 megohms, 20 mmf.
Price: Standard model, $620.00
Rack-mounted, $700.00



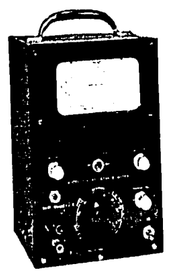
THE M-2 OSCILLATOR, the standard of the geophysical industry, is an extremely versatile instrument. It combines many desirable features—wide range, accurate calibration, low distortion, high output, low drift, excellent dynamic stability, and constant output throughout the range—in a compact, rugged instrument of reasonable price. For geophysical, audio, servo, vibration, medical, and computer work, the M-2 is unexcelled.

SPECIFICATIONS:
Frequency range: 1-120,000 cps.
Distortion: less than .2% in audio range
Calibration accuracy: 1½% + .1 cps.
Output: 20 volts at 20 ma.
Amplitude stability: ± .5 db.
Price: $425.00



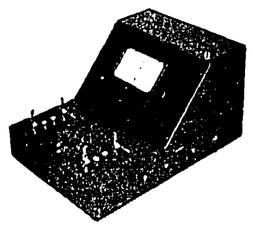
THE MB-1 OSCILLATOR is powered by self-contained batteries, providing signals completely free of power line transients and 60 cps ripple. It provides low-distortion sine wave signals and covers the geophysical, medical, and audio ranges, with good dynamic and amplitude stability characteristics. The addition of the Geophysical Microvolter (shown installed below) provides signals of accurately calibrated amplitudes at low levels.

SPECIFICATIONS:
Frequency range: 2-20,000 cps
Distortion: less than .5% in audio range
Calibration accuracy: 2% + .1 cps
Output: 5 volts at 5 ma.
Price: $215.00 (Microvolter $80.00 extra)



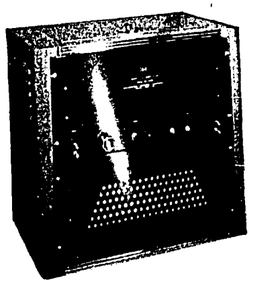
THE MODEL C-6 RESISTANCE METER features a quick-charge go, no-go capacitor leakage checker. Operating from a 110-volt 60 cps power source, it measures resistances at 1½, 50 or 500 volts, enabling it to meet MIL specs on insulation tests, measure the leakage of 200 WVDC capacitors, and check continuity. It is accurate, stable, and covers the widest range of any direct-reading ohmmeter.

SPECIFICATIONS:
Range: 0 to 10,000,000 megohms
Test voltages: 1½, 50, and 500 volts
Accuracy: 3% of scale below 1,000,000 megohms
5% of scale above 1,000,000 megohms
Price: $200.00



THE MODEL E-2 COMPARISON BRIDGE indicates percentage differences between resistors, capacitors, and reactors at 60-cycle frequency. It is useful for rapid acceptance and production-line tests and can be used in conjunction with decade boxes. SIE Comparison Bridges with other test frequencies and voltages are also available.

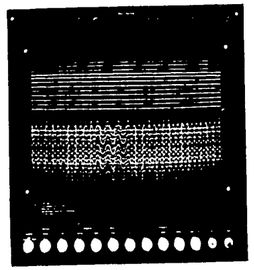
SPECIFICATIONS:
Full scale ranges: 1, 2.5, 5, 10, & 25%
Accuracy: ± .1% on the 1% range
Test limits for
Resistors: 1 ohm to 5 megohms
Capacitors: 500 mmfd. to 2000 mfd.
Inductors: 3 mh. to 10,000 henries
Price: $185.00



THE MODEL B DIRECT-COUPLED POWER AMPLIFIER is capable of producing up to 6 watts output. It may be used to amplify the output of the D-1 amplifier, low frequency oscillators, or various transducers; and will drive recorders, shaking tables, loudspeakers, electric motors, Helmholtz coils, and other transducers. It finds application also as an ultra-low-frequency transformer.

SPECIFICATIONS:
Voltage gain: 2.5
Power gain: 30,000
Output: 25 volts RMS, 250 ma.
Frequency response: 0-20,000 cps ± 1 db
Input impedance: 500,000 ohms
Price: $575.00 (less cabinet)

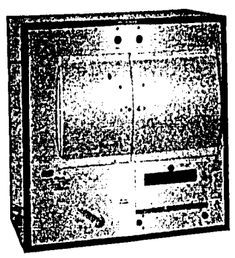
For details, circle #21 on Reader Service Card.



THE MODEL MO MULTI-CHANNEL OSCILLOSCOPE permits visual observation of twenty-eight channels of dynamic data, simultaneously displayed on a 21" single-gun cathode ray tube with a long-persistance P-7 phosphor. A raster scanning technique provides useful frequency response to 2000 cps, while a special "window" circuit accelerates the sweep for detailed examination of certain signals.

The auxiliary Model EP Event Pre-selector generates .1 and .01 second timing lines, and provides calibrated sweep delays

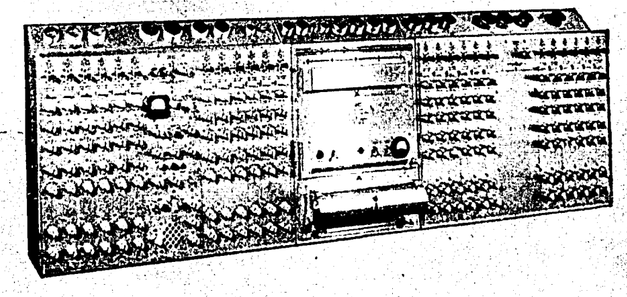
SPECIFICATIONS:
Sweep speeds: 3-300 ips.
Sensitivity: 2 volts/inch
Prices: Model MO, $6000.00
Model EP, $1500.00



MAGNETIC RECORDERS . . . SIE manufactures a varied line of drum-type magnetic tape recorders, with as many as fifty-six channels, for portable, mobile, and laboratory installations. Among the special features available are servo-controlled individually movable heads, viewing screen and photographic attachments, and tape storage magazines for long-time recording.

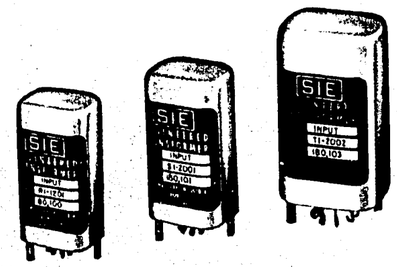
TYPICAL SPECIFICATIONS USING WIDE-DEVIATION FM (SIE SLOPE MODULATOR):
Frequency response: 0-500 cps (down 3 db.)
Harmonic distortion: less than 1% measured at 35 cps
Signal-to-noise ratio: better than 54 db.
Timing accuracy: .25 millisecond
Sensitivity: 1 volt RMS for 100% modulation
Price and delivery will be quoted on receipt of specific inquiry.

For details, circle #22 on Reader Service Card.



SIE is the world's largest manufacturer of electronic seismograph instruments, having supplied more than 420 complete systems to organizations operating throughout the world. The complete SIE line of geophysical equipment includes geophones, galvanometers, recording oscillographs, magnetic tape recorders, matched sets of amplifiers, control and checking units, blasters, power supplies, and special vehicle bodies.

Shown above is an SIE G-22A high production seismograph system. The RO-22A-10 Oscillograph records fifty channels on ten-inch paper, and all of the components in the GA-22A amplifiers are hermetically sealed for low noise and long life.



SIE Precision Engineered Transformers and Reactors are manufactured by the Hermetic Seal Transformer Division of Southwestern Industrial Electronics Company. Standard designs for low frequency applications are small, hermetically-sealed units and offer uniform response characteristics from 5 to 1000 cps. Special precautions are taken to insure identical phase characteristics . . . a feature that is very important in the manufacture of matched sets of amplifiers.

The Hermetic Seal Transformer Division also produces a wide variety of standard and custom-designed transformers and chokes. Some of these special components are: low-level, low-frequency, high-inductance coils, hum-bucking construction types; wound components with single, double, or triple Mu-metal shielding; and high-temperature insulation and toroidal windings on a wide variety of core materials.

SIE transformers include a complete line of products built to the requirements of specification MIL-T-27A. Other wound components from SIE include recording heads and magnetic amplifiers.

CRYSTAL DIODES, DUO-DIODES & VARISTORS

SYLVANIA CRYSTAL DIODES

*ABSOLUTE MAXIMUM RATINGS — CHARACTERISTICS AT 25° C:

Type	Application or Description	Continuous Reverse Working Voltage (volts)	Average Anode Current (ma)	Forward Current at +1 Volt (ma min.)	Reverse Current (ua max.)
1N34A	60 volt	60	50	5	30 at —10v, 500 at —50
1N35	Matched Pair	50	22.5	7	10 at —10v
1N38A	100 volt	100	50	4	6 at —3v, 500 at —100v
1N38B	100 volt	100	50	4 (25 max.)	6 at —3v, 500 at —100v
1N39A	200 volt	200	50	4	100 at —100v, 600 at —200v
1N40	Plug-in Varistor	25	22.5	12.7 at 1.5v	40 at —10v
1N54A	High Back Resistance	50	50	5	7 at —10v, 100 at —50v
1N55A	150 volt	150	50	4	500 at —150v
1N56A	High Conduction	40	60	15	300 at —30v
1N58A	100 volt	100	50	4	600 at —100v
1N60	Video Detector	25	50	—	—
1N63	High Back Resistance	100	50	4	50 at —50v
1N65	70 volt	70	50	2.5	200 at —50v
1N67A	Miniature—High Back	80	30	4	5 at —5v, 50 at —50v
1N69	60 volt	60	40	5	5 at —10v, 850 at —50v
1N69A	60 volt	100	40	5 (25 max.)	30 at —10v, 500 at —50v
1N70	100 volt	100	30	3	25 at —10v, 300 at —50v
1N70A	100 volt	40	30	3 (25 max.)	25 at —10v, 300 at —50v
1N71	Low Impedance Varistor	—	—	15	300 at —30v
1N77A	Photodiode	40	60	—	15 at —10v, 100 at —50v (Dark)
1N81	Low Voltage	40	30	3	10 at —10v
1N81A	Low Voltage	—	30	3 (25 max.)	10 at —10v
1N82	UHF Mixer	—	—	—	—
1N82A	UHF Mixer	—	—	—	—
1N90	Miniature—General Purpose	60	30	5	750 at —50v
1N98	Miniature—High Back	80	30	20	8 at —5v, 100 at —50v
1N100	Miniature—High Back	80	30	20	5 at —5v, 50 at —50v
1N112	60 volt Computer	60	25	5	—
1N115	60 volt Computer	60	25	2.5	—
1N118	Miniature—High Conduction	60	90	20	100 at —50v
1N119	60 volt—Computer	60	25	5	—
1N120	60 volt—Computer	60	25	5	—
1N126	Miniature—60 volt	100	30	5	50 at —10v, 850 at —50v
1N127	Miniature—100 volt	40	30	3	25 at —10v, 300 at —50v
1N128	Miniature—High Back	90	30	3	10 at —10v
1N191	Miniature—Computer	40	30	5	—
1N193	High Temperature	40	30	1.0 at +2v	20 at —10v, 40 at —40v
1N194	High Temperature	40	30	1.5 at +2v	10 at —40v
1N194A	High Temperature	40	30	1.5	10 at —40v
1N195	High Temperature	50	30	2.0 at +2v	10 at —40v
1N196	High Temperature	80	30	1.0 at +2v	10 at —40v
1N198	Miniature—75°C	60	60	4	10 at —10v, 50 at —50v
1N417	Computer	60	60	—	—
1N418	Computer	80	60	7	—
1N419	Computer	30	60	125	—
1N447	VLI (Very Low Impedance)	100	60	25	20 at —10v, 60 at —30v
1N448	VLI	30	60	25	30 at —30v, 100 at —100v
1N449	VLI	100	60	50	10 at —10v, 30 at —30v
1N450	VLI	150	60	50	30 at —30v, 100 at —100v
1N451	VLI	30	80	50	150 at —150v
1N452	VLI	100	80	100	30 at —30v
1N453	VLI	50	100	100	30 at —30v, 100 at —100v
1N454	VLI	30	100	200	50 at —50v
1N455	VLI	60	60	300	30 at —30v
1N631	Miniature—Computer	60	16	—	—
1N632	Miniature—Computer	80	60	7	—
1N633	Miniature—Computer	60	60	125	—
1N634	Miniature—VLI	60	60	50	35 at —30v, 115 at —100v
1N635	Miniature—VLI	15	50	50	175 at —150v
1N1093	Computer			—	25 at —5v and 75 at —15v at 55° C

*Ratings are limiting values assigned by the manufacturer to operating or storage conditions (electrical, mechanical, or environmental) under the control of the user. If values are exceeded, permanent impairment of the device and/or performance may result.

SYLVANIA
LIGHTING · RADIO · ELECTRONICS · TELEVISION · ATOMIC ENERGY

MICROWAVE CRYSTALS, TRANSISTORS, Photodiodes and Glow Transfer Tubes

MICROWAVE CRYSTAL DIODES

Sylvania manufactures microwave crystals for radar, counter-measure and test applications. All frequencies from 1000 to 35,000 mc are covered within the series.

TYPE	PURPOSE	FREQUENCY
1N21B	Mixer	3000 mc
1N21C	Mixer	3000 mc
1N21D	Mixer	3000 mc
1N21E	Mixer	3000 mc
1N23B	Mixer	9375 mc
1N23C	Mixer	9375 mc
1N23D	Mixer	9375 mc
1N23E	Mixer	9375 mc
1N25	Mixer	1000 mc
1N25A	Mixer	1000 mc
1N26	Mixer	24000 mc
1N53	Mixer	25000 mc
D938	Mixer	35000 mc
1N78	Mixer	16000 mc
1N78A	Mixer	16000 mc
1N79	Instrument Rectifier	3000
1N286	Mixer	10,000-23,000 mc
1N1132	Tripolar Mixer	1,000-12,000 mc
1N31	Video Detector	9375
1N32	Video Detector	3000
1N76	Video Detector	10000
1N358	Tripolar Video Det.	1000-12000
1N369	Tripolar Video Det.	3000-12000
1N369A	Tripolar Video Det.	1000-12000
1N446	Video Detector	26,500-40,000

NOTE: Reverse polarity and matched pairs are available for all mixer crystal types except 1N286 and 1N1132.

AUDIO TRANSISTORS

Audio Types	Class	Total Dissipation P_t MW	Collector Base Voltage V_{cb} Volts	Collector Emitter Voltage V_{ce} Volts	Typical Alpha Cut-off Frequency f_{α}	Collector Current I_c ma	Application
2N34	PNP	50*	-40	-25	.6	-50	high gain
2N35	NPN	50*	40	25	.8	50	high gain
2N213	NPN	50*	—	25	.8	100	very high gain
2N228	NPN	50*	—	25	.8	50	high gain
2N214	NPN	125*	—	25	.8	50	high gain
2N229	NPN	50*	10	12	1.9	40	high gain
2N306	NPN	50*	20	12	.75	40	high gain

*Derate 2.5 mw per °C rise above 25°C ambient; for 50 mw units derate 1 mw per °C

RF/IF TRANSISTORS

RF/IF Types	Class	Total Dissipation P_t MW	Collector Emitter Voltage V_{ce} Volts	Typical Alpha Cut-off Frequency f_{α}	Collector Current I_c MA	Gain	Application
2N94	NPN	50*	20	3.5	50	32(1)	IF
2N94A	NPN	50*	20	7	50	49(1)	RF
2N193	NPN	50*	15	3.5	50	5.5(2)	Oscillator
2N194	NPN	50*	15	3.5	50	7.5(2)	Converter
2N211	NPN	50*	10	3.5	50	5.5(2)	Oscillator
2N212	NPN	50*	10	6.	50	10(2)	Converter
2N216	NPN	50*	15	3.5	50	7.5(2)	IF
2N233	NPN	50*	10	3	50	4.5(2)	General Purpose

*Derate 2.5 MW per °C rise above 25°C ambient; for 50 MW units derate 1 mw per °C. NOTES—1. Current gain at 270 CPS 2. Current gain at 455 Kc

POWER TRANSISTORS

Power Type	Class	Total Dissipation P_t Watts	Collector Base Voltage V_{cb} Volts	Collector Emitter Voltage V_{ce} Volts	Typical Beta Cut-off Frequency f_{β}	Collector Current I_c Amps	Gain	Application
2N68	PNP	2**	-30	-15	5	-1.5	40(1)	Audio Amplifiers, Voltage regulated power supplies, DC Converter, Magnetic Core Driver, Servo Amplifier, Vertical Sweep Output, Pulse Power Output, High Current Switch, RF Modulator
2N95	NPN	2**	30	15	5	1.5	40(1)	
2N101	PNP	1**	-30	-15	5	-1.5	40(1)	
2N102	NPN	1**	30	15	5	1.5	40(1)	
2N141	PNP	1.5**	-60	-30	5	-.8	40(1)	
2N142	NPN	1.5**	60	30	5	.8	40(1)	
2N143	PNP	1**	-60	-30	5	-.8	40(1)	
2N144	NPN	1**	60	30	5	.8	40(1)	
2N242	PNP	***	-45	-45	7.5	2	33db	
2N307	PNP	35	-35	-35	5	1.0	30(2)	

**Free air rating shown; with dissipator rating is 4 watts
***Thermal rise from mounting hole on Collector to junction 3°C/ watt max.

(1) Base to Collector current gain at 50 ma I_c
(2) Base to Collector current gain at 200 ma I_c

COMPUTER TRANSISTORS

Computer Type	Class	Total Dissipation P_t MW	Collector Base Voltage V_{cb} Volts	Collector Emitter Voltage V_{ce} Volts	Typical Alpha Cut-off Frequency f_{α}	Collector Current I_c MA	Max. Junction Temp. °C	Application
2N377	NPN	150*	25	20	6	200	85	high gain fast switching
2N385	NPN	150*	25	25	6	200	85	
2N388	NPN	150*	25	20	8	200	85	

*Derate 2.5 mw per °C above 25°C ambient Note: On Computer types, base tied to can

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MICROWAVE COMPONENTS

TR and ATR TUBES

Gas switching tubes designed for radar application.

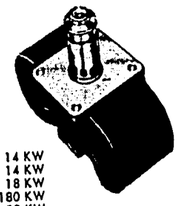
Type	Description	Frequency
1B58	Broadband TR	2659-2969
1B58A	Broadband TR	2659-2969
5865	Broadband TR	5395-5905
6624	Broadband TR	5370-5430
1B63A	Broadband TR	8490-9578
5863	Broadband TR	8490-9578
6164	Broadband TR	8490-9578
6232	Broadband TR	8490-9600
1B24A	Tunable TR	8490-9578
6795	Bantam TR	8490-9578
6334	Dual TR	33814-35906
5790	Tunable TR	33814-35906
6545	Tunable TR	33814-35906
1B44	ATR	2750
1B56	ATR	2850
6081	ATR	5640
6591	ATR	5400
1B35A	ATR	9300
1B37A	ATR	8750
6163	ATR	9050
6214	Quick-firing ATR	9375
5791	ATR	34860
6546	ATR	34860

TRAVELING WAVE TUBES

Type	Description	Frequency (KMC)	Power Output	Max. Noise figure (db)	Min. Gain (db)
6493	Wide Band Low Power TWT Amplifier	2-4	10 mw		35
6494	Dispersive Amplifier	2-4			15-27
6495	Broadband Low Noise Amplifier	2-4	7 mw	11	30
6496	Backward Wave Oscillator	2-4	70 mw (2KMC) 600 mw (4KMC)		33
6559	TWT C. W. or Pulsed Amplifier	2-4	2.0 w		27
6698	Hi power pulsed Amplifier	2-4	1 kw peak		33
6699	Backward Wave Oscillator	1-2	70 mw at 1 KMC—600 mw at 2 KMC		33
6752	Medium Power Amplifier	1-2	2 watts		35
6753	Low Level Amplifier	1-2	10 mw		35
BW623	Backward Wave Oscillator	4-8	20 mw at 4 KMC—130 mw at 8 KMC		35
TW612	Low Level Amplifier	4-8	10 mw		35
TW613	Low Level Amplifier	8-12.5	.5 mw		35

MAGNETRONS

Sylvania magnetrons are designed for military and commercial radar applications.



2J42	9375 Fixed	14 KW
2J42H	9375 Fixed	14 KW
6027	9375 Fixed	18 KW
6874	8800-9400 Tunable	180 KW
5789	34800 Fixed	32 KW
6799	34800 Fixed	100 KW

COUNTER TUBES

Sylvania decade counter tubes provide visual and electrical read-out for a broad field of counting applications.

Type	Rated Speed	Outputs
6476	4 KC	10
6802	4 KC	4
6879	5 KC	3
6909	100 KC	4
6910	100 KC	10

TRIGGER TUBES

OA5—Cold cathode trigger tube capable of dissipating one watt of energy. Designed in T5½ bulb size.

6403—Cold cathode trigger tube capable of dissipating one watt of energy. Designed in T-3 bulb size.

FERRITE ISOLATORS

Sylvania ferrite isolators are designed for use in radar microwave link or test equipment. The ferrite isolator will protect the power source from reflected energy, thereby contributing to more stable operation and longer life performance.

FD977	5300-5500	120 KW peak
FD962	7100-8000	10 watts CW
FD963	4600-5000	10 watts CW
FD1013	8500-9600	125 KW peak
FD1037	8500-9600	125 KW peak

PIRANI TUBES

R1111—Pressure measuring tube.
R1111M—Matched pairs of Pirani tubes.

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MICROWAVE COMPONENTS

ROCKET TUBES

Sylvania Rocket Tubes are planar-electrode disc-seal triodes for use as oscillators and amplifiers at frequencies up to 3300 mc. Design permits broadband operation. Tuning is simpler and covers a greater continuous range than that of many other types of UHF tubes.

2C36—is a pulse-modulated oscillator for frequencies up to 1200 mc.

2C37—is designed for use as a c.w. oscillator up to 3300 mc. Plate disc is flat, grid disc folded.

5764—is a pulse-modulated oscillator for use up to 3300 mc.

5765—is for use as a c.w. oscillator without external feedback in the range from 900 to 3000 mc.

5767—is a c.w. oscillator for use up to 3300 mc. Both discs are folded.

5768—is intended for use as a c.w. amplifier-multiplier up to 3000 mc.

6018—is intended for use as a c.w. amplifier-multiplier up to 3000 mc.

6BA4—High gain, low noise, UHF television amplifier.

6481 (RT434)—c.w. amplifier for use up to 3000 mc.

6503—c.w. amplifier for use up to 3000 mc.

KLYSTRONS

Disc-Seal Reflex Oscillators

Type No.	Mode	Frequency mc.
6BL6, 5836	1¾	1600-4000
	2¾	2100-4500
	3¾	3600-6500
6BM6, 6BM6A, 5837	1¾	550-2300
	¾	1100-3000
	3¾	1500-3800

Reflex Oscillators For Microwave Relay

Type No.	Mode	Frequency mc.
6468	3¾	6125-6425
6469	3¾	6575-6875
6470	3¾	7125-7425
K525	3¾	5925-6225

Amplifiers For Microwave Relay

Type No.	Output Watts	Frequency mc.
6465	6	5975-6375
6466	5	6800-7175

ELECTRONIC LITERATURE

Germanium Diode and Transistor Applications Literature

Sylvania offers you the most complete collection of germanium diode applications ever published. *"Industrial Uses for Germanium Crystals"* contains 27 never-before-published circuits for industrial applications of Germanium Crystals.

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TWO NEW BOOKLETS... *"How To Build A Transistorized Portable Radio,"* 25¢; *"Microwave Diode Handbook,"* 50¢

FREE Electronics Catalog Sheets

	Catalog Number
Crystal Diode Replacement Guide—Book	
Crystal Diode Replacement Guide—Chart	
Sylvania Glow Modulator Tubes Types 1B59/R1130B & R1131C	EC-15B
Pirani Tube—Type R1111	EC-14B
Electronic Tubes	EC-201
Crystal Diodes	NH-29
Magnetrons	EC-37C
Ratings and Characteristics of Microwave Crystal Diodes	NP-12
Sylvania Selenium Rectifiers	EC-39B
Broadband Reflex Klystrons	EC-40B
TR & ATR Packet Guide	
Engineering Data Service Sheets	
Transistor Brochure	
Electronic Computer Book	

For literature and Engineering Data Service Sheets on all products described on these pages, write to:

Sylvania Electric Products Inc.,
Advertising Dept. L24R
1100 Main Street,
Buffalo, New York

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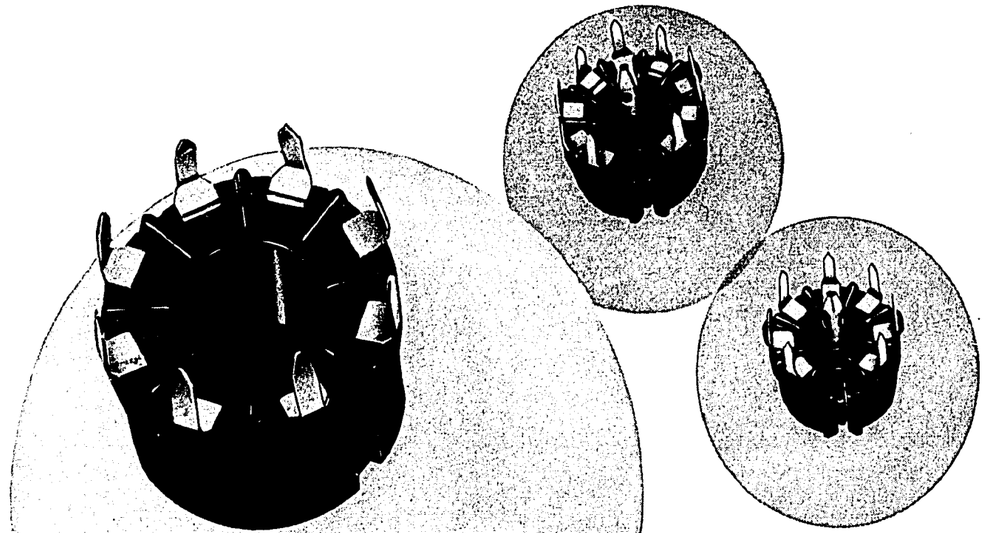

NEW OCTAL SOCKET

—LETS YOU STANDARDIZE PRINTED CIRCUIT TECHNIQUES

• Sylvania introduces a new octal socket designed for printed circuits. It incorporates the basic design features of the widely used 7- and 9-pin sockets, making it possible for you to develop new, more compact printed circuitry which can be standardized in production.

Current production can be speeded, too, by incorporating the new Sylvania printed-circuit octal socket wherever standard or compromise mountings are now being used.

Sylvania printed circuit sockets offer these important features

- All molded insulator
- Superior contact characteristics
- Top surface insulation
- Nesting for automatic feeding
- Positive orientation
- Cross-contact wiring

NEW SPECIAL SOCKETS

Neo-diheptal socket assembly for color TV picture tubes. Molded in low loss phenolic or alkyd. Compact design, only 11/16" deep. Leads can be supplied taped, stripped, twisted and solder dipped.

Counter Tube Socket with "zero-adjust" feature. Provides ±10° adjustment of socket orientation, providing for positive zero adjustment upon original installation as well as replacement.

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Please send ☐ complete data ☐ samples on the following sockets
☐ octal ☐ 7-pin ☐ 9-pin
☐ Neo-diheptal socket assembly
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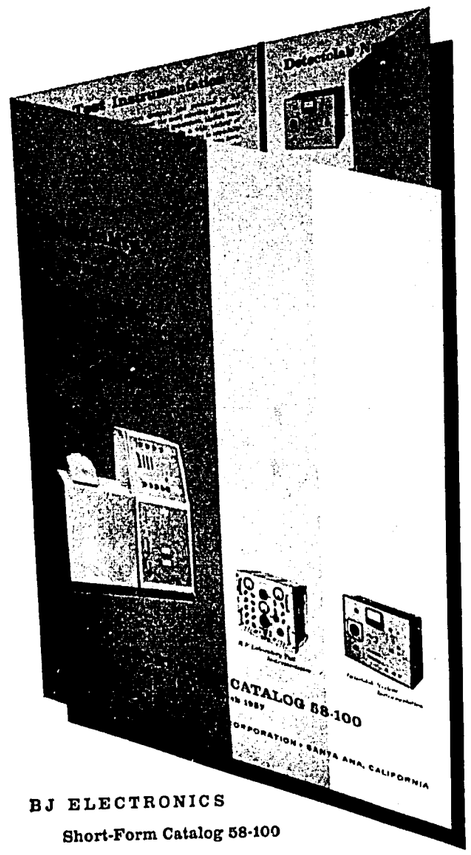
For details, circle #29 on Reader Service Card.

Instant answers from this ready-reference short-form catalog...

This new Short-Form Catalog contains condensed specification data relative to products of BJ Electronics.
Your request for a personal copy is invited.



BJ ELECTRONICS
Short-Form Catalog 58-100

DIGITAL DATA PROCESSING SYSTEMS

Simultaneous and sequential measurement and recording of any physical parameter with printed results delivered as a series of digits. The outputs of associated system components such as Vibrotron Digital Transducers and Shaft Position Digitizers require no analog-to-digital conversion and greatly enhance data-handling and telemetry system flexibility.

R-F LABORATORY TEST INSTRUMENTS

Accuracies of measurement not otherwise attainable are characteristics of BJ Electronics' radio-frequency test instrumentation. High-level signal generators and VSWR indicators are typical of the reliable laboratory devices available for a wide variety of measurement tasks.

NUCLEAR INSTRUMENTATION

Detectolab Products are available from BJ Electronics as an expanded line of nuclear instruments. These devices are applicable within a wide range of industrial and medical fields including the control of atomic reactors.

ENVIRONMENTAL TESTING

Measurement of electronic product performance and characteristics under accurately simulated environmental conditions is the purpose of this recently completed laboratory. It is commercially available for industry-wide testing on a contract basis. Current projects include the development of evaluation and measurement techniques involving the testing of electronic instruments.

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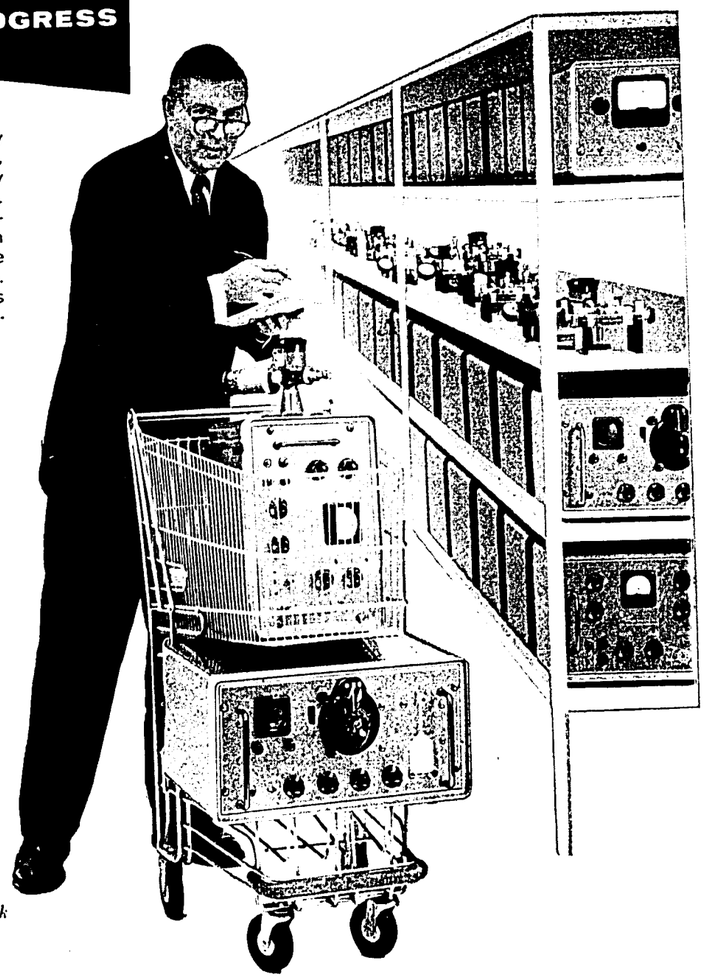
MICROWAVE PROGRESS



At this time, in place of our usually scheduled scientific discussions, we'd like to introduce our specially skilled field representatives to you. These men are highly qualified engineers, capable and willing to sit down with you to discuss any microwave equipment problems you may have. They'll see to it that your problems are answered promptly and completely.

Washington State
J. K. Dooley Co.
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Buffalo, New York
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Hartford, Conn.
Jackson 5-4846

PRD West Coast Sales Office
737-41 North Seward Street
Suite 7
Hollywood 38, California
Hollywood 5-5287
TWX LA1101

We've expanded our production runs to fill the increasing demand for our catalog products. Delivery on these items can now be made within 30 days (at the outside) from receipt of order.

The listing on the opposite page is a partial rundown of the PRD items in stock and available for immediate delivery.

If you don't see the product you want, contact our Engineering Representative nearest you (see Microwave Progress column), or write directly to us.

P.S. We will always maintain the same high standards of product quality that started this increasing demand in the first place.

Be sure your name's on our mailing list for:

- PRD Catalog . . . complete descriptions and specifications on PRD's microwave equipment. NEW CATALOG COMING SOON!
- PRD Reports . . . internationally famous, authoritative professional papers that give practical information on virtually every aspect of microwave research and engineering.

PRD MICROWAVE TEST EQUIPMENT READY FOR IMMEDIATE DELIVERY!

PRODUCT	PRD TYPE #	FREQUENCY RANGE (kmc/sec)
Waveguide Termination	116-A	8.2 to 12.4
Fixed Coaxial Attenuator	130 Series	2.0 to 10
Fixed Coaxial Attenuator	1100 Series	DC to 4.0
Coaxial Termination	145-A	0 to 4.0
Precision Dial-Gauge Attenuator	185-B	7.0 to 10.0
Precision Dial-Gauge Attenuator	192-A	26.5 to 40.0
Precision Dial-Gauge Attenuator	195-B	8.2 to 12.4
Shielded Uncalibrated Variable Attenuator	154-A	8.2 to 12.4
Precision Dial Attenuator	196-C	8.2 to 12.4
Precision Dial Attenuator	196-D	8.5 to 9.6
Variable Cutoff Attenuator	180-A	8.2 to 10
Precision Coaxial Slotted Section	200-C	1.0 to 4.0
Precision Coaxial Slotted Section	205-A	4.0 to 10.0
Precision Waveguide Slotted Section	201-A	3.95 to 5.85
Precision Waveguide Slotted Section	203-E	8.20 to 12.4
Precision Waveguide Slotted Section	212-A	26.5 to 40.0
Rotary Standing Wave Detector	219	100 to 1,000 mc/s
Broadband Probe	250-A	1.00 to 12.4
Standing Wave Amplifier	277	350 to 2500 cycles
Waveguide Slide Screw Tuners	303-A	8.2 to 12.4
Double Stub Tuner	306-A	2.0 to 10.0
E-H Tuner	313-A	18.0 to 26.5
Waveguide-to-Coaxial Adapter	354-B	8.2 to 12.4
Waveguide-to-Coaxial Adapter	356-A	5.4 to 8.2
Directional Coupler	401	7.05 to 10.0
Directional Coupler	402	8.5 to 9.6
E-Plane Bend	452	8.2 to 12.4
H-Plane Bend	463	8.2 to 12.4
Frequency Standard Multiplier	500	3.25 to 10,000 mc/s
Heterodyne Frequency Meter	504	100 to 10,000 mc/s
Precision Direct Reading Frequency Meter	559 Series	8.20 to 10.0
Precision Direct Reading Frequency Meter	570 Series	26.5 to 32.0
Calibrated Precision Frequency Meter	560-S1	2.7 to 3.7
Calibrated Precision Frequency Meter	583-D	2.4 to 3.7
Direct Reading Frequency Meter	585 Series	8.2 to 10.0
Tunable Crystal and Bolometer Mount	621-A	18.0 to 26.5
Bolometer	610-A	0 to 12.4
Coaxial Tunable Crystal and Bolometer Mount	612-A	1 to 10
Broadband Coaxial Bolometer Mount	627-A	0.5 to 10
Broadband Coaxial Bolometer Mount	628-A	0.5 to 10
Broadband Bolometer	631 Series	0.5 to 10
Waveguide Thermistor Mount	643-A	8.2 to 12.4
Waveguide Thermistor Mount	646	5.4 to 8.2
Universal Power Bridge	650-B	——
Shielded Tube Mount	702	8.50 to 9.66
Universal Klystron Power Supply	801-A	——
Klystron Power Supply	809	——
VHF-UHF Noise Generator	904	30 to 1000 mc/s

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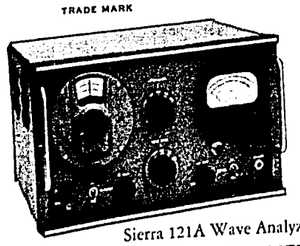
sierra

TRADE MARK



Sierra 121A Wave Analyzer

WAVE ANALYZERS

Model	Frequency Range	Selectivity		Accuracy		Direct Reading in dbm	
		Down 3db	Down 45db	Frequency	Measuring	Balanced	Unbalanced
121A	15 KC-500 KC	± 100 cps	± 1000 cps	± 3 KC	± 2 db	Note D	600 ohms
158A	500 KC- 10 MC	± 2000 cps	± 5000 cps	± 0.08 MC	± 2 db	—	600 ohms

CARRIER FREQUENCY VOLTMETERS

101C	20 KC-500 KC	± 550 cps	± 2900 cps	Note A	± 3 db	Note D	600 ohms
103B†	3 KC- 40 KC	± 400 cps	± 3000 cps	± 0.5 KC	± 3 db	Note D	600 ohms
104A	5 KC-150 KC	± 300 cps	± 1500 cps	± 1 KC	± 3 db	Note D	600 ohms
108B	15 KC-500 KC	± 550 cps	± 2900 cps	± 3 KC Note B	± 2 db Note C	135 ohms Note D	600 ohms
114A	100 KC-800 KC	± 550 cps	± 2900 cps	Note A	± 3 db	Note D	600 ohms

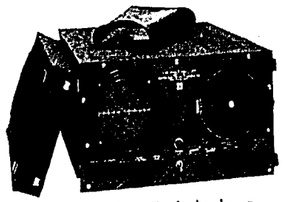
All Models feature built-in calibration oscillators and circuits for level calibration have aural monitoring jacks, and (except 103B) are furnished with Sierra Model 149A Precision Spiral Scale Dials.

†Contains carrier re-insertion oscillator for monitoring suppressed carrier systems. Furnished with planetary drive dial. Note A. Ranges from ± 2 KC at low end of dial to ± 3 KC at upper end. Note B. ± 1 KC in the 48 KC to 256 KC region. Note C. ± 1 db for + 30 db to —40 db attenuator steps on 135 ohm balanced measurements. Note D. All models may be converted for 135 and 600 ohm balanced line measurements by convenient plug-in bridging transformer, Model 130D.

LINE BRIDGING TRANSFORMER

Converts voltmeter and wave analyzer inputs from single-ended to balanced operation. Model 130D bridges both 135 and 600 ohm balanced lines. Frequency range 3 KC to 500 KC. Write for details.

LINE FAULT ANALYZER



Sierra 124A Line Fault Analyzer

Operates on most open wire power, communications lines. Instantly pinpoints shorts, opens, grounds. Direct reading, easy to use, range ½ to 200 miles. Sweep marker continuously adjustable from 5 to 100 miles; locates faults with accuracy of ¼ mile. Request Bulletin 102.

(Sierra now offers Model 169 Line Coupling Network rated at 5 KV. Ideal for coupling Model 124A to "dead" power lines. Affords protection to personnel and equipment.)

REFLECTION COEFFICIENT METER

Compact, moderately-priced instrument giving great speed, convenience for measuring coaxial transmission line reflection coefficient, VSWR, or matching loads to line. High accuracy. Sensitivity permits operation with any standard CW signal generator. Provides continuous monitoring at any frequency over the range 32 MC to 1125 MC. Employs Sierra wideband directional couplers to sample incident and reflected voltage. Attenuator calibrated in reflection coefficient and VSWR. Request Bulletin 106.

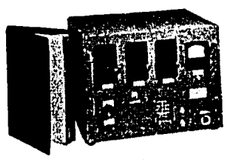
COAXIAL READOUT DEVICES

Insure sensitive readout for Sierra vhf-uhf Directional Couplers. Model 148 Crystal Detector, low VSWR, higher sensitivity to 1200 MC. Incorporates 50 ohm input impedance and filtered output. Type N input, BNC output connectors. Request Bulletin 113.

DOUBLE STUB TUNERS

New tuners match to a 50 ohm line any load having a 2:1 VSWR. Three models: 151 (155 MC to 300 MC); 152 (380 MC to 825 MC); 153 (900 MC to 1750 MC). Operates up to 1.5 KW peak power. Request Bulletin 110.

CALIBRATED RF LOAD



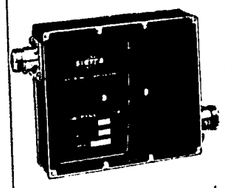
Sierra 141
Calibrated RF Load

Model 141 Variable Impedance Calibrated RF Load provides for direct power measurements from 25 to 250 watts at 2 MC to 30 MC. Load impedance resistance and reactance adjustable over wide range. High accuracy instrument with comprehensive individual impedance calibration charts for all frequencies, or typical charts for general purpose use. Accuracy: ± 5% (impedance magnitude), ± 10% (power). Request Bulletin 105.

IMPEDANCE METER

Sierra Model 166 Carrier Systems Impedance Meter is specifically designed for the measurement of impedances on circuits with high noise levels at any frequency over the range 30 KC to 300 KC. Either high or low power signal sources may be used. Measurements may be made on "hot" power lines through a series carrier coupling capacitor. Request Bulletin 112.

LOW PASS FILTERS



Model 184 Series Low Pass Filters have an insertion loss of not more than 0.4 db in pass band, sharp cut-off, 1.5 VSWR or less, and rejection greater than 60 db from 1.25 to 10 times cut-off frequency. Five models: for cut-off frequencies of 44, 76, 135, 230, 400 MC. Power range 250 watts in pass band, 25 watts in rejection band. Request Bulletin 115.

WIDEBAND DIRECTIONAL COUPLERS

Coupling Factor: (in db ± 1 db)

Model	10 KC	3 MC	10 MC	30 MC	100 MC	300 MC	1000 MC	2000 MC
137, 137A				73	63	53	43	37
138, 138A				59	49	39	29	
145		52	42	32	22	12		
150				53	43	33	23	
139	50	50						

Directivity: 12 db ± 3 db greater than coupling factor at each frequency.
Impedance: Models 137 and 138 are 51.5 ohms. Models 137A, 138A, 145 and 150 are 50.0 ohms. Model 139 may be matched to most impedances.
Power: Usable to 1000 watts throughout frequency range.

PHASE CHANGER

Model 191 Phase Changers, ideal for life-testing tubes, are offered with ac or dc motor for 1¼" x ⅝" or 1" x ½" waveguides. VSWR preset at 1.5 but adjustable from 1.02 to 1.6. For powers to 200 Kw peak, average power rating 500 watts. Request Bulletin 117.

SIERRA ELECTRONIC CORPORATION
A subsidiary of Philco Corporation

FIELD, LAB POWER MEASURING INSTRUMENTS

sierra

TERMINATION WATTMETERS

Sierra 195A-Z
Termination Wattmeter

Sierra 185A Series Average Reading Termination Wattmeters and Sierra 195A Series Peak-Reading Termination Wattmeters are broadly useful, dependable new instruments for terminating rf coaxial transmission systems and measuring rf powers. All models are ruggedly built, conservatively rated, and ideal as dummy loads for testing and adjusting transmitters and oscillators. Request Bulletins 120 (average reading) and 121 (peak-reading).

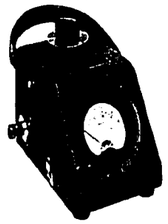
Model 185A Average-Reading and 195A Peak-Reading Wattmeters

Model Number	Connector	Frequency Range, MC	Power Range, Watts	Accuracy % of F. S.	Max. Power Dissipation	Max. VSWR
185A- 15FN	N	20-1000	0-5/15	± 5%	15 watts	1.2
185A-100FN	N	20-1000	0-30/100	± 5%	100 watts	1.2
185A-500FN	N	20-1000	0-150/500	± 5%	500 watts	1.2

Model Number	Connector	Frequency Range, MC	Peak Power Range, KW	Max. Average Power	Pulse Width, μsec	Repetition Rate, PPS
195A-Z	N	250-1000	0-1/3/10	15 watts	1.0 minimum	400 minimum
195A-X	LC	250-1000	0-10/30/100	100 watts	1.0 minimum	400 minimum
195A-Y	LC	250-1000	0-100/300/1000	500 watts	1.0 minimum	400 minimum
195A-W*	N	950-1250	0-1 and 0-3	15 watts	3.0 to 5.0	48 to 300
195A-V*	N	450-1250	0-3 and 0-10	100 watts	3.0 to 5.0	300 to 7200
195A-U*	HN	450-1250	0-5 and 0-15	500 watts	3.0 to 5.0	300 to 7200

NOTE: Female connectors are standard. *Available on special order only.

BI-DIRECTIONAL POWER MONITORS



Sierra 164
Power Monitor

Model 164 Series Two plug-in elements cover 25 MC to 1,000 MC, measure incident and reflected power of 10, 50, 100 and 500 watts full scale. Also four lower power elements covering same range at 1, 5, 10 and 50 watts full scale. Power is read direct on linear scale accurate within ± 5%. Insertion VSWR less than 1.08 (Type N connectors) except on 1 watt ranges where VSWR is 1.15. 50 ohm impedance. Model 164 available with Type N, Type C or UHF connectors, male or female. Request Bulletin 111.

Plug-In Elements for Model 164 *(Note: Model 164 does not include plug-ins. Order separately as needed.)*

180 Series—1, 5, 10, 50 watts full scale
180-52: 25 MC to 52 MC
180-148: 50 MC to 148 MC
180-470: 144 MC to 470 MC
180-1000: 460 MC to 1000 MC

181 Series—10, 50, 100, 500 watts full scale
181-250: 25 MC to 250 MC
181-1000: 200 MC to 1000 MC

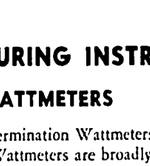
270 Series—50, 100, 500, 1000 watts full scale
270-75: 10 MC to 75 MC

Accessories Available: Model 164-LS Equivalent Transmission Line Section; Model 164-CC Carrying Case.

THERMOPILE

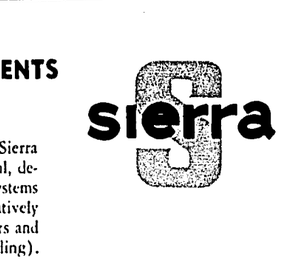
Model 189A Differential Thermopile converts differential temperatures in flowing liquids to electrical energy. Internal resistance approx. 5 ohms, output voltage approx. 1 mv per °C, max. pressure 75 psi. Request Bulletin 119.

50 OHM COAXIAL TERMINATIONS



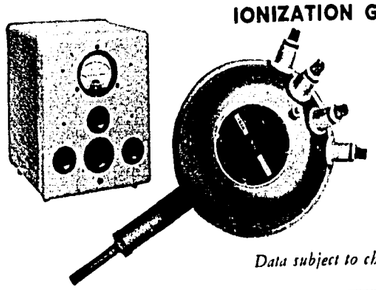
New compact, light weight Model 160 series coaxial terminations feature stable operation over a wide frequency range and up to high ambient temperatures. High surface to volume ratio provide a very low VSWR from dc to 3300 MC. Model 160-5: 5 watts; Model 160-20: 20 watts; Model 160-100: 100 watts; Model 160-500: 500 watts. Request Bulletin 114.

CALORIMETER, X-BAND WATER LOAD



Model 190A Calorimeter and XB187A Water Load provide fast, accurate power measurement from a few watts to kilowatts. Accuracy ± 2%. Calorimeter ranges 300, 600, 1,500, 3,000 watts, max. 50 psi, sensitivity 1.5 mv. Water Load range 7 KMC to 10 KMC, VSWR less than 1.2, power 1 Kw CW, 300 Kw peak. Request Bulletin 116.

IONIZATION GAUGE AND AMPLIFIER



Model 193A Ionization Gauge and Model 192A Ionization Gauge Amplifier provide convenient, dependable and accurate monitoring of pressures during processing from 10^{-4} to 10^{-7} mm Hg. Monel-encased Phillips type ion gauges operate for months without attention; amplifier includes high voltage rf power supply, VTVM, heater transformer and low voltage supply. Request Bulletin 118.

MODEL 194A-A PEAK-READING POWER MONITOR

New bi-directional instrument for radar and other pulsed measurements. Quickly measures incident and reflected powers. Measures peak power directly, independently of duty cycle. Write for Bulletin 122.

Data subject to change without notice.

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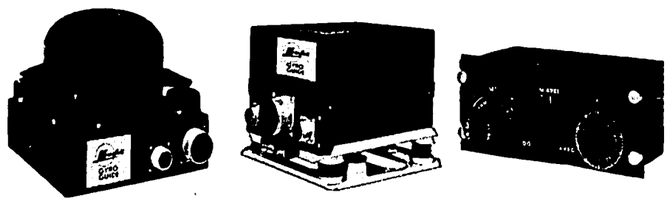
PRECISION SYSTEMS AND COMPONENTS *in production*

NAVIGATION SYSTEMS

Kearfott Systems include 3 gyro, 3 and 4 gimbal platforms. They provide precise azimuth and vertical reference. Also Directional Gyro Compass Systems.



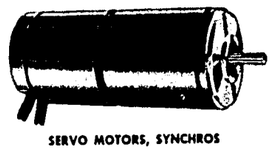
The Gyro Guide System shown provides Latitude Corrected Gyro and Magnetic Slaved Heading information. Weighs 20 lbs. Max. random drift 3°/hour.

GYROS, SERVO MOTORS, SYNCHROS

Kearfott produces a complete line of gyros, servo motors, and synchros to satisfy every aircraft control requirement.

FLOATED INTEGRATING GYRO

3 Gyro Platforms, Floated Rate Integrating Gyros, Vertical, Free, Directional, Rate Gyros and Gyro operated rate switches—compact, lightweight, hermetically sealed.

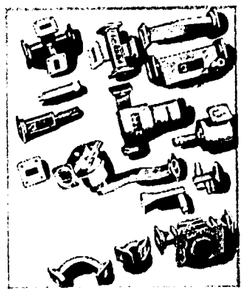


SERVO MOTORS, SYNCHROS

High torque, low inertia Servo motors, Servo-motor-Generators, inertial and viscous damped Servo motors 3/4" to 1-3/4" diameter, Synchro Transmitters, Control Transformers, Resolvers, Repeaters and Differentials in size 8, 11 and 15.

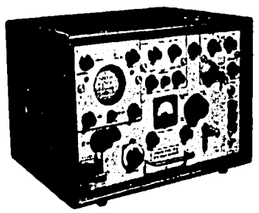
MICROWAVE EQUIPMENT

Kearfott offers engineering-design service, manufacturing facilities and a wide experience in the production of microwave components and test sets.



COMPONENTS

Including attenuators, directional couplers, crystal mixers, twists and tees for S, C, Xb, X and Ku bands.



TEST SETS (for X, C, and Ku)

A four-in-one instrument for functional testing of radar or beacon. Includes Wavemeter, Spectrum Analyzer, Power Monitor, and signal generator.

Bulletins giving physical and technical data on the various Kearfott Products will be sent on request. The Kearfott organization is available to assist in the development and manufacture of other precision components you may require.

KEARFOTT COMPANY, INC., Little Falls, N. J.

Western Manufacturing Division

Kearfott

GPE — A Subsidiary of General Precision Equipment Corporation

For details, circle #35 on Reader Service Card.

Kearfott

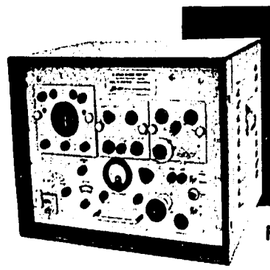
FERRITE ISOLATORS
RADAR TEST SETS
CUSTOM PLUMBING

FERRITE ISOLATORS
Selected standard units for fast delivery.

For production radar and microwave applications Kearfott maintains complete design, fabrication and test facilities. If you need a complete R.F. system or a single component...check Kearfott.

Model No.	Freq. Range (KMC)	Nom. Peak Power (KW)	Avg. Power Rating (Watts)	Isolation (db) Min.	Isolation (db†) Max.	Insertion Loss (db)	VSWR	Overall Length (ins.)	Net Weight (Ozs)	Waveguide Size (in. x in.)
LOW POWER—NARROW BAND WIDTH										
W152-1B-1	8.8°	2	20	20		0.25	1.30	2.75	6	1 x ½
W165-1A-1	8.5-9.6	1	50	15	33	0.50	1.25	1.8	10	1 x ½
W165-1B-1	8.8-9.0	1	50	25		0.25	1.25	1.8	10	1 x ½
W369-1A-1	5.4°	2	100	25		0.7	1.15	10.0	30	2 x 1
LOW POWER—10% to 20% BAND WIDTH										
W165-2B-1	8.5-9.6	1	10	20		0.7	1.40	2.2	12	1 x ½
W177-2A-1	8.5-9.6	1	100	23	29	0.5	1.10	2.0	15	1 x ½
W177-2C-1	8.2-10.2	1	100	25		1.0	1.15	2.5	20	1 x ½
W258-2B-1	5.4-5.8	1	50	17	22	1.5	1.15	3.0	18	1½ x ¾
HIGH POWER—10% OR MORE BAND WIDTH										
W177-2A-2	8.5-9.6	150	200	17	21	0.7	1.10	2.0	15	1 x ½
W177-1B-2	8.7-10.8	100	500	10		0.6	1.10	1.25	10	1 x ½
W177-2B-2	8.5-10.2	200	200	10	13	0.5	1.10	2.0	14	1 x ½
W177-1C-2	8.5-10.4	100	300	10	17	0.8	1.10	1.25	8	1 x ½
W177-2C-2	8.5-9.6	150	200	25	29	1.0	1.10	2.5	20	1 x ½
W177-1D-2	9.6-11.0	100	300	15	22	0.8	1.10	1.25	14	1 x ½
W569-1A-2	13.4-13.6	75	50	30		0.4	1.15	6.0	15	.702 x 391
W568-2B-2	12.5-18.0	100	100	10		1.0	1.15	2.25	32	.702 x .391
W668-2A-2	8.5-9.6	350	300	17	24	0.6	1.10	2.5	32	1¼ x ⅝

°Designed for narrow band use. †Peak isolation at a spot frequency in the specified band.



RADAR TEST SET

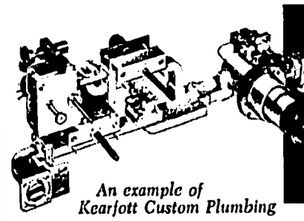
For C, X, or Ku Band

Telephone for a demonstration appointment.

Special Test Equipment built to your specifications.

- A complete testing unit in one compact portable case.
- Makes all receiver and transmitter tests.
- Saves time, cost and space.
- 1957 Model incorporates new features.

Write for bulletins W104 and W105 for detailed information on test sets and ferrite isolators.



CUSTOM PLUMBING

Antenna Assemblies

An example of Kearfott Custom Plumbing

Advanced design is featured in the radar components now being produced by Kearfott microwave laboratories and production facilities. Complete departments are maintained for dip-brazing, testing and production, in our own plant.

Kearfott design engineers are available on your microwave problems.

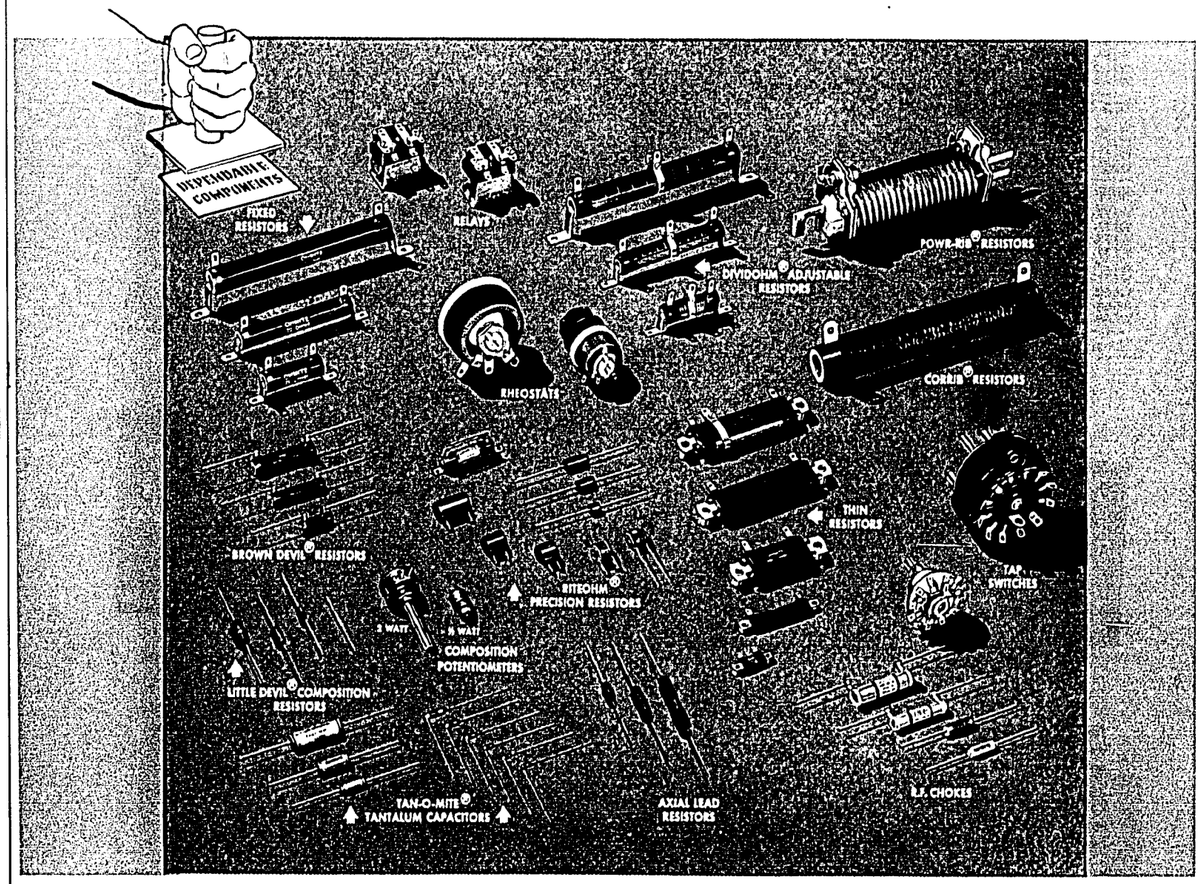
Kearfott COMPANY, INC.
LITTLE FALLS, NEW JERSEY
WESTERN DIVISION
MICROWAVE DEPARTMENT
14844 OXNARD ST. · VAN NUYS, CALIF.
A Subsidiary of GPE

For details, circle #36 on Reader Service Card.

OHMITE®

the complete line of industry-preferred COMPONENTS

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, molded composition resistors and potentiometers, general-purpose relays, subminiature tantalum capacitors, and R. F. chokes. Write on company letterhead for the complete Ohmite Catalog and Engineering Manual.



BE RIGHT WITH OHMITE®

RHEOSTATS • RESISTORS • RELAYS • TAP SWITCHES • TANTALUM CAPACITORS

OHMITE MANUFACTURING COMPANY • 3692 Howard Street, Skokie, Illinois

For details, circle #37 on Reader Service Card.

NEW OHMITE TAN-O-MITE® TANTALUM CAPACITORS

The new Tan-O-Mite® line of wire-type subminiature capacitors features six sizes which collectively offer sufficient range and flexibility to satisfy the design needs of any manufacturer of miniaturized equipment. Sizes "S" and "T" *constitute the smallest units of this type available.* (Note dimensions in table below.) Tan-O-Mite® foil-type and wire-type tantalum capacitors both feature greater capacitance per unit volume, lower leakage current and power factor, and small capacitance drop at extremely low temperatures as compared to other types of electrolytics. Ohmite engineers will work with you on your design requirements.

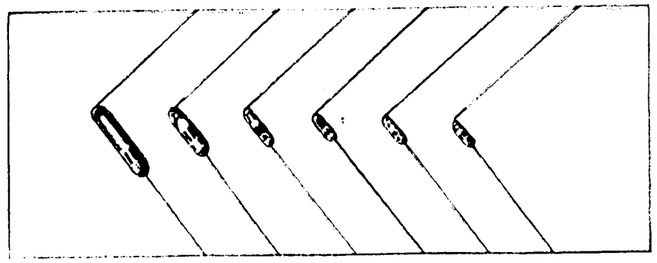
HIGH STABILITY

FOR −55°C TO +85°C OPERATION

HIGH CAPACITANCE

SUBMINIATURE SIZES

LONG SHELF LIFE

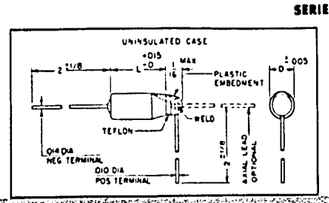


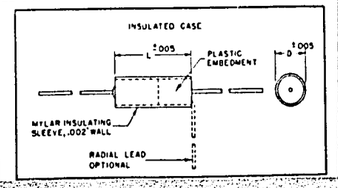
SERIES TW, SUBMINIATURE, WIRE-TYPE TANTALUM CAPACITORS

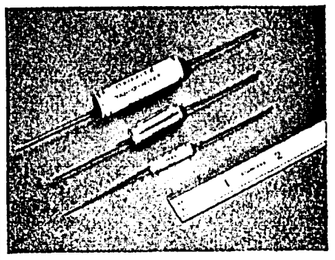
Ultrasmall for low-voltage DC transistorized electronic equipment, these new units provide substantial savings in circuit space plus high quality and long, reliable operation. Available in six subminiature sizes; 0.1 to 60 mfd. over-all capacitance range. Smallest size .075 x .156 inches; largest .125 x .500 inches. *Five stock sizes in a wide range of capacitances and voltages.* Capacitors can be supplied insulated with a tough Mylar plastic sleeve for application in confined locations near metal parts. Leads are normally axial on these units. *Bulletin 148.*

SIZE	UNINSULATED		INSULATED	
	D (inches)	L (inches)	D	L
T	.075 (5/64)	.156 (5/32)	.082	.203
S	.075 (5/64)	.187 (3/16)	.082	.234
M	.095 (3/32)	.172 (11/64)	.100	.218
A	.095 (3/32)	.250 (1/4)	.100	.312
B	.125 (1/8)	.312 (5/16)	.134	.375
C	.125 (1/8)	.500 (1/2)	.134	.562

SERIES TW







SERIES TF, FOIL-TYPE TANTALUM CAPACITORS

Three sizes now available in limited quantities for engineering evaluation and use.

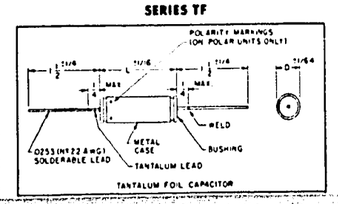
Capacitors are tantalum foil, electrolytic-type units designed for low voltage AC and DC applications. Available in three sizes; .25 to 140 mfd. over-all capacitance range. Working voltage up to 150 volts. Polar and nonpolar units are available. *Bulletin 152.*

TANTALUM FOIL CAPACITOR

CASE SIZE	D*	L*
J	3/16"	11/16"
K	9/32"	7/8"
L	3/8"	1-7/16"

*Add 1/16" to L and 1/64" to D when insulating sleeve is used.

SERIES TF



OHMITE® RHEOSTATS • RESISTORS • RELAYS • TAP SWITCHES • TANTALUM CAPACITORS

OHMITE MANUFACTURING COMPANY • 3692 Howard Street, Skokie, Illinois

For details, circle #38 on Reader Service Card.

SILICON DIODES

FEATURES

- Recovery times under .15 μsec
- High voltage ratings
- Operation up to 200°C
- High Inverse Resistance
- Subminiature size

MILITARY AND HIGH CONDUCTANCE TYPES

RATINGS AT 150°C AMBIENT

Type	Maximum Inverse Operating Voltage (volts)	Maximum Average Forward Current (ma)	Maximum Inverse Current (μa) @ V
1N457*	60	25	5 @ 60
1N458*	125	25	5 @ 125
1N459*	175	25	5 @ 175
1N484A	225	50	25 @ 225
1N488A	380	50	25 @ 380

*JAN Types

HIGH FREQUENCY AND FAST SWITCHING TYPES

RATINGS AT 25°C

Type	Maximum Inverse Operating Voltage (volts)	Maximum Average Forward Current (ma)	Inverse Recovery Time (μsec)
1N251*	30	75	.15
1N252	20	100	.15
SG213	200	30	.3
SG223	200	55	.5
SG228	200	80	1

*JAN Types

Write for Bulletin TE1350

GERMANIUM DIODES

FEATURES

- Complete Reliability
- Superior Forward Conductance
- Higher Inverse Resistance
- More Uniform Characteristics
- Greater Ruggedness

SPECIFICATIONS AND RATINGS AT 25°C

Type	Forward Current at + 1V (ma)	Inverse Current at Specified Voltage (μa @ V)	Max. Oper. Voltage (volts)	Description
1N270	200	100 @ −50	80	JAN TYPES
1N277	100	250 @ −50 @ 75°C 75 @ −10	100	
1N276	40	100 @ −50	70	
1N281	40	500 @ −50 30 @ −10	60	
1N126	5	500 @ −50 30 @ −10	60	
1N127	5	300 @ −50 25 @ −10	100	
1N198	5	250 @ −50 @ 75°C 75 @ −10	50	
1N283	200	20 @ −10	20	COMPUTER TYPES
T16G	40	100 @ −50 20 @ −10	60	
1N278	20	125 @ −50 @ 75°C	50	HI-TEMPERATURE TYPES
T22G	40	20 @ −10 @ 75°C	15	
T9G	100	20 @ −50 2 @ −10	60	HI-RESISTANCE TYPES
1N67A	5	50 @ −50 5 @ −5	80	

Other JAN types: 1N38A, 1N69, 1N70, 1N81, 1N128

Write for Bulletin TE1300 & TE1319

Trans

SILICON Power

FEATURES

- Reliability at High Temperature
- High Power Handling Ability
- High Efficiency
- Rugged Construction
- Hermetically Sealed

MINIATURE TYPES

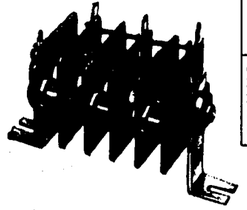
RATINGS AT 150°C AMBIENT

Type	Peak Recurrent Inverse Voltage (volts)	Maximum Average Forward Current (ma)	Maximum Inverse Current (ma)
TJ10A	100	200	.5
TJ25A	250	200	.5
TJ40A	400	200	.5

SILICON RECTIFIER STACKS

RATINGS AT 125°C AMBIENT

Circuit	DC Output Voltage (volts)	DC Output Current (amps)	Stack Designation
6 ϕ Star	150	30	TL6S1A1/TR352
3 ϕ Bridge	325	18	TL6F1A1/TR352
3 ϕ Halfwave	1120	1.2	TD12Y6B1A4
1 ϕ Bridge	748	1.2	TD12B4C1A3
1 ϕ Center Tap	250	3.0	TD12C4C3A2



SILICON VOLTAGE REGULATORS and REFERENCES

FEATURES

- Excellent long-term stability
- High current handling ability
- Operation to 150°C
- Extended operating current range
- Small size, easy mounting
- Hermetically sealed

Reference assemblies are available with temperature coefficients to .002%. They are also available with voltage tolerances to 1% from 10 to over 100 volts. The assemblies are encapsulated in a miniature axial lead package.

For details, circle #39 on Reader Service Card.

"Leadership in semiconductors"

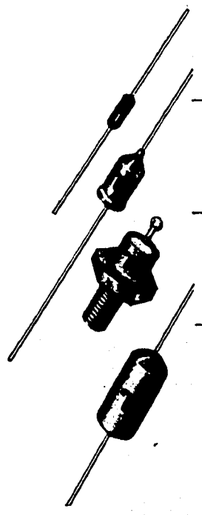
itron

RECTIFIERS

Type	Peak Recurrent Inverse Voltage (volts)	Maximum Average Forward Current (ma)	Maximum Inverse Current (ma)
MILITARY TYPES			
1N253	95	1000	.1
1N254	190	400	.1
1N255	380	400	.15
1N256	570	200	.25
STUD MOUNTED TYPES			
TM47	400	3000	.5
TM64	600	1000	.5
MEDIUM POWER TYPES	(amps)		
1N250A	200	20	5
TR301	300	10	5
TR402	400	20	5
HIGH POWER TYPES	(amps)		
1N412A	100	35	5
TH402	400	35	5

RATINGS AT 150°C CASE TEMPERATURE

Write for Bulletin TE1342 & TE1351



Type	Voltage Range (volts)	Maximum Dynamic Resistance (ohms)	Maximum Current @ 25°C (ma)	Maximum Current @ 125°C (ma)
Subminiature				
SV-5	4.3- 5.4	55	50	10
SV-7	6.2- 8	8	30	6
SV-11	9.0-12.0	50	20	4
SV-15	13.5-18	120	14	3
SV-24	20 -27	300	10	2
Miniature				
SV-804	4.3- 5.4	55	150	30
SV-806	6.2- 8	8	90	18
SV-810	9 -12	50	60	12
SV-815	13.5-18	120	40	8
SV-824	20 -27	300	27	5
Power			55°C (amps)*	(ma)*
SV-904	4.3- 5.4	.5	2.0	500
SV-906	6.2- 8	.8	1.2	300
SV-910	9 -12	1.5	.8	200
SV-915	13.5-18.0	3	.6	150
SV-924	20 -27	8	.4	100

Write for Bulletin TE-1352

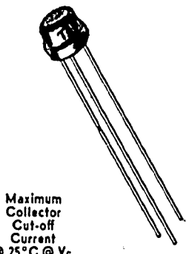
*Case temperature ratings

SILICON TRANSISTORS

HIGH FREQUENCY TYPES

FEATURES

- Low I_{co}, typically under .02 μa
- Operation to 175°C
- Power Ratings of 200 mw
- High Frequency Operation
- Welded Hermetic Seal



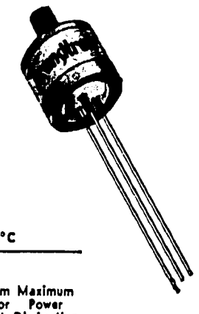
Type	Minimum Common Emitter Current Gain β	Maximum Collector Voltage Vcb Peak (volts)	Typical Cut-off Frequency (mc)	Maximum Collector Cut-off Current @ 25°C @ Vc Max. (μa)
ST12	40	15	16	.5
ST32	40	30	16	.5
ST11	20	15	13	.5
ST31	20	30	13	.5
ST10	10	15	9	.5
ST30	10	30	9	.5

Write for Bulletin TE1353

GERMANIUM Power TRANSISTOR

FEATURES

- Operation to 85°C
- Linearity at High Currents
- Up to 10 watts Dissipation
- Low Thermal Resistance
- Small Size
- Hermetically Sealed



SPECIFICATIONS AND RATINGS AT 25°C

TYPE	Minimum DC Common Emitter Current Gain (β @ Ic)	Maximum Collector Voltage Vcb Peak (volts)	Maximum Collector Current (amps)	Maximum Power Dissipation (watts)
2N83A	8 @ 1.0A	60	3	10
2N83	8 @ .5A	60	2	10
2N84A	12 @ 1.0A	45	3	10
2N84	12 @ .5A	45	2	10

Write for Bulletin TE1320

For details, circle #40 on Reader Service Card.

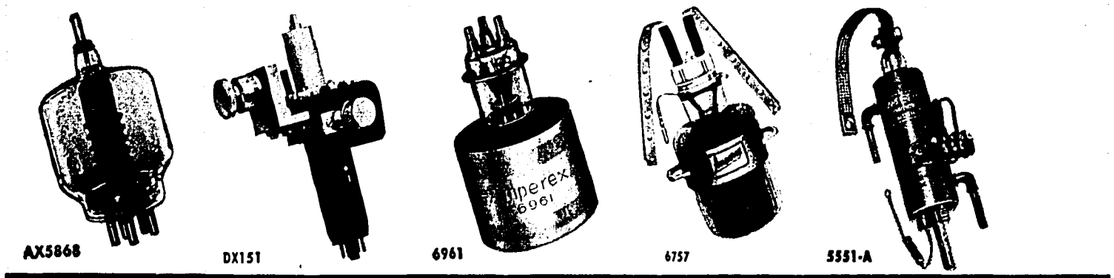
Transitron

electronic corporation

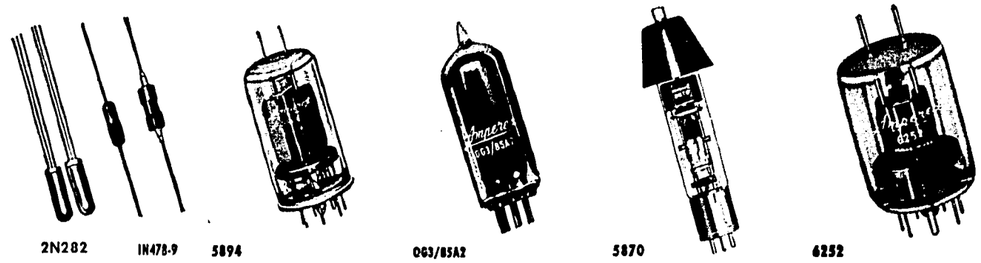
wakefield, massachusetts

CRystal 9-4500

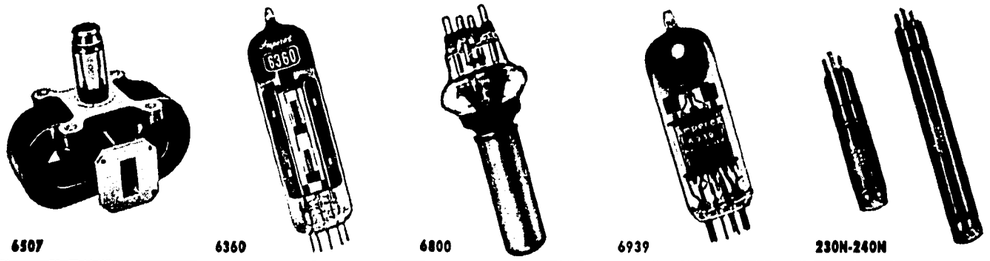
Amperex®



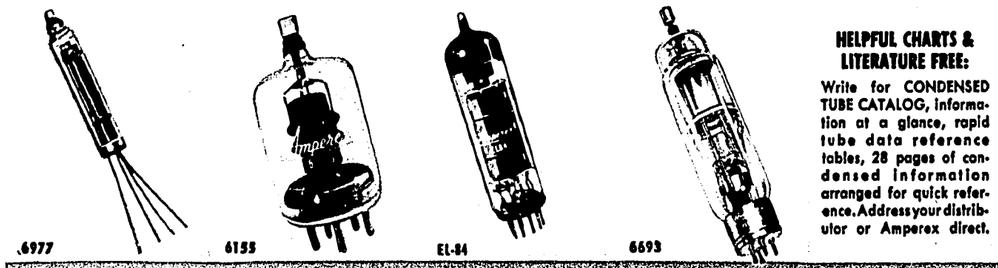
RADIATION DETECTION • SPECIAL PURPOSE



INDUSTRIAL • ELECTRO-MEDICAL



COMMUNICATION • RECTIFICATION • AMATEUR



HELPFUL CHARTS & LITERATURE FREE:

Write for CONDENSED TUBE CATALOG, information at a glance, rapid tube data reference tables, 28 pages of condensed information arranged for quick reference. Address your distributor or Amperex direct.

Amperex ELECTRONIC CORPORATION
230 DUFFY AVENUE, HICKSVILLE, LONG ISLAND, N. Y.
In Canada: Rogers Electronic Tubes & Components, Ltd., 11-19 Brentcliffe Road, Leaside, Toronto 17

For details, circle #41 on Reader Service Card.

ELECTRON TUBES

Detailed Data Sheets on any of these tubes, and application engineering service are yours for the asking.

BEAM POWER TUBES

Type No.	Price
813	$18.00
829B	16.25
6146	5.75

VACUUM CONDENSERS

VC25/20	20.00
VC25/32	23.25
VC50/20	24.25
VC50/32	27.50
VC100/20	30.00
VC100/32	33.00
VC250/32	70.00

DECADE COUNTER

E1T/6370	16.50

GEIGER COUNTERS

75N	10.00
75NB3	10.00
90NB	20.00
100C	35.00
100N	35.00
100NB	37.50
120C	75.00
120N	75.00
120NB	77.50
150N	50.00
150NB	52.50
153C	65.00
200C	45.00
200CB	47.50
200N	45.00
200NB	47.50
230N	30.00
240C	35.00
240N	35.00
912NB	35.00

CLIPPER DIODE

6339	35.00

TWIN DIODE

5726	2.00

HEPTODE

E91H/6687	1.45

IGNITRONS

5550	41.00
5551-A/652	65.00
5551-A/P	67.00
5552-A/P	101.25
5552-A	99.00
5553-B	216.00
5553/P	218.75
5554/679	163.00
555/653B	316.00
5822	116.00
5822/P	118.25

INDICATOR TUBES

Type No.	Price
EM34	$1.55
DM70/1M3	.95
EM80	2.45
EM81	2.45

INDICATOR TRIODE

6977	3.50

REFLEX KLYSTRON

2K25	39.50

KLYSTRONS

DX122	**
DX123	**
DX124	**

MAGNETRONS

2J42	160.00
2J48	250.00
2J55	165.00
2J56	165.00
4J47	500.00
4J57	270.00
4J58	270.00
4J59	270.00
JP9-15	260.00
5586	417.00
5657	417.00
5780A	**
6507	**
6589	**
6823	**
6824	**

PENTODES

‡E81L/6686	5.00
‡E83F/6689	4.50
‡E180F/6688	8.00
828	20.95
5654	3.00
6083	14.25
‡6084	3.75
‡6227	3.75
6083	14.25

PENTODES—HI-FI

6CA7	4.35
EL84	2.40
EF86	2.75

PENTODES Secondary Emission

EFP60	8.75

PENTODES—Subminiature

6007/5913	1.50
6008/5911	1.50

HI-FI VACUUM RECTIFIERS

Type No.	Price
GZ34/5AR4	$3.50
EZ80	1.50
EZ81/6CA4	1.60

MERCURY RECTIFIERS

575A	20.00
673	20.00
857B	218.50
866AX	2.65
869B	138.00
872AX	8.20
6508	80.00
6693	30.00
8008	8.20

VACUUM RECTIFIERS

5R4GY	2.65
8020AX	15.00

XENON RECTIFIERS

3B28	7.60
4B32	12.00

VOLTAGE REFERENCE TUBES

OE3/85A1	2.50
OG3/85A2	2.50
5651	2.30

VOLTAGE REGULATORS

OA2	1.75
OB2	1.90
90C1	2.50
6354/150B2	3.00

TETRODES

4X150A	38.95
4X250B	42.50
4X500A	121.00
807	2.90
6075/AX9907	225.00
6076/AX9907R	275.00
6079/AX9908	60.00
6155/AX4-125A	27.50
6156/AX4-250A	37.50
6979	42.50

TWIN TETRODES

832A	14.26
5894/AX9903	22.00
6360	4.00
6907	22.00
6252/AX9910	22.00

THYRATRONS

Type No.	Price
3C23	$11.98
AX260	150.00
632B	28.00

HYDROGEN THYRATRONS

†6268/AX9911	32.50
†6279/AX9912	45.00

INERT GAS THYRATRONS

2D21	2.00
5727	2.90

MERCURY THYRATRONS

FG17/1701/ 967/5557	8.50
AX105/FG105	49.50
678	47.00
5559	22.00
5560/FG95	28.00
5869/AGR9950	25.00
5870/AGR9951	100.00
6786	200.00

XENON THYRATRONS

2050	2.55
5544	27.00
5545	29.40
5685/C6J	26.40

TRIODES

2C39A	22.50
6Q4	3.25
6R4	2.50
HF200	35.00
HF201A/468	28.50
250TH	33.00
250TL	33.00
HF300	35.00
450TH	77.00
450TL	77.00
501R/5759	225.00
502/5760	210.00
502R/5761	235.00
504R	245.00
508/6246	500.00
750TL	137.50
805	15.90
810	19.50
811A	5.65
812A	5.65
833A	49.00
834	14.50
838	16.00
845	15.95
849	145.00
849A	145.00

TRIODES (cont'd)

Type No.	Price
880	$545.00
889A	210.00
889RA	330.00
891	260.00
891R	410.00
892	255.00
892R	405.00
ZB3200	350.00
5604	570.00
5619	410.00
5658	545.00
5666	250.00
5667	330.00
5736	160.00
5771	540.00
5866/AX9900	20.00
5867/AX9901	30.00
5868/AX9902	50.00
5923/AX9904	150.00
5924/AX9904R	210.00
5924A	240.00
6077/AX9906	1675.00
6078	1900.00
6333	245.00
6445	390.00
6446	290.00
6447	430.00
6617	360.00
6618	495.00
6756	388.00
6757	535.00
6758	173.00
6759	206.00
6800	350.00
6960	150.00
6961	210.00

GLOW DISCHARGE TRIODE Miniature

5823	2.50

HI-FI TWIN TRIODES

ECC81/12AT7	2.85
ECC82/12AU7	2.30
ECC83/12AX7	2.30

TWIN TRIODES

ECC85/6AQ8	2.60
‡E88CC/6922	4.75
‡E92CC	1.75
‡5920	2.00
‡6085	3.75

TRIGGER TUBE

Z804U	4.30

† The Amperex types 6268/AX-9911 and 6279/AX-9912 are improved versions but completely interchangeable in every respect with the standard types 4C35 and 5C22 respectively. They have a minimum guaranteed life of 1000 hours due to the self-contained, self-regulating source of hydrogen.

** Price on request. ‡ 10,000 hour life tubes. Prices subject to change without notice.

RADIATOR CREDIT FOR FORCED AIR-COOLED TUBES

TUBE TYPE	USERS ALLOWANCE
889RA	$20.00
891R, 892R	20.00
5604	75.00
5667	20.00
6445	30.00
6447	30.00
6757	75.00

ask Amperex about electronic tubes and semiconductors for every industrial and communications application.

For details, circle #42 on Reader Service Card.

Announcing A Complementary New Line of

ALL-TRANSISTORIZED INSTRUMENTS

BY **KAY**

DESIGNED FROM THE TRANSISTOR OUT . . .

KAY *Audiolator*

All-Transistorized Beat-Frequency Audio Oscillator

FEATURES

• Constant Output, No Line Voltage Influences • Built-In Stability By Means of Feedback • Output Constant with Frequency: 1 db over range • No Hum • Battery Power Supply—Long Life • No Grounds Needed—Place Across Any Transmission System • Excellent for Field Service, Military, Commercial and Domestic Hi-Fi, Industrial Applications

SPECIFICATIONS

Frequency Range: 50 cycles to 15 KC
Output Voltage: 1 volt at 600 ohms
Output Impedance: 600 ohms
Output Flatness: 1 db over entire range
Attenuator: Continuously variable from 1 volt to 40 db below 1 volt
Δf dial: 0 adjust—fine frequency control. Constant frequency shift over entire range
Power Supply: Mercury or penlight cells—300 hrs. life
Dimensions: 6" x 2" x 3¾"
Weight: 2 lbs.
Price: $149.50 f.o.b. Pine Brook, N.J.

KAY *Transvolter*

Model Video

All-Transistorized, Broad-Band Audio-Video Voltmeter

FEATURES

• Inherent stability due to feedback amplifier design • Broad-Band frequency response 10 cycles to 10 mc • Inherent advantages with use of transistors instead of vacuum tubes —small size—light weight—long life—rugged use—lower power consumption—high conversion efficiency • Low Level Measurement over Frequency Range • May be used as a Humless Audio-Video Amplifier

SPECIFICATIONS

Frequency Range: 10 cycles to 10 mc. Direct Reading in volts and db
Amplifier Frequency Response: Flat ± .5 db over range
Accuracy of Measurement: ± 5% of full scale reading
Voltage Range: 1 Millivolt to 1 volt full scale—7 ranges
Sensitivity: Will measure down to 250 Microvolts
Input Impedance: Capacity 5 micromicrofarads; Resistance Component 0.5 Megohms at 1 mc
Audio-Video Amplifier: Maximum output .25 volt at 75 ohms, Gain up to 40 db
Price: $495.00, f.o.b. Pine Brook, N.J.

KAY *Transiply*

Transistorized, Miniature Power Supply

FEATURES

• Stable Metered Output • Continuously Variable Output • Low Impedance • No Ripple • High Current • Positive or Negative Bias Available

SPECIFICATIONS

Input Voltage: 105-125 V, A.C., 50-60 cps
Output Voltage: 0.5 V—7.0 V, D.C., Continuously variable
Output Current: Maximum 200 Ma
Impedance (Internal): 0.5 ohms
Ripple: Less than 1 millivolt at full load
Regulation: 50 Millivolts output variation over input voltage range
Weight: 3½ lbs.
Dimensions: Width 5", Height 6½", Depth 6½"
Price: $125.00 f.o.b. Pine Brook, N.J.

KAY *Transifier*

Small, Modular, Plug-in, Wide-Band Transistorized Video Amplifier

FEATURES

• Broad-Band Response to 15 mc • Completely Transistorized—Small, Self-Contained, Compact Portable Unit • Signal Gain Controlled by Overall Feedback—Built-In Stabilization • No Hum • Long Stable Life—Powered By Three Penlight or Mercury Cells • Units May Be Cascaded to Provide Additional Gain

SPECIFICATIONS

Frequency Response: 10 db position: 3 db down at 20 cycles and 15 mc—20 db position: 3 db down at 20 cycles and 10 mc
Gain: 10 db and 20 db switchable
Input Impedance: Capacitance 15 micromicrofarads—Resistive Component—20,000 ohms at 1 mc to 15,000 ohms at 10 mc
Output Impedance: 75 ohms, approximately
Maximum Output Voltage: 0.15 volts in db position 0.30 volts 20 db position
Price: $85.00 f.o.b. Pine Brook, N.J.

KAY *Minilator*

Multi-Crystal-Controlled Transistor Oscillator

FEATURES

• Transistorized for Long-Life—Self-Contained Mercury Cells • (For Replacement, Ordinary Penlight Cells May Be Used) • Selection by Switch of 1 mc, 2 mc, 5 mc • External jack for any crystal from 1 mc to 5 mc • Stable; Adjustable to WWV Frequencies • Clean Waveform with Stabilizing Diode • Amplitude Feedback* • Portable, Light-Weight, Small Cast-Aluminum Case • Low Priced—Many Uses

SPECIFICATIONS

Output: 0.25 volt at 1000 ohms impedance level
Dimensions: 2¼" x 1¾" x 4½"
Weight: 12 oz.
Price: $95.00 f.o.b. Pine Brook, N.J.
* Pat. Pend.

KAY *Transiprobe*

All-Transistorized, Low-Capacity RF Probe

FEATURES

First transistorized broad-band probe, 20 cycles to 15 mc • Low power dissipation, all transistorized • Built-in stability, amplifier feedback • Open design for easy manipulation • No hum

SPECIFICATIONS

Frequency Response: 20 cycles to 15 mc, 1 db down at 50 cycles and 12 mc, 3 db down at 20 cycles and 15 mc
Output Impedance: Nominal 50 ohms
Input Impedance: Capacitance, 4 micromicrofarads; resistive component, 100,000 ohms
Gain: 1:1 (Unity gain), held constant by feedback amplifier
Maximum Input Voltage: 0.3 volt peak-to-peak
Power Supply: Mercury cells, 800 hour life; constant supply over life of cells. Separate power supply and connecting cables provided with probe
Price: $125.00, f.o.b. Pine Brook, N.J.

For Literature and Complete Specifications, Write

KAY ELECTRIC COMPANY

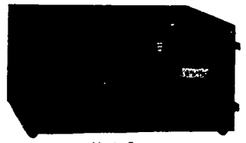
14 Maple Avenue, Pine Brook, N.J.
Dept. ID-9

For details, circle #43 on Reader Service Card.

KAY Electronic Test & Measuring Instruments

● Sweeping Oscillators ● Noise Figure Measurement ● TV Picture & Sound Signal Sources ● Marker Generators ● Pulsed Carrier Generators ● TV Transmitters ● Color Generators ● Signal Generators ● Attenuators ● Sound Spectrographs ● Gain and Loss Test Sets ● Spectrum Analyzers ● Vibration Analyzers ● Vacuum Tube Voltmeters ● Transistorized Test Instruments ● Power Supply ● Voltmeters ● Probe ● Video Amplifier ● Crystal Oscillator ● Audio Oscillator

SWEEPING OSCILLATORS



Vari-Sweep

INST.	RANGE	TUNING	WIDTH	OUTPUT	PRICE
MEGA-SWEEP	50kc—1000 mc	continuous	0-40	100mv	$465.
CALIBR. MEGA-SWEEP	50kc—1000 mc	single dial	0-50	100mv	495.
MEGA-SWEEP 111A	10mc—950 mc	zero level	0-40	.15V rms 70 ohms	575.
	450mc—900 mc	base line		.3V rms 300 ohms	
MEGA-SWEEP 112A	800mc—1200 mc	single dial	0-40	.3V rms 70 ohms	575.
VARI-SWEEP	2—220 mc Fund.	continuous	Up to 30mc plus	1.0V rms 70 ohms	695.
LIGNA-SWEEP C	TV, FM, Video	continuous	Up to 15mc plus	1.0V rms 70 ohms	350.
ULTRA-SWEEP	450—900 Fund.	continuous	0-60 mc	3.0V rms 70 ohms	895.

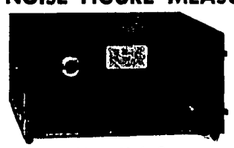
SWEEPING OSCILLATORS WITH MARKS

Rada-Sweep Sr.

Marka-Sweep
MODEL VIDEO 50

INST.	RANGE	TUNING	WIDTH	MARKERS	OUTPUT	PRICE
MARKA-SWEEP	50kc—20mc	3 ranges	complete	6 crystals	1.0V P.-P.	$525.
MODEL VIDEO		50kc-20mc	range		70 ohms	
MARKA-SWEEP	50kc—8mc	cont. variable	8mc	5 crystals	1.5V rms	695.
MODEL VIDEO TTV		CW signal		1 variable	70 ohms	
MARKA-SWEEP	50kc—50mc	contin.	4—50mc	5 crystals	1.0V P.-P.	695.
MODEL VIDEO 50			contin. variable			
VARI-SWEEP	10—145mc Fund.	contin.	30mc+	11 crystals	1.0V rms	950.
MODEL RADAR				1 variable	70 ohms	
VARI-SWEEP	4—120mc Fund.	contin.	30mc+	11 crystals	1.0V rms	950.
MODEL IF				1 variable	70 ohms	
RADA-SWEEP SR.	1—260mc Fund.	6 switched bands	30-70mc	24 crystals	0.5V rms 70 ohms	545. Less Crystals
MEGA-SWEEP	10—500mc	contin.	50kc—40mc		0.15V rms—70 ohms	745.
MODEL MARKER	400—950mc	center			0.07V rms—70 ohms	
KILO-SWEEP	50kc—2mc	contin.	contin. to	6 crystals	.5V rms	575.-700.
	—5mc		100kc		70 ohms	
	—10mc					
SONA-SWEEP	5kc—200kc	contin.	20kc	6 crystals	.5V rms—70 ohms	575.
RADA-SWEEP	30 & 60mc	center	20mc or 3mc	9 crystals	.25V rms—70 ohms	395.
RF-P MARKA-SWEEP	1F+ 12 channels	switchable	15mc	picture and sound	.5V rms—70 ohms	695.

NOISE FIGURE MEASUREMENT . . . NOISE GENERATORS



Mega-Node Sr.

INST.	RANGE	NOISE FIG. RANGE	PRICE
MEGA-NODE	5—220mc	0—16db @ 50 to 300 ohms	$325.
MEGA-NODE SR.	10—3000mc	0—20db @ 50 ohms	790.
MICROWAVE MEGA-NODES	1200—26,500mc	Fluorescent Tube 15.8 ±.25db Inert Gas Tubes 15.2 ±.1db	$295.-$695. (with power supply)
RADA-NODE	5—26,500mc	0—21db ±.25db IF strips @ 30 and 60 mc	$1,395. covering range 5 mc to 400mc

SOUND ANALYSIS

Echo-Vox Sr.

INST.	DESCRIPTION	FREQ. RANGE		PRICE
VIBRALYZER	Vibration Frequency Analyzer	5—4400 cps.	Displays amplitude vs. frequency vs. time; provides permanent record	$2500.
SONAGRAPH	Sound spectrograph for frequency analysis of audio energy	85—8000 cps.	Records frequency and intensity to time	1995.
SONALATOR	Dynamic translater for visible speech display	100—4000 cps.	Displays frequency vs. time on oscilloscope	1595.
ECHO-VOX, SR.	Provides variable periods of time delay at audio frequencies	40—12,000 cps.	20 to 1600 millisecond delay range	1495.
SONA-STRETCHER	Speech stretcher for slowing speech to ½ normal tempo	100—4000 cps.		950.
AUTO-VOX	Variable audio time delay. Dual Channel Input.	40—12,000 cps.	Negative to positive passing through zero. Delay Range—100 to +720 ms	1795.

OTHER INSTRUMENTS

Microlter

INST.	RANGE	RANGE OF MEASUREMENT	FEATURES	PRICE
KILO-Q	20cps—1mc	Q, 0-12.5, 0-25, 0-50 0-125, 0-250, 0-500	60mmf-.1mf Cap. Range	$ 895.
MICROLTER 50 VTVM	100cps—50mc	Full Scale: 1 millivolt-1V. 7 ranges	May Be Used As 50mc Video Amp.	495.
TRANSALYZER	50kc—50mc	Measures Alpha and Alpha Cutoff-Collector and Emitter Current, 3 Voltages—Emitter to Base, Emitter to Collector and Base to Collector		1595.
MEGA-MATCH	10mc—1000mc	Contin. tuned sweeping oscillator	Displays Reflected Energy. Check matching impedance	895.
UTILATOR	4.5—220mc	Fundamental Freq. Utility Oscillator AGC'D	0.7V rms into 75 ohms metered AGC'D	295.
GAINSET	Complete Equipment for Making Precision Measurements of Gain or Loss in Components and Systems.			1995.
MEGA-PIX	TV Sound-Picture. Color or Black and White Transmitter		.25V output into 70 ohms Specify Channel	550.
RADA-PULSER SR.	Carrier Freq. 12—80mc	CW & RF Pulse .2V rms into 70 ohms Video Pulse .5V rms into 50 ohms	Rise Decay .03 mus Pulse Width .2-20 mus Rep. Rate 400-4000 P.P.S.	745.

KAY ELECTRIC COMPANY

DESIGNERS & MANUFACTURERS OF PRECISION ELECTRONIC TEST AND MEASURING EQUIPMENT

Dept. ID-9, 14 MAPLE AVE., PINE BROOK, NEW JERSEY CAldwell 6-4000

For details, circle #44 on Reader Service Card.

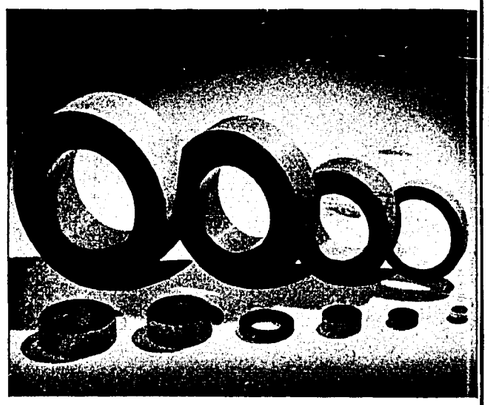
HERE'S HOW TO SPECIFY

Performance-Guaranteed TAPE WOUND CORES

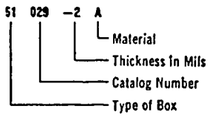
Magnetics, Inc. manufactures "Performance-Guaranteed" Tape Wound Cores using such commercially available alloy materials as Hy Mu 80, 48 Alloy and Orthonol. These alloys, when properly processed, fill the majority of applications in which tape wound cores are used today.

Each "Performance-Guaranteed" Tape Wound Core is coded by a part number which describes it in great detail. Knowing this code will greatly simplify your purchasing and assembly line practices.

1. 50,000 series are Standard Cores in Phenolic Boxes
   51,000 series are Standard Cores in Aluminum Boxes
2. Number preceding final letter is tape thickness in mils
3. Final letter describes the high permeability material as follows: A—Orthonol D—Hy Mu 80 H-48 Alloy



Example: A typical core number is 51029-2A
1. 51,000 indicates a standard core in an Aluminum Core Box.
2. The number preceding final letter is 2, indicating tape thickness is 2 mils.
3. Final letter is A, showing Orthonol is the material.



For complete information, write for Catalog-Design Manual TWC-200

TABLE I • STANDARD SIZES OF TAPE WOUND CORES

A_eA_w X 10^{-6} (See Note 1)	CORE NUMBER (See Note 2)	CORE DIMENSIONS (In.) I.D.	O.D.	Ht.	NOMINAL CASE DIMENSIONS (In.) I.D.	O.D.	Ht. (See Note 3)	CASE WINDOW AREA IN CIRCULAR MILS X 10^{-6}	MEAN LENGTH OF MAGNETIC PATH (Cm.)	EFFECTIVE CORE CROSS SECTION AREA ($Cm.^2$) .001	.002	.004 & .006	I.D./O.D. RATIO
0.004	50153	0.375	0.500	0.125	0.315	0.560	0.195	0.099	3.49	0.041	0.043	0.046	0.750
*0.008	50056	0.500	0.625	0.125	0.440	0.685	0.195	0.194	4.47	0.040	0.043	0.045	0.800
0.013	50057	0.625	0.750	0.125	0.555	0.810	0.195	0.308	5.49	0.040	0.042	0.046	0.833
*0.017	50000	0.500	0.750	0.125	0.440	0.810	0.195	0.194	4.92	0.081	0.086	0.091	0.667
*0.030	50002	0.650	0.900	0.125	0.590	0.960	0.195	0.348	6.13	0.081	0.086	0.091	0.722
0.053	50033	0.625	0.875	0.250	0.555	0.945	0.330	0.308	5.99	0.162	0.172	0.182	0.714
0.059	50003	0.750	0.938	0.250	0.680	1.010	0.330	0.460	6.74	0.121	0.128	0.135	0.800
*0.059	50076	0.625	1.000	0.188	0.555	1.070	0.268	0.308	6.36	0.182	0.193	0.205	0.625
*0.074	50011	1.000	1.250	0.125	0.930	1.320	0.195	0.864	8.94	0.081	0.086	0.091	0.800
*0.079	50007	0.625	1.000	0.250	0.555	1.070	0.330	0.308	6.36	0.242	0.257	0.272	0.625
*0.079	50061	0.750	1.000	0.250	0.680	1.070	0.330	0.462	6.93	0.161	0.171	0.181	0.750
*0.089	50106	0.750	1.125	0.188	0.680	1.195	0.260	0.462	7.38	0.182	0.193	0.205	0.667
0.118	50168	0.750	1.000	0.375	0.680	1.070	0.455	0.462	6.97	0.227	0.257	0.272	0.750
0.119	50094	0.625	1.000	0.375	0.555	1.070	0.445	0.308	6.49	0.339	0.385	0.411	0.625
*0.148	50004	1.000	1.250	0.250	0.930	1.320	0.330	0.864	8.94	0.161	0.171	0.181	0.800
0.179	50034	0.750	1.125	0.375	0.680	1.195	0.455	0.460	7.49	0.342	0.389	0.405	0.667
0.186	50115	1.125	1.375	0.250	1.045	1.445	0.330	1.090	9.99	0.161	0.171	0.181	0.818
*0.222	50029	1.000	1.375	0.250	0.930	1.445	0.330	0.864	9.39	0.242	0.257	0.272	0.727
0.237	50188	0.750	1.250	0.375	0.680	1.320	0.455	0.462	7.98	0.453	0.514	0.544	0.600
0.250	50181	0.875	1.250	0.375	0.805	1.320	0.440	0.648	8.48	0.340	0.386	0.408	0.700
*0.296	50032	1.000	1.500	0.250	0.930	1.570	0.330	0.864	9.84	0.323	0.343	0.363	0.667
*0.444	50026	1.000	1.500	0.375	0.930	1.570	0.445	0.864	9.84	0.484	0.514	0.544	0.667
*0.469	50030	1.250	1.750	0.250	1.170	1.820	0.330	1.368	11.85	0.323	0.343	0.363	0.714
*0.592	50038	1.000	1.500	0.500	0.930	1.570	0.590	0.864	9.84	0.605	0.685	0.726	0.667
*0.597	50018	1.625	2.000	0.250	1.525	2.100	0.330	2.324	14.41	0.242	0.257	0.272	0.813
*0.937	50035	1.250	1.750	0.500	1.170	1.820	0.590	1.368	11.85	0.605	0.685	0.726	0.714
*1.055	50425	1.250	2.000	0.375	1.170	2.100	0.465	1.368	12.60	0.726	0.771	0.817	0.625
*2.471	50017	2.000	2.500	0.500	1.900	2.600	0.590	3.608	17.87	0.605	0.685	0.726	0.800
2.685	50040	1.500	2.000	1.000	1.400	2.100	1.110	1.960	13.99	1.211	1.370	1.457	0.750
*2.686	50001	1.500	2.500	0.500	1.400	2.600	0.590	1.959	15.79	1.210	1.371	1.452	0.600
*3.944	50031	2.500	3.000	0.500	2.400	3.100	0.590	5.757	21.73	0.605	0.685	0.726	0.833
*4.947	50103	2.000	3.000	0.500	1.900	3.100	0.590	3.608	19.67	1.210	1.371	1.452	0.667
*7.320	50128	2.500	3.500	0.500	2.312	3.688	0.713	5.343	23.71	1.210	1.371	1.452	0.714
*8.893	50022	2.000	3.000	1.000	1.900	3.100	1.110	3.608	19.67	2.419	2.742	2.903	0.667
*14.661	50042	2.500	3.500	1.000	2.313	3.688	1.188	5.343	23.71	2.419	2.742	2.903	0.714
*22.907	50080	2.500	3.750	1.250	2.313	3.938	1.437	5.347	24.59	3.780	4.284	4.536	0.667
*27.489	50100	2.500	3.750	1.500	2.313	3.938	1.688	5.347	24.59	4.536	5.141	5.444	0.667
*48.176	50081	3.250	4.500	1.500	3.062	4.688	1.688	9.371	30.64	4.536	5.141	5.444	0.722
*57.452	50427	3.250	5.000	1.500	3.062	5.188	1.688	9.371	32.40	6.351	7.198	7.621	0.650
*59.617	50112	4.000	5.250	2.000	3.782	5.469	2.280	14.063	36.66	6.048	6.855	7.258	0.762
*159.386	50426	4.000	6.000	2.000	3.782	6.280	2.276	14.532	39.34	9.677	10.968	11.613	0.667

*A.I.E.E. Proposed Standard Size.

Note 1—Product of window area and iron area calculated for 2 mil material.
Note 2—Part numbers listed are for phenolic cases. Specify 51000 series for aluminum cases (last three numbers remain the same).
Note 3—Dimensions listed are nominal sizes for phenolic cases. For aluminum cases, add .015 to .020 inches to heights shown.

For details, circle #45 on Reader Service Card.

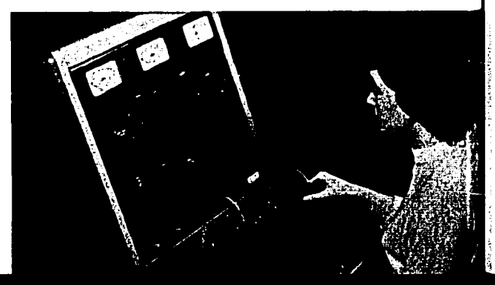
TABLE II • NAMES OF SIMILAR MATERIALS

D—Hy Mu 80	H-48 Alloy	A—Orthonol
4—79 Permalloy	Carpenter 49	Orthonik
MO—Permalloy	Allegheny 4750	Deltamax
Mu Metal*	Hipernik	Hipernik V

*This material has a different composition than the others in the same column. The characteristics of this material are such that in general it is not recommended for use in tape wound cores.

MATCHED CORES

Magnetics, Inc. will match cores within 5% over the entire voltage-current loop. Matching prior to winding results in improved yield and economical production. There is a very slight service charge for matching cores.



MAGNETICS INC. PRODUCTS

Performance-Guaranteed BOBBIN CORES

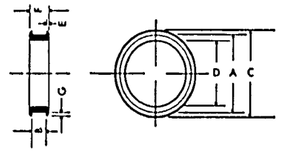
TABLE III • STANDARD CERAMIC AND STAINLESS BOBBIN CORES

	PART NO.	NOMINAL DIMENSIONS IN INCHES A	B	C	D	E	F	G
CERAMIC BOBBIN	80002-B	.125	.140	.185	.090	.030	.200	.030
	80003-B	.188	.140	.248	.148	.030	.200	.030
	80023-A	.250	.140	.310	.210	.030	.200	.030
	80004-B	.313	.140	.373	.270	.030	.200	.030
	80018-A	.313	.140	.435	.270	.030	.200	.061
	80009-B	.375	.140	.435	.330	.030	.200	.030
	80017-A	.563	.140	.685	.513	.030	.200	.061
STAINLESS STEEL BOBBIN	80163	.110	.050	.140	.100	.005	.060	.015
	80164	.110	.140	.140	.100	.005	.150	.015
	80165	.125	.075	.185	.105	.010	.095	.030
	80166	.125	.140	.155	.110	.005	.150	.015
	80167	.188	.140	.248	.168	.010	.160	.030
	60168	.313	.140	.373	.293	.010	.160	.030

For Additional Information, Write for Bulletin BC-102

Bobbin cores are now being made in combinations of the following dimensions. Other sizes can be supplied on request.

*BOBBIN DIAMETERS: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 1", 1 1/4", 1 1/2".
†TAPE WIDTH: 1/16", 1/8", 1/4", 3/8", 1/2", 1", 1 1/2".
TAPE THICKNESS: 0.000125", 0.000250", 0.0005", 0.001".
BUILD-UP: 1 wrap to several hundred.
MATERIALS: 4-79 Mo Permalloy, Orthonol.
*1 1/2-in. diam. bobbin is not standard, but can be furnished upon request.
†Not with standard bobbins if tape width is over 1/4-in., but can be furnished upon request.



Performance-Guaranteed POWDER CORES

TABLE IV • MOLYBDENUM PERMALLOY POWDER CORES

Core Number	μ	Inductance (mh) 1000 Turn Coil Min.	Nom.	Max.	Dimensions (inches) before finish O.D. Min.	Nom.	Max.	I.D. Min.	Nom.	Max.	Height Min.	Nom.	Max.	Radii
55206-A2	125	58	68	83	.790	.800	.810	.495	.500	.505	.240	.250	.260	.032
55848-A2	60	28	32	39	.790	.800	.810	.495	.500	.505	.240	.250	.260	.032
55511-A2	26	12	14	17	.790	.800	.810	.495	.500	.505	.240	.250	.260	.032
55057-A2	14	6.6	7.8	9.2	.790	.800	.800	.495	.500	.505	.240	.250	.260	.032
55310-A2	125	77	90	104	.890	.900	.910	.547	.550	.553	.290	.300	.310	.062
55930-A2	125	136	157	179	1.050	1.060	1.070	.575	.580	.585	.428	.440	.452	.075
55894-A2	60	65	75	86	1.050	1.060	1.070	.575	.580	.585	.428	.440	.452	.075
55395-A5	60	65	75	86	1.050	1.060	1.070	.575	.580	.585	.428	.440	.452	.075
55066-A2	26	28	32	37	1.050	1.060	1.070	.575	.580	.585	.428	.440	.452	.075
55068-A2	14	15	18	20	1.050	1.060	1.070	.575	.580	.585	.428	.440	.452	.075
55548-A2	125	106	127	148	1.288	1.300	1.312	.780	.785	.795	.400	.420	.437	.062
55585-A2	125	71	79	91	1.335	1.350	1.365	.908	.920	.925	.333	.350	.367	.062
55324-A2	125	101	117	137	1.395	1.410	1.425	.868	.880	.885	.400	.412	.424	.062
55254-A2	125	146	168	195	1.558	1.570	1.582	.938	.950	.955	.555	.570	.585	.100
55438-A2	125	248	281	325	1.825	1.840	1.855	.938	.950	.955	.690	.710	.730	.100

For Complete Details, Write for Bulletin PC-103

Performance-Guaranteed MAGNETIC LAMINATIONS

TABLE V • STANDARD MAGNETIC CORE LAMINATION SHAPES

LAMINATION TYPE	STACK HEIGHT (inches)	WINDOW AREA (sq. in.) W	CROSS-SECTION AREA (sq. in.) A	W x A	LAMINATION TYPE	STACK HEIGHT (inches)	WINDOW AREA (sq. in.) W	CROSS-SECTION AREA (sq. in.) A	W x A
DU 1	1/4	.5625	.063	.035	EI 375	3/8	.234	.141	.033
DU 37	3/8	1.125	.141	.159	EI 625	1/2	.293	.391	.115
DU 50	1/2	2.000	.250	.500	F 12	.344	.188	.118	*.022
EE 24-25	1/4	.125	.063	.008	F 12				
EE 26-27	3/8	.172	.141	.024	(Modified)	.344	.188	.118	.022
EE 28-29	1/2	.039	.014	.0005	F 13	.344	.190	.118	.022
EE 186-187	5/16	.125	.063	.008	F 20	1/2	.371	.141	.052
EI 11	7/8	.574	.766	.440	F 21	1/2	.257	.25	.064
EI 12	1	.750	1.000	.750	Ring	Variable	Various	Various	Variable
EI 21	1/2	.254	.250	.064	U-BE	1/4	.313	.063	.020
EI 75	3/4	.422	.563	.237	UI 312	5/16	.293	.098	.028
EI 187	5/16	.082	.035	.003	UI 375	3/8	.422	.141	.059

Performance-Guaranteed laminations are made from any commercially available soft magnetic material. Heat treatment for specific properties may be specified but should be checked by Magnetics, Inc. Engineering Department if the Performance-Guarantee is to apply. When asking for quotations, describe, if possible:

1. Shape required
2. Grade of magnetic steel
3. Gauge of lamination
4. Surface insulation

For Complete Details, Write for Catalog ML-201.

Performance-Guaranteed MAGNETIC SHIELDS

TABLE VI • MAGNETIC SHIELDS

Tube To Be Used With	Tube Mfr.	Magnetics, Inc. Part No.	Tube To Be Used With	Tube Mfr.	Magnetics, Inc. Part No.	Tube To Be Used With	Tube Mfr.	Magnetics, Inc. Part No.
RS-1, 2, 3		40012	5 AMP-1	Dumont	40036	7 MP	Dumont	40120
RS-4, 5, 6		40013	5 BP-1	RCA	40086	7 JP-1, 4	RCA	40005
RS-7, 8, 9		40014	5 BPA	Dumont	40086	7 VP-1	RCA	40005
2 BP-1, 11	RCA	40024	5 CP-1A	RCA	40087	10 SP-4	RCA	40031
3 ACP	Dumont	40023	5 CPA	Dumont	40087	10 WP-7	Dumont	40031
3 BP-1A	RCA	40023	5 FP-4, 7	RCA	40149	5819	RCA	40050
3 JP-1, 7	RCA	40023	5 AHP & 5FP	Dumont	40149	K 1197	Dumont	40021
3 GPA	Dumont	40007	3 JPA	Dumont	40044	6363	Dumont	40021
3 KP-1, 4, 11	RCA	40007	5 LPA	Dumont	40151	K-1198	Dumont	40022
3 MPI	RCA	40148	5 RP	Dumont	40119	6384	Dumont	40022
3 RPA	Dumont	40001	5 UP-1, 7, 11	RCA	40000	K-1211	Dumont	40067
3 RP-1	RCA	40001	5 WP-11, 15	RCA	40150	6199	RCA	40015
3 WPI	Dumont	40074	5 XP	Dumont	40153	6292	Dumont	40020
5 ABP-1,7,11	RCA	40019	5 YP	Dumont	40152	6467	Dumont	40055
5 ADP	Dumont	40019	7 ABP	Dumont	40120	931-A	RCA	40066
5 AFP	Dumont	40109	7 MP-7, 14	RCA	40120			

For Further Details, Write Sales Engineering Dept.

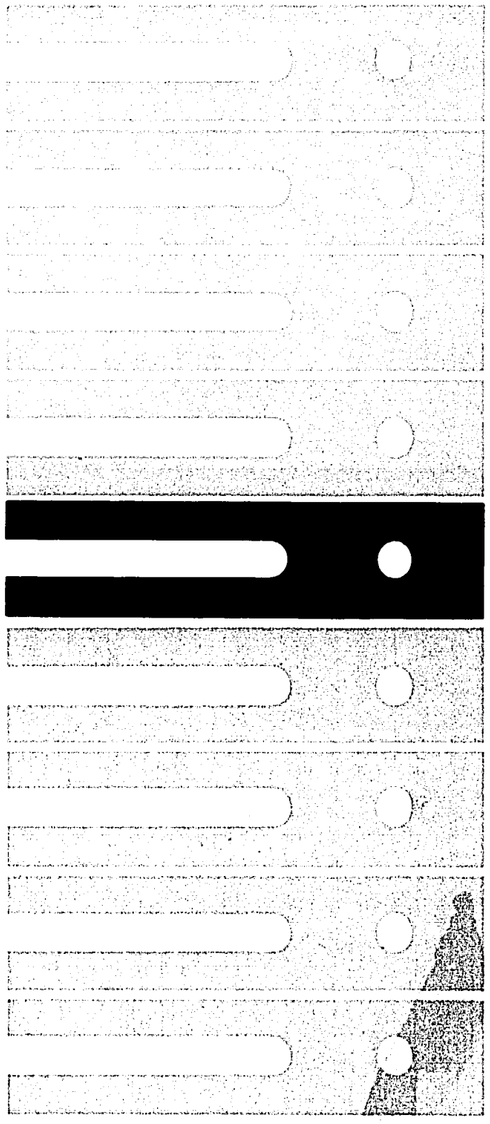
For details, circle #46 on Reader Service Card.

DEPT. Y-39

MAGNETICS inc.

BUTLER, PENNSYLVANIA

Tuning Fork Controlled



Tuning Fork Resonators, the ultimate in precision audio frequency control.

PHONE OR WRITE
for complete information regarding component type Tuning Fork Resonators, and variously packaged Frequency Standards, Oscillators, Drivers, and Frequency Dividers.

PHILAMON LABORATORIES INC.

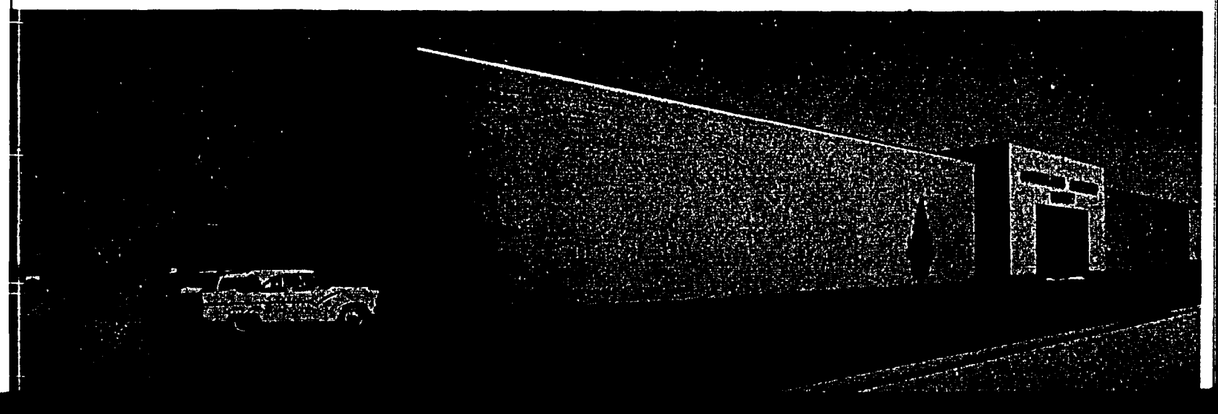
90 Hopper Street, Westbury, Long Island, N. Y. EDgewood 3-1700

For details, circle #47 on Reader Service Card.

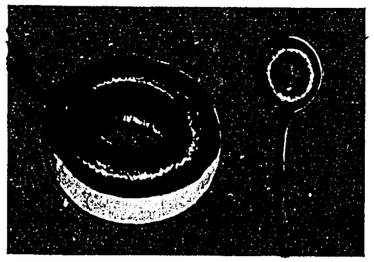
C-A-C®

AMERICA'S LARGEST EXCLUSIVE FACILITY for the Manufacture of All Types of TOROIDAL COMPONENTS

For details, circle #48 on Reader Service Card.

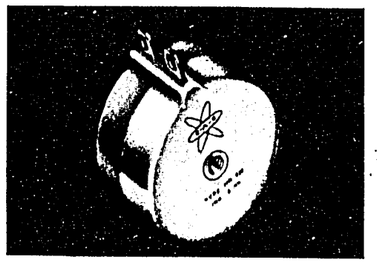


TOROIDAL INDUCTORS



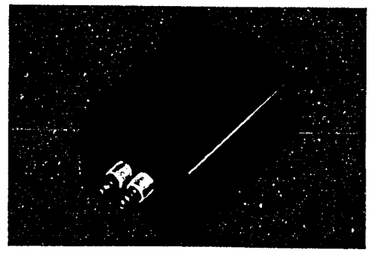
UNCASED TOROIDS

Basic inductor component. Plain, wax or plastic dipped with flex-leads. Hi Q values 10cps to 10mc. Complete range of sizes: subminiature, wedding ring and up to 12" OD. Standard inductances stocked for immediate delivery. Mass production utilizing CAC-designed winding equipment enables swift completion of large orders.



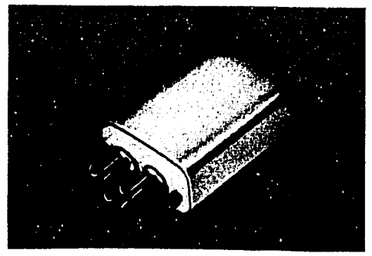
PLASTIC CASED TOROIDS

CAC compression molded toroids per Mil specs have become the standard of the industry. Most compact design — may be stacked — mounted by center bushing which absorbs mounting pressures — sturdy, tinned terminals — arrangements available up to 6 terminal connections. Standard inductance values shipped from stock — special inductances and configurations supplied promptly on request.



HERMETICALLY SEALED CASED TOROIDS

CAC "HS" series provides metal encased, hermetically sealed units complying with MIL specifications. Mounting area minimized — extremely low hum pickup — terminals of proven design using Teflon assure permanent seal at temperature extremes. Rugged construction — convenient mounting facilities. To insure stability, cores are thermo-cycled prior to encasement. Standard inductances in stock.



SUBMINIATURE TOROIDS

Uncased, plastic molded and hermetically sealed in three standard core types (others available). Designs for all requirements—for chassis mount or printed circuits.

For the engineer whose design considerations dictate the utmost in electrical performance versus size, CAC's subminiature toroids present the answer.

For details, circle #52 on Reader Service Card.

Catalogs on Individual Components are Available on Request.

COMMUNICATION ACCESSORIES COMPANY
Lee's Summit, Missouri ● Phone Kansas City BRoadway 1-1700
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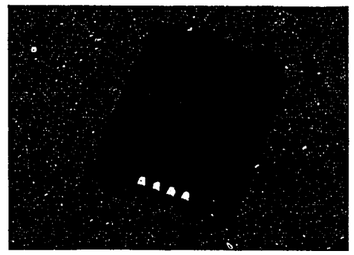
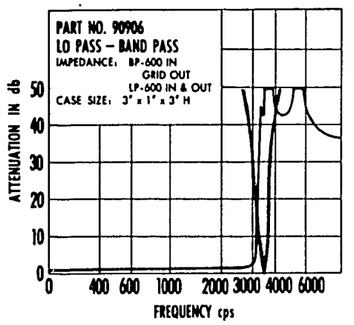
L-C AND MECHANICAL FILTERS



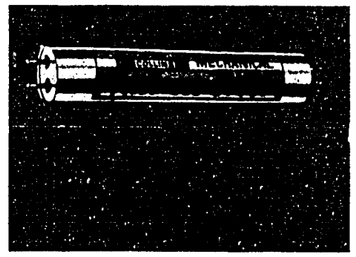


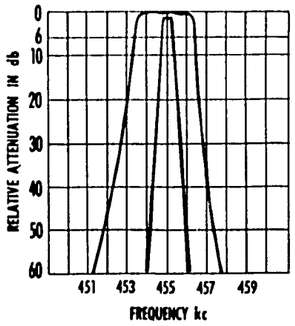
L-C FILTERS

L-C filters utilizing high Q toroidal inductors and high quality capacitors are the heart of these frequency selective components. Recent developments of magnetic materials and highly stable capacitors have extended the useful frequency and temperature range of electrical wave filters. Use of impedance transformations, near unity coupling, and other applications of advanced network theory result in high performance units in small volume packages.

Low pass, high pass, band pass and band stop filters can be designed covering sub audio to over 500kc range. Line, interstage or other impedances can be specified. Filters can be designed for direct paralleling where required. High permeability cases and the closed toroidal form assure low hum pickup. Temperature stabilization on the order of 0.1% frequency can be attained through use of negative TC compensation to offset slightly positive coil and capacitor characteristics.

Depicted response curve is for an integrally packaged low pass—band pass filter employing the latest design and production procedures. This unit uses less chassis area and is an excellent example of subminiature coil usage, impedance transformations, and printed circuitry. Hermetically sealed to meet the military specifications.





MECHANICAL FILTERS *(Developed and mfd. by Collins Radio Co.)*

The new Collins manufactured, miniaturized "Y" series mechanical filters provide obvious circuitry design advantages. The response characteristics of the "Y" series are identical to the previous styles of Collins mechanical filters which of course are available from stock in series "A", "Z", "F", "H", "J", and "K".

The new "Y" series advantages are as follows:

1. Smaller size!
2. Standard performance!
3. Lowest priced mechanical filters yet!
4. Ideal for transistorized printed circuit applications!
5. From Stock! Center frequencies of 455kc and 6db bandwidths of 2.1kc (F455Y-21), 3.1kc (F455Y-31), 4.0kc (F455Y-40), 6.0kc (F455Y-60), 8.0kc (F455Y-80), 12.0kc (F455Y-120), 16.0kc (F455Y-160), and 35.0kc (F455Y-350). Other bandwidths available soon.
6. Tooled for quantity production!

Catalogs on Individual Components are Available on Request.

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Lee's Summit, Missouri ● Phone Kansas City BRoadway 1-1700
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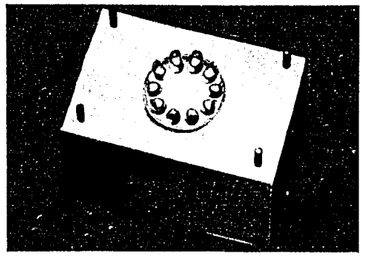
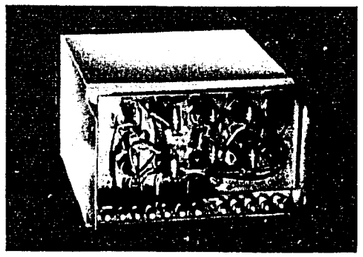
MAGNETIC AMPLIFIERS AND TRANSFORMERS



MAGNETIC AMPLIFIERS

Custom computer amplifiers with high stability and linearity can be designed having single or multiple inputs to your specific needs. Servo drives and relay actuators are also available. Frequency selective networks can be integrally designed to provide additional useful control functions. Proven packaging techniques insure minimum size—proven toroidal construction assures highest performance.

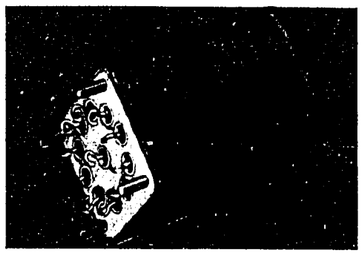
Typical Temperatures..... −60°C. to +150°C.
Typical Line Frequencies..... 60cps to 6000cps



MISSILE POWER TRANSFORMERS

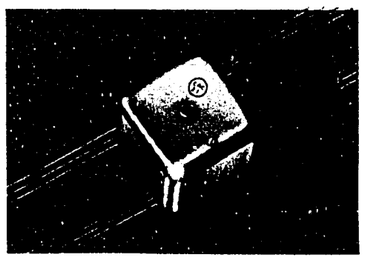
Recommended for supply frequencies above 400 cps and where size performance and reliability are factors. Thin nickel alloy toroidal cores reduce core losses. Toroid structure cures stray field problems.

SEALED MISSILE POWER SUPPLIES combining toroidal power transformers, toroidal filter chokes, hi temp capacitors and silicon rectifiers. These units offer multiple outputs and low ripple. Low stray field of toroidal elements obviate usual internal shielding. Mag regulation where required.



LAMINATED TRANSFORMERS AND INDUCTORS

A complete line of laminated constructed units are now available through CAC. Our highly qualified engineering staff, a well complimented laboratory, humidity controlled production facility with modern manufacturing equipment guarantees conformance with any specifications. Both power and audio transformers employing advanced techniques can be supplied either hermetically sealed or encapsulated to 150° C. ambients. Catalogues, supplied upon request, cover a wide range of standardized designs including omnirange and ILS Filters.



PRECISION RATIO COMPUTER TRANSFORMERS

Toroidal form of construction is ideal for designing precision ratio transformers since the turns of wire are applied to and adjusted *on* the core. Normal production procedure of zero turn accuracy, high permeability cores, low phase shift, and near unity coupling will yield laboratory quality on any production run. Advanced design and newest packaging methods provide optimum performance with minimum size and rugged construction.

For details, circle #51 on Reader Service Card.

Catalogs on Individual Components are Available on Request.

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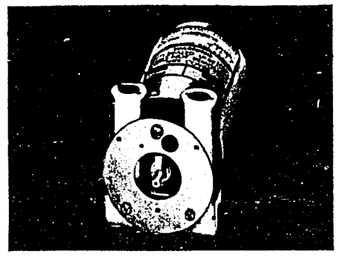
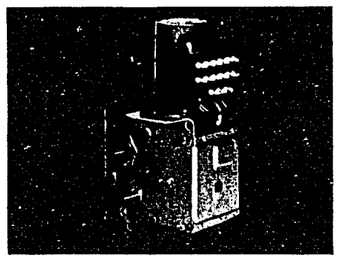


PERMEABILITY-TUNED VFO's *(Mfd. by Collins Radio Co.)*

Mechanically stable — sealed against atmospheric changes — temperature and voltage compensated. Available as complete packages for incorporation into your equipment. Superior accuracy, stability and linear dial calibration for your transmitters, receivers, test equipment or frequency standards.



AUTOTUNES *(Mfd. by Collins Radio Co.)*

Electro-mechanical position systems. Ideally suited for components requiring rotary or linear motion. Positioning accuracies of 0.05 angular degrees with reset accuracy to 0.0001 inch relative to ¼ inch shaft size. Designed for the lifetime of any equipment. Fast — versatile — high torque — accurate — dependable.

Bulletin No. 457—Printed in U.S.A.

Communication Accessories Company

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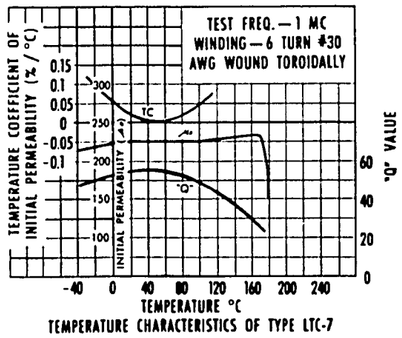
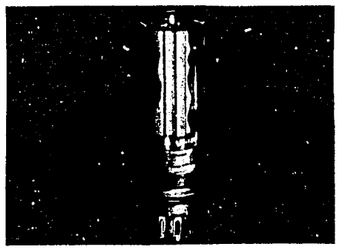
LEE'S SUMMIT, MISSOURI
PHONE KANSAS CITY BRoadway 1-1700



TEMPERATURE CHARACTERISTICS OF TYPE LTC-7

FERRITE CORES *(Mfd. by Collins Radio Co.)*

Requirements for extreme temperature stability and consistently reproducible cores encouraged the Collins Radio Company to enter the magnetic materials field. Now, after several years of intensive research and development, these cores are available through CAC in many standard or custom forms for all applications. Temperature characteristics developed exhibit 10 times improvement over previous materials. Special saturation and other properties are presently available. Technical bulletins upon request.



HEAT DISSIPATING TUBE SHIELDS *(Mfd. by Collins Radio Co.)*

Heat treated beryllium copper corrugated liner and socket insert are highly resilient and accommodate wide variations of tube diameter. Base liner reduces bulb temperature in most critical tube area. Interchangeable with standard JAN equipment. Tube cannot work out of socket through long term vibration. Maximum electrostatic shielding.

For details, circle #53 on Reader Service Card.

Catalogs on Individual Components are Available on Request.

COMMUNICATION ACCESSORIES COMPANY
Lee's Summit, Missouri ● Phone Kansas City BRoadway 1-1700
A Subsidiary of Collins Radio Company

C-A-C's New Large Facilities Provide PRODUCTION ADVANTAGES

The new C-A-C building, covering over 50,000 square feet on a single level, makes possible complete departmentalization utilizing the most modern production facilities and techniques. Over 750 employees, working as a well-organized team—and highly experienced in their specialized fields—offer an unexcelled service in the processing of orders. Year 'round air-conditioning and humidity control not only provide greater employee comfort, but contribute to higher precision workmanship.

The C-A-C organization was built on service—it pioneered many of the recent developments in toroidal windings and packaging techniques. Now, in the most complete laboratory of its kind (including environmental testing facilities), C-A-C engineering and research is progressing to bring you new developments—new advantages.

SEE YOUR C-A-C MAN FOR ADDITIONAL INFORMATION

NEW YORK—H. Gray Assoc., YE 2-3825
21-10 33rd Rd., Long Island City 6, N. Y.

PHILADELPHIA—C. R. Hile Co., Elgin 6-2266
Hillview Road, Box 144, Paoli, Pa.

BALTIMORE—C. R. Hile Co., Lyric 2-7755,
L. G. Korman, Box 44,
Kingsville, Md.

LOS ANGELES—S. O. Jewett, State 9-8103,
13537 Addison St., Sherman Oaks, Calif.

TUCSON—S. O. Jewett, Pat Maguire, East 7-1644
1025 S. Van Buren, Tucson, Arizona

SYRACUSE—Naylor Electric Co., 2-3894,
1115 Hills Building, Syracuse, N. Y.

MERIDEN—Henry Lavin Assoc., Beverly 7-5527,
P. O. Box 196, Meriden, Conn.

DALLAS—Norvell Assoc., Forest 8-4180,
5622 Dyer St., Dallas, Texas

ST. PAUL—Northport Engineering, Inc.
Midway 6-2623, J. D. Webster, 1729 Selby St.,
St. Paul 4, Minn.

ST. LOUIS—E. W. McGrade Co., Parkview 5-6550,
1110 S. Brentwood, St. Louis 17, Mo.

ORLANDO—C. R. Hile Co., 711 Magnolia Ave.,
Wm. Lehmann, Orlando, Fla., Orlando 4-0131

CHICAGO—Gassner & Clark Co.,
Rogers Pk. 4-6121, 6644 N. Western Ave.,
Chicago 45, Ill.

NEEDHAM—Henry Lavin Associates,
3-3446, Bob Curtin, 82 Curve St.,
Needham, Mass.

CLEVELAND—Ernie Kohler Assoc.,
Olympic 1-1242, 8905 Lake Ave.,
Cleveland 2, Ohio

DAYTON—Ernie Kohler Assoc.,
Oxmoor 2813, 2600 Far Hills Ave.,
Dayton 9, Ohio

SEATTLE—Testco, Mohawk 4895,
D. Thompson, Boeing Field, Rm. 105,
Seattle 8, Wash.

INDIANAPOLIS—Morris, Cunningham &
Mitchell, Clifford 1-3222, 1-0225, 5-6268,
6101 College Ave. Bldg., Indianapolis 20, Ind.

KANSAS CITY—E. W. McGrade Co.,
Logan 1-3709, P. O. Box 8876, Kansas City, Mo.

For details, circle #49 on Reader Service Card.

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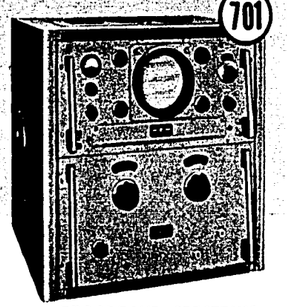
Communication Accessories Company

A Subsidiary of Collins Radio Company

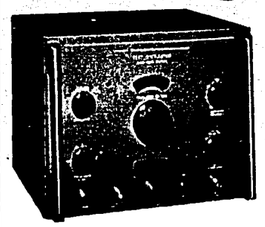
LEE'S SUMMIT, MISSOURI
PHONE KANSAS CITY BRoadway 1 1700

701 — BROADBAND SPECTRUM ANALYZER



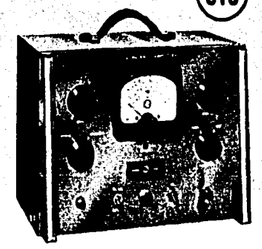
Type L701A: 950 to 2000 Mc/s (Fund.)
Type S701A: 1900 to 4000 Mc/s (Fund.)
Direct Reading: One Knob Freq. Control
Swept IF: 7 Kc and 50 Kc
Sweep Width: 50 Mc

771 — SIGNAL SOURCES



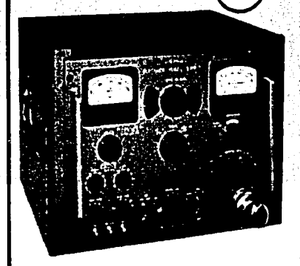
Type L771A: 950 to 2000 Mc/s
Type S771A: 1900 to 4000 Mc/s
Output Power: 50 mw (average)
Direct Reading Frequency Dial: 1%
Internal Modulation: Pulsed, Square Wave, C.W.
Integral RF Level Set Attenuator

810 — STANDING WAVE AMPLIFIER



VSWR Ranges: 1-3, 3-10, 10-30, 30-100
Modulation: 1000 cps and 300-4000 cps
Sensitivity: 0.1μ volts (max.)
Output: Cathode Follower, 10 volts (max.)
Bolometer Bias: 3.5 to 9.0 ma (front panel control and meter)
Bolometer protection circuit prevents transient burnout

815 — UNIVERSAL KLYSTRON POWER SUPPLY



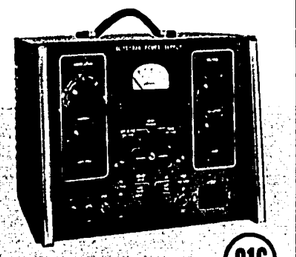
Direct Reading Voltage Dials: ±1%
Beam: 200 to 2000V and 1800 to 3600V (250 watts, max.)
Ripple: 3mv RMS (max.); Regulation: 0.03%
Reflector: 0 to 1000V (negative)
Control Grid: 0 to +150V and 0 to −300V (0 to 5 ma)
Internal Modulation: Pulsed, square wave, saw tooth and sine wave

F-R MACHINE WORKS, INC. - ELECTRONICS & X-RAY DIVISION

FXR

KLYSTRON POWER SUPPLY

Beam: 300 to 500 Volts (65 ma)
Ripple: 7 mv RMS (max.)
Regulation: 1% (105 to 125V)
Reflector: 0 to 600 Volts (10μa, max.)
Ripple: 5 mv RMS (max.); Diode Protected
Internal Modulation: Square wave (250 to 2500 cps), saw tooth (40 to 120 cps)



816

UNIVERSAL POWER METER

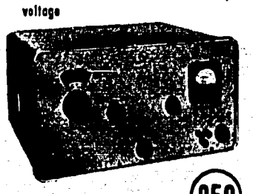
Power Ranges: 0.1, 1, 10, 100 mw Full Scale; −10, 0, +10, +20, dbm Full Scale
Accuracy: ±5% of Full Scale
Bolometer Bias: 3 to 10 ma and 10 to 40 ma
Bolometer Temperature Coefficient: Positive or Negative
Bolometer Resistance Ranges: 50, 100, 150, 200, 250 ohms, ±10%

830

For details, circle #54 on Reader Service Card.

AUDIO FUNCTION GENERATOR

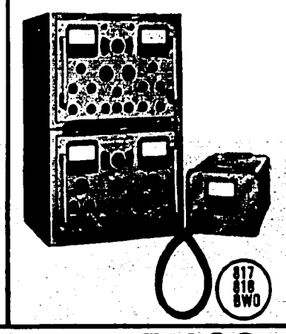
Frequency Range: 5 to 50,000 cps (in 4 ranges)
Frequency Response: Constant within ±0.2 db (all ranges)
Frequency Calibration: ±2% of Dial and Range Switch
Output Shapes: Sine wave, square wave, triangular wave
Output Meter: Voltage, ±3% of Full Scale
Hum Level: 60 db below maximum output voltage



850

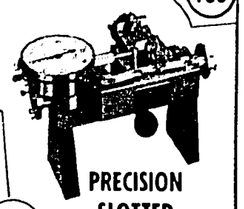
SWEPT UNIVERSAL B.W.O. POWER SUPPLY

Coming Soon!



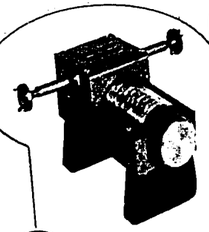
817
816
BWO

1957 SHORT FORM CATALOG



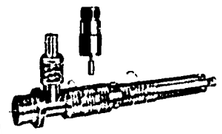
103

PRECISION SLOTTED SECTIONS



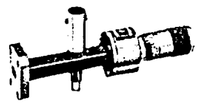
164

PRECISION MM ATTENUATOR



200

TUNABLE PROBE



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DETECTOR MOUNTS

WAVEGUIDE TEST EQUIPMENT

INSTRUMENT		SIZE	"L" 6½"x3¼"	"R" 4.460"x 2.310"	"S" 3"x1½"	"H" 2"x1"	"C" 1½"x¾"	"W" 1¼"x⅝"	"X" 1"x½"	"Y" 0.622"x 0.311" ID	"K" 0.420"x 0.170" ID	"U" 0.280"x 0.140" ID	"Q" 0.224"x 0.112" ID	"M" 0.148"x 0.074" ID	"E" 0.122"x 0.061" ID
		Freq. Range	1.12-1.70 kmc/sec	1.70-2.60 kmc/sec	2.60-3.95 kmc/sec	3.95-5.85 kmc/sec	5.85-8.20 kmc/sec	7.05-10.00 kmc/sec	8.20-12.40 kmc/sec	12.40-18.00 kmc/sec	18.00-26.50 kmc/sec	26.50-40.00 kmc/sec	33.00-50.00 kmc/sec	50.00-75.00 kmc/sec	60.00-90.00 kmc/sec
SLOTTED SECTIONS			L101A	R101A	S101A	H101A	C101A	W101A	X101A	Y102A	K102A, F	U102A, F	Q103A	M103A	E103A
FLAP ATTENUATORS			L150B	R150B	S151A	H151A	C151A	W151A	X151A	Y151A	K151A, F	U151A, F	Q151A	M151A	E151A
PRECISION ATTENUATORS			L160B		S161A	H161A	C161A	W161A	X161A	Y161A	K164A	U164A	Q164A	M164A	E164A
FIXED ATTENUATORS			L168A, B, C, D, E		S168A, B, C, D, E	H168A, B, C, D, E	C168A, B, C, D, E	W168A, B, C, D, E	X168A, B, C, D, E	Y168A, B, C, D, E	[A-3db B-6db	C-10db D-20db	E-30db]		
DETECTOR MOUNTS (crystal, bolometer)	Tunable									Y205B	K205B, F	U205B, F			
	Broadband				S207A	H207A	C207A	W207A	X207A			U206B, F	Q206B	M206B	E206B
	Fixed-Tuned								X211A	Y212A	K212A, F	U212A, F			
THERMISTOR MOUNTS			L216A		S216A	H216A	C216A	W216A	X216A	Y216A	K216A	U216S			
TUNERS	Slide Screw		L310A	R310A	S311A	H311A	C311A	W311A	X311A	Y311A					
	E/H				S312A	H312A	C312A	W312A	X312A	Y312B	K312B, F	U312B, F	Q312B	M312B	E312B
	Precision						C402A		X402A						
FREQUENCY METERS (direct reading)	Reaction		N410A coaxial (1.00 to 4.00 kmc/sec)			H410A	C410A	W410A	X410A	Y410A	K410A, F	U410A, F	Q410X (micrometer)	M410X (micrometer)	E410X (micrometer)
	Transmission								X411A						
TERMINATIONS	Fixed		L501A	R501A	S501B	H501B	C501B	W501B	X501B	Y501B	K501A, F	U501A, F	Q501A	M501A	E501A
	Sliding				S502A,	H502A	C502A	W502A	X502A	Y502A	K502A, F	U502A, F			
STANDARD MISMATCHES					S510A, B, C, D, E	H510A, B, C, D, E	C510A, B, C, D, E	W510A, B, C, D, E	X510A, B, C, D, E	Y510A, B, C, D, E	K510A, B, C, D, E	U510A, B, C, D, E	[A-1.00 B-1.05	C-1.10 D-1.20	E-1.50]
ADAPTERS (waveguide to coax)			L600B	R600B	S601B	H601B	C601B	W601B	X601B						
DIRECTIONAL COUPLERS					S610A, B, C, D	H610A, B, C, D	C610A, B, C, D	W610A, B, C, D	X610A, B, C, D	Y610A, B, C, D	K610A, B, C, D	U610A, B, C, D		M610A, B, C, D	[A-3db C-10db B-6db D-20db]
	Series		L620A	R620A	S620A	H620A	C620A	W620A	X620A	Y620A	K620A	U620A	Q620A	M620A	E620A
WAVEGUIDE TEES	Shunt		L621A	R621A	S621A	H621A	C621A	W621A	X621A	Y621A	K621A	U621A	Q621A	M621A	E621A
	Hybrid		L622A	R622A	S622A	H622A	C622A	W622A	X622A	Y622A	K622A	U622A	Q622A	M622A	E622A
WAVEGUIDE BENDS	90° E-Plane		L623B		S623B	H623B	C623B	W623B	X623B	Y623B	K623B	U623B	Q623B	M623B	E623B
	90° H-Plane		L624B		S624B	H624B	C624B	W624B	X624B	Y624B	K624B	U624B	Q624B	M624B	E624B
PRECISION SLIDING SHORTS			L630A		S630A	H630A	C630A	W630A	X630A	Y630B	K630B	U630B	Q630B	M630B	E630B
STANDARD GAIN HORNS			L638A	R638A	S638A	H638A	C638A	W638A	X638A	Y638A	K638A	U638A	Q638A	M638A	E638A
SHIELDED TUBE MOUNTS						H760A		W760A	X760A			Z762B (unshielded)			
TRANSMISSION LINE STANDS			Z911A		Z910A	Z910A	Z910A	Z910A	Z910A	Z910B	Z910B	Z910B	Z910C	Z910C	Z910C
			Z912L		Z912S	Z912HC	Z912HC	Z912W	Z912X	Z912Y	Z912KU	Z912KU			
FLANGE SCREWS			Z913L		Z913S	Z913HC	Z913HC	Z913W	Z913X	Z913Y	Z913KU	Z913KU			
											Z914K	Z914U	Z914Q	Z914M	Z914E

Waveguide flanges also available

Bi-directional couplers available on special order

COAXIAL TEST EQUIPMENT*

For details, circle #55 on Reader Service Card.

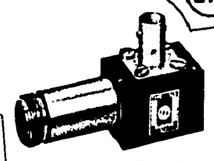
FREQUENCY IN KILOMEGACYCLES PER SECOND

INSTRUMENT	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00
Slotted Sections		N101A**				N101B**						
Slotted Sections (⅞")		V101A, V101B										
Cut-off Attenuators		N170A						X170A				
Tunable Probe						B200A**						
Detector Mounts (crystals, balometer)					N210A, B (with 30 dyne mount)							
Thermistor Mount			N23A (E231A) (Normistor supplied)				N217A (Keen compensation)					
Double Stub Tuner						N300A						
Frequency Meter		N410A (direct reading)										
Adapter (⅜" to ⅞")		N603A B C D										
Tee					N626A (variable)							
Oscillator Cavity			N750A									
Klystron Tube Mount						N761A** (variable or shielded)						

*All items are ⅞" coaxial components unless otherwise noted

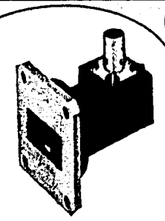
**Accessories: N101A, B—"TYPE N" and "TYPE C" ADAPTER-CONNECTORS

B200A Z200M BARRETTER-ADAPTER RING
N200A N200N R-F OUTPUT ADAPTER
N761A—Z761L, M, N, P, CABLES



215

BROADBAND COAXIAL THERMISTOR MOUNT

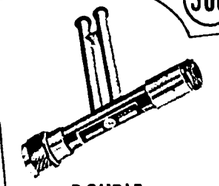


216

BROADBAND THERMISTOR MOUNTS

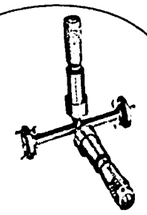
220

CRYSTAL-CASE BOLOMETERS



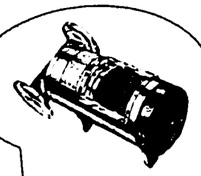
300

DOUBLE STUB TUNERS



311

SLIDE SCREW TUNERS E/H TUNERS

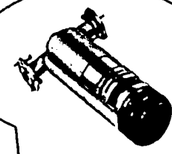


402

PRECISION DIRECT READING FREQUENCY METERS

410

COAXIAL DIRECT READING FREQUENCY METERS



410

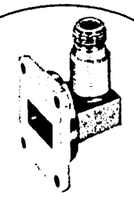
WAVEGUIDE DIRECT READING FREQUENCY METERS

501

TERMINATIONS

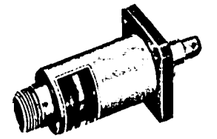
510

STANDARD MISMATCHES



601

WAVEGUIDE-TO-COAX ADAPTERS

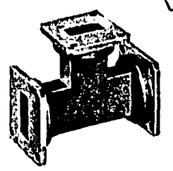


605

COAX-TO-COAX ADAPTERS

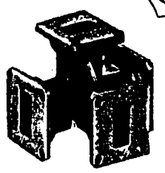
610

PRECISION MULTI-HOLE DIRECTIONAL COUPLERS



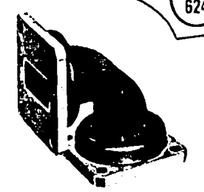
620 621

SERIES AND SHUNT TEES



622

HYBRID TEES



623 624

90° WAVEGUIDE BENDS

630

PRECISION SLIDING SHORTS

638

STANDARD GAIN HORNS

760

SHIELDED TUBE MOUNT

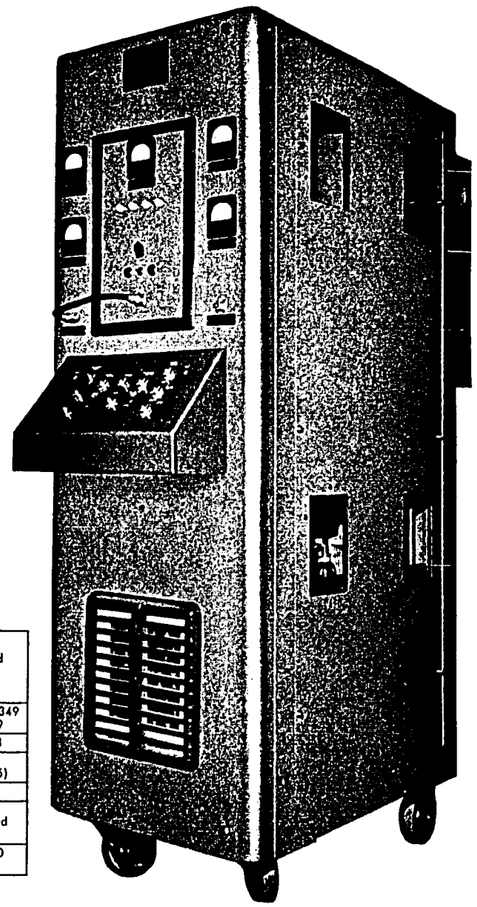
For details, circle #56 on Reader Service Card.

761 762

KLYSTRON TUBE MOUNTS

Electronics & X-Ray Division F-R MACHINE WORKS INC., 26-12 Borough Place, Woodside 77, N. Y. AStoria 8-2800

CUSTOM MODULATORS from STANDARD DESIGNS...



(FXR) High-Power Pulse Modulators are custom-built to meet the specific requirements of each application through the use of FXR standard designs, developed by our skilled modulator engineering group. Our staff of experienced application engineers cannot be surpassed in the close integration of the most recent engineering developments with packaged design and standard procedures. You benefit, with a precision instrument at economical cost.

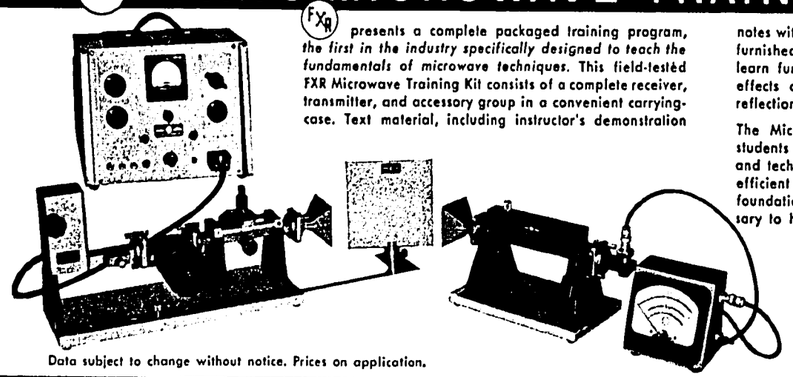
FXR's competent and efficient research, design and development staff, augmented by ultra-modern manufacturing facilities capable of production-quantity fabrication welcomes the opportunity to aid you in the design and construction of the most intricate pulse modulators and high-voltage power supplies.

Send for the "Preliminary Questionnaire" to assist you in planning the design of your next High-Power Pulse Modulator!

High Power Modulator Type No.	Power (peak mega-watts)	Voltage (peak kilovolts)	Current (peak plate-amperes)	Impedance (output-ohms)	Duty Cycle (maximum)	Pulse Shape (μsec/pps)	Input 60 CPS (Ø/volts)	Tubes Operated
Z820A	1.0	33	33	1,000	.001	0.5/2000 2.5/400	1/190-250	4J50, QK-349 RK-6249
Z821A	14.0	90	160	560	.001	2.0/200-500	3/440-550	QK-338
Z822A	0.2	20	10	3,330	.018	10/1200-1800	3/440	SAL 39 (GL-6625)
Z823A	0.042	12.7	3.3	3,330	064	coded/300	3/440	SAL 39
Z824A	0.625	25	25	1,000	.001 at 0.5/2000	1.0/1000 2.0/250 5.0/100	1/190-250	QK-349 at reduced power
Z825A	1.6	40	40	1,000	.001 at 0.5/2000	1.0/1000 2.5/400	1/190-250	WE-5780

Modulator Loads and Exhaust Ovens are also available.

X845A FXR's MICROWAVE TRAINING KIT



(FXR) presents a complete packaged training program, *the first in the industry specifically designed to teach the fundamentals of microwave techniques.* This field-tested FXR Microwave Training Kit consists of a complete receiver, transmitter, and accessory group in a convenient carrying-case. Text material, including instructor's demonstration notes with extensive student laboratory exercises, are also furnished. By interchanging the accessories, the students learn fundamentals of propagation and the method and effects of such phenomena as shielding, polarization, reflection, focusing and bending of microwaves.

The Microwave Training Kit, an FXR exclusive, trains students to take numerical data and learn the methods and techniques of microwave measurements. This simple, efficient training program provides the student with a foundation of practical knowledge and experience necessary to his work in the microwave field.

Data subject to change without notice. Prices on application.

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Denver 23, Colorado
PEarl 3-3701

J. C. Van Groos Co.
Post Office Box 425
Woodland Hills, California
Diamond 0-3131

New RCA Super-Power Tubes deliver unprecedented levels of electronically controlled power to work new industrial miracles

To add a new dimension to the usefulness of electronically controlled power—in industry, medicine, research . . . RCA now presents a major "first" in electronic progress—a remarkable group of super-power tube designs capable of unleashing enormous amounts of high-frequency power *above and beyond all previous tube capabilities!*

Ingenious in their application . . . dramatic in their results . . . these tubes begin their work where conventional power tubes leave off. Think for a moment of the possibilities of a million watts, or more, of electronically controlled power *harnessed to your industry*—working with hairline accuracy under millionth-second control. Consider the enormous potential of this electronic tool for heating glass, metals, plastics, and other materials at super speeds . . . irradiating and sterilizing products . . . "blasting" atoms for applied uses of atomic particle acceleration.

Visualized by the Radio Corporation of America as early as 1937 . . . and under a continuing development and field-testing program . . . RCA super-power tubes are now offered to progressive industries looking ahead to the practical application of super power in their future product planning. RCA is ready to discuss your present and future needs for super-power tubes. If *you* are ready, write today—to RCA, Tube Division, Commercial Engineering, Section 122Q-a, Harrison, New Jersey.

RCA ELECTRON TUBES FOR INDUSTRY
RADIO CORPORATION OF AMERICA

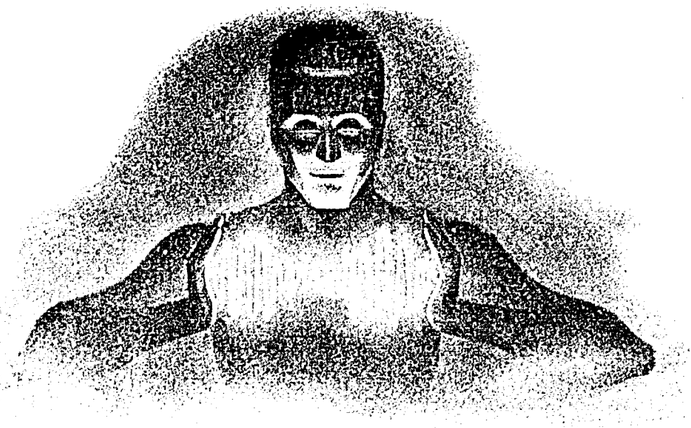
• Induction and Dielectric Heating

• Irradiation and Sterilization

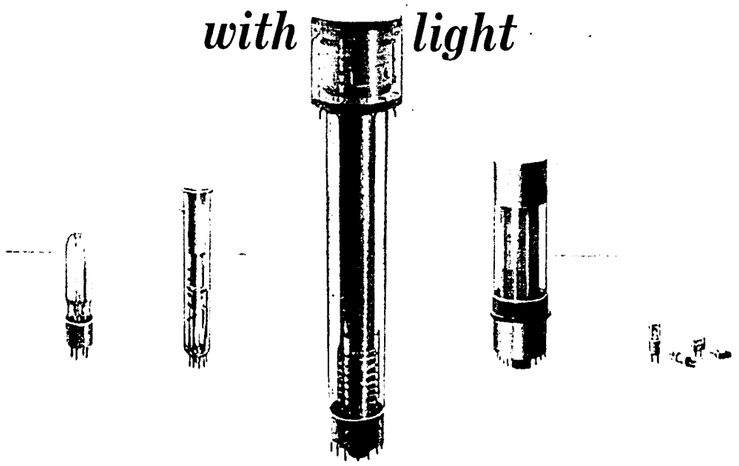
• Radiology

• Communications and Scatter Transmission

• Radar



Through the magic of photoelectronics —RCA Tubes work wonders with light



Like a modern genie of Aladdin's tales, RCA photosensitive devices are putting light to work in amazing ways to control, inspect, measure, guard—efficiently, speedily, and economically.

In industrial television, for example, RCA TV camera tubes are helping to improve product quality, increase production, train personnel, protect life and property—extending human vision into places heretofore impractical or too hazardous for man to work.

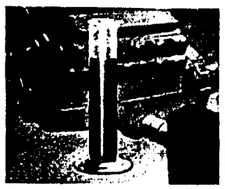
In work with invisible radiation, RCA Multiplier Phototubes are used in devices to: Simplify geophysical surveys... determine thickness of materials...conduct atomic particle research (an RCA Tube helped in the discovery of the antiproton)...study material flow, growth of organisms, wear of machinery, and effectiveness of chemicals through radioactive tracer techniques.

In control work using light, RCA Phototubes and Photosensitive Cells are serving as "electronic switches" to help industry: Turn street lights and display signs on and off..."read" film soundtracks and computer punch cards...measure light, and compare colors...inspect, sort, and route materials.

And this is just an inkling of the myriad applications in which RCA photosensitive devices are used in industry, medicine, and science. If you see where photoelectronics holds a special promise in your operations, we will be glad to put you in touch with organizations specializing in photoelectronic equipment Simply write RCA Commercial Engineering, Section 122Q-b, Harrison, N. J.

For details, circle #59 on Reader Service Card.

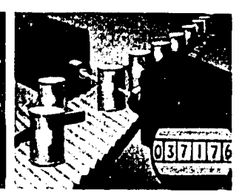
ELECTRON TUBES FOR INDUSTRY
RADIO CORPORATION OF AMERICA TUBE DIVISION



Checking durability of pistons—radioactively treated—by measuring radioactivity of worn particles deposited in the oil

Safe-guarding property at night—more reliably than with the eye

Safely monitoring hazardous operations—with small, industrial TV cameras



Counting by light and sorting by color—fast and accurately

Controlling streetlights, signs, headlights—automatically

Amazing new RCA Storage Tubes "memorize and process" electronic data ...make millionth of a second stand still!

To extend the usefulness of electronic data processing...in industry...business...research...medicine, RCA announces new spectacular tools for technological progress–a remarkable group of "storage" tubes that can "remember" electronic data...slow it down...translate it...or display it.

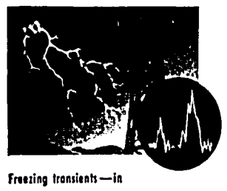
Take the RCA-6866 tube for example. Used today in airborne radar, this unique device transposes electronic information into brilliant pictures *you can see in bright daylight.* It can display data in line or half-tone form. It captures fixed or slow-moving subjects with equal clarity—*"freezes" millionth-second pulses for study as long as a minute.* Visualize what your electronics engineers can accomplish with a tube like this in the design of equipment—to transmit written information electronically from point to point—to reproduce signatures, charts, ticket data, reservations, sales orders via regular telephone-type lines—to help analyze transient phenomena taking place at super speeds.

And there are other RCA storage tubes to excite the imagination of engineers. One such tube, the Radechon, can take electronic data occurring at phenomenal speeds...store it...then extract any part of it at the same or different speeds. Another tube, the Graphechon, translates electronic information for reproduction on TV screens wherever wanted. Already, Radechons and Graphechons are working miracles in data processing.

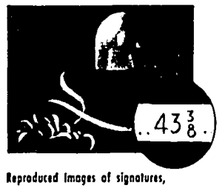
Today, RCA is engaged in an extensive storage-tube development program that holds promise of revolutionizing industry by electronics. If you see a place for application of these new tubes in your future business, write RCA Commercial Engineering, Section 122Q-c, Harrison, N.J.

For details, circle #60 on Reader Service Card.

ELECTRON TUBES FOR INDUSTRY
RADIO CORPORATION OF AMERICA, HARRISON, N.J.

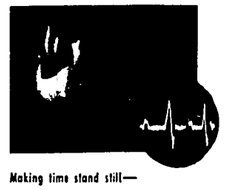


Freezing transients—in electrical observation

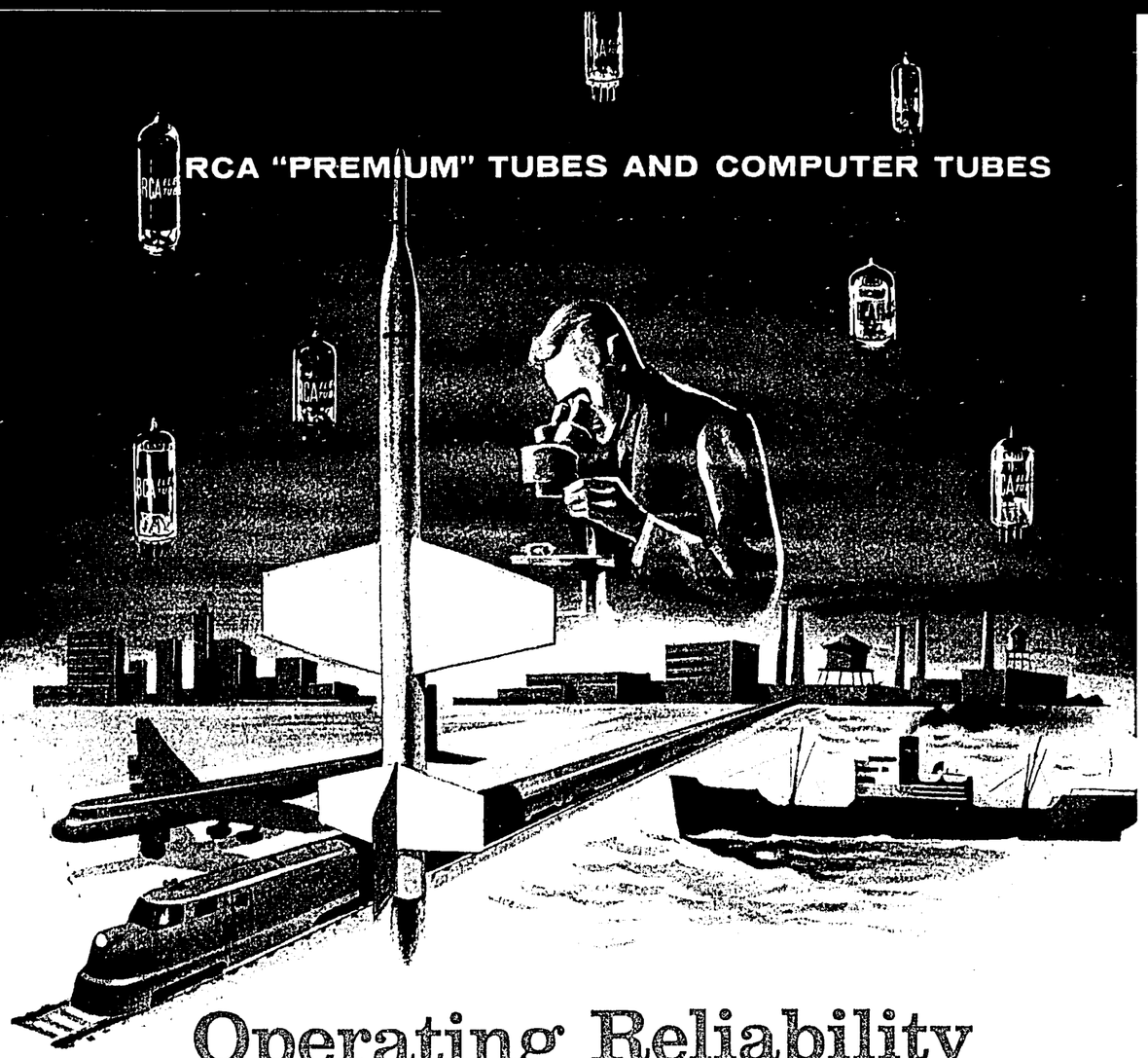


Reproduced images of signatures, tickets, charts—transmitted via wire

Brilliant cockpit display of data—for improved aircraft navigation



Making time stand still—for medical research



Operating Reliability

...extended to new levels of performance

To pace the demands for higher quality tubes in critical applications, RCA "Premium" Tubes and Computer Tubes have opened new possibilities for sustained reliability that exceeds previous levels of tube performance. Here are two important ways in which RCA insures that it *builds* QUALITY into these tubes:

1 RCA has developed a precision-type quality-control system that provides never-ending vigilance over the quality of "Premium" Tubes and Computer Tubes—*throughout every phase of tube manufacture.*

2 RCA backs up this quality-control system with 100% microscopic monitoring of 24 different categories of tube workmanship. By this method, each manufacturing point is constantly under surveillance, and prompt corrective action can be taken if needed.

Precision Quality-Control—coupled closely with microscopic monitoring—is another big step ahead in the manufacture of RCA "Premium" Tubes and Computer Tubes to assure excellent uniformity of characteristics and long-term reliability.

Your RCA Field Representative will welcome an opportunity to discuss the unusual advantages of RCA "Premium" Tubes and Computer Tubes for your specific applications. Contact him at the RCA Field Office nearest you:

East . . . . . 744 Broad Street
Newark 2, N. J.
HUmboldt 5-3900

Midwest. . . Suite 1181
Merchandise Mart Plaza
Chicago 54, Illinois
WHitehall 4-2900

West . . . . . 6355 E. Washington Blvd.
Los Angeles 22, Calif.
RAymond 3-8361

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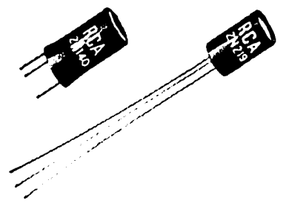
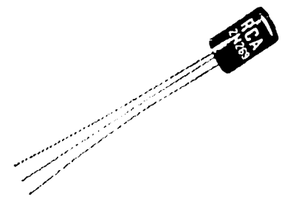
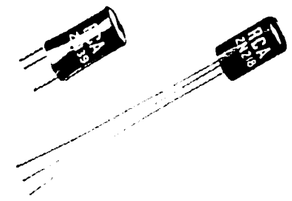
RADIO CORPORATION OF AMERICA
Tube Division • Harrison, N. J.



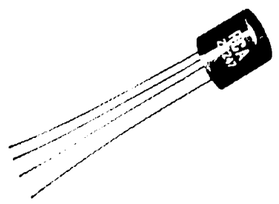
RCA-2N140—For converter and mixer-oscillator applications in standard-AM broadcast-band receivers. Linotetrar 3-pin base. For flexible-lead version, specify **RCA-2N219.**



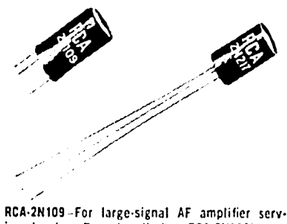
RCA-2N269—For low-level, medium speed, on-off, control applications as in flip-flop and gating circuits of electronic computers.



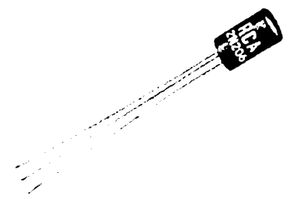
RCA-2N139—For 455-Kc IF amplifier applications in standard-AM broadcast-band receivers. Linotetrar 3-pin base. For flexible-lead version, specify **RCA-2N218.**



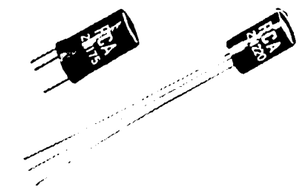
RCA-2N247—"Drift" Transistor for use as an RF amplifier in the AM broadcast-band and up into the short-wave bands.



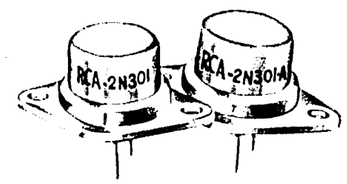
RCA-2N109—For large-signal AF amplifier service. In class B push-pull, two RCA-2N109's can deliver max. signal power output of approximately 150 milliwatts. Linotetrar 3-pin base. For flexible-lead version, specify **RCA-2N217.**



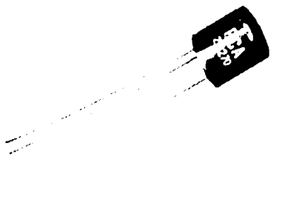
RCA-2N206—For moderate-power AF amplifier service. Meets military specification MIL-T-25380. 4 USAF. (Max. collector dissipation, 75 mw. at ambient temp. of 25°C.)



RCA-2N175—Exceptionally low-noise type for preamplifier or input stages of transistorized audio amplifiers operating from extremely small input signals. Linotetrar 3-pin base. For flexible-lead version, specify **RCA-2N220.**



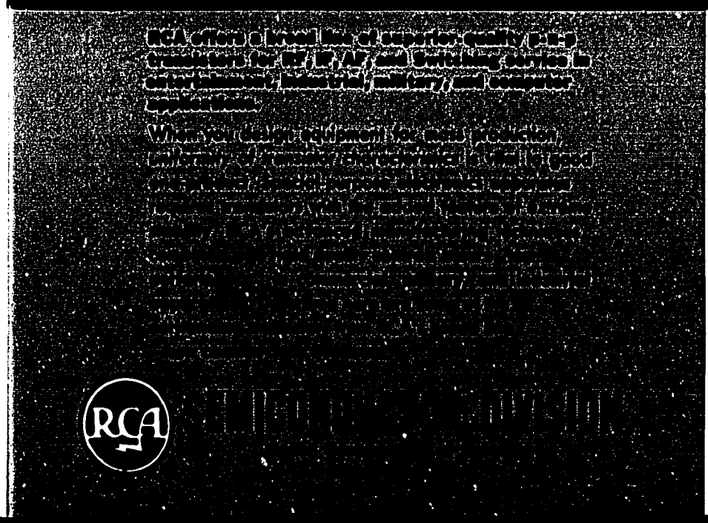
RCA-2N301—For audio-power output stages of equipment requiring high output with low distortion at high power gain. In class A, one RCA-2N301 can deliver a max.-signal power output of approximately 2.7 watts; a pair can deliver up to 12 watts in class B push-pull. For operation at peak collector voltages as high as 60 volts, specify **RCA-2N301-A.**



RCA-2N270—For large-signal AF amplifier service. In class A, one RCA-2N270 can deliver a max.-signal power output of approximately 60 milliwatts; in class B push-pull, a pair can deliver up to 500 milliwatts.

When top performance is essential...

SPECIFY RCA TRANSISTORS



Contact your RCA Field Representative for a discussion of the many advantages offered your specific designs by RCA Transistors.

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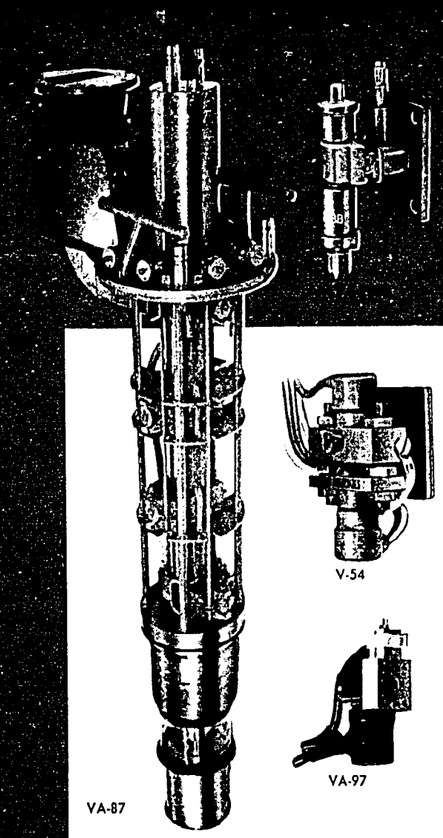
District 7-1260

For technical data on RCA Transistors, write to RCA Commercial Engineering, Sec. 122NN, Somerville, N. J.

For details, circle #62 on Reader Service C

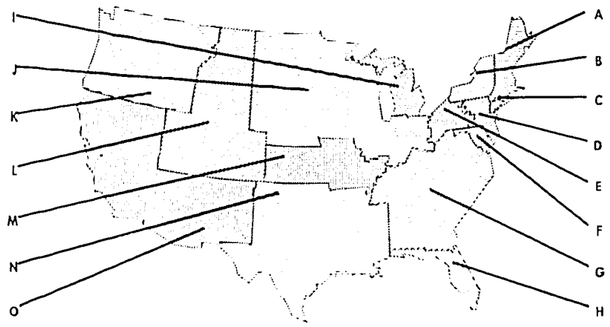


VA-87

V-54

VA-97

unsurpassed performance in every application



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TUBE	TYPE	TUNER	BASING	FREQUENCY RANGE kMc	TYPICAL POWER OUTPUT MILLIWATTS	MAXIMUM RATINGS RESONATOR VOLTAGE	MAXIMUM RATINGS RESONATOR CURRENT
X-12	Reflex	Micro.	3-Pin	12.4—17.5	100	600 V	65 mA
X-13	Reflex	Micro.	3-Pin	8.2—12.4	300	500	65
X-13B	Reflex	Micro.	3-Pin	7.5—11.0	300	500	65
V-23	2-Res. Osc.	Lock Nut	Molded Leads	9.1—11.0	5 watts	1350	125
V-24B	4-Res. Pulse Amp. 55 db gain 0.75% DU			9.35—9.40	40 kW pk	36 kV pk	10 A pk
X-26B	Reflex	Single Screw	Octal	6.3—7.5	1.3 watts	750	80 mA
X-26D	Reflex	Single Screw	Octal	5.8—7.125	1.4 watts	750	80
X-26E	Reflex	Single Screw	Octal	5.3—6.6	1.3 watts	750	80
X-26F	Reflex	Single Screw	Octal	5.3—6.0	1.4 watts	750	80
V-27	2-Res. Amp.	Lock Nut	Molded Leads	9.1—11.0	6 W @ 8 db	1350	125
V-27B	2-Res. Amp.	Lock Nut	Molded Leads	8.5—10.0	6 W @ 8 db	1350	125
VA-28	2-Res. Osc.	Lock Nut	Molded Leads	13.35—13.65	10 watts	3300	74
V-39B	Reflex	External Cavity	Molded Leads	10—15.5	50	750	42
V-39C	Reflex	External Cavity	3-Pin	10—15.5	60	750	42
V-40B	Reflex	External Cavity	Molded Leads	15—21	55	750	42
V-40C	Reflex	External Cavity	3-Pin	15—21	65	750	42
V-42B	3-Res. CW Amp. 27 db gain			.375—.425	12 kW	18 kV	3.25 A
V-42C	3-Res. CW Amp. 32 db gain			.890—.960	12 kW	18 kV	3.25 A
V-45	Fr. Multiplier 5X	Screw	Octal	1.8—2.0/9.0—10.0	280 @ —6 db	1000	80 mA
V-53	Reflex	Single Screw	3-Pin	10.7—11.7	200	500	70
V-53B	Reflex	Single Screw	3-Pin	10.7—11.7	200	500	70
V-54	Reflex	Lock Nut	Molded Leads	10.5—12.2	215	450	70
V-55	Reflex	Lock Nut	3-Pin	8.2—11.5	700	500	70
V-55B	Reflex	Lock Nut	Molded Leads	8.2—11.5	700	500	70
V-58	Reflex	Single Screw	3-Pin	8.5—10.0	620	500	70
V-63	2-Res. Osc.	Lock Nut	Molded Leads	8.5—10.0	6 W	1350	125
V-82	4-Res. Pulse Amp. 57 db gain 3% DU			9.225—9.375	7 kW pk	18 kV pk	2.9 A pk
VA-87B	4-Res. Pulse Amp. 57 db gain 0.3% DU			2.7—2.9	1.5 Meg W pk	110 kV pk	64 A pk
VA-87C	VA-87B 2.7-2.8 kMc; VA-87C 2.8-2.9 kMc						
VA-92	Reflex	Single Screw	Molded Leads	14.0—17.5	30	600	65 mA
VA-92C	Reflex	Single Screw	3-Pin	12.4—14.5	150	600	65
*VA-94	Reflex	Single Screw	Molded Leads	16.0—17.0	40	350	45
*VA-94B	Reflex	Single Screw	Molded Leads	15.8—16.2	30	350	45
VA-96	Reflex	Lock Nut	Molded Leads	22.0—25.0	35	850	40

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C NEW YORK CITY & NORTHERN NEW JERSEY

RMC ASSOCIATES
- New York, New York, 236 East 75th Street, TRafalgar 9-2023
- Bogota, New Jersey, 114 E. Main Street, Diamond 3-5926

D EASTERN PENNSYLVANIA & SOUTHERN NEW JERSEY

I. E. ROBINSON COMPANY
- Upper Darby, Pa., 7404 W. C'ester Pike, FLanders 2-7017
- Camp Hill, Pa., 2120 Market Street, REgent 7-6791
- Asbury Park, N.J., 905 Main St., KEllog 1-3150

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M. P. ODELL COMPANY
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- Pittsburgh 21, Pa., 750 Penn Avenue, FRemont 1-1231

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- Atlanta 5, Ga., 3133 Maple Drive, N.E., CEdar 3-7522

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ARTHUR H. LYNCH & ASSOCIATES
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I MICHIGAN & TOLEDO, OHIO

S. STERLING COMPANY
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- St. Paul 14, Minn., 842 Raymond Ave., Midway 5-4955

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- San Carlos, Calif., 501 Laurel Street, LYtell 1-2626
- Albuquerque, N.M., 107 Washington Street, S.E., 5-5586
- Las Cruces, N.M., 126 S. Water Street, JAckson 6-2486
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NEW YORK CITY

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Regional Applications Engineering Office
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VARIAN ASSOCIATES – LIAISON OFFICE (Walter B. Brown)
- Washington, D.C., 4200 Cathedral Ave., N.W., EMerson 3-7795

CANADA

VARIAN ASSOCIATES OF CANADA, LTD.
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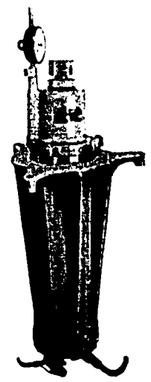
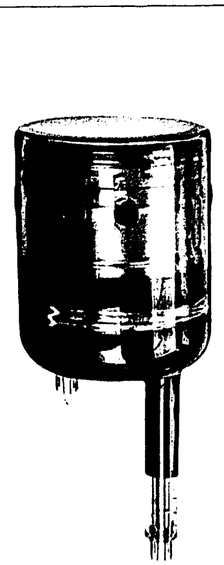


X-Band Stalo Cavity VA-1280B
Shown with VA-201B klystron

TUBE	TYPE	TUNER	BASING	FREQUENCY RANGE kMc	TYPICAL POWER OUTPUT MILLIWATTS	MAXIMUM RATINGS RESONATOR VOLTAGE	MAXIMUM RATINGS RESONATOR CURRENT
*VA-97	Reflex	Single Screw	Molded Leads	34.0—35.6	18	425	50
*VA-98	Reflex	Single Screw	Molded Leads	23.6—24.4	25	400	45
VA-121B	TWT Amp. 35 db gain 1% DU			2.7—2.9	40 W pk	2300 V pk	190 mA pk
V-152B	Reflex	External Cavity	Molded Leads	8.8—9.6	70	350	60 mA
V-154	Reflex	Lock Nut	3-Pin	10.5—12.2	215	450	70
V-155	Reflex	External Cavity	Molded Leads	8.8—9.6	55	350	60
VA-157	Reflex	Single Screw	3-Pin	8.5—10.0	50	385	74
VA-161	BWO	Electronic	Molded Leads	8.2—12.4	40	650	30
*VA-201B	Reflex	Single Screw	Molded Leads	8.5—9.6	90	350	55
*VA-203B	Reflex	Single Screw	3-Pin	8.5—9.6	40	350	52
*VA-220A-F,Z	Reflex	Single Screw	Octal	5.925—7.750	1.2 watts	750	80
VA-220A 7.425-7.750 kMc; VA-220B 7.125-7.425 kMc; VA-220C 6.875-7.125 kMc; VA-220D 6.575-6.875 kMc; VA-220E 6.125-6.425 kMc; VA-220F 5.925-6.225 kMc; VA-220Z 7.75-8.1 kMc							
*VA-220J	Reflex	Single Screw	Octal	4.9—5.2	1 watt	750	80
*VA-221B to	Reflex	Single Screw	Octal	5.985—7.555	40	330	35
VA-221F	VA-221B 7.225-7.555 kMc; VA-221C 6.955-7.255 kMc; VA-221D 6.705-7.005 kMc; VA-221E 6.285-6.585 kMc; VA-221F 5.985-6.285 kMc						
*VA-221H	Reflex	Single Screw	Octal	5.250—5.560	40	330	35
*VA-222B to	Reflex	Single Screw	Octal	5.925—7.725	1.2 watts	750	80
VA-222F	VA-222B 7.125-7.425 kMc; VA-222C 6.875-7.125 kMc; VA-222D 6.575-6.875 kMc; VA-222E 6.125-6.425 kMc; VA-222F 5.925-6.225 kMc						
*VA-222R	Reflex	Single Screw	Octal	5.8—6.0	2 watts	750	80
V-262	Reflex	Single Screw	3-Pin	8.5—10.0	150	350	42
VA-800A, C	4-Res. CW Amp. 50 db gain			1.7—2.4	10 kW	20 kV	3 A
VA-804 Ser.	4-Res. CW Amp. 45 db gain			4.4—5.0	2 kW	10 kV	1 A
VA-805 Ser.	4-Res. CW Amp. 45 db gain			5.925—6.425	2 kW	10 kV	1 A
VA-806 Ser.	4-Res. CW Amp. 45 db gain			7.125—8.5	2 kW	10 kV	1 A
VA-808	4-Res. Pulse Amp. 60 db gain 1.6% DU			5.3—5.9	24.5 kW pk	23 kV pk	4.5 A pk
VA-809	4-Res. Pulse Amp. 60 db gain 2.5% DU			9.44	10 kW pk	20 kV pk	2.1 A pk
VA-816	5-Res. Pulse Amp. 0.25% DU			3.43—3.57	2.5 Meg W pk	125 kV pk	75 A pk
VA-6237 to	3-Res. CW Amp. 27 db gain			.470—.890	15 kW	18 kV	3.25 A
VA-6242	VA-6237 470-530 Mc; VA-6238 530-584 Mc; VA-6239 584-656 Mc; VA-6240 656-728 Mc; VA-6241 728-806 Mc; VA-6242 806-890 Mc.						
VA-6310/V-260	Reflex	Single Screw	3-Pin	8.5—10.0	70	350	42 mA
VA-6312/V-270	Reflex	Single Screw	Molded Leads	8.5—10.0	70	350	42
VA-6314/V-290	Reflex	Lock Nut	Molded Leads	8.5—10.5	120	385	74
VA-6315/V-153	Reflex	Single Screw	Molded Leads	8.5—10.0	50	385	74
VA-6316/V-151	Reflex	Lock Nut	Molded Leads	8.5—10.0	25	350	52

Brazed-on external cavity. Bold face type numbers indicate recommended microwave tubes for new equipment design.

DIRECT-DISPLAY CATHODE RAY STORAGE TUBES BY HUGHES



Hughes TONOTRON

direct-display storage tube

FEATURES: Half-tone presentation . . . excellent grey scale . . . controllable decay rate . . . compact design.

APPLICATIONS: Closed circuit TV . . . instrumentation . . . PPI . . . narrow band, slow scan TV.

SPECIFICATIONS: 1,000 foot-lamberts brighness at 10 kv . . . electrostatic focusing . . . magnetic deflection . . . 60 lines per inch resolution . . . writing speed of 150,000 inches per second.

Hughes TYPOTRON

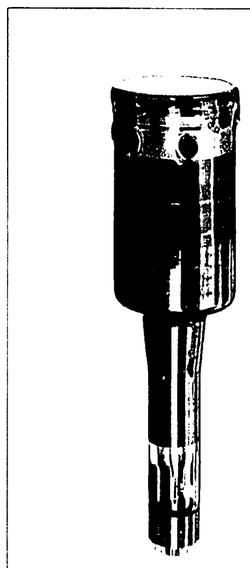
character-display storage tube

FEATURES: High brightness . . . permanent display until intentionally erased . . . rapid display of printed data . . . 63-character matrix.

APPLICATIONS: Digital computers . . . Teletype reception . . . wherever printed data must be displayed rapidly for use by human operator.

SPECIFICATIONS: Writes up to 25,000 characters per second . . . permanent storage until erased . . . almost instantaneous erasure . . . electrostatic focusing and deflection.

For details, circle #65 on Reader Service Card.



Hughes MEMOTRON

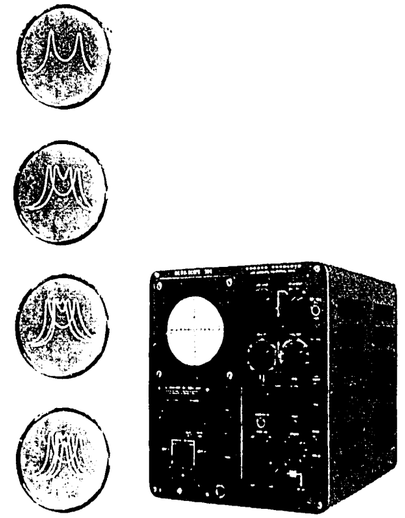
direct-display storage tube

FEATURES: Bright display . . . constant and uniform intensity of presentation . . . no perceptible transient decay . . . simplifies photography.

APPLICATIONS: Transient analysis . . . spectrum analysis . . . direct comparison of wave forms.

SPECIFICATIONS: 100,000 inches per second writing speed . . . stores traces until intentionally erased . . . erasure triggered by push-button or programmed voltage . . . electrostatic focusing and deflection.

* *Trademark of Hughes Aircraft Company*



New Hughes 104 MEMO-SCOPE oscilloscope*

FEATURES: Captures and retains any number of traces indefinitely . . . eliminates waste of time and film for unnecessary photography.

APPLICATIONS: Presentation of tube or transistor characteristics without need of repetition . . . displaying frequency response with a single scan through the desired spectrum . . . investigation of transient behavior for power supply regulation . . . transients encountered in ballistics or missile firing . . . to monitor phase relationships.

SPECIFICATIONS: 5-inch diameter MEMOTRON* direct-display storage tube . . . optional plug-in preamplifiers for increased flexibility . . . almost instantaneous erasure by push-button or programmed voltage.

For additional information, write to

HUGHES PRODUCTS · ELECTRON TUBES

International Airport Station, Los Angeles 45, California

HUGHES PRODUCTS

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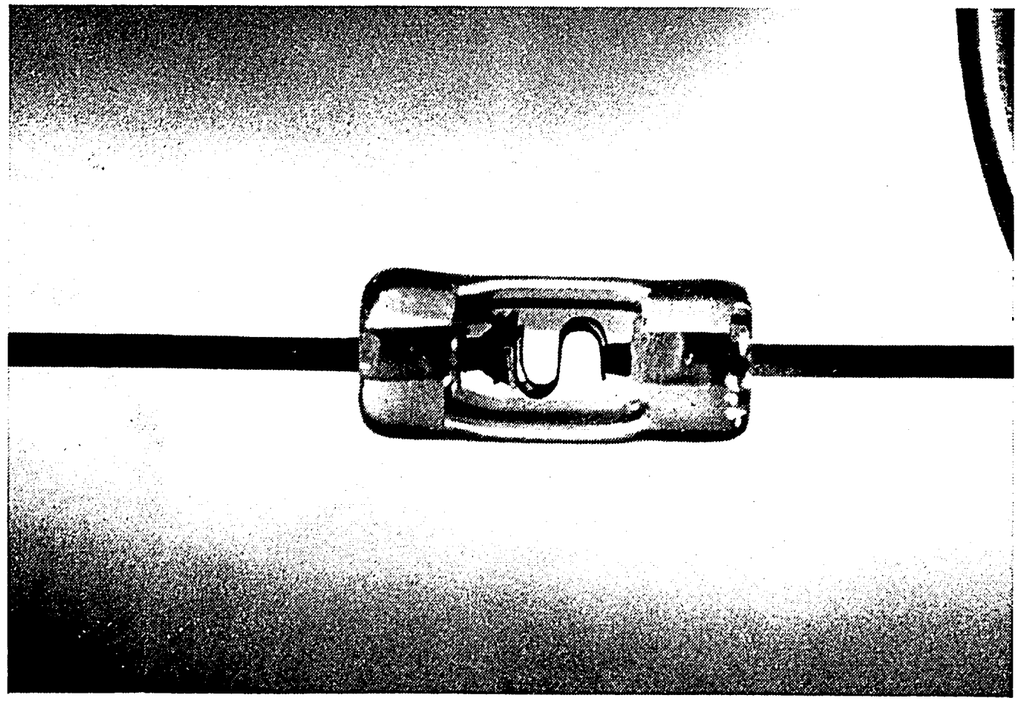
For details, circle #66 on Reader Service Card.



HUGHES SEMICONDUCTORS

DIODES · TRANSISTORS · RECTIFIERS

First of all, for reliability!

At Hughes, reliability is the standard upon which every device is based, from research and development through all phases of production. Its significance to you can only be determined if you specify Hughes, if you actually design our units into your equipment. Then you will *know* that Hughes reliability means trouble-free operation under even the most severe operating conditions.

GERMANIUM POINT-CONTACT DIODES

STANDARD—A large series comprising RETMA, JAN and special types, all having Hughes' famous glass package for complete protection from contaminant penetration. For applications in computers, radar, communications equipment, control equipment.

Peak Inverse Voltage	50-190V	Min. Forward Current @ +1V	3-200mA
Max. Inverse Working Voltage	40-150V	Max. Inverse Current @ −50V	.050-.850mA

QUICK RECOVERY, HIGH CONDUCTANCE—Germanium diodes with all the features of the standard series plus quick recovery and high conductance together.

Peak Inverse Voltage	50-130V	Min. Forward Current @ +1V	20-150mA
Max. Inverse Working Voltage	40-100V	Max. Inverse Current @ −50V	.050-.500mA
	Recovery (IBM "F" test)	100KΩ in 1 μsec.	

For some time now the Hughes line has covered an extensive variety of applications in the electronics industry. And it is still growing, with many new products "just around the corner." Watch for their introduction, but meanwhile, for details of those already here, please write:

SEMICONDUCTOR DIVISION • HUGHES PRODUCTS
International Airport Station, Los Angeles 45, California

SILICON JUNCTION DIODES

STANDARD—High-temperature units (200°C) featuring excellent forward conductance, extremely high back resistance, and extremely low saturation current throughout wide temperature ranges.

Saturation Voltage	30-200V	Back Current @ 25°C	as low as .025 μA (-175V)
Forward Current @ 1V	1-40mA	Back Current @ 150°C	as low as .005 mA (−175V)

QUICK RECOVERY—A high-speed, high-voltage, high-temperature series for high frequency or fast-switching circuits.

WIV @ 0.1mA	30-200V	Recovery (modified IBM "Y" test)	400KΩ (min.) in 1 μsec.
Forward Voltage @ 4mA	<1.5V	Reverse Current @ 25°C	as low as 1 μA (−175V)
	Reverse Current @ 100°C	as low as 100 μA (−175V)	

HIGH CONDUCTANCE—Reliable devices ideal for miniaturized circuits requiring high back resistance, high voltage, high temperature.

Breakdown Voltage	200-400V	Forward Current Rating (Ave. Rect.)	up to 200mA
Reverse Current	as low as 0.1 μA (350V)	Forward Voltage @ 200mA	<1V

SILICON POWER RECTIFIERS

Exceptionally efficient units for use in electronic power supplies and miniaturized rectifier circuitry in general.

Max. AC Input Voltage	140-275V RMS	Max. Ave. Rect. Fwd. Current	200mA
Max. Reverse DC Working Voltage	175-375V	Power Dissipation @ 25°C	200mW

GERMANIUM NPN TRANSISTORS

A medium-power series of alloyed-junction devices in a hermetically sealed axial package.

Frequency Cut-off (f_α)	0.5-2.0 mc/s min.	Maximum Collector Voltage (V_M)	10-40V
Output Admittance (h_{22})*	100-400 mhos max. X 10^{-8}	Collector Capacitance (C_c)**	20-40μμf max. @ 10V
Current Amplification ($1+h_{21}$)*	25-150 max. X 10^{-3}	Collector Cut-Off Current (I_{co})†	10-30 μA max.

* Measured with 5V Collector Voltage and 1mA Emitter Current ** Measured with 10V Collector Voltage † Measured with 5V Collector Voltage

Creating a new world with ELECTRONICS

HUGHES PRODUCTS

HUGHES
SEMICONDUCTORS

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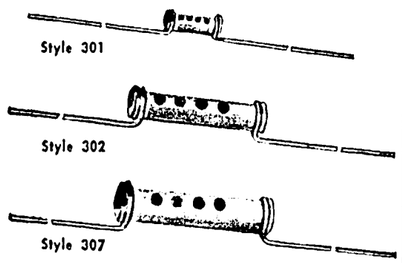
from a single source, all these . . .

RELIABLE ELECTRONIC COMPONENTS

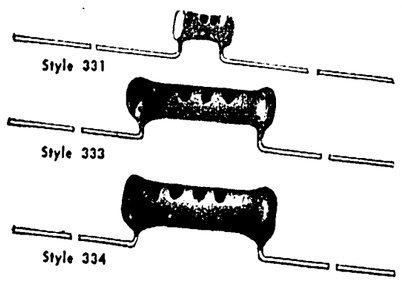
TRADE ERIE MARK
electronics

ERIE TUBULAR CERAMICONS®

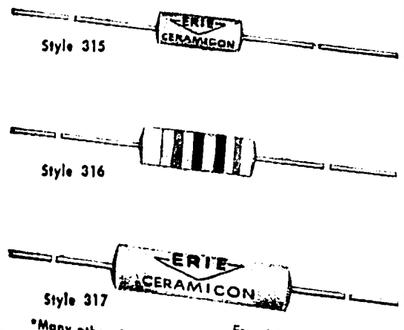
Non-Insulated*



Dipped Phenolic Insulated*



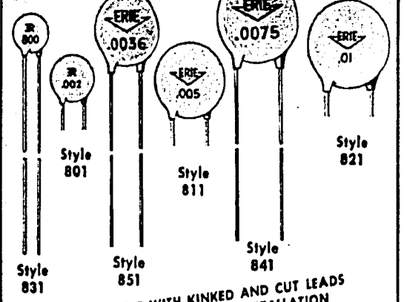
Molded Insulated



*Many other sizes available

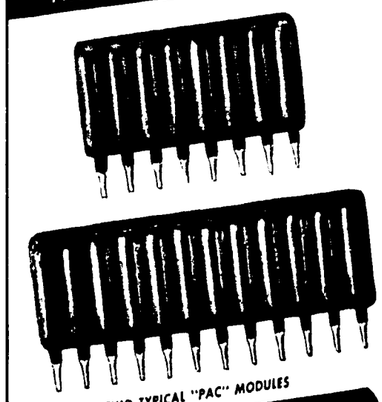
For details, circle #69 on Reader Service Card.

ERIE DISC & PLATE CERAMICONS©



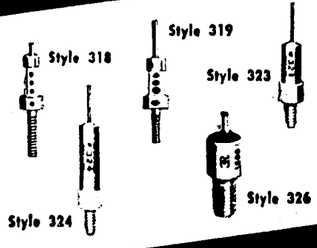
ALSO AVAILABLE WITH KINKED AND CUT LEADS FOR PRINTED WIRING BOARD INSTALLATION

ERIE "PAC" MODULES PACKAGED ASSEMBLY CIRCUITS

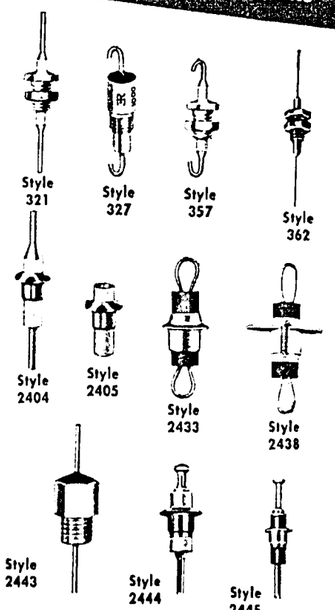


TWO TYPICAL "PAC" MODULES

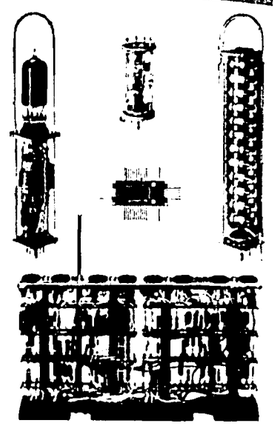
ERIE STAND-OFF CERAMICONS©



ERIE FEED-THRU CERAMICONS®

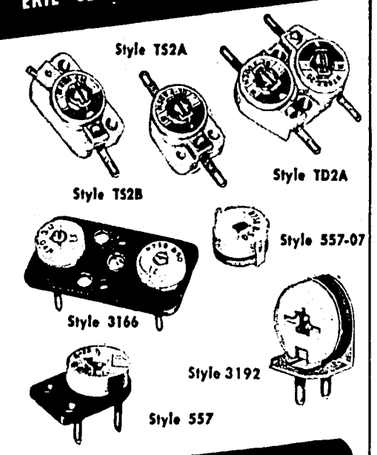


ERIE ELECTRO-MECHANICAL ASSEMBLIES

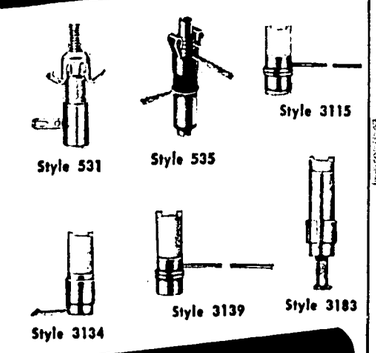


TYPICAL ERIE ELECTRO-MECHANICAL ASSEMBLIES

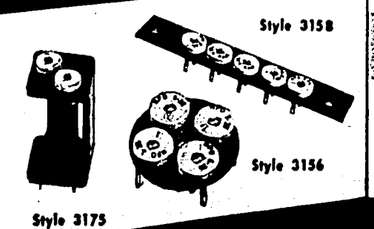
ERIE CERAMICON® TRIMMERS



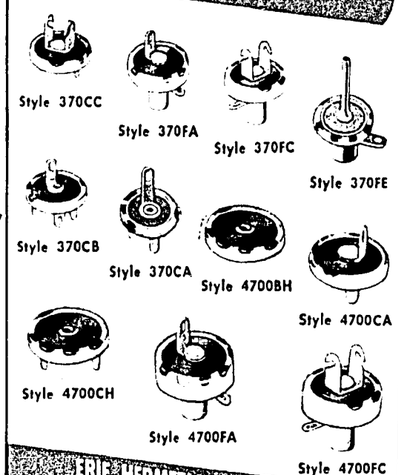
ERIE TUBULAR TRIMMERS



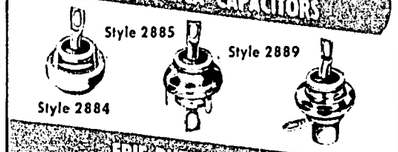
ERIE CUSTOM TRIMMER ASSEMBLIES



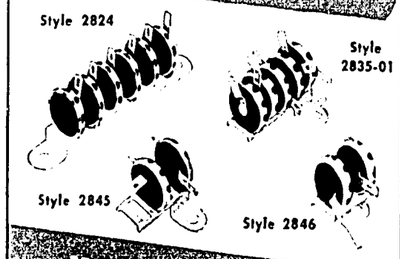
ERIE BUTTON® MICA CAPACITORS



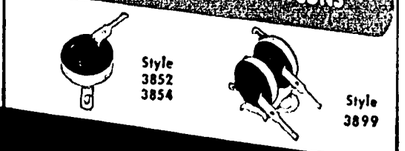
ERIE HERMETICALLY SEALED BUTTON® MICA CAPACITORS



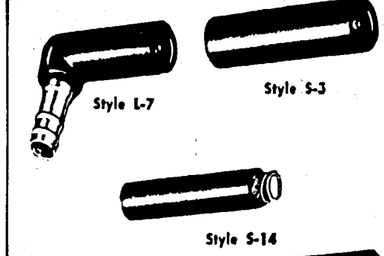
ERIE BUTTON® MICA BRACKET ASSEMBLIES



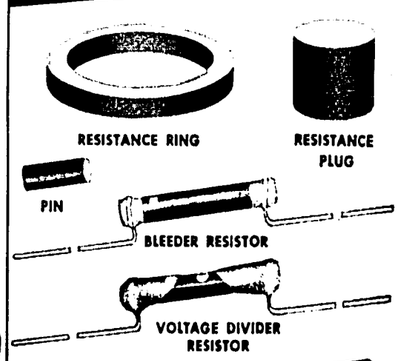
ERIE BUTTON® CERAMICONS



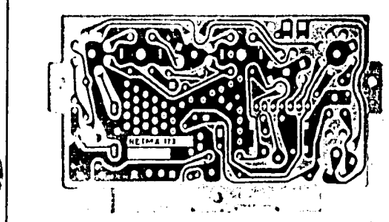
ERIE SUPPRESSORS



ERIE CUSTOM RESISTANCE PRODUCTS



ERIE EMBOSSED BOARDS



A TYPICAL ERIE EMBOSSED BOARD

For details, circle #70 on Reader Service Card.

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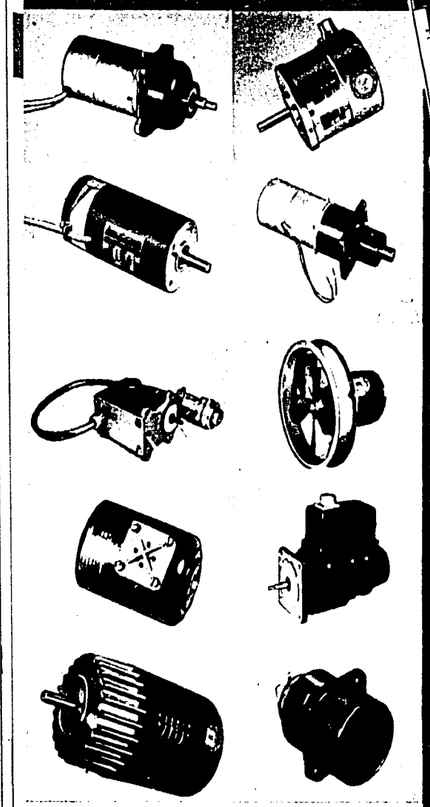
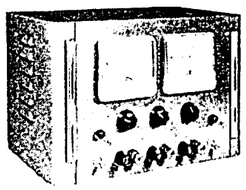
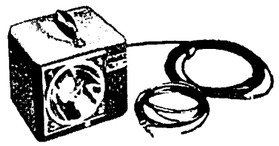
WESTERN GEAR



Pictured above are only a few of Western Gear's complete miniature motor line, ranging from 1/500th to 4 HP. Choose from cycle ranges of 50 to 400 at any voltage required. Furthermore, if our basic designs do not meet your particular requirements, our engineers will be glad to work with you on your rotary electrical problems WITHOUT OBLIGATION!

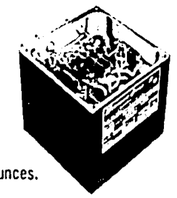


LABORATORY-TYPE POWER SUPPLY— New from Western Gear, Electro Products Division, is this lab-type, voltage-regulated power supply, available in either cabinet or rack type mounting. Input voltage is 105 to 125 volts at 50 to 60 cycles per second. Three output voltages are available . . . continuously variable 0 to 300V DC at 150 MA; continuously variable 0 to negative 150V DC at 5 MA; and 6.3V AC at 8 amperes. For full information, use the coupon below.

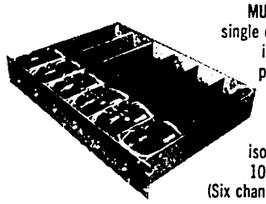


STROBOSCOPE UNIT— Now available, a reasonably-priced, compact, true-color stroboscope for viewing rotary, reciprocating or repetitive motion, as designed and manufactured by Western Gear's Electro Products Division. SPECIFICATIONS: Flash duration, 10 microseconds; light output, 5 Lumen seconds per flash; repetition rate, 0 to 100 pulses per second; dimensions, 6" wide, 5" high, 5¾" deep. For complete information, mail the coupon below.

TRANSISTORIZED VOLTAGE REGULATOR— Rugged conditions are made to order for this precision unit, especially where performance, space and weight are of extreme importance. The circuitry employs a shunt power transistor and a temperature-compensated Zener diode reference voltage. Input voltage is 31V DC plus or minus 4V. Output of the 7VR12 is 5V DC at 100 to 200 MA. Regulation less than plus or minus .1 per cent for combined variations of input voltage, load current, temperature, drift and vibration. Dimensions 2 x 2 x 2. Weight 8.5 ounces. For more of the story, check and mail the coupon below.



CLIP AND SAVE



MULTIPLE CHANNEL STRAIN GAGE POWER SUPPLY— Model 7P01 single or multiple channel strain gage power supply, 115 V, 60 cycle input, 10V DC output, adjustable from 9-11V DC with a 10-turn potentiometer. Output voltage changes less than plus or minus .05% due to temperature change from 0 to 45°C; output voltage changes less than .1% due to 2% change in load current. Output ripple is less than 300 microvolts RMS, isolated from ground as follows: insulation resistance to ground, 10,000 megohms; AC pickup voltage to ground, 5 microvolts peak. (Six channel unit shown.) For complete information, mail coupon below.

Glenn Malme • WESTERN GEAR CORPORATION • P.O. Box 182, Lynwood, California

Please send information checked:

- ☐ Motor Catalog No. 254-A
- ☐ Data sheet on Voltage Regulator
- ☐ Data sheet on Strain Gage Power Supply
- ☐ Data sheet on Lab-type Power Supply
- ☐ Data sheet on Stroboscope Unit

Name_____

Title_____

Company_____

Address_____

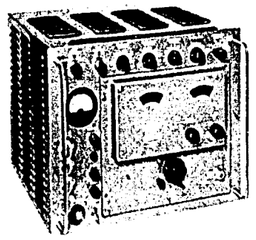
City_____ State_____

WESTERN GEAR Corporation

ENGINEERS AND MANUFACTURERS

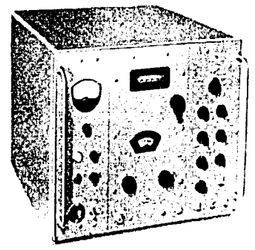
POLARAD MICROWAVE · ELECTRONICS

SIGNAL GENERATION EQUIPMENT

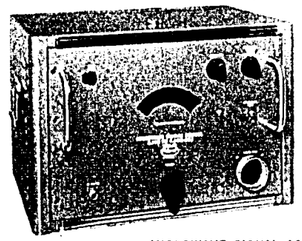


MICROWAVE SIGNAL GENERATORS
Models MSG-1, 2, 3, 4, 4A
950 to 11,500 mc

Model No.	Frequency Range
MSG-1	950 - 2400 mc
MSG-2	2150 - 4600 mc
MSG-3	4450 - 8000 mc
MSG-4	6950 - 10,800 mc
MSG-4A	6950 - 11,500 mc



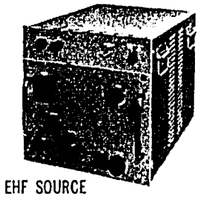
MICROWAVE SIGNAL GENERATOR
Model MSG-34
4,200 to 11,000 mc



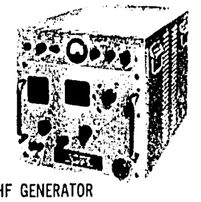
MICROWAVE SIGNAL SOURCES
650 to 11,500 mc

MAXIMUM POWER AVAILABLE FROM POLARAD SIGNAL SOURCES IN THE RANGE OF 650 TO 10,750

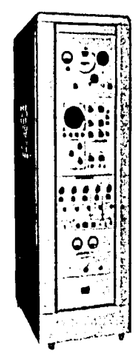
FREQUENCY RANGE	MODEL SSR 650-1300MC	MODEL SSL 1050-2250MC	MODEL SSS 2140-4600MC	MODEL SSM 4450-8000MC	MODEL SSX 7850-10,750MC	MODEL SSXA 7850-11,500MC
AVAILABLE POWER RANGE (mw)	100 to 700	80 to 400	40 to 250	15 to 50	14 to 40	Available on Special Order



EHF SOURCE



EHF GENERATOR



CODE MODULATED MULTIPLE-PULSE MICROWAVE SIGNAL GENERATOR
Model 8
950 to 10,750 mc

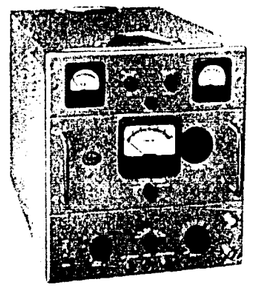
4 Interchangeable Tuning Units

Frequency Range:
BL-1 — 950 to 2400 mc
S-1 — 2150 to 4600 mc
BC-1 — 4450 to 8000 mc
BX-1 — 7850 to 10,750 mc

EHF MICROWAVE GENERATORS AND SOURCES
9 plug-in units cover 18,000 to 50,000 mc

SIGNAL GENERATORS Basic Unit Model HU-2 Plug-In Tuning Unit Model No.	FREQUENCY RANGE	SIGNAL SOURCES Basic Unit Model HU-1 Plug-In Tuning Unit Model No.
G1822-1	18,000 — 22,000 mc	S1822-1
G2225-1	22,000 — 25,000 mc	S2225-1
G2427-1	24,700 — 27,500 mc	S2427-1
G2730-1	27,270 — 30,000 mc	S2730-1
G2933-1	29,270 — 33,520 mc	S2933-1
G3336-1	33,520 — 36,250 mc	S3336-1
G3540-1	35,100 — 39,700 mc	S3540-1
	37,100 — 42,600 mc	S3742-1
	41,700 — 50,000 mc	S4150-1

Model SG-1218, Signal Generator and Model SS-1218 Signal Source are available to cover the frequency range 12,400 to 17,500 mc

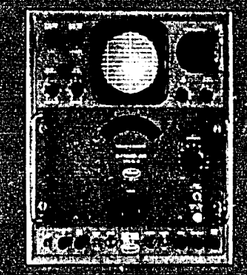


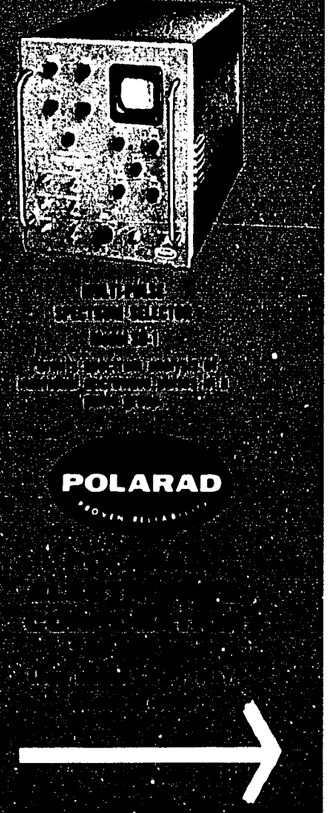
MICROWAVE SWEEP GENERATOR
Model ESG
1,000 to 15,000 mc 7 Interchangeable Tuning Units

Basic Unit: Model E-B

MODEL	FREQUENCY RANGE	POWER OUTPUT
Model E-L1	1000 to 2,000 mc	70 to 900 mw
Model E-L2	1600 to 3,200 mc	70 to 900 mw
Model E-S1	2000 to 4,000 mc	70 to 750 mw
Model E-C1	3600 to 7,200 mc	20 to 350 mw
Model E C2	4800 to 9,600 mc	15 to 125 mw
Model E-X1	6500 to 11,000 mc	15 to 80 mw
Model E-X2	7500 to 15,000 mc	10 to 35 mw

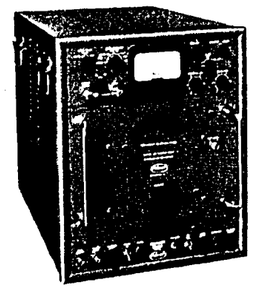
SPECTRUM ANALYZERS





MICROWAVE · ELECTRONICS

MICROWAVE RECEIVERS



EXTENDED RANGE MICROWAVE RECEIVER
Model R
400 to 22,000 mc

7 Interchangeable Tuning Units

Basic Receiver: Model R-B
Tuning Unit Frequency Ranges:

*Model RR-T	400- 1,000 mc
*Model RL-T	950- 2,040 mc
*Model RS-T	1,900- 4,340 mc
*Model RM-T	4,200- 7,740 mc
*Model RX-T	7,300-11,260 mc
*Model RKS-T	9,500-15,600 mc
*Model RKU-T	14,700-22,000 mc

*U.S. Patent No. 2,774,243

CALIBRATED MICROWAVE
FIELD INTENSITY RECEIVER SYSTEM
Model FIM
1,000 to 10,000 mc

Frequency Range:	1,000 to 10,000 mc
Tuning Unit	Frequency Range
*FIM-L	1,000 to 2,240 mc
*FIM-S	2,140 to 4,340 mc
*FIM-M	4,190 to 7,740 mc
*FIM-X	7,360 to 10,000 mc

*U.S. Patent No. 2,774,243

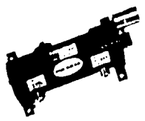
MONITOR UNIT

POWER SUPPLY

ANTENNAS

MICROWAVE ACCESSORIES

MICROWAVE
ATTENUATOR
Model SIJ
Covering
4,000 to 12,400 mc
. . . continuously variable, stub-tuned waveguide beyond cut off attenuator. For use in making microwave measurements.



SUB-MINIATURE
S-BAND CAVITIES
Plate and Grid Pulse
Models Each Covering
2,750 to 3,000 mc
. . . only 3" long and 1" diameter. Useful where miniaturization and high power are essential. Frequency can be varied by simple tool adjustment.

MICROWAVE
TEST ANTENNAS
Six models covering
1,000 to 26,000 mc
. . . rugged, portable. For field measurements, leakage measurements and other laboratory uses.

ALL CERAMIC
KLYSTRON TUBE
Model ZV1009
VELOCITRON
1,600 to 6,500 mc

Reliable maintenance Service for life available throughout the country is an important part of every Polarad instrument.

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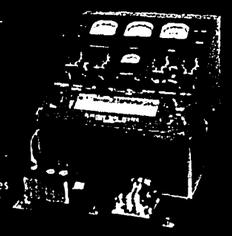
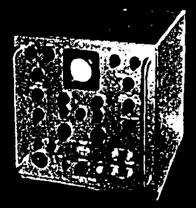
Resident Representatives in Principal Foreign Cities
For details, circle #73 on Reader Service Card.

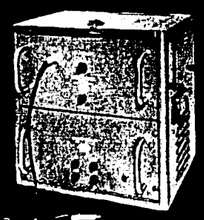
GENERAL LABORATORY EQUIPMENT



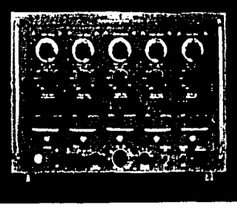
MICROWAVE
TUBE TESTER
Model K-200
Tests all microwave tubes as easily as ordinary vacuum tubes



PULSE
JITTER TESTER
Model PJ-1
Measures
(a) Pulse-to-pulse jitter
(b) Pulse width jitter
(c) Repetition rate jitter
Displays
(a) Jitter magnitude
(b) Jitter waveform

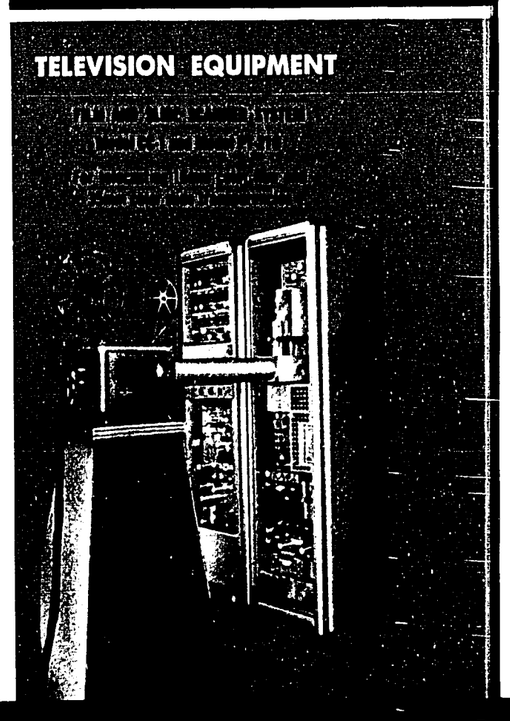


WIDE BAND
VIDEO AMPLIFIER
Model VT
10 cps to 20 mc



5 PULSE CODED
MULTI-PULSE
GENERATOR
Model MP-1A
Generates 5 separate pulses each with independently variable width and delay for missiles, beacons, and other systems

TELEVISION EQUIPMENT



Consult CHATHAM for all four

including tubes, aircraft conversion equipment, selenium rectifiers and radar components. Illustrated bulletins sent on request.

CHATHAM TYPE 5949/1907

Hydrogen filled, zero bias thyratron with hydrogen reservoir for generation of peak pulse power up to 6.25 megawatts.

CHATHAM TYPE VC-1258

Zero bias miniature thyratron for generation of peak pulse power to 10 KW. Available with 28 volt heater, ruggedized for extreme vibration.

HIGH PERFORMANCE

HYDROGEN THYRATRONS

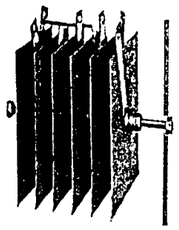
Years of experience in the design and production of these special types have resulted in tubes that offer superior service in the generation of pulse voltages in the order of microseconds.

CHATHAM TYPE 5948/1754

Hydrogen filled, zero bias thyratron with hydrogen reservoir for generation of peak pulse power up to 12.5 megawatts.

CHATHAM TYPE VC-1257

Hydrogen filled, zero bias thyratron with hydrogen reservoir for generation of pulse power up to 33 megawatts.



LIGHTWEIGHT CHATHAM "kotron"

SELENIUM RECTIFIERS

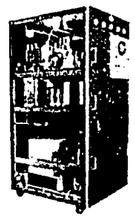
Both electrically and mechanically, Chatham kotron Selenium Rectifiers offer important design advantages. Combining lighter weight with smallest efficient size, kotrons are built rugged to last longer. Improved design assures longer short circuit loads, twice the voltage surge of ordinary rectifiers.

ADVANCE DESIGNED

AIRBORNE CONVERSION EQUIPMENT

Input – 195 to 210 volts, 3 phase, 400 cycles
Output – 28 v. DC, 100 amps.
Regulation – 25 to 31 volts
Weight – under 17 lbs.

Type 28V100 Power Supply illustrated provides substantial weight savings, reduced size, greater reliability and improved electrical characteristics. Ruggedized throughout. Type 28V-100 exceeds MIL-P-7212 requirements.



CUSTOM-DESIGNED EQUIPMENT

CHATHAM specializes in the development, design and production of equipment built to customers' needs. Our engineers will supply estimates on receipt of your drawings and specifications.

High power Radar modulators built to government specifications.

IF YOU HAVE A PROBLEM — Chatham facilities are available for the solution of problems involving tubes and special equipment for industrial and military applications. Your inquiry will receive prompt attention.

CHATHAM ELECTRONICS

LIVINGSTON, NEW JERSEY

Division of Tung-Sol Electric, Inc.

For the QUALITY that's a "MUST" in Hydrogen Thyratrons —look to Kuthe

•

Here at Kuthe—world's largest manufacturer of hydrogen thyratrons—every facility of research, engineering, design and production is geared to provide industry, laboratories, government agencies, the armed forces and others with the finest tubes possible.

Kuthe's unmatched facilities also are available for the development of hydrogen thyratrons for special applications . . . whether small in size, or ruggedized to withstand the most adverse environments, or for controlling electrical energy of greater powers.

Whatever your requirements you can depend upon

Kuthe for "QUALITY Without Equal"

HYDROGEN THYRATRON TUBES

KUTHE HYDROGEN THYRATRON TUBES are built to the most rigid specifications that insure consistently uniform, top quality performance.

1258

Peak pulse power.....10 KW
Peak forward anode voltage.....1.0 KV
Peak anode current.....20 amperes
Average anode current.....50 ma. max.
Pb.....0.1 x 10³

3C45

Peak pulse power.....50 KW
Peak forward anode voltage.....3000 volts max.
Peak anode current.....35 amperes max.
Average anode current.....45 ma. max.
Pb.....0.3 x 10³

3C45W

Electrical characteristics same as 3C45 except a hydrogen reservoir is incorporated for long tube life. Ruggedized construction is used.

4C35

Peak pulse power.....350 KW
Peak forward anode voltage.....8.0 KV max.
Peak anode current.....90 amperes max.
Average anode current.....100 ma. max.
Pb.....2.0 x 10³

SGR-1

Electrical characteristics same as 4C35 except
tad.....0.6 us
△tad.....0.04 us
tj.....0.01 us
A hydrogen reservoir is incorporated for long tube life.

5956/E36

(Compact and rugged, suitable for airborne radar)
Peak pulse power.....350 KW
Peak forward anode voltage.....8.0 KV max.
Peak anode current.....90 amperes max.
Average anode current.....100 ma. max.
Pb.....2.5 x 10³
A hydrogen reservoir is incorporated for long tube life.

5957/E37B

Electrical characteristics same as 5956/E36. Construction also identical, except for special ceramic, 4-pin base and size, which is 4.0" o.a.l. x 1.56" dia. max.

6777/KU14

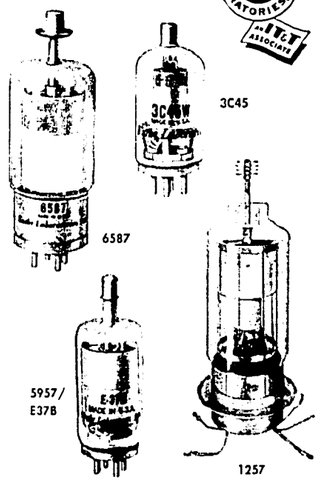
Peak pulse power.....120 KW
Peak forward anode voltage.....8.0 KV max.
Peak anode current.....35 amperes max.
Average anode current.....45 ma. max.
Pb.....1.1 x 10³

5958/E40

(Compact and rugged, suitable for airborne radar)
Peak pulse power.....150 KW
Peak forward anode voltage.....8.0 KV max.
Peak anode current.....40 amperes max.
Average anode current.....45 ma. max.

5959/E41

Electrical characteristics same as 5958/E40. Construction also identical, except for special all-glass, 4-pin base and size, which is 4.0" o.a.l. x 1.56" dia. max.



1257

Peak pulse power.....38,000 KW
Peak forward anode voltage.....38.0 KV max.
Peak anode current.....2000 amperes max.
Average anode current.....2500 ma. max.
Pb.....20 x 10³

5C22/HT415

Peak pulse power.....2500 KW
Peak forward anode voltage.....16.0 KV max.
Peak anode current.....325 amperes max.
Average anode current.....200 ma. max.
Pb.....3.2 x 10³

KU25

Electrical and mechanical characteristics same as 5C22/HT-415, except for modification permitting operation at high pulse recurrence rates.

6587

Peak pulse power.....2500 KW
Peak forward anode voltage.....16.0 KV
Peak anode current.....325 amperes
Average anode current.....225 ma. max.
Pb.....3.9 x 10³

5949/1907

Peak pulse power.....6000 KW
Peak forward anode voltage.....25.0 KV max.
Peak anode current.....500 amperes max.
Average anode current.....500 ma. max.
Pb.....6.25 x 10³

5948/1754

Peak pulse power.....12,000 KW
Peak forward anode voltage.....25.0 KV max.
Peak anode current.....1000 amperes max.
Average anode current.....1000 ma. max.
Pb.....9.0 x 10³

RESERVOIR EQUIPPED TUBES

Kuthe Laboratories, Inc.

An Associate of
INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION
730 SOUTH 13th STREET NEWARK, NEW JERSEY

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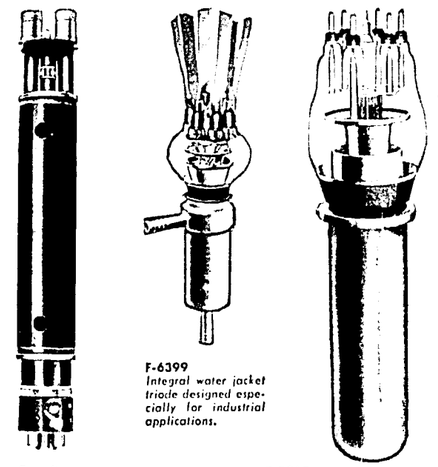
Federal ELECTRONIC TUBES

DEPENDABLE *Federal* ELECTRON TUBES

TRAVELING WAVE TUBES
TRANSMITTING • BROADCASTING
INDUSTRIAL
SPECIAL PURPOSE
Clipper Diodes • Hard Tube Modulators
High Voltage Rectifiers
Mercury Vapor Rectifiers



Traveling Wave Tube

F-6399
Integral water jacket triode designed especially for industrial applications.

F-5918
High power triode for broadcast communications and industrial applications.

FEDERAL TRAVELING WAVE TUBES

Type	Frequency KMC	Power Output (Watts) CW	Pulse
F-6658	2.0-4.0	1	2.5
F-6825	2.4-3.6	—	1000
F-6826	2.4-3.6	—	750
F-6867	8.5-9.6	0.2	0.2
F-6868	2.0-4.0	10	10
F-6996	8.0-9.6	10	—
F-6997	2.7-2.9	—	30

FEDERAL RECTIFYING TUBES

Type	Description	Max. Peak Inverse Volt.	Max. Peak Current (Amps.)	Filament Voltage
F-869-B	Mercury Vapor	20,000	10	5
F-857-B	Mercury Vapor	22,000	40	5
F-575-A	Mercury Vapor	15,000	6	5
F-673	Mercury Vapor	15,000	6	5

Basic Technical Data Covering Complete Line of FEDERAL POWER TUBES

Type	Description	Cooling*	Plate Dissipation	Mu	Plate Input	DC Plate Volt.	Max. Freq. Ratings	Filament Voltage
F-3X2500A3	HF Triode	A	2.5 KW	20	8 KW	4,000	110 MC	7.5
F-3X2500F3	HF Triode	A	2.5	20		6,000	30	7.5
F-7C23	Pulse Triode	A	1.2	25		17,000	5	11
F-7C25	HF Triode	A	2.5	25	5.6	4,500	50	11
F-7C26	HF Triode	A	1	17	3	3,000	150	9
F-8C25	AF Triode	A	5	6	10	5,000		7
F-9C23	RF Triode	W	25	32	50	15,000	20	22
F-9C28	AF Triode	W	40	4.75	100	15,000		7.5
F-9C29	AF Triode	A	20	4.75	50	15,000		7.5
F-9C30	RF Triode	W	40	42	120	15,000	20	7.5
F-9C31	RF Triode	A	20	42	100	15,000	20	7.5
F-110X	RF Triode	W	25	40	50	20,000	3	28
F-124-A	RF Triode	W	40	42	135	20,000	20	13.6
F-124R	RF Triode	A	20	42	100	20,000	20	13.6
F-125-A	AF Triode	W	40	4.75	100	15,000		13.6
F-127-A	RF Triode	A	0.2	38	0.95	3,000	30	10
F-128-A	RF Triode	A	0.6	36	3	3,500	30	11
F-129-B	RF Triode	W	7.5	26	18	12,000	30	18
F-129-R	RF Triode	A	5	26	18	12,000	30	18
F-132-A	AF Triode	A	0.6	10	1.8	3,500		11
F-134	RF Triode	W	150	21	450	20,000	22	25
F-212E	RF Triode	A	0.275	16	0.7	2,000	4.5	14
F-220CA/320BA	RF Triode	A	5	40	22.5	15,000	4	21.5
F-220C/320B	RF Triode	W	10	40	22.5	15,000	4	21.5
F-342-A	RF Triode	W	25	40	50	20,000	4	20
F-343-A	RF Triode	W	10	40	36	18,000	4	21.5
F-343-AA	RF Triode	A	5	40	20	18,000	4	21.5
F-631	RF Triode	W	25	40	50	20,000	3	28
F-862-A	RF Triode	W	100	45	200	20,000	1.6	33
F-891	RF Triode	W	6	8.5	18	12,000	1.6	11/22
F-891-R	RF Triode	A	4	8.5	15	10,000	1.6	11/22
F-892-A	RF Triode	W	10	50	30	15,000	1.6	11/22
F-892-R	RF Triode	A	4	50	18	10,000	1.6	11/22
F-898-A	RF Triode	W	100	45	200	20,000	1.6	16.5
F-5604	HF Triode	A	10	19.5	32.5	12,500	22.5	11
F-5606	RF Triode	W	10	50	30	15,000	1.6	22
F-5619	HF Triode	W	20	19.5	32.5	12,500	22.5	11
F-5658	RF Triode	W	20	20.5	60	10,500	25	12
F-5666	HF Triode	W	12.5	21	20	10,000	22.5	11
F-5667	RF Triode	A	7.5	21	20	10,000	22.5	11
F-5668	RF Triode	W	20	50	28	14,000	5	22
F-5669	RF Triode	A	10	50	28	14,000	5	22
F-5680	HF Triode	A	2.5	25	12	6,000	30	13
F-5762	HF Triode	A	3	29	8.7	6,200	30	12.6
F-5771	RF Triode	W	22.5	20	60	12,500	25	7.5
F-5874	AF Triode	W	7.5	6	15	6,000		7
F-5917	HF Triode	W	5	20	8	4,000	110	7.5
F-5918	RF Triode	W	70	37	300	17,500	22	11
F-5919	RF Triode	A	35	37	175	17,500	22	11
F-5996	HF Triode	A	2.5	25	12	6,000	30	13
F-6009	HF Triode	W	6	25	12	6,000	30	13
F-6166	VHF Tetrode	A	10	10	16	5,900	220	5
F-6179	AF Triode	W	50	4.75	120	15,000		27.2
F-6366	HF Triode	A	3	25	7	5,500	30	11
F-6367	HF Triode	A	3	25	12	6,200	30	13
F-6379	AF Triode	W	70	4.75	150	17,500		11
F-6398	RF Triode	W	225	21	500	25,000	22	15.5
F-6399	HF Triode	W	6	25	9	6,200	30	11
F-6400	HF Triode	W	6	25	18	9,200	30	13
F-6401	Pulse Triode	W	1	12		17,000	600	4.25
F-6691	HF Triode	A	15	37	54	12,500	30	5
F-6692	HF Triode	W	30	37	80	15,000	30	5
F-6800	HF Triode	W	20	20	45	15,000	22	7.5
F-6801	HF Triode	A	10	20	40	15,000	22	7.5
F-6920	Pulse Triode	A	10	41		35,000		11
F-6921	AF Triode	W	30	4.25	60	15,000		5
F-6925	RF Triode	A	3	17	12	6,500	50	13
F-6926	RF Triode	W	6	17	12	6,500	50	13
F-6926J	RF Triode	W	6	17	12	6,500	50	13
F-7012	HF Triode	A	2.5	25	12	6,000	30	15

* A=Forced Air Cooling W=Water Cooled ALL RATINGS MAX.

FEDERAL TUBES

Components Division

INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

100 Kingsland Road • Clifton, N. J.

For details, circle #76 on Reader Service Card.

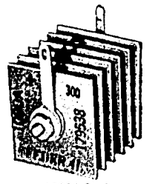
Federal

SELENIUM RECTIFIERS

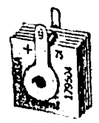
RADIO AND TELEVISION

FEATURES

1. Longer life.
2. Higher output voltage.
3. Lower temperature rise.
4. Superior humidity resistance.
5. Proven mechanical construction.
6. 85° C. UL acceptance.
7. Conservative ratings.
8. More uniform quality.
9. Largest plant capacity.
10. More engineering know-how.



1090A Stud Construction (S)



1003A Eyelet Construction (E)

OTHER AVAILABLE TYPES

- Printed circuit rectifiers
- Plug-in rectifiers
- Special purpose rectifiers manufactured to customer specifications

FTR Catalog No.	Max. DC-Ma.	Max. RMS Volts	Mtg. "M" Dim. (Max.)	Plate Size	Application
FEDERAL'S STANDARD SELENIUM RECTIFIERS					
1159	20	130	—	3/8" dia.	B + Booster-Bias
*1002 A	65	130	9/16"	1" sq.	B + AC-DC (5 Tube)
*1003 A	75	130	3/4"	1" sq.	B + 3 Way Radio
*1101 A	100	130	1 5/8"	1" sq.	B + Radio-TV
*1004 A	100	130	3/4"	1 33/64" x 1 5/32"	B + Radio-TV
*1005 A	150	130	1"	1 33/64" x 1 5/32"	B + Radio-TV
*1006 A	200	130	1"	1 17/32" sq.	B + Television
*1028 (1010)	250	130	1 1/4"	1 17/32" sq.	B + Booster-Bias
1090 A	300	130	2 7/32"	1 17/32" sq.	B + Television
1023 A (1206)	350	130	2 7/32"	1 1/2" sq.	B + Television
1130 (1056)	400	130	1 1/4"	2" sq.	B + Television
1179 (1021)	500	130	2 7/32"	2" sq.	B + Television
FEDERAL'S SPECIAL PURPOSE RECTIFIERS					
1015	150	25	1" sq.	1" sq.	Filament Supply
*1512 (1018)	1600	18	15/16"	2 1/2" sq.	Power Supply
1014	100	172	1" sq.	1 17/32" max.	Battery Charger
1007	75	172	2 1/16"	1" sq.	Power Supply High Voltage Power Supply
1008	100	172	2 1/16"	1 33/64" sq.	Power Supply High Voltage Power Supply
1009	200	172	2 21/32"	1 17/32" sq.	Power Supply High Voltage Power Supply
1022	450	172	2 13/16"	2" sq.	B + Television
*1016	300	25	3/4"	1 33/64" x 1 5/32"	Filament Supply
*1017	600	25	3/4"	1 17/32" sq.	Filament Supply
*1013	700	18	1 1/4"	1 17/32" sq.	Filament Supply
*1001	75	20	3/4"	1" sq.	Bias-Rectifier
1265	65	130	† 3/4" ± 1/16" — O	1" sq.	AC-DC (Radio)
1090 AP	300	130	† 15/16" ± 1/16"	1 17/32" sq.	Plug-in Type
1356 AP	350	130	† 1 13/16" ± 1/16"	1 5/8" sq.	B + Television
1319 A	600	195	3 1/2"	2" sq.	B + Color Television
1090 C	300	130	2 7/32"	1 17/32" sq.	B + Television
1179-C (1021 C)	500	130	2 7/32"	2" sq.	B + Television

Letter "A" after catalog number indicates locking lug. *Eyelet construction. † Terminal to terminal dimensions.

"PACKAGED-POWER" SELENIUM RECTIFIERS

Catalog Number	Old Catalog Number	Rectifier Stack Code Number	Max. D.C. Output Volts	Max. D.C. Output Amps.	Max. A.C. Input Volts	Rectifier Stack Dimensions "A"	"B" ± 1/16"	"C"
010	2100S	106C1SAX1	10	3	13	3"	1 1/2"	3"
011	—	*107C1SAX1	10	5	13	4"	1 1/2"	4"
012	2101S	133C1SAX1	10	6	13	4"	1 3/4"	4"
013	—	*135C1AX1	10	8	13	6"	1 9/16"	5"
014	2102	136C1AX1	10	12	13	6"	1 3/4"	6"
015	—	*169C1AX1	10	16	13	10"	2 1/16"	6"
016	—	*170C1AX1	10	24	13	10"	2 1/4"	6"
210	—	*142B1AX1	20	1.5	26	2"	1 7/8"	2"
211	2103S	106B1SAX1	20	3	26	3"	2 1/16"	3"
212	—	*107B1SAX1	20	5	26	4"	2 1/16"	4"
213	2104S	133B1SAX1	20	6	26	4"	2 13/16"	4"
214	—	*135B1AX1	20	8	26	6"	2 1/16"	5"
215	2105	136B1AX1	20	12	26	6"	2 3/4"	5"
216	—	*169B1AX1	20	16	26	10"	3 1/16"	6"
217	—	*170B1AX1	20	24	26	10"	3 1/4"	6"
310	2026S	106B2SAX1	40	3	52	3"	3 9/16"	3"
311	—	*107B2SAX1	40	5	52	4"	3 9/16"	4"
312	2107S	133B2SAX1	40	6	52	4"	3 13/16"	4"
313	—	*135B2AX1	40	8	52	6"	3 1/16"	5"
314	2108	136B2AX1	40	12	52	6"	3 1/4"	5"
315	—	*169B2AX1	40	16	52	10"	4 1/16"	6"
316	—	*170B2AX1	40	24	52	10"	4 1/4"	6"
410	2118S	106B3SAX1	60	2.6	78	3"	4 1/16"	3"
411	—	*107B3SAX1	60	4.5	78	4"	4 1/16"	4"
412	2033S	133B3SAX1	60	6	78	4"	4 13/16"	4"
413	—	*135B3AX1	60	8	78	6"	4 1/16"	5"
414	2085	136B3AX1	60	12	78	6"	4 3/16"	5"
415	—	*169B3AX1	60	16	78	10"	5 1/16"	6"
416	—	*170B3AX1	60	24	78	10"	5 3/16"	6"
510	2109S	106B4SAX1	80	2.6	104	3"	5 1/16"	3"
511	—	*107B4SAX1	80	4.5	104	4"	5 1/16"	4"
512	2110S	133B4SAX1	80	6	104	4"	5 13/16"	4"
513	—	*135B4AX1	80	8	104	6"	6 1/16"	5"
514	2111	136B4AX1	80	12	104	6"	6 3/16"	5"
515	—	*169B4AX1	80	16	104	10"	7 1/16"	6"
516	—	*170B4AX1	80	24	104	10"	7 3/16"	6"
710	—	*104B5AX1	100	.6	130	1 1/2"	4 3/16"	1 1/2"
711	2112	139B5AX1	100	1	130	2"	5 1/16"	2"
712	2113S	106B5SAX1	100	2.4	130	3"	6 3/16"	3"
713	—	*107B5SAX1	100	4	130	4"	6 3/16"	4"
714	2114S	133B5SAX1	100	6	130	4"	10 3/16"	4"
715	—	*135B5SAX1	100	8	130	6"	7 3/16"	5"
716	—	*136B5AX1	100	12	130	6"	11 1/16"	5"
810	2115	103B6AX1	120	.3	156	1 1/4"	4 3/16"	1 1/4"
811	2036	104B6AX1	120	.6	156	1 1/2"	4 7/16"	1 1/2"
812	2116	139B6AX1	120	1	156	2"	6 1/16"	2"
813	2038S	106B6SAX1	120	2.4	156	3"	7 3/16"	3"
814	—	*107B6SAX1	120	4	156	4"	7 3/16"	4"
815	2117S	133B6SAX1	120	6	156	4"	12 3/16"	4"
816	—	135B6AX1	120	8	156	6"	8 3/16"	5"
817	—	*136B6AX1	120	12	156	6"	13 1/2"	5"

* Asterisks indicate new Type Rectifiers. Bold face type indicates Rectifiers recommended for stocking.
Note: Ratings for 35° Ambient; Resistive or inductive loads.

FEDERAL'S CONTACT PROTECTORS

- End arcing contacts
- Stop erosion of switch contact surfaces
- Extend contact life by more than 1000 times
- Eliminate circuit failure and interference caused by arcing contacts

ADAPTS ALL SIGNAL AND TELEPHONE TYPE RELAYS OPERATING TO 40 TIMES PER SEC. AND DRAW UP TO 600 MA. OPERATING CURRENT AT 150V AC OR DC.

FOR DIRECT CURRENT APPLICATIONS					
Max. Volts	Max. Coil Current Ma.	Minimum Volts	Federal Code # (Paper Tube Only)	Dimensions A	B
22	100	15	8A1PS1	25/64"	5/16"
22	200	15	15A1PS1	1/2"	5/16"
44	200	23	8A2PS1	25/64"	5/16"
44	500	23	15A2PS1	1/2"	5/16"
66	250	45	8A3PS2	25/64"	5/16"
66	500	45	15A3PS2	1/2"	5/16"
88	250	67	8A4PS2	25/64"	5/16"
88	500	67	15A4PS2	1/2"	5/16"
110	250	89	8A5PS2	25/64"	15/16"
110	600	89	15A5PS2	1/2"	15/16"
132	250	111	8A6PS2	25/64"	15/16"
132	600	111	15A6PS2	1/2"	15/16"
154	250	133	8A7PS2	25/64"	15/16"
154	600	133	15A7PS2	1/2"	15/16"

FOR ALTERNATING CURRENT APPLICATIONS					
Max. Volts	Max. Coil Current Ma.	Minimum Volts	Federal Code # (Paper Tube Only)	Dimensions A	B
26	100	15	8A1PS1	25/64"	5/16"
26	200	15	15A1PS1	1/2"	5/16"
52	200	27	8A2PS2	25/64"	5/16"
52	400	27	15A2PS2	1/2"	5/16"
78	200	53	8A3PS3	25/64"	5/16"
78	400	53	15A3PS3	1/2"	5/16"
104	200	79	8A4PS4	25/64"	15/16"
104	400	79	15A4PS4	1/2"	15/16"
130	200	105	8A5PS5	25/64"	15/16"
130	400	105	15A5PS5	1/2"	15/16"
156	200	131	8A6PS6	25/64"	1 1/16"
156	400	131	15A6PS6	25/64"	1 1/16"

Components Division

INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

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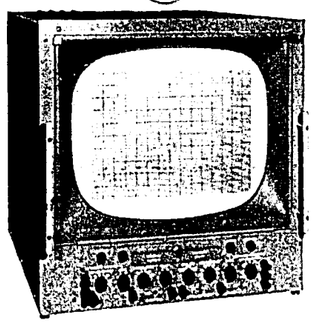
Federal INSTRUMENTS Industrial Products Division

MEASURING AND TESTING EQUIPMENT



LARGE SCREEN OSCILLOSCOPES

Available in 21" Bench Console and 17" Rack Mounted Model. Basic models of each type are available; the "35" Dual Response Medium Sensitivity Models, and the High Sensitivity "40" Model featuring Differential Input in the 1 to 10 Millivolt Sensitivity Range. These Oscilloscopes feature unequalled stability and linearity.

MULTI-CHANNEL OSCILLOSCOPES

Large Screen Multi-channel Oscilloscopes feature forty input channels and permit continuous reading of forty separate signals.

The display consists of a vertical bar graph 9" high by 12" wide. The vertical length of each line indicates the value of the maximum input voltage which existed during the previous tenth of a second.

SWEPT FREQUENCY GENERATORS

Used in conjunction with an oscilloscope provides an amplitude versus frequency display of high accuracy. The frequency response plots obtained thereby permit highly accurate and rapid production testing and calibration of frequency sensitive devices. This instrument also enables the user to determine instantly the effects of changes in circuit parameters upon frequency characteristics, thus permitting an optimum design to be obtained in minimum time.

SHORT FORM CATALOGS AVAILABLE ON FOLLOWING:

TERA-OHMMETERS • IMPEDANCE BRIDGES • FREQUENCY MEASURING SYSTEMS • WAVEFORM ANALYZERS • SIGNAL GENERATORS • ELECTRONIC VOLTMETERS AND POWER METERS • CAPACITANCE STANDARDS • ATTENUATORS • FIELD INTENSITY METERS • GALVANOMETERS.

TERA-OHMMETERS

INSULATION MEASUREMENTS up to 5000 MILLION MEGOHMS

For testing resistors, capacitors, cables, switches, tube sockets, transformers and many other components...incoming inspection and quality control.

Type FT-H

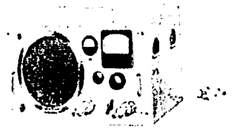
TYPE FT-H4

Range: 20 megohms to 5000 x 10^6 megohms in 6 ranges • Test Voltage: Adjustable from 100 to 1000 v., dc • Accuracy: ±3% in scale center • Power Supply: 115 v., 50-60 cps. Instrument can also be operated from its own battery supply.

Note: Other types available to cover ranges from .2 megohms to 500 x 10^6 megohms with fixed test voltages between 3 and 1000 volts.

Z-G DIAGRAPH

Plots Impedance Instantaneously



Type FT-ZDU

Features:

- **Rapid Measuremnt of Impedance and Admittance of Antennas, Components, Coaxial Systems, Cables, Transistors, Filters and Attenuators**
- **Rapid Measurement of Transmission Characteristics of Coaxial Cables, Filters and Attenuators**
- **Measures Phase Angle between RF Voltages**
- **Direct Readings on Standard Charts:**
  - ***—eliminate need for calculation***
  - ***—prevent computation errors***
  - ***—save valuable engineering time***

SPECIFICATIONS

Freq Ranges: Type FT-ZDU . . . 30 to 300 mc; Type FT-ZDD . . . 300 to 2400 mc • Characteristic Impedance: 50 ohms • Measuring Ranges: Impedance . . . 1 to 2500 ohms, Phase . . . 0 to 360°, Attenuation . . . 0 to 30 db • Accuracy: Amplitude . . . ±3%; Phase . . . ±1.5 • Terminals: Type N • Power Supply: 115 volts (or 220 volts), 50 to 60 cycles.

FEDERAL INSTRUMENTS

Industrial Products Division

INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

100 Kingsland Road • Clifton, N. J.

A LIST OF IT&T PRODUCTS NOT DESCRIBED HERE:

AMPLIFIERS
- Klystron AFC
- Magnetic
- Microwave
- Null

ANALYZERS
- Distortion
- Frequency
- Harmonic
- Spectrum
- Wave

ANTENNAS
- Aircraft Type
- Ground Plane

ATTENUATORS
- Audio
- r-f & i-f

BATTERY CHARGES
- Selenium

BEACONS
- Radio Navigation

BRIDGES
- Capacitance
- Electrical
- Impedance
- Inductance
- Megohm
- VHF
- Wheatstone

CALIBRATORS
- Frequency

CAMERAS
- Television

CIRCUITS
- Computor, Packaged
- Plug-In
- Potted
- Printed

COMMUNICATION SYSTEMS
- Aircraft
- Airport Traffic Control
- Portable Installation
- Railroad
- Teletype
- Vehicular

COMPARATORS
- Capacitance
- Inductance

COMPUTERS
- Analog
- Digital

CONVERTERS
- Analog to Digital
- Power Frequency, Electronic

DATA RECORDING EQUIPMENT

DECADE BOXES
- Capacitance

DETECTORS
- Null
- Null-R-F
- Null-vtvm

FLUXMETERS

GENERATORS, ELECTRONIC
- AM-FM
- Microwave
- Random Noise
- Variable Frequency
- Signal, a-f
- Signal, f-m
- Signal, r-f
- Signal, shf
- Signal, Sweeping
- Signal, uhf or vhf
- Variable Frequency

INDICATORS
- Null

INVERTERS
- DC-AC

LINES
- Slotted

MEGOHMMETERS

MEGOHMMETERS, VACUUM TUBE

METERS
- Distortion and Noise
- Electronic Capacitance
- Field Strength
- f-m Deviation
- Frequency
- Frequency, Microwave
- Impedance
- Microvolt
- Microwave
- Modulation
- Null
- Power-Microwave

MICROFARADMETERS

MILLIVOLTMETERS

OSCILLATORS
- Microwave Power
- Radio Frequency
- Sweeping

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- Cathode Ray, Multiple Channel

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- Single Side Band

TUBE PARTS

TUBES—ALL TYPES

Send for complete details — address **FEDERAL TELEPHONE AND RADIO COMPANY, 100 KINGSLAND ROAD, CLIFTON, N. J.**

For details, circle #78 on Reader Service Card.

DESIGN ACHIEVEMENTS WITH SUPRAMICA* ceramoplastics

SUPRAMICA ceramoplastics . . . . . .

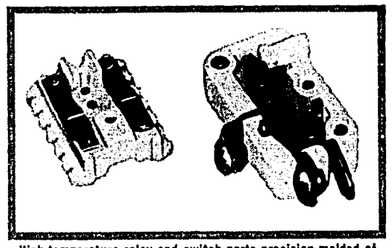
MOLDED OR MACHINABLE HIGH TEMPERATURE INSULATION

Supramica ceramoplastics, the world's most nearly perfect high temperature insulations, are formulated with SYNTHAMICA* synthetic mica. Supramica possesses high temperature and thermal shock resistance, and complete dimensional stability. Thermal expansion coefficients are the same as steel. They have low electrical loss, excellent arc resistance, high dielectric strength, and are impervious to moisture, oil and organic solvents, with permanent resistance to radiation.

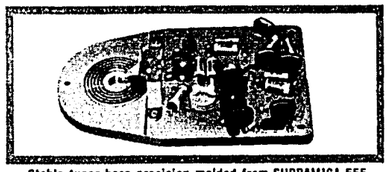
SUPRAMICA* 560 — New insulation for **continuous operation** at 500° C (932° F). Lightweight material can be precision molded with fragile inserts . . . specified for conditions **which no other material can meet!** Specific gravity similar to that of aluminum or mineral-filled polyesters . . . perfect for relay bases, connectors, radomes, tube sockets and other components for high temperature use.

SUPRAMICA* 555 — Precision-molded ceramoplastic having high-temperature endurance up to 750° F. Moldable with or without inserts.

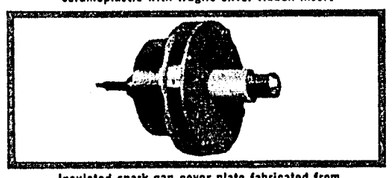
SUPRAMICA* 500 — Compression-molded ceramoplastic sheets and rods for use at temperatures up to 900° F. Readily machinable; not precision moldable. Inserts must be cemented.



High-temperature relay and switch parts precision molded of SUPRAMICA 560 ceramoplastic



Stable tuner base precision molded from SUPRAMICA 555 ceramoplastic with fragile silver ribbon insert



Insulated spark gap cover plate fabricated from SUPRAMICA 500 ceramoplastic

MYCALEX* glass-bonded mica . . .

MOLDED OR MACHINABLE ELECTRICAL INSULATION

Mycalex glass-bonded mica formulations have been recognized for many years as high-temperature, high-frequency insulation . . . impervious to oil and water, resistant to high temperatures, with total, permanent dimensional stability and thermal expansion coefficient equivalent to that of insert metals . . . resistant to radiation.

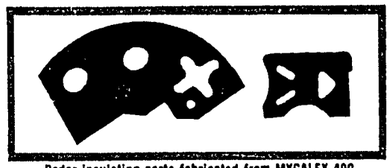
MYCALEX 410* Glass-bonded mica precision-molded with or without inserts, for applications involving temperatures up to 650° F.

MYCALEX 400* Standard compression molded glass-bonded mica for operating temperatures to 850° F. Readily machinable, but not moldable. Inserts must be cemented.

MYCALEX* 385 Glass-bonded mica with excellent resistance to circuit breaker arcing and thermal shock, for continuous operating temperatures up to 700° F. Readily machinable, but not moldable in intricate shapes.

MYCALEX* K (machinable) and KM (moldable) Glass-bonded mica capacitor dielectrics with higher dielectric constant indicated by numbers 10, 20, 30.

High shock potentiometer parts precision molded with steel supporting inserts — MYCALEX 410 glass-bonded mica



Radar insulating parts fabricated from MYCALEX 400 glass-bonded mica

Circuit breaker arc chute fabricated from MYCALEX 385 glass-bonded mica

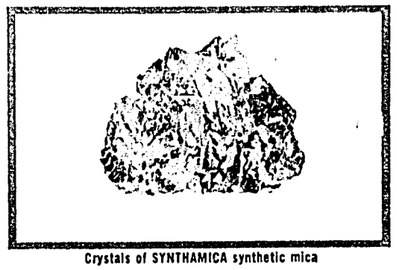
SINCE 1919 MYCALEX — THE FIRST SUPRAMICA® CERAMOPLASTIC — THE FIRST SYNTHAMICA SYNTHETIC MICA

* "SUPRAMICA", "MYCALEX", "400", "410", are registered trade-marks of MYCALEX CORPORATION OF AMERICA: "500", "555", "560" and "385" are trade-marks of MYCALEX CORPORATION OF AMERICA

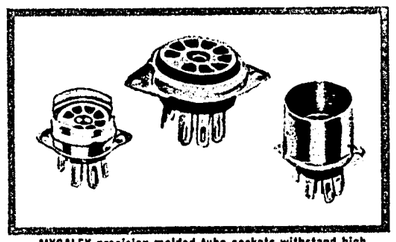
"SYNTHAMICA" is a trade-mark of SYNTHETIC MICA CORPORATION, a subsidiary of MYCALEX CORPORATION OF AMERICA.

AND MYCALEX* glass-bonded mica . . . . . .

MYCALEX TM Commutation Switch with commutator plates precision molded of SUPRAMICA 555 ceramoplastic. Plate is CP-346, 2-poles, 360 contacts.



Crystals of SYNTHAMICA synthetic mica



MYCALEX precision molded tube sockets withstand high temperatures and rugged service. Standard miniature and subminiature types.

Write today for complete technical information concerning any of the above products or materials.

MYCALEX TM telemetering switches

WITH SUPRAMICA CERAMOPLASTIC COMMUTATOR PLATES ASSURE RELIABLE OPERATION UNDER EXTREME CONDITIONS

Precision-molded Supramica ceramoplastic commutator plates have introduced a degree of accuracy and sustained dependability never before approached in telemetry. Where warpage of only .0002" of the commutator plate will distort and destroy the value of the signal, these precision switches withstand extremes of temperature, altitude, shock and vibration and deliver a clean, unvarying signal . . . tests show completely satisfactory performance of these switches after more than 1000 hours at 1200 RPM.

In military and industrial applications, Mycalex TM Telemetering Switches with Supramica ceramoplastic commutator plates have made significant contributions to the reliability of electronic equipment.

MYCALEX ELECTRONICS CORPORATION

SYNTHAMICA* synthetic mica . . . .

Available in commercial quantities, as powder, flake or crystal, and in chemically bonded sheets for all applications in the electronic, communications and related industries. Manufactured from readily available native raw materials, Synthamica synthetic mica is an important contribution to the development of military and civilian electronics.

Synthamica synthetic mica is chemically pure, hydroxyl free, and will withstand temperatures almost twice as high as its natural counterpart. One of the outstanding properties of this crystal clear material is the freedom from outgassing at elevated temperatures and pressures.

SYNTHETIC MICA CORPORATION
A Subsidiary of MYCALEX CORPORATION OF AMERICA

MYCALEX tube sockets . . . . . .

High temperature tube sockets made from Supramica ceramoplastic and Mycalex glass-bonded mica are produced under exclusive license of Mycalex Corporation of America.

Supramica 560 ceramoplastic tube sockets have successfully passed operating tests at 500° C.

MYCALEX TUBE SOCKET CORPORATION

MYCALEX
CORPORATION OF AMERICA

GENERAL OFFICES AND PLANT:
CLIFTON BOULEVARD
CLIFTON, NEW JERSEY

EXECUTIVE OFFICES:
30 ROCKEFELLER PLAZA
NEW YORK 20, NEW YORK

SALES OFFICES:
CHICAGO — DAYTON
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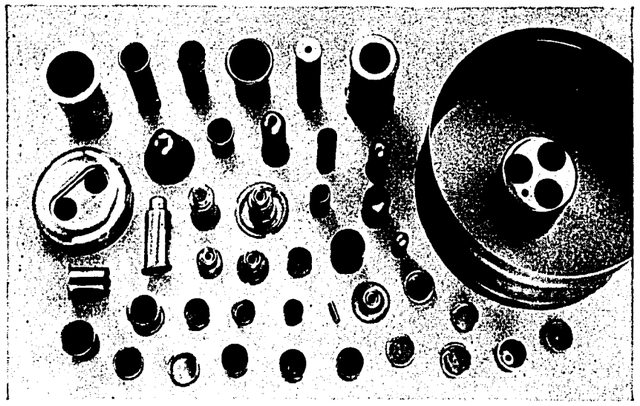
WASHINGTON



DEEP-DRAWN PARTS

Parts made by drawing the metal into the desired shape. These parts include cups, eyelets, rings, flanges and grommets.

Precision Metal Stampings

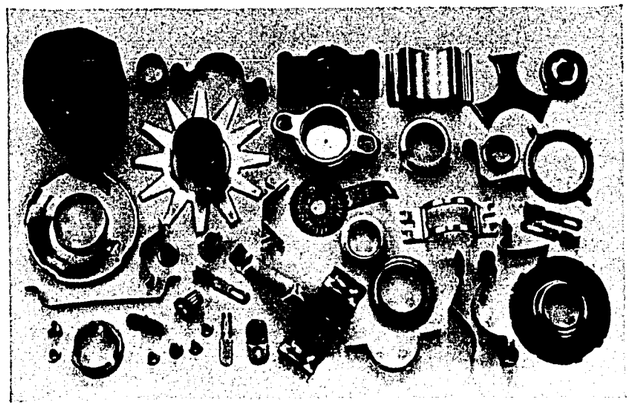
Untrimmed or trimmed, depending on available tooling.

TOOLING ON HAND FOR ROUND CUPS IN THESE SIZES

Save cost. Johnson & Hoffman can make round cups in these sizes from existing tooling, saving you the high cost of special dies. A small tooling charge may be necessary to accommodate different end shapes. These parts are available in low carbon steel, stainless steel, glass sealing alloys, nickel, aluminum, brass and titanium. When ordering, please specify material, wall thickness, diameter, length, and shape of open end.

OUTSIDE DIA.	HEIGHT	OUTSIDE DIA.	HEIGHT	OUTSIDE DIA.	HEIGHT	OUTSIDE DIA.	HEIGHT
.004 Mat'l (Wall)		.010 Mat'l (Wall)		.010 Mat'l (Wall)		.015 Mat'l (Wall)	
.284	5/32	1.000	3/8	.374	9/16	.608	7/16
.231	3/16	.988	5/8	.314	5/8	.575	1 13/16
.198	1/4	.940	1 1/4	.271	5/8	.552	13/32
.170	9/32	.934	7/16			.529	2 1/8
.150	11/32	.900	1 11/16	.012 Mat'l (Wall)		.485	1 1/8
.135	3/8	.860	1 29/32			.470	5/8
.121	13/32	.795	1 9/32	.730	13/16	.453	1/2
		.790	1	.585	1	.402	3/4
.007 Mat'l (Wall)		.780	3/8	.520	1 3/16	.373	5/8
		.770	13/16				
.703	9/32	.752	1 5/16	.015 Mat'l (Wall)		.030 Mat'l (Wall)	
.562	3/8	.737	23/32				
.520	1/2	.704	7/16	1.605	1 1/16	2.170	1
		.658	1 1/2	1.225	1 1/2	1.787	1 1/4
.010 Mat'l (Wall)		.632	1 7/32	1.195	7/8	1.583	1 3/8
		.625	5/8	1.100	1 11/16	1.498	1 5/16
1.310	3/4	.620	1/2	1.027	3/4	1.310	1/2
1.210	1 5/16	.600	29/32	.950	1 7/8	1.050	5/8
1.202	7/8	.576	1 5/8	.935	1 7/8	.926	5/16
1.195	13/16	.562	9/16	.920	1 1/4	.859	13/16
1.180	13/16	.530	1 9/32	.788	15/16	.806	7/16
1.050	15/16	.520	1 3/4	.750	1 1/2	.795	15/16
1.030	13/16	.497	11/16	.657	1 3/4	.730	1 5/16
1.020	1 1/16	.455	7/16	.615	3/8	.710	1/2

For details, circle #81 on Reader Service Card.



STAMPINGS

Parts made of flat strip which is bent or curved to the shape desired or cut to a particular shape. These machines can also perform embossing or drawing operations within certain limits.

MICRO-MINIATURE PARTS

A typical example is this group of parts made for use in the new General Electric 6BY4 ceramic electron tube.* These parts, with a maximum diameter of only ¼ in., are held within .0005 in. tolerance.

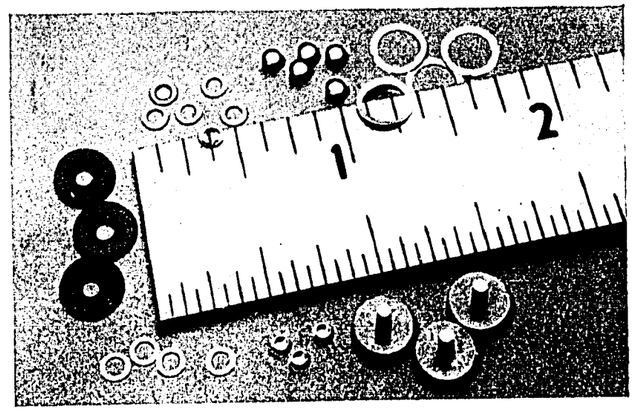
**Reproduced by permission of General Electric Co., Electronic Components Division.*

at Low Cost

Johnson & Hoffman ingenuity can save you money while insuring product quality

The ability of Johnson & Hoffman to make precision metal stampings and deep-drawn parts at low cost is a result of its emphasis on creative engineering . . . ingenious design and tooling . . . combining two parts into one . . . or reducing the number of operations required to produce a given part.

Whatever your requirements, look to Johnson & Hoffman as your fast, reliable source of supply. We have an extensive line of standard designs and are equipped to develop new tooling for special parts you may need.



MATERIALS

Titanium, molybdenum, tungsten, stainless steel, brass, carbon steel, copper, aluminum, Berylco,* phosphor bronze, Inconel,† HC-4, 52 alloy, Kovar,‡ nickel silver, silver, Rodar.§

FINISHES

Electropolished, tumbled, plated.

SIZE LIMITATIONS

Johnson & Hoffman has facilities to produce a wide variety of parts to exacting close tolerances. Deep-drawn parts, for example, can be supplied from strip metals from .003 to .060 in. thick in sizes up to 2.75 in. OD and 3.75 in. in depth. These include plain or contoured cups, pierced or closed. Materials of other thicknesses can be used, depending on the contour of the part and the particular material. There is virtually no limit to the variety of stampings that can be produced. Complete information on these parts, plus micro-miniature parts, can be supplied on request.

WRITE FOR ESTIMATE

If you currently buy precision stampings or deep-drawn parts, ask Johnson & Hoffman for an estimate. Find out just how much you can save, while maintaining or possibly improving your product quality.

**T.M. Reg. U.S. Pat. Off., The Beryllium Corporation.*
†T.M. Reg. U.S. Pat. Off., International Nickel Co.
‡Kovar is distributed by the Carborundum Co., Stupakoff Division, Latrobe, Pa., for Westinghouse Electric Corporation. Reg. U.S. T.M. No. 337,962, Westinghouse Electric Corporation.
§T.M. Reg. U.S. Pat. Off., Wilbur B. Driver Co.

An affiliate of Superior Tube Co.

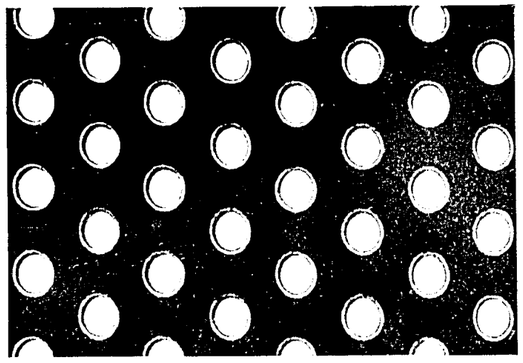
J&H JOHNSON & HOFFMAN

MANUFACTURING CORPORATION

31 East 2nd Street • Mineola, New York • Pioneer 2-3333

For details, circle #82 on Reader Service Card.

Superior makes the parts



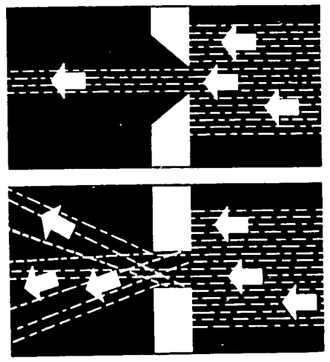
New tapered hole aperture mask—an actual photograph at 18X magnification.

NEW, TAPERED HOLE APERTURE MASKS[1]

. . . for sharper, truer color TV

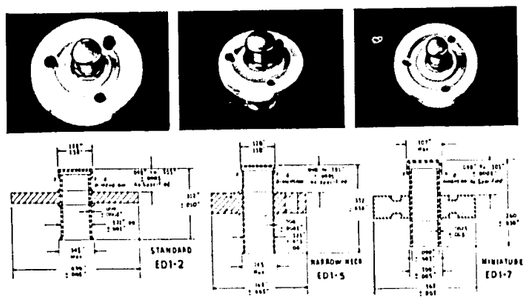
Here's a way to reduce beam diffusion, minimize false color and get better color TV pictures—in your present-design picture tubes.

Ideally, an aperture mask should have zero thickness. Electrons impinge on the walls of cylindrical holes, and are deflected out of the narrow beam. Instead of striking a single dot, they sometimes strike adjacent color dots. The result is a hazy picture or false color. But with these new Superior Tube tapered-hole aperture masks, beam diffusion is practically eliminated. The walls of the tapered holes lie outside the path of beam electrons—even at the extreme edges of the picture. The electrons see only the holes.



See how electron beam passes through hole without diffusion. There are nearly 500,000 of these holes in each mask—all controlled to close tolerance.

Notice how old cylindrical hole aperture mask can diffuse electron beam. Electrons striking aperture walls are scattered over several dots.



Standard disc cathodes. *(EDI-2) Most widely used cathodes in TV, radar test equipment, computer storage tubes and special beam type tubes.*

Narrow neck disc cathodes. *For 110 cathode ray tubes (EDI-5). Make possible shorter, narrower neck tubes and wider beam deflection angle. In growing use for portable TV.*

Miniature disc cathodes. *(EDI-6 and EDI-7) Save up to 50% heater power. Ideal for tri-gun color TV tubes. Make possible use of smaller deflection yokes and smaller cabinets.*

DISC CATHODES

. . . three types, to cover all applications

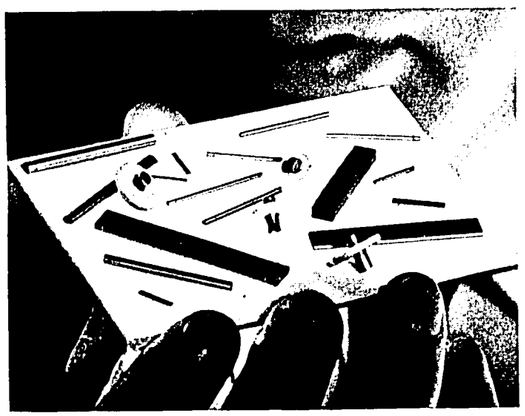
In all Superior Tube disc cathodes, the critical "E" dimension (distance from top of ceramic to top of emission cap) is guaranteed accurate within ±.0005". Hence makers of TV picture tubes and other cathode ray tubes can save the time and cost of compensating for "E" dimension variations on the assembly line. Because of this close dimensional control, cathodes can be used universally in different tubes and are interchangeable with each other during electron gun assembly. Both manufacturing efficiency and quality control can be significantly improved.

In addition, Superior Tube precision disc cathodes offer these four important advantages:

1. *Separate cap alloy.* Permits the choice and use of best alloys for both cap and shank in varying applications.
2. *Slight flare of shank opening.* Easier insertion of heater. Less abrasion of heater coating during normal expansion and contraction.
3. *Shadow groove in ceramic.* Inhibits electrical leakage between cathode and No. 1 grid.
4. *Chemically clean shank interior.* Minimizes heater-cathode leakage.

THE CATHALOYS[2]

. . . cathode alloys free from sublimation and interface impedance



The Cathaloys are not only the world's most versatile cathode alloys, but they offer advantages not available in any other: high strength, high activity, or a combination of both plus low sublimation and freedom from interface impedance. In addition, they give electron tube manufacturers the assurance that they can produce tubes with new uniformity in performance characteristics. Even before being approved for production, each heat of a Cathaloy metal must be tested in an electron tube.

Of the five Cathaloys developed so far, A-32, the all-around active alloy and P-50, the all-around passive alloy, fill the vast majority of applications requirements. The others offer special advantages in countless applications. Principal characteristics are as follows:

Cathaloy A-32.[3] Suitable for active alloy applications. Can be used for ruggedized tubes. Contains tungsten. Approximately 50% stronger than tungsten-free alloys.

Cathaloy P-50. Suitable for applications requiring a passive alloy. Available in Weldrawn[2] tubing. The only alloy commercially available in Weldrawn as well as in Lockseam.[4]

Cathaloy A-31. Specially designed for extreme stress applications. Contains 4% tungsten. Approximately twice as strong at high temperatures as tungsten-free alloys.

Cathaloy A-30. An active alloy. Versatile, yet not as strong as A-32. A good material for entertainment-type tubes.

Cathaloy P-51. 100% stronger than Cathaloy P-50. Ideal for ruggedized tubes. Available in seamless, Weldrawn and Lockseam forms.

SPECIAL ALLOYS

Superior Tube is equipped also with melting facilities to supply on special order cathodes made from other alloys of specified composition. If you have a need for such cathodes, write for detailed information on this extra Superior Tube service.

SEND FOR NEW COMPLETE CATALOG

Superior Tube's new Catalog 51—recently revised and supplemented with the most up-to-the-minute facts on cathodes, disc cathodes, tubular parts and glass sealing alloys. Gives standard cathode dimensions and tolerances, complete chemical and physical data on materials. Tells how to order. Write Superior Tube Company, 2512 Germantown Ave., Norristown, Pa.

[1] *Manufactured by Superior Tube Co., under license from Buckbee Mears Co., St. Paul, Minn.*
[2] *T.M. Reg. U.S. Pat. Off., Superior Tube Co.*
[3] *Pat. Applied for.*
[4] *Manufactured under U.S. Patents.*

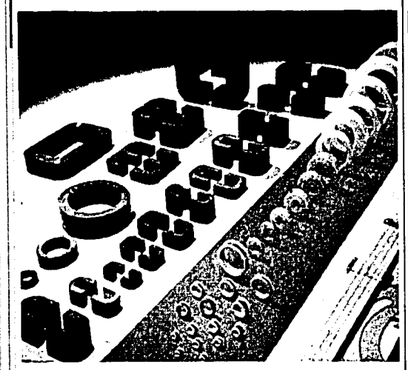
Superior Tube
The big name in small tubing
NORRISTOWN, PA.

Johnson & Hoffman Mfg. Corp., Mineola, N.Y.—an affiliated company making precision metal stampings and deep-drawn parts

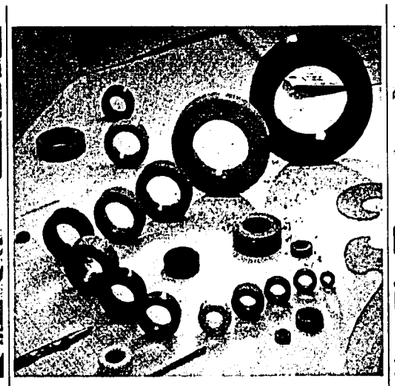
Arnold Magnetic Materials

ARNOLD magnetic materials can answer all your requirements. It is the most complete line in the industry; and in addition, Arnold maintains complete control over every production step from raw materials to finished products. Such a source can bring you advantages in long experience and undivided responsibility, and in unequalled facilities for quality production and control.

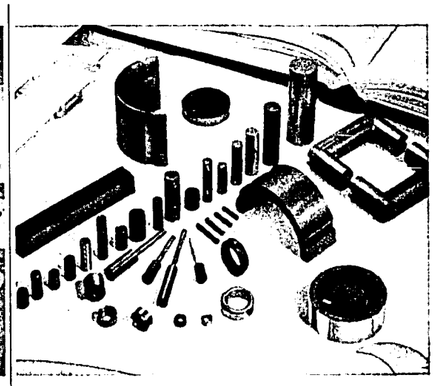
● *Let us supply your needs.*



C and E cut cores, tape wound cores, and bobbin cores..



Mo-Permalloy powder cores.



Iron powder cores.

Write for Bulletin SC-107

TYPES "C" AND "E" CUT CORES

Available in more than 500 standard sizes and almost any special size, Arnold "C" and "E" Cores are made from precision-rolled Silectron strip (highly oriented silicon steel) in 1, 2, 4 or 12-mil thicknesses and a wide variety of window sizes and core areas, for high and low-frequency applications. Sizes range from a fraction of an ounce to hundreds of pounds.

Insulated strip of the proper width is wound on a mandrel, then heat treated, bonded and cut into halves. Careful control results in accurately dimensioned and matched core halves whose effective air gap at the butt joint is very small. Rigid standard tests are employed for both "C" and "E" types of cores, and special tests where required.

Write for Bulletin TC-101A

TAPE WOUND CORES

Depending upon the specific properties required, Arnold Tape Wound Cores are available made of Deltamax, 4-79 Mo-Permalloy, Supermalloy, Mumetal, 4750 Electrical Metal, or Silectron . . . in standard tape thicknesses of 1, 2, 4 or 12-mils, and in ultra-thin gauges of ½ and ¼-mil where required.

This gapless type of core construction results in maximum effective working permeability with minimum flux leakage. Practically any size core can be supplied, from a fraction of a gram to hundreds of pounds. Toroidal cores are made in 30 standard sizes with protective nylon or aluminum cases. Special sizes of toroidal cores, and all square or rectangular tape wound cores, are produced to individual requirements.

Write for Bulletin TC-108

BOBBIN CORES

These cores, fabricated by winding ultra-thin tape of high-permeability magnetic materials on ceramic bobbin cores, possess ideal qualities for use in electronic computer assemblies. Their desirable properties include quite rectangular hysteresis loops, relatively low coercive values and high saturation densities; plus temperature stability and the ability to shift in a few microseconds from negative remanence to positive saturation, and vice versa, under conditions of pulse excitation.

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. Magnetic materials usually employed are Deltamax, Square Permalloy and Supermalloy, in standard thicknesses of 1, ½, ¼ and ⅛ mil. Special advantages derive from Arnold's position as a fully-integrated producer of wound cores, able to maintain precise control over every production operation . . . melting, rolling, winding, testing, etc.

Write for Bulletin PC-104B

MO-PERMALLOY POWDER CORES

These toroids provide high Q in a small volume, characterized by low eddy current and hysteresis losses.

Arnold Mo-Permalloy 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. The 125 Mu cores are recommended for use up to 15 kc; the 60 Mu at 10 to 50 kc; the 26 Mu at 30 to 75 kc; and the 14 Mu at 50 to 200 kc. Many of these cores may be furnished stabilized to provide constant permeability (±0.1%) over a specific temperature range.

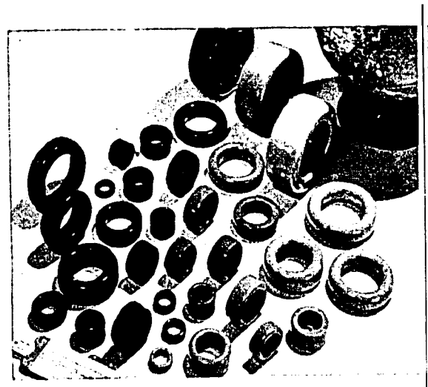
Arnold Mo-Permalloy powder toroids are available in a wide range of sizes, to obtain nominal inductances as high as 281 mh/1000 turns. They are given various types of enamel and varnish finishes, some of which permit winding with heavy Formex insulated wire without supplementary insulation over the core.

Write for Bulletin PC-109

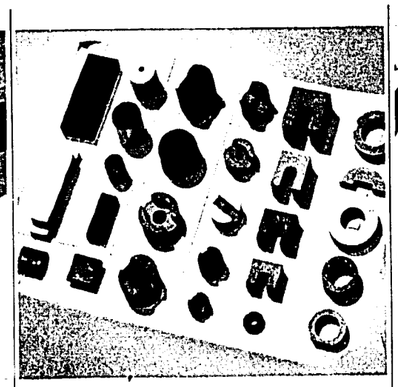
IRON POWDER CORES

Arnold quality control of iron powder cores includes the maintaining of rigid electrical, physical and dimensional specifications unmatched in the industry. A wide selection of cores is available, from simple cylinders to special cores of complicated design. The line includes all standard types and sizes 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 RF coils, noise filter coils, induction heating and bombarder coils, and other low frequency applications. A standard series of iron powder toroids is also manufactured, conforming to the standard sizes proposed by the Metal Powder Association.

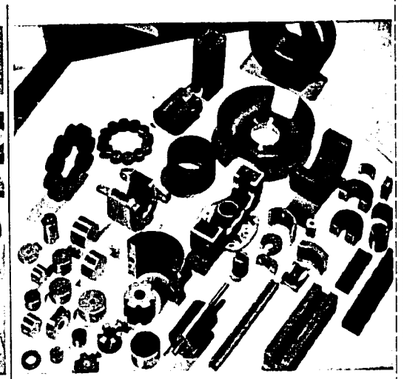
The most complete line in the industry ...made by a fully integrated producer



Sendust powder cores.



Various types and sizes of sintered Alnico magnets.



A wide variety of cast Alnico magnets.

SENDUST POWDER CORES

Write for Bulletin SDC-110

Sendust Powder Cores are available in a wide selection of sizes, ranging from .800" O.D. to 3.346" O.D., and in permeabilities of 10, 13, 25, 30, 50 and 80, although not all sizes are available in all permeabilities.

Sendust cores possess magnetic properties that are generally superior to iron powder cores, but inferior to Mo-Permalloy powder cores in the audio and carrier frequency range. The eddy current loss for Sendust cores is lower than that of Mo-Permalloy powder cores, but the hysteresis loss of Sendust cores is substantially higher, and they also have higher values of electrical resistivity. In other characteristics of powder cores, the two types are somewhat similar, but Sendust cores contain no scarce or strategic materials and can offer a core source in times of alloy shortage.

Write for Bulletin GC-106B

ALNICO MAGNETS—Cast and Sintered

Arnold manufactures permanent magnets from all grades of Alnico, although Alnico V is usually the preferred type due to the high value of energy product of that alloy. Alnico magnets are quite hard and somewhat brittle and may be machined only by grinding. Most sizes and shapes are manufactured as sand castings and are made to the customer's drawings and specifications. Some types and shapes of Alnico Magnets are carried as stock items.

Some small sizes of magnets may be furnished in sintered Alnico, and a wide range of shapes are carried in stock for quick delivery. Special shapes made in this way, however, require rather expensive dies.

SPECIAL MAGNETIC MATERIALS

Write for Bulletin GC-106B

Vicalloy is a permanent magnet alloy containing about 10% vanadium, 50% cobalt and the balance iron. It 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. The alloy finds its greatest usefulness in the form of forged rotors, stamped parts and special recording tape. The coercive force, Hc, is about 250 oersteds, the residual induction, Br, is about 7500 gausses and the energy product, (BH) max, is about 0.8 x 10^6.

Supermendur is a new material composed of about 2% vanadium, 49% iron and 49% cobalt. It work hardens slowly and can be rolled from .090" to less than .001" without intermediate softening treatments. Even after severe cold reduction, it remains ductile and can be bent back upon itself without fracture. Experimental cores measured at room temperature showed a coercive force, Hc, of 0.26 oersted, a residual induction, Br, of 21,000 gausses, and a maximum permeability, μ, of 66,000 at 20,000 gausses. Presently, it appears to be best suited for such applications as power transformers, pulse transformers, magnetic amplifiers, telephone receiver diaphragms, and switching and memory devices.

Cunife is a permanent magnet alloy of copper, nickel and iron which is malleable, ductile and machinable, even after it has been age hardened. 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.

THE ARNOLD ENGINEERING COMPANY

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Providing you with outstanding reliability and accuracy at economical prices, TI precision carbon film resistors are supplied in six sizes from ¼ to two watts with resistance values from 25 ohms to 30 megohms, 1, 2 or 5% tolerances. Special values, modifications and tolerances will be supplied at your request.

MIL-Line—Far exceed MIL-R-10509B specifications for characteristic X. They show an average resistance value change of only 0.092%—after 18 months of shelf life—and have an exclusive coating which protects them from the effects of moisture.

Hermetically Sealed—solder sealed in a pure ceramic shell and fully insulated for maximum protection and reliability . . . meet specifications for characteristic B of MIL-R-10509B.

Industrial Line . . economical precision resistors with the close tolerance required in instrument and industrial uses where military approval is not required.

PRECISION PANEL METERS

You will find the **precision** meter your applications require in TI's line of bakelite, ruggedized and hermetically sealed panel meters . . . available in a wide range of shapes and styles . . . in sizes from 1½ to 4½ in. All TI meters exceed MIL-M-6A and MIL-M-10304A. All provide you with long service life and lasting calibration at economical prices.

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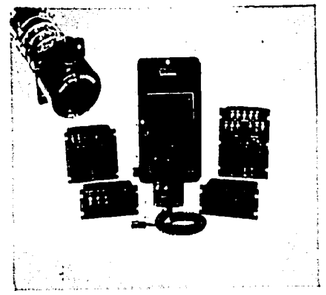

TI knowledge and skill in the semiconductor field—combined with rapid systems engineering progress—has solved some of the toughest, most intricate problems in the development of weight, space and power-saving military equipment. TI's top-quality manufacture, on an accelerated basis, is being applied to radar, sonar, magnetics, VHF, and other means for detection, navigation, communications, telemetering, fire control, and missile guidance. Unusual scope and facilities also make TI a leader in the field of infrared . . . from materials manufacture through components processing to development of complete systems. For more information contact:

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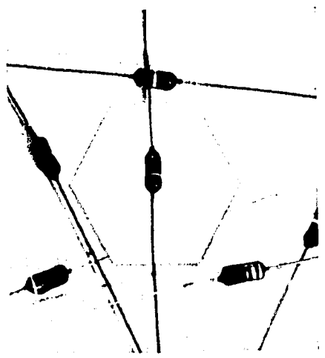

SILICON DIODES

For higher voltage operation and new highs in forward conductance . . . plus extremely low power loss, look to new, ruggedized TI glass diodes. When you use TI diodes you are insured the stable performance, high uniformity and greater heat dissipation your circuits require. TI 100%-tested diffused junction diodes are especially advantageous in extreme heat, shock and vibration conditions . . . giving you stability, reliability and long service life.

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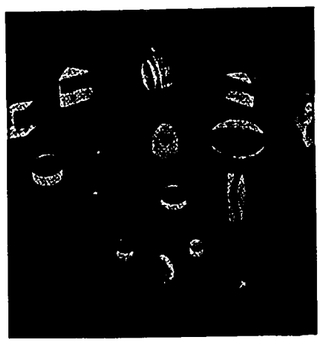

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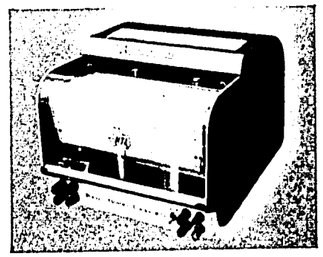

Now, **both** SINGLE and DUAL **recti/riters** are available to fit your specific needs in hundreds of applications never practicable with conventional recorders. You get time and work-saving rectilinear recording . . . as well as portability, galvanometer simplicity, convenient controls . . . and economy.

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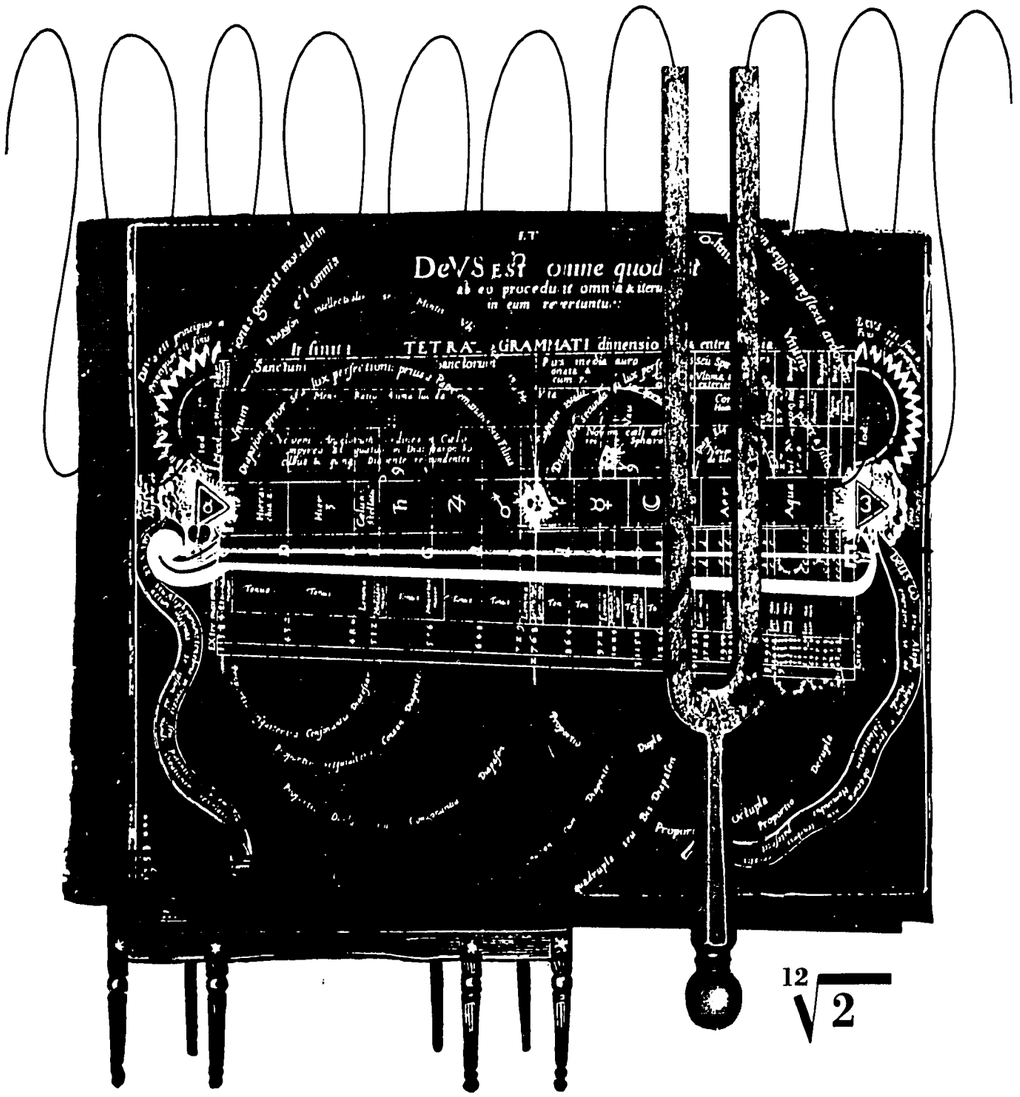

The Formula That Revolutionized Music

MATHEMATICIANS long ago divided an octave into 12 equal semitones, each a successive power of the twelfth root of 2. This "equal temperament" formula was the key to a new world of music that could be created for much-simplified instruments. We like this example of one of the Arts benefiting from one of the Sciences—and of mankind benefiting from both. The example contains the mightiest of the Sciences, a new world of thought, creativeness, and refinement of design. These elements exemplify the work of Litton Industries in advanced electronics.

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For all power supply needs through ***1.5 amperes***

LAMBDA SPACE-SAVING COM-PAK® POWER SUPPLIES

THREE VOLTAGE RANGES: 0-200, 125-325, 325-525 VDC

1.5 AMPERE MODELS — *NEW!*

NEED ONLY 8¾" OF PANEL HEIGHT!

MODEL C-1580M (with meters): 0-200 VDC, 0-1500 MA.....580.00
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MODEL C-1580: 0-200 VDC, 0-1500 MA.....550.00
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NEED ONLY 7" OF PANEL HEIGHT!

MODEL C-880M (with meters): 0-200 VDC, 0-800 MA.....370.00
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MODEL C-882M (with meters): 325-525 VDC, 0-800 MA.....390.00

MODEL C-880: 0-200 VDC, 0-800 MA.....340.00
MODEL C-881: 125-325 VDC, 0-800 MA.....315.00
MODEL C-882: 325-525 VDC, 0-800 MA.....360.00

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MODEL C-480: 0-200 VDC, 0-400 MA.....259.50
MODEL C-481: 125-325 VDC, 0-400 MA.....244.50
MODEL C-482: 325-525 VDC, 0-400 MA.....259.50

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NEED ONLY 5¼" OF PANEL HEIGHT!

MODEL C-280M (with meters): 0-200 VDC, 0-200 MA.....214.50
MODEL C-281M (with meters): 125-325 VDC, 0-200 MA.....189.50
MODEL C-282M (with meters): 325-525 VDC, 0-200 MA.....199.50

MODEL C-280: 0-200 VDC, 0-200 MA.....184.50
MODEL C-281: 125-325 VDC, 0-200 MA.....159.50
MODEL C-282: 325-525 VDC, 0-200 MA.....169.50

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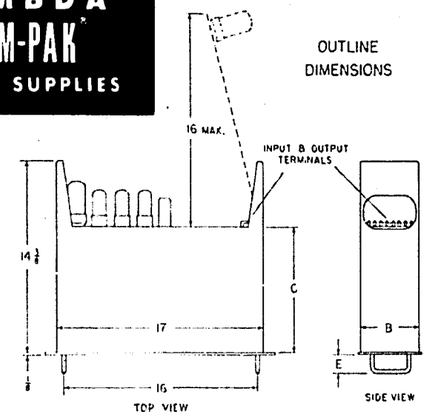


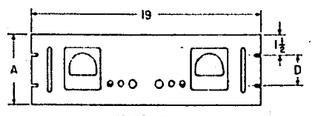


TABLE OF DIMENSIONS

MODEL*	A	B	C	D	E
C-280, C-281, C-282	5¼	4 15/16	9½	2¼	1⅜
C-480, C-481, C-482	5¼	4 13/16	9⅞	2¼	1⅜
C-880, C-881, C-882	7	6 9/16	9⅞	4	1 9/16
C-1580, C-1581, C-1582	8¾	8 3/16	11 1/32	5¾	1 13/16

*ALSO INCLUDES METERED MODELS WITH SUFFIX "M", e.g. MODEL C-281 M

COM-PAK SERIES . . . SPECIFICATIONS

DC OUTPUT (regulated for line and load):

Voltage and Current

Models	Voltage Range[1]	Current Range[2]
C-280, C-280M	0-200 VDC	0-200 MA
C-281, C-281M	125-325 VDC	0-200 MA
C-282, C-282M	325-525 VDC	0-200 MA
C-480, C-480M	0-200 VDC	0-400 MA
C-481, C-481M	125-325 VDC	0-400 MA
C-482, C-482M	325-525 VDC	0-400 MA
C-880, C-880M	0-200 VDC	0-800 MA
C-881, C-881M	125-325 VDC	0-800 MA
C-882, C-882M	325-525 VDC	0-800 MA
C-1580, C-1580M	0-200 VDC	0-1500 MA
C-1581, C-1581M	125-325 VDC	0-1500 MA
C-1582, C-1582M	325-525 VDC	0-1500 MA

[1]*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

[2]*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.

Regulation (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.

Transient Response (load).....Output voltage is constant within regulation specifications for step-function load change from 0 to full load or full load to 0.

Internal Impedance .....
C-200 Series .....Less than 6 ohms.
C-400 Series .....Less than 3 ohms.
C-800 Series .....Less than 1.5 ohms.
C-1500 Series .....Less than 0.75 ohms.

Ripple and Noise .....Less than 3 millivolts rms.

Polarity .....Either positive or negative may be grounded.

AMBIENT TEMPERATURE AND DUTY CYCLE .....Continuous duty at full load up to 50°C (122°F) ambient.

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

Models	Input Power[4]		
C-280	300 Watts	C-880	670 Watts
C-281	330 Watts	C-881	850 Watts
C-282	390 Watts	C-882	1070 Watts
C-480	410 Watts	C-1580	1180 Watts
C-481	480 Watts	C-1581	1420 Watts
C-482	595 Watts	C-1582	1850 Watts

[4]*With all outputs loaded to full ratings and input at 125 VAC.*

OVERLOAD PROTECTION:
External Overload Protection .....AC and DC fuses, front panel, with built-in blown-fuse indicators.

Internal Failure Protection .....Fuse, rear of chassis.

INPUT AND OUTPUT CONNECTIONS .....Heavy duty barrier terminal block, rear of chassis. 8 foot heavy duty rubber covered line cord with integral molded plug, also supplied.

METERS:
Output Voltage .....3½" rectangular voltmeter on metered models.

Output Current .....3½" rectangular milliammeter on metered models.

CONTROLS:
DC Output Controls .....Band-switches and screw-driver adjusting vernier-control, rear of chassis.

AC and DC Switches ....Front panel.

VOLTAGE REFERENCE .....A stable 5651 reference tube is used to obtain superior long-time voltage stability.

PHYSICAL DATA:
Mounting .....Standard 19" rack mounting.
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.
Weight:
C-200 Series .....53 lb. Net 80 lb. Shipping Wt.
C-400 Series .....53 lb. Net 80 lb. Shipping Wt.
C-800 Series .....84 lb. Net 100 lb. Shipping Wt.
C-1500 Series .....120 lb. Net. 140 lb. Shipping Wt.
Panel Finish .....Black ripple enamel (standard). Special finishes available to customers' specifications at moderate surcharge.

For details, circle #91 on Reader Service Card.

* LESS PANEL SPACE
* IMPROVED PERFORMANCE
* LONG, TROUBLE-FREE SERVICE

LAMBDA COM-PAK® POWER SUPPLIES

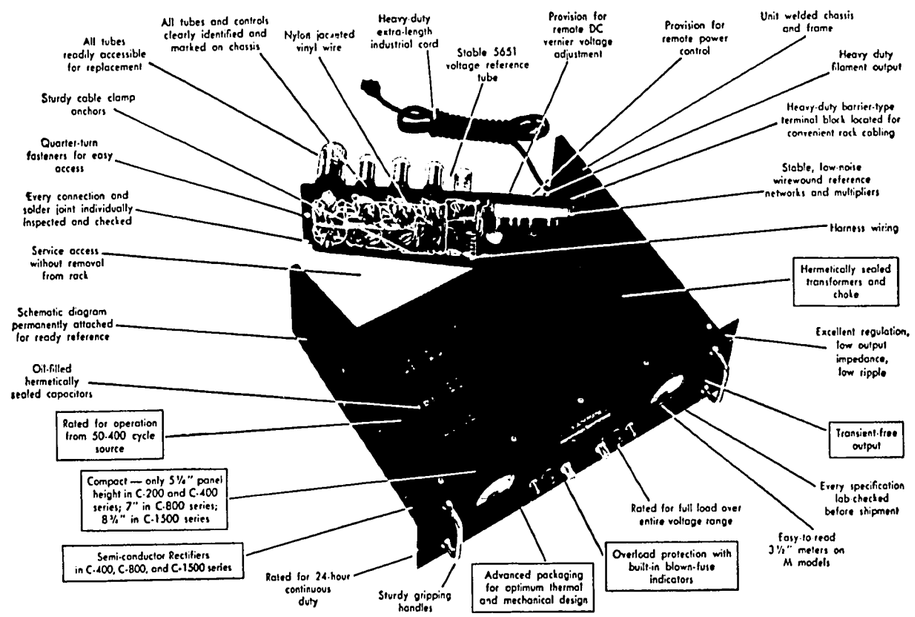
Lambda's COM-PAK series wins immediate and enthusiastic acceptance. Engineers welcome advanced thermal, mechanical design; praise economy of panel space.

The new COM-PAK models fill the need for compact, regulated DC power supply units. You'll find their economy of panel space matched by their functional simplicity. You'll appreciate their quick-service features. All wiring, tubes and other components are readily accessible. You can reach them easily, service them fast.

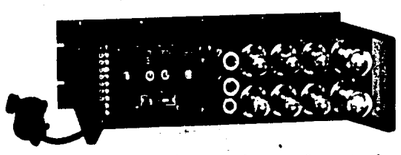
All COM-PAK models are made with hermetically-sealed transformers, chokes and capacitors. The 400 MA, 800 MA and 1.5 ampere models include new, high-efficiency, long-life, hermetically-sealed semi-conductor rectifiers.

Demand for COM-PAK power supplies is the greatest in our history. Place your order now for a better priority in shipment.

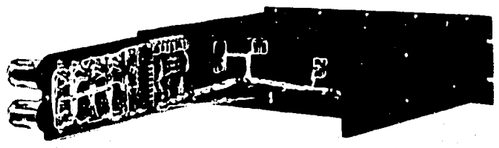
ONLY THE NEW COM-PAK SERIES INCLUDES ALL 31 OF THESE IMPORTANT DESIGN AND PERFORMANCE FEATURES



FAST IN-RACK SERVICING



Quick rear access to tubes and controls.



Rear panel swings open for servicing.

For details, circle #92 on Reader Service Card.

LAMBDA
POWER SUPPLIES

CONDENSED CHECK LIST

LAMBDA REGULATED POWER SUPPLIES
including **COM-PAK®** series

Model	Style	Voltage Range (VDC)	Current Range (MA DC)	Regul'n 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										
28	Rack	200-325	0-100	A	3A	*	Rear	Rear	S-2	59.50
29	Rack	100-200	0-100	B	3A	*	Rear	Rear	S-2	69.50
32	Rack	200-325	0-300	C	2 @ 5A	*	Rear	Rear	S-3	129.50
33	Rack	100-200	0-300	C	2 @ 5A	*	Rear	Rear	S-3	154.50
50-R	Rack	0-500	0-500	D	2 @ 5A	4½" Rect	Front	Fr & rear	S-4	420.00
		0-50	Bias	E						
		0-200	High Imped.	F						
C-280	Rack	0-200	0-200	K	10A	*	Rear	Rear	S-9	184.50
C-281	Rack	125-325	0-200	K	10A	*	Rear	Rear	S-9	159.50
C-282	Rack	325-525	0-200	K	10A	*	Rear	Rear	S-9	149.50
C-480	Rack	0-200	0-400	L	15A	*	Rear	Rear	S-9	259.50
C-481	Rack	125-325	0-400	L	15A	*	Rear	Rear	S-9	244.50
C-482	Rack	325-525	0-400	L	15A	*	Rear	Rear	S-9	259.50
C-880	Rack	0-200	0-800	M	20A	*	Rear	Rear	S-10	340.00
C-881	Rack	125-325	0-800	M	20A	*	Rear	Rear	S-10	315.00
C-882	Rack	325-525	0-800	M	20A	*	Rear	Rear	S-10	360.00
C-1580	Rack	0-200	0-1500	N	30A	*	Rear	Rear	S-11	550.00
C-1581	Rack	125-325	0-1500	N	30A	*	Rear	Rear	S-11	575.00
C-1582	Rack	325-525	0-1500	N	30A	*	Rear	Rear	S-11	650.00
1500	Rack	0-400	0-1500**	P	2 @ 15A	*	Front Access	Rear	S-12	730.00
1510	Rack	0-125	0-1500**	P	2 @ 15A	*	Front Access	Rear	S-12	630.00
1511	Rack	25-150	0-1500**	P	2 @ 15A	*	Front Access	Rear	S-12	630.00
1512	Rack	50-175	0-1500**	P	2 @ 15A	*	Front Access	Rear	S-12	650.00
1513	Rack	75-200	0-1500**	P	2 @ 15A	*	Front Access	Rear	S-12	650.00
1514	Rack	100-225	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	670.00
1515	Rack	125-250	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	670.00
1516	Rack	150-275	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	690.00
1517	Rack	175-300	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	690.00
1518	Rack	200-325	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	690.00
1519	Rack	225-350	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	700.00
1520	Rack	250-375	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	700.00
1521	Rack	275-400	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	700.00
1530	Rack	0-50	100-1500	P	2 @ 15A	*	Front Access	Rear	S-12	590.00
1531	Rack	25-75	100-1500	P	2 @ 15A	*	Front Access	Rear	S-12	590.00
1532	Rack	50-100	100-1500	P	2 @ 15A	*	Front Access	Rear	S-12	600.00
1533	Rack	75-125	0-1500**	P	2 @ 15A	*	Front Access	Rear	S-12	600.00
1534	Rack	100-150	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	600.00
1535	Rack	125-175	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	620.00
1536	Rack	150-200	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	620.00
1537	Rack	175-225	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	640.00
1538	Rack	200-250	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	640.00
1539	Rack	225-275	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	660.00
1540	Rack	250-300	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	660.00
1541	Rack	275-325	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	660.00
1542	Rack	300-350	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	670.00
1543	Rack	325-375	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	670.00
1544	Rack	350-400	0-1500	P	2 @ 15A	*	Front Access	Rear	S-12	670.00
REGULATED POWER SUPPLIES—PORTABLE AND BENCH										
25	Bench	200-325	0-100	A	3A	None	Front	Front	S-1	69.50
26	Bench	100-200	0-100	B	3A	None	Front	Front	S-1	79.50
50	Bench				See Model 50-R above				S-7	440.00
71	Portable	0-500	0-200	H	2 @ 5A	3½" Rect	Front	Front	S-8	310.00
		0-50	Bias	I						
		0-200	High Imped.	J						

* For metered models (two 3½" rectangular meters), add suffix "M" to model and add $30 to base price. (For example, C-281M, $189.50).
**Current rating of 0-1.5 amperes applies over entire voltage range except for voltages below 100 VDC where the rating of 0.1-1.5 amperes applies.

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 RETMA specifications.

INPUT:

105-125 VAC, 50-60 CPS, single phase. Except for Com-Pak series (models with prefix C) 105-125 V, 50-400 C.

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. No "derating" 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, 50-R, 71 and "1500" series as protection against external overloads.

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:

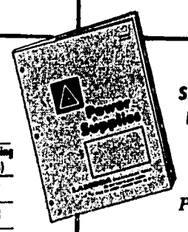
All components used are of the highest quality and are operated well within manufacturers ratings. Hermetically-sealed, oil-filled capacitors are used exclusively. Ample safety factors are provided in the design to insure the long life, and the dependable, trouble-free operation so desirable in industrial and laboratory applications.

TABLE I DC OUTPUT VOLTAGE REGULATION, IMPEDANCE, RIPPLE

	Regulation: Line (105-125 VAC)	Regulation: Load (min to max)	Internal Impedance (ohms)	Ripple, rms (millivolts or %)
	Less than	Less than	Less than	Less than
A	1%	1%	10	10 mv
B	1%	1%	10	5 mv
C	1%	1%	4	10 mv
D	0.15% or 0.1V	0.5% or 0.3V	2	8 mv
E	0.1%	unregulated	3,300	2 mv
F	0.1%	unregulated	17,500	5 mv
H	0.15% or 0.3V	0.15% or 0.3V	4	5 mv
I	0.1%	unregulated	5,500	2 mv
J	0.1%	unregulated	25,000	5 mv
K	0.15% or 0.3V	0.25% or 0.5V	6	3 mv
L	0.15% or 0.3V	0.25% or 0.5V	3	3 mv
M	0.15% or 0.3V	0.25% or 0.5V	1.5	3 mv
N	0.15% or 0.3V	0.25% or 0.5V	0.75	3 mv
P	0.15% or 0.3V	0.15% or 0.3V	4	5 mv

TABLE II SIZES AND WEIGHTS

	Size H x W x D (inches)	Weight: Net (lbs)	Weight: Shipping (lbs)
S-1	8 x 14 x 6	19	23
S-2	5¼ x 19 x 8	19	23
S-3	10½ x 19 x 9¼	42	52
S-4	10½ x 19 x 14¼	89	140
S-7	12½ x 22 x 15	110	158
S-8	13 x 8¾ x 14½	49	85
S-9	5¼ x 19 x 14⅜	53	80
S-10	7 x 19 x 14⅜	84	100
S-11	8¾ x 19 x 14⅜	120	140
S-12	12¼ x 19 x 16½	175	225



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Complete specifications for all Lambda Power Supplies.

LAMBDA
Electronics Corp.
The first name in power supplies
11-11 131 Street, College Point 56, New York
INdependence 1-8500

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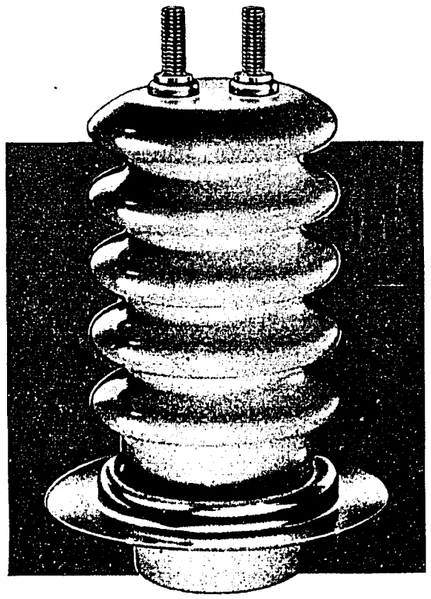
One Integrated Source
for High Temperature • Vacuum-Tight
Mass-Spectrometer Tested

Ceramic-to-Metal Seals



NOW AVAILABLE—A standard line of Alite high voltage bushings. Sizes 2" or 2¾" diameters; 2 to 8 flutes; 1, 2 or 3 terminal studs; optional stud lengths and thread sizes.

With the addition of complete facilities for high temperature metalizing and bonding, our Alite Division offers engineers and designers a single dependable source for ceramic-metal assemblies. Now you can plan for superior quality and highest precision in electronic insulating components employing ALITE—the sintered aluminum oxide especially formulated for critical electronic applications.

Alite possesses a unique combination of properties which makes it ideal for use as the insulating body in ruggedized, high performance hermetic seals and bushings. It has exceptionally high mechanical strength and thermal shock resistance, permitting operation over wide extremes of temperature, pressure, humidity and vibration. Alite maintains its high dielectric strength and excellent low-loss characteristics at micro-wave frequencies and elevated temperatures.

Alite seals are operative at extremely high temperatures, being limited only by the melting point of the bond metal used. When Alite is metalized and bonded, using high temperature brazing metals such as pure silver, copper, gold, or their alloys, the result is a vacuum-tight Alite-to-metal seal that meets the most exacting requirements.

Get in touch with us if you have component problems involving ceramic-to-metal seals.

Our technical service is ready to handle your toughest assignments.

A Few Outstanding Properties of ALITE

Tensile Strength	26,500 psi
Compressive Strength	285,000 psi
Dielectric Constant @ 10,000 mc	8.4
Dielectric Strength (volts per mil)	250
Power Factor @ 10,000 mc	0.0008
Loss Factor @ 10,000 mc	0.0067

Write for Bulletins A-35, A-20 and A-7R

ALITE DIVISION
U. S. STONEWARE
AKRON 9, OHIO
NEW YORK OFFICE: 60 EAST 42nd ST.

480-E

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Celco Constantine Engineering Laboratories Co.

Design, Development

Celco DEFLECTION YOKES TRANSFORMERS

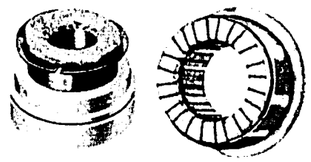
For...Military and Commercial Avionics

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.

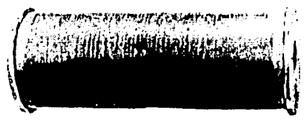
Apply the CELCO "know-how" to your production requirements!

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.

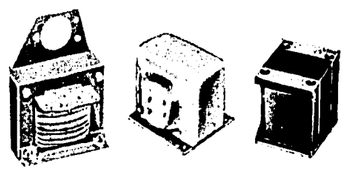


Celco **COILS FOR TRAVELING WAVE TUBES –** precision wound for minimum transverse magnetic fields. High temperature windings are a CELCO engineering development –

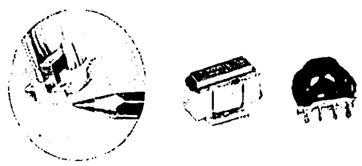
Unit illustrated is 12" long.



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.

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No. 50 wire on a .062" ID Toroid

No. 15 wire on 9" OD Toroid

Celco Constantine Engineering Laboratories Co.
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and Production of:

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MAGNETIC AMPLIFIERS AIRCRAFT MOTOR COMPONENTS

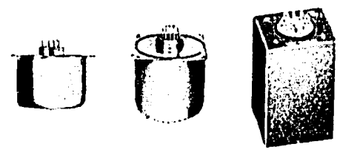
...Nuclear and Computer Industries

Celco **MAGNETIC AMPLIFIERS**–encapsulated with epoxy resins or silicone rubber. CELCO experience with proper treatment of Toroidal Coils assures designed performance.

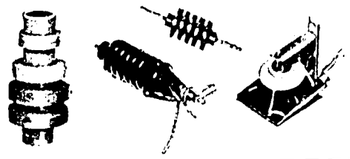
Celco **TOROIDAL COMPONENTS –** for use in system assemblies. Sub-assemblies of chokes, Transformers and Saturable Reactors are manufactured at CELCO for packaging into a single unit.

Celco **PRECISION TRANSFORMERS –** CELCO develops Precision Transformers for such applications as Computer Components with high accuracy of turns ratio and output voltages.

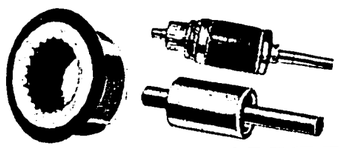
Celco **HERMETICALLY SEALED MAGNETIC AMPLIFIERS & TRANSFORMERS –** with various types of terminations, evacution and inert gas pressurization give CELCO components minimum weight with high-breakdown voltage resistance.



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.



Call DAvis 7-1123 – *for immediate engineering evaluation price and delivery quotations on any of these component requirements.*

Your plant is only hours away by the **Celco** Air Fleet

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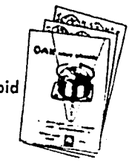
OAK "EARLY-BIRD" ENGINEERING HELPS YOU GET BETTER COMPONENTS . . . FASTER!

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.

Write on company letterhead for a copy of the Oak Switch Catalog...

...or the Oak Rotary Solenoid Bulletin.



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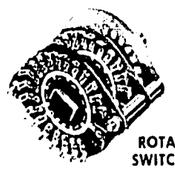
low-current switches

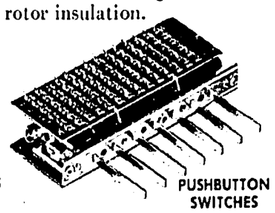
Mounts in a 1" diameter circle

NEW . . . Type A Miniature Rotary Switch

Available in three models: 45°, 36°, and 30° throw. Up to 18 contacts. Silicone glass stator insulation; KEL-F® rotor insulation.

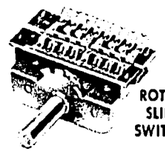


ROTARY SWITCHES



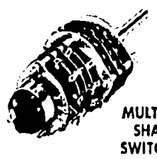
PUSHBUTTON SWITCHES

PRINTED CIRCUIT SWITCHES



ROTARY SLIDER SWITCHES

LEVER OPERATED SWITCHES



MULTIPLE SHAFT SWITCHES

The above switches represent but seven of the hundreds of basic Oak designs—already tooled for fast production. Custom variation of these designs provides a source of special switches in almost *infinite variety*. Excellence of design plus highest quality materials make Oak switches the best you can buy. Standard insulation is phenolic, steatite, and Mycalex; contacts, silver-plated spring brass or spring silver alloy.

choppers

NEW!
Oak Chopper for Missile Applications

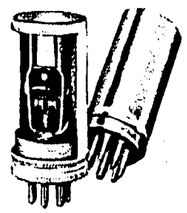
Designed for high shock, high acceleration, high vibration frequencies, and high temperature operation.

NEW 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

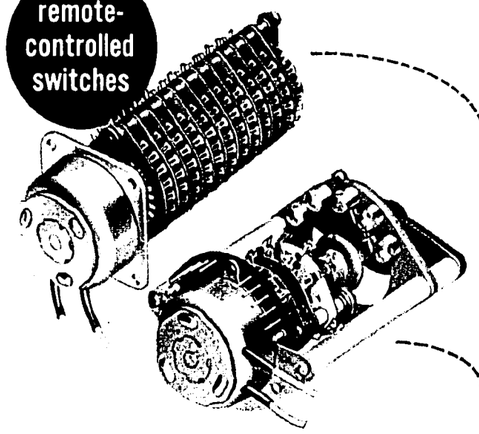
Custom-Designed and Custom-Built

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.

SERVO-SELECTOR BUILT FOR RADIO CORPORATION OF AMERICA

MT273E MOUNTING BASE BUILT FOR BENDIX RADIO DIVISION

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.

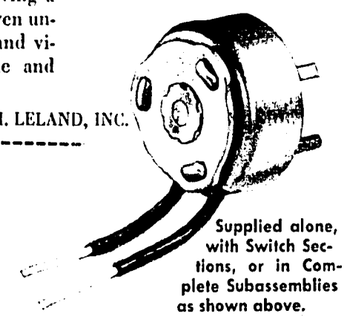
*Mfd. under license from G. H. LELAND, INC.

special sub-assemblies

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.

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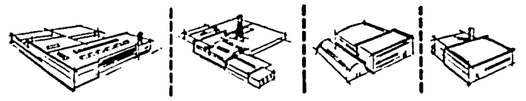
OAK MFG. CO.

1260 Clybourn Ave., Dept. R, Chicago 10, Illinois
Phone: MOhawk 4-2222

Four plants . . . 3200 employees . . . 400,000 sq. ft. equipped for economical production



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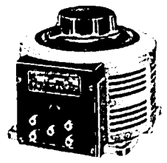
For a continuously adjustable output voltage from a-c power lines

TYPE 10
INPUT: 120 volts, 60 cycle, 1 phase. OUTPUT: 0-120/132 volts, 1.25 amperes, .165 KVA for Back-of-Panel

TYPE 2PF10
INPUT: 120 volts, 60 cycle, 1 phase. OUTPUT: 0-132 volts, 1.0 amperes, .132 KVA

POWERSTAT®

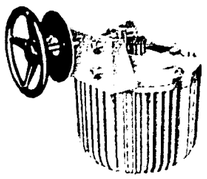
VARIABLE TRANSFORMERS



TYPE 136
INPUT: 120 volts, 50/60 cycle, 1 phase. OUTPUT: 0-120/140 volts, 20.0 amperes, 2.8 KVA. Exposed Terminal Connections.

Standard types meet the most unusual conditions

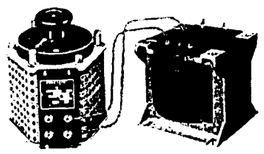
The most extensive line of variable transformers is POWERSTAT. And now a complete standard line of POWERSTATS for high frequency use is offered in addition to the innumerable standard air-cooled types for manually-operated or motor-driven duty . . . oil-cooled models . . . and explosion-proof units. You'll find 120, 240 and 480 volt, single phase and 3-phase models. They all provide excellent regulation with high efficiency. Their conservative ratings and rugged construction assure precise plus long, dependable service. Look to POWERSTAT for the complete line of variable transformers of the highest quality.



TYPE 0-1126
INPUT: 120 volts, 50/60 cycle, 1 phase. OUTPUT: 0-140 volts, 30 amperes, 4.2 KVA. For Oil-Cooled Operation.

TYPE X-1126
INPUT: 120 volts, 50/60 cycle, 1 phase. OUTPUT: 0-140 volts, 12 amp., 1.7 KVA. Explosion-Proof for Hazardous Locations.

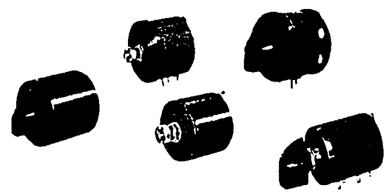
TYPE 10-1002
INPUT: 120 volts, 50/60 cycle, 1 phase. OUTPUT: 0-120 volt, 1.25 amp., .15 KVA. Complete Rotation.



TYPE 2106LC
INPUT: 95-135 volts, 50/60 cycle, 1 phase. OUTPUT: 115 volts, 52 amperes, 6.0 KVA. Limited Output Range or a Line Corrector.

New, Standard Line for HIGH FREQUENCY Applications

One-third the weight . . . one-half the size of 60 cycle units, these POWERSTATS are ideal for ship, aircraft, guided missile and other 400/800 cycle applications. Here are some of the new models. There are many others. We will be glad to develop special units to meet your special needs.

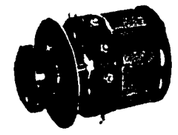


HS SERIES

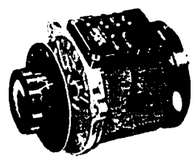
For 400/800 cycle, single phase use. Units for 28 and 120 volt service. The 120 volt types can be connected for 0-120 or 0-140 volts output. Reduced voltage types have a double winding and operate from 120 volts to deliver an output of 0-28 volts. A fixed tap provides a non-adjustable 28 volt supply.

Precision products of

For details, circle #99 on Reader Service Card.

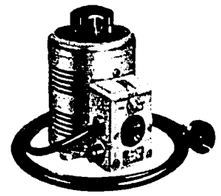


TYPE 20
INPUT: 120 volts, 60 cycle, 1 phase. OUTPUT: 0-120/140 volts, 3.0 amperes, .42 KVA for Back-of-Panel.

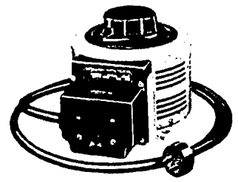


TYPE 116U
INPUT: 120 volts, 50/60 cycle, 1 phase. OUTPUT: 0-120/140 volts, 7.5 amperes, 1 KVA for Back-of-Panel.

TYPE 116
INPUT: 120 volts, 50/60 cycle, 1 phase. OUTPUT: 0-140 volts, 7.5 amp., 1 KVA. Enclosed with Cord-Plug, Receptacle, Fuse, Switch.

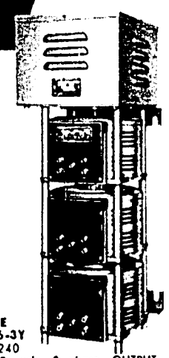


TYPE 3PN116
INPUT: 120 volts, 50/60 cycle, 1 phase. OUTPUT: 0-140 volts, 7.5 amperes, 1 KVA. Third Wire Grounded.

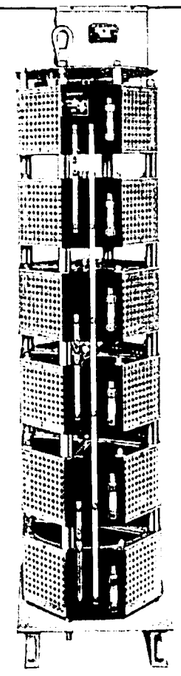


TYPE 2PF136
INPUT: 120 volts, 50/60 cycle, 1 phase. OUTPUT: 0-120/140 volts, 20.0 amperes, 2.8 KVA. With Cord-Plug, Fuse, Receptacle.

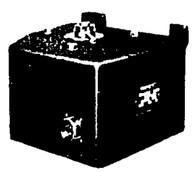
TYPE LW136 (and LW136-3)
Double wound assembly with isolated secondary. One phase 120 or 240 volt input. Three uses: (1) One phase 120 or 240 volt input; 3-phase 240 or 480 volt input; low voltage isolated output. (2) 120 or 240 volt 1-phase, or 240 or 480 volt 3-phase line corrector. (3) 120 or 240 volt, 1-phase, or 240 or 480 volt, 3-phase limited range "buck-boost" variable transformer.



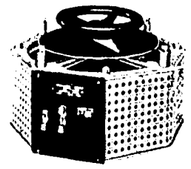
TYPE 15M136-3Y
INPUT: 240 volts, 60 cycle, 3 phase. OUTPUT: 0-240/280 volts, 20 amperes, 9.7 KVA. Motor-Driven for Remote Control.



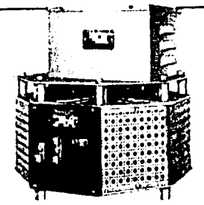
TYPE MW1136-6Y
INPUT: 240 volts, 60 cycle, 3 phase. OUTPUT: 0-280 volts, 90 amperes, 43.6 KVA. Motor-Driven for Easy Operation.



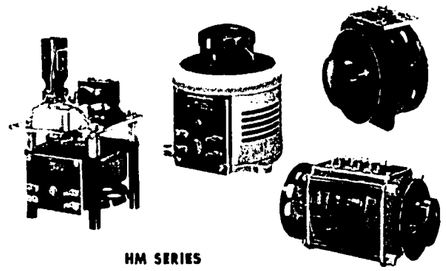
TYPE 1126-1001
INPUT: 115 volts, 400/800 cycle, 1 phase. OUTPUT: 0-130 volts, 15 amperes, 1.95 KVA. With a Dust-Proof Container.



TYPE 1136
INPUT: 120 volts, 50/60 cycle, 1 phase. OUTPUT: 0-140 volts, 45 amperes, 6.3 KVA. For Heavy Duty.

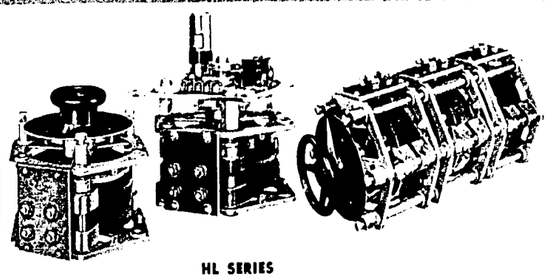


TYPE MZ1136
INPUT: 120 volts, 50/60 cycle, 1 phase. OUTPUT: 0-140 volts, 45 amperes, 6.3 KVA. Motor-Driven for Remote Control.



HM SERIES

For 400/800 cycle, single and 3-phase use. Units for 120 and 240 volts, 1-phase . . . 240 and 480 volts 3-phase service. All units with terminal connections to provide output voltages limited to input voltages . . . or output voltages above input voltages.



HL SERIES

For 400/800 cycle, single and 3-phase use. Manually-operated and motor-driven models. Units for 120 and 240 volt service. Three phase models are wye connected to operate from 240 or 480 volt lines. Input terminals provide choice equal to or 17% higher than line voltage.

THE SUPERIOR ELECTRIC COMPANY
8000 Bradley Ave., Bristol, Connecticut

For details, circle #100 on Reader Service Card.

For a constant output voltage from a-c power lines

STABILINE®

Automatic VOLTAGE REGULATORS

Have you a *special* voltage regulation requirement? Chances are it can be handled by a *standard* STABILINE. Look at the range of characteristics shown here. STABILINES maintain a constant output voltage regardless of line or load changes. Type IE is completely electronic without moving parts; Type EM corrects faster than most regulators and maintains constant voltage to large loads without waveform distortion; Type TM is without tubes, transistors, or moving parts.

3 TYPES TO SUIT INDIVIDUAL APPLICATIONS

MODELS OF EACH TYPE FOR HIGH FREQUENCY APPLICATIONS

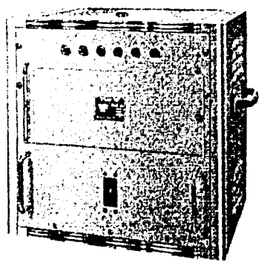
Temperature Limited
DIODE type 1236C
characteristics

		AVERAGE	MAXIMUM
CATHODE (Tungsten)			
	VOLTAGE	1.9 volts a-c or d-c	2.3 volts a-c or d-c
	CURRENT	440 MA	520 MA
PLATE			
	VOLTAGE	600 volts d-c	700 volts d-c
	CURRENT	0.7 MA d-c	1.0 MA d-c

Applications:
RMS detector for differential volt meters
RMS detector for a-c voltage and current stabilizers
Detector for d-c voltage and current stabilizers

TYPE IE51002
INPUT: 95-135 volts, 60 cycle, 1 phase. OUTPUT: 115 volts, 2.2 amperes, .25 KVA. Completely Electronic, Portable with Cord-Plug, Receptacle.

OTHER STANDARD TYPES TO FULFILL THE MOST EXACTING REQUIREMENTS

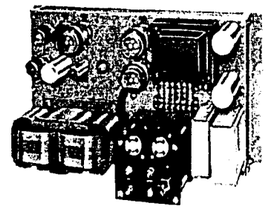


TYPE EMD4208
Two Type EM units with *individual* control and power circuits in one cabinet. One phase, 2 or 3 wire, 120 or 240/120 volt, 45-66 cycle service. Output from 2.1 to 8.4 KVA depending on input connections.

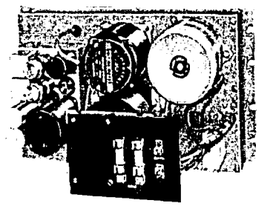
TYPE EMD4208S
Same as Type EMD4208 except with common control . . . added 240 volt service . . . and output from 4.2 to 16.8 KVA depending on input connections.

Precision products of

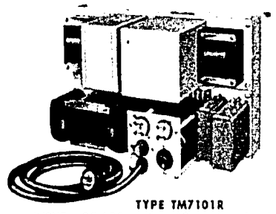
For details, circle #101 on Reader Service Card.



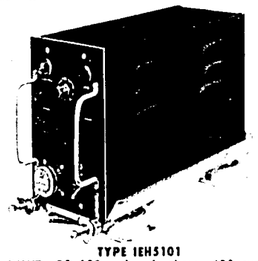
TYPE IES101R
INPUT: 95-135 volts, 60 cycle, 1 phase. OUTPUT: 115 volts, 8.5 amperes, 1.0 KVA. Instantaneous Electronic. No Moving Parts.



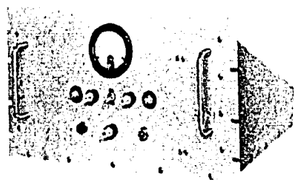
TYPE EM4102R
INPUT: 95-135 volts, 50/60 cycle, 1 phase. OUTPUT: 115 volts, 17.5 amperes, 2.0 KVA Electro-Mechanical with zero waveform distortion.



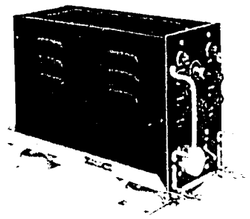
TYPE TM7101R
INPUT: 95-135 volts, 60 cycle, 1 phase. OUTPUT: 115 volts, 1.0 KVA. Tubeless Magnetic without Transistors, Tubes or Moving Parts. TYPE TM7105 the same characteristics except 5.0 KVA output.



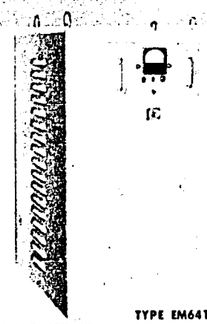
TYPE IEH5101
INPUT: 95-130 volts, 1 phase, 400 cycle. OUTPUT: 115 volts, 1.0 KVA.



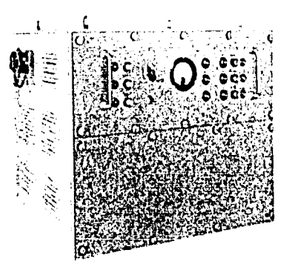
TYPE EM10009
INPUT: 187-229 volts, 3 phase, 400 cycle. OUTPUT: 208 volts, 5.0 KVA.



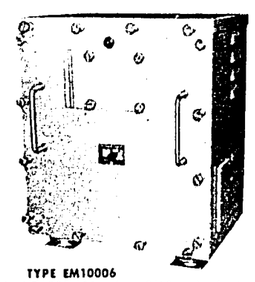
TYPE TMH7101
INPUT: 95-130 volts, 1 phase, 400 cycle. OUTPUT: 115 volts, 1.0 KVA.



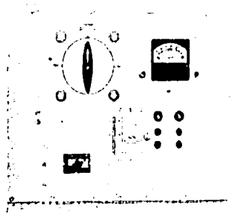
TYPE EM64100Y
INPUT: 420-500 volts, 50/60 cycle, 3 phase. OUTPUT: 460 volts, 131 amperes, 100 KVA. Electro-Mechanical for Large Industrial Loads.



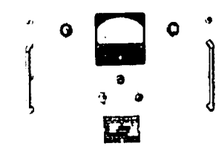
TYPE EM10002
INPUT: 105-135 volts per phase, 55/65 cycle, 3 phase. OUTPUT: 120 volts, 55.5 amperes, 20 KVA. Electro-Mechanical Meets MIL-E-4158.



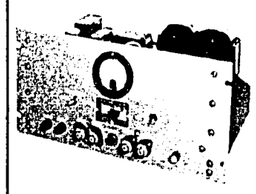
TYPE EM10006
INPUT: 385-490 volts, 45/65 cycle, 1 phase. OUTPUT: 440 volts, 2.2 KVA. Electro-Mechanical Meets U. S. Navy Specifications 16-E-4 and 40-T-9.



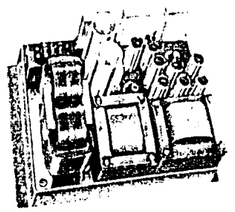
TYPE EM10004
INPUT: 195-255 volts, 50/60 cycle, 1 phase. OUTPUT: 230 volts, 24 KVA. Electro-Mechanical Designed for MIL-E-16400.



TYPE EM10003
INPUT: 80-115 volts, 50/60 cycle, 1 phase. OUTPUT: 115 volts, 2.0 KVA. Electro-Mechanical for Normally Low Input Voltages.



TYPE IE20003
INPUT: 95-135 volts, 60 cycle ±10%, 1 phase. OUTPUT: 115 volts, 8.5 amperes, 1.0 KVA. Completely Electronic for Military Applications.



TYPE IE20002
INPUT: 190-250 volts, 50/60 cycle, 1 phase. OUTPUT: 230 volts, .15 KVA. Completely Electronic, withstands High Humidity.

THE SUPERIOR ELECTRIC COMPANY
8000 Bradley Ave., Bristol, Connecticut

For details, circle #102 on Reader Service Card.

FROM THE SMALLEST TO THE LARGEST UNITS...

the most desirable characteristics ever offered in selenium rectifiers!

RADIO RECEPTOR *hcd** PETTI-SEL

**high current density*

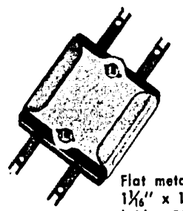
INDUSTRIAL TYPE SELENIUM RECTIFIERS

Made possible by the improved new vacuum process requiring no artificial barrier layer

Developed by Siemens Organization of West Germany, used extensively throughout Europe . . . and now manufactured exclusively in the U.S.A. by Radio Receptor Company.

the complete line ranges from...

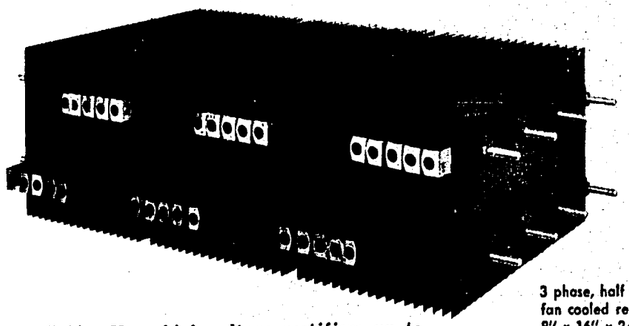
Plastic units, 7/16" x 7/16" x 3/32", single phase, center tap, 30V AC, 150 MA DC



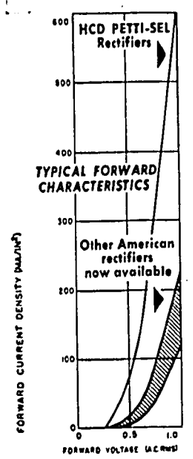
Flat metal rectifiers, 1 1/16" x 1 1/16" x 1/4", bridge, 30V AC, 200 MA DC

- **Better performance**
- **Estimated life 100,000 hours**
- **Lower forward voltage drop**
- **Suitable for high temperature applications**
- **Conveniently smaller cell sizes than conventional units of the same ratings**

...to the large space-saving



3 phase, half wave, fan cooled rectifiers, 8" x 16" x 24", 26V AC, 4500 amperes DC



Also available: Very high voltage rectifiers up to 296,000 peak inverse volts at 30 MA; Dwarfs — 5 MA up to 125V AC with resistive load; Cartridge types up to 17,000 peak inverse volts at 5 MA.

For complete information, submit your requirements today to Section PD

Semiconductor Division

RADIO RECEPTOR COMPANY, INC.

Subsidiary of General Instrument Corporation

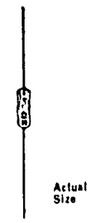
240 Wythe Avenue, Brooklyn 11, N. Y. • EVergreen 8-6000

Radio Receptor Products for Industry and Government: Selenium Rectifiers • Germanium Diodes
Thermatron Dielectric Heating Generators & Presses • Communications, Radar & Navigation Equipment

For details, circle #103 on Reader Service Card.

RADIO RECEPTOR GOLD BONDED GERMANIUM DIODES

DIMENSIONS
Diameter: .105" max.
Length: .270" max.
Lead diameter: .020"
Lead length: 1.25"



Actual Size

GERMANIUM GOLD BONDED GLASS DIODE CHARACTERISTICS

All ratings and characteristics listed are at 25°C unless otherwise specified

GENERAL PURPOSE TYPES

Code No.	Minimum Forward DC Current @ + 1V (MA)	Maximum Inverse Operating Voltage	Peak Inverse Voltage	Max. Reverse DC Current in UA & Corresponding Resistance (Ohms) at Indicated Voltages	Max. Continuous DC Forward Current (MA)
1N67A	4	80	100	5 (1meg) @ 5V; 50 (1meg) @ 50V	
1N68A	3	100	130	625 (160K) @ 100V	
1N89	3.5	80	100	8 (625K) @ 5V; 100 (500K) @ 50V	
1N90	5	60	75	500 (100K) @ 50V	
1N95	10	60	75	500 (100K) @ 50V	
1N96	20	60	75	500 (100K) @ 50V	
1N97A	20	80	100	8 (625K) @ 5V; 100 (500K) @ 50V	
1N98A	40	80	100	8 (625K) @ 5V; 100 (500K) @ 50V	
1N99A	20	80	100	5 (1meg) @ 5V; 50 (1meg) @ 50V	
1N100A	40	80	100	5 (1meg) @ 5V; 50 (1meg) @ 50V	
1N116A	10	60	75	100 (500K) @ 50V	
1N117A	20	60	75	100 (500K) @ 50V	
1N118A	40	60	75	100 (500K) @ 50V	
1N126*	5	60	75	50 (200K) @ 10V; 850 (59K) @ 50V	
1N127*	3	100	125	25 (400K) @ 10V; 300 (167K) @ 50V	
1N128*	3	40	50	10 (1meg) @ 10V	
1N198*	4	80	100	75 (133K) @ 10V; 250 (200K) @ 50V; at 75° C	
DR315	50	120	150	50 (2meg) @ 100V	
DR316	50	100	125	100 (1meg) @ 100V	
DR317	50	80	100	50 (1meg) @ 50V	
DR318	50	60	75	2 (5meg) @ 10V	
DR319	50	60	75	5 (2meg) @ 10V	

HIGH TEMPERATURE TYPES (rated at 75° C)

1N198*	5	50		75 (133K) @ 10V; 250 (200K) @ 50V	— —
DR321	200	50		125 (400K) @ 50V	45
DR323	100	50		200 (250K) @ 50V	40
DR324	100	50		500 (100K) @ 50V	40
DR325	100	50		75 (133K) @ 10V; 250 (200K) @ 50V	40

HIGH CONDUCTANCE TYPES

DR301	400	100	125	100 (500K) @ 50V	100
DR302	400	80	100	100 (500K) @ 50V	100
DR303	400	60	75	50 (400K) @ 20V	100
DR309	400	80	100	10 (1meg) @ 10V; 50 (1meg) @ 50V	100
DR327	300	100	125	100 (500K) @ 50V	100
DR328	300	80	100	100 (500K) @ 50V	100
DR329	300	60	75	50 (400K) @ 20V	100
DR330	300	80	100	10 (1meg) @ 10V; 50 (1meg) @ 50V	100
DR305	200	100	125	100 (500K) @ 50V	100
DR306	200	80	100	100 (500K) @ 50V	100
DR307	200	60	75	50 (400K) @ 20V	100
DR308	200	80	100	10 (1meg) @ 10V; 50 (1meg) @ 50V	100
1N281	100	60	75	30 (333K) @ 10V; 500 (100K) @ 50V	80
DR310	100	120	150	50 (2meg) @ 100V	80
DR311	100	120	150	100 (1meg) @ 100V	80
DR312	100	100	125	5 (2meg) @ 10V; 20 (5meg) @ 100V	80
DR313	100	80	100	2 (5meg) @ 10V; 20 (2.5meg) @ 50V	80
DR314	100	80	100	50 (1meg) @ 50V	80
DR326	100	60	75	250 (200K) @ 50V	

COMPUTER TYPES

Code No.	Min. Forward DC Current at Specified Voltage (MA)	Maximum Inverse Operating Voltage	Reverse Resistance Characteristics (Min)†	Reverse Recovery Characteristics (Min)
DR401	20 @ 0.5V	60	400K between 10 & 50V @ 55° C	50K in 0.5 usec; 400K in 2.0 usec‡
1N191	5 @ 1.0V	60	400K between 10 & 50V @ 55° C	50K in 0.5 usec; 400K in 3.5 usec‡
DR402	20 @ 0.5V	60	200K between 10 & 50V @ 55° C	50K in 0.5 usec; 200K in 2 usec‡
1N192	5 @ 1.0V	60	200K between 10 & 50V @ 55° C	50K in 0.5 usec; 200K in 3.5 usec‡
DR403	20 @ 0.5V	60	500K between 10 & 50V	80K in 0.3 usec§
DR404	20 @ 0.5V	60	500K between 10 & 50V	50K in 0.3 usec§

*Jan type
†Test voltage is a continuous 60 CPS sine wave.
‡Switching from a forward current of 30 MA to a reverse of 35 volts.
§Switching from a forward current of 5 MA to a reverse of 40 volts.

In addition to the diodes shown above, the electrical characteristics of the following types are available: 1N34, 1N34A, 1N38, 1N38A, 1N48, 1N51, 1N52, 1N54, 1N54A, 1N55, 1N55A, 1N55B, 1N56, 1N56A, 1N58, 1N58A, 1N63, 1N69, 1N70, 1N81

Semiconductor Division

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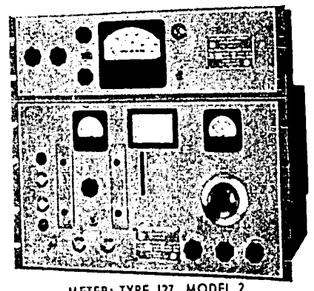
Northern Radio FREQUENCY SHIFT TERMINAL EQUIPMENT

FREQUENCY and SHIFT MONITOR SYSTEM

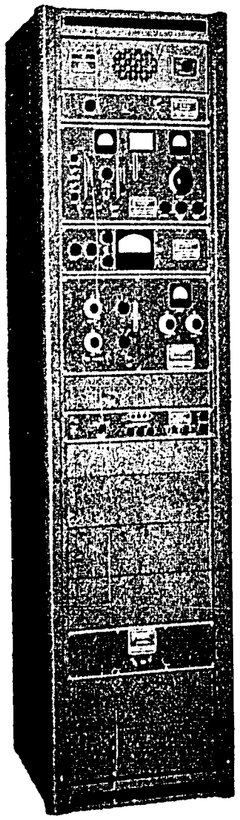


METER: TYPE 127, MODEL 2
MONITOR: TYPE 106, MODEL 4

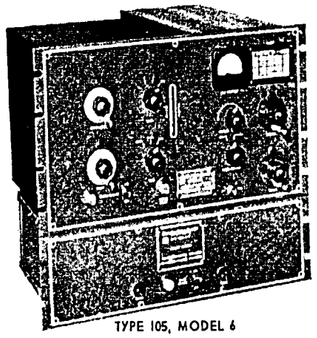
This system consists of a Type 106 Frequency and Shift Monitor and a Type 127 Frequency Meter. It is designed as a secondary standard to monitor the frequency and amount of shift of transmitter carrier outputs. It is particularly intended to measure the frequency shift of a mark and space (FS) signal 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/degree 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.



TYPICAL TRANSMITTER TERMINAL for TWINPLEX OPERATION

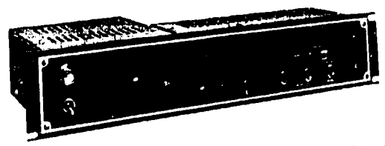


TYPE 105, MODEL 6

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.

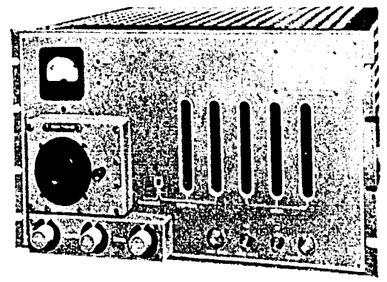
The two telegraph channels provide the same operational flexibility as that of two separate single channel FS systems. One can, for example, simultaneously use channel #1 on 60 wpm teletype and channel #2 on high-speed Morse or Time-Division Multiplex.

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: 45 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: 110/220 volts, 50/60 cycles. Approximately 50 watts. Connections at rear of chassis.
Dimensions: 3½" High x 19" Wide x 10" Deep.

For details, circle #105 on Reader Service Card.

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

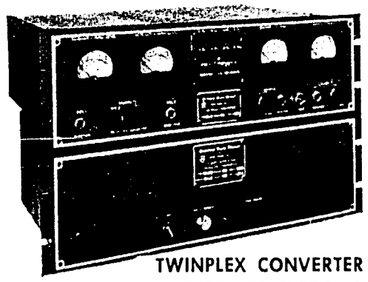
Output Frequency: 2—4 MC continuously variable.
Stability for any combination of temperature range from 0 to 50° C., and line voltage of 115 to 230 ± 10%: Approximately 1 cycle per megacycle.
Output level: ½ watt into 75 ohm load. Lever control on rear of chassis.
Readability: ± 2.5 cycles per second. 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.

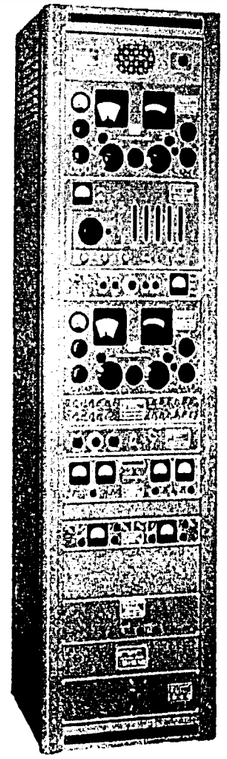


TWINPLEX CONVERTER TYPE 178 MODEL 1

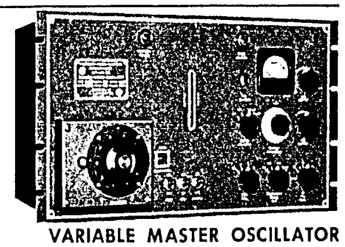
This Twinplex communication system makes possible a 2-channel radio circuit whereby 2 non-synchronous or synchronous telegraph transmissions modulate a single radio carrier wave by causing the carrier to assume one of four specific frequencies with 400 cps separations.

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 or 60 wpm teletype and channel #2 on high-speed Morse or 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.

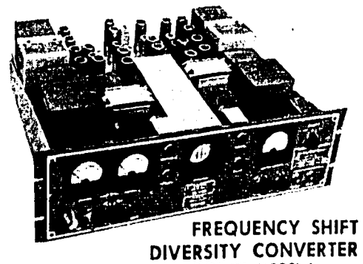


TYPICAL RECEIVER TERMINAL for TWINPLEX OPERATION



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.

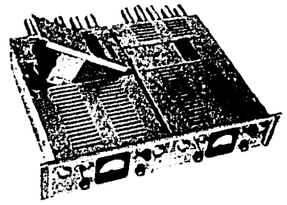
Normal Input Level: −40 to +10 VU (Zero VU = 1MW into 600 ohms). (Satisfactory operation on fades to −60 VU.)
Limiter Recovery Time: Negligible for a 40 VU differential between Mark and Space frequencies.
Output: 65 ma into 2000 ohms floating (self-contained line battery).
Keying Speed: Maximum of 40 dot cycles with narrow band frequencies diversity. Up to 400 dot cycles with the wide band networks.
Monitor: 2-inch Cathode Ray tube
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

For details, circle #106 on Reader Service Card.

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 "Crytographic," 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.

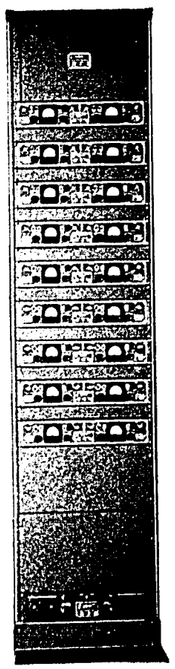


DUAL FS TONE KEYER; TYPE 153 MODEL 3:

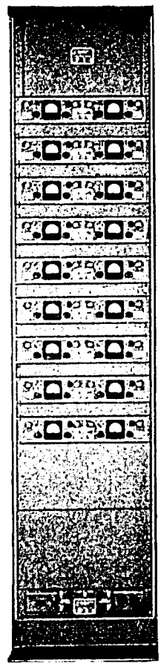
Keying Input. . . . Relay contacts, ± DC current or voltage pulses, neutral or polar.

Input Level. . . . DC voltage: ± 10 volts min. DC current: 45 ma min., ± or polar. Relay: contact rating 5 ma min.

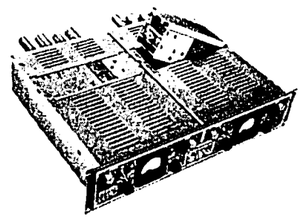
Keying input Z. . . . DC voltage: 100K ohms. DC current: 220 ohms.



TRANSMITTER



RECEIVER



DUAL FS TONE CONVERTER: TYPE 152 MODEL 3:

Input Z: 600 ohms, unbalanced.

Input Level: —40 dbm to 0 dbm.

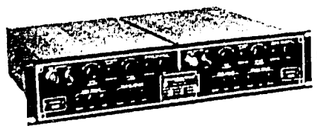
Input Frequencies: 18 channels, 425-3315 cps, 170 cycle spacing.

Keying Speed: 45 dot cycles.

DUPLEX TELEGRAPH SYSTEM FOR MULTI-CHANNEL TONE EQUIPMENT

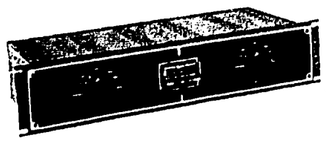
SEVEN NEW FEATURES in this system—simple 4-position switch selects from 12 possible duplex combinations; duplex operation between stations connected via carrier telegraph channels; *all-electronic*, without relays or moving parts; polar or neutral for either half duplex or full duplex; break-in now also 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.



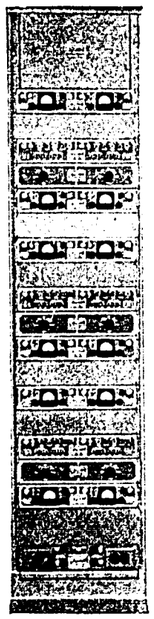
DUAL DUPLEX SELECTOR PANEL Type 200 Model 1

The Dual Selector Panel provides 12 loop options, patching facilities for monitoring purposes and channel routing, including the possibility of patching-in another teleprinter 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 arrangement. 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

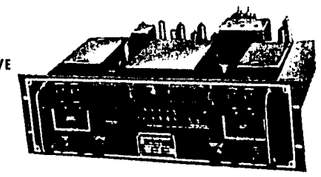
The Dual Loop Switch Panel rapidly selects half-duplex and/or full duplex mode of operation for any of the 4 standard loop options by front panel switching available from the 12 loop options in the Dual Duplex Selector Panel.



NEW! 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 re-transmission. 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 as "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

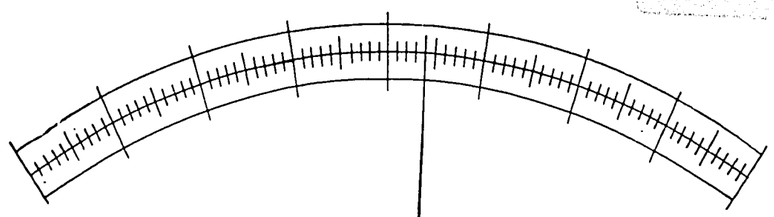
NORTHERN RADIO CO. inc.

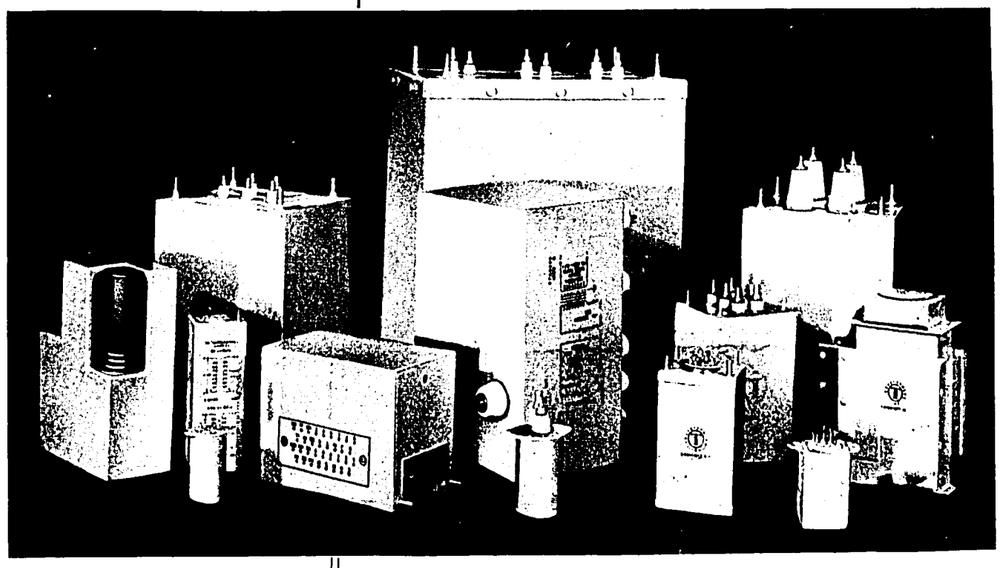
147 W. 22nd ST., NEW YORK 11, N. Y.

In Canada: Northern Radio Mfg. Co. Ltd., 1950 Bank St., Billings Bridge, Ottawa, Ontario

For details, circle #107 on Reader Service Card.

TRANSISTOR MIKES





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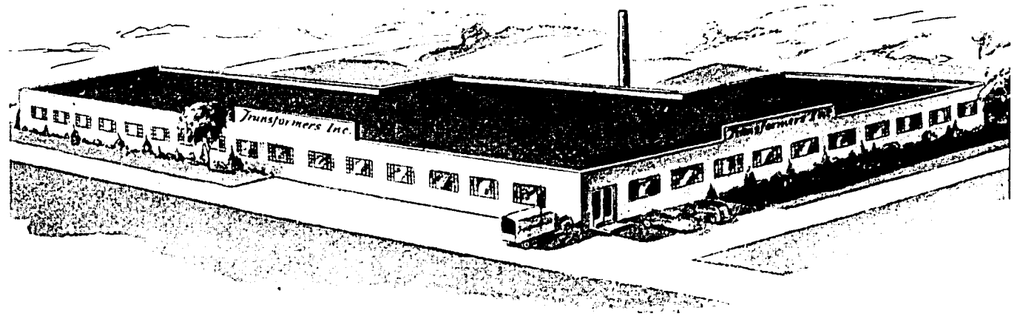


Functionally Designed for the Manufacture of Transformers

Manufacturing transformers requires special equipment which is unique in that it cannot be used for other purposes. In the layout of the plant of Transformers, Inc., three objectives have been closely aimed for: a laboratory capable, not only of measuring all the parameters of transformers, but making measurements on all types of electronic equipment in which transformers are to be used. The second objective was a Prototype plant or Sample Department complete and independent of the Production Department. The third objective was manufacturing space laid out in such a manner that complete control can be maintained on the quality of the transformer while it is in the various stages of manufacture.

For details, circle #109 on Reader Service Card.

FOR ALL BRANCHES OF THE MILITARY

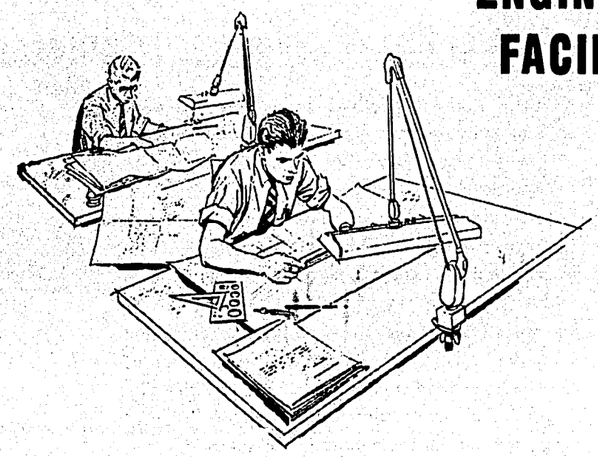
Transformers, Inc. have been specialists in designing transformers for special military applications. These transformers must meet the rigid MS and MIL-T-27A requirements. We have been suppliers to government contractors on transformers that meet these exacting requirements.

FOR ALL INDUSTRIAL APPLICATIONS

Computer transformers and magnetic amplifiers made by Transformers, Inc. have found wide application in industrial controls and automation equipment. Transformers, Inc. has been a leading supplier for the highly specialized transformers required in computers. Transformers, Inc. is equipped to manufacture all types of magnetic memory equipment.

TRANSFORMERS Inc.

DESIGN ENGINEERING FACILITIES



Transformers, Inc. is equipped with the most complete laboratory of any transformer company in the United States. It is possible to make measurements on all parameters at all frequencies from .01 cycles per second to 10 megacycles. In addition Transformers, Inc. has complete environmental test chambers which permit testing of transformers at simulated altitudes up to 100,000 ft. and at temperatures from 100 degrees below zero to 200 degrees above zero Fahrenheit. There is vibration equipment which permits the vibration testing from 5 cycles up to 3,000 cycles per second. Standard transformers are designed on the basis of the experience gathered from nomographs and our standard design specifications. We are constantly confronted with design of radically different transformers. Such transformers can only be acceptable in the field if they are subjected to complete tests for electrical specifications and under all environmental conditions. The final design is only acceptable when it is thoroughly tested.

For details, circle #110 on Reader Service Card.

TRANSFORMERS INCORPORATED

200 STAGE ROAD ● VESTAL ● NEW YORK

TRANSFORMERS Inc.

SPECIAL PURPOSE TRANSFORMERS

VOLTAGE REFERENCE
COMPUTER EXCITATION
voltage accuracy up to .001%

•

INSTRUMENT
AUDIO
PULSE
HYBRID
POWER
and all the sub-classifications
MAGNETIC AMPLIFIERS
RATIOMETERS
BRIDGES
and special test equipment

.....to meet today's critical requirements demands highly specialized skills and equipment

The accuracy required in voltage reference transformers and computer excitation transformers demands exacting specifications, supervision and material control. In order that high precision transformers be acceptable they must have predictable performance for all temperature and load conditions. A specialized method has been developed at Transformers, Inc. to make this possible. The measurement of voltage ratio is not sufficient, data must also be obtained which will indicate in which manner the variables of a particular transformer are affected by temperature and changes in the load.

For details, circle #111 on Reader Service Card.

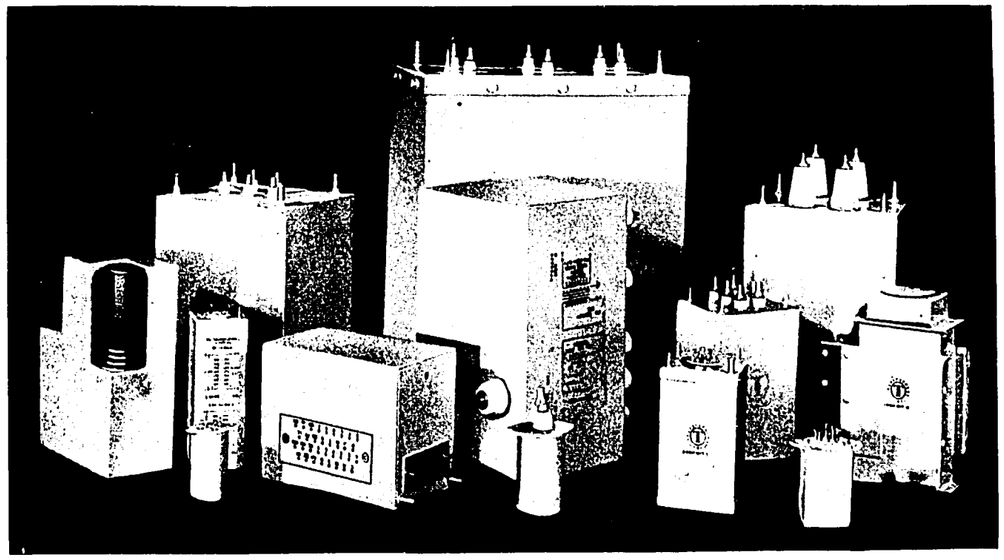
MINIATURIZATION

Airborne equipment may require the same accuracy as ground equipment with the additional requirement of miniaturization. Miniaturization can only be achieved by the use of higher operating temperatures with a resulting loss of efficiency. Thus highly accurate transformers can be designed and manufactured which operate at very high temperatures and are extremely small. Methods of encapsulating transformers in order to reduce weight have been developed at Transformers, Inc.

CORE MATERIALS

Transformers, Inc. maintains an adequate stock of various types and sizes of laminations of different core materials such as deltamax, orthonik, permalloy, mumetal, 4750, grain oriented silicon steel, etc. Each one of these specialized metals has special advantages which makes them suitable for use in specialized transformers.

TRANSFORMERS Inc.



IMPORTANT FEATURES OF TRANSFORMERS, INC. PRODUCTS

GREATER ACCURACY

Transformers, Inc. has developed special equipment to permit the measurements of ratio to a greater accuracy than heretofore possible. In our laboratory we can measure voltage ratio with an accuracy of 5 parts per million with a sensitivity of one part per million. In addition we have developed special equipment for the measurement of phase angles as low as .001 milliradian.

RELIABILITY

The manufacturing processes adhered to by Transformers, Inc. insure greater reliability. First by the specialized impregnating methods (vacuum and pressure). Second, by the standards adopted to insure maximum rigidity of assembly. Third, by the careful inspection of raw material.

MECHANICAL ACCURACY

In order to insure the accuracies we require for the mechanical dimensions for transformers, Transformers, Inc. has incorporated a complete metal working department. Through these facilities we are assured of mechanical perfections to within 5 thousandths of an inch for can dimensions and to within 1 thousandth of an inch for studs and other transformer components.

MINIMUM SIZE

It is of increasing importance for Airborne equipment to obtain optimum performance for minimum weight and size. The use of specialized core material and specially coated wires such as silicone coated wire and teflon insulated wire have permitted the design of transformers by Transformers, Inc. to minimum sizes. In addition we have developed special molded bobbins of high temperature material to obtain transformers without paper margins (which represent a loss of space) with resultant decrease in size and weight.

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TRANSFORMERS INCORPORATED

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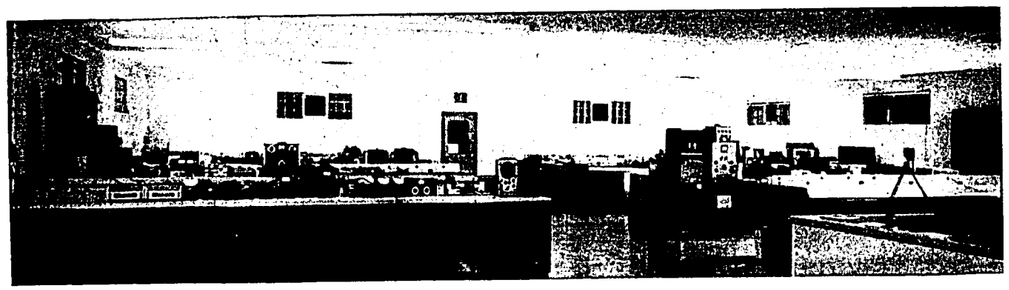
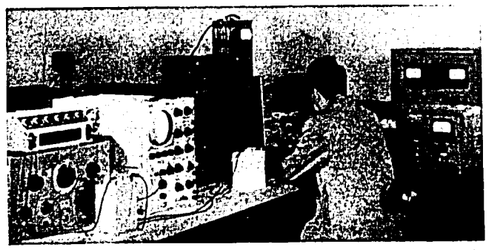
TRANSFORMERS Inc

TESTING TECHNIQUES AT TRANSFORMERS, INC.



General laboratory covers approximately 5 000 sq. ft., has the necessary equipment to make measurements from .01 cycles to 50 megacycles. Sections of the Lab on succeeding pages show specific test set-ups. There is sufficient equipment available so that all the set-ups can be operated simultaneously without interference.

Testing pulse transformers. This set-up can simulate the operating conditions of pulse transformers up to one million volts.

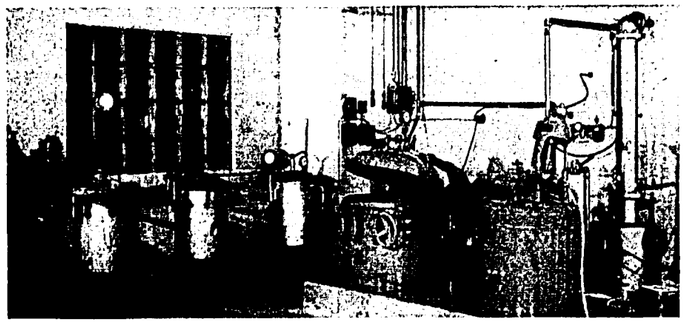


Equipment used in the design of pulse transformers to eliminate the "cut and try" method generally employed.

"Transformers, Inc. is equipped to measure any parameter at any frequency between .01 cycles to 50 megacycles."

"The following measurements can readily be made in the laboratory:

- **Measurement of core loss down to 2.5 microwatts at any frequency between 20 cycles and 20 KC**
- **Measurement of inductance from .1 microhenry to 1000 henries at any frequency to 50 KC**
- **Measurement of resistance from .00001 ohms to 10,000,000 megohms**
- **Measurement of impedance or admittance**
- **Measurement of filter characteristics**
- **Measurement of vacuum tube and transistor characteristics**
- **Measurement of intermodulation distortion**
- **Measurement of frequency from .01 cycles to 100 MC with an accuracy of 1 part per million**
- **Measurement of voltage ratio with an accuracy of 5 parts per million**
- **Measurement of phase shift down to .001 milliradians at 0° or 180°**
- **Wave analysis**



VACUUM IMPREGNATION

Production vacuum impregnated in these tanks and then subjected to gas pressure of 100 lbs. per square inch while they are still submerged in the varnish. This insures complete penetration of the varnish. The multiple of tanks permits simultaneous vacuum impregnation with different varnishes.

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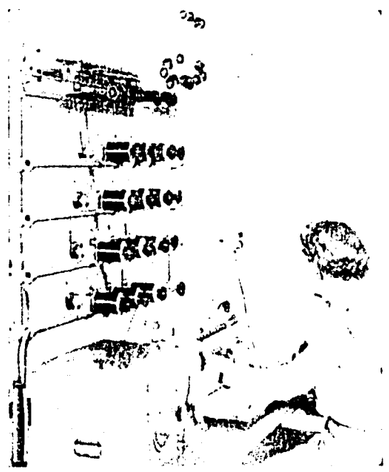
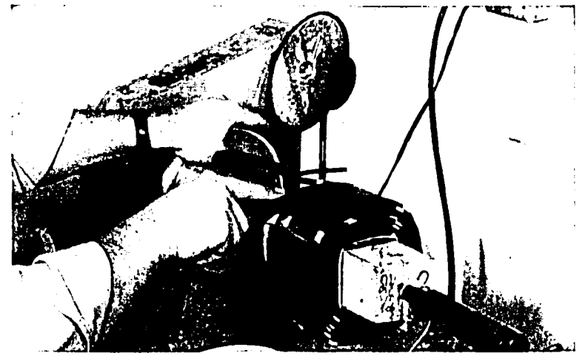
TRANSFORMERS Inc

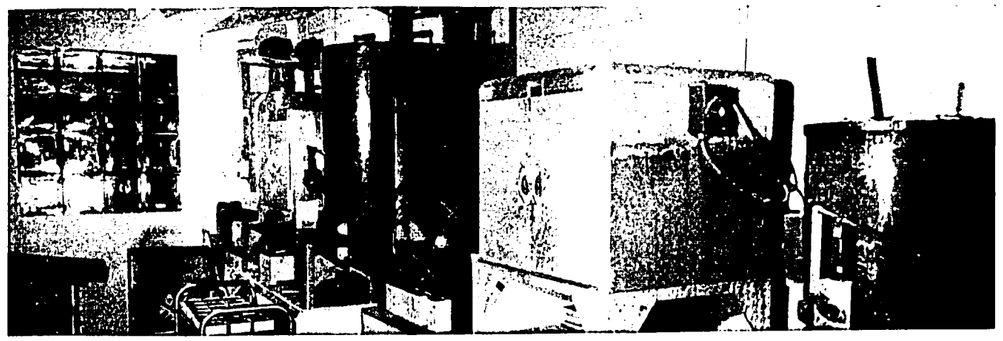
MEASURED ACCURACY IN TRANSFORMER WINDING

A detailed view of the automatic winding machines.





TRANSFORMER POTTING



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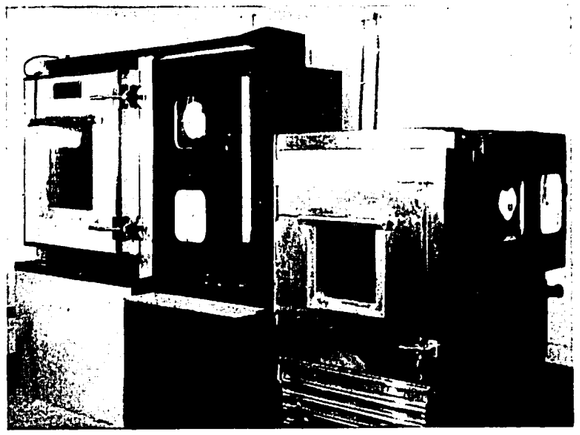
TRANSFORMERS Inc.

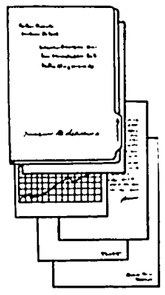
ENVIRONMENTAL TESTING



One chamber performs MIL-T-27 humidity cycling and Monmouth cold shock. Another chamber is a combination altitude and extreme cold chamber. Altitude up to 100,000 feet can be simulated. Temperatures as low as 100 degrees below zero Fahrenheit can be readily obtained. Another installation not yet completed will perform vibration testing up to 3,000 cycles at any simulated altitude up to 125,000 feet and at any temperature from 125 degrees below zero to 190 degrees above zero.

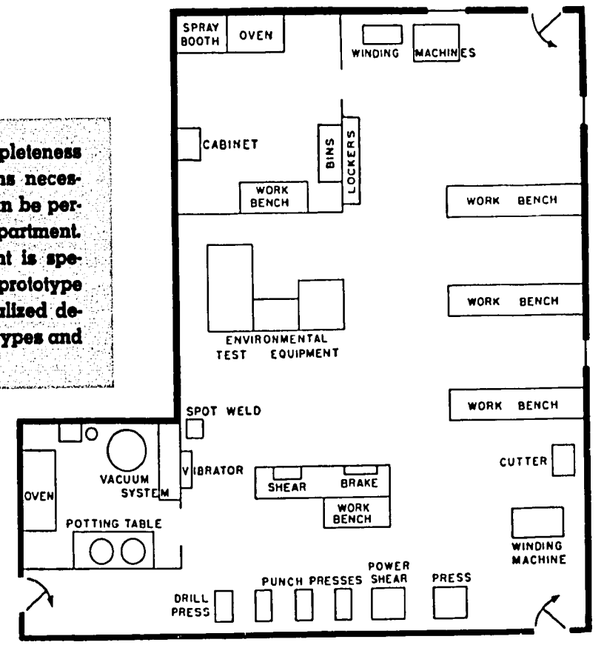
PRETESTED PROTOTYPES

The floor plan on the right shows the completeness of our Prototype Department. All operations necessary to the manufacture of a transformer can be performed independent of the Production Department. The personnel in the Prototype Department is specially trained to follow the design of new prototype transformers accurately. This highly specialized department is at your service to produce prototypes and samples at short notice.



COMPREHENSIVE PROTOTYPE REPORTS

Test data and design data are accurately maintained in files of all transformers manufactured by Transformers, Inc. This data makes possible repeat orders without delay or additional cost.



PROTOTYPE AND SAMPLE DEPARTMENT

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TRANSFORMERS INCORPORATED

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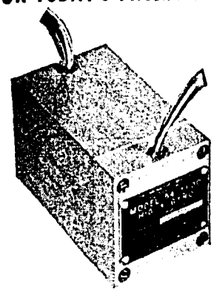
Precision Products

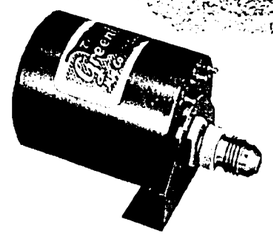
BY Greenleaf

FOR TODAY'S PROJECTS—TOMORROW'S PLANS



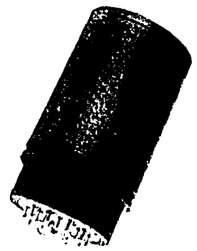
HIG-3 MODEL 2 INTEGRATING GYROSCOPE

This smallest integrating Gyro is dimensionally $1\frac{1}{2}$"x$1\frac{1}{2}$"x$2\frac{3}{4}$" including heater block and is being used in fire control and navigation systems. Has viscous damping, single degree of freedom and a maximum drift rate of .2 milliradians second.



PRESSURE SENSING DEVICES

Used for the measurement of absolute, differential and gage pressures. Accuracies within ± 2% or better throughout entire operating range.



HIG-4 MODEL 2 GYRO

Greater accuracy, including low drift rate, is a feature of this HIG-4 Gyro, now being used for missile guidance and fire control systems. The design and development phases of this Gyro have long been completed and it is now a production item.

FREE, RATE, DIRECTIONAL AND VERTICAL GYROS

For telemetering, missile guidance, inertial guidance and navigation. Whatever your gyroscope requirements, Greenleaf has the accurate, economical answer.

ACCELEROMETERS

The Greenleaf line includes linear, angular and three-axis accelerometers. Accuracy is within ± 2% or better throughout the entire operating range. Military environmental conditions were considered in the design of these units in order to comply with the reliability concept.

All these, and other Greenleaf products, may readily be modified in many respects to meet your individual requirements.

Complete specifications and technical Bulletins will be sent immediately upon request. Write, wire or 'phone today.

THE Greenleaf MANUFACTURING COMPANY

GRE-55RR

A DIVISION OF MANDREL INDUSTRIES, INC.

7814 Maplewood Industrial Court, Saint Louis 17, Missouri

For details, circle #116 on Reader Service Card.

cppc

for ALL Types of SYNCHROS

SIZE 8

SIZE 10

SIZE 11

SIZE 15

STANDARD UNITS — ROTOR AS PRIMARY — STATOR AS PRIMARY

SYNCHRO FUNCTION	CPPC TYPE	Rotor Input Voltage (400 ~)	Rotor Input Current (Amps.)	Rotor Input Power (Watts)	Rotor Output Voltage (Volts)	Rotor Sensitivity (MV/deg.)	Rotor Phase Shift (deg. lead)	Stator Input Voltage (400 ~)	Stator Input Current (Amps.)	Stator Input Power (Watts)	Stator Output Voltage (volts)	Stator Sensitivity (MV/deg.)	Stator Phase Shift (deg. lead)
Torque Transmitter	CGC-8-A-7	26	.100	.5	11.8	206	8°	–	–	–	–	–	–
Control Transformer	CTC-8-A-1	–	–	–	–	–	–	11.8	099	23	23.5	410	8.5°
Control Transformer	CTC-8-A-4	–	–	–	–	–	–	11.8	033	08	23.5	390	8°
Torque Receiver	CRC-8-A-1	26	.100	.5	11.8	206	8°	–	–	–	–	–	–
Electrical Resolver	CSC-8-A-1	26	039	.43	10.6	185	20°	11.8	.084	27	23.2	400	11°
Control Differential	CDC-8-A-1	–	–	–	–	–	–	11.8	095	.21	11.8	206	9°
Vector Resolver	CVC-8-A-1	26	057	.34	11.8	206	10.2°	–	–	–	–	–	–

STANDARD UNITS — ROTOR AS PRIMARY — STATOR AS PRIMARY

SYNCHRO FUNCTION	CPPC TYPE	Rotor Input Voltage (400 ~)	Rotor Input Current (Amps.)	Rotor Input Power (Watts)	Rotor Output Voltage (Volts)	Rotor Sensitivity (MV/deg.)	Rotor Phase Shift (deg. lead)	Stator Input Voltage (400 ~)	Stator Input Current (Amps.)	Stator Input Power (Watts)	Stator Output Voltage (volts)	Stator Sensitivity (MV/deg.)	Stator Phase Shift (deg. lead)
Torque Transmitter	CGC-10-AS-4	26	.142	61	11.8	206	5	–	–	–	–	–	–
Control Transformer	CTC-10-AS-1	26	033	23	11.2	200	10	11.8	081	.19	23.5	410	8
Control Transformer	CTC-10-AS-4	26	069	65	11.2	200	10	11.8	021	05	23.5	410	8
Control Differential	CDC-10-AS-1	11.8	042	23	11.2	200	11	11.8	040	19	23.5	195	8
Torque Receiver	CRC-10-AS-1	26	095	42	11.8	206	6.5	–	–	–	–	–	–
Electrical Resolver	CSC-10-AS-1	26	016	35	11.9	206	18	11.8	072	21	23	413	25
Vector Resolver	CVC-10-AS-1	26	049	25	11.8	206	7	11.8	092	33	23.9	344	12
Vector Resolver	CWC-10-AS-1	26	040	28	11.8	206	10	11.8	090	26	21.0	365	16.5

STANDARD UNITS — ROTOR AS PRIMARY — STATOR AS PRIMARY

SYNCHRO FUNCTION	CPPC TYPE	Rotor Input Voltage (400 ~)	Rotor Input Current (Amps.)	Rotor Input Power (Watts)	Rotor Output Voltage (Volts)	Rotor Sensitivity (MV/deg.)	Rotor Phase Shift (deg. lead)	Stator Input Voltage (400 ~)	Stator Input Current (Amps.)	Stator Input Power (Watts)	Stator Output Voltage (volts)	Stator Sensitivity (MV/deg.)	Stator Phase Shift (deg. lead)
Torque Transmitter	CG-11-B-2	26	.168	69	11.8	206	4	–	–	–	–	–	–
Control Transmitter	CG-11-B-7	26	089	36	11.8	206	3.5	–	–	–	–	–	7
Torque Transmitter	CG-11-B-6	115	042	71	11.8	206	3.4	–	–	–	–	–	–
Control Transformer	CT-11-B-2	26	078	32	11.8	206	6	11.8	138	29	23.5	410	5
Control Transformer	CT-11-B-8	–	–	–	–	–	–	11.8	068	19	23.5	410	5
Control Transformer	CT-11-E-7	26	015	102	11.8	206	6	11.8	035	09	22.7	400	5
Control Differential	CD-11-B-2	–	–	–	–	–	–	11.8	150	38	11.8	206	5
Torque Receiver	CR-11-B-2	26	095	41	11.8	206	4	–	–	–	–	–	–
Electrical Resolver	CS-11-B-2	26	050	32	12.4	220	8.5	12.6	062	23	23.5	410	5.5
Vector Resolver	CV-11-B-2	3	.100	36	3.1	54	3.5	3.2	072	.05	21.5	427	8.5

STANDARD UNITS — ROTOR AS PRIMARY — STATOR AS PRIMARY

SYNCHRO FUNCTION	CPPC TYPE	Rotor Input Voltage (400 ~)	Rotor Input Current (Amps.)	Rotor Input Power (Watts)	Rotor Output Voltage (Volts)	Rotor Sensitivity (MV/deg.)	Rotor Phase Shift (deg. lead)	Stator Input Voltage (400 ~)	Stator Input Current (Amps.)	Stator Input Power (Watts)	Stator Output Voltage (volts)	Stator Sensitivity (MV/deg.)	Stator Phase Shift (deg. lead)
Torque Transmitter	CG 15 D 1	26	221	75	11.8	206	3.0	–	–	–	–	–	–
Torque Transmitter	CG-15 D 4	26	100	35	11.8	206	3.5	–	–	–	–	–	–
Torque Transmitter	15CX4a	115	067	70	90	1560	2.5°	–	–	–	–	–	–
Torque Transmitter	CG 15 MS 1	115	067	70	90	1560	2.5°	–	–	–	–	–	–
Control Transformer	CT-15 D 1	–	–	–	–	–	–	11.8	125	24	23.4	410	4.5°
Control Transformer	CT-15 D 4	–	–	–	–	–	–	11.8	032	.06	23.4	410	4.5°
Torque Receiver	CR 15 D 1	26	100	35	11.8	206	3.5°	–	–	–	–	–	–
Electrical Resolver	CS 15 D 1	26	055	31	11.8	206	7.5°	11.8	110	.75	23	400	5°
Vector Resolver	CW 15 D 1	32	005	03	15	260	5.0°	15	010	03	23.5	495	5.5°
Control Differential	CD 15 D 1	11.8	122	.33	10.8	188	9°	11.8	120	24	11.0	192	4.5°

D.C. RESISTANCE — IMPEDANCE — ACCURACY

Rotor (Ohms)	Stator (Ohms)	Zin (Ohms)	Zo (Ohms)	Zrot (Ohms)	Max. Null Voltage (MV)	Max. Error (Min.)	Max. Error Speed (Min.)	Length in Inches
37	12	54 + j260	12 + j45	80 + j20	30	7	14	1.240
143	25	220 + j740	29 + j110	245 + j60	30	7	14	1.240
359	64	560 + j1860	90 + j340	640 + j190	30	7	14	1.240
37	12	54 + j260	12 + j45	80 + j20	30	–	30	1.240
230	27	280 + j690	39 + j136	70 + j136	30	7	14	1.240
36	25	38 + j122	27 + j120	48 + j14	30	7	14	1.240
78	27	103 + j440	8 + j30		30	7	14	1.240

D.C. RESISTANCE — IMPEDANCE — ACCURACY

Rotor (Ohms)	Stator (Ohms)	Zin (Ohms)	Zo (Ohms)	Zrot (Ohms)	Max. Null Voltage (MV)	Max. Error (Min.)	Max. Error Speed (Min.)	Length in Inches
16	7.2	35 + j130	8 + j31	47 + j16	30	–	12	1.241
140	24	205 + j752	32 + j128	234 + j81	30	–	15	1.241
566	160	807 + j2350	115 + j481	945 + j325	30	–	15	1.241
32	25	34 + j113	31 + j123	57 + j17	30	–	15	1.291
34	12	58 + j250	13 + j51	80 + j27	30	–	30	1.241
215	29	273 + j668	41 + j159	308 + j71	1 mv v	–	15	1.291
68	28	107 + j527	43 + j123	170 + j59	1 mv v	–	15	1.241
111	28	177 + j625	91 + j143	215 + j70	1 mv v	–	15	1.241

D.C. RESISTANCE — IMPEDANCE — ACCURACY

Rotor (Ohms)	Stator (Ohms)	Zin (Ohms)	Zo (Ohms)	Zrot (Ohms)	Max. Null Voltage (MV)	Max. Error (Min.)	Max. Error Speed (Min.)	Length in Inches
10.4	3.6	24 + j153	5 + j24	28 + j14	30	–	12	1.600
18	7.7	45 + j268	9 + j38	48 + j22	30	–	12	1.600
180	3.8	410 + j2700	5 + j24	50 + j21	100	–	12	1.600
45	9.5	94 + j336	15 + j72	81 + j40	30	–	12	1.600
47	13	103 + j620	19 + j100	–	30	–	12	1.600
156	35	454 + j3620	24 + j283	320 + j163	30	–	12	1.600
12	8.5	14 + j67	17 + j66	62 + j28	30	–	12	1.640
20	9.5	40 + j260	10 + j43	50 + j21	30	–	30	1.600
50	136	123 + j503	27 + j136	126 + j43	1 mv v	–	12	1.640
18	64	33 + j293	10 + j41	–	1 mv v	–	12	1.600

D.C. RESISTANCE — IMPEDANCE — ACCURACY

Rotor (Ohms)	Stator (Ohms)	Zin (Ohms)	Zo (Ohms)	Zrot (Ohms)	Max. Null Voltage (MV)	Max. Error (Min.)	Max. Error Speed (Min.)	Length in Inches
6.5	3	12 + j115	3.9 + j19	28 + j11	30	–	10	1.600
15.5	5.7	35 + j260	7.1 + j40	40 + j23	30	–	10	1.600
65	161	163 + j1690	175 + j894		125	12	24	2.000
65	161	163 + j1690	175 + j894		75	–	10	2.000
37	10	80 + j490	15 + j80	74 + j50	30	–	10	1.600
180	37	360 + j1870	63 + j370	338 + j203	30	–	10	1.600
15.5	5.7	35 + j260	7.1 + j40	40 + j23	30	–	30	1.600
74	13	110 + j520	23 + j120		1 mv/v	–	10	1.640
540	156	1100 + j6300	300 + j1600	1180 + j602	1 mv/v	–	10	1.600
17	9.2	22 + j81	17 + j83	27 + j13	30	–	10	1.640

- ★ Extreme Reliability ★ Light Weight
- ★ Highest Accuracy ★ Tight Coupling
- ★ Environmentally Qualified ★ Low Nulls
- ★ Low Phase Shift ★ High Torque
- ★ Matched Impedances ★ Low Friction
- ★ Low Heat Rise ★ Early Delivery
- ★ Special Units ★ Cost No More

SYNCHROS are our business

In addition to the wide variety of standard units shown, we also produce an equally large number of special units on special order in production quantities for which we are already tooled.

For more complete information on our synchros including Typical System Measurements, write for booklet SC-3 or phone MAdison 6-2101 (Suburban Philadelphia).

NAVY BuOrd SYNCHROS

Contact Clifton Precision for standard Navy BuOrd units. If your specification requires conformance to BuOrd drawings and your system can take advantage of exceptional accuracy, CPPC can hold extra close error spread and accuracy tolerances. See CG-15-MS-1 in the tables.

PRECISION RESOLVERS

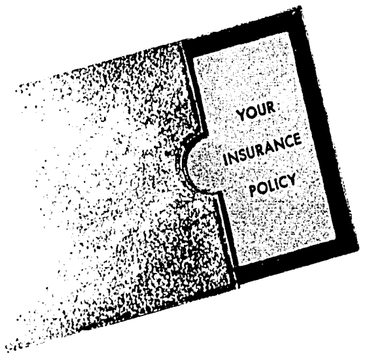
Precision Computing Resolvers with functional accuracies of the order of .1% and transformation ratios 1:1 are currently being constructed in the size 15 class for special applications. Contact CPPC for applications involving the use of Precision Resolvers in all sizes.

CLIFTON PRECISION PRODUCTS COMPANY, INC.

CLIFTON HEIGHTS, PENNA.

Constantin GLASS-TO-METAL SEALS

YOUR "INSURANCE POLICY" FOR



RELIABLE OPERATION

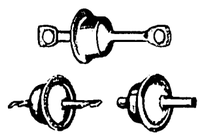
Wherever glass-to-metal sealing is needed to insure long life and continuously high performance, Constantin seals give your components a big bonus "premium" in endurance and protection.

Constantin's experienced research and production engineers have designed and manufactured thousands of different glass-to-metal seals for specific applications. Its complete research, design and manufacturing facilities . . . machine shops for die construction, stamping, wire cutting and forming . . . and separate glass shops . . . provide prompt action on any work order.

For any glass-to-metal electronics application where a positive, efficient, vacuum-tight seal is a critical need, Constantin can meet your technical specifications with a custom designed unit. Improve the quality of your components . . . "insure" their high performance by making Constantin seals a major part of your production "policy." Write today for complete details.

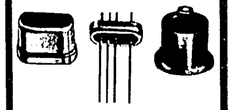
ALL-IN-ONE ASSEMBLIES

Constantin can design an original seal to meet the special needs of your equipment. All-In-One Assemblies come with different types of internal and external mountings, doing away with expensive subassemblies and costly production line operations such as hole stamping, brazing, soldering, mounting of seals, etc



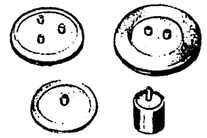
SINGLE TERMINALS

Extensive line of Single Terminals includes high compression and kovar types. Available Standard Pin types include pierced flats, hollow tubes, turret heads, tubulations with self-lugs, straight ends and cane or goose neck hooks.



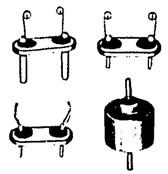
TRANSISTOR AND DIODE MOUNTS

For any soldering or welding application, Constantin has a complete line of Transistor and Diode Mounts which provide complete protection from moisture, dust, heat conditions and shock.



END SEALS

These quality units are designed and produced for electronic components which must stand up under extended operation . . . such as rectifiers, capacitors, resistors, delay lines, etc. Many different types and sizes are continually being developed to meet varying technical requirements.



CRYSTAL BASES AND COVERS

Constantin's Crystal Bases and Covers are world-known and have been widely used for many years by components manufacturers. They meet all military specifications and can be manufactured in varying designs with standard and special crystal mounts.

CONNECTORS

Constantin Connectors are made with special steel alloys which are combined with glass using high compression techniques. Any desired finish can be supplied to meet all present anti-corrosion requirements. Constantin is especially known for the construction of standard and unique flanges and pin types.

ALL-METAL HIGH COMPRESSION HEADERS

Special fusing techniques are used in the manufacture of Constantin's All-Metal Headers. Standard types find use in countless applications . in relays, transformers, thermostats and many others If your technical specifications encompass a special unit, Constantin will design a seal for your equipment

MULTIPLE HEADERS

Constantin's plug and standard type Multiple Headers are manufactured with precision by advanced engineering techniques. Their rugged construction enables them to withstand thermal shock and assure continuously reliable operation. Available in many standard configurations and special designs

L.L. Constantin & Co. **MANUFACTURING ENGINEERS**

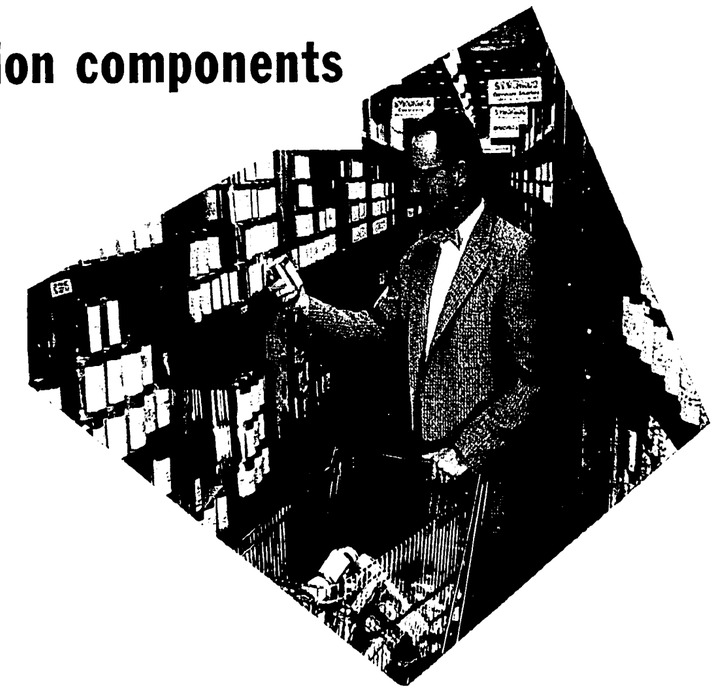
Route 46, Lodi, N. J. • 187 Sargeant Ave., Clifton, N. J.

CN

TRANSISTOR MOUNTS • SINGLE TERMINALS • COMPRESSION HEADERS • END SEALS • CRYSTAL BASES • CONNECTORS • MINIATURIZATION

For details, circle #119 on Reader Service Card.

Supermarket for precision components



- ROTATING COMPONENTS
- RADAR ANTENNA DEVICES
- GYROS . . . . . .
- COMPONENT PACKAGING

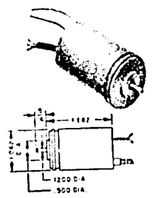
ECLIPSE-PIONEER DIVISION, BENDIX AVIATION CORPORATION
TETERBORO, N.J.

PRINTED IN U.S.A.

Publication No. 5612-13
Supersedes Publication No. 563-1

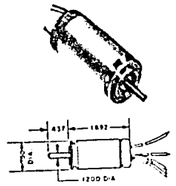
For details, circle #120 on Reader Service Card.

AY-190 SERIES, SIZE 11 FRAME — AUTOSYN® SYNCHROS — AY-300 SERIES, SIZE 8 FRAME



Function	Corrosion Resistant
Transmitter	AY-190-A1
Control Transformer	AY-191-A1
Resolver	AY-192-A1
Differential	AY-193-A1
Receiver	AY-194-A1*

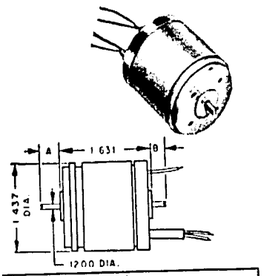
* Receiver not normally furnished in corrosion resistant construction.



Function	Corrosion Resistant
Receiver	AY-300-2-A1*
Control Transformer	AY-300-25-A1
Transmitter	AY-300-26-A1
Control Transformer (HI-Z)	AY-300-38-A1
Resolver	AY-320-25-A1
Differential	AY-330-25-A1

* Receiver not normally furnished in corrosion resistant construction

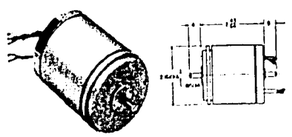
AY-200 SERIES AUTOSYN SYNCHROS — SIZE 15 FRAME



TYPICAL No.	Dimension A	Dimension B
AY-200-1	¼	0
AY-201-1	½	0
AY-202-1	7/16	⅜

FUNCTION	STANDARD CONSTRUCTION	CORROSION RESISTANT	HIGH TEMPERATURE
Multi-Power Transmitter	AY-20 ☐S-1-B	AY-20 ☐S-44-B	
Receiver	AY-20 ☐S-2-B		
Control Transformer	AY-20 ☐S-3-B	AY-20 ☐S-25-B	
Single-Power Transmitter	AY-20 ☐S-4-B	AY-20 ☐S-26-B	AY-20 ☐S-31-B
Control Transformer (HI-Z)	AY-20 ☐S-5-B	AY-20 ☐S-38-B	
Linear		AY-21 ☐S-42-B	AY-21 ☐S-48-B
Resolver (HI-Z)	AY-22 ☐S-5-B	AY-22 ☐S-38-B	
Resolver	AY-22 ☐S-27-B	AY-22 ☐S-25-B	
Differential (Servo Application)	AY-23 ☐S-3-B	AY-23 ☐S-25-B	
Differential (Synchronous Application)	AY-23 ☐S-4-B		
Resolver (Omni Application)	AY-24 ☐S-5-B		
Resolver (HI-Frequency)	AY-25 ☐S-24-B	AY-25 ☐S-39-B	
Resolver, Control Transformer	AY-26 ☐S-3-B		
Variable Transformer	AY-27 ☐S-43-B	AY-27 ☐S-46-B	AY-27 ☐S-46-B

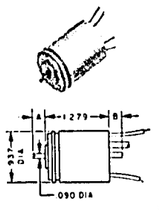
AY-400 SERIES AUTOSYN SYNCHROS — SIZE 22 FRAME



TYPE No.	Dimension A	Dimension B
AY-401-1	½	0
AY-402-1	½	½

FUNCTION	STANDARD CONSTRUCTION	CORROSION RESISTANT
Transmitter	AY-40 ☐-1-A	AY-40 ☐-2-A
Differential	AY-43 ☐-1-A	AY-43 ☐-2-A

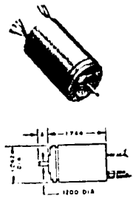
AY-500 SERIES "PYGMY" AUTOSYNS — SIZE 10 FRAME



TYPICAL No.	Dimension A	Dimension B
AY-500-2	¼	0
AY-502-2	¼	¼
AY-503-2	⅜	0

FUNCTION	STANDARD CONSTRUCTION	CORROSION RESISTANT	HIGH TEMPERATURE
Receiver	AY-50 ☐-2-A1		
Control Transformer	AY-50 ☐-3-A1	AY-50 ☐-25-A1	
Transmitter	AY-50 ☐-4-A1	AY-50 ☐-26-A1	AY-50 ☐-8-A1
Control Transformer (HI-Z)	AY-50 ☐-5-A1	AY-50 ☐-38-A1	
Linear	AY-51 ☐-10-A1		
Resolver	AY-52 ☐-3-A1	AY-52 ☐-25-A1	
Differential	AY-53 ☐-3-A1	AY-53 ☐-25-A1	
Resolver (HI-Z)	AY-54 ☐-5-A1	AY-54 ☐-38-A1	
Resolver (HI-Frequency)	AY-55 ☐-24-A1	AY-55 ☐-39-A1	

AY-600 SERIES AUTOSYN SYNCHROS — SIZE 11 FRAME



TYPICAL No.	A INCHES
AY-600-1	5/16
AY-601-1	½

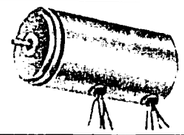
FUNCTION	STANDARD CONSTRUCTION	CORROSION RESISTANT	HIGH TEMP. AND CORROSION RESISTANT
Multi-Power Transmitter	AY-60 ☐-1-A1	AY-60 ☐-6-A1	
Control Transformer	AY-60 ☐-3-A1	AY-60 ☐-5-A1	AY-60 ☐-12-A1
Control Transformer (Med. Z)		AY-60 ☐-11-A1	AY-60 ☐-9-A1
Receiver	AY-60 ☐-10-A1		
Single-Power Transmitter	AY-60 ☐-8-A1		
Resolver	AY-62 ☐-3-A1	AY-62 ☐-5-A1	
Differential		AY-63 ☐-5-A1	AY-63 ☐-12-A1

Units listed have loose leads. Can also be furnished with terminal boards.

LOW INERTIA SERVO MOTORS

TYPE No.	RATED VOLTAGE Phase 1	RATED VOLTAGE Phase 2	Max. Power Input Total (Watts)	No Load Speed (RPM)	Stall Torque (Oz. in.)	Torque to Inertia Ratio (Radians-sec.²)	Frame Size	REMARKS
CK-1018-7-A1	18	18	5.0	10,000	0.13	18,400	10	Tapered Shaft
CK-1018-16-A1	26	26	6.0	10,000	0.3	40,000	10	125°C Ambient Temp. Corrosion Resistant, Tapered Shaft
CK-1025-13-A1	115	115 57.5	12.0	4,800	1.45	31,000	15	MK 7 Mod. 1
CK-1027-14-B1	115	115 57.5	7.0	6,200	0.60	41,500	11	
CK-1027-15-B1	115	180 90	7.2	6,200	0.60	41,500	11	
CK-1031-18-A1	26	55	9.0	6,175	0.35	10,000	10	Corrosion Resistant
CK-1038-17-A1	26	50	4.75	5,500	0.39	14,500	15	Pinion on Tapered Shaft
CK-1041-19-A1	26	65	6.6	3,600	0.7	3,500	15	Drag Cup
CK-1043-17-A1	26	50	4.75	5,500	0.39	14,500	15	Tapered Shaft
CK-1045-16-A1	26	26	6.0	10,000	0.3	40,000	10	125°C Ambient Temp. Corrosion Resistant, Splined Shaft
CK-1048-24-A1	18	18	3.0	6,300	0.15	21,300	8	Splined Shaft
CK-1048-29-A1	26	26	4.5	6,300	0.20	28,300	8	Splined Shaft
CK-1049-25-A1	26	26	6.5	5,800	0.35	19,000	8	Splined Shaft
CK-2006-5-A1	115	115	30.0	6,600	3.0	5,700	20	
CK-2006-13-A1	115	115	26.0	6,000	2.5	41,500	20	Corrosion Resistant
CK-2011-13-A1	115	115	26.0	6,000	2.5	41,500	20	Corrosion Resistant
CK-3004-4-A1	115	230	70.0	3,700	14.5	5,800	28	

RATE AND SERVO MOTOR GENERATORS



TYPE No.	RATED VOLTAGE Phase 1	RATED VOLTAGE Phase 2	Max. Power Input Total (Watts)	No Load Speed (RPM)	Stall Torque (Oz. in.)	Torque to Inertia Ratio (Radians-sec.²)	Gen. Excit. (Volts)	Generator Output (Volts)	Frame Size	REMARKS
FV-10 ☐-5-A1	26	26	7.0	10,000	0.28	20,000	18	0.3 1000	10	Corrosion Resistant
FV-103-6-A1	115	115 57.5	7.0	6,200	0.60	25,500	115	0.5 1000	11	
FV-104-7-A1	26	26	9.7	6,000	0.50	22,000	26	0.5 1000	11	High Temperature Corrosion Resistant
FV-109-10-A1	26	26	7.0	10,000	0.28	14,000	18	0.3 1000	10	Includes Permanent Magnet Generator for Speed Measurement
FV-110-9-A1	26	52 26	7.0	10,000	0.28	20,000	26	0.5 1000	10	Corrosion Resistant
FV-110-12-A1	33	52	7.0	10,000	0.28	20,000	26	0.5 1000	10	Corrosion Resistant
FV-112-11-A1	18	18	3.0	6,300	0.15	13,000	18	0.25 1000	8	Corrosion Resistant
FV-2001-4-A1	115	115	23.0	7,200	2.5	69,000	18	0.3 1000	20	Corrosion Resistant
FV-2005-5-A1	115	115 57	26.0	6,000	2.5	39,000	115	0.5 1000	20	Corrosion Resistant
FV-2007-6-A1	115	115	25.0	7,000	2.8	5,400	18	0.3 1000	20	Corrosion Resistant
FV-3005-5-A1	115	230 115	70.0	3,700	14.5	4,200	115	0.5 1000	28	

RATE AND SERVO MOTORS — CENTER TAPPED CONTROL WINDINGS

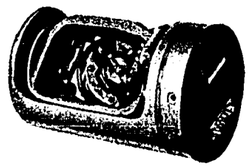
TYPE NUMBER	FRAME SIZE	CONT. PHASE VOLT.	CENTER TAPPED CONTROL PHASE TOTAL Z	R	X	POWER CONT. PHASE	FIXED PHASE VOLT.	FIXED PHASE Z	R	X	POWER FIXED PHASE	EFFECTIVE RESISTANT CONTROL PHASE	TORQUE
1265271	8	55	750	597	450	3.19	26	170	142	93	3.25	960	.3
1265272	10	52	584	419	405	3.3	26	146	105	101	3.3	830	.3
1265273	11	40	263	151	215	3.5	115	2175	1250	1780	3.5	460	.63
1269605	8	26	290	240	158	2.2	26	290	240	158	2.2	310	.2
1269606	10	26	290	240	158	2.2	26	290	240	158	2.2	310	.2
FV100-12-A1	10	33	241	175	167	3.3	26	146	105	101	3.3	335	.3
1269702	8	52	680	568	372	3.25	26	170	142	93	3.25	830	.3

ORDNANCE AND NAVY TYPE AUTOSYN SYNCHROS

TYPE No. ECLIPSE-PIONEER	TYPE No. MILITARY	FUNCTION
AY-1601-5	15TR4A	Torque Receiver
AY-2400-9	23CX6	Control Transmitter
AY-2400-10	23CT6	Control Transformer
AY-2400-12	23TX6	Control Transmitter
AY-2400-13	23TR6	Torque Receiver
AY-2401-10	23CT6A	Control Transformer
AY-3200-9	31TX4A	Torque Transmitter
2323-1	1HCT	Control Transformer
2324-1	1HG	Transmitter
2325-1	1HDG	Differential Transmitter
2326-1	3HCT	Control Transformer
2327-1	3HG	Torque Transmitter
2328-1	3F	Receiver
2330-1	1F	Receiver
2340-1	5HG	Transmitter
2341-1	5F	Receiver
2343-1	1D	Differential Receiver
2344-1	6HG	Transmitter
2345-1	3D	Differential Receiver
2346-1	5SCT	Control Transformer
2352-1	5HDG	Differential Transmitter
2353-1	5HCT	Control Transformer
2369-1	6HDG	Differential Transmitter

PRECISION GYROS FOR ALL APPLICATIONS

Eclipse-Pioneer . . . the nation's foremost supplier of panel indicator gyros . . . offers a complete line of gyros to meet all applications. This group includes all the basic vertical, rate, free, and directional gyro types used as reference components in complete navigation, radar, compass, autopilot, and guidance systems.



Type Number 14110-1-A

VERTICAL GYRO TRANSMITTERS

FEATURES: includes quick erecting mechanism which makes the remote unit ready for operation within 3 minutes. • Two ball erection system • Non-tumbling stops • Inclined axis (1 degree) to minimize turn error.

Power requirement	115 volts, single phase, 400 cps	Autosyn excitation	26 volts, 400 cps
Starting	19 watts, 0.9 P.F.	Erection rate (normal)	3°/minute
Running	13 watts, 0.85 P.F.	Weight	2¾ lbs.
Gyro speed	22,000 rpm	Size	3⅛" diameter x 5 1⅞₁₆" long
Gyro moment	600 gram cm²		

Diameter — 6⅛" Weight — 6¼ lbs. Height — 6¾"

Designed for use as a remote vertical reference where vertical stabilization is required. The instrument is essentially an electrically driven, vertical-seeking gyro with separate Autosyn transmitter pick-offs on the pitch and bank axes. Provisions are incorporated to reduce bank error encountered in turns.

- **Operating temperature range:** —55°C to +70°C.
- **Operational limits:** 360° in roll and pitch with controlled tumbling of the pitch axis at near 90°.
- **Accuracy:** The erection system maintains the gyro in a vertical position to within ¼° of vertical position with respect to the earth.
- **Caging:** From any position at full rotor speed in less than 45 seconds.

Type Number 14104-1-B

This Vertical Gyro Transmitter provides roll and pitch displacement signals which will operate remote indicating devices or which can be used wherever attitude information could be applied. It consists of an electrically driven, torquer erected, vertical-seeking gyro enclosed in a hermetically sealed case with separate Autosyn transmitter pick-offs on the roll and pitch axes.

Provisions have been made so that the pitch and roll erection systems can be cut out by external switches.

An outstanding feature of this instrument is the use of the newly developed Eclipse-Pioneer Electrolytic Switch which provides precise erection and has long serviceability. Besides being rugged, of simple design, and easily serviceable, the transmitter also features a quick erection to true vertical instead of vertical in relation to the instrument case; a sensitive measuring vertical detection system with an accuracy of better than ¼°; and an improved gimbal construction resulting in greater operational stability. This gyro is completely self-contained and requires no erection amplifier.

Type Number 14126-1-A

Size: 4¼" diameter, 8²¹/₃₂" in length
Weight: Approx. 6 lbs. without shockmount
Power requirements: Gyro Motor and Erection System — 115 volts, 400 cycles, 3 phase
Autosyn — 26 volts, 400 cycles, 1 phase

VERTICAL GYRO—Non pendulous

Momentum: 4,000,000 gm cm²/sec

Freedom: 360° in roll. Controlled tumbling near ± 82° in pitch with stops set to provide minimum loop error at 10°/sec rate of loop

RADAR ANTENNA DEVICES

GROUND ANTENNA PEDESTAL
TYPE NUMBER 40101-1-A

SPECIFICATIONS

Weight	700 lbs.
Data accuracy	0.5 Mil.
Slewing rates (in azimuth and elevation)	12 rpm.
Operating temperature range	—54°C to +66°C
Elevation and Azimuth	Two-speed 60 cps synchro data systems are used, having ratios of 1:1 and 16:1
Servo drives	¾ HP motors (DC) for use with an Amplidyne servo system
Wind loading	50 mph (full operating performance) 100 mph (no structural damage)

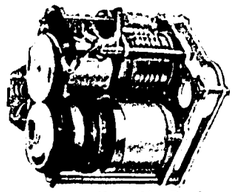
SPECIFICATIONS

Standard frequency range	9345 tto 9405 mc/s. This permits beacon operation at 9310 mc/s
Optional frequency range	9215 to 9275 mc/s
Operation	Up to 60KW peak with a 0.001 duty cycle
Beam width	4° maximum in E and H planes
Side lobes	At least 18 db below main lobe peak
Polarization	Horizontal
Weight	24 lbs. (approximate)
Operating temperature range*	—40°C to +55°C
Storage temperature range*	—65°C to +55°C
Humidity	10% to 95%

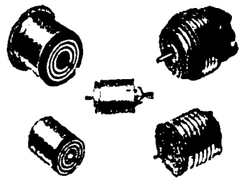
*These temperature ranges can be extended for specific applications.

AIRBORNE WEATHER RADAR ANTENNA
TYPE NUMBER 40023-□-A

COMPONENT PACKAGING



Servo Follow-Up Package



External Slip Ring Autosyn

In addition to supplying catalog component items such as — synchros, motors, gyros, etc. — Eclipse-Pioneer is in an excellent position to offer a premium in the way of customer service and accommodation on component packaging.

We may have already solved a problem similar to yours, thus enabling our system specialists to adapt from our extensive line, existing production packages to meet your systems requirements.

Should your problem turn out to be entirely new, we can — and will — design, develop, and produce a component or complete system to solve your specific problem.

No package is too small or too large for Eclipse-Pioneer, and may be as simple as an Autosyn mounting clamp or be more complex such as a complete servo follow-up subassembly from a production computer.

ECLIPSE-PIONEER DIVISION

TETERBORO, NEW JERSEY

For details, circle #123 on Reader Service Card.

Bendix AVIATION CORPORATION

MILLIONS OF VARIABLE RESISTORS

for every commercial and military need

- A world-wide reputation . . . for economical uniform high quality assembly . . . on a precision mass production basis . . . by 1500 skilled, trained-on-the-job specialists . . . to your exact individual specification.
- 315,000 sq. ft. of plant area devoted to variable resistors.
- Exceptionally good delivery cycle . . . on both commercial and military orders.
- Write for complete 62 page catalog today.

Typical Bushing Mounted Controls	Typical Ear-Mounted Controls	Typical Printed Circuit Controls	Typical Military Controls
15/16" diameter composition	Molded shaft twist ear mounted 15/16" diameter composition	Miniaturized 3/4" diameter 1/2 watt composition	
1-1/8" diameter concentric tandem tone switch and composition variable resistor with SPST on-off switch	Hollow shaft twist ear mounted 15/16" diameter composition for screwdriver adjustment	Bushing mounted 15/16" diameter concentric tandem composition with SPST switch	15/16" diameter 1 watt composition
	Twist ear mounted 15/16" diameter composition with flatted shaft for push-on knobs		15/16" diameter composition with water-seal between shaft and bushing and bushing and panel
	Twist ear mounted 15/16" diameter composition with SPST switch	Self-supporting snap-in bracket mounted 15/16" diameter composition with SPST switch	1-1/8" diameter composition
	Twist ear mounted 15/16" diameter preset tandem		1-1/8" diameter 2 watt composition
1-17/64" diameter 2 watt wirewound	Miniaturized clinch ear mounted composition	Miniaturized bushing mounted 3/4" diameter composition	1-17/64" diameter 2 watt wirewound with locking type bushing
	Miniaturized clinch ear mounted composition with SPST switch		1-17/32" diameter 4 watt wirewound

Variable resistors shown 1/3 actual size

WEST COAST MANUFACTURERS: Many types of variable resistors now in production at our South Pasadena plant. Your coil, transformer and compression molding business also invited. Prompt delivery. Modern versatile equipment. L. A. phone Clinton 5-7186.

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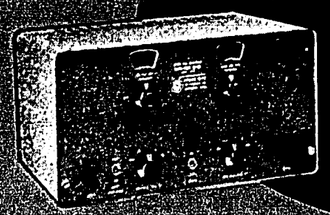
ELKHART • INDIANA

The Exclusive Specialists in Precision Mass Production of Variable Resistors • Founded 1896

Krohn-Hite
FIRST and still the ONLY VARIABLE ELECTRONIC FILTERS
0.02 to 20,000 cps



MODEL 330-A & 330-M

- PROVEN TROUBLE-FREE OPERATION
- WIDE FREQUENCY RANGE
- ADJUSTABLE BAND WIDTH

0.01 to 200,000 cps

THE MOST WIDELY SOLD ELECTRONIC FILTERS IN THE WORLD

Model	Type	Frequency Range	Frequency Accuracy	Noise & Hum	Power Consumption	Price
310-AB**	Band Pass	20 cps to 200 kc	10%	1 mv	40 watts	$295.00
330-A**	Band Pass	.02 cps to 2 kc	5%	0.1 mv	50 watts	$475.00
330-M**	Band Pass	0.2 cps to 20 kc	5%	0.1 mv	50 watts	$475.00
340-A	Servo	.01 cps to 100 cps	5%	10 mv	40 watts	$385.00
350-A**	Rejection	.02 cps to 2 kc	5%	0.1 mv	50 watts	$475.00
360-A**	Rejection	20 cps to 200 kc	10%	5 mv	40 watts	$295.00

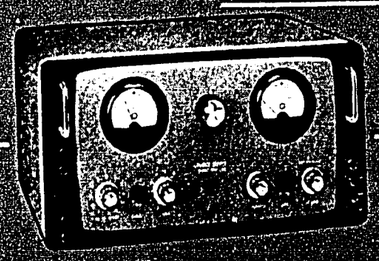
**Available for rack mounting at $5.00 additional.

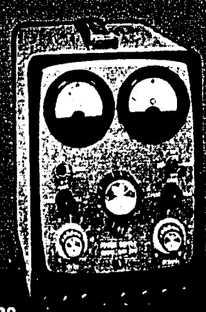
UHR* POWER SUPPLIES
PROVEN UNSURPASSED PERFORMANCE

COMPARE Krohn-Hite specifications with those of any of the existing 316 Power Supply Manufacturers.**

0.001% Load Regulation 0.1 Millivolts Ripple
0.005 Ohms Impedance 0.003% Line Stabilization

**As listed in the 1958 Electronics Buyers' Guide Pages 0-132 to 0-135





*Featuring ULTRA-HIGH REGULATION and the PURITY of BATTERIES

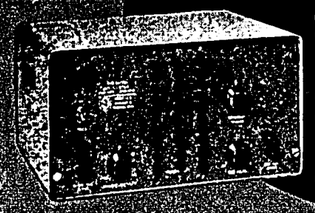
Model	Voltage	Current	Impedance D.C.	Impedance A.C.	Other Outputs: Bias	Other Outputs: Heaters	Price
UHR-240*	0-500v	0-500ma	0.005 ohms	0.05 ohms	0-150v, 0-5ma	6.3v ac, 10a 6.3v ac, 10a 5-13v dc, 2.5a	$625.00
UHR-245*	150-500v	0-500ma	0.01 ohms	0.05 ohms	—	6.3v ac, 10a 6.3v ac, 10a	$425.00
UHR-220**	0-500v	0-200ma	0.01 ohms	0.1 ohms	0-150v, 0-5ma	6.3v ac, 5a 6.3v ac, 5a	$390.00
UHR-230R	Dual Supply consisting of two Models UHR-220, Rack Mounted						$790.00
UHR-225**	150-500v	0-200ma	0.02 ohms	0.1 ohms	—	6.3v ac, 5a 6.3v ac, 5a	$275.00
UHR-235R	Dual Supply consisting of two Models UHR-225, Rack Mounted						$560.00

ALL PRICES F.O.B. PLANT

MODEL UHR-220

For details, circle #125 on Reader Service Card.

Krohn-Hite
FIRST and still the BEST WIDE RANGE PUSH-BUTTON OSCILLATOR
.001 to 100,000 cps



MODEL 440-A

- FREQUENCY RANGE OF 10⁸
- 0.1% DISTORTION
- CONTINUOUS FREQUENCY COVERAGE

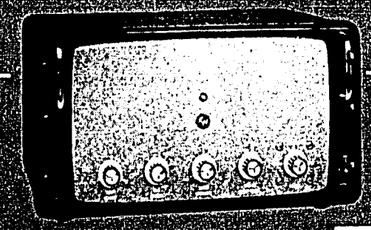
RC OSCILLATORS TO MEET YOUR SPECIAL REQUIREMENTS

0.001 to 520,000 cps

Model	Frequency Range	Frequency Accuracy	Output	Distortion	Power Consumption	Price
400-A	.009 cps to 1.1 kc	2%	25 mw/10v	1%	45 watts	$375.00
400-C***	.009 cps to 1.1 kc	2%	100 mw/10v	1%	65 watts	$395.00
410-A***	.02 cps to 20 kc	2%	10 mw/5v	1 10%	150 watts	$1050.00
420-A	.35 cps to 52 kc	2%	25 mw/10v	1%	45 watts	$315.00
420-C***	.35 cps to 52 kc	2%	100 mw/10v	1%	65 watts	$345.00
430-AB**	4.5 cps to 520 kc	2%	50 mw/10v	1%	45 watts	$145.00
440-A**	.001 cps to 100 kc	1%*	100 mw/10v	1/10%*	120 watts	$550.00
440-B**	1 cps to 1 kc	1/20%*	100 mw/10v	1/10%	110 watts	$950.00

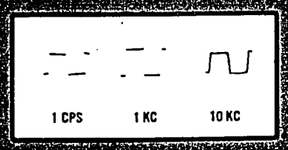
All oscillators except 430-AB and 440-B have both sine wave and square wave outputs.
*Higher at end of range. **Available for rack mounting at $5.00 additional. ***Rack panel construction.

UF* POWER AMPLIFIER
THE ULTIMATE IN POWER AMPLIFICATION
delivering 99.9999999%** DISTORTION-FREE POWER



*Featuring ULTRA-FIDELITY

MODEL UP-101



SQUARE WAVE RESPONSE

SPECIFICATIONS

POWER OUTPUT . . 50 watts from 15 cps to 30 kc
FEEDBACK . . . . . 80 db
FREQUENCY RESPONSE ±0.5 db from 0.5 cps to 30 kc ±3 db from 0.03 cps to 70 kc
DYNAMIC RANGE . . . . 110 db
OUTPUT IMPEDANCE 2, 4, 8, 16 and 450 ohms
VOLTAGE GAIN . . 14 db or 30 db to 16 ohm output
PRICE $425.00

*Available for rack mounting at $5.00 additional.

** Typical harmonic distortion at 1,000 cps is 0.003% in voltage or 0.000000009% in power at 50 watts.

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Krohn-Hite CORPORATION
580 MASSACHUSETTS AVE., CAMBRIDGE 39, MASS., U. S. A.

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MAGNETIC RESEARCH CORP.

INDUSTRIAL

HIGH POWER MAGNETIC SERVO AMPLIFIERS FOR AUTOMATION

MB-1000-60 (1000 watt)

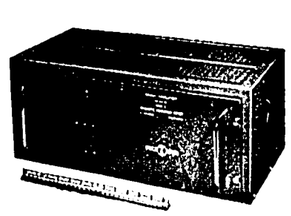
Provides 1000 watt continuous output to reference phase and 1000 watt phase-reversible output to control phase. Designed for ¾ h.p., 2 phase, 60 cycle servo motor. Ultra-fast response of less than 30 ms approaches theoretical limit. Incorporates a Scott connected transformer for change of 3-phase power into 2-phase output. Eliminates slow acting, bulky type rotating equipment or hydraulics. Completely static circuitry insures maintenance-free unattended operation.

Amplifiers can also be supplied for polarity reversing D.C. output for D.C. servo motors.

MB 1000-60

MB-200-60 (200 watt)

Provides both reference-phase and control-phase power for a 1/6 or 1/8 h.p. industrial servo motor. Features and operation are similar to those given for the MB-1000-60 above.



MB 200-60

MH-532-15

STABLVOLT® DC POWER SUPPLIES

with Dual Magnetic Regulation

A complete line of precision power supplies for laboratory, industrial and original equipment applications. Dual Magnetic principle provides for independent regulation of line and load changes. Exclusive flux oscillator achieves superior static and dynamic line transient regulation. No tubes, no moving parts. Short circuit-proof, maintenance-free. Ideal for unattended locations.

MR-15-1

FOR YOUR SPECIAL DEVELOPMENT NEEDS .

MRC offers a complete service in creative engineering, design, development and production. Whatever your field of application – automation, computer, communication, electronic, instrumentation, aviation or guided missile – you'll find that MRC men have the highly specialized magnetronic experience and skill to do a fast, successful job. If you have a special problem involving magnetronic components, write or call MRC. Prompt response, no obligation.

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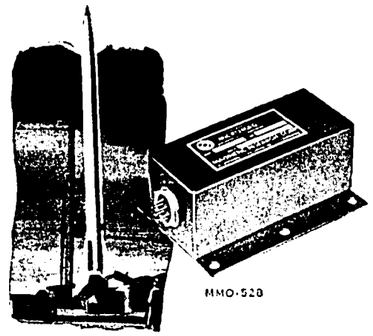
AN OUTSTANDING LINE OF ALL-MAGNETIC COMPONENTS, SYSTEMS AND MAGNETICALLY REGULATED POWER SUPPLIES



MMO-528

NEW MICROMAG® MMO-528 LOW-LEVEL MAGNETIC DC AMPLIFIER

Powered from 28 volt aircraft or missile systems—draws 20 milliamperes

For amplification of signals from thermocouples, strain gages, and similar low level transducers used in telemetering systems. DC voltage gain of 500 achieves 5 VDC output from a 10 millivolt DC input signal. Input electrically isolated from output. Designed for use in missile and aircraft telemetering systems, the amplifier has virtually no zero drift, and is temperature compensated to provide excellent gain stability. Operates directly from the aircraft 28 VDC supply. Draws 20 milliamps. No tubes are used, no warm-up time necessary. Potted and hermetically sealed to insure reliable operation. Designed to meet MIL-E-5272-A specs.

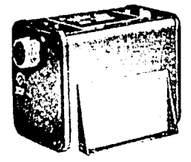
Write for complete technical data

AIRCRAFT AND MISSILE

TUBELESS PRECISION MISSILE AND AIRCRAFT INSTRUMENT POWER SOURCE MRP-5-1S

5 VDC transient-free output

Dual magnetic regulating system isolates line voltage transients from the output, regulates DC to 0.1% accuracy. Does not distort line voltage wave form. Trimpot having 5 millivolt resolution provides 0.5 volt output adjustment. Mounts easily in any position. Rugged, compact, short circuit-proof. Output current 0-1 amp. Hermetically sealed; all components cast in thermosetting plastic. Meets MIL-E-5272-A specs.

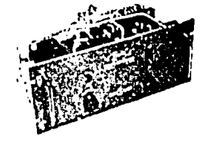


MRP-5-1S

400 CYCLE A.C. LINE VOLTAGE REGULATOR MXP 3000

For laboratory and ground support equipment

Designed for laboratory and ground support equipment requiring constant regulation of 400 CPS voltage. Input 100-130 VAC, 380-420 CPS. Output adjustable from 110-120, regulated to ± ½ volt at 400 CPS, under any combined conditions of line voltage change from 100-130 VAC, and load changes from 0-25 amperes. Distortion 5% maximum. Static magnetic circuitry used throughout. Can be connected for three phase circuitry. Other ratings available for ground and airborne applications.



MXP 3000

INSTRUMENT MAGNETIC SERVO AMPLIFIER SERIES

For aircraft and missile servo systems

Precisely engineered Magnestat Magnetic Servo Amplifiers are available from stock, from the smallest model rated at 3 watts, and having a frequency response of 0-30 CPS, to the high-power 40-watt model, frequency response 0-10 CPS. These units have sinusoidal phase reversing output, with transistor or tube control . . . a.c. or d.c. input. Temperature range of −55°C to +100 C. Currently being applied in many major aircraft and missile servo systems.

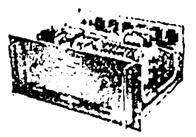
MA 6 400

COMPLETE MAGNETIC SERVO SYSTEMS

for military and industrial applications

Accurate, reliable systems for remote indication, measurement, recording and control in airborne and ground equipment. Developed to meet your specialized needs. Use of MRC magnetic components throughout makes your system really rugged. Fast response, strong output signal, compact packaging.

Write for further information, indicating your special needs



MAGNETIC SERVO SYSTEM

Write for complete technical data

MAGNETIC RESEARCH CORP.

3160 West El Segundo Boulevard • Hawthorne, California

For details, circle #128 on Reader Service Card.

FIRST in MICROWAVE and

Effective Date March 15, 1957
Prices F. O. B. Pasadena, Calif.

Prices subject to change without notice.

Size Designation Frequency Band in KMC Waveguide Nomenclature	DBA 60-90 RG-99/U		DBB 50-75 RG-98/U		DBC 33-50 RG-97/U		DBD 26.5-40 RG-96/U		DBE 18-26.5 RG-53/U		DBF 12.4-18 RG-91/U		DBG 8.2-12.4 RG-52/U		DBH 7.05-10.0 RG-51/U		DBJ 5.85-8.2 RG-50/U		DBK 3.95-5.85 RG-49/U		DBL 2.6-3.95 RG-48/U	
	Cat No	Price	Cat No	Price	Cat No	Price	Cat No.	Price	Cat No	Price	Cat No.	Price	Cat No.	Price	Cat No	Price	Cat No.	Price	Cat No.	Price	Cat No.	Price
Tube Mounts Klystron Tube Mount Noise Tube Mount with Tube									DBE-140-T	$306			DBG-111-1 DBG-140-T	$215 $249	DBH-111-1	$225	DBJ-111-1	$260	DBK-111-1	$276	DBL-111-1 DBL-140-T	$285 $250
Transmission Line Components Adapters, Choke to Cover	DEAL-018	$32	DBDL-018	$220	DBCE-018	$120	DBD-010 DBDL-018	$39 $265	DBE-010 DBEG-018	$36 $55	DBF-010 DBFG-018	$29 $55	DBG-010 DBGH-018	$23 $55	DBH-010 DBHJ-018	$22 $150	DBJ-010 DBJK-018	$17 $104	DBK-010 DBKL-018	$16 $104	DBL-010 DBCL-018	$13 $225
Tapered Transitions							DBD-057	$58	DBE-057	$56	DBF-057	$50	DBG-057	$50	DBH-057	$50	DBJ-057	$55	DBK-057	$60	DBL-057	$60
N to Waveguide Transformers															DBH-210	$35	DBJ-210	$32	DBK-210	$42	DBL-210	$75
*Straight Sections	DBA-210	$41	DBB-210	$45	DBC-210	$47	DBD-210	$37	DBE-210	$24	DBF-210	$25	DBG-210	$21	DBH-224	$18	DBJ-224	$19	DBK-224	$20	DBL-224	$45
90° E Plane Elbows	DBA-274	$35	DBB-224	$30	DBC-224	$30	DBD-224	$30	DBE-224	$30	DBF-224	$30	DBG-224	$30	DBH-234	$28	DBJ 234	$29	DBK-234	$26	DBL-234	$45
90° H Plane Elbows	DBA-234	$35	DBB-234	$35	DBC-234	$39	DBD-234	$35	DBE-234	$35	DBF-234	$35	DBG-234	$31	DBH-266-1	$225	DBJ-266-1	$208	DBK-266-1	$153	DBL-266-1	$225
Rotating Joints 90-90							DBD-266-1	$312	DBE-266-1	$312	DBF-266-1	$260	DBG-266-1	$242	DBH-266-2	$184	DBJ-266-2	$169	DBK-266-2	$104	DBL-266-2	$215
Rotating Joints 90 Col.							DBD-266-2	$352	DBE-266-2	$352	DBF-266-2	$311	DBG-266-2	$259	DBH-266-3	$184	DBJ-266-3	$169	DBK-266-3	$104	DBL-266-3	$215
Rotating Joints Col-90							DBD-266-3	$352	DBE-266-3	$352	DBF-266-3	$311	DBG-266-3	$259	DBH-266-4	$184	DBJ-266-4	$169	DBK-266-4	$104	DBL-266-4	$225
Rotating Joints Col-Col.							DBD-266-4	$352	DBE-266-4	$352	DBF-266-4	$311	DBG-266-4	$259	DBH-274	$96	DBJ-274	$83	DBK-274	$62	DBL-274	$110
90° Twisted Sections	DBA-274	$36	DBB-274	$36	DBC-274	$36	DBD-274	$36	DBE-274	$52	DBF-274	$46	DBG-274	$32	DBH-275	$28	DBJ-275	$63	DBK-275	$74	DBL-275	$108
Bulkhead Flanges	DBA 275	$50	DBB-275	$50	DBC-275	$50	DBD-275	$36	DBE-275	$49	DBF-275	$43	DBG-275	$34	DBG-275-1	$74						
Bulkhead Flanges with Seals	DBA-275-1	$46	DBB-275-1	$46	DBC-275-1	$46	DBD-275-1	$46	DBE-275-1	$46	DBF-275-1	$46	DBG-275-1	$74								
Pressurizing Units	DBA-276	$29	DBB-276	$29	DBC-276	$29	DBD-276	$29	DBE-276	$29	DBF-276	$29	DBG 276	$29	DBH-276	$29	DBJ-276	$52	DBK-276	$63	DBL-276	$90
Crystal Mounts & Multipliers Crystal Mounts	DBA-310	$63	DBB-310	$63	DBC-310	$56	DBD-310	$63	DBE-310	$63	DBF-310	$63	DBG-310	$55	DBH-310	$60	DBJ-310	$53	DBK-310	$58	DBL-310	$128
Crystal Mounts, Movable Short	DBA-313	$116	DBB-313	$116	DBC-313	$116	DBD-313	$116	DBE-313	$116	DBF-313	$116	DBG-313	$104								
Tunable Crystal Mounts	DBA-319	$191	DBB-319	$214	DBC-319	$241	DBD-319	$214	DBE-319	$214	DBF-319	$214	DBG-319	$176	DBH-319	$162	DBJ-319	$139	DBK-319	$225	DBL-319	$240
Crystal Multipliers			DBBW-350	$182	DBCA-350	$227	DBDB-350	$227	DBEC-350	$227	DBFC-350	$227	DBGE-350	$242	DBHF-350	$260	DBIF-350	$242	DBKG-350	$198	DBL-350	$152
Power Absorbing Units Precision Attenuators	DBA-410	$135	DBB-410	$135	DBC-410	$135	DBD-410	$135	DBE-410	$135	DBF-410	$220	DBG-410	$220	DBH-410	$220	DBJ-410	$319	DBK-410	$325	DBL-410	$380
Variable Attenuators, Calibrated	DBA-430-1	$148	DBB-430-1	$138	DBC-430-1	$138	DCD-430-1	$138	DBE-430-1	$138	DBF-430	$220	DBG-430	$200	DBH-430	$225	DBJ-430	$200	DBK-430	$225	DBL-430	$115
Variable Attenuators	DBA-430	$110	DBB-430	$110	DBC-430	$110	DBD 430	$110	DBE-430	$110	DBF-440A	$54	DBG-440A	$54	DBH-440A	$54	DBJ-440A	$44	DBK-440A	$55	DBL-440A	$130
Fixed Attenuators	DBA-440A	$54	DBB-440A	$54	DBC-440A	$54	DBD-440A	$54	DBE-440A	$54	DBF 450	$34	DBG 450	$34	DBH 450	$34	DBJ-450	$29	DBK-450	$29	DBL-450	$72
Low Power Terminations	DBA 450	$25	DBB 450	$25	DBC-450	$25	DBD 450	$25	DBE 450	$25	DBF-456A	$26	DBG-456A	$26	DBH-456A	$26	DBJ-456A	$26	DBK-456A	$110	DBL-456A	$124
Movable Low Power Terminations	DBA-456A	$27	DBB-456A	$27	DBC-456A	$27	DBD 456A	$27	DBE 456A	$26	DBF-456	$85	DBG-456	$85	DBH-456	$85	DBJ-456	$76	DBK-456	$152	DBL-456	$231
Movable Term with Extension	DBA-456	$92	DBB 456	$92	DBC-456	$92	DBD 456	$92	DBE 456	$85	DBF-456-1	$110	DBG-456-1	$110	DBH 456-1	$110	DBJ-456-1	$102	DBK-456-1	$183	DBL-456-1	$242
Movable Term with Ext. & Vernier	DBA-456-1	$116	DBB-456-1	$116	DBC-456-1	$116	DBD 456-1	$116	DBE 456-1	$110	DBF-459	$125	DBG 459	$114	DBH 459	$114	DBJ-459	$102	DBK-459	$186	DBL-459	$250
Tunable Low Power Terminations	DBA-459	$125	DBB 459	$125	DBC-459	$125	DBD 459	$125	DBE 459	$125	DBF-460	$80	DBG 460	$75	DBH 460	$68	DBJ-460	$125	DBK-460	$169	DBL-460	$150
High Power Terminations	DBA-460	$90	DBB-460	$90	DBC-460	$90	DBD 460	$90	DBE 460	$90												
Horns Pickup Horns	DBA-510	$83	DBB-510	$83	DBC-510	$83	DBD-510	$83	DBE-510	$83	DBF-510	$72	DBG-510	$71	DBH-510	$71	DBJ-510	$59	DBK-510	$90	DBL-510	$130
Standard Gain Horns, 10, 15 DB	DBA-529	$92	DBB-520	$92	DBC-520	$92	DBD 520	$92	DBE-520	$92	DBF-520	$82	DBG-520	$82	DBH 520	$68	DBJ-520	$95	DBK-520	$116	DBL-520	$124
Standard Gain Horns, 20 DB	DBA-520	$104	DBB-520	$104	DBC-520	$104	DBD 520	$104	DBE-520	$104	DBF-520	$92	DBG-520	$92	DBH 520	$78	DBJ-520	$121	DBK-520	$195	DBL-520	$235
Tees, Junctions and Mixers E-Plane Tees	DBA-610	$56	DBB-610	$56	DBC 610	$56	DBD-610	$52	DBE-610	$52	DBF-610	$41	DBG 610	$32	DBH 610	$46	DBJ-610	$42	DBK-610	$72	DBL-610	$110
Waveguide Switches, 2 Way	DBA 616	$554	DBB 616	$554	DBC-616	$554	DBD 616	$554	DBE 616	$554	DBF-616	$532	DBG 616	$532	DBH 616	$654	DBJ-616	$561	DBK-616	$590	DBL 616	$660
Waveguide Switches, 4 Way	DBA 617	$554	DBB 617	$554	DBC 617	$554	DBD 617	$554	DBE 617	$554	DBF-617	$532	DBG 617	$530	DBH 617	$546	DBJ-617	$554	DBK 617	$561	DBL-617	$662
H Plane Tees	DBA 620	$56	DBB 620	$56	DBC-620	$58	DBD-620	$52	DBE 620	$52	DBF 620	$41	DBG 620	$44	DBH 620	$36	DBJ-620	$42	DBK-620	$72	DBL-620	$110
Basic Directional Couplers	DBA-630	$110	DBB 630	$110	DBC-630	$110	DBD-630	$110	DBE-630	$52	DBF 630	$41	DBG 630	$50	DBH 630	$07	DBJ-630	$42	DBK-630	$110	DBL-630	$172
Directional Couplers, Fig. to Term.	DBA 631	$129	DBB-631	$129	DBC-631	$129	DBD 631	$90	DBE 631	$90	DBF-631	$65	DBG 631	$52	DBH 631	$78	DBJ-631	$85	DBK-631	$129	DBL-631	$165
Directional Couplers, Coax. to Term.											DBF 632	$104	DBG 632	$80	DBH 632	$106	DBJ-632	$119	DBK-632	$150	DBL-632	$216
Directional Couplers, Xtal to Fig	DBA 633	$129	DBB 633	$129	DBC 633	$129	DBD 633	$129	DBE-633	$130	DBF-633	$105	DBG 633	$105	DBH 633	$136	DBJ-633	$150	DBK-633	$150	DBL-633	$214
Directional Couplers, Xtal to Term	DBA 634	$144	DBB-634	$144	DBC-634	$144	DBD 634	$130	DBE 634	$130	DBF 634	$132	DBG 634	$132	DBH 634	$142	DBJ-634	$142	DBK-634	$179	DBL-634	$261
Magic Tees	DBA 650	$68	DBB 650	$68	DBC 650	$68	DBD 650	$68	DBE 650	$68	DBF-650	$56	DBG 650	$52	DBH 650	$62	DBJ 650	$80	DBK-650	$100	DBL-650	$100
Balanced Crystal Mixers	DBA-665	$305	DBB 665	$305	DBC 665	$305	DBD 665	$305	DBE-665	$325	DBF 665	$304	DBG 665	$227	DBH 665	$292	DBJ 665	$303	DBK-665	$326	DBL 665	$405
Frequency Meters Precision Cavity Waremeters, Reaction Type	DBA-715-1	$596	DBB-715-1	$596	DBC-715-1	$596	DBD-715-1	$596	DBE-715-1	$596	DBF-715-1	$473	DBG-715-1	$357	DBH-715-1	$395	DBJ-715-1	$334	DBK-715-1	$583	DBL-715-1	$803
Absorption Type	DBA-715-2	$520	DBB-715-2	$520	DBC-715-2	$520	DBD-715-2	$520	DBE-715-2	$520	DBF-715-2	$504	DBG-715-2	$504	DBH-715-2	$528	DBJ-715-2	$502	DBK-715-2	$620	DBL-715-2	$855
Transmission Type	DBA-715-3	$525	DBB-715-3	$525	DBC-715-3	$525	DBD-715-3	$525	DBE-715-3	$525	DBF-715-3	$525	DBG-715-3	$525	DBH-715-3	$525	DBJ-715-3	$525	DBK-715-3	$627	DBL-715-3	$902
Reference Cavity, Reaction Type	DBA-715-1A	$290	DBB-715-1A	$290	DBC-715-1A	$290	DBD-715-1A	$290	DBE-715-1A	$290	DBF-715-1A	$257	DBG-715-1A	$257	DBH-715-1A	$279	DBJ-715-1A	$257	DBK-715-1A	$262	DBL-715-1A	$270
Reference Cavity, Absorption	DBA-715-2A	$525	DBB-715-2A	$525	DBC-715-2A	$525	DBD-715-2A	$525	DBE-715-2A	$525	DBF-715-2A	$290	DBG-715-2A	$257	DBH-715-2A	$525	DBJ-715-2A	$559	DBK-715-2A	$699	DBL-715-2A	$914
Reference Cavity, Transmission	DBA-715-3A	$530	DBB-715-3A	$530	DBC-715-3A	$530	DBD-715-3A	$530	DBE-715-3A	$530	DBF-715-3A	$265	DBG-715-3A	$279	DBH-715-3A	$507	DBJ-715-3A	$561	DBK-715-3A	$911	DBL-715-3A	$923
Impedance Meters Precision Standing Wave Detectors, Complete	DBA 825	$560	DBB 825	$560	DBC-825	$560	DBD 825	$514	DBE-825	$514	DBF-825	$340	DBG 825	$340	DBH 825	$405	DBJ 825	$414				
Carriage Units Only	DBA-820	$392	DBB-820	$392	DB 820	$392	DB 820	$392	DB 820	$392	DB 820	$392	DB-820-1	$242	DB-820-1	$232	DB-820-1	$252				
Waveguide Sections	DBA 821	$181	DBB 821	$181	DBC-821	$181	DBD 821	$154	DBE 821	$154	DBF-821	$152	DBG 821	$152	DBH 821	$150	DBJ-821	$109				
Broadband Probes	DBA 822	$92	DBB 822	$92	DBC-822	$92	DBD 822	$75	DBE 822	$75	DBF-822	$61	DBG-822	$61	DBH 822	$61	DBJ-822	$61				
Phase Shifters, Tuners & Shorts Phase Shifters	DBA-915	$110	DBB-915	$110	DBC-915	$110	DBD-915	$110	DBE-915	$110	DBF-915	$220	DBG-915	$200	DBH-915	$225	DBJ-915	$200	DBK-915	$323	DBL-915	$345
Calibrated Phase Shifters	DBA-915-1	$126	DBB-915-1	$126	DBC-915-1	$126	DBD-915-1	$126	DBE-915-1	$126	DBF-915-1	$220	DBG-915-1	$256	DBH-915-1	$226	DBJ-915-1	$200	DBK-915-1	$325	DBL-915-1	$360
Variable Stub Tuners	DBA-919	$126	DBB-919	$126	DBC-919	$126	DBD-919	$126	DBE-919	$126	DBF-919	$152	DBG-919	$127	DBH-919	$152	DBJ-919	$150	DBK-919	$169	DBL-919	$210
Fixed Shorts	DBA-960	$69	DBB-960	$69	DBC-960	$69	DBD-960	$69	DBE-960	$69	DBF-960	$69	DBG-960	$69	DBH-960	$69	DBJ-960	$69	DBK-960	$90	DBL-960	$110
Movable Shorts	DBA-969A	$58	DBB-969A	$58	DBC-969A	$58	DBD 969A	$58	DBE-969A	$58	DBF-969A	$58	DBG-969A	$58	DBH-969A	$66	DBJ-969A	$52	DBK-969A	$82	DBL-969A	$110
Movable Shorts with Extension	DBA-969	$58	DBB-969	$58	DBC-969	$58	DBD-969	$58	DBE-969	$58	DBF-969	$72	DBG-969	$72	DBH-969	$94	DBJ-969	$105	DBK-969	$125	DBL-969	$158
Movable Shorts with Ext. & Vernier	DBA-969-1	$82	DBB-969-1	$82	DBC-969-1	$82	DBD-969-1	$82	DBE-969-1	$82	DBF-969-1	$101	DBG-969-1	$96	DBH-969-1	$118	DBJ-969-1	$142	DBK-969-1	$179	DBL-969-1	$203
E-H Plane Tuners	DBA-979	$150	DBB-979	$150	DBC-979	$150	DBD-979	$150	DBE-979	$135	DBF-979	$155	DBG-979	$126	DBH-979	$158	DBJ-979	$202	DBK-979	$252	DBL-979	$345
E-H Plane Tuners with Vernier	DBA-979-1	$198	DBB-979-1	$198	DBC-979-1	$198	DBD-979-1	$198	DBE-979-1	$183	DBF-979-1	$203	DBG-979-1	$196	DBH-979-1	$231	DBJ-979-1	$257	DBK-979-1	$290	DBL-979-1	$395
Accessories Standard Plain Flange	DBA-1000	$2.25	DBB-1000	$2.25	DBC-1000	$2.25	DBD-1000	$2.00	DBE-1000	$2.00	DBF-1000	$1.50	DBG-1000	$1.05	DBH-1000	$1.50	DBJ-1000	$3.85	DBK-1000	$5.25	DBL-1000	$6.15
Standard Choke Flange							DBD-1001	$5.50	DBE-1001	$5.50	DBF-1001	$3.50	DBG-1001	$3.15	DBH-1001	$5.70	DBJ-1001	$5.70	DBK-1001	$8.75	DBL-1001	$13.15
Aluminum Plain Flange													DBG-1002	$1.05							DBL-1002	$6.60
Aluminum Choke Flange													DBG-1003	$2.40							DBL-1003	$14.00
Special Round Flange							DBD-1004	$2.45	DBE-1004	$2.45												
Screw Plain Flange									DBE-1005	$6.45												
Screw Choke Flange									DBE-1006	$9.25												
Adjustable Waveguide Supports, Ultramicrowave	DB-1010	$6.00	DB-1010	$6.00	DB-1010	$6.00	DB-1010	$6.00	DB-1010	$6.00												
Adjustable Waveguide Supports, Microwave											DB-1010-1	$14	DB-1010-1	$14	DB-1010-1	$14	DB-1010-1	$14	DB-1010-2	$14	DB-1010-2	$16
Waveguide Chassis Mounting Stands	DBA-1012	$10	DBB-1012	$10	DBC-1012	$10	DBD-1012	$10	DBE-1012	$10	DBF-1012	$10	DBG-1012	$10	DBH-1012	$14	DBJ-1012	$13	DBK-1012	$15	DBL-1012	$17
Waveguide Fastening Screws, Pr.	DBA-1020	$1.10	DBB-1020	$1.10	DBC-1020	$1.10	DBD-1020	$1.10	DBE-1020	$1.10	DBF-1020	$1.10	DBG-1020	$1.10	DBH-1020	$1.50	DBJ-1020	$1.50	DBK-1020	$1.40	DBL-1020	$1.65
Waveguide Window Seals	DBA-1100	$14	DBB-1100	$14	DBC-1100	$14	DBD-1100	$14	DBE-1100	$14	DBF-1100	$11	DBG-1100	$8.5								
Electronic Equipment Noise Diode Power Supplies											DB-2140	$140										
CW DC AFC Amplifiers											DB-2328	$900										
I.F. Amplifiers											DB-2340	$940										

*Sections One Foot Long or Shorter.
All instruments sizes A through E solid coin silver waveguide.

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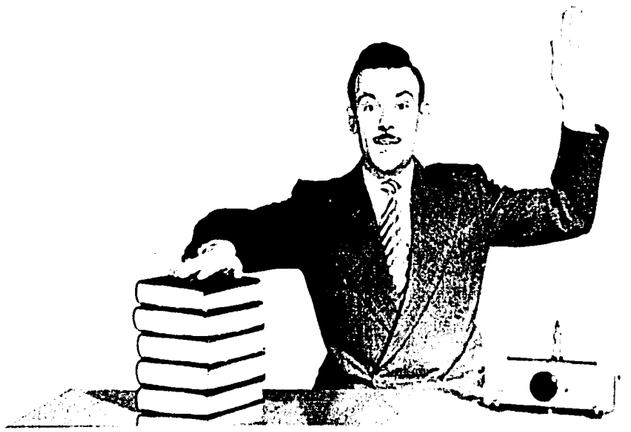
ULTRAMICROWAVE equipment



it's a fact

that D-B offers the most complete line of dependable equipment

Here's the newest equipment for 2.6 to 140 KMC—by DeMornay-Bonardi, leaders in microwave instrumentation for 16 years. This advanced line offers you the ultimate in precision, dependability and operating ease. Major items are shown. Deliveries on most items are running 30 days. Ask for latest catalogue containing complete data.

DB-410 Precision Attenuator 0-40 DB

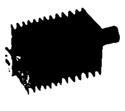
DB-825 Standing Wave Detector

DB-420 Flap Attenuator 0-20 DB

DB-111 Klystron Tube Mount Pressurized, Shielded

DB-350 Crystal Multiplier

DB-430-1 Calibrated Attenuator 0-40 DB



DB-460 High Power Termination

DB-520 Standard Gain Horn

DB-715 Cavity Wavemeter Sealed, Temperature Compensated

DB-915 Phase Shifter 180° Minimum

DB-919 Variable Stub Tuner

DB-969 Movable Short

DB-979-1 E-H Plane Tuner

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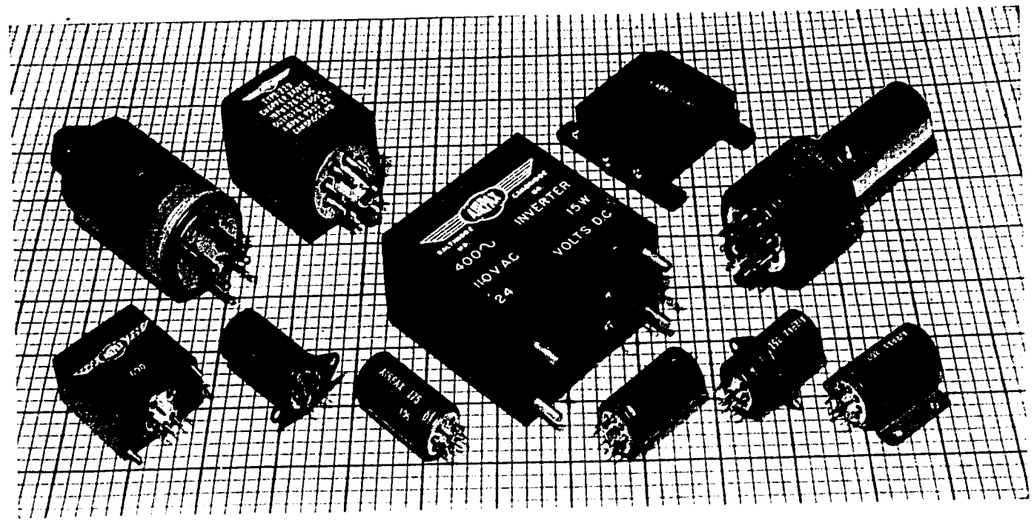

These accurately made components represent products available to you that meet rigid industrial or military requirements.

Choppers—A variety of Airpax choppers enables you to select the appropriate type for each application. They are manufactured on precision machines to assure you of uniformly high quality. These choppers are used in instruments and automatic control. Contacts are rated for 0 to 2 milliamperes at up to 100 volts. Drive is 6.3 RMS volts.

Typical Signal Choppers

Frequency (CPS)	7-Pin Base Type	Octal Base Type	Miniature Solder Lug Type
	Standard Environment		
60	175, 176	170, 586	178, 179, 800*
400	300, 400	520, 580	302 thru 304, 600*
	High Temperature		
400	150, 310, 320	100	311 thru 314
	High Vibration		
400	350		351 thru 354

*Double-pole double-throw, split reed

400-CPS Chopper Drivers—Chopper drivers enable you to use 400-CPS choppers even if 400-CPS drive power is not otherwise available. There are two types: Series 202 is for use in 60-CPS powered equipment with conventional heater and plate voltages. Series 220 is for use in battery powered equipment.

Vibrators—Airpax pioneered high-frequency power vibrators because of reduced size and weight of associated transformers and chokes.

Type 500 vibrator is a 400-CPS interrupter unit for use with moderate continuous or heavy intermittent loads. It is hermetically sealed, operates in any position. This vibrator and variations are used in airborne transceivers, guidance equipments, and portable sets.

Type 505 is a center-pivoted vibrator rated for 28 DC volts input and output at 250 CPS. It is designed to withstand vibrations of 10 G from 10 to 1,000 CPS; time efficiency is 46%.

Inverters—Using 400-CPS vibrators, Airpax custom designs and manufactures compact low-power inverters. By way of example, Type 512 is hermetically sealed, weighs 14 ounces, occupies 7.5 cubic inches, withstands accelerations of more than 50 G, and has an efficiency of 75%. Its output is essentially a square wave, 15 watts at 110 RMS volts, 400 CPS. Input is 6, 12 or 24 DC volts.

Pulse Transformers—For preferred blocking oscillator circuits, use Airpax Pulsite transformers. These compact, hermetically sealed units are available as a kit covering many requirements of pulse circuits.

Characteristics of Pulsite Transformers

Pulse Width (usec)	Loc (mh)	LI (uh)	Cd (uuf)	Type
0.1	0.08	6	7	PT-1081
0.2	0.13	14	7	PT-1082
0.3	0.30	25	8	PT-1083
0.5	0.80	30	8	PT-1084
1.0	2.4	35	9	PT-1085
2.0	7.8	125	10	PT-1086
5.0	28	400	10	PT-1087
10.0	153	1,000	12	PT-1088

Custom Transformers—Airpax designs and manufactures custom transformers. The largest Fosterite facility in the country is at Airpax; units 3 x 3 x 4 feet can be baked and vacuum impregnated, or large batches of small units can be processed quickly. In addition to vacuum impregnated and molded units for airborne equipment, Airpax manufactures hermetically sealed MIL-T-27A units. Airpax has supplied transformers in quantity for operation in ambients to 175 C.

Sheet Metal Facilities—A complete machine and sheet metal shop complements the transformer production. The shop has sufficient capacity to fabricate custom metal parts, such as chassis and cases.

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DESIGNERS ENGINEERS
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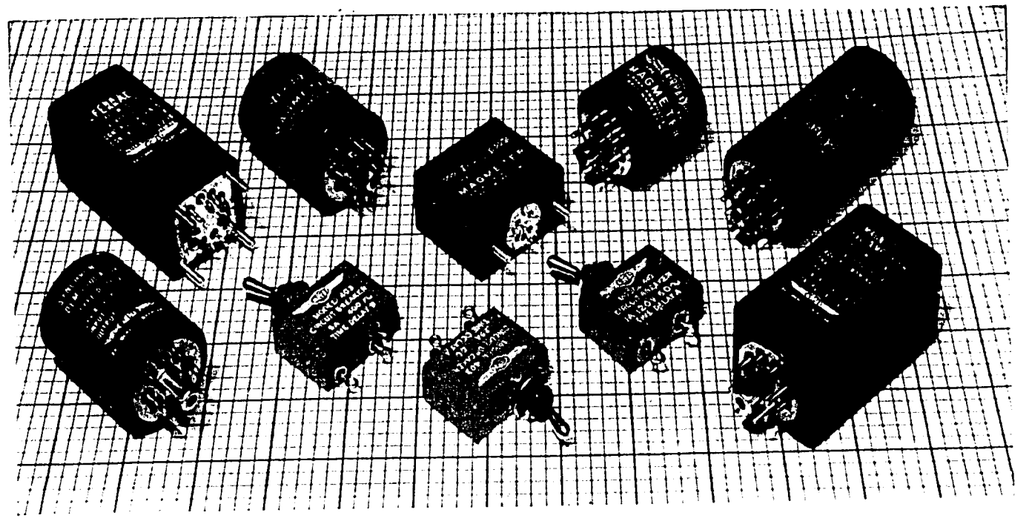

Thorough testing and inspection assure you that these Airpax components meet critical requirements for control and guidance.

Magnetic Amplifiers—Ferrac magnetic amplifiers are highly stable and linear DC amplifiers. You can use them in analog computer portions of guidance and control equipment. Several types are available to meet usual applications. Each amplifier has two input windings; output is electrically isolated from input and power supply. At stand-by, amplifier draws about 1.5 watts; with full signal, 2.5 watts at 115 RMS volts, 400 CPS.

Instrument Magnetic Amplifiers

Application	Plug-In Type	Bolt-Down Type
General Purpose	M-943	M-5174
Integrator	M-1039	M-5175
Thermocouple	M-1040	M-5176
High Gain	M-1057	M-5177

Synchronous Demodulators—So that 400-CPS synchros can be used with DC control circuits, Airpax developed highly accurate ring rectifiers.

Type D-5170 has a highly accurate null for use in zero-seeking equipments. A null accuracy (exclusive of the synchro) of 9 minutes can be obtained with it.

Type D-5171 has a wider linear range for proportional control equipments. It presents about 20,000 ohms to the control transformer.

Servo Amplifiers—Airpax magnetic power amplifiers control current to both phases of 400-CPS instrument servo motors. As a result, they draw little stand-by power. This characteristic results in up to 60% saving in stand-by power, compared with some other servo amplifiers. Standard units deliver 3.5, 6, or 10 watts per phase.

Typical Ratings, Type M-5178

Input—Two identical control windings of about 125 DC ohms each
Sensitivity—7.5 DC milliamperes into either control winding produces 6 watts output to each phase
Power—115 to 150 RMS volts at 400 CPS, approximately 21 watts at maximum output, only 3 watts during stand-by
Connections—Octal plug-in base, hermetically sealed
Dimensions (Max.)—1⅝" square base, 3" seated height
Weight—Approximately 14 ounces

Frequency Detectors—Magmeter frequency detectors convert AC signals to DC outputs. The output is linearly proportional to input frequency. These detectors are relatively insensitive to changes in signal amplitude and wave shape. They are used in telemetering, tachometers, and for pulse-rate measurement. Standard Magmeter detectors require about 1 watt of signal input. They can be driven directly from 120-volt power lines, from vacuum tubes or transistors. Plug-in units fit octal sockets; bolt-down units have solder lugs.

Magmeter Frequency Detector

Frequency (CPS)	Line or Tube Drive Plug-In	Line or Tube Drive Bolt-Down	Transistor Drive Plug-In
0-50	F-945	F-5121	F-5156
0-100	F-979	F-5122	F-5157
0-200	(F-979)	F-5123	F-5158
375-425	F-992	F-5133	
0-500	F-5146	F-5124	F-5159
0-1000	F-980	F-5125	F-5160
0-2000	F-981	F-5126	F-5161
0-5000	F-947	F-5127	F-5162

Circuit Breakers—Electronic circuits can be protected by Airpax miniature magnetic time delay circuit breakers. Trip level is unaffected by temperature. Units are rated up to 50 DC volts or up to 120 RMS volts; the latter either for 60 or for 400 CPS. Trip sensitivities are as low as 50 milliamperes; current ratings are available up to 10 amperes. There are two standard time delays: Rapid response A for protecting conventional electronic equipments, and slow response B for equipments that draw substantial starting surges.

Miniature Circuit Breakers

Rating	Series Type	Shunt Type	Relay Type
50 DC volts	401-	402-	403-
120 RMS volts at 60 CPS	410-	411-	412-
120 RMS volts at 400 CPS	420-	421-	422-

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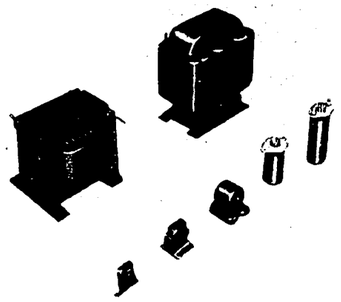
TRANSFORMERS FOR MILITARY & INDUSTRIAL APPLICATIONS

APPROVED FACILITIES FOR CERTIFYING COMPLIANCE TO MIL-T-27A

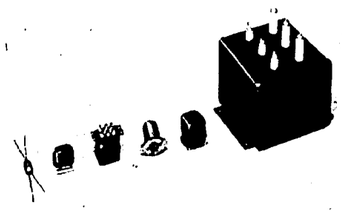
Manufacturers of Transformers since 1930

SPECIALLY TREATED TRANSFORMERS

For those innumerable transformer applications in electronic equipment where size, weight and resistance to various atmospheric and temperature conditions are the determining factors, ITC can encapsulate or mold to meet practically any specified condition. This can be accomplished without any deviation in transformer performance due to special ITC techniques and materials. Special ITC test equipment can simulate temperature, humidity and atmospheric conditions thereby permitting transformer testing under identical operating conditions. ITC specially treated transformers have been "use-proven" in the field under rigid MIL-T-27A specifications.



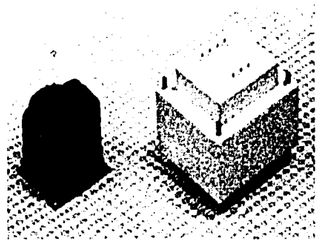
PULSE TRANSFORMERS



ITC's design file includes pulse transformers varying in size from the subminiature molded types used for blocking oscillator and low power matching purposes to high power pulse output transformers feeding magnetron loads. ITC engineers have produced a great variety of pulse transformers designed for a wide range of specialized electronic equipment and as a result are considered outstanding specialists in this field. This, coupled with their many other design specialties, points out the versatility of design and manufacturing facilities available at ITC.

HIGH TEMPERATURE TRANSFORMERS

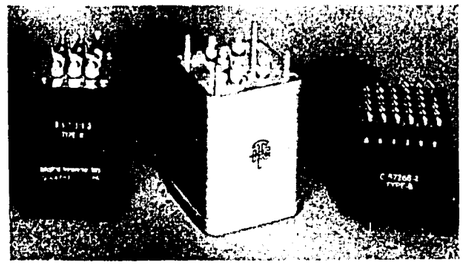
Constant technological developments in the electronic industry, primarily in the area of military defense, are rapidly increasing the applications for reliable, high temperature transformers. ITC has accumulated much data and experience in the design, fabrication and testing of these transformers to meet rigid Military Specifications.



Transformers have been constructed using practically every high temperature material that has been available in the last decade to insure transformer reliability and performance in the field. ITC's work on high temperature transformers has met with complete acceptance by both government and industry . . . you can put their "know-how" to work with confidence on high temperature transformer applications.

COMPUTER TRANSFORMERS

ITC engineers have, for several years, devoted considerable time to developing precision transformers for computer applications. These transformers have found complete acceptance among the outstanding computer manufacturers. Illustrated are some examples of computer precision transformers typical of the engineering skill and resourcefulness gained as a result of constantly working to rigid technical requirements demanded in computer components.



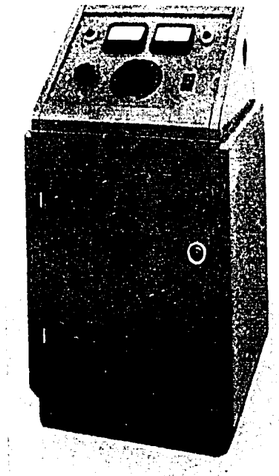
INDUSTRIAL TRANSFORMER CORPORATION
GOULDSBORO · PENNSYLVANIA

For details, circle #133 on Reader Service Card.

PRODUCTION TECHNIQUES FOR GUARANTEED PERFORMANCE

Industrial Insulation Breakdown Testers

DIELECTRIC TEST SET NO. 50



General: Designed to furnish the potentials required for dielectric tests conducted under MIL-C-13294A. Console type unit completely self-contained. Rating: Output is 5 kw at 1000 or 5000 V RMS.

Input: Operates from 220 V RMS, 60 cycle, single phase line.

Output: 1000 V RMS at 5.0 amps or 5000 V RMS at 1.0 amps, selection to be made by manual change-over switch mounted on the control panel.

Voltage Control: Output voltage is continuously adjustable from zero to max. by panel mounted control driving a variable auto-transformer within the console.

Overload Protection: Instantaneous trip type circuit breaker is mounted on panel to interrupt circuit in case of breakdown. Also serves as on-off switch for unit. Two pole type, rated to trip at 25 amps.

Indicators: Control panel has 2 pilot lights to indicate "line voltage on" and "high voltage on."

Metering: Voltage and current are simultaneously metered. An iron vane type ammeter having ranges of 0-1.0 amp. and 0-5.0 amperes is included in the output circuit. An iron vane type volt meter with 0-1000 V and 0-5000 V range is mounted on control panel.

Input Cables: 50-ft. line-cord furnished having 3 conductors; 2 for line circuit, 1 to ground set. Two 50 ft. 8 KV cables furnished. Insulated fittings at remote ends of cables.

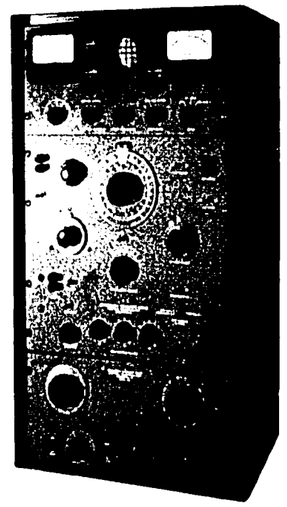
INSULATION BREAKDOWN TEST SETS

MODEL IT-25-A: Accurate indicator of grounds, shorts or opens. High voltage output and short circuit current: 500 V 1 amp. 1500 V 360 ma, 1000 V 500 ma-1750 V 310 ma, 1250 V 420 ma-2000 V 370 ma. Input: 115 V, 60 cycles. Rating: 500 Va.

MODEL IT-630: Has two operating ranges. 0-3000 V RMS and 0.6000 V RMS, continuously variable, with circuit breaker. It is a convenient, compact and accurate means of testing insulation breakdown. Input: 115 V, 6 cycles. Rating: 1 KVA.

INCREMENTAL INDUCTANCE BRIDGE

MODEL 226 Three bridge circuits in one instrument. Owen-Hay-Maxwell. Range—1 Millihenry—2000 henrys. Test voltage—.01-300 volts—R.M.S. D.C. saturation—0-1000 M.A. Q—.06-300. Frequency—60 cycles internal, 20-5000 cycles external. Accuracy—1%. With the HAY arrangement, any inductance between 1 Millihenry and 2000 henrys can be measured provided the Q is larger than 5. With the OWEN arrangement, the same inductance range can be covered, but the Q must be comparatively low and can have a value as low as .06 at 60 cycles. The MAXWELL arrangement is suitable for the measurement of low Q coils (below 5 at 60 cycles) without superimposed D.C. and for the measurement of leakage inductance. Both the OWEN and the HAY circuits can be used with or without superimposed D.C. Automatically disconnects the D.C. supply from the bridge when it is put into the MAXWELL position.



COMPLETE FACILITIES

Coil Winding • Complete Machining • Can Fabrication • Plating • Tinning • Potting • Humidity Cycling Testing • Constant Temperature Testing • Vibration Testing.

We are completely equipped with facilities for in-plant testing to meet MIL-T-27 specifications. All raw materials are given numerous inspection tests to insure uniform high standing quality and ability to withstand the stresses of actual service. We are constantly working to improve design and production, and our engineering staff is always ready to assist you in your Transformer problems.

INDUSTRIAL TRANSFORMER CORPORATION
GOULDSBORO · PENNSYLVANIA

For details, circle 134# on Reader Service Card.

JENNINGS VACUUM

VACUUM FIXED CAPACITORS

FIG.	TYPE NICKEL	TYPE COPPER	CAPACITY MMFD	PEAK VOLTAGE KILOVOLTS	RMS AMPERES† NICKEL	RMS AMPERES† COPPER	NOMINAL DIMENSIONS② LENGTH	NOMINAL DIMENSIONS② DIAMETER
2 to 5 KV L		JCSL	100, 250	3, 5		35	2 5/8	1 7/8
2 to 5 KV M		JSLF	250, 450	3, 5		30	1 1/4	1 7/8
2 to 5 KV B		JCSL	500, 750, 1000, 1500	3, 5		42	3 7/8	2 7/8
2 to 5 KV B		JCSL	2000	2, 3		42	4	2 7/8
7.5 to 15 KV M		JCSF	25, 40, 80, 120, 150	7.5, 10, 15		30	1 5/8	1 5/8
7.5 to 15 KV L		JCS2	10, 20, 25, 50, 75, 100, 150	7.5, 10, 15		20	3 1/8	1 7/8
7.5 to 15 KV B		JCS1	25, 50, 75, 100, 150	7.5, 10, 15		50	3 3/4	2 1/8
7.5 to 15 KV B		JCS	250, 400, 500	7.5, 10, 15		42	4	3 1/8
7.5 to 15 KV A		JCS	900, 1000	7.5, 10, 12		42	4 5/8	3 5/8
7.5 to 15 KV D		MC1	500, 750, 1000	10, 15		75	4 1/8	4 1/8
7.5 to 15 KV C	M	MC	500, 750, 1000	10, 15, 20	21	120	8 1/8	5
7.5 to 15 KV J	MM	MMC	1500, 2000	10, 15	35	125	9 1/4	6 1/8
7.5 to 15 KV F		MMC1	2000	10, 15		125	5	6 1/4
7.5 to 15 KV E		MMC	5000	10, 15		125	13	9 1/4
17 to 30 KV K	V		1, 2, 3, 4, 5	17	7		3 1/4	1 1/4
17 to 30 KV K	X		5, 10, 15, 20, 25	17	7		3 1/4	1 1/8
17 to 30 KV N	W		6, 12, 25, 50, 100	20, 25	10.5		4 5/8	2 1/8
17 to 30 KV I		VCCA	6, 12, 25, 50, 75, 100, 150	20, 30		60	4 1/2	2 3/8
17 to 30 KV I	VC	VCC	6, 12, 25, 50, 75, 100, 150	20, 30, 35	14	60	6 1/2	2 3/8
17 to 30 KV I	VC	VCC	200, 250	20, 30	14	60	6 1/2	2 3/8
17 to 30 KV M		JMF	50, 75, 100	20, 30		40	2 1/4	2 1/8
17 to 30 KV H		JC2	25, 50, 75, 100	20, 30		42	4	3 1/4
17 to 30 KV C	ML	MLC	500, 750, 1000	25, 30	21	125	9 1/4	5
35 to 60 KV A		JHC	75	50, 60		42	4	3 1/2
35 to 60 KV G		JC3	20, 40, 50, 60	35, 45, 55, 60		140	8 1/4	3 1/2
35 to 60 KV G		JC4	75, 100, 125	35, 45, 55, 60		175	9 1/4	5
35 to 60 KV G		JC5	200	35, 45, 55, 60		225	11 1/4	7
35 to 60 KV J	MMH	MMHC	450	35, 45, 55	21	125	9 1/4	6 1/8
35 to 60 KV E		MMHC	1000	35, 40, 45		125	13	9 1/4

† Current ratings can usually be doubled with forced air cooling. Water cooled units are also available.
② Nominal Dimensions are for the largest unit of each type.
NOTE: Intermediate capacities, feed-thru capacitors, and glass insulators are available.

The all copper construction of Vacuum Fixed Capacitors give high current ratings, long life and stability of operation.

Type MMC 2000 mmfd 15 kv

Type JCSL 1500 mmfd 5 kv

Type JCSF 250 mmfd 15 kv

TYPES R & RH VACUUM SWITCHES

VACUUM SWITCH RATINGS

For RF and DC Transfer Switching

Jennings Type	R5C	R1	R1K	R2	R8	RH6	RH7
Test Voltage (300 kc dry)—peak kv	20, 30	40, 50	30, 40	50, 60	70, 85, 95	85, 100	85, 100
Operating Voltage—peak kv	15	30	20	40	30 to 85	85	85
Continuous Current (rms amp)—dc①	50	50, 100	100, 200	50, 100	100, 200	50, 200	50, 400
—300 kc	30	35	100	35	100	100	100
— 10 mc	25	25	50	25	50	50	50
— 30 mc		15	25	15	25	25	25
RF Interrupting Power—kilowatts	50	250	500	250	1000		

① DC continuous currents may be increased as shown by using special connectors.

For DC Switching Under Load or Capacitor Discharging

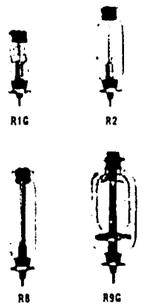
Jennings Type	R5C	R1G	R1J	R2G	R8G	R9G	RH4G	RH1G	RH7G
Test Voltage (60 cycles dry)—peak kv	20, 30	40, 50	30, 40	50, 60	50, 70	50, 70, 85	30, 40	35, 45	85, 100
Max. Operating Voltage—peak kv	15	20	20	30	50	60	10	20	70
Continuous Current—dc amp①	50	50, 100	50, 100	50, 100	100, 200	100, 200	50, 600	50, 400	50, 400
DC Interruption②—power in kw	5	25	50	25	50	100	250	200	250
—current in amp	5	25	50	25	50	100	250	200	250
Capacitor Discharge—decaying (initial amp		500	1000	500	1000	1500	10,000	5000	5000
to 30% in 1 millisec or less) peak kv		30	25	40	50	60	20	30	70

① DC continuous currents may be increased as shown by using special connectors.
② For DC interruption in continuous operation, neither power nor current rating should be exceeded.

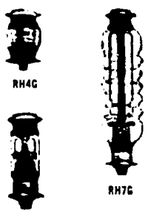
For 60 Cycle Power Switching

Jennings Type	R1J	R2G	R8G	R9G	RH1G	RH4G
Operating Voltage Class—rms kv line to line) grounded Y capacitor load to 85% lag pf (	2.5	8.25	12	15.5	2.5	2.5
Withstand Voltage—rms kv (60 cycle, 1 min. dry test)	19	26	36	50	19	19
Impulse Voltage—peak kv (1½x40 μ (NEMA test)	60	75	95	110	60	40
Operating Current—rms amp at 0% (Break only	100	60	100	200	100	600
lead (capacitor load) to 85% lag pF) Make & Break	50	30	50	100	50	400
Interrupting Current (rms amp)—NEMA one time	1500	800	2000	2500	1500	2500
—NEMA ten times	1000	500	1500	1500	1000	1500
Short Time Surge Currents (rms amp)—NEMA 4 second	2000	500	2000	2500	2500	4000
—NEMA 10 cycle mom.	4000	1500	4000	5000	5000	10,000
Thermal Current (for 30° C. rise—rms amperes	100	100	200	200	400	600

TYPE R VACUUM SWITCHES


R1G, R2, R8, R9G

TYPE RH VACUUM SWITCHES


RH4G, RH7G, RH1G

RELAYS USING VACUUM SWITCHES

Type R and RH Vacuum Switches are available from Jennings mounted as relays for indoor use. They may be mounted with contacts normally open or normally closed or two switches may be mounted in a single pole double throw arrangement. Either ac or dc solenoids may be used. Insulation between the switch and its actuating solenoid is provided by a 2 to 8 inch puller rod providing 40 to 100 kv insulation. CE grade phenolic laminate is recommended for dc or 60 cycle use; Grade G7 silicone glass laminate is recommended for radio frequency applications.

For details, circle #135 on Reader Service Card.

CAPACITORS & RELAYS

VACUUM VARIABLE CAPACITORS

FIG	TYPE NICKEL	TYPE COPPER	CAPACITY MMFD	PEAK VOLTAGE KILOVOLTS	RMS AMPERES① NICKEL	RMS AMPERES① COPPER	NOMINAL DIMENSIONS② LENGTH	NOMINAL DIMENSIONS② DIAMETER
2 to 5 KV E		UCSL	4-250	3, 5		30	4 1/8	2 1/4
2 to 5 KV B		USL	5-500	3, 5		40	5 1/2	2 3/8
2 to 5 KV B		USLS	5-465 shorting	3, 5		40	5 5/8	2 3/8
2 to 5 KV B		UCSL	5-500	3, 5		30	5	2 1/4
2 to 5 KV A		UCSL	5-750, 7-1000	3, 5		42	7 3/8	3 1/8
2 to 5 KV A		UCSL	20-2000	2, 3		42	8 1/4	3 1/8
7.5 to 15 KV E		QCS	5-100	7.5, 10, 15		40	4 3/4	2 1/8
7.5 to 15 KV I		UCSV	8-110, 125-250	7.5, 10, 15		50	5 1/4	2 1/8
7.5 to 15 KV K		ATCS	10-150, 15-200	7.5, 10, 15		20	7	3 1/4
7.5 to 15 KV L		UCS	5-200, 10-300	7.5, 10, 15		42	8 1/4	2 1/8
7.5 to 15 KV L		UCS	10-400, 25-500	7.5, 10, 15		42	9	3 1/4
7.5 to 15 KV A		UCSF	5-250, 12-500	7.5, 10, 15		45	7 1/4	3 1/8
7.5 to 15 KV H		UCSX	25-700, 25-1000	7.5, 10, 15		45	9 1/2	3 1/8
7.5 to 15 KV M		UCSXF	12-1000, 15-1200	7.5, 10, 15		45	10	4 1/8
7.5 to 15 KV N		UCSXF	20-1500, 50-2000	7.5, 10, 12		45	10	5 1/8
10 to 20 KV C		ECS	2-8, 3-30	10, 15		20	4	1 3/8
10 to 20 KV K	T	TC	5-25	20	10.5	20	6 5/8	2 1/4
10 to 20 KV K	AT	ATC	10-50, 15-75	20, 30	10.5	20	6 7/8	3 1/8
10 to 20 KV F	U	UC	50-250	10, 15, 20	21	60	11 1/2	5
10 to 20 KV D	UX	UXC	25-500	10, 15, 20	21	60	14	5
10 to 20 KV M		UXCF	10-250, 20-500	10, 15, 20		60	9 1/4	4 1/8
10 to 20 KV J	VMM	VMMC	50-1000, 100-2000	10, 15	35	125	15 1/2	6 1/8
10 to 20 KV G		VMMC	100-5000	7.5, 10, 15		125	19	9 1/4
35 to 60 KV I		UCSVH	8-35	25, 35		60	4 3/4	3
35 to 60 KV F	UH	UHC	10-75, 75-150	35, 45, 55, 60	21	60	12	5
35 to 60 KV D	UXH	UXHC	25-150	35, 45, 55	21	60	14 3/8	5
35 to 60 KV H		UCSXH	10-200	35, 45		60	10	4 1/2
35 to 60 KV N		UCSXHF	25-450	35, 40		60	10 1/2	5 1/8
35 to 60 KV J		VMMHC	10-250, 25-450	35, 45, 55		125	16	8 1/4
35 to 60 KV N		VMMHCW	25-250, 50-400	35 45, 55		500	17	9 3/4
35 to 60 KV G		VMMHC	60-1000	35, 40, 45		125	19 1/8	9 1/4
120 KV G		VMMHHC	25-200	120		125	20 1/4	9 1/4

† Current ratings can usually be doubled with forced air cooling. Water cooled units are also available
② Nominal Dimensions are for the largest unit of each type.
NOTE: A series of adjustable capacitors are availab – to cover the range of 8 to 1000 mmfd at 10 KV.

The Vacuum Variable Capacitors combine extreme high ratio of capacitance change with small physical size.

Type UCSL 7-1000 mmfd 5 kv

Type UCSXF 50-2000 mmfd 12 kv

Type QCS 5-100 mmfd 15 kv

VACUUM TRANSFER RELAYS

RA1

RD1

RE2

RE4

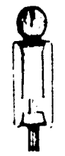
RM2

Jennings type	RD1	RD2	RD3	RA1	RE2	RE3	RE4	RM2	RM4	RA4
Contact arrangement	N.O	N/C	N/O	SPDT	SPDT	SPDT	SPDT	2PDT	4PDT	4PDT
Rated operating voltage	10 kv	10 kv	25 kv	300 v	10 kv	2.5 kv	25 kv	12 kv	12 kv	300 v
Test voltage between terminals	15 kv	15 kv	40 kv	1500 v	15 kv	3 kv	30 kv	18 kv	18 kv	1500 v
Test voltage terminals to ground	12 kv	12 kv	40 kv	1500 v	15 kv	3 kv	30 kv	18 kv	18 kv	1500 v
Continuous rf current	15 amp	15 amp	12 amp	25 amp	15 amp	15 amp	12 amp	15 amp	15 amp	25 amp
Contact resistance	.01 ohms	.01 ohms	.01 ohms	.01 ohms	.02 ohms	.02 ohms	.015 ohms	.010 ohms	.015 ohms	.01 ohms
Contact capacitance	.09 mmfd	.09 mmfd	.09 mmfd	17 mmfd	.25 mmfd	.25 mmfd	.25 mmfd	.33 mmfd	.33 mmfd	17 mmfd

DC ACTUATING COILS
Standard actuating coils are rated for operation at 26.5 vdc and draw 2 to 10 watts of power. Coils rated for operation at 110 vdc are also available for most types

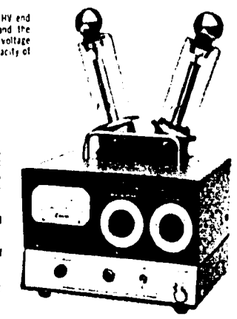
HIGH VOLTAGE VACUUM RELAYS

MODEL JP 325 HIGH VOLTAGE PROBE
VOLTAGE RATINGS: 40, 50, or 60 KV peak
VOLTAGE DIVISION RATIO: 325 to 1 to termination of 3 ft of RG 58 A U cable
INPUT IMPEDANCE:
Resistance: above 10⁸ ohms
Capacitance: 4 mmfd
FREQUENCY RESPONSE: High frequency limited by that of measuring instrument (Internal resonances are above 200 mc.) Low frequency response is 100 cps if operating into 10 megohm shunt resistance. 1000 cps if operating into 1 megohm shunt resistance



TYPE JCO 5 MMFD SERIES CAPACITOR attaches to HV end of the VDF 2.8 divider in the J1003 meter and the JP 325 probe doubling the division ratio and the voltage rating in each case. Decreases total loading capacity of meter or probe from 4 mmfd to 2 mmfd.
Sold without corona sphere unless ordered
VOLTAGE RATING: 60 KV peak

MODEL J-1003 HIGH VOLTAGE VACUUM TUBE VOLTMETER for use in pulse, rf, and 60 cycle circuits at voltages up to 100 KV.
VOLTAGE RANGES (peak volts full scale):
Single Ended: 2.5, 5, 10, 25, 50 KV
Double Ended: 2.5, 5, 10, 25, 50, 100 KV
(By using Type JCO Series capacitor, these ranges can be more than doubled.)
OSCILLOSCOPE CONNECTION: 300 to 1 division ratio
FREQUENCY RESPONSE: 10 cycles to 20 megacycles at full rated voltage and up to 50 megacycles for lower voltages with low harmonic content
INPUT IMPEDANCE: 10¹¹ ohms and 4 mmfd
CALIBRATION ACCURACY: ± 3% of full scale
POWER SUPPLY: 117 volt, 50 60 cy
DIMENSIONS: 16¼" x 11" x 9"

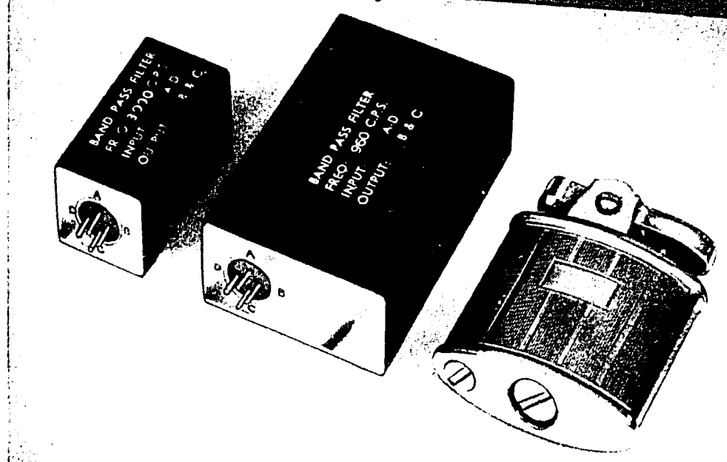


JENNINGS RADIO MANUFACTURING CORPORATION · 970 McLAUGHLIN AVE. P.O. BOX 1278 · SAN JOSE 8, CALIF.

For details, circle #136 on Reader Service Card.

Burnell SUBMINIATURE FILTERS

AS SMALL AS 3/4" x 3/4" x 13/8"
AS LIGHT AS 1 1/4 OUNCES



"TOM THUMB" TELEMETERING FILTERS

CHAN. #	FREQ.	IMP. 100K P/N	B. W.	SIZE	WT.
1	400 cps.	S-60001	±7½%	¾ x 1½ x 2¼ H	4 oz.
2	560 cps.	S-60002	±7½%	¾ x 1½ x 2¼ H	4 oz.
3	730 cps.	S-60003	±7½%	¾ x 1½ x 2¼ H	4 oz.
4	960 cps.	S-60004	±7½%	¾ x 1½ x 2¼ H	4 oz.
5	1300 cps.	S-60005	±7½%	¾ x 1½ x 2¼ H	4 oz.
6	1700 cps.	S-60006	±7½%	¾ x 1½ x 2¼ H	4 oz.
7	2300 cps.	S-60007	±7½%	¾ x ¾ x 1⅜ H	1¼ oz.
8	3 KC	S-60008	±7½%	¾ x ¾ x 1⅜ H	1¼ oz.
9	3.9 KC	S-60009	±7½%	¾ x ¾ x 1⅜ H	1¼ oz.
10	5.4 KC	S-60010	±7½%	¾ x ¾ x 1⅜ H	1¼ oz.
11	7.35 KC	S-60011	±7½%	¾ x ¾ x 1⅜ H	1¼ oz.
12	10.5 KC	S-60012	±7½%	¾ x ¾ x 1⅜ H	1¼ oz.
13	14.5 KC	S-60013	±7½%	¾ x ¾ x 1⅜ H	1¼ oz.
14	22 KC	S-60014	±7½%	¾ x ¾ x 1⅜ H	1¼ oz.
15	30 KC	S-60015	±7½%	¾ x ¾ x 1⅜ H	1¼ oz.
16	40 KC	S-60016	±7½%	¾ x ¾ x 1⅜ H	1¼ oz.
17	52.5 KC	S-60017	±7½%	¾ x ¾ x 1⅜ H	1¼ oz.
18	70 KC	S-60018	±7½%	¾ x ¾ x 1⅜ H	1¼ oz.
A	22 KC	S-60019	±15%	¾ x ¾ x 1⅜ H	1¼ oz.
B	30 KC	S-60020	±15%	¾ x ¾ x 1⅜ H	1¼ oz.
C	40 KC	S-60021	±15%	¾ x ¾ x 1⅜ H	1¼ oz.
D	52.5 KC	S-60022	±15%	¾ x ¾ x 1⅜ H	1¼ oz.
E	70 KC	S-60023	±15%	¾ x ¾ x 1⅜ H	1¼ oz.

Designed and tested to specification #MIL-T 26985

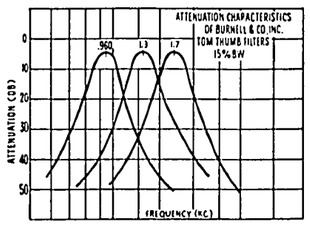
Supplied in two principal case sizes:

1. For RDB channels 1 through 6, case size is ¾ x 1½ x 2¼ inches high; weight: 4 ounces.
2. For channels 7 and up, case size is ¾ inches square and 1⅜ inches high; weight: 1¼ ounces.

These cases are generally equipped with a 4-pin plug to match the small Winchester socket.

ATTENUATION CHARACTERISTICS

Impedance: 100 K ohms in and out.
Insertion loss: less than 6 db.
At ± 7.5% band width is less than 3 db.
At ± 25% band width is greater than 15 db.
At 1.75 f attenuation is 40 db or more.
At .57 f attenuation is 40 db or more.

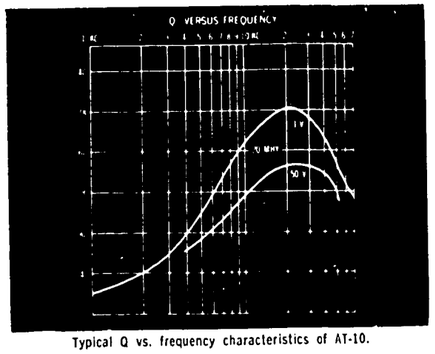


Burnell & Co. Inc.

Note our new address:
10 PELHAM PARKWAY, PELHAM, N. Y. • TEL. PELHAM 8-5002
PACIFIC DIVISION • 720 MISSION STREET • SOUTH PASADENA, CALIFORNIA • RYAN 1-2041

For details, circle #137 on Reader Service Card.

variable "L" by BURNELL



Typical Q vs. frequency characteristics of AT-10.

RANGE OF INDUCTANCES FOR STOCK ADJUSTOROIDS

IND MY	AT-11	AT-12	AT-0	AT-6	AT-10	AT-4	AT-1	AT-15	AT-2
	TC 11 CORE	TC 12 CORE	TC 0 CORE	TC 6 CORE	TC 10 CORE	TC 4 CORE	TC 1 CORE	TC 15 CORE	TC 2 CORE
050									
500									
750									
1 0									
2 0									
3									
5									
10									
15									
50									
80									
100									
125									

For nominal D. C. R. values refer to Burnell catalog No. 103.

ADJUSTOROIDS®

The Adjustoroid, a low cost adjustable toroid, exclusively developed by Burnell & Company, Inc., contains an actual complete toroid which relays all the excellent characteristics of the non-adjustable types. Adjustment is obtained by a completely stepless function with magnetic biasing.

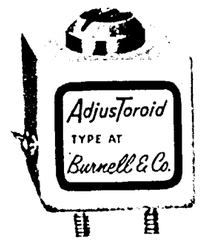
The nominal inductance value for an Adjustoroid is the **maximum** value, and the inductance range is the nominal value minus approximately 10%.

Hermetically sealed to meet Government MIL specifications. Many types of networks in tuned circuits are being produced which employ the Adjustoroid in completely hermetically sealed packages.

Intermediate inductance values as well as special taps and extra windings available on special order with minimum delay.

For additional technical data on Adjustoroids, refer to equivalent toroid in catalog.

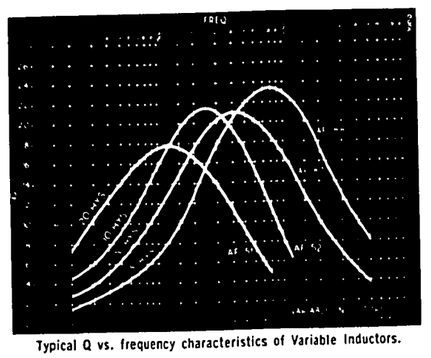
AT-0, AT-6, AT-10, AT-4



AT-1, AT-2, AT-11, AT-12

ADJUSTOROID & VARIABLE INDUCTOR DIMENSION CHART

	LENGTH/DIA.	WIDTH	HEIGHT
AT-0, AT-6	1-7/16"		1"
AT-10, AT-4	1 19 64"		1 1 4
AT-15	1-31/32"		1 7 8
AT-11, AT-12	45/64"	45 64"	3 4"
AT-1	1 3 4"	1 3 4"	1 1 4
AT-2	2 3 4"	2 3 4	2 1 4"
AF-51, AF-52	1-19/64"		2"



Typical Q vs. frequency characteristics of Variable Inductors.

and now ...

NEW SUBMINIATURE VARIABLE INDUCTORS

AF-87 AF-88

(30-500 cycles) maximum Q at 400 cycles

(50-1000 cycles) maximum Q at 800 cycles

Burnell subminiature variable inductors are especially designed for low frequency applications or where proportionately high inductance values are required. Except for low frequency, high inductance values, subminiature inductors are similar to Adjustoroids and measure 1¼" in height and 45/64" in width and depth. Variable inductors are available in all inductance values up to 80 Hys.

BURNELL & CO., INC.
10 Pelham Parkway, Pelham Manor, New York
Pacific Division: 720 Mission St., S. Pasadena, Calif.

For details, circle #138 on Reader Service Card.

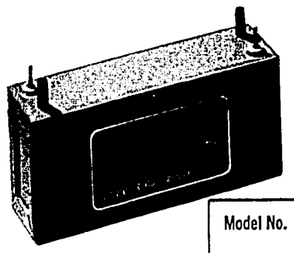
HYCON EASTERN, INC.

CRYSTAL FILTERS

.. in the 10 Kc to 30 Mc range

Hycon Crystal Filters make possible *single conversions* in AM and FM receivers while retaining the important advantages of double and triple conversions. High selectivity at the first i.f. with greater stability and reliability are among these advantages.

The following table shows a partial list of *standard* Hycon Filters. New *standard* models are frequently being added. If a standard Hycon Filter should not meet your requirements, our engineering service can be made available to help solve your selectivity problems.

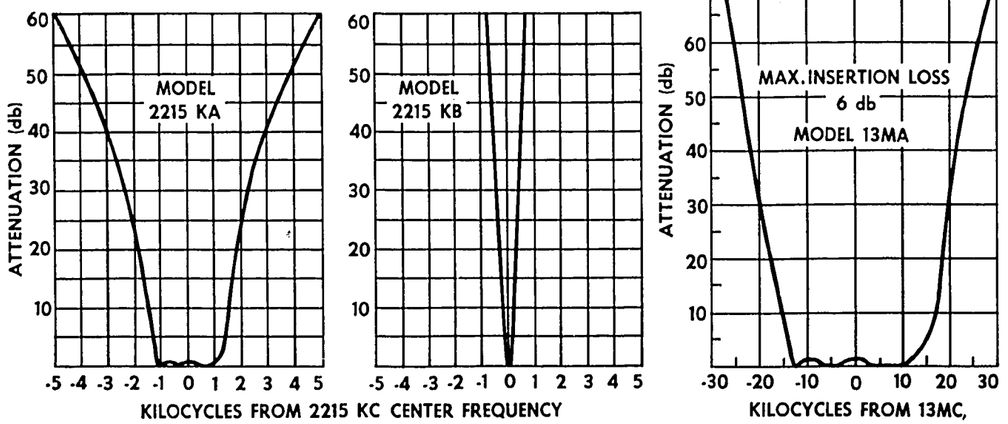


Model 13MA

Model No.	Frequency	Bandwidth	Insertion Loss	Shape Factor	Size
100 KPA	100 Kc	50 cps	3 db	4.0	3 15/16"L x 2 3/4"W x 2"H
2215 KA	2215 Kc	2800 cps	3 db	3.0	2 7/16"L x 1 5/16"W x 1 3/4"H
2215 KB	2215 Kc	250 cps	3 db	4.0	2 7/16"L x 1 5/16"W x 1 3/4"H
13 MA	13 Mc	30 Kc	6 db	1.8	3 7/16"L x 1"W x 1 1/2"H
13 MB	13 Mc	15 Kc	6 db	1.8	3 7/16"L x 1"W x 1 1/2"H
13 M-DA	13 Mc	50 Kc	—	—	2 3/8"L x 1"W x 1 1/2"H

- SMALL SIZE
- HIGH SELECTIVITY
- EXTREME ACCURACY
- LOW INSERTION LOSS
- EXTREME STABILITY WITH VARIATION IN TEMPERATURE
- HERMETICALLY SEALED

Write for Crystal Filter Bulletins



Call the Hycon Eastern Representative Nearest You

Murphy & Cota
Atlanta, Ga. TRinity 6-3020
Winston-Salem, N.C. Park 4-0750
Orlando, Florida 4-2167

Southwestern Eng. & Equip. Co.
Dallas, Texas LAkeside 6-7433
Denver, Colo. Pearl 3-5373
Houston, Texas Jackson 3-7954

Hobster-Soenke
Dayton, Ohio HEmlock 2897

Kay Sales Co.
Kansas City, Mo. BAltimore 1-3800
Tulsa, Okla. Riverside 2-4784
Des Moines, Iowa 5-4584

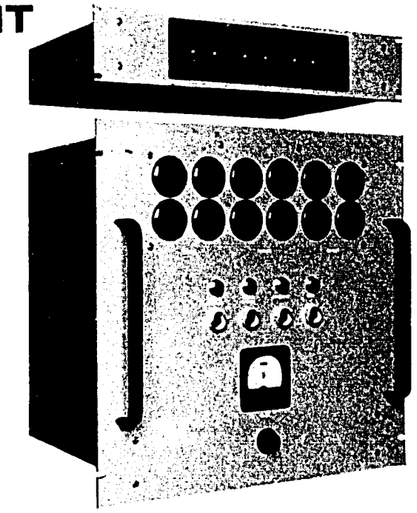
For details, circle #139 on Reader Service Card.

Rapid Access For Instrumentation Data Reduction Systems

- Timing system operates over any combination of tape speeds.
- High speed search in either direction.
- Timing Information occupies only a part of the available bandwidth.
- Mounts in any RETMA standard 19" relay track.

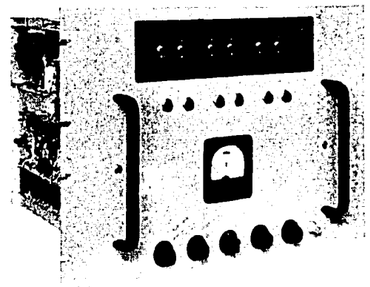
MAGNETIC TAPE SEARCH UNIT

... for tape search



DIGITAL TIMING GENERATOR

... for tape indexing



DIGITAL TIMING GENERATOR, MODEL 201 generates numerically coded timing signals which are recorded on the magnetic tape throughout the data recording periods, providing a precise digital index in terms of elapsed time.

MODEL 206A *is a militarized airborne version of Model 201.*

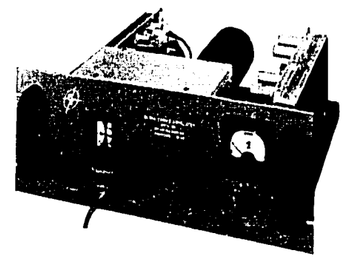
MAGNETIC TAPE SEARCH UNIT, MODEL 202, operates during data reduction periods. This instrument automatically locates and selects for controlled playback the tape data included between a "sequence start time" and a "sequence end time" specified by panel dial settings. The time index is visually displayed as illuminated digits.

Write for Bulletin TSG

ULTRA STABLE OSCILLATOR

... One Megacycle Signal Source ... Stability: 1 part in 10^9 per day

Hycon Eastern's new Ultra Stable Oscillator is useful wherever precise time measurements or frequency control are required, as in reinsertion of carrier in suppressed carrier systems, telemetry, astronomical measurements, navigation systems, geophysics or other critical applications. MULTIPLIERS and DIVIDERS are available for other frequency values with corresponding stability.



- **FREQUENCY STABILITY:** Drift Rate less than 1 part in 10^9 per day after one month's operation.
- **CRYSTAL OVEN:** Stabilized to better than 0.01°C. by temperature-sensitive resistance bridge. Oven contains no moving parts.
- **DISSIPATION IN OSCILLATOR CRYSTAL:** Stabilized at a power level less than one microwatt.

Write for Bulletin USO

Hycon Electronics
Pasadena, California
RYan 1-9381

Hycon Mfg. Co.
N.Y.C., N. Y.
PLaza 5-0600

Hycon Mfg. Co.
Washington, D. C.
STerling 3-7070

Burt C. Porter Co.
Seattle, Washington
ME 6828

"Bridging the Gap between Science and Technology . . . in Electronics"

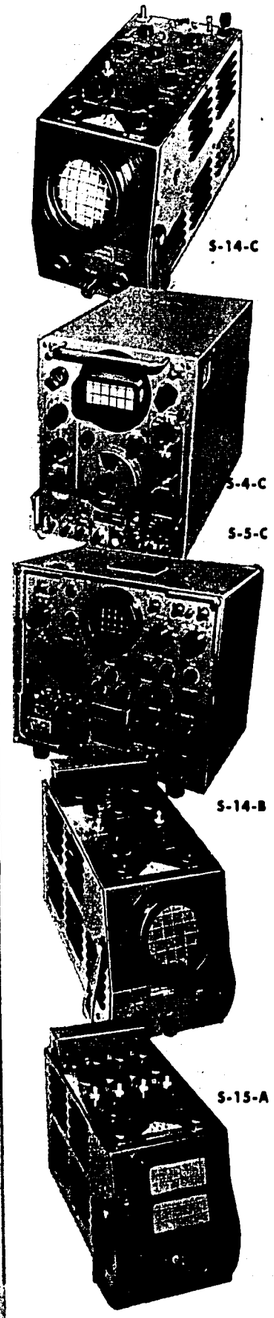
HYCON EASTERN, INC.

75 Cambridge Parkway Cambridge 42, Massachusetts

Affiliated with HYCON MFG. COMPANY, Pasadena, California

For details, circle #140 on Reader Service Card.

Waterman PRODUCTS



S-14-C COMPUTER POCKETSCOPE is a portable oscilloscope, especially designed for computers and business machine service. Lightweight and small size together with simplicity of operation makes this instrument IDEAL for field servicing. In addition . . . signal amplifier with 0.35 μs pulse rise from dc, with signals of 1 mv observable . . . calibrated fixed sweeps and continuously adjustable linear time base from 20 μs to 2 seconds . . . 5x stable time base expansion with complete parading for accurate pulse position . . . sync limiting . . . special intensification circuits permits observation of pulses shorter than 10 μs at repetition rates slower than 1 pps . . . accessory attenuating and amplifying probes . . . make this instrument a MUST for computer type service.

S-4-C SAR PULSESCOPES are improved JANized equivalents to the Gov't Model AN/USM-25. These portable instruments (only 31.5 lbs. each) are for precision pulse time measurements in radar, TV and all electronics equipment. Portray all attributes of the pulse . . . internal crystal controlled markers of 10 and 50 μs available for self-calibration . . . in R operation a small segment of the A sweep is expandable for detailed observation with a direct-reading calibrated dial accurate to 0.1%. Video amplifier band-pass up to 11 mc . . . optional video delay 0.55 μs . . . pulse rise time better than 0.05 μs . . . R pedestal (sweep) 2.4 to 24 μs . . . video sensitivity of 0.1 v rms/in. Easily convertible from μs to yards. Operates from 50 to 400 cycles at 115 volts.

S-5-C LAB PULSESCOPES are JANized equivalents to the Gov't Model AN/USM-24C. These portable, AC, wide band-pass laboratory oscilloscopes are ideal for pulse as well as general purpose measurements. Internal delay of 0.55 us permits observation of pulse leading edge. Includes precision amplitude calibration, 10X sweep expansion, internal trace intensity time markers, internal trigger generators and many other features. Video amplifier .06 v RMS/inch . . . pulse rise time of 0.07 us or response to 11 mc . . . 5 to 50,000 us/in. triggered or repetitive sweep . . . internally generated markers from 0.2 to 500 us . . . trigger generator from 50 to 5000 pps. for internal and external triggering. Operates from 50 to 400 cycles at 115 volts AC.

S-11-A INDUSTRIAL POCKETSCOPE is a small, compact, and lightweight instrument for observing electrical circuit phenomena. The flexibility of the POCKETSCOPE permits its use for ac measurements as well as for dc. The vertical and horizontal amplifiers are capable of reproducing within—2 db from dc to 200 kc with a sensitivity of 0.1 v rms/in. . . . repetitive time base from 3 cycles to 50 kc continuously variable throughout its range . . . variations of input impedance, line voltage or controls do not "bounce" the signal—the scope stabilizes immediately.

S-14-A HI-GAIN POCKETSCOPE provides the optimum in oscilloscope flexibility for analysis of low-level electrical impulses. Vertical and horizontal channels: 10 mv rms/inch with response within —2 db from dc to 200 kc and pulse rise of 1.8 μs . . . non-frequency discriminating attenuators and gain controls with internal calibration of trace amplitude . . . repetitive or trigger time base with linearization from ½ cycle to 50 kc with ± sync or trigger.

S-14-B WIDE BAND POCKETSCOPE is ideal for investigations of transient signals, dc signals, aperiodic pulses or recurrent waveforms. Vertical channel: 50 mv rms/in. within—2 db from dc to 700 kc . . . pulse rise time of 0.35 μs. Horizontal channel: 0.15 v rms/in. within—2 db from dc to 200 kc . . . pulse rise of 1.8 μs. Attenuators and gain controls are non-frequency discriminating . . . trace amplitude calibration . . . repetitive or triggered time base from ½ cycle to 50 kc . . . ± sync or trigger . . . trace expansion, filter graph screen and many other features.

S-15-A POCKETSCOPE is a portable, twin tube, high sensitivity oscilloscope with two independent vertical as well as horizontal channels. It is indispensible for investigation of electronic circuits in industry, school and laboratory. Vertical channels 10 mv rms/in. with response within—2 db from dc to 200 kc and pulse rise time of 1.8 μs . . . horizontal channels 1 v rms/in. within—2 db from dc to 150 kc . . . non-frequency discriminating controls . . . internal signal amplitude calibration . . . linear time base from ½ cycle to 50 kc, triggered or repetitive, for both horizontal channels.

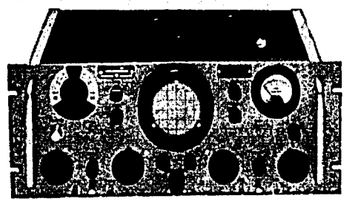
S-12-B RAKSCOPE admirably fills the need for a small oscilloscope of wide versatility. With all the features of the S-11-A POCKETSCOPE, the RAKSCOPE is JANized (Gov't Model No. OS-11), and has many additional advantages; the sweep, from 5 cycles to 50 kc, is either repetitive or triggered . . . vertical and horizontal amplifiers are 50 mv rms/inch with band-pass from 0 to 200 kc . . . special phasing circuitry for frequency comparison.

For details, circle #141 on Reader Service Card.

Write for your complimentary copy of "POCKETSCOOP" • Official Waterman publication.

POCKETSCOPES® PULSESCOPES® RAKSCOPES® PANELSCOPES® RAYONIC TUBES®

SYSTEMS CONCEPT



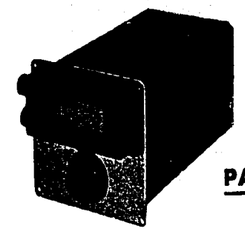
RAKSCOPE S-12-C

The Waterman SYSTEMS RAKSCOPE, S-12-C series is a rack mounted oscilloscope with SYSTEMS CONCEPT. Systems concept is a basic means for rapid monitoring of desired signals with minimum operative effort and without the use of auxiliary switching or jack panels. S-12-C series provide the following:

1. BASIC UNIT—The basic S-12-C SYSTEMS RAKSCOPE is a complete combination systems monitoring and trouble-shooting oscilloscope with outstanding physical and electrical characteristics. The RAKSCOPE occupies but 7 inches of a standard 19" rack and extends only 10 inches behind the front panel. Identical vertical and horizontal amplifiers are DC type having rise times better than 0.35 usec, and 50 or 71 millivolts rms per inch of deflection respectively. Signal calibration method uses a direct reading accurate meter. Time base sweeps are from ½ cps to 50KC in trigger or repetitive operation. Sync from internal or external sources provide stable operation by means of new sync lockout circuits. Special plug-in elliptical sweep circuit for easy phase and frequency checks greatly increase its systems utility. Construction is ruggedized throughout. Tube type options include standard commercial, ruggedized commercial or ruggedized military. Operable from 50 to 400 cycles.

2. CUSTOM MODIFICATION—Desired flexibility is obtained with the optional signal input selector. For the first time it is possible to select up to eleven different signal sources with the necessary built-in attenuation (supplied by us or by you) for each source. Thus the entire switching panel can be omitted from an overall system resulting in circuit and space economics. Standard elliptical sweep is 60 cycles, but plug-in units for other frequencies can be supplied. Accessories such as attenuating, direct, and amplifying probes are available.

Improve your existing or contemplated systems by including the S-12-C SYSTEMS RAKSCOPE as an integral part. Your local Waterman representative is ready to assist you in determining specific requirements.



PANELSCOPE®

The Waterman PANELSCOPE is a custom-built cathode ray tube oscilloscope, with simplified operation, and yet available at a low price. The PANELSCOPE concept provides for the following:

(1) MINIATURIZATION—Panel space required is only 5¼" x 5-3/16"—depth is 10" and the weight is less than 7 lbs. The PANELSCOPE can be installed in practically any equipment—mobile or stationary—air, sea, or land—military or commercial.

(2) SIMPLICITY OF OPERATION—Twist of a single rotary switch provides a synchronized pattern of desired incoming signal (up to 11 circuits) against proper linear time base. This is ideal for monitoring and trouble shooting, as it removes the need of fiddling with knobs as is done now on general purpose oscilloscopes. The static controls, such as beam, focus, positioning, and graticule brightness are located in tube escutcheon.

(3) CUSTOM DESIGN—A wide variety of—signal amplifiers with response from dc to megacycles and sensitivities from 5 millivolts—synchronized or triggered linear time base generators from ½ cycle (and lower if need be) to 2 microseconds—can be specified by you to fit your needs for particular equipment.

(4) PARTIAL KIT FORM—the PANELSCOPE comes fully wired and tested with chosen signal amplifier, linear time base generator and attendant sync. amplifier. The desired signal attenuators, frequency and amplitude determining components, and method of synchronization can be installed either by us or by you.

(5) POWER REQUIREMENT—Less than 10 watts of line power for built-in high voltage supply—The required B+ and heater current as selected by your requirements. For those cases where B+ and heater power is not available, auxiliary power pack can be supplied.

There is a place in your equipment for Waterman PANELSCOPE, a custom built oscilloscope at production prices, although your needs may be but one or two. Ask for specification sheets either from our representatives or direct from the factory.

RAYONIC CATHODE RAY TUBES BY WATERMAN

TUBE	PHYSICAL DATA		STATIC VOLTAGE		DEFLECTION*		LIGHT OUTPUT**
	FACE	LENGTH	A3	A2	VERT	HOR	
3JP1	3"	10"	3000	1500	111	150	40
3MP1	3"	8"		750	99	104	4
3RP1	3"	9.12"		1000	61	86	5
3SP1	1.5x3"	9.12"		1000	61	86	5
3XP1	1.5x3"	8.875"		2000	33	80	22

*Deflection in volts per inch.
**Light output of a line in millifoot lamberts per millimeter at line width not to exceed .65mm.

The basic properties of the cathode ray tube that concern the designer or the user are: deflection sensitivity, unit line brightness, line width, static voltage requirements and physical size. A comparison between cathode ray tubes manufactured by Waterman Products Company is shown in the table adjoining. These tubes are available in P1, P2, P7 and P11 phosphors. 3JP1, 3JP2, 3JP7, 3RP1, 3SP1 and 3XP1 are available as JAN tubes.

For details, circle #142 on Reader Service Card.

WATERMAN PRODUCTS

WATERMAN PRODUCTS CO., INC.

PHILADELPHIA 25, PENNA., U.S.A. • CABLE ADDRESS, POKETSCOPE, PHILA.

Manufacturers of Pocketscopes®• Rakscopes®• Pulsescope®• Panelscopes® and Rayonic® Tubes

ALLIED'S

HERMETICALLY SEALED RELAYS

NOTE 1: Use 14 pin miniature socket

NOTE 2: Two Relays in one enclosure

NOTE 3: Air Force approved

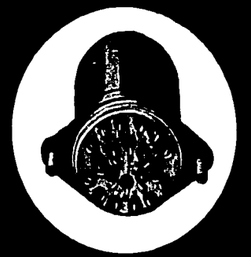
NOTE 4: Sockets available from Allied Control

ALLIED TYPE	TYPE OF TERMINAL	OUTLINE DIMENSIONS AA	A	B	C	WT. (OZ.)	MOUNTING DIMENSIONS D	E	TYPE MOUNTING	CONTACT RATING (AMPS.)	CONTACT FORM MAX.	COIL DATA MAX. D.C. OHMS	OPERT.
ASH	SOLDER	2 5/16	2 1/16	1 1/8	1 7/16	3.5	.938	1.187	(3)#6-32 Studs	5	SPDT	3500 / 3485	AC / DC
ASHO	PLUG-IN	3	2 7/16	1 3/8	1 7/16	4			Octal Plug-in	5	SPDT	3500 / 3485	AC / DC
BJHR	SOLDER	3 3/32	2 23/32	1 13/64	1 11/32	7.5	.875	1.625	(3)#6-32 Studs	5	DPDT	3700 / 5000	AC / DC
BJHRO	PLUG-IN	3 3/8	3 1/4	1 13/64	1 11/32	7.5			Octal Plug-in	5	DPDT	3700 / 5000	AC / DC
BOH	SOLDER	3 1/32	2 23/32	2 3/4	DIA.	7.5	1.856	1.856	(4).206 Dia. Holes	10	DPDT	2675 / 5000	AC / DC
BOHO	PLUG-IN	3 5/16	3	2 3/16	DIA.	8			Octal Plug-in	5	DPDT	2675 / 5000	AC / DC
BOHR	SOLDER	3 1/16	2 11/16	1 49/64	1 41/64	8.5	1.250	1.250	(3)#8-32 Studs	10	DPDT	2675 / 5000	AC / DC
BOHRO	PLUG-IN	3 17/32	2 31/32	1 49/64	1 41/64	8.5			Octal Plug-in	10	DPDT	2675 / 5000	AC / DC
BOYH	SOLDER	3 1/32	2 23/32	2 3/4	DIA.	8.5	1.856	1.856	(4).206 Dia. Holes	10	DPDT	10,000	DC
BOYHO	PLUG-IN	3 5/16	3"	2 3/16	DIA.	8.5			Octal Plug-in	5	DPDT	10,000	DC
BOYHR	SOLDER	3 1/16	2 11/16	1 49/64	1 41/64	8.5	1.250	1.250	(3)#8-32 Studs	10	DPDT	10,000	DC
BOYHRO	PLUG-IN	3 17/32	2 31/32	1 49/64	1 41/64	8.5			Octal Plug-in	10	DPDT	10,000	DC
CNAH	SCREW	4 1/2	3 5/16	2 11/32	2 31/32	22	1 3/8	2"	(3)#10-32 Studs	50	SPST	600 / 4460	AC / DC
CH	SOLDER	2 5/64	1 3/64	1 3/64		.5	1.187	1.268	(3) #6-32 Studs	10	4PDT	525	DC
DSHR	SOLDER	3 3/8	3 1/16	2 1/16	1 11/32	9.5	.687	1.750	(3)#8-32 Studs	5	DPDT	8,000	DC
KH-3-1D	PLUG-IN	1 3/64	1 3/64	2 3/64	4 9/64	0.33			7 Pin Plug-in	½	SPDT SPST NO	1,500	DC
KH-3-2D	PLUG-IN	1 3/64	1 3/64	2 3/64	4 9/64	0.33			7 Pin Plug-in	½	SPDT SPST NC	1,500	DC
KH-6D	PLUG-IN	1 3/64	1 3/64	.396	.800	0.33			8 Pin Plug-in	½	DPDT	5,000	DC
LKH-6C	SOLDER	3 1/16	3 1/16	1 7/8	1 7/8	8.5	1.375	1.500	(3)#6-32 Studs	2	6PDT	11,000	DC
LKH-4C	SOLDER	3 1/16	2 11/16	1 3/8	1 7/16	6	.938	1.187	(3)#6-32 Studs	2	4PDT	11,000	DC
LKHO	PLUG-IN	3 1/16	3"	1 3/8	1 7/16	5.5			Octal Plug-in	2	DPDT	11,000	DC
MEH-6	SOLDER	2 5/32	1 23/32	1 3/8	1"	3	.672	1.047	(3)#6-32 Studs	5	DPDT	1330 / 2930	AC / DC
MEHG	PLUG-IN	2 7/32	1 17/32	1 3/8	1"	3.5	.750	1.125	Note 1 (3)#6-32 Studs	5	DPDT	1330 / 2930	AC / DC
MEHX	SOLDER	2 3/8	2 1/16	1 3/8	1 7/16	5.3	.938	1.187	Note 2 (3)#6-32 Studs	5	4PDT	7260	AC DC
MH-6D	SOLDER	1 23/64	1 23/64	41/64	DIA.	1	CTR/CTR	.875	(2) Holes .125 Dia.	2	DPDT	15,900	DC
MH-12	SOLDER	1 23/32	1 23/64	1 3/64	DIA.	2.5	CTR/CTR	1.406	Note 3 (2)#6-32 Studs	2	4PDT	16,000	DC
MH-18	SOLDER	1 23/32	1 23/64	1 3/64	DIA.	4	CTR/CTR	1.562	Note 3 (2)#6-32 Studs	2	6PDT	22,100	DC
MHT-12	SOLDER	2 1/16	1 13/64	1 3/64	DIA.	3	CTR/CTR	.625	Note 3 (2)#6-32 Studs	2	4PDT	16,000	DC
MHT-18	SOLDER	2 1/16	1 13/64	1 3/64	DIA.	4.5	CTR/CTR	.625	Note 3 (2)#6-32 Studs	2	6PDT	22,100	DC
MHK-12	SOLDER	1 7/8	1 1/2	1 3/64	DIA.	3.5	.938	1.187	(3)#6-32 Studs	2	4PDT	16,000	DC
MHUO-12	PLUG-IN	1 3/4	1 23/64	1 3/64	DIA.	2.5	CTR/CTR	1.406	Note 4 (2)#6-32 Thd.	2	4PDT	16,000	DC
MHLO-12	PLUG-IN	1 3/4	1 23/64	1 3/64	DIA.	2.5	CTR/CTR	1.531	Note 4 (2)#10-32 Thd.	2	4PDT	16,000	DC
MHUO-18	PLUG-IN	1 3/4	1 23/64	1 3/64	DIA.	4.0	CTR/CTR	1.562	Note 4 (2)#6-32 Thd.	2	6PDT	22,100	DC
MHLO-18	PLUG-IN	1 3/4	1 23/64	1 3/64	DIA.	4.0	CTR/CTR	1.687	Note 4 (2)#10-32 Thd.	2	6PDT	22,100	DC
*MHJ-12	SOLDER	1 13/32	1 23/64	1 3/64	DIA.		CTR/CTR	1.406	(2)#6-32 Studs	2	4PDT	16,000	DC
*MHJ-18	SOLDER	1 13/32	1 23/64	1 3/64	DIA.		CTR/CTR	1.562	(2)#6-32 Studs	2	6PDT	22,100	DC
MHY-12	SOLDER	1 13/64	1 23/64	1 3/64	DIA.		CTR/CTR	1.562	(2)#6-32 Studs	10	4PDT	22,100	DC
PBHW-6	SOLDER	2 3/8	2 1/4	1 49/64	1 41/64	6	CTR/CTR	1.468	Note 3 (2)#6-32 Studs	10	DPDT	380 / 4800	AC / DC
PBH-6	SOLDER	2 3/8	2 1/4	1 49/64	1 41/64	6	1.218	1.218	(4)#6-32 Studs	10	DPDT	380 / 4800	AC / DC
PBH-9	SOLDER	2 27/32	2 1/4	1 49/64	1 41/64	6	1.218	1.218	(4)#6-32 Studs	10	3PDT	380 / 4800	AC / DC
PBH-12	SOLDER	2 27/32	2 1/4	1 49/64	1 41/64	6.5	1.218	1.218	(4)#6-32 Studs	10	4PDT	380 / 4800	AC / DC
PBHN-6	PLUG-IN	3 3/32	2 3/32	1 49/64	1 41/64	9	Note 3		"AN" CONNECTOR	10	DPDT	380 / 4800	AC / DC
PBHN-9	PLUG-IN	3 3/32	2 3/32	1 49/64	1 41/64	9	Note 3		"AN" CONNECTOR	10	3PDT	380 / 4800	AC / DC
PBHN-12	PLUG-IN	3 3/32	2 1/8	1 49/64	1 41/64	9.5	Note 3		"AN" CONNECTOR	10	4PDT	380 / 4800	AC / DC
PDH-6	SOLDER	2 11/16	2 1/16	1 5/8	1 7/8	6	.938	1.187	(3)#6-32 Studs	2	DPDT	475 / 4800	AC / DC
PDH-9	SOLDER	2 11/16	2 1/16	1 5/8	1 7/8	6	.938	1.187	(3)#6-32 Studs	2	3PDT	475 / 4800	AC / DC
PDH-12	SOLDER	2 11/16	2 1/16	1 5/8	1 7/8	6.5	.938	1.187	(3)#6-32 Studs	2	4PDT	475 / 4800	AC / DC
PDHG	PLUG-IN	2 5/16	2 1/16	1 5/8	1 7/8	6.5	Note 1		14 Pin Plug (3)#6-32 Studs	2	4PDT	475 / 4800	AC / DC
POHR-9	SOLDER	3 15/32	3 7/32	1 7/8	1 7/8	12	1.375	1.437	(3)#8-32 Studs	10	3PDT	870 / 5000	AC / DC
POHR-12	SOLDER	3 25/32	3 17/32	2 1/4	2 1/8	13.5	1.625	1.812	(3)#8-32 Studs	10	4PDT	870 / 5000	AC / DC
POHRO-12	PLUG-IN	4 1/16	3 1/2	2 1/4	2 1/8	13.5			14 Pin Plug-in	10	4PDT	870 / 5000	AC / DC
PRH	SOLDER	3 1/32	2 17/32	3 1/8	1 13/32	9.5	CTR/CTR	2.687	(2) .161 Dia. holes	10	4PDT	620	DC
RSH-3D	SOLDER	2 3/4	1 11/64	¾ DIA.		2.0	CTR/CTR	.973	(2).125 dia. clearance holes	2	SPDT	14,000	DC
RSH-6D	SOLDER	2 3/4	1 11/64	¾ DIA.		2.0	CTR/CTR	.973	(2).125 dia. clearance holes	2	DPDT	14,000	DC
RSHO-6D	8 PIN PLUG-IN	2 13/64	1 11/64	¾ DIA.		2.0	CTR/CTR	.973	8 pin plug-in+keyway+ (2).125 dia. clearance holes	2	DPDT	14,000	DC
RSH-3D	7 PIN PLUG-IN	2 1/8	1 13/64	¾ DIA.		2.0			7 Pin Plug-in	2	SPDT	14,000	DC
SKH	SOLDER	2 3/8	2 1/16	1 3/8	1 7/16	4.5	.938	1.187	(3)#6-32 Studs	2	4PDT	4,500	DC
SKHO	PLUG-IN	3	2 1/16	1 3/8	1 7/16	5			Octal Plug-in	2	DPDT	4,500	DC
SKHW	SOLDER	2 3/8	2 1/16	1 3/8	1 7/16	4.5	.938	1.187	Note 3 (3)#6-32 Studs	3	4PDT	4,500	DC
SKHG	PLUG-IN	2 3/8	2 7/32	1 3/8	1 7/16	5	Note 1		14 Pin Plug-in(3)#6-32 Studs	2	4PDT	4,500	DC
SKHN	PLUG-IN	3 3/32	2	1 3/8	1 7/16	6.8	Note 3		"AN" CONNECTOR	2	4PDT	4,500	DC
SWHO	PLUG-IN	2 11/16	2 1/8	1 3/8	1 7/8	5.5			Octal Plug-in	2	DPDT	13,800	DC
SWH	SOLDER	2 7/16	2 1/16	1 3/8	1 7/16	5.5	.938	1.187	(3)#6-32 Studs	2	DPDT	13,800	DC

* NOTE: MHJ type relays are available in all MH type mountings.

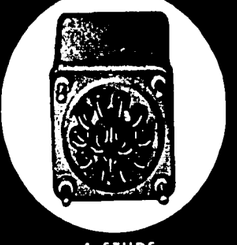
For details, circle #143 on Reader Service Card.

TYPES OF MOUNTINGS AND TERMINALS



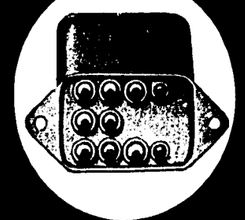
2 STUDS

3 STUDS



4 STUDS

"AN" PLUG-IN

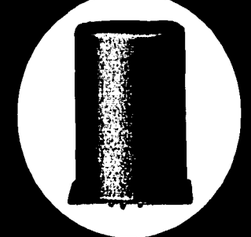


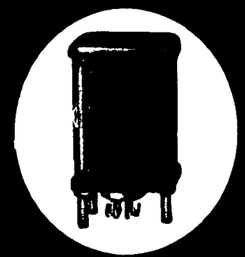
2 HOLE

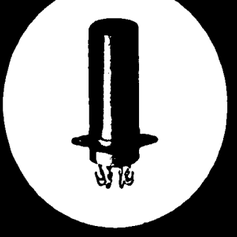
OCTAL PLUG

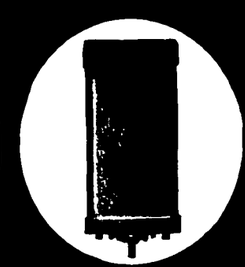
14 PIN PLUG-IN

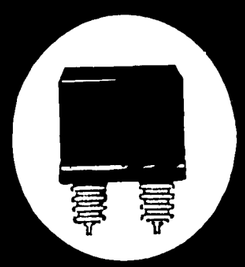
TYPES OF HOUSINGS

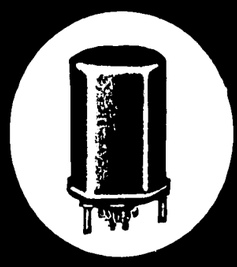




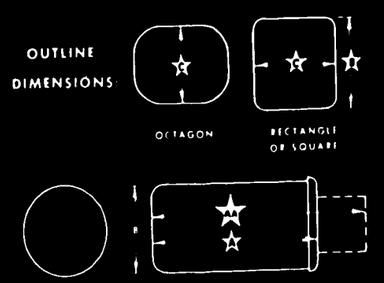




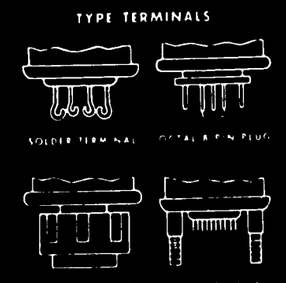




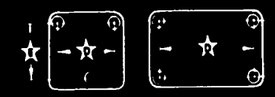
OUTLINE DIMENSIONS:



TYPE TERMINALS



MOUNTING DIMENSIONS:



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AL168

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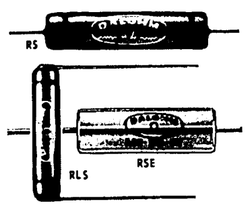
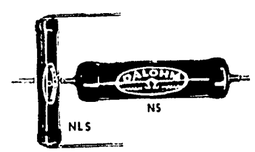
TYPES RS, RLS, RSE

Five wattage ranges—2, 3, 5, 7 and 10, six sizes; resistance range from .05 ohm to 175K ohms depending on type; tolerance range .05% to 3%. Type RS with axial leads; Type RLS with radial leads; Type RSE housed in metal tubing for tremendous shock and vibration resistance.



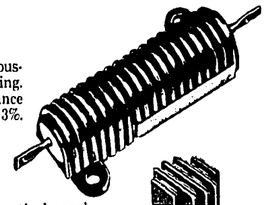
TYPES NS, NLS

Newly conceived NON-INDUCTIVE resistors. Five wattage ranges – 2, 3, 5, 7, and 10, six sizes; resistance range from 2 to 37K ohms; tolerance from .05% to 3%. Type NS with axial leads; Type NLS with radial leads.



TYPE RH

Die-cast, black anodized radiator finned housing. Lugs provided for horizontal mounting. Three wattage ranges—25, 50, 250; resistance range 0.1 to 100K ohms. Tolerance .05% to 3%.

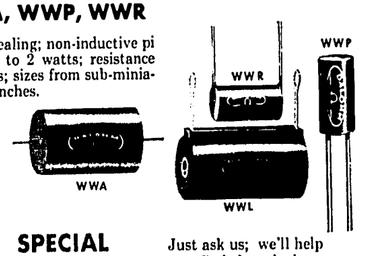


TYPE PH

New ruggedized Powerhouse resistor for vertical panel mounting. Black anodized finned aluminum housing. Two wattages 25 and 100; resistance range from 0.1 to 60K ohms; tolerance .05% to 3%.

TYPES WWL, WWA, WWP, WWR

Encapsulated for hermetic sealing; non-inductive pi wound; powered at .1 watt to 2 watts; resistance range 0.1 ohm to 5 megohms; sizes from sub-miniature ⅛ by ⅜ inch to ½ by 2 inches.



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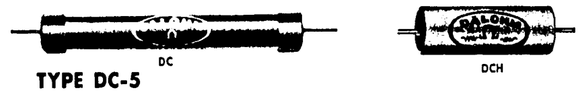
TYPES DC, DCH

Resistance range from 10 ohms to 50 megohms; tolerance 1% or higher as specified. Type DCH hermetically sealed in non-hygroscopic ceramic envelope. Five wattages—⅛, ¼, ½, 1 and 2; eight sizes.



TYPE DC-5

For high voltage and/or high resistance applications; powered at 5 watts; high voltage up to 20,000 VDC; resistance range 1 megohm to 200 megohms; tolerance 1%.

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High temperature–humidity proof–ruggedized–wire wound–designed to provide highest performance under ever-increasing MIL SPEC requirements. Powered at .8 watt; resistance range 10 ohms to 100K ohms; tolerance 5% standard.

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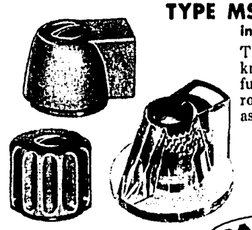

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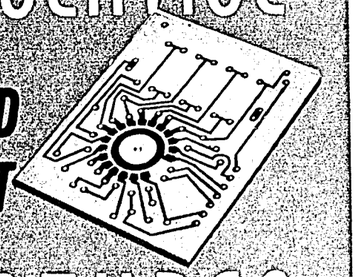

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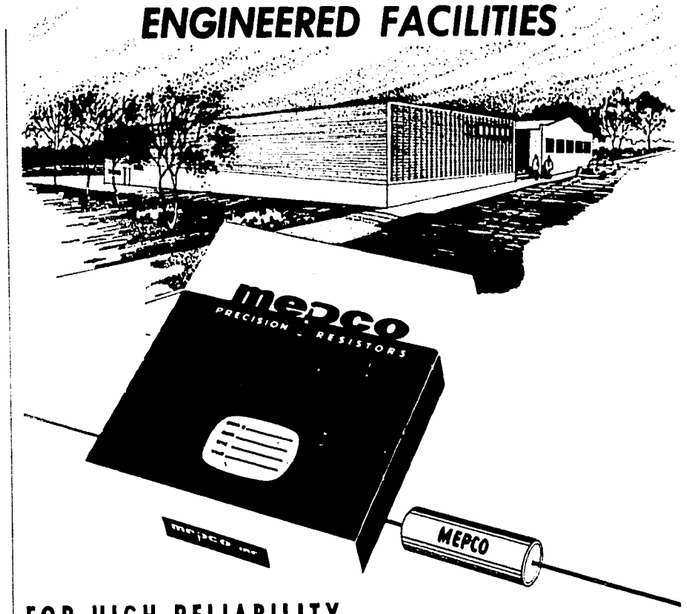

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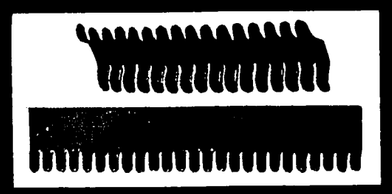

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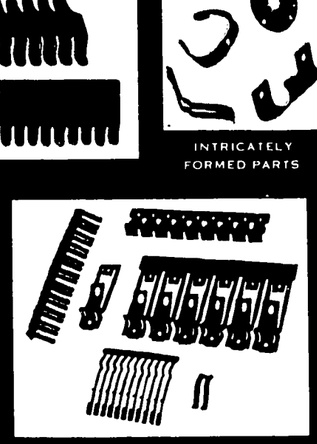

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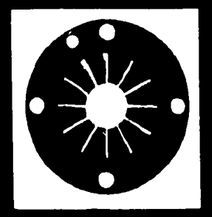

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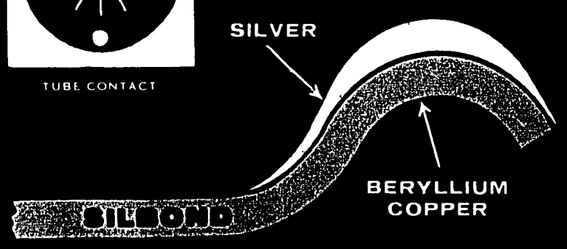

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HELPFUL HINTS
for using the IRE DIRECTORY

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 three-page 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 four product directories.

THE COMPLETE DATA SPREAD SECTION (pages 1-150) 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 151-253) contains a list of 3,265 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 100 major products listed in the book (for quick reference to the meaning of the codes, use the questionnaire form on pages v-viii of the pink section).

THE FOUR DIRECTORIES OF PRODUCTS ARE:

1. Communications Equipment
2. Components
3. Controls and Instruments
3. Materials and Services

This breakdown into four 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!

100 MAJOR PRODUCTS are listed within these four 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 100, the last class in the book. This section contains a list of 1,425 manufacturers representatives, distributors and jobbers, grouped geographically. See page 605 for a more complete explanation of the use of this section.

ADVERTISER'S INDEX appears on pages 146-150 and on pages 635 and 636.

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 635-636.

Key to Products, Pink Section.

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Detailed Machol edge indexes will be found on the first page of the alphabetical Directory and each of the four major product Directories, pages 151, 255, 287, 459 and 521. The Machol system will help you find both alphabetical and product sections swiftly.

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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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1958 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; Frank G. MacAloon, Research.

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Tel: JAmaica 3-5500

Acheson Colloids Co., 1635 Washington Ave., Port Heron, Mich., 91
Tel: YUkon 4-4171

Ackerman Engravers, 458 Broadway, New York 13, N.Y., 86, 87

Acme Electric Corp., 449 Water St., Cuba, N.Y., 47, 59, 65, 68, 92
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Tel: CUba 4

Acme Telectronix, Div. of NEA Service, Inc., 1200 W. Third St., Cleveland 13, Ohio, 8, 75
Tel: MAin 1-7300

Acme Wire Co., 1255 Dixwell Ave., New Haven 14, Conn., 83, 86, 89, 91
Tel: LOcust 2-2171

Acme Wire Machine Co., 234 E. Ord St., New York 9, N.Y., 92
Tel: ORegon 7-8290

Acoustica Associates, Inc., Dept. IRE, Shore Rd., Glenwood Ldg., L.I., N.Y., 21, 44, 58, 59, 68, 72, 85, 88, 90, 92
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Tel: GLen Cove 4-5170

Acoustical Mfg. Co., Ltd., St. Peters Rd., Huntingdon, Huntingdon County, England, 21, 40, 60
Tel: HUntingdon 361

Acro Mfg. Co., Switch Div., 2040 E. Main St., Columbus 16, Ohio, 56
Tel: FA 2143

Acro Products Co., 369 Shurs Lane, Philadelphia 28, Pa., 21, 59
Tel: IV 3-5969

Acro Tool & Die Works, 4554 Broadway, Chicago 40, Ill., 86, 92
Tel: LO 1-1807

Acromark Co., 538 Morrell St., Elizabeth 4, N.J., 86, 87, 92
Tel: ELizabeth 2-6500

Actioncraft Products, 8 Sagamore Hill Dr., Port Washington, N.Y., 87, 89
Tel: POrt Washington 7-4500

Acton Laboratories, Inc., 533 Main St., Acton, Mass., 21, 69, 72, 74, 80, 85, 87, 90, 94
Tel: COlonial 3-7756

Adams & Westlake Co., 1025 N. Michigan St., Elkhart, Ind., 52
Tel: 2-0550

Adelman Co., Leon L., 25 Chittenden Ave., New York 33, N.Y., 100
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Tel: TOmpkins 7-1145

Adler Electronics, Inc., 1 Le Fevre St., New Rochelle, N.Y., 3, 5, 6, 11, 12, 13, 18, 21, 25, 31, 36, 42, 47, 68, 77, 80, 81, 90
Tel: NEw Rochelle 6-1620

Admiral Corp., 3800 W. Cortland St., Chicago 47, Ill., 4, 25, 45
Tel: SPaulding 2-0100

Admiral Plastics Corp., 446 12th St., Brooklyn 15, N.Y., 23, 94
Tel: ST 8-1681

Admittance Nameo Corp., Marine St., Farmingdale, N.Y., 3, 21, 22, 60, 77, 90
Tel: CHapel 9-8080

Advance Electronics Co., P.O. Box 3706, 8510 North Blvd., Oak Park 37, Mich., 3, 36
Tel: LIncoln 6-0248

Advance Electronics Lab., Inc., 249-259 Terhune Ave., Passaic, N.J., 34, 70, 77, 80
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Tel: GRegory 2-5622

Advanced Electronics Corp., 86 Magnolia Ave., Westbury, N.Y., 47, 86, 90
Tel: EDgewood 4-0500

Advanced Electronics, Inc., 94 Silas Deane Hwy., Rocky Hill 9, Conn., 21, 29, 56, 68, 72, 86, 90
Tel: JA 9-6881

Advanced Vacuum Products, Inc., Sub. Gen. Ceramics Corp., Dept. ID, 430 Fairfield Ave., Stamford, Conn., 38, 84, 86, 97
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Tel: DAvis 4-2148

Aemco, Inc., 10 State St., Mankato, Minn., 52
Tel: 5153

Aermotive Equipment Corp., 1632 Central St., Kansas City 8, Mo., 6, 19, 34, 66, 72, 77
Tel: VIctor 2-5870

Aero Electronics Co., 1512 N. Wells St., Chicago 10, Ill., 21, 69, 81, 85, 86, 90
Tel: WHitehall 3-0401

Aero Instrument Co., 11423 Vanowen St., North Hollywood, Calif., 3, 42, 52, 75
Tel: STanley 7-5433

Aero Service Corp., 210 E. Cortland St., Philadelphia 20, Pa., 85
Tel: GLadstone 7-3000

Aerocoil, Inc., 24 Cliff St., Jersey City 6, N.J., 29, 34, 36
Tel: OLfield 3-7446-7

Aeroflex Research, Inc., 48-25 36th St., Long Island City 1, N.Y., 21, 47, 81
Tel: ST 6-3315

Aerojet General Corp., 6532 N. Irwindale Ave., Azusa, Calif., 9, 21, 58, 68, 85, 86, 90
Tel: EDgewood 4-6211

Aerolite Electronics Corp., 507-26th St., Union City, N.J., 3, 30, 39, 46, 83, 86, 87
Tel: UNion 3-2955

Aerolux Lights Corp., 655-11th Ave., New York 36, N.Y., 46, 51, 62, 71, 72, 90
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Tel: CIrcle 6-5324

Aeronautical Communications Equipment, Inc, 3090 S.W. 37th Ave., Miami 33, Fla., 1, 3, 13, 19
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Aeronautical Electric Co., 5656 Northwest Hwy., Chicago 30, Ill., 46
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Aeronautical Electronics, Inc., P.O. Box 6043, Raleigh, N.C., 1, 11, 33
Tel: TEmple 4-6209

Aeronca Research Div., Hilltop & Frederick Rds., Baltimore 28, Md., 3, 11, 12, 20, 21, 28, 34, 47, 65, 67, 68, 72, 75, 81
Tel: RI 7-0200

Aeronautical Instrument & Radio Co., 49-57 Washington Ave., Little Ferry, N.J., 80
Tel: DIamond 2-1540

Aeronautical Radio Mfg. Corp., 155 First St., Mineola, L.I., N.Y., 1
Tel: PIoneer 6-6770

Aeronutronic Systems, Inc., Sub. of Ford Motor Co., 1234 Air Way, Glendale 1, Calif., 90
Tel: Citrus 3-1146

Aeroprojects Inc., 310 E. Rosedale Ave., Westchester, Pa., 72, 92
Tel: WEstchester 4710

Aeroquip Corp., 300 S. East Ave., Jackson, Mich., 79
Tel: STate 2-0361

Aerotest Labs, Inc., 15-35 129 St., College Pt., 56, N.Y.
Tel: IN 1-7272

Aerovox Corp., 740 Belleville Ave., New Bedford, Mass., 18, 21, 22, 26, 28, 29, 32, 35, 36, 39 ,41, 42, 47, 49, 53, 55, 56, 59, 69, 72, 84
Tel: WYman 4-9661

Ahrendt Instrument Co., 4910 Calvert Rd., College Park, Md., 21, 81, 86
Tel: UNion 4-5678

Aid, Douglas G., 972 Elsinore Court, Palo Alto, Calif., 85
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Ainslie Corp., 312 Quincy Ave., Quincy 69, Mass., 3, 86
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Airborne Accessories Corp., 1414 Chestnut Ave., Hillside 5, N.J., 21, 26, 29, 36, 44, 59, 68, 81
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Airborne Electronics Inc., 155 First St., Mineola, N.Y., 1
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Airborne Instruments Laboratory, Inc., 160 Old Country Rd., Mineola, L.I., N.Y., 14, 15, 20, 66, 68, 70, 72, 74, 77, 78, 80
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Tel: PIoneer 2-0600

Aircom, Inc., 354 Main St., Winthrop 52, Mass., 15, 20, 21, 22, 30, 36, 47, 60, 66, 77, 90
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Tel: OCean 3-3096

Aircraft Electronics, Rt. 3, P.O. Box 165, Tucson, Ariz., 9
Tel: MA 4-6348

Aircraft Radio Corp., Boonton, N.J., 1, 3, 4, 11, 21, 30, 31, 47, 77, 80
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Tel: DEerfield 4-1800

Aircraft Transformer Corp., West & Willow Aves., Long Branch, N. J., 29, 51, 52, 59
Tel: LOng Branch 6-6250

Airdesign, Inc., 241 Fairfield Ave., Upper Darby, Pa., 29, 34, 36, 41, 47, 59
Tel: GRanite 4-8000

Airflyte Electronics Co., 535 Ave. A, Bayonne, N.J., 30, 56, 70, 86, 94
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Tel: HEmlock 6-2230

Code Numbers TELL YOU

what each company does or makes. The numbers after each address refer you to the 100 product and service classes, in which detailed information on the firm will be found.

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Tel: AMityville 4-3700

Airmec, Ltd., High Wycombe, Buckinghamshire, England, 2, 12, 21, 47, 65, 67, 68, 72, 75, 78, 79, 80
Tel: HIgh Wycombe 2060

Air-O-Tronics, P.O. Box 31, Lancaster, Calif., 7, 9, 21, 30, 39, 67, 71, 72, 78, 87, 90
Tel: LAncaster 277-W

Airpax Products Co., Middle River, Baltimore 20, Md., 21, 29, 31, 42, 52, 59, 81, 86
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Tel: MU 6-9100

Airtron, Inc., Dept. I, 1101 W. Elizabeth Ave., Linden, N.J., 3, 14, 15, 21, 22, 30, 36, 48, 60, 66, 77, 83, 87, 94
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Tel: HUnter 6-1000

Ajax Condenser Co., Inc., 932 W. Wrightwood Ave., Chicago 14, Ill., 26
Tel: GRaceland 7-0660

Aladdin Electronics, 719 Murfreesboro Rd., Nashville 10, Tenn., 29, 34, 59
Tel: CHapel 2-3411

Alcar Instruments, Inc., 17 Industrial Ave., Little Ferry, N.J., 21, 59, 72, 90, 92
Tel: HU 9-3040

Alcon Metal Products, Inc., 1750 N. Kimball Ave., Chicago 47, Ill., 30, 39, 48, 55, 56, 85, 86, 87
Tel: BE 5-5030

Alcor Electronics Corp., 180 Lafayette St., New York 13, N.Y., 6, 19, 21, 47, 67, 70, 86, 89, 91
Tel: WA 5-3111

Alden Electronic & Impulse Recording Equipment Co., Alden Research Center, Westboro 6, Mass., 8, 20, 21, 28, 47, 56, 68, 70, 74, 75, 81
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Alden Products Co., 140 N. Main St., Brockton 64, Mass., 25, 28, 29, 30, 32, 33, 37, 39, 46, 48, 55, 56, 59, 83, 86, 87, 90, 94
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Alfax Paper & Eng. Co., Washington St., Westboro 6, Mass., 8, 74
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Alford Consulting Engineers, Andrew, 299 Atlantic Ave., Boston 10, Mass., 85
Tel: HAnrock 6-2150

Alford Manufacturing Co., 299 Atlantic Ave., Boston 10, Mass., 3, 36, 56, 77, 80
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Tel: HAncock 6-2150

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Alfred Electronics, 897 Commercial St., Palo Alto, Calif., 21, 47, 68, 77
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All Star Products, Inc., Squire Ave., Defiance, Ohio, 27
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Allegany Instrument Co., Inc., 1091 Wills Mountain, Cumberland, Md., 20, 21, 68, 69, 70, 72, 79, 85, 86, 90
Tel: PA 4-1200

Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, PA., 32, 93
Tel: GRant 1-1085

Allen-Bradley Co., 136 W. Greenfield Ave., Milwaukee 4, Wisc., 26, 29, 32, 36, 53, 56
Tel: OR 1-2000

Allen Communications, Inc., 1845 Broadway, New York 23, N.Y., 9, 21
Tel: CI 7-7727

Alliance Mfg. Co., Lake Park Blvd., Alliance, Ohio, 3, 44
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Alliance Motors, Schell Ave., Toronto 10, Ont., Canada, 44
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Allied Allegri Co., Inc., 141 River Rd., Nutley 10, N.J., 48, 81, 83, 86, 87
Tel: NUtley 2-3910

Allied Chem. & Dye Corp., Barrett Div., 40 Rector St., New York 6, N.Y., 89, 95
Tel: HAnover 2-7300

Allied Chem. & Dye Corp., Genl. Chem. Div. Baker & Adamson Prods., 40 Rector St., New York 6, N.Y., 71, 93
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Tel: CHerry 1-3691

Allied Industries, Inc., 2500 Woodland Ave., Louisville 10, Ky., 30, 33, 66
Tel: SPring 6-4649

Allied International Co., 230 Park Ave., New York 17, N.Y., 1, 3, 7, 10, 11, 13, 17
Tel: LE 2-1258

Allied Plastics Supply Corp., 75 Cliff St., New York 38, N.Y., 25, 26, 28, 37, 48, 57, 64, 84, 86, 87, 89, 94, 95
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Allied Radio Corp., Dept. 55-58, 100 N. Western Ave., Chicago 80, Ill., 2, 4, 9 16, 21, 68, 69, 72, 79, 80, 82, 100
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Tel: HAymarket 1-6800

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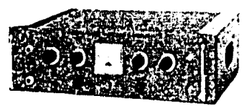

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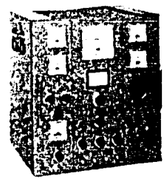

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Allies Products Corp., P.O. Box 188, Kendall Branch, Miami, Fla., 53
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Allison Laboratories, 14185 Skyline Dr., La Puente, Calif., 72
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Allmetal Screw Products Co., Inc., 821 Stewart Ave., Garden City, N.Y., 86, 87
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Alloy Metalsmiths, Inc., 88 Commerce Rd., Cedar Grove, N.J., 25, 28, 86
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All-Tronics, Inc., 45 Bond St., Westbury, L.I., N.Y., 26, 29, 34, 36, 59, 67, 68, 72, 81, 85, 86, 90
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Alonge Products, Inc., 103 W. 23rd St., New York 11, N.Y., 49
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Alpha Instrument Co., 43 Hempstead St., New London, Conn., 12, 21, 67, 69, 72, 88
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Alpha Metals, Inc., 56 Water St., Jersey City 4, N.J., 38, 71, 83, 93, 96
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Alpha Wire Corp., Dept. PD, 200 Varick St., New York 14, N.Y., 83, 87, 89
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Alpha-Loy Corp., 2250 S. Lumber St., Chicago 16, Ill., 93, 96, 97
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Altair Company, 19209 Van Owen St., Reseda, Calif., 10, 11, 14, 15, 17, 20, 21, 47, 68, 85, 90
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Altec Lansing Corp., 9356 Santa Monica Blvd., Beverly Hills, Calif., 9, 18, 21, 25, 29, 36, 40, 59, 60
Tel: CRestview 5-5101

Alto Scientific Co., 855 Commercial St., Palo Alto, Calif., 21, 31, 42, 47, 59, 67, 72, 77, 85, 90
Tel: DAvenport 4-4733

Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa., 83, 87, 93, 96
Tel: Atlantic 1-4545

Alwac Corp., 13040 S. Cerise Ave., Hawthorne, Calif., 70
Tel: OSborne 5-0311

Amco Engineering Co., 7333 W. Ainslie St., Chicago 31, Ill., 25, 28, 86
Tel: UN 7-8500

Amerac, Inc., 116 Topsfield Rd., Wenham, Mass., 1, 3, 13, 14, 15, 21, 22, 36, 42, 60, 66, 70, 72, 77, 80
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American Brass Co., 414 Meadow St., Waterbury 20, Conn., 86, 87, 93, 97
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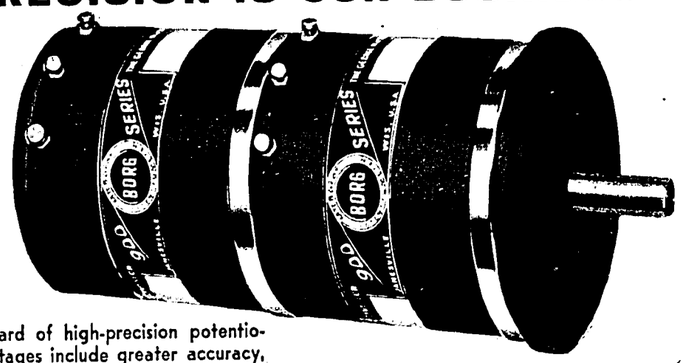

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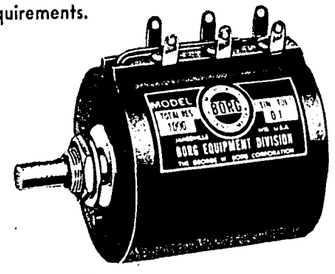

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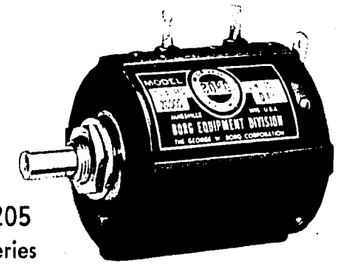

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American Condenser Co., 4410 Ravenswood Ave., Chicago 40, Ill., 26
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American Electric Cable Co., 181 Appleton St. Holyoke, Mass., 83
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American Electrical Heater Co., 6110 Cass Ave., Detroit 2, Mich., 88, 92
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American Electronic Labs., Inc., 121 N. 7th St., Philadelphia 6, Pa., 3, 21, 36, 47, 58, 66, 72, 79, 90
Tel: WAlnut 5-8780

American Electronics Co., 1203 Bryant Ave., New York 59, N.Y., 2, 3, 30
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American Electronics Mfg., Inc., 655 W. Washington Blvd., Los Angeles 15, Calif., 16, 20, 21, 24, 43, 44, 45, 47, 49, 53, 58, 65, 67, 72, 78, 81, 85
Tel: RIchmond 9-7671

American Electroplating Co., 7 Harvard St., Cambridge 42, Mass., 86
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American Gas Furnace Co., 130 Spring St., Elizabeth 4, N.J., 88
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American Hydromath Corp., 25-20 43rd Ave., Long Island City 1, N.Y., 70, 85, 86, 90
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American Instrument Co., Inc., 8030 Georgia Ave., Silver Spring, Md., 3, 52, 59, 68, 71, 72, 88
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American Insulator Corp., New Freedom, Pa., 25, 86
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American Leonic Mfg. Co., 3001 Walnut St., Philadelphia 4, Pa., 83
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American Machine & Foundry Co., Electronics Div., 1085 Commonwealth Ave., Boston 15, Mass., 14, 70
Tel: ALgonquin 4-4234

American Machine & Foundry Co., P.O. Box 11097, Raleigh, N.C., 68, 90
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American Machine & Foundry Co., Defense Products Group, 1101 N. Royal St., Alexandria, Va., 1, 3, 10, 14, 15, 20, 23, 25, 28, 30, 31, 42, 47, 68, 70, 76, 77, 85, 86, 90
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American Metal Co., Ltd., 61 Broadway, New York 6, N.Y., 93, 96
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American Metrix Corp., 40 Haddon Ave., Camden 3, N.J., 42, 69, 72, 77, 79, 80, 82
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American Microwave Corp., 11754 Vose St., N. Hollywood, Calif., 3, 5, 6, 13, 14, 15, 18, 20, 21, 22, 35, 47, 60, 66, 77
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American Optical Co., Instrument Div., Eggert Rd., Buffalo 15, N.Y., 67, 71, 72
Tel: FIlmore 4000

American Plastics Corp., 342 Madison Ave., New York 17, N.Y., 25, 86, 94, 95
Tel: MU 2-5880

American Platinum Works, 231 N.J.R.R. Ave., Newark 5, N.J., 93, 96
Tel: MArket 2-8035

American Printed Circuits Co., Inc., 104 Forrest St., Box 471, Metuchen, N.J., 48, 85, 86
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American Products Mfg. Co., Inc., 8127-33 Oleander St., New Orleans 18, La., 91, 95
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American Quartz Labs., Route 9-D, Garrison, N.Y., 33, 85, 92
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American Radar Components, Inc., Rt. 10, WHippany, N.J., 30, 66
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American Silver Co., Inc., 36-07 Prince St., Flushing 54, N.Y., 93, 96
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American Standard T.V. Tube Corp., 9450-158th St., Jamaica, N.Y., 57, 97
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American Steel & Wire Co., Div. U.S.S., Rockefeller Bldg., Cleveland 13, Ohio, 83, 93
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Amplifier Corp. of America, 398 Broadway, New York 13, N.Y., 19, 21, 67
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Amplitel, Inc., 642 W. 40th St., New York 18, N.Y., 3, 5, 21, 22, 30
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Ampower Corp., 50 Broad St., New York 4, N.Y., 86, 87, 90
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Tel: TWinbrook 4-5020

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Tel: LOngacre 5-4622

Anaconda Wire & Cable Co., 25 Broadway, New York 4, N.Y., 83
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Analogue Controls, Inc., 39 Roselle St., Mineola, L.I., N.Y., 21, 53, 68, 70, 72, 81, 85, 90
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Analytical Measurements, Inc., 585 Main St., Chatham, N.J., 72
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Tel: RA 9-1494

Anchor Metal Co., Inc., 966 Meeker Ave., Brooklyn 22, N.Y., 93, 96
Tel: ST 2-7090

Anchor Specialty Mfg. Co., Inc., 300 Hollister Ave., Peterboro, N.J., 25, 71, 72, 83, 86, 90
Tel: ATlas 8-1939

Andersen Laboratories, Inc., 501 New Park Ave., West Hartford 10, Conn., 21, 34, 70, 72
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Tel: ADams 3-4491

Anderson Associates, H. V., 233 Broad St., Summit, N.J., 84, 91, 93, 96
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How to choose magnetic tape recorders for data

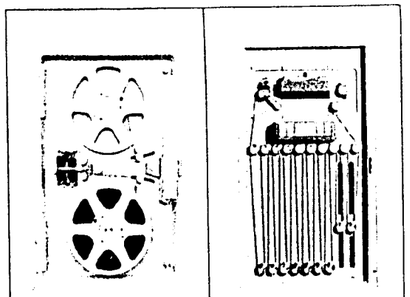
Types, performance and sources of further information

A magnetic tape recorder for your particular use is chosen from hundreds of possibilities, and yet from Ampex it can almost always be a standard production-line model. There are three reasons:

(1) Ampex offers the broadest available selection of basic types.

(2) Ampex modular design permits innumerable combinations of standard components to fit individual needs.

(3) By designing for the most critical user requirements, Ampex achieves performance standards ample for almost all practical uses.



Reel-to-reel *Continuous loop*

TYPES OF TAPE TRANSPORTS

Reel-to-reel recorders are the most familiar. They record over relatively long time intervals, hence are almost always used for acquiring permanent data.

Continuous-loop recorders recycle on a definite time interval, either to provide a cyclic repetition of a length of data or to act as a time-delay device. The Ampex FL-100 is of this type.

Digital recorders, a special variation of reel-to-reel, are characterized by extremely rapid start-stop characteristics for close pulse packing. The Ampex FR-200 is typical.

"Transportable" recorders with varying degrees of portability are available from Ampex. Even Ampex's "fixed" recorders, FR-100 and FR-1100 may be mounted in a truck or trailer. But recorders like the Ampex 800 are built for true mobility, hence are light, compact and resistant to shock and vibration. Ampex also has miniaturized designs.

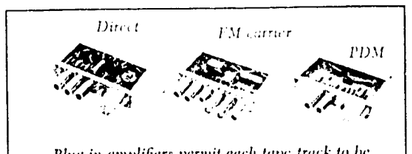
TYPES OF RECORDING

Most Ampex models use interchangeable plug-in amplifiers that enable each track to be used with any of three recording techniques:

Direct recording has frequency response of 100 to 100,000 cycles/sec. at 60 in/sec. tape speed. This high response is its greatest advantage and is utilized either directly or for multiplexed data.

FM-carrier recording has high instantaneous amplitude accuracy with frequency response of 0 (DC) to 20,000 cycles at 60 in/sec. It is used for transients, low frequencies and wherever accurate reproduction of amplitude is important.

PDM recording (pulse-duration modulation) can time-multiplex as many as 85 channels of data onto each tape track (data from 0 (DC) to a few cycles per second). PDM provides high accuracy and easy convertibility to digital form.



Plug-in amplifiers permit each tape track to be used with one of three recording techniques.

OTHER CONSIDERATIONS

Tape widths of quarter, half and one-inch width with 2, 3, 4, 7 and 14 parallel tracks are Ampex standards.

Commonly furnished tape speeds are 60, 30, 15, 7½, 3¾ and 1⅞ in/sec. Others are available. Recorders have up to eight speeds.

Time-base accuracy within 2 parts in 100,000 can be provided with standard Ampex accessory equipment.

Compatibility (for tape interchange) between Ampex recorders of same or different models is an important Ampex advantage.

Full performance specifications are available in literature on individual series.

A general application brochure and literature on individual models are available upon request. Ampex's Field Sales Engineers will be pleased to answer your inquiry with specific information on any requirement. Write Dept K-57

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Tel: MOhawk 8-3348

Andrew Corp., 363 E. 75th St., Chicago 19, Ill., 3, 22, 30, 34, 36, 42, 52, 56, 59, 66, 77, 80, 83
See ad on page 258
Tel: TRiangle 4-4400

Anelex Corp., 150 Causeway St., Boston 14, Mass., 70
Tel: RIchmond 2-3400

Angus-Campbell, Inc., 4417 S. Soto St., Los Angeles 58, Calif., 93, 95
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Ansley Mfg. Co., Arthur, New Hope, Pa., 48
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Antenna Specialists Co., 12435 Euclid Ave., Cleveland 6, Ohio, 3
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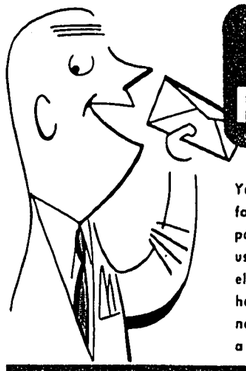

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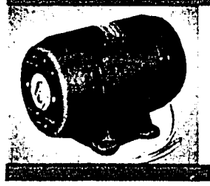

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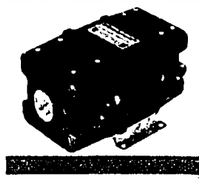

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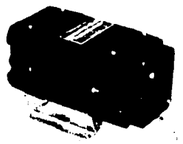

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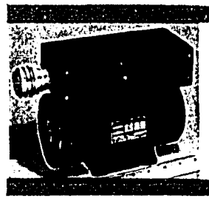

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Ballantine Laboratories, Inc., 102 Fanny Rd., Boonton, N.J., 21, 31, 67, 72, 90
See ad on page 460
Tel: DEerfield 4-1432

Ballastran Corp., 1701 N. Calhoun St., Fort Wayne, Ind., 59
Tel: EAstbrook 2285-6

Barber-Colman Co., Dept. 58D, 1856 Rock St., Rockford, Ill., 24, 31, 44, 52, 57, 68, 81
See ad on page 370
Tel: 8-6833

Barber Laboratories, Alfred W., 32-44 Francis Lewis Bldg., Flushing 58, N.Y., 13, 17, 21, 47, 48, 72, 85, 86, 90
Tel: IN 3-3306

Barco, Inc., P.O. Box 1222, Milwaukee 2, Wis., 26
Tel: BRoadway 6-8515

Barium & Chemicals, Inc., P.O. Box 390, Willoughby, Ohio, 71
Tel: WHitehall 2-5151

Barker & Williamson, Inc., Canal St. & Beaver Dam Rd., Bristol, Pa., 2, 3, 11, 13, 17, 19, 21, 27, 29, 30, 34, 36, 47, 59, 67, 69, 72, 80, 85, 86, 90
Tel: STillwell 8-5581

Barnes Company, Arnold, 5526 Dyer St., Dallas 6, Texas, 100
See ad on page 629
Tel: EM 1-6716

Barnes Development Co., 213 W. Baltimore Ave., Lansdowne, Pa., 68, 69, 86
Tel: MA 6-3294

Barnes Engineering Co., 30 Commerce Rd., Stamford, Conn., 16, 68

Barnstead Still & Demineralizer, Inc., 2 Lanesville Ter., Boston 31, Mass., 71
Tel: JA 4-3100

Barry Controls, Inc., 718 Pleasant St., Watertown 72, Mass., 64, 72
Tel: WAtertown 3-1150

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Tel: PLymouth 9-0200

Barton Electronics, Inc., 1000 Farmington Ave., W. Hartford 7, Conn., 52, 68, 90
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Baruch Laboratories, 1476 Broadway, New York 36, N.Y., 51, 62, 82
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Tel: LOcust 2-3000

Bayly Engineering, Ltd., First St., Ajax, Ont., Canada, 29, 36, 39, 59
Tel: EMpire 8-6866

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Tel: EDison 4-4124

Beam Instruments Corp., 350 5th Ave., New York 1, N.Y., 21, 25, 40, 79, 83
Tel: LO 5-0522

Bean & Co., Morris, Hyde Rd., Yellow Springs, Ohio, 66
Tel: ROckwell 7-7301

Beckley Electric Co., Inc., 468 Grand Ave., Brooklyn 38, N.Y., 30, 39, 55, 56, 83
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Beckman Instrument Div., 2500 Fullerton Rd., Fullerton, Calif., 21, 42, 70
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Beckman Instruments, Inc., Scientific Inst. Div., 2500 Fullerton Rd., Fullerton, Calif., 21, 31, 47, 62, 70, 72
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Beede Electrical Instrument Co., Inc., Penacook, N.H., 42, 72
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Tel: WAlnut 2-0900

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See ad on page 377
Tel: VI 9-5328

Bel Fuse, Inc., 311 Mountain Rd., Union City, N.J., 34, 37
Tel: UNion 6-5416

Belden Manufacturing Co., 4647 W. Van Buren St., Chicago 44, Ill., 83
Tel: EStabrook 8-1000

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Tel: NIagara Falls 7851

Bell Telephone Laboratories, 463 West St., New York 14, N.Y., 90
Tel: CH 3-1000

Bellaire Electronics, Inc., 62 White St., Red Bank, N.J., 2, 3, 13, 21, 22, 29, 80
Tel: SHadys 1-8383

Belling & Lee, Ltd., Gr. Cambridge Rd., Enfield, Middlesex, England, 30, 36, 37, 55, 71, 87

Belock Instrument Corp., 111-01 14th Ave., College Point 56, N.Y., 3, 21, 81
Tel: HIckory 5-4200

Benco Television Associates, Ltd., 278 Bridgeland Ave., Toronto 10, Ont., Canada, 3, 21, 36, 59, 80
Tel: RUssell 1-6681

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Tel: ORegon 8-2128

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Bendix Aviation Corp., Cincinnati Div., 203 W. 3rd St., Cincinnati 2, Ohio, 68, 70, 72, 78
Tel: DUnbar 5885

Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N.J., 3, 21, 44, 68, 70, 81
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Tel: ATlas 8-2000

Bendix Aviation Corp., Friez Instrument Div., 1400 Taylor Ave., Baltimore 4, Md., 18, 48
Tel: VAlley 3-4040

Bendix Aviation Corp., Red Bank Div., Eatontown, N.J., 31, 44, 47, 54, 61, 62, 63, 65
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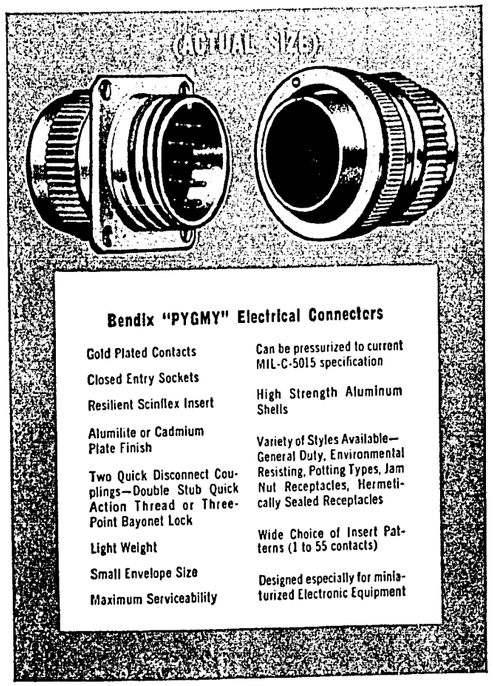

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Berman Laboratories, 121-03 Rockaway Blvd., Ozone Park 20, L.I., N.Y., 75
Tel: VIrginia 3-1045

Berneo Engineering Corp., 2320 S. Tibbs Ave., Indianapolis 41, Ind., 58, 71, 72, 83
Tel: CH 1-2871

Bernstein, Robert I., 15 North St., New York 27, N.Y., 85, 90
Tel: UNiversity 5-5000

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Binghamton Magnetic Industries, Inc., 42 Wall St., Binghamton, N.Y., 21, 29, 49, 59
Tel: 2-0880

Bird & Co., Inc., Richard H., 1 Spruce St., Waltham 54, Mass., 46
Tel: TW 4-0140

Bird Electronic Corp., 1800 E. 38th St., Cleveland 14, Ohio, 3, 36, 42, 56, 77, 80
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Tel: EXpress 1-3535

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Tel: WAlker 5-6980

Birtcher Corp., 4371 Valley Blvd., Los Angeles 32, Calif., 21, 28, 33, 47, 56, 76, 97
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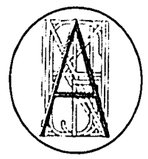

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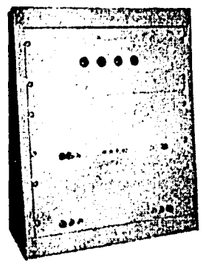

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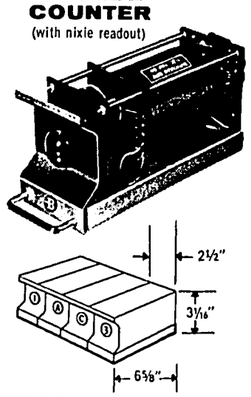

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Tel: BEnsonhurst 6-9320

Brevel Products Corp., 601 W. 26 St., New York 1, N.Y., 44
Tel: WAtkins 4-4737

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Bruno-New York Industries Corp., Dept. IRE-57, 460 W. 34th St., New York 1, N.Y., 1, 42, 72, 77, 80, 92
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Brunswick-Blake Collender Co., 623 S. Wabash Ave., Chicago, Ill., 3, 86
Tel: WAbash 2-4020

Brunswick Instruments, P.O. Box 813, New Brunswick, N.J., 31, 46, 71, 80, 90
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Brush Electronics Co., 3405 Perkins Ave., Cleveland 14, Ohio, 12, 20, 21, 25, 33, 49, 67, 72, 74, 79, 81
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Budd-Stanley Co., Inc., Dept. IRE, 43-01 22nd St., Long Island City 1, N.Y., 3, 22, 36, 60, 66, 77
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Tel: STillwell 6-1706

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Tel: FIreside 8-9231

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Tel: RIverside 3640

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Burnell & Co., Inc., 10 Pelham Pkwy., Pelham Manor, N.Y., 29, 34, 36, 59
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Tel: PElham 8-5000

Burnett Radio Lab., Wm. W. L., 4818 Idaho St., San Diego, Calif., 33, 85, 90
Tel: AT 2-2740

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Burton-Rogers Co., Sales Div., Hoyt Elec., 42 Carleton St., Cambridge 42, Mass., 42
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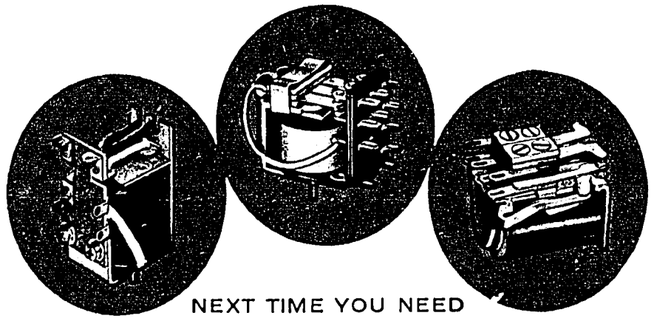

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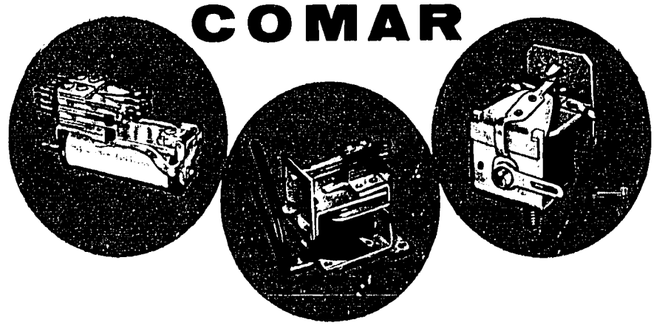

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Cado Mfg. Div. See: Electromation Co., Inc.

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Tel: PIoneer 2-0278

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Tel: PIoneer 3-6701

Campbell Industries, Inc., Sub. Clarostat Mfg. Co., Inc., Dover, N.H., 53
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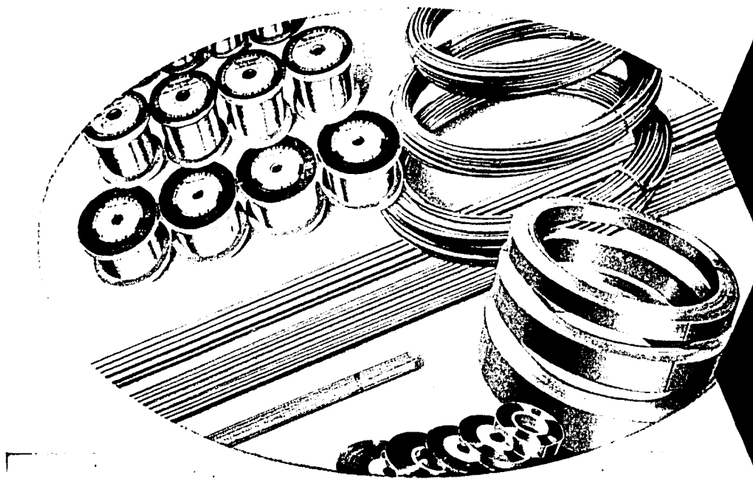

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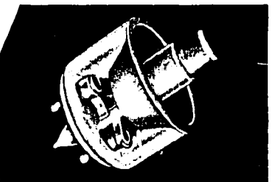

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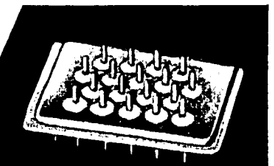

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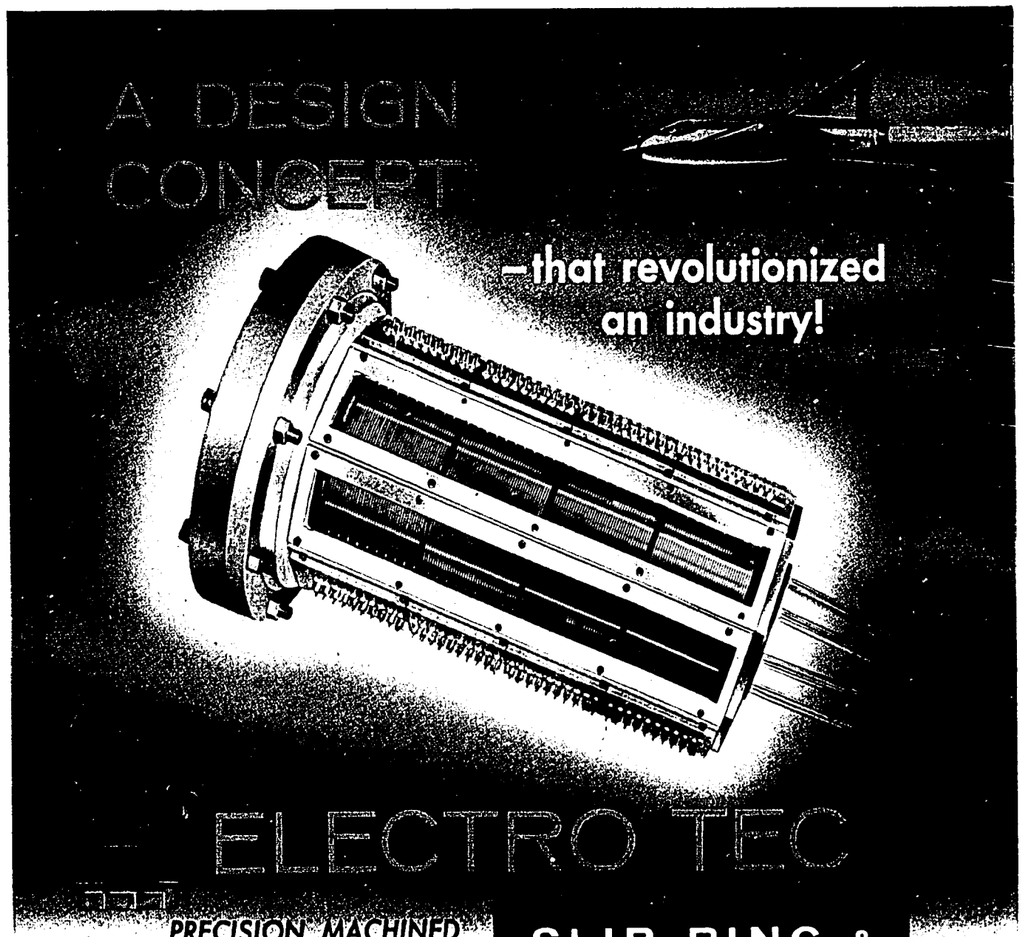
Tel: CHelsea 3-3411

Cohn Corp., Sigmund, 121 S. Columbus Ave., Mount Vernon, N.Y., 83, 93
See ad on page 525
Tel: MOunt Vernon 4-5300

Coil Company of America, Inc., 207-209 Washington St., Northvale, N.J., 21, 29, 59
Tel: CLoster 5-3434

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.



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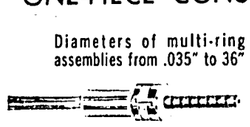
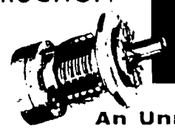
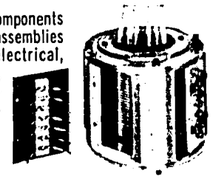
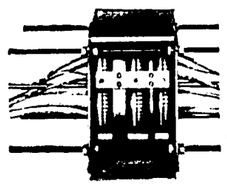




Individual components or complete assemblies to precise electrical, mechanical, and environmental specifications.





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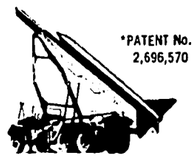

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Coil Engineering & Mfg. Co., Inc., P.O. Box 24, Roanoke, Ind., 29, 59
Tel: 2013

Coil Winders, Inc., 100 New York Ave., Westbury, L.I., N.Y., 29, 34, 36, 59
Tel: ED 4-3170

Coil Winding Equipment Co., 19 Maxwell Ave., Oyster Bay 9, N.Y., 92
See ads on pages 576, 577
Tel: OYster Bay 6-1285

Coilcraft, Inc., Jandus St., Cary, Ill., 21, 29, 53, 59
Tel: MErcury 9-2361

Coils-Electronics Co., 2939-49 N. 2nd St., Philadelphia 33, Pa., 21, 28, 29, 31, 41, 47, 59, 72, 83, 86, 90
Tel: REgent 9-6465

Colbert, Charles & Westgate Lab., 602 Keystone Ct., P.O. Box 63, Yellow Springs, Ohio, 85, 90
Tel: YEllow Springs 7-7466

Coleman Engineering Co., Inc., 6040 W. Jefferson Blvd., Los Angeles 16, Calif., 70
Tel: VE 9-7549

Collectron Corp., 304 E. 45th St., New York 17, N.Y., 30, 86, 94
See ad on page 327
Tel: Murray Hill 9-7120

Collins, Joseph L., Statler Bldg., Boston 16, Mass., 85
Tel: HU 2-1092

Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 1, 2, 3, 5, 6, 11, 13, 14, 15, 17, 19, 25, 32, 36, 67, 75
Multiple pages of additional data on 49-54
Tel: EM 3-0281

Collins Radio Co., Western Div., 2700 W. Olive Ave., Burbank, Calif., 90
Tel: THornwall 5-1751

Colortone Electronics, Inc., 200 Frank Rd., Hicksville, L.I., N.Y., 42, 75
See ad on page 487
Tel: WElls 8-0500

Columbia University, Lamont Geological Observatory, Palisades, N.Y., 90
Tel: PIermont 2-0320

Columbia Technical Corp., 61-02 31st Ave., Woodside 77, L.I., N.Y., 34
Tel: AStoria 8-7401

Columbia Wire & Supply Co., 2850 Irving Park Rd., Chicago 18, Ill., 83
Tel: CO 7-3160

Columbian Carbon Co., Mapico Color Unit, 380 Madison Ave., New York, 17, N.Y., 93
See ad on page 583
Tel: MUrray Hill 7-2300

Columbus Process Co., Inc., 2851 Southeastern Ave., Columbus, Ind., 59
Tel: 2-4419

Comar Electric Co., 3349 Addison St., Chicago 18, Ill., 52, 56
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Tel: JUniper 8-2410

Combined Book Exhibit, Inc., 950 University Ave., New York 25, N.Y., 99

Comco Plastics, Inc., 97-24 Albert Rd., Ozone Park 17, N.Y., 86, 87, 89, 95
Tel: MIchigan 1-0934

Commercial Plastics Co., 933 George St., Chicago 14, Ill., 87, 95
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Tel: BElmont 5-1030

Communication Accessories Co., Highway 50 & 71 Bypass, Lee's Summit, Mo., 21, 29, 31, 32, 34, 35, 36, 55, 59, 97
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Tel: BRoadway 1-1700

Communication Equipment & Engineering Co., 5646 W. Race Ave., Chicago 44, Ill., 3, 6, 9, 21, 25, 28, 36, 59
Tel: EStebrook 8-3109

Communication Measurements Lab., Inc., 350 Leland Ave., Plainfield, N.J., 31, 47, 72
Tel: PLainfield 4-5502

Communication Parts, 9216 W. Grand Ave., Franklin Park, Ill., 29, 34, 36, 59

Communication Products Co., Inc., State Highway 79, Marlboro, N.J., 3, 30, 56, 91
Tel: FReehold 8-1880

Communications Co., 300 Greco Ave., Coral Gables 34, Fla., 1, 11, 13
Tel: HI 6-0846

Communications Engineering Co., 28059 Groveland Ave., Roseville, Mich., 85
Tel: PRescott 8-0188

Community Engineering Corp., P.O. Box 824, State College, Pa., 4, 5, 21, 35, 36, 80, 82, 86, 90
Tel: ADams 7-7221

Compagnie Generale de Metrologie, Chemin de Lacroix Rouge, Annecy, Haute-Savoie, France, 42, 67, 69, 72, 77, 79, 80, 82
Tel: 777

Compass Communications Corp., 75 Varick St., New York 13, N.Y., 90
Tel: CAnal 6-7455

Components Corp., 106 Main St., Denville, N.J., 16, 18, 21, 45, 49, 72
Tel: RO 9-0290

Components Sales Corp., 218 E. Hartsdale Ave., Hartsdale, N.Y., 100
See ads on pages 607, 613
Tel: SCarsdale 5-1050

Computer Co. of America, Div. of Bruno-New York Industries Corp., 460 W. 34th St., New York 1, N.Y., 72
Tel: LOngacre 4-5930

Computer Control Co., Inc., 92 Broad St., Babson Park 57, Wellesley, Mass., 21, 34, 70
See ad on page 469
Tel: WEllesley 5-6220

Computer Instruments Corp., 92 Madison Ave., Hempstead, L.I., N.Y., 30, 53, 56
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Tel: IVanhoe 3-8200

Computer-Measurements Corp., 5528 Vineland Ave., N. Hollywood, Calif., 12, 20, 42, 70, 75
Tel: STanley 7-0401

Computing Devices of Canada, Ltd., P.O. Box 508, Ottawa 4, Ont., Canada, 21, 47, 70, 77, 78, 80, 81, 85, 90
Tel: PArkway 8-1761

Conant Laboratories, 6500 "O" St., Lincoln 5, Nebr., 50
Tel: 2-5774

Condenser Prods. Div., New Haven Clock & Watch, 140 Hamilton St., New Haven 4, Conn., 26, 47
Tel: MAin 4-1174

Conn, Ltd., C. G., 1101 E. Beardsley, Elkhart, Ind., 42
Tel: 3-3350

Conn-Craft Co., 301 Fairlawn Ave., Waterbury 4, Conn., 86, 87
Tel: PLaza 4-1811

Connecticut Hard Rubber Co., 407 East St., New Haven 9, Conn., 89
Tel: SPruce 7-3631

Connecticut Telephone & Electric Co., 70 Britannia St., Meriden, Conn., 1, 6, 7, 9, 10, 11, 13, 16, 17, 19, 20, 21, 25, 28, 29, 30, 31, 36, 37, 39, 40, 43, 44, 47, 52, 56, 58, 59, 67, 68, 70, 71, 78, 80, 85, 87
Tel: BEverly 5-7941

Conrac, Inc., 19217 E. Foothill Blvd., Glendora, Calif., 4, 12
Tel: EDgewood 5-1241

Conrad, Inc., 141 Jefferson St., Holland, Mich., 71
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Tel: EXport 2-3161

Conrad & Moser, 2 Borden Ave., Long Island City, N.Y., 25, 28

Consolidated Avionics Corp., 60 Brooklyn Ave., Westbury, N.Y., 20, 31, 42, 44, 47, 68, 70, 72, 75, 81, 85
Tel: ED 4-8400

Consolidated Diesel Elec. Corp., Aircraft Equip. Div., Stamford, Conn., 44, 47

Consolidated Electrodynamics Corp., 300 N. Sierra Madre Villa, Pasadena, Calif., 16, 20, 21, 30, 42, 47, 48, 49, 58, 68, 69, 70, 72, 73, 74, 78, 79, 84, 90, 92
Tel: SYcamore 6-9381

Consolidated Electrodynamics Corp., 1775 Mt. Read Blvd., Rochester 3, N.Y., 72, 92
Tel: GLenwood 3-7972

Consolidated Mining & Smelting Co., 215 St. James St. W., Montreal, P.Q., Canada, 93

Consolidated Molded Prods. Corp., 309-29 Cherry St., Scranton 2, Pa., 86
Tel: DI 2-7886

Consolidated Radio Products Co., 350 W. Erie St., Chicago 10, Ill., 29, 40, 59
Tel: DElaware 7-6900

Consolidated Resistance Co. of America, Inc., 44 Prospect St., Yonkers 1, N.Y., 53
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Tel: YOnkers 3-5900

Consolidated Vacuum, 1775 Mt. Read Blvd., Rochester 3, N.Y., 68, 72, 92
Tel: GLenwood 7972

The Constanta Co. of Canada, Ltd., 280 Regina Ave., Montreal, P.Q., Canada, 55

Constantin & Co., L. L., Route 46, Lodi, N.J., 30, 33, 38
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Tel: GRegory 1-0100

Contact, Inc., Main St., Maynard, Mass., 92
Tel: TW 7-2642

Content, Edward J., Pan American Radio Bldg., 16 Rue Delacroix, Tangier, Morocco, 85
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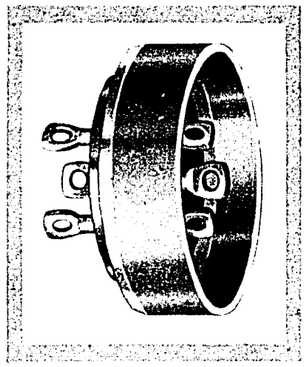
Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section.



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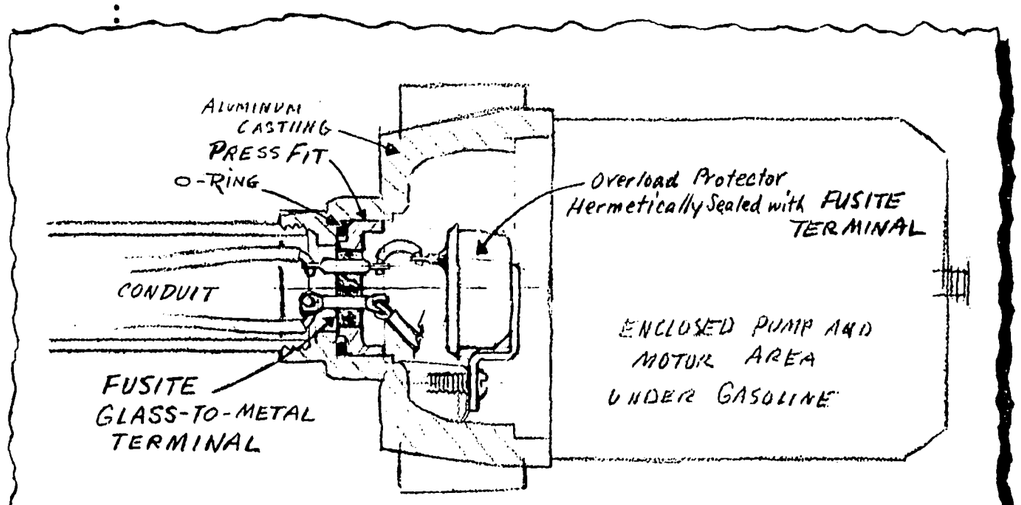

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Tel: GErmantown 8-9334

Continental Carbon, Inc., 13400 Lorain Ave., Cleveland 11, Ohio, 36, 53
Tel: CLearwater 1-6500

Continental Communications, Inc., 452 W. Chicago Ave., Chicago 10, Ill., 7, 11, 68, 75
Tel: MIchigan 2-2102

Continental Connector Corp., 30-30 Northern Blvd., Long Island City 1, N.Y., 30
Tel: ST 4-2903

Continental Diamond Fibre Div. of The Budd Co., Inc., 16 Chapel St., Newark 111, Del., 48, 86, 87, 89, 94, 95, 97
Tel: ENdicott 8-8531

Continental Electric Co., 6 N. Michigan Ave., Chicago 2, Ill., 51, 62, 72
Tel: FI 6-1433

Continental Electric Co., Inc., 325 Ferry St., Newark 5, N.J., 31, 44, 47
Tel: MI 2-4050

Continental Electronics Mfg. Co., 4212 S. Buckner Blvd., Dallas 27, Texas, 5, 13, 14, 15, 17, 21, 26, 36, 47, 56, 60
Tel: EVergreen 1-1137

Continental Screw Co., 457 Mt. Pleasant St., New Bedford, Mass., 87
Tel: WY 3-2621

Continental Wire Corp., P.O. Box 363, Wallingford, Conn., 83
Tel: COlony 9-1421

Control, A Div. of Magnetics, Inc., Dept. Y-38, Box 391, Butler, Pa., 21, 81
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Tel: 7-1745

Control Components Co., 1 Holden St., Brookline 46, Mass., 21, 29, 44, 58, 81
Tel: AS 7-4557

Control Electronics Co., Inc., 1925 New York Ave., Huntington Station, L.I., N.Y., 3, 21, 31, 34, 36, 67, 68, 75, 77, 80, 81, 90
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Tel: HAmilton 7-7961

Cook Co., Frank R., 36 S. Santa Fe Dr., Denver 23, Colo., 13, 23, 29, 43, 58, 68, 70, 81, 86
Tel: SHerman 4-1753

Cook Electric Co., 2700 N. Southport Ave., Chicago 14, Ill., 16, 20, 31, 52, 70, 71, 73, 86, 90
Tel: DIversey 8-6700

Cook Laboratories, Inc., 101 Second St., Stamford, Conn., 90
Tel: FIreside 8-7578

Cooper Electronics, Inc., 5637 Tulip St., Philadelphia 24, Pa., 21, 25, 86, 90
Tel: JE 5-7792

Cooper & Sons, Inc., Joseph B., 25 W. 47th St., New York 36, N.Y., 83, 93, 96
Tel: JUdson 2-3095

Coors Porcelain Co., 600 9th St., Golden, Colo., 38, 84, 89, 97
Tel: CRestview 9-2536

Copperweld Steel Co., Glassport, Pa., 83
Tel: NOrth 4-7131

Copperweld Steel Co., Flexo Wire Div., Oswego, N.Y., 83

Corbin Corp., 5419 56th Pl., Riverdale, Md., 1, 3, 8, 13, 14, 17, 20, 36, 68, 70, 80, 81, 85, 90
Tel: AP 7-7676

Cornell Aeronautical Lab., Inc., 4455 Genesee St., Buffalo 21, N.Y., 90
Tel: PLaza 7500

Cornell-Dubilier Electric Corp., 333 Hamilton Blvd., S. Plainfield, N.J., 3, 26, 31, 36, 48, 69
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Tel: PLainfield 6-9000

Corning Glass Works, Corning, N.Y., 22, 26, 27, 34, 38, 48, 53, 56, 78, 87, 88, 97
Tel: 2-5011

Cornish Wire Co., Inc., 50 Church St., New York 7, N.Y., 83
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Tel: BArclay 7-5140

Corona Engineering Service, 94-52 Corona Ave., Elmhurst 73, L.I., N.Y., 29, 34, 52, 85
Tel: ILlinois 7-2777

Corrugated Paper Products, Inc., 2240 Utica Ave., Brooklyn 34, N.Y., 87
Tel: ESplanade 7-6112

Corry-Jamestown Mfg. Corp., 44 N. Center St., Corry, Pa., 25
Tel: 2-8221

Corson Electric Mfg. Corp., 540 39th St., Union City, N.J., 26
Tel: UNion 6-4227

Cortland Industries, Inc., 4545 W. Cortland St., Chicago 39, Ill., 86, 89, 95
Tel: CA 7-1500

Cosa Corp., 405 Lexington Ave., New York 17, N.Y., 92
Tel: OREgon 9-3560

Cosmic Condenser Co. (Cosmic Radio Corp.), 853 Whittier St., New York 59, N.Y., 26
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Tel: LUdlow 9-3360

Cosmo Engineering Labs., Inc., Mountain Ave., Hackettstown, N.J., 31, 68
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Cossor (Canada) Ltd., 301 Windsor St., Halifax, N.S., Canada, 3, 9, 21, 25, 28, 29, 66, 77, 79, 80, 82, 85, 86, 90
Tel: 4-6487

Coto-Coil Co., Inc., 74 Pavilion Ave., Providence 5, R.I., 29
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Tel: WIlliams 1-3355

Cottrell Paper Co., Inc., Rock City Falls, N.Y., 89
Tel: RAllston SPA 280

Couch Ordnance, Inc., 3 Arlington St., N. Quincy, Mass., 52
Tel: PResident 3-0074

Cowan Publishing Corp., 300 W. 43 St., New York 36, N.Y., 99

Cox & Co., Inc., 115 E. 23rd St., New York 10, N.Y., 33, 57, 88
Tel: OREgon 4-4727

Craig Systems, Inc., Dept. F, 90 Holten St., Danvers, Mass., 3, 11, 25, 28
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Tel: SPring 4-1870

Cramer Controls Corp., Centerbrook, Conn., 44, 52, 68
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Crane Co., Torrey S., Summer St., Plantsville, Conn., 93, 96
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Crane Packing Co., 6400 Oakton St., Morton Grove, Ill., 86, 89, 94, 95

Cratex Mfg. Co., 81 Natoma St., San Francisco 5, Calif., 87

Creative Plastics Corp., N. Country Rd., Stony Brook, N.Y., 87
Tel: STony Brook 7-0921

Crescent Co., Inc., 20 Central Ave., Pawtucket, R.I., 83
Tel: PAwtucket 2-3100

Crest Transformer Corp., 1834 W. North Ave., Chicago 22, Ill., 59
Tel: EVerglade 4-1600

Cresthill Industries, Inc., 196 Ashburton Ave., Yonkers, N.Y., 90
Tel: YOnkers 5-9510

Croname, Inc., 3701 Ravenwood Ave., Chicago 13, Ill., 25, 39, 48, 60, 85, 86, 87
Tel: BI 8-7500

Crosby Laboratories, Inc., Robbins Lane, Hicksville, N.Y., 2, 13, 17, 80, 85, 90
Tel: WElls 1-3191

Crosley Div., Avco Mfg. Corp., 2630 Glendale-Milford Rd., Cincinnati 15, Ohio, 1, 3, 4, 14, 15, 21, 25, 28, 29, 47, 59
Tel: PRinceton 1-8931

Cross Company, H., 15 Beekman St., New York 38, N.Y., 93
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Tel: COrtlandt 7-0470

Crowhurst, Norman H., 150-47 14th Road, Whitestone 57, L.I., N.Y., 85
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Tel: INdependence 3-7258

Crowley Div., Aerovox Corp., 1 Central Ave., W. Orange, N.J., 21, 22, 32, 41, 66, 84, 89, 93
Tel: ORange 3-7660

Crown Controls Co., Inc., 40-44 S. Washington St., New Bremen, Ohio, 3, 21
Tel: 2311

Crown Cork & Seal, Inc., 4425 Eastern Ave., Baltimore 3, Md., 90, 91
Tel: BRoadway 6-0400

Crucible Steel Co. of America, H. W. Oliver Bldg., Mellon Sq., Pittsburgh 22, Pa., 21, 41, 49, 63, 84, 87, 93
Tel: ATlantic 1-3800

Crystal Research Products, W. Madison & Prospect Aves., Dumont, N.J., 68, 86
Tel: DUmont 4-3910

Cubic Corp., 2841 Canon St., San Diego, Calif., 66, 77

Cumeralto, Quinten G., 28059 Groveland Ave., Roseville, Mich., 85
Tel: PRescott 8-0188

Cumming & Associates, Bruce, 6029 W. Belmont Ave., Chicago 34, Ill., 100
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Tel: MErrimac 7-3770

Cunningham Son & Co., Inc., James, 33 Litchfield St., Rochester 10, N.Y., 56
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Curtis Development & Mfg. Co., 3276 N. 33rd St., Milwaukee 16, Wis., 87
Tel: HIlltop 5-1817

Curtis, Morris & Safford, 60 E. 42nd St., New York 17, N.Y., 85
Tel: MUrray Hill 2-7171

Curtiss-Wright Corp., Electronics Div., Plant #2, Carlstadt, N.J., 21, 42, 52, 65, 68, 70, 72, 78
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Tel: GEneva 8-4000

Cushing & Nevell, 101 Park Ave., New York 17, N.Y., 85, 98, 99
Tel: OREgon 9-3810

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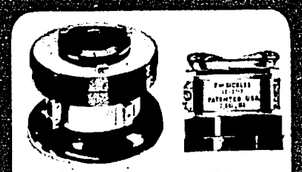
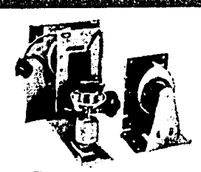
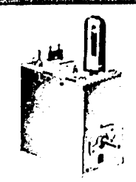
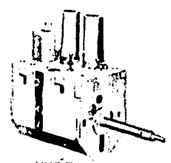
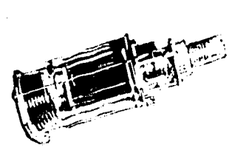

Color and Monochrome Yokes

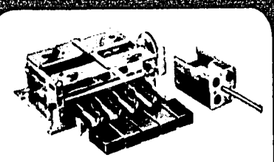

Flyback Transformers

Toroids & Magnetic Amplifier Assemblies

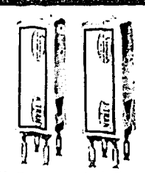

UHF Tuners

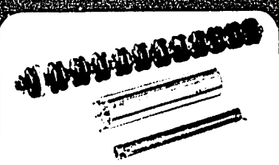

VHF Tuners

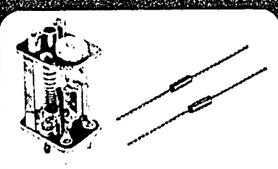

Electro-mechanical Assemblies


Auto Radio Tuners

Military Type Variable Capacitors


K. Trans and J. Trans


Delay Lines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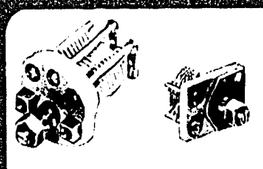
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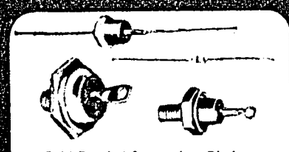
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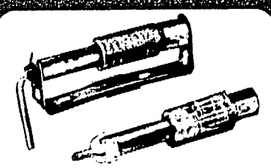
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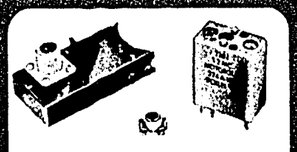
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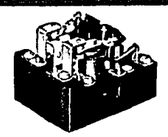
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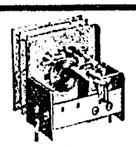
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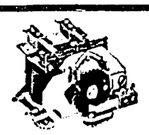
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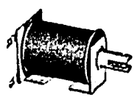
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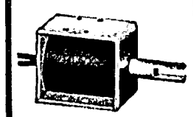
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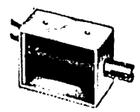
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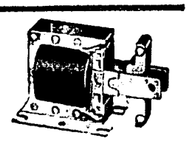
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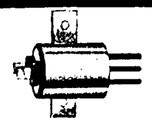
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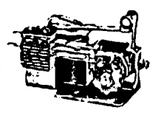
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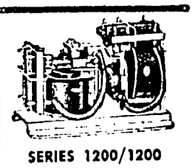
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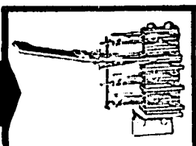
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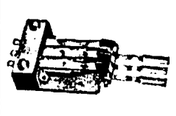
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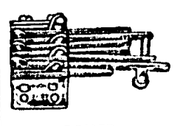
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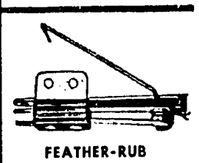
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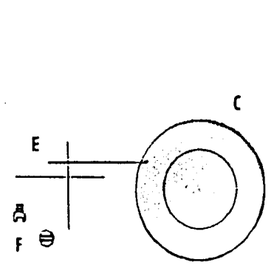

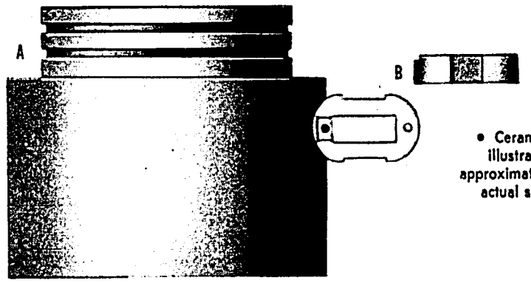

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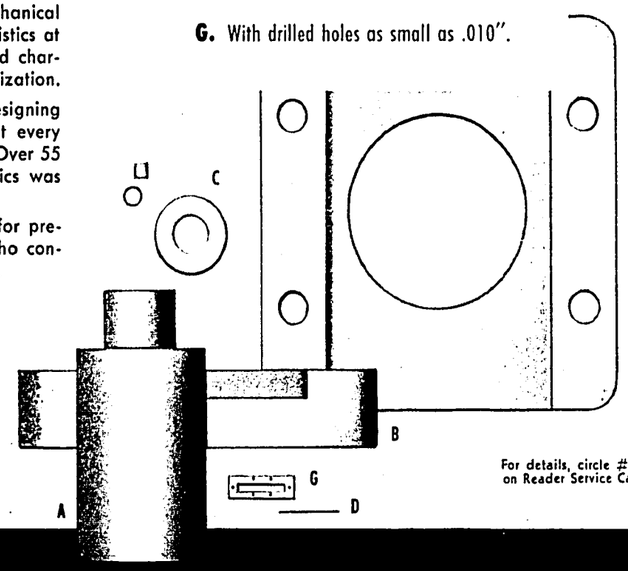

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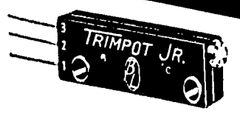

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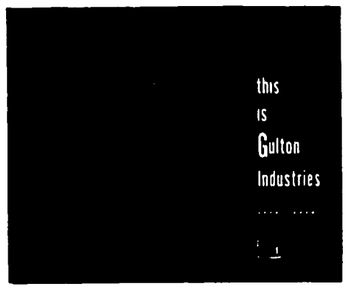

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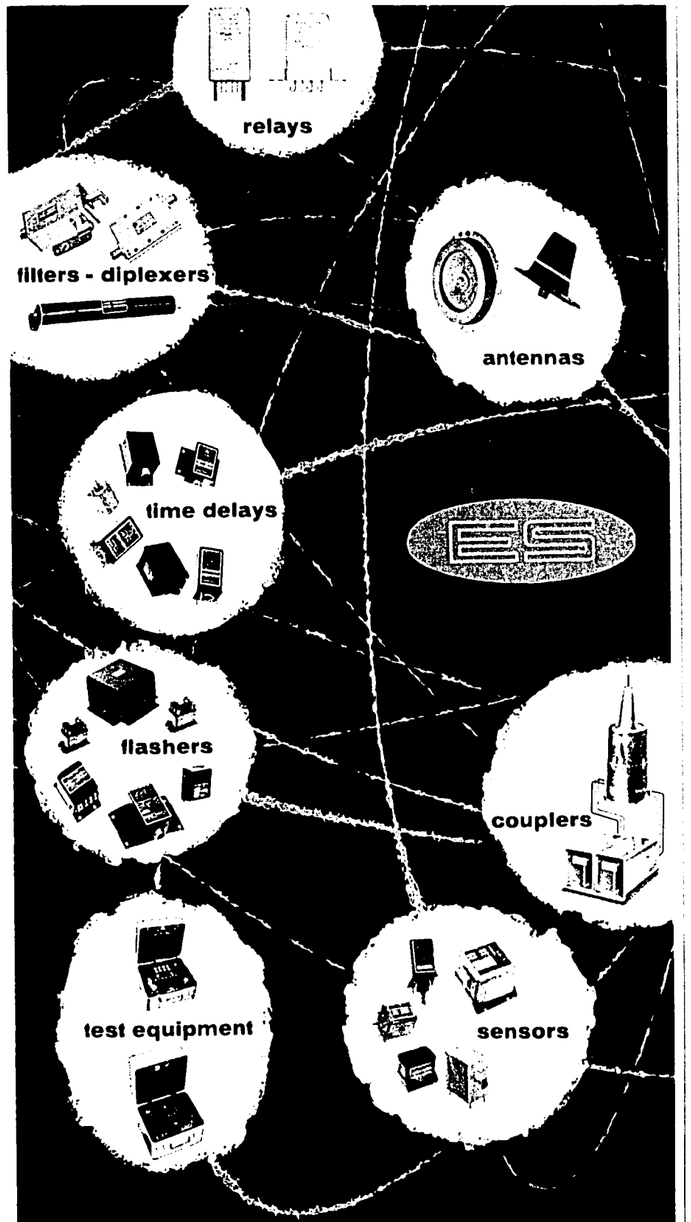

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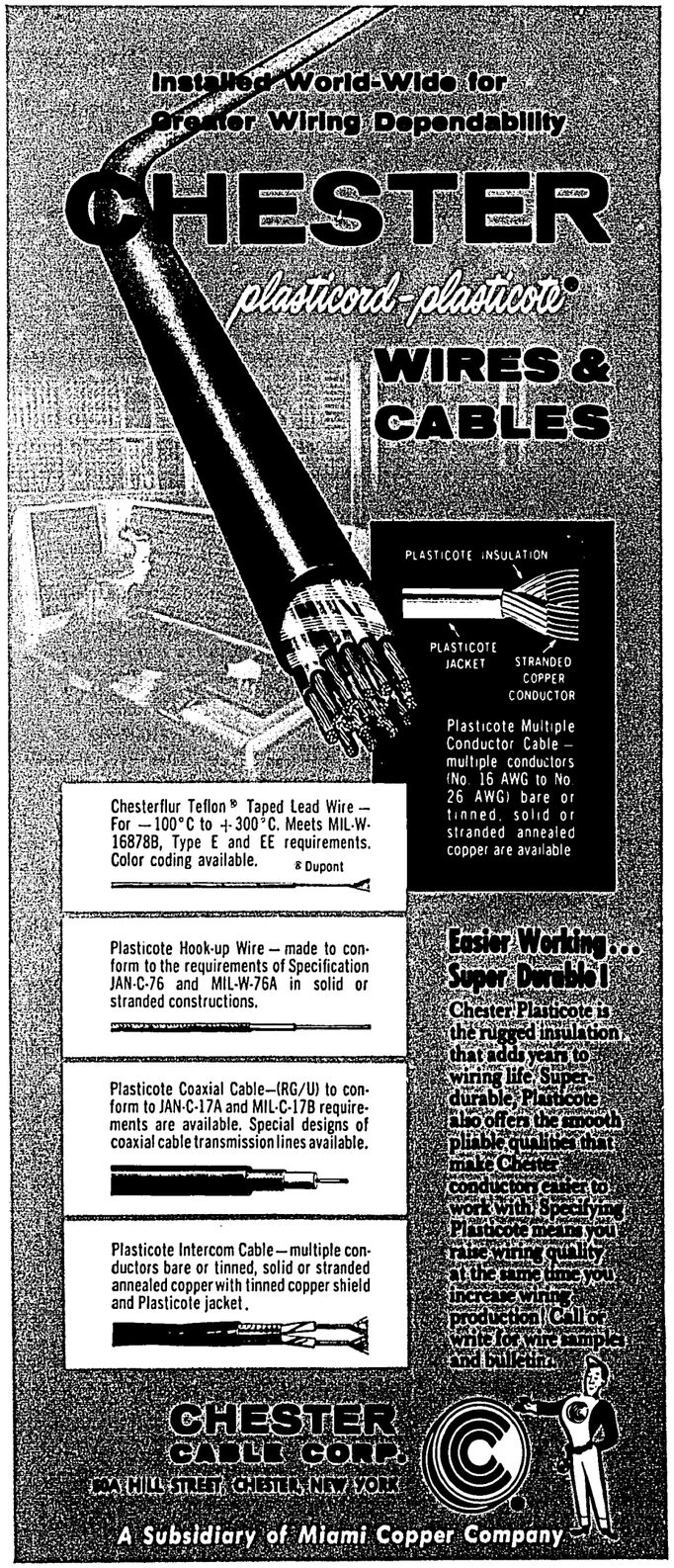

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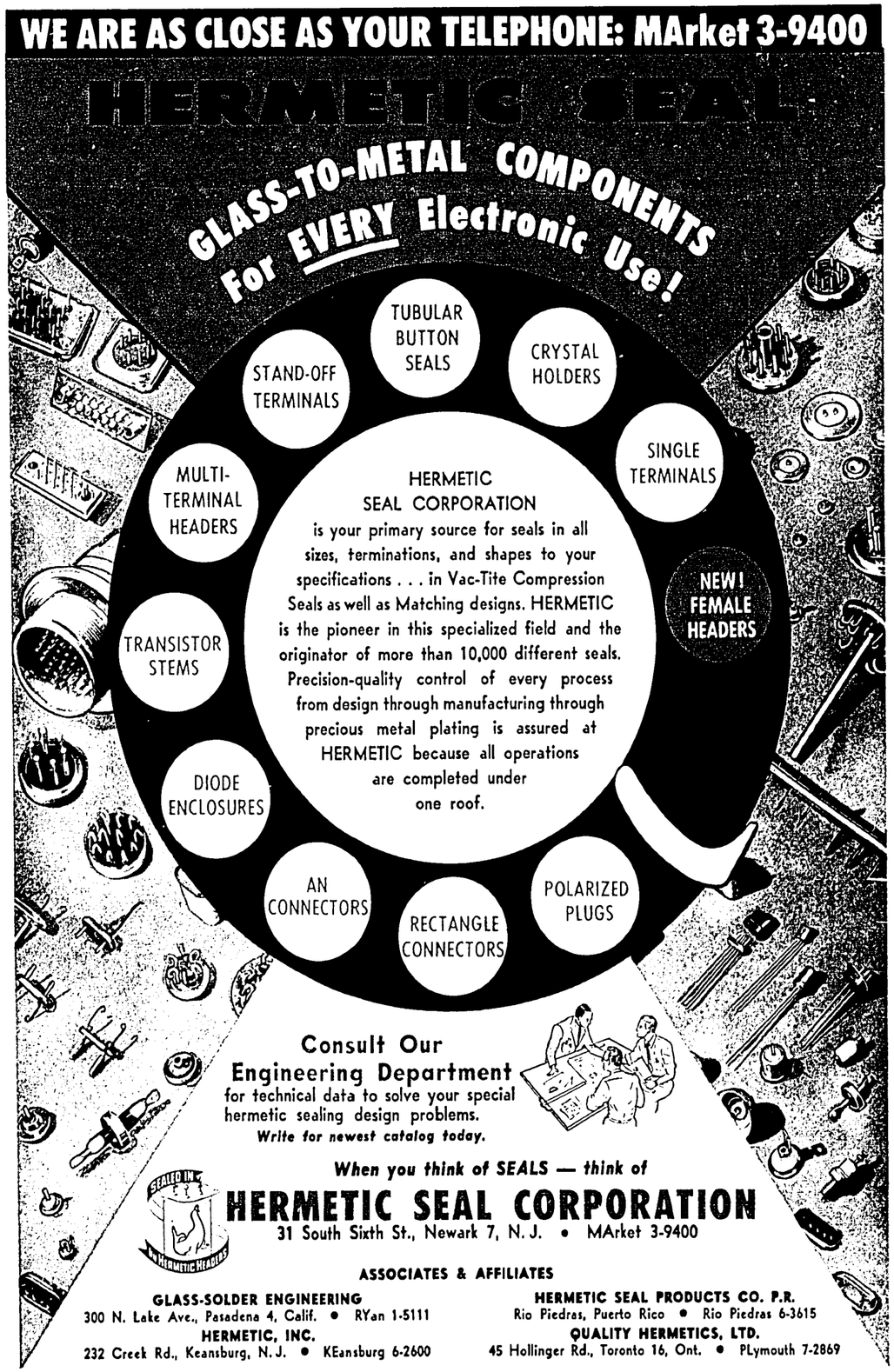

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Tel: AD 7-3932

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Tel: DAlaware 2-5400

Gardner Denver Co., Quincy, Ill., 92
Tel: BAldwin 2-5400

Garfield Wire Div., Overlake Corp., 142 Monroe St., Garfield, N.J., 83
Tel: GReenley 2-3661

Garland Sales Corp., 50 Shore Rd., Port Washington, N.Y., 45
Tel: PO 7-7700

Garner Co., Inc., George K., 1048 Locust St., Philadelphia 34, Pa., 85, 87, 97
Tel: GArfield 6-3000

Garrison Aircraft Supply, Inc., 5 Union Square, New York 3, N.Y., 85, 87
Tel: ORegon 5-8700

Garrett Metal Products, L., 69-15 59th Ave., Woodside, L.I., N.Y., 25, 28, 86, 90
Tel: HAvemeyer 9-3025

Gates Electronic Co., 2000 Barnes Ave., New York 62, N.Y., 31, 47, 50, 59, 65, 68, 71, 72
See ad on page 378
Tel: TYrone 2-6490

Gates Radio Co., 123 Hampshire St., Quincy, Ill., 3, 5, 12, 13, 18, 25, 35, 95
Tel: BAldwin 2-8202

Garrett Wire & Cable Co., Brookfield, Mass., 86, 87
Tel: VOlunteer 7-3000

Gear Specialties, Inc., 2635 W. Medill Ave., Chicago 47, Ill., 81
Tel: DI 2-3200

Gee Lar Manufacturing Co., 400 S. Wyman St., Rockford, Ill., 3, 37, 39, 56, 92, 94
See ad on page 586
Tel: 5-0548

Gemloid Corp., 78-01 Queens Blvd., Elmhurst 73, N.Y., 32, 84, 86, 87, 89, 94, 95

General American Trans. Corp., 135 S. La Salle, Chicago, Ill., 24, 25, 48, 86, 87, 95
Tel: FRanklin 6-4000

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General Antenna Corp., 1 Bala Ave., Bala Cynwyd, Pa., 85, 90
Tel: MOhawk 4-8800

General Automatic Corp., 25 Carlton Ave., Mountain View, N.J., 32
Tel: Little Falls 4-2787

General Automatics, Inc., 972 Post Rd., Darien, Conn., 34, 36, 67, 78, 85, 86, 96
Tel: DArtmouth 4-0960

General Bronze Corp., 711 Stewart Ave., Garden City, L.I., N.Y., 3, 36, 37
Tel: PIoneer 1-4400

General Cable Corp., 420 Lexington Ave., New York 17, N.Y., 87
Tel: LExington 2-2020

General Cement Mfg. Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 3, 30, 31, 37, 39, 40, 46, 49, 53, 55, 56, 71, 83, 85, 86, 87, 91, 94, 96
See ad on page 586
Tel: 2-6695

General Ceramics Corp., Dept. ID, Crows Mill Rd., Keasbey, N.J., 32, 38, 41, 70, 84, 89
See ads on pages 334, 476
Tel: VAlley 6-5100

General Chemical Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N.Y., 32, 71, 95
Tel: HAnover 2-7500

General Coil Products Corp., 4 Rose St., Murray Hill, L.I., N.Y., 3, 29, 30, 92
Tel: PLeasant 6-4455

General Coil & Transformer Co., Inc., Rt. 533, Watchung Stas., N.J., 21, 29, 59
Tel: WHitehall 6-2525

General Communication Co., 681 Beacon St., Boston 15, Mass., 1, 3, 14, 15, 21, 22, 36, 47, 48, 52, 56, 60, 66, 77, 79, 85, 86, 90
See ad on page 495
Tel: COpley 7-6030

General Communications, Inc., 1 Mile & Lancaster Rd., Ft. Wayne, Ind., 5, 18, 21, 25, 28, 36, 47, 52, 56, 87, 90
Tel: IOgan 3-5241

General Components, Inc., 225 E. 144th St., New York 51, N.Y., 47, 86, 87, 94
See ad on page 551
Tel: MOtthaven 5-0740

General Costs Co., Inc., 501 Kenilworth Ave., Glendale 1, Calif., 3, 5, 12, 37, 39, 78, 79
Tel: VAlencia 5-3161

General Control Co., Inc., 720 Commonwealth Ave., Boston 34, Mass., 36
Tel: ST 2-7430

General Electronics Corp., 1731 N. Coronado St., Los Angeles 26, Calif., 3, 4, 5
Tel: NOrmandy 2-1800

General Devices, Inc., P.O. Box 255, Princeton, N.J., 59
See ad on page 422
Tel: MOnmouth Junction 7-4571

General Electric Co., Apparatus Sales Div., 1 River Rd., Schenectady 5, N.Y., 20, 21, 24, 26, 31, 42, 44, 47, 50, 52, 55, 56, 57, 59, 65, 68, 69, 72, 74, 75, 77, 78, 81, 88, 92
Tel: FRanklin 4-2211

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Tel: HUdson Falls 4-3341

General Electric Co., Clock & Timer Dept., Homer Ave., Ashland, Mass., 42, 44
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General Electric Co., Communication Prods. Dept., Electronics Park, Syracuse 9, N.Y., 6, 7, 10, 11, 14
Tel: Granite 6-4411

General Electric Co., Computer Dept., 1103 N. Central Ave., Phoenix, Ariz., 20, 21, 68, 70, 85
Tel: AL 4-3171

General Electric Co., Direct Current Motor & Generator Dept., 3001 East Lake Rd., Erie, Pa., 44, 92
Tel: ERie 5-5461

General Electric Co., Electronic Components Dept., W. Genesee St., Auburn, N.Y., 21, 23, 26, 32, 33, 34, 36, 40, 45, 48, 53, 84, 87, 97
Tel: AUburn 3-7321

General Electric Co., Electr. Components Div., Schenectady 5, N.Y., 51, 61, 62, 63
Tel: FRanklin 4-2211

General Electric Co., Heavy Military Electronic Equip. Dept., Industrial Park, Syracuse, N.Y., 3, 14, 15, 58, 66
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General Electric Co., Laminated Prods. Dept., Coshocton, Ohio, 95
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General Electric Co., Lamp Wire & Phosphors Dept., 1331 Chardon Rd., Cleveland 17, Ohio, 83, 93, 97
Tel: KE 1-5050

General Electric Co., Armament & Control Section, Light Military Electronic Equip. Dept., 600 Main St., Johnson City, N.Y., 3, 14, 15, 70, 81
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General Electric Co., Magnetic Materials Div., Edmore, Mich., 41, 53, 65
Tel: HAmilton 7-5151

General Electric Co., Miniature Lamp Dept., Nela Park, Cleveland 12, Ohio, 46
Tel: GLenville 1-6600

General Electric Co., Power Tube Department, Bldg. 267, Schenectady 5, N.Y., 51, 62, 63, 66
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Tel: FRanklin 4-2211, Ext. 6181

General Electric Co., Precision Parts Section, Rt. 22, Springfield, N.J., 97
Tel: DR 6-2600

General Electric Co., Radio Receiver Dept., 1285 Boston Ave., Bridgeport 4, Conn., 4
Tel: ED 4-1012

General Electric Co., Radio Receiver Dept., Utica, N.Y., 4
Tel: 5-8381

General Electric Co., Rectifier Dept., 1200 Western Ave., W. Lynn, Mass., 47, 50
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General Electric Co., Semiconductor Products Dept., Section S 3767, 1224 W. Genesee St., Syracuse, N.Y., 50, 54
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General Electric Co., Specialty Transformer Dept., 1635 Broadway, Ft. Wayne, Ind., 21, 47, 59, 65
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General Industries Co., Olive & Taylor Sts., Elyria, Ohio, 16, 44,
Tel: 2235

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See ad on page 176
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General Insulated Wire Works, Inc., Div. Gen. Cable Corp., 69 Gordon Ave., Providence, R.I., 83
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General Magnetic Corp., 10001 Erwin Ave., Detroit 34, Michigan, 41

General Magnetics, Inc., 135 Bloomfield Ave., Bloomfield, N.J., 21, 47, 59
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Tel: GL 9-7256

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See ad on page 407
Tel: CYpress 2-1500

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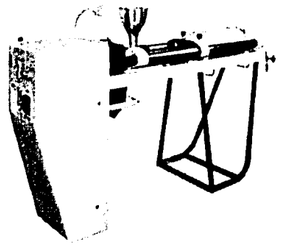

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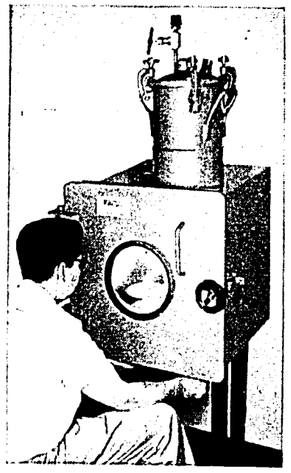

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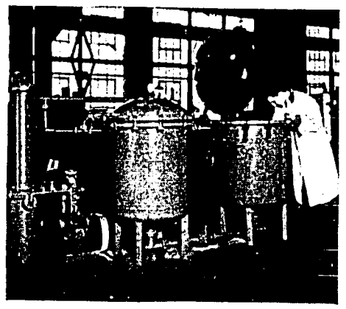

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Glass Engineering Labs., 601 O'Neill Ave., Belmont, Calif., 86, 89
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Glass Products Co., 30 S. Salsipuedes St., Santa Barbara, Calif., 48
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Tel: WOodland 2-0670

Glass Solder Engineering, 300 N. Lake Ave., Pasadena 4, Calif., 89
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Graphite Metallizing Corp., 1057 Nepperhan Ave., Yonkers, N.Y., 30, 56, 66, 87
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Gray Instrument Co., 200 E. Church Lane, Philadelphia 44, Pa., 53, 69, 72
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Tel: JUstice 2-2201

Gray Research & Dev. Co., Inc., Manchester, Conn., 18, 21, 35, 44, 45
Tel: MItchell 9-4506

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Tel: FLeetwood 4-1040

Great American Industries, Inc., Rubatex Div., Bedford, Va., 89, 95
Tel: 2611

Great Eastern Mfg., Inc., Bridge St., Springfield, Vt., 44, 81
Tel: TU 5-4531

Great Eastern Metal Products Co., 22 Woodworth Ave., Yonkers 2, N.Y., 86, 87
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Green Instrument Co., Inc., 385 Putnam Ave., Cambridge 39, Mass., 92
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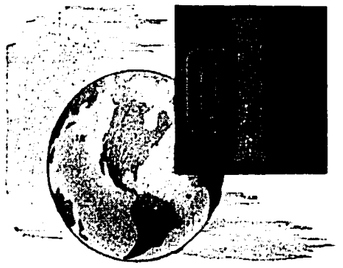

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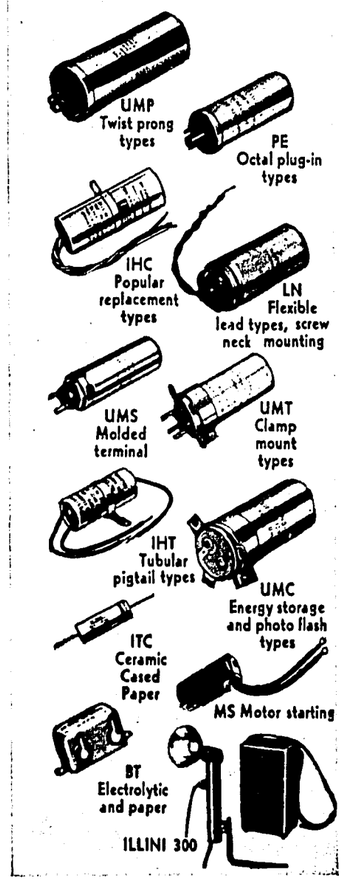

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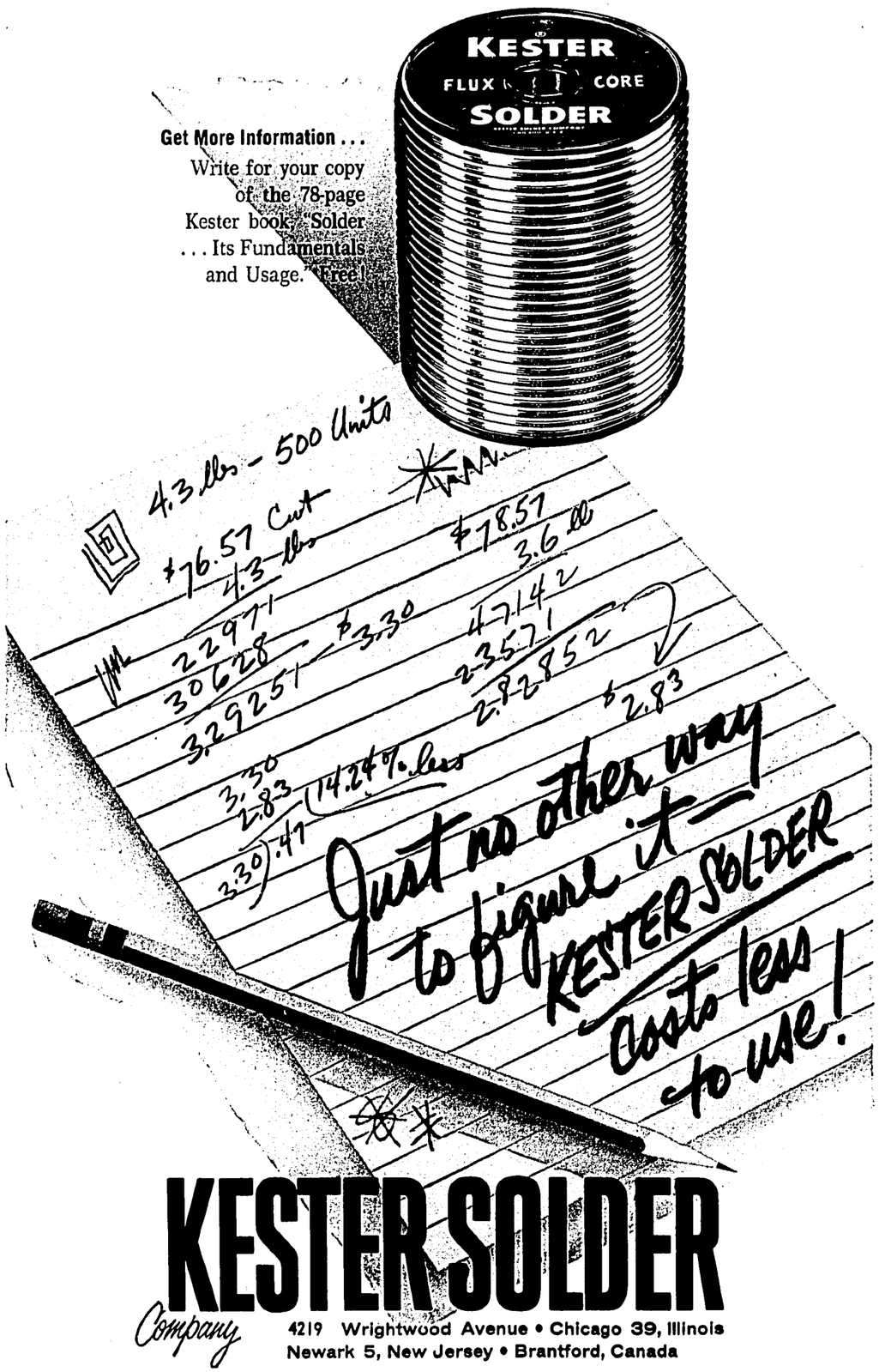
Tel: INdependence 3-2200

Industrial Control Co., Straight Path & Arlington Ave., Wyandanch, L.I., N.Y., 72



For details, circle #176 on Reader Service Card.

Industrial Development Eng. Assoc., Inc., 7900 Pendleton Pike, Indianapolis 26, Ind., 2, 4, 11, 21, 31, 60
Tel: LIberty 7-3581

Industrial Development Labs., Inc., 17 Pollock Ave., Jersey City 5, N.J., 69, 72, 90
Tel: HEnderson 5-0100

Industrial Devices, Inc., 982 River Rd., Edgewater 23, N.J., 38, 46, 87, 94
Tel: WHitney 3-4085

Industrial Electrical Works, Inc., 1509 Chicago, Omaha 2, Nebr., 92
Tel: ATlantic 4600

Industrial Electronic Controls Co., 2271 E. 14th St., Brooklyn 29, N.Y., 68, 70
Tel: ES 5-5259

Industrial Electronic Engineers, 3973 Lankershim Blvd., N. Hollywood, Calif., 68, 70, 85
Tel: POplar 3-7303

Industrial Electronics Co., Hanover, Mass., 9, 12, 21, 68

Industrial Electronics, Inc., 7007 Lancaster Rd., Baltimore 7, Md., 85
Tel: HUnter 6-8988

Industrial Electronics, Inc., 8060 Wheeler St., Detroit 10, Mich., 68
Tel: TYler 8-7600

Industrial Electronics of Canada, Ltd., 83 Torbarrie Rd., Toronto 15, Ont., Canada, 20, 21, 24, 25, 28, 44, 47, 58, 65, 68, 70, 76, 85
Tel: CHerry 1-3501

Industrial Engravers, Inc., 2212 McDonald Ave., Brooklyn 23, N.Y., 86
Tel: HIckory 9-3200

Industrial Hardware Mfg. Co., Inc., 109 Prince St., New York 12, N.Y., 30, 55, 86, 87
See ad on page 417
Tel: ORegon 7-1881

Industrial Instruments, Inc., 89 Commerce Rd., Cedar Grove, N.J., 56, 69, 72
Tel: PIlgrim 6-3300

Industrial Labs. Pub Co., 201 N. Wells St., Chicago, Ill., 99
Tel: FInancial 6-1026

Industrial Mica Corp., 223 S. Van Brunt St., Englewood, N.J., 89
Tel: LOwell 8-4800

Industrial Nucleonics Corp., 1205 Chesapeake Ave., Columbus 12, Ohio, 58, 68, 70, 78, 81
Tel: HUdson 8-0671

Industrial Production Associates Corp., 280 Madison Ave., N.Y. 16, N.Y., 85, 86, 90
Tel: MUrray Hill 5-1989

Industrial Prods. Co., Div. Danbury-Knudsen, Inc., Federal Rd., Danbury, Conn., 30, 52, 56
Tel: SP 5-2521

Industrial Research Lab., Div. of Aeronca, Hilltop & Frederick Rd., Baltimore 28, Md., 1, 3, 20, 21, 68, 70, 81
Tel: RI 7-0200

Industrial Research Products, Inc., 9400 Belmont, Franklin Park, Ill., 85
Tel: GLadstone 5-3600

Industrial Retaining Ring Co., 57 Cordier St., Irvington 11, N.J., 87
Tel: WAverly 6-5000

Industrial Television Inc., 369 Lexington Ave., Clifton, N.J., 12, 21, 79, 90
Tel: GRegory 3-0900

Industrial Test Equipment Co., 55 E. 11th St., New York 3, N.Y., 21, 67, 69, 72, 75, 80, 81
See ad on page 509
Tel: GRamercy 3-4684

Industrial Timer Corp., 1407 Mc Carter Highway, Newark 2, N.J., 42, 52, 75
Tel: HUmboldt 2-4500

Industrial Transformer, Gouldsboro, Pa., 59, 69, 72
See ad on pages 134-135
Tel: VIctor 2-2111

Industrial Tubes, Inc., 321 Stevens St., Geneva, Ill., 62, 63
Tel: GEneva 806

Industrial Winding Machinery Co., 120 Wall St., Suite 3410, New York 5, N.Y., 72, 92
See ad on page 575
Tel: WHitehall 3-1754

Industro Transistor Corp., 649 Broadway, New York 12, N.Y., 54, 61, 62, 63
See ad on page 415
Tel: ORegon 7-8400

Industron Co., 307 38th St., New York 18, N.Y., 21, 31, 42, 47, 65, 67, 71, 72, 73, 80, 90
Tel: LOngacre 5-4482

Industron Corp., 55 Needham St., Newton 61, Mass., 21, 47, 59, 88, 90
Tel: DE 2-1477

Information for Industry, Inc., 1108 16th St., N.W., Washington 6, D.C., 99
Tel: STerling 3-4938

Inland Electronics Corp., 500 Rathbone Ave., Aurora, Ill., 83, 86, 90
Tel: 6-7744

Inland Testing Laboratories, Div. of Cook, 6401 W. Oakton, Morton Grove, Ill., 85, 90
Tel: SPring 4-2200

Institute of Radio Engineers, Inc., 1 East 79th St., New York 21, N.Y., 99
See ads on pages 254, 286, 412
Tel: LEhigh 5-5100

Instrument Cases, Inc., 510 W. Garfield St., Glendale 4, Calif., 25, 87, 97
Tel: CHapman 5-5767

Instrument Corp. of America, Blacksburg, Va., 30

Instrument Development Laboratories, Inc., 67 Mechanic St., Attleboro, Mass., 30, 56, 70, 85
Tel: ATtleboro 1-3880

Instrument Electronics Corp., 90 Main St., P.O. Box 830, Port Washington, L.I., N.Y., 67, 72
Tel: POrt Washington 7-4242

Instrument Laboratories, 315 W. Walton Place, Chicago 10, Ill., 67, 72
Tel: MU 2-0123

Instrument Motors, 460 North Ave., New Rochelle, N.Y., 44, 81
See ad on page 373
Tel: NEw Rochelle 6-7222

Instrument Resistors Co., 1036 Commerce Ave., Union, N.J., 53
Tel: MUrdock 6-4364 4363

Instrument Specialties Co., Inc., 232-A Bergen Blvd., Little Falls, N.J., 87, 89, 97
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Tel: LIttle Falls 4-0280

Instruments for Industry, Inc., 156 Glen Cove Rd., Mineola, L.I., N.Y., 21, 90
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Tel: PIoneer 2-5300

Instruments Publishing Co., 845 Ridge Ave., Pittsburgh 12, Pa., 99
Tel: FAirfax 1-0161

Insulated Circuits Inc., 100-8 St., Passaic, N.J., 48, 85, 86
Tel: GRegory 2-5300

Insulating Fabricators, Inc., 150 Union Ave., East Rutherford, N.J., 86, 95
Tel: LAckawanna 4-0190

Insulating Fabricators of New England, Inc., 69 Grove St., Watertown 72, Mass., 86, 89, 95
Tel: WA 3-9800

Insulation Manufacturers Corp., 565 W. Washington Blvd., Chicago 6, Ill., 86, 87, 89, 91, 95
Tel: CEntral 6-7320

Insulation Products Co., Box 5679, Pittsburgh, Pa., 86, 89, 94

Insuline Corp. of America, 186 Granite St., Manchester, N.H., 3, 25, 28, 30, 37, 39, 56, 86, 87
Tel: NAtional 5-8511

Integrated Mica Corp., 202 Franklin Place, Woodmere, N.Y., 89
Tel: FRanklin 4-2350

Intercontinental Electronics Corp., 1551 Franklin Ave., Mineola, L.I., N.Y., 4, 5, 6, 7, 11, 12, 13, 14, 15, 17, 18, 70, 72
Tel: PIoneer 6-5010

Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y. 9, 21, 23, 29, 31, 35, 36, 44, 47, 59, 65, 76
See ad on page 381
Tel: LUdlow 4-6200

Interference Testing & Research Lab., Inc., 150 Causeway St., Boston 14, Mass., 80, 85, 90
Tel: LAfayette 3-7826

International Business Machines Corp., 590 Madison Ave., New York, N.Y., 70
Tel: PLaza 3-1900

International Crystal Mfg. Co., Inc., 18 North Lee, Oklahoma City 2, Okla., 21, 30, 33, 36, 42, 48, 72, 80, 82
Tel: FOrest 5-1165

International Electronic Research Corp., 145 W. Magnolia Blvd., Burbank, Calif., 97
See ad on page 596
Tel: VIctoria 9-2481

International Electronics Corp., 81 Spring St., New York 12, N.Y., 5, 11, 17, 32, 40, 49, 51, 54, 58, 79
Tel: WOrth 6-0790

International Fermont Machinery Co., Inc., Ramapo, N.Y., 47
Tel: SLoatsburg 3-2796

International Instruments, Inc., P.O. Box 2954, New Haven 15, Conn., 42, 56
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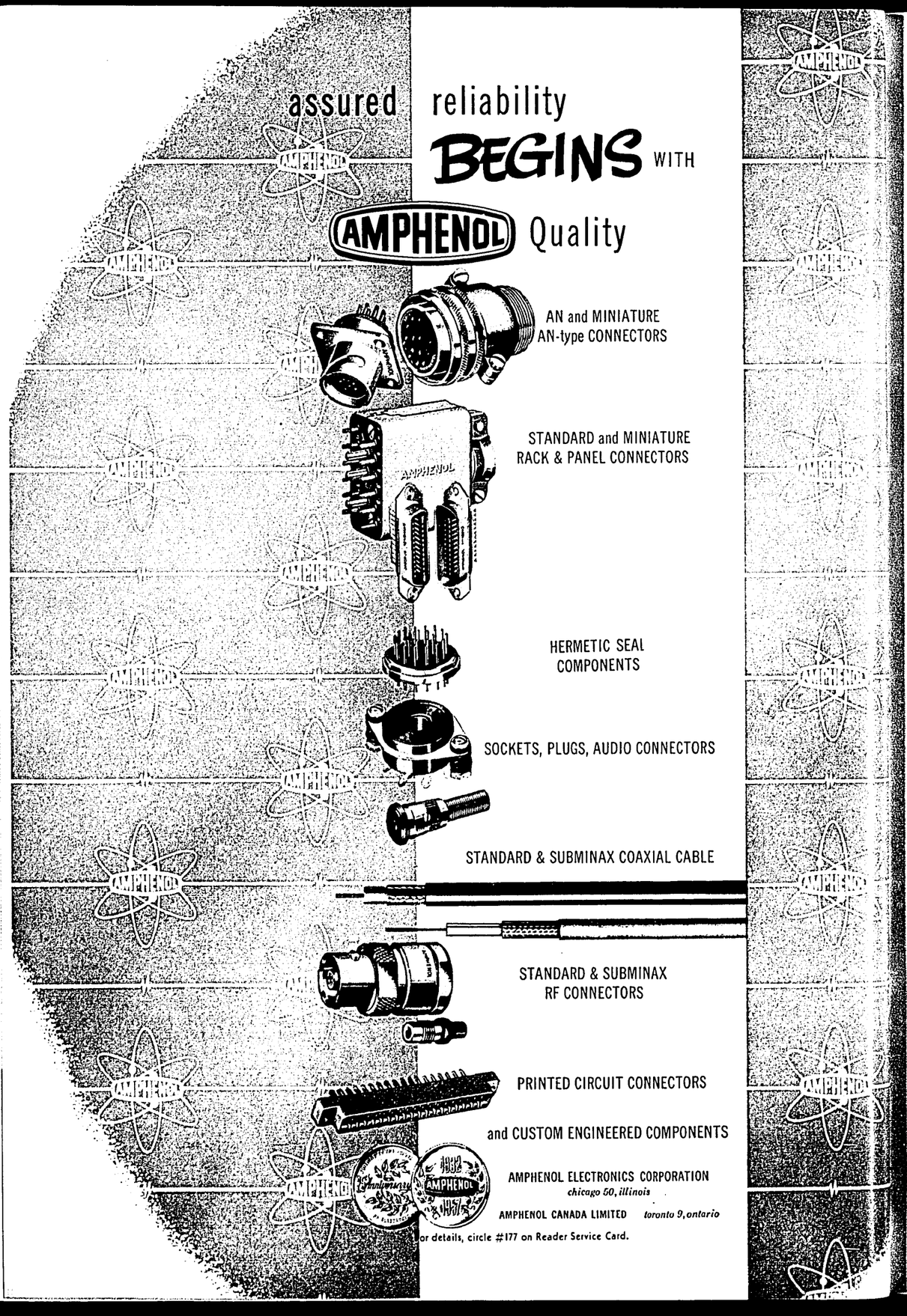
Tel: FUlton 7-2515

International Nickel Co., Inc., 67 Wall St., New York 5, N.Y., 93, 96
Tel: WHitehall 4-1000

International Optical Co., Inc., 45 Urban Ave., Westbury, L.I., N.Y., 71
Tel: ED 3-2232

International Projector Corp., 55 La France Ave., Bloomfield, N.J., 3, 9, 11, 21, 47, 58, 66, 72, 74, 81
Tel: PIlgrim 3-1400

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.



International Pump & Machine Works, Inc., 81 Dorsa Ave., Livingston, N.J., 38, 86, 89, 92, 97
Tel: LIvingston 6-0660-1

International Radiant Corp., 40 Matinecock Ave., Port Washington, L.I., N.Y., 71, 88
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Tel: POrt Washington 7-3184

International Rectifier Corp., 233 Kansas St., El Segundo, Calif., 23, 31, 50, 54
See ad on page 390
Tel: ORegon 8-6281

International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa., 22, 29, 34, 36, 38, 50, 53, 58, 59
Tel: WAlnut 2-2166

International Resistance Co., Hycor Div., 12970 Bradley Ave., Sylmar, Calif., 29, 35, 36, 47, 53, 59, 69, 72
Tel: EMpire 5-3125

International Telemeter Corp., Dept. K, 2000 Stoner Ave., Los Angeles 25, Calif., 5, 21, 30, 66, 83
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Tel: GRanite 8-7751

International Telephone & Telegraph Corp., Components Div., 100 Kingsland Rd., Clifton, N.J., 38, 50, 51, 63
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Tel: NUtley 2-3600

International Telephone & Telegraph Co., Industrial Products Div., 100 Kingsland Rd., Clifton, N.J., 1, 4, 5, 11, 18, 19, 21, 22, 47, 48, 65, 67, 69, 70, 72, 75, 77, 79, 80, 92
Multiple pages of additional data on 76-79
Tel: NUtley 2-3600

Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N.Y., 99
Tel: LExington 2-1727

Interstate Electronic Supply Corp., 230 Ida, Box 2018, Wichita 1, Kansas, 100
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Tel: HO 4-8185

Interstate Electronics, Inc., 227 Fulton St., New York 7, N.Y., 30, 66
Tel: BEekman 3-8780

Invengineering, Inc., P.O. Box 360, Belmar, N.J., 85, 90
Tel: MUtual 1-4525

Ippolito & Co., Inc., James, 1624 Stillwell Ave., New York 66, N.Y., 97

Iron Fireman, Electronics Div., 2838 S.E. 9 Ave., Portland 2, Ore., 44, 52, 57
Tel: BElmont 4-6551

Ironbound Operating Co., 110 Polk St., Newark 5, N.J., 29, 34, 35, 36, 59
Tel: MA 3-4090

Islip Transformer & Metal Co., Inc., Beech St., Islip, L.I., N.Y., 29, 36, 59
Tel: JUniper 1-0960

Isolantite Mfg. Corp., Warren Ave., Stirling, N.J., 32, 38, 84, 87, 89, 94, 97
Tel: MIllington 7-0385-6

For additional information on any of the products advertised in this issue, circle the appropriate number on the Reader's Service Card at the back of this issue.

J

J-B-L Instrument Co., Sycamore & Mill Rd., Clifton Heights, Pa., 56
Tel: MAdison 3-4377

J-B-T Instruments, Inc., 441 Chapel St., New Haven 8, Conn., 38, 42, 56, 72, 87
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Tel: STate 7-5825

JFD Electronics, Inc., 1462, 62nd Ave., Brooklyn 19, N.Y., 3, 27
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Tel: DEwey 1-1000

J.S.H. Sales Co., 1108 Venice Blvd., Los Angeles 15, Calif., 50, 54, 61, 62, 63
Tel: RIchmond 9-7644

J-V-M Engineering Co., 4632 S. Lawndale Ave., Lyons, Ill., 3, 14, 15, 22, 36, 56, 60, 66, 77
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Tel: Lyons 3-7990

Jackson Electrical Instrument Co., 18 S. Patterson Blvd., Dayton 2, Ohio, 67, 72, 79, 80, 82
Tel: MIchigan 0367

Jacobs Instrument Co., 4718-20 Bethesda Ave., Bethesda 14, Md., 34, 70, 75, 77, 78, 86, 90
Tel: OLiver 4-8100

James Vibrapowr Co., 4036 N. Rockwell St., Chicago 18, Ill., 29, 31, 52, 59
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Tel: COrnelia 7-6333

Jan Hardware Mfg. Co., Inc., 75 N. 11th St., Brooklyn 11, N.Y., 46, 81, 89, 90, 94, 97
Tel: EVergreen 7-3541

Janette Electric Mfg. Co., Lehigh at Main, Mortongrove, Ill., 3, 56, 81
Tel: OR 3-8300

Jansky & Bailey, Inc., 1339 Wisconsin Ave., Washington 7, D.C., 17, 85, 89, 90
Tel: FE 3-4800

Jarrell-Ash Co., 26 Farwell St., Newtonville 60, Mass., 21, 62, 71, 72, 73, 76, 93
Tel: DEcatur 2-2130

Jarvis Electronics Corp., 1140 Cherry St., Winnetka, Ill., 1, 85, 90
Tel: WI 6-1255

Jeffers Electronics Div., Speer Carbon Co., Hoover Ave., Du Bois, Pa., 26, 29, 48
Tel: DU Bois 2100

Jefferson Products, Inc., Pleasant Valley Rd., Sutton, Mass., 83
Tel: UNion 5-4447

Jelliff Mfg. Corp., C.O., Pequot Rd., Southport, Conn., 83
Tel: CL 9613

Jennings Radio Mfg. Corp., 970 McLaughlin Ave., P.O. Box 1278, San Jose 8, Calif., 26, 27, 42, 52, 56, 72
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Tel: CYpress 2-4503

Jensen Industries, Inc., 7333 W. Harrison St., Forest Park, Ill., 45
Tel: FO 6-0180

Jensen Manufacturing Co., 6601 S. Laramie Ave., Chicago 38, Ill., 22, 25, 36, 40, 59

Jerrold Electronics, Ltd., 50 Wingold Ave., Toronto 10, Canada, 3, 21, 30, 36, 56, 80, 82, 83

Jerrold Electronics Corp., Dept. TED #2, 23 & Chestnut Sts., Philadelphia 3, Pa., 3, 5, 6, 21, 30, 36, 42, 52, 56, 59, 80, 82, 83
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Tel: LOcust 4-0707

Jersey Specialty Co. Inc., Burges Pl., Mountain View, N.J., 83
Tel: LIttle Falls 4-0784 1404 1405

Jetronic Industries, Inc., Main & Cotton Sts., Philadelphia 27, Pa., 10, 21, 47, 67, 72, 77, 80, 86
Tel: IV 2-7160

Johanson Mfg. Corp., P.O. Box 329, Boonton, N.J., 27
Tel: DE 4-2676

Johnson Co., E. F., Waseca, Minn., 2, 3, 11, 17, 27, 29, 33, 36, 39, 46, 55, 56, 87, 94, 97
Tel: 990

Johnson & Hoffman Mfg. Corp., 31 E. 2nd St., Mineola, L.I., N.Y., 86, 87, 92, 97
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Tel: PIoneer 2-3333

Johnson-Williams, Inc., 2625 Park Blvd., Palo Alto, Calif., 72
Tel: DAvenport 3-4131

Jones Div., Howard B., Cinch Mfg. Corp., 1026 S. Homan Ave., Chicago 24, Ill., 30, 37, 39, 87
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Tel: NEvada 2-2000

Jones Electronics Co., Inc., M.C., 185 N. Main St., Bristol, Conn., 3, 66, 77, 80
Tel: LUdlow 2-6388

Jones, Jr., Howland B., 59 Montview Ave., Short Hills, N.J., 85

Jordan Co., Inc., 3235 W. Hampton Ave., Milwaukee 9, Wis., 68, 81
Tel: UPtown 1-3200

Jordan Electronics, Inc., 3025 W. Mission Rd., Alhambra, Calif., 78

Joy Manufacturing Co., Elect. Products Div., 1201 Macklind Ave., St. Louis 10, Mo., 30
Tel: MIssion 5-6670

Joy Manufacturing Co., Fan Div., 333 Oliver Bldg., Pittsburgh 22, Pa., 24
Tel: GRant 1-2140

Joy Manufacturing Co., 333 Oliver Bldg., Pittsburgh 22, Pa., 24, 30
Tel: GRant 1-2140

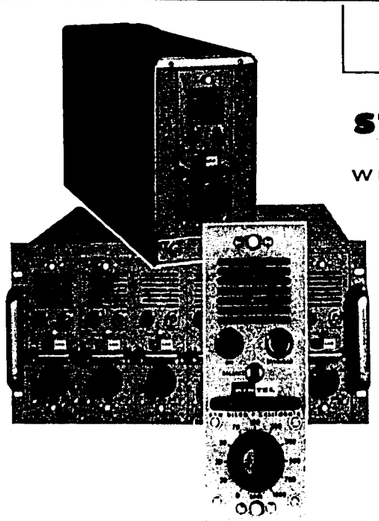
Joyro Associates, 488 Latham Rd., Mineola, L.I., N.Y., 92
Tel: PIoneer 6-4007

Juall Gear Co., Inc., 1108 Goffle Rd., Hawthorne, N.J., 81
Tel: HA 7-4220

Julie Research Laboratories, Inc., 556 W. 168th St., New York 32, N.Y., 22, 53, 69, 70
Tel: LO 8-8700

For quick interpretation of code numbers following company names in the Alphabetical Directory, see the eight-page pink section preceding page 1.

KINTEL



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WITH CHOPPER AMPLIFIERS

- ± 2 Microvolt Drift
- Extremely Low Noise
- High Input Impedance
- Low Output Impedance
- ± 35 Volt, ± 40ma Output
- 10 Accurate Gain Ranges
- 6 Unit Rack-Mounting
- Integral Power Supply

AMPLIFY MICROVOLTS WITH STABILITY

KIN TEL Model 111A amplifiers provide the lowest drift of any commercially available wideband DC amplifiers. They utilize KIN TEL's proven chopper amplifier circuitry to provide unsurpassed dynamic performance — unaffected by load or gain changes.

OPERATIONAL AMPLIFIER

The Model 111AO is an operational version of the Model 111A amplifier. In this unit, the "0" gain position is an open loop position, and the user may employ his own external networks to provide up to 100% resistive or capacitive feedback around the amplifier. By choosing the proper attenuator, input, and feedback components the user may obtain whatever amplifier characteristics are desired, such as limiting the gain or bandwidth, performing integrations, and generating complex linear transfer functions.

FLOATING INPUT AMPLIFIER

The Model 111AF is a floating input version of the Model 111A which permits its use with transducers, particularly thermocouples, which are grounded at the pickup location. The Model 111AF differs from the Model 111A only in that it eliminates the problem of ground loops resulting from grounding at both the amplifier and the pickup location.

APPLICATIONS

These amplifiers make dynamic, high-accuracy, low-level DC instrumentation systems practical. In comparison to AC systems, DC strain gage systems offer greater accuracy, wider bandwidth, operational simplicity, reduced maintenance, and eliminate capacitive balance problems. In one installation alone, KIN TEL DC amplifiers have logged over a million hours of accurate, trouble-free operation. The Model 111 series is ideally suited to telemetering, data reduction and all types of instrumentation facilities utilizing transducer measuring systems. They are excellent as scope preamplifiers, recorder and galvanometer driver amplifiers, or general purpose laboratory amplifiers.

SPECIFICATIONS

Gain (Phase Inverting)	0, 20, 30, 50, 70, 100, 200, 300, 500, 700, 1000
Gain Accuracy	±1%, DC to 2 KC; ±3%, DC to 10 KC; ±30%, DC to 40 KC
Input Impedance	100,000 ohms
Output Impedance	Less than 1 ohm in series with 25uh
Equivalent Input Drift	±2uv when used with regulated line voltage, ±10% change in AC input causes less than ±5uv change. 10 minute warm-up period required.
Equivalent Input Noise	0 to 3 cps, less than 5uv peak to peak. 0 to 750 cps, less than 5uv RMS. 0 to 50 kc, less than 12uv RMS.
Chopper Intermodulation	Less than 0.1%
Maximum Output Cable Capacity	0.02uf (external)
Linearity	Better than 0.1% to 2KC
DC Output Capability	0 to 35v where RL > 1000 ohms 0 to 40 ma where RL is 10 to 400 ohms
Frequency Response	0.3 db (±3%) DC to 10KC, less than 3 db down at 40KC
Rise Time	Less than 10 u sec.
Phase Shift	Less than 5° to 2KC
Overload Recovery Time	Less than 3 seconds
Dimensions:	
Amplifier Unit	2⅞" wide, 7⅝" high, 14⅝" deep
Unit in Cabinet	5 7/16" wide, 10" high, 18¼" deep
Rack Adapter Module for 6 Units	19" wide, 8¾" high, 18¼" deep (Width of cabinet behind 19" front panel is 17⅜")
Net Weight (Amplifier)	11 pounds
Price:	
111A Amplifier	$550.00*
111AO Amplifier	$560.00*
111AF Amplifier	$575.00*
111CF Cabinet for single 111A, AO, or AF Amplifier, with fan and connector	$105.00
111RF Rack Adaptor Module for six 111A, AO, or AF Amplifiers, with fans and connectors	$200.00

* Amplifier must be used with cabinet or rack adapter module.

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K

K-F Development Co., 2606 Spring St., Redwood City, Calif., 2, 4, 11, 53
Tel: EMerson 8-5670

K-V Transformer Corp., 20 E. Franklin St., Danbury, Conn., 29, 59
Tel: PIoneer 3-5531

K-W Engineering Works, 15920 Pin Oak Ct., Milwaukee 18, Wis., 3, 86
Tel: CUster 3-2095

Kaar Engineering Co., 2995 Middlefield Rd., Palo Alto, Calif., 1, 4, 7, 10, 11, 13, 36
Tel: DAvenport 6-5050

Kaddis Screw Prod. Co., Inc., 308-316 Hudson Ave., Rochester 18, N.Y., 87
Tel: BAker 5-3486

Kahle Engineering Co., 1357 7th St., North Bergen, N.J., 92
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Tel: UNion 7-6500

Kahn & Co., Inc., 541 Windsor St., Hartford 1, Conn., 25, 28, 47, 69, 72, 86, 90, 92
Tel: CHapel 6-7431

Kahn, Leonard R., 22 Pine St., Freeport, L.I., N.Y., 85
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Tel: FReeport 9-8800

Kahn Research Laboratories, 22 Pine St., Freeport, N.Y., 1, 5, 13, 17
Tel: FReeport 9-8800

Kane Mfg. Corp., N. Frahey St., Kane, Pa., 25, 86
Tel: KAne 1075

Kaiser Aircraft & Electronics Corp., 850 San Antonio Rd., Palo Alto, Calif., 90
Tel: YO 7-7267

Kaiser Aluminum & Chemical Sales, Inc., 919 N. Michigan Ave., Chicago 11, Ill., 83, 93

Kaiser Mfg. Engineers, Inc., Railroad Ave., Summit, N.J., 29, 56, 85, 86, 87
Tel: CR 3-3377

Kalite Technical Co., Inc., 715 Mattison Ave., Asbury Park, N.J., 99
Tel: PRospect 4-2100

Kall, Albert R., 431 W. Tabor Rd., Philadelphia 20, Pa., 85, 90
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Tel: LIvingston 8-4100

Kama Instrument Corp., 178 E. Second St., Mineola, L.I., N.Y., 21, 22, 36, 47, 53, 56, 58, 60, 67, 82, 86, 90
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Tel: PIoneer 6-4942

Kane & Co., J. V., 1004 Cloverhill Rd., Wynnewood, Pa., 72

Kanthal Corp., Amelia Pl., Stamford, Conn., 80, 92
Tel: FIreside 8-9251

Kapitol Magnetic Corp., 3322 W. Lawrence Ave., Chicago 25, Ill., 59
Tel: IRving 8-5170

Kardon Inc., Harman, 520 Main St., Westbury, L.I., N.Y., 21, 60
Tel: EDgewood 4-1500

Karlson Associates, Inc., 1610 Neck Rd., Brooklyn 29, N.Y., 3, 9, 25, 85, 90
Tel: NIghtingale 8-4522

Kartron, P.O. Box 472, Huntington Beach, Calif., 72
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Tel: LEhigh 9-4606

Kato Engineering Co., 1415 First Ave., Mankato, Minn., 31, 44, 47
Tel: 5031

Kay Electric Co., Dept. ID-9, 14 Maple Ave., Pine Brook, N.J., 5, 12, 21, 22, 42, 47, 67, 72, 75, 76, 77, 80, 82
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Tel: CAldwell 6-4000

Kay Sales Company, 2660 Grand Ave., Kansas City 8, Mo., 100
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Tel: BA 1-3800

Kearfott Co., Inc., 1378 Main Ave., Clifton, N.J., 10, 21, 22, 44, 66, 68, 70, 77, 81, 84
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Tel: GRegory 2-1000

Kearfott Co., Western Div., 253 N. Vinedo, Pasadena, Calif., 3, 21, 22, 33, 36, 59, 60, 66, 77, 86
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Tel: STanley 7-1178

Keil Engineering Products, 4356 Duncan Ave., St. Louis 10, Mo., 48, 87
Tel: STerling 1-3209

Keim, Llewellyn Bates, 270 Congress Pl., Pasadena, Calif., 85
Tel: SYcamore 9-6993

Keisers Industries, Inc., Lauman St., P.O. Box 42, Mt. Holly Springs, Pa., 83
Tel: 356

Keithley Instruments, Inc., 12415 Euclid Ave., Cleveland 6, Ohio, 21, 42, 72
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Tel: SWeetbriar 5-2666

Kelco Electronics, Box 438, Albertson, L.I., N.Y., 82
Tel: PIoneer 2-0230

Kellman Productions, Louis W., 1729-1733 Sansom St., Philadelphia 15, Pa., 18
Tel: RI 6-3892

Kellog Co., M. W., P.O. Box 469, Jersey City 3, N.J., 89, 95

Kellogg Switchboard & Supply Co., 79 W. Monroe St., Chicago 3, Ill., 52, 56
Tel: DEarson 2-0750

Kelvin Electric Co., 5907 Noble Ave., Van Nuys, Calif., 53
Tel: STanley 3-2666

Kemet Co., Div. Union Carbide Corp., Madison Ave. & W. 117th St., Cleveland 1, Ohio, 97
Tel: ACademy 6-3330

Kemode Mfg. Co., Inc., 161 W. 18th St., New York 11, N.Y., 92
Tel: WA 4-1869

Kemtron Electron Products, Inc., 14 Prince Pl., Newburyport, Mass., 33, 50, 54
Tel: HOmestead 2-4464

Kennedy & Co., D.S., 155 King St., Cohasset, Mass., 3, 22, 36, 66, 86, 88
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Tel: COhasset 4-1200

Kennedy Industries, 6808 Vista Del Mar, Playa Del Rey, Calif., 30
Tel: EXbrook 6-2475

Kenru Company, Box 121, Parsippany, N.J., 55
Tel: WHippany 8-0739

Kent Corp., F. C., 64 Howard St., Irvington, N.J., 3, 66
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Tel: ESsex 3-5500

Kenyon Transformer Co., Inc., 840 Barry St., New York 59, N.Y., 21, 29, 36, 47, 59, 81
Tel: KIlpatrick 2-4500

Kepco Laboratories, Inc., 131-38 Sanford Ave., Flushing 55, N.Y., 21, 31, 47, 59, 65
Tel: INdependence 1-7000

Kern & Co., Inc., Louis M., 770 Fifth Ave., Brooklyn 32, N.Y., 25, 28, 86, 87
Tel: STerling 8-6207

Kerr Laboratories, Ltd., Wayne, Roebuck Rd., Chessington, Surrey, England, 22, 66, 67, 69, 72, 77, 80
Tel: LOwer Hook 1131

Kessler Co., Frank, 41-45 47 St., Long Island City 4, N.Y., 59
Tel: STillwell 4-0263

Kester Solder Co., 4219 Wrightwood Ave., Chicago 39, Ill., 96
See ad on page 200
Tel: BElmont 5-1601

Key Electric Corp., 46 S. Bayles Ave., Port Washington, N.Y., 16
Tel: POrt Washington 7-4100

Keystone Carbon Co., 1935 State St., St. Marys, Pa., 53, 87
See ad on page 409
Tel: 41-591

Keystone Electronics Co., 65-67 7th Ave., Newark, N.J., 33

Keystone Electronics Corp., 423 Broome St., New York 13, N.Y., 30, 37, 39, 55, 86, 87
See ad on page 553
Tel: WOrth 2-2789

Keystone Plastics, Inc., 2331 Morris Ave., Union, N.J., 89, 95
Tel: MUrdock 6-2365

Keystone Products Co., 904-06 23 St., Union City, N.J., 21, 29, 36, 59
Tel: UNion 6-5400

Kidde & Co., Walter, 675 Main St., Belleville 9, N.J., 21, 58, 69, 70, 81, 90
Tel: PLymouth 9-5000

Kidde Ultrasonic Div., Walter, 717 Broadway, Newark, N.J., 68
Tel: PLymouth 9-5000

Kimble Glass Co., P.O. Box 1035, Toledo 1, Ohio, 38, 97
Tel: CH 2-6543

Kimp, Harry D., 703 Bernley Bldg., Philadelphia 7, Pa.
See ad on page 537

Kinevox-Hallen Div. See: Electromation, Inc.

See 8 page pink section for quick reference to any product.

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your NUMBER ONE source for standard and special electronic components

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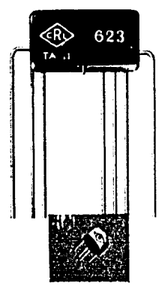

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Centralab's new, revolutionary 4-stage TA-11 transistor-amplifier is the smallest unit of its kind. It includes 4 special transistors, 5 capacitors, 12 resistors, plus wiring.

Up to 75 db. gain at 1 kc. Input impedance 1000 ohms nominal. Operates from 1.3 v mercury cell or flashlight battery. Frequency characteristics, 250 to 20,000 c.p.s. ± 5 db., adjustable to special requirements. Capacity up to 1 mf.

Also choice of TA-6 and TA-7 single-stage Transpecs* to meet other sub-miniature design requirements.

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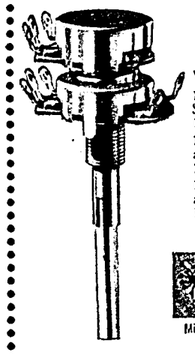

VARIABLE RESISTORS

1/2-w. standard — For radio, TV. Single, twin, or dual-concentric. 15/16" diam. 250 ohms to 10 megs.

1/10-w. sub-miniature — For hearing aids, communications, computers. 5/8" diam. 500 ohms to 10 megs.

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Rotary — 15/16" to 1-5/8" diam. Phenolic or Steatite insulation. Single or multiple sections.

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Specialized — Lever, slide, tone, tuner sections, others.

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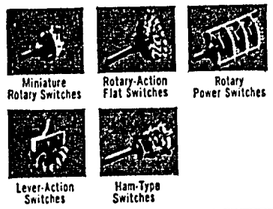


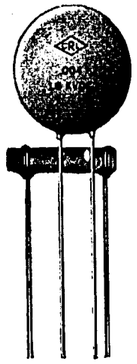
CERAMIC CAPACITORS

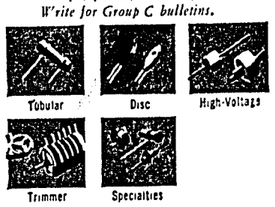
TC-BC — Discs, tubulars. 150 v to 6,000 v.d.c.w. 1 mmf. — 0.1 mf. TC available + 100 to — 5250. High voltage — high accuracy — High-voltage types, up to 30,000 v.d.c.w. High-accuracy types, ± 1% tolerance, 500 v.d.c.w., up to 2,500 mmf.

Trimmer — Tubular or flat. Meet JAN-C-81 specifications. 1 mmf. to 400 mmf., 500 v.d.c.w.

Specialties — Feed-thru, stand-off, button-shape, potted, other capacitors.

Write for Group C bulletins.





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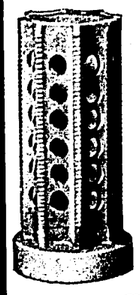

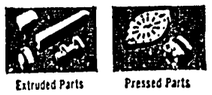

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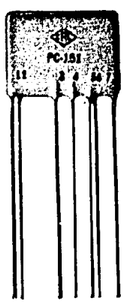

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Tel: SWiftwater 3-5000

Kinn, Theodore P., 7007 Lancaster Rd., Baltimore 7, Md., 85
See ad on page 537
Tel: HUnter 6-8988

Kinney Co., Inc., Joseph, Locust St., Carnegie, Pa., 66, 93
Tel: BRowning 9-6600

Kinney, Mfg. Div., N.Y. Air Brake Co., 3529 Washington St., Boston 30, Mass., 72, 92
Tel: JAmaica 4-3220

KinTel, 5725 Kearny Villa Rd., San Diego 12, Calif., 12, 18, 21, 42, 47, 70, 72, 82
See ad on page 204
Tel: BRowning 7-6700

Kip Electronics Corp., 29 Holly Pl., Stamford, Conn., 61, 62, 90
See ad on page 447
Tel: DAvis 5-1551

Kirkland Co., H.R., 10 King St., Morristown, N.J., 46, 86
Tel: JE 8-2777

Kittleson Co., 416 N. La Brea Ave., Los Angeles 36, Calif., 90
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Kliegl Brothers, 321 W. 50th St., New York 19, N.Y., 18, 30
Tel: COlumbus 5-0130

Klipsch & Associates, P.O. Box 96, Hope, Ark., 25, 40
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Knickerbocker Annunciator Co., 75 Murray St., New York 7, N.Y., 83
Tel: BArclay 7-5306-7

Knights Co., James, 101 E. Church St., Sandwich, Ill., 33, 36
See ad on page 340
Tel: 2141

Knowles Electronics, Inc., 9400 Belmont Ave., Franklin Park, Ill., 40, 43, 58
Tel: GLadstone 5-3600

Kobzy Tool Co., 1535 N. Dayton St., Chicago 22, Ill., 32, 86
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Tel: NEw Haven 2423

Kollmorgen Optical Corp., 347 King St., Northampton, Mass., 71, 81
Tel: JUstice 4-0280

Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst, L.I., N.Y., 21, 44, 81
See ad on page 516
Tel: NEwton 9-2900

Koppers Co., Inc., Koppers Bldg., Pittsburgh 19, Pa., 95
Tel: EXpress 1-3300

Kopple Associates, John J., 9 West Prospect Ave., Mt. Vernon, N.Y., 100
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Tel: MOunt Vernon 4-5577

Krengel Mfg. Co., Inc., 227 Fulton St., New York 7, N.Y., 86, 87, 97
Tel: CO 7-5712

Krohn-Hite Corp., 580 Massachusetts Ave., Cambridge 39, Mass., 21, 36, 47, 67
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Tel: UNiversity 4-4272

Krystinel Corp., P.O. Box 6, Port Chester, N.Y., 32, 84
Tel: WE 9-2261

Kulite Tungsten Corp., 1040 Hoyt Ave., Ridgefield, N.J., 38, 56, 83, 93, 97
Tel: WHitney 5-3000

Kulka Electric Mfg. Co., Inc., 633 S. Fulton Ave., Mt. Vernon, N.Y., 30, 37, 46, 56, 57, 87
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Tel: MOunt Vernon 4-4024

Kupfrian Manufacturing Corp., 395 State St., Binghamton, N.Y., 87
Tel: 3-6426

Kurman Electric Co., Inc., Dept. ID, 191 Newel St., Brooklyn 22, N.Y., 52, 68, 86
See ad on page 397
Tel: EVergreen 3-8000

Kurz-Kasch, Inc., 1421 S. Broadway, Dayton 1, Ohio, 94
Tel: ADams 8161

Kuss Industries, Inc., Tacony & Lewis Sts., Philadelphia 24, Pa., 4, 25, 28, 48, 90 92
Tel: CU 9-3115

Kuthe Laboratories, Inc., 730 S. 13th St., Newark 3, N.J., 62
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Tel: BIgelow 2-6000

Kwikheat Mfg. Co., 3732 San Fernando Rd., Glendale, Calif., 88, 92
Tel: CHapman 5-2376

Kybernetes Corp., 9 E. 40 St., New York, N. Y., 12, 70
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L.E.E., Inc., 625 New York Ave. N.W., Washington 1, D.C., 16, 18, 31, 40, 44, 47, 85
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LMB, 1101 Venice Blvd., Los Angeles 15, Calif., 25

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Laboratory For Electronics, Inc., 75 Pitts St., Boston 14, Mass., 14, 15, 20, 34, 47, 59, 68, 70, 77, 78, 79
Tel: RIchmond 2-3200

Lacey Brothers, 113 S. Lombard Ave., Oak Park, Ill., 86

Lake Chemical Co., 3052 W. Carroll Ave., Chicago 12, Ill., 87, 91
Tel: SAcramento 2-6085

Lake Service Corp., 89 Brighton Ave., Boston 34, Mass., 3, 9, 85, 88
Tel: STadium 2-5868

Lambda Electronics Corp., 11-11 131st St., College Point 56, L.I., N.Y., 47
Multiple pages of additional data on 91-94
Tel: INdependence 1-8500

Lambda-Pacific Engr., Inc., 14725 Arminta St., Van Nuys, Calif., 3, 5, 14, 15, 21, 36, 48, 66
Tel: STanley 3-2400

Lampkin Laboratories, Inc., R.R. #1, Bradenton, Fla., 12, 75
Tel: 6-1906

Lamtex Ind., Inc., 51 State St., Westbury, N.Y., 30, 48, 86, 89, 91, 94, 95
Tel: EDgewood 3-2680

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Tel: WOodbine 1-4700

Landes Electronic Fasteners, 48 Grand St., New York 13, N.Y., 87
Tel: WAlker 5-4770

Landis & Gyr, Inc., 45 W. 45th St., New York 36, N.Y., 42, 56
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Tel: RAvenswood 9-1850

Lansing Sound, Inc., James B., 3249 Casitas Ave., Los Angeles 39, Calif., 21, 25, 40, 58
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Lansky Die Cutting Corp., 194 Greene St., New York 12, N.Y., 86
Tel: SPring 7-5212

La Pointe Industries, Inc., 155 W. Main St., Rockville, Conn., 3, 4, 5, 36, 48
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Lapp Insulator Co., Inc., Radio Specialties Div., 100 Sumner St., Le Roy, N.Y., 26, 27, 30, 32, 84, 89
Tel: 385

Larson Instrument Co., 24 Orchard St., Tarrytown, N.Y., 8, 52, 56, 65, 68, 74
Tel: MEdford 1-3419

Lashinsky, Herbert, 10 E. 39 St., RM. 531, New York 16, N.Y., 85

Lavin Associates, Henry, P.O. Box 196, Meriden, Conn., 100
Tel: BEverly 7-5227
82 Curve St., Needham, Mass., 100
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Tel: NEedham 3-3446

Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville 6, N.J., 1, 14, 15, 33, 59, 66, 67, 72, 77, 79, 80
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Tel: MAtawan 1-2600

Leach Corp., Inet Div., 4441 S. Santa Fe Ave., Los Angeles 58, Calif., 21, 44, 47, 65
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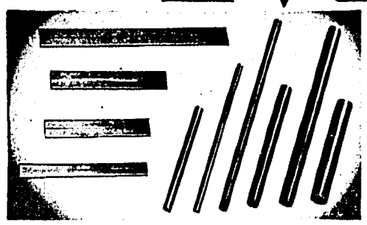

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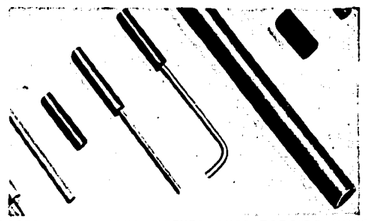

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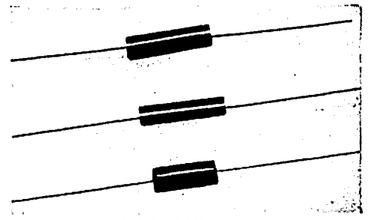

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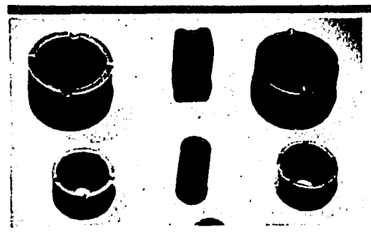

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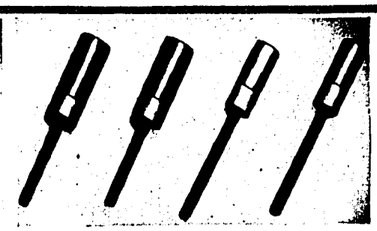

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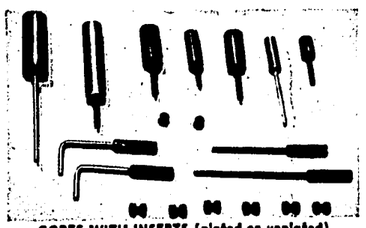

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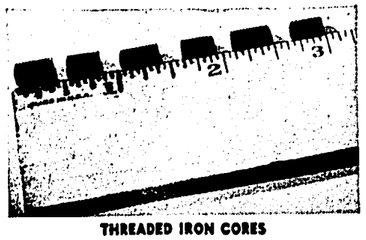

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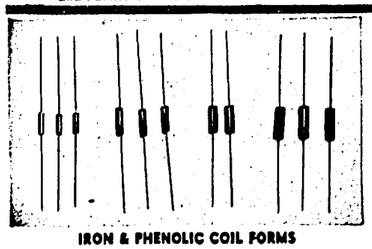

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Tel: EXmont 8-6211

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Lee Electric & Mfg. Co., 2806 Clearwater St., Los Angeles 39, Calif., 21, 47, 92
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Tel: MItchell 2-3155

Lehigh Metal Products Corp., 275 Beacon St., Somerville 43, Mass., 87
Tel: UN 4-9500

Lehman Associates, Charles H., 3 E. 48th St., New York 17, N.Y., 21, 40
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Lehigh Structural Steel Co., 17 Battery Pl., New York 4, N.Y., 3
Tel: WHitehall 4-1424

Lehmann, H. Gibner, 114 State St., Bridgeport, Conn., 85
Tel: ED 5-2115

Leitch Engineering Corp., 326 Lincoln St., Manchester, N.H., 3, 7, 72, 86
Tel: NAtional 3-4773

Lel, Inc., 380 Oak St., Copiague, N.Y., 7, 11, 14, 21, 60
Tel: AMity 4-2200

Leland, Inc., G. H., 123 Webster St., Dayton 2, Ohio, 52, 56
Tel: MIchigan 9891

Lemert Engineering Co., Inc., 201 E. Jefferson St., Plymouth, Ind., 92
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Lenkurt Electric Co., 1105 County Rd., San Carlos, Calif., 6, 13, 19, 20
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Lenz Electric Manufacturing Co., 1751 N. Western Ave., Chicago 47, Ill., 83
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Leonard Electric Products Co., Inc., 67 34th St., Brooklyn 32, N.Y., 21, 26, 29, 32, 34, 36, 59, 60, 85, 90
Tel: ST 8-2023

Lepace Mfg. Co., 5932 Putnam Ave., Brooklyn 27, N.Y., 29, 36, 59

Lepel High Frequency Labs., Inc., 54-18 37th Ave., Woodside 77, N.Y., 88, 92
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Tel: HAvemeyer 6-4580

Le Roi Engineering, P.O. Box 251, Elmhurst, Ill., 85, 90

Lerco Electronics, Inc., 501 S. Varney St., Burbank, Calif., 30, 55, 87
See ad on page 554
Tel: VIctoria 9-5556

Levco Metal Finishers, Inc., 34-18 37th St., Long Island City 1, N.Y., 86, 91
Tel: AStoria 8-4095

Levinthal Electronic Products, Inc., 3180 Hanover St., Palo Alto, Calif., 17, 21, 47, 76, 77
Tel: DAvenport 6-1640

Leviton Mfg. Co., Inc., 236 Greenpoint Ave., Brooklyn 22, N.Y., 87, 94, 96
Tel: EV 9-4500

Lewis Co., Inc., E. B., 11 Bragg St., E. Hartford 8, Conn., 33, 36, 75
Tel: JAckson 8-0830

Lewis Engineering Co., 52 Rubber Ave., Naugatuck, Conn., 56, 83
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Tel: PArk 9-5253

Lewis & Kaufman, Ltd., 17320 El Rancho Ave., Los Gatos, Calif., 63
Tel: ELgato 4-3540

Lewis Spring & Mfg. Co., 2652 W. North Ave., Chicago 47, Ill., 86, 87
Tel: DIckens 2-2222

Lewyt Corp., 60 Broadway, Brooklyn 11, N.Y., 90
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Librascope, Inc., 808 Western Ave., Glendale, Calif., 21, 31, 49, 58, 68, 70, 74, 81, 85, 86
Tel: CH 5-2677

Licon Switch & Control Div., Ill. Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill., 56
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Tel: CA 7-2200

Lieco, Inc., 3610 Oceanside Rd., Oceanside, N.Y., 3, 36, 56, 59, 66, 77
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Tel: ROckville Centre 6-7620

Light Electric Corp., 214 Lackawanna Ave., Newark 3, N.J., 29, 59
Tel: HU 2-0975

Lignacraft, 66 Main St., Binghamton, N.Y., 85
Tel: 2-4871

Lindberg Engineering Co., 2450 W. Hubbard St., Chicago 12, Ill., 59
Tel: MOnroe 6-3443

Linde Co., Div. of Union Carbide Corp., 30 E. 42nd St., New York 17, N.Y., 88, 89, 92, 97
Tel: MUrray Hill 7-8000

Lindgren & Assoc., Inc., Erik A., 4515 N. Ravenswood Ave., Chicago 40, Ill., 71
Tel: LOng Beach 1-0408

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Long Engineering Co., 54 Burke St., Winston-Salem, N.C., 72, 90
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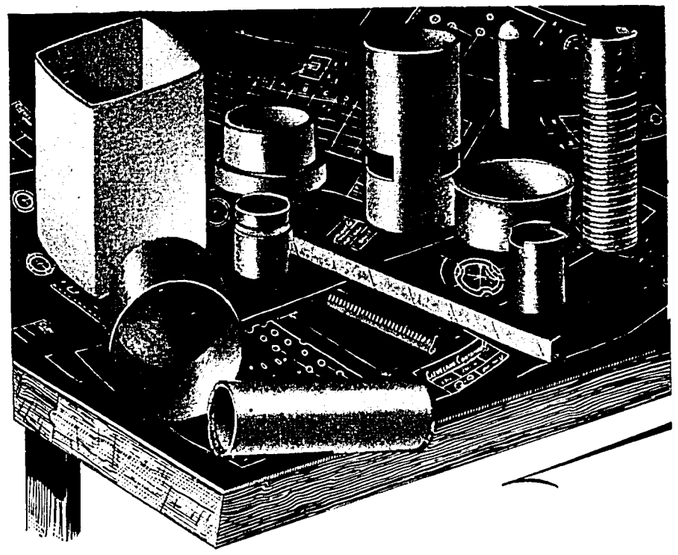

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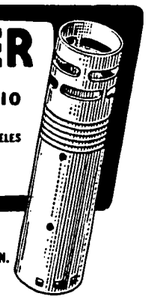

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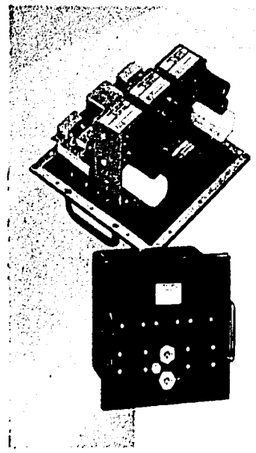

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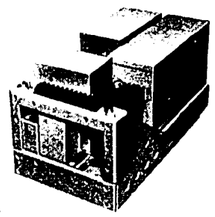

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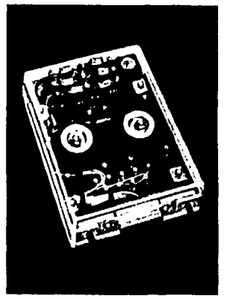

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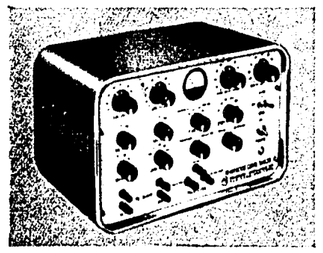

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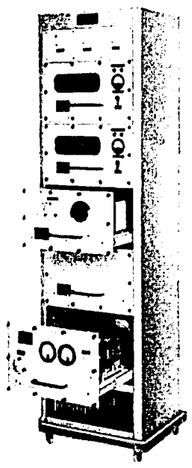

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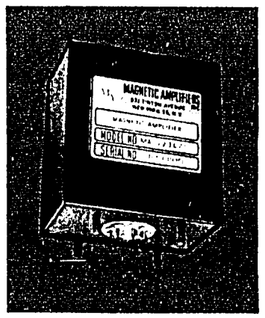

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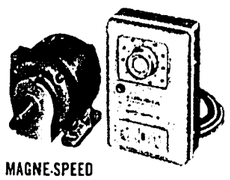

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Metal Textile Corp., 647 E. First Ave., Roselle, N.J., 71, 87, 89, 97
See ad on page 598
Tel: CHestnut 5-3000

Metal & Thermit Corp., Rahway, N.J., 91
Tel: FUlton 1-3000

Metal & Wood Fastening Devices Co., 60 Lakeshore Rd., Valois, Montreal 33, P.Q., Canada, 87
Tel: OXford 5-4582

Metalcraft Inc., 65-33 Austin St., Rego Park, Brooklyn, N.Y., 25, 28
Tel: TWining 6-3600

Metallic Arts of N.E., Inc., 150 Broadway, Cambridge 42, Mass., 25, 28, 86, 91, 97
Tel: KIrkland 7-5790

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Metals & Controls Corp., Spencer Thermostat Div., 51 Forest St., Attleboro, Mass., 52, 56, 57
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Metaplast Co., Inc., 34-51 56th St., Woodside 77, N.Y., 84, 86, 90, 91
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Tel: FLushing 9-8838

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Tel: CLifford 5-3570

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Tel: UNderhill 7-9600

Metron Instrument Co., 432 Lincoln St., Denver 9, Colo., 42, 81
Tel: PEarl 3-3764

Metronix, Inc., Mill Lane, Waterford, Conn., 67, 69, 72, 75, 80

Metropolitan Electronic & Instrument Co., 106 Fifth Ave., New York 11, N.Y., 72, 82

Metropolitan Supply Corp., 1133 Broadway, New York 10, N.Y., 61, 100
See ad on page 443
Tel: CHelsea 3-1105

Metz Refining Co., 369 Mulberry St., Newark 2, N.J., 83, 86, 91, 93, 96
Tel: MArket 2-0866

Meyercord Co., 5323 W. Lake St., Chicago 44, Ill., 87
Tel: ES 8-3700

Mica Condensers Corp., 71 Murray St., New York 7, N.Y., 26
Tel: DIgby 9-0512

Mica Fabricating Co., Rochelle Park, N.J., 26, 80, 94, 95, 97
Tel: HUbbard 7-5717

Mica Insulator Co., 797 Broadway, Schenectady, N.Y., 89
Tel: FRanklin 4-4191

Micacraft Products, Inc., 701 McCarter Hwy., Newark, N.J., 97
Tel: MA 3-6921

Micamold Electronics Corp., 1087 Flushing Ave., Brooklyn 37, N.Y., 26, 34, 36
Tel: HYacinth 7-5400

Micarta Fabricators, Inc., 5412 N. Clark St., Chicago 40, Ill., 37, 39, 46, 48, 55, 86, 87, 89, 95
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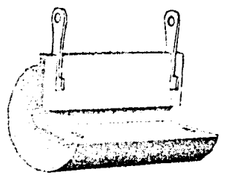

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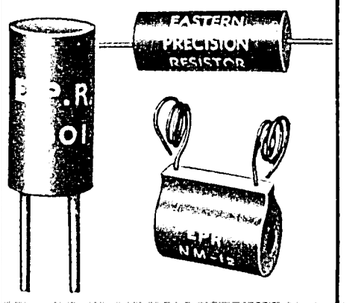
Designed to surpass the requirements of MIL-R-93A and MIL-R-9444 specifications, EPR "N-Caps" encapsulated lug resistors feature optimum reliability over a wide range of adverse environmental conditions. Available in all standard military sizes, plus hundreds of commercial, subminiature and special sizes and shapes.



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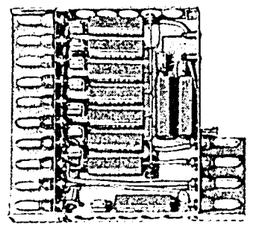

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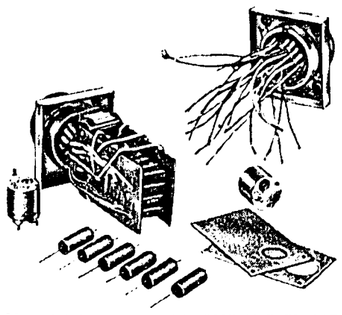

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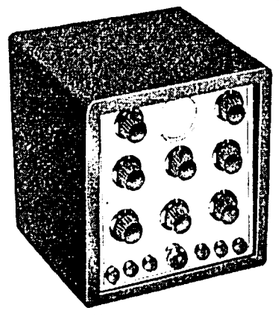

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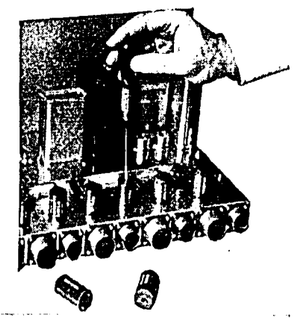

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Tel: 272W1

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Tel: WE 5-4141

Micro-Lab Industries, Inc., 10 E. Clair St., Anderson, Ind., 1, 3, 10, 47
Tel: 4838

Micro Switch Div., Minn.-Honeywell Reg. Co., Freeport, Ill., 56
Tel: STate 4400

Micro Time Labs., 7247 Atoll Ave., North Hollywood, Calif., 26, 47, 59, 77

Microdot Inc., Pasadena Ave., S. Pasadena, Calif., 30, 32, 83
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Microtech, Inc., 2975 State St., Hamden, Conn., 66
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See ad on page 437
Tel: LOcust 1-6050

Microwave Associates, Inc., Northwest Industrial Park, Burlington, Mass., 31, 47, 50, 54, 59, 63, 66, 77
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Microwave Development Labs., Inc., 92 Broad St., Babson Park 57, Mass., 14, 15, 21, 22, 33, 36, 66, 77
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Tel: FInley 2-7950

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Midwest Research Institute, 425 Volker Blvd., Kansas City 15, Mo., 90
Tel: LOgan 1-0202

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Miles Reproducer Co., Inc., 812 Broadway, New York 3, N.Y., 16
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Tel: FE 2-5225

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Tel: WAverly 6-2250

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Mobil Electronics Mfg. Co., 1111 State Rd. 67 E., Anderson, Ind., 11, 25, 28, 30
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Model Rectifier Corp., 1065 Utica Ave., Brooklyn 3, N.Y., 31, 47, 50, 92
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Modelectric Products Co., Inc., Asbury Park, N.J., 29, 50, 83
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Modern Design, Inc., Vestal Highway, Vestal, N.Y., 45, 47, 48, 72, 85, 86, 90
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Mooradian High Frequency Labs., 13 E. Fort Lee Rd., Bogota, N.J., 76
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Morand Electronics, 2538 S. Highland, Los Angeles 16, Calif., 21, 29, 32, 34, 36, 47, 53, 59, 86
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NRD Instrument Co., 6425 Etzel Ave., St. Louis 14, Mo., 12, 62, 68, 70, 78, 85, 90
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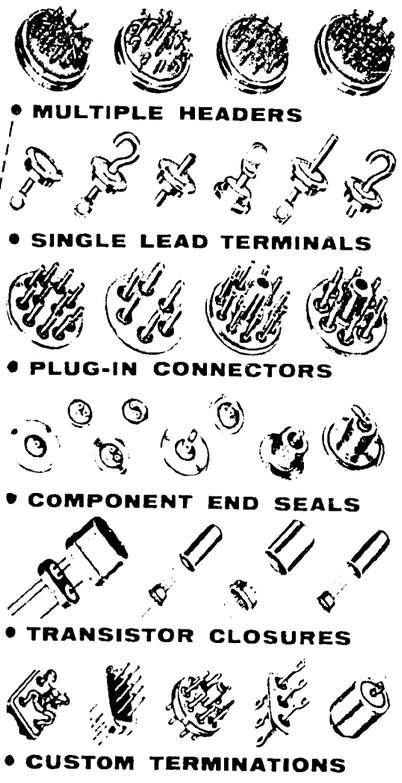

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Narrow Fabric Co., Reading, Pa., 87
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Tel: CIrcle 6-0348

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Tel: MA 2-7950

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Tel: POplar 5-3832

National Electronics, Inc., 628 North St., Geneva, Ill., 51, 62, 63
Tel: 7000

National Electronics Labs., Inc., 1713 Kalorama Rd. N.W., Washington 9, D.C., 1, 11, 19, 90
Tel: HU 3-5000

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Tel: YOnkers 8-6400

National-U.S. Radiator Corp., Plastic Metals Div., 342 Madison Ave., New York 17, N.Y., 32, 93
Tel: MUrray Hill 2-2974

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Natvar Corp., 211 Randolph Ave., Woodbridge, N.J., 89, 95
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Navigation Computer Corp., 1623 Snyder Ave., Philadelphia 45, Pa., 12, 21, 42, 47, 48, 70
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Naybor Laboratories, Inc., E. V., 2 Yennicock Ave., Port Washington, L.I., N.Y., 29, 52
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Nelson, Earl P., 10 Chester Rd., Upper Montclair, N.J., 85
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Tel: CHapel 2-2281

Nichols, Ltd., R. H., 2781 Dufferin St., Toronto 10, Ont., Canada, 20, 42, 47, 50, 65, 69, 72, 74, 78, 79, 80, 86, 88, 92
Tel: ORchard 1196

Nickel Cadmium Battery Corp., Easthampton, Mass., 23
Tel: 1200

Nielsen Hardware Corp., 770 Wethersfield Ave., Hartford 14, Conn., 87
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Tel: JAckson 2-8145

Nixon Gear & Machine Co., Inc., 201 Oxford St., Syracuse 4, N.Y., 81, 92
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Tel: ALgonquin 4-0470

Norden-Ketay Corp., Gyromechanisms Div., New York Ave., Halesite, N.Y., 68
Tel: HAmilton 3-6336

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Norrich Plastics Corp., 109 W. 18th St., New York 11, N.Y., 30, 32, 87, 94, 95, 97
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Tel: WAtkins 4-8360

Norrman Laboratories, Ernst, Williams Bay, Wis., 75, 90
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North American Philips Co., Inc., 230 Duffy Ave., Hicksville, L.I., N.Y., 16, 21, 40, 43, 45
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Tel: KIrkland 7-1778

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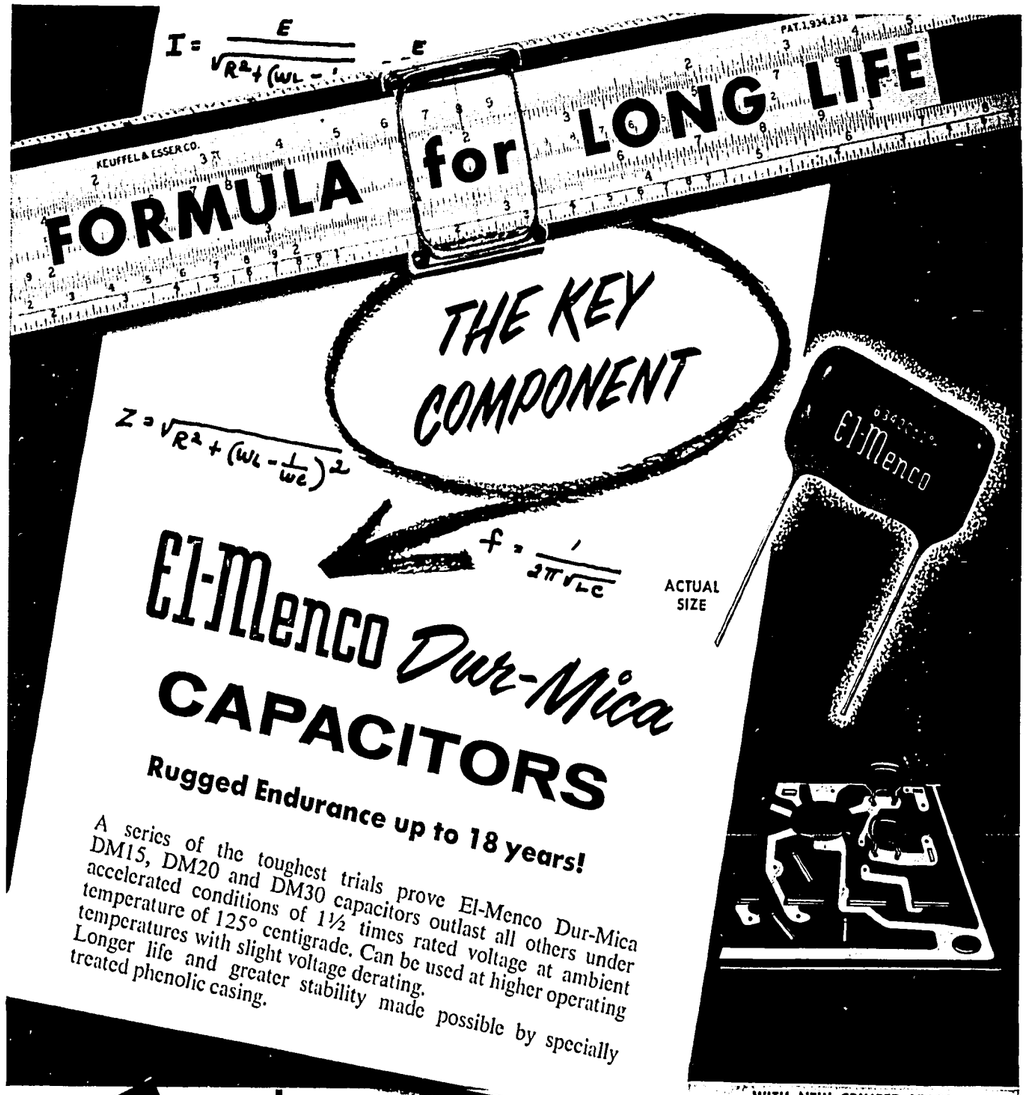

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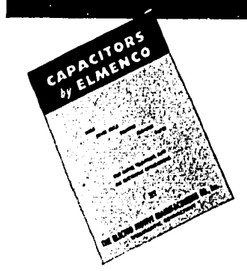

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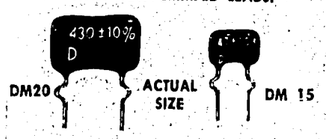

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Paterson Moos Div., Univ. Winding Co., Inc., 90-28 Van Wyck Expwy., Jamaica 18, N.Y., 21, 23, 47, 78, 85, 90
Tel: AXtel 7-4400

Patton-MacGuyer Co., 17 Virginia Ave., Providence 5, R.I., 87
Tel: HOpkins 1-1550

Paul & Beekman, Inc., 1801 Courtland St., Philadelphia 40, Pa., 33, 86, 87

Paul & Stein Bros., Inc., F. H., 235 Fifth Ave., New York 16, N.Y., 91, 93
Tel: MUrray Hill 4-6371

Pawling Rubber Corp., Pawling, N.Y., 87, 89, 91, 95
Tel: 3231

Pearl Engineering & Tool Co., 8056 Rodney St., Philadelphia 50, Pa., 85
Tel: LIvingston 8-4103

Pearson Electronics, 1200 Bryant St., Palo Alto, Calif., 59
Tel: DA 3-7677

Peck Spring Co., 313 John St., Plainville, Conn., 32, 39, 86, 87
Tel: SHerwood 7-2767

Pedersen Electronics, P.O. Box 572, Lafayette, Calif., 21, 47, 65, 86
Tel: ATlantic 3-3434

Peeco Corp., 2760 Whittier Blvd., Los Angeles 23, Calif., 88
Tel: AN 9-4164

Peer, Inc., 1200 Milton St., Benton Harbor, Mich., 1, 92
Tel: WAlnut 5-8828

Peerless Products Industries, 812 N. Pulaski Rd., Chicago 51, Ill., 3, 86, 87
Tel: BElmont 5-9883-4

Peirce Dictation Systems, 5900 N. Northwest Hwy., Chicago 31, Ill., 16, 49
Tel: RO 3-3220

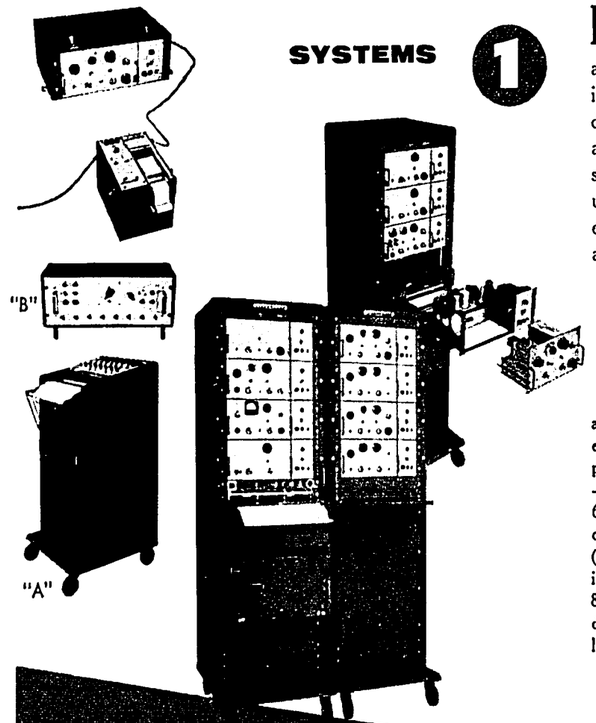
Penn-East Engineering Corp., P.O. Box 240, Kutztown, Pa., 21, 29, 36, 59
See ad on page 439
Tel: OVerbrook 3-7308

Penn Fibre & Specialty Co., Inc., 2024-30 E. Westmoreland St., Philadelphia 34, Pa., 86, 95
Tels: REgent 9-4862 & 9-5642

Penn Precision Products, Inc., 501 Crescent Ave., Reading, Pa., 93
Tel: FRanklin 5-4361

Penn Transformer Corp., E. Bishop St. Ext., Bellefonte, Pa., 29, 59
Tel: ELgin 5-4747

Penta Laboratories, Inc., 312 N. Nopal St., Santa Barbara, Calif., 55, 62, 63
Tel: WOodland 5-4581



BASIC "150" assemblies housed in either vertical mobile cabinets or separate portable cases are available in 1-, 2-, 4-, 6- and 8-channel models. Each is equipped with driver amplifiers of current feedback design and regulated power supplies for *each* channel, and a recorder featuring *nine* extremely accurate paper speeds on 2- to 8-channel models, five on single channel units. Appropriate plug-in preamplifiers quickly and efficiently equip a basic assembly for recording virtually any 0-100 cps phenomena.

new 6- and 8-channel analog readout systems

In addition, complete Sanborn systems from 2- to 8-channels are available for recording analog computer outputs. These are equipped with dual-channel DC amplifiers, for single-ended or push-pull signals — input impedance 5 megohms each input lead to ground — drift less than 0.5 mm/hr. — frequency response down 2 db at 60 cycles for all amplitudes to 4 cm peak to peak. Newest of the computer readout recorders are the 6- and 8-channel console systems (8-channel illustrated — "A" at left). The Model 183 Programmer in a Model 184 case ("B" at left) is optional for use with the 6- and 8-channel consoles. The Programmer automatically turns on chart drive, feeds calibrated signals to all channels, reads computer DC levels, determines the length of record, and shuts off the paper drive.

SANBORN

oscillographic recording equipment

3 **UNIT INSTRUMENTS**

All Sanborn Preamplifiers and Recorders, as well as various other units, are available separately for specialized applications or use as "original equipment" in other apparatus. Instruments include the Model 150-300/700 Wide Band Driver Amplifier and Power Supply, for use with low power galvanometer elements, a 'scope and/or panel meter. When equipped with suitable "150" preamplifier, this amplifier provides a portable indicator for strain, force, pressure, temperature, AC watts, audio level, etc. Other units include the Model 150-1900 Master Oscillator Power Amplifier: Model 150-3100 Triplexer; Model 601 and 602 galvanometers; Model 150-2900 Dual-Channel DC Amplifier.

2 **PREAMPLIFIERS**

A choice of *twelve* "150 Series" plug-in preamplifiers is now available, to equip systems for any of numerous recording problems. Improved control of input signals results from attenuator ratios of 1, 2, 5, etc., and calibrated zero suppression on AC-DC, Carrier, and Low Level DC Coupling, Frequency Meter, and Chopper Stabilized DC models. Other "150" preamplifiers include: Servo Monitor, Log-Audio, AC Wattmeter, RMS Volt/Ammeter, 400 cycle Frequency Deviation, and Triplexer.

Added to these three aspects of Sanborn Oscillographic Recording Equipment are the basic advantages of inkless recording in true rectangular coordinates, to provide accurate, easily interpreted records; high torque galvanometer (10 ma develops 200,000 dyne cm.); one percent linearity resulting from current feedback driver amplifiers and high torque galvanometers (maximum error is ¼ mm in middle 4 cm of chart, ½ mm across entire chart); controls for timing, manual and remote coding.

Take advantage of the scope and flexibility of Sanborn equipment to answer your recording requirements. Sanborn engineers will be glad to provide further information and application assistance whenever you wish. Contact your local representative or write to the main office below.

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Tel: SAcramento 2-3201

Perfection Mica Co., 1322 N. Elston Ave., Chicago 22, Ill., 71, 83, 84, 87, 89, 93, 97
See ad on page 599
Tel: EVerglade 4-2122

Performance Measurements Co., 15301 W. McNichols Rd., Detroit 35, Mich., 21, 42, 47, 68, 69, 70, 72, 81, 85, 90
Tel: VErmont 8-7879

Perkin-Elmer Corp., Main Ave., Norwalk, Conn., 18, 72
Tel: VIctor 7-2422

Perkin Engineering Corp., 345 Kansas St., El Segundo, Calif., 21, 31, 47, 50, 59, 65, 77, 81
Tel: ORegon 8-7215

Permacel Tape Corp., U.S. Highway 1, New Brunswick, N.J., 83, 87, 89, 91, 94
Tel: CHarter 7-7900

Permag Corp., 210 Taaffe Pl., Brooklyn 5, N.Y., 41
See ad on page 365
Tel: MAin 2-0114

Permo-Power Co., 3100 N. Elston, Chicago 18, Ill., 11, 13, 31, 47, 65, 68, 86
Tel: KEystone 9-7171

Permo, Inc., 6415 Ravenswood Ave., Chicago 26, Ill., 45, 49, 93
Tel: BRiargate 4-0075

Permonite Mfg. Co., 444 Lake Shore Dr., Chicago 11, Ill., 30, 33, 37, 39, 46, 55, 86, 87, 95
Tel: MIchigan 2-1915

Peschel Electronics, Inc., 13 Garden St., New Rochelle, N.Y., 21, 47, 56, 59, 68, 72, 81, 85, 86, 90
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Tel: NEw Rochelle 6-3342

Pesco Products Div., Borg-Warner Corp., 24700 N. Miles Rd., Bedford, Ohio, 24, 44
Tel: MOntrose 2-2100

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See ad on page 545
Tel: TRiangle 5-4033

Peters-Dalton, Inc., 17900 Ryan Rd., Detroit 12, Mich., 25, 88
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Petersen Radio Co., Inc., 2800 W. Broadway, Council Bluffs, Iowa, 33
Tel: 2-2760

Pettinos, Inc., Charles, 1 E. 42nd St., New York 17, N.Y., 91
Tel: MUrray Hill 7-7337

Pfaff & Kendall, 84 Foundry St., Newark, N.J., 3, 86
Tel: MArket 3-2215

Pfannkuch & Co., O. E., 952 Main St., Bridgeport 3, Conn., 26, 56, 84, 86, 89, 91, 94
Tel: FO 7-8673

Phalo Plastics Corp., 25 Foster St., Worcester 8, Mass., 83
Tel: PLeasant 5-8658

Phaostron Instrument & Electronic Co., 151 Pasadena Ave., S. Pasadena, Calif., 3, 42, 52, 53, 72
Tel: CLinton 5-1471

Phelps Dodge Copper Products Corp., 300 Park Ave., New York 22, N.Y., 83, 93
See ad on page 528
Tel: PLaza 1-3200

Philadelphia Wireless Technical Institute, 1533 Pine St., Philadelphia 2, Pa., 98
Tel: Kingsley 6-0745

Philadelphia Bronze & Brass Corp., 22nd & Master St., Philadelphia 21, Pa., 93
Tel: PO 5-2100

Philamon Laboratories, Inc., 90 Hopper St., Westbury, L.I., N.Y., 75
See ad on page 48
Tel: EDgewood 3-1700

Philbrick Research, Inc., George A., 230 Congress St., Boston 10, Mass., 21, 47, 70
Tel: HUboard 2-3225

Philco Corp., C & Tigoa St., Philadelphia 34, Pa., 3, 4, 5, 11, 12, 13, 14, 15, 16, 18, 21, 47, 48, 61, 70
Tel: NEbraska 4-5100

Philco Corp., Govt. & Indl. Div., 4700 Wissahickon Ave., Philadelphia 44, Pa., 1, 4, 5, 12, 14, 15, 18
Tel: TEnnessee 9-4000

Philco Corp., Lansdale Tube Co. Div., Dept. 1-2, Church Rd., Lansdale, Pa., 54
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Tel: ULysses 5-4681

Phillips Control Corp., 59 W. Washington St., Joliet, Ill., 38, 52
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Tel: 3-3431

Philips Electronics, Inc., 750 S. Fulton Ave., Mt. Vernon, N.Y., 1, 62, 68, 70, 71, 72, 78, 85, 90, 98
Tel: MOunt Vernon 4-4500

Philips Laboratories Div. North American Philips Co., Irvington-on-Hudson, N.Y., 63, 97
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Tel: ULster 5-0136

Photo Chemical Products, Inc., 999-A Stewart Ave., Garden City, L.I., N.Y., 48, 86, 87
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Tel: LU 5-0200

Photo Research Corp., 837 N. Cahuenga Blvd., Hollywood 38, Calif., 18
Tel: HOllywood 2-6674

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Tels: GLen Cove 4-8000 & FLushing 7-8100

Photo-Crystals, Inc., 15 S. First St., Geneva, Ill., 3, 22, 62, 68
Tel: GEneva 7150

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Tel: PRospect 4-4503

Photovolt Corp., 95 Madison Ave., New York 16, N.Y., 68, 74
Tel: MUrray Hill 6-3350

Photron Instrument Co., 6516 Detroit Ave., Cleveland 2, Ohio, 21, 74
Tel: ATlantic 1-7020

Physics Research Labs., Inc., P.O. Box 555, Hempstead, L.I., N.Y., 42, 69, 72
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Tel: IVanhoe 3-8299

PIC Design Corp., 477 Atlantic Ave., E. Rockaway, N.Y., 81, 87
Tel: LYnbrook 3-6470

Pickard & Burns, Inc., 240 Highland Ave., Needham 94, Mass., 85, 86, 90
Tel: NE 3-3345

Pickering & Co., Inc., 309 Woods Ave., Oceanside, N.Y., 21, 40, 45, 56, 58
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Tel: ROckville Centre 4-3200

Pickett & Eckel, Inc., 1109 S. Fremont Ave., Alhambra, Calif., 92
Tel: CUmberland 3-3421

Pickles, Sidney, P.O. Box 1126, Tonopah, Nev., 3
Tel: TOnopah 1826

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Tel: WH 8-1305

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Tel: MOnroe 6-6300

Planet Manufacturing Corp., 225 Belleville Ave., Bloomfield, N.J., 26
Tel: PIlgrim 3-2874

Plasteck, Inc., Cor. Grady at McKenna, Poteau, Okla., 86, 87, 94
Tel: 706

Plastic Capacitors, Inc., 2620 N. Clybourn Ave., Chicago 14, Ill., 26, 47
Tel: DI 8-3735

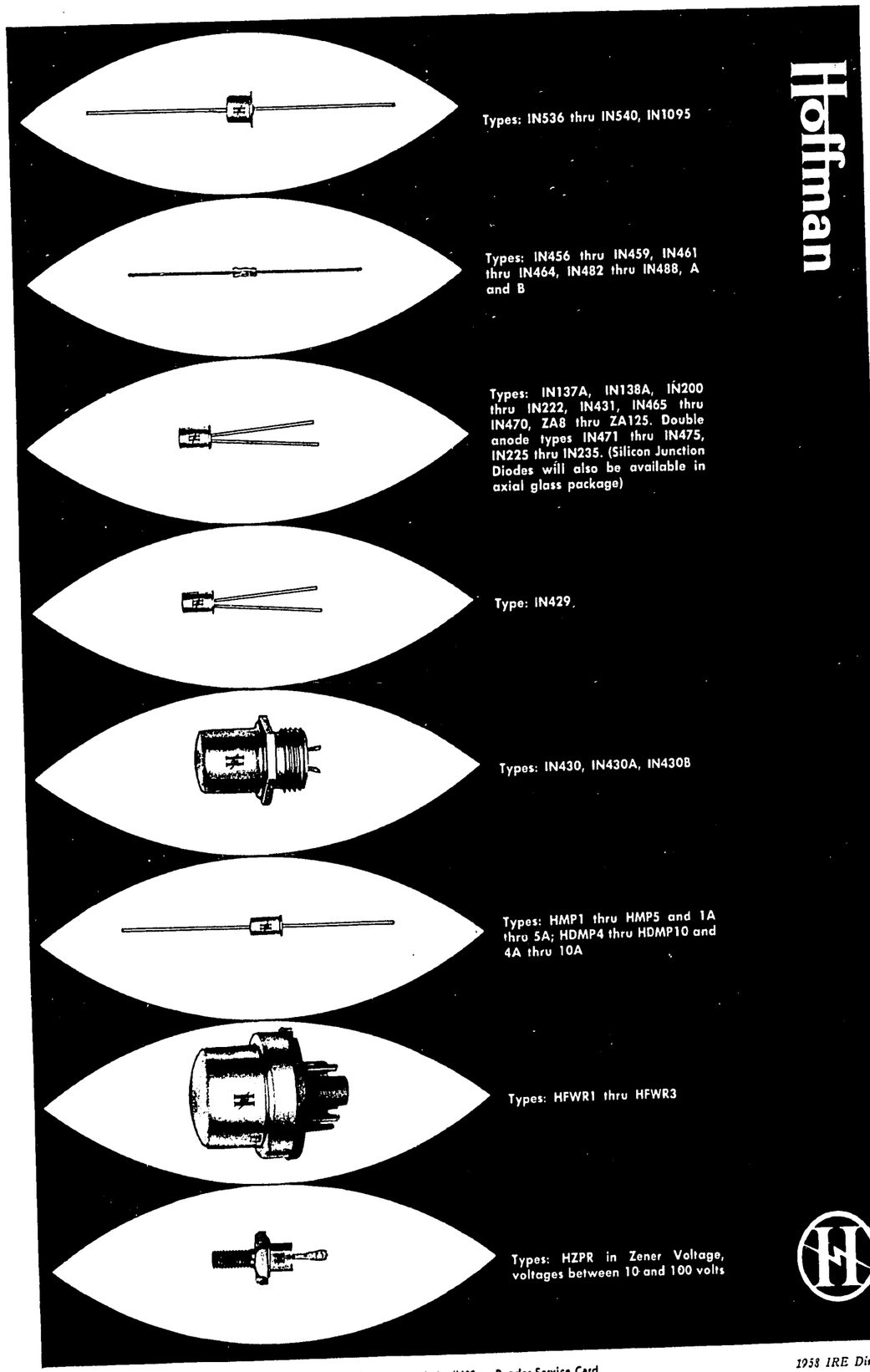
Plastic Metals Div., Nat'l. U.S. Radiator Corp., 2158 Bridge St., Johnstown, Pa., 32, 93
Tel: JOhnstown 7-4491

Plastics & Electronics Corp., P.O. Box 38, Station J, Buffalo 8, N.Y., 21, 48, 86, 90
Tel: SUmmer 1630

Plastoid Corp., 42-61 24th St., Long Island City 1, N.Y., 83
Tel: STillwell 6-6200

Plisco, William B., 62 Schenectady Ave., Brooklyn 13, N.Y., 86, 87, 92, 94
Tel: PR 4-3440

Point Consulting Co., P.O. Box 8656, Pittsburgh 21, Pa., 85, 90
Tel: EXport 8-1841



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Tel: AVenue 2-9550

Poly Scientific Corp., College Ave., Blacksburg, Va., 30
Tel: PRescott 2-8042

Polydoroff & Associates, D. J., Carry Bldg., 927 15th St., Washington 5, D.C., 85, 90
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Polyphase Instrument Co., E. 4th St., Bridgeport, Pa., 21, 29, 34, 36, 58, 59, 72
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Popper & Sons, Inc., 300 Fourth Ave., New York 10, N.Y., 92
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Tel: ORegon 4-5500

Porcelain Products, Inc., 225 N. Patterson St., Carey, Ohio, 84, 94
Tel: 6-2211

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Tel: WEstmore 9-4092

Port-O-Vox Corp., 521 W. 43rd St., New York 36, N.Y., 11
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Tel: BEverly 811

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Potter & Brumfield, Inc., Princeton, Ind., 44, 52
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Tel: FUlton 5-5251

Potter Co., 1950 Sheridan Rd., N. Chicago, Ill., 26, 36, 47
Tel: DExter 6-4350

Potter Instrument Co., Inc., 115 Cutter Mill Rd., Great Neck, N.Y., 20, 42, 56, 58, 70, 75, 77
Tel: HU 2-6430

Poughkeepsie Coil Co., 24 Charlotte St., Binghamton, N.Y., 21, 29, 59.
See ad on page 318
Tel: 9-0523

Power Designs, Inc., Dept. 57-RD, 89-25 130th St., Richmond Hill 18, N.Y., 47
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Tel: VIrginia 9-3675

Power Industries, 2611 Indiana Ave., Chicago, Ill., 29, 59, 90

Practical Electronics Mfg. Co., 569 W. Van Buren St., Chicago 7, Ill., 62, 68
Tel: WAbash 2-6353

Pratt & Whitney Co., Inc., Oakwood Ave., W. Hartford, Conn., 68, 78, 92

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Tel: ROckville Centre 6-0171

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Tel: FLemington 900

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Tel: FRanklin 4-2321

Precision Metal Products, Inc., 41 Elm St., Stoneham 80, Mass., 28, 30, 87
Tel: ST 6-1999

Precision Paper Tube Co., 2062 W. Charleston St., Chicago 47, Ill., 87, 89, 95
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Tel: ARmitage 6-5200

Precision Recording Chart Co., 2430 Linden Ave. E., Linden, N.J., 74
Tel: HUnter 6-2102

Precision Registor Co., Inc., 108 U.S. Hwy. 22, Hillside 5, N.J., 53
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Pressman Associates, 7803 Farnsworth St., Philadelphia 15, Pa., 47, 85
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Presto Recording Corp., P.O. Box 500, Paramus, N.J., 16, 18, 19, 21, 35, 45, 49, 75, 86
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Price Electric Corp., 5300 Church St., Frederick, Md., 29, 52
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Tel: MOnument 3-5141

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Tel: RAvenswood 6-7241

Prodelin, Inc., 307 Bergen Ave., Kearny, N.J., 3, 66
Tel: KEarny 2-8600

Product Development Corp., 61 Batterymarch St., Boston 10, Mass., 85
Tel: HUbbard 2-0407

Production Metals, Inc., 129 Pierrepont St., Brooklyn 1, N.Y., 93
Tel: ULster 8-0750

Production Research Corp., Claremont Ave., Thornwood, N.Y., 3, 7, 13, 15, 20, 21, 36, 68, 80, 90
Tel: ROgers 9-2766

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Tel: OYster Bay 6-0009

Progress Electronics Co., 296 Broadway, New York 7, N.Y. 30, 83, 100
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Tel: WOrth 2-8041

Progressive Electronics, Inc., 41 Hudson St., Yonkers, N.Y., 61
Tel: YOnkers 8-6800

Publication Engineering Consultants, See: Roger M. Stern

Publishers Authorized Bindery Service, 5809 W. Division St., Chicago 51, Ill., 98
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Pulse Engineering, Inc., 2657 Spring St., Redwood City, Calif., 21, 29, 34, 59
Tel: EMerson 8-3331

Pulse Techniques, Inc., 1411 Palisades Ave., W. Englewood, N.J., 18, 21, 35, 36, 47, 67, 85, 86, 90
Tel: TEaneck 7-2575

Pye Corp. of America, 1149 Raritan Ave., Highland Park, N.J., 3, 4, 6, 10, 11, 13, 30, 33, 43, 52, 53, 54
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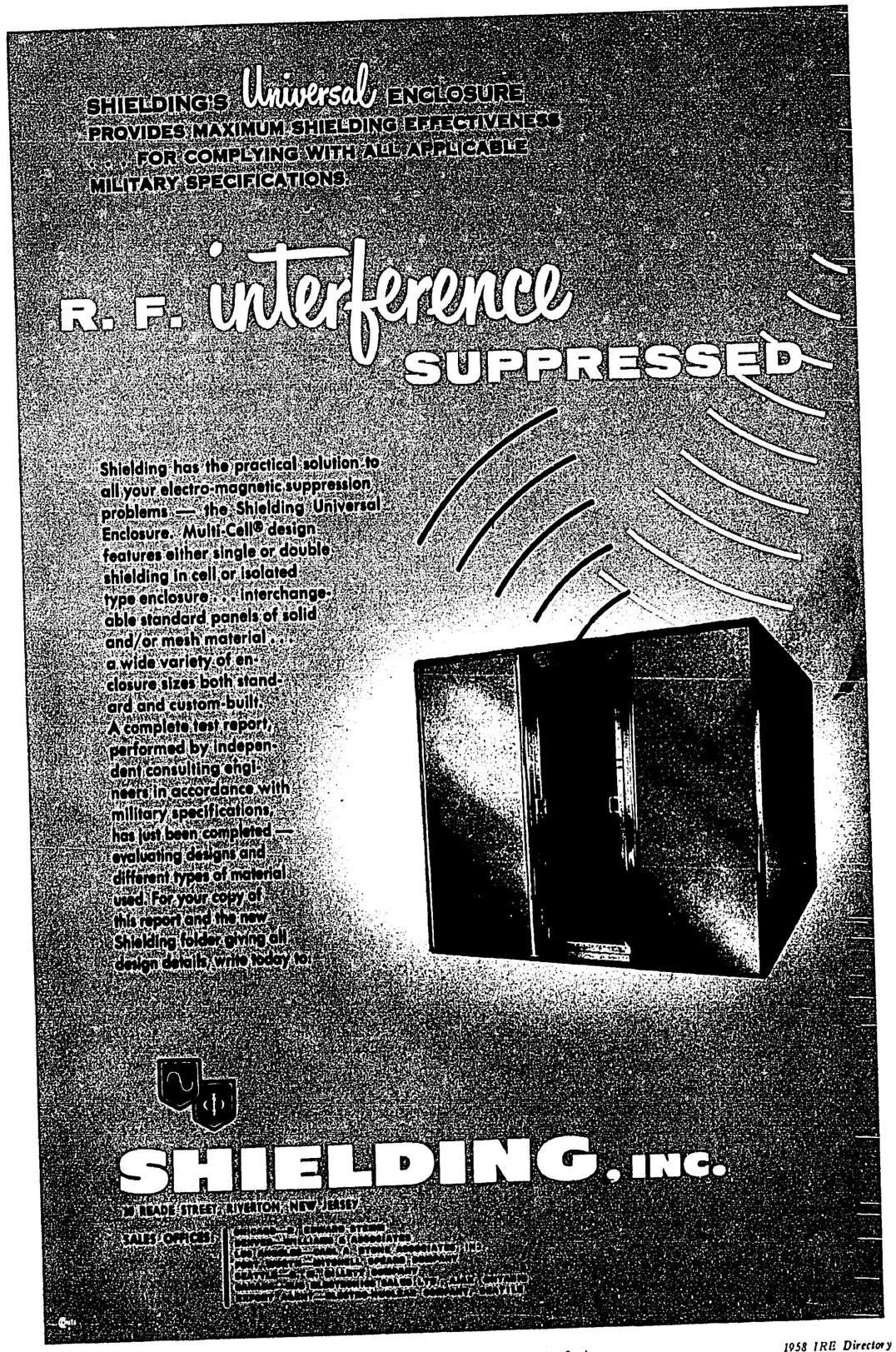

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Pylon Electronic Development Co., Ltd., 161 Clement St., Ville La Salle, Montreal 32, P.Q., Canada, 12, 21, 25, 31, 68, 72, 80, 85, 86, 90
Tel: HU 8-8853

Pyramid Electric Co., 1445 Hudson Blvd., North Bergen, N.J., 26, 50, 72
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Tel: UNion 5-1776

Pyramid Instrument Corp., 630 Merrick Rd., Lynbrook, N.Y., 42, 52, 59
Tel: LYnbrook 3-9634

Pyroferric Co., Inc., E. 216th St., New York 67, N.Y., 32
Tel: OL 4-3930

Pyrofilm Resistor Co., Inc., U.S. Hwy. 46, Parsippany, N.J., 53
Tel: DEerfield 4-8282

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Q Circuits Co., 32 Laskie St., San Francisco 3, Calif., 48, 72, 78, 86
Tel: MArket 1-5734

Q-Line Mfg. Corp., 1562 61st St., Brooklyn 19, N.Y., 3, 25, 27, 28, 36, 86
Tel: BEnsonhurst 6-9320

Quadriga Manufacturing Co., 213 W. Grand Ave., Chicago 10, Ill., 86, 87
Tel: DE 7-0610

Quaker City Gear Works, Bethayres, Pa., 81
Tel: CHapel Hill 0800

Quality Engraving Co. of Long Island, 42-36 27th St., Long Island City 1, N.Y., 86, 87, 94
Tel: ST 6-6946

Quality Name Plate, Inc., P.O. Box 344, Ridgewood, N.J., 48, 86, 87
Tel: GIlbert 4-5392

Quam-Nichols Co., 234 E. Marquette Rd., Chicago 37, Ill., 40
Tel: WEntworth 6-8150

Quantum Electronics, Inc., 1921 Virginia St. N.E., Albuquerque, N.M., 72
Tel: 6-1429

Quarie Controllers, P.O. Box 95, Canton, Mass., 68
Tell: SHaron, SUnset 4-2842

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Tel: IVanhoe 9-9556

Quase Associates, P.O. Box 95, Canton, Mass., 31, 47, 65, 90
Tel: SUnset 4-2842

Quigley Publications, Motion Picture Daily, 1270 Sixth Ave., New York 20, N.Y., 99
Tel: CIrcle 7-3100

Qutronic Transformer Corp., 525 Broadway, New York 12, N.Y., 21, 29, 59
Tel: WOrth 2-3639

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R.C.L. Mfg. Co., New York Ave., Riverside, N.J., 53
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Tel: PIoneer 2-8400

R-J Audio Products, Inc., 80 Shore Rd., Port Washington, N.Y., 25
Tel: POrt Washington 7-7700

R.K. Manufacturing, Box 112, Marion, Ill., 36, 59
Tel: ORdill 251

R.N.R. Metal Products, Inc., 901 Elton St., Brooklyn 8, N.Y., 25
Tel: NI 9-8200

R-S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 1, 14, 21, 31, 47, 48, 66, 90
Tel: DAvenport 3-9063

R.T.A., 4 Rue De Garches, St. Cloud, France, 11

Racon Electric Co., Inc., 1261 Broadway, New York 1, N.Y., 36, 40, 43, 58
Tel: MUrray Hill 4-0258

Radar Design Corp., 210 Fifth Ave., New York 10, N.Y., 22, 30, 36, 60, 66, 77, 85, 90, 95
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Tel: El 5-9000

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Tel: 1800

Radiation Counter Laboratories, Inc., 5121 W. Grove St., Skokie, Ill., 21, 33, 38, 62, 70, 78
Tel: ORchard 3-8700

Radiation Instrument Development Lab., 5737 S. Halsted St., Chicago 21, Ill., 47, 70, 78, 90
Tel: WEntworth 6-2345

Radiation Physics Corp., 8434 Iowa St., Downey, Calif., 3, 36, 90
Tel: TOpaz 2-4176

Radiation Research Corp., 140 E. 59 St., New York 22, N.Y., 23, 26, 65, 78
Tel: PLaza 1-3261

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Radio City Products Co., Inc., Centre & Glendale Sts., Easton, Pa., 72, 79, 80, 82, 86
Tel: 9122

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Tel: BRoadway 2-1161

Radio Components Ltd., 50 Wingold Ave., Toronto 10, Canada, 3, 21, 26, 29, 34, 36, 47, 48, 53, 55, 56, 59, 60, 86, 87
Tel: RU 1-6174

Radio Condenser Co., Davis & Copewood Sts., Camden 3, N.J., 27, 36, 60, 81
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Radio Cores Inc., 9540 Tulley Ave., Oak Lawn, Ill., 32
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Tel: GArden 2-3353

RCA Institutes, Inc., 350 W. Fourth St., New York 14, N.Y., 98
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RCA Laboratories, David Sarnoff Research Center, Princeton, N.J., 90
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Radio Corp. of America, Commercial Electronic Products, Dept. X-94, Bldg. 15-1, Front & Cooper Sts., Camden 2, N.J., 36, 69, 71, 72, 77, 80
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Radio Corp. of America, Electron Tube Div., Section 122Q, 415 S. Fifth St., Harrison, N.J., 50, 51, 61, 62, 63, 67
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Radio Corp. of America, 415 S. Fifth St., Harrison, N.J., 4, 16, 23, 29, 32, 40, 42, 45, 52, 59, 60, 67, 72, 79, 80, 82, 84, 97
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Radio Corp. of America, Semiconductor Div., Section 122NN, Somerville, N.J., 21, 54
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Tel: RAndolph 5-4500

RCA Victor Co., Ltd., 1001 Lenoir St., St. Henry, Montreal, P.Q., Canada, 3, 4, 5, 7, 10, 11, 12, 14, 15, 16, 18, 19, 21, 23, 29, 35, 36, 39, 40, 42, 43, 45, 47, 51, 54, 59, 60, 61, 62, 67, 72, 77, 79, 80, 82, 85

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Tel: UNiversity 6-6887

Radio Frequency Laboratories, Inc., Boonton, N.J., 19, 20, 28, 36, 38, 72, 75, 87, 92
See ad on page 489
Tel: DEerfield 4-3100

Radio Industries, Inc., 5225 N. Ranvenwood Ave., Chicago 25, Ill., 26, 29, 59, 60
Tel: UPtown 8-6500

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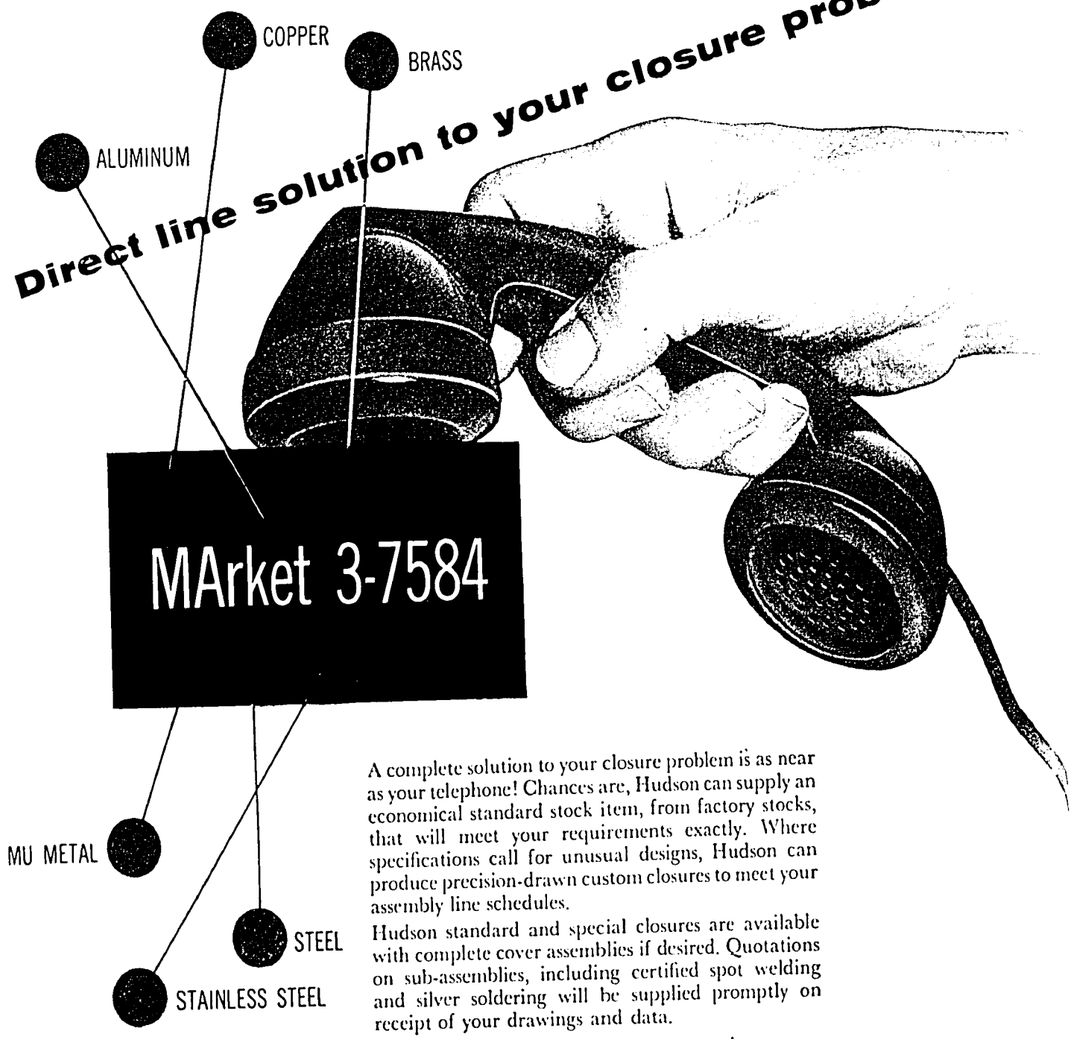

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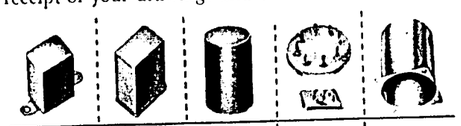

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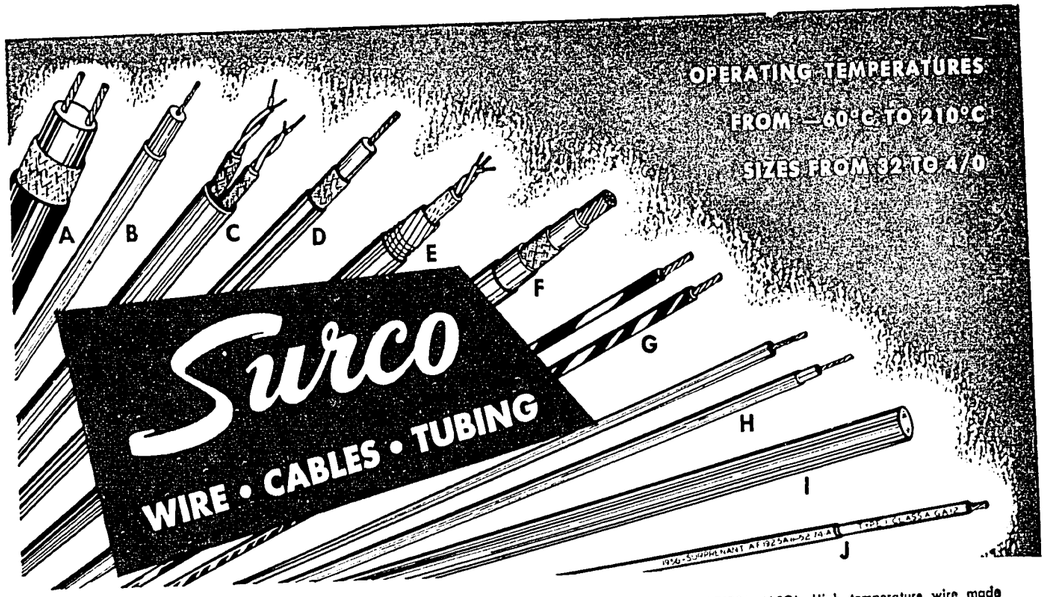

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Rex Rheostat Co., 3 Foxhurst Rd., Baldwin, L.I., N.Y., 53, 92
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Rheem Electronics Div., 7777 Industry Ave., Rivera, Calif., 21, 31, 47, 65, 72, 81
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Tel: BR 2-1163

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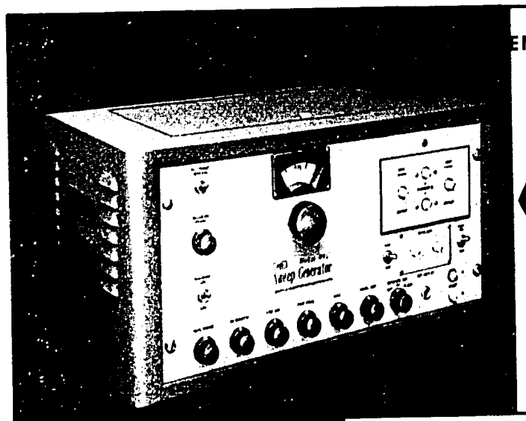

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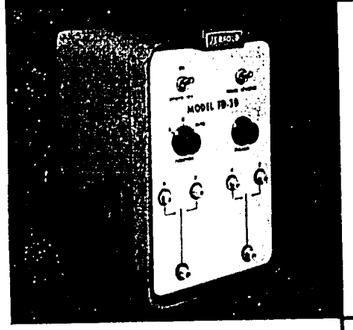
UHF SWEEP RANGE

Center frequency continuously variable from 275 MC to 900 MC. Sweep width continuously variable from a minimum of 0.1 MC, at any center frequency setting, to a maximum of 100 MC at a center frequency of 275 MC, and to a maximum of 300 MC at a center frequency of 850 MC. Maximum output voltage variation is ± 3 db with a minimum output of 0.3 volts RMS into a 50 ohm load.



WIDE BAND SWEEP GENERAT
MODELS 95 and

Rugged, portable instruments designed for test and alignment of RF circuitry from 22 MC to 220 MC . . .

MODEL 95

Frequency range from 22 MC to 95 MC with an RF output of 1.5 volts RMS, and within ±½ db across a 73 MC band.

MODEL 220

Frequency range from 54 MC to 220 MC with an RF output of 0.7 volts RMS, and within ±½ db across a 166 MC band.

A HIGH SPEED COAXIAL SWITCH • MODEL FD-30

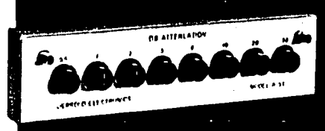
For the simultaneous display of two channels or voltages on an oscilloscope . . .

Frequency range of coaxial circuit is from DC to 250 MC with a VSWR of less than 1.1 at 50 or 75 ohms impedance. Switch contacts "Mercury-Wetted" with an adjustable switch rate of 30, 15 or 10 cps.

VARIABLE RF ATTENUATOR •

For Precise Attenuation in Laboratory Use . . .

Attenuation range from 0 to 62.5 db, in 0.5 db steps. VSWR is less than 1.08 up to 250 MC, and less than 1.5 at 1,000 MC at 50 ohms impedance. Accuracy is ±2% up to 50 db and ±5% above 50 db, at 250 MC.



For details, circle #193 on Reader Service Card.

S

S & B Machine & Tool Co., Inc., 52 Edison Pl., Newark 2, N.J., 21, 25, 86, 87, 90, 92, 97

SNC Manufacturing Co., Inc., P.O. Box 277, Oshkosh, Wis., 29, 59
Tel: STanley 187

Salt Corp. of America, Gregg St., Lodi, N.J., 23
Tel: DIamond 3-5900

Sage Electronics Corp., 302 N. Goodman St., Rochester 7, N.Y., 53
Tel: GR 5770

Sage Laboratories, Inc., 30 Guinan St., Waltham 54, Mass., 3, 22, 33, 36, 59, 66, 77
Tel: TWinbrook 4-7040-1

St. Eloi Corporation, Box 307, Newtown, Ohio, 84, 85, 90, 93
Tel: LO 1-6463

St. Regis Sales Corp., 230 Park Ave., New York 17, N.Y., 89, 95

Sampson Chemical & Pigment Corp., 2830-36 W. Lake St., Chicago 12, Ill. 56, 86, 87
Tel: SA 2-6346

Sams & Co., Inc., Howard W., 2201 E. 46th St., Indianapolis 5, Ind., 99
Tel: CLifford 1-4531

Sancor Instrument Corp., 1109 Ninth Ave., Neptune, N.J., 81
Tel: PRospect 5-3879

San Fernando Electric Mfg. Co., 1509 First St., San Fernando, Calif., 26, 36, 53
Tel: EMpire 1-8681

Sanborn Co., 175 Wyman St., Waltham 54, Mass., 20, 21, 72, 74, 76, 79
See ad on page 224
Tel: TWinbrook 4-6300

Sanders Associates, 137 Canal St., Nashua, N.H., 3, 14, 15, 22, 26, 48
Tel: TU 3-3321

Sands Associates, Inc., 535 Ramona St., Palo Alto, Calif., 85, 99
Tel: DAvenport 5-3716

Sangamo Electric Co., 11th & Converse Sts., Springfield, Ill., 21, 26, 29, 31, 36, 42, 44, 47, 56, 59
Tel: 2-7711

Sanial, Arthur J., 168-14 32nd Ave., Flushing 58, N.Y., 85
Tel: FLushing 9-3574

Saratoga Industries, Congress & Ballston Aves., Saratoga Springs, N.Y., 1, 4, 8, 13, 20, 21, 29, 34, 36, 41, 42, 47, 59, 60, 66, 69, 72, 77, 80, 86
Tel: SAratoga 4100

Sargent-Rayment Co., 4926 E. 12th St., Oakland 1, Calif., 21, 60
Tel: KEllog 6-5277

Sargent & Wilbur Heat Treating Corp., 170 York Ave., Pawtucket, R.I., 86
Tel: PA 3-5900

Sauereisen Cements Co., 1044 N. Canal St., Pittsburgh 15, Pa., 91
Tel: STerling 1-2323

Savage Transformers, Ltd., Nursteed Rd., Devizes, Wilts, England, 21, 29, 59
Tel: DEvizes 932

Savage Industries, Inc., Shepard Instrument Div., 3131 N. 29 Ave., Phoenix, Ariz., 20, 21, 58, 90
See ad on page 283
Tel: ALpine 8-6967

SavilleRaTeleNics Labs., 1125 Russel St., P.O. Box 782, Covington, Ky., 85, 90

Saxonburg Ceramics, P.O. Box 157, Saxonburg, Pa., 32, 84, 87, 89, 97
Tel: FLanders 2-1566

Saxton Products, Inc., 1661 Boone Ave., New York 60, N.Y., 83, 95
Tel: WYandotte 1-0120

Scaico Controls, Inc., P.O. Box 41, Cooper St., Delanco, N.J., 52, 56, 57, 68
Tel: HObart 1-3930

Scala Radio Company, 2814 19th St., San Francisco 10, Calif., 3, 72, 82
Tel: VA 6-2898

Scantlin Electronics, Inc., 11624 W. Pico Blvd., Los Angeles 64, Calif., 11, 67, 68, 70, 75, 85, 90
Tel: GRanite 8-3771

Schaevitz Engineering, Crescent Blvd. at Drexel Ave., Camden, N.J., 21, 58, 81
Tel: MErchantville 8-5353

Schafer Custom Engineering, P., 235 S. Third St., Burbank, Calif., 5, 12, 18, 63
Tel: THornwall 5-3561

Schaffer Air Industries, Inc., 290 N. Henry St., Brooklyn 22, N.Y., 86
Tel: EVergreen 3-5300

Schauer Manufacturing Corp., 4500 Alpine Ave., Cincinnati 42, Ohio, 31, 47, 50
Tel: SYcamore 1-3030

Scheidel Manufacturing Co., 1985 Great Neck Rd., Copaigue, L.I., N.Y., 25, 86, 87, 95

Schimer-National Alarm Co., 20 Westside Ave., Bergenfield, N.J., 21, 47, 68, 92
Tel: DUmont 4-9628

Schloer, Inc., H. C., Modern Design Div., Vestal Parkway, Vestal, N.Y., 85, 86, 90, 92
Tel: 5-9901

Schoene Electronics Lab., 1410 S. Grand Ave., Evansville 13, Ind., 47, 67, 72, 85, 86, 90
Tel: HArrison 3-9038

Schutter Corp., Carl W., 80 E. Montauk Hwy., Lindenhurst, N.Y., 66
Tel: LIndenhurst 5-2290

Schuyler Manufacturing Corp., 84 Porete Ave., N. Arlington, N.J., 33, 71, 83, 87, 89, 97
Tel: KEarny 2-2094

Schweber Electronics, 122 Herricks Rd., Mineola, L.I., N.Y., 26, 100
See ad on page 304
Tel: PIoneer 6-6520

Schweitzer, Inc., Peter J., Lee, Mass., 89
Tel: LEe 7 Ext 25

Science Electronics, Inc., 195 Massachusetts Ave., Cambridge 39, Mass., 71, 90, 98
Tel: UNiversity 4-5700

Scientific-Atlanta, Inc., 2162 Piedmont Rd., N.E., Atlanta 9, Ga., 3, 74
Tel: TRinity 5-7291

Scientific Electric, 105-119 Monroe St., Garfield, N.J., 47, 72, 88, 92
Tel: PRescott 7-0507

Scientific Electronic Lab., 866 Bergen St., Newark 8, N.J., 30, 33, 38, 56, 97
Tel: BIgelow 3-8675-76

Scientific Radio Products, Inc., 215 S. 11th St., Omaha 2, Neb., 33, 36
See ad on page 341
Tel: ATlantic 9787

Scientific Radio Service, 4301 Sheridan St., University Park, Md., 33
Tel: WArfield 7-0535

Scientific Wood Cabinet Co., 87 Holmes St., Belleville 9, N.J., 25
Tel: PLymouth 9-3500

Scott, Inc., Hermon Hosmer, 385 Putnam Ave., Cambridge 39, Mass., 4, 18, 21, 60, 67, 72, 81
Tel: KIrkland 7-0646

Scovill Manufacturing Co., 99 Mill St., Waterbury 20, Conn., 86, 87, 93, 97
Tel: PLaza 4-1171

Sealectro Corp., 610 Fayette Ave., Mamaroneck, N.Y., 30, 33, 39, 55, 87
See ad on page 556
Tel: MAmaroneck 9-7800

Sealtron Corp., Reading Rd. at Amity, Cincinnati 15, Ohio, 30, 38, 52
Tel: VA 1-7444

Seamless Rubber Co., 253 Hallock Ave., New Haven 3, Conn., 89, 94
Tel: STate 7-2211

Seco Manufacturing Co., 5015 Penn Ave. S., Minneapolis, Minn., 72
Tel: WA 6-4545

Secon Metals Corp., 7 Intervale St., White Plains, N.Y., 83
Tel: WHite Plains 9-4757

Seeburg, J. P., Div. of Fort Pitt Ind., Inc., 1510 N. Dayton St., Chicago 22, Ill., 9, 16, 20, 21, 45
Tel: MIchigan 2-0800

Seismograph Service Corp., P.O. Box 1590, Tulsa, Okla., 21, 25, 35, 70, 73, 74, 79, 85, 86, 90
Tel: RI 3-1381

Sela Electronics Co., 128 W. 48th St., New York 36, N.Y., 68, 71, 72
Tel: CIrcle 6-1571

Sel-Rex Corp., Precious Metals Div., Dept. IRE-57, 75 River Rd., Nutley 10, N.J., 21, 31, 47, 50, 65, 86, 93
See ad on page 585
Tel: NUtley 2-5200

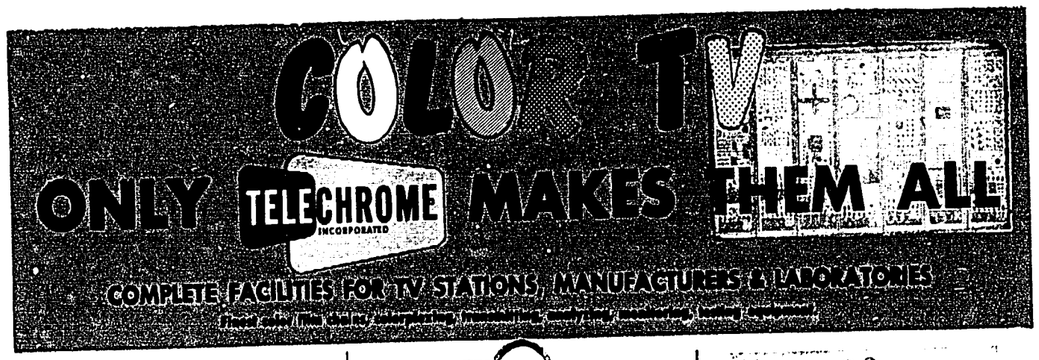
Semiconductor Information Service, Box 407, Cambridge 39, Mass., 99

Semimetals, Inc., 130-11 90th Ave., Richmond Hill 18, N.Y., 33, 72
Tel: VIrginia 9-6165

Semrow Products Co., Inc., 4317 N. Ravenswood Ave., Chicago 13, Ill., 87
Tel: GRaceland 7-7660

Senn Corp., New Augusta, Ind., 31, 47
Tel: TR 8-2363

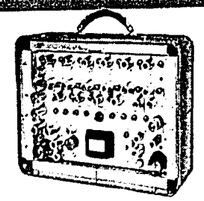
Sensitive Research Instrument Corp., 310-316 Main St., New Rochelle, N.Y., 42, 72, 80
See ad on page 369
Tel: BEverly 5-2300



617-BR AUTOMATIC BALANCE CONTROL FOR ALL COLORPLEXERS

(Regardless of Manufacture)

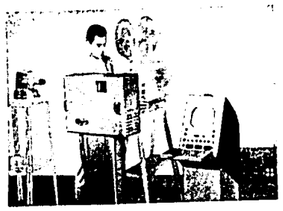
An ingenious circuit locks the entire encoding equipment in balance within 20 seconds after being turned on. Thereafter balance is held under even the most difficult operating conditions.



1003-A VIDEO TRANSMISSION TEST SIGNAL GENERATOR

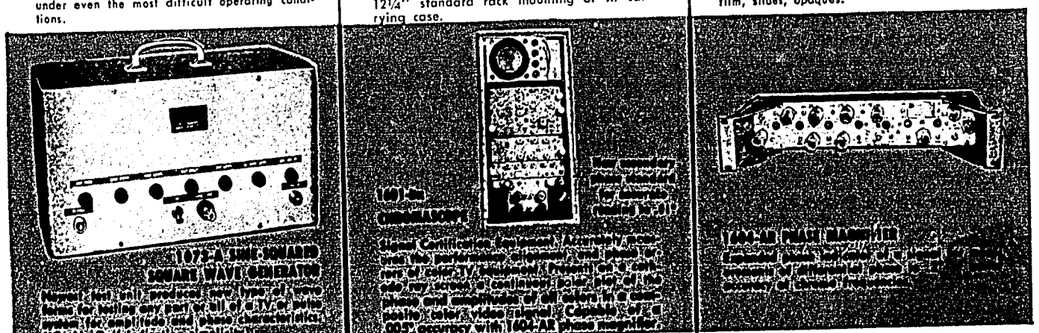
Portable

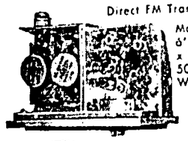
Completely self-contained, portable. Produces multi-frequency burst, stairstep, modulated stairstep, white window, composite synch. Regulated power supply. 12¼" standard rack mounting or in carrying case.

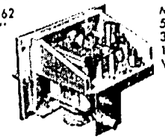


700-A 3V COLOR FILM CHAIN

Finest in quality, lowest in price. 3V provides greatest latitude in selection of color films. Designed specifically for broadcast application, requires little space. Multiplexes 35 or 16mm film, slides, opaques.







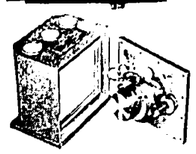
TELEMETERING TRANSMITTERS • High Power in Small Packages

Direct FM Transmitters Crystal controlled 215-235 megacycles. 125kc deviation.

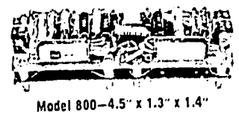
Model 1462
6" x 4¾" x 3¾"
50 to 80 Watts

Model 1463
5 19/32" x 3 13/16" x 4"
15 to 30 Watts

Model 1472
4" x 1.5" x 2.7"
2 Watts

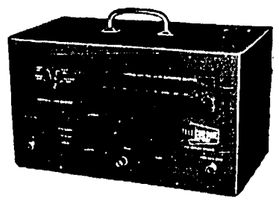


Model 1460
5" x 4¾" x 3 15/16"
RF Amplifier
15 to 30 Watts



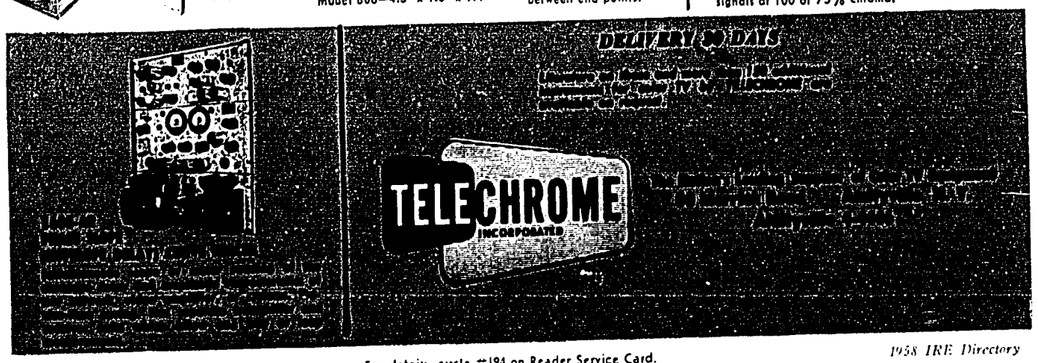
Model 800—4.5" x 1.3" x 1.4"

SUB-CARRIER OSCILLATOR. Deviation stability ±1% of band width. Deviation linearity less than 1% of band width under all conditions measured from a straight line drawn between end points.



636-B CHROMALYZER

Portable Precision Color Bar Generator for checking color broadcast studio and transmission facilities, receivers and monitors. Can be tied into a system. Provides complete composite color signals at 100 or 75% chroma.



For details, circle #194 on Reader Service Card.

Sensory Incorporated, 10 New St., Morristown, N.J., 68, 70, 81, 85, 90
Tel: JEfferson 8-7661

Sequoia Wire Corp., 2201 Bay Rd., Redwood City 1, Calif., 83
See ad on page 529
Tel: EMerson 9-0331

Servo Corp. of America, 20-20 Jericho Turnpike, New Hyde Park, L.I., N.Y., 1, 21, 47, 53, 58, 68, 72, 75, 77, 81, 85, 86
Tel: FIeldstone 3-4100

Servomechanisms, Inc., 12500 Aviation Blvd., Hawthorne, Calif., 21, 29, 31, 36, 44, 58, 59, 68, 70, 81
Tel: ORegon 8-7841

Servomechanisms, Inc., Mechatrol Div., 625 Main St., Westbury, L.I., N.Y., 21, 31, 44, 47, 81
Tel: EDgewood 4-6500

Servonics, Inc., 822 N. Henry St., Alexandria, Va., 70, 81
Tel: TEmple 6-6800

Servo-Tek Products Co., 1086 Goffle Rd., Hawthorne, N.J., 21, 44, 47, 51, 58, 68, 81
Tel: HAwthorne 7-3100

Servotrol Co., 114 W. Illinois St., Chicago 10, Ill., 53
Tel: SUperior 7-3082

Setchell-Carlson, Inc., 330 Fifth Ave., New Brighton, St. Paul 12, Minn., 4, 5, 12, 13, 15, 21, 29, 40, 59
Tel: MElrose 3-3131

Shakeproof Div., Illinois Tool Works, St. Charles Rd., Elgin, Ill., 87
Tel: SHerwood 1-7900

Shallcross Manufacturing Co., 521 Pusey Ave., Collingdale, Pa., 22, 34, 42, 47, 53, 56, 69, 72, 85, 86, 90
Tel: LUdlow 3-5100

Shallite, Inc., 128 W. First Ave., Roselle, N.J., 53
Tel: CH 5-9800

Shamban Engineering Co., 11617 W. Jefferson Blvd., Culver City, Calif., 86, 87, 89, 94, 95
Tel: EXmont 7-2195

Shanda Laboratories, Inc., 96 Harrison Ave., Jersey City 4, N.J., 91, 96

Shand & Jurs Co., 8th & Carleton Sts., Berkeley 10, Calif., 12, 20, 68
Tel: AShberry 3-2345

Shasta Div., Beckman Instruments, Inc., P.O. Box 296, Station A, Richmond 3, Calif., 12, 21, 42, 47, 67, 69, 72, 80
Tel: LAnscape 6-7730

Sheffield Corp., 721 Springfield St., Dayton 1, Ohio, 72, 92
Tel: KEnmore 3131

Sherman Industrial Electronics Co., Inc., 505 Washington Ave., Belleville 9, N.J., 88
Tel: PLymouth 9-5800

Sherman Mfg. Co., H. B., 22 Barney St., Battle Creek, Mich., 30, 87
Tel: WOodward 4-7104

Sherwin-Williams Co., 101 Prospect Ave. N.W., Cleveland 1, Ohio, 94
Tel: TOwer 1-7000

Sherold Crystals, Inc., 1510 McGee St., Kansas City, 8, Mo., 33
Tel: VIctor 2-9792

Shielding, Inc., 30 Reade St., Riverton, N.J., 71
See ad on page 228
Tel: TAlmage 9-1433

Shipley Company, Inc., 980 Worcester St., Wellesley 82, Mass., 91, 92, 96
Tel: WEllesley 5-6631

Shockley Semiconductor Lab., 391 S. San Antonio Rd., Mt. View, Calif., 54
Tel: DA 6-1300

Shores Laboratory, East Patchogue, L.I., N.Y., 85, 90
Tel: GR 5-2522

Shure Brothers, Inc., 222 Hartrey Ave., Evanston, Ill., 43, 45, 49
Tel: DAvis 8-9000

Shurite Meters, 35 Hamilton St., New Haven 8, Conn., 42
Tel: STate 7-5825

Sibley Co., Haddam 3, Conn., 48, 85
See ad on page 388
Tel: DIamond 5-4501

Sickles Div., F. W., General Instrument Corp., 165 Front St., Chicopee, Mass., 3, 27, 29, 34, 36, 50, 54, 59, 60
Tel: LYceum 4-4781

Sierra Electronic Corp., 3885 Bohannon Dr., Menlo Park, Calif., 3, 15, 36, 47, 60, 66, 72, 77, 78, 80, 85, 90
Multiple pages of additional data on 34-35
Tel: DAvenport 6-2060

Sigmamaster Corp., 85 Beechwood Ave., New Rochelle, N.Y., 37
Tel: NEw Rochelle 6-1200

Sigma Instruments, Inc., 170 Pearl St., S. Braintree, Mass., 21, 52, 68, 70
Tel: VIctor 3-5000

Signalite, Inc., 41 Neptune Hwy., Neptune, N.J., 46, 62,
Tel: PRospect 5-2490

Silicone Insulation, Inc., 1383 Seabury Ave., New York 61, N.Y., 86, 87, 89, 94, 95
Tel: SYcamore 2-4400

Silleocks-Miller Co., 10 W. Parker Ave., Maplewood, N.J., 86, 89, 94, 95
Tel: SOuth Orange 2-6171

Simmonds Aerocessories, Inc., 105 White Plains Rd., Tarrytown, N.Y., 26, 68, 69, 81
Tel: MEdford 1-7500

Simmons Fastener Corp., 1750 N. Broadway, Albany 1, N.Y., 87
Tel: ALbany 62-5431

Simonds Saw & Steel Co., Ohio St., Lorkport, N.Y., 41
Tel: LOckport, N.Y. 3-5921

Simplex Equip. Corp., 55 Lafrance Ave., Bloomfield, N.J., 3, 9, 21, 68, 70, 81
Tel: PIlgrim 3-1400

Simpson Electric Co., 5200 W. Kinzie St., Chicago 44, Ill., 42, 52, 72, 77, 79, 80
Tel: EStebrook 9-1121

Simpson, Inc., Pearce, 3023 Coral Way, Miami 45, Fla., 3, 10, 11
Tel: HIghland 8-1708

Simpson Mfg. Co., Inc., Mark, 32-28 49 St., Long Island City, N.Y., 4, 9, 11, 16, 21, 30, 31, 60
Tel: YEllowstone 2-3400

Sims Castings Corp., 2174 E. Erie Blvd., Syracuse 3, N.Y., 66
Tel: GRanite 2-2489

Sivers Lab., Kristallvagen 18, Stockholm-Hagersten, Sweden, 22, 47, 52, 56, 59, 60, 66, 77, 78, 80, 85, 86, 90
Tel: 19 86 33

Skiatron Electronics & TV Corp., 180 Varick St., New York 14, N.Y., 4, 5, 8, 12, 13, 14, 18, 19, 20, 21, 34, 48, 67, 68, 70, 73, 74, 79, 81, 82, 85, 86, 90
Tel: WAtkins 4-7060

Skydyne, Inc., P.O. Box 1106, River Rd., Port Jervis, N.Y., 25, Tel: 3-2241

Slater Electric & Mfg. Co., 45 Sea Cliff Ave., Glen Cove, N.Y., 55, 56, 94
Tel: ORiole 6-1100

Small Motors, Inc., 2076 Elston Ave., Chicago 14, Ill., 31, 44
Tel: ARmitage 6-6900

Smith Company, Wm. M., 20 Ferguson Ave., Broomall, Pa., 9
Tel: ELgin 6-0669

Smith, Inc., Herman H., 2326 Nostrand Ave., Brooklyn 10, N.Y., 30, 37, 39, 56
Tel: CLoverdale 3-7900

Smith-Meeker Eng. Co., 157 Chambers St., New York 7, N.Y., 9, 18, 85, 90
Tel: WOrth 4-5510

Smith & Purdy Associates, 944 Main St., Walpole, Mass., 100
See ad on page 608

Smooth-On Mfg. Co., 572 Communipaw Ave., Jersey City 4, N.J., 89, 91
Tel: HEnderson 3-0076

Snyder Co., V. A., Inc., 2165 Morris Ave., Union, N.J., 100
See ad on page 613
Tel: MUrdock 8-6100

Snyder Mfg. Co., 22nd & Ontario Sts., Philadelphia 40, Pa., 3, 43
Tel: BAldwin 5-6565

Sola Electric Co., 4633 W. 16th St., Chicago 50, Ill., 47, 59, 65
See ad on page 440
Tel: BIshop 2-1414

Solar Manufacturing Corp., 4553 Seville Ave., Los Angeles 58, Calif., 26, 27, 33, 48, 53, 84
Tel: LUdlow 3-1411

Solartron, Inc., 10761 Burbank Blvd., N. Hollywood, Calif., 21, 22, 25, 47, 67, 68, 72, 77, 79
See ad on page 292
Tel: STanley 7-5081

Solartron Electronic Group, Ltd., Queens Rd., Thames Ditton, Surrey, England, 20, 21, 25, 28, 47, 48, 67, 68, 70, 72, 77, 79, 80, 81, 90
Tel: EMberbrook 5522

Somers Brass Co., Inc., 94 Baldwin Ave., Waterbury 20, Conn., 93
Tel: PLaza 6-8321

Sonar Radio Corp., 3050 W. 21st St., Brooklyn 24, N.Y., 2, 10
Tel: ESplanade 2-6000

Sonex, Inc., 73 S. State Rd., Upper Darby, Pa., 21, 47, 72, 85, 86, 90
Tel: FLanders 2-1721

Sonotone Corp., P.O. Box 200, Elmsford, N.Y., 21, 23, 40, 45, 61
Tel: LYric 2-6400

Sorensen & Co., Inc., Richards Ave., Norwalk, Conn., 47, 59, 65
Tel: TEmple 8-6571

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.

for electronic and avionic devices

STEMCO® THERMOSTATS

give you more of what you want most

FEATURES such as snap or positive-action . . . various terminal arrangements or mounting provisions . . . different temperature ranges—there's a *standard* type Stemco thermostat for your *special* needs. That means you cut down on lead time, research and development costs, tooling and production inventory. Specify Stemco and you get *better thermostats, faster and for less* than you can make them or buy them elsewhere.

SIZE and weight are particularly important in avionic and electronic applications. And here Stemco thermostats score, too. Their compactness and lightness give a better product without sacrificing performance.

ECONOMY of mass production of many standard Stemco types with literally hundreds of terminal arrangements and mounting provisions means your product costs less to make.

AVAILABILITY of most types is good. Design is flexible for your special applications, tooling is in existence for short-term delivery. If heat control is your problem, Stemco thermostats can provide the answer.

AA-4092

**Refer to Guide 400 EO for U.L. and C.S.A. approved ratings.*

STEVENS *manufacturing company, inc.*
Lexington and Mansfield, Ohio

TYPE A*
Semi-enclosed
Insulated electrically independent bimetal disc gives fast response and quick snap action control. Operation from 15° to 400° F or higher on special order. Various mountings and terminals. Average rating 6½ amps at 115 volts AC, 4 amps at 230 volts AC and 28 volts DC. See Bulletin 3000.

TYPE A*
Hermetically sealed
Electrically identical to semi-enclosed Type A. Temperatures from 15° to 300° F. Various enclosures and mountings, including brackets available for appliance or electronic apparatus applications. Bulletin 3100.

TYPE C
Hermetically sealed
Electrically identical to semi-enclosed Type C but sealed in metal can. Also supplied as double thermostat, alarm type. Latest terminals and mountings. Request Bulletin 5000.

TYPE C
Semi-enclosed
Small positive acting electrically independent bimetal snap disc for operation from 15° to 300° F. Rated at approximately 3 amps depending on application. Terminals and mountings to customer specifications. See Bulletin 5.

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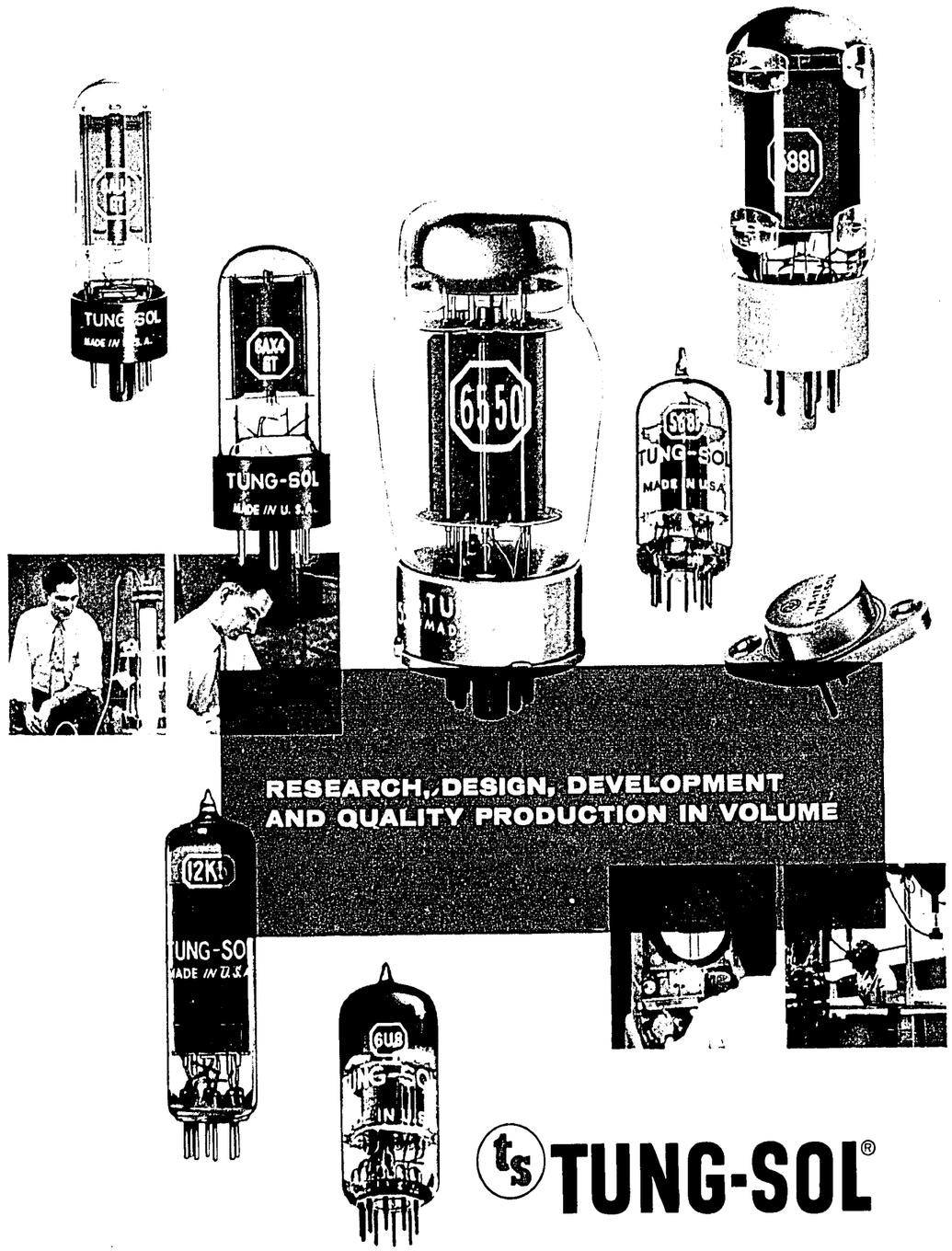

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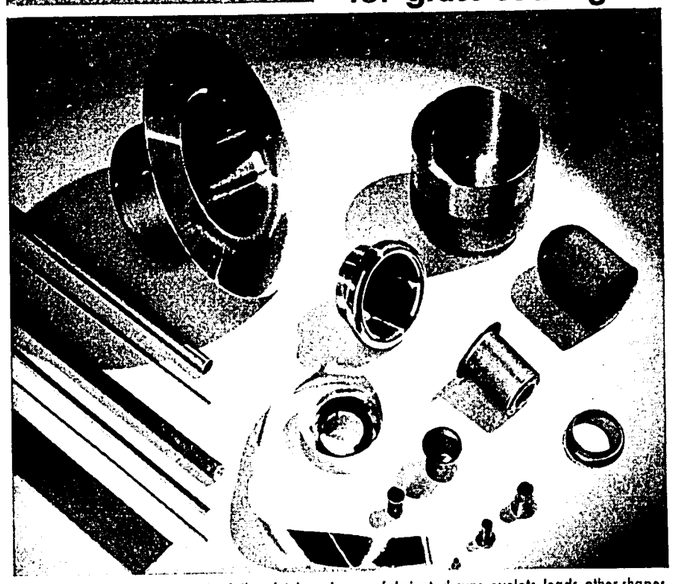

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Telecomputing, Div. of Telecomputing Corp., 16217 Lindbergh St., Van Nuys, Calif., 70, 74
Tel: ST 3-1950

Telectro Industries Corp., 35-16 37 St., Long Island City 1, N.Y., 1, 3, 6, 16, 17, 20, 21, 22, 25, 26, 27, 36, 41, 47, 59, 66, 67, 70, 72, 80, 84, 86, 90
Tel: YEllowstone 2-8600

Telectron Co., Broward Internatl. Airport, Ft. Lauderdale, Fla., 11, 13, 28, 29, 59, 68, 83, 85, 86, 90

Telectronsonic Corp., 35-18 37 St., Long Island City 1, N.Y., 16
Tel: YE 2-8600

Tele-Dynamics, Inc., 32 & Walnut Sts., Philadelphia 11, Pa., 20, 90
Tel: EVergreen 2-5015

Tele-Matic Ind., Inc., 16 Howard Ave., Brooklyn 21, N.Y., 22, 28, 36, 42, 59
Tel: GLenmore 2-7788

Telemeter Magnetics, Inc., 2245 Pontius Ave., Los Angeles 64, Calif., 20, 21, 32, 70, 84, 90
Tel: BRadshaw 2-0991

Telephonics, Corp., Park Ave., Huntington, N.Y., 1, 7, 14, 15, 17, 21, 40, 43, 47, 73
Tel: HAmilton 3-6200

Telerad Mfg. Corp., 1440 Broadway, New York 18, N.Y., 3, 21, 22, 33, 36, 42, 60, 66, 77, 87
Tel: BRyant 9-0893

Teleradio Engineering Corp., 90 Wall St., New York 5, N.Y., 26, 27, 29, 41, 59
Tel: WHitehall 4-4161

Teleregister Corp., 445 Fairfield Ave., Stamford, Conn., 70
Tel: FIreside 8-4291

Teletronic Laboratories, Inc., 1835 W. Rosecrans Ave., Gardena, Calif., 4, 21, 60, 83
Tel: FAculty 1-0627

Teletronics Laboratory, Inc., 54 Kinkel St., Westbury, L.I., N.Y., 20, 22, 25, 42, 47, 56, 67, 71, 72, 75, 77, 79, 80
Tel: EDgewood 3-1027

Televex Co., 46 Lakeview Ave., Yonkers, N.Y., 45
Tel: SPencer 9-1297

Television Digest, Wyatt Bldg., Washington 5, D.C., 99

Television Laboratories, Inc., 333 Mill St., Wauconda, Ill., 3, 59
Tel: JAckson 6-2511

Television Specialty Co., Inc., 350 West 31st St., New York 1, N.Y., 18
Tel: LOngacre 4-2334

Television Utilities Corp., 112-33 Colonial Ave., Corona 68, N.Y., 4, 12, 16, 21, 60, 82
Tel: TW 8-1000

Televiso Corp., 1415 Golf Rd., Des Plaines, Ill., 1, 2, 14, 21, 29, 36, 72, 77, 79, 80
Tel: RODney 3-8200

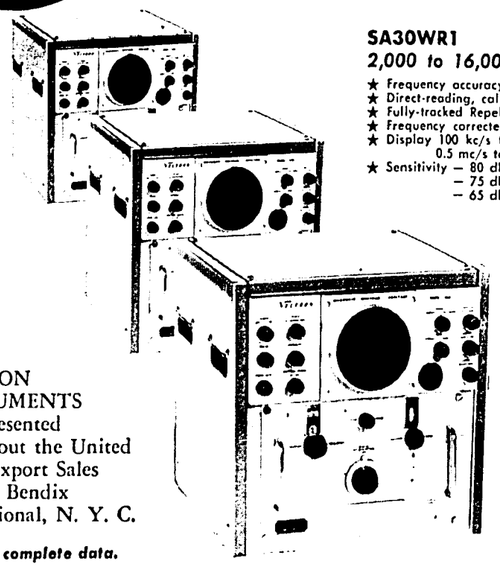
Telewave Corp., 43-20 34th St., Long Island City 1, N.Y., 53

Telex, Inc., Telex Park, St. Paul 1, Minn., 21, 29, 30, 39, 40, 43, 48, 58, 59, 69, 86
Tel: MI 6-7211

Tel-Instrument Electronics Corp., 728 Garden St., Carlstadt, N.J., 5, 12, 21, 47, 65, 72, 80, 82
Tel: WEbster 3-1600

3 NEW VECTRON MICROWAVE SPECTRUM ANALYZERS

To determine power and frequency distribution of pulsed and CW microwave signals.



SA30WR1
2,000 to 16,000 mc/s

★ Frequency accuracy 0.5% or better
★ Direct-reading, calibrated Tuning Dial
★ Fully-tracked Repeller Voltage Control
★ Frequency corrected 50-db Input Attenuator
★ Display 100 kc/s to 10 mc/s per inch at 2,000 mc/s
0.5 mc/s to 40 mc/s per inch at 16,000 mc/s
★ Sensitivity — 80 dbm at 2,000-4,000 kc/s
— 75 dbm at 4,000-8,000 kc/s
— 65 dbm at 8,000-16,000 kc/s

SA30X5
8,500 mc/s to 9,660 mc/s

★ Frequency accuracy 0.05% or better
★ Direct Signal-Frequency-Reading Wavemeter
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★ Precision 80 db RF Input Attenuator
★ Displays 100 kc/s to 10 mc/s per inch
★ Sensitivity — 80 dbm for usable signal

VECTRON INSTRUMENTS are represented throughout the United States. Export Sales through Bendix International, N. Y. C.

Write for complete data.

SA30 with interchangeable RF heads
800 mc/s to 75 kmc/s

NEW — Dual unit for standard rack mounting or portable 80-pound bench top package
NEW — Simplified Control Panel with necessary operating controls conveniently available
NEW — Frequency Difference Control for direct incremental measurements of 100 kc/s to 5 mc/s
NEW — Direct Frequency Calibration without confusion with new Image Check feature
NEW — Separate Brightness and Intensity Controls for displayed signal and baseline
NEW — All aluminum construction for lighter weight and easier transport

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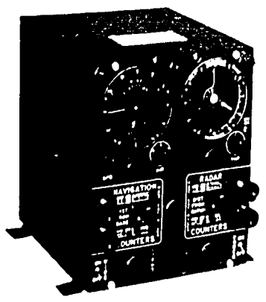

GROUND POSITION INDICATOR COMPUTER

Custom designed and manufactured by Vectron to solve navigational vector problems. Input information includes air m.p.h., compass heading, deviation, wind direction and velocity. Output is read directly as N-S and E-W components. Additional electro-mechanical circuits permit establishment of secondary flight pattern over target.

Vectron's precision manufacturing facilities are available to meet your needs for dependable contract, sub-contract or custom manufacture, with or without design engineering. Send us your next quotation request or ask for a copy of our contract manufacturing facilities brochure.

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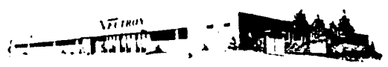
Vectron's engineering and production specialists can make necessary design improvements and modifications to assure efficient production, consistent with sound engineering and quality control.

PRODUCTION

Vectron's complete facilities, skilled personnel, precision machine tools, careful production planning and thorough quality control with proper testing equipment assure the highest standards of fabrication and assembly.



VECTRON, inc. 1607 TRAPELO ROAD
Electronic and Electro-Mechanical Equipment WALTHAM 54, MASS.

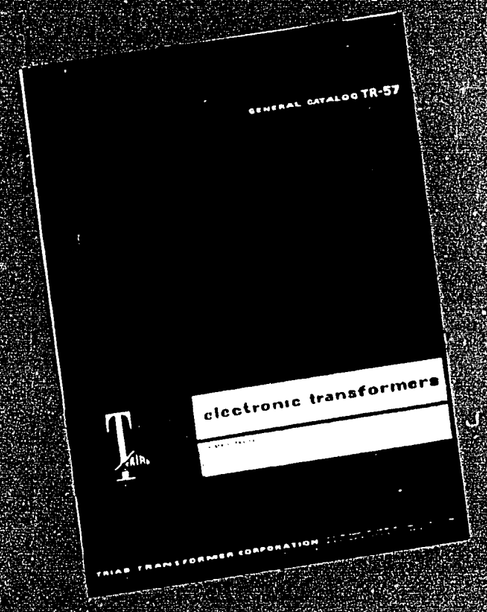
MINIATURIZED SPHERE RESOLVER

requires less than 5 in/oz input for 1 to 2 in/oz from the sine and cosine output shafts. It is 1½" square with a body block only 2⅛" long.

Write for complete data.

For details, circle #198 on Reader Service Card.

BOOK-OF-THE-YEAR for TRANSFORMER BUYERS...



NEW TRIAD GENERAL CATALOG TR-57

Lists the complete line of transformers that have made TRIAD the symbol of quality. Includes over 75 new items. Now available from your distributor or write . . .

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A SUBSIDIARY OF LITTON INDUSTRIES

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Telonic Industries, Inc., 73 N. 2nd Ave., Beech Grove, Ind., 22, 33, 36, 77, 80, 82
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Telrex Labs., Asbury Park, N.J., 3
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Tel: PRospect 5-7252

Temco, Inc., 4104 Charlotte Ave., Nashville 9, Tenn., 90
Tel: CY 7-7551

Tempel Mfg. Co., 1939 Bryn Mawr Ave., Chicago 23, Ill., 32

Ten Bosch, Inc., M., 80 Wheeler Ave., Pleasantville, N.Y., 21, 70, 72, 81, 85, 90
Tel: ROgers 9-3000

Tenney Engineering, Inc., 1090 Springfield Rd., Union, N.J., 71, 88, 90
Tel: MUrdock 6-7870

Tensitron, Inc., Harvard Depot Rd., Harvard, Mass., 58, 68, 85, 86, 90
Tel: GLadstone 6-3521

Tensolite Insulated Wire Co., Inc., 198 Main St., Tarrytown, N.Y., 83
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Tel: MEdford 1-2300

Tensor Electric Development Co., Inc., 1873 Eastern Pkwy., Brooklyn 33, N.Y., 1, 21, 29, 36, 41, 59, 86, 90
Tel: HY 5-9200

Terado Co., 1068 Raymond Ave., St. Paul 14, Minn., 31, 52
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Tel: MIdway 6-2514

Terpening Co., L. H., 10 West 61st St., New York 23, N.Y., 3, 60
Tel: CIrcle 6-4760

Tetrad Co., Inc., 62 St. Marys St., Yonkers, N.Y., 45
Tel: YOnkers 3-1474-5-6

Texas Crystals Div. of Westronix Corp., 8538 W. Grand Ave., River Grove, Ill., 31, 33
Tel: GLadstone 3-3555

Texas Instruments Incorporated, 6000 Lemmon Ave., Dallas 9, Tex., 14, 15, 20, 21, 31, 33, 42, 50, 53, 54, 66, 70, 73, 74, 93
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Tel: FLeetwood 2-1781

Tevco Insulated Wire, 108 E. Prospect, Burbank, Calif., 83
Tel: VI 9-5574

Textile Thread Co., 47 Bacon St., Watertown 72, Mass., 87
Tel: WAtertown 4-5432

Thal, Bernard, 791 Tremont St., Boston 18, Mass., 85, 86, 87, 89, 94, 95
Tel: COmmonwealth 6-1236

Thermador Elec. Mfg. Co., 2000 Camfield Ave., Los Angeles 22, Calif., 59, 65
Tel: PA 8-2105

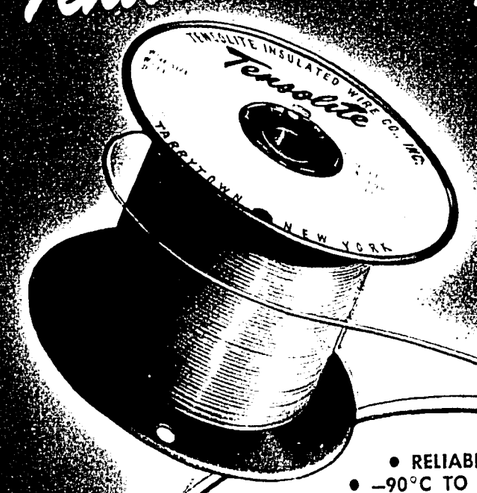
Thermal American Fused Quartz Co., 18-20 Salem St., Dover, N.J., 33
Tel: FOxcroft 6-2807

Thermo Materials, Inc., 4040 Campbell Ave., Menlo Park, Calif., 32, 38, 48, 84, 87, 88, 89, 90, 97
Tel: DAvenport 6-2780

Thomas Electronics, Inc., 118 Ninth St., Passaic, N.J., 61, 97
Tel: GRegory 3-4040

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.

Tensolite ENGINEERED WIRE & CABLE PRODUCTS



THE *Quality* STANDARD IN THE WORLD OF WIRE

- RELIABILITY
- –90°C TO +250°C
- SUPERIOR CHEMICAL RESISTANCE
- EASE OF STRIPPING & SOLDERING
- UNLIMITED COLOR CODING

★ **TEFLON® INSULATED HOOK-UP WIRE**
To Mil-W-16878B, Types E and EE. Solid Colors and Stripes. Parallel wrapped, Spiral wrapped and Extruded Insulation. AWG sizes 8 thru 32.

★ **"TEFLON" COATED MAGNET WIRE**
Round Magnet Wire to Mil-W-19583, Type III. AWG sizes 20 thru 44 in all coating thicknesses.

★ **"TEFLON" AIRFRAME WIRE TO MIL-W-7139A**
TEFLON-Fiberglas construction for superior resistance to abrasion and short-term emergency fire conditions. AWG sizes 6 thru 22. Natural, white, colors and tracers available.

HIGH TEMPERATURE LEAD WIRE
TEFLON or Silicone impregnated fiberglas braid over TEFLON insulated wire for Missile application and High Temperature Motor and Transformer leads. AWG sizes 6 thru 36.

SUPER-FLEXIBLE THINWALL HOOK-UP WIRE
Extra thin wall of TEFLON insulation over super-flexible stranding in AWG sizes 20 thru 36.

SHIELDED "TEFLON" COATED WIRE
All TENSOLON, TEFLON insulated wire is available with closely woven, braided shield to military and customer specifications.

9MMF/Ft "TEFLON" AIR DIELECTRIC COAX CABLE
Extra-flexible 9MMF/Ft Capacitance coax available with variety of outer jackets. LOW-NOISE type coax also being supplied.

"TEFLON" COAXIAL CABLE TO MIL-C-17B
50, 75, 95, ohm miniature coaxial cables in compliance with MIL-C-17B, or with variety of outer jackets to fit specific applications.

"TEFLON" INSULATED RIBBON CABLE
Up to 20 conductors, laid parallel in flat ribbon. Available with metallic or textile braids and variety of lacquers and impregnants. AWG sizes 10 thru 36.

SINGLE AND MULTI CONDUCTOR "TEFLON" CABLE
From 1 to 50 TEFLON Insulated conductors, may be cabled, shielded, and jacketed with TEFLON, thermoplastics, or lacquered braids. Units and custom assemblies available.

SURFACE TREATED "TEFLON" INSULATED WIRE
To provide a surface for ready adhesion of potting compounds and printing foils. Ideal for high-temperature encapsulation. AWG sizes 10 thru 32.

★ MOST GAUGE SIZES AVAILABLE FOR OFF-THE-SHELF DELIVERY

WRITE FOR COMPLETE TECHNICAL INFORMATION ON ANY OF ABOVE ITEMS

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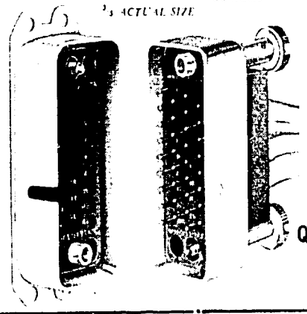
PACIFIC DIV.: 1516 N. GARDNER ST., LOS ANGELES, CALIF.

For details, circle #200 on Reader Service Card.

WINCHESTER ELECTRONICS, INC.

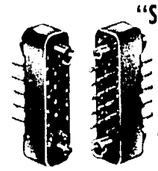
SERIES "XMRE" 9, 14, 18, 20, 21, 26, 34, 42, 50, 75 Contacts



MINIATURE and SUB-MINIATURE
ELECTRICAL CONNECTORS
The Accepted Standard for
QUALITY • COMPACTNESS • RUGGEDNESS
LIGHT WEIGHT • DEPENDABILITY

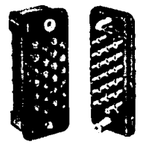
Precision-manufactured Connectors . . . to the highest quality control standards in the industry . . . have established Winchester Electronics, Inc. components as the finest in the electrical connector art. These and many others . . . or completely new designs . . . are quickly available to you . . . for long and dependable trouble-free service.

SUB-MINIATURE **SERIES "SMRE"**



7, 14, 20, 26, 29, 34 Contacts
ACTUAL SIZE

QUICK DISCONNECTING SELF-ALIGNING **SERIES "QRE"**



6, 12, 18, 24, 34, 54, 208 Contacts
¼ ACTUAL SIZE

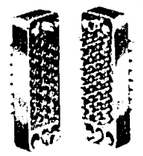
SERIES "M" MINIATURE

4, 5, 7, 9 Contacts
ACTUAL SIZE

HERMETIC PLUG (Round Hole) **SERIES "HM"**

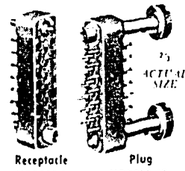
Used with "M" Receptacles
ACTUAL SIZE

MINIATURE for No. 16 Wire **SERIES "MRA"**



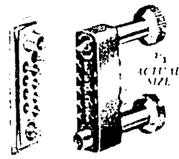
14, 20, 34, 41, 50, 66, 104 Contacts
¼ ACTUAL SIZE

JACKSCREW LOCK



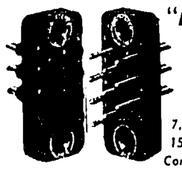
Receptacle MRE20S-J — Plug MRE20P-JT

JACKSCREW LOCK



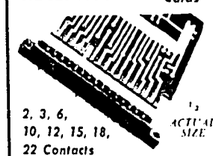
Hermetic Plug HMRE9P-J used with MRE Receptacle MRE9S-JT

AIRCRAFT **SERIES "A"**



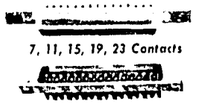
7, 10, 15, 18 Contacts
½ ACTUAL SIZE

SERIES "K" RECEPTACLE *Used with 1/16" Printed Circuit Cards*



2, 3, 6, 10, 12, 15, 18, 22 Contacts
½ ACTUAL SIZE

PRINTED CIRCUIT CONNECTORS **SERIES "W"**



7, 11, 15, 19, 23 Contacts

Right angle, for Printed Circuit 1/16", 1/8" & 1/4" thick boards
½ ACTUAL SIZE

Many features are covered by our Patents Nos. 2411861, 2466370, 2513080, 2526325, 2532538, 2610222, 2633482, 2689337, 2691771, 2760174, D161900, D162795

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Wire or write for catalog of other types or advise your special requirements.

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WINCHESTER ELECTRONICS INCORPORATED

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Alphabetical Directory

Thomas Instrument Co., Silver Rock, Phoenix, N. Y., 92
Tel: PHoenix 5134

Thomas Mold & Die Co., 249 W. Henry St., Wooster, Ohio, 3
Tel: HOward 2-5911

Thomas & Skinner, Inc., 1120 E. 23rd St., Indianapolis 7, Ind., 32, 41
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Tel: WAlnut 3-2448

Thomas & Sons Co., R., Lisbon, Ohio, 84, 89
Tel: HArrison 4-7231

Thomas & Sons, Inc., William, Sheaun Ave., Ridgefield, N.J., 86, 97

Thompson-Bremer & Co., 520 N. Dearborn, Chicago 10, Ill., 87
Tel: WHitehall 4-3474

Thompson & Co., John I., 921 17th St., N.W., Washington 6, D.C., 85, 90, 99
Tel: NAtional 8-5318

Thompson Engineering Products, 2425 Pennsylvania Ave., Boulder, Colo., 85
Tel: HIllcrest 2-9245

Thompson Fiber Glass Co., H. I., 1733 Cordova St., Los Angeles 7, Calif., 89
Tel: REpublic 3-9161

Thompson Products, Inc., Electronics Div., 2196 Clarkwood Rd., Cleveland 3, Ohio, 1, 21, 56, 66, 78, 81
Tel: HEnderson 1-0765

Thompson Products, Inc., Dare Television Div., West 10th St., Michigan City, Ind., 5, 12, 15, 18, 82
Tel: 3-3251

Thomson Industries, Inc., 1029 Plandome Rd., Manhasset, N.Y., 87
Tel: MAnhasset 7-1800

Thor Ceramics, Inc., 225 Belleville Ave., Bloomfield, N.J., 32, 38, 87
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Tel: PIlgrim 3-7797

Tibbetts Industries, Inc., Colonial Ave., Camden, Me., 43
Tel: CEdar 6-3366-67

Timely Instruments & Controls Corp., 1645 W. 135th St., Culver City, Calif., 21, 31, 47, 59, 65, 81
Tel: DAvis 4-6067

Times Facsimile Corp., 540 W. 58th St., New York 19, N.Y., 8, 75, 97
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Times Wire & Cable Co., Inc., 358 Hall Ave., Wallingford, Conn., 3, 5
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Tingstol Co., 1461 W. Grand Ave., Chicago 22, Ill., 46, 48, 86, 89, 95
Tel: CA 6-1520

Tinnerman Products, Inc., P.O. Box 6688, Brookpark Rd., Cleveland 1, Ohio, 87
Tel: SHadyside 1-9300

Torngren Co., Inc., C. W., 236 Pearl St., Somerville 45, Mass., 3
Tel: 736-3250

Torocoil Co., 2615 Bristol Rd., Columbus 21, Ohio, 29, 36, 59, 69
Tel: HU 6-4067

Torotel, Inc., 11505 Bellmont Ave., Kansas City 34, Mo., 29
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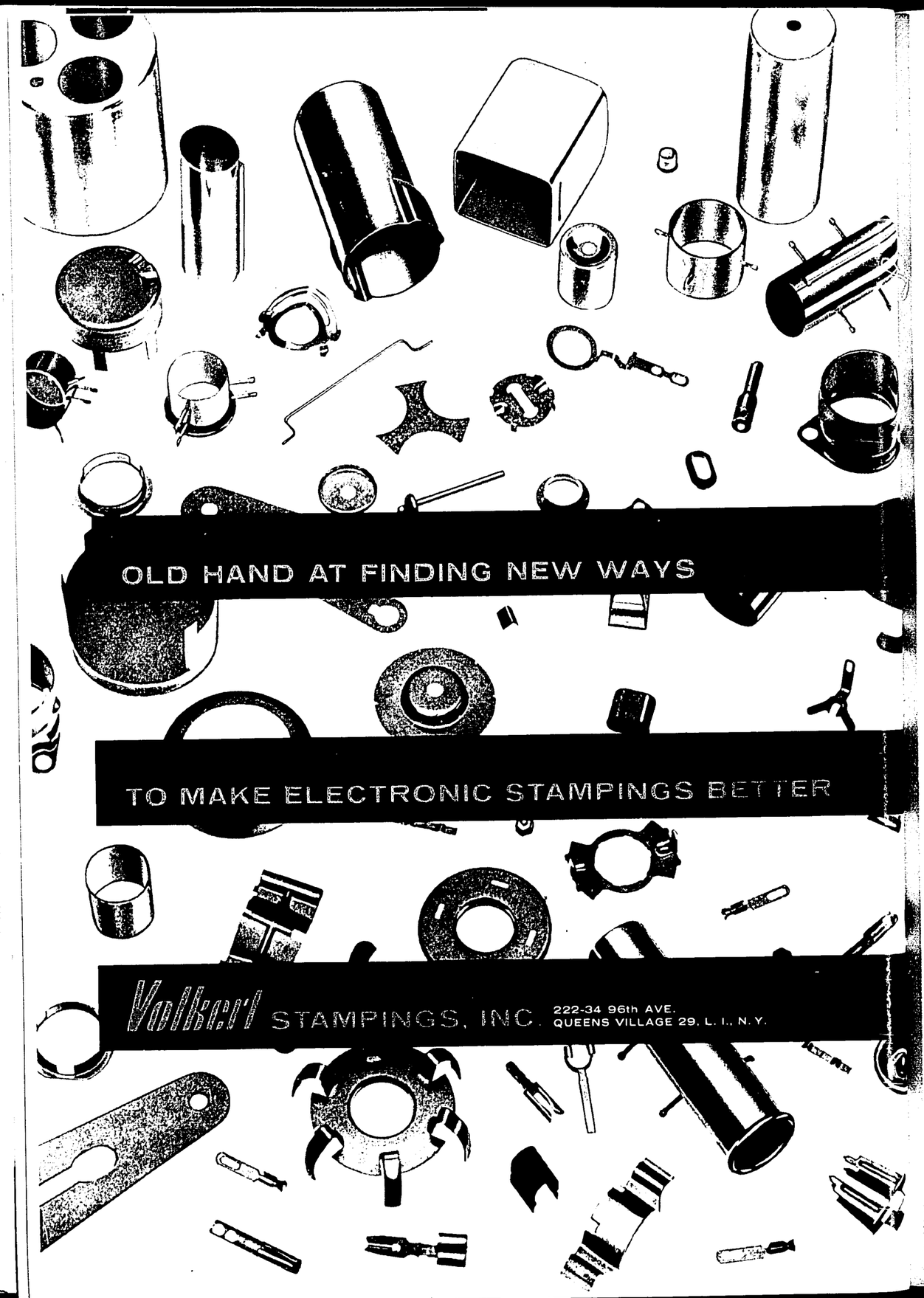

Torsion Balance Co., 35 Mouhegan St., Clifton, N.J., 50
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Torwico Electronics, Inc., 1090 Morris Ave., Union, N.J., 21, 29, 35, 36, 52, 59, 81
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Tel: ELizabeth 4-5650

Tower Construction Co., 2712-A Hawkeye Dr., Sioux City, Iowa, 3
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Tel: 5-7653

Tracerlab, Inc., 1601 Trapelo Rd., Waltham 54, Mass., 62, 78
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Trad Electronics Corp., 1001 First Ave., Asbury Park, N.J., 4, 22, 56, 66, 80
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Transco Products, Inc., 12210 Nebraska Ave., Los Angeles 25, Calif., 3, 52, 59
Tel: BRadshaw 2-5087

Transdyne Corp., 7337 Grand Ave., Maspeth 78, N.Y., 1, 20, 21, 47, 68, 72, 90
Tel: NEwton 9-0300

Transformers, Inc., 200 Stage Rd., Vestal, N.Y., 21, 29, 36, 59, 67
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Transformer Technicians, Inc., 2648 N. Cicero Ave., Chicago 39, Ill., 21, 29, 36, 47, 59
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Transicoil Corp., see: Daystrom Transicoil

Transistor Applications, Inc., 65 Broad St., Boston 9, Mass., 21, 43, 47, 72, 81, 85, 95
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Transistor Devices, Inc., 730 Boulevard, Kenilworth, N.J., 21, 31, 47, 67
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Transitron Electronic Corp., 168 Albion St., Wakefield, Mass., 50, 54
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Tel: NAtional 5-9701

Translite Electronics Corp., 5720 W. Armitage Ave., Chicago 39, Ill., 29, 59, 86
Tel: BE 7-4756

Trans-Lux Corp., 625 Madison Ave., New York 22, N.Y., 18
Tel: PLaza 1-3110

Transradio, Ltd., 138A Cromwell Rd., London, England, 30, 83, 87
Tel: FRemantle 4421

Trans-Sonics, Inc., P.O. Box 328, Lexington 73, Mass., 72
Tel: BUrlington 7-2011

Transval Engineering Corp., 10401 W. Jefferson Blvd., Culver City, Calif., 1, 3, 11, 16, 17, 21, 31, 35, 47, 65, 67, 68, 72, 81, 85, 96
Tel: VErmont 9-2361

Transvision Inc., 460 North Ave., New Rochelle, N.Y., 4, 12, 21, 80
Tel: NEw Rochelle 6000

Traveler Radio Corp., 571 W. Jackson Blvd., Chicago 6, Ill., 4, 45
Tel: HA 7-9151

Trenton Transformer Corp., P.O. Box 568, Trenton, N.J., 59
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Tresco, Inc., 3824-28 Terrace St., Philadelphia 28, Pa., 59
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Triad Transformer Corp., 4055 Redwood Ave., Venice, Calif., 29, 36, 38, 59
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Tel: TExas 0-5381

Tri-Dex Electronics, P.O. Box 1207, Lindsay, Calif., 29, 48, 83, 86, 87, 90
Tel: 2-4051

Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 30, 38
See ad on page 331
Tel: LIbertyville 2-3700

Trimount Plastic Co., Inc., 71 Dudley St., Arlington 74, Mass., 89, 95
Tel: MIssion 3-5600

Trio Laboratories, Inc., 4025 Merrick Rd Seaford, L.I., N.Y., 72
See ad on page 484
Tel: SUnset 5-5030

Triplett & Barton, Inc., 831 N. Lake St., Burbank, Calif., 71, 85, 90
Tel: VIctoria 9-4291

Triplett Electrical Instrument Co., Harmon Rd., Bluffton, Ohio, 42, 72, 77, 79, 80, 82
Tel: 323-W

Trop-Arctic, Inc., 627 S. Mulberry St., Muncie, Ind., 71
Tel: ATlas 2-4582

Tru-Connector Corp., 416 Union St., Lynn, Mass., 30
Tel: LYnn 8-9579

Tru-Ohm Products Div., Model Eng. & Mfg. Co., 2800 N. Milwaukee Ave., Chicago 18, Ill., 53
See ad on page 413
Tel: EV 4-2646

Truscon Steel Div., Republic Steel, Albert St., Youngstown 1, Ohio, 3, 83
Tel: RIverside 6-7211

Tubular Rivet & Stud Co., Weston Ave., Wollaston 70, Mass., 59, 87
Tel: PResident 3-1770

Tung-Sol Electric, Inc., 95 8th Ave., Newark 4, N.J., 46, 51, 52, 54, 61, 62, 63
See ad on page 240
Tel: HUmboldt 2-4200

Tur Bo Jet Products, Inc., 424 S. San Gabriel Blvd., San Gabriel, Calif., 29
See ad on page 322
Tel: CU 3-5191

Turner Co., 909 17th St. N.E., Cedar Rapids, Iowa, 43, 45
Tel: EMpire 3-8144

Turner & Co., W. R., 4831 W. Jefferson, Los Angeles 16, Calif., 44
Tel: RE 1-2279

U

U.H.F. Resonator Co., 1465 16th St., Racine, Wis., 86, 87
Tel: MElrose 3-9472

Ucinite Co., Div. United Carr Fastener Corp., 459 Watertown St., Newtonville 60, Mass., 30, 39, 59, 64
Tel: LAsell 7-8400

Ulanet Co., George, 416 Market St., Newark 5, N.J., 52, 56, 57
See ad on page 428
Tel: MArket 2-4876

Ultra Electroforming & Mfg. Co., 110 Cedar Ave., Pitman, N.J., 26
Tel: LUther 9-7000

Ultrasonic Corp., 640 Memorial Dr., Cambridge 39, Mass., 14, 21, 68, 70, 79, 81
Tel: UNiversity 4-6800

Ultra-Violet Products, Inc., 5114 Walnut Grove Ave., San Gabriel, Calif., 92
Tel: CUmberland 3-3193

Underwood Electric & Mfg. Co., Inc., 4920 W. Grand Ave., Chicago 39, Ill., 26, 27, 86
Tel: NAtional 2-9450

Ungar Electric Tools, Inc., 4101 Redwood Ave., Los Angeles 66, Calif., 92
Tel: EX 8-5718

Unimax Div. of W. L. Maxson Corp., Ives Rd., Wallingford, Conn., 59
Tel: COlony 9-8791

Union Carbide Corp., Silicone Div., 30 East 42nd St., New York 17, N.Y., 89, 91
Tel: MUrray Hill 7-8000

Union Electronics & Machine Corp., Moulton & Monroe Sts., Greatertown, Mass., 30
Tel: FLeetwood 2-2261

Union Plastics Corp., 1927 Paterson Plank Rd., Secaucus, N.J., 85, 89, 95
Tel: UN 4-1313

Union Switch & Signal, Div. Westinghouse Air Brake Co., Braddock Ave., Pittsburgh 18, Pa., 46, 50, 52, 68, 72
See ad on page 402
Tel: CHurchill 2-5600

Unistrut Products Co., 74 W. Sixth St., Irvington, N.J., 18, 25, 71
Tel: ES 2-4337

United-Carr Fastener Corp., 71 Ames St., Cambridge 42, Mass., 87

United Audio Products, Div. United Optical Mfg. Corp., 202 E. 44th St., New York 3, N.Y., 40, 42, 45
Tel: GRamercy 7-4372

United Catalog Publishers, Inc., 200 Madison Ave., Hempstead, N.Y., 59
Tel: IVanhoe 6-7755

United Control Corp., 4540 Union Bay Pl., Seattle 5, Wash., 21, 56, 57, 81
Tel: PLaza 9200

United Electrodynamics, 1200 S. Marengo Ave., Pasadena, Calif., 16, 20, 21, 35, 36, 47, 48, 58, 65, 70, 71, 72, 73, 86, 90
Tel: SYcamore 9-7161

United Electronics Co., 42 Spring St., Newark 4, N.J., 26, 51, 62, 63
Tel: HU 2-0576

United Insulator Co., Ltd., Oakcroft Rd., Chessington, Surrey, England, 32, 33, 37, 38, 72, 84, 89
Tel: ELmbridge 5241-6

United Mfg. Co., Div. W. L. Maxon Corp., 41 Haig St., Hamden 14, Conn., 72

United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 26, 27, 33, 43, 83, 84, 87, 89, 93, 97
Tel: BEekman 3-8870

United Shoe Machinery Corp., 140 Federal St., Boston 7, Mass., 87, 92
Tel: LIberty 2-9100

U.S. Ceramic Tile Co., Diamonite Div., 217 Fourth St., N.E., Canton 2, Ohio, 26, 32, 38, 43, 45, 49, 84, 89, 94, 97
Tel: GLendale 6-2446

U.S. Components, Inc., 454 E. 148th St., New York 55, N.Y., 30
See ad on page 330
Tel: CYpress 2-6525

U.S. Dynamics Corp., 1250 Columbus Ave., Boston 20, Mass., 31, 33, 47, 50, 54, 72, 88, 92
Tel: HIghlands 5-3850

U.S. Electric Motors, 200 E. Slauson Ave., Los Angeles 54, Calif., 44
Tel: ADams 3-3131

U.S. Electrical Tool Co., 3640 Llewellyn St., Cincinnati 23, Ohio, 92
Tel: MUlberry 1-3410

U.S. Electronics Corp., 276 Warren St., Lyndhurst, N.J., 29, 36, 59
Tel: GEneva 8-2400

U.S. Electronics Development Corp., 1323 Airway, Glendale 1, Calif., 26, 27, 69
Tel: CHapman 5-1880

U.S. Engineering Co., P.O. Box 311, Glendale 3, Calif., 3, 21, 32, 34, 39, 48, 66, 84, 85, 86, 87
Tel: TExas 0-7346

U.S. Expansion Bolt Co., 500 State St., York, Pa., 87
Tel: 7361

U.S. Gear Corp., Dept. I, 71 Broadway, Wakefield, Mass., 81
See ad on page 517
Tel: CRystal 9-4488

U.S. Motors Corp., Nebraska St., Oshkosh, Wis., 47
Tel: BLackhawk 9100

U.S. Radium Corp., P.O. Box 246, Morristown, N.J., 86, 87, 90, 97
Tel: JEfferson 9-4000

U.S. Recording Co., 1347 South Capitol St., Washington 3, D.C., 18, 21, 45, 47, 76
Tel: LIncoln 3-2705

U.S. Relay Company, 1740-44 Albion St., Los Angeles 31, Calif., 52, 56
Tel: CApitol 2-9146

U.S. Rubber Co., Mechanical Goods Div., 1230 6th Ave., New York 20, N.Y., 86, 87, 88, 89
Tel: CIrcle 7-5000

U.S. Stoneware Co., Alite Div., Akron 9, Ohio, 84, 86, 89, 97
See ad on page 95
Tel: ME 3-3224

U.S. Testing Co., Inc., 1415 Park Ave., Hoboken, N.J., 3, 86, 90
Tel: SWarthmore 2-2400

U.S. Time Corp., 500 Fifth Ave., New York 36, N.Y., 70
Tel: OXford 5-5050

U.S. Tool Co., Inc., 255 N. 18th St., East Orange, N.J., 92
Tel: ORange 5-4000

United Technical Laboratories, Morristown, N.J., 3, 29, 80, 91
Tel: JE 8-0711

United Transformer Corp., 150 Varick St., New York 13, N.Y., 21, 29, 34, 35, 36, 59, 65, 69
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Tel: ALgonquin 5-3500

Unitek Corp., Weldmatic Div., 380 N. Halstead Ave., Pasadena, Calif., 92
Tel: SY 5-5995

Universal Atomics Corp., 19 E. 48th St., New York 17, N.Y., 21, 47, 73, 77, 78
Tel: PLaza 8-1520

Universal Can & Condenser Co., 3435 N. Kimball, Chicago 18, Ill., 26
Tel: CO 7-3933

Universal Circuit Controls Corp., 3610 Oakton St., Skokie, Ill., 56
Tel: IR 8-8889

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For detailed identification, these 100 products and services, grouped in the 4 indexes, are further defined into 769 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 used in "Communications" whether components or complete apparatus form the first fundamental group. Yet, the same manufacturer and product 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, preceding the product system in the pink pages introducing the company index. 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

Universal Electronics Co., 1720 22nd St., Santa Monica, Calif., 47
See ad on page 387
Tel: EXbrook 3-7707

Universal Mfg. Co., Inc., 410 Hillside Ave., Hillside 5, N.J., 92
Tel: MUrdock 8-1700

Universal Transistor Products Corp., 143 E. 49th St., New York 17, N.Y., 21, 31, 47, 73, 78
Tel: PLaza 8-1520

Universal Winding Co., 1655 Elmwood Ave., Cranston, R.I., 92

Universal X-Ray Products, Inc., 1140 N. Western Ave., Chicago 22, Ill., 47, 59
Tel: ARmitage 6-4487

University Loudspeakers, Inc., 80 S. Kensico Ave., White Plains, N.Y., 9, 25, 36, 40
Tel: WHite Plains 6-7700

Univox Corp., 102 Warren St., New York 7, N.Y., 3, 30, 66, 68, 83
See ad on page 531
Tel: WOrth 2-5630

Uniwave, Inc., 2 Marine St., Farmingdale, N.Y., 3, 13, 14, 21, 22, 36, 42, 52, 56, 66, 68, 75, 77, 86
Tel: CHapel 9-8180

Utrad Corp. 305 N. Briant, Huntington, Ind., 29, 59
Tel: 4088

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V-M Corp., 4th & Park Sts., Benton Harbor, Mich., 21, 45
Tel: WAlnut 5-8841

Vacap Corporation, 1905 Summit Ave., Union City, N.J., 27
Tel: UN 7-6699

Vaco Products Co., 317 E. Ontario St., Chicago 11, Ill., 87
Tel: WH 4-2340

Vacumet, Inc., 1001-W Weed St., Chicago 22, Ill., 38, 92
Tel: MOhawk 4-5989

Vacuum Equipment Div., New York Air Brake Co., 3650 Washington St., Boston 30, Mass., 92
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Tel: JAmaica 4-3220

Vacuum-Electronic Engineering Co., 86 Denton Ave., New Hyde Park, L.I., N.Y., 72, 92

Vacuum Tube Products Co., Inc., 506 S. Cleveland St., Oceanside, Calif., 38, 51, 52, 59, 61, 62, 63, 68, 72, 78, 88, 90, 92
Tel: SAratoga 2-6567

Valentine, Inc., Forrest C., 511 Ft. Wayne Bank Bldg., Ft. Wayne, Ind., 100
See ad on page 624
Tel: ANthony 9122

Valpey Crystal Corp., 1244 Highland St., Holliston 2, Mass., 33
Tel: GArde 9-4851

Valtronic Corp., 123 W. 64th St., New York 23, N.Y., 25, 71, 87, 92
Tel: SU 7-1422

Van Deventer, Inc., H. R. 342 Madison Ave., New York 17, N.Y., 85
Tel: MUrray Hill 2-5166

Vanguard Electronics Co., 3384 Motor Ave., Los Angeles 34, Calif., 29, 34, 36, 59, 86
Tel: VErmont 8-6628

Vanguard Instrument Corp., 184 Casper St., Valley Stream, L.I., N.Y., 56

Van Nostrand Co., Inc., D., Dept. IRD, 120 Alexander St., Princeton, N.J., 98, 99
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Tel: PRinceton 1-6000

Vartlex Corp., 512 W. Court St., Rome, N.Y., 89, 95
Tel: 7200

Varian Associates, 611 Hansen Way, Palo Alto 2, Calif., 21, 29, 41, 47, 61, 63, 74, 77, 80
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Tel: DAvenport 5-5631

Vari-L Co., Inc., 432 Fairfield Ave., Stamford, Conn., 21, 29, 80
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Tel: FIreside 8-0091

Varo Mfg. Co., Inc., 2201 Walnut St., Garland, Tex., 1, 3, 13, 29, 31, 42, 44, 47, 59, 68, 75, 90
Tels: GArland 3-1285 & DAllas Davis 7-4521

Vector Electronic Co., 3352 San Fernando Rd., Los Angeles 65, Calif., 50, 55, 87, 90, 97
See ad on page 418
Tel: CLinton 7-8237

Vectrol Engineering, Inc., P.O. Box 1089, Stamford, Conn., 20, 21, 47, 51, 68, 81
Tel: DAvis 4-4876

Vectron, Inc., 1607 Trapelo Rd., Waltham 54, Mass., 22, 31, 36, 47, 60, 70, 72, 77, 85, 86, 90
See ad on page 244
Tel: TWinbrook 3-8700

Veeco Vacuum Corp., 86 Denton Ave., New Hyde Park, L.I., N.Y., 62, 68, 72, 92
Tel: PIoneer 6-1161

Veeder-Root, Inc., 70 Sargeant St., Hartford 2, Conn., 70
Tel: JAckson 7-7201

Vega Co., 155 Columbus Ave., Boston 16, Mass., 21, 43, 85
Tel: HAncock 6-1020

Ventrak Corporation, 11 W. 42nd St., New York 36, N.Y., 24, 25, 28, 44
Tel: LAckawanna 4-3652

Vesto Co., Inc., 20th & Clay St., N. Kansas City 16, Mo., 3
Tel: BA 1-3322

Vibration Research Labs., Inc., 97 Lake Ave., Tuckahoe, N.Y., 31, 47, 59
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Tel: WOodbine 1-2440

Vibrex Fastener Corp., P.O. Box 150, Mt. Kisco, N.Y., 81
Tel: MO 6-9780

Victor Adding Machine Co., 3900 N. Rockwell St., Chicago 18, Ill., 21, 70
Tel: KEystone 9-8210

Victor Electric Wire & Cable Corp., 618 Main St., W. Warwick, R.I., 83, 89, 93, 94, 95
Tel: VAlley 1-1700

Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 47, 53, 62, 72, 78, 86, 90
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Tel: ENdicott 1-6200

Victory Engineering Corp., 114 Springfield Rd., Union, N.J., 20, 52, 53, 65, 72, 76
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Tel: MUrdock 8-7150

Victory Mica Mfg. Co., Inc., 1313 39th St., Brooklyn 18, N.Y., 86, 89, 97
Tel: GE 5-3427

Vidaire Electronics Mfg. Corp., 576 Merrick Rd., Lynbrook, N.Y., 21, 36, 65
Tel: LYnbrook 9-6544

Viking Industries, Inc., 21434 Roscoe Blvd., Canoga Park, Calif., 21, 30, 38, 40, 86, 87, 89, 94
Tel: DI 7-8500

Viking Instruments, Inc., East Haddam, Conn., 86 88, 92
Tel: TRiangle 3-8643

Virginia Electronics Co., 5214 River Road, Washington 16, D.C., 1, 3, 4, 7, 9, 10, 11, 12, 18, 21, 39, 47, 66, 83, 85, 86, 87, 90, 92
Tel: OLiver 4-6601

Visual Electronics Corp. 342 W. 40th St., New York 18, N.Y., 3, 4, 5, 6, 12, 14, 15, 18, 20, 21, 36, 47, 63, 66, 77, 82
Tel: LOngacre 4-0518

Vitavox, Ltd., Westmoreland Rd., London N.W. 9, England, 36, 40, 43
Tel: COlindale 8671

Vitramon, Inc., P.O. Box 544P, Bridgeport 1, Conn., 26
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Tel: AMherst 8-1656

Vitro Laboratories, 200 Pleasant Valley Way, W. Orange, N.J., 70, 85, 86, 90
Tel: REdwood 1-3400

Vitroseal Corp., 709 E. 100th St., Indianapolis 20, Ind., 30, 38, 84
Tel: VIctor 6-2511

Vocaline Co. of America, Inc., Coulter St., Old Saybrook, Conn., 11, 42, 44, 52
Tel: EVergreen 8-3414

Vogel Mgf. Co., Harvey, 2577 Como Ave., St. Paul, Minn., 28, 86
Tel: MIdway 6-1347

Volkert Stampings, Inc., 222-34 96th Ave., Queens Village 29, L.I., N.Y., 97
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Tel: HOllis 4-8400

Vulcan Electric Co., 88 Holten St., Danvers, Mass., 88
Tel: SPring 4-1730

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Wac Line, Inc., 35 S. St. Clair St., Dayton 2, Ohio, 3, 42, 44, 66, 68, 72, 77, 81
Tel: FUlton 5161

Waldes Kohinoor, Inc., 47-16 Austel Place, Long Island City 1, N.Y., 87
Tel: EXeter 2-3100

Wales-Strippit Co., Unit of Houdaille Ind., Inc., Akron, N.Y., 92
Tel: AKron 9441

Walker Co., George, 118 Amsterdam Ave., Passaic, N.J., 87
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Tel: PRescott 7-3337

Walkirt Co., 141 W. Hazel St., Inglewood Calif., 21, 56, 68, 70, 75, 86
Tel: ORegon 8-4814

Wall Mfg. Co., P., P.O. Box 71, Grove City, Pa., 86, 88, 92
Tel: GRove City 910

Wallace, Don C., 1206 Maple Ave., Los Angeles 15, Calif., 85
Tel: RIchmond 7-0401

Wallson Associates, Ltd., 961 Frelinghuysen Ave., Newark, N.J., 21, 47, 65, 68, 72, 90
See ad on page 484
Tel: TAlbot 4-2600

Walsco Electronics Mfg. Co., 100 W. Green St., Rockford, Ill., 3, 30, 39, 53, 56, 87, 91
Tel: 2-6695

Walsh Engineering Co., P.O. Box 491, 34 Dehart Pl., Elizabeth 2, N.J., 59, 85
Tel: ELizabeth 4-5120

Walter Co., Inc., S., 1400 Atlantic Ave., Brooklyn 16, N.Y., 25, 28
Tel: HY 3-9460

Waltham Horological Corp., 395 Lynnway, Lynn, Mass., 30, 66
Tel: LYnn 8-4750

Waltham Screw Co., 77 Rumford Ave., Waltham 54, Mass., 30, 87
Tel: TWinbrook 3-5830

Wang Laboratories, Inc., 37 Hurley St., Cambridge 41, Mass., 20, 67, 68, 70, 77, 80, 82, 90
See ad on page 471
Tel: UNiversity 4-8380

Wappler, Inc., 27-10 Astoria Blvd., Long Island City 2, N.Y., 76, 85
Tel: RAvenswood 8-8831

Ward Leonard Electric Co., 83 South St., Mount Vernon, N.Y., 52, 53
Tel: MOunt Vernon 4-1000

Ward Products Corp., 1148 Euclid Ave., Cleveland 15, Ohio, 3, 83
Tel: MAin 1-4610

Warner, Inc., 522 Fifth Ave., New York 36, N.Y., 98, 99
Tel: MUrray Hill 7-3190

Warren Corp., J. C., 21 Hanse Ave., Freeport, L.I., N.Y., 13, 16, 44, 47
Tel: FReeport 8-4441

Warren Wire Co., Pownal, Vt., 83, 89
Tel: VAlley 3-7321

Warsaw Coil Co., P.O. Box 389, Warsaw, Ind., 29, 36, 59
Tel: 490

Warwick Manufacturing Corp., 7300 N. Lehigh Ave., Chicago 31, Ill., 4, 16, 48, 60
Tel: SP 4-6400

Washington Aluminum Co., Inc., Knecht Ave. & Penna. R.R., Baltimore 29, Md., 3, 25, 28, 86
Tel: CIrcle 2-1000

Wassco Electric Products Corp., 204 S. Larkin Ave., Joliet, Ill., 88, 92
Tel: 3-9366

Waterbury Pressed Metal Co., 300 Chase Ave., Waterbury 14, Conn., 86, 87
Tel: PLaza 4-6189

Waterbury Rolling Mills, Inc., E. Aurora St., Waterbury 20, Conn., 93
Tel: PL 4-5131

Waterman Products Co., Inc., 2445 Emerald St., Philadelphia 25, Pa., 61, 79
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Tel: GArfield 6-8600

Waters & Drew, Inc., P.O. Box 208, Arlington, Mass., 100
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Tel: MI 8-3510

Waters Manufacturing, Inc., Boston Post Rd., Rt. 20, Wayland, Mass., 29, 42, 53, 69, 72, 86, 90
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Tel: ELmwood 8-2777

Waveforms, Inc., 333 Sixth Ave., New York 14, N.Y., 42, 67, 72
Tel: WAtkins 9-2795

Waveline, Inc., P.O. Box 470, Caldwell, N.J., 3, 22, 36, 59, 66, 68, 77
Tel: CAldwell 6-5785

Wave/Particle Corp., P.O. Box 252, Menlo Park, Calif., 21, 58, 77
Tel: EMerson 8-1579

Webster Electric Co., 1900 Clark St., Racine, Wis., 9, 16, 21, 45
Tel: MElrose 3-3511

Webster Manufacturing Co., 242 Shoreline Hwy., Mill Valley, Calif., 3
Tel: DUnlap 8-6775-76

Weckesser Co., 5713-17 Northwest Hwy., Chicago 30, Ill., 87
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Tel: ROdney 3-6688

Weightman & Associates, 4101 Burbank Blvd., Burbank, Calif., 31, 34, 46, 47, 52, 53, 67, 72, 86, 92, 94
Tel: VIctoria 9-2435

Weinschel Engr. & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 22, 67, 72, 77, 80, 90
See ads on pages 297, 499
Tel: LOckwood 4-0122

Welch Manufacturing Co., W. M., 1515 Sedgwick St., Chicago 10, Ill., 42, 53, 68, 71, 72, 78, 92
Tel: MIchigan 2-2000

Welch Connectors, 520 Moreno Ave., Los Angeles 49, Calif., 55
Tel: EX 3-6251

Weller Electric Corp., 601 Stones Crossing Rd., Easton, Pa., 88, 92
Tel: 3-3521

Wells-Gardner & Co., 2701 N. Kildare Ave., Chicago 39, Ill., 1, 4, 11, 25
Tel: ALbany 2-8220

Weltronic Co., 19500 W. 8th Mile Rd., Detroit 19, Mich., 68, 72, 88
Tel: KEnwood 2-2800

Welwyn Canada, Ltd., 1255 Brydges St., London, Ont., Canada, 53
Tel: 4-8458

Welwyn Electrical Labs., Bedlington, Northumberland, England, 22, 26, 38, 53
Tel: BEdlington 2181

Wesbar Stamping Corp., P.O. Box 209, West Bend, Wis., 40
Tel: FEderal 4-2381

Wesrep Corp., 2022 S. Sepulveda Blvd., Los Angeles 25, Calif., 100
See ad on page 634
Tel: BRadshaw 2-3757

West Coast Electronics Co., 9261 W. 3 St., Beverly Hills, Calif., 90
Tel: BR 2-0383

West Instrument Corp., 4363 W. Montrose Ave., Chicago 41, Ill., 68, 72, 74
Tel: PAlisade 5-1007

Western Coil Products Co., 969 Commercial St., Palo Alto, Calif., 29, 59
Tel: DAvenport 5-2718

Western Gear Corp., Electro Products Div., Box 182, Lynwood, Calif., 3, 24, 31, 44, 47, 65, 72, 81
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Tel: NEvada 6-2161

Western Gold & Platinum Co., 525 Harbor Blvd., Belmont, Calif., 83, 84, 89, 93, 94, 97
Tel: LYtell 3-3121

Western Insulated Wire Co., 2425 E. 30 St., Los Angeles, Calif., 83
Tel: LUdlow 7-7103

Western Union Telegraph Co., 60 Hudson St., New York 13, N.Y., 8
Tel: WOrth 2-7300

Westfield Metal Products Co., Inc., Lower Union St., Westfield, Mass., 87
Tel: LOgan 2-3614

Westgate Laboratory, Inc., 506 S. High St., Yellow Springs, Ohio, 85, 90
Tel: RO-77375

Westinghouse Electric Corp., Air Arm Div., P.O. Box 746, Baltimore 3, Md., 90
Tel: SOuthfield 1-1000

Westinghouse Electric Corp., Lamp Div., Bloomfield, N.J., 97
Tel: HUmbolt 4-3000

Westinghouse Electric Corp., Route 27, Metuchen, N.J., 3, 4
Tel: LIberty 8-5000

Westinghouse Electric Corp., P.O. Box 868, Pittsburgh, Pa., 6, 14, 15, 21, 32, 38, 42, 44, 46, 47, 50, 52, 54, 56, 57, 59, 62, 65, 68, 72, 88, 89, 91, 92, 93, 95
Tel: EXpress 1-2800

Westinghouse Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 61, 62, 63
Tel: 9-3611

Westlabs Incorporated, P.O. Box 1111, Palo Alto, Calif., 21, 85
Tel: DAvenport 4-0514

Westlake Plastics Co., 133 West Lenni Rd., Lenni Mills, Pa., 26, 71, 78, 84, 86, 87, 89, 94, 95
Tel: LO 6-5170

Westline Products Div., Western Lithograph Co., 601 E. Second St., Los Angeles 54, Calif., 48, 87
See ad on page 561
Tel: TRinity 2641

Weston Electrical Instrument Corp., A subsidiary of Daystrom, Inc., 614 Frelinghusen Ave., Newark 5, N.J., 42, 50, 52, 67, 69, 72, 78
Tel: BIgelow 3-4700

Westrex Corp., 111 Eighth Ave., New York 11, N.Y., 1, 8, 10, 11, 16, 18, 19, 40, 45, 63
Tel: CHelsea 3-2300

Westronics, Inc., 3605 McCart, Ft. Worth 10, Tex., 74
Tel: WAlnut 3-2986

Wheeler, Harold A., 122 Cutter Mill Rd., Great Neck, L.I., N.Y., 85, 90
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Tel: HUnter 2-7876

Wheeler Insulated Wire Co., Inc., 150 E. Aurora St., Waterbury 20, Conn., 21, 29, 41, 47, 59, 83
Tel: PLaza 4-5191

Wheeler Laboratories, Inc., 122 Cutter Mill Rd., Great Neck, L.I., N.Y., 85, 90
Tel: HUnter 2-7876

Wheelock Signals, Inc., 273 Branchport Ave., Long Branch, N.J., 52
Tel: CApitol 2-6880

White Dental Mfg. Co., Industrial Div., 10 E. 40th St., New York 16, N.Y., 83, 87
Tel: MUrray Hill 3-3015

White Electron Devices, Inc., Roger, 92 4th Ave., Haskell, N.J., 21, 22, 41, 56, 63, 66, 72, 77
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Tel: TErhune 5-5333

White Instrument Laboratories, P.O. Box 9006, Austin 17, Tex., 21, 36
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Tel: GLendale 3-8447

Whitting & Davis Co., Inc., 23 W. Bacon St., Plainville, Mass., 15, 21, 22, 29, 30, 33, 36, 66, 87
Tel: MYrtle 9-4411

Whitney Metal Tool Co., 724 Forbes St., Rockford, Ill., 92
Tel: 2-5571

Whitso, Inc., 9328 Byron St., Schiller Park, Ill., 39, 86, 87, 94
Tel: GLadstone 5-5297

Whittaker Gyro, Div. Telecomputing Corp., 16217 Lindberg St., Van Nuys, Calif., 68, 81
Tel: ST 3-1950

Whitworth Aircraft, Ltd., Sir W. G. Armstrong, Baginton Works, Near Coventry, Warwickshire, England, 90
Tel: TOll Bar 2261

Who's Who in Electronics, 2775 S. Moreland Blvd., Cleveland 20, Ohio, 99
Tel: SKyline 1-1141

Wickes Engineering & Construction Co., 12th St. & Ferry Ave., Camden 4, N.J., 12, 47, 80, 82, 86
Tel: WOodlawn 4-4912

Wihtol Laboratories, 2029 Sunnyview Lane, Mountain View, Calif., 90
Tel: YO 7-4758

Wilcox Electric Co., Inc., 1400 Chestnut St., Kansas City 27, Mo., 1, 3, 13, 17, 21, 47
Tel: BEnton 1-0700

Wilder Mfg. Co., Inc., Dept. E, Mechanic St. & Erie R.R., Port Jervis, N.Y., 92
See ad on page 582
Tel: 3-2291

Wiley & Sons, Inc., John, 440 4th Ave., New York 16, N.Y., 99
See ad on page 604
Tel: MUrray Hill 9-7630

Wilgreen Industries, 99 Murray St., New York 7, N.Y., 30
Tel: WOrth 4-2490

Williams & Co., C. K., 640 N. 13th St., Easton, Pa., 32
Tel: EAston 3-6261

Willson Camera Co., Inc., 1395 Lawrence Rd., Havertown, Pa., 86, 95
Tel: HIlltop 6-8760

Wilmington Fibre Specialty Co., 7th & Washington Sts., New Castle, Del., 86, 87, 88, 95
Tel: EAst 8-7525

Wilson & Co., G. C., 1915 Eighth Ave., Huntington, W.Va., 52, 56, 68
Tel: 3-5149

Winatic Corp., P.O. Box 240, Endicott, N.Y., 29
See ad on page 323
Tel: 8-1518

Wincharger Corp., Antenna Tower Div., Seventh & Division Sts., Sioux City 2, Iowa, 3

Winchester Electronics, Inc., Willard Rd., Norwalk, Conn., 30, 55, 87
See ad on page 247
Tel: TEmple 8-8433

Wind Turbine Co., 248 E. Market St., West Chester, Pa., 3, 56, 86
See ad on page 266
Tel: OWen 6-3110

Winkler Laboratories, 5225 N. 20th St., Phoenix, Ariz., 72
Tel: AMhurst 6-5952

Winner Mfg. Co., 100 Sullivan Way, Trenton, N.J., 3, 25, 86, 89
Tel: OW 5-5406

Wolfe Co., Franklin C., 10567 Jefferson Blvd., Culver City, Calif., 87
Tel: TExas 0-4618

Woodwelding, Inc., 355 N. Newport Blvd., Newport Beach, Calif., 88
Tel: LIberty 8-6123

Worcester Pressed Steel Co., 100 Barber Ave., Worcester 6, Mass., 86, 87
Tel: PLeasant 5-4361

Worklon, Inc., 253 W. 28th St., New York 1, N.Y., 92
Tel: LOngacre 4-7390

Worner Electronic Devices, Rankin 1, Ill., 21, 68
Tel: RAnkin 55

Wright Electronics, Inc., 2537 Grand Ave., Kansas City 8, Mo., 33, 36
Tel: BAltimore 1-8686

Wright Engineering Co., 180 East California St., Pasadena 1, Calif., 3, 21, 26, 30, 33, 42, 44, 58, 67, 68, 69, 70, 72, 81, 83, 92
Tel: RYan 1-8488

Wright Equipment Co., 128 N. Main St., Milltown, N.J., 90
Tel: MIlltown 8-1284

Wright, Inc., 2233 University Ave., St. Paul 14, Minn., 25, 40, 59
Tel: MI 6-3553

Wright Machinery Co., Div. Sperry Rand Corp., Calvin & Holloway Sts., Durham, N.C., 44
Tel: 2-8161

Wright Metalcoaters, Inc., 255 West St., S. Hackensack, N.J., 86
Tel: HUbbard 7-5136

Wright-Zimmerman, Inc., New Brighton, St. Paul 12, Minn., 29, 40, 59
Tel: MElrose 3-3131

Wybar Electronics, Inc., P.O. Box 388, Auburn, N.Y., 92
Tel: 2-6229

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Yale & Towne Mfg. Co., Powdered Metal Div., 9335 W. Belmont Ave., Franklin Park, Ill., 21, 32, 41, 84, 85, 86, 93
Tel: GLadstone 5-0134

Yardney Electric Corp., 40-50 Leonard St., New York 13, N.Y., 23
Tel: WOrth 6-3100

Yellow Springs Instrument Co., Inc., Yellow Springs, Ohio, 68, 76, 86, 90
Tel: ROckwell 7-2181

Yonkers Industries, Inc., 28 School St., Yonkers, N.Y., 36, 42, 72
Tel: YOnkers 9-4600

York Co., Inc., Otto H., 6 Central Ave., W. Orange, N.J., 71, 83, 89
Tel: ORange 7-3000

York Metal Products, Inc., 350 Greenwich St., New York 13, N.Y., 28
Tel: WA 5-7227

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Z & W Mfg. Corp., Electronics Div., 30240 Lakeland, Wickliffe, Ohio, 3, 11, 29, 36, 87
Tel: WHitney 3-5700

Zagora Gears, Inc., 1327 S. Mint St., Charlotte 3, N.C., 81
Tel: ED 3-7111

Zauderer Associates, Inc., 21 Bertel Ave., Mount Vernon, N.Y., 100
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Tel: MOunt Vernon 4-7385

Zell Products Corp., 280 Main St., Norwalk, Conn., 30, 33, 38, 86, 97
Tel: VIctor 7-2477

Zenith Optical Laboratory, 1940 Great Neck Rd., Copiague, L.I., N.Y., 92
Tel: AMityville 4-4616

Zenith Plastics Co., Sub. Minn. Mining & Mfg. Co., P.O. Box 91, Gardena, Calif., 3, 84, 89, 90, 95
Tel: FAculty 1-2020

Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Ill., 4
Tel: BErkshire 7-7500

Zephyr Manufacturing Co., Inc., 201 Hindry Ave., Inglewood, Calif., 88
Tel: ORegon 8-4331

Zero Manufacturing Co., 1121 Chestnut St., Burbank, Calif., 25, 28, 86
Tel: VIctoria 9-5521

Zierick Manufacturing Corp., Beechwood & Rockdale Ave., New Rochelle, N.Y., 86, 87
Tel: NEw Rochelle 6-8520

Zophar Mills, Inc., 112-130 26th St., Brooklyn 32, N.Y., 91
See ad on page 571
Tel: SOuth 8-0907

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.

IRE remembers the man

He sent written words and pictures by radio and created new markets!

JOHN V. L. HOGAN, recipient of the *IRE Medal of Honor, 1956* ...for his contributions to the electronic field as a founder and builder of The Institute of Radio Engineers, for the long sequence of his inventions, and for his continuing activity in the development of devices and systems useful in the communications art.

IRE honors *John V. L. Hogan* for his leadership in electronics. His pioneering in the field of FACSIMILE, the electronic miracle of transmitting and receiving written words and pictures through the air, has helped build a new world market for many products and services. Mr. Hogan also established, and for many years operated, the nationally famous New York City radio station, WQXR. Radio engineers, such as Mr. Hogan, in reaching new frontiers of achievement, originate the demand... then, demand the supply. It is these men who are the creative forces in a dynamic, growing industry that IRE always remembers.

The Institute of Radio Engineers is a professional Society of 50,000 radio-electronic engineers devoted to the advancement of their field of specialization. Their official publication, *Proceedings of the IRE*, is concerned solely with these men and their accomplishments. And *Proceedings of the IRE* is the only engineering journal in the radio-electronic industry exclusively edited *by* and *for* radio-electronic engineers.

Earth satellites, FM, TV, radar, computers, color TV, transistors, scatter propagation, solid state electronics ... all that is history making in radio-electronics is first presented, then followed step-by-step in its development, on the pages of *Proceedings of the IRE* in authoritative articles by the men behind these advances.

IRE remembers the man! Is it any wonder that the men remember IRE? Best way to get *products remembered*, if they are sold in the radio-electronics field, is through advertising in the pages of *Proceedings of the IRE* for *...if you want to sell the radio industry, you've got to tell the radio engineer!*

THE INSTITUTE OF RADIO ENGINEERS.

Proceedings of the IRE

Adv. Dept., 72 W. 45th St., New York 36, New York
Chicago • Cleveland • San Francisco • Los Angeles

1958 IRE DIRECTORY

DIRECTORY I COMMUNICATIONS

20 major groups
90 products

The products and services of the radio-electronics industry have been organized into four basic directories:

I. Communications
II. Components
III. Controls & Instruments
IV. Materials & Services

Within these four basic directories, 100 major product and service groups are numbered consecutively throughout. Under each of these 100 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 769 sub-products in alphabetical order, consult the eight-page 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 four major directory groups will be found on pages 1, 151, 255, 287, 459, and 521.

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!

LICENSE NO. 25
MACHOL EDGE INDEX PATENT #2680630

For complete list of products and services, arranged alphabetically for fast reference, see the eight-page pink section preceding page 1.

1	COMPLETE DATA SPREADS
151	ALPHABETICAL DIRECTORY
255	DIRECTORY I COMMUNICATIONS
287	DIRECTORY II COMPONENTS
459	DIRECTORY III CONTROLS & INSTRUMENTS
521	DIRECTORY IV MATERIALS & SERVICES

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Antlab, Inc., Ohio, Position Indicator
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Bell Aircraft Corp., P.O. Box 1, Buffalo 5, N.Y., 5
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Tel: Niagara Falls 7851
Bendix Aviation Corp., Md., 5, 10, 15, 20, 25, 30
Brubaker Electronics, Inc., Calif., 5
Bruno-New York Industries Corp., Dept. IRE-57, 460 W. 34 St., New York 1, N.Y., ILS type
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Tel: LOngacre 4-5930
Canadian General Electric Co., Ltd., Canada, 5, 10, 15, 20, 25, 30
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Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 5, 10, 15, 20, 30
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Communications Co., Fla., 15, 20
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Federal Television Corp., N.Y., 25
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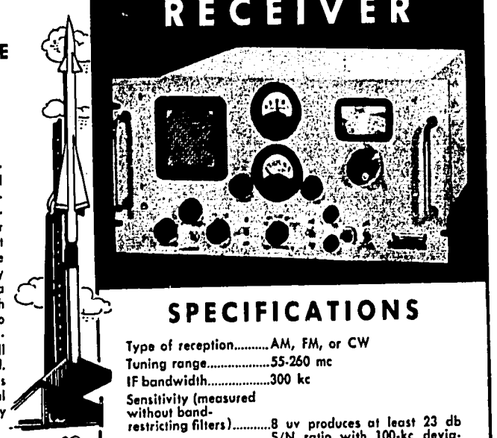
Mitchell Industries, Inc., Tex., 5, 10, 15, 30
Munston Manufacturing & Service, Inc., N.Y., 5, 10, 15, 20, 30
National Aeronautical Corp., Pa., 5, 10, 15, 20, 30
National Co., Mass., 5, 10, 15, 20, 25, 30
National Electronics Labs., Inc., D.C., 15, 20
Nems-Clarke, Inc., Dept. H-13, 919 Jesup-Blair Dr., Silver Spring, Md., 5, 10, 15
See ad on this page
Tel: JUniper 5-8300
Northeastern Engineering, Inc., N.H., 5, 10, 15
Northern Electric Co., Ltd., Canada, 15

UNEQUALED PERFORMANCE IN

- **TELEMETERING**
- **GUIDED-MISSILE MONITORING**
- **RADIOSONDE RECEPTION**

This Special Purpose Receiver is an improved version of the NEMS-CLARKE 167-J1 and 167-J2. This new Receiver incorporates the best qualities of both of the former types plus many new features including a BFO. A video bandwidth control is provided to greatly improve signal-to-noise ratio when full bandwidth is not needed. It is especially useful as a high quality general purpose laboratory receiver.

TYPE 1501 SPECIAL PURPOSE RECEIVER



SPECIFICATIONS

Type of reception	AM, FM, or CW
Tuning range	55-260 mc
IF bandwidth	300 kc
Sensitivity (measured without band-restricting filters)	8 uv produces at least 23 db S/N ratio with 100-kc deviation, 400-cycle modulation.
Noise figure	11 db, maximum
IF rejection	Not less than 70 db
Image rejection	Not less than 40 db below 130 mc; 30 db minimum at any frequency.
FM output	0.15 volt per kc deviation (Approx.)
AM output	12 volts for 10 uv input modulated 30% at 1000 c.p.s. (Approx.)
Squelch	Operates on monitor circuit

NEMS-CLARKE
INCORPORATED
919 JESUP-BLAIR DRIVE
SILVER SPRING, MARYLAND

For further information write Dept. H-13

Directory I. Communications

1. Airport & Airport Equip.

Northern Radio Co., Inc., 147 W. 22 St., New York 11, N.Y., 5, 10
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Tel: WAtkins 9-9117
Olympic Radio & Television, Inc., N.Y., 5, 10, 15
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Ryan Aeronautical Co., Calif., Navigation Systems
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Westrex Corp., N.Y., 5, 15, 20
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5. Receiving equipment
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American Electronics Co., N.Y., 5, 10
Approved Electronic Instrument Corp., N.Y., 5, 10, Kits
Ateliers De Montages Electriques, France, 5, 10
Barker & Williamson, Inc., Pa., 5, 10
Bellaire Electronics, Inc., N.J., 10
Clegg Laboratories, Inc., N.J., 5, 10
Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 5, 10
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Tel: EM 3-0281
Crosby Laboratories, Inc., N.Y., 5, 10
Daystrom, Inc., N.J., 5, 10
Eldico Electronics, N.Y., 10
Electro-Voice, Inc., Mich., 5
Engineered Sound Systems Ltd., Canada, 5
Gonset Div., L. A. Young Spring & Wire Corp., Calif., 5, 10
Hallicrafters Co., Ill., 5, 10
Hammarlund Mfg. Co., Inc., N.Y., 5
Heath Co., 305 Territorial Rd., Benton Harbor 4, Mich., 5, 10
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Tel: WAlnut 5-0051
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Industrial Development Eng. Assoc., Inc., Ind., 5
Johnson Co., E. F., Minn., 10
K-F Development Co., Calif., 5
Link Radio Corp., N.Y., 5, 10
Lynco, N.Y., 5
Marconi Instruments, 44 New St., New York 4, N.Y., 5
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Tel: NAtional 5-9701

Code numbers following company names in the product classifications refer to subheadings listed at the beginning of each product category. Complete addresses and phone numbers are shown for those firms advertising in this issue. For complete addresses and phone numbers of non-advertisers, consult the alphabetical directory, pages 151-253.

Amplifiers: See class 21

3. Antennas & Accessories.

5. AM broadcast transmitting
7. Aircraft
10. All-wave receiving
15. Amateur antennas, accessories & rotators
17. Automobile
20. Dummy
22. FM broadcast transmitting
24. Ground plane
25. Marine
30. Microwave
35. Mobile
40. Radar reflectors
45. Rotators
50. Supporting towers
55. TV broadcast transmitting
60. TV multiple systems
63. TV receiver
65. Tower erection & maintenance service
70. Tower lighting equipment
75. UHF—VHF

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Adler Electronics, Inc., N.Y., 55, 75
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Advance Electronics Co., Mich., 10
Aero Instrument Co., Calif., 30
Aerolite Electronics Corp., N.J., 60
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Aircraft Radio Corp., Boonton, N.J., 7, 75
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Tel: DEerfield 4-1800
Airtron, Inc., Dept. 1, 1101 Elizabeth Ave., Linden, N.J., 20, 30, 40, 45
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Alford Manufacturing Co., 299 Atlantic Ave., Boston 10, Mass., 55 & VOR Type
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Tel: HAncock 6-2150
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American Instrument Co., Inc., Md., Alarm, Sleet & Ice
American Machine & Foundry Co., Defense Prods. Group, 1101 N. Royal St., Alexandria, Va., 40, 45
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Tel: KIng 9-9110
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Amphenol Electronics Corp., 1830 S. 54 Avenue, Chicago 50, Ill., 15, 75
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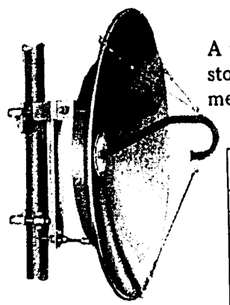
Amy, Aceves & King, Inc., N.Y., 60
Andrew Antenna Corp., Ltd., Canada, 5, 7, 17, 22, 24, 30, 35, 40, 45, 50, 60, 70, 75

ANDREW *Leadership for 20 Years...*

ANTENNAS
ANTENNA SYSTEMS
TRANSMISSION LINES

The ANDREW product line covers the related fields of antennas for communication and broadcasting, and transmission lines to connect these antennas to transmitters, receivers or other electronic equipment.

PARABOLIC ANTENNAS



Type PT4-59 4-foot antenna with waveguide horn for 5925-6425 mc.

A wide selection of standard models in a complete range of sizes and frequencies is stocked for immediate delivery. Special antennas are designed and manufactured to meet individual requirements. Here is a representative selection of stock antennas.

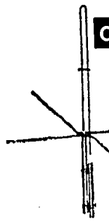
TYPE NUMBERS OF STOCK PARABOLIC ANTENNAS

Frequency Range (MC)	ANDREW Type Number 4 ft. dia.	6 ft. dia.	8 ft. dia.	10 ft. dia.
890- 920	1004A-1	1006A-1		1010A-1
920- 960	1004A-2	1006A-2		1010A-2
1700-1850	2004A-1	2006A-1	2008A-1	2010A-1
1850-1990	2004A-2	2006A-2	2008A-3	2010A-3
1990-2110	2004A-3	2006A-3	2008A-3	2010A-3
2450-2700		P6-24		P10-24
3750-4200			PS8-37	
5925-6425	P4-59	P6-59	P8-59	P10-59
6575-7125	P4-65	P6-65	P8-65	P10-65
7125-7425	P4-71	P6-71	P8-71	P10-71

Tower or roof mounts are included as part of the antenna. Most standard mounts include elevation and azimuth adjustments of at least ± 5°. Special heating equipment is available and recommended for antennas operating above 5000 mc in ice areas.

For antennas requiring tower mounts, specify prefix PT for all sizes: example, PT4-59. Roof mounts for 4' and 6' sizes use prefix PM; example, PM6-71. 8' and 10' mounts are designed for either tower or roof mounting.

COMMUNICATIONS ANTENNAS



FOLDED UNIPOLES—(25 mc to 174 mc), omnidirectional. The ideal fixed station transmitting and receiving antenna. Inexpensive, lightweight and easy to install. Some lower frequency models incorporate new design changes which increase windload ratings and eliminate field cutting of vertical elements to frequency.

HIGH GAIN—for 148-174 mc, 400-470 mc. ANDREW High Gain omnidirectional antennas will increase your coverage and multiply benefits by the number of mobile units in the system. Type numbers,* frequency and gain are shown below.

Omnidirectional Pattern

Type 3000	148-174 mc	6.3 db
Type 3006	148-174 mc	9.0 db
Type 4000	450-470 mc	7.6 db
Type 4002	450-470 mc	5.0 db
Type 4010	400-420 mc	7.5 db

Offset Omnidirectional Pattern

Type 201	450-470 mc	10.8 db in max. dir.
Type 3004	148-174 mc	8.1 db in max. dir.

CORNER REFLECTORS. Unidirectional antennas for 25-174 mc and 400-960 mc. Preferred for their high gain and stable operation under severe weather conditions. Also may be utilized for low power TV transmitting in directional and omnidirectional arrays.

TRANSMISSION LINES

HELIAX, flexible air dielectric cable combines the efficiency of the finest copper cables with handling ease of solid dielectric types. Available in two sizes, ⅞", Type HO and 1⅝", Type H1, with complete series of pressurized end fittings. Type HO may now be used up to 5000 mc.

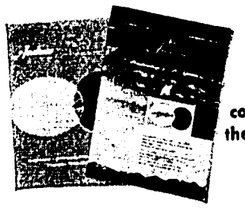
RIGID AND SEMI-FLEXIBLE. Complete range of sizes for UHF and VHF systems. Semi-flexible soft copper cable in ⅜" and ⅞" sizes, rigid copper line ⅞" to 9" sizes. Adaptors and fittings available from stock. New 50 ohm, 6⅛" line now available for high power applications.

WAVEGUIDE. High efficiency copper clad steel waveguide in sizes ranging from 7½" to 15" for pressurized UHF systems. Includes accessories for complete line installation.

COAXIAL SWITCH. Automatic, 50 ohm, 3⅛", UHF and VHF. This new, automatic switch now allows high power communication systems, as well as VHF and UHF television stations, the convenience of four-second switching of 3⅛" coaxial transmission line at powers up to 10 kw at 1000 mc. Both automatic and manual models include automatic high voltage disabling switch and remote position indicating lights.

ANTENNA SYSTEMS AND PLANNING

ANDREW Corporation offers engineering assistance in the planning of your antenna-transmission line system at no cost to you. Contact the nearest ANDREW office for this consulting service.



** All are covered by Patent No. 2,757,371.*

Be sure your library contains Andrew catalog 21 and the new product supplement, 21S.

ASSOCIATED ANDREW PRODUCTS

Antenna Reflectors, Parabolic
Antennas, Tropospheric
Antennas, Yagi
Antennas, Mobile
Antennas, UHF and VHF
Cable, Transmission Line (all types)
Connectors, Coaxial Cable
Controls, Photoelectric
Dehydrators, Automatic
Filters, Microwave
Filters, UHF and VHF
Lighting Equipment, Tower
Lines, Slotted
Masts, Telescoping
Phasing and Tuning Equipment

Andrew
CORPORATION
363 EAST 75th STREET • CHICAGO 19

For details, circle #204 on Reader Service Card.

Directory I. Communications

3. Antennas & Accessories.

Andrew Corp., 363 E. 75th St., Chicago 19, Ill., 20, 22, 24, 30, 35, 40, 70, 75
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Tel: TRiangle 4-4400

Antenna Specialists Co., Ohio, 10, 15, 17, 24, 25, 35

Antlab, Inc., Ohio, 45 & Model Support Tower

Applied Electronics Co., Inc., Calif., 35

Ateliers De Montages Electriques, France, 24, 75

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Babcock Radio Engineering, Inc., Calif., 75

Barker & Williamson, Inc., Pa., 15, 20, 70

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Belock Instrument Corp., N.Y., 25

Benco Television Associates, Ltd., Canada, 60

Bendix Aviation Corp., Md., 7

Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N.J., 45
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Tel: ATlas 8-2000

Bird Electronic Corp., 1800 East 38 St., Cleveland 14, Ohio, 20
See ad on page 504
Tel: EXpress 1-3535

Blaine Electronics, Inc., Calif., 7, 24, 30, 40, 75, Radiation Pattern Meas. Tower

Blonder-Tongue Labs., Inc., N.J., 60

Bogart Mfg. Corp., N.Y., 20, 30, 45

Brenner Metal Products Corp., N.Y., 63

Brooks & Perkins, Inc., Mich., 40

Brown Co., Irv, N.Y., 17

Browning Laboratories, Inc., Mass., 10

Brunswick-Balke Collender Co., Ill., 40

Budd-Stanley Co., Inc., Dept. IRE, 43-01 22nd St., Long Island City 1, N.Y., 20, 30
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Tel: STillwell 6-1706

Buggie, Inc., H. H., Ohio, 35

C. G. S. Laboratories, Inc., Conn., 10

CTV-Clear Television, Inc., W.Va., 60

Camera Equipment Co., Inc., N.Y., 30

Canadian General Electric Co., Ltd., Canada, 5, 20, 22, 30, 35, 40, 50, 55, 65, 70

Canadian Westinghouse Co., Ltd., Canada, 25, 30, 35, 50, 65, 70, 75

Canoga Corp., Calif., 7, 30, 40, 45, 75

Channel Master Corp., N.Y., 63, 75

Chisholm-Ryder Co., Inc., Premax Prods. Div., N.Y., 15, 24, 25, 35

Chu Associates, Mass., 30, 35, 40, 45

Coaxial Connector Co., Inc., 37 N. 2nd Ave., Mt. Vernon, N.Y., 20, 30
See ad on page 326
Tel: MOunt Vernon 8-6416

Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 7, 30, 75
Multiple pages of additional data on 49-54
Tel: EM 3-0281

Communication Equipment & Engineering Co., Ill., 7

Communication Products Co., Inc., N.J., 24, 35

Control Electronics Co., Inc., 1925 New York Ave., Huntington Station, L.I., N.Y., 20
See ad on page 346
Tel: HAmilton 7-7961

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Cornell-Dubilier Electric Corp., 333 Hamilton Blvd., S. Plainfield, N.J., 10, 15, 17, 45, 63, 75
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Tel: PLainfield 6-9000

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Craig Systems, Inc., Dept. F, 90 Holten St., Danvers, Mass., 50
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Crosley Div., Avco Mfg. Corp., Ohio, 40

Crown Controls Co., Inc., Ohio, 15, 45, 75, Couplers

D X Radio Products Co., Ill., 63, 75

Dale Products, Inc., 1318 28th Ave., Columbus, Neb., 7
See ads on pages 146-147
Tel: LOcust 4-3131

Dalmo-Victor Co., Div. of Textron, Inc., Calif., 7, 30

Danbury-Knudsen, Inc., Conn., 35

Daystrom, Inc., N.J., 15

Dayton Aircraft Products, Inc., Fla., 7

Defiance Engineering & Microwave Corp., P.O. Box 488, Beverly, Mass., 7, 17, 20, 24, 25, 30, 35, 40, 45, 75
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Tel: WAlker 2-8100

De Mornay Bonardi, 780 S. Arroyo Parkway, Pasadena, Calif., 30
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Tel: RYan 1-7416

Denson Electronics Corp., Conn., 50, 65

Diamond Antenna & Microwave Corp., Mass., 20, 24, 30, 40

Dollar Co., Robert, Calif., 24

Dominion Electrohome Industries, Ltd., Canada, 17

Dorne & Margolin, Inc., N.Y., 7, 30, 75

Douglas Microwave Co., Inc., 252 E. 3rd St., Mt. Vernon, N.Y., 30
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Tel: MOunt Vernon 8-6900

Dresser-Ideco Co., Ohio, 50

Duncan Precision Electroforming, C. L., Ga., 30

EMI Electronics, Ltd., England, 30, 55

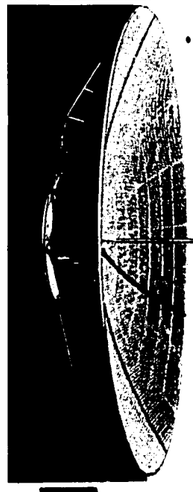
Easy-Up, Inc., Wis., 50, Small

Eheor Products Co., N.Y., 20, 35

Ed-Berl Products, Inc., N.Y., 25

Electro Impulse Laboratory, Inc., 208 River St., Red Bank, N.J. 20
See ad on page 493
Tel: SHadyside 1-0404

AINSLIE ANTENNAS



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MODEL CF12IM — 12 ft. diameter with dipole exciter. Gain 23 db at 500 mc. Minimum side lobes 20 db (or better). Cross Polarization 20 db (or better).

Low VSWR at any frequency in the band. Accomplished through adjustable balun and reflector assembly.

STOCK REFLECTORS—4 in. to 10 ft. diameter solid spun. 4 ft. to 18 ft. diameter mesh. Larger sizes or special shapes on request. Antennas up to 10,000 mc.

Weatherized & corrosion resistant. Rugged, lightweight.

PROMPT DELIVERY
Any type antenna or reflector precision-built to your specifications.

Write for complete performance data sheets.

MODEL CF141M with 14' diameter reflector available

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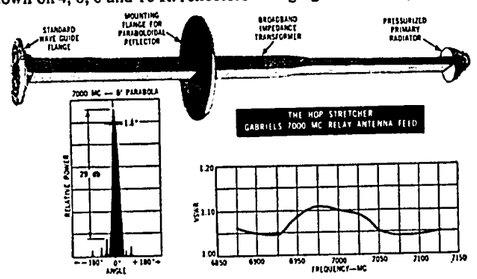
Gabriel electronics division

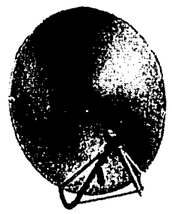
THE GABRIEL COMPANY

New Products

The HOP-STRETCHER feeds offer higher gain, lower sidelobe levels and more desirable beam-widths for center-fed parabolic antennas. This feed was developed for S, X, K_u and K_a bands.

Technical features of X-band antenna • Sidelobes at least 24 db down on 4, 6, 8 and 10 ft. reflectors • High gain efficiency, 65-70%

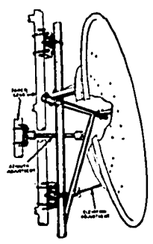




The new hi gain 3 kmc Cylindrical Coaxial Feed provides similar E and H-plane patterns, minimum side and backlobes, and negligible squint. Rear-mounted, with easy polarization adjustment to any angle.

7000 mc Offset Antenna. Ideal for installations where passive reflectors are utilized — VSWR less than 1.10:1 over 5900-8500 mc — Sidelobes at least 24 db down — gain is 41 db at 7000 mc. Elliptically shaped reinforced fiberglas reflector.

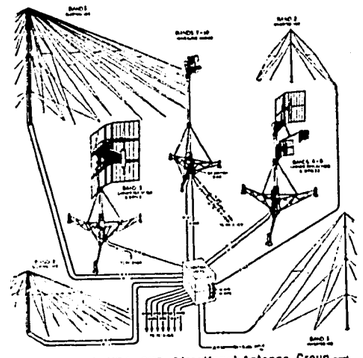
The new X-band parabolic antenna with standard feed. Features variable polarizing adjustment, 0 to 90°. Manually locked in position.



The new universal 3-point suspension mounting bracket for 2, 4, 6, 8 and 10 ft. parabolic reflectors.

Features • Independent azimuth adjustment. • Independent elevation adjustment. • Adaptable for mounting in all locations.

INTEGRATED ANTENNA PROGRAMS — 75 mc — 33,000 mc — **RESEARCH DEVELOPMENT PRODUCTION**



Broadband, HF-to-SHF, Directional Antenna Group — Remotely controlled.

Low-drag Airborne Flush-mount Antenna. Beacon — Countermeasures — Homing — Navigation

Missile Antennas — Telemetering, Destruct, Guidance ICBM, Surface-to-Air, Air-to-Air, and Surface-to-Surface.

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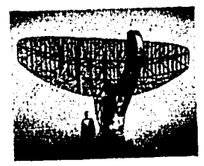
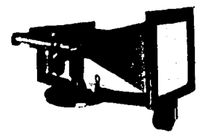
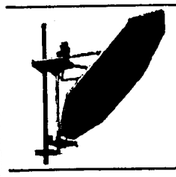
- Harbor Control
- Airborne Height Finding
- Land Base Search



Designed, developed, and constructed to military specifications with improved strength-to-weight ratio and component reliability.



Aleutian Line—Dew Line Low loss, heavy duty duplex feed horns for Tropospheric Scatter Radio Communication Systems.



Motorized Passive Reflector For maximum point-to-point transmission in microwave relay links. Fast, accurate, easy adjustment from remote location. Manually adjusted reflectors also available.

The Gabriel Electronics Division is one of the world leaders in microwave relay link antennas, and the more complex antennas. They are dedicated to improve and extend the state-of-the-art in antennas and antenna components.

Call or write to GABRIEL ELECTRONICS DIVISION for counsel on your antenna needs.

Gabriel

GABRIEL'S STANDARD MICROWAVE PARABOLIC ANTENNAS

...Contributing millions of trouble-free operational hours for industry and the military.

- 7000 mc — Broadband (5925-7425 mc) high gain > 40 db low sidelobes — low VSWR < 1.13:1 over band.
- 4000 mc — Narrow-beam broadband (3700-4200 mc) — low VSWR < 1.2:1 — gain > 37 db.
- 2000 mc — Available in offset and center-fed feeds. Narrow-beam broadband (1750-2110 mc) — high gain > 28 db low VSWR < 1.3:1 over band
- 940 mc — All weather radome covered feed — gain > 22 db low VSWR < 1.25:1.

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DEFIANCE MICROWAVE CORPORATION

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Operations at Beverly Airport Beverly, Mass.

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Directory I. Communications

3. Antennas & Accessories.

Electrola, Inc., Ill., 25, 40
Electromation Co., 1646 18th St., Santa Monica, Calif., 30
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Tel: TExas 0-6401
Electron Laboratories, N.Y., 65, 70
Electron-Radar Products, Ill., 20, 30
Electronic Specialty Co., 5121 San Fernando Rd., Los Angeles 39, Calif., 7, 10, 30, 75
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Tel: CHapman 5-3771
Electronics Research, Inc., Ind., 7, 22, 40, 55
Elliott Brothers (London) Ltd., England, 17, 25, 30, 35, 40, 45, 75
Emerson & Cuming, Inc., Mass., 40
Emerson Radio & Phonograph Corp., Md., 30
Entron, Inc., Md., 60
Erco Radio Laboratories, Inc., N.Y., 24
F-R Machine Works, Inc., 26-12 Borough Pl., Woodside 77, N.Y., 20, 30
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Tel: AStoria 8-2800
Fair hild Camera & Instrument Corp., N.Y., 75
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Federal Telecommunication Labs., N.J., 30, 35
Federal Telephone & Radio Co., Div. Int'l. Tel. & Tel. Corp., 100 Kingsland Rd., Clifton, N.J., 7, 24
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Foley Assoc., Andrew A., N.J., 63
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Gabriel Electronics Div., The Gabriel Co., 135 Crescent Rd., Needham Heights 94, Mass., 7, 30, 40, 45
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Tel: NEedham 3-0005
Gates Radio Co., Ill., 5, 20, 22
Gee Lar Manufacturing Co., 400 S. Wyman St., Rockford, Ill., 75
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Tel: 5-9548
General Bronze Corp., N.Y., 5, 7, 10, 17, 20, 22, 24, 25, 30, 35, 40, 45, 50, 70, 75
General Cement Mfg. Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 17, 63
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Tel: 2-6695
General Coil Products Corp., N.Y., 20
General Communication Co., 681 Beacon St., Boston 15, Mass., 30
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Tel: COpley 7-6030
General Electric Co., Broadcast & Mil. Elect. Prods. Dept., N.Y., 55, 75
General Electric Co., Heavy Military Electronic Equip. Dept., N.Y., 40, 45
General Electric Co., Light Military Electronic Equip. Dept., N.Y., 40
General Electronic Laboratories, Inc., 18 Ames St., Cambridge 42, Mass., 30, 35, 40, 45
See ad on page 193
Tel. UNiversity 4-8500
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 20
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Tel: TRowbridge 6-4400
Glasply Corp., N.Y., 50 & Radomes
Gonset Div., L. A. Young Spring & Wire Corp., Calif., 15, 17, 24, 35, 63, 75
Gorham Manufacturing Co., Bronze Div., R.I., 20, 30
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Haller, Raymond & Brown, Inc., Pa., 7, 10, 30, 75
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Hemisphere Electronics Corp., N.Y., 30
Hi-Lo TV Antenna Corp., Ill., 17, 20, 63, 75
Hoffman Electronics Corp., Calif., 75
Houlihan Co., T. J., Ill., 20
Hughey & Phillips, Inc., 3200 N. San Fernando Blvd., Burbank, Calif., 70
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Tel: VIctoria 9-1104
I-T-E Circuit Breaker Co., Pa., 10, 20, 24, 25, 30, 35, 40, 45, 50, 75
IE Manufacturing, Ill., 15, 65, 75
Industrial Research Lab., Div. of Aeronca, Md., 25, 40
Insuline Corp. of America, N.H., 15, 17, 20, 35
International Projector Corp., N.J., 30
JFD Electronics, Inc., 1462 62nd St., Brooklyn 19, N.Y., 7, 17, 45, 63, 75
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Tel: DEwey 1-1000
J-V-M Engineering Co., 4632 S. Lawndale Ave., Lyons, Ill., 30, 40, 45
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Tel: LYons 3-7990
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K-W Engineering Works, Wis., 15, 35
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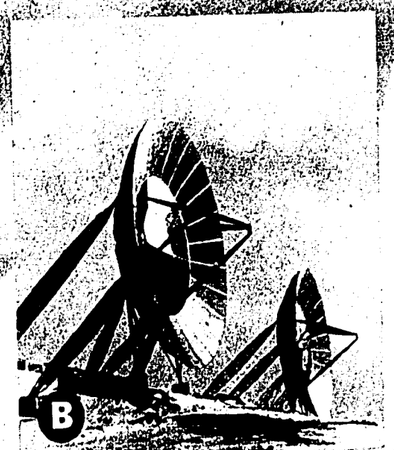
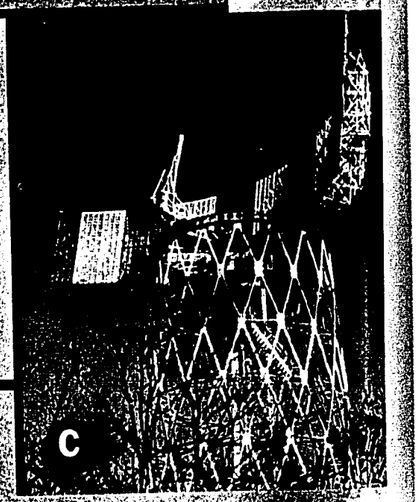
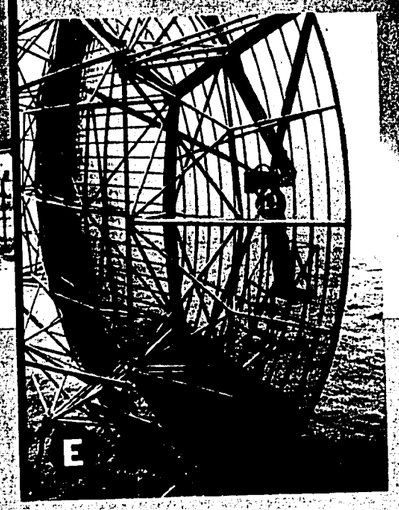
Kearfott Co., Western Div., 253 N. Vinedo Ave., Pasadena, Calif., 30
See ad on page 37
Tel: STanley 7-1178
Kennedy & Co., D. S., 155 King St., Cohasset, Mass., 25, 30, 40, 50
See ad on page 262
Tel: COhasset 4-1200

ANTENNA PROBLEMS?

Ask Kennedy!







A *60' Radio Telescope Harvard University*

B *60' Trans-horizon Antennas Northern Europe*

C *120' Radar Antenna Maine*

D *28' Trans-horizon Antennas Cape Cod*

E *28' Trans-horizon Antenna Texas Tower*

The solution to antenna problems begins when someone says: "Let's ask Kennedy!"

A few of the many reasons why are shown on this page. These Kennedy antennas are setting new standards for all-weather reliability and versatility wherever they serve throughout the free world.

Kennedy antennas come in many shapes, many sizes (the world's largest scatter antenna is being built here). But whatever the type, and whatever the conditions under which it must serve, Kennedy can offer a design that fully measures up to specifications. And there are additional advantages in Kennedy's advanced construction techniques—like the extra ease in shipping and handling made possible by sectionalized aluminum construction, for example.

Kennedy engineers are available to supervise installations anywhere in the world. It's a part of the complete, integrated service that is still another reason why more and more people in communications are "asking Kennedy" about antenna problems.

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D. S. KENNEDY & CO.

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Down-To-Earth **SOLUTIONS** *to Out-Of-This-World* **PROBLEMS**

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Directory I. Communications

3. Antennas & Accessories.

Kent Co., F. C., 64 Howard St., Irvington, N.J., 30
See ad on page 456
Tel: ESsex 3-5500
Kings Electronics Co., Inc., 40 Marbledale Rd., Tuckahoe 7, N.Y., 7
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Tel: SWiftwater 3-5000
Lake Service Corp., Mass., 60
Lambda-Pacific Engr., Inc., Calif., 30
La Pointe Industries, Inc., Conn., 15, 45, 75
Lear, Inc., Calif., 7, 75
Lehigh Structural Steel Co., N.Y., 50
Leitch Engineering Corp., N.H., 7, 15, 75
Lieco, Inc., 3610 Oceanside Rd., Oceanside, N.Y., 30
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Tel: Rockville Centre 6-7620
Lingo & Son., Inc., John E., N.J., 55
Link Radio Corp., N.Y., 22, 35, 75
Litton Industries, Components Div., Calif., 30
Mack Electronics Div., Inc., N.J., 20, 75
Marine Electronics Co., N.Y., 25
Mark Products Co., 6412 W. Lincoln Ave., Morton Grove, Ill., 7, 17, 24, 30, 35, 75
See ad on this page
Tel: ORchard 5-4999
Master Mobile Mounts, Inc., Calif., 24, 25, 35, 75
McDermont Corp., Julian A., N.Y., 70
McMillan Ind. Corp., Mass., Radomes
Melpar, Inc., Va., 7, 40, 75
Meridian, Inc., Conn., 20, 30, 45
Meridian Metalcraft, Inc., 8739 S. Millergrove Dr., Whittier, Calif., 30
See ad on page 454
Tel: OX 2-3761, RA 3-1508
Micro-Lab Industries, Inc., Ind., 7, 25
Microlab, 71 Okner Parkway, Livingston, N.J., 20, 30, 75
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Tel: LIvingston 6-5577
Microwave Radiation Co., Inc., Calif., 7, 24, 30
Mitchell Industries, Inc., Tex., 7
Munston Manufacturing & Service, Inc., N.Y., 20, 25
Mytron, Inc., Mass., 30
Narda Corp., 160 Herricks Rd., Mineola, L.I., N.Y., 20, 30
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Tel: Pioneer 6-4650
National Aeronautical Corp., Pa., 7
National Co., Mass., 30
Network Mfg. Corp., N.J., 20
Nuclear Corp. of America, N.Y., 30
Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 20
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Tel: ORchard 5-2600
Olsen Corp., Gunnar A., N.Y., 70
Olympic Radio & Television, N.Y., 30
Omega Laboratories, Inc., Mass., 30, 40
Packard-Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 7
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Philson Mfg. Co., Inc., N.Y., 10
Photo-Crystals, Inc., Ill., 20, 30
Pickles, Sidney, Nev., 35, 55, 75
Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 30
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Tel: EXeter 2-4500
Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 30, 40
See ad on page 457
Tel: WEstmore 9-4092
Premier Instrument Corp., 52 W. Houston St., New York 12, N.Y., 30
See ad on page 458
Tel: GRamercy 5-3520

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RIXON has designed and developed much of the auxiliary communications equipment which has been specified and installed by Page Communications Engineers for the Armed Forces.

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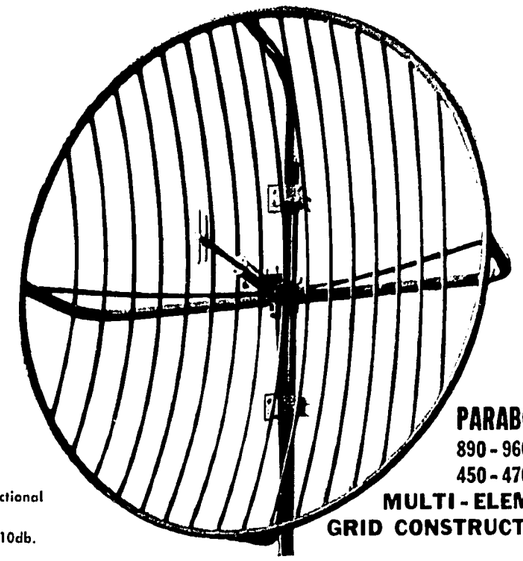

also 150 & 450 MC Omnidirectional Arrays—gains to 10db.

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

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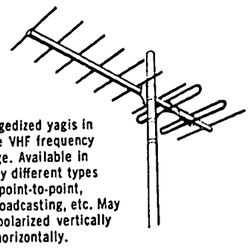
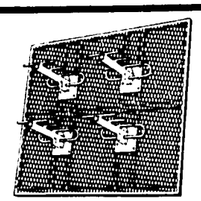
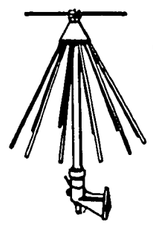


Ruggedized yagis in wide VHF frequency range. Available in many different types for point-to-point, rebroadcasting, etc. May be polarized vertically or horizontally.

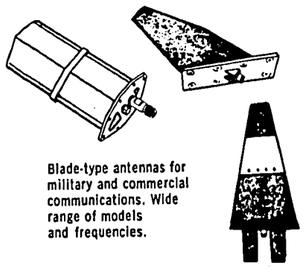


SY-44 Screen type reflector with 4 yagi antennas. 450-470 MC range. Mounting for tower or pipe mast available. 13 db gain over half-wave dipole.

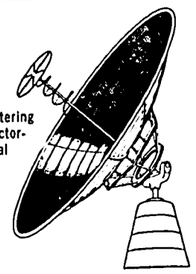
when it comes to antennas . . .



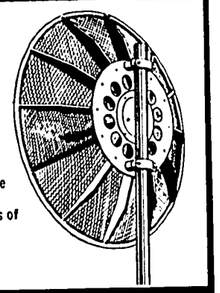
AT-197
Disc cone type.
Frequency range
225-400 MC.



Blade-type antennas for military and commercial communications. Wide range of models and frequencies.



16-foot telemetering parabolic reflector-antenna. Helical driver for operation in range of 215-235 MC. Other drivers available.

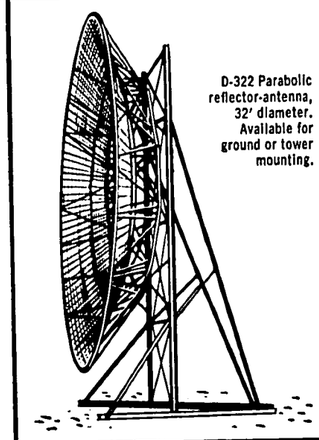


4-foot, one-piece parabolic reflector-antenna. Wide selection of drivers. Also, 6, 8,10, 16, 19 and 32-foot dishes available with drivers to meet the needs of the system.

you name it—we make it

Taco is the world's largest organization devoted solely to design, development and production of fine antenna systems for the military, commercial and home markets. A wide choice of 'stock' antenna types makes Taco the place to look for antennas to meet your needs. If we don't have what you need, we'll make it.

Send for complete technical catalog . . .



D-322 Parabolic reflector-antenna, 32′ diameter. Available for ground or tower mounting.

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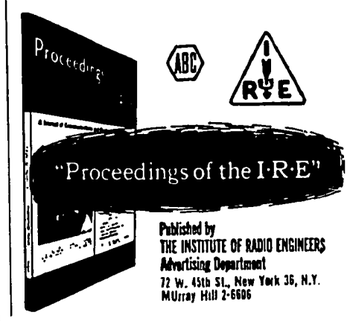

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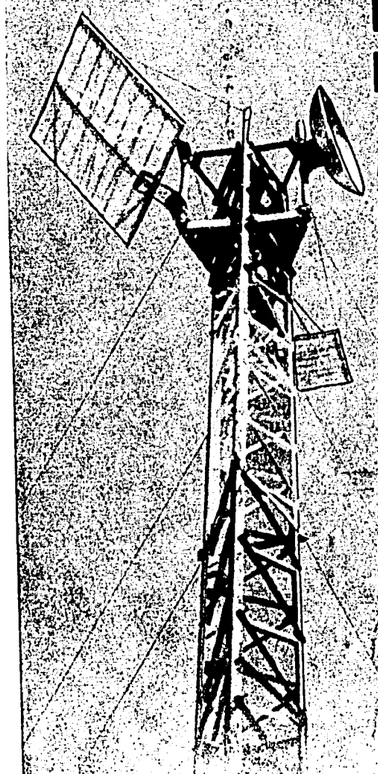

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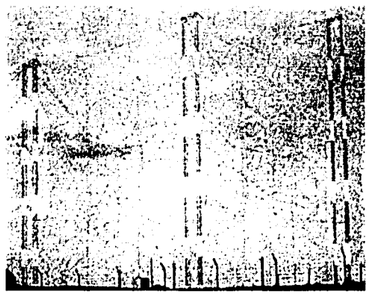
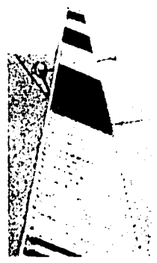
Modern communications often require more than just an assembly of conventional antennas, towers, and feed lines. That's why leading broadcasters find Trylon's sound engineering approach to every phase of antenna system design pays big dividends in terms of greater reliability . . . lower maintenance costs . . . longer life.

Trylon specialists welcome the opportunity to quote on your next job—design, fabrication, and installation of the complete antenna system, or of any component.



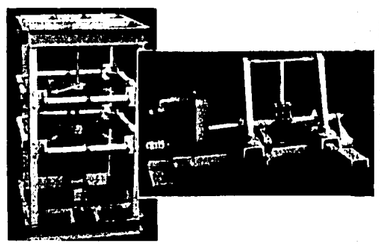
First Successful *Broadband* Curtain Antenna

Designed, built and installed by Trylon, these two broadsides give 5% to 10% more reliable long-distance communications than comparable rhombics. Each covers a bandwidth ±15% of center frequency with a VSWR of only 1.5.



Galvanized Steel Ladder Towers

As specialists in antenna supports for over 20 years, Trylon offers a broad, thoroughly-proved line of towers for TV, FM, AM, microwave, and commercial communications antennas.



Selector, Shorting & Slewing Switches

Illustrated above are typical Trylon motor-driven switches designed for flexible remote control selection of transmission lines, antennas, radiation patterns, etc., in antenna parks. Switches handle r-f up to 30KV wire-to-wire with minimum line disturbance.

WIND TURBINE COMPANY, West Chester, Pa.

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Bolometers: See class 77

4. Broadcast Receivers.

5. AM broadcast
10. AM shortwave
15. FM broadcast
20. TV broadcast—
B & W
25. TV broadcast—Color
30. TV closed circuit

A. R. & T. Electronics, Inc., Ark., U H F Convertors
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Tel: DEerfield 4-1800
Allied Radio Corp., Dept. 35-58, 100 N. Western Ave., Chicago 80, Ill., 5, 10, Kits
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National Co., Mass., 5, 10, 15
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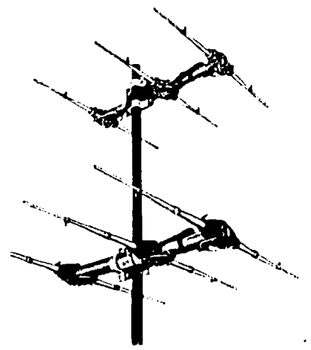

Standard Telrex structures upon which we design antennas to your specific requirements.

- Broad-band or single-frequency arrays for communication, fixed or rotary, point-to-point, FM, TV-relaying, scatter-propagation, etc.
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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

new!

The Model WWVC STANDARD FREQUENCY COMPARATOR is a new instrument incorporating a highly sensitive crystal controlled radio receiver for utilizing the transmissions of the National Bureau of Standards radio stations WWV and WWVH and is now available for precise audio and radio frequency standards work as well as accurate time interval measurements.

The model WWVC STANDARD FREQUENCY COMPARATOR is available in cabinet or for rack mounting using a 5¼" panel.

***NEW*—Model SR-7 WWV RECEIVER**

This receiver is the dual conversion type. Dimensions: 3-15/16" x 11" x 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.

***NEW*—Model AK-8 ANTENNA KIT**

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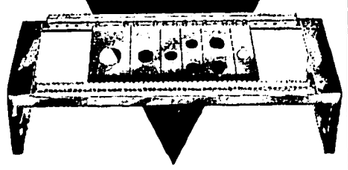

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The Speed-Chassis is a flexible breadboard assembly with interchangeable socket arrangements which can be mounted on a relay rack if desired. Shield cover and panel are available to make successful breadboard assemblies both permanent and neat.

The NEW Half-Size SPEED-CHASSIS accommodates small breadboards where additional length of the full-size model is not needed. Stacking and place arrangements of either unit or units in combination are extremely varied. Both Chassis models are preassembled: controls may be mounted on either end.

Send for specifications, prices and delivery

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WOODLAND HILLS, CALIF.

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Specific Products, P.O. Box 425, 21051 Costanso, Woodland Hills, Calif., 10, WWV
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Superior Marine Radio Co., Fla., 5, 10
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Sylvania Electric Products Inc., Dept. L24R, 1100 Main St., Buffalo 9, N.Y., 5, 20, 25
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Wells-Gardner & Co., Ill., 5, 15, 20, 25
Westinghouse Electric Corp., N.J., 5, 15, 20, 25
Zenith Radio Corp., Ill., 5, 15, 20, 25

5. Broadcast Transmitters.

5. AM broadcast
10. FM broadcast
15. Relay broadcast
& STL equipment
20. TV broadcast
25. TV closed circuit

A.R. & T. Electronics, Inc., Ark., TV Translator
Adler Electronics, Inc., N.Y., 20, 25
American Microwave Corp., Calif., 15
Amplitel, Inc., N.Y., 25
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5. Broadcast Transmitters.

B & K Manufacturing Co., Ill., 25
Blonder-Tongue Labs., Inc., N.J., 25
Browning Laboratories, Inc., Mass., 10
Budelman Radio Corp., 375 Fairfield Ave., Stamford, Conn., 15
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Tel: FIreside 8-9231
Canadian General Electric Co., Ltd., Canada, 5, 10, 15, 20, 25
Canadian Westinghouse Co., Ltd., Canada, 5, 10, 15, 20, 25
Chisholm Industries, Ltd., Canada, 5
Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 5, 15
Multiple pages of additional data on 49-54
Tel: EM 3-0281
Community Engineering Corp., Pa., 25
Continental Electronics Mfg. Co., Texas, 5, 15, 20
Erco Radio Laboratories, Inc., N.Y., 5, 10
Foto-Video Labs., Inc., N.J., 25
Gates Radio Co., Ill., 5, 10, 20
General Cybernetics Corp., Calif., 30
General Electric Co., Broadcast & Mil. Elect. Prods. Dept., N.Y., 5, 15, 20, 25
General Electric Co., Technical Prods. Dept., N.Y., 25
General Precision Labs., Inc., N.Y., 25
Hi-Video, Inc., N.Y., 25
Hoffman Electronics Corp., Calif., 20, 25
Intercontinental Electronics Corp., N.Y., 5, 15, 20, 25
International Telemeter, Dept K, 2000 Stoner Ave., Los Angeles 25, Calif., 25
See ad on page 526
Tel: GRanite 8-7751
International Telephone & Telegraph Corp., Industrial Products Div., 100 Kingsland Rd., Clifton, N.J., 25
Multiple pages of additional data on 76-79
Tel: NUtley 2-3600
Jerrold Electronics Corp., Dept. TED #2, 23rd & Chestnut Sts., Philadelphia 3, Pa., 5, 25
See ad on page 234
Tel: LOcust 4-0707
Kahn Research Laboratories, N.Y., 5
Kay Electric Co., Dept. ID-9, 14 Maple Ave., Pine Brook, N.J., 20, 25
Multiple pages of additional data on 44-45
Tel: CAldwell 6-4000
Lambda-Pacific Engr., Inc., Calif., 15
La Pointe Industries, Inc., Conn., 25
Ling Electronics, Inc., 5120 West Jefferson Blvd., Los Angeles 16, Calif., VLF
See ad on page 480
Tel: WEbster 3-9595
Link Radio Corp., N.Y., 10
Mullard, Overseas, Ltd., England, 5, 10
Philco Corp., Pa., 5, 10, 15, 20, 25
Philco Corp., Govt. & Indl. Div., Pa., 15, 20, 25
RCA Victor Co., Ltd., Canada, 5, 15, 20, 25
Radio Engineering Labs., Inc., N.Y., 15
Schafer Custom Engineering, P., Calif., Remote Control
Setchell-Carlson, Inc., Minn., 25
Skiatron Electronics & TV Corp., N.Y., 15, 25
Standard Electronics Div. Radio Eng. Lab., Inc., N.Y., 5, 10, 15, 20, 25

Directory I. Communications

5. Broadcast Transmitters.

Tarzian, Inc., Sarkes, Rectifier Div., Dept. P-4, 415 N. College Ave., Bloomington, Ind., 15, 20, 25
See ad on page 392
Tel: 2-1435
Tel-Instrument Electronics Corp., N.J., 25
Telechrome, Inc., 28 Ranick Dr., Amityville, L.I., N.Y., 15, 20, 25
See ad on page 236
Tel: LIncoln 1-3600
Thompson Products, Inc., Dage Television Div., Ind., 20, 25
Visual Electronics Corp., N.Y., 15, 20, 25

Cabinets & Consoles: See class 25

Cameras: Oscilloscope: See class 79

Cameras: Television: See class 18

6. Carrier Current Equipment.

Link Radio Corp., N.Y., 5, 10
Lynch Carrier Systems, Inc., Calif., 5, 10
Meridian, Inc., Conn., 15
Newman-Krause Co., Ill., 15
North Electric Co., Ohio, 5
Northeast Electronics Corp., N.H., 10
Northern Electric Co., Ltd., Canada, 5, 10
Pye Corp. of America, N.J., 5
Radio Communication Co., Wis., 10
Radio Engineering Products, 1080 University St., Montreal, Quebec, Canada, 5, 10,
See ad on page 282
Tel: UNiversity 6-6887
Stelma, Incorporated, Conn., 5, 10
Stromberg-Carlson, Div. Gen. Dynamics Corp., N.Y., 5, 10
Summit Electronics, Inc., N.J., 5
Telectro Industries Corp., N.Y., 10
Visual Electronics Corp., N.Y., 10
Westinghouse Electric Corp., Pa., 5

Cathode-Ray Tubes: See class 61

Consoles, cabinets & enclosures: See class 25

Consoles, studio: See class 18

Couplings: See class 66

Cutting heads & styli: See class 49

Data recorders: See class 20

Disk recorders: See class 16

Disks, blank: See class 49

Embossing recorders: See class 16

7. Emergency Communications Equipment.

5. Despatching equipment
10. Walkie-talkies

Air-o-Tronics, Calif., 10
Allied International Co., N.Y., 10
Avco Mfg. Corp., Crosley Div., Ohio, 10
Bendix Aviation Corp. Md., 5, 10

6. Carrier Current Equipment.

5. Complete terminal equipment
10. Repeat & relay equipment

Adler Electronics, N.Y., Inc., N.Y., 10
Aermotive Equipment Corp., Mo., 5
Alcor Electronics Corp., N.Y., 15
American Microwave Corp., Calif., 10
Automatic Electric Co., Ill., 5, 10
Budelman Radio Corp., 375 Fairfield Ave., Stamford, Conn., 5
See ad on this page
Tel: FIreside 8-9231
Canadian General Electric Co., Ltd., Canada, 5, 10
Canadian Westinghouse Co., Ltd., Canada, 5, 10
Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 5, 10
Multiple pages of additional data on 49-54
Tel: EM 3-0281
Communication Equipment & Engineering Co., Ill., 5, 10
Connecticut Telephone & Electric Co., Conn., 5, 10
Erco Radio Laboratory, Inc., N.Y., 5, 10
General Electric Co., Communication Prods. Dept., N.Y., 5
Harmon Electronics Co., Mo., 5, 10
Intercontinental Electronics Corp., N.Y., 5, 10
Jerrold Electronics Corp., Dept. TED #2, 23rd & Chestnut Sts., Philadelphia 3, Pa., 5, 10
See ad on page 234
Tel: LOcust 4-0707
Lenkurt Electric Co., Calif., 5, 10

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RADIO AND WIRE LINE COMMUNICATIONS EQUIPMENT

- **TELEPHONE SUBSCRIBER CARRIER**
- **RADIO PAGING**
- **MULTI-CHANNEL MICROWAVE SYSTEMS**
- **CUSTOM EQUIPMENT ENGINEERING**

Communications equipment bearing the **BUDELMAN** name is designed and built to meet practical commercial and public service needs. Its sound mechanical construction and advanced circuit developments account for its outstanding dependability, long life and unusually low initial and operating costs.

BUDELMAN equipment meets or exceeds applicable FCC requirements, and is available for prompt delivery from stock. Phone, write or wire for catalogs, or send us your specifications for a firm quotation on equipment built to your special needs.

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For details, circle #216 on Reader Service Card.

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

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ALFAX PAPER AND ALDEN ADJUSTERLESS RECORDING TECHNIQUES MAKE POSSIBLE—

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Record full range of your electronic signal outputs—monitor processes and operations directly and instantaneously on Alfax Paper —no pens or ink—up to 17 step permanent tone shades.

Magazine Fact Finder— 2 Channels Plus Timing

Here is a compact Magazine Recorder which will permanently record two separate operations and automatically print a recurring time signal on the Alfax Tape. Simple to install—they will operate unattended — remotely or on the spot.

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.

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 Curve Plotters

The Basic Helix Recorder with special electronics can provide continuous, automatic curve plotting of phenomena converted to voltage. Any number of channels can be recorded simultaneously along with standard or reference signals so that the information is instantly and permanently self-calibrated.

• ***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.

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ALDEN ELECTRONIC AND IMPULSE RECORDING EQUIPMENT CO.

Alden Research Center Westboro 6, Mass.

7. Emergency Communications Equipment.

Canadian General Electric Co., Ltd., Canada, 5, 10
Canadian Westinghouse Co., Ltd., Canada, 10
Chisholm Industries, Ltd., Canada, 10
Cleveland Electronics, Inc., Ohio, 10
Connecticut Telephone & Electric Co., Conn., 5
Continental Communications, Inc., Ill., 5
Dollar Co., Robert, Calif., 5
Emerson Radio & Phonograph Corp., Md., 10
Federal Telecommunication Labs., N.J., 10
Feiler Engineering & Mfg. Co., Ill., 5
Forway Industries, Inc., N.J., 5
Galbraith & Son Electric Corp., C. C., N.Y., 5
General Electric Co., Communication Prods. Dept., N.Y., 5
Gray Manufacturing Co., Conn., 10
Hartford Ear & Acoustic Research Labs., Conn., 5
Hoffman Electronics Corp., Calif., 10
Intercontinental Electronics Corp., N.Y., 10
Kaar Engineering Co., Calif., 5
Leitch Engineering Corp., N.H., 10
Lel, Inc., N.Y., 5, 10
Link Radio Corp., N.Y., 5, 10
Motorola, Inc., Comm. & Electronics Div., Ill., 5, 10
Pacific Mercury Television Mfg. Corp., Calif., 10
Packard-Bell Electronics Corp. 12333 W. Olympic Blvd., Los Angeles 64, Calif., 5
See ad on page 216
Tel: BRadshaw 2-2171
Production Research Corp., N.Y., 10, Disaster Transceiver
Pye Telecommunications, Ltd., England, 10
Radio Communication Co., Wis., 5
RCA Victor Co., Ltd., Canada, 10
Radio Specialty Mfg. Co., Ore., 10
Stromberg-Carlson, Div. Gen. Dynamics Corp., N.Y., 5, 10
Telephonics, Corp., N.Y., 10
Transitron, Inc., Div. Van Norman Ind., Inc., 186 Granite St., Manchester, N.H., 5
See ad on page 498
Tel: NAtional 5-9701
Virginia Electronics Co., D.C., 5

Equalizers: See class 35

8. Facsimile Equipment.

5. Receiving equipment
10. Sensitized paper
15. Transmitting equipment

ACME Telectronix, Div. of Nea Service, Inc., Ohio, 5, 15
Alden Electronic & Impulse Recording Equipt. Co., Alden Research Center, Westboro 6, Mass., 5, 10, 15
See ad on this page
Tel: FOrest 6-4467
Alden Systems Co., Mass., 5, 15

8. Facsimile Equipment.

Alfax Paper & Eng. Co., Washington St., Westboro 6, Mass., 10
See ad on this page
Tel: FOrest 6-4467
Browning Laboratories, Inc., Mass., 5
Burroughs Corp., Mich., 15
Canadian Westinghouse Co., Ltd., Canada, 5, 10, 15
Corbin Corp., Md., 5, 15
Electronic Communications, Inc., Fla., 5, 10, 15
Executon, Inc., N.Y., 5, 10
Fairchild Camera & Instrument Corp., N.Y., 5, 15
Fuchs Impulse Motors Co., Harry, N.Y., 5, 10, 15
Haloid Co., N.Y., 10
Hogan Laboratories, Inc., N.Y., 5, 10, 15
Larson Instrument Co., N.Y., 5
Maurer, Inc., J. A., N.Y., 5, 15
Muirhead & Co., Ltd., England, 5, 10, 15
Muirhead Instruments, Inc., N.Y., 5, 10, 15
Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 5, 15
Multiple pages of additional data on 106-108
Tel: WAtkins 9-9117
Radio Broadcasting Co., Pa., 5
Saratoga Industries, N.Y., 5, 15
Skiatron Elecertonics & TV Corp., N.Y., 5, 15
Stromberg-Carlson Company, Calif., 5
Taller-Cooper, Inc., N.Y., 15
Times Facsimile Corp., 540 W. 58th St., New York 19, N.Y., 5, 10, 15
See ad on page 487
Tel: JUdson 2-3030
Western Union Telegraph Co., 10
Westrex Corp., N.Y., 5, 10

Film projectors, television: See class 18

Filters: See class 36

Frequency shift converters & keyers: See class 19

GCA equipment: See class 1

Generators, marker (microwave): See class 77

Generators, marker (radio frequency): See class 80

Generators, marker (television): See class 82

Generators, pulse: See class 77

Directory I. Communications

Generators, signal (AM & FM): See class 80

Generators, signal (TV): See class 82

Generators, sweep (radio frequency): See class 80

Generators, sweep (TV): See class 82

Generators, synchronizing: See class 82

Generators, time delay: See class 77

Generators, ultrasonic: See class 72

Graphic recorders: See class 74

Headphones: See class 40

9. Industrial Sound Systems.

5. Complete systems
10. Installation & rental contractors

Aerojet General Corp., Calif., 5
Air-o-Tronics, Calif., 5
Aircraft Electronics, Ariz., 5, 10, 15, 20
Allen Communications, Inc., N.Y., 5, 10
Allied Radio Corp., Dept. 35-58, 100 N. Western Ave., Chicago 80, Ill., 5
See ad on page 622
Tel: HAymarket 1-6800
Altec Lansing Corp., Calif., 5
Bogen Co., Inc., David, N.J., 5
Browning Laboratories, Inc., Mass., 5
Budelman Radio Corp., 375 Fairfield Ave., Stamford, Conn., 5
See ad on page 269
Tel: FIreside 8-9231
Communication Equipment & Engineering Co., Ill., 5
Connecticut Telephone & Electric Co., Conn., 5, 10
Cossor (Canada) Ltd., Canada, 5
Denson Electronics Corp., Conn., 5
Dictograph Products Inc., N.Y., 5, 10
Doty Acoustical Electronic Labs., N.Y., 5

9. Industrial Sound Systems.

Dukane Corp., Ill., 5
Engineered Sound Systems Ltd., Canada, 5, 10
Feiler Engineering & Mfg. Co., Ill., 5
Galbraith & Son Electric Corp., C. C., N.Y., 5
General Communications, Inc., Wis., 5
Hi-Video, Inc., N.Y., 5, 10
Industrial Electronics Co., Mass., 5
Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 5
See ad on page 381
Tel: LUdlow 4-6200
International Projector Corp., N.J., 5
Karlson Associates, Inc., N.Y., 5
Lake Service Corp., Mass., 5, 10
Land-C-Air Sales Co., N.Y., 5
Langevin Mfg. Corp., N.Y., 5
Magnecord, Div. Midwestern Inst., Inc., Ill., 10
Morecroft, John H., Calif., 10
Murdoch, Jr., Alexander, N.Y., 5, Ultrasonic
Neill Co., Inc., R. W., Ill., 5
Northern Electric Co., Ltd., Canada, 5
Radio Broadcasting Co., Pa., 5, 10
Seeburg, J. P., Div. Fort Pitt Ind., Inc., Ill., 5
Simplex Equip. Corp., N.J., 5
Simpson Mfg. Co., Inc., Mark, N.Y., 5
Smith Company, Wm. M., Pa., 5
Smith-Meeker Eng. Co., N.Y., 5, 10
Sperti Faraday, Inc., N.J., 5
Stromberg-Carlson, Div. Gen. Dynamics Corp., N.Y., 5, 10
Summit Electronics, Inc., N.J., 5, 10
University Loudspeakers, Inc., N.Y., 5
Virginia Electronics Co., D.C., 5
Webster Electric Co., Wis., 5

Jacks: See class 39

Klystrons: See class 63

Lighting equipment, television studio: See class 18

Lighting equipment, tower: See class 3

Loudspeakers: See class 40

Magnetic tape & wire: See class 49

Magnetic tape & wire recorders: See class 16

Magnetrons: See class 63

10. Marine Equipment.

5. Contract installers
10. Pleasure craft radiotelephones
15. Shipborne communications equipment

Allied International Co., N.Y., 10, 15
Altair Company, Calif., 5
American Machine & Foundry Co., Defense Prods. Group, 1101 N. Royal St., Alexandria, Va., 15
See ad on page 274
Tel: KIng 9-9110
Applied Electronics Co., Inc., Calif., 10, 15
Brubaker Electronics, Inc., Calif., 15
Canadian General Electric Co., Ltd., Canada, 5, 10, 15
Chisholm Industries, Ltd., Canada, 15
Connecticut Telephone & Electric Co., Conn., 15
D X Radio Products Co., Ill., 10
Electronic Communications, Inc., Fla., 15
Electronic Specialty Co., 5121 San Fernando Rd., Los Angeles 39, Calif., 15
See ad on page 185
Tel: CHapman 5-3771
Electronics Research, Inc., Ind., 5, 10, 15
Elgin National Watch Co., Electronics Div., Calif., 10, 15
Emerson Radio & Phonograph Corp., Md., 15
Engineered Sound Systems Ltd., Canada, 10, 15
Federal Telecommunication Labs., N.J., 15
Feiler Engineering & Mfg. Co., Ill., 15
Fisher Radio Corp., N.Y., 15
Galbraith & Son Electric Corp., C. C., N.Y., 15
General Electric Co., Communication Prods. Dept., N.Y., 15
Gray Manufacturing Co., Conn., 15
Gray Radio Co., Inc., Fla., 5, 10
Harrison Laboratories, Inc., B. M., Mass., 15
Hartford Ear & Acoustic Research Labs., Conn., 15
Hoffman Electronics Corp., Calif., 15
Jetronic Industries, Inc., Pa., 10, 15
Kaar Engineering Co., Calif., 10, 15, Direction Finder
Kearfott Co., Inc., 1378 Main Ave., Clifton, N.J., 10, 15
See ad on page 36
Tel: GRegory 2-1000
Link Radio Corp., N.Y., 15
Mack Electronics Div., Inc., N.J., 15
Mackay Radio & Telegraph Co., Marine Div., N.J., 5, 15, Director & Direction Finder
Magnavox Co., Ind., 15
Manson Laboratories, Inc., 207 Greenwich Ave., Stanford, Conn., 15
See ad on page 494
Tel: DAvis 4-6783

Directory I. Communications

10. Marine Equipment.

Marine Electronics Co., N.Y., 10
McPherson Engineering Co., N.Y., 10
Micro-Lab Industries, Inc., Ind., 10
Modulation Products Co., N.Y., 10
Morecroft Design Eng., J. H., Calif., 10
Morecroft, John H., Calif., 5
Mullard, Overseas, Ltd., England, 15
Munston Manufacturing & Service, Inc., N.Y., 10, 15
Nuclear-Electronics Corp., Pa., 10
Pye Corp. of America, N.J., 10, 15
Pye Telecommunications, Ltd., England, 10, 15
RCA Victor Co., Ltd., Canada, 5, 10, 15
Raytheon Mfg. Co., Equip. Sales Operations, Mass., 10
Remler Co., Calif., 15
Rich Electronics, Inc., Fla., 15
Simpson, Inc., Pearce, Fla., 10
Sonar Radio Corp., N.Y., 10, 15
Sperry Gyroscope Co., Marine Div., N.Y., 5
Sperry Gyroscope Co. of Canada, Ltd., Canada, 5, 15
Sperry Piedmont Co., Div. of Sperry Rand Co., Va., 5, Navigation & Steering Equip.
Standard Electronics Div. Radio Eng. Lab., Inc., N.Y., 10
Stromberg-Carlson, Div. Gen. Dynamics Corp., N.Y., 5, 15
Superior Marine Radio Co., Fla., 5, 10, 15
Virginia Electronics Co., D.C., 15
Westrex Corp., N.Y., 15

Microphones: See class 43

Microphones, geophysical: See class 73

Microwave amplifiers: See class 21

Microwave antennas: See class 3

Microwave attenuators: See class 22

Microwave filters: See class 36

Microwave power supplies: See class 47

Microwave receivers: See class 14

Microwave transmitters: See class 15

Microwave tuners: See class 60

Microwave, waveguides: See class 66

11. Mobile Equipment.

5. Central station receivers
10. Central station transmitters
15. Citizen radio
20. Mobile receivers
25. Mobile transmitters
30. Selective calling equipment

Adler Electronics, Inc., N.Y., 25
Aeronautical Electronics, Inc., N.C., 5, 10, 20, 35
Aeronca Research Div., Md., 5, 10
Aircraft Radio Corp., Boonton, N.J., 20, 25
See ad on page 490
Tel: DEerfield 4-1800
Allied International Co., N.Y., 5, 10, 20, 25
Altair Company, Calif., 30
Applied Electronics Co., Inc., Calif., 20, 25
Ateliers De Montages Electriques, France, 5, 10
Avco Mfg. Corp., Crosley Div., Ohio, 20, 25
Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 30
See ad on page 476
Tel: UNiversity 4-0101
Barker & Williamson, Inc., Pa., 5, 10, 25
Bendix Aviation Corp., Md., 5, 10, 20, 25
Browning Laboratories, Inc., Mass., 5
C G Electronics Corp., N.M., 30
Canadian General Electric Co., Ltd., Canada, 5, 10, 20, 25, 30
Canadian Westinghouse Co., Ltd., Canada, 5, 10, 15, 20, 25, 30
Clegg Laboratories, Inc., N.J., 20, 25
Cleveland Electronics, Inc., Ohio, 15
Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 30
Multiple pages of additional data on 49-54
Tel: EM 3-0281
Communications Co., Fla., 5, 10, 20, 25
Connecticut Telephone & Electric Co., Conn., 5, 10, 15, 20, 25, 30
Continental Communications, Inc., Ill., 15, 25
Craig Systems, Inc., Dept. F, 90 Holten St., Danvers, Mass., 5, 10, 20, 25, Trailers, Vans, & Shelters
See ad on page 302
Tel: SPring 4-1870
Decker Aviation Corp., Pa., 5, 10, 30
Dictograph Products Inc., N.Y., 10, 20
Dollar Co., Robert, Calif., 30
Dumont Labs., Inc., Allen B., N.J., 5, 10, 15, 20, 25, 30
Electronics Research, Inc., Ind., 15, 20, 25
Elgin National Watch Co., Electronics Div., Calif., 30
Elliott Brothers (London) Ltd., England, 5, 10, 20, 25
Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio, 20
See ad on page 275
Tel: WAlnut 1662
Fairchild Guided Missiles Div., N.Y., 20, 25

11. Mobile Equipment.

Federal Telecommunication Labs., N.J., 20, 25, 30
Franklin Electronics, Inc., Pa., 20
General Electric Co., Communication Prods. Dept., N.Y., 5, 10, 15, 20, 25, 30
General Motors Corp., Delco Radio Div., Ind., 20
Gonset Div., L. A. Young Spring & Wire Corp., Calif., 5, 10, 20, 25
Haller, Raymond & Brown, Inc., Pa., 30
Hallicrafters Co., Ill., 5, 10, 15, 20, 25, 30
Harmon Electronics Co., Mo., 30
Hoffman Electronics Corp., Calif., 20, 25
I.D.E.A., Inc., Ind., 5, 20
Industrial Development Eng. Assoc., Inc., Ind., 20
Intercontinental Electronics Corp., N.Y., 20, 25
International Electronics Corp., N.Y., 20, 25
International Projector Corp., N.J., 30
International Telephone & Telegraph Corp., Industrial Products Div., 100 Kingsland Rd., Clifton, N.J., 20, 25
Multiple pages of additional data on 76-79
Tel: NUtley 2-3600
Johnson Co., E. F., Minn., 25
K-F Development Co., Calif., 20, Amateur
Kaar Eng. Co., Calif., 5, 10, 15, 20, 25
Lel, Inc., N.Y., 20, 25
Link Radio Corp., N.Y., 5, 10, 15, 20, 25, 30
Mack Electronics Div., Inc., N.J., 5, 10, 20, 25
Mackay Radio & Telegraph Co., Marine Div., N.J., 30
Magnavox Co., Ind., 20, 25
McPherson Engineering Co., N.Y., 30
Mobil Electronics Mfg. Co., Ind., 30
Modulation Products Co., N.Y., 15, Model Controls
Motorola, Inc., Comm. & Electronics Div., Ill., 5, 10, 15, 20, 25, 30
Mullard, Overseas, Ltd., England, 5, 10, 20, 25
National Co., Mass., 5, 10
National Electronics Labs., Inc., D.C., 20, 25
Northeast Electronics Corp., N.H., 5, 10, 20, 25, 30
Olympic Radio & Television, Inc., N.Y., 20, 25
Packard-Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 30
See ad on page 216
Tel: BRadshaw 2-2171
Perma-Power Co., Ill., 10, 15, 30
Philco Corp., Pa., 30
Port-O-Vox, Corp., N.Y., 20
Pye Corp. of America, N.J., 5, 10, 20, 25
Pye Telecommunications, Ltd., England, 5, 10, 20, 25, 30
R.T.A., France, 5, 10, 15, 20, 25, 30
Radio Broadcasting Co., Pa., 15, 20, 30
Radio Communication Co., Wis., 30
RCA Victor Co., Ltd., Canada, 5, 10, 20, 25
Radio Engineering Products, Ltd., 1080 University St., Montreal, Quebec, Canada, 30
See ad on page 282
Tel: UNiversity 6-6887

11. Mobile Equipment.

Royal Communications Systems, Inc., Ohio, 5, 10, 15, 20, 25, 30
Scantlin Electronics, Inc., Calif., 15, 20, 25, 30
Simpson, Inc., Pearce, Fla., 20, 25
Simpson Mfg. Co., Inc., Mark, N.Y., 5, 10, 20, 25, 30
Stromberg-Carlson, Div. Gen. Dynamics Corp., N.Y., 5, 10, 15, 20, 25, 30
Superior Marine Radio Co., Fla., 20, 25
Telectron Co., Fla., 25
Transitron, Inc., Div. Van Norman Ind., Inc., 186 Granite St., Manchester, N.H., 5, 10, 20, 25
See ad on page 498
Tel: NAtional 5-9701
Transval Engineering Corp., Calif., Static Inverters for Mobile
Virginia Electronics Co., D.C., 20, 25
Vocaline Co. of America., Inc., Conn., 15
Wells-Gardner & Co., Ill., 15, 25
Westrex Crop., N.Y., 5, 10, 15, 20, 25, 30
Z & W Mfg. Corp., Electronics Div., Ohio, 15

12. Monitor Equipment.

5. Frequency
10. Modulation
15. Remote control monitors
20. Video monitors

Adler Electronics, Inc., N.Y., 20
Aeronca Research Div., Md., 5, 10, 15, 20
Airmec, Ltd., England, 5
Alpha Instrument Co., Conn., 10
Beckman Instruments, Inc., Berkeley Div., Calif., 5
Blonder-Tongue Labs., Inc., N.J., 20
Browning Laboratories, Inc., Mass., 10
Brush Electronics Co., Ohio, 5, 10
Budelman Radio Corp., 375 Fairfield Ave., Stamford, Conn., 5, 10
See ad on page 269
Tel: FIreside 8-9231
C. G. S. Laboratories, Inc., Conn., 5
Calbest Electronics Co., Calif., 20
Canadian General Electric Co., Ltd., Canada, 5, 10, 15, 20
Clegg Laboratories, Inc., N.J., 10
Computer-Measurements Corp., Calif., 5
Conrac, Inc., Calif., 20
Dage Television Division, Thompson Products, Ind., 20
Daystrom, Inc., N.J., 10
Diamond Power Specialty Corp., Ohio, 20
Doty Acoustical Electronic Labs., N.Y., 20
Dumont Labs., Inc., Allen B., N.J., 15, 20
Dunlap Electronics, Iowa, 5, 15
Dynapar Corp., Ill., 5
Emerson Radio & Phonograph Corp., Md., 5, 10
F-R Machine Works, Inc., 26-12 Borough Pl., Woodside 77, N.Y., 5
Multiple pages of additional data on 55-58
Tel: AStoria 8-2800

12. Monitor Equipment.

Fairchild Camera & Instrument Corp., N.Y., 10, 20
Federal Telecommunication Labs., N.J., 5, 10
Federal Television Corp., N.Y., 15
Foto-Video Labs., Inc., N.J., 20
Gates Radio Co., Ill., 5, 10, 15
General Precision Labs. Inc., N.Y., 20
General Radio Co., 275 Massachusetts Ave., Cambridge, Mass., 5, 10
See ad on Cover 4
Tel: TRowbridge 6-4400
Hewlett-Packard Co., 4277 D, Page Mill Road, Palo Alto, Calif. 5, 10
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Tel: DAvenport 5-4451
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Intercontinental Electronics Corp., N.Y., 10, 20
Kay Electric Co., Dept. ID-9, 14 Maple Ave., Pine Brook, N.J., 5
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Tel: CAldwell 6-4000
Kin Tel, 5725 Kearny Villa Rd., San Diego 12, Calif., 20
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Kybernetes Corp., N.Y., 15
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Mack Electronics Div., Inc., N.J., 15
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Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 20
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Polytechnic Research & Development Co., Inc., 202 Tillary St., Brooklyn 1, N.Y., 5
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Shasta Div., Beckman Instruments, Inc., Calif., 5
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Tarzian, Inc., Sarkes, Rectifier Div., Dept. P-4, 415 N. College Ave., Bloomington, Ind., 15, 20
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Tel: 2-1435
Tech-Master Corp., N.Y., 15, 20
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Television Utilities Corp., N.Y., 20, Pulse Cross Type
Tel-Instrument Electronics Corp., N.J., 20
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Transvision, Inc., N.Y., 20
Virginia Electronics Co., D.C., 15
Visual Electronics Corp., N.Y., 20
Wickes Engineering & Construction Co., N.J., 20

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Phonographs: See class 45

Pick-ups: See class 45

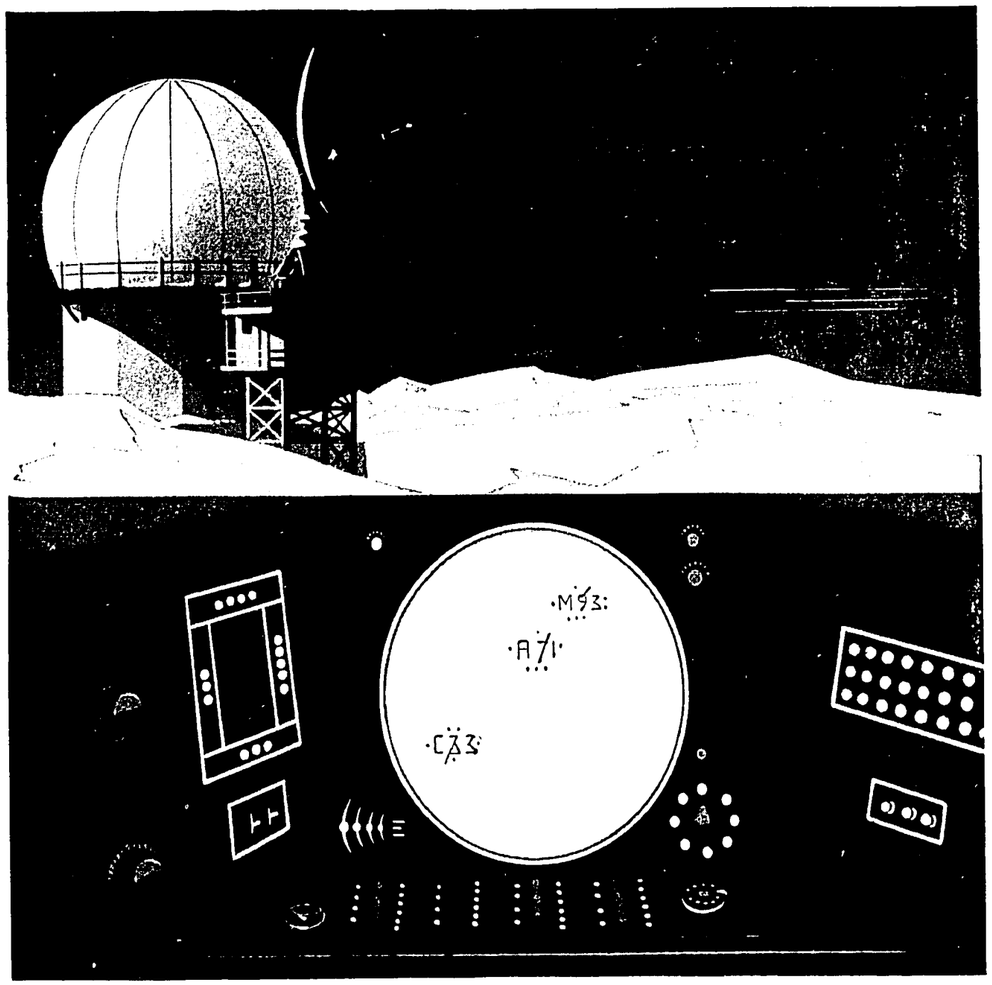
Picture tubes: See class 61

Plugs: See class 39

13. Point to Point Equipment.

5. Receivers
10. Transmitters

Adler Electronics, Inc., N.Y., 10
Aeronautical Communications Equipment, Inc., Fla., 5, 10
Allied International Co., N.Y., 5, 10
Amerac, Inc., Mass., 5, 10



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Barker & Williamson, Inc., Pa., 10
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Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 5, 10
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Skiatron Electronics & TV Corp., N.Y., 5, 10
Stelma, Incorporated, Conn., 5, 10, Wire
Stromberg-Carlson, Div. Gen. Dynamics Corp., N.Y., 5, 10
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Technical Material Corp., N.Y., 5, 10
Telechrome, Inc., 28 Ranick Dr., Amityville, L.I., N.Y., 5, 10
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Projectors, television film: See class 18

Public address amplifiers: See class 21

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14. Radar-Microwave Receivers.

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10. Position
indicators
15. Radar

ACF Industries, Inc., Erco Div., Md., 15
Airborne Instruments Laboratory, Inc., 160 Old Country Rd., Mineola, L.I., N.Y., 15
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Airtron Inc., Dept. 1, 1101 W. Elizabeth Ave., Linden, N.J., 15
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Altair Company, Calif., 5, 15
Amerac, Inc., Mass., 5, 15
American Machine & Foundry Co., Electronics Div., Mass., Radar Beacon
American Machine & Foundry Co., Defense Prods. Group, 1101 N. Royal St., Alexandria, Va., 15
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AVCO Mfg. Corp., Crosley Div., Ohio 15
Brubaker Electronics, Inc., Calif., 15
Budelman Radio Corp., 375 Fairfield Ave., Stamford, Conn., 5
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Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 5
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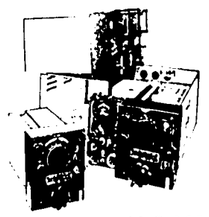

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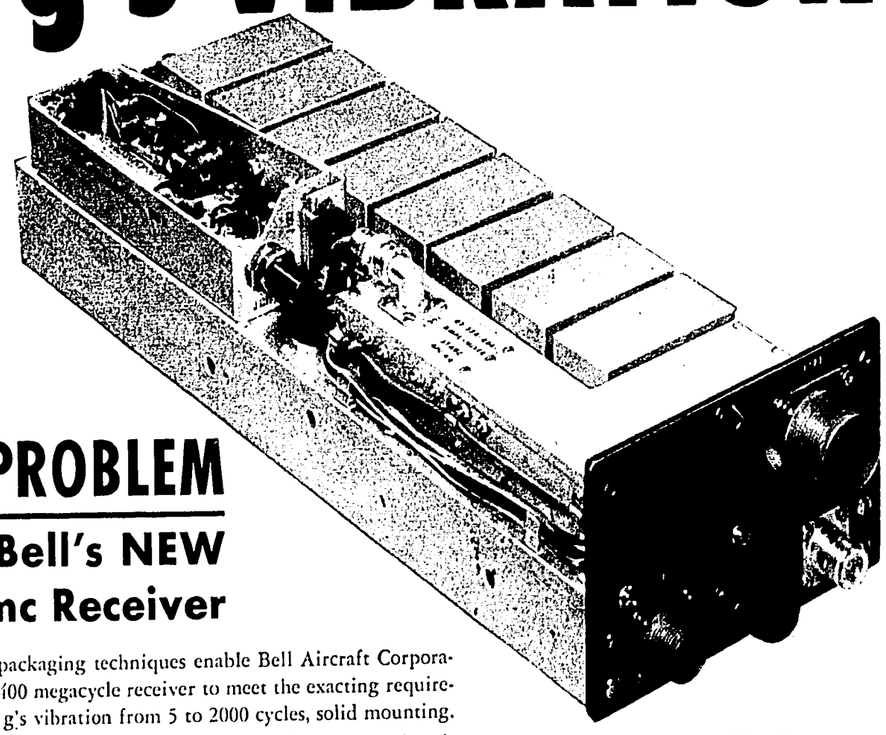

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TYPE: FM 300 KC Deviation
TUNING RANGE: 406 to 420 megacycles
Plug-in assemblies to extend range to 500 mcs available
OSCILLATOR: Crystal controlled
SENSITIVITY: 5 microvolts or better for 10 db quieting
INPUT IMPEDANCE: 50 ohms
BANDWIDTH: 1.15 mcs ± .1 at 3 db
IMAGE AND SPURIOUS RESPONSE: Better than 60 db
OUTPUT: ± 0.5 db 40 cps to 40 kc 3 db at 100 kc
3.5 volts RMS 500 ohms closed circuit
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VOLUME: 300 cubic inches
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Directory I. Communications

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Crosley Div., Avco Mfg. Corp., Ohio, 15
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Tel: Walnut 1662
Fairchild Camera & Instrument Corp., N.Y., 10, 15
Fairchild Guided Missiles Div., N.Y., 10, 15
Federal Telephone & Radio Co., Div. Int'l. Tel. & Tel. Corp., 100 Kingsland Rd., Clifton, N.J., 15
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Tel: NUtley 2-3600
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General Electric Co., Heavy Military Electronic Equip. Dept., N.Y., 15
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Hoffman Electronics Corp., Calif., 15
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Intercontinental Electronics Corp., N.Y., 5, 15
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Lambda-Pacific Engr., Inc., Calif., 5
Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville 6, N.J., 10, 15
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Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 5
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Ramo-Wooldridge Corporation, 5730 Arbor Vitae St., Los Angeles 45, Calif., 15
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Resdel Engineering Corp., Calif., 15
Sanders Associates, N.H., 15
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Stromberg-Carlson, Div. Gen Dynamics Corp., N.Y., 5, 10, 15
Sylvania Electric Products, Inc., Dept. F24P, 1740 Broadway, New York 19, N.Y., 15
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Texas Instruments Incorporated, 6000 Lemmon Ave., Dallas 9, Tex., 15
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Visual Electronics Corp., N.Y., 5
Westinghouse Electric Corp., Pa., 15

15. Radar-Microwave Transmitters.

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ACF Industries, Inc., Erco Div., Md., 15
Airborne Instruments Laboratory, Inc., 160 Old Country Rd., Mineola, L.I., N.Y., 15
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Ametac, Inc., Mass., 5, 10, 15
American Machine & Foundry Co., Defense Prods. Group, 1101 N. Royal St., Alexandria, Va., 15
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Avco Mfg. Corp., Crosley Div., Ohio, 15
Bendix Aviation Corp., Md., 15
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Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 5, 10
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Electronic Tube Corp., Pa., 15
Elliott Brothers (London) Ltd., England, 10, 15
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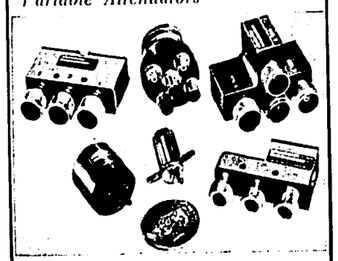

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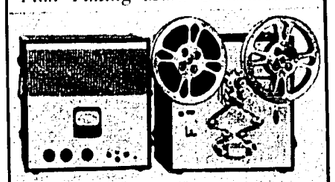

ELECTROMATION
Company, Inc.
1646 Eighteenth Street
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TExas 0-6401

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F-R Machine Works, Inc., 26-12 Borough Pl., Woodside 77, N.Y., 5, 10, 15
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Tel: AStoria 8-2800

Fairchild Guided Missiles Div., N.Y., 15

Federal Telecommunication Labs., N.J., 5, 10

Federal Telephone & Radio Co., Div. Int'l. Tel. & Tel. Corp., 100 Kingsland Rd., Clifton, N.J., 15
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General Communication Co., 681 Beacon St., Boston 15, Mass., 15
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General Electric Co., Broadcast & Mil. Elect. Prods. Dept., N.Y., 5

General Electric Co., Heavy Military Electronic Equip. Dept., N.Y., 15

General Electric Co., Light Military Electronic Equip. Dept., N.Y., 15

General Electronic Laboratories, Inc., 18 Ames St., Cambridge 42, Mass., 5, 15
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Gilfillan Bros., Inc., Calif., 15

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Gray Manufacturing Co., Conn., 15

Hallicrafters Co., Ill., 5, 10, 15

Hoffman Electronics Corp., Calif., 15

Hoover Electronics Co., Md., 15

Intercontinental Electronics Corp., N.Y., 5, 10, 15

J-V-M Engineering Co., 4632 S. Lawndale Ave., Lyons, Ill., 5, 10, 15
See ad on page 455
Tel: LYons 3-7990

Laboratory for Electronics, Inc., Mass., 15

Lambda-Pacific Engr., Inc., Calif., 10

Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville 6, N.J., 5, 15
See ads on pages 478, 496, 500
Tel: MAtawan 1-2600

Litton Industries, 336 N. Foothill Rd., Beverly Hills, Calif., 15
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Tel: CRestview 4-7411

Loral Electronics Corp., N.Y., 5, 15

Mack Electronics Div., Inc., N.J., 5, 15

Magnavox Research Laboratories, Calif., 15

Microwave Development Labs., Inc., Mass., 5, 15

Motorola, Inc., Comm. & Electronics Div., Ill., 5, 10, 15

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Norden-Ketay Corp., N.Y., 15

Northern Electric Co., Ltd., Canada, 5, 10, 15

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Philco Corp., Govt. & Indl. Div., Pa., 5, 10

Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 5, 10, 15
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Tel: WEstmore 9-4092

Premier Instrument Corp., 52 W. Houston St., New York City 12, N.Y., 5, 10, 15
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Production Research Corp., N.Y., 5

RCA Victor Co., Ltd., Canada, 10, 15

Radio Corp. of America, Defense Electronics Products, N.J., 15

Radio Research Instrument Co., 550 Fifth Ave., New York 36, N.Y., 5, 10, 15
See ad on this page
Tel: JUdson 6-4691

Ramo-Wooldridge Corporation, 5730 Arbor Vitae St., Los Angeles 45, Calif., 15
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Raytheon Mfg. Co., Equip. Sales Operations, Mass., 5, 10

Resdel Engineering Corp., Calif., 5, 15

Sanders Associates, N.H., 5, 15

Setchell-Carlson, Inc., Minn., 15

Sierra Electronic Corp., 3885 Bohannon Dr., Menlo Park, Calif., 5
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Tel: DAvenport 6-2060

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Jan. spec: 2700-2900mc, 1.5db max. loss at ctr freq over band. Details: single tuned filter for freq channelling in radar beacon. Silver plated coax resonator. Invar center tuning conductor ¾ wavelength. Tuneable 9-11.2cm. Loaded Q 450-650 for insertion loss at band ctr 1db, 700-1000 for loss 2 to 3 db. Band center stable to 1mc/sec for 100 deg. C amb. temp change. A double tuned cct with a flat response over wider band pass and less critical tuning had by cplg. two filters in series. New. $37.50 each.

3KW 400 CYCLE SOURCE
Complete generator set. 115v 60cy AC 3HP speed regulated, motor. Generator output 115 volts, 400 cycle, single phase 17.4 amp. continuous duty (easily converted to 3 phase by transformer). Output electronically regulated. Built to rigid U. S. Navy spec. A perfect source 115 volt 400 cycle. $385.00 each.

CRYSTAL MOUNTS
X band. Broad banded. BNC (teflon) output. UG39 Flange Input. VSWR better than 1.0 Mfg. Airtron. New. $24.50 (illus.)
3 cm freq. meter. Coax type 8700-9500 mc ± 5 mc. Micrometer adjust. Mfg. Western Electric. New. $39.50 each.

TAPER. RG51 to RG52 (1¼ x ⅝" to 1 x ½") Smooth Electroform. Standard Flanges. New. $16.50.

FLEXIBLE WAVEGUIDE. 1x.5 X band 9" Technicraft. New $10.00. 1x.5 X band 24" CG779/U Titeflex. New $21.50. 1¼ x ⅝" X band 12" Western Elec. New $19.50.

BENDIX GYRO SERVO UNIT. Combined horizon gyro, Autosyn & tilt correction motor. Maintains tilt stabilization of radar antenna, etc. Pioneer 12800-1-B (APS-15). New $75.00.

⅞" RIGID COAX. 50 ohm, standard fittings, 10cm stub supported. 12 ft. lengths. Silver plated. New $34.50 each. 12 ft. length.

RT39/APG-5 10CM RADAR. Complete S band RF package. Lighthouse 2C40 xmtr, 2C43 rcvr, TR. 829B pulser, miniature 6AK5 IF strip. Press. 12" dia., 24" lg. Brand new with all tubes $275.00.

For details, circle #222 on Reader Service Card.

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Texas Instruments Incorporated, 6000 Lemmon Ave., Dallas 9, Tex., 15
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Receivers, broadcast: See class 4

Receivers, facsimile: See class 8

Receivers, microwave: See class 14

Receivers, mobile: See class 11

Receivers, point-to-point: 13

Receivers, radar: See class 14

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Record changers & players: See class 45

Recorders, graphic: See class 74

Recording accessories: See class 49

Recording amplifiers: See class 21

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10. Embossing types of recorders
15. Magnetic tape recorders
20. Magnetic wire recorders

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Allied Radio Corp., Dept. 35-58, 100 N. Western Ave., Chicago 80, Ill., 15
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Tel: HAymarket 1-6800

American Electronics Mfg., Inc., Calif., 15

Ampex Corp., Dept. K-57, 934 Charter St., Redwood City, Calif., 15, Video Tape & Mobile Data Recorders
See ad on page 158
Tel: EMerson 9-1481

Amplifier Corp. of America, N.Y., 15, Battery Operated Spring-Motor Types

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Audion-Master Corp., N.Y., 15

Barnes Engineering Co., Conn., Binatrol Tape Program

Broadcast Equipment Specialties Corp., N.Y., 15

California Technical Industries, Calif., Antenna Pattern Recorders

Camera Equipment Co., Inc., N.Y., 15, Tripods, Dolleys & Lenses

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Electromation Co., 1646 18th St., Santa Monica, Calif., 15
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Electron Laboratories, N.Y., 15

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Engineered Sound Systems Ltd., Canada, 15

Fairchild Recording Equipment Co., N.Y., 5, 15

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Houston Technical Laboratories, Tex., 15

Key Electric Corp., N.Y., 15

L.E.E., Inc., D.C., 15

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Logistics Research, Inc., Calif., 15

Magnecord, Div. Midwestern Inst., Inc., Ill., 15

Maurer, Inc., J. A., N.Y., Film Recording Equip.

Midwestern Instruments, Okla., 15

Miles Reproducer Co., Inc., N.Y., 10

Minnesota Mining & Mfg. Co., Mincom Div., Calif., 15

Mohawk Business Machines Corp., N.Y., 15

North American Philips Co., Inc., N.Y., 15

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Summit Electronics, Inc., N.J., 15, 20

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General Electric Co., Broadcast & Mil. Elect. Prods. Dept., N.Y., 10
General Electronic Laboratories, Inc., 18 Ames St., Cambridge 42, Mass.
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Tel: UNiversity 4-8500
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20. TV film projectors
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Hazeltine Electronics Corp., N.Y., 35, 50, 55
Hett Associates, Inc., N.J., Image Convertor
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International Telephone & Telegraph Corp., Industrial Products Div., 100 Kingsland Rd., Clifton, N.J., 10
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Kellman Productions, Louis W., Pa., Film Production
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Scott, Inc., Hermon Hosmer, Mass., 30
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Technisonic Studios, Inc., Mo., 5
Telechrome, Inc., 28 Ranick Dr., Amityville, L.I., N.Y., 10, 15, 20
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Tape phonographs: See class 45

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15. Receivers
20. Transmitters

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20. Telemetering Equipment.

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10. Data storage mechanisms
15. FM/FM modulators
20. Receivers
25. Transmitters

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A-V Mfg. Corp., N.Y., 5, 10
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Airborne Instruments Laboratory, Inc., 160 Old Country Rd., Mineola, L.I., N.Y., 10
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Altair Company, Calif., 15, 20, 25
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American Machine & Foundry Co., Defense Prods. Group, 1101 N. Royal St., Alexandria, Va., 5, 10, 15, 20, 25
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Tel: KIng 9-9110
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Ampex Corp., Dept. K-57, 934 Charter St., Redwood City, Calif., 5, 10
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Tel: EMerson 9-1481
Applied Science Corp. of Princeton, P.O. Box 44, Princeton, N.J., 10, 20, 25, PWM Switches
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Tel: PLainsboro 3-4141
Associated Missile Products Corp., Calif., 5, 20, 25
Austin Co., N.Y., 5
Avco Mfg. Corp., Crosley Div., Ohio, 20
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Electronic Communications, Inc., Fla., 5, 20, 25

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

VOICE MULTIPLEX EQUIPMENT FOR BROADBAND RADIO SYSTEMS

FOUR TO NINETY-SIX CHANNELS

A series of voice-multiplex systems providing from four to ninety-six voice channels over a radio system are now available. These systems have been designed specifically for radio use, and are not simply converted wire-line carrier-telephone systems. They have all the advantages which design for a specific application produces: High performance, small size, light weight, low cost, circuit simplicity, low power requirements, small number of tubes, low operating cost, low maintenance cost and high reliability.

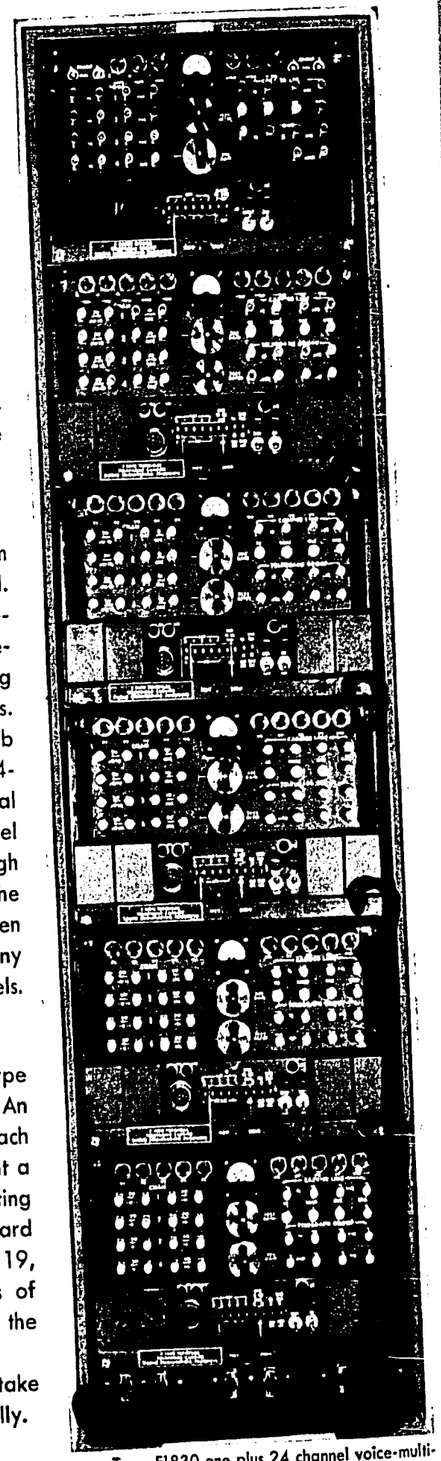
CHANNELS ARE 3500 CYCLES WIDE

These systems provide a voice channel flat within 1 db from 300 to 3500 cycles, for each 4 kc of bandwidth occupied. Each channel is obtained as the lower sideband in a single-sideband suppressed-carrier amplitude-modulation arrangement, and is equipped with hybrid, signalling, and dialling circuits for all the standard 2-wire and 4-wire loop options. These systems are ordinarily arranged for a net loss of 3 db between 2-wire v-f loops or a net gain of 5 db between 4-wire v-f loops. Volume limiters and compandors are optional on all channels. On the v-f side the receive level of each channel is +1 dbm and the transmit level −4 dbm. On the high frequency side the transmitting level is +12 dbm and the receiving level −30 dbm min. per channel. Crosstalk between channels is more than 50 db below these levels, and any harmonic in one channel is more than 45 db below these levels.

TELEGRAPH GROUP

A telegraph channel is provided on which up to 8 teletype circuits can be multiplexed without double modulation. An order-wire channel and telephone set is provided for each group of up to 24 channels. Channels can be added five at a time. Full flexibility is provided for dropping and inserting channel groups at repeater and terminal points. Standard assemblies provide up to a maximum of 1 plus 4, 9, 14, 19, 24, 49 or 99 channels. In all systems moderate lengths of 4-wire cable or open-wire line may be inserted between the multiplex equipment and the radio terminals.

Telephone, wire or write us for further in formation. We can take care of your multiplex requirements quickly and successfully.

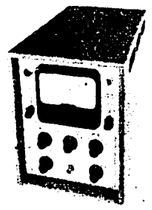


Type F1830 one plus 24 channel voice-multiplex terminal complete with hybrid, ringing and dialling circuits, and test facilities. Dimensions are 58" high, 16" wide and 8" deep. Power input 250 watts. Weight 326 lbs.

RADIO ENGINEERING PRODUCTS
1080 UNIVERSITY ST., MONTREAL 3, CANADA
TELEPHONE UNiversity 6-6887
CABLES RADENPRO MONTREAL

For details, circle #223 on Reader Service Card.

STANDING WAVE AMPLIFIER



RANGE: 60 db • INPUT ATTENUATOR: 50 db. in steps of 5 or 10 db. • SENSITIVITY: 1 microvolt across 200 ohms for full scale deflection • AMPLIFIER FREQUENCIES: Wide-band, 400 cycles tunable ±5%, 1000 cycles tunable ±5% • AMPLIFIER: Q 25 ±5 • METER SCALES: VSWR 1-4, VSWR 3-10, DB 0-10 • SIZE: 14¼" d, 8½" w, 10½" h • PRICE: $195.00.

MICROWAVE POWER METER

POWER RANGES: Full scale readings of .1, .3, 1, 3, 10 Mw. Continuous readings from −20 to +10 dbm. • BOLOMETER RESISTANCE: 200 ohms • BOLOMETER COEFFICIENT: plus or minus • BOLOMETER BIAS CURRENT: 8.6 ma. max. • ACCURACY: ±5% of full scale reading • SIZE: 14¼" d, 8½" w, and 10½" h • PRICE: $195.00.

TELEMETERING TRANSMITTERS

10 Kw, Pulsed Transmitter • Frequency 400-1200 Mc • Tuning Range 5%.

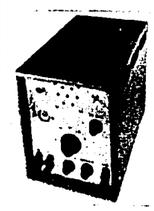
TWO CHANNEL • FREQUENCY: 215-235 Mcs. • POWER OUTPUT: 50 Watts Peak • SIZE: 5½" dia. 4¼" long

MICROWAVE • FREQUENCY: 2150-2350 Mc. • POWER OUTPUT: 15 Watts CW • MODULATION: Amplitude or Frequency (± 125 Kc. deviation) • SIZE: 2" by 4" by 7"

SPECIAL MICROWAVE COMPONENTS

RACK & PANEL CONNECTORS: Designed to permit plug in chassis with positive mating action to connector in the rack • IMPEDANCE: 50 ohms • INSULATION: Teflon • ADAPTERS: to TNC or BNC MAGNETRON TO WAVEGUIDE TRANSDUCERS-WAVEGUIDE SIZE: RG 69/U • FLANGE: UG 417/U • TRANSITION: Probe, stub supported. STRIP TRANSMISSION LINES-POWER DIVISION: Equal or Tapered • IMPEDANCE: 50 ohms • FREQUENCY: Fixed.

WWV RECEIVER



FREQUENCIES: 2.5, 5.0, 10.0, 15.0, 20.0, 25.0 Mc • SENSITIVITY: better than 1.0 microvolt for standard output • SELECTIVITY: 10 Kc. • INPUT: dual • OUTPUT: 600 ohms and self contained speaker • TUNING EYE: zero beat indicator • SIZE: 14¼" d, 8½" w, and 10½" h • PRICE: 195.00

AIRCOM INC.
384 MAIN STREET WINTHROP, MASS.

For details, circle #224 on Reader Service Card.

Directory I. Communications

20. Telemetering Equipment.

Electronic Engineering Co. of Calif., Calif., 10, 15

Elliott Brothers (London) Ltd., England, 5, 10, 20, 25

Emerson Radio & Phonograph Corp., Md., 5, 10, 15, 20, 25

Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio, 20
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Erco Radio Laboratories, Inc., N.Y., 20, 25

Fairchild Camera & Instrument Corp., N.Y., 5, 10

Federal Telephone & Radio Co., Div. of International Telephone & Telegraph Corp., 100 Kingsland Rd., Clifton, N.J., 5
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General Communication Co., 681 Beacon St., Boston 15, Mass., 20, 25
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General Electric Co., Apparatus Sales Div., N.Y., 5, 10, 15, 20, 25

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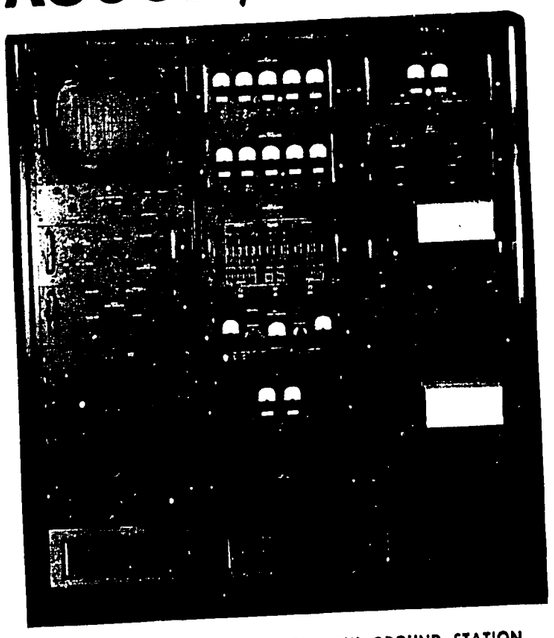

MULTICHANNEL DATA TRANSMISSION OR RECORDING USING RF CARRIER FM SUBCARRIER OR SINGLE MAGNETIC TAPE TRACK

ASCOP pulse width coding and time division multiplexing techniques result in systems featuring large numbers of data channels, highest accuracy, reliability, flexibility and ease of operation. That is why ASCOP Telemetering Systems have been first choice for the nation's most vital projects involving automatic handling of data from aircraft, missiles, test stands, nuclear reactors, etc. With an ASCOP PW System as many as 88 data channels may be sampled, transmitted and/or recorded and reduced in real time. Up to 1232 data channels are available by means of multiple tape recording, or up to 1760 data channels by means of sub-commutation. System accuracy is better than 1%.

TYPICAL SYSTEM PERFORMANCE
(Utilizing Zero and Full Scale Reference)

NUMBER OF DATA CHANNELS	26	41	86
SAMPLES/CHANNEL/SECOND	30	20	10
FREQUENCY RESPONSE, CPS	5	3.3	1.5

LINEARITY....Better than ±0.5% of full scale.
STABILITY....Long term drift less than ±1% of full scale.

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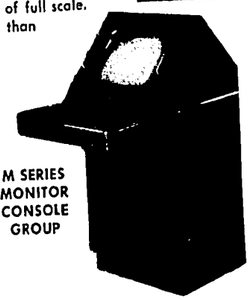
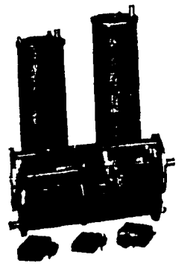
Complements ASCOP's PW Multicoders and Telemetering Sets. A "packaged" system for operational testing of airborne or land vehicles . . . and for static testing.
Continuous automatic compensation of system zero and scale factor eliminates need for calibration and manual adjustment.
Operates directly from PW signals of 30x30, 45x20 or 90x10 configurations — or indirectly at non-standard rates of 30, 45 or 90 channels by means of proper tape control. Provides for visual monitoring of all data channels and produces reduced graphic output records of selected channels in real time. Features missing data point correction for continuous synchronization. Easy access to slide-mounted chassis is also provided.



M SERIES MONITOR CONSOLE GROUP



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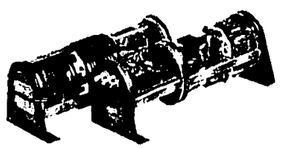
For short life applications, where the ultimate in compactness, ruggedness, and performance are required. Standard packages as shown are available for 30 x 30 and 45 x 20 operation. Special configurations, using standard functional components, may be ordered. Some components are sold separately.



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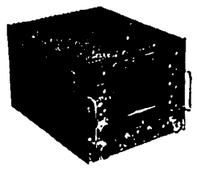
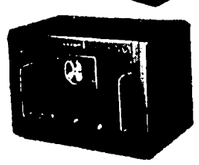
Low level sensitivity opens a whole new field of mobile instrumentation. Combine supersensitivity, high accuracy and a wide selection of data channels (up to 88). Ultra high altitude pressurization and rugged design make them ideal for recovery and repeat use. Available for 15 or 30 mv range. High speed models operate at 900 PPS . . . low speed models at 112.5 PPS. Operate from low level or standard transducers. Accept double ended balanced inputs.



C SERIES MONITOR EQUIPMENT

A means for rapid inspection and visual monitoring of airborne or test stand data. Permits engineer to check or read data both before and during test runs on entire telemetering train from commutator through the tape recording system, saving a great deal of data reduction time. Samples data at repetition rates of 1¼ to 30 samples per second. Provides reliable performance under extremes of vibration, acceleration, deceleration, etc.



G SERIES LOW LEVEL MULTICODERS

A commercial series for use in wind tunnels, chemical processes, nuclear reactors, etc., where automatic data handling is mandatory. Provide 88 channels of low level information with sampling speeds of 10 or 1¼ samples per second. Output is in pulse width form . . . can be recorded on magnetic tape, transmitted over a line or used to modulate a transmitter. Input sensitivity 15 mv. Available for rack mounting or in a bench cabinet.

A SERIES ACCESSORY EQUIPMENT

RF Preamplifier units for greatly increased receiving range, and RF Multicoupler for operation of up to 4 receivers from a single Preamplifier or antenna. Broad band operation 215 to 235 megacycles.

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See ad on page 438
Tel: OR 8-0311, OR 2-0171

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Transmitters, point-to-point: See class 13

Transmitters, radar: See class 15

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VOR equipment: See class 1

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Video monitors: See class 12

Waveguides: See class 66

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Wire recorders: See class 16

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

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He launched a balloon that opened a new electronic market!

WILBUR S. HINMAN, Jr., recipient of the *IRE Harry Diamond Memorial Award, 1956*...for his contributions to the electronic art in the fields of meteorology and proximity fuzes.

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1958 IRE DIRECTORY
DIRECTORY II
COMPONENTS

46 major groups
373 products

The products and services of the radio-electronics industry have been organized into four basic directories:

I. Communications
II. Components
III. Controls & Instruments
IV. Materials & Services

Within these four basic directories, 100 major product and service groups are numbered consecutively throughout. Under each of these 100 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 769 subproducts in alphabetical order, consult the eight-page 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 four major directory groups will be found on pages 1, 151, 255, 287, 459 and 521.

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!

LICENSE NO. 25
MACHOL EDGE INDEX PATENT #2680630

For complete list of products and services, arranged alphabetically for fast reference, see the eight-page pink section preceding page 1.

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287	DIRECTORY II COMPONENTS
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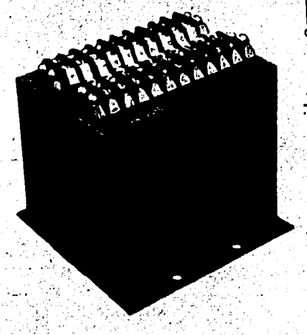
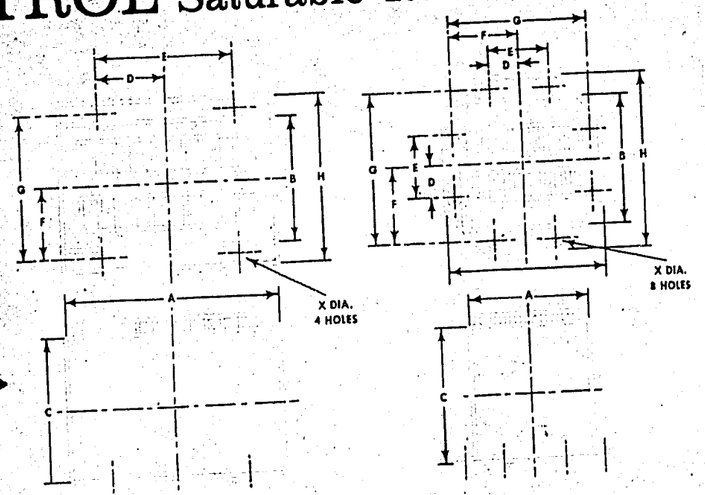
Here's how to order reliable

CONTROL Saturable Reactors





STANDARD LINE REACTOR ASSEMBLIES — **240 VOLTS RMS** — **60 CPS SERIES**

Type No.	Rated Current In Amps (1)	Rated Load In Ohms (2)	NOMINAL AVERAGE D.C. OUTPUT (3) Volts	Amps	Volts-Amps	K For Response Time Equation	D.C. Control In Amp Turns (4)	Area Available For Control Windings In Circular Mils	Weight In Pounds	Can Style	OUTLINE DIMENSIONS (5) A	B	C	H	MOUNTING DIMENSIONS (5) D	E	F	G	X
3902	0.46	375	160	0.41	60	.022	2.25	300,000	8	2	5.50	4.00	4.00	5.25	1.00	2.00	2.31	4.62	0.312
3903	0.61	290	160	0.54	85	.023	2.25	300,000	11	2	5.50	4.50	5.00	5.50	1.87	3.75	2.50	5.00	0.312
3904	0.89	200	160	0.80	130	.025	2.63	300,000	13	1	5.50	5.50	5.50	6.75	1.50	3.00	3.06	6.12	0.312
3905	1.38	130	160	1.23	200	.035	2.75	375,000	15	1	5.50	5.50	5.50	6.75	1.50	3.00	3.06	6.12	0.312
3906	1.87	95	160	1.67	260	.035	3.00	375,000	21	1	6.00	6.00	5.50	7.25	2.00	4.00	3.31	6.62	0.312
3907	3.00	60	160	2.67	430	.044	3.00	400,000	31	1	6.50	6.50	6.50	7.75	2.00	4.00	3.56	7.12	0.312
3908	3.64	50	160	3.25	530	.053	3.00	400,000	35	1	7.25	7.25	6.50	8.50	2.00	4.00	3.94	7.87	0.312
3909	4.30	42	160	3.80	610	.060	3.50	500,000	41	1	7.50	7.50	7.50	8.75	2.00	4.00	4.06	8.12	0.312
3910	6.14	29	160	5.45	860	.065	4.25	500,000	51	1	8.25	8.25	7.00	9.50	2.00	4.00	4.44	8.87	0.312
3911	7.20	25	160	6.32	1000	.055	4.25	500,000	64	1	9.00	9.00	8.00	10.25	2.00	4.00	4.81	9.62	0.312
3912	12.6	13	160	11.1	1650	.065	4.25	500,000	85	1	9.50	9.50	9.00	10.75	3.00	6.00	5.06	10.12	0.312

STANDARD LINE REACTOR ASSEMBLIES — **120 VOLTS RMS** — **60 CPS SERIES**

4052	0.96	90	80	0.81	60	.030	2.25	300,000	8	2	5.50	4.00	4.00	5.25	1.00	2.00	2.31	4.62	0.312
4053	1.28	67	80	1.10	85	.023	2.25	300,000	11	2	5.50	4.50	5.00	5.50	1.87	3.75	2.50	5.00	0.312
4054	2.02	42	80	1.79	130	.030	2.63	300,000	13	1	5.50	5.50	5.50	6.75	1.50	3.00	3.06	6.12	0.312
4055	2.72	32	80	2.40	185	.032	2.75	375,000	15	1	5.50	5.50	5.50	6.75	1.50	3.00	3.06	6.12	0.312
4056	4.30	20	80	3.85	300	.042	3.00	375,000	21	1	6.00	6.00	5.50	7.25	2.00	4.00	3.31	6.62	0.312
4057	6.50	13.5	80	5.77	450	.064	3.00	400,000	31	1	6.50	6.50	6.50	7.75	2.00	4.00	3.56	7.12	0.312
4058	8.10	11.0	80	7.14	560	.060	3.00	400,000	35	1	7.25	7.25	6.50	8.50	2.00	4.00	3.94	7.87	0.312
4059	9.77	9.0	80	8.66	680	.073	3.50	400,000	41	1	7.50	7.50	7.50	8.75	2.00	4.00	4.06	8.12	0.312
4060	11.7	7.0	80	10.4	760	.046	4.25	400,000	51	1	8.25	8.25	7.00	9.50	2.00	4.00	4.44	8.87	0.312
4061	16.4	5.0	80	14.5	1050	.060	4.25	400,000	64	1	9.00	9.00	8.00	10.25	2.00	4.00	4.81	9.62	0.312
4062	25.0	3.2	80	21.9	1540	.050	4.25	400,000	85	1	9.50	9.50	9.00	10.75	3.00	6.00	5.06	10.12	0.312

1. *Average DC output at 110% of nominal AC supply voltage.*
2. *Resistance for 40° C. ± 2° C. rise above 35° C. ambient at 110% of nominal AC supply voltage.*
3. *Taken at 120 volts AC supply for Types 4052 to 4062 and at 240 volts AC supply for Types 3902 and 3912.*
4. *Total control required to change the output voltage from 5 to 95 per cent of maximum.*
5. *All dimensions are in inches.*

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HOW TO ORDER: To order standard reactor assemblies, the following information must be specified:

1. Reactor type number.
2. Voltage (number of turns on each control winding).
3. Current (wire size of each control winding).

To determine number of turns and wire size of each control winding:

1. Choose the size of reactor which will meet requirements.
2. From the table, select the ampere-turns of control needed to control the reactor from full-on to full-off. If additional forcing is required, please write CONTROL for reactor curves.
3. Divide the ampere-turns needed by the maximum control current needed to control the reactor. This is the number of turns needed to control the reactor.
4. Multiply maximum control current by 1,000 to determine circular-mil area of bare copper wire needed.
5. Select a wire size whose circular-mil area is equal to or greater than the calculated value.

NOTE: A maximum of eight control windings can be supplied, provided the total circular-mil area of the wire of the control windings does not exceed maximum mil area available as shown in the table.

For full details, write for Catalog R-10

CONTROL

A DIVISION OF MAGNETICS, INC.

Dept. Y-38 **BUTLER, PA.**

For details, circle #227 on Reader Service Card.

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Ammeters: See class 42

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12. Differential
15. Dynamic noise suppressors
20. Geophysical
25. Hearing Aid
30. High fidelity
35. IF amplifiers
40. Inter-coms
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50. Microwave
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Airpax Products Co., Middle River, Baltimore 20, Md., 5, 45, 80
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Tel: MU 6-9100

Airtron, Inc., Dept. 1, 1101 W. Elizabeth Ave., Linden, N.J., 50
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Tel: HUnter 6-1000

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Alden Electronic & Impulse Recording Equipt. Co., Alden Research Center, Westboro 6, Mass., 5, 60, 67, 75
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Tel: FOrest 6-4467

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Tel: DAvenport 4-4368, YOrkshire 7-8177

Allegany Instrument Co., Inc., Md., 5, 85

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Allied Radio Corp., Dept. 35-58, 100 N. Western Ave., Chicago 80, Ill., 30, 55, 65
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Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 80, 85, 92
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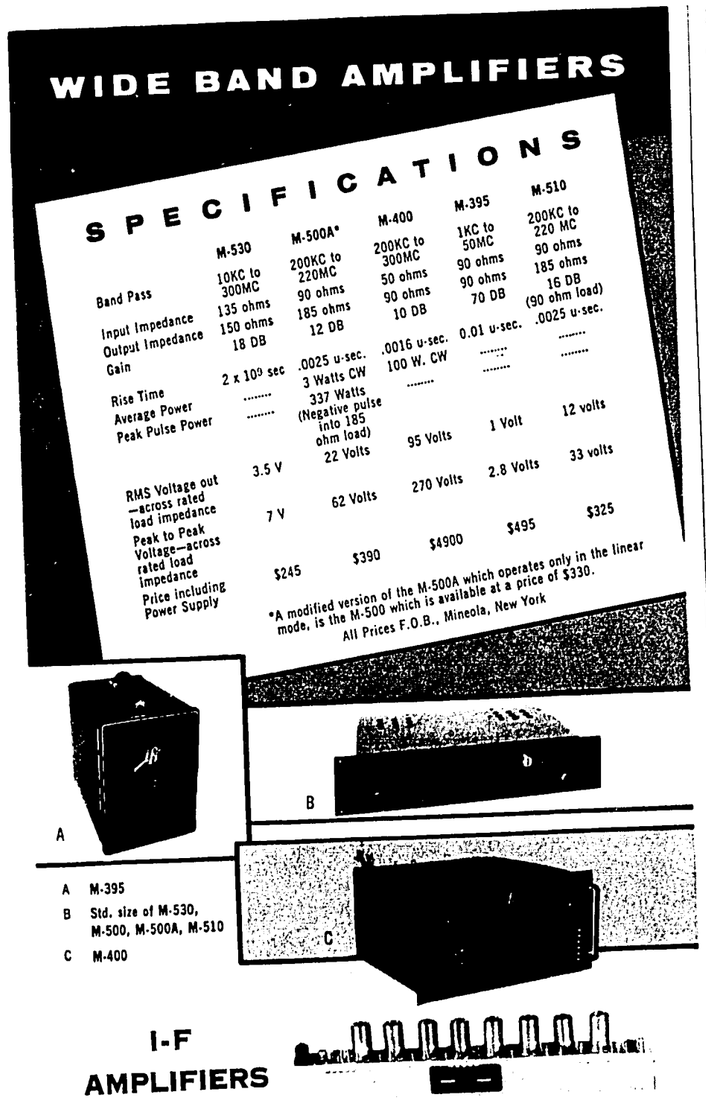

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Centralab Div. of Globe Union, Inc., 920Y E. Keefe Ave., Milwaukee 1, Wis., 25, 47, 55, 92, 95
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Tel: WOodruff 2-9200

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Chicago Aerial Industries, Inc., Ill., 5, 12, 45, 80, 95

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Tel: 7-1745

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Fairfield Engineering Corp., Conn., 5, 12, 30, 45, 60, 80, 92

Federal Telephone & Radio Co., Div. of International Telephone & Telegraph Corp., 100 Kingsland Rd., Clifton, N.J., Klystron
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Federal Television Corp., N.Y., 60

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General Electronic Laboratories, Inc., 18 Ames St., Cambridge 42, Mass., 5, 35, 45, 50, 60, 80, 92
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Tel: UNiversity 4-8500

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Tel: VAlley Stream 5-6363

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Gray & Kuhn, Inc., N.Y., 35, 67, 70

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Gray Research & Dev. Co., Inc., Conn., 30, 55

Greenleaf Mfg. Co., Div. Mandrel Ind., Inc., 7814 Maplewood Industrial Court, St. Louis 17, Mo., 80
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Tel: STerling 1-9888

Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J., 5, 10, 45
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Tel: WAlnut 5-0051

Heiland Div., Minneapolis Hon. Reg. Co., Colo., 5, 47, 75, 85, 95

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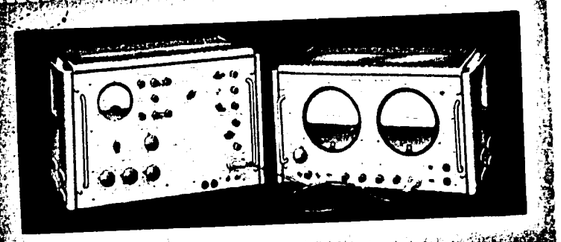

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AD 557 A	Solarscope
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BO 567 A	Two Phase L.F. Oscillator

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10761 Burbank Boulevard
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Eastern Division: Camden 2, New Jersey

Instruments for Industry, Inc., 156 Glen Cove Rd., Mineola, N.Y., 35, 67, 70, 88, 96
See ad on page 290
Tel: PIoneer 2-5300

Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 15, 30, 35, 45, 47, 55, 60, 65, 67, 75, 92, 94, 95, 96
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Tel: LUdlow 4-6200

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Tel: MUlberry 4-5858

Osborne Electronic Sales Corp., Ore., 45, 60

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Packard-Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 30, 35, 92
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Penn-East Engineering Corp., P.O. Box 240, Kutztown, Pa., 45, 80
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Tel: OVerbrook 3-7308

Performance Measurements Co., Mich., 80, 85

Perkin Engineering Corp., Calif., 5, 45, 80

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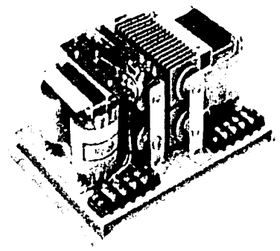

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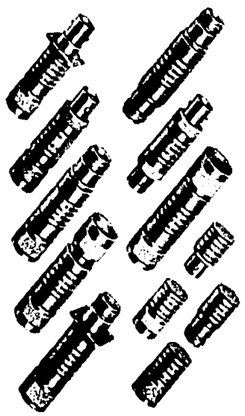

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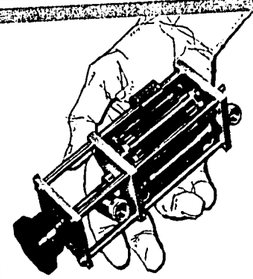

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Peschel Electronics, Inc., 13 Garden St., New Rochelle, N.Y., 60, 80
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Tel: Rockville Centre 4-3200

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Ramo-Wooldridge Corp., 5730 Arbor Vitae St., Los Angeles 45, Calif., 45, 50, 67, 70, 75, 80, 92
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Suffolk Products Corp., N.Y., 80

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Telechrome, Inc., 28 Ranick Dr., Amityville, L.I., N.Y., 5, 10, 12, 60, 67, 70, 88, 94, 96
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Viking Industries, Inc., Calif., 60, 80

Virginia Electronics Co., D.C., 5, 40, 55, 65

Visual Electronics Corp., N.Y., 50

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Tel: TErhune 5-5333

White Instrument Laboratories, Box 9006, Austin 17, Tex., Band Pass
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Tel: GLendale 3-8447

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5. Decade
10. Impedance matching
15. Microwave
20. Volume controlling

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Douglas Microwave Co., Inc., 252 E. 3rd St., Mt. Vernon, N.Y., 15
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Duncan Precision Electroforming, C. L., Ga., 15
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Electrical & Physical Instrument Corp., N.Y., 15
Electromation Co., 1646 18th St., Santa Monica, Calif., 15
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Tel: TExas 0-6401
Electro-Pulse, Inc., 11861 Teale St., Culver City, Calif., 5
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Electronic Tube Corp., Pa., 10
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Elliott Brothers (London) Ltd., England, 15
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General Electronic Laboratories, Inc., 18 Ames St., Cambridge 42, Mass., 15
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International Resistance Co., Pa., 5, 15
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Kama Instrument Corp., 178 E. 2nd St., Mineola, L.I., N.Y., 5, 15
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Kay Electric Co., Dept. ID-9, 14 Maple Ave., Pine Brook, N.J., 5, 10, 20
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Kerr Laboratories, Ltd., Wayne, England, 15
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Micromat Co., N.J., 15
Microwave Development Labs., Inc., Mass., 15

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Directory II. Components

22. Attenuators.

Microwave Engineering Laboratories, Calif., 15
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Narda Corp., 160 Herricks Rd., Mineola, L.I., N.Y., 15
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Polytechnic Research & Development Co., Inc., 202 Tillary St., Brooklyn 1, N.Y., 15
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Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 15
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Premier Instrument Corp., 52 W. Houston St., New York 12, N.Y., 15
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Radar Design Corp., 210 Fifth Ave., New York 10, N.Y., 15
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Radiation, Inc., Fla., 15
Radio Engineering Products, Ltd., 1080 University St., Montreal, Quebec, Canada, 5
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Tel: UNiversity 6-6887
Rho Company, Calif., 5
Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 10
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Tel: LOckwood 5-3516
Sage Laboratories, Inc., Mass., 15
Sanders Associates, Inc., N.H., 15
Shallcross Manufacturing Co., Pa., 5, 10, 20
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Solartron, Inc., 10761 Burbank Blvd., N. Hollywood, Calif., 5
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Sperry Gyroscope Co. of Canada, Ltd., Canada, 15
Stoddart Aircraft Radio Co., Inc., 6644-C Santa Monica Blvd., Hollywood 38, Calif., 10, 15
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Tele-Matic Ind., Inc., N.Y., 10
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Telonic Industries, Inc., 73 N. Second Ave., Beech Grove, Ind., 5
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Uniwave, Inc., N.Y., 10, 15
Vectron, Inc., 1607 Trapelo Rd., Waltham 54, Mass., 15
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23. Batteries.

Waveline, Inc., N.J., 15
Weinschel Engr. & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 15
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Welwyn Electrical Labs., England, 10
White Electron Devices, Inc., Roger, 92 Fourth Ave., Haskell, N.J., 15
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Whitting & Davis Co., Inc., Mass., 15

Ballasts and voltage regulators: See class 62

23. Batteries.

5. Dry batteries
10. Mercury batteries
15. Storage batteries —lead-acid
20. Storage batteries —nickel-alkali
25. Storage batteries —silver-zinc
30. Sun batteries

Admiral Plastics Corp., N.Y., 20
American Machine & Foundry Co., Defense Prods. Group, 1101 N. Royal St., Alexandria, Va., 25
See ad on page 274
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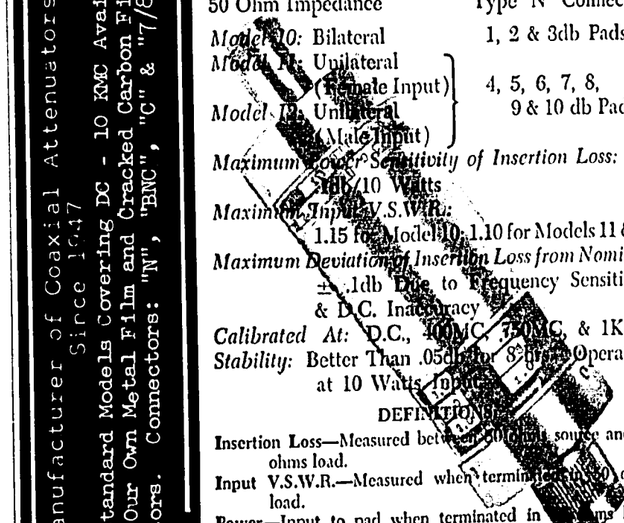
Many Standard Models Covering DC - 10 KMC Available
Using Our Own Metal Film and Cracked Carbon Film Resistors. Connectors: "N", "BNC", "C" & "7/8"

10 WATT PRECISION POWER PADS D.C. TO 1 KMC

50 Ohm Impedance — Type "N" Connectors
Model 10: Bilateral — 1, 2 & 3db Pads
Model 11: Unilateral (Female Input)
Model 12: Unilateral (Male Input) — 4, 5, 6, 7, 8, 9 & 10 db Pads
Maximum Power Sensitivity of Insertion Loss: .1db/10 Watts
Maximum Input V.S.W.R.: 1.15 for Model 10, 1.10 for Models 11 & 12
Maximum Deviation of Insertion Loss from Nominal: ±.1db Due to Frequency Sensitivity & D.C. Inaccuracy
Calibrated At: D.C., 100MC, 350MC, & 1KMC
Stability: Better Than .05db for 8 Hr. Operation at 10 Watts Input

DEFINITIONS
Insertion Loss—Measured between 50 ohm source and 50 ohms load.
Input V.S.W.R.—Measured when terminated in 50 ohms load.
Power—Input to pad when terminated in 50 ohms load.
Power Sensitivity—Change of insertion loss between 50 milliwatts and 10 watts input.



WE CO *Weinschel Engineering* Kensington, Maryland

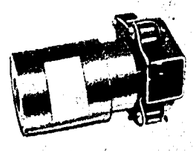
For details, circle #232 on Reader Service Card.

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

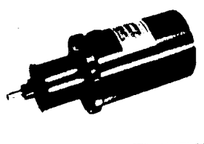
Performance through Precision

fans • motors • blowers

Adaptability through Variety



C 2364-1
Voltage 115 V
Frequency 400 cps
Phase Single
Air Delivery 12 CFM @ 0" S.P.

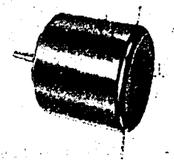


C 15G-1
Voltage 115 V
Frequency 400 cps
Phase Single
Output 50" oz. at 21 RPM

A 15BD-11
Voltage 115 V
Frequency 60 cps
Phase Single
Air Delivery 70 CFM @ 0" S.P.

B 1324-1
Voltage 115 V
Frequency 60 cps
Phase Single
Air Delivery 125 CFM @ 0" S.P.

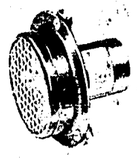
M 06C-1
Voltage 115 V
Frequency 400 cps
Phase Single
Speed 11,000 RPM



B 10CF-3
Voltage 208 V
Frequency 400 cps
Phase Three
Speed 5600 RPM

B 1221-7
Voltage 115 V
Frequency 60 cps
Phase Single
Speed 3400 RPM
Air Delivery 495 CFM at 0" S.P.
305 CFM at .4" S.P.

F 1343-1
Voltage 208 V
Frequency 60 cps
Phase Three
Air Delivery 720 CFM at 0" S.P.



C-2241-2
Voltage 115 V
Frequency 400 cps
Phase Single
Air 140 CFM @ 0" S.P. NAFM
Delivery 48 CFM @ .6" S.P. NAFM

years-ahead engineering...

Air Marine Motors equipment features stainless steel thru-bolts... die-cast aluminum housings... riveted stators... positive bearing alignment... uniform air gap... ball bearings... shock and vibration resistance... humidity and fungus resistance... omni-position mountings... temperature lubrication.

AIR MARINE MOTORS equipment will meet virtually *all* your sub-fractional power requirements and AN specifications.

Write for specific information and brochure about any of these units, or for the complete catalog... and use the Air Marine advisory services without obligation.

AIR-MARINE MOTORS, INC.

air-marine motors, inc.

369 Bayview Avenue, Amityville, L. I., N. Y. • AMityville 4-3700

West Coast Factory: 2055 Pontius Avenue, Los Angeles 25, Calif.

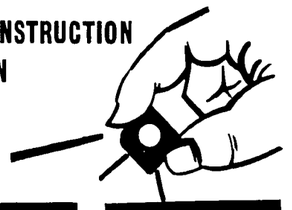
For details, circle #233 on Reader Service Card.

MR. ENGINEER!

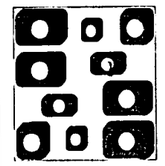
BURGESS

EXCLUSIVE WAFER CELL CONSTRUCTION GIVES GREATEST SELECTION IN DRY BATTERIES

Whatever You Need in . . .

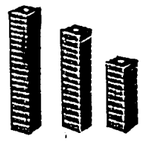


CAPACITY



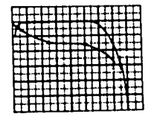
A correct cell size for any capacity.

VOLTAGE



Wafer Cell construction produces from 1½ volts on up.

SERVICE



Burgess will make batteries to fit any application.

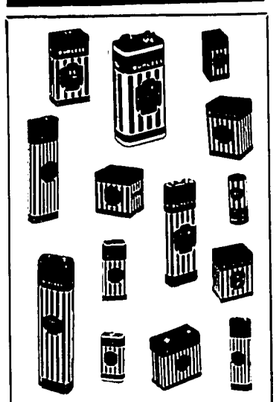
BURGESS

HAS THE WIDEST CHOICE OF DRY BATTERIES EVER MANUFACTURED . . .

The revolutionary Wafer Cell offers a 30% increase in battery life at *no increase in size*. This exclusive Burgess construction consists of a sandwich of manganese dioxide mix between two flat electrodes of zinc and carbon with spots of hot silver-wax applied to each exposed pole of the cell, allowing perfect electrical contacts throughout and almost complete absence of vibration. Cells are wrapped in Mylar film and packed in such modern materials as aluminum for compactness, long shelf life, exceptional service life, outstanding dependability.

Burgess design specialists will work out the exact battery to fit your needs. Send your requirements to Dept. E57.

SIZES AND SHAPES



Wafer Cell construction can meet any space, size and weight requirements.

RESERVE BATTERIES

Can be stored dry for years. Activated only when immersed in water. No handling of dangerous electrolyte, no spilling or leaking. Wider range of efficient operating temperatures than any other type of battery.

BURGESS BATTERY COMPANY

FREEPORT, ILLINOIS

For details, circle #234 on Reader Service Card.

Directory II. Components

23. Batteries.

(Continued)

Apex Coated Fabrics Co., Inc., N.Y., Covering Fabrics
Borolite Corp., N.Y., 5, 20, 25
Bright Star Industries, N.J., 5
Burgess Battery Co., Dept. E 57, Foot of Exchange St., Freeport, Ill., 5
See ad on this page
Tel: Main 3300
Cook Co., Frank R., Colo., 25
Electronic Batteries, Inc., N.Y., 15
Elgin National Watch Co., Ill., 10
Exide Industrial Div., Electric Storage Battery Co., Pa., 15, 25
General Electric Co., Electronic Components Dept., N.Y., 5
Hal-Hen Co., N.Y., 10
Hoffman Electronics Corp., Calif., 30
Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 5, 10, 15, 20, 25
See ad on page 381
Tel: LUdlow 4-6200
International Rectifier Corp., 233 Kansas St., El Segundo, Calif., 30
See ad on page 390
Tel: ORegon 8-6281
Leclanche S. A., Switzerland, 5, 15
Magnavox Co., Ind., 10
Mallory & Co., Inc., P. R., Ind., 5, 10
Marathon Battery Co., Wis., 5
National Carbon Co., Div., of Union Carbide Corp., 5, 10
Nickel Cadmium Battery Corp., Mass., 20, Cadmium
Olin Mathieson Chemical Corp., Electrical Div., Conn., 5
Paterson Moos Div., Univ. Winding Co., Inc., N.Y., 5, 20
Radiation Research Corp., N.Y., Nuclear
Radio Corp. of America, N.J., 5, 10
RCA Victor Co., Ltd., Canada, 5, 10
Ray-O-Vac Co., Wis., 5
Reading Batteries, Inc., Pa., 15
Rockland County Associated Battery Co., N.Y., 5, 15
Saft Corp. of America, N.J., 20
Sonotone Corp., N.Y., 20, Cadmium
Standard Electric Time Co., Mass., 20
Yardney Electric Corp., N.Y., 25

Bearings: See class 87

24. Blowers & Cooling Fans.

5. Air wheels & housings
10. Complete blower assemblies
15. Fan blades

Air-Marine Motors, Inc., 369 Bayview Ave., Amityville, N.Y., 5, 10
See ad on page 298
Tel: AMityville 4-3700
American Electronics Mfg., Inc., Calif., 10
Ashland Electric Products, Inc., N.Y., 10

Cool That Cabinet—Save Sensitive Components

GENERAL FEATURES

- Pressurizes Cabinet With Filtered Air
- Rubber Isolated Motors For Quieter Operation
- Widely Accepted for Use In Military Equipment
- Maximum Air Delivery For Efficient Filter Action

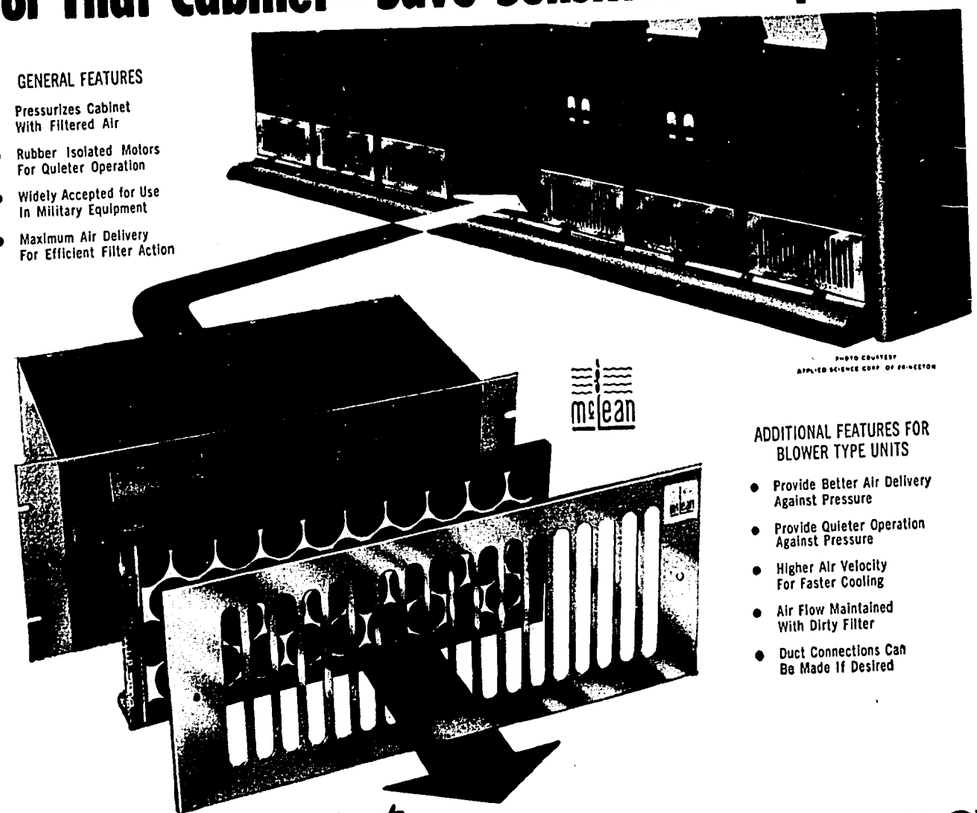


PHOTO COURTESY APPLIED SCIENCE CORP. OF PRINCETON

ADDITIONAL FEATURES FOR BLOWER TYPE UNITS

- Provide Better Air Delivery Against Pressure
- Provide Quieter Operation Against Pressure
- Higher Air Velocity For Faster Cooling
- Air Flow Maintained With Dirty Filter
- Duct Connections Can Be Made If Desired

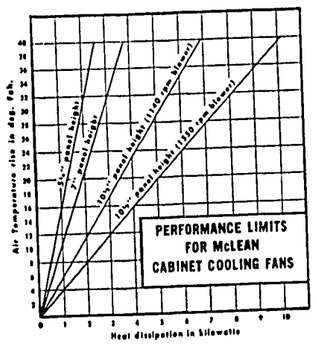
use McLEAN Cabinet Cooling FANS and BLOWERS*

*Pat. Applied For

RACK MOUNTED FOR EASY ASSEMBLY • FIT STANDARD 19" RACKS

THREE STANDARD MODULAR PANEL HEIGHTS COVER WIDE RANGE OF AIR DELIVERIES

Excessive or fluctuating temperatures in electronic racks make thousands of tubes die young . . . make crystals, transistors and sensitive electronic equipment perform erratically. System failure at critical times is disastrous . . . replacement costs are high. That is why leading manufacturers install McLean Fans and Blowers in Computers, Control Systems, Data Processing Systems, etc. These small packaged units pressurize the cabinet with cool filtered air, keeping dust out. They are complete in one unit and ready for use. Standard RETMA notching allows mounting on rack . . . no cutting or fitting is necessary. All units contain an easily replaceable filter. Smart stainless steel grilles add beauty and eliminate the necessity of matching cabinet finishes.



SPECIFICATIONS

PANEL HEIGHT	MODEL	DEPTH	CFM	REMARKS	TYPE
5¼"	2A300	7½"	80	Standard Rack Mounting	Blower
	2E300	7½"	80	For Trim Strip Racks	Blower
	2B300	7½"	150	Basic Model	Blower
	3E40	5⅞"	190	For Special Clearance	Propeller
	2P408	11⅛"	300	Inside Height 7"	Blower
7"	2E55	8¼"	250	Basic Model	Propeller
	2E408	10"	300	Basic Model	Blower
	2A408	8¼"	300	No Projecting Outlets	Blower
	2E408V	8¾"	300	Vertical Discharge	Blower
	2E55H	8¼"	310	400 cps Model	Propeller
10½"	2E80	8⅛"	500	Basic Model	Propeller
	2B610	13¼"	550	Slow Speed Model	Blower
	2A610	13¼"	800	22" Rack Width	Blower
	2E610	13¼"	800	Basic Model	Blower

MODIFICATIONS OF ABOVE MODELS CAN BE MADE TO 24" OR SPECIAL WIDTH RACKS TO ORDER

FREE OUR NEW CONDENSED CATALOG! SEND FOR IT TODAY.

McLEAN ENGINEERING LABS. PRINCETON, NEW JERSEY. PHONE: PRINCETON 1-4440

Representatives in all principle Electronics Manufacturing areas.

For details, circle #235 on Reader Service Card.

RIPLEY ESTABLISHED 1936 HEADQUARTERS for SMALL BLOWERS

L-R BLOWERS Compact-Lightweight

Unexcelled in Performance

L-R Blowers available from stock with or without motors. Contact your local electrical-electronic parts distributor or the factory.

NO. 1 High impact Phenolic Housing. Output-free air up to 10 CFM.

NO. 1½ High impact Phenolic Housing. Output-free air up to 23 CFM.

NO. 2 High impact Phenolic Housing. Output-free air up to 40 CFM.

NO. 2½ High impact Phenolic Housing. Output-free air up to 70 CFM.

NO. 2¾ Rigid Steel Housing. Output-free air up to 58 CFM.

NO. 3 High impact Phenolic Housing. Output-free air up to 150 CFM.

Write for further information:

BULLETIN B-303 — Stock Motor-Blower Assemblies

BULLETIN B-101 — Detail Engineering Data on L-R Blowers

BULLETIN B-203 — Data on the #1 Sub-Miniature Blower

BULLETIN BW-10 — Complete Data on Blower Wheels

L-R "Whirlwind" BLOWER WHEELS

AVAILABLE FROM STOCK!

Here are Blower Wheels manufactured from the finest material available, precision engineered and rigidly inspected to meet your most exacting requirements. A complete line of standard sizes available from stock for immediate delivery. Flexible manufacturing procedures insure rapid delivery of special sizes, material, finishes, and hub bores. Wheels normally stocked in cadmium plated steel, CW or CCW rotation. Write for Bulletin BW-10.

Superior RIPLEY ESTABLISHED 1936 *. . . through Research*

RIPLEY COMPANY, INC. Middletown, Conn.

For details, circle #236 on Reader Service Card.

Blowers & Cooling Fans—Class 24

Directory II. Components

24. Blowers & Cooling Fans.

(Continued)

Barber-Colman Co., Dept 58D, 1856 Rock St., Rockford, Ill., 10, 15
See ad on page 370
Tel: 8-6833

Borg-Warner Corp., Pesco Prods. Div., Ohio, 10

Carrier Corp., N.Y., 10

Diehl Manufacturing Co., N.J., 10

Dietz Co., Henry G., N.Y., 10

Dominion Electrohome Industries, Ltd., Canada, 10

Eastern Air Devices, Inc., N.H., 5, 10, 15

Eastern Industries, Inc., 100 Skiff St., Hamden 14, Conn., 5, 10
See ad on page 575
Tel: CHestnut 8-3841

Electric Trading Co., N.Y., 5, 10, 15

Fairchild Elect. Prod. Div., Fairchild Camera & Instr. Corp., Vt., 10

Fiber Glass Industries, Inc., N.Y., 15

General American Trans. Corp., Ill., 5, 10, 15

General Electric Co., Apparatus Sales Div., N.Y., 10

Globe Industries, Inc., Ohio, 10

Grieve-Hendry Co., Inc., Ill., 5, 10, 15

Handee Household Products, Inc., N.Y., 15

Heinze Electric Co., Mass., 5, 10

Industrial Electronics of Canada, Ltd., Canada, 10

Joy Manufacturing Co., Fan Div., Pa., 10

Joy Manufacturing Co., Pa., 10

McLean Engineering Laboratories, Box 228, Princeton, N.J., 5, 10, 15
See ad on page 300
Tel: PRinceton 1-4440

National Electronics Corp., Calif., 10

Oster Manufacturing Co., John, 1 Main St., Racine, Wis., 10
See ad on page 374
Tel: MElrose 3-6331

Pesco Products Div., Borg-Warner Corp., Ohio, 10

Ripley Co., Inc., 1 Factory St., Middletown, Conn., 5, 10
See ad on this page
Tel: DIamond 6-6679

Rotating Components, Inc., N.Y., 10

Rotron Manufacturing Co., N.Y., 10

Suckle Electronics Co., N.J., 5

Technical Apparatus Builders, 109RV Liberty St., New York 6, N.Y., 5, 10
See ad on page 386
Tel: REctor 2-6249

Teiner Co., Inc., Roland, Mass., 5

Ventrak Corporation, N.Y., 10

Western Gear Corp., Electro Products, Box 182, Lynwood (Los Angeles), Calif., 5, 10
See ad on page 72
Tel: NEvada 6-2161

Bridges: See class 69

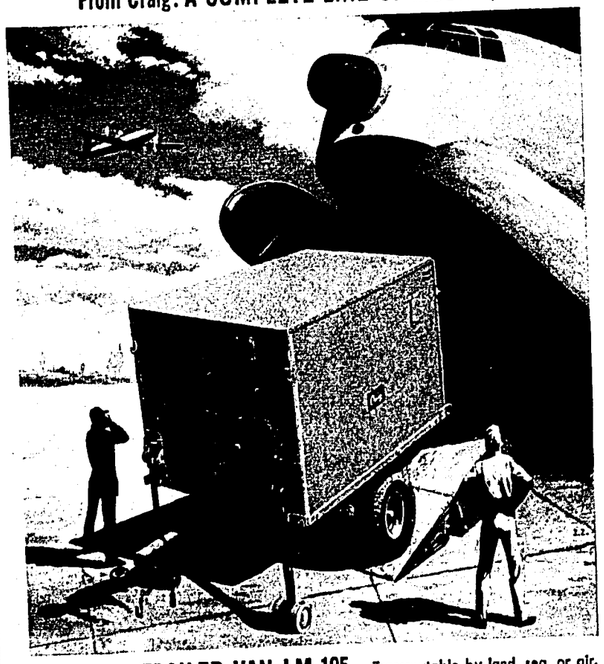
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

The *word* for mobile, air-transportable systems is CRAIG!

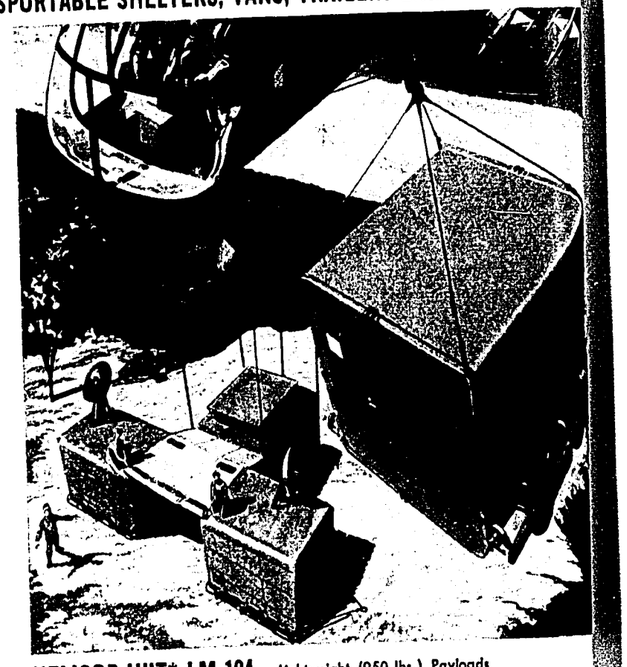
In this increasingly mobile age of electronics, nearly everything that must move swiftly and arrive safely can do it better in Craig-designed and built shelters and carriers. Complete electronic systems — with equipment installed and ready to operate — travel in rugged, roomy vans like the LM-105 you see on this page. Other systems fly direct — for a helicopter can transport an entire system when that system is housed in a lightweight Craig Helicop-Hut LM-104.

New developments like these . . . plus matchless experience in the field . . . and Craig's complete, design-through-installation service . . . are excellent reasons why you can turn to Craig with complete confidence when you have a problem in mobile, air-transportable systems.

From Craig: A COMPLETE LINE OF MOBILE, AIR-TRANSPORTABLE SHELTERS, VANS, TRAILERS LIKE THESE . . .



TRAILER VAN LM-105 — Transportable by land, sea, or air. 7,000 lb. payload. Detachable chassis. 2" thick honeycomb insulation for walls, floor, ceiling. Inside dimensions: 140" x 90" x 79". Easily detachable from dolly for aircraft, ship, or rail loading.



HELICOP-HUT* LM-104 — Lightweight (950 lbs.) Payloads up to 6300 lbs. Aluminum skins with foamed-in-place plastic core. Inside dimensions 76" x 76" x 96". Insulated. Highly adaptable. Quickly attachable dolly for towing overland.

Designed for world-wide use — RUGGED, DEPENDABLE, CRAIG-BUILT PRODUCTS LIKE THESE . . .

CONSOLES — For air traffic control and other installations. Provision for remote control equipment, loudspeakers, etc.

REUSABLE CONTAINERS — For transporting and storing airplane parts, optical systems and electronic equipment. Aluminum construction. Built to pass all applicable government specifications.

MISSILE CARRIERS — Lightweight, aluminum construction. Fully tested for shock, vibration, impact and submersion. Craig's missile programs include carriers for Falcon, Petrel, Sidewinder, Terrier, and Sparrow.

RELAY RACKS — Rugged, high strength, aluminum construction general purpose electronic racks. Accommodate standard RETMA panels. Drawers and accessories available.

SPARE PARTS CABINETS — For indoor and outdoor storage. Many sizes and configurations. Removable drawers, doors and covers. Aluminum or steel.

ANTENNA TOWERS — Full information on towers for supporting all types of antennas on request.

COMPLETE INSTALLATION SERVICE — *Craig service includes layout, installation, and check-out of electronic equipment in shelters of all types. Complete systems are ready to operate when they leave the factory.*

For full information, write or phone —

Craig SYSTEMS, INC.
Dept. F, Danvers, Mass.
Tel., SPring 4-1870

*TRADE MARK

WESTERN DIVISION: *6214 West Manchester Avenue, Los Angeles 45, California – ORegon 8-0025*

For details, circle #237 on Reader Service Card.

Directory II. Components

Broadcast equipment: See Directory I

Brushes, motor: See class 87

Bushings: See class 87

25. Cabinets, Consoles & Enclosures.

5. Assembly enclosures
10. Metal cabinets
15. Metal relay rack panels
20. Moulded plastic cabinets
22. Transit cases
25. Wood cabinets

A A Metal Products, Inc., Vt., 5
A & P Metal Products Mfg. Corp., N.Y., 10, 15
Abalon Precision Mfg. Corp., N.Y., 5, 10, 15
Adler Electronics, Inc., N.Y., 10, 15, 22
Admiral Corp., Ill., 20, 25
Alden Products Co., 140 North Main St., Brockton 64, Mass., 5, 10, 15
See ad on page 324
Tel: BRockton 160
Allied Plastics Supply Corp., 75 Cliff St., New York 38, N.Y., 5, 20
See ad on page 584
Tel: BEekman 3-7377
Alloy Metalsmiths, Inc., N.Y., 5, 10, 15
Altec Lansing Corp., Calif., 10, 15, 25
Amco Engineering Co., Ill., 5, 10, 15
American Communication Corp., N.Y., 25
American Insulator Corp., Pa., 20
American Machine & Foundry Co., Defense Prods. Group, 1101 N. Royal St., Alexandria, Va., 5, 15, 22
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Tel: KIng 9-9110
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Anchor Specialty Mfg. Co., N.J., 25
Arrow Machinists & Fabricators, N.Y., 5, 10, 15
Artisan Metal Works Co., Ohio, 5, 10, 15
Ateliers De Montages Electriques, France, 5, 10, 15
Beam Instruments Corp., N.Y., 25
Bennett Manufacturing Co., N.Y., 5, 10, 15
Bohn Music Systems Co., N.Y., 25
Boyle Metalcraft Corp., N.Y., 5, 10, 15 22
Brenner Metal Products Corp., N.Y., 5, 10, 15, 22
Brooks & Perkins, Inc., Mich., 5, 10, 15, 22
Brush Electronics Co., Ohio, 10
Buck Engineering Co., Inc., N.J., 5, 10, 15, 20, 22
Cal-Tronics Corp., Calif., 10, 15
Cambridge Pattern Works, Inc., Mass., 25
Chisholm Industries, Ltd., Canada, 10, 15, 22, 25
Churchill Cabinet Co., Ill., 5, 22, 25
Churchill Lighting Corp., Mass., 5, 10, 15
Circle Dot Mfg. Corp., Conn., 5, 10, 15
Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 10
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Tel: EM 3-0281
Communication Equipment & Engineering Co., Ill., 10, 15
Connecticut Telephone & Electric Co., Conn., 5, 10, 15
Conrad & Moser, N.Y., 10, 15, 20
Cooper Electronics, Inc., Pa., 5
Corry-Jamestown Mfg. Corp., Pa., 5, 10, 15
Cossor (Canada) Ltd., Canada, 10
Craig Systems, Inc., Dept. F, 90 Holten St., Danvers, Mass., 5, 10, 15, 22
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Tel: SPring 4-1870
Croname, Inc., Ill., 5, 10
Crosley Div., Avco Mfg. Corp., Ohio, 25
Dahlstrom Metallic Door Co., N.Y., 10, 15
Daven Company, N.J., 25
Davies Molding Co., Harry, Ill., 20
Dolin Metal Products, Inc., N.Y., 10, 22
Dominion Electrohome Industries, Ltd., Canada, 25
Downing Crystal Co., Md., 10, 15, 22
Dura Plastics of New York, Inc., N.Y., 20
E. B. Metal Products Co., Inc., N.Y., 5, 10, 15
Eagle Mfg. Co., N.Y., 5, 10, 15
Ehrick Co., Fred, N.Y., Canvas Carrying Cases & Web Strap Assemblies
Electro-Voice, Inc., Mich., 25
Electron Laboratories, N.Y., 25
Electronic Engineering Co. of Calif., Calif., 10
Electronic Tube Corp., Pa., 15
Elgin Metalformers Corp., Ill., 5, 10, 15
Elzee Metal Products Co., Inc., N.Y., 5, 10, 15, 22
Engene Engineering Co., Inc., Mass., 5, 10, 15, 20, 22
Falls Metal Works, Ltd., 409-415 Main St., Little Falls, N.J., 5, 10 & Test Stand Structures
See ad on this page
Tel: LIttle Falls 4-1300
Falstrom Company, N.J., 5, 10, 15, 22
Ferranti Electric Ltd., Canada, 5
Fiber Glass Industries, Inc., N.Y., 5, 20
Formica Metal Products Co., Mass., 5, 10
Forway Industries, Inc., N.J., 5, 10
Gardner & Co., Ill., 25
Gasser Metal Products, J., N.Y., 5, 10, 15
Gates Radio Co., Ill., 10, 15
General Communications, Inc., Wis., 5, 10, 15
Glasply Corp., N.Y., 22
Golding Manufacturing Co., N.J., 5, 10, 15, 20

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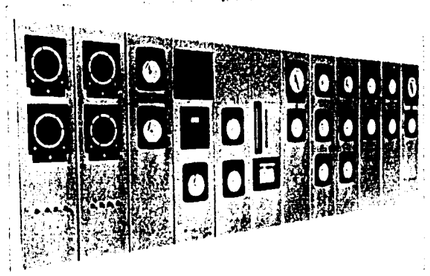
Falls Metal Works Limited, a combination of well-trained personnel and up to date equipment, has the background and manufacturing technique to serve the Electronics industry with a wide range of fabricated parts . . . Specializing in the manufacture of Electronic Consoles . . . Special and Standard Cabinets . . . Panel Boards . . . Cubicles . . . Switch Gear Housings . . . Chassis and other details . . .



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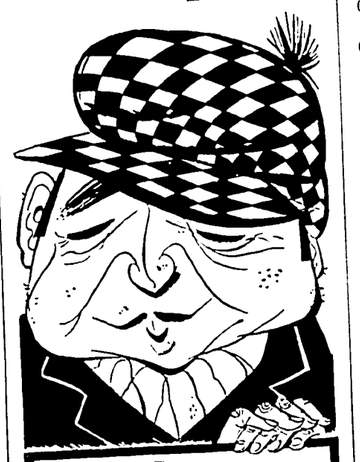

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26. Capacitors: Fixed.

5. Ceramic
10. Decade
15. Electrolytic
17. Energy storage
20. Feed through
25. Fixed composition
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35. Glass dielectric
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80. Printed circuit
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Capcon, Inc., N.Y., 20, 25, 40, 45, 55, 60, 65, 80

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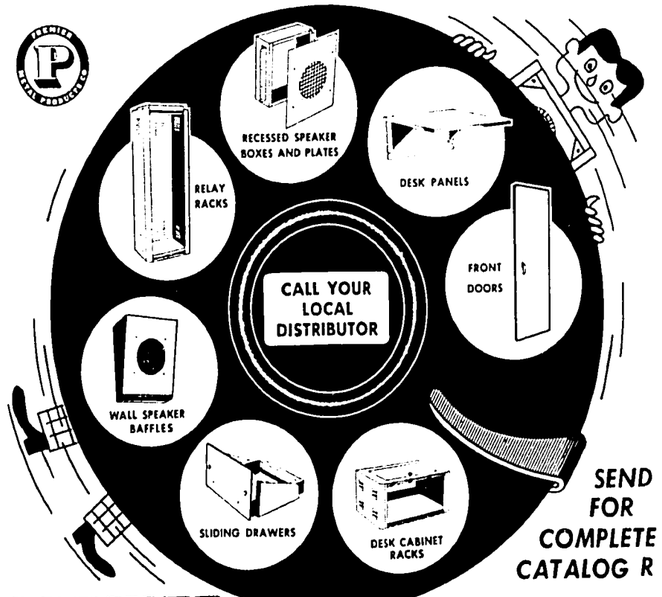

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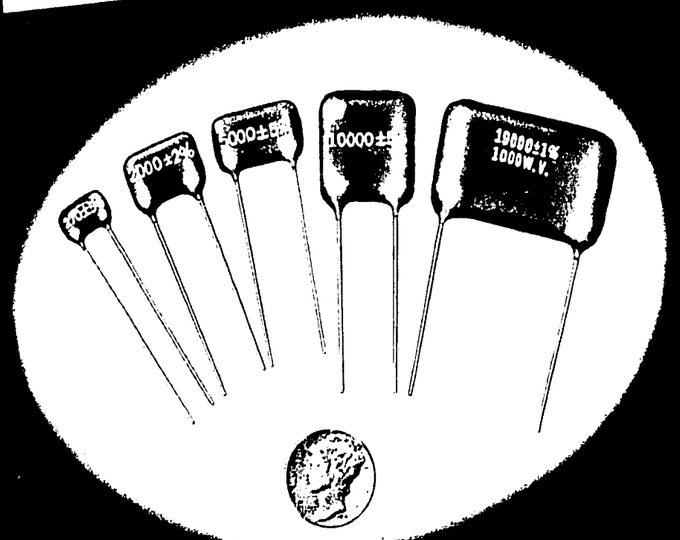

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Directory II. Components

26. Capacitors: Fixed.

Centralab, Div. of Globe Union, Inc., 920Y E. Keefe Ave., Milwaukee 1, Wis., 5, 20, 25, 40, 80
See ad on page 206
Tel: WOodruff 2-9200

Chicago Condenser Corp., Dept. A, 3255 W. Armitage Ave., Chicago 47, Ill., 17, 20, 25, 40, 45, 55, 60, 65, 70, 80, 85
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Tel: CApitol 7-7070

Clarch Co., George H., Minn., 17, 20, 40, 45, 55, 60, 65, 70

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Cornell-Dubilier Electric Corp., 333 Hamilton Blvd., South Plainfield, N.J., 5, 10, 15, 17, 20, 25, 40, 45, 50, 55, 60, 65, 70, 80, 85, 90, 95
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Tel: PLainfield 6-9000

Corning Glass Works, N.Y., 17, 35, 40, 85

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E S C Corporation, 542 Bergen Blvd., Palisades Park, N.J., 85
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Electra Mfg. Co., 4051 Broadway, Kansas City, Mo., 5, 40, 65, 80
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Electro-Measurements, Inc., Ore., 10

Electro-Motive Mfg. Co., Inc., S. Park & John Sts., Willimantic, Conn., 5, 20, 40, 50, 60, 90
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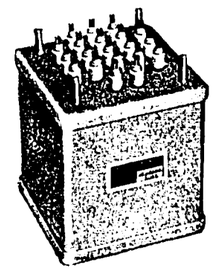

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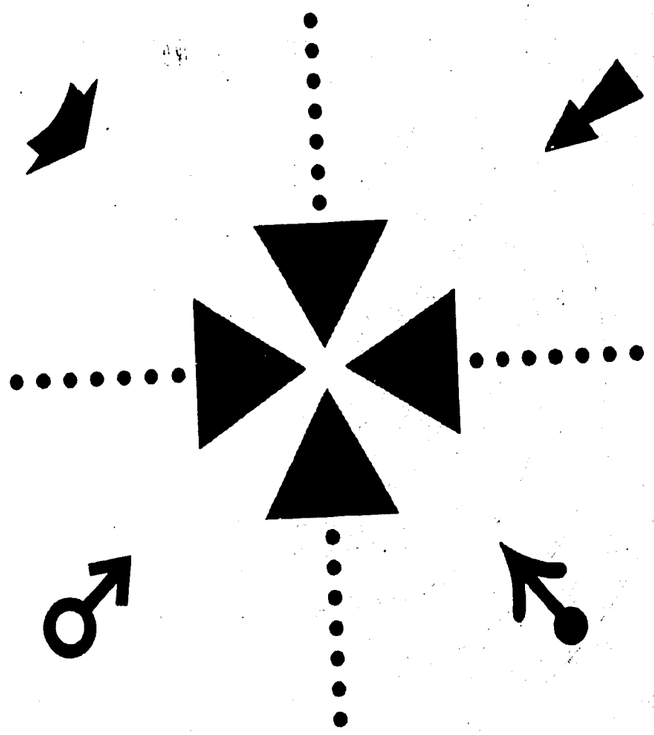

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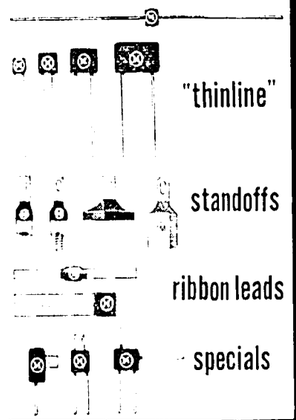

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Electronic Fabricators, Inc., 682 Broadway, New York 12, N.Y., 65
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Tel: SPring 7-4900

Electronic Plastics Co., Calif., 95, Computer Plug-In

Electronica Industrial Ltda., Brazil, 5, 98

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Erie Resistor Corp., 644 W. 12 St., Erie 6, Pa., 5, 20, 25, 40, 50, 65, 80, 90
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Tel: 2-1481

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Filtron Co., Inc., 131-15 Fowler Ave., Flushing 55, L.I., N.Y., 20, 25, 40, 45, 55, 60, 65, 85
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Tel: FLushing 9-8300

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General Electric Co., Electronic Components Dept., N.Y., 5, 80

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General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 10, 50, 65, 75, 90
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Tel: TRowbridge 6-4400

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Tel: WAlnut 5-0051

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Tel: EV 4-1300

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Mucon Corp., 9 St. Francis St., Newark 5, N.J., 5, 80
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26. Capacitors: Fixed.

Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 15, 95
Multiple pages of additional data on 38-39
Tel: ORchard 5-2600

Onondaga Pottery Co., Electronics Div., 1858 W. Fayette St., Syracuse 1, N.Y., 5
See ad on page 389
Tel: HO 8-1681

Pfannkuch & Co., O. E., Conn., 50

Planet Manufacturing Corp., N.J., 15, 80

Plastic Capacitors, Inc., Ill., 17, 40, 55, 60, 65, 70, 85

Potter Co., Ill., 17, 20, 25, 40, 45, 55, 60, 65, 70, 80

Precision Capacitors, Inc., Calif., 10, 17, 40, 55, 65, 70

Pyramid Electric Co., 1445 Hudson Blvd., North Bergen, N.J., 15, 20, 35, 40, 45, 55, 60, 80, 95
See ad on page 310
Tel: UNion 5-1770

Radiation Research Corp., N.Y., 17, 40

Radio Components Ltd., Canada, 5, 20, 80, 90

Radio Industries, Inc., Ill., 5, 20, 80, 90

Radio Materials Corp., Ill., 5

Rogers Majestic Electronic Tubes and Components, Canada, 5, 15, 45, 50, 55, 60, 65, 70, 75, 90

Sanders Associates, Inc., N.H., 5, 65, 80

San Fernando Electric Mfg. Co., Calif., 10, 20, 45, 60, 65, 80, 85

Sangamo Electric Co., Ill., 15, 17, 20, 40, 50, 55, 60, 65, 70, 80, 90, 95

Schweber Electronics, 122 Herricks Rd., Mineola, L.I., N.Y., 95
See ad on page 304
Tel: PIoneer 6-6520

Simmonds Aerocessories, Inc., N.Y., 75

Solar Manufacturing Corp., Calif., 5, 20, 40, 80

Southern Electronics Corp., Calif., 10, 17, 40, 65, 70

Sprague Electric Co., Mass., 5, 15, 17, 20, 40, 45, 50, 55, 60, 65, 70, 80, 85, 90, 95

Sprague of Wisconsin, Inc., Wis., 5, 20, 80

Stackpole Carbon Co., Pa., 25

Standard Condenser Corp., Ill., 40, 55, 60, 65, 70, 80

Steatix, France, 50

Symphony Electronics Corp., Calif., 5, 15, 50, 60, 95

Telectro Industries Corp., N.Y., 75

Teleradio Engineering Corp., N.Y., 5, 60, 98

Ultra Electroforming & Mfg. Co., N.J., 10

Underwood Electric & Mfg. Co., Inc., Ill., 20, 90

United Electronics Co., N.J., 98

United Mineral & Chemical Corp., N.Y., 5

U.S. Ceramic Tile Co., Diamonite Div., Ohio, 5

U.S. Electronics Development Corp., Calif., 10, 20, 40, 45, 55, 60, 65, 70, 85, 90

Universal Can & Condenser Co., Ill., 40, 55, 60, 65, 70, 80

Vitramon, Inc., Box 544P, Bridgeport 1, Conn., 35, Vitreous Enamel
See ad on this page
Tel: AMherst 8-1650

Welwyn Electrical Labs., Eng., 5

Westlake Plastics Co., Pa., 65

Wright Engineering Co., Calif., 10

27. Capacitors: Variable.

5. Neutralizing
10. Precision variable
15. Temperature compensating
20. Trimmers, air
25. Trimmers, ceramic
30. Trimmers, glass
35. Trimmers, vacuum
40. Tuning

All Star Products, Inc., Ohio, 20, 40

Arco Electronics, Inc., 64 White St., New York 13, N.Y., 25, Mica
See ad on page 306
Tel: WOrth 6-0530

Arnhold Ceramics, Inc., N.Y., 25

Ateliers De Montages Electriques, France, 5

Barker & Williamson, Inc., Pa., 5, 40

British Radio Electronics Ltd., Wash., D.C., 15, 20

Cambridge Thermionic Corp., 440 Concord Ave., Cambridge 38, Mass., 25
See ad on page 548
Tel: TRowbridge 6-2800

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27. Capacitors: Variable.

Cardwell Condenser Corp., Conn., 5, 10, 15, 20

Centralab, Div. of Globe Union, Inc., 920Y E. Keefe Ave., Milwaukee 1, Wis., 25
See ad on page 200
Tel: WOodrun 2-9200

Corning Glass Works, N.Y., 10, 20, 40

Daystrom, Inc., Ind., 30

Electro Measurements, Inc., Ore., 30

Electro-Motive Mfg. Co. Inc., S. Park & John Sts., Willimatic, Conn., 25, Mica
See ad on page 222
Tel: WIllimantic 3-4551

Erie Resistor Corp., 644 W. 12 St., Erie 6, Pa., 15, 20, 25
Multiple pages of additional data on 70-71
Tel: 2-1461

Lapp Div., Illinois Tool Works, Ill., 25

Electrocraft Products, Inc., Del., see U.S. Gasket, N.J., Plastic Trimmer

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 10, 20
See ad on Cover 4
Tel: TRowbridge 6-4400

Gudeman Co., Ill., N.Y., 20

Hammarlund Mfg. Co., Inc., N.Y., 5, 20, 40

Hammarlund Mfg. Co., Ltd., Canada, 5, 20, 40

JFD Electronics, Inc., 1462 62nd St., Brooklyn 19, N.Y., 5, 10, 15, 25, 30
See ad on page 312
Tel: DEwey 1-1000

Jennings Radio Mfg. Corp., 970 McLaughlin Ave., P.O. Box 1278, San Jose 8, Calif., 5, 35, 40, vacuum
Multiple pages of additional data on 136-137
Tel: CYpress 2-4503

Johanson Mfg. Corp., N.J., 20, 40

Johnson Co., E. F., Minn., 5, 20, 40

Lapp Insulator Co., Inc., Radio Specialties Div., N.Y., Gen. Ins. Co.

Marsland Engineering, Ltd., Can., 5, 20, 30, 40

McCoy Electronics Co., Watts & Chestnut Sts., Mt. Holly Springs, Pa., 40
See ad on page 339
Tel: 370

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 40
See ad on page 600
Tel: MAlden 4-4100

Mitronics, Inc., N.J., 25, 30

Muirhead & Co., Ltd., England, 5

Muirhead Instruments, Inc., N.Y., 5

Mullard, Overseas, Ltd., England, 10, 20

Muter Co., Ill., 15, 35

National Co., Mass., 5, 10, 20, 25, 40

Painton & Co., see British Electronic Sales, N.Y., Letter Trimmer

Q-Line Mfg. Corp., N.Y., 30

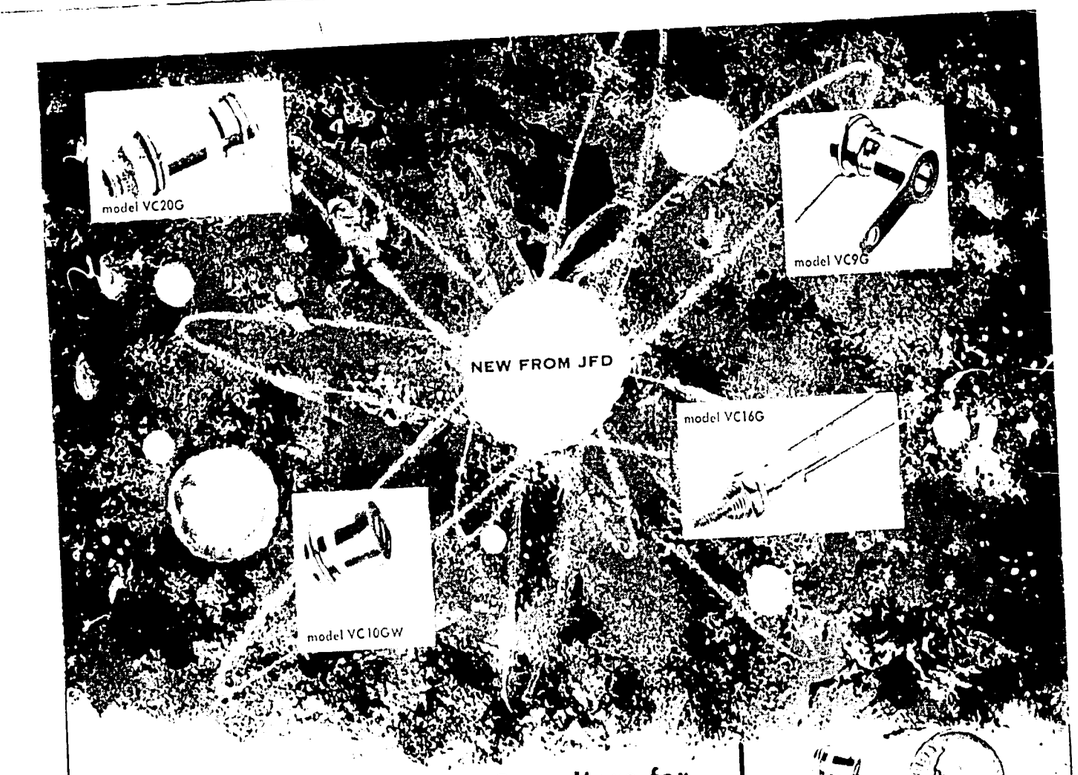
Radio Condenser Co., N.J., 10, 20, 40

Rogers Majestic Electronic Tubes and Components, Canada, 5, 10, 20, 25

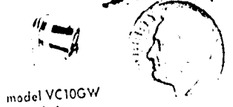
Sickles Div., F. W., General Instrument Corp., Mass., 20

Solar Manufacturing Corp., Calif., 15, 20

Southern Electronics Corp., Calif., 10



Trimmer Capacitors for Miniaturization and Subminiaturization


model VC10GW
actual size

WHERE DESIGNS CALL FOR MAXIMUM RANGE IN MINIMUM PHYSICAL SIZE

VC9G Trimmer series (lug & lead type for printed circuits)

Model	Capacitance Range (MMF) Min.	Max.
VC9G	0.8	8.5
VC10G	0.8	4.5
VC31G	0.8	12
VC32G	0.8	18
VC42G	1	21
VC43G	0.8	30

VC20G Trimmer series (panel type)

Model	Capacitance Range (MMF) Min.	Max.
VC20G	0.8	8.5
VC21G	0.8	4.5
VC22G	0.7	12
VC23G	0.8	18
VC24G	1	30

VC9GW Trimmer series (4 wire type for printed wiring boards)

Model	Capacitance Range (MMF) Min.	Max.
VC9GW	0.8	8.5
VC10GW	0.8	4.5
VC31GW	0.8	12
VC32GW	0.8	18
VC42GW	1	21
VC43GW	0.8	30

These new miniature types incorporate the exclusive new JFD telescoping tuning assembly. Both the telescoping piston and self-contained adjustment shaft function as a low inductance coaxial assembly within the dielectric cylinder. This innovation makes possible a highly compact variable trimmer piston capacitor of minimum size for the given capacitance range—up to 50% reduction in overall length compared to previous similar types.

VC16G Split stator series (panel type)

Model	Capacitance Range (MMF) Plate to Plate Min.	Max.
VC16G	0.8	2.5
VC17G	1.1	4.5
VC18G	1.8	7.5
VC80	0.4	1.0
VC81	0.6	1.6
VC82	0.85	2.8
VC83	3.0	6.0

The new JFD Split Stator trimmer series was expressly engineered for critical push pull radio frequency circuits and similar sensitive networks. The extreme stability and low temperature coefficient of the quartz dielectric types recommend these trimmers for applications requiring extreme low-loss operation with maximum tuning resolution. Where maximum range for physical size is needed, you have your choice of the JFD glass dielectric split stator type.

JFD keeps pace with new trimmer capacitors ready to meet new challenges. The result is today's JFD line of 42 Precision trimmers (the industry's largest) to meet your most critical network design and production needs.

Write for Bulletins 201A, 202A, 203A and 204A, for comprehensive electrical data on above JFD trimmers.

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Directory II. Components

27. Capacitors: Variable.

Sprague of Wisconsin, Inc., Wis., 25
Tarzian, Inc., Sarkes, Rectifier Div., Dept. P-4, 415 College Ave., Bloomington, Ind., 20
See ad on page 392
Tel: 2-1435
Telectro Industries Corp., N.Y., 25
Teletalk Engineering Corp., N.Y., 5, 15, 20, 25
Underwood Electric & Mfg. Co., Ill., 20
United Mineral & Chemical Corp., N.Y., 25
U.S. Electronics Development Corp., Calif., 10
Vacap Corporation, N.J., 10, 25

Caps, vacuum tube: See class 97

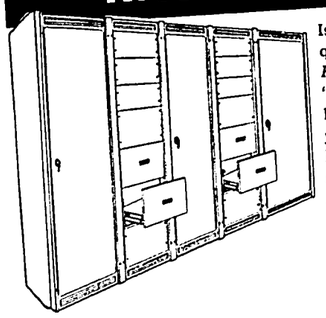
Cathode ray tubes: See class 61

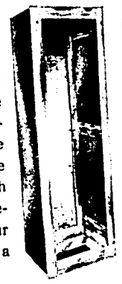
28. Chassis, Racks & Slides.

5. Aluminum chassis cabinets
10. Chassis slides
15. Relay racks &
25. Steel chassis

A A Metal Products, Inc., N.Y., 5, 25
ACF Industries, Inc., Elec. Div., N.Y., 5, 15, 20
A & P Metal Products Mfg. Corp., N.Y., 5, 15, 20
Abalon Precision Mfg. Corp., N.Y., 5, 10, 15, 20
Accessory Controls & Equipment Co., Conn., 5, 10, 15, 20
Aeronca Research Div., N.Y., 5
Aeroxon Corp., Mass., 20, 25
Alden Electronic & Impulse Recording Equipt. Co., Alden Research Center, Westboro 6, Mass., 10, 20
See ad on page 270
Tel: FOrest 6-4407
Alden Products Co., 340 North Main St., Brockton 64, Mass., 5, 15
See ad on page 324
Tel: BRockton 10
Allied Plastics Supply Corp., 25 Central, New York 38, N.Y., 10, 15
See ad on page 584
Tel: BEekman 3-7377
Alloy Metalsmiths, Inc., 5
Amco Engineering Co., 15, 25
American Machine & Foundry Co., Defense Prods. Group, 1025 N. Royal St., Alexandria, Va., 15
See ad on page 274
Tel: KIng 9-3330
Arrow Machinists & Tool Works, N.Y., 5, 10, 15, 20
Artisan Metal Works Co., Ohio, 5, 15, 20

SOLVE THE CABINET HOUSING PROBLEM
WITH **PAR-METAL UNIVERSAL CABINET RACK ASSEMBLIES**





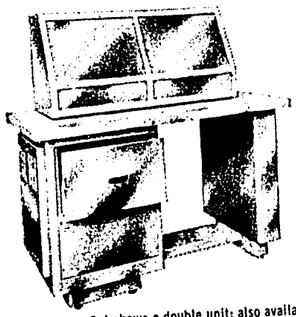
Is it possible to embody "custom-quality" in a standardized unit? *Par-Metal* answers definitely *"yes"*... Indeed, you'll be delighted how easily you can fill your needs with a distinctive Housing from our line of standardized units. And *you'll save money too* — not to mention the time and fuss connected with blueprints when ordering "special" equipment. So give us your problem in metal and enjoy a quick, economical solution.

Only PAR-METAL Universal Cabinet Racks have these adjustable features:

- Solid Sides or Open Sides. Open sides have detachable side panel arrangement. Front Doors are optional equipment.
- Single units, or any arrangement of "multi-racks."
- Vertical Side Supports for adjustable mounting brackets, shelves, and sliding devices.
- Heights: 48⅛", 67⅜", 76⅛", 83⅛".
- Depths: 18", 24". Panel Widths: 19", 24", 30".
- Finishes: Black ripple, grey ripple, primer coat only, grey hammertone enamel, aluminum grey lacquer.

Vertical Side Supports can be used with all our Universal Cabinet Racks. To provide adjustment for mounting brackets, shelves, and sliding devices, holes are drilled and tapped vertically. When installed in *19"* wide racks the clearance between uprights is *17¾"*; in *24"* wide racks clearance is *23¾"*.

A complete line of *standard accessories* such as Roller Trucks, Sliding Shelves, Phono Drawers, Rack Mounting Chasses, Panels, in complete harmony with the proper rack are also available.



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These units are admirably suited for control stations, testing apparatus, sound distribution systems, atomic energy installations, etc. They *often eliminate* the need for costly custom-built equipment, as you need only purchase the specific parts you need. The pedestal is *substantially constructed for heavy-duty usage*. Desk Panel Cabinets, Table Tops, Doors, Panels, Pedestals, End Pedestal and Foot Brace, and other parts may be bought as needed.

Cut shows a double unit; also available in single or triple units.

Doors are easily removable, allowing complete access to the *INSIDE FROM ALL SIDES*. Each side is drilled and tapped on "universal" centers so that standard rack panels or doors can be mounted on all sides. Although considerably less in cost than similar "custom-built" units, they are delivered in less time, and avoid the necessity of blueprints, etc.

Mail this coupon for information on how PAR-METAL Racks and Utility Assemblies will save you money!

PAR-METAL RACKS — PAR METAL ELECTRONIC HOUSINGS
PAR-METAL PRODUCTS CORP.
LONG ISLAND CITY 3, N. Y.
Telephone AStoria 8-8905

Par-Metal Products Corp.
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☐ We are interested in "Universal Cabinet" Racks and accessories. ☐ Utility Desk Assemblies.
☐ Please send me a copy of your latest catalog.

Name_____ Position_____
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Company_____
City_____ State_____ Zone_____

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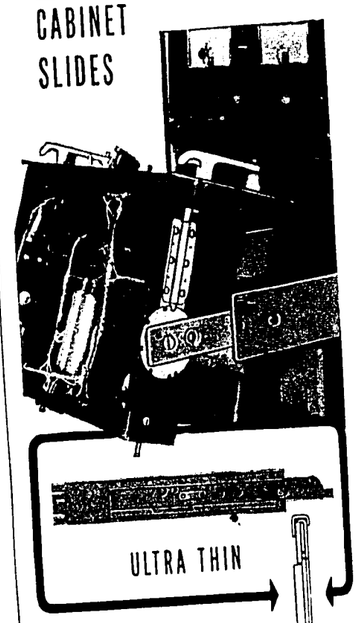
SPECIFY
Chassis-Trak
ROLLER BEARING
CABINET
SLIDES



New Chassis-Trak roller bearing slides make your electronic equipment more accessible . . . faster and easier to service. Chassis Trak's ultra thin design, wider bearing rollers support up to 175 lbs. with chassis extended. Rollers assure permanent, smooth slide operation.

PLUS:

- Ultra thin slide design (.350") for maximum use of cabinet interior
- Permanent, dust-repellent, dry lubricant finish
- High corrosion resistance
- Easy installation
- 8 stock lengths, standard width
- Push button emergency chassis removal

WRITE: DEPT. 918

Chassis-Trak, Inc.
1525 S. WEBSTER AVENUE
INDIANAPOLIS 19, IND.

For details, circle #251 on Reader Service Card

Directory II. Components

28. Chassis, Racks & Slides.

Ateliers de Montages Electriques, France, 15
Aurora Equipment Co., Equipto Div., Ill., 15, 20, Test Stands
Bennett Manufacturing Co., N.Y., 5, 15, 20
Birtcher Corp., Calif., 5, 20
Boyle Metalcraft Corp., N.Y., 5, 10, 15, 20
Brenner Metal Products Corp., N.Y., 5, 15, 20
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Buck Engineering Co., Inc., N.J., 5, 15, 20
Chassis-Trak, Inc., Dept. 918, 525 So. Webster Ave., Indianapolis, 19, Ind., 10
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Tel: FLeetwood 9-5407
Chisholm Industries, Ltd., Canada, 5, 10, 15, 20
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Communication Equiptment & Engineering Co., Ill., 15, 20
Connecticut Telephone & Electric Co., Conn., 5, 15, 20
Conrad & Moser, N.Y., 15, 20
Cossor (Canada), 5, 15, 20
Craig Systems, Inc., Dept. F, 90 Holten St., Danvers, Mass., 15
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Tel: SPring 4-1870
Crosley Div., Avco Mfg. Corp., Ohio, 5, 20, 25
Dahlstrom Metallic Door Co., N.Y., 5, 15, 20
Donnelly Mfg. Co., Div. of Indian Co., Mass., 5, 20
Downing Crystal Co., Md., 5, 20
E. B. Metal Products Co., Inc., N.Y., 5, 10, 15, 20
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Elzee Metal Products Co., Inc., N.Y., 5, 15, 20
Eugene Engineering Co., Inc., Mass., 5, 10, 15, 20
Falls Metal Works, Ltd., 409 Main St., Little Falls, N.J., 5, 15, 20
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Tel: LIttle Falls 4-1300
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General Communications, Inc., Wis., 5, 15, 20
General Electric Co., Broadcast & Mil. Elect. Prods. Dept., N.Y., 5, 10, 15, 20
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Hamner Electronics Co., Inc., P.O. Box 531, Princeton, N.J., 5, 20
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Tel: PEnnington 7-1320
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Heeger, Inc., Calif., 5, 10
Henry & Miller Industries, Inc., N.J., 5, 15, 20
Hi-Video, Inc., N.Y., 5, 10, 15, 20
Hudson Tool & Die Co., 18-38 Malvern St., Newark 5, N.J., 5, 20
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Tel: MArket 3-7584
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Insuline Corp. of America, N.H., 5, 10, 15, 20
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Kern & Co., Inc., Louis M., N.Y., 5, 15
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Lowell Manufacturing Co., Mo., 5, 10, 15, 20
McCurdy Radio Industries, Ltd., Canada, 15
Meridian Metalcraft, Inc., 8739 S. Millergrove Dr., Whittier, Calif., 5, 20
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Tel: OX 2-3761
Metal Fabricators Corp., Mass., 5, 10, 15, 20
Metalcraft Inc., N.Y., 5, 10, 15, 20
Metallic Arts of N.E., Inc., Mass, 5, 10, 15, 20
Milwaukee Stamping Co., Wis., 20
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National Metalcrafters, Inc., Pa., 5, 10, 15, 20, 25
Northeastern Engineering, Inc., N.H., 5, 10, 20, 25
Northern Electric Co., Ltd., Canada, 5, 15, 20
Olympic Products Co., Inc., N.J., 5, 10, 15, 20
Par-Metal Products Corp., 32-50 49th St., Long Island City 3, N.Y., 10, 15, 20
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Tel: AStoria 8-8905
Precision Metal Products, Inc., Mass., 20
Premier Metal Prods. Co., 337 Manida St., New York 59, N.Y., 5, 15, 20
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Tel: WYandotte 1-6600
Q-Line Mfg. Corp., N.Y., 5, 15, 20
REF Mfg. Corp., N.Y., 5, 15
Radio Engineering Products, Ltd., 1080 University St., Montreal, Quebec, Canada, 15
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Tel: DEerfield 4-3100
Remler Co., Calif., 10, 20
Riester & Thesmacher Co., Ohio, 5, 20
Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5, 15, 20
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Tel: LOckwood 5-3516
Solartron Electronic Group, Ltd., England, 5, 15, 20
Specific Products Co., P.O. Box 425, 21051 Costanso, Woodland Hills, Calif., 20, Experimental
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Tel: DI 0-3131
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Clamps, tube: See class 97

Clips, cable: See class 87

Clips, test: See class 87

Coaxial cables: See class 83

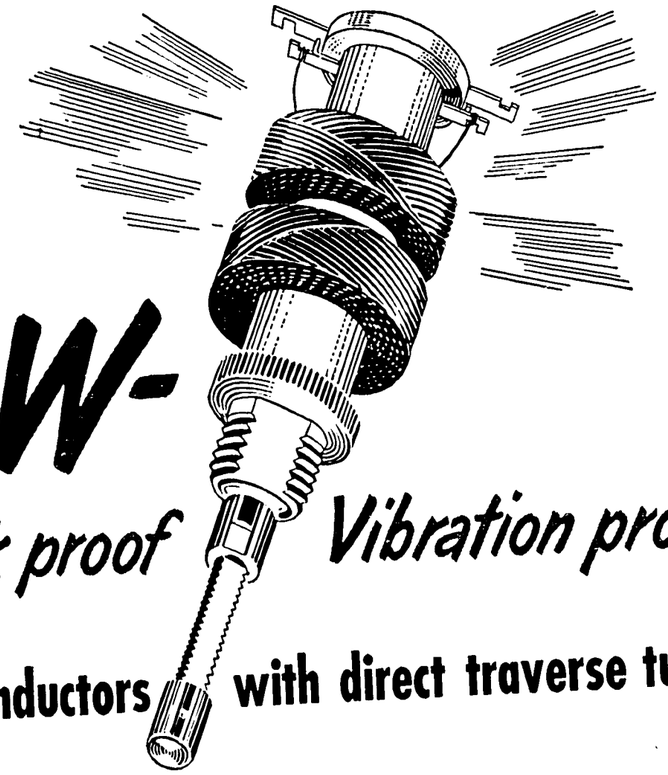
Coil dope: See class 91

Coil forms, ceramic: See classes 84 and 87

Coil forms, paper & plastic: See class 87

Coil winding machines: See class 92

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.



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Shock proof Vibration proof

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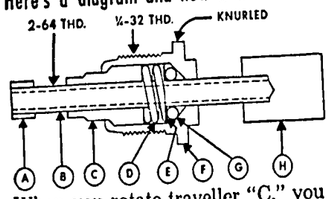
Here's a diagram and how it works . . .



When you rotate traveller "C," you impart a linear motion to the core "H." The direction the core moves depends on which way you turn "C." Four silver-plated brass balls, "G," act as rolling contacts, give smooth action to the square threaded 2-64 shaft, "B." Spring "D" and washers, "E" give continuous spring loading to both the traveller and the rider contact balls. The bushing for this motion fits a "D" hole .237" across flat. We furnish a ¼"-32 silver-plated mounting nut.

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Learn how much more stability you can build into mobile circuits with Forbes and Wagner Direct Traverse Inductors. Let us send you a kit of various size forms and cores for some typical frequencies. You'll receive complete coils from 2 to 1,000 Microhenries to examine and test on your own. Simply write us on your business letterhead. Or, wire or phone us. We'll get your samples to you *fast*.

For uniform high stability . . .

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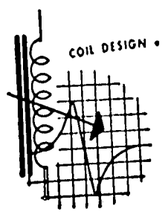
Our direct traverse unit design is the same as you get in well-known Corning Glass Works' D. T. Trimmers. Corning's units are rugged and stable under severe mechanical and thermal conditions. Available with brass or Invar cores. Ranges from 0.5-3.0 mmfd to 1.0-12.0 mmfd. You need only one tool to tune both inductors and trimmers.



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20. Flyback
25. Focusing coils
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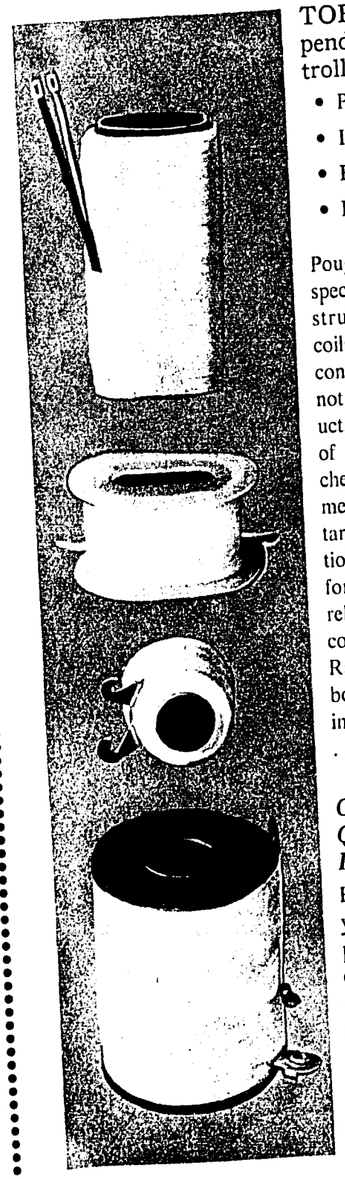
POUGHKEEPSIE

COILS



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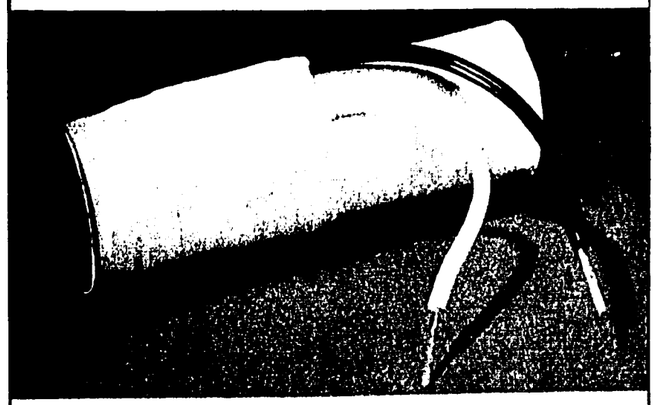

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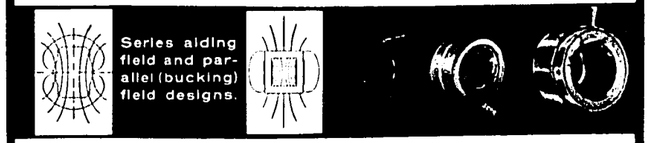

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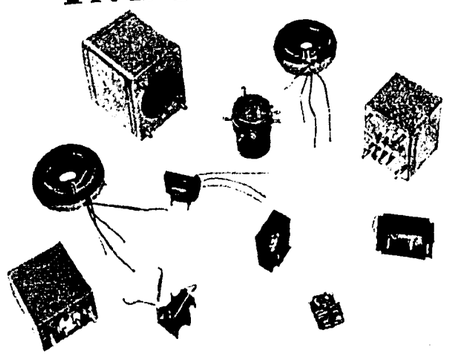

Let our five years of design and manufacturing experience in this *exclusive* field work for you.

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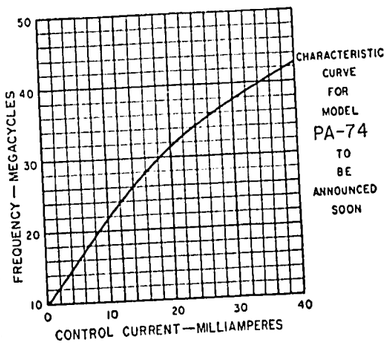

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The custom-designed models we have recently produced include the following:

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Vari-L Company, Inc.

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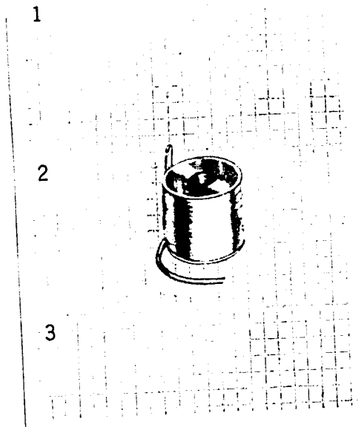

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Tur-Bo Jet also winds to class A, B, H and C requirements.

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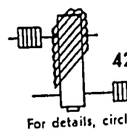

products co., inc.

424 S. San Gabriel Blvd.
San Gabriel, Calif.

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Directory II. Components

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Southwestern Industrial Electronics Co., 2831 Post Oak Rd., P.O. Box 13058, Houston, Tex., 30, 40
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Tel: MOhawk 7-6611

Specialties, Inc., N.Y., 40

Specialty Automatic Machine Corp., 100 Gerrish Ave., Chelsea 50, Mass., Microwave
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Tel: CHelsea 3-6160

Sperry Gyroscope Co. of Canada, Ltd., Canada, 38, 40

Standard Coil Products, Canada, 29, 38

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Standard Electronics Div. Radio Eng. Lab., Inc., N.Y., 30, 35, 40

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Superex Electronics Corp., N.Y., 5, 15, 26, 30, 35, 45

Sylvania Electric Products Inc., Dept. F24P, 1740 Broadway, New York 19, N.Y., 15, 26, 28, 40
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Syntronic Instruments, Inc., 170 Industrial Rd., Addison, Ill., 5, 25
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Tel: TErrace 4-6103

Technical Apparatus Builders, 109RV Liberty St., New York 6, N.Y., 15, 28, 30
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Torotel, Inc., 11505 Bellmont Ave., Kansas City 34, Mo., 40 & PC Types
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Transformers, Inc., 200 Stage Rd., Vestal, N.Y., 5, 15, 30, 40
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Transformer Technicians, Inc., Ill., 5, 15, 30

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Triad Transformer Corp., 4055 Redwood Ave., Venice, Calif., 5, 15, 25, 30, 38, 40
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Tur Bo Jet Products Co., Inc., 424 S. San Gabriel Blvd., San Gabriel, Calif., 28, 36, 38
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Tel: CU 3-5191

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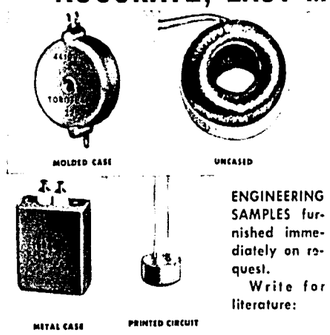

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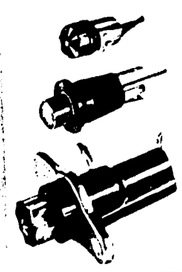

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Pan-i-Lite Switch is ultra-compact momentary contact indicator switch. When pressed, light glows when switch closes. Five bright colors, three voltages. Snap ring mount.

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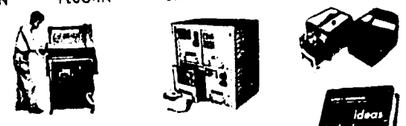

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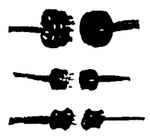

ALDEN UNIT MOLDED CONNECTORS
A whole series of new high reliability connectors Leads and contacts are integrally molded in a single shot of insulation carefully selected for its mechanical and electrical characteristics. A patented feature allows the use of highly resilient, long life punch press contacts. Available in a variety of standard types and layouts.

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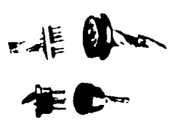
Advanced molding techniques are used to provide you with complete integral molded insulation cable assemblies. You can have a choice of several standard designs in a variety of layouts



ASSEMBLED CONNECTORS AND CABLES
Here's a standard series of pre-wired assembled connectors from one to 11 contacts, phenolic insulated. Leads are 'top-connected" for positive strain relief to resilient long life punch press contacts. Just specify connector, lead lengths, and we assemble.

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Available in phenolic or integral molded assemblies in a variety of insulations with or without integral molded circuit components such as resistors, condensers, corona shields, etc. Leads are tailored to your specs so that complete assembly is ready to put into your equipment.

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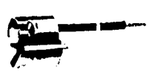

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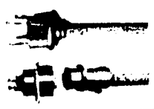

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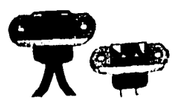

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Compact MINI-SPACE OUTLETS for all types of electrical or electronic equipment whenever power take-off convenience is needed. Available with solder tabs or leads tailored to your specs.

ALDEN PRODUCTS COMPANY. 140 NORTH MAIN ST BROCKTON, MASS.

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U.S. Electronics Corp., N.J., 5, 15, 25, 26, 28, 30, 35, 36, 38, 45
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30. Connectors.

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15. Hermetically sealed
17. Int rlock
20. M crophone
25. Multiple circuit connectors
28. Phono
30. Power
32. Print'd circuit
34. RF type
35. Slip ring and commutating connectors
40. Sub-miniature
45. Waterproof

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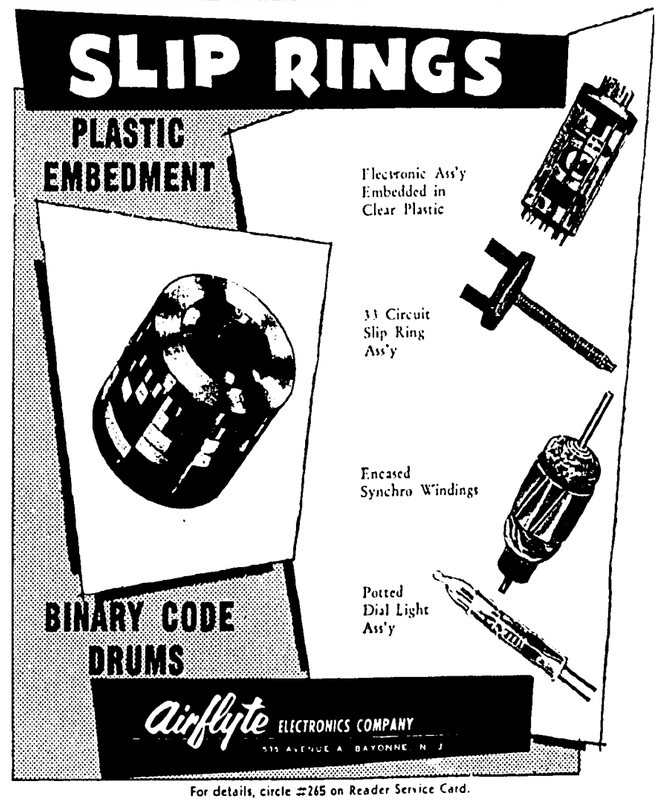

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

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meet all your circuit design, mounting and environmental requirements

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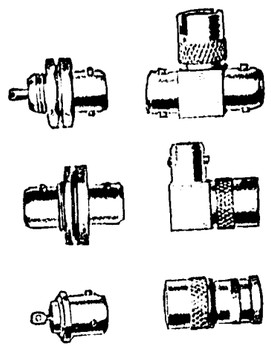
• Only half the size of standard BNCs • Twelve polarity groups—two and three lug • Vibration proof bayonet locking (MIL-C-5015) • Teflon insulators permit use over wide temperature range with low electric loss • .002" silver plating and gold flash affords excellent corrosion resistance



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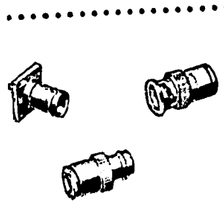

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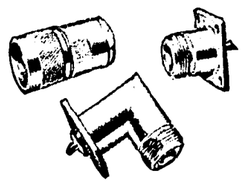
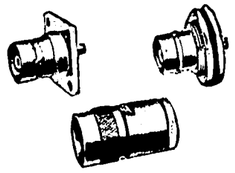
BNC connectors are designed for use with miniature RF cables. Small, lightweight and weatherproof, all have the quick-disconnect bayonet locking feature. Teflon insulators assure low electric loss at high temperatures. Manufactured to MIL-C-3608 specs. Frequency limit: 10,000 mc.



N series

Low voltage, constant impedance connectors for use with medium sized cables. Provide excellent VSWR at frequencies up to 10,000 mc. Available in both weatherproof and non-weatherproof types. Screw type coupling ring locking. Maximum voltage: 500v. Meet MIL-C-71A specs.



C series

A newly developed line of weatherproof connectors for use with medium sized RF cables. Features several design improvements over other connectors, including improved clamping mechanism for excellent cable grip, and a silicone rubber gasket for moisture-proof sealing.

Write for your free copy of Catalog No. 301. It contains complete engineering data on all Dage RF Coaxial Cable Connectors.

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- To see them all, send for our catalog.

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- The Hi-Volt 259 and 239 are designed expressly for high voltage application where RG cable is used in conjunction with power supplies. These connectors are rated for 5000 volts DC.
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C OAXIAL CONNECTOR CO., INC.

- 37 N. 2nd AVE.
- MT. VERNON, N.Y.
- MOunt Vernon 8-6416
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Directory II. Components

30. Connectors.

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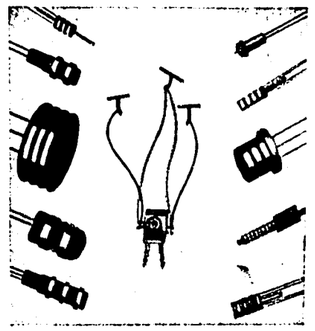

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RG coaxial cables

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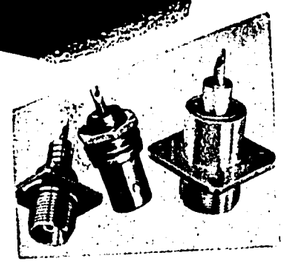

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Fluorocarbon Products, Inc., Div., of U.S. Gasket, N.J., 15, 28, 32, 40

Frenchtown Porcelain Co., N.J., 15

Garde Manufacturing Co., R.I., 15, 25, 32

General Cement Mfg. Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 17, 20, 28
See ad on page 586
Tel: 2-6695

General Electric Co., Broadcast & Mil. Elect. Prods. Dept., N.Y., 10

General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 15
See ad on page 542
Tel: VAlley Stream 5-6363

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 10, 34
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Tel: TRowbridge 6-4400

General Screw & Specialty Co., N.Y., 5

Gibson Electric Co., Pa., 35

Glasseal Products Co., Inc., N.J., 15

Gramatan Instrument Co., N.Y., 5, 10, 34

Graphite Metallizing Corp., N.Y., 35

Gremar Mfg. Co., Inc., Mass., 10, 15, 17, 34, 40, 45

Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J., 10, 15, 40, 45
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Tel: LIberty 8-2800

Hallett Mfg. Co., Calif., 10, 45

Hatfield Wire & Cable Div., Cont'l. C & S. Ind., Inc., N.J., Rubber Molded-on

Hermetic Connector Corp., N.J., 15

Hi-Video, Inc., N.Y., 20

Hoffman Electronics Corp., Calif., 5

Hollingsworth Co., Solderless Terminal Div., Pa., 5

Hubbell, Inc., Harvey, Conn., 17

Industrial Hardware Mfg. Co., Inc., 109 Prince St., New York 12, N.Y., 17, 28, 32
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Tel: ORegon 7-1881

Industrial Prods. Co., Div. Danbury-Knudsen, Inc., Conn., 10, 32

Instrument Corp. of America, Va., 35

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Insuline Corp. of America, N.H., 20, 28

International Crystal Mfg. Co., Inc., Okla., 10

International Telemeter Corp., Dept. K, 2000 Stoner Ave., Los Angeles 25, Calif., 10
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Tel: GRanite 8-7751

Interstate Electronics, Inc., N.Y., 10

Jerrold Electronics, Ltd., Canada, 10

Jerrold Electronics Corp., Dept. TED #2, 23rd & Chestnut Sts., Philadelphia 3, Pa., 10
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Tel: LOcust 4-0707

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Jones, Howard B., Div., Cinch Mfg. Corp., 1026 S. Homan Ave., Chicago 24, Ill.
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Tel: NEvada 2-2000

Joy Manufacturing Co., Elect. Products Div., Mo., 5, 25, 30, 45

Joy Manufacturing Co., Pa., 5, 15, 17, 25, 30, 45

Kennedy Industries, Calif., 32

Keystone Electronics Corp., 423 Broome St., New York 13, N.Y., 28
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Tel: WOrth 2-2789

Kings Electronics Co., Inc., 40 Marbledale Rd., Tuckahoe 7, N.Y., 10
See ads on pages 329, 363
Tel: SWiftwater 3-5000

Kliegl Brothers, N.Y., 30

Kulka Electric Mfg. Co., Inc., 633 S. Fulton Ave., Mt. Vernon, N.Y., 17, 28, 30
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Tel: MOunt Vernon 4-4024

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Lapp Insulator Co., Inc., Radio Specialties Div., N.Y., 25

Lerco Electronics, Inc., 501 S. Varney St., Burbank, Calif., 32, 40
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Litton Industries, 336 N. Foothill Rd., Beverly Hills, Calif., 32, 40
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Lynn Electronic Research Co., Calif., 5, 40

Malco Tool & Mfg. Co., Ill., 17, 32, 40

Mandex Manufacturing Co., Inc., Ill., 17, 28

Mendelsohn Speedgun Co., Inc., Fourth Ave., Haskell, N.J., 10, 34, 40, 45
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Tel: TErhune 5-3224

Meridian, Inc., Conn., 10

Methode Mfg. Corp., 7447 W. Wilson Ave., Chicago 31, Ill., 25, 32, 40
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Tel: UNderhill 7-9600

Microdot Inc., Calif., 10, 15

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 30
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Tel: MAlden 4-4108

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Molding Corp. of America, R.I., 15, 35, 40

Morton Electronics Corp., Chester, Pa., 10, 28

Mutual Electronic Industries Corp., Essex Connector Div., N.Y., 5, 10, 17, 34, 45

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Norrich Plastics Corp., 109 W. 18th St., New York 11, N.Y., 40
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Painton & Co., c/o British Electronic Sales, N.Y., 17, 20, 25, 30, 32, 34, 40, 45

Panseal, Inc., N.J., 30, 40, 45

Permonite Mfg. Co., Ill., 17, 28

Poly Scientific Corp., Va., 35

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Progress Electronics Co., 296 Broadway, New York 7, N.Y., 10, 40
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Tel: MUrray Hill 5-1422

Raypar, Inc., Ill., 17

Raytheon Mfg. Co., Ceramic Sales, Foundry Ave., Waltham 54, Mass., 10, 15, 45
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Reese, Inc., J. Ramsey, N.Y., 5

Revere Corp. of America, Sub. of Neptune Meter Co., Conn., 5

Richards Electrocraft, Inc., Ill., 20

Robco Mfg. Co., Inc., N.Y., 15

Rubber Associates, Neosil Prods. Div., N.Y., 15, 45

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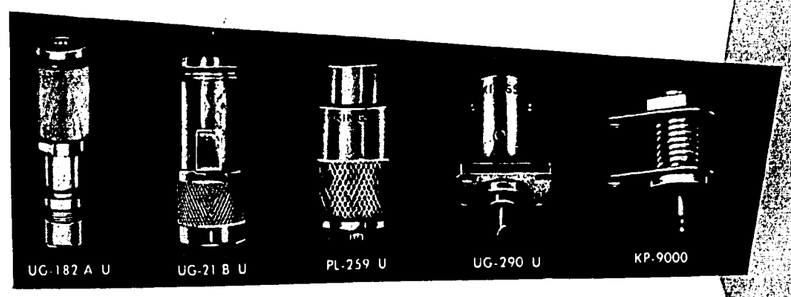

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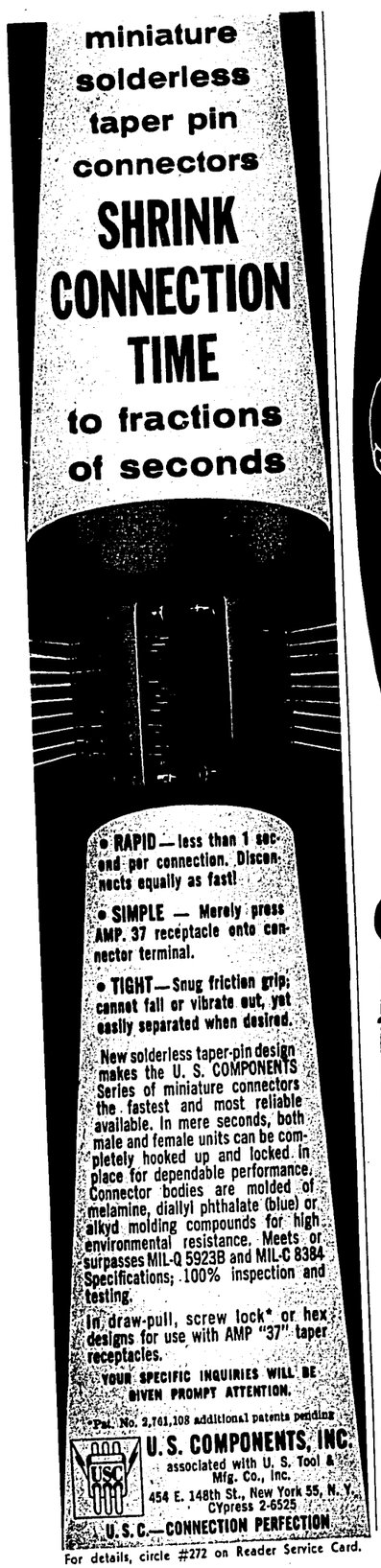

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30. Connectors.

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Switchcraft, Inc., 1340 N. Halsted St., Chicago 22, Ill., 20, 28
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Tel: MI 2-7136

Sylvania Electric Products, Inc. Dept. F24P, 1740 Broadway, New York 19, N.Y., 17, 28, 30, 40
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Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 20, 25
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Ucinite Co., Div. United-Carr Fastener Corp., Mass., 25, 32

Union Electronics & Machine Corp., Mass., 10, 40

U.S. Components, Inc., 454 E. 148th St., New York 55, N.Y., 5, 15, 25, 30, 32, 40, 45
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Tel: CYpress 2-6525

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Waltham Horological Corp., Mass., 5, 10, 15, 20, 25, 28, 34, 40, 45

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Whitting & Davis Co., Inc., Mass., 10

Wilgreen Industries, N.Y., 5, 10, 15, 25, 30, 40

Winchester Electronics, Inc., Willard Rd., Norwalk, Conn., 5, 10, 15, 25, 30, 32, 40, 45
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31. Converters.

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10. DC to AC
15. Inverters
20. Rotary
25. Vibrators
30. Voltage

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Adler Electronics, Inc., N.Y., 10, 15

Aircraft Radio Corp., Boonton, N.J., 15
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Airpax Products Co., Middle River, Baltimore 20, Md., 25-Hermetic
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American Machine & Foundry Co., Defense Prods. Group, 1101 N. Royal St., Alexandria, Va., 5, 10
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Tel: KIng 9-9110

American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn., 5, 10, 15, 25, 30
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Ballantine Laboratories, Inc., 102 Fanny Rd., Boonton, N.J., 15
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Beckman Instruments, Inc., Scientific Inst. Div., Calif., 5, 10

Bendix Aviation Corp., Red Bank Div., Eatontown, N.J., 5, 10, 15, 20, 30
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Tel: EAtontown 3-2000

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Bogue Electric Mfg. Co., N.J., 5, 10, 15, 30

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Brunswick Instruments, N.J., 10

Camden Electronics, Inc., N.J., 5, 10

Carter Motor Co., 2735 W. George St., Chicago 18, Ill., 10, 15, 20
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Communication Accessories Co., Highway 50 & 71 Bypass, Lee's Summit, Mo., 30
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Connecticut Telephone & Electric Co., Conn., 25

Consolidated Avionics Corp., N.Y., 5, 10, 15

Continental Electric Co., Inc., N.J., 5, 10, 15, 20, 30

Control Electronics Co., Inc., 1925 New York Ave., Huntington Station, L.I., N.Y., 15
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Cook Electric Co., Ill., 15

Cornell-Dubilier Electric Corp., 333 Hamilton Blvd., S. Plainfield, N.J., 5, 10, 15, 25
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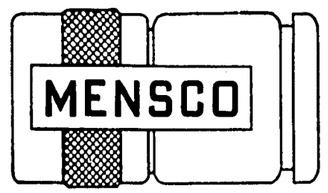

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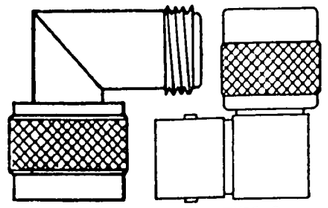
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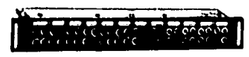
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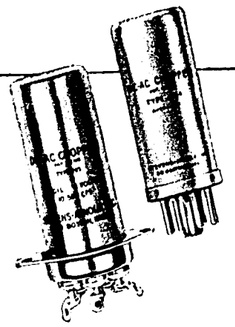

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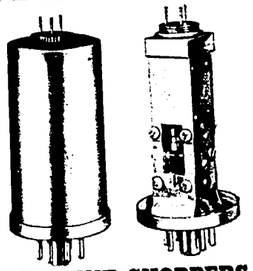

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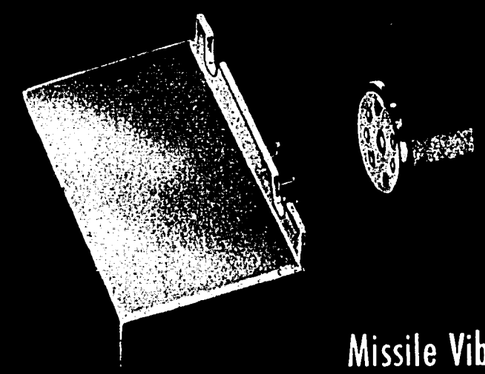

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Electronic Measurements Co., Inc., Lewis St. & Maple Ave., Eatontown, N.J., 5, 30
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Tel: EAtontown 3-0300

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Electronics Corp. of America, Mass., 5
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Fielden Instrument Div., R-F C Co., Pa., 10, 15, 25
Forway Industries, Inc., N.J., 10, 25

Gates Electronic Co., 2090 Barnes Ave., New York 62, N.Y., 5, 10, 15, 30
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Tel: TYrone 2-6490

General Cement Mfg. Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 5
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General Electric Co., Apparatus Sales Div., N.Y., 5, 10, 15, 20

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 10
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Georator Corp., Va., 5, 10, 20

Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J., 5, 30
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Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 5, 10, 15, 20, 30
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Kepco Laboratories, Inc., N.Y., 5, 10, 30
L.E.E., Inc., D.C., 5, 10, 15
Librascope, Inc., Calif., 20
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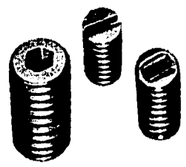
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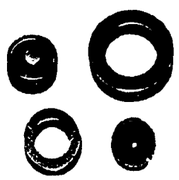
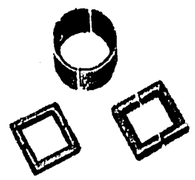

CUP AND TOROID CORES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31. Converters.

Magnetic Amplifiers, Inc., 632 Tinton Ave., New York 55, N.Y., 5, 10, 30
See ad on page 212
Tel: CYpress 2-6610

Magnetic Research Corp., 3160 W. El Segundo Blvd., Hawthorne, Calif., 5, 10, 15
Multiple pages of additional data on 128-129
Tel: OSborne 5-1171

Mallory & Co., Inc., P. R., Ind., 25

Maxson Corp., W. L., Maxson Instrument Div., N.Y., 5

Microwave Associates, Inc., Mass., Transistorized

Millivac Instrument Corp., N.Y., 10

Minneapolis-Honeywell Reg. Co., Industrial Div., Pa., 10

Model Rectifier Corp., 1065 Utica Ave., Brooklyn 3, N.Y., 5, 30
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Tel: HYacinth 5-4600

NJE Corp., N.J., 5, 10, 15, 30

National Aircraft Corp., Calif., 5, 10, 15, 30

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Opad Electric Co., 69-8 Murray St., New York 7, N.Y., 5, 30
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Precise Measurements Co., Millbrook Lane, R.D. #1, Flemington, N.J., 5, 10, 25, 30
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Tel: FLemington 900

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R-S Electronics Corp., Calif., 5, 10

Ranson Research, Calif., 5

Rheem Electronics Div., Calif., 30

Rho Company, Calif., 5, 10, 30

Richardson-Allen Corp., N.Y., 5

Riverbank Laboratories, Dept. of Engineering, Ill., 10

Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 30
See ad on page 263
Tel: LOckwood 5-3516

Robertshaw-Fulton Controls Co., Aeronautical Div., Calif., 10

Sangamo Electric Co., Ill., 5, 10, 20

Schauer Manufacturing Corp., Ohio, 5

Sel-Rex Corp., Dept. IRE-57, Precious Metals Div., 75 River Rd., Nutley 10, N.J., 5, 30
See ad on page 585
Tel: NUtley 2-5200

Senn Corp., Ind., 10, 15, 25

Servomechanisms, Inc., Calif., 5, 10

Servomechanisms, Inc., Mechatrol Div., N.Y., 10

Simpson Mfg. Co., Inc., Mark, N.Y., 5, 10, 15

Small Motors, Inc., Ill., 5, 10, 15

Stevens-Arnold, Inc., 22 Elkins St., S. Boston 27, Mass., 10, 25
See ad on page 332
Tel: AN 8-1170

Technical Apparatus Builders, 109RV Liberty St., New York 6, N.Y., 5, 10, 15, 20, 25, 30
See ad on page 386
Tel: REctor 2-6249

Terado Co., 1068 Raymond Ave., St. Paul 14, Minn., 10
See ad on page 403
Tel: MIdway 6-2514

Texas Crystals Div., of Westronix Corp., Ill., 31

Texas Instruments Incorporated, 6000 Lemmon Ave., Dallas 9, Texas, 15
Multiple pages of additional data on 88-89
Tel: FLeetwood 2-1781

Timely Instruments & Controls Corp., Calif., 10

Transistor Devices, Inc., N.J., 5, 10, 15

Transval Eng. Corp., Calif., 5, 10, 15

U.S. Dynamics Corp., Mass., 5

Universal Transistor Products Corp., N.Y., 5, 10, 15, 30

Varo Mfg. Co., Inc., Tex., 5, 10, 15, 20

Vectron, Inc., 1607 Trapelo Rd., Waltham 54, Mass., Power Frequency
See ad on page 244
Tel: TWinbrook 3-8700

Vibration Research Labs., Inc., 97 Lake Ave., Tuckahoe, N.Y., 5, 10, 15, 25, 30
See ad on page 333
Tel: WOodbine 1-2440

Weightman & Assoc., Calif., 10, 20, 25

Western Gear Corp., Electro Products, Box 182, Lynwood (Los Angeles), Calif., 5, 10, 15, 20, 30
See ad on page 72
Tel: NEvada 6-2161

Cord, lacing: See class 87

32. Cores & Core Materials.

5. Ceramic
10. Ferrite
15. Laminations
20. Metallic powders
25. Powdered metal
30. Tape wound
35. Toroid

Abalon Precision Mfg. Corp., N.Y., 15, 20

Aerovox Corp., Mass., 10, 20, 25, 35

Alden Products Co., 140 N. Main St., Brockton 64, Mass., 35
See ad on page 324
Tel: BRockton 160

Allegheny Ludlum Steel Corp., Pa., 15

Allen-Bradley Co., Wis., 10

American Lava Corp., Cherokee Blvd. & Mfrs. Rd., Chattanooga, Tenn., 5
See ad on page 182
Tel: AM 5-3411

Antara Chemicals Div., Gen. Aniline & Film Corp., N.Y., 20, 25

Ardente Acoustic Laboratories, Ltd., England, 15

Arnold Engineering Co., P.O. Box G, Marengo, Ill., 10, 15, 20, 25, 30, 35
Multiple pages of additional data on 86-87
Tel: ANdover 3-6300, JOrdan 8-7251

B G Corp., N.J., 5

Baker & Co., Inc., N.J., Precious Metals

Beemer Engineering Co., Pa., 25

Burroughs Corp., Mich., 10, 30

Burroughs Corp., Electronic Instruments Div., Pa., 30

Carstedt Research, Inc., Calif., 5, 10, 15, 20, 25

Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 10
Multiple pages of additional data on 49-54
Tel: EM 3-0281

Communication Accessories Co., Highway 50 & 71 Bypass, Lee's Summit, Mo., 10
Multiple pages of additional data on 49-54
Tel: BRoadway 1-1700

Crowley Div., Aerovox Corp., N.J., 10, 25, 35

Custom Components, Inc., N.J., 20, 25, 35

D X Radio Products Co., Ill., 25

Diamonite Products Mfg. Co., Ohio, 5

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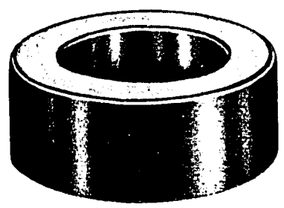

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Magnetic Core Laminations

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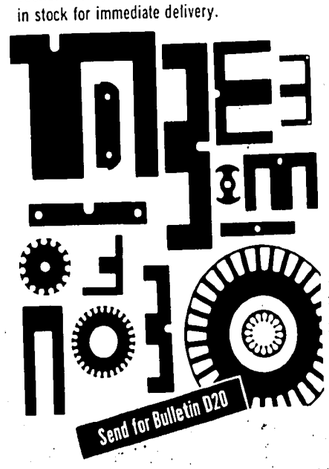

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Send for Bulletin D30

Centricore No.	CORE DIMENSIONS (Inches) I.D.	O.D.	Strip Width	CASE DIMENSIONS (Inches) I.D.	O.D.	H
38	.375	.500	.125	.315	.570	.195
1	.475	.633	.125	.415	.710	.195
45	.500	.550	.125	.440	.620	.195
46	.500	10 turns	.125	.440	.610	.195
*47	.500	.625	.125	.440	.685	.195
* 2	.500	.750	.125	.440	.820	.195
72	.500	.750	.188	.440	.820	.262
64	.500	.750	.250	.440	.820	.340
48	.530	.625	.125	.470	.685	.195
36	.563	.750	.125	.500	.820	.195
34	.600	.900	.250	.540	.965	.335
49	.625	5 turns	.125	.550	.700	.195
50	.625	10 turns	.125	.550	.700	.195
74	.625	.750	.125	.570	.820	.195
40	.625	.750	.188	.570	.820	.262
67	.625	.875	.250	.570	.945	.340
*37	.625	1.000	.188	.570	1.085	.262
3	.625	1.000	.250	.570	1.085	.340
32	.625	1.000	.375	.570	1.085	.445
4	.633	.844	.125	.575	.915	.195
* 5	.650	.900	.125	.585	.975	.195
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

VOLUME AND WEIGHT		
VOLUME	2.615 cu ins	42.8 cm³
WINDOW AREA	1.86 sq ins	12.0 cm²
WT HYMU	83 lb	377 gr.
WT "49"	77 lb.	350 gr.
WT SILICON STEEL	71 lb	312 gr.

60 CYCLE R

PROPERTIES OF WITH WINDING C

$B_{sat.}$ = 183.6 x 10³ K,N

H_c = (.0598 x 10³ (Gilberts per millioampere

L_s = (.122 x 10⁴) K

SPECIFICATIONS			WT. & COUNT	
CATALOG NUMBER	MATERIAL	THICKNESS	LBS /M PCS	PCS /LB
106LMC4	Micromol	.004"	2 521	396 7
106L496	"49"	.006"	4 020	248 8
106LHY6	Hymu	.006"	4 321	231 4
106LSL14	Silicon	.014"	8 250	121 2
106L4914	"49"	.014"	9 380	106 6
106LHY14	Hymu	.014"	10 082	99 2

SPECIFICATIONS			WT. & COUNT	
*CATALOG NUMBER	MATERIAL	THICKNESS	LBS /M PCS	PCS /LB

SHIELD AND COVER DIMENSIONS

Catalog Number	Material	Thickness	A
155SHY20	HYMU	.020"	1.375
155S4920	"49"	.020"	1.375"
155SHY25	HYMU	.025"	1.375"
155S4925	"49"	.025"	1.375"
155ASHY20	HYMU	.020"	1.52[illegible]
155AS4920	"49"	.020"	1.5[illegible]
155ASHY25	HYMU	.025"	1.5
155AS4925	"49"	.025"	1.[illegible]
155BSHY20	HYMU	.020"	1.6
155BS4920	"49"	.020"	1.6
155BSHY25	HYMU	.025"	1.67
155BS4925	"49"	.025"	1.67"

SHIELD AND COVER DIMENSIONS

Catalog Number	Material	Thickness	A
636SHY20	HYMU	.020"	1.50"
636S4920	"49"	.020"	1.50"
636SHY25	HYMU	.025"	1.50"
636S4925	"49"	.025"	1.50"
636ASHY20	HYMU	.020"	

MAGNETIC METALS COMPANY REPRESENTATIVES: CALIFORNIA: Los Angeles 22, E. A. Wilcox Company, 6436 East Corvette Street; San Francisco, E. A. Wilcox Company, 277 Seventh Street **CONNECTICUT:** West Cheshire, P. O. Box 294, J. A. Upson **ILLINOIS:** Chicago 30, C. L. Moyer, 5454 West Higgins Avenue **MINNESOTA:** Minneapolis 3, Wood Clemons, 321 Fawkes Building, 1645 Hennepin Avenue **TEXAS:** Dallas, Allied Components Inc., 2517 Converse Street **WASHINGTON:** Seattle, E. A. Wilcox Company, 915 Arctic Building

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- AXIAL LEAD COIL FORMS (FAIR-RITE M and LDR)
  .107"-.500" DIA. .375"-2.000" LONG
- INSERT CORES (FAIR-RITE M and LDR)
  .156-.370 DIA. ANY LENGTH • 2-56 TO 8-32 BRASS SCREWS BRASS OR NYLON RODS
- THREADED CORES (FAIR-RITE M and LDR)
  8-32, 10-32, 1/4-28 OR 5/16-20 THREAD
  .105 HEX HOLE OR THRU (EXTRUDED) SLOT
- ANTENNA RODS (FAIR-RITE LD and LDR)
  .125 TO .500 DIA. • SOLID OR TUBULAR
- SLUGS AND SHIELDING BEADS

Relative Magnetic Properties of FAIR-RITE Materials

Material	Permeability	Temperature Stability	Frequency Range	Curie Point	Volume Resistivity
M	High	High	.01-2Mc.	>180°C	Medium
LDR	Medium	Highest	.1-20Mc.	>300°C	High
LD	Med.-Low	High	.5-50Mc.	>300°C	High

FAIR-RITE PRODUCTS CORP.
P.O. BOX 358, WALLKILL, N.Y.
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John & Lawrence Streets, New Windsor, Newburgh, New York
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For details, circle #283 on Reader Service Card.

Components Directory II.

32. Cores & Core Materials.

Fair-Rite Products Corp., P.O. Box 358, Commercial Row, Wallkill, N.Y., 10
See ad on this page
Tel: WAllkill 3-2632

Ferroxcube Corp. of America, N.Y., 10
Fiber Glass Industries, Inc., N.Y., 15
Frenchtown Porcelain Co., N.J., 5
Gabagan, Inc., Pa., 15
Gemloid Corp., N.Y., 15
General Aniline & Film Corp., N.Y., 25

General Ceramics Corp., Dept. ID., Crows Mill Rd., Keasbey, N.J., 5, 10, 35
See ads on pages 334, 470
Tel: VAlley 6-5100

General Chemical Div., Allied Chemical & Dye Corp., N.Y., 20
General Electric Co., Electronic Components Dept., N.Y., 5, 10, 35
Handy & Harman, N.Y., 20
Honeycomb Co. of America, Conn., 15

Indiana Steel Products Co., Valparaiso, Ind., 30
See ad on page 364
Tel: 2-5601

Indium Corp. of America, N.Y., 25
International Electronics Corp., N.Y., 10
Isolantite Mfg. Corp., N.J., 5
Kobzy Tool Co., Ill., 15
Krystinel Corp., N.Y., 5, 10, 25, 35

Lapp Insulator Co., Inc., Radio Specialties Div., N.Y., 5

Leonard Electric Products Co., Inc., N.Y., 10, 25
Mackay, Inc., A. D., N.Y., 10, 20, 25

Magnetic Core Corp., John & Lawrence Sts., New Windsor, Newburgh, N.Y., 10, 20, 25, 35
See ad on this page
Tel: NEwburgh 5116

Magnetic Metals Co., Hayes Ave. at 21st St., Camden 1, N.J., 15, 30
See ad on page 336
Tel: WOodlawn 4-7842

Magnetic Powders, Inc., Pa., 25

Magnetics, Inc., Dept. Y-39, P.O. Box 391, Butler, Pa., 15, 20, 25
Multiple pages of additional data on 46-47
Tel: 7-1745

Maryland Lava Co., Md., 5
McKeown Co., Inc., Robert, N.Y., 35
Metal Powder Association, N.Y., 5, 10, 20, 25, 35
Microdot, Inc., Calif., 34, 40

Moloney Electric Co., 5390 Bircher Blvd., St. Louis 20, Mo., 30
See ad on page 434
Tel: EVergreen 3-3300

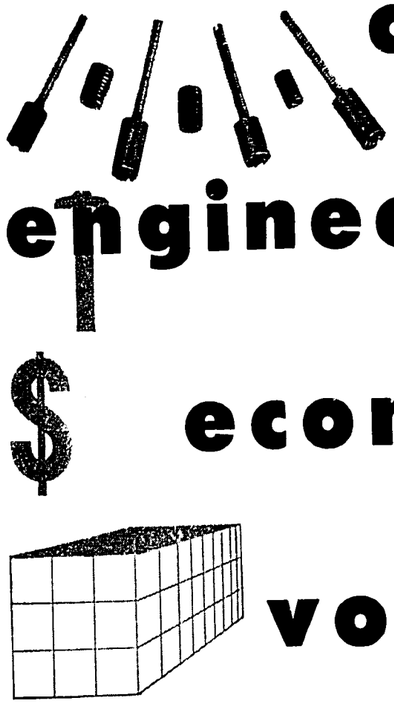
Morand Electronics, Calif., 20
Mullard, Overseas, Ltd., England, 10

National Moldite Co., 1410 Chestnut Ave., Hillside 5, N.J., 10, 20, 25, 35
See ad on page 208
Tel: WAverly 6-2123

National-U.S. Radiator Corp., Plastic Metals Div., N.Y., 20

Norrich Plastics Corp., 109 W. 18th St., New York 11, N.Y., 10, 15, 25
See ad on page 413
Tel: WAtkins 4-8360

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory



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9540 Tulley Avenue Oak Lawn, Illinois

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32. Cores & Core Materials.

Northern Electric Co., Ltd., Canada, 5, 10

Peck Spring Co., Conn., Metal, Special

Plastic Metals Div., Natl. U.S. Radiator Corp., Pa., 20, 25

Polymer Corp. of Pennsylvania, 2140 Fairmont Ave., Reading, Pa., 25, 35
See ad on page 594
Tel: FRanklin 6-7241

Pyroferric Co., Inc., N.Y., 20, 25, 35

Radio Cores, Inc., 9540 Tulley Ave., Oak Lawn, Ill., 25, 35
See ad on page 338
Tel: GArden 2-3353

Radio Corp. of America, N.J., 5, 10

Raytheon Mfg. Co., Ceramic Sales, Foundry Ave., Waltham 54, Mass., 5
See ad on page 534
Tel: TWinbrook 3-5860

Remington Rand Div. Sperry Rand Corp., N.Y., 30, 35

Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 35
See ad on page 263
Tel: LOckwood 5-3516

Rogers Majestic Electronic Tubes and Components, Canada, 10

Saxonburg Ceramics, Pa., 5

Stackpole Carbon Co., Pa., 10, 25, 35

Standard Electrical Products Co., Ohio, 30, 35

Standard Electronics Div. Radio Eng. Lab., Inc., N.Y., 35

Steward Manufacturing Co., D. M., Tenn., 5, 10, 35

Superex Electronics Corp., N.Y., 10

Superior Carbon Products, Inc., Ohio, 15

Superior Steatite & Ceramic Corp., 85 W. Forest Ave., Englewood, N.J., 5
See ad on page 533
Tel: ENglewood 3-4555

Sylvania Electric Products Inc., Dept. F24P, 1740 Broadway, New York 19, N.Y., 5, 10, 20, 25, 45
Multiple pages of additional data on 25-30
Tel: JUdson 6-2424

Telemeter Magnetics, Inc., Calif., 10

Tempel Mfg. Co., Ill., 15

Thermo Materials, Inc., Calif., 5, 10

Thomas & Skinner, Inc., 1120 E 23rd St., Indianapolis 7, Ind., 15, 30, 35
See ad on page 365
Tel: WAlnut 3-2448

Thor Ceramics, Inc., 225 Belleville Ave., Bloomfield, N.J., 5
See ad on page 560
Tel: PIlgrim 3-7797

United Insulator Co., Ltd., England, 5

U.S. Ceramic Tile Co., Diamonite Div., Ohio, 5

U.S. Engineering Co., Calif., 10

Westinghouse Electric Corp., Pa., 15, 35

Williams & Co., C. K., Pa., 20

Yale & Towne Mfg. Co., Powdered Metal Div., Ill., 10, 35

Counters: See class 70

Directory II. Components

Couplings: See class 66

Crystal testers: See class 72

33. Crystals & Accessories.

5. Crystal holders
10. Crystal ovens
15. Germanium
20. Oscillating quartz crystals
25. Piezo electric
30. Raw quartz
35. Silicon

Aeronautical Electronics, Inc., N.C., 20

Alden Products Co., 140 N. Main St., Brockton, Mass., 5
See ad on page 324
Tel: BRockton 160

Allied Industries, Inc., Ky., 5

American Quartz Labs., N.Y., 20, 25

Automatic Metal Products Corp., N.Y., 5

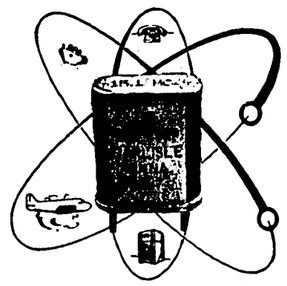
Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 25
See ad on page 476
Tel: UNiversity 4-0101

Birtcher Corp., Calif., 5

Bliley Electric Co., Union Station Building, Erie, Pa., 10, 20, 25
See ads on pages 342, 343
Tel: ERie 22-287

STABILITY

HUNT CR-7 CRYSTAL



Miniature Type CR-7 Crystal Unit

(Illustration is actual size)

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For details, circle #285 on Reader Service Card.

33. Crystals & Accessories.

Bodnar Industries, Inc., N.Y., 20

Brush Electronics Co., Ohio, 25

Bulova Watch Co., Inc., Dept. DA-776, 40-06 62nd St., Woodside 77, N.Y., 10, 20, 25
See ad on page 348
Tel: NEwton 9-5700

Burnett Radio Lab., Wm. W. L., Calif., 5, 10, 20

Clark Crystal Co., Mass., 10, 20, 25

Constantin & Co., L. L., Rt. 46, Lodi, N.J., 5
See ad on page 120
Tel: GRegory 1-0100

Cox & Co., Inc., N.Y., 10

D X Radio Products Co., Ill., 20, 25

Diamond Antenna & Microwave Corp., Mass., 5

Diamond Drill Carbon Co., N.Y., 30

Downing Crystal Co., Md., 10, 20, 25

Eldson Electronic Co., Texas, 20, 25

Electrofilm, Inc., Calif., 10

Electronic Specialties Co. of Maryland, Md., 5, 10, 30

Erwood, Inc., Ill., 10

F-R Machine Works, 26-12 Borough Pl., Woodside 77, N.Y., 5
Multiple pages of additional data on 55-58
Tel: AStoria 8-2800

General Electric Co., Electronic Components Dept., N.Y., 25

General Radio Co., 275 Massachusetts Ave., Cambridge, Mass., 20
See ad on Cover 4
Tel: TRowbridge 6-4400

Grieve-Hendry Co., Inc., Ill., 10

Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J., 25
See ad on page 184
Tel: LIberty 8-2800

Hemisphere Electronics Corp., N.Y., 5

Hermetite Corp., Mass., 5

Hill Electronic Engr. & Mfg. Co., Inc., Pa., 10, 20, 25

Hoffman Co., P. R., Pa., 20, 25

Hoffman Semiconductor Div., 930 Pitner Ave., Evanston, Ill., 35
See ad on page 226
Tel: UNiversity 9-9850

Howard Precision, Inc., N.J., 5

Hunt Corp., 453 Lincoln St., Carlisle 2, Pa., 10, 20, 25
See ad on this page
Tel: CArlisle 1486

Hupp Electronics Co., Ill., 5, 10, 20, 25

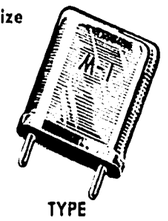
International Crystal Mfg. Co., Inc., Okla., 20, 25

Johnson Co., E. F., Minn., 5

Kearfott Co., Western Div., 253 N. Vinedo Ave., Pasadena, Calif., 5
See ad on page 37
Tel: STanley 7-1178

You Can Rely On mcCoy for UNIFORM, DEPENDABLE PERFORMANCE

in Standard Size



Hermetically sealed unit. Plated crystal. Frequency range 500 kc. to 125 mc. Meets government specifications MIL-C-3098A and CAA-R-916. Also ARINC No. 401. Proven in stationary, mobile and airborne applications. For wire leads specify M-4.

TYPE M-1

RUGGED CRYSTAL UNITS

and Subminiature

The McCoy "McMite." Hermetically sealed precision unit incorporates standard size stability, dependability and performance into a subminiature size. Meets all military specifications in its range from 5 mc. to 125 mc. For plug-in type specify M-21.

TYPE M-20

mcCoy ELECTRONICS COMPANY

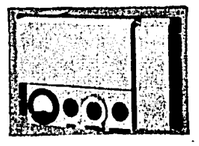
MT. HOLLY SPRINGS, PENNA.

Phone 376 and 377

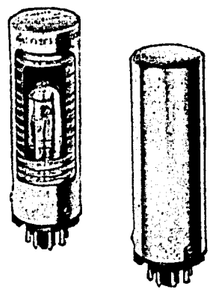
For details, circle #286 on Reader Service Card.

PACKAGED FREQUENCY MANAGEMENT

JK PRODUCTS

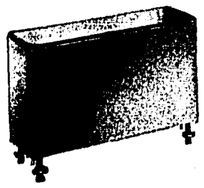


JK Sulzer Frequency Standard: For your most precise laboratory measurements, the JK SULZER 1 megacycle Frequency Standard provides stability of better than 1 part in 10^9 per day. Frequency is variable over a range of 0.9 cycles or more, and capable of being reset to 5 parts in 10^{10}.

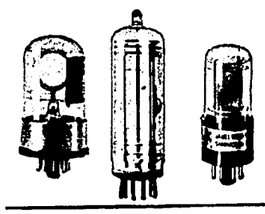


JK Thermystal: An advanced-design frequency control unit combining plug-in simplicity with extreme precision. ***Frequency stability:*** 30 to 900 kc, ±.0001%; 1000 kc to 150 mc, ±.00005%.

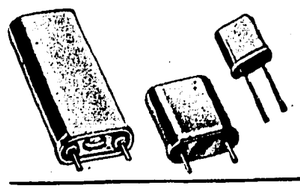
JK Transistor Oscillator: Complete, compact, precise plug-in signal source providing fixed temperature and humidity environment for transistor and circuitry elements. ***Frequency stability:*** (24-hr. period) 1 part in 10^6.



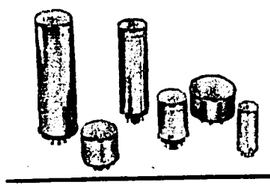
JK Crystal Filters: Compact, rugged, hermetically-sealed and stable, JK CRYSTAL FILTERS (band pass filters) have a ***Frequency Range:*** 1 mc to 17.5 mc., and are available for special filtering purposes to 150 mc. ***Band Width*** at 6 db: 0.01% to 4% of nominal on all frequencies, and up to 12% for certain frequencies.



JK Glasline Crystals: For ultra stable frequency control, JK GLASLINE CRYSTALS provide unprecedented stability and reliability. Compact, evacuated and hermetically-sealed against moisture, contamination, shock, and barometric pressure. Over a complete range of 800 cycles to 5 mc. and up.



JK Military Types: Hermetically-sealed, JK MILITARY TYPE CRYSTALS are metal-cased and in ***Frequency Ranges:*** 16 kc to 100 mc.



JK Ovens: Capable of maintaining set temperatures around components or circuitry with less than ±1° C. variation over the range of −55° to +100° C., JK OVENS are light, compact, inexpensive, uniform and reliable.

THE JAMES KNIGHTS COMPANY—SANDWICH, ILLINOIS

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From 747 pages in 1949 to 2417 pages in 1956—that's how advertising in "Proceedings of the I R E" sprouted in seven short years. It's a whopping 324% increase.

Not to be outdone, the annual IRE DIRECTORY also shows a mushroom advertising growth of 312%—from 133 pages in 1949 to 414 pages this year.

So rapid is progress in the radio-electronic field, so far-reaching is each new engineering achievement, manufacturers must run to keep from standing still. It's the radio engineers—designing, planning, producing and buying—who are the backbone and brains of this vast industry. They are the "thinking engineers"—members of The Institute of Radio Engineers—the men you most want to sell.

Engineers are educated to specify and buy.

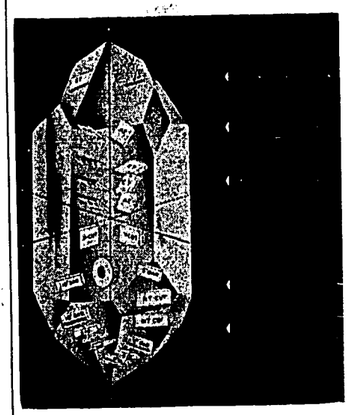
IRE DIRECTORY

Published by

The Institute of Radio Engineers

Adv. Dept., 72 W. 45th St.,
New York 36, N.Y.
MUrray Hill 2-6606

We make EVERY TYPE for every crystal need . . . .



Standard offers precision-cut crystals for EVERY application—aircraft, automotive, computers, marine, military, railway, radio, TV, etc. Immediate delivery on thousands of stock items; 24 hour delivery on most custom types. Write for complete diagrammed catalog!

Military-approved source for all government types

STANDARD CRYSTAL CO.

1714 LOCUST, KANSAS CITY 6, MO.

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An Announcement Of Importance

TO COMMUNICATION ENGINEERS AND DESIGNERS

Scientific Radio has felt that, in order to move ahead with the design thinking and planning of the communications engineer, it was necessary to take a fresh look at our own technical and engineering staff.

As a result of this appraisal, Scientific has developed the largest and most fully qualified staff in the world in the field of frequency control and its attendant fields of application.

Besides maintaining the largest crystal research laboratory in the country—located at Estes Park, Colo.—and one of the major production units—at Omaha, Nebraska—Scientific is building a new facility for specialized production at Loveland, Colorado.

Scientific makes available for the communication industry:

- Standard military-types of crystals
- Standard civilian-types of crystals

and more important, QUALITY PRODUCTION in the field of:

- Extremely high precision crystals
- New designs in low frequency crystals
- Filter crystals

and

ESPECIALLY IMPORTANT CRYSTAL FILTERS

If you are interested in the highest quality and the greatest precision, carefully evaluate the potential and performance of your crystal supplier against the standard of Scientific Radio Products, Inc.

CRYSTALS OF THE HIGHEST QUALITY FOR EVERY PURPOSE

One of the Oldest Manufacturers of Crystals in the United States.

Scientific

RADIO PRODUCTS, INC.

For details, circle #289 on Reader Service Card.

Crystals & Accessories—Class 33

Components Directory II.

33. Crystals & Accessories.

Kemtron Electron Products, Inc., Mass., 15, 35

Keystone Electronics Co., N.J., 10, 20, 25

Knights Co., James, Sandwich, Ill., 10, 20, 25
See ad on page 340
Tel: 2141

Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville 6, N.J., 10
See ads on pages 478, 496, 500
Tel: MAtawan 1-2600

Lewis Co., Inc., E. B., Conn., 10, 20, 25

Maryland Lava Co., Md., 5

Master Mobile Mounts, Inc., Calif., 20

McCoy Electronics Co., Watts & Chestnut Sts., Mt. Holly Springs, Pa., 5, 10, 20, 25
See ad on page 339
Tel: 376

Microlab, 71 Okner Parkway, Livingston, N.J., 5
See ad on page 353
Tel: LIvingston 6-5577

Microwave Development Labs., Inc., Mass., 5

Midland Manufacturing Co., Inc., Kan., 10, 20, 25

Monitor Products Co., Calif., 10, 20, 25

National Aircraft Corp., Calif., 15, 35

National Co., Mass., 5

National Fabricated Prods., Ill., 5

Northeast Electronics Corp., N.H., 5

Northern Electric Co., Ltd., Canada, 15

Northern Engineering Laboratories, Inc., Wis., 5, 10, 20, 25

Paul & Beekman, Inc., Pa., 10

Permonite Mfg. Co., Ill., 5

Petersen Radio Co., Inc., Iowa, 20, 25

Premier Research Labs., Inc., N.Y., 5, 10, 20, 25

Pye Corp. of America, N.J., 5, 10, 25

Radiation Counter Laboratories, Inc., Ill., 10

Reeves-Hoffman Div., Standard Electronics Corp., Ill., 5, 10, 20, 25

Rixon Electronics, 2414 Reedie Dr., Silver Spring, Md., 10
See ad on page 263
Tel: LOckwood 5-3516

Sage Laboratories, Inc., Mass., 5

Schuyler Manufacturing Corp., N.J., 35

Scientific Electronic Lab., N.J., 5

Scientific Radio Products, Inc., 215 S. 11th St., Omaha 2, Neb., 10, 20, 25
See ad on this page
Tel: ATlantic 9787

Scientific Radio Service, Md., 20

Sealectro Corp., 610 Fayette Ave., Mamaroneck, N.Y., 5
See ad on page 556
Tel: MAmaroneck 9-7800

Semimetals, Inc., N.Y., 15, Silicon

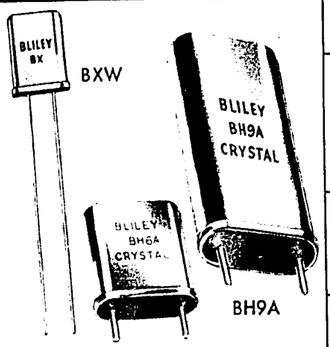
Sherold Crystals, Inc., Mo., 20, 25

Solar Manufacturing Corp., Calif., 25

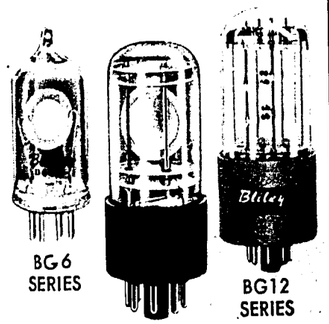
Standard Crystal Co., 1714 Locust St., Kansas City 6, Mo., 5, 10, 20, 25
See ad on page 340
Tel: VIctor 2-6841

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

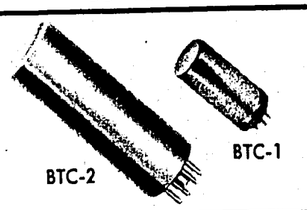
BLILEY CRYSTALS • BLILEY OVENS



BLILEY HOLDER	DESCRIPTION	MIL CRYSTAL UNIT
BH6A (MIL HOLDER HC-6/U)	Hermetically sealed unit. Also available with wire leads as "BH6W." Freq. Range: 200kc to 125mc. Dimensions: 25/32" long x 3/4" wide x 11/32" thick (excl. pins). Bulletin #493.	CR-18/U, CR-19/U, CR-23/U, CR-25/U, CR-26/U, CR-27/U, CR-28/U, CR-32/U, CR-33/U, CR-35/U, CR-36/U, CR-44/U, CR-45/U, CR-46/U, CR-47/U, CR-48/U, CR-51/U, CR-52/U, CR-53/U, CR-54/U, CR-62/U
BXW (MIL HOLDER HC-18/U)	Subminiature hermetically sealed unit, wire leads. Also available plug-in as "BXP." Freq. Range: 10mc to 125mc. Dimensions: 33/64" long x 27/64" wide x 11/64" thick (excl. wire leads). Bulletin #502.	CR-55/U, CR-56/U, CR-59/U, CR-60/U, CR-61/U
BH9A (MIL HOLDER HC-13/U)	Hermetically sealed unit. Freq. Range: 4kc to 200kc. Dimensions: 1-17/32" long x 3/4" wide x 11/32" thick (excl. pins). Bulletin #501.	CR-37/U, CR-38/U, CR-42/U, CR-50/U



	DESCRIPTION	DIMENSIONS
BG9 SERIES BG9D-S, 100kc Std. BG9A-S, 1000kc Std.	Sealed-in-glass crystal unit provides exceptional stability with minimum ageing. Used as reference source in secondary frequency standards. Bulletins #491 (1000kc) and #492 (100kc).	2-1/2" long x 1-9/32" dia. (excl. pins) Octal Base
BG6 SERIES	All glass, vacuum mounted crystal unit for tight tolerance performance with minimum change due to ageing. Advance process techniques assure high reliability. Freq. Range: 3mc to 125mc. Bulletin #496.	1-3/8" long x 3/4" dia. (excl. pins) Small Button Miniature Base
BG12 SERIES BG12G-S, 100kc Std.	For primary frequency standards. Precision sealed-in-glass crystal unit combines high stability performance with minimum ageing. Temp. coefficient: Less than 0.2ppm per degree C. between +65°C. and +75°C. Bulletin #498.	3-11/16" long x 1-23/32" dia. (excl. pins) Octal Base



BTC-1	Subminiature hermetically sealed package combines crystal control and temperature stabilization in a single plug-in unit. Freq. Range: 5mc to 125mc. Stability: ± .0003%. Bulletin #494.	1-5/8" long x 51/64" dia. (excl. pins) Std. Noval 9-Pin Base
BTC-2	Hermetically sealed package combines all-glass vacuum mounted crystal with precise temperature control. Freq. Range: 4kc to 125mc. Stability: ± .00004% in range 800kc to 125mc. Bulletin #497.	3-3/4" long x 1-1/4" dia. (excl. pins) Octal Base

BLILEY TYPE	DESCRIPTION
TCO-1 OVEN SERIES	Plug-in ovens for temperature control of single crystal unit in Bliley BH6A or MIL HC-6/U holder. Stability: ±3°C. at 75°C. or 85°C. Supplied for 6.3 volt, 12.6 volt or 26.5 volt operation. Dimensions: 1-9/16" long x 1-3/16" dia. (excl. pins). Octal Base. Bulletin #499.
TCO-2 OVEN SERIES	Plug-in ovens for temperature control of two crystal units in Bliley BH6A or MIL HC-6/U holders. Stability: ±3°C. at 75°C. or 85°C. Supplied for 6.3 volt, 12.6 volt, or 26.5 volt operation. Dimensions: 1-9/16" long x 1-3/16" dia. (excl. pins). Octal Base. Bulletin #499.
TCO-21 OVEN SERIES	Plug-in ovens for temperature control of two crystal units in Bliley BH6A or MIL HC-6/U holders. Stability: ±2°C. at 75°C. or 85°C. Supplied for 6.3 volt, 12.6 volt or 26.5 volt operation. Dimensions: 1-9/16" long x 1-3/16" dia. (excl. pins). Octal Base. Bulletin #499.
TCO-2L TCO-2P OVENS	Plug-in ovens for temperature control of two crystal units in Bliley BH9A or MIL HC-13/U holders. Stability: ±4°C. at 75°C. TCO-2L for 6.3 volt operation; TCO-2P for 12.6 volt operation. Dimensions: 2-3/16" long x 1-3/16" dia. (excl. pins). Octal Base. Bulletin #499.
TC91 TC92 TC93 OVEN SERIES	Precision temperature control ovens for Bliley crystal units: FM6, BH81A, MC7, BH8, MC75, MS46A, AR23W, BG9A series and BG9D series. Stability: ± 1°C. Supplied for 6.3 volt, 18 volt or 115 volt operation. Dimensions: 4-7/16" long x 3-3/4" dia. (excl. pins). Giant 7-pin base. Bulletin #500.
TC97 OVEN SERIES	High precision temperature control ovens for Bliley crystal units: BH8, MC75, MS46A, and BG12G-S. Stability: ±0.25°C. Supplied for 6.3 volt operation. Dimensions: 4-23/32" long x 4-1/2" dia. (excl. pins). Giant 7-pin base. Bulletin #500.

Bliley CRYSTALS

BLILEY ELECTRIC COMPANY UNION STATION BLDG., **ERIE, PENNSYLVANIA**

Directory II. Components

33. Crystals & Accessories.

Sylvania Electric Products Inc., Dept. F24P, 1740 Broadway, New York 19, N.Y., 5, 15, 35
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Tel: JUdson 6-2424
Technicraft Labs., Inc., Conn., 5
Telerad Mfg. Corp., 5, Microwave
Telonic Industries, Inc., 73 N. Second Ave., Beech Grove, Ind., 5
See ad on page 511
Tel: STate 6-9239
Texas Crystals Div., Ill., 5, 20
Texas Instruments Incorporated, 6000 Lemmon Ave., Dallas 9, Tex., 15, 35
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Tel: FLeetwood 2-1781
Thermal American Fused Quartz Co., N.J., 20
United Insulator Co., Ltd., England, 25
United Mineral & Chemical, N.Y., 35
U.S. Dynamics Corp., Mass., 15, 25
Valpey Crystal Corp., Mass., 10, 20, 25
Whitting & Davis Co., Inc., Mass., 5
Wright Electronics, Inc., Mo., 10, 20, 25
Wright Engineering Co., Calif., 25
Zell Products Corp., Conn., 5

Cutting heads & styli: See class 49

Decades: See class 69

Deflection yokes: See class 29

34. Delay Lines.

5. Decade
10. Distributed constant fixed
15. Distributed constant variable
20. Lumped constant fixed
22. Lumped constant variable
25. Ultrasonic

Advance Electronics Lab., Inc., 249-259 Terhune Ave., Passaic, N.J., 5, 10, 15, 20, 22
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Tel: GRegory 2-5622
Aermotive Equipment Corp., Mo., 20
Aerocoil, Inc., N.J., 20
Aeronca Resch., Md., 5, 10, 15, 20, 22, 25
Airdesign, Inc., Pa., 10, 20
Aladdin Electronics, Tenn., 10
All-Tronics, Inc., 45 Bond St., Westbury, L.I., N.Y., 5, 20
See ad on page 347
Tel: EDgewood 3-3090
Andersen Laboratories, Inc., 501 New Park Ave., W. Hartford 10, Conn., 25
See ad on this page
Tel. ADams 3-4491
Andrew Corp., 363 E. 75th St., Chicago 19, Ill., 10
See ad on page 258
Tel: TRiangle 4-4400

34. Delay Lines.

Arenberg Ultrasonic Lab., Inc., Mass., 25
Barker & Williamson, Inc., Pa., 10, 15, 20, 22
Bel Fuse, Inc., N.J., 10
Bliley Electric Co., Union Station Building, Erie, Pa., 25
See ads on pages 342, 343
Tel: ERie 22-287
Brew & Co., Inc., Richard D., 90 Airport Rd., Concord, N.H., 10, 15, 20, 22, 25
See ad on page 345
Tel: CApitol 5-6606
Brubaker Electronics, Inc., Calif., 5, 20
Burnell & Co., Inc., 10 Pelham Parkway, Pelham Manor, New York 26, Mutual Inductance
Multiple pages of additional data on 138-139
Tel: PElham 8-5000
Burroughs Corp., Mich., 25
Carad Corp., Calif., 20
Coil Winders, Inc., N.Y., 20, 22
Columbia Technical Corp., N.Y., 5, 10, 20
Communication Accessories Co., Highway 50 & 71 Bypass, Lee's Summit, Mo., 20
Multiple pages of additional data on 49-54
Tel: BRoadway 1-1700

SOLID ULTRA-SONIC DELAY LINES

Production quantities and prototype development of both fixed and variable lines.

Complete range of length to customers' specifications for *radar* and computer applications.

Andersen Laboratories INCORPORATED ADams 3-4491

501 New Park Avenue
West Hartford 10, Conn.

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SOLID ULTRASONIC DELAY LINES by BLILEY...
FROM 3 TO 4500 MICROSECONDS

Solid ultrasonic delay lines by Bliley are supplied for any specified delay interval from 3 to 4500 microseconds.

Without resorting to temperature control and temperature adjustment, the following table shows practical tolerances that can be maintained with Bliley delay lines.

2-10	microsecond	delay	±.05%	at 25°C
10-50	microsecond	delay	±.03%	at 25°C
50-100	microsecond	delay	±.05%	at 25°C
100-500	microsecond	delay	±.07%	at 25°C
500-4500	microsecond	delay	± .1%	at 25°C

Special bonding methods (transducers to fused quartz) and hermetically sealed cases assure permanent performance characteristics from - 60°C to +85°C.

BLILEY ELECTRIC CO., UNION STATION BLDG., **ERIE, PA.**

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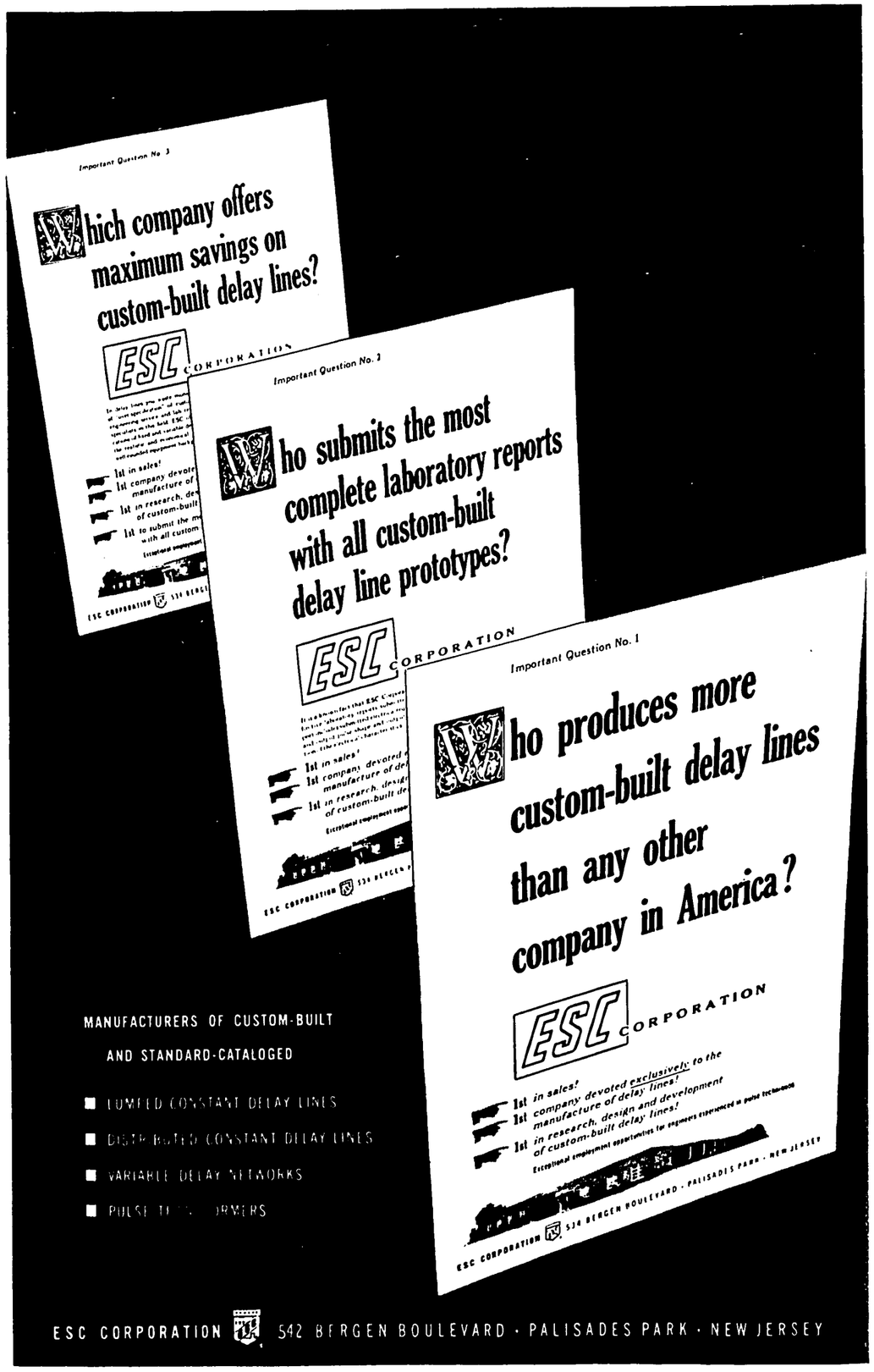
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

← For details, circle #290 on Reader Service Card.



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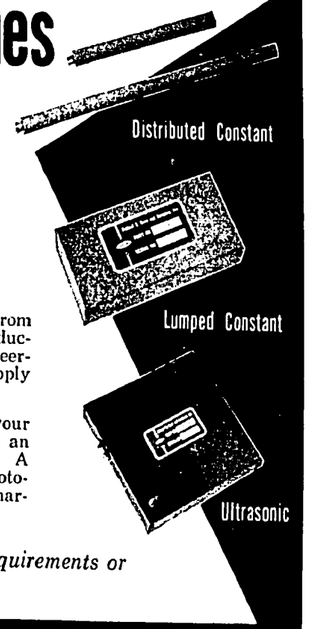
Brew Delay Lines meet exacting specifications



Whatever your delay line requirements, from prototype to large scale manufacture of production units, Brew offers you the design-engineering experience and complete facilities to supply your most exacting specifications.

Brew Delay Lines are custom made to your requirements and are available covering an extremely wide range of characteristics. A Laboratory Report accompanies every prototype showing your specifications and the characteristics of the prototype.

Send us specifications on your requirements or send for your copy of catalog 54.

BREW **Richard D. Brew and Company, Inc.**

Concord, New Hampshire

design · development · manufacture

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DELAY LINES-LUMPED-PARAMETER
- . . High Delay To Rise Time Ratios
- . . Low Attenuation
- . . Potted To Meet MIL Specifications

MECHANICAL CLUTCHES
- . . Mechanical Pulsing Devices
- . . Mechanical Amplifiers
- . . Stepping Devices

MAGNETIC TAPE HANDLING EQUIPMENT
- . . Versatility
- . . Reliability
- . . Rugged Construction

SPECIAL PURPOSE SYSTEMS AND DEVICES
- . . Conversion and Decoding Equipment
- . . High Speed Printers
- . . Memory Systems-Drums

For more information, please write or phone.

DIGITRONICS CORP.

ALBERTSON, N.Y. • Pioneer 7-5090

For details, circle #295 on Reader Service Card.

Directory II. Components

34. Delay Lines.

Communication Parts, Ill., 10, 20
Computer Control Co., Inc., 92 Broad St., Babson Park, Wellesley 57, Mass., 20, 25
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Tel: WEllesley 5-6220
Control Electronics Co., Inc., 1925 New York Ave., Huntington Station, L.I., N.Y., 5, 10, 15, 20, 22
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Tel: HAmilton 7-7961
Corning Glass Works, N.Y., 25
Corona Engineering Service, N.Y., 20
D X Radio Products Co., Ill., 25
Daven Company, N.J., 5, 10, 20
Deltime, Inc., N.Y., 25 Magnetostrictive, 26 Variable
Deutschmann Corp., Tobe., Mass., 20, 22
Digitronics Corp., Albertson Ave., Albertson, L.I., N.Y., 5, 20, 22
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Tel: PIoneer 7-5090
Direct TV Replacements, England, 10
E S C Corporation, 542 Bergen Blvd, Palisades Park, N.J., 5, 10, 15, 20, 22, 25
See ad on page 344
Tel: WIndsor 7-0400
Electrical & Physical Instrument Corp., N.Y., 15
Electron Laboratories, N.Y., 5, 10, 15, 25
Elliott Brothers (London) Ltd., England, 10, 25
El-Rad Mfg. Co., Ill., 10, 20
Enslein, Kurt, 96 Greenaway Rd., Rochester 10, N.Y., 5
See ad on page 536
Tel: HI 5-4314
Epsco, Inc., Mass., 20
Essex Electronics, N.J., 10, 20
Farnsworth Electronics Co., Ind., 20
Federal Television Corp., N.Y., 20
Ferranti Electric, Inc., N.Y., 20, 25
Ferranti Electric Ltd., Canada, 25
Filtron Co., Inc., 131-15 Fowler Ave., Flushing 55, L.I., N.Y., 10, 20
See ad on page 350
Tel: FLushing 9-8300
Forbes & Wagner, Inc., 345 Central Ave., Silver Creek, N.Y., 10, 20
See ad on page 316
Tel: SIlver Creek 650
Fugle-Miller Labs., Inc., N.J., 20
General Automatics, Inc., Calif., 20
General Electric Co., Electronic Components Dept., N.Y., 10
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 15
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Tel: TRowbridge 6-4400
Gray & Kuhn, Inc., N.Y., 10, 20, Phase Corrected
Gudeman Co., Dilectron Div., Calif., 10, 15
Gudeman Co., Ill., 10, 20
Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J., 20
See ad on page 184
Tel: LIberty 8-2800

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

34. Delay Lines.

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Helipot Corp., Beckman Instruments, Inc., Calif., 15
International Resistance Co., Pa., 10
Ironbound Operating Co., N.J., 5, 10, 15, 20, 25
Jacobs Instrument Co., Md., 5, 20, 22
Laboratory for Electronics, Inc., Mass., 25
Leonard Electric Products Co., Inc., N.Y., 20
Litton Industries, 336 N. Foothill Rd., Beverly Hills, Calif., 20
See ad on page 90
Tel: CRestview 4-7411
Litton Industries, Components Div., Calif., 20
Meridian, Inc., Conn., 5
Micamold Electronics Corp., N.Y., 20
Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 10, 20
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Tel: MAlden 4-4108
Morand Electronics, Calif., 20
Ortho Filter Corp., 196 Albion Ave., Paterson 2, N.J., 10, 20
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Tel: MUlberry 4-5858
PCA Electronics, Inc., Calif., 5, 10, 15, 20, 22
Packard-Bell Electronics Corp., 12333 W Olympic Blvd., Los Angeles 64, Calif., 10, 15, 20, 22, 25
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Tel: BRadshaw 2-2171
Polyphase Instrument Co., Pa., 20
Pulse Engineering, Inc., Calif., 10, 20
Radio Components Ltd., Canada, 10
Ranson Research, Calif., 25
Raytheon Mfg. Co., Equip. Sales Operations, Mass., 20
Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 20, 22
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Shallcross Manufacturing Co., Pa., 10, 15, 20, 22
Sickles Div., F. W., General Instrument Corp., Mass., 10, 20
Skiatron Electronics & TV Corp., N.Y., 15
Stromberg-Carlson, Div. Gen. Dynamics Corp., N.Y., 10, 20
Technitrol Engineering Co., Inc., Pa., 5, 10, 20
Telechrome, Inc., 28 Ranick Dr., Amityville, L.I., N.Y., 5, 10, 15, 20, 22, 25
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United Transformer Corp., 150 Varick St., New York 13, N.Y., 20
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Tel: ALgonquin 5-3500
Vanguard Electronics Co., Calif., 10, 20, 22
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Dials: See class 87

Diodes, germanium and silicon: See class 54

Diodes, selenium: See class 50

Disks, Blank recording: See class 49

Dosimeters: See class 78

Drums, magnetic: See class 70

Electro-magnets: See class 41

Electrometer tubes: See class 62

Envelopes, vacuum tube: See class 97

DELAY LINES
FIXED & VARIABLE
For: LABORATORY — COLOR TELEVISION
COMPUTERS — RADAR — etc.
Also: UHF CRYSTAL CALIBRATOR
PHASE METER & STANDARD
TIME INTERVAL STANDARD
CONTROL ELECTRONICS CO., INC.
1925 New York Ave., Huntington Station, Long Island, N. Y.
HAmilton 7-7961
For details, circle #296 on Reader Service Card.

35. Equalizers.

5. Dialogue equalizers
10. Line equalizers
15. Magnetic recording
20. Recording diameter equalizers
25. Sound effect equalizers

A-V Mfg. Corp., N.Y., 15
Aerovox Corp., Mass., 5, 25
American Microwave Corp., Calif., 10
Atlas Engineering Co., Inc., Mass., 10
Audio Development Co., Minn., 10
Cinema Eng., Calif., 5, 10, 15, 20, 25
Communication Accessories Co., Highway 50 & 71 Bypass, Lee's Summit, Mo., 10
Multiple pages of additional data on 49-54
Tel: BRoadway 1-1700
Community Engineering Corp., Pa., 10
Daven Company, N.J., 10, 25
Dunlap Electronics, Iowa, 15
Entron, Inc., Md., 10
Fairchild Redng. Equip. Co., N.Y., 15
Fisher Radio Corp., N.Y., 20, Audio Freq. Filter
Fonda Corp., Pa., 15
Gates Radio Co., Ill., 25
General Electric Co., Broadcast & Mil. Elect. Prods. Dept., N.Y., 10, 25
Gray Research & Dev. Co., Conn., 20
Harrison Laboratories, Inc., Industrial Rd., Berkeley Heights, N.J., 10
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Tel: CRestview 3-9123
Hycor Div., International Resistance Co., Calif., 5, 10, 25
Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 5, 10, 15, 25
See ad on page 381
Tel: LUdlow 4-6200
Ironbound Operating Co., N.J., 10, 15, 25
Ling Electronics, Inc., 5120 West Jefferson, Los Angeles 16, Calif., Audio
See ad on page 480
Tel: WEbster 3-9595
Magnecord, Div. Midwestern Inst., Inc., Ill., 15
Minnesota Mining & Mfg. Co., Mincom Div., Calif., 15
Northern Electric Co., Ltd., Canada, 10
Ortho Filter Corp., 196 Albion Ave., Paterson 2, N.J., 10
See ad on page 353
Tel: MUlberry 4-5858
Pacific Transducer Corp., Calif., 10
Painton & Co., c/o British Electronic Sales, N.Y., 5, 10, 15, 20, 25 & Input Faders
Presto Recording Corp., N.J., 15, 20
Pulse Techniques, Inc., N.J., 5
RCA Victor Co., Ltd., Canada, 5, 10, 15, 25
Radio Engineering Products, Ltd., 1080 University St., Montreal, Quebec, Canada, 5, 10, 15, 20, 25
See ad on page 282
Tel: UNiversity 6-6887
Reeves Equipment Corp., N.Y., 15, 20
Seismograph Service Corp., Okla., 15
Spencer-Kennedy Laboratories, Inc., 1320 Soldiers Field Rd., Boston 35, Mass., 10
See ad on page 352
Tel: ALgonquin 4-5400
Technisonic Studios, Inc., Mo., 20, 25

Directory II. Components

35. Equalizers.

Torwico Electronics, Inc., 1090 Morris Ave., Union, N.J., 10
See ad on page 320
Tel: ELizabeth 4-5650
Transval Engineering Corp., Calif., 15
United Electrodynamics, Calif., 15
United Transformer Corp., 150 Varick St., New York 13, N.Y., 5, 10, 15, 20, 25
See ad on Cover 2
Tel: ALgonquin 5-3500

Fans: See class 24

Fasteners: See class 87

36. Filters.

5. Antenna
10. Band pass & band rejection
12. Crystal
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20. Loudspeaker dividing networks
22. Low pass
25. Mechanical
30. Microwave
35. RF noise reduction
37. SSB
40. TV noise reduction
45. UHF & VHF
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Adler Electronics, Inc., N.Y., 5, 45, 50
Advance Electronics Co., Mich., 45
Aerocoil, Inc., N.J., 5
Aerovox Corp., Mass., 5, 10, 15, 22, 35, 40
Airborne Accessories Corp., N.J., 35
Aircom, Inc., 354 Main St., Winthrop 52, Mass., 5, 10, 30
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Tel: OCean 3-3096
Airdesign, Inc., Pa., 10, 15
Airtron, Inc., Dept. 1, 1101 W. Elizabeth Ave., Linden, N.J., 30
See ad on page 453
Tel: HUnter 6-1000
Alford Manufacturing Co., 299 Atlantic Ave., Boston 10, Mass., 5, 22
See ad on page 507
Tel: HAncock 6-2150
Allen-Bradley Co., Wis., 45
Altec Lansing Corp., Calif., 10, 15, 20
All-Tronics, Inc., 45 Bond St., Westbury, L.I., N.Y., 5, 10, 15, 22, 35, 37, 40, 45
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Tel: EDgewood 3-3090
Amerac, Inc., Mass., 30
American Communication Corp., N.Y., 20
American Electronic Labs., Inc., Pa., 30
American Research & Mfg. Corp., Md., 10, 15, 22
Amtron Corp., Mass., 45
Andrew Antenna Corp., Ltd., Canada, 5
Andrew Corp., 363 E. 75th St., Chicago 19, Ill., 5, 10, 15, 22, 30, 35, 45, 50
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Tel: TRiangle 4-4400
Ark Engineering Co., Pa., 5, 10, 22, 30, 35
Armstrong Cork Co., Pa., 20
Arrow Radio Co., Canada, 35
Astron Corp., 255 Grant Ave., East Newark, N.J., 15, 20, 22, 35
See ad on page 164
Tel: HUmboldt 2-7800

36. Filters.

Atlas Engineering Co., Inc., Mass., 10, 15, 22
Audio Development Co., Minn., 10, 15, 20, 22, 50
Axel Bros., Inc., N.Y., 35
Balco Research Laboratories, N.J., 5, 10, 15, 22
Barker & Williamson, Inc., Pa., 5, 10, 15, 20, 22
Bayly Engineering, Ltd., Canada, 10, 15, 22, 37
Belling & Lee, Ltd., England, 35
Benco Television Associates, Ltd., Canada, 40
Bergen Laboratories, N.J., 10, 45
Bird Electronic Corp., 1800 E. 38th St., Cleveland 14, Ohio, 5, 10, 15, 22, 30, 45
See ad on page 504
Tel: EXpress 1-3535

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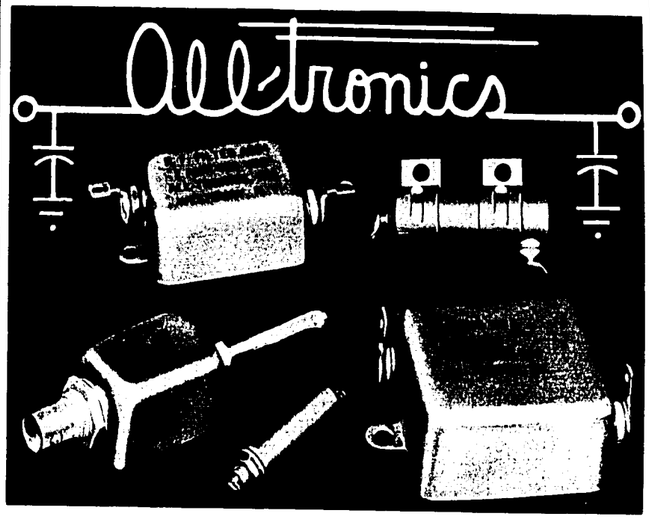
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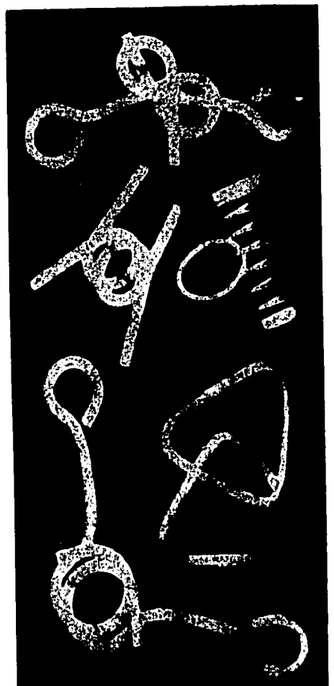

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Directory II. Components

36. Filters.

Browning Laboratories, Inc., Mass., 10

Budd-Stanley Co., Inc., Dept. IRE, 43-01 22nd St., Long Island City 1, N.Y., 30
See ad on page 450
Tel: STillwell 6-1706

Budelman Radio Corp., 375 Fairfield Ave., Stamford Conn., 45
See ad on page 269
Tel: FIreside 8-9231

Bulova Watch Co., Inc., Dept. DA-776, 40-60 62nd St., Woodside 77, N.Y., 10, 12, 15, 22, 37
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Tel: NEwton 9-5700

Burnell & Co., Inc., 10 Pelham Pkwy., Pelham Manor, N.Y., 5, 10, 12, 15, 22, 37
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Tel: PElham 8-5000

C G Electronics Corp., N.M., 10, 25

Cal-Air Engineering, Inc., Calif., 10, 15, 22

Calbest Electronics Co., Calif., 15

Canoga Corp., Calif., 5, 10, 15, 22, 30, 50

Capcon, Inc., N.Y., 5, 15, 35, 40, 45

Celco—Constantine Eng. Labs. Co., 70 Island Ave., Box 55, Mahwah, N.J., 10, 15
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Tel: DAvis 7-1123

Channel Master Corp., N.Y., 5

Chicago Electronic Engineering Co., 3223 W. Armitage Ave., Chicago 47, Ill., 10, 15, 22, 50
See ad on page 431
Tel: CApital 7-3130

Chicago Magnetic Control, 1616 N. Damen Ave., Chicago 47, Ill., 10, 15, 22, 50
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Tel: ARmitage 6-7400

Chicago Standard Transformer Corp., 3514 W. Addison St., Chicago 18, Ill., 10, 15, 22
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Tel: INdependence 3-7400

Cinema Engineering, Calif., 15, 22

Clegg Laboratories, Inc., N.J., 5, 10, 15, 22, 37, 40, 45

Cleveland Electronics, Inc., Ohio, 20

Clippard Instrument Lab., Inc., Ohio, 15, 45

Coil Winders, Inc., N.Y., 5, 10, 15, 22, 35, 45, 50

Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa, 25, 37, 45
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Tel: EM 3-0281

Communication Accessories Co., Highway 50 & 71 Bypass, Lee's Summit, Mo., 10, 12, 15, 22, 25, 37
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Tel: BRoadway 1-1700

Communication Equipment & Engineering Co., Ill., 10, 15, 22

Communication Parts, Ill., 10, 35

Community Engineering Corp., Pa., 10, 40, 45

Connecticut Telephone & Electric Co., Conn., 5, 10, 15, 45, 50

Continental Carbon, Inc., Ohio, 35

Continental Electronics Mfg. Co., Tex., 30, 37

Control Electronics Co., Inc., 1925 New York Ave., Huntington Station, L.I., N.Y., 22
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Tel: HAmilton 7-7961

Corbin Corp., Md., 5, 10, 35, 45

Cornell-Dubilier Electric Corp., 333 Hamilton Blvd., S. Plainfield, N.J., 10, 15, 22, 35, 40, 50
See ad on Cover 3
Tel: PLainfield 6-9000

Cycle Transformer Corp., N.J., 15, 22

D & R, Ltd., Calif., 10, 37

D X Radio Products Co., Ill., 10, 15, 20, 22, 35, 40, 45

Daven Company, N.J., 10, 37, 50

Daystrom, Inc., N.J., 15, 20, 22

Defiance Engineering & Microwave Corp., P.O. Box 488, Beverly, Mass., 5, 10, 15, 22, 30
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Tel: WAlker 2-8100

Deutschmann Corp., Tobe, Mass., 5, 10, 15, 22, 30, 35, 37, 40, 45

Devol Research Co., Conn., 10, 50

Diamond Antenna & Microwave Corp., Mass., 5, 10, 15, 22, 30, 50

Dietz Design & Mfg. Co., Mo., 10, 15, 22, 25, 37, 40, 45, 50

Dorne & Margolin, Inc., N.Y., 5

Douglas Microwave Co., Inc., 252 E. 3rd St., Mt. Vernon, N.Y., 22, 30
See ad on page 452
Tel: MOunt Vernon 8-6900

Dubrow Development Co., N.J., 10, 15

Dwyer Engineering Co., Inc., N.H., 30

E S C Corporation, 542 Bergen Blvd., Palisades Park, N.J., 5, 10, 15, 22, 35, 45
See ad on page 344
Tel: WIndsor 7-0400

Eagle Electronics Corp., Conn., 5, 10, 15, 20, 22, 35, 40

Edin Company, Inc., Mass., 10

Electron Laboratories, N.Y., 5, 20, 40

Electronic Designs, Inc., N.Y., 10

Electronic Specialty Co., 5121 San Fernando Rd., Los Angeles 39, Calif., 5, 10, 15, 22, 35, 37, 45, 50
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Tel: CHapman 5-3771

El-Rad Mfg. Co., Ill., 5, 10, 15, 20, 22, 37

Empire Devices Products Corp., Amsterdam, N.Y., 30
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Tel: VIctor 2-8400

Ensign Coil Co., Ill., 10, 15, 22

Entron, Ind., Md., 5, 10, 15, 45

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F-R Machine Works, Inc., 26-12 Borough Place, Woodside, 77, N.Y., 30
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Tel: AStoria 8-2800

F S D Laboratories, Conn., 22, 35

Fiber Glass Industries, Inc., N.Y., 5

Filtron Co., Inc., 131-15 Fowler Ave., Flushing, 55, L.I., N.Y., 5, 10, 15, 22, 30, 35, 45
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Tel: FLushing 9-8300

Foto-Video Labs., Inc., N.J., 15

Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 10, 15, 22
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Tel: EVergreen 6-1300

Frequency Standards, Inc., N.J., 10, 15, 22, 30, 37

Fugle-Miller Labs., Inc., N.J., 5, 10, 22, 35, 50

General Automatics, Inc., Calif., 10, 15, 20, 22

General Bronze Corp., N.Y., 5, 10, 15, 22, 25

General Communication Co., 681 Beacon St., Boston 15, Mass., 30
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Tel: COpley 7-6030

General Electric Co., Broadcast & Mil. Elect. Prods. Dept., N.Y., 45

General Electric Co., Electronics Components Dept., N.Y., 15, 20

General Lab. Assoc., Inc., N.Y., 35

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 10, 15, 22
See ad on Cover 4
Tel: TRowbridge 6-4400

Gertsch Products, Inc., 3211 S. La Cienega, Los Angeles 16, Calif., 50
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Tel: TExas 0-2761

Goodmans Industries, Ltd., England, 20

Gorham Manufacturing Co., Bronze Div., R.I., 30

Gramatan Instrument Co., N.Y., 30, 50

Gray & Kuhn, Inc., N.Y., 35, 40

Gray Manufacturing Co., Conn., 12

Gudeman Co., Ill., 22, 35, 40

Guthman & Co., E. I., Ill., 5

Hallett Mfg. Co., Calif., 35, 40

Hammarlund Mfg. Co., N.Y., 10, 15, 22

Harder Co., Donald C., Calif., 10

Heath Co., 305 Territorial Rd., Benton Harbor 4, Mich., 20
See ad on page 478
Tel: WAlnut 5-0051

Hewlett-Packard Co., 4277D Page Mill Rd., Palo Alto, Calif., 10, 15, 22, 30, 45
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Tel: DAvenport 5-4451

Hi-Lo TV Antenna Corp., Ill., 5, 10, 15, 22, 45

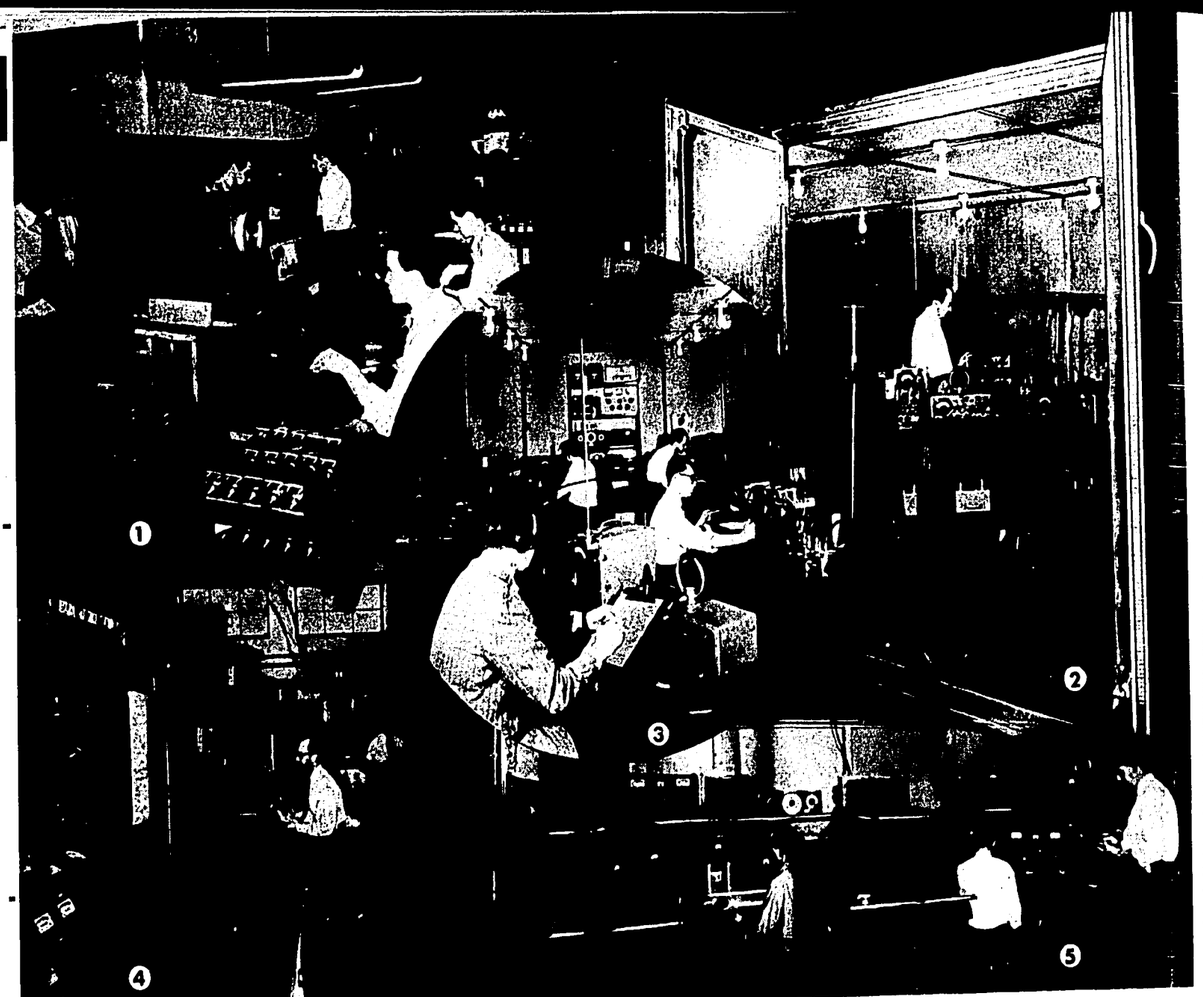
Hill Associates, Inc., James J., Fla., 10, 35, 40, 45

Hill Electronic Engr. & Mfg. Co., Inc., Pa., 10, 12, 15, 22

Hogan Laboratories, Inc., N.Y., 10, 15

Hopkins Engineering Co., Calif., 35

Hycon Eastern, Inc., 75 Cambridge Pkwy., Cambridge 42, Mass., 10, 12, 15, 22, 35, 37, 45
Multiple pages of additional data on 140-141
Tel: UNiversity 4-7200



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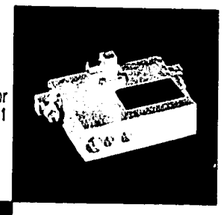

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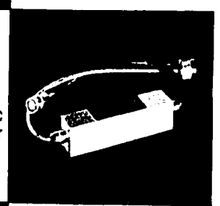

Miniature 1450-mc Low-Pass Filter

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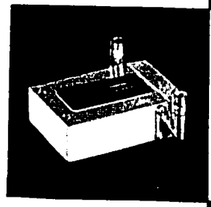
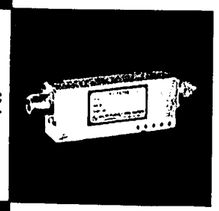


Miniature 400-mc Low-Pass Filter



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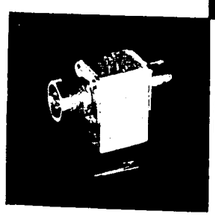

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36. Filters.

Hycon Electronics, Inc., Calif., 12
Hycor Div., International Resistance Co., Calif., 10, 15, 22, 50
I.D.E.A., Inc., Ind., 15, 40
Inductor Engineering, Inc., Del., 10, 12, 15
Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 20
See ad on page 381
Tel: LUdlow 4-6200
International Crystal Mfg. Co., Inc., Okla., 15, 22
International Resistance Co., Pa., 10, 15, 22
Ironbound Operating Co., N.J., 10, 20
Islip Transformer & Mental Co., Inc., N.Y., 10, 15, 22
J-V-M Engineering Co., 4632 S. Lawndale Ave., Lyons, Ill., 5, 10, 30, 45
See ad on page 455
Tel: LYons 3-7990
Jensen Manufacturing Co., Ill., 20
Jerrold Electronics, Ltd., Canada, 10, 40, 45
Jerrold Electronics Corp., Dept. TED #2, 23rd & Chestnut Sts., Philadelphia, Pa., 10
See ad on page 234
Tel: LOcust 4-0707
Johnson Co., E. F., Minn., 22
Kaar Engineering Co., Calif., 22
Kama Instrument Corp., 178 E. 2nd St., Mineola, L.I., N.Y., 5, 10, 15, 22, 30, 40, 45, 50
See ad on page 411
Tel: PIoneer 6-4942
Kearfott Co., Western Div., 253 North Vinedo Ave., Pasadena, Calif., 5, 30
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Tel: STanley 7-1178
Kennedy & Co., D. S., 155 King St., Cohasset, Mass., 10
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Tel: COhasset 4-1200
Kenyon Transformer Co., Inc., N.Y., 10, 15, 22
Keystone Products Co., N.J., 10, 15
Knights Co., James, Sandwich, Ill., 12
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Tel: 2141
Krohn-Hite Corp., 580 Massachusetts Ave., Cambridge 39, Mass., 10, 50
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Tel: UNiversity 4-4272
Lambda-Pacific Engr., Inc., Calif., 30
La Pointe Industries, Inc., Conn., 5, 45
Leonard Electric Products Co., Inc., N.Y., 10, 15, 45
Lepace Mfg. Co., N.Y., 10, 15
Lewis Co., Inc., E. B., Conn., 12
Lieco, Inc., 3610 Oceanside Rd., Oceanside, N.Y., 30
See ad on page 455
Tel: ROckville Centre 6-7620
Litton Industries, 336 N. Foothill Rd., Beverly Hills, Calif., 10, 15, 22
See ad on page 90
Tel: CRestview 4-7411
Lynch Carrier Systems, Inc., Calif., 10, 15, 22

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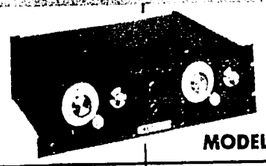
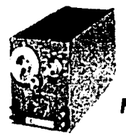


MODEL 302



MODEL 300

		MODEL 302	MODEL 300
FUNCTION		High or Low Pass Band Pass or Reject	High or Low Pass
Cut-off Freq. Range		20 cps to 200 kc	20 cps to 200 kc
Attentuation Rate	Per Section	18 db/octave	18 db/octave
	Max.	36 db/octave	18 db/octave
PASS BAND		2 cps to 4 mc	2 cps to 4 mc
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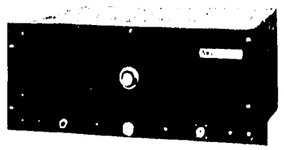

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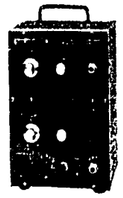
Gaussian, flat or sloping response curve

Linear, pulse or high level pulse output mode

MODEL	BANDWIDTH	GAIN	OUTPUT	IMPEDANCE	
				INPUT	OUTPUT
214B	200 cps—90 mc	30 db	125 v, pulse	180	5000
211	15 mc—110 mc	33 db	4 v, rms	50	50
202D	1 kc—210 mc	20 db	4 v, rms	200	200
212C-TV	54 mc—216 mc	20 db	3 v, peak	50 or 75	50 or 75
206	600 cps to 320 mc	18 db to 24 db	(1) 6 v, rms (2) 60 v, pulse (3) 125 v, pulse	180	200

FAST-RISE PULSE GENERATOR

***THE* Standard for Millimicrosecond Pulses**



Model 503 is ideal for testing the transient response of wide band amplifiers and semiconductors. Higher voltage pulses are available through use of an external power supply.

Rise time:	Less than 1 millimicrosecond
Amplitude:	0 to 150 volts
Repetition Rate:	50 to 120 cps
Pulse Width:	.06 x 10^{-10} Sec., Minimum Determined by Length of Width Cable. Max. Width not Restricted. .05 x 10^{-9} Sec., Factory Supplied
Polarity:	Either Positive or Negative
Load Impedance:	50 ohms

For further information write

SKL SPENCER-KENNEDY LABORATORIES, INC.
1320 SOLDIERS FIELD ROAD
BOSTON 35, MASS.

WIDE-BAND TELEVISION DISTRIBUTION SYSTEM: SKL manufactures complete TV distribution systems for community, apartment house and industrial use. Details upon request.

Directory II. Components

36. Filters.

Magnavox Co., Ind., 10, 15, 22

McCoy Electronics Co., Watts & Chestnut Sts., Mt. Holly Springs, Pa., 10
See ad on page 339
Tel: 376

Meridian, Inc., Conn., 30

Meridian Metalcraft, Inc., 8739 S. Millergrove Dr., Whittier, Calif., 30
See ad on page 454
Tel: OX 2-3761, RA 3-1508

Micamold Electronics Corp., N.Y., 22, 35

Microlab, 71 Okner Pkwy., Livingston, N.J., 5, 10, 15, 22, 30, 35, 45
See ad on this page
Tel: LIvingston 6-5577

Microphase Corp., P.O. Box 1166R, Greenwich, Conn., 5, 10, 15, 22, 30, 45, 50
See ad on page 351
Tel: NOrmandy 1-6200

Microwave Development Labs., Inc., Mass., 10, 12, 15, 22, 30, 50

Microwave Engineering Laboratories, Calif., 30, 45

Microwave Radiation Co., Inc., Calif., 10, 30, 50

Mid-West Coil & Transformer Co., 1642 N. Halsted St., Chicago 14, Ill., 20
See ad on page 436
Tel: MIchigan 2-4055

Midland Manufacturing Co., Inc., Kan., 12

Miller Co., Calif., 10, 15, 35, 40

Morand Electronics, Calif., 10, 15, 35

N.R.K. Mfg. & Engineering Co., 4601 W. Addison St., Chicago 41, Ill., 30
See ad on page 456
Tel: SPring 7-2970

Nagog Associates, Inc., Mass., 10

Narda Corp., 160 Herricks Rd., Mineola, L.I., N.Y., 30
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Tel: Pioneer 6-4650

National Co., Mass., 10, 15, 22

National Scientific Laboratories, Inc., D.C., 35

New York Transformer Co., Inc., N.J., 10, 15, 22

North Hills Electric Co., Inc., 402 Sagamore Ave., Mineola, L.I., N.Y., 5, 10, 15, 22, 35
See ads on pages 319, 451
Tel: Pioneer 7-0555

Northern Electric Co., Ltd., Canada, 10, 12, 15, 22, 30

Omega Laboratories, Inc., Mass., 30

Ortho Filter Corp., 196 Albion Ave., Paterson 2, N.J., 5, 10, 12, 15, 22, 37, 45
See ad on this page
Tel: MUlberry 4-5858

Packard-Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 15, 22
See ad on page 216
Tel: BRadshaw 2-2171

Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 30
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Tel: EXeter 2-4500

Polyphase Instrument Co., Pa., 10, 15, 22

Polytechnic Research & Development Co., Inc., 202 Tillary St., Brooklyn 1, N.Y., 10, 15, 22, 30
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Tel: ULster 2-6800

Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 30
See ad on page 457
Tel: WEstmore 9-4092

Potter Co., Ill., 22, 35

Poughkeepsie Coil Co., Inc., 24 Charlotte St., Binghamton, N.Y., 10, 15, 22
See ad on page 318
Tel: 9-0523

Premier Instrument Corp., 52 W. Houston St., New York 12, N.Y., 30
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Tel: GRamercy 5-3520

Production Research Corp., N.Y., 5

Pulse Techniques, Inc., N.J., 15, 22, 50

Q-Line Mfg. Corp., N.Y., 5, 45

R. K. Manufacturing., Ill., 10, 15, 22

Racon Electric Co., Inc., N.Y., 10, 20, 22

Radar Design Corp., 210 Fifth Ave., New York 10, N.Y., 30, 45
See ad on page 497
Tel: MUrray Hill 5-1422

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HIGH PASS FILTERS
ATTENUATORS
CRYSTAL MOUNTS
STUB TUNERS
POWER DIVIDERS

- low cost
- delivery from stock
- write for catalog

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MICROLAB
71 Okner Parkway • Livingston, N. J.

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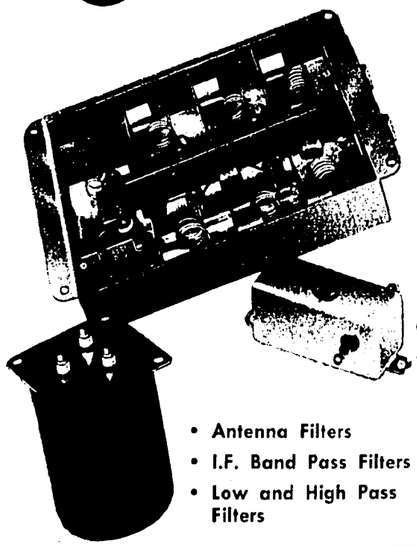
WAVE FILTERS



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- Send specifications for prompt quotation and additional information.

Ortho Filter Corporation specializes in . . .

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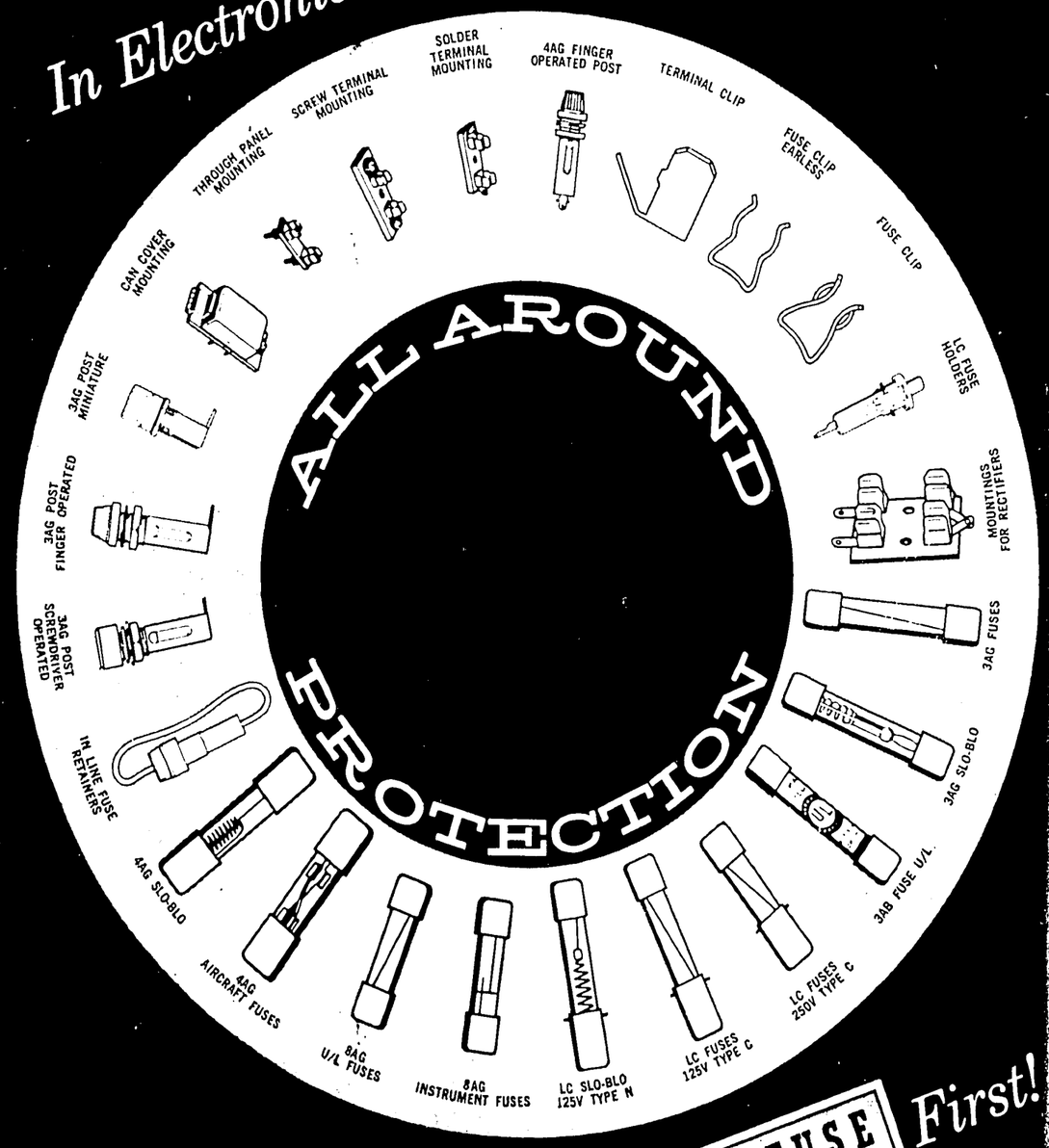

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FILTERS NETWORKS

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TWIN-T NETWORKS

White
INSTRUMENT LABORATORIES
BOX 9006 • AUSTIN 17, TEXAS

36. Filters.

Radio Corp. of America, Dept. X-6, Bldg. 15-2, Commercial Electron. Products, Front & Cooper Sts., Camden, N.J., 25
See ad on page 4A
Tel: WOodlawn 6-[illegible]

Radio Engineering Products, Ltd., 1[illegible] University St., Montreal, Que., Canada, 2, 15, 25
See ad on page 8A
Tel: UNiversity 6-[illegible]

Radio Frequency Laboratories, Inc., Boonton, N.J., 2, 15, 25
See ad on page 4A
Tel: DEerfield 4-[illegible]

Raxon Electronics, Inc., 424 Roeder Dr., Silver Spring, Md., 2, 15, 48
See ad on page 76
Tel: LOckwood 5-[illegible]

Scientific Radio Products, Inc., 2[illegible] S. 24th St., Omaha 2, Neb., 1, 12, 15, 48, 58
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Tel: ATlantic 6[illegible]

Sierra Electronic Corp., 3[illegible] Bohannon Dr., Menlo Park, Calif., 1, 2, 15, 22, 48
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Tel: DAvenport 6-[illegible]

Spencer Kennedy Laboratories, Inc., [illegible] Soldiers Field Rd., Boston 63, Mass., 1, 2, 15, 22, 48, 58
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Tel: AL 4-54[illegible]

Standard Crystal Co., 1714 Locust St., Kansas City 6, Mo., 2, 6, 7
See ad on page 84
Tel: VIctor 2-0641

Technical Apparatus Builders, 1[illegible] RV Liberty St., New York 6, N.Y.
See ad on page 88
Tel: REctor 2-[illegible]

United Transformer Co., [illegible] St., New York 13, N.Y.
See ad on Cover
Tel: AL[illegible]

Vectron, Inc., [illegible] Trapelo Rd., Waltham 54, Mass., [illegible]
See ad on page 88
Tel: TWinbrook 4-[illegible]

White Instrument Laboratories, [illegible] 6, Austin 17, Tex., [illegible] 1 Networks
See ad on this page
Tel: GLendale [illegible]

Flexible shafts: See class 87
Frequency meters: See class 42
Frequency meters, microwave: See class 77
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37. Fuses & Fuse Holders.

. . . You'll find the Type and Size Fuse you need

• • • IN THE COMPLETE LINE OF BUSS AND FUSETRON FUSES

The following is a representative selection of the complete BUSS line of fuses that includes standard, dual-element (slow blowing), renewable and one-time types — in sizes from 1/500 ampere up . . . plus a companion line of fuse clips, blocks and holders.

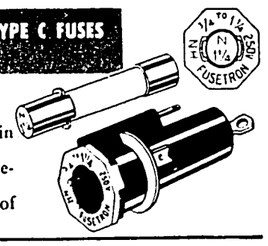
FUSETRON TYPE N and TYPE C FUSES and FUSEHOLDERS

Especially suitable for protection of TV

Ears on fuses match slots in holder.

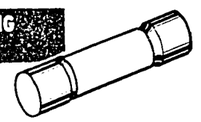
Marking on fuse and fuseholder in direct view.

Safeguard against use of wrong size and type of fuse.



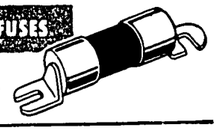
BUSS KLM HIGH INTERRUPTING CAPACITY FUSES

$13/32$ x 1½ inch. Capable of safely interrupting 68,000 amps.



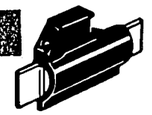
FUSETRON ACK CLAMP TYPE FUSES

20 to 300 amp., Dual-element type.



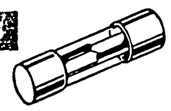
BUSS ACO AIRCRAFT FUSES

Mechanical Indicating — Limiter type 1 to 75 amp.



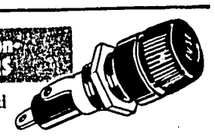
BUSS AGX FAST ACTING FUSES

¼ x 1 in. Glass tube 1/500 to 2 amp.



BUSS Series HJ and HK Non-Indicating FUSEHOLDERS

Panel mounted for ¼ x 1 inch and ¼ x 1¼ inch fuses.



BUSS IBM SIGNAL ACTIVATING FUSES

¼ x 1¼ inch. Silverplated pin pops out when fuse is blown and activates signal or alarm.

BUSS Series HJ and HK Lamp Indicating FUSEHOLDERS

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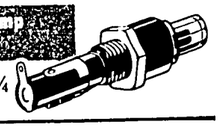
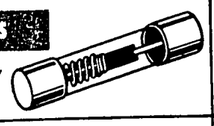


FUSETRON MDL FUSES

¼ x 1¼ inch. Dual-element — slow blowing type 1/100 to 30 amp.



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Solder type terminal for ¼ inch fuses.

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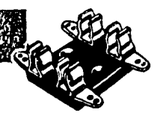
¼ x 1¼ inch. High interrupting capacity fuses ¼ to 30 amp.

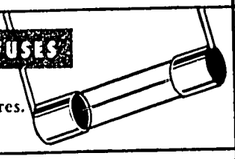
BUSS No. 4409 FUSE BLOCKS

Small Base, solder type Side Terminals.



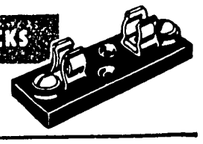
BUSS GJV PIG TAIL FUSES

⅛ to 6 amp. Solder into circuit wires.



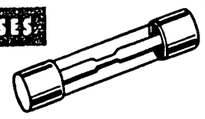
BUSS No. 4512 FUSE BLOCKS

Full Base, Screw type Terminals.



BUSS SFE STANDARD FUSES

Fuses of different amperages are different lengths — to make it impossible to insert too large a size.



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$13/32$ x 1½ inch. Dual-element — slow blowing type.

For more detailed information to help you select fuses and fuseholders to meet your electrical protection needs . . . Write for bulletin SFB.

Or tell us your problem and let our Fuse Engineers assist you in getting the protection you require.

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Makers of a complete line of fuses for home, farm, commercial, electronic and industrial use.

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See ad on page 324
Tel: BRockton 160

Allied Plastics Supply Corp., 75 Cliff St., New York 38, N.Y., 10
See ad on page 584
Tel: BEekman 3-7377

Atlas E-E Corp., 47 Prospect St., Woburn, Mass., 10
See ad on page 546
Tel: WOburn 2-5390

Bel Fuse, Inc., N.J., 5, 10

Belling & Lee, Ltd., England, 10

Bradford Components, Inc., Pa., 5, Resistor Type

Burndy Corp., Omaton Div., Conn., 5, 10

Bussmann Mfg. Div., McGraw-Edison Co., University at Jefferson, St. Louis 7, Mo., 5, 10, Fuse Clips
See ad on page 356
Tel: GArfield 1-1740

Cinch Manufacturing Corp., 1026 S. Homan Ave., Chicago 24, Ill., 10
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Tel: NEvada 2-2000

Connecticut Telephone & Electric Co., Conn., 5, 10

Eby Company, Hugh H., Pa., 10

Garde Manufacturing Co., R.I., 10

Gee Lar Manufacturing Co., 400 S. Wyman St., Rockford, Ill., 10
See ad on page 586
Tel: 5-9548

General Cement Mfg. Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 10
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Tel: 2-6695

General Components, Inc., 225 E. 144th St., New York 51, N.Y., 10
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Tel: MOtthaven 5-0740

Gray Manufacturing Co., Conn., 10

Hi Lo TV Antenna Corp., Ill., 5, 10

Hudson Tool & Die Co., 18-38 Malvern St., Newark 5, N.J., 10
See ad on page 230
Tel: MArket 3-7584

Insuline Corp. of America, N.H., 10

Jones Div., Howard B., Cinch Mfg. Corp., 1026 S. Homan Ave., Chicago 24, Ill., 10
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Tel: NEvada 2-2000

Keystone Electronics Corp., 423 Broome St., New York 13, N.Y., 10
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Tel: WOrth 2-2789

Kulka Electric Mfg. Co., Inc., 633 S. Fulton Ave., Mt. Vernon, N.Y., 10
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Tel: MOunt Vernon 4-4024

Littelfuse, Inc., 1865 Miner St., Des Plaines, Ill., 5, 10
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Tel: VAnderbilt 4-1188

Micarta Fabricators, Inc., Ill., 10

Molding Corp. of America, R.I., 10

Neosil Products Div. of Rubber Assoc., N.Y., 10

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OK Electronics Corp., N.J., 5

Permonite Mfg. Co., Ill., 10

Royal Electric Corp., R.I., 5

Rubber Associates, Neosil Prods. Div., N.Y., 10

Sightmaster Corp., N.Y., 5

Smith, Inc., Herman H., N.Y., 10

United Insulator Co., Ltd., England, 5

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Galvanometers, recording: See class 73

Gaskets: See class 87

Gears: See class 81

Geiger-Mueller tubes: See class 62

Generators, marker (microwave): See class 77

Generators, marker (radio frequency): See class 80

Generators, marker (TV): See class 82

Generators, motor: See class 44

Generators, pulse: See class 77

Generators, signal (AM & FM): See class 80

Generators, signal (TV): See class 82

Generators, square wave: See class 67

Generators, sweep (radio frequency): See class 80

Generators, sweep (TV): See class 82

Generators, synchronizing: See class 82

Generators, time delay: See class 77

Generators, ultrasonic: See class 72

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38. Hermetic Seals.

5. Ceramic to metal seals
10. Complete headers
15. Glass to metal
20. Switch & shaft seals

Advanced Vacuum Prods., Inc., Sub. General Ceramics Corp., Dept. ID, 430 Fairfield Ave., Stamford, Conn., 5, 10
See ad on page 358
Tel: DAvis 4-2148

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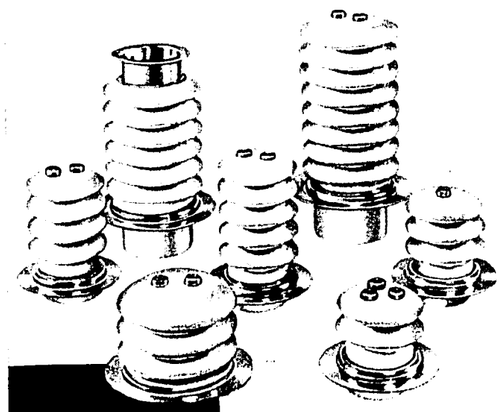

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Specify ADVAC for temperatures to 1400°F, pressures to 2000 P.S.I.

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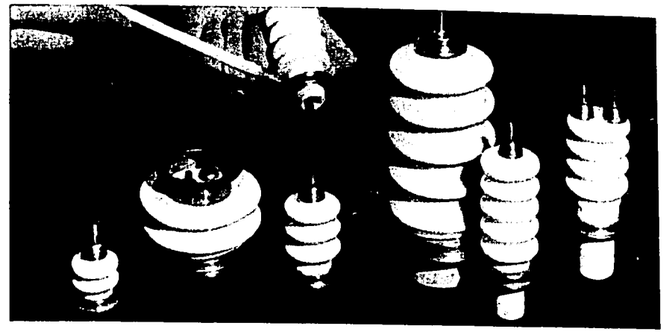

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CERAMASEAL, Inc.

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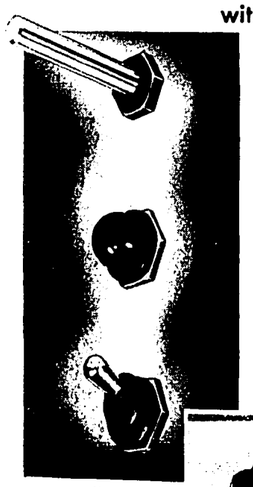
APM

HIGH PRESSURE SWITCH and SHAFT SEALS, SELF-SEALING SCREWS



HEXSEALS*

APM HEXSEALS for Switches and Shafts consist of a grooved nut to which is molded a rubber boot. High pressure sealing is maintained by a gasket rib — an integral part of the boot — which seats firmly against any panel surface regardless of finish.

APM SEELSKREWS — Pre-assembled, vibration resistant fasteners, designed for panels and motor housings. A rubber O-ring is pressed into a groove underneath the head of the screw. They will seal in excess of 500 psi, internal and external pressure.

HEXSEALS and SEELSKREWS Meet Military Specs:

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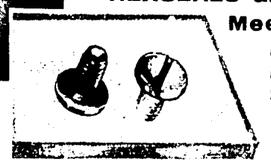
MIL-B-19257 (Ships)
SCL-6303 (Sig. Corps)



Send for complete Military Catalog M-2, or Commercial Catalog C-2.

Trade Mark SEELSKREWS

AUTOMATIC and PRECISION MANUFACTURING CO.
252 Hawthorne Ave., Yonkers, N. Y.

For details, circle #310 on Reader Service Card.

Hermetic Seals—Class 38

Directory II. Components

38. Hermetic Seals.

American Feldmuehle Corp., 11 W. 42 St., New York 36, N.Y., 5
See ad on page 532
Tel: PEnnsylvania 6-9751

Alpha Metals, Inc., N.J., 5, 15

American Lava Corp., Cherokee Blvd. & Mfrs. Rd., Chattanooga 5, Tenn., 5, 20
See ad on page 182
Tel: AM 5-3411

Amphenol Electronics Corp., 1830 S. 54 Ave., Chicago 50, Ill., 10, 15
See ad on page 202
Tel: BIshop 2-1000

Atmo Seal Co., Ohio, 5, 10, 15, 20

Automatic & Precision Mfg. Co., 252 Hawthorne Ave., Yonkers, N.Y., 20
See ad on this page
Tel: YOnkers 8-2010

B G Corp., N.J., 5, 10

Buggie, Inc., H. H., Ohio, 15

Cathodeon Limited, Meadowcraft Labs., England, 10, 15

Central Sales & Mfg. Corp., N.J., 5, 15

Centralab Div. of Globe Union, Inc., 920Y E. Keefe Ave., Milwaukee 1, Wis., 5
See ad on page 206
Tel: WOodruff 2-9200

Ceramaseal, Inc., P.O. Box 25, New Lebanon Center, N.Y., 5, 10
See ad on this page
Tel: WEst Lebanon 3-5851

Coaxial Connector Co., Inc., 37 N. 2nd Ave., Mt. Vernon, N.Y., 5, 15
See ad on page 326
Tel: MO 8-6416

Constantin & Co., L.L., Route 46, Lodi, N.J., 10, 15
See ad on page 120
Tel: GRegory 1-0100

Coors Porcelain Co., Colo., 5

Corning Glass Works, N.Y., 15

Deutsch Co., Calif., 15

Diamonite Products Mfg. Co., Ohio, 5

Electrical Industries, Div. Philips Electronics, Inc., 691 Central Ave., Murray Hill, N.J., 10, 15, 20
See ad on page 218
Tel: CRestview 7-4300

Electronic Mechanics, Inc., N.J., 5

Electronic Plastics Corp., 675 Barbey St., Brooklyn 7, N.Y., 10
See ad on page 570
Tel: HYacinth 5-0133

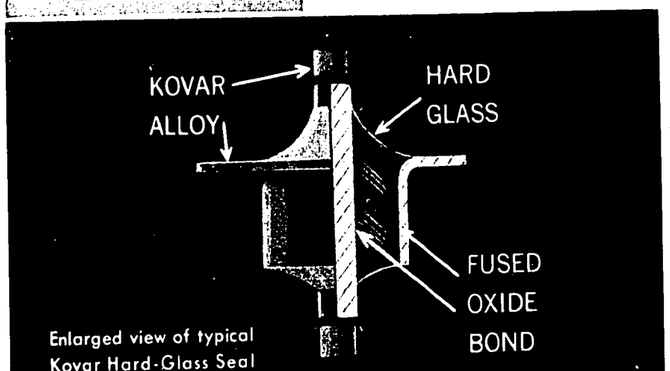
Farnsworth Electronics Co., Pacific Div., 815 San Antonio Rd., Palo Alto, Calif., 10, 15
See ad on page 361
Tel: YOrkshire 7-7249

Frenchtown Porcelain Co., N.J., 5

Fusite Corporation, Dept. B-1, 6026 Fernview Ave., Cincinnati 13, Ohio, 10, 15
See ad on page 174
Tel: REdwood 1-2020

Stupakoff

Kovar **HARD GLASS** Seals



Enlarged view of typical Kovar Hard-Glass Seal

Here are 5 practical reasons why

KOVAR AND HARD GLASS

make the Best hermetic seals

BEST *for thermal endurance*

– because the thermal expansion of Kovar matches exactly that of hard glass over the entire working range.

BEST *for insulating value*

– because of the high dielectric strength of hard borosilicate glass. No silicone treatment is required.

BEST *for hermetic tightness*

– because the fused oxide bond is a chemical bond, forming a true hermetic seal, free from strains at all working temperatures.

BEST *for miniaturization*

– because insulating efficiency and high mechanical strength of hard glass permit the use of seals of minimum size and weight.

BEST *for your product*

– because Stupakoff's broad experience, engineering skill and modern manufacturing methods provide hermetic seals that are right for your product. You get all the advantages that can be secured *only with Kovar and Hard Glass.*

WRITE DEPARTMENT P

for Catalog 453A, which shows all the standard and many of the special types of Stupakoff Hermetic Seals.

STUPAKOFF DIVISION OF **The CARBORUNDUM Company**

WRITE DEPT. P LATROBE, PENNSYLVANIA

For details, circle #311 on Reader Service Card.

38. Hermetic Seals.

Garde Manufacturing Co., R.I., 10, Plastic Metal Seals

General Ceramics Corp., Dept. ID., Crows Mill Rd., Keasbey, N.J., 5
See ads on pages 334, 470
Tel: VAlley 6-5100

General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 5, 10, 15
See ad on page 542
Tel: VAlley Stream 5-6363

Glasseal Products Co., N.J., 5, 10, 15

Hamlin, Inc., Ill., 10, 15

Haydon Switch, Inc., Conn., 20

Heldor Mfg. Corp., N.J., 5, 10, 15

Hermetic Connector Corp., N.J., 10, 15

Hermetic Seal Corp., 31 S. 6th St., Newark 7, N.J., 5, 10, 15
See ad on page 188
Tel: MArket 3-9400

Hermetite Corp., Mass., 10, 15

Hermseal Co., Inc., Ind., 10, 15

Industrial Devices, Inc., N.J., 10

International Pump & Machine Works, Inc., N.J., 5, 10, 15, 20

International Resistance Co., Pa., Fluorocarbon to Metal

International Telephone & Telegraph Corp., Components Div., 100 Kingsland Rd., Clifton, N.J., 10, 15
Multiple pages of additional data on 76-79
Tel: NUtley 2-3600

Isolantite Mfg. Corp., N.J., 5

J-B-T Instruments, Inc., 441 Chapel St., New Haven 8, Conn., 20
See ad on page 366
Tel: STate 7-5825

Kimble Glass Co., Ohio, 5, 15

Kulite Tungsten Corp., N.J., 15

Litton Industries, 336 N. Foothill Rd., Beverly Hills, Calif., 10
See ad on page 90
Tel: CRestview 4-7411

Lundey Associates, Inc., Mass., 5, 10

McDowell Electronics, Inc., N.J., 5

Mitronics, Inc., N.J., 5, 10

Molding Corp. of America, R.I., 10

Neosil Products Div. of Rubber Asso[illegible], N.Y., 10, 20, Rubber-to-Metal

Networks Electronic Corp., Calif., 5, [illegible]

Olsen, M., N.Y., 10, 15

Phillips Control Corp., 59 W. Washington St., Joliet, Ill., 10, 15
See ad on page 399
Tel: 3-3431

Pix Mfg. Co., Inc., N.J., 10

Radiation Counter Labs., Inc., Ill., 15

Radio Frequency Laboratories, Inc., Boonton, N.J., 20
See ad on page 489
Tel: DEerfield 4-3100

Raytheon Mfg. Co., Ceramic Sales, Foundry Ave., Waltham 54, Mass., 5, 10
See ad on page 534
Tel: TWinbrook 3-5860

Reliance Mica Co., Inc., N.Y., 5

Rogers Majestic, Canada, 15

Rubber Associates, Neosil Prods. Div., N.Y., 10, Neosil To Metal Seals

Scientific Electronic Lab., N.J., 10, 15

Sealtron Corp., Ohio, 5, 10, 15

Sperti Faraday, Inc., N.J., 15

Sphere Co., Inc., N.J., 5, 10, 15 & Compression

Directory II. Components

38. Hermetic Seals.

Stupakoff Div. Carborundum Co., Box 390, Hillview Ave., Latrobe, Pa., 5, 10, 15
See ads on pages 242, 360, 533, 558, 601
Tel: KEystone 7-3331

Sylvania Electronic Products Inc., Dept. F24P, 1740 Broadway, New York 19, N.Y., 5
Multiple pages of additional data on 25-30
Tel: JUdson 6-2424

Thermo Materials, Inc., Calif., 5, 10

Thor Ceramics, Inc., 225 Belleville Ave., Bloomfield, N.J., 5
See ad on page 560
Tel: PIlgrim 3-7797

Triad Transformer Corp., 4055 Redwood Ave., Venice, Calif., 5
See ad on page 245
Tel: TExas 0-5381

United Insulator Co., Ltd., England, 5

U.S. Ceramic Tile Co., Diamonite Div., Ohio, 5

Vacumet, Inc., Ill., 5, 15

Vacuum Tube Products Co., Inc., Calif., 10, 15

Valpey Instruments, Inc., Calif., 10, 15

Vitrohm Corp., Ind., 5, 10, 15

Weldaun Electrical Labs., Deptford, 5

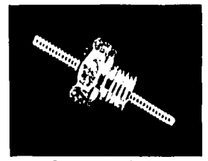
Westinghouse Electric Corp., Pa., 5, 15

Zell Products Corp., Conn., 10, 15

HERMETIC SEALS

Standard compression headers, plugs and individual seals now available

Compression individual with lug



Pressure terminal

Compression multiple header

New fusing equipment plus new plating plant plus top-notch technical engineering supervisors have been important factors in Bennett's progress toward greater service to hermetic seal users.

Our vacuum-tight compression seals give greater latitude in design applications. They can be used wherever leakage requirements are critical. They will also withstand thermal shocks of dry ice to boiling water, check out in excess of 10,000 megohms, and pressure check in excess of 10,000 psi.

We also design pressure and solder seals to meet your requirements.

For complete details, write

FARNSWORTH ELECTRONICS CO.

PACIFIC DIV.

815 San Antonio Road, Palo Alto, California

For details, circle #312 on Reader Service Card.

CONTACTS • PINS • TERMINALS • JACKS
PLUGS • WIRE LEADS • PLASTIC INSERTS

made by the cost-saving

BEAD CHAIN

Multi-Swage Process

For Small Metal Parts

TRADE MARK

The advanced method for producing small metal parts — hollow or solid — headed, grooved, shouldered, etc., — dimensions about ¼" or less diameter and up to 1½" length. This high speed process usually requires runs of 100,000 pieces, other than stock items, to justify job set-up costs.

Contact Pins have a tightly swaged seam with hole through entire length for easy threading of lead wires. Ideal for plastic, ceramic, metal and other bases or panels.

Male & Female Friction Contacts are available to close tolerances, maintain "holding power" with ease of engagement and release.

Terminals in many special and standard types, including turret-type — for flared, rolled, split, spun and other assemblies.

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Inductors: See class 29

Insulating materials: See class 89

Insulators, ceramic: See class 84

Insulators, plastic: See class 94

Insulators & spacers, vacuum tube: See class 97

Inverters: See class 31

39. Jacks, Jack Fields & Plugs.

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10. Jack fields
15. Patch cords
20. Plugs

Accurate Electronics Corp., Ohio, 5, 20

Aerolite Electronics Corp., N.J., 5, 15, 20

Aerovox Corp., Mass., 5, 10, 15, 20

Air-O-Tronics, Calif., 15

Alcon Metal Products, Inc., Ill., 5, 20

Alden Products Co., 140 North Main St., Brockton 64, Mass., 5, 15, 20
See ad on page 324
Tel: BRockton 160

Amphenol Electronics Corp., 1830 S. 54 Ave., Chicago 50, Ill., 5, 20
See ad on page 202
Tel: BIshop 2-1000

Associated Engineering Corp., Mass., 15

Audio Development Co., Minn., 5, 10, 15, 20

Automatic & Precision Mfg. Co., 252 Hawthorne Ave., Yonkers, N.Y., 20, Power
See ad on page 359
Tel: YOnkers 8-2010

Bayly Engineering, Ltd., Canada, 5

Bead Chain Mfg. Co., Mountain Grove St., Bridgeport 5, Conn., 5
See ad on this page
Tel: EDison 4-4124

SWITCHCRAFT INC.

COMPONENT PARTS

In Switchcraft products you get the benefit of creative engineering, latest designs, expert workmanship, and thorough inspection — your assurance of the most dependable and efficient components made today.

JACKS

FOR MILITARY AND INDUSTRIAL EQUIPMENT—MOST COMPLETE LINE

"LITTEL-JAX"—require minimum panel space available in all common and many special circuits.

"SF-JAX" short frame design—innumerable circuits.

"LF-JAX"—long frame design—all circuits.

"TINI-JAX"—sub-miniature.

PHONE PLUGS

THE LARGEST VARIETY OF STYLES, SIZES AND TYPES

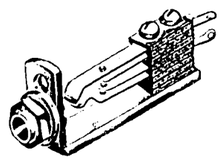
"LITTEL-PLUG"—small—fits standard Jacks.

"LUG PLUG"—small—low cost.

"STANDARD"—conventional size heavy terminals—rugged design.

"TINI-PLUGS"—sub-miniature 2 conductor Phone Plug for use with "Tini-Jax".

"FLAT-PLUG"—removable cover permits use with screw or solder lug terminals. 2 or 3 conductor types.



TELEPHONE & MILITARY JACKS

"T-JAX"—a conventional telephone switchboard design all standard circuits and military specifications.

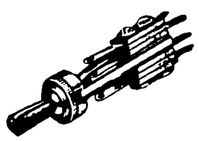
"M-JAX"—(illustrated) a heavy duty design used in heavy industrial equipment.

"SHIELDED JAX"

A unique modification of the "Littel-Jax". The shield is assembled into and made a part of the jack.

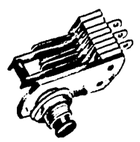
"EXTENSION JAX"

For cable extensions. Features "Switchcraft" clamp type terminal. 2 and 3-conductor circuits.



"LEV-R-SWITCH"

A lever action switch requires only single hole for mounting. Available in numerable circuits; various contact materials.



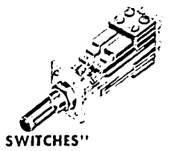
"FF-SWITCH"

Flat frame support spring "pile-up" in various circuits and contact combinations. "Easy" action of colored push buttons.

"TELEVER SWITCHES"

Series 6000

Rugged telephone type; 3" depth behind panel. Welded cross bar, Palladium contacts rated at 3 amps., 300 watts maximum, non-inductive A. C. load. Locking and non-locking types.



Series 16000

Same design as series 6000, features single hole mounting; Unique feature, "non-locking" type can easily be converted to "locking" by removing "stop plate".

"LITTEL-SWITCH"

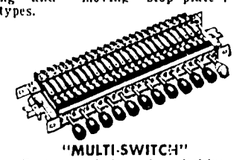
Rugged yet small, a Push Button switch available in simple circuits; contacts to suit. Various colors of Buttons.

"TINI-SWITCH"

Similar to "Littel-Switch" except sub-miniature design.

"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.

Write for Bulletin 560.

"JACK PANELS"

Black phenolic strip, reinforced with steel, supports Switchcraft "T-JAX" and "MT-JAX".

"MINI-MIX"

Miniature 2-input Audio Mixer connects directly to equipment — no external cables.

"ADAPTERS"

For connecting equipment having different type connectors.

Illustrated are representative parts of the regular line. Send for catalog No. S-57A.

Inquiries on custom-made components will receive prompt attention.

Switchcraft components are carried by all leading Radio Parts Jobbers.

"MIC CONNECTORS"

"AUDIO JUMPER CABLES"

"JACK COVERS"

"PHONO CONNECTORS"

SWITCHCRAFT INC.

1340 N. Halsted Street, Chicago 22, Illinois

Canadian Representative:

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50 Wingold Avenue, Toronto, Canada

For details, circle #314 on Reader Service Card.

39. Jacks, Jack Fields & Plugs.

Beckley Electric Co., Inc., N.Y., 20

Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 5, 15, 20
See ad on page 525
Tel: WAlker 5-6980

Cambridge Thermionic Corp., 440 Concord Ave., Cambridge 38, Mass., 5, 20
See ad on page 548
Tel: TRowbridge 6-2800

Carter Parts Co., Ill., 5, 15, 20

Cinema Engineering, Calif., 5, 15, 20

Circon Component Co., Santa Barbara Municipal Airport, Goleta, Calif., 5, 20
See ad on page 327
Tel: WOodland 8-2011

Coaxial Connector Co., Inc., 37 N. 2nd Ave., Mt. Vernon, N.Y., 5, 10, 15, 20
See ad on page 326
Tel: MO 8-6416

Connecticut Telephone & Electric Co., Conn., 5, 10, 15, 20

Cronaine, Inc., Ill., 5, Jack Covers

Daystrom, Inc., N.J., 5, 20

Decatur Electr. Indus. Corp., N.Y., 15

Don Mar Products, Inc., Colo., 5, 20

Eby Company, Hugh H., Pa., 5, 20

Electronic Plastics Corp., 675 Barbey St., Brooklyn 7, N.Y., 15, 20
See ad on page 570
Tel: HYacinth 5-0133

Empire Electronics Co., Inc., N.J., 15

Engineered Electronics Co., Calif., 10

Etelco, Ltd., England, 5, 10, 15, 20

Fluorocarbon Products, Inc., Div. of U.S. Gasket, N.J., 5

Gee Lar Manufacturing Co., 400 S. Wyman St., Rockford, Ill., 5, 20
See ad on page 586
Tel: 5-9548

General Cement Mfg. Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 5, 20
See ad on page 586
Tel: 2-6695

General Electric Co., Broadcast & Mil. Elect. Prods. Dept., N.Y., 5, 15, 20

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 5, 15, 20
See ad on Cover 4
Tel: TRowbridge 6-4400

Gulliksen Mfg. Co., W. M., Mass., 20

Hubbel, Inc., Harvey, Conn., 5, 20

Insuline Corp. of America, N.H., 5, 15, 20

Johnson Co., E. F., Minn., 5, 20

Jones Div., Howard B., Cinch Mfg. Corp., 1026 S. Homan Ave., Chicago 24, Ill., 5, 20
Multiple pages of additional data on 15-17
Tel: NEvada 2-2000

Keystone Electronics Corp., 423 Broome St., New York 13, N.Y., 5, 20
See ad on page 553
Tel: WOrth 2-2789

Kings Electronics Co., Inc., 40 Marbledale Rd., Tuckahoe 7, N.Y., 5, 10, 15, 20
See ads on pages 329, 363
Tel: SWiftwater 3-5000

Litton Industries, 336 N. Foothill Rd., Beverly Hills, Calif., 5, 20
See ad on page 90
Tel: CRestview 4-7411

Mallory & Co., Inc., P. R., Ind., 5, 20

Directory II. Components

39. Jacks, Jack Fields & Plugs.

Methode Mfg. Corp., 7447 W. Wilson Ave., Chicago 31, Ill., 20
See ad on page 388
Tel: UNderhill 7-9600

Micarta Fabricators, Inc., Ill., 20

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 5, 20
See ad on page 600
Tel: MAlden 4-4108

Molded Insulation Co., Pa., 5, 20

Morton Electronics Corp., Pa., 5, 15, 20

National Tel-Tronics Corp., 52 St. Casimir Ave., Yonkers, N.Y., 5, 15
See ad on page 544
Tel: YO 8-6400

Nems-Clarke, Inc., Dept. H-13, 919 Jesup Blair Dr., Silver Spring, Md., 5, 20
See ad on page 256
Tel: JUniper 5-8300

North Electric Co., Ohio, 5, 15, 20

Northern Elec. Co., Canada, 5, 10, 15, 20

Panseal, Inc., N.J., 20

Peck Spring Co., Conn., 5, 20, Special

Permonite Mfg. Co., Ill., 5, 20

Pomona Electronics Co., Inc., Calif., 15

RCA Victor Co., Canada, 5, 10, 15, 20

Radio Engineering Products, Ltd., 1080 University St., Montreal, Quebec, Canada, 5, 10, 20
See ad on page 282
Tel: UNiversity 6-6887

Raytheon Mfg. Co., Equip. Sales Operations, Mass., 5

Richards Electrocraft, Ill., 5, 15, 20

Robco Mfg. Co., Inc., N.Y., 5, 15, 20

Royal Electric Corp., R.I., 20

Sealectro Corp., 610 Fayette Ave., Mamaroneck, N.Y., 5, 15, 20
See ad on page 556
Tel: MA 9-7800

Smith, Inc., Herman H., N.Y., 5, 10, 15, 20

Standard Electric Time Co., Mass., 5, 15, 20

Standard Electronics Div. Radio Eng. Lab., Inc., N.Y., 10, 15, 20

Stromberg-Carlson, N.Y., 5, 15, 20

Switchcraft, Inc., 1340 N. Halsted St., Chicago 22, Ill., 5, 10, 20
See ad on page 362
Tel: MI 2-7136

Sylvania Electric Products, Inc., Dept. F24P, 1740 Broadway, New York 19, N.Y., 20
Multiple pages of additional data on 25-30
Tel: JUdson 6-2424

Tarc Electronics, Inc., N.Y., 10

Telex, Inc., Minn., 5, 15, 20

Ucinite Co., Div. United-Carr Fastener Corp., Mass., 5, 20

U.S. Engineering Co., Calif., 5, 20

Virginia Electronics Co., D.C., 10

Walsco Electronics Mfg. Co., Ill., 5, 20

Whitso, Inc., Ill., 5

Junctions, Hybrid: See class 66

Klystrons: See class 63

Knobs: See class 94

Labels, adhesive: See class 87

Lacing cord & tape: See class 87

Lights, pilot: See class 46

40. Loudspeakers.

5. Commercial grade loudspeakers
7. Cones
10. Headphones
15. High-frequency loudspeakers
20. Low-frequency loudspeakers
25. Wide-range, 2 & 3 way systems

Acoustical Mfg. Co., Ltd., England, 25

Altec Lansing, Calif., 15, 20, 25

American Communication Corp., N.Y., 25, Mushroom

Atlas Sound Corp., N.Y., 5, 15

Audio Equipment Co., Inc., N.Y., 5

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

Audion-Master Corp., N.Y., 10
Audivox, Inc., Mass., Hearing Aids
Beam Instruments Corp., N.Y., 15, 25
Bohn Music Systems Co., N.Y., 25
Bozak Sales Co., R. T., Conn., 15, 20, 25
Brown Co., Irv, N.Y., 5, 15, 20, 25
Cannon Co., C. F., N.Y., 10
Cleveland Electronics, Inc., Ohio, 5, 15, 20, 25
Connecticut Telephone & Electric Co., Conn., 5, 10
Consolidated Radio Products Co., Ill., 5, 10, 15, 20, 25
D X Radio Products Co., Ill., 5, 15, 20
Daystrom, Inc., N.J., 15, 20, 25
Dictograph Products Inc., N.Y., 10
Dukane Corp., Ill., 15
Duode, Ltd., England, 25
Duotone Co., Inc., N.J., 15, 20, 25
Electro-Voice, Inc., Mich., 5, 10, 15, 20, 25
Electronic Instrument Co., Inc., N.Y., 25
Engineered Sound Systems Ltd., Canada, 5, 15, 20, 25
Etelco Ltd., England, 10
Fisher Radio Corp., N.Y., 25
Galbraith & Son Electric Corp., C. C., N.Y., Marine Loundspeakers
General Cement Mfg. Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 5
See ad on page 586
Tel: 2-6695
General Communications, Inc., Wis., 25
General Electric Co., Electronic Components Dept., N.Y., 25
General Motors Corp., Delco Radio Div., Ind., 5
Goodmans Industries, Ltd., England, 5, 15, 20, 25
Gray Manufacturing Co., Conn., 5, 15, 20
Gulliksen Mfg. Co., W. M., Mass., 10
H. J. Transitions, Inc., N.J., 15, 20, 25
Hartley Co., Ltd., H. A. England, 25
Hartley Products Co., N.Y., 25
Hawley Products Co., 333 N. 6th St., St. Charles, Ill., 7 & Spiders
See ad on page 364
Tel: Chicago: COlumbus 1-0247
St. Charles 3130
Heath Co., 305 Territorial Rd., Benton Harbor 4, Mich., 5, 25
See ad on page 478
Tel: WAlnut 5-0051
Hi-Video, Inc., N.Y., 5, 15, 20, 25
International Electronics Corp., N.Y., 25
Jensen Manufacturing Co., Ill., 5, 15, 20, 25
Klipsch & Associates, Ark., 25
Knowles Electronics, Inc., Ill., 10
L.E.E., Inc., D.C., 15, 20, 25
Land-C-Air Sales Co., N.Y., 5
Lansing Sound, Inc., James B., Calif., 15, 20, 25
Lehman Associates, Charles H., N.Y., 10
Magnavox Co., Ind., 5, 15, 20
Marsland Engineering, Ltd., Canada, 5, & Military Types
Murdock Co., Wm. J., Mass., 10
National Co., Mass., 25
North American Philips Co., Inc., N.Y., 15, 20, 25
Oxford Electric Corp., Ill., 5, 15, 20, 25
Pickering & Co., Inc., 309 Woods Ave., Oceanside, N.Y., 15
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Tel: ROckville Center 4-3200
Pilot Radio Corp., N.Y., 25
Quam-Nichols Co., Ill., 5, 15, 20
Racon Electric Co., Inc., N.Y., 5, 7, 15, 20, 25
Radio Corp. of America, N.J., 5, 15, 25
RCA Victor Co., Ltd., Canada, 15, 20
Reeves Equipment Corp., N.Y., 5, 15
Remler Co., Calif., Marine
Roanwell Corp., N.Y., 10
Rogers Majestic Electronic Tubes and Components, Canada, 15, 20, 25
Setchell-Carlson, Inc., Minn., 5
Sonotone Corp., N.Y., 15, 20
Stevens Products, Inc., N.J., 7
Stromberg-Carlson, Div. Gen. Dynamics Corp., N.Y., 5, 15, 20, 25
Superex Electronics Corp., N.Y., 10
Symphony Electronics Corp., Calif., 5, 10
Telephonics, Corp., N.Y., 10
Telex, Inc., Minn., 10
Transitron, Inc., Div. Van Norman Ind., Inc., 186 Granite St., Manchester, N.H., 15
See ad on page 498
Tel: NAtional 5-9701
United Audio Prods., Div., United Optical Mfg. Corp., N.Y., 15, 20, 25
University Loudspeakers, Inc., N.Y., 5, 7, 15, 20, 25
Viking Industries, Inc., Calif., 30
Vitavox, Ltd., England, 15, 20, 25
Wesbar Stamping Corp., Wis., Car Top Carriers
Westrex Corp., N.Y., 5
Wright, Inc., Minn., 5, 15, 25
Wright-Zimmerman, Inc., Minn., 5, 15, 20, 25

Magnet Wire: See class 83

Magnetic Drums: See class 70

Magnetic Recorders: See class 16

Magnetic Recording Tape and Wire: See class 49

Magnetrons: See class 63

41. Magnets.

5. Electro **10. Permanent**

Aerovox Corp., Mass., 10
Airdesign, Inc., Pa., 5
Allied Control Co., Inc., 2 East End Ave., New York 21, N.Y., 5
Multiple pages of additional data on 144-145
Tel: BUtterfield 8-7403

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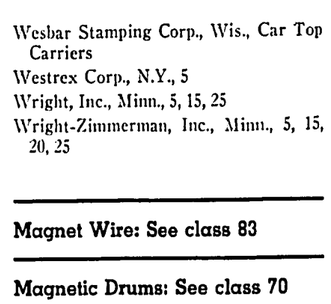

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Valparaiso, Indiana
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Diaphragms—Suspensions—Cabinets—Housings—TweeterHorns—Phono Bases—Carrying Cases

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HAWLEY PRODUCTS COMPANY
ST. CHARLES, ILLINOIS

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Directory II. Components

41. Magnets.

Arnold Engineering Co., P.O. Box G, Marengo, Ill., 10
Multiple pages of additional data on 86-87
Tel: JOrdan 8-7251
Coils-Electronics Co., Pa., 5
Crowley Div., Aerovox Corp., N.J., 10
Crucible Steel Co. of America, Pa., 5, 10
Dormeyer Industries, Ill., 5
General Ceramics Corp., Dept. ID., Crows Mill Rd., Keasbey, N.J., 10
See ads on pages 334, 470
Tel: VAlley 6-5100
General Electric Co., Magnetic Materials Div., Mich., 10
General Magnetic Corp., Mich., 10
Glaser-Steers Corp., N.J., 5, 10
Hillburn Electronic Products Co., 55 Nassau Ave., Brooklyn 22, N.Y., 5
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Tel: STagg 2-3875, 6, 7
Houlihan Co., T. J., Ill., 5
Indiana Steel Prods. Co., Valparaiso, Ind., 10
See ad on page 364
Tel: 2-5601
Little, Inc., Arthur D., Mass., 5
Metal Powder Association, N.Y., 10
Morris & Co., Owen, N.Y., 10
Mullard, Overseas, Ltd., England, 10
Permag Corp., 210 Taaffe Pl., Brooklyn 5, N.Y., 10
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Tel: MAin 2-0114
Plamondon Magnetics Co., Ill., 10
Polymer Corp. of Penna., 2140 Fairmont Ave., Reading, Pa., 5
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Tel: FRanklin 6-7241
Rogers Majestic Electronic Tubes and Components, Canada, 10
Saratoga Industries, N.Y., 5
Simonds Saw & Steel Co., N.Y., 10
Stackpole Carbon Co., Pa., 10
Standard Electrical Products Co., Ohio, 5
Telectro Industries Corp., N.Y., 5
Teleradio Engineering Corp., N.Y., 5, 10, Assemblies
Tensor Electric Development Co., Inc., N.Y., 5
Thomas & Skinner, Inc., 1120 E 23rd St., Indianapolis 7, Ind., 10
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Tel: WAlnut 3-2448
Varian Associates, 611 Hansen Way, Palo Alto 2, Calif., 5
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Wheeler Insulated Wire Co., Inc., Conn., 5
White Electron Devices, Inc., Roger, 92 Fourth Ave., Haskell, N.J., 5
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Tel: TErhune 5-5333
Yale & Towne Mfg. Co., Powdered Metal Div., Ill., 10

Markers and Tags: See class 87

Mesh, wire: See class 83

Metals: See class 93

42. Meters (Indicating Instruments).

5. Ammeters **30. Milli-ammeters**
10. Elapsed time **35. Voltmeters**
15. Frequency indicating **40. Volume level, (DB & VU)**
20. Galvanometers **45. Wattmeters & watt hour meters**
25. Micro-ammeters

Adler Electronics, Inc., N.Y., 15
Aero Instrument Co., Calif., 10, 15
Aerovox Corp., Mass., 40
Airpax Products Co., Middle River, Baltimore 20, Md., 15
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Tel: MU 6-9100
Alto Scientific Co., Calif., 35
Amerac, Inc., Mass., 15
American Chronoscope Corp., N.Y., 10
American Machine & Foundry Co., Defense Prods. Group, 1101 N. Royal St., Alexandria, Va., 5, 15, 35, 45
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Tel: KIng 9-9110

42. Meters (Indicating Instruments).

American Metrix Corp., N.J., 5, 10, 15, 20, 25, 30, 35, 40, 45
Andrew Corp., 363 E. 75 St., Chicago 19, Ill., 5
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Tel: TRiangle 4-4400
Assembly Products, Inc., Wilson Mills Rd., Chesterland 33, Ohio, 5, 20, 25, 30, 35
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Tel: HAmilton 3-4436
Automatic Coil Winder & Elec. Equip. Co., Ltd., England, 5, 25, 30, 35, 40, 45
Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 10, 15
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Tel: UNiversity 4-0101
Beckman Instrument Div., Calif., 25, 30
Beede Electrical Instrument Co., Inc., N.H., 5, 25, 30, 35, 40
Bergen Laboratories, N.J., 10, 35
Berkeley Div., Calif., 10, 15, 35
Beta Electric Corp., N.Y., 25
Biddle Co., James G., Pa., 15, 20
Bird Electronic Corp., 1800 E. 38th St., Cleveland 14, Ohio, 45
See ad on page 504
Tel: EXpress 1-3535

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WE CARRY IN STOCK ALL SIZES, ALL SHAPES ALL ALNICO GRADES

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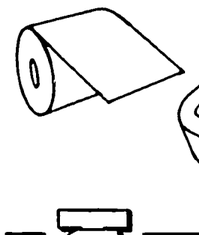
Specialists in Magnetic Materials



• Magnetic Tapes
• Wound Cores
• Laminations
• Permanent Magnets

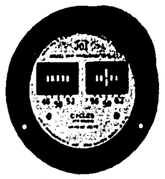
Thomas & Skinner, Inc.

For details, circle #319 on Reader Service Card.

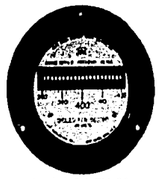
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

REED FREQUENCY METERS • ELAPSED TIME METERS
TOGGLE, LEVER and ROTARY SWITCHES of Instrument and Test Equipment Quality
for THE ELECTRONIC INDUSTRY

J-B-T



Model 30-F
Dual Range, Double Window



Model 36-FX-21
21-Reed Meter in 3½" Case

Model 34-FHXX
9-Reed in 3½" Sealed Case

Model 41-FX-42
300—500 cycles and
380—420 cycles, 4" case.

Model 15-FHAC
2-Reed in 1½" Sealed Case

Model 33-FP-9M
Portable, Metal Case
TS-328 A/U (400 cy. type) Shown

VIBRATING REED FREQUENCY METERS

Meters illustrated are typical panel mounting or portable—for use where constant or known frequency is important to efficient operation of equipment.

- *Permanently Accurate* within ±0.3% or better at reference temperature, depending on the model. This accuracy is not affected by poor wave form, external magnetic disturbances, or voltage fluctuations.
- *Size and Type for Every Service.* Made in a wide variety of portable and panel case styles, reed groupings and frequency ranges from 12 to 650 cycles and above; 100-130 volts furnished unless otherwise specified.
- *Rugged Construction* of simplified, patented design, with no moving parts to wear out or get out of calibration. Ideal for field and mobile applications.
- *Suitable for Electronic Circuits* because of relatively low power consumption and J-B-T reeds with high Q and sharp, immediate response.

3½" and 2½" SEALED Types

3½ inch FHXX Meters sealed, glass-to-metal construction with solder terminals, meet or exceed the sealing and electrical requirements of JAN-I-6 and MIL-M-6A including the 3000 volt breakdown, and use the front mounting dimensions specified. Max. barrel diameter, $2^{11}/_{16}$"; $2^{7}/_{8}$" overall depth behind flange. While not regularly stocked, these meters are in volume production. New 2½" meters Model 21-FXXX available on special order.

1½" SEALED Types

Model 15-FHAC (illustrated above). 60 and 400 cycles, 2 reeds, 8-10 volts, for cathode follower circuit. Widely used on audio oscillators to standardize output. Meets intent JAN-I-6, MIL-M-6A and amendments on sealed meters. Barrel, 1½" diameter; detachable flange, 2.094" diameter; solder terminals.

Model 15-FH Series (not illustrated) — Same case, sealed, 5 reeds, 58-62 cycles, 100-130 volts, or 390-410 cycles, 100-130 volts. Variations such as 6 reeds or 25 cycles available on special order.

ASK FOR CATALOG 657

ELAPSED TIME METERS

For Maintenance, Tube Life Data, and Operating Time Records—on Motor Generators, Transmitters, Receivers, Rectifiers, Test Set-ups, etc.

Model 31-EX (illustrated) also known as running-time or total time meter, registers in 1/10 hours to 9,999.9 hours, then automatically resets. Normally stocked for 60 cycles, 110-130 volts. 3½" standard meter mounting. Variations such as 50 cycles; 230 volts; 0-99,999 hours; 3" rectangular case; and readings in minutes available on special order.

SEALED ELAPSED TIME METERS

Model 31-EHXX—Fully sealed meter, reading 0-9,999.9 hours, same as Model 31-EX above. Glass-to-metal construction, solder terminals, and 3½" detachable flange, all match XX metal frequency meter case. 1000 volt breakdown.

Model 33-EHXX — Operates on 400 cycles, 110-125 volts, to read 0-9,999.9 hours in 1/10 hour steps. It is presently made only in 3½" flange sealed metal case, 2¾" diameter, 4" deep behind panel. 1000 volt breakdown.

Model 21-EHXX—New. 2½" flange, sealed, full size counter.

FREQUENCY — TIME METERS

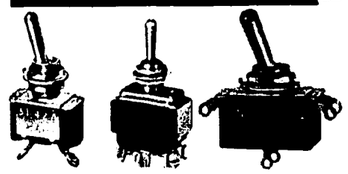
Combination Reed-Type Frequency — Elapsed Time Meters—One Meter Does the Work of Two.

Model 31-FE (illustrated) pioneered by J-B-T, saves panel space and cost, and encourages periodic maintenance; 3¼" flange, metal case, $4^{19}/_{32}$" overall depth, standard. 3½" case known as 31-FEX-1 supplied on custom orders. 5 reeds, 60 cycle range, standard; 7, 9, 11 reeds or 50 cycle range on special order.

DISTRIBUTOR SERVICE

Standard J-B-T items are available through authorized electronics parts distributors.

TOGGLE SWITCHES, AN, JAN, or MIL



J-B-T now manufactures over 100 models of toggle switches, designed for exceptional reliability, as in JAN-S-23 and Ordnance Standards DDAX. Variations with bushing seal are made at additional cost for MIL-S-6745 specialized AN Air Force requirements. Other types are being planned for pending MIL-S-3950. Improved enclosed designs are supplied on all models—there are no unused holes.

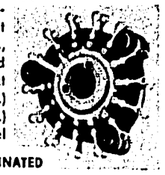
ST40, 42, 52 series—Solid coin silver contacts and rocker arms, unique to J-B-T, add overload protection and keep contact resistance under .005 ohms. Nominal ratings 20 amp at 125 VAC, 10 amp, 250 VAC. See Bulletin TS-4B.

ST12, 13, 16, 17, 22, 23, 26, 27 series—Nominally rated 6 amp at 125 VAC, 3 amp, 250 VAC; threaded bushings $^{27}/_{64}$" or ¼" long. Current carrying parts heavily silver plated. See Bulletin TS-5B.

ROTARY SWITCHES

MOLDED

Shorting and Non-Shorting...14 or 20 Positions ...1 to 6 Decks (more on special order)...All moving contacts enclosed — eliminates dirt and corrosion...sturdy construction with 3-post deck suspension, double-grip collector arms, and rectangular drive shaft through decks for precision indexing... test results available covering certain procedures of MIL-E-5272 A...interchangeable, electrically and mechanically with J-B-T Series SS-14 and 20 position Laminated Switches. Carrying capacity (not make-and-break): 1 amp.; maximum momentary, normal 5 amp.; maximum voltage between contacts and ground, 1000 volts R.M.S.; between decks and ground, 2000 volts R.M.S. Average contact resistance 0.007 ohms or less. Also available in 6-pole per deck double throw construction. Non-shorting (break before make) and shorting (make before break). Bonded construction is available on special order as MS-14R and MS-20R Types. Provides permanent moisture-proof bond between decks, and strong mechanical support for contacts.



LAMINATED

For dependable performance in quality test equipment, instruments, inspection setups and avionics — two compact types. 14 pos. (2" dia.) or 20 pos. ($2^{23}/_{32}$" dia.) one to six decks. Model SS-14-2 shown.

LEVER ACTION SWITCHES

Model MS-20-1L5A-1 (illustrated) provides 5 live positions, 2 circuits per deck in molded body. Mounting to Print SK-64. Single deck types use same top quality parts as laminated SS-14 switches. For ganged lever series, SSG types, in 3, 4, or 5 positions, 2-10 decks. See Print SK-74.

ASK FOR CATALOG 657

J-B-T INSTRUMENTS, INC. J-B-T NEW HAVEN 8, CONN.

RUGGEDIZED METERS

1½" Square

Meets MIL-M-10304 (SIG.C.) Accurate within ±3% of full scale deflection. Basic d-c ranges 0-100 d-c ua, 0-1 d-c ma, and 0-10 d-c mv. RF and VU meters and other ranges also available.

SUB-MINIATURE ROTARY SWITCH

Wafer size 1" x ⅞". Twelve positions per deck ... one to three decks. One, two, three or four poles per deck. Shorting or non-shorting contacts. Positive indexing with 30° spacing.

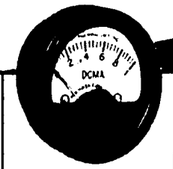
SPECIALISTS
in Sub-Miniature Panel Meters

FIRST in U.S. to manufacture 1" diameter meter.
FIRST to produce 1" and 1½" illuminated meters.
FIRST to produce 1½" self-contained DB and VU meters.
FIRST to produce Miniature Side Indicators.

1" ROUND

MODEL 100

1" barrel diameter. Full 90° scale arc, scale length .770". VU, DB and Illuminated meters also available with external accessory attached.



MODEL 150

1½" ROUND and SQUARE

1½" barrel diameter. Full 90° scale arc, scale length 1.322". Model 153 meets MIL-M-3823 requirements. Also available: self-contained VU and DB meters — illuminated meters with lamp housing attached.

MODEL 153

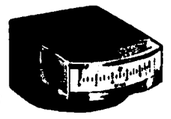
SIDE INDICATORS*

MODEL 1135
Single Horizontal Mounting

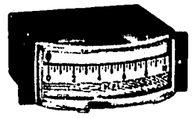
- GREATER READABILITY
- REDUCES PANEL AREA ⅓ OVER CONVENTIONAL METER INSTALLATIONS OF SAME SCALE LENGTH
- HORIZONTAL OR VERTICAL MOUNTING

THREE SIZES AVAILABLE:

MODEL 1120—Scale length 1.3".
MODEL 1135—Scale length 2.1". Front external zero adjuster.
MODEL 1145—Scale length 2.75". Front external zero adjuster.



MODEL 1120



MODEL 1145
Single Horizontal Mounting

International Instruments' components lead the way for miniaturization through practical engineering design.

*Pat. Pending

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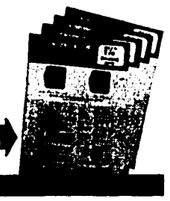
COMPLETELY DESCRIBING THESE INSTRUMENTS ARE AVAILABLE. WRITE FOR YOUR COPIES TODAY.



international instruments
INCORPORATED
P.O. BOX 2954, NEW HAVEN 15, CONN., CABLE "INTERINST"

For details, circle #321 on Reader Service Card.

Directory II. Components

42. Meters (Indicating Instruments).

Bristol Motor Div., Vocaline Co., of America, Inc., Conn., 10
Bristol Co., Conn., 5, 10, 20, 25, 30, 35, 45
Bruno-New York Industries Corp., Dept. IRE-57, 460 W. 34 St., New York 1, N.Y., 5, Clamp
See ad on page 574
Tel: LOngacre 4-5930
Burton-Rogers Co., Sales Div., Hoyt Elec., Mass., 5, 20, 25, 30, 35
Colortone Electronics, Inc., 200 Frank Rd., Hicksville, L.I., N.Y., 15
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Tel: WElls 8-0500
Compagnie Generale De Metrologie, France, 5, 25, 30, 35
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Tel: GEneva 8-4000
Daystrom, Inc., N.J., 5, 10, 15, 20, 25, 30, 35, 40, 45
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Edgerly Instrument Labs., Inc., Md., 5, 25, 30, 35, 40
Edin Company, Inc., Mass., 20
Electric Design & Mfg. Co., Iowa, 5, 25, 30, 35
Electro Instruments, Inc., Calif., 35
Electronic Designs, Inc., N.Y., 35
Electronic Specialty Co., 5121 San Fernando Rd., Los Angeles 39, Calif. Meter Protector Device
See ad on page 185
Tel: CH 5-3771
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Ferranti Electric Ltd., Canada, 5, 25, 30, 35, 45
Fielden Instrument Div., R-F C Co., Pa., 5, 30, 35, 45
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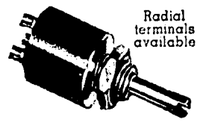
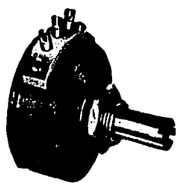
General Electric Co., Apparatus Sales Div., N.Y., 5, 10, 15, 20, 25, 30, 35, 40, 45
General Electric Co., Clock & Timer Dept., Mass., 33
Gibbs Mfg. & Research Corp., Wis., 10
Greibach Instruments Corp., N.J., 5, 25, 30, 35
Greibach Research & Development Labs., N.Y., 5, 20, 25, 30, 35

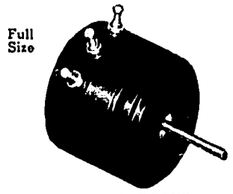
Waters Miniature POTENTIOMETERS Precision

Waters Wire Wound Precision Potentiometers

have a proven reputation for reliability. Built to applicable military specifications, they are available in many variations — ganged, tapped, with various electrical and mechanical angles, locking shafts, anti-rotation pins, "O" rings, custom shafts and the new dual Concentric Shaft construction. Write for catalog.







AP 1/2 BUSHING — **Micro-Miniature** — **AP 1/2 S** SERVO — **RT/RTS 7/8** **AP1 1/8** BUSHING OR SERVO MOUNT — **AP1-1/16** **WP1 5/8** — **LT 7/8** Ball Bearings — **"LO TORK"** — **LLT 7/8** Jewel Bearings

Miniature Low Torque

STANDARD WATERS ELECTRICAL AND MECHANICAL SPECIFICATIONS

Model	Resistance Range ±5%*	Linearity (Bushing)*	Linearity (Servo) (S)*	Case Diameter	Case Length (Bushing)	Case Length (Servo) (S)	Shaft Diameter
AP 1/2	1/2-250 K ohm	5%-2% over 50 K	3%-2% over 50 K	1/2 inch	3/8 inch min.	1/2 inch min.	1/8 inch
RT/RTS 7/8	1/2-250 K ohm	3%	2%	7/8 inch	3/8 inch	1/2 inch	1/8"/1/4"
LT 7/8	25-100 K ohm	None	0.5%	7/8 inch	None	0.80 inch	1/8 inch
LLT 7/8	1/2-150 K ohm	None	0.5%	7/8 inch	None	0.80 inch	0.040"
AP 11/16	1/2-350 K ohm	2%	1%	1-1/16 inch	1/2 inch	11/16 inch	1/8 inch
AP 1 1/8	1/2-350 K ohm	2%	1%	1 1/8 inch	1/2 inch	11/16 inch	1/4 inch
WP 1 5/8	1/4-500 K ohm	0.5%	0.5%	1 5/8 inch	2-5/32 inch	1-1/32 inch	1/4 inch

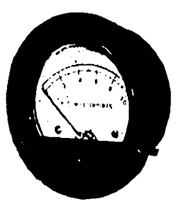
*Variations available on special order, forward requirements for prompt analysis. Details subject to change without notice.

STANDARD RESISTANCES — ALL SERIES, 50, 100, 200, 500, 1K, 2K, 5K, 10K, 20K, 25K. IN ADDITION, 40K and 50K ON RT/RTS 7/8 AND "LO TORK" SERIES AND 40K, 50K AND 100K ON AP 1-1/16, AP 1 1/8 AND WP 1 5/8 SERIES.

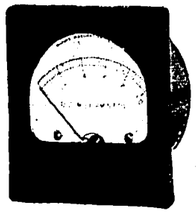
Waters COMPONENTS and PANEL METERS

Waters Components and Panel Meters

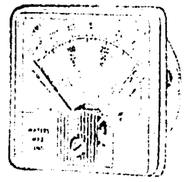
Include an ever-increasing variety of high-quality products. Write for our latest catalogs whenever you need electronic components.



Model 250



Model 350S



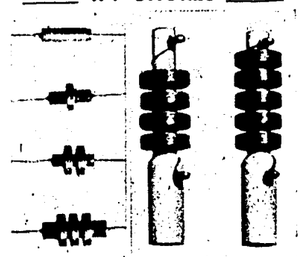
Model PS250

Model	Size	Description
250	2 1/2"	Round Bakelite case
260	2 1/2"	Round metal case*
PS250	2 1/2"	Rectangular, clear plastic case
350	3 1/2"	Round Bakelite case
360	3 1/2"	Round metal case*
PS350	3 1/2"	Rectangular, clear plastic case
250-S	2 1/2"	Rectangular black Bakelite case
350-S	3 1/2"	Rectangular black Bakelite case
450-S	4 1/2"	Rectangular black Bakelite case
450-SP	4 1/2"	Rectangular black Bakelite case; has provision for front illumination

Ranges	D-c Types	A-c Rectifier Types
Microamperes	0-25 to 0-9000	0-100 to 0-900
Milliamperes	0-1 to 0-1000	0-1 to 0-500
Amperes	0-1 to 0-20[1]	—
Millivolts	0-10 to 0-1000	—
Volts	0-1 to 0-500[2 3]	0-1 to 0-500[3]

[1] Over 20 amperes, a 50-millivolt movement is used with an external shunt.
[2] 1000 ohms per volt.
[3] External resistor required over 500 volts.
*Hermetically sealed MIL-M-6A JAN-1-6

R-F CHOKES



Waters R-F Chokes provide high Q in small size. Standard constructions include:

- Solenoids on phenolic & powdered-iron forms.
- Pie-wound coils on ferrite cores & powdered-iron or phenolic forms.
- Pie wound coils on ceramic forms.

Write for free data sheet #C-657 giving inductance, resistance, current rating, Q vs frequency, distributed capacitance, and core sizes. Ask for quotation on special units.

Waters MANUFACTURING, inc.

APPLICATION ENGINEERING OFFICES IN PRINCIPAL CITIES

Wayland Massachusetts
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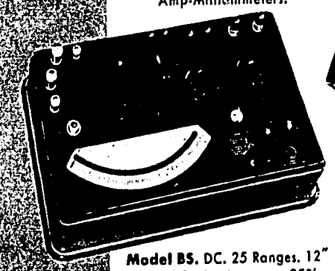
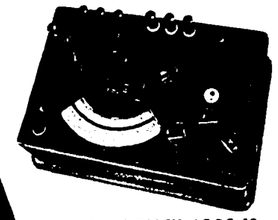
Electrical Indicating Instruments by SENSITIVE RESEARCH

Laboratory Standard and Reference Standard Portable and Panel Instruments that have earned Sensitive Research the reputation of *"Those Standards People."* All instruments have individually calibrated, hand drawn mirrored scales. Available with the now world famous SRIC *Diamond Pivot* and *Shock Mounted Jewel.* Write for Catalog 70.

The Diamond Pivot

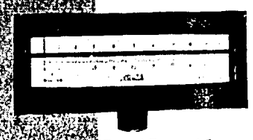
Self-Checking Volt-Amp-Milliammeters.



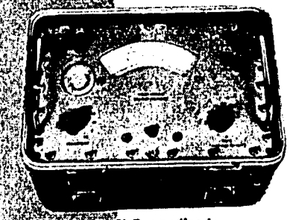


Model THACH. AC-DC. 19 Ranges. Accuracy .2% to 4 KC.

Model BS. DC. 25 Ranges. 12" Vernier Scale. Accuracy .05%.



Edgewise Panel Type. AC or DC. 7" Scale. Accuracy .25%.



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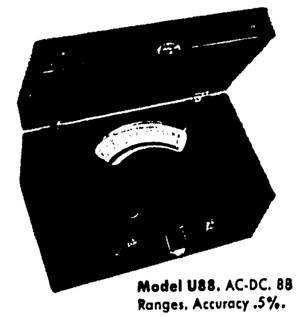
Single and Polyphase Wattmeters. Accuracies to .1%.



Model U88. AC-DC. 88 Ranges. Accuracy .5%.

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- Milliammeters
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Symbol of Quality

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NEW ROCHELLE, N.Y. *ELECTRICAL INSTRUMENTS OF PRECISION SINCE 1927*

For details, circle #323 on Reader Service Card.

Meters (Indicating Instruments)—Class 42

Directory II. Components

42. Meters (Indicating Instruments).

Haydon Co., A. W., Dept. IRE, 240 North Elm St., Waterbury 20, Conn., 10
See ad on page 398
Tel: PLaza 6-4481

Haydon Mfg. Co., Inc., Conn., 10, 33

Hazelton Instrument Co., N.Y., 5, 10, 15, 20, 25, 30, 35, 45

Heath Co., 305 Territorial Rd., Benton Harbor 4, Mich., 30, 35, 45
See ad on page 478
Tel: WAlnut 5-0051

Helipot Corp., Beckman Instruments, Inc., Calif., 5, 15, 35

Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland 8, Ohio
See ad on page 502
Tel: LIberty 1-8060

Howell Instrument Co., Inc., Tex., 20

Hoyt Electrical Instrument Works, Mass., 5, 25, 30, 35, 40

Hycon Electronics, Inc., Calif., 35

Ideal Precision Meter Co., Inc., N.Y., 5, 25, 30, 35, 40

Industrial Timer Corp., N.J., 10

Industron Co., N.Y., 35

International Crystal Mfg. Co., Inc., Okla., 15

International Instruments, Inc., P.O. Box 2954, New Haven 15, Conn., 5, 25, 30, 35, 40
See ad on page 367
Tel: FUlton 7-2515

J-B-T Instruments, Inc., 441 Chapel St., New Haven 8, Conn., 10, 15, 20
See ad on page 366
Tel: STate 7-5825

Jennings Radio Mfg. Corp., 970 McLaughlin Ave., P.O. Box 1278, San Jose 8, Calif., 35, High Voltage
Multiple pages of additional data on 136-137
Tel: CYpress 2-4503

Jerrold Electronics Corp., Dept. TED #2, 23rd & Chestnut Sts., Philadelphia 3, Pa., 15
See ad on page 234
Tel: LOcust 4-0707

Kay Electric Co., Dept. ID-9, 14 Maple Ave., Pine Brook, N.J., 15, 40
Multiple pages of additional data on 44-45
Tel: CAldwell 6-4000

Keithley Instruments, Inc., 12415 Euclid Ave., Cleveland 6, Ohio, 5, 25, 30, 35
See ad on page 481
Tel: SWeetbriar 5-2666

Kin Tel, 5725 Kearny Villa Rd., Box 623, San Diego 12, Calif., 20, 25, 30, 35
See ad on page 204
Tel: BRowning 7-6700

Landis & Gyr, Inc., N.Y., 45

Lytle Engineering & Mfg. Co., N.M., 10

Maico Co., Inc., Minn., Feed-Rate

Marconi Instruments, Ltd., St. Albans, Hertfordshire, England, 15, 35
See ad on page 518
Tel: St. Albans 5-6161

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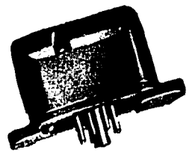
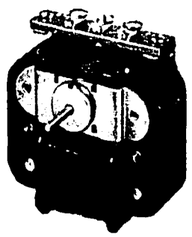
quick solutions to various electronic problems



Ultra-Sensitive Relays

Operating on input powers of 40 to 1,000 microwatts, the Barber-Colman Micropositioner polarized relay is ideal for use as a differential relay in electronic plate circuits, a null detector in resistance bridge circuits, an amplifier in photoelectric circuits. Replaces several stages, simplifies various phases of electronic gear.



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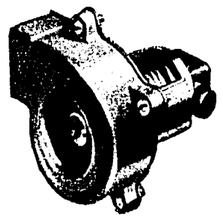
Shaded pole a-c type, up to 1/20 hp . . . adaptable to a variety of control circuits. Low-inertia rotors permitting rapid reversing and follow-up make these motors ideal for electronic circuits.



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In both a-c and d-c types with cooling fans or blowers for quick, dependable dissipation of heat from tubes, circuit components, and other equipment mounted in confined enclosures.

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For details, circle #324 on Reader Service Card.

42. Meters (Indicating Instruments).

Marion Elec. Inst. Co., N.H., 5, 10, 20, 25, 30, 35, 40

Measurements Corp., Box 180, Boonton, N.J., 35
See ad on page 510
Tel: DEerfield 4-2131

Meridian, Inc., Conn., 5, 35, 45
Meters, Inc., Ind., 5, 20, 25, 30, 35, 40
Metron Instrument Co., Col., Tachometer
Midwestern Instruments, Okla., 20

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 15
See ad on page 600
Tel: MAlden 4-4108

Minneapolis-Honeywell Reg. Co., Boston Div., Mass., 20

Moseley Co., F. L., 409 N. Fair Oaks Ave., Pasadena, Calif., 35
See ad on page 486
Tel: RYan 1-0208

Navigation Computer Corp., 1623 Snyder Ave., Philadelphia 45, Pa., 10, 15
See ad on page 382
Tel: HOward 5-7700

Nichols, Ltd., R. H., Canada, 5, 20, 25, 30, 35, 45
Non-Linear Systems, Inc., Calif., 35
Nuclear Corp. of America, N.Y., 5, 25
Oltronix Co., Ga., 5, 20, 25, 30, 35, 45
Pace Electrical Instruments Co., Inc., N.Y., 5, 20, 25, 30, 35, 40
Parks Laboratory, Henry Francis, Calif., Moisturometer
Performance Measurements Co., Mich., 15
Phaostron Instrument & Electronic Co., Calif., 5, 25, 30, 35, 40
Photographic Products, Inc., Calif., 10

Physics Research Labs., Inc., P.O. Box 555, Hempstead, L.I., N.Y., 5, 20, 25, 30, 35, 45
See ad on page 467
Tel: IVanhoe 3-8299

Polytechnic Research & Development Co., Inc., 202 Tillary St., Brooklyn 1, N.Y., 15
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Tel: ULster 2-6800

Potter Instrument Co., Inc., N.Y., 10, 15
Precise Development Corp., N.Y., 35, 45
Precision Apparatus Co., Inc., N.Y., 5, 20, 25, 30, 35, 40
Pyramid Instrument Corp., N.Y., 5, 35
Radio Corp. of America, N.J., 25, 35
RCA Victor Co., Ltd., Canada, 25, 35
Ram Meter, Inc., Mich., Shunts
Rawson Electrical Instrument Co., Mass., 5, 20, 25, 30, 35, 45
Roller-Smith Corp., Pa., 5, 10, 15, 25, 30, 35, 40, 45
Rubicon Co., Pa., 20
Sangamo Electric Co., Ill., 5, 35, 45
Saratoga Industries, N.Y., 15

Sensitive Research Instrument Corp., 310-316 Main St., New Rochelle, N.Y., 5, 15, 20, 25, 30, 35, 45
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Tel: BEverly 5-2300

Shallcross Manufacturing Co., Pa., 20
Shasta Div., Beckman Instruments, Inc., Calif., 35
Shurite Meters, Conn., 5, 30, 35
Simpson Electric Co., Ill., 5, 10, 15, 20, 25, 30, 35, 40, 45

Southwestern Industrial Electronics Co., 2831 Post Oak Rd., P.O. Box 13058, Houston, Tex., 20, 35
Multiple pages of additional data on 22-23
Tel: MOhawk 7-6611

Stark Electronic Sales Co., Canada, 5, 15, 25, 30, 35, 40
Sterling Mfg. Co., Ohio, 5, 30, 35

Sticht Co., Inc., Herman H., 27 Park Pl., New York 7, N.Y., 10, 15
See ad on page 497
Tel: REctor 2-8163

Systron Corporation, Calif., 10, 15

Technical Apparatus Builders, 109 RV Liberty St., New York 6, N.Y., 5, 35
See ad on page 386
Tel: REctor 2-6249

Tele-Matic Ind., Inc., N.Y., 35
Telerad Mfg. Corp., 15, Microwave
Teletronics Laboratory, Inc., N.Y., 15

Texas Instruments Incorporated, 6000 Lemmon Ave., Dallas 9, Tex., 5, 10, 15, 20, 30, 35, 40
Multiple pages of additional data on 88-89
Tel: FLeetwood 2-1781

Triplett Electrical Instrument Co., Ohio, 5, 25, 30, 35, 40
United Audio Prods., Div. United Optical Mfg. Corp., N.Y., 35
Uniwave, Inc., N.Y., 10
Varo Mfg. Co., Inc., Tex., 15
Vocaline Co. of America, Inc., Conn., 10
WAC Line, Inc., Ohio, 5, 25, 30, 40

Waters Manufacturing, Inc., Boston Post Rd. (Rte. 20), Wayland, Mass., 5, 25, 30, 35, 40
See ad on page 368
Tel: ELmwood 8-2777

Waveforms, Inc., N.Y., 35
Welch Manufacturing Co., W. M., Ill., 5, 20, 25, 30, 35, 40, 45
Westinghouse Electric Corp., Pa., 5, 10, 15, 25, 30, 35, 45
Weston Electrical Instrument Corp., N.J., 5, 10, 15, 20, 25, 30, 35, 40, 45
Wright Engineering Co., Calif., 35
Yonkers Industries, Inc., N.Y., 35

Microphones, geophysical: See class 73

43. Microphones & Stands.

3. Aircraft
5. Carbon
10. Ceramic
15. Condenser
20. Crystal
25. Dynamic
30. Velocity
32. Magnetic
35. Microphone stands

American Electronics Mfg., Inc., Calif., 32, 35
Atlas Sound Corp., N.Y., 35
Audio Instrument Co., Inc., N.Y., 15
Brown Co., Irv, N.Y., 35

Budelman Radio Corp., 375 Fairfield Ave., Stamford, Conn., Wireless Microphones
See ad on page 269
Tel: FIreside 8-9231

Camera Equipment Co., Inc., N.Y., 5, 15, 25, 35

Directory II. Components

43. Microphones & Stands.

Connecticut Telephone & Electric Co., Conn., 3, 5, 32
Duotone Co., Inc., N.J., 20

Dyna-Empire, Inc., Dept. ID-57, 1075 Stewart Ave., Garden City, N.Y., 32, Underwater
See ad on page 477
Tel: PIoneer 1-2700

Electro-Sonic Labs., N.Y., 25, 35
Elgin National Watch Co., Electronics Div., Calif., 3, 5, 10, 20, 25, 35
Elgin National Watch Co., Ill., 5, 15, 20, 25, 30, 35
Fenton, Co., N.Y., 25, 30

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 15, 20, 25
See ad on Cover 4
Tel: TRowbridge 6-4400

Greibach Research & Development Labs., N.Y., Throat
Hi-Lo TV Antenna Corp., Ill., 35
Hi-Video, Inc., N.Y., 5, 10, 15, 20, 25, 30, 35
Knowles Electronics, Inc., Ill., 32
Luxo Lamp Corp., N.Y., 35
Medical-Electronics Development Co., N.Y., 15
National Cine Equip., Inc., N.Y., 35
North American Philips Co., Inc., N.Y., 15, 20, 25
Northern Electric Co., Ltd., Canada, 25, 35
Omega Instrument Co., Calif., 15
Pye Corp. of America, N.J., 25, 32
Racon Electric Co., Inc., N.Y., 35
RCA Victor Co., Ltd., Canada, 25, 30, 35
Reeves Equipment Corp., N.Y., 15, 20
Remler Co., Calif., 3 & Marine
Roanwell Corp., N.Y., 3, 5, 25, 32
Ronette Acoustical Corp., N.Y., 20
Shure Brothers, Inc., Ill., 5, 10, 20, 25, 30, 32, 35
Snyder Mfg. Co., Pa., 35
Telephonics, Corp., N.Y., 3, 5, 25, 32
Telex, Inc., Minn., 25, 32
Tibbetts Industries, Inc., Me., 20, 32

Transistor Applications, Inc., Mass., Cordless Microphone Transmitter

Turner Co., Iowa, 5, 10, 20, 25, 32, 35
United Mineral & Chemical Corp., N.Y., 15, 25, 40, 50, 60
U.S. Ceramic Tile Co., Diamonite Div., Ohio, 10
Vega Co., Mass., 25
Vitavox, Ltd., England, 25, 35

Microwave amplifiers: See class 21

Microwave antennas: See class 3

Microwave attenuators: See class 22

Microwave filters: See class 36

Microwave power supplies: See class 47

Microwave receivers: See class 14

Microwave transmitters: See class 15

Microwave tuners: See class 60

Microwave, waveguides: See class 66

Monoscope tubes: See class 63

44. Motors & Motor-Generators.

5. Blower & fan motors
10. Dynamotors
12. Fractional HP
15. Frequency changers
20. Motor-generators
25. Phonograph
30. Servo
35. Synchronous motors
40. Timing motors

ACF Industries, Inc., Erco Div., Md., 30

Acoustica Associates, Inc., Dept. IRE, Shore Rd., Glenwood Ldg., L.I., N.Y., 15, 20
See ad on page 573
Tel: GLen Cove 4-5170

Air-Marine Motors, Inc., 369 Bayview Ave., Amityville, N.Y., 5, 12, 30, 35
See ad on page 298
Tel: AMityville 4-3700

Airborne Accessories Corp., N.J., 12
Alliance Mfg. Co., Ohio, 5, 12, 25, 40
Alliance Motors, Canada, 5, 15, 20, 25
Allied Industrial Electronics of Canada, Ltd., Canada, 15
American Electronics Mfg., Inc., Calif., 5, 12, 20, 30, 35
Amglo Corp., Ill., DC Motors & Timers, 40
Ashland Electric Products, Inc., N.Y., 5, 12, 15, 20, 35

Barber-Colman Co., Dept. 58D, 1856 Rock St., Rockford, Ill., 5, 12, 25, 30, 35
See ad on page 370
Tel: 8-6833

Bendix Aviation Corp., Red Bank Div., Eatontown, N.J., 12, 15, 20
See ad on page 372
Tel: EAtontown 3-2000

Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N.J., 20, 30, 35
Multiple pages of additional data on 121-124
Tel: ATlas 8-2000

44. Motors & Motor-Generators.

Bill-Jack Scientific Instrument Co., Calif., 20, 30
Bogue Electric Mfg. Co., N.J., 10, 15, 20, 35

Borg Corp., George W., Borg Equipment Div., 120 South Main St., Janesville, Wis., 12, 35
See ad on page 156
Tel: PLeasant 4-6616

Borg-Warner Corp., Pesco Prods. Div., Ohio, 5, 12
Brevel Products Corp., N.Y., 12
Bristol Motor Div., Vocaline Co. of America, Inc., Conn., 35, 40
Camera Equipment Co., Inc., N.Y., 35

Carter Motor Co., 2735 W. George St., Chicago 18, Ill., 10
See ad on page 162
Tel: JUniper 8-7700

Celco—Constantine Eng. Labs., Co., 70 Island Ave., Box 555, Mahwah, N.J., 5, 12, 30
Multiple pages of additional data on 96-97
Tel: DAvis 7-1123

Clifton Precision Prods. Co., Inc., Marple at Broadway, Clifton Heights, Pa., 30, Synchronous
Multiple pages of additional data on 118-119
Tel: MAdison 6-2101

Connecticut Telephone & Electric Co., Conn., 12
Consolidated Avionics Corp., N.Y., 15
Consolidated Diesel Elec. Corp., Aircraft Equip. Div., Conn., 5, 20
Continental Electric Co., Inc., N.J., 10, 15, 20
Control Components Co., Mass., Torque
Cramer Controls Corp., Conn., 35, 40
D & R, Ltd., Calif., 15, 20
Dalmotor Co., Calif., 5, 12, 20, 30, 35
Damon Recording Studios, Inc., Mo., 25, 9 Speed Direct Drives

Daystrom Transicoil Corp., Worcester, Montgomery County, Pa., 30
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Tel: JUno 4-2421

Diehl Manufacturing Co., N.J., 5, 12, 20, 30
Doelcam Div., Minneapolis-Honeywell Reg. Co., Mass., 30, 35
Dominion Electrohome Industries, Ltd., Canada, 5, 12
Eastern Air Devices, Inc., N.H., 5, 12, 15, 20, 25, 30, 35, 40
Edison Industries, Thomas A., Instrument Div., N.J., 30
Edwards Engineering Co., N.Y., 10, 12, 20
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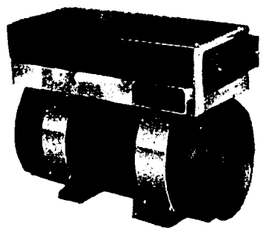
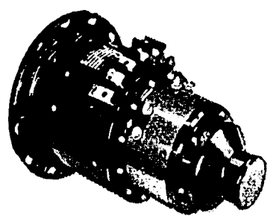
Electric Indicator Co., Conn., 5, 12, 20, 25, 30, 25
Electric Specialty Co., Conn., 10, 12, 15, 20, 30
Electric Trading Co., N.Y., 5

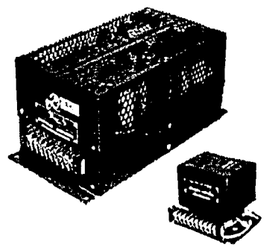
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.



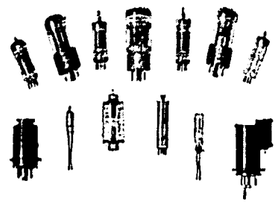
High-altitude and Missile
INVERTERS



High-temperature
AC GENERATORS



AC Voltage Regulators
(Magnetic Amplifier Type)
and
SYSTEM COMPONENTS



Special-purpose Tubes
featuring
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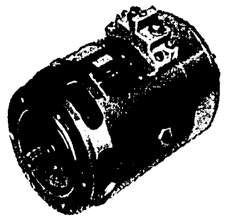
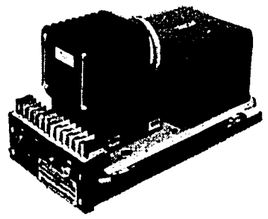


High-temperature
DC GENERATORS



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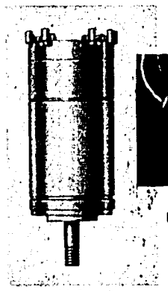

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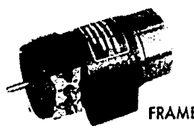

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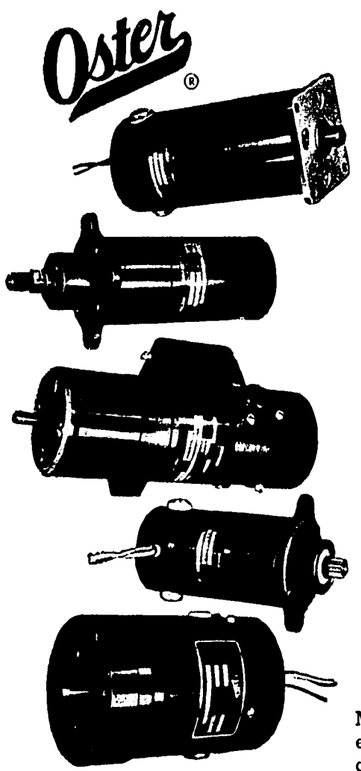

MOTOR GEAR TRAIN													
Gear Ratio	No-Load Speed	Nominal Voltage D.C.	Voltage Range D.C.	No-Load Current	Normal Speed	Normal Load OZ.IN.	Normal Current	Operating Temp. Range	Size	Overall Length Inches-Max.	Motor Type	Mounting	Oster Type
5.68:1	1800	28	24-32	0.4	1800	5.0	1.0	−55° To +85°C	13	3.777	P.M. GOVERNOR	FACE	13R-9102-88
17.9:1	600	28	24-32	0.4	600	12.0	1.0	−55° To +85°C	13	3.930	P.M. GOVERNOR	FACE	13R-9102-06
32.3:1	300	28	24-32	0.4	300	12.0	1.0	−55° To +85°C	13	3.935	P.M. GOVERNOR	FACE	13R-9102-02
67:1	150	28	24-32	0.4	150	12.0	0.6	−55° To +85°C	13	4.092	P.M. GOVERNOR	FACE	13R-9102-05
85:1	150	27.5	—	.25	130	50.0	0.7	−55° To +85°C	13	4.095	P.M.	FACE	13R-9101-11
109:1	100	28	24-32	0.4	100	32	0.6	−55° To +85°C	13	4.094	P.M GOVERNOR	SYNCHRO	13R-9102-12
109:1	180	27.5	—	0.4	175	30	0.5	−55° To +100°C	13	2.843	P.M.	FLANGE	13R-9104-01
125:1	75-90	28	—	.25	70-85	20	0.3	−55° To +71°C	13	3.920	P.M.	FACE	13R-9101-13
157:1	60	28	24-32	0.4	60	12.0	0.6	−55° To +85°C	13	4.095	P.M. GOVERNOR	FACE	13R-9102-03
285:1	48	35	—	.25	40	160	0.6	−55° To +71°C	13	4.038	P.M.	FACE	13R-9103-01
333:1	30	28	24-32	0.4	30	12.0	0.6	−55° To +85°C	13	4.317	P.M. GOVERNOR	FACE	13R-9102-04
410:1	15	27	25-29	0.3	15	8.0	0.3	−55° To +85°C	13	4.400	P.M. GOVERNOR	FACE	13R-9102-11
1043.8:1	5-10	27	24-30	0.15	7	30	0.2	−55° To +71°C	13	4.458	P.M. BRAKE	FACE	13R-9105-01
1044:1	5-10	27	24-30	0.15	7	30	0.2	−55° To +71°C	13	3.910	P.M.	FACE	13R-9101-12
2214:1	3-4	6	—	1.2	3.4	30	1.2	−55° To +71°C	13	4.454	P.M.	FACE	13R-9101-04
3241:1	5.5	35	—	.35	5.5	18	0.4	−55° To +71°C	13	4.454	P.M.	FACE	13R-9101-03
5933:1	1.3	30	—	.13	1.9	30	0.15	−55° To +71°C	13	4.816	P.M.	FACE	13R-9101-10
21,707:1	2-3	120	—	.25	2-3	12	0.25	−55° To +71°C	13	3.475	P.M.	FLANGE	13R-9101-16
322:1	80	110	—	0.2	30	240	0.3	−55° To +71°C	15	3.815	SPLIT SERIES	FLANGE	15R-9201-01
407:1	22	27	—	0.2	20	8	0.2	−20° To +50°C	15	3.909	SPLIT SERIES	SYNCHRO	15R-9201-03
433:1	30	26	—	0.6	25	260	1.2	−50° To +80°C	15	3.110	SHUNT	FACE	15R-9201-02
955:1	33	27	—	0.6	12-18	420	1.0	−55° To +50° C	15	4.419	SPLIT SERIES	FLANGE	15R-9201-08
26:1	240	27.5	24-29	0.65	240	40	1.3	−10° To +71°C	17	5.315	SHUNT GOVERNOR	SYNCHRO	17R-9251-01
4.26:1	1000	28	—	0.6	1000	12	1.05	−30° To +55°C	24	4.640	SHUNT GOVERNOR	FACE	24R-9451-01

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V-M Corp., Mich., 30, 35, 55
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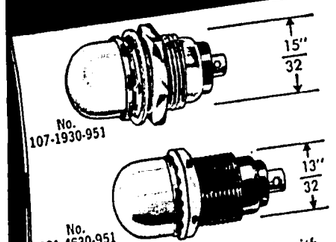

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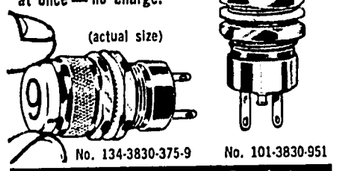

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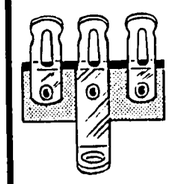

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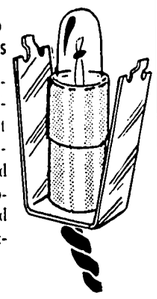

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Directory II. Components

46. Pilot Lights & Accessories.

Sylvania Electric Products Inc., Dept. F24P, 1740 Broadway, New York 19, N.Y., 5, 10, 15
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Tel: JUdson 6-2424

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See ad on page 402
Tel: CHurchill 2-5000

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Westinghouse Electric Corp., Pa., 10

MODEL 3 ILLUSTRATED

ELECTRONICALLY REGULATED
D. C. CONSTANT VOLTAGE
POWER SUPPLIES

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.

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The Silent, Dependable INVERTRON Features:

POWER OUTPUT RATINGS from milliwatts to kilowatts

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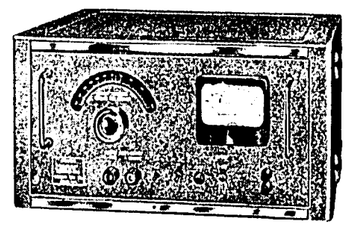
SINE WAVE distortion never greater than 2%, with .5% or less available

REGULATION from no load to full load... standard 1% — with .5% or better available

Negligible Interaction between output frequency, voltage and load.



MODEL 161-D-1
POWER OUTPUT: 160 VA single phase, FREQUENCY: 350 to 450 cps variable, FREQUENCY ACCURACY: 0.5% (0.2% and 0.1% available), INPUT: 115v 60 cps single phase, OVERALL SIZE: 22" wide x 10" high x 15" deep.

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Pins & Prongs: See class 97

Pirani tubes: See class 62

Potentiometers: See class 53

47. Power Supplies.

2. AC type
4. DC type
5. High voltage, (kilovolt)
10. Klystron
15. Low voltage
20. Medium voltage
25. Microwave
30. Primary power sources, fuel-engine driven
35. Transistor
40. Voltage regulated power sources

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Alden Electronic & Impulse Recording Equipt. Co., Alden Research Center, Westboro 6, Mass., 4, 40
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Tel: Forest 6-4467

Alden Systems Co., Mass., Power Channels

Alfred Electronics, 897 Commercial St., Palo Alto, Calif., 4, 5, 10, 15, 20, 25 40 & Sweeping Type
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YOrkshire 7-8177

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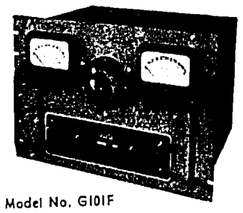

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AIRCRAFT BATTERY ELIMINATOR

Output: 0-28V DC, 20 amps.

Ripple: 1%

UNIT CAN BE USED FOR EITHER RACK OR BENCH

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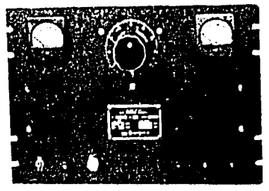

Model No. G45-5F

Output: 0-45V DC, 0-5 amps.

Ripple: 1%

UNIT FOR RACK MOUNT CAN BE SUPPLIED FOR BENCH

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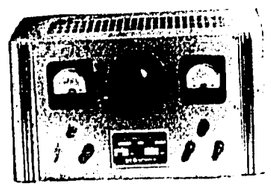

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47. Power Supplies.

American Machine & Foundry Co., Defense Prods. Group, 1101 N. Royal St., Alexandria, Va., 2, 4, 5, 20, 30, 35, 40
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Tel: KIng 9-9110

American Microwave Corp., Calif., 10, 25

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American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn., 2, 4, 15, 20, 35
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Tel: CA 2-3791

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Applegate & Co., C. J., Colo., 2, 4, 5, 10, 15, 20, 35, 40

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Simplify D-C Power Requirements

MODEL 212A . . . 0 to 100 V dc, 100 ma. Regulation 0.1% or 0.02 volt over entire range of load and input voltage. Weight 14 lbs. 3½" H x 19" W x 9¼" D. Price $129.00 unmetered. Other models up to 3 amps.

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With a minimum of adjustment, REGATRONS will deliver the precise power your equipment requires. Here are the features that make it possible:

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DuMont Labs., Inc., Allen B., N.J., 2

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Tel: TExas 0-6401

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General Electric Co., Rectifier Dept., Mass., 40 Airborne & Computer

General Electric Co., Specialty Transformer Dept., Ind., 40

General Magnetics, Inc., 135 Bloomfield Ave., Bloomfield, N.J., 40
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General Precision Labs, Inc., N.Y., 40

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass. 2, 4, 10, 15, 20, 40
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Tel: TRowbridge 6-4400

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Tel: CRestview 3-9123

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Heath Co., 305 Territorial Rd., Benton Harbor 4, Michigan, 40
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Tel: WAlnut 5-0051

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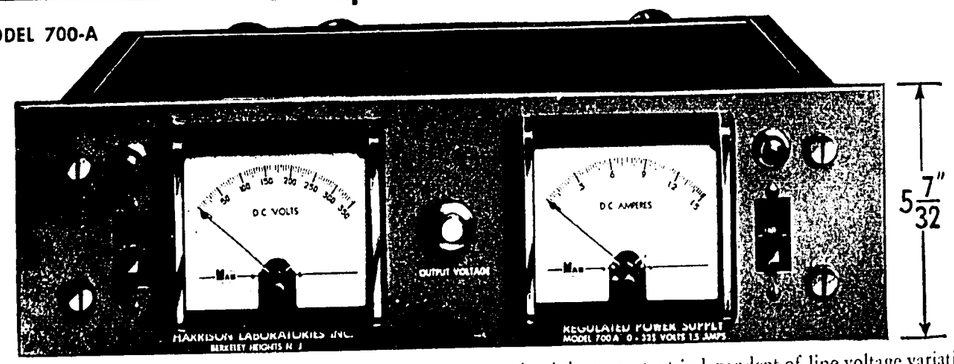
Jetronic Industries, Inc., Pa., 4, 15, 20, 35

Kahn & Co., Inc., Conn., 15

HAB Power Supplies

700 SERIES VARIABLE VOLTAGE—HIGH CURRENT 3-325 Volts @ 0 to 1.5 Amps.

MODEL 700-A



5 7/32"

- **Less than .01 volts variation from N.L. to 1.5 amps.**
- **Less than 500 microvolts ripple**
- **Continuously variable**
- **Compact**

A new design philosophy enables the 700 series of D. C. power supplies to provide excellent regulation. They are compact and continuously variable, with a wide continuous range of output voltage control. Another basic advantage of this power supply is that the voltage across the series tubes is kept constant independent of line voltage variations, load changes, or manual variation of the output voltage. In this way, the series tubes always have the proper operating voltage, and the regulator never loses regulation even with a full 1.0 ampere step change in load. Although this power supply is relay-rack mounted, the front panel is hinged and can be dropped down without removing the supply from the relay rack.

Designed for continuous operation, this power supply will provide the *real dependability* you need.

Price:.....$695.00

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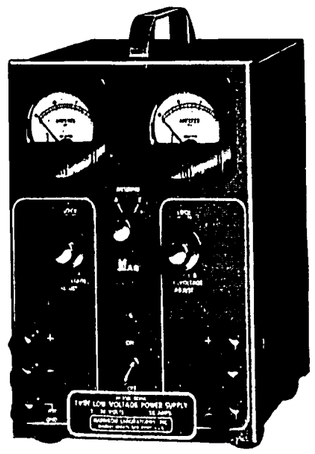
The 800 series consists of a line of highly regulated low voltage D. C. power supplies that are completely transistorized. Model 800-A is a portable bench-type supply that incorporates two completely independent, continuously variable 2 to 30 volt, 0 to 1.0 ampere power supplies. When required, these supplies can be connected in series to obtain a single 4 to 60 volt supply at 1.0 ampere. Model 800-B is also a portable bench-type supply, continuously variable from 2 to 30 volts, with a 2.5 ampere capacity.

Both models in the 800 series feature automatic short-circuit and overload protection. When the output terminals have been inadvertently short-circuited, a protection circuit opens the regulator loop and prevents the output current from flowing. At approximately four second intervals, the supply endeavors to re-establish the output voltage, and it will succeed when the overload or short circuit condition has been removed.

The response to a sudden no load to full load change does not break the regulator loop. A no load to 1.0 ampere current change produces less than 50 millivolts change in output voltage, and this output voltage variation persists for less than 400 microseconds.

- **Short circuit and overload protection with automatic reset**
- **Less than 500 microvolts ripple**
- **Less than .01 volts variation from no load to full load**
- **Uses transistor circuitry throughout**



MODEL 800-A

MODEL 800-B

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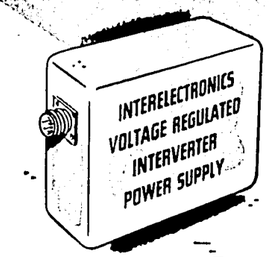
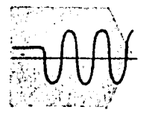
DC to DC and DC to AC solid-state power converters voltage regulated, frequency controlled, for missiles, telemetering, gyros, servos





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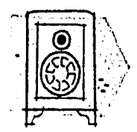

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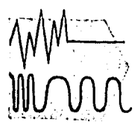

Now in use in major missiles, powering telemetering transmitters, radar beacons, electronic equipment. Single and polyphase AC output units now power airborne and marine missile gyros, synchros, servos, magnetic amplifiers.

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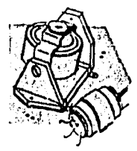

For complete engineering data write Interelectronics today, or call LUdlow 4-6200 in N. Y.

INTERELECTRONICS CORPORATION

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47. Power Supplies.

Kama Instrument Corp., 178 E. 2nd St., Mineola, L.I., N.Y., 5, 10, 15, 20, 35, 40
See ad on page 411
Tel: PIoneer 6-4942

Kato Engineering Co., Minn., 2, 4, 5, 40

Kay Electric Co., Dept ID-9, 14 Maple Ave., Pine Brook, N.J., 35
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Tel: CAldwell 6-4000

Kenyon Transformer Co., Inc., N.Y., 40

Kepco Laboratories, Inc., N.Y., 2, 4, 5, 10, 15, 20, 25, 35, 40

Kin Tel, 5725 Kearny Villa Rd., Box 623, San Diego 12, Calif.
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Tel: BRowning 7-6700

Krohn-Hite Corp., 580 Massachusetts Ave., Cambridge 39, Mass., 4, 20, 40
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Tel: UNiversity 4-4272

L.E.E., Inc., D.C., 2, 4, 15, 20, 35, 40

Laboratory for Electronics, Mass., 5

Lambda Electronics Corp., 11-11 131 St., College Point 56, L.I., N.Y., 4, 15, 20, 35, 40
See ad on pages 91-94
Tel: INdependence 1-8500

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Lard-C-Air Sales Co., N.Y., 25, 40

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Lee Electric & Mfg. Co., Calif., 4

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Levinthal Electronic Products, Inc., Calif., 4, 5, 10, 25, 40

Ling Electronics, Inc., 5120 West Jefferson, Los Angeles, Calif. Electronic
See ad on page 480
Tel: WEbster 3-9595

Macarr, Inc., N.Y., 5, 15, 20

MacLaren & Co., Inc., F. B., N.Y., 4, 20, 40

Magnatran, Inc., N.J., 5, 10

Magnetic Amplifiers, Inc., 632 Tinton Ave., New York 55, N.Y., 2, 4, 35, 40
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Tel: CYpress 2-6610

Magnetic Research Corp., 3160 W. El Segundo Blvd., Hawthorne, Calif., 2, 4, 15, 20, 35, 40
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Tel: OSborne 5-1171

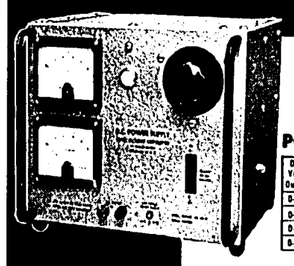
Manson Laboratories, Inc., 207 Greenwich Ave., Stamford, Conn., 2, 4, 5, 20, 40
See ad on page 494
Tel: DAvis 4-6783

Marconi Instruments, Ltd., St. Albans, Hertfordshire, England, 10
See ad on page 518
Tel: St. Albans 5-6161

HIGH QUALITY • HIGH POWER

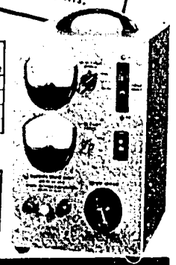
TRANSISTOR POWER SUPPLIES

MRC D.C. POWER SUPPLIES . . . EFFICIENT, ECONOMICAL POWER SOURCES FOR ALL TRANSISTOR CIRCUITRY! ★ Superior to conventional high voltage Power Supplies which are often erratic at Transistor voltages. ★ One continuously variable MRC unit will replace several high priced power sources. ★ Ends annoying battery hook-up. FEATURES: Conservative Ratings; No Moving Parts; Isolated Output; Magnetic Circuit Breakers; Easy-to-read Meters; Compact, Rigid and Lightweight Units.



POWERUNIT SERIES:

D.C. Volts Output	Amps	% Ripple at Max. Outp.	Model Number	Rect. Type	Net Price
0-35	0-15	.25	GR 35-15	Germ.	$380
0-35	0-15	.02	GS 35-15	Germ.	395
0-90	0-8	2.	GP 90-8	Germ.	360
0-90	0-8	.1	GR 90-8	Germ.	395



DV SERIES:

D.C. Volts Output	Amps	% Ripple at Max. Outp.	Model Number	Rect. Type	Net Price
0-60	0-1.	.05	DV 60-2	Sel.	$110
0-30	0-3.	.2	DV 30-3	Sel.	160

PROMPT DELIVERY

WRITE FOR COMPLETE CATALOG AND QUOTATION ON CUSTOM UNITS TODAY!

All Prices F.O.B. Brooklyn, N.Y.

MRC MODEL RECTIFIER CORPORATION
1065 UTICA AVE BKLYN 3, N Y

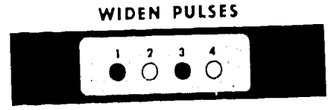
For details, circle #338 on Reader Service Card.

DO YOU WANT TO...

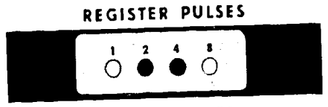
GENERATE PULSES

DELAY PULSES

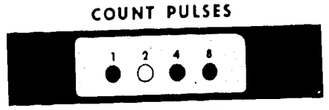
WIDEN PULSES



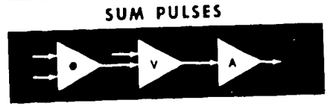
REGISTER PULSES



COUNT PULSES



SUM PULSES



DO BINARY LOGIC

DRIVE TRANSISTOR CIRCUITS

The logic functions are built into miniaturized 2¼" x 10" slide-in units. Most units contain 10 functions or stages — others at least three. They are all designed to work together, and are easily interconnected by simple patch cords at the rear of the units. Operating rates are up to 200 K.C.

A single regulated power supply can handle up to 15 units, and fits into the small portable rack. Only two voltages (- 10V, - 20V) are required for the system operation.

WRITE FOR COMPLETE DATA FOLDER

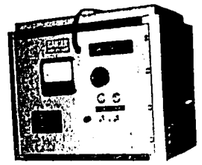
Mavcor

NAVIGATION COMPUTER CORP.
1623 SNYDER AVE.
PHILADELPHIA 45, PA.
PHONE: HOward 5-7700

For details, circle #339 on Reader Service Card.

HIGH VOLTAGE POWER SUPPLIES

All of the following Standard NEUTRONIC Lab-Type units are now available with .1% *Regulation*

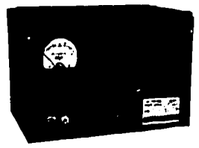


RACK MOUNTED . . . BENCH TYPE CABINETS

Model	Voltage Range	Current Range	Regulation
21K	1–10 KV	10 ma @ 5 KV	.1%
21KR	1–10 KV	10 ma @ 5 KV	.1%
21M	1–12 KV	6 ma @ 10 KV	.1%
21MR	1–12 KV	6 ma @ 10 KV	.1%
22C	3–26 KV	2 ma @ 18 KV	.1%
22CR	3–26 KV	2 ma @ 18 KV	.1%
22M	3–30 KV	3 ma @ 20 KV	.1%
22MR	3–30 KV	3 ma @ 20 KV	.1%
23C	5–10 KV	1.3 ma @ 25 KV	.1%
23CR	5–10 KV	1.3 ma @ 25 KV	.1%
23M	5–15 KV	1.5 ma @ 30 KV	.1%
23MR	5–15 KV	1.5 ma @ 30 KV	.1%
24C	5–30 KV	1 ma @ 35 KV	.1%
24CR	5–30 KV	1 ma @ 35 KV	.1%
24M	5–30 KV	2 ma @ 30 KV	.1%
24MR	5–30 KV	2 ma @ 30 KV	.1%
25S	5–35 KV	3 ma @ 30 KV	.1%
25SR	5–35 KV	3 ma @ 30 KV	.1%

REVERSIBLE OUTPUT MODELS ALSO AVAILABLE

3 NEW NEUTRONIC ECONOMY POWER UNITS AT AMAZING LOW COST.



MODEL 75 BR
SIZE: 7¼x8x8
VOLTAGE RANGE: 2–7.5 KV-DC
CURRENT OUTPUT: 1 ma @ 6 KV
REGULATION: Better than 1% **$98.50**

MODEL 15 BR
SIZE: 7¼x12x8
VOLTAGE RANGE: 2–15 KV-DC
CURRENT OUTPUT: 1 ma @ 10 KV
REGULATION: Better than 1% **$161.50**

MODEL 30 BR
SIZE: 7¼x14x8
VOLTAGE RANGE: 5–30 KV-DC
CURRENT OUTPUT: 1 ma @ 20 KV
REGULATION: Better than 1% **$219.50**

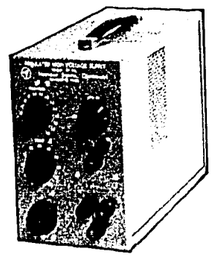
Write to Dept. I for completely new catalog and price list.
Prices Subject to Change Without Notice

NEUTRONIC ASSOCIATES
93-14 101st Ave., Ozone Park 17, N.Y.
Virginia 7-7703

For details, circle #340 on Reader Service Card.

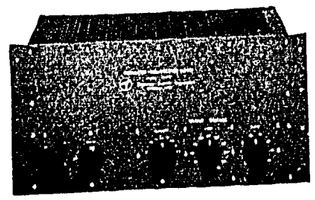
PRECISION SUPPLIES

Portable Pattern



Model	Voltage	Current
RE-1601	200-1600	0-25 Ma
RE-1602	300-1600	0-10 Ma
RE-1901	300-1900	0-25 Ma

Rack Pattern



Model	Voltage	Current
RE-1603	300-1600	0-10 Ma
RE-1610	300-1600	0-100 Ma
RE-2003	500-2000	0-25 Ma
RE-2006	500-2000	0-50 Ma
RE-3002	500-3000	0-20 Ma
RE-3004	500-3000	0-40 Ma
RE-3006	500-3000	0-60 Ma
RE-5001	500-5000	0-10 Ma
RE-5002	500-5000	0-20 Ma
RE-5003	500-5000	0-30 Ma
RE-5502	1000-5500	0-25 Ma
RE-10001	1000-10000	0-10 Ma

Features

Either positive or negative of any supply may be grounded.
Regulation: .01 to .001%
Line Stability: .05 to .005%
Long-term Stability: .01-.05% per hour, about 0.1% per day
Impedance: 1 to 5 Ohms
Ripple: 0.5 to 3 Mv P-P
Standard tubes used

Constant Current Supplies

RI-222E	.01-220 Ma	0-340V

Millimeter Wave Generators

KSG-291	36.2-33.5 kmc	8.3-8.9 mm
KSG-290	33.5-29.7 kmc	8.9-10. mm
KSG-289	30-27.3 kmc	10.-11. mm
KSG-33	25-22 kmc	12.-13.6 mm

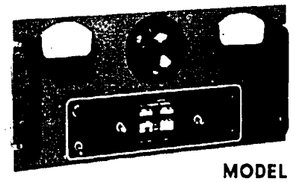
Any of these supplies can be modified or special designs built to meet specialized requirements.

Northeast Scientific Corp.
617 CONCORD AVENUE
CAMBRIDGE 38, Mass.

For details, circle #341 on Reader Service Card.

POWER SUPPLIES
IMMEDIATE DELIVERY

O-150 VOLTS D.C., 2 AMPS.



MODEL TM25

VOLTAGE REGULATED

RIPPLE: 0.03% at Maximum Load.
REGULATION:
LINE, ± 1% for line change of ± 10% from nominal 115 V.
LOAD, Less than 4% for Load Change of zero to F.L. at Maximum Output Voltage and Nominal Input.
Request Bulletin No. 250

O-30 VOLTS D.C.

AMPS.	PORTABLE UNFILTERED (Full Wave Rectified)	RACK FILTERED (Ripple: Less than 1%)	PORTABLE FILTERED (Ripple: Less than 1%)
5	GM72	KM75*	KM75B*
10	GM78	KM81	KM81B
20	GM84	KM87	KM87B
40	GM90	KM93	KM93B

*Ripple: Less than 0.5%
Write for Literature

O-30 VOLTS D.C.

RIPPLE: 4 - 5% of Average DC Output.

REGULATION: 1/10 Load, 31½ V Full Load, 30 V

FULLY PROTECTED against:
- Short Circuits
- Low Line Voltage
- Overcurrent
- Rectifier Thermal Overload
- Power Line Interruptions.

MODEL FR100 ..... 100 Amperes
MODEL FR200 ..... 200 Amperes

Request Bulletin No. 155

Opad ELECTRIC COMPANY
69-8 MURRAY STREET • NEW YORK 7, N. Y.
Telephone: BEekman 3-7548

For details, circle #342 on Reader Service Card.

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Radiation Instrument Development Lab., Ill., 5, 40
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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	
		2,500	80.00	
6000		2,500	80.00	$120.00
6000-A	With Kilovolt Meter	5,000	75.00	
6005		5,000	95.00	135.00
6005-A	With Kilovolt Meter	10,000	85.00	
6010		10,000	105.00	145.00
6010-A	With Kilovolt Meter	15,000	95.00	
6015		15,000	115.00	155.00
6015-A	With Kilovolt Meter	25,000	115.00	
6025		25,000	155.00	205.00
6025-A	With Kilovolt Meter			

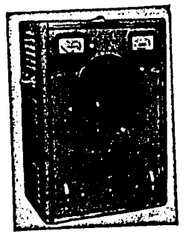
MIRROR SCALE HIGHER ACCURACY METERS: Recommended where more exact settings or measurements are needed. Meter size has been increased to 6 inches for easier reading. Price $35.00 additional on any meter equipped model.
TWO METER MODEL .....ADD $35.00

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 kilovolimeter, current meter and automatic overload cutout circuits.

Model	Voltage	VA	AC	Price AC and DC
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

INDUSTRIAL POWER SUPPLIES



Regulated Types Available

These industrial type power supplies are built for service and efficiency. All 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. Polarity reversing models (as illustrated) can be had at additional cost.

Model	Voltage	Current	Price
F-500	0-500	3 AMP	$800.00
F-1001	0-1000	2 AMP	975.00
F-2002	0-2000	1 AMP	985.00
F-5005-AI-H	0-5000	100 MA	550.00
F-5005-AI-5H	0-5000	500 MA	650.00
F-5005-AI-K	0-5000	1 AMP	1100.00
F-6010-AI	0-10,000	100 MA	830.00
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

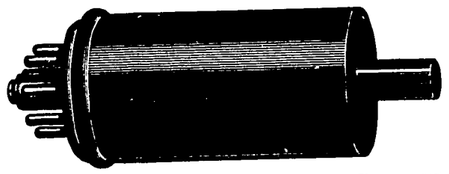
100 KV. KILOVOLTMETER

- Read High Voltages Directly with Extra-High Input Impedance.
- Single Instrument Reads Both A.C. and D.C. Voltages!
- Superb Craftsmanship—Portable Oak Case.

Model	Range Kilovolts	Price D.C. Model	Price A.C./D.C. Model
4000	0-25/50	$67.50	$100.00
4000-A	0-100	80.00	125.00
4000-B	0-50/100	85.00	130.00
4000-C	0-10/50/100	95.00	160.00

Other Ranges to Order .....
1% MIRROR SCALE INSTRUMENT .....ADD $50.00

HIGH VOLTAGE CONVERTERS



Solves your High Voltage problem in the simplest possible way. Simply connect input to 1½ or 3 V. battery (or low voltage A.C.) and obtain your high voltage output. Output voltage adjustable from zero to 6,000 Volts AC (or DC when rectified). Typical output is 1 Ma. at 130 Volts D.C., 200 Microamperes at 500 Volts and 100 Microamperes at 1,000 Volts with 3 Volts input. Model 7 MVT as illustrated, plugs in like a radio tube. The Model 10 MVT is not encased.

Model	Primary	Secondary	Price
7 MVT	1 to 4 Volts	0 to 6,000 Volts AC Max.	$12.50
10 MVT	1 to 4 Volts	0 to 6,000 Volts AC Max.	$10.00

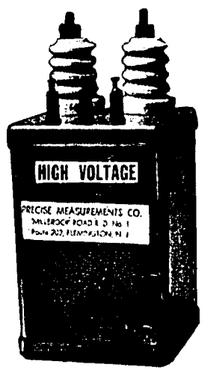
TRANSFORMERS, HIGH VOLTAGE

For those who build their own power supplies. These units are small and compact and rated for constant service. Primary designed for 115 Volts 60 Cycle. Only standard models are listed, other voltages and currents available on order.

Model	Max. Voltage	Model	Max. 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		

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.

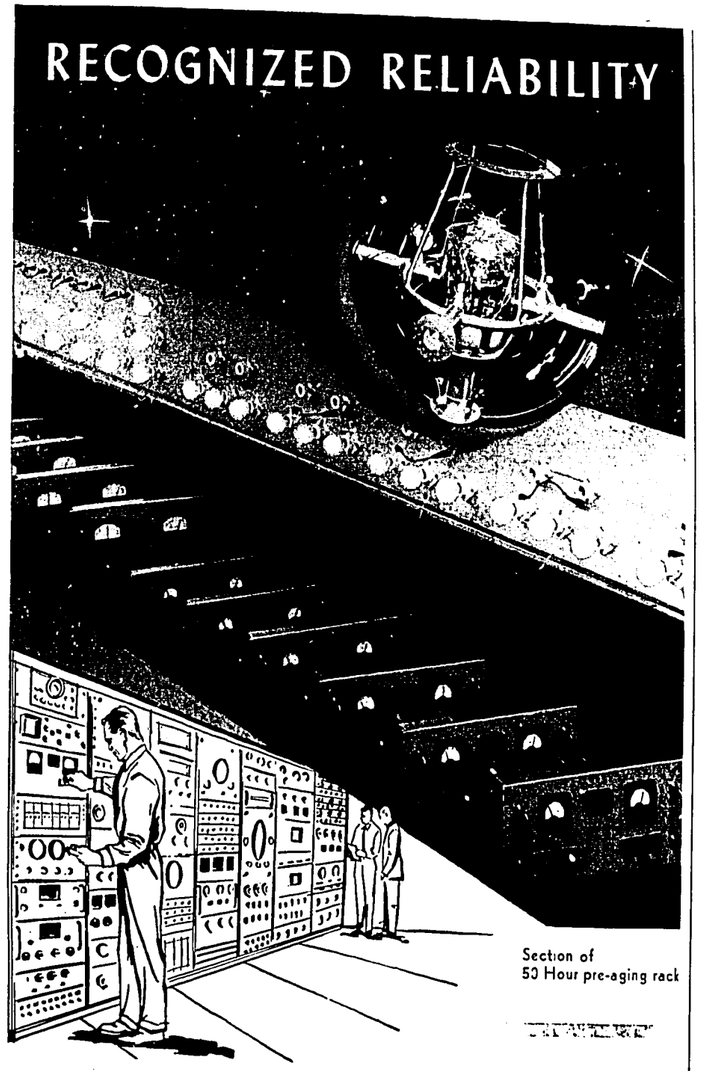


Model	Output Voltage	Current	Model	Output Voltage	Current
05-KV-5MA	500 Volts DC	5 Ma.	20-KV-1MA	20 KV DC	1 Ma.
1-KV-5MA	1 KV DC	5 Ma.	20-KV-5MA	20 KV DC	5 Ma.
2-KV-5MA	2 KV DC	5 Ma.	30-KV-1MA	30 KV DC	1 Ma.
5-KV-1MA	5 KV DC	1 Ma.	30-KV-5MA	30 KV DC	5 Ma.
5-KV-5MA	5 KV DC	5 Ma.	50-KV-1MA	50 KV DC	1 Ma.
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.			

PRECISE MEASUREMENTS COMPANY

MILLBROOK LANE • R.D. 1 • FLEMINGTON, NEW JERSEY • TEL. FLEMINGTON 900

For details, circle #343 on Reader Service Card.



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50 Hour pre-aging rack

POWER DESIGNS commercial standard power supplies

are being furnished for ground telemetering equipment

in the EARTH SATELLITE program.

We have been manufacturing precision power sources for electronic instrumentation for 15 years. Can we be of service in the solution of your power supply problems. Literature available. Write Dept. 57-RD

Power Designs inc.

89-25 130th STREET
RICHMOND HILL 18, N. Y.

STABLE POWER SOURCES FOR ELECTRONIC INSTRUMENTATION

For details, circle #344 on Reader Service Card.

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47. Power Supplies.

RCA Victor Co., Ltd., Canada., 5, 20, 25, 35

Radio Engineering Products, Ltd., 1080 University St., Montreal, Quebec, Canada, 2, 40
See ad on page 282
Tel: UNiversity 6-6887

Ramo-Woolridge Corp., 5730 Arbor Vitae St., Los Angeles 45, Calif., 4, 5, 35, 40
See ad on page 438
Tel: OR 8-0311, OR 2-0171

Ranson Research, Calif., 4, 15, 35, 40

Reeves Instrument Corp., Sub. Dynamics Corp. of America, N.Y., 4, 20, 40

Rese Engineering, Inc., Pa., Pulse

Rheem Electronics Div., Calif., 2, 4, 15, 20, 35, 40

Rho Company, Calif., 2, 4, 5, 15, 20, 35

Richardson-Allen Corp., N.Y., 4

Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 35
See ad on page 263
Tel: LOckwood 5-3516

Sangamo Electric Co., Ill., 2, 4, 5, 15

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Sel-Rex Corp., Dept. IRE-57, Precious Metals Div., 75 River Rd., Nutley 10, N.J., 4, 5, 15, 20
See ad on page 585
Tel: Nutley 2-5200

Senn Corp., Ind., 5, 15, 20, 35, 40

Servo Corp. of America, N.Y., 2, 4

Servomechanisms, Inc., Mechatrol Div., N.Y., 2, 4

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Shasta Div., Beckman Instruments, Inc., Calif., 20

Sierra Electronic Corp., 3885 Bohannon Dr., Menlo Park, Calif., 10
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Tel: DAvenport 6-2060

Sivers Lab., Sweden, 10, 25, 40

Sola Electric Co., 4633 W. 16th St., Chicago 50, Ill., 40
See ad on page 440
Tel: BIshop 2-1414

Solartron Electronic Group, Ltd., England, 4, 5, 10, 15, 20, 35, 40

Solartron, Inc., 10761 Burbank Blvd., N. Hollywood, Calif., 4, 10, 40
See ad on page 292
Tel: STanley 7-5081

Sonex, Inc., Pa., 15, 35

Sorensen & Co., Inc., Conn., 2, 4, 15, 20, 35, 40

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

TABTRON **TECHNICAL APPARATUS BUILDERS** **TABTRON**

109RV LIBERTY ST., NEW YORK 6, N.Y.

New "TEKSEL"® SELENIUM RECTIFIERS* Engineered for Automation & Industry "Technical Apparatus Builders" Mfgrs. Industrial Power Rectifiers with "KOOLTAB" Current Collectors & Brackets. Also to Your Specs Any Current. Quick Deliveries! Replacements Our Specialty. Write for Quantity Prices.

*FULL WAVE BRIDGE & 1C.T. • DATED & ONE YEAR GTD.

MAX DC AMP	Single Phase Full Wave Bridge 1HVAC 14VDC	36VAC 28VDC	54VAC 42 VDC	72VAC 54VDC	130VAC 100VDC	266VAC 217VDC	3-Phase Bridge 3 phase 16VAC 20VDC	3-Phase 30VAC 36VDC	3-Phase 120VAC 150VDC	3-Phase 208VAC 256VDC
1	$1.50	$2.30	$3.75	$5.30	$8.75	$27.90	$3.75	$4.90	$21.45	$39.75
2	2.35	3.35	5.40	6.45	11.70	33.60	4.75	5.95	24.90	47.90
3	3.00	4.15	6.30	9.60	13.45	42.90	5.40	6.85	27.60	63.30
4	3.70	7.50	11.30	16.15	25.00	49.80	6.75	7.95	31.15	69.75
6	4.45	8.85	12.90	19.30	32.85	61.90	7.90	9.30	48.45	81.90
10	6.50	12.60	19.90	27.90	42.30	99.70	9.00	14.25	63.60	117.75
12	8.10	15.90	22.50	32.75	45.90	111.45	10.75	16.15	69.75	137.90
20	13.20	25.40	38.00	52.50	79.45	177.90	16.20	24.75	124.15	165.75
24	16.15	32.40	44.90	63.60	86.35	210.60	18.60	31.70	149.70	279.90
30	19.80	37.80	56.45	78.75	120.75	256.15	21.60	34.95	189.60	363.75
36	24.90	48.45	72.45	95.70	147.60	326.70	24.75	39.30	225.75	399.60
50	33.45	63.75	121.50	135.75	192.75	445.90	31.60	46.75	297.90	591.75

Battery Charger Stacks * †

6&12VDC—OUT FAN COOLED

CR20R† $14 6VDC@100AMP

REPLACEMENT OR CONVERSION

6&12VDC 100/50AMP

CR32D† $20 BR18R* $24 BR18C* $26

BN18R* $20 6& 12 VDC 80/40AMP

BATTERY CHARGER STACKS VOLTS AC INPUT : CR20R† 10VAC/CT., CR32D†16VAC/CT, BR18R*—BR18C*—BN18R*—18VAC.

COMING NEW "SILTAB"® SILICON JUNCTION HITEMP RECTIFIERS! WRITE

TEKAP-TABPAK®

High Current Power Supplies

One Year Guarantee

Variable 0-28 VDC. Completely built. Ready to go. Full Wave Selenium Rectifier, Transformer, Variac, Meter, Pilot Light, 4" Volt & Amp Meters, Switch, Terminals & Fuse, Hvy Duty Steel Cabinet. Std. 115V/60cy Input or 220V† (3 phase) to order.

Stock Number	Continuous Rating	With Meters
T28V5A*	0-28 VDC at 5 Amp	$57
T28V5ACC	5 Amp (1% Ripple)	84
T28V5A2CC	5 Amp @ 1% Ripple	155
T2KV12A	0-28 VDC at 12 Amp	138
T28V12ACC	12 Amp (1% Ripple)	168
T28V12A2CC	12 Amp @ 1% Ripple	250
T35V16ACC†	0 to 35V @ 16 Amp/.5% Ripple	210
T28V24A†	0-28 VDC at 24 Amp	175
T28V24ACC†	24 Amp 1% Ripple	250
T28V24A2CC†	24 Amp @ 1% Ripple	345
T28V50A†	0-28 VDC at 50 Amp	325
T28V50ACC†	50 Amp (1% Ripple)	450
T28V100A†	0-28 VDC at 100 Amp	550
T28V100ACC†	100 Amp (1% Ripple)	750
T35V25ACC†	0-35V @ 25 Amp (1% Ripple)	370
T35V50ACC†	0-35V @ 50 Amp (1% Ripple)	639
T60V1ACC	0-60 VDC @ 1 Amp (0.1% Rip	108
T60V2ACC	0-60 VDC @ 2 Amp/0.1% Rip	139
T60V5ACC	0-60 VDC @ 5 Amp/0.1% Rip	225

Variable 0-130 VDC Completely built.

Includes Isolation Transformer, Selenium F.W. Bridge, Rectifier, 4" Rectangular Volt & Ammeter Specify for 115 or 230VAC/1ø/60cy input.

T130V5A†	0-130 VDC at 5 Amp	$225
T130V5ACC†	5 Amp (1% Ripple	275
T130V10A†	0-130 VDC at 10 Amp.	275
T130V10ACC†	10 Amp 1% Ripple	369

Includes 4" Meters 2% Acy. *2" Meters

"TABTRAN" Rectifier Xfmrs

Sec'd Volts (DUAL† 0-9-15-18-&0-9-15-18 Series Sec'ds 0-3-6-9-12-15-18-21-24-27-30-33-36 Volts.

TR4001 @	1 Amp ea/sec/wndg.†	$ 4.95
TR4002 @	2 Amp ea/sec/wndg.†	7.20
TR4003 @	3 Amp ea/sec/wndg.†	9.45
TR4005 @	12 Amp ea/sec/wndg.†	16.70
TR4006 @	24 Amp ea/Sec Wndg.†	35.85
TR4007 @	50 Amp* per each SEC WNDG.†	59.65
TR4008 @	100 Amp* per each SEC WNDG.†	117.00

† Wndgs. in Series at Amps shown; Parallel 2X Current, Voltage equals 0-9-15-18§

TAP PRI 105, 110 & 115V; *PRI 115 & 230V/60 cy AC-Rectifier Transformer (ONLY) for 120* or 230†VDC Output: when used with A Full Wave Bridge Rectifier§ All Primaries 115 & 230VAC /60 cy/1ø Input.

Secondary 0-125, 150, 160, 165V, *Nema Specs	
TR4009* @ 5 Amp Continuous Duty	$ 50
TR4010* @ 10 Amp Continuous Duty	$ 72
Secondary 0-250, 300, 320, 330, Nema Specs	
TR4011† @ 5 Amp Continuous Duty	$ 65
TR4012† @ 10 Amp Continuous Duty	$105

§ Selenium F. W. Bridge Rectifier Extra!

"TABTRAN" Rectifier Chokes

CR6001/ 1 Amp/0.1 HY/1.4 Ohm	$3.50
CR6002/ 2 Amp/0.1 HY/.07 Ohm	5.45
CR6003/ 5 Amp/.07 HY/.0 Ohm	9.45
CR6004/12 Amp/.01 HY/.1 Ohm	14.75
CR6005/24 Amp/.004 HY/.025 Ohm	29.75
CR6006/50 Amp/.001 HY/.001 Ohm	47.85

FILTER CAPACITORS

CE156M 6000MFD 15 V ..... $2 ea.; 2/$3; 10/$12
CE502M 2000MFD 50 V ..... $4 ea. 10 for $30
CE 2005M 500 mfd @ 200 V $6 ea., 4/ $22, 10/$45
Brackets for capacitors 25c ea., 5 for $1.

230 to 115 V Autoformers

For 220v/60cy Input. To 110-120V or Step up, With Cord, Plug & Receptacle.

TPA050/50W*	$2.55
TPA075/75W*	3.66
TPA100/100W†	4.00
TPA200/200W†	5.75
TPA250/250W†	6.75
TPA500/500W†	8.25
TPA750/750W†	11.79
TPA1000/1000W†	$16.95

Model TPA 1000 Watts: 1 kw† $34.00
TPA1500/1500W* $22.50; TPA2000/2 KW* $34.00
* Less Cord, Plug & Receptacle

Isolation and Control Transformers

Indoor Power Circuit Type, NEMA CASED & Specs Primary 230/460V & Secondary 115/230V 1ø 60 cys

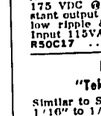
TPP 050/50W $10	TPP075/75W $12
TPP100/100W $13	TPP150/150W $14
TPP250/250W $17	TPP500/500W $25
TPP750/750W $32	TPP1000/1KW $39
TPP2000/2KW $59	TPP3000/3KW $81

Also one & 3-phase Booster Transformers.

AIR CONDITIONING BOOSTER Transformers

104 to 115V. TPB21/1KVA $15, TPB22/2KVA $20
208 to 230V. TPB23/1KVA $16, TPB 24/1.5 KVA $19
TPB 25/2 KVA $23, TPB26/2.3 KVA $25,
TPB3/3KVA $29

New Variable 0 to 6 & 12 Volt 12 Amp DC Power Supply, Filtered



Battery Eliminator, Charger, Auto Radios, Model RR, Plater, Aircraft, Marine or any DC.

Extra Hvy Duty Selenium Rectifier, 2 Meters V. & A. Designed for Cont. Service and up to 20 Amp Intermittent overload; 10% Ripple.

Model T612V12AC $33

T612V12A2CC same specs (0.5% Ripple) $43

New "TEKPAK" Variable 0 to 6 & 12 Volt, 50 & 25 Amp Filtered DC Supply. Air-Marine-Police-Power Supply designed for communications. Transmit & Receive. Rugged design 4" Volt & Amp Mtrs. Designd for continuous service. 6V@ 50AMPS & 12V@25 Amps Filtered 2% Ripple 115 VAC/60CY/1ø Input. One Year Gtd.

T612SNACC $200

NEW! LOW PRICED HIGH CURRENT BASIC SUPPLIES

Consisting of Transformer & Full Wave Bridge Rectifier mtd. and wired, fused, outlet, pilot light & ventilated grill & chassis or cabinet. Ready to deliver constant DC Power. 1 yr. Gtd. Input 115 VAC/60 cys.

Stock Number	Continuous Rating	Basic
B28V/5A	0-28 WVDC at 5 Amp	$45
B28V/5ACC	5 Amp (1% Ripple)	69
B28V/12A	0-28 VDC at 12 Amp	90
B28V/12ACC	12 Amp (1% Ripple)	135
B28V/24A	0-28 VDC at 24 Amp	139
B28V/24ACC	24 Amp (1% Ripple)	189
B28V/50A*	0-28 VDC at 50 Amp	225
B28V/50ACC*	50 Amp (1% Ripple)	350
B28V/100A*	0-28 VDC at 100 Amp	439
B28V/100ACC*	100 Amp (1% Ripple)	600

INDUSTRIAL DC SUPPLIES

B100V1A	100 VDC @ 1 Amp	$39
B115V1.5A	115 VDC @ 1.5 Amp	52
B115V5A*	115 VDC @ 5 Amp	120
B220V5A*	220 VDC @ 5 Amp	234
B115V5ACC*	115 VDC @ 5 Amp/1% Ripple	169
B115V10ACC*	115 VDC @ 10 Amp/1% Ripple	275
B220V10ACC*	220 VDC @ 10 Amp/1% Ripple	468

* 115 & 230 VAC/60cy/1ø Input

New "Tekpak" Relay 24 VDC Supplies Cased Filtered Ready to Work. Input 115 VAC/60 cys.

B24VAR 24VDC @ 1 Amp	$8
B24VER 24VDC @ 2 Amp	$11
B24VJR 24 VDC @ 5 Amp	$24

"TEKAP"® ONE & 3 PHASE 400 CYS SUPPLIES

3ø 400 cys /115v/750 watt & 1ø/400 cys 26v @ 250 watts with voltage adjustment. Operates 115 & 230v/60cy/1ø input, 28VDC @ 60 amps Filtered to inbuilt Inverter, V/adj & Freq/adj & Radio Noise Filter; All in One Cabinet.

T4750B Basic Non-Metered	$563
T4750M DC & AC & Freq Metered	$475

"TEKAP"® 1ø/400 cys/115v/1500 watts Regulated Power Supply Pckg. Operates 115 or 230v/60cy/1ø input, 28VDC@100 amps Filtered to inbuilt Regulated Inverter .00Pf, Carbon Pile Voltage Regulator, Freq Adj & Radio Noise Filter, All in one Cabinet.

T4150B Basic Non-Metered Supply	$650
T4150M DC&AC & Freq Metered	$738

"TEKAP"® 1ø 400 cys/115v/485 watts Power Supply Pckg. Op/ 115v/60 cys

T4485B Basic Non-Metered	$299

NEW "REGOVAC"® 450VDC Pcks

Regulated 250 to 450 VDC @ 200 ma. REGULATION 1% MIN TO MAX. CURRENT RIPPLE LESS THAN 5 MV, IMPED 2 OHMS & ALSO NON REGULATED 125 VDC @ 100 MA. 6.3V/12A. COMPLETE CONTROLS FRONT PANEL, SWITCHES, PILOT LIGHT, BINDING POSTS, FUSES, 4" VOLT AND MILLIAMMETER (2% ACCY) RACK 834 H13D19"W or CABINET. 115VAC Input.

R200R RACK MOUNTING	$135
R200C CABINET	$150

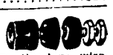
New "REGOVAC"® 100 VDC PCKG. Regulated 145 to 190VDC @ 35 Ma. Regulation 1% Min to Max. Constant Output for 25% Variation in line & load. Extremely low ripple & recovery time. Input 115VAC. Housed in compact cover grill & Chassis.

R35C19	$24

New "REGOVAC"® 175 VDC PCKG. Regulated 75 to 175 VDC @ 50 ma. Regulation 1% Min to Max. Constant output for 25% variation in line & load. Extremely low ripple & recovery time. Also 6.3VAC @ 3 amp. Input 115VAC Housed in compact cover grill & chassis.

R50C17	$30

New Five Way "Tekap" Binding Posts



Similar to Superior BP30* takes plugs, tips lugs, wire, 1/16" to 1/4" panel. Red & Black.

BP30*, 30 Amp, 29¢ @	12/$3, 50/$11, 100 $19
BP10*, 10 Amp, 18¢ @	12/$2, 50/$ 6, 100/$11
BP60*, 60 Amp, 75¢ @	50/$30
BP100, 100 Amp, $1 @	24/$18

ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE

TECHNICAL APPARATUS BUILDERS 109RV LIBERTY ST., N.Y. 6, N.Y., U.S.A. Telephone: REctor 2-6249

For details, circle #345 on Reader Service Card.

47. Power Supplies.

Specific Products Co., P.O. Box 425, 21051 Costanso, Woodland Hills, Calif., 15, Experimental, B & Filament Supply
See ad on page 268
Tel: DI 0-3131

Spellman Television Co., Inc., N.Y., 5

Sperry Gyroscope Co. of Canada, Ltd., Canada, 10, 25

Standard Electronics Div. Radio Eng. Lab., Inc., N.Y., 2, 4, 5, 15, 20, 40

Stark Electronic Sales Co., Canada, 2, 15, 20

Stromberg-Carlson, Div. Gen. Dynamics Corp., N.Y., 2, 15, 35

Strong Electric Corp., Ohio, 15

Summit Electronics, Inc., N.J., 5, 15, 20, 35, 40

Superior Electric Co., 8000 Bradley Ave., Bristol, Conn., 2, 4, 40
Multiple pages of additional data on 100-103
Tel: LUdlow 2-9561

Systems Development, Inc., N.Y., 2, 4, 5, 15, 20, 40

Taller-Cooper, Inc., N.Y., 2, 4, 5

Technical Apparatus Builders, 109 RV Liberty St., New York 6, N.Y., 2, 4, 5, 10, 15, 20, 25, 35, 40
See ad on this page
Tel: REctor 2-6249

Technical Products Co., Instrument Div., Calif., 40

Telechrome, Inc., 28 Ranick Dr., Amityville, L.I., N.Y., 4, 5, 15, 20, 25, 40
See ad on page 236
Tel: LIncoln 1-3600

Telectro Industries Corp., N.Y., 4, 5, 30, 40

Telephonics, Corp., N.Y., 2, 4, 5, 40

Teletronics Laboratory, Inc., N.Y., 2, 4, 15, 20, 40

Tel-Instrument Electronics Corp., N.J., 2

Timely Instruments & Controls Corp., Calif., 35, 40

Transdyne Corp., N.Y., 35, 40

Transformer Technicians, Inc., Ill., 4, 15, 20

Transistor Applications, Inc., Mass., 35

Transistor Devices, Inc., N.J., 2, 4, 15, 35, 40

Transval Engineering Corp., Calif., 2, 4, 15, 20, 35, 40

United Electrodynamics, Calif., 5, 35, 40

U.S. Dynamics Corp., Mass., 4, 15, 20, 35, 40

U.S. Motors Corp., Wis., 30

Universal Atomics Corp., N.Y., 5, 15, 20, 35, 40

Universal Electronics Co., 1720 22nd St., Santa Monica, Calif., 4, 15, 20, 35, 40
See ad on page 387
Tel: EXbrook 3-7707

Universal Transistor Products Corp., N.Y., 2, 4, 5, 15, 20, 25, 35, 40

Universal X-Ray Products, Inc., Ill., 5

Varian Associates, 611 Hansen Way, Palo Alto, 2, Calif., 10
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Tel: DAvenport 5-5631

Directory II. Components

47. Power Supplies.

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Vectrol Engineering, Inc., Conn., 40

Vectron, Inc., 1607 Trapelo Rd., Waltham 54, Mass., 2, 10, 25
See ad on page 244
Tel: TWinbrook 3-8700

Vibration Research Labs., Inc., 97 Lake Ave., Tuckahoe, N.Y., 2, 4, 5, 15, 20, 35, 40
See ad on page 333
Tel: WOodbine 1-2440

Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 2, 4, 5, 15, 20, 40
See ad on page 444
Tel: ENdicott 1-6200

Virginia Electronics Co., D.C., 15, 40

Visual Electronics Corp., N.Y., 10, 25, 30

Wallson Associates Ltd., 961 Frelinghuysen Ave., Newark, N.J., 2, 4, 5, 10, 15, 20, 30, 35, 40
See ad on page 484
Tel: TAlbot 4-2600

Warren Corp., J. C., N.Y., 2, 4

Weightman & Associates, Calif., 4, 40

Western Gear Corp., Electro Products, Box 182, Lynwood (Los Angeles), Calif., 2, 4, 15, 20, 35, 40
See ad on page 72
Tel: NEvada 6-2161

Westinghouse Electric Corp., Pa., 2, 4

Wheeler Insulated Wire Co., Inc., Conn., 2, 4, 15, 20, 35

Wickes Engineering & Construction Co., N.J., 4, 15, 20

Wilcox Electric Co., Inc., Mo., 5

Power tubes: See class 63

Pre-amplifiers: See class 21

48. Printed Circuits.

5. Etched or screened prewired chassis
10. Printed electronic assemblies
15. Solder dipped prewired chassis PC production See: #92

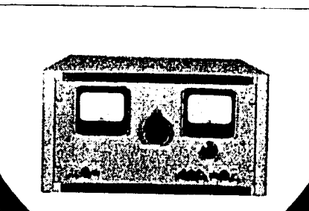
Accurate Electronics Corp., Ohio, 10

Airtron, Inc., Dept. 1, 1101 W. Elizabeth Ave., Linden, N.J., 5, 10
See ad on page 453
Tel: HUnter 6-1000

Alcon Metal Products, Inc., Ill., 10

Alden Products Co., 140 N. Main St., Brockton 64 Mass., 5, 10, 15
See ad on page 324
Tel: BRockton 160

Allied Allegri Co., Inc., N.J., 5, 10



FIRST TO ZERO*

UNIREG MODEL U32-10 *mag amp* **DC** *power supply*

Range 0-32V, 0-10 Amps 0% Regulation

Tubeless—Advanced Engineering Design—Vernier Control
A laboratory must with high-low versatility
Ripple . . . 0.25%; Transient Response . . . faster than 0.2 seconds;
Line Input . . . 105-125 VAC, 1ϕ, 60 cycles; Regulation . . . nominal 1%, line or load/with load compensation adiustment to 0%.

UNIVERSAL ELECTRONICS COMPANY

1720 Twenty-Second Street, Santa Monica, California EXbrook 3-7707

For details, circle #346 on Reader Service Card.

48. Printed Circuits.

Allied Plastics Supply Corp., 75 Cliff St., N.Y. 38, N.Y., 10
See ad on page 584
Tel: BEckman 3-7377

American Printed Circuits Co., Inc., N.J., 5, 10, 15

Ansley Mfg. Co., Arthur, Pa., 5, 10, 15

Barber Laboratories, Alfred W., N.Y., 10

Becks, Inc., Minn., 5, 10, 15

Bendix Aviation Corp., Friez Instrument Div., M.D., 5, 10, 15

Blane Co., Whitney, Conn., 5, 10, 15

Buckbee Mears Co., Minn., 5

Burroughs Corp., Mich., 5, 10, 15

C G Electronics Corp., N.M., 5, 10, 15

Cal-Tronics Corp., Calif., 5, 10, 15

Camden Electronics, Inc., N. J., 5, 10

Capps & Co., N.Y., 15, 20

Cardwell Condenser Corp., Conn., 5, 15

Centralab, Div. of Globe Union, Inc., 920Y E. Keefe Ave., Milwaukee 1, Wis., 10
See ad on page 206
Tel: WOodruff 2-9200

Ceramet Corp., N.Y., 5

Cinch Manufacturing Corp., 1026 S. Homan Ave., Chicago 24, Ill., 5, 10, 15
Multiple pages of additional data on 15-17
Tel: NEvada 2-2000

Circon Component Co., Santa Barbara Municipal Airport, Goleta, Calif., 5, 10
See ad on page 327
Tel: WOodland 8-2011

Cleveland Metal Specialties Co., Ohio, 5, 10, 15

Consolidated Electrodynamics Corp., Calif., 5

Continental Diamond Fibre Div. of the Budd Co., Inc., Del., 5

Cook Co., Frank R., Colo., 5

Cornell-Dubilier Electric Corp., 333 Hamilton Blvd., S. Plainfield, N.J., 5, 10, 15
See ad on Cover 3
Tel: PLainfield 6-9000

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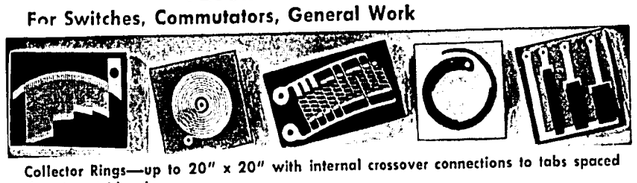

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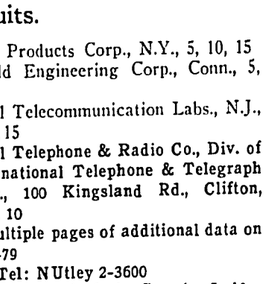

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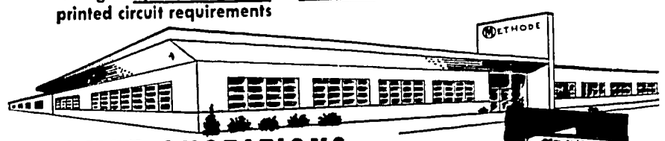

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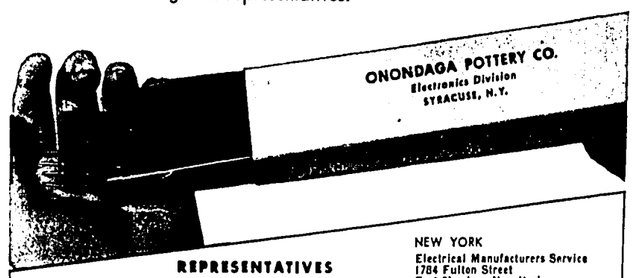

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International Rectifiers

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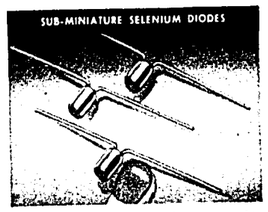
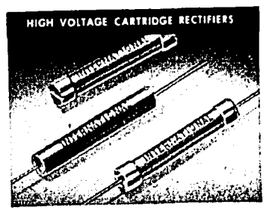
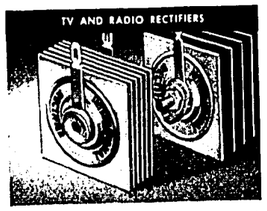


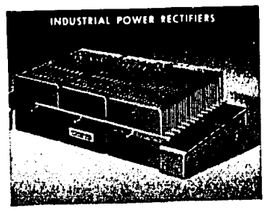
Developed for use in limited space at ambient temperatures ranging from −50°C to +100°C. Encapsulated to resist adverse environmental conditions. Output voltages from 20 to 160 volts; output currents of 100 microamperes to 11 MA. **Bulletin SD-1B**



Designed for long life and reliability in Half-Wave, Voltage Doubler, Bridge, Center-Tap Circuits, and 3-Phase Circuit Types. Phenolic Cartridge and Hermetically Sealed types available. Operating temperature range: −65°C to +100°C. Specify **Bulletin H-2**



The widest range in the industry! Designed for Radio, Television, TV booster, UHF converter and experimental applications. Input ratings from 25 to 150 volts AC and up. DC output current 50 to 1,200 MA. Write for application information. **Bulletin ER-178-A**



For all DC power needs from microwatts to kilowatts. Features: long life; compact, light weight and low initial cost. Ratings: to 250 KW, 50 ma to 2,300 amperes and up. 6 volts to 30,000 volts and up. Efficiency to 87%. Power factor to 95%. **Bulletin C-349**

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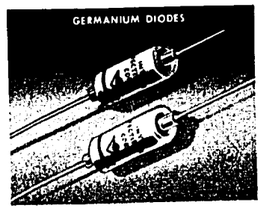
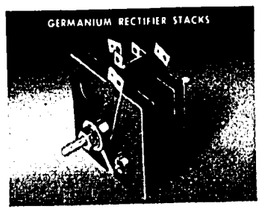
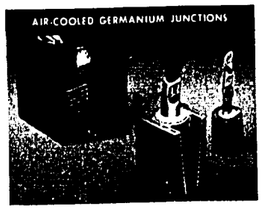


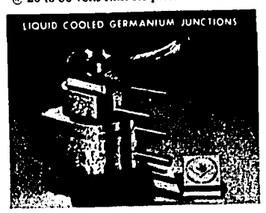
This series of general purpose, high quality point contact diodes provide excellent rectification efficiency for very high frequency applications. Special "RED DOT" series available for ambient temperatures from −55° C to +100° C. **Bulletin SR-140.**



Extremely low reverse leakage values make this series ideal for magnetic amplifier applications. These units utilize 10 amp junctions—20 to 60 AC input volts rms—are available in a wide range of circuit types and DC current ratings. **Bulletin SR-148.**



Engineered for heavy power applications, these highly efficient forced air cooled units feature moisture and corrosion resistant housings. A complete series in each of 3 current ratings: 150, 330 and 500 Amperes @ 26 to 66 volts rms. Request **Bulletin GPR-2.**



Liquid cooled for maximum power in minimum space. Junction rating: 670 amps at 26 to 66 volts rms. Housed in high-conductivity copper cast around special steel coils. Water, oil or other accepted coolants may be used. For complete data. **Bulletin GPR-2.**

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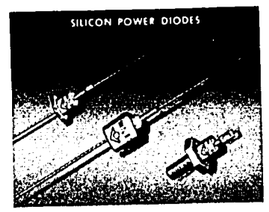
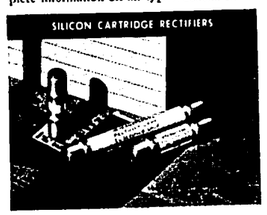
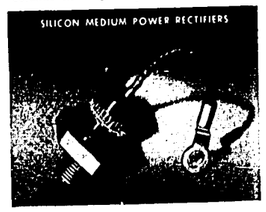


Hundreds of types in three basic styles, for operating temperatures from −55°C to +150°C. Up to 800ma DC output current per junction over a voltage range of 50 to 1,000 PIV. Hermetically sealed. For complete information on all types. **Bulletin SR-A.**



The answer to tough miniaturization problems! Ratings for high temperature applications: from 1000 volts PIV at 100ma half-wave DC output to 16,000 volts PIV at 45ma. Hermetically sealed, metallized ceramic housing. Request **Bulletin SR-139B**



Specifically engineered for industrial applications—the most conservatively rated silicon rectifiers in the industry! Rugged all-welded construction and hermetic sealing mean greater reliability—longer life. Types available in 3 series. Request **Bulletin SR-143B.**

These units consist of hermetically sealed junction diodes mounted on copper cooling fins, stacked to include the interconnections required for specific circuits. Junction ratings: 1.25 amps. DC output; 70 to 550 AC input volts rms. Request **Bulletin SR-137A.**

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10. Cutting heads
15. Cutting styli
20. Magnetic recording, playback & erase heads
25. Magnetic recording tape-acetate base
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50. Rectifiers.

5. Copper oxide
10. Germanium
15. Selenium diodes
20. Selenium stacks
25. Silicon

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Bradley Laboratories, Inc., Conn., 5, 15, 20
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Chatham Electronics, Div. of Tung-Sol Electric, Inc., 630 W. Mt. Pleasant Ave., Livingston, N.J., 15, 20
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Clark Electronic Labs., Calif., 10, 25
Clevite Transistor Products, Mass., 10
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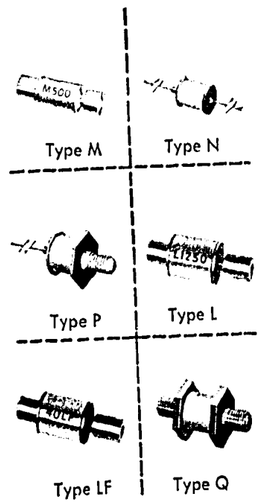
Sarkes Tarzian area type silicon rectifiers are made by a special process that provides optimum forward to reverse ratios and long useful life. Current ratings for half wave application range from 500 milliamperes dc to 15 amperes dc and voltage ratings per unit range from 50 to 400 volts peak inverse. Small size coupled with high efficiency and allowable high ambient temperatures make silicon rectifiers the practical component for most applications that require dc power. Our staff of competent power conversion engineers is ready to consider your application for prompt recommendations. Write, wire or phone.



Type M silicon rectifiers are rated at 500 milliamperes dc with peak inverse voltage ratings of 100 to 400 volts. Connection is made by means of end ferrules that fit standard fuse clips. Low cost holders are available.

Type N—Four basic terminal arrangements are available in the N series of silicon rectifiers. (1) Axial leads, (2) Axial stud and lead, (3) Axial stud and lug, (4) Axial studs. The convection cooled current rating is 500 milliamperes and the conduction cooled rating is 1 ampere provided an adequate heat sink is used. Voltage ratings range from 50 to 400 volts peak inverse.

Type P—The P series of silicon rectifiers includes the same end terminal designs as the N series. The dc current ratings, however, are 1.5 amperes with convection cooling and 5 amperes when a heat sink is used. Voltage ratings range from 50 to 400 volts peak inverse.

Type L silicon rectifiers are rated at 1.5 amps in half wave circuits with peak inverse voltage ratings of 100 to 400 volts. Mounting is by means of ferrules that fit standard fuse clips. Low cost holders are available.

Write for complete information

Type LF—Use of a special heat sink arrangement and hardware allows a current rating of 5 amperes dc from the Type L rectifier. Precautions must be taken, however, to provide adequate cooling area to limit case temperature. Voltage ratings range from 100 to 400 volts peak inverse.

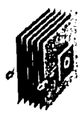
Type Q—The Q series of rectifiers is provided with axial studs only, however, it is possible to attach special end terminals. The current rating is 7.5 amperes in convection cooled applications and 15 amperes when a heat sink is used. Peak inverse voltage ratings range from 50 to 300 volts.

A Rectifier for Every Application

SELENIUM

A wide selection of Selenium Rectifier designs is offered to the design engineer by the Sarkes Tarzian line. It is possible to provide ratings of a few milliamperes to thousands of amperes and from a few volts to thousands of volts by using series, parallel and series-parallel arrangements. Whatever your power conversion problem write for specific recommendations for your application.

Standard and High Temperature—Sarkes Tarzian standard and high temperature selenium rectifiers offer the design engineer a variety of combinations. The standard line includes fourteen basic cell sizes and the high temperature line includes nine cell sizes. Maximum permissible cell temperature on high temperature types is 150°C.



Radio-Television Types—Radio and Television type selenium rectifiers are mass produced under tight quality control standards. The resultant good availability, good quality and low price have made these types popular in a variety of electronic equipments.

Embedments—Embedments provide a small unit at relatively low cost when extreme environmental or shock conditions are anticipated. Six basic cell sizes are available to assemble various combinations.

High Voltage—Series stacking of cells in glass or phenolic enclosures increases voltage ratings and half wave units are available with ratings as high as 7500 volts peak inverse with current ratings as high as 25 milliamperes. Axial leads or ferrules are available for connection.

Remember—whatever your problem on power conversion, let Sarkes Tarzian applications engineers provide you with the practical answer.

Send for your copies of the Selenium and Silicon rectifier handbooks.

Sarkes Tarzian, Inc. RECTIFIER DIVISION
415 NORTH COLLEGE AVE., DEPT. P-4, BLOOMINGTON, IND.
In Canada: 700 Weston Rd., Toronto 9, Tel. Rogers 2-7535 • Export: Ad Auriema, Inc., New York City

For details, circle #352 on Reader Service Card.

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50. Rectifiers.

Gates Electronic Co., 2090 Barnes Ave., New York 62, N.Y., 20
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General Electric Co., Semiconductor Products Dept., Section S3767, 1224 W. Genesee St., Syracuse, N.Y., 10, 25
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Tel: GRanite 6-4411
General Instrument Corp., Automatic Mfg. Div., 829 Newark Ave., Elizabeth, N.J., 25
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Tel: HUmboldt 5-2100
Good-All Electric Mfg. Co., Neb., Cathodic Protection
Hughes Aircraft Co., Florence & Teale Sts., Culver City, Calif., 25
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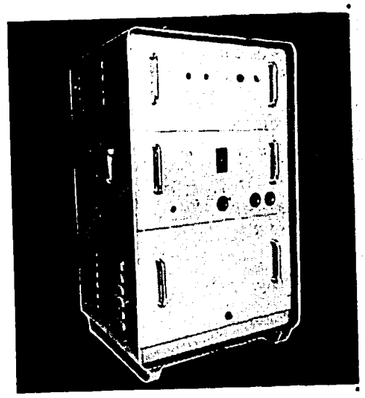
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

INSTRUMENTS & COMPONENTS

precision engineered by CURTISS-WRIGHT

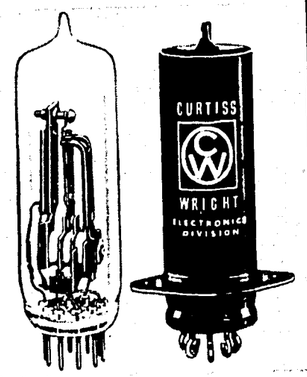


The Curtiss-Wright DISTORTION ELIMINATING VOLTAGE REGULATOR

- Furnishes 1.4 KVA of distortion-free, ± 1% regulated power without phase shift
- 330 microseconds recovery time —fastest regulation available
- Reduces line distortion to less than 0.3%
- Simultaneously provides 4 KVA of ± 1% electromechanically regulated power
- Model EE 100A $1,689.00 F.O.B., Carlstadt, N. J.

Applications:

Provides simpler, more accurate calibration of meters . . . better design of transformers, synchros, motors, magnetic amplifiers . . . easier testing with fewer rejects . . . more accurate measurement of magnetic properties . . . better computer performance . . . elimination of fast line transient effects.



The Curtiss-Wright "SNAPPER" THERMAL TIME DELAY RELAYS

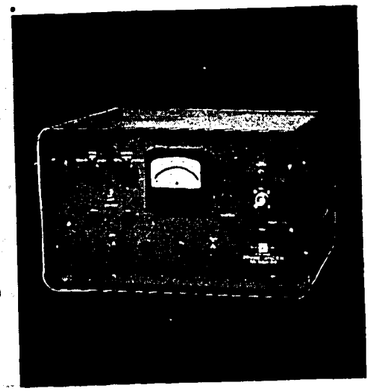
- Eliminate chatter with snap action
- Single-pole, double throw contacts
- Wide temperature range (—65°C +100°C)
- Metal envelope (7 or 9 pin) miniature or (8 pin) octal
- Glass envelope in 9 pin miniature
- Preset time delays in metal from 3 seconds to 3 minutes, glass from 5 to 60 seconds

Applications:

For military or commercial applications, "Snapper" Relays are providing positive, reliable action in circuits requiring time delays.

Other Components:

Curtiss-Wright also manufactures "Snapper" Thermostats, "Memory" Relays and Magnetic Amplifiers.



The Curtiss-Wright DYNAMIC CAPACITOR ELECTROMETER

- A micro-microammeter and millivoltmeter in one instrument
- Measures currents from 10^{-16} to 10^{-5} amperes
- 10, 100 and 1,000 mv ranges
- Exclusive diaphragm-type dynamic capacitor
- Extremely high input impedance —10^{15} ohms
- Better than 2% accuracy, high stability
- Price $1,075.00 F.O.B., Carlstadt, N. J.

Applications:

Measurement of semi-conductor parameters, low-level voltages, static charges, floating grid potentials, grid currents and insulation resistance. Used in mass spectrometry and pH measurements; nuclear reactor control and radiation monitoring systems; beta and gamma gauge control systems.

Nuclear Instrumentation and Controls

The Electronics Division is now working on contracts for nuclear control systems. You are cordially invited to discuss your nuclear instrumentation and control problems with us.

ELECTRONICS DIVISION
CURTISS-WRIGHT
CORPORATION · CARLSTADT, N. J.

Detailed data sheets and application information available on all products.

Curtiss-Wright has career positions open for qualified engineers and technicians.

For details, circle #353 on Reader Service Card.

Directory II. Components

Relay rack panels: See class 25

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52. Relays.

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15. Differential
20. Frequency selective
25. Hermetically sealed
30. Impulse
35. Keying
40. Latching
45. Mercury contact
50. Polarized
55. Power control & overload
60. Sensitive
65. Stepping
70. Sub-miniature
75. Telephone
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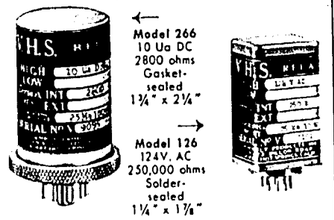
Biddle Co., James G., Pa., 20

VHS METER-RELAY

(Very High Sensitivity)



← Model 266
10 Ua DC
2800 ohms
Gasket-sealed
1¾" x 2¼"

→ Model 126
124V. AC
250,000 ohms
Solder-sealed
1¼" x 1⅞"

The VHS is a D'Arsonval moving coil relay, internally shock-mounted. Its operation is similar to that of indicating meter-relays.

Connections: 9-pin octal style.

Weight: 4 ounces.

Sensitivity: From 0.2 Ua to 10 Amp., 0.1 Mv to 500 volts. AC relays are rectifier type.

Accuracy: Trip point to 1% (depends on sensitivity). Differential and repeatability 1%.

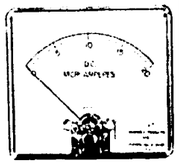
Shock and Vibration: Operates at 10 G or more, 5 to 55 cycles. Non-operating, withstands 10 G or more, 5 to 2,000 cycles; shocks of 10 G or more.

Contacts: SPST or SPDT, 5-25 Ma DC. Other ratings to ½ Amp. AC. A locking coil gives high pressure and chatter-free contact.

Price: $20 to $80. Ask for Bulletin 104-A.

API PANEL METERS

Model 261
0-1Ma DC $12.65



Model 451
0-20 Ua DC $30.25

D'Arsonval movements, Alnico magnets, tubing or knife-edge pointers. AC meters are rectifier type. DC accuracy, 2%; AC 3%. Better accuracies available. Zero right, zero center meters or up to two-thirds of range suppressed. AC and DC meters in multiple ranges. Special dials in colors, black face, your name, etc. Mirror scales.

STYLES: PYROMETERS & API PANEL METERS

Ruggedized-Sealed

2½, 3½, 4½-inch round metal case, sealed zero adjust, shock-mounted movement.

Black Bakelite

2½", round or square, 3½" round or square, 4½" rectangular. (Other colors and illumination in 4½" size.)

Clear Plastic

2½", 3¾" and 4½" rectangular.

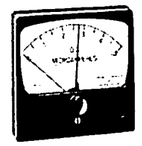
Send For Catalog:

40-PAGE CATALOG 4-C DESCRIBES COMPLETE PRODUCT LINE—includes circuitry, response time, prices, discounts, etc.

METER-RELAYS

Indicating meters with built-in locking contacts for control or alarm. Trip point adjustable.

Model 255-C
High limit,
Ruggedized-Sealed
0-100 Ua DC
$46.00



Model 461-C Bakelite
High Limit
0-5 Ua DC
$107.50

Styles:

RUGGEDIZED-SEALED metal cases are 2½, 3½, and 4½" round, shock-mounted movement, gasket-sealed.

BLACK BAKELITE . . . glass front, 4½" rectangular case. Other colors on special order. CLEAR PLASTIC 2½, 3¾, & 4½" rectangular.

Ranges:

0-5 Microamps to 0-50 Amps. 0-5 Millivolts to 0-500 volts, AC or DC. (Minimum AC voltage range 0-250 Mv.) Thermocouple temperature ranges cover from −400 to +3000°F.

Model 451-C
Double Contact -100 to +400 F.—$64.00

MIL Specs:

Ruggedized - sealed meter-relays will meet these specs: Shock: 1 and 3-foot drops, 400 lb. hammer, 3 planes. Vibration: MIL-M-10304A.

Salt Spray: QQ-M-151A. Temp.: −30°/+70°C. Sealing: MIL-M-6A.

Accuracy:

Point of contact: ¼% to 1%.

Indicating: ±2% of full scale at any point of dial. Can be 1%.

Contacts:

Rating: Standard is 5-25 milliamperes at 75-125 volts DC. Optional ratings to 250 Ma, 6 to 250 volts, DC.

Arrangement: High Limit (makes on increase of signal), Low Limit (makes on decrease of signal), Double (both high and low contacts)

Life: 10 to 20 million operations.

LIAD MULTI-CONTACT METER-RELAY

The LIAD consists of a D'Arsonval meter movement with one or several contacts carried on the moving pointer, a printed circuit scale (95 angular degrees), and a device for gripping the pointer and its contacts to the scale contact bars.

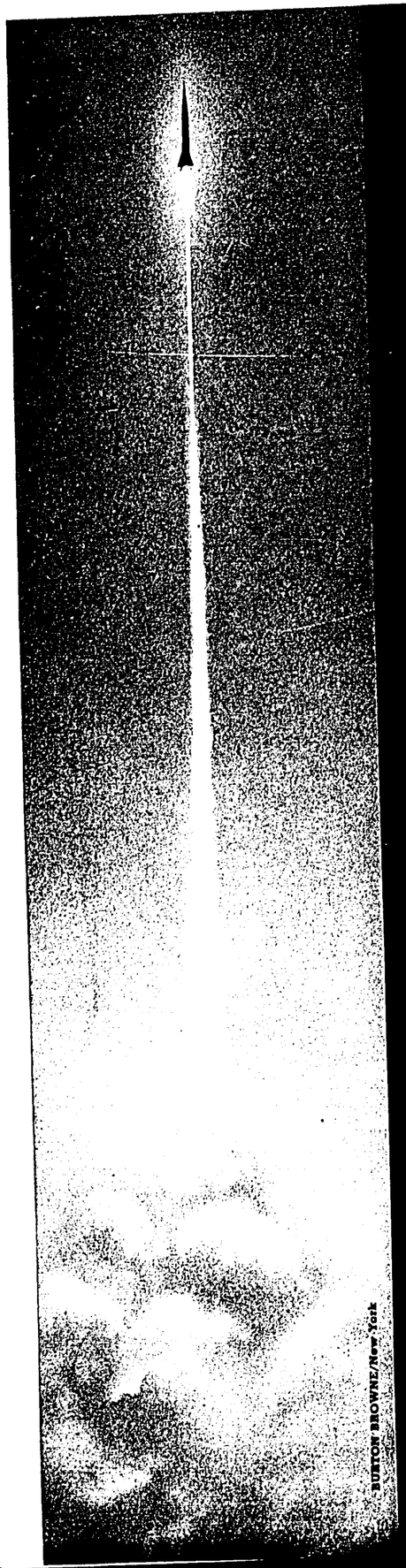
The unique combination of contact closures resulting from this gripping tells the level of the signal —and can be transmitted or used for telemetering; automatic production testing or grading; maximum value reading; simple quantitative read-out, etc.

Standard LIAD with 10 segment scale band, one milliampere sensitivity, 12 volt read-out coil. Price $100.00

ASSEMBLY PRODUCTS, INC.

CHESTERLAND 33, OHIO. Phone: (Cleveland, O.) HAmilton 3-4436

For details, circle #354 on Reader Service Card.



EXCLUSIVE

By Filtors,
smallest and lightest
hermetically sealed latching
sub-miniature relays,
magnetically held—
no power drain—
and electrically reset.
2PDT, 4PDT and 6PDT

High shock and vibration resistance.

All made to
MIL-R-25018 (USAF)
and MIL-R-5757C.

Dry circuit relays available

Write for catalog

Leading manufacturers of
hermetically sealed
sub-miniature relays.

FILTORS, INC.

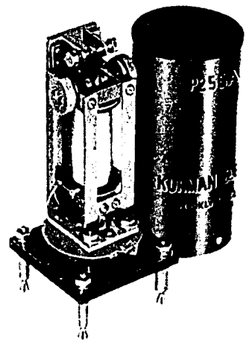
Port Washington,
Long Island, New York
POrt Washington 7-3850

For details, circle #355 on Reader Service Card.

SMALLEST—
LIGHTEST

NOT A SUBSTITUTE!

here's the real thing . . .



The
KURMAN
P255A POLAR
RELAY

- Unconditionally approved as an equal to the W.E. 255A by both Government and Industry.
- No modifications required for existing field equipment or techniques.
- No adapters necessary—standard connecting blocks available.
- Variations are available including ultra-sensitivity down to 5 micro watts.

IMMEDIATE DELIVERY FROM STOCK!

The complete line of Kurman relays, manufactured to commercial or military specifications, are interchangeable with other leading makes.

- TELEPHONE TYPES
- MEDIUM POWER
- SENSITIVE-PLATE CIRCUIT
- HERMETICALLY SEALED
- PHOTOELECTRIC
- ANTENNA CHANGEOVER

Send to Dept. ID for complete catalog

KURMAN
ELECTRIC CO., INC.
191 Newel Street
Brooklyn 22, New York
MANUFACTURER OF QUALITY RELAYS . . . SINCE 1928

For details, circle #356 on Reader Service Card.

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Filtors, Inc., 30 Sagamore Hill Dr., Pt. Washington, N.Y., 25, 40, 70
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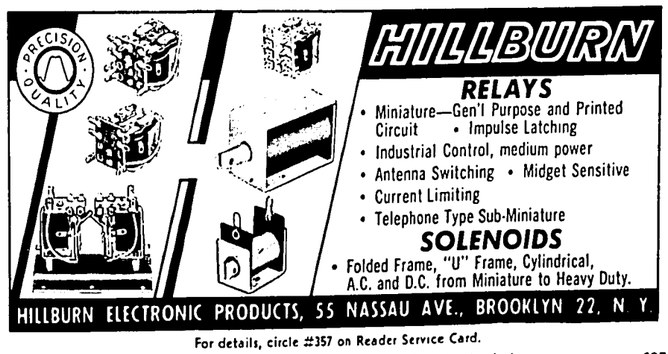
Tel: CHesapeake 3-1100



HILLBURN

RELAYS
- Miniature—Gen'l Purpose and Printed Circuit • Impulse Latching
- Industrial Control, medium power
- Antenna Switching • Midget Sensitive
- Current Limiting
- Telephone Type Sub-Miniature

SOLENOIDS
- Folded Frame, "U" Frame, Cylindrical, A.C. and D.C. from Miniature to Heavy Duty.

HILLBURN ELECTRONIC PRODUCTS, 55 NASSAU AVE., BROOKLYN 22, N. Y.

For details, circle #357 on Reader Service Card.

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

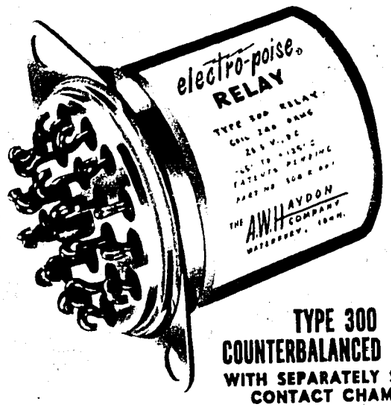
FIRST *Really New* RELAY

TO MEET TODAY'S RIGID REQUIREMENTS
PERFECTED BY THE

A. W. HAYDON CO.

This miniature, hermetically-sealed, general purpose relay has been designed with increased magnetic force to provide higher contact pressures and greater travel than are usually found in this type. Special care has been taken to assure reliable operation in low level circuits.

Rated Load: 2 amperes, 28 Volts DC, resistive. Ambient Temperature Range: 65°C to + 125°C. Vibration: 15g to 2,000 cps — no contact chatter. Shock: 50g, 11 milliseconds — no contact chatter. Write for Bulletin AWH RY 1001.



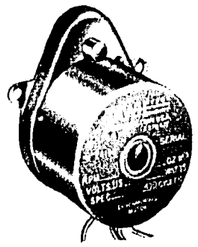
TYPE 300 COUNTERBALANCED RELAY
WITH SEPARATELY SEALED CONTACT CHAMBER

Uniquely designed with contacts isolated from coil. Contacts can never become contaminated with vapors or gas from organic insulating materials.

TIMING AND CONTROL DEVICES BY THE A. W. HAYDON COMPANY ARE RECOGNIZED AS THE MOST DEPENDABLE PERFORMERS IN THE FIELD.

400 CYCLE MOTORS

Reversible — Light weight (8 ounces). 115 volts ± 10%; 55 milliamps. Torque: 0.025 oz-in at 3000 rpm. Meet Military Requirements. Write for Bulletin AWH MO 803.

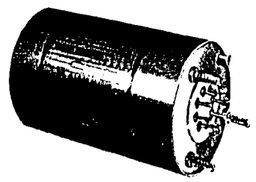


MINIATURE HERMETICALLY SEALED TIMERS

Supplied in 2½" diameter housing. Optional mounting and electrical termination.

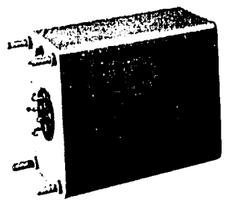
TIME DELAY RELAYS
Single or multiple switching. Delay periods from 2 seconds to 3 hours. Write for Bulletin AWH TD 400.

REPEAT CYCLE TIMERS
Single or multiple switching. Wide Range of Time Cycles. Write for Bulletin AWH RC 200.

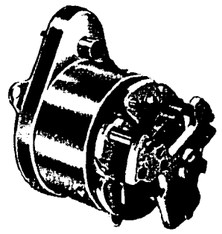


PROPORTIONAL DELAYED RESET TIME DELAY RELAY

Provides a controlled reset rate. Designed to meet special applications. Hermetically sealed or enclosed in dust cover. Meets military requirements. Write for Bulletin AWH TD 402.

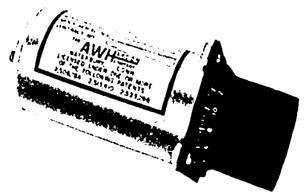


GOVERNED DC MOTORS



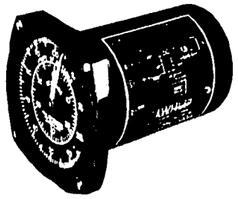
The A. W. Haydon Company now offers 3 series of Chronometrically Governed DC Motors. Each designed to do the same job in a different application.
5700 Series — non-military applications where extreme temperature, vibration and shock are not experienced.
5600 Series — Aircraft and military applications where extreme temperature and moderate vibration and shock are encountered.
5800 Series — Aircraft and missile applications where extreme temperature, vibration, and shock are encountered. Write for Bulletin AWH MO 800, -801, -802, -804.

SPECIAL TIME DELAY RELAY



Supplied in 2.2" diameter housing. Precision unit: ± 1% accuracy. Meets military requirements. Adjustable over wide range. Write for Bulletin AWH TD 500.

STOP CLOCKS



20-30 Volts DC. Precision Movement — Electrical Reset Temperature Range -65°F to 185°F. Option on mounting and electrical termination. Write for Bulletin AWH ET 700.

FOR FULL PARTICULARS ON COMPLETE LINE OF THE A. W. HAYDON COMPANY'S ELECTRO-MECHANICAL DEVICES, WRITE FOR CATALOG, Dept. IRE

The A. W. HAYDON COMPANY
240 NORTH ELM STREET
WATERBURY 20, CONNECTICUT

Design and Manufacture of Electro-Mechanical Timing Devices

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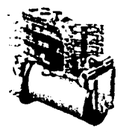
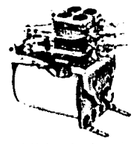
PHILLIPS

RELAYS and HERMETIC SEALS



Type 8—Compact, highly sensitive, multi-contact telephone-type relay. Ideally suited for electronic control circuits, communications and data handling systems. 2 5/32" long x 1 3/32" wide.

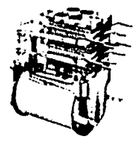


Type 9—Miniaturized version of our famous telephone type relay. Versatility in coil and contact arrangement, extreme reliability and precision adjustment. 1¼" long x 21/32" wide.

Type 33B—General purpose power relay for switching power loads on welding timers, process controls and applications requiring precise operation for long periods. Compact, lightweight. 2 3/16" high x 2" long x 1 17/16" wide. (3 pole).

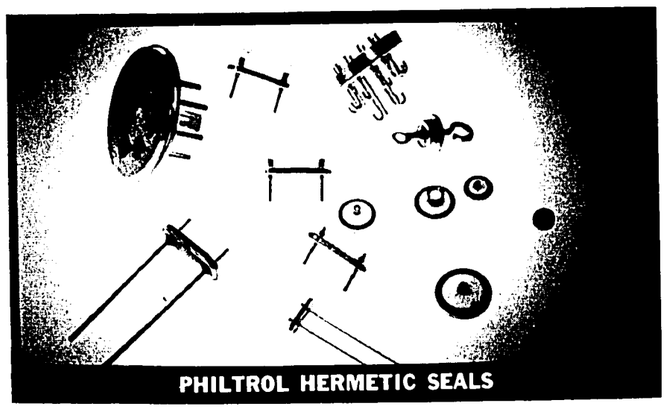
Type 27—Compact, efficient power relay designed for maximum reliability and long life. Commonly used in aircraft industry. 2 1/16" high x 2" long x 1 23/32" wide. (3 pole).

Type 57—Medium-power aircraft type relay. Compact and rugged enough to meet severe environmental conditions imposed by military applications. Built to meet or exceed MIL-R5757C, 25018, 6106B (MS-25024). 1 3/16" high x 1 7/16" long x 1¼" wide.



Type 4C General purpose multi-contact switching relay. Fast operating speeds, sensitivity, long life. Offers variations in coils and contact arrangements within minimum space. 1 11/16" long x 1 1/32" wide.

Complete technical bulletins are available on these and the many other standard relays. In addition, Phillips custom-engineers relays to meet any operating and environmental condition. Write us today.



Standard or custom-engineered glass-to-metal seals — any type, any size, any quantity.

PHILLIPS CONTROL CORPORATION . . . JOLIET, ILLINOIS

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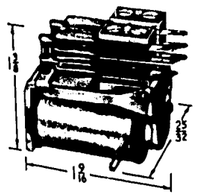
Millivac Instrument Corp., N.Y., 60
Minneapolis-Honeywell Reg. Co., Minn., 55

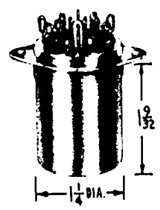
P&B RELAYS

are used in every industry. Design engineers like their quality and P&B's ability to build to exact specifications. Here is a "sampler" of basic types



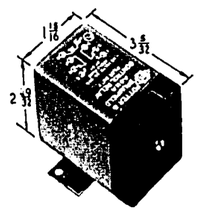
communications

MH Series telephone type relays are small, versatile and available in contact arrangements up to 18 springs (9 per stack) DC and a variety of contact materials. Silver contacts (⅛") are rated 5 amp. 115 V. 60 cycles resistive load. High temperature models operate from −65°C to +125°C.



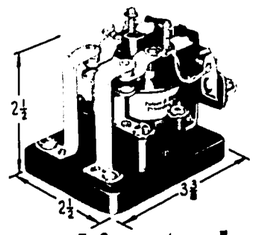
missiles and jets

BD "Star Series" relays are used in applications demanding maximum reliability. These 26.5 V. DC relays were designed to surpass shock test II per MIL-R-5757C. 50 G and vibration Grade III per MIL-R-25018; 5-2000 cps at 15 G. This 6 pole, double throw relay is operative in ambients of −65°C to +125°C.



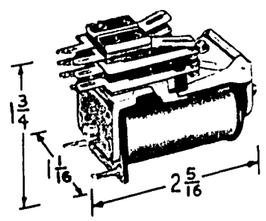
air frame

AC Series relays are designed for airframe controls and other applications calling for good mechanical shock resistance. Relays are enclosed in dust proof cover; phenolic base meets U/L spacing and creepage distances. Double pole double throw contact arrangement in AC and DC models.



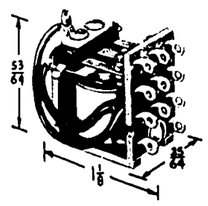
machine tools

PR Series relays are rugged, fast acting . . . designed for high current or high voltage switching. Floating movable contact carrier assures ample wipe and contact pressure. AC or DC models available with contact arrangements up to double pole double throw. Supplied open or with dust cover.



instrumentation

LS Series relays—Medium coil, telephone type—have special hinge construction resulting in a mechanical life in excess of 100 million operations. Contact arrangements go to 20 springs (10 per stack). Power required: 100 mw per movable arm. DC only to 200 V. Open or hermetically sealed models.



business machines

KM Series relays meet the demand for miniaturization and multiplicity of action within a single relay. Contact arrangements available from single pole single throw to three pole double throw. May be ordered in coil voltages up to 48 V. DC in open or sealed models. Weight, open, 7/8 oz. Sealed, 1-1/4 oz.

Write today for a copy of our new full line catalog

Potter & Brumfield, inc.

PRINCETON, INDIANA

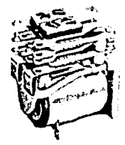
SUBSIDIARY OF AMERICAN MACHINE & FOUNDRY COMPANY

For details, circle #360 on Reader Service Card.

PRICE ELECTRIC CORP., FREDERICK, MD. — HUSKY RELAYS & CONTROLS

Sub-miniature Relay — DPDT Style 506

Meets requirements of MIL-R-25018 (USAF) for a general purpose relay for aircraft and missile use. Standard coil for 26.5 VDC operation. Special design, for low-level circuit use, permits isolation of all organic materials from contact chamber.



Series 5400

Improved design withstands in excess of 10 G vibration through 500 cycles. Contacts rated at 3 amps. at 24 VDC or 115 VAC, non-inductive. Available with higher contact ratings.

Series 5700

One of a complete line of multi-leaf relays from midget to long-frame types. (Open styles available.)

Series 8200

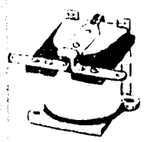
200-amp, high shock relay for aircraft and missile use. Temperature range from—65 C. to + 125 C. For operation from DC only.

Style 6351

Designed for use in 52-ohm transmission line. Supplied with 3 UHF fittings. Available without auxiliary contacts as style 6350.

Series 2100

Designed for military and commercial needs. Two frame sizes providing up to 6 PDT. Contacts rated at 15 amps. at 24 VDC non-inductive. DC relays are available for voltages up to 120. AC relays up to 250 V 50 60 cycle.



Series 1000

Small, light, efficient relays for many uses. SPDT contacts rated at 1 amp. at 50 VDC. Maximum voltage 24 VDC. Available hermetically sealed.

The complete Husky line contains relays designed to meet most needs. If you have a design problem, send us your specifications for engineering review.
Write for literature and specifications.

For immediate service, call Frederick, Maryland, MOnument 3-5141

Price Electric CORPORATION

6300 CHURCH STREET, FREDERICK, MARYLAND

For details, circle #361 on Reader Service Card.

Directory II. Components

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Radio Corp. of America, N.J., 25
Radio Engineering Products, Ltd., 1080 University St., Montreal, Quebec, Canada, 15, 35, 50, 75
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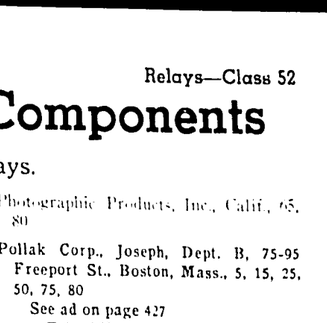
Tel: UNiversity 6-6887
Ram Meters, Inc., Mich., 55

RELAYS

world's largest stock



★ Immediate Delivery
★ Hundreds of Types
★ All Standard Makes
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Automatic Electric	Phillips Control
Besson and Robinson	Potter & Brumfield
C. P. Clare	Struthers Dunn
Elgin Neomite	Terado

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Standard Telephone Relays
Short Telephone Relays
Midget Relays
Timers
Aircraft Contactors
Rotary Relays
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Write for New Relay Sales Catalog, C-8

Relay Sales

P. O. Box 186-U, West Chicago, Ill. Phone West Chicago 1100

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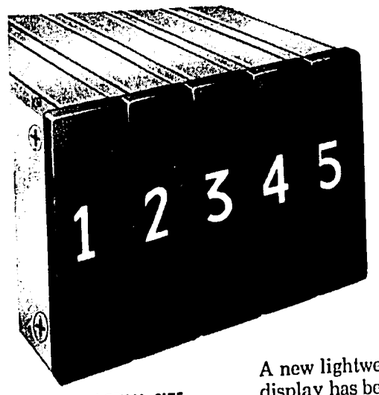
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

NEWS for design engineers



ACTUAL SIZE

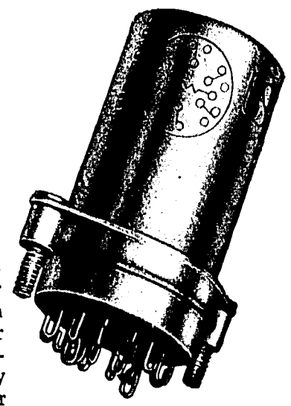
UNION
DIGITAL
INDICATOR

A new lightweight Digital Indicator for data display has been developed by Union Switch & Signal that has many uses in aviation and other industries. It is designed for either local or remote use, on a direct wire basis, and responds to binary code. The indicator reads out directly and has a non-dissipating storage facility. Data can be printed out if necessary. Write for Bulletin 1011.

UNION
MINIATURE RELAYS
AC or DC

A wide variety of UNION AC or DC Miniature Relays, with all standard mountings, is stocked for immediate shipment. Contacts can be gold alloy, palladium or the new HI-LO material which permits the use of one relay for both high-level loads of two amperes and low-level, dry-circuitry loads, eliminating the need for two separate relays.

Coil resistance runs up to 13,500 ohms, vibration resistance up to 2000 cycles at 30 G's, and shock in excess of 50 G's. Write for Bulletin 1012.

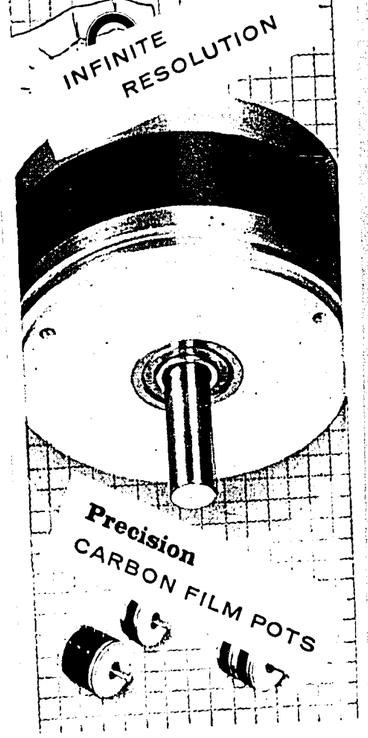


ACTUAL SIZE

UNION SWITCH & SIGNAL
DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY
PITTSBURGH 18, PENNSYLVANIA

For details, circle #363 on Reader Service Card.

CRITICAL POT SPECS* are met at CIC



Equipment designers who demand more than "shelf item" specifications, rely on CIC for dependable delivery of ultra-precise potentiometers.

The result of CIC research, carbon film potentiometers are setting new standards of accuracy, life at higher speeds and performance reliability.

CIC has assisted many firms in a wide variety of industrial instrumentation, military fire control and flight guidance equipment.

Why not discuss your specific requirements with us?

*New carbon film techniques assure virtually infinite resolution; linearity to .01%, sine-cosine to .025%; compact ganging; precision ball bearing servo construction.

"For Precision Performance...specify CIC"

Detailed Technical Data Sheets available on request.

CIC COMPUTER INSTRUMENTS CORPORATION
92 Madison Ave • Hempstead, Long Island, N.Y.

For details, circle #364 on Reader Service Card.

TERADO
BUILDS RELAYS TO *MATCH* YOUR CIRCUITS

MICRO RELAY
Series 6000

- 10 MILLIWATT & UP OPERATION
- 1-TO-150,000 OHM COILS
- DRY CIRCUIT TO 1. AMPERE CONTACT RANGE
- DESIGNED TO MEET APPLICABLE PORTIONS OF MIL.-R-5757C SPEC'S.
- VIBRATION CHARACTERISTICS EXCELLENT, IN KEEPING WITH PRESENT DAY ADVANCED DESIGN.

Write for full Engineering data.

TERADO COMPANY
Phone Midway 6-2514
RAYMOND AVE., ST. PAUL 14, MINN.

For details, circle #365 on Reader Service Card.

Directory II. Components

52. Relays.

Relay Sales, Inc., P.O. Box 186-U, West Chicago, Ill., 5, 15, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80
See ad on page 401
Tel: WEst Chicago 1100

Revere Corp. of America, Sub. of Neptune Meter Co., Conn., 25, 60
Rhodes, Inc., M. H., Conn., 80
Ronar, Inc., Ill., 45
Scaico Controls, Inc., N.J., 80
Sealtron Corp., Ohio, 25
Sigma Instruments, Inc., Mass., 15, 25, 35, 40, 50, 60, 70, 80
Simpson Electric Co., Ill., 10, 30, 35, 40, 45
Sivers Lab., Sweden, 5, Waveguide
Sperti Faraday, Inc., N.J., 60
Sterling Engineering Co. Div., A.M.F., Ind., 25, 30, 40, 55, 60, 65, 70, 75, 80
Stevens-Arnold, Inc., 22 Elkins St., So. Boston 27, Mass., 20, 25, 35, 50
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Sunvic Controls, Ltd., England, 25, 80
Terado Co., 1068 Raymond Ave., St. Paul 14, Minn., 25, 70
See ad on this page
Tel: MIdway 6-2514
Torwico Electronics, Inc., 1090 Morris Ave., Union, N.J., 60, 80
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Tel: ELizabeth 4-5650
Transco Products, Inc., Calif., 5
Tung-Sol Electric, Inc., 95-8th Ave., Newark 4, N.J., 15, 25, 55, 60, 80
See ad on page 240
Tel: HUmboldt 2-4200
Ulanet Co., George, 416 Market St., Newark 5, N.J., 80
See ad on page 428
Tel: MArket 2-4876
Union Switch & Signal Div. Westinghouse Air Brake Co., Braddock Ave., Pittsburgh 18, Pa., 25, 30, 50, 60, 70, 80
See ad on page 402
Tel: CHurchill 2-5000
U.S. Relay Company, Calif., 20, 25, 40, 55, 60, 70, 75, 80
Uniwave, Inc., N.Y., 5
Vacuum Tube Products Co., Inc., Calif., 80
Victory Engineering Corp., 114 Springfield Rd., Union, N.J., 60
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Wheelock Signals, Inc., N.J., 5, 25, 35, 40, 50, 55, 60, 70, 75
Wilson & Co., G. C., W.Va., 80

53. Resistors.

5. Carbon fixed, moulded
10. Carbon, variable
15. Deposited carbon
20. Potentiometers
22. Potentiometers, precision
25. Precision film
30. Printed circuit
35. Rheostats
40. Thermistors
45. Vacuum sealed
50. Very high megohm
55. Wirewound, fixed
60. Wirewound, variable
65. Wirewound, precision

Ace Electronics Associates, Dept. IR-2, 101 Dover St., Somerville 44, Mass., 20, 22, 35, 55, 60, 65
See ad on page 404
Tel: SOmerset 6-5130
Aerovox Corp., Mass., 15, 20, 30, 50, 55, 65
Allen-Bradley Co., Wis., 5, 10
Allies Products Corp., Fla., 5, 50
American Electronics Mfg., Inc., Calif., 20, 22
Analogue Controls, Inc., N.Y., 20, 22, 35, 60, 65
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Arnhold Ceramics, Inc., N.Y., 15, 25, 50, 55
Axel Bros., Inc., N.Y., 65
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Borg Corp., George W., Borg Equipment Div., 120 S. Main St., Janesville, Wis., 22
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Tel: PLeasant 4-6616
Bourns Laboratories, Inc., 6135 Magnolia Ave., Riverside, Calif., 10, 20, 30, 35, 60
See ad on page 183
Tel: OVerland 4-1700
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British Radio Electronics Ltd., Wash., D.C., 20, 60
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Buckbee Mears Co., Minn., 30
Calbest Electronics Co., Calif., 22, 65
Campbell Industries, Inc., Sub. Clarostat Mfg. Co., Inc., N.H., 15, 25
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Centralab, Div. of Globe Union, Inc., 920Y E. Keefe Ave., Milwaukee 1, Wis., 5, 10, 15, 20, 22, 30, 60, 65
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Tel: WOodruff 2-9200
Chicago Telephone Supply Corp., 1142 W. Beardsley Ave., Elkhart, Ind., 10, 20, 30, 35, 60
See ad on page 125
Tel: 3-0310

For quick location of any specific product, see the eight-page pink section preceding page 1.

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

Potentiometers — Trimmers — Relays

Ace *delivers reliability* in sub-miniaturization

Maximum performance — advanced designs, special materials, and unique winding and manufacturing techniques are combined to give you "heavyweight" performance in the "featherweight" class.

Sustained reliability — rigid quality controls and testing assure highest standards of performance-reliability over extended periods. Ace designs have been proved in use by leading manufacturers.

Prompt delivery — modern mass production techniques and extensive facilities guarantee delivery to meet your requirements. Prototype orders are expedited in a special order department.

*ACEPOT** Sub-miniature precision wire-wound potentiometers . . .

actual size

This outstanding unit provides extremely high resolution and linearity yet is only ½" in size.

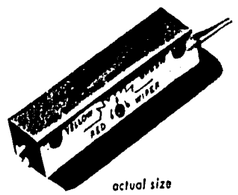
Size	½" x ½"
Weight	0.25 ounce
Resistance Range	10 Ω to 250K ±2% std.
Linearity	±.3%
Temperature	—55° C. to 125° C. **
Winding Angle	325° std. ≷ available
Resolution	Extremely high
Torque	.035 oz./in. @ 20° C. ***
Power	2 W for 60° C. rise
Mounting	Threaded bushing, servo, flush, flanged. Ganged up to 6 cups.

The above are standard. Modifications are available.
Fully sealed against dust, moisture, humidity. Anti-fungus treated. Meets applicable JAN-MIL specs including shock and vibration.

** X-500 rated for higher temperature range —55° C. to 150° C.
*** Jewel Bearing Acepot torque of .001 ounce/inch

*ACEOHM** Sub-miniature, high temperature, humidity-proof trimmers . . .

Specially designed for dependable operation in circuits subject to extreme environmental conditions.

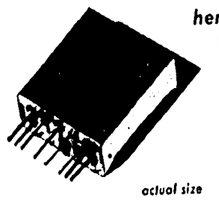


actual size

Size	1 5/16" x 3/16" x 3/16"
Weight	0.2 ounce
Resistance Range	10 Ω to 50K
Usable Potentiometer Range	95-100%
Power Rating	1 W @ 50° C. (flush mount design) derated to O W @ 150° C.
Temperature	—55° C. to 150° C.
Resolution	High; to 0.15%
Dielectric Strength	1 minute @ 1M V. DC per JAN-R-19
Load Life	1M hours in accordance with JAN-R-19

35 turn adjustment for precision settings. Excellent shock, vibration, acceleration characteristics. (Meets or exceeds MIL-E-5272A.)

*ACERELAY** Sub-miniature, hermetically sealed relays . . .



actual size

Bifurcated contact design assures *positive* reliability both in power and dry circuit work.

Size	¾" x 7/8" x 3/8"
Weight	0.75 ounce
Contacts	bifurcated *
Contact rating	3 amp @ 28 V DC 1 amp @ 115V AC
Coil resistance	to 10,000 Ω
Vibration	5-2000 CPS @ 20G
Shock	50G
Life	500,000 operations minimum
Header types	plug in, wire leads, solder hook
Mounting	socket, top studs, side studs, bracket
Temperature	to 125° C.

Entire relay hermetically sealed — coil assembly hermetically isolated from contact assembly.

* Double pole double throw, break before make, make before break.

*ACETRIM** Sub-miniature precision wire-wound trimmers . . .

actual size

A wide range of resistances is available in this low-cost, space and weight-saving trimmer.

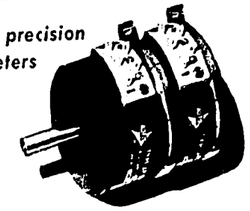
Size	½" x ½"
Weight	0.25 ounce
Resistance Range	10 Ω to 150K ±5% std.
Linearity	±3%
Temperature	—55° C. to 125° C. (to 150° C. on special order)
Winding Angle	325° std. ≷ available
Torque	.035 oz./in. @ 20° C.
Power	2 W for 60° C. rise
Mounting	Threaded bushing, printed circuit, flush, flanged, ganged

with tabs for printed circuits

The above are standard. Modifications are available.

Fully sealed against dust, moisture, humidity. Anti-fungus treated. Meets applicable JAN-MIL specs including shock and vibration.

*ACEPOT** Nonlinear precision wire-wound potentiometers



Ace designs, plus precision mechanical construction, give highest possible linearity and close conformity. Available in all AIA sizes to meet your unique nonlinear requirements.

	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

Other nonlinear configurations to meet your specific requirements available in prototype and production quantities.

Call or write for information

Complete Fact File and Application Data Sheets available. New developments, and improvements of existing types, are part of a continuous program. Engineering assistance on designs and applications available immediately.

* trademarks applied for

ACE ELECTRONICS ASSOCIATES, INC.

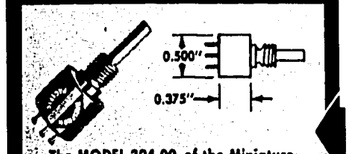
Dept. IR-2. 101 Dover Street, Somerville 44, Massachusetts
Telephone: SOmerset 6-5130 • MOnument 6-4800
Engineering Representatives in principal cities.

For details, circle #366 on Reader Service Card.

PRECISION POTENTIOMETERS

SUB-MINIATURE, MINIATURE AND STANDARD

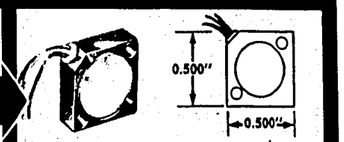
Potentiometers of all basic types are designed for maximum reliability and broad application. Production series are just part of the story though. Special, custom designs are available to meet "unusual" specifications.



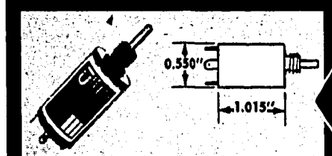
The MODEL 304-00, of the Miniature Single Turns group.

MINIATURE SINGLE TURNS—Only 0.375 inch body length by 0.500 inch diameter, 10 to 50K ohms, wire wound; linearity from 3 to 0.3%; 2 watts at 50°C, 0 watts at 125°C.

TRIMMING POTENTIOMETERS—Worm gear adjustment design produces maximum stability under extreme environmental conditions; 10 ohms to 150 K ohms, wire wound; up to 1.5 watts at 50°C, 0 watts at 150°C; as small as 0.050 cubic inch. Manufactured with leads or printed circuit terminals.



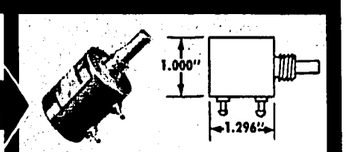
MODEL 300-00, one of the many Trimming Potentiometers



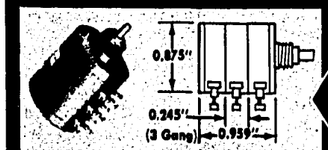
Typical Miniature Multiturn—the MODEL 341-60

MINIATURE MULTITURNS—The smallest precision, ballbearing, 10-turn pots offer maximum reliability with unique zero backlash construction and double wipers; 20 G's to 2000 cyc; to 250K ohms; 2.5 watts at 40°C, 0 watts at 140°C; panel or servo mount.

GENERAL PURPOSE MULTITURNS—To 500K ohms, wirewound, to 4 watts at 40°C, 0 at 100°C; as small as 1.0 inch diameter, sleeve or ball bearing, excellent resolution, designed to fit ALL applications.



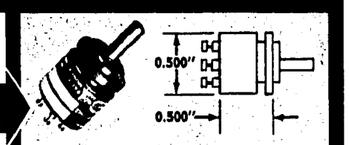
MODEL 400, typical of the General Purpose Multiturns



Representative of the Ganged Single Turns—the MODEL 319-60

GANGED SINGLE TURNS—Unique screwdriver phasing, no clamp rings or movable cups; minimum depth "per cup"; from 0.875 to 3.0 inch diameter; to 500K ohms, wire wound with exceptional linearity and resolution.

HIGH TEMPERATURE DESIGNS—Special designs are available, offering all of the features listed for separate groups above PLUS stability at elevated temperatures. Emphasis on 200°C to 500°C range.



Typical of High Temperature Designs—MODEL 314

Openings exist for qualified engineers.

DAYSTROM PACIFIC CORPORATION

A subsidiary of Daystrom, Inc.

POTENTIOMETER DIVISION

3030 NEBRASKA AVENUE SANTA MONICA, CALIFORNIA

For details, circle #367 on Reader Service Card.

Directory II. Components

53. Resistors.

Chicago Telephone of California, Inc., Calif., 10, 20, 30
Cima Corp., Mass., 55, 65
Cinema Engineering, Calif., 20, 22, 65
Circuit Instruments, Inc., Fla., 20, 22
Clark Electronic Laboratories, Calif., 45, 50
Clarostat Mfg. Co., Inc., N.H., 10, 15, 20, 22, 25, 30, 35, 55, 60, 65
Coilcraft, Inc., Ill., 65
Computer Instruments Corp., 92 Madison Ave., Hempstead, N.Y., 22, 25, Carbon
See ad on page 402
Tel: IVanhoe 3-8200
Consolidated Resistance Co. of America, Inc., 44 Prospect St., New York 1, N.Y., 55, 65
See ad on page 407
Tel: YOnkers 3-5900
Continental Carbon Div., Wirt Co., Pa., 15, 20, 25, 30, 35, 55, 60
Continental Carbon, Inc., Ohio, 5, 10, 15, 20, 25, 35, 55, 60
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Tel: LOcust 4-3131
Daven Company, N.J., 10, 20, 22, 25, 35, 45, 50, 55, 60, 65
Daystrom, Inc., N.J., 20, 22, 25, 35, 55, 60, 65
Daystrom Pacific Corp., Potentiometer Div., 3030 Nebraska Ave., Santa Monica, Calif., 20, 22
See ad on this page
Tel: GRanite 8-3796
De Jur-Amsco Corp., N.Y., 20, 22
Dmeter Manufacturing Co., Inc., N.Y., 50, 55, 65
Dwyer Engineering Co., Inc., N.H., 22
Eastern Precision Resistor Corp., 675 Barbey St., Brooklyn 7, N.Y., 30, 55, 60, 65
See ad on page 214
Tel: HYacinth 5-0133
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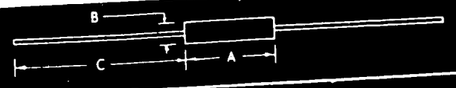
Edgerly Instrument Labs., Inc., Md., 55
Electra Mfg. Co., 4051 Broadway, Kansas City, Mo., 15, 22, 25, 30
See ad on page 406
Tel: WEstport 1-6864
Electro Instruments, Inc., Calif., 65
Electro-Measurements, Inc., Ore., 20, 22, 35, 55, 60, 65
Electro-Mec Laboratory, Inc., 47-51 33rd St., Long Island City 1, N.Y., 20, 35, 60, 65
See ad on page 407
Tel: STillwell 6-3402
Electromath Corp., Conn., 20, 55, 60, 65
Electron-Radar Products, Ill., 65
Electronic Plastics Co., Calif., 25, 45, Computer Plug-In
El-Rad Mfg. Co., Ill., 65

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

ELECTRA
DEPOSITED CARBON RESISTORS

If increased reliability is your ultimate goal, begin with Electra deposited carbon resistors. Get precision, stability, small physical size, plus a full range of resistance values. Get the benefit, too, of an unsurpassed degree of manufacturing skill . . . skill resulting from years of pioneer work and production leadership in this field of electronics. Check the wide selection of available sizes, then write today for full details.

STANDARD



Electra Part No.	Mil. Style	Wattage	Max. Rated Voltage	Resistance Range	Length A	Dia. B	Leads Dia.
DC1/8	none	125	250	4 ohms 250K	9/32"	5/64"	.016"
DC1/4	RN-10	25	300	5 ohms 1 meg	17/32"	3/32"	.026"
DC1/4A	none	25	300	5 ohms 800K	13/32"	3/32"	.026"
DC1/2	none	5	500	6 ohms 5 megs	13/16"	11/64"	.032"
DC1/2A	RN-20	5	350	3 ohms 2.2 megs	19/32"	11/64"	.032"
DC1/2B	none	5	500	3 ohms 5 megs	11/16"	15/64"	.032"
DC1/2C	RN-15	5	350	2 ohms 2 megs	15/32"	11/64"	.032"
DC1	RN-25	10	500	3 ohms 10 megs	15/16"	9/32"	.032"
DC2	RN-30	20	1000	10 ohms 50 megs	2 1/16"	9/32"	.032"

Special coatings, sleeves, lead lengths, etc., available. Standard lead length (C) 1½"

MOLDED

Electra Part No.	Mil. Style	Wattage	Maximum Rated Voltage	Resistance Range	Length A	Dia. B	Leads Dia.
DCM 1/8	RN-60	1/8	250 Volts	10 ohms 1 meg	13/32"	136"	026"
DCM 1/4	RN-65	1/4	300 Volts	10 ohms 2.5 megs	19/32"	219"	026"
DCM 1/2	RN-70	1/2	350 Volts	10 ohms 2.5 megs	3/4"	25"	032"
DCM 1	RN-75	1	500 Volts	10 ohms 10 megs	1 1/8"	395"	032"
DCM 2	RN-80	2	750 Volts	30 ohms 40 megs	2 1/4"	395"	032"

HERMETICALLY SEALED

HC-3

Electra Part No.	Mil. Style	Wattage	Maximum Rated Voltage	Resistance Range	Length A	Dia. B	Leads Dia.
HC-1		1/4	250	10 ohms 250K	15/32"	5/32"	.016"
HC-2		1/3	300	10 ohms 1 meg	3/4"	3/16"	.026"
HC-3	RN-70	1/2	350	10 ohms 2 megs	11/16"	1/4"	.032"
HC-4		1	500	10 ohms 5 megs	7/8"	5/16"	.032"
HC-5		1	500	10 ohms 5 megs	1"	9/32"	.032"
HC-6	RN-75	1	500	10 ohms 10 megs	1 3/32"	3/8"	.032"
HC-7	RN-80	2	1000	30 ohms 50 megs	2 1/4"	3/8"	.032"
HC-8	RN-65	1/4	300	10 ohms 2 megs	5/8"	1/4"	.032"
HC-9	RN-70	1/2	350	10 ohms 3 megs	3/4"	1/4"	.032"
HC-10	RN-60	1/8	250	10 ohms—1 meg	7/16"	5/32"	.026"
HC-40		1/8	150	10 ohms—350K	9/32"	5/32"	.016"

All Electra resistors made to meet or exceed Mil-R-10509B. Lead length C Standard and Molded resistor is 1½". For Hermetically Sealed resistor it is 1⅜".

NEW ELECTRA SEALED SWITCH

Write for details on new Snap Action W-Blade Sealed Switch. Completely new water-proof, dust-proof switch at a cost comparable to open type switches. Write today for specifications and prices.

Electra

ELECTRA Ceramic Disc Capacitors

EKC 102

Temperature Compensating • A. C. Line Filters
General Purpose • Extended T. C. • General By-Pass

AVAILABLE IN NINE PHYSICAL SIZES—from ¼" to 15/16" diameter . . . Electra now offers you a complete line of Ceramic Disc Capacitors. These capacitors offer you the utmost in high stability, low power factor, High Q, low drift, high insulation and low inductance. You get, too, precision, product uniformity, small physical size, plus a wide range of capacitance values and low cost. For full details write today for our new Catalog Bulletin No. 101. In addition to the types listed above, high voltage disc capacitors and other special types also are available on request.

ELECTRA MANUFACTURING COMPANY 4051 Broadway WEstport 1-6864 Kansas City, Mo.

For details, circle #368 on Reader Service Card.

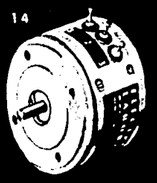
POTENTIOMETERS
DIGITOMETERS
ELECTRO-MEC

PRECISION • LOW TORQUE • ULTRA ACCURATE LINEARITY •

POTENTIOMETER TYPE 9

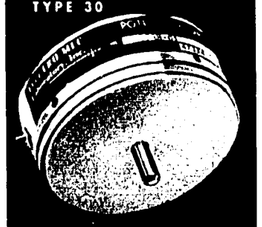
TYPE 11

TYPE 14



TYPE 18

TYPE 30



DIGITOMETER TYPE D-15

• EXTREME ACCURACY • RUGGEDNESS • HIGH RELIABILITY

ELECTRO-MEC LABORATORY, INC.
47-51 33 Street, Long Island City 1, N. Y.

For details, circle #369 on Reader Service Card.

Directory II. Components

53. Resistors.

Empire Devices Products Corp., Amsterdam, N.Y., 15
See ad on page 508
Tel: VIctor 2-8400

Erie Resistor Corp., 644 W. 12 St., Erie 6, Pa., 5, 15, 30
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Tel: 2-1481

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General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 20, 22, 35, 55, 60, 65
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Tel: TRowbridge 6-4400

General Resistance, Inc., 577 E. 156th St., New York 55, N.Y., 55, 65, Precision Networks
See ad on this page
Tel: CYpress 2-1500

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Gray Instrument Co., Pa., 55, 65

Gulton Industries, Thermistor Div., 212 Durham Ave., Metuchen, N.J., 40
See ad on page 184
Tel: LIberty 8-2800

CRCA Series "200" Resistors

- Precision Wire Wound.
- 1% to .005% Accurate.
- .003% Stable.
- ±5 ppm/°C Temperature Coefficient.
- Epoxy Encapsulation.
- Meet MIL-R93A & MIL-R9444.
- Hundreds of standard types.
- 48 hrs. Special Delivery Service.
- Also: High Accuracy Resistance Networks, Decades, Voltage Dividers & Wheatstone Bridges.

CRCA TYPE					Dimensions	
MIL-R-93A Code	Temperature Char.	Type	Watts (Free Air)	Dia. (max.)	Length (max.)
2			2	.875	2.250
2			1.25	.687	.875
2			1	.531	.562
2			.75	.531	.687
2			.50	.531	.937
2			.33	.312	.500
2			.5	.250	.312
2			.10	.187	.562

R—Radial in phase; P—Radial, 180° out of phase; A—Axial (may be off-center unless specified); O—One Sided; L—Solder Lug; W—Wire lead (#20 or #22); T—Tap (.54.10 x 1" dp.); S—Screw (.51.40 x ¼" L); IDENTIFICATION EXAMPLES: CRCA Type 217PS:—1 Watt; out of phase radial screw terminals. CRCA Type 215AW-RL: —.5 Watt; One axial wire lead, One radial lug terminal.

287 OW

Consolidated Resistance Co. of America, Inc.
44 Prospect Street, Yonkers, N.Y. Tel: Yonkers 3-5900

For details, circle #370 on Reader Service Card.

LET US HELP YOU WITH YOUR RESISTOR or NETWORK PROBLEM...

- Resistors meet Mil R-93A or Mil R-9444
- Resistor networks matched to 0.01%
- Encapsulated resistors to 0.01% over temperature range of −55° C to +100° C
- Microminiaturized resistor only 3/32" x 5/16"
- Temperature compensating resistors

Our engineering staff welcomes your inquiries. We're at your service . . .

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GENERAL RESISTANCE, INC.
577 EAST 156 STREET, NEW YORK 55, N.Y. CYpress 2-1500

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

GAMEWELL *Blue Line* PRECISION POTENTIOMETERS

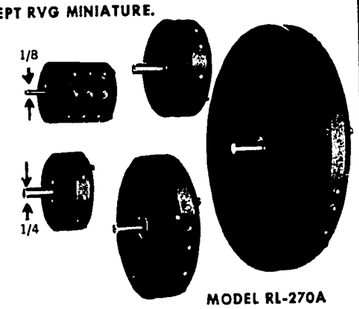
ALL ILLUSTRATIONS SHOWN APPROXIMATE ½ SIZE, EXCEPT RVG MINIATURE.

The RL-270A and B Series

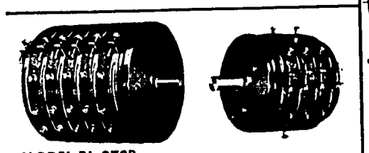
Operates to 150C at 65° ambient • Only ⅜" per section • Taps limited only by physical spacing High unit pressure spring connections • High "G" and vibration characteristics • RL-270B style recommended if more than two sections required.

Diameter (inches)	5	3	2	1⅓	1¼
Rating (watts)	12	6	3	2	1.5
Torque, Max. (oz.-in.)	1	1	1	½	½
Weight (ounces)	15	6	3	2	1
Mounting: 3 holes (¼" deep)	#8-32	#8-32	#8-32	#6-32	#4-40
Mounting-circle Diam. "B" (inches)	3.250	1.750	1.250	1.000	1.000
Max. Resistance (ohms) ±5%	500K	250K	150K	100K	65K
Min. Resistance (ohms) ±5%	115	60	35	25	20
Max. Number of Turns	13,500	7,300	4,200	3,100	2,200
Electrical Functional Angle (deg.)*	358.5	357	355	353	350
Linearity, Standard (%)	±0.1	±0.1	±0.15	±0.25	±0.25
Maximum Number of Taps	74	40	26	20	14

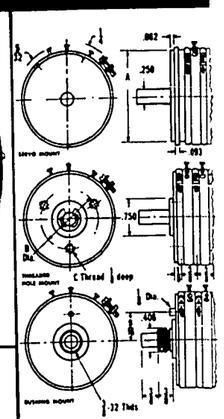
*Tolerances not shown on angles



MODEL RL-270A



MODEL RL-270B
. . . Exclusive Gamewell Phasing Clamp Style



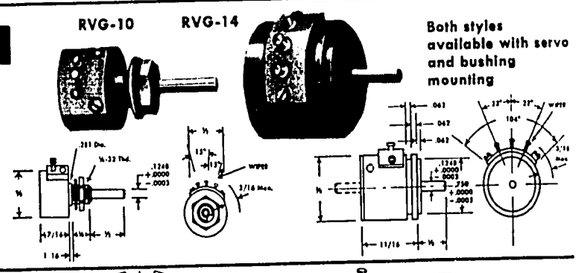
MODEL	MAX. DIA.	A	B
RL-270B-1½	1½	1.595	1.000
RL-270B-2	2	1.875	1.250
RL-270B-3	3	2.875	1.750

The RVG Miniatures

	RVG-10	RVG-14
Diameter	⅛	⅛
Rating (Watts)	1	1.25
Torque, Max. (oz.-in.)	0.2	0.25
Weight (ounces)	⅛	⅛
Max. Resistance (ohms) ±5%	30,000	50,000
Min. Resistance (ohms) ±5%	25	40
Max. Number of Turns	1230	1800
Electrical Function Angle (deg.)	345 ±3	354 ±2
Linearity, Standard (%)	±0.5	±0.5

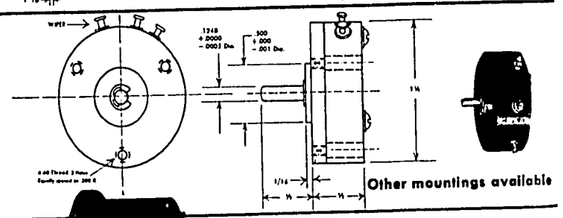
RVG-10 RVG-14

Both styles available with servo and bushing mounting



The LOW COST G-20

Rating (Watts)	1.5	Min. Resistance (ohms) ±5%	20
Torque, Max. (oz.-in.)	1	Max. Number of Turns	2,100
Weight (ounces)	1¼	Electrical Function Angle (deg.)	340 ±3
Max. Resistance (ohms)	±5% 63,000	Linearity, Standard (%)	±0.5



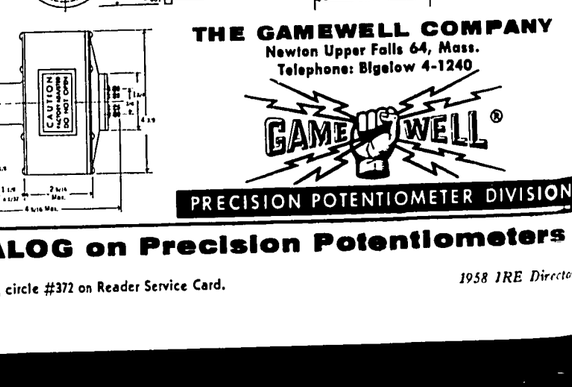
Other mountings available

The SINUSOIDAL Type

	RL-14MS	RL-11C	RVG-17XS
Total Resistance (ohms)	35,400 ± 1%	16,000 ± 10%	18,000 ± 5%
Approx. % Resistance within brush circle	98.5 ±½	85	95
Angle of Rotation	360°	360°	360°
Weight	1.8 lb.	4.75 oz.	1.5 oz.
Torque (Approximate)	2 oz.-in.	¾ oz.-in.	¼ oz.-in
Wire	80 Ni-20 Cr	80 Ni-20 Cr	80 Ni-20 Cr
Resolution	0.2°	0.4°	0.5°
Angular Accuracy	±0.5°	±0.6°	±1°
Amplitude Accuracy	±0.6%	±0.8%	±1.5%
Maximum Volts across winding	350	150	150
Maximum Speed	60 RPM	60 RPM	60 RPM
Nominal Life	200,000 cycles	350,000 cycles	350,000 cycles

RVG-17XS

RL-11C



RL-14MS

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Newton Upper Falls 64, Mass.
Telephone: Bigelow 4-1240

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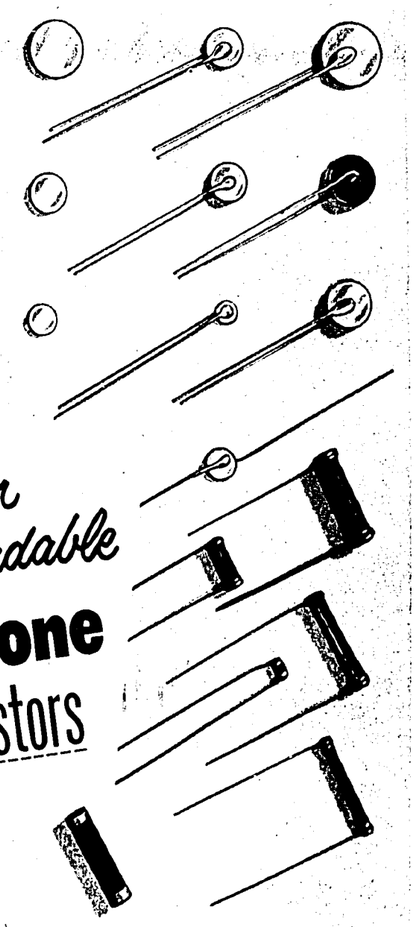

Reliability, rapid response, stable operation in temperatures as high as 500°F continuous—these Keystone thermistor advantages are yours to employ over a wide range of project applications. With resistance to current flow varying inversely to their temperature, Keystone thermistors interrelate thermal and electrical behaviour, and translate one into the other. They are available in many compositions, sizes and shapes to meet your requirements (from tiny .050 diameter beads to 5 watt discs).

If you have a temperature compensation or other application suggesting the use of thermistors, we invite you to have your problem reviewed by Keystone engineers. Write us, without obligation of any kind.

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CARBON COMPANY
Resistor Division
ST. MARYS, PA.

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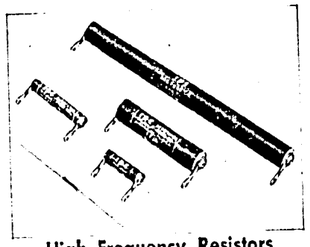
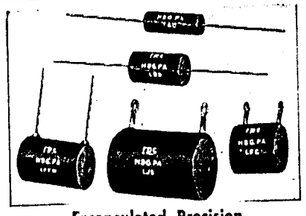


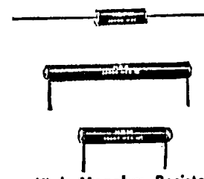
High Frequency Resistors

Used where requirements call for very low inductance and skin effect in circuits involving pulses and steep wave fronts. Depending on size and resistance value, these resistors are usable at frequencies to over 400 mc. Resistance values range from 20 ohms to 100 megohms with tolerance of 20% to 5%. 2 types available.
TYPE F resistors (shown) in 8 sizes from 9/16" long x 0.10" diameter to 6½" long x 9/16" diameter, with lugs or wire leads. Power ratings ¼ to 10 watts.
TYPE G resistors (not shown), in 6 sizes up to 18½" long. Power ratings 10 to 100 watts.



Encapsulated Precision Wire Wound Resistors

RPC Type L Encapsulated Resistors will withstand temperature and humidity cycling, salt water immersion and extremes of altitude, humidity, corrosion and shock without electrical or mechanical deterioration. Type L resistors are available in many sizes and styles ranging from sub-miniature to standard with lug terminals, axial or radial wire leads. Available for operation at 105° C. or 125° C. ambient temperatures. These resistors will meet all applicable requirements of MIL-R-93A, Amdt. 3. Type L can be furnished with all resistance alloys and resistance tolerances from 1% to .02%.



High Megohm Resistors

Type H Resistors are used in electrometer circuits, radiation equipment and as high resistance standards. Resistance available to 100 million megohms, (10^{14} ohms). For utmost stability under adverse conditions Type HSD and HSK Hermetically Sealed are recommended. Eight sizes from ⅞ inch to 3 inches long are available. Voltage rating to 15,000 volts. Low temperature and voltage coefficients. Standard resistance tolerance 10%. Tolerance of 5% and 3% available. Also matched pairs 2% tolerance.

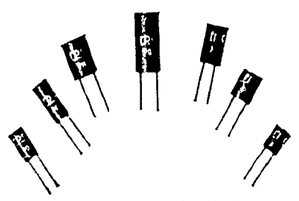
rpc

HIGH QUALITY RESISTORS FOR ELECTRONICS

RPC is a widely recognized supplier of high quality resistors to industry, Government Agencies and the Armed Forces. Advanced production methods, modern equipment and scientific skill enables RPC to manufacture resistors of *highest quality* in *large quantities* at *reasonable cost*. Modern manufacturing plant is completely air conditioned and equipped with electronic dust precipitators to insure highest production accuracy. RPC resistors are specified for use in instruments, electronic computers, radiation equipment, aircraft equipment and scientific instruments.

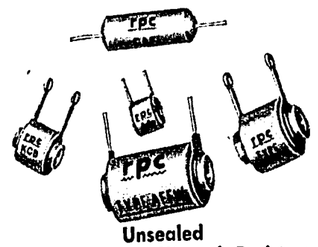
Test equipment and standards for checking and calibrating are equalled by only a few of this country's outstanding laboratories. Our ability to produce resistors of highest quality coupled with prompt delivery have established RPC as a leading manufacturer of resistors. Small or large orders are promptly filled.

Representatives in principal cities. For full information send for latest catalog.



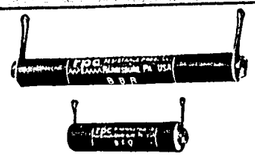
Printed Circuit Precision Resistors

To meet the requirements for printed circuitry, RPC has developed Type P Encapsulated Wire Wound Precision Resistors Miniature, single ended units designed for easy rapid mounting on printed circuit panels with no support other than the wire leads. Many newly developed techniques are employed in the manufacture of Type P Resistors. These units can be operated in ambient temperatures up to 125°C. and will withstand all applicable tests of MIL-R-93A, Amdt. 3. Available in 6 sizes, rated from 1/10 watt to .4 watt. ¼" diameter by ⅜" long to ¾" diameter by ¾" long. Resistance values to 3 megohms. Tolerances from 1% to 0.05%.



Unsealed Precision Wire Wound Resistors

Unsealed precision resistors are wound on steatite forms and are used for all general requirements. They can be furnished with all resistance alloys in tolerances from 1% to .02%. These resistors will meet the requirements of MIL-R-93A, Amdt. 2, characteristic B. Special winding techniques, impregnation and thermal aging result in resistors of exceptional stability. They are available in a wide variety of sizes, styles and terminal types. Matched resistors, networks and special assemblies can be supplied.



High Voltage Resistors

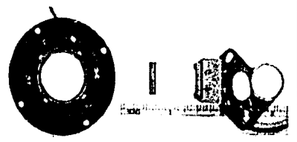
Type B Resistors are stable compact units for use up to 40 KV. These resistors are used for VT voltmeter multipliers, high resistance voltage dividers, bleeders, high resistance standards and in radiation equipment. They can be furnished in resistance to 100,000 megohms. Available as tapped resistors and matched pairs. Sizes range from a 1 watt resistor 1 inch long x ⅜ inch diameter rated at 3500 volts, to a 10 watt resistor 6½ inches long x ⅞ inch diameter rated at 40 KV. Low temperature and voltage coefficients. Standard resistance tolerance 15%. Tolerances of 10%, 5% and 3% available. Tolerance of 2% available in matched pairs.

RESISTANCE PRODUCTS CO. 914 S. 13th Street HARRISBURG, PA.

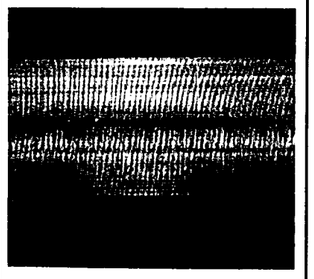
For details, circle #374 on Reader Service Card.

kama

• LINEAR AND ONE TURN ROTARY POTENTIOMETERS WITH FINE WIRE WINDINGS



FINE WIRE WINDINGS



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Gyroscope Pickoffs · Accelerometers · Pressure Transducers · Trimmers

CONSTRUCTION—Platinum alloys and evenohm wire on copper mandrel.

EXTREME LINEARITY
EXCEPTIONAL RELIABILITY
LOW NOISE
LOW CONTACT RESISTANCE
LOW TEMPERATURE COEFFICIENT
HIGH TEMPERATURE OPERATION

0.0004 inch to 0.002 inch diameter wire

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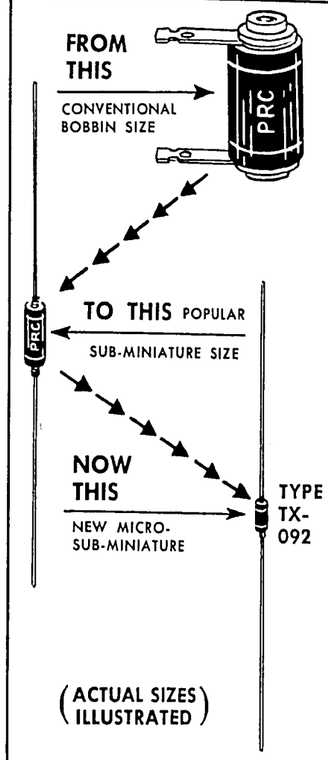

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WITH
OUTSTANDING PERFORMANCE
PLUS
ABSOLUTE PRECISION
WITH
PERMANENT STABILITY
FEATURED IN
***NEW* SUB-MINIATURE WIRE-WOUND RESISTORS**

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HILLSIDE, N. J.

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For details, circle #376 on Reader Service Card.

Directory II. Components

53. Resistors.

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Ohmwere Co., Conn., Woven Inductive

Onondaga Pottery Co., Electronics Div., 1858 W. Fayette St., Syracuse 1, N.Y., 30
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Resistance Products Co., 914 S. 13th St., Harrisburg, Pa., 45, 50, 55, 65, & High Voltage & Frequency, Resistance Networks
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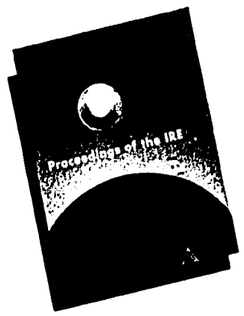

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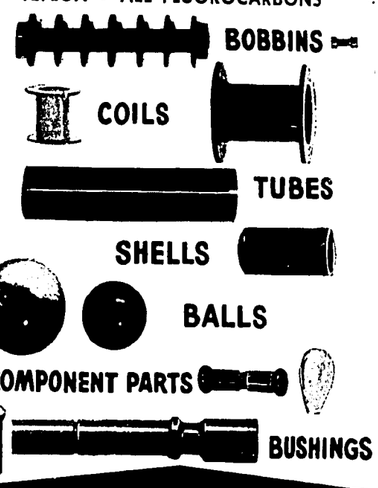

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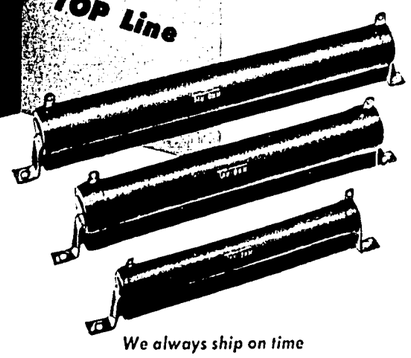

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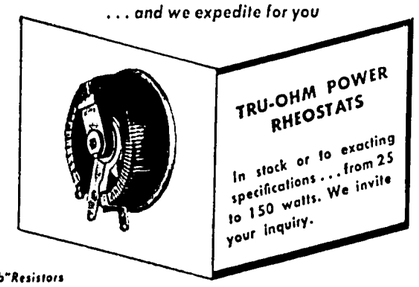

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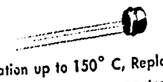

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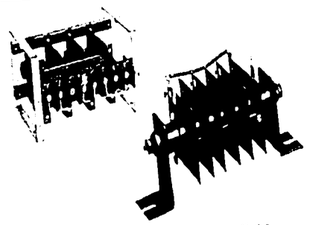

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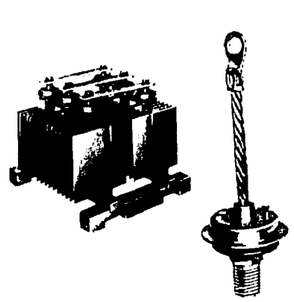

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Tru-Ohm Products Div., Model Eng. & Mfg. Co., 2800 N. Milwaukee Ave., Chicago 18, Ill., 20, 35, 55, 60
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Tel: UNiversity 9-9850

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General Transistor Type	Polarity	Transistor Dissipation (mW)	Collector to Base Voltage (Emitter Open) (Volts)	DC Collector Current (ma)	Peak Collector Current (ma)	Storage Temperature (°C)	AC Current Gain (Common Emitter) (β)	DC Current Gain (β) Conditions	DC Current Gain (β) Gain	Power Gain (DB)	Noise Figure (DB)	Collector Cutoff Current Conditions	Collector Cutoff Current (μa)	Alpha Cutoff Frequency (mc)	Collector Voltage (Volts)	Emitter Current (ma)	Applications
GT-14	PNP	125	25	100		85	28			36	16	VCB=10V	6		4.5	1	Audio, Gen. purpose
GT-20	PNP	125	25	100		85	42			40	16	VCB=10V	6		4.5	1	Audio, Gen. purpose
GT-34	PNP	125	25	100		85	15			32	16	VCB=10V	6		4.5	1	Audio, Gen. purpose
GT-74	PNP	125	25	100		85	75			42	<12	VCB=10V	6		4.5	1	Audio, Gen. purpose
GT-75	PNP	125	25	100		85	150			44	<12	VCB=10V	6		4.5	1	Audio, Gen. purpose
GT-81	PNP	125	25	100		85	75			42	16	VCB=10V	6		4.5	1	Audio, Gen. purpose
GT-81 HS*	PNP	150	25	200		85	120			44	16	VCB=10V	6		4.5	1	Audio, Gen. purpose
GT-82	PNP	125	25	100		85	150			46	16	VCB=10V	6		4.5	1	Audio, matched pair
GT-109	PNP	125	25	100		85	120			44	16	VCB=10V	6		4.5	1	Audio, Gen. purpose
GT-222	PNP	125	12	100		85	20			30	30	VCB=10V	6		4.5	1	Hearing Aid
GT-14 H	PNP	90	12	50		75	28			36	12	VCB=10V	6		4.5	1	Hearing Aid
GT-20 H	PNP	90	12	50		75	42			40	12	VCB=10V	6		4.5	1	Hearing Aid
GT-81 H	PNP	90	12	50		75	80			42	12	VCB=10V	6		4.5	1	Hearing Aid
GT-210 H	PNP	90	12	50		75	15-250			>34	>29	VCB=10V	<25		4.5	1	R.F. & I.F.
GT 759 R	PNP	90	12	100		75	25			24◊			6	2.5	4.5	1	R.F. & I.F.
GT-760 R	PNP	90	10	100		75	40			28◊			6	5	4.5	1	R.F. & I.F.
GT-761 R	PNP	90	10	100		75	70			32◊			6	11	4.5	1	R.F. & I.F.
GT-762 R	PNP	90	6	100		75	120			34◊			6	17	4.5	1	R.F. & I.F.
GT-83†	PNP	125	25	200	500	85	35-49			40	16		10	<.7	4.5	1	Low Speed Computer
GT-87	PNP	125	25	200	500	85	38			36	16		10	.5	4.5	1	Low Speed Computer
GT-88	PNP	125	25	200	500	85	80			42	16		10				Low Speed Computer
GT-122	PNP	125	25	200	500	85	80			42	16		10	1.5	4.5	1	Low Speed Computer
2N311†	PNP	100	15	‡		−55 to +85		IC=10ma VCE=5V	25-75			VCB=15V	<60				
GT-758†	PNP	100	>20	200	500	−55 to +85	15			20◊	16	VCB=15V	< 5	<.5	4.5	1	Low Speed Computer
GT-123†	PNP	100	>20	200	500	−55 to +85	30-150					VCB=20V	< 6	> 5	4.5	1	High Speed Computer
GT-153†	PNP	100	>30	200	500	−55 to +85	> 20					VCB=20V	< 5				High Speed Computer
GT-269†	PNP	100	25	200	500	−55 to +85						VCB=12V	< 4	> 4	4.5	1	High Speed Computer
GT-759†	PNP	100	>20	200	500	−55 to +85	20			24◊	16	VCB=15V	< 5	.5 to 3	4.5	1	High Speed Computer
GT-760	PNP	100	15	50		−55 to +85	40			28◊	16		1	5	4.5	1	High Speed Computer
GT-761	PNP	100	15	50		−55 to +85	75			32◊	16		1	10	4.5	1	High Speed Computer
GT-762	PNP	100	6	50		−55 to +85	100			34◊	16		1	20	4.5	1	High Speed Computer
GT-763	PNP	100	6	50		−55 to +85	120			35◊	16		1	30	4.5	1	High Speed Computer
GT-764†	PNP	100	>20	200	500	−55 to +85	200					VCB=15V	< 5	> 25	4.5	1	High Speed Computer
2N43A	PNP	150	45	50		−55 to +85	32-65			>12	<20	VCB=45V	16	>.4	5	1	Military-Type
2N44	PNP	150	45	50		−55 to +85	16-32			34-43	<33	VCB=45V	15	>.4	5	1	Military-Type
2N315	PNP	100	20	200	500	−55 to +85		IC=100ma VCE=.2V	20			VCB=5V	1	5	5	1	Switching computer
2N316	PNP	100	20	200	500	−55 to +85		IC=200ma VCE=.2V	30			VCB=5V	1	12	5	1	Switching computer
2N317	PNP	100	20	200	500	−55 to +85		IC=400ma VCE=.2V	30			VCB=5V	1	20	5	1	Switching computer
2N356	NPN	100	>30	200	500	−55 to +85		IC=100ma VCE=.25V	30			VCB=5V	< 5	3	5	1	Switching computer
2N357	NPN	100	>30	200	500	−55 to +85		IC=200ma VCE=.25V	30			VCB=5V	< 5	6	5	1	Switching computer
2N358	NPN	100	>30	200	500	−55 to +85		IC=300ma VCE=.25V	30			VCB=5V	< 5	9	5	1	Switching computer
2N318/(GT-66)	PNP	50	12	20		85	100						10		4.5	1	Phototransistor
GT-34HV	PNP	150	50	‡		85	10			42	20		10		4.5	1	High Voltage
GT-34N†	PNP	125	100	200	500	85	18			32	16		10		4.5	1	Neon light
GT-34S†	PNP	125	40	200	500	−55 to +85	15					VCB=100V	<450		4.5	1	Bi-directional
GT-35/(2N35)†	NPN	100	25	100	200	−40 to +75	40			32	24	VCB=15V	15		5	1	Audio, Gen. purpose
GT-229†	NPN	100	>10	200	500	−55 to +85	> 10			40	16	VCB=12V	12		5	1	Experimental Amateur
GT-167†	NPN	100	25	200	500	85	> 25				30	VCB=10V	<10		5	1	High speed switching computer
2N312†	NPN	100	15	‡		−55 to +85						VCB=15V	<10	> 5			
GT-792†	NPN	100	20	100	200	−55 to +85		IC=10ma VCE=5V	25-75			VCB=15V	<60				High medium speed switching computer
GT-903†	NPN	100	20	200	500	−55 to +85		IC=5ma VCE=5V	37-160			VCB=5V	6	4.8	5	3	Switching computer
GT-904†	NPN	100	20	200	500	−40 to +75		IB=1ma VCE=.2V	35-70			VCB=20V	<25				High & med. speed switching computer
GT-905†	NPN	100	20	200	500	−55 to +85		IB=1ma VCE=.2V	>30			VCB=20V	<25	> 4	5	1	High speed switching computer
GT-947†	NPN	100	15	200	500	−55 to +85		IB=1ma VCE=.2V	20-40			VCB=20V	<25				High & med. speed switching computer
GT-948†	NPN	100	20	200	500	−55 to +85		IB=1ma VCE=.2V	>40			VCB=10V	<25				High & med. speed switching computer
GT-949†	NPN	100	30	200	500	−55 to +85		IB=1ma VCE=3.5V	>30			VCB=20V	<20	> 4	5	3	High & med. speed switching computer
								IB=1ma VCE=3.5V	>30			VCB=30V	<25	>.7	5	3	High & med. speed switching computer

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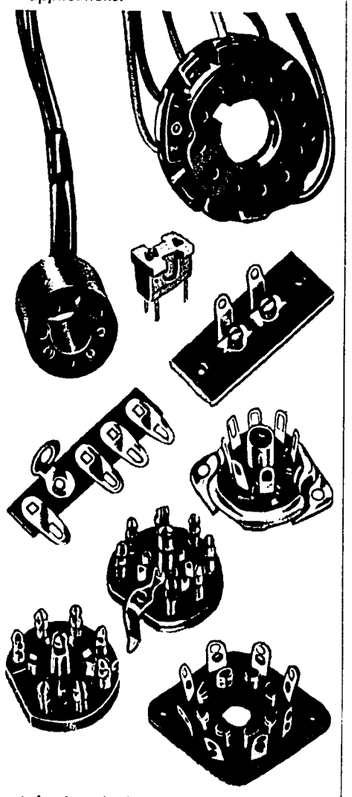

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54. Semi-Conductors.

Radio Development & Research Corp., N.J., 7, 10
Radio Receptor Co., Inc., Section PD, 240 Wythe Ave., Brooklyn 11, N.Y., 5, 7
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Shafts, flexible: See class 87

Signal generators, AM & FM: See class 80

Signal generators, TV: See class 82

Silicon crystals: See class 33

Silicon diodes: See class 54

Silicon rectifiers: See class 50

Slides, chassis: See class 28

Slip rings: See class 30

55. Sockets.

5. Capacitor, plug-in sockets
10. Crystal
15. Diode
20. Receiving tube
25. Transistor
30. Transmitting tube
35. UL approved industrial types

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Star Expansion Products Div. of Star Precision Devices, Inc., 142 Liberty St., New York 6, N.Y., Wiring Plugs
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Sylvania Electric Products Inc., Dept., F24P, 1740 Broadway, New York 19, N.Y., 10, 15, 20
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Sylvania Electric Products Inc., Dept. L24S, 1100 Main St., Buffalo 9, N.Y., 10, 15, 20
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Vector Electronic Co., 3352 San Fernando Rd., Los Angeles 65, Calif., Turrets
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Welch Connectors, Calif., 20

Winchester Electronics, Inc., Willard Rd., Norwalk, Conn., 20
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Solenoids: See class 56

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Sweep generators, TV: See class 82

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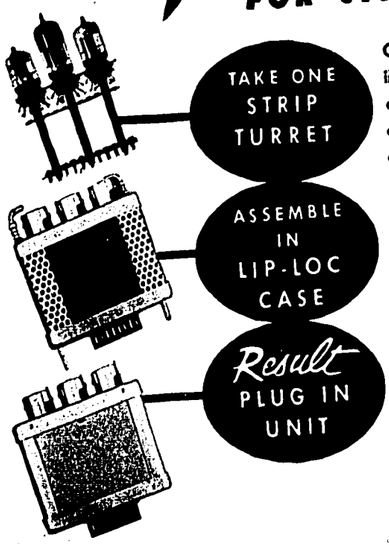
WITH *Vector* STRUCTURES FOR CIRCUITRY



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27. Limit
30. Mercury
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Andrew Corp., 363 E. 75th St., Chicago 19, Ill., 10
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Applied Science Corp. of Princeton, P.O. Box 44, Princeton, N.J., 50, Commutator Sampling Switches
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Cherry Electrical Products Corp., Ill., 15, 20, 27, 35, 45, 70

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(Silver-Cadmium Oxide)

Resistance to sticking under high current and high inductive circuit conditions. Effective arc quenching properties. Can be supplied in the form of contact rivets, welding type contacts, etc. Whether you are seeking advice on new applications, redesign, or wish your own designs executed, send us your requirements, and they will receive our most careful attention.

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Chicago Telephone Supply Corp., 1142 W. Beardsley Ave., Elkhart, Ind., 19, 45, 50, 80
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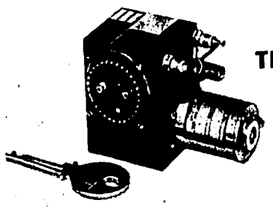
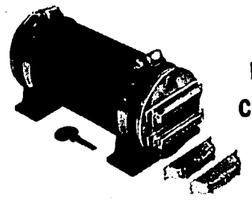
Time Division Multiplexers by ASCOP

TELEMETERING SENSOR SAMPLER



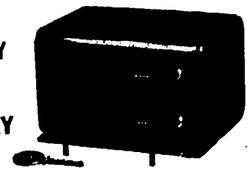
Type A: Sub-miniature 2 pole, 30 contacts per pole switch provides 60 channels in make-before-break operation. A filtered 27.5 volt DC motor rotates the switch at 2.5 RPS providing a sampling rate of 150 samples per second. Solid block construction permits satisfactory operation under random noise vibration of from 36 to 2000 cycles at 18 G's RMS, 160 G's impact for 2 milliseconds and a steady state acceleration of 100 G's.

LOW LEVEL COMMUTATOR



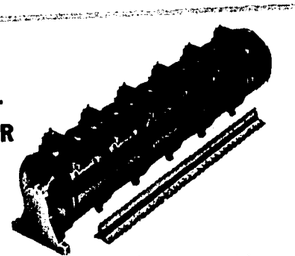
Type AS: The ASCOP Type AS multi-channel rotary sampling switch is designed specifically for airborne telemetering applications where precision high-speed sampling with the utmost reliability is necessary for accurate data. 3 poles 27 channels @ 2.5, 5 or 10 rps. 27.5 VDC governed drive. Proven reliability in 25,000 hours of life testing.

HERMETICALLY SEALED RADAR DISPLAY



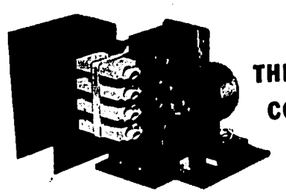
Type AN: This multichannel sampling switch is designed for use in a target designation system for fighter aircraft. The metal on metal hermetically sealed switch housing provides a dust-proof, moisture-proof, explosion proof enclosure to allow the switch to run properly at high attitudes over extreme temperature ranges.

INDUSTRIAL MULTIPLEXER



Type AU: This multipole sampling switch has been designed for the flexibility of application, ease of servicing and long life required for automation and control applications in industry. Speeds from 1 to 1800 RPM, 30 to 250 channels per pole, 1 to 20 poles. Years of service free operation.

THERMOCOUPLE COMMUTATOR



Type Y: Samples 40 independent low level sensors with a noise level below 20 microvolts. By reducing noise and leakage to a minimum, temperature variations smaller than 1°F can be detected when sampling copper-constantan thermocouples.

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Landis & Gyr, Inc., N.Y., 77
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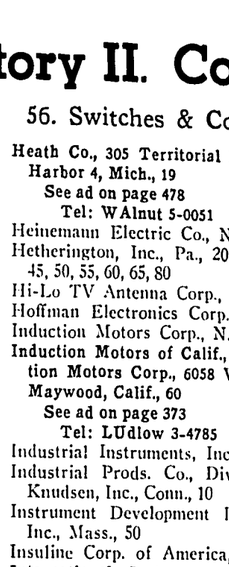
KULKA ELECTRICAL WIRING DEVICES
Designed For Performance and Economy



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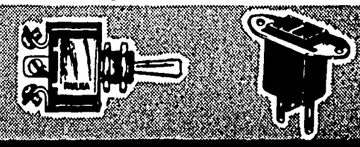

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MULTICHANNEL DEVICES FOR SCIENTIFIC MILITARY INDUSTRIAL APPLICATIONS

GDI

GENERAL DEVICES, INC.

P.O. BOX 253, PRINCETON, NEW JERSEY

TELEPHONE: MONMOUTH JUNCTION 7-4571 TWX: MONMOUTH JUNCTION N J 271 X

OFFICES IN DALLAS LOS ANGELES NEW YORK AND CANADA

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Licon®
SWITCHES & CONTROLS

- long life
- high dependability
- exacting performance

STANDARD SWITCHES

SUBMINIATURE

TYPE 16
22 Million actuations by test
1/4" 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.

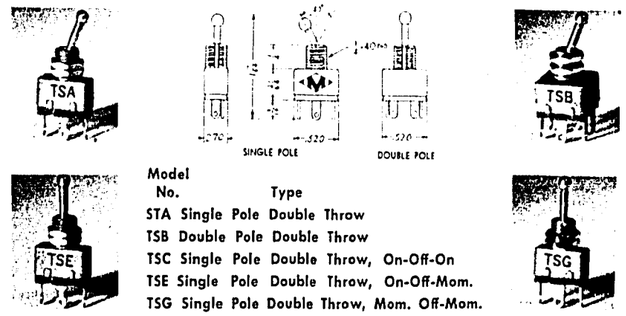
for descriptive literature, write:

Licon itw
Division of Illinois Tool Works
2501 N. Keeler Ave., Chicago 39, Illinois

For details, circle #389 on Reader Service Card.

SUBMINIATURE TOGGLE SWITCHES

FEATURING BALL TYPE TOGGLE AND GOLD FLASHED TERMINALS FOR LOW LEVEL (DRY CIRCUIT) APPLICATIONS RATED TO 1,000 VOLTS RMS USING IRRIDITED BODY CASTING



Model No.	Type
STA	Single Pole Double Throw
TSB	Double Pole Double Throw
TSC	Single Pole Double Throw, On-Off-On
TSE	Single Pole Double Throw, On-Off-Mom.
TSG	Single Pole Double Throw, Mom. Off-Mom.

OTHER CHARACTERISTICS

CONTACT RATINGS: Up to 5 Amp. (Res.) at 115 volts AC or 24 volts DC.
INSULATION RESISTANCE: Greater than 500 Megohms.
VIBRATION: 10-G 10-500 cps.
SHOCK: Specification MIL-S-901 (Type C).
ENDURANCE: 10,000 Make and Break Cycles.
TUMBLING: In accordance with Signal Corps Requirements.
CORROSION RESISTANCE: 50 hour Salt Spray per Federal Spec. QQ-M-151.
HUMIDITY: 10 Cycles per Specification JAN-S-23.
SEAL: Low Temperature Rubber Boot for Panel Sealing is available.

Miniature Switch Corporation
AN AFFILIATE OF LIECO, INC.
Telephone:
ROckville Center 6-7620
3610 Oceanside Rd., Oceanside, L.I., New York

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 major classification. Complete addresses will be found in the Alphabetical Directory.

GRAYHILL Switches • Test Clips • Molded Parts

Grayhill Miniature Tap Switches

SERIES 5000

For Commercial Applications

SERIES 12

For Military Applications

Available 1 to 6 decks—2 to 10 contacts per deck.

Shorting (make before break) or Non-shorting (break before make). Switch rotates 360° with 10 positions—stops provided with 9 or less positions.

Bushings, ¼" long—⅜"—32 thread
Diameter of switch 1-1/32"

Rated to break—1 amp., 115 V., AC., non-inductive.

To carry—5 amps., 115 V., AC.

SERIES 24

Positive Detent Action and better feel for precision requirements. Available 1 to 6 decks—2 to 10 contacts per deck.

Shorting (make before break) or Non-shorting (break before make). 360° rotation with 10 positions—stops provided for less than 10 positions.

Bushings, ¼" long—⅜"—32 thread
Diameter of switch 1-1/32"

Rated to break—1 amp., 115 V., AC., non-inductive.

To carry—5 amps., 115 V., AC.

Spring Return Rotary Switch

Similar to Series 24 except with spring return to center position. Provides momentary contact on either side of center position only. Available in 1 to 3 decks, either shorting or non-shorting type.

Grayhill Push Botton Switches

SERIES 2000—Snap Action

For Manual Operation

Audible click when actuated
Momentary contact, single pole, single throw type.
O.D.—⅞" dia. x 1-59/64" high
Bushings, 7/16" long—15/32"—32 thread.
Rated—10 amps., 115 V., AC., non-inductive.
1 amp., 115 V., DC.
Rated Life—Approx. 50,000 operations
No. 2201—Normally open
No. 2202—Normally closed

SERIES 4000—Momentary Contact

Momentary contact, single pole, single throw type.
O.D.—51/64" dia. x 1-17/32" high
Bushings, ⅜" long—15/32"—32 thread.
Rated—½ amp., 115 V., AC.—non-inductive.
Rated Life—Approx. 800,000 operations.
No. 4001—Normally open
No. 4002—Normally closed

SERIES 23

Miniature Momentary Contact

Momentary contact, single pole, single throw.
O.D. ½" dia. x 1-3/64" high
Bushings, ¼" long—5/16"—32 thread
Rated—¼ amp., 115 V., AC., non-inductive.
Rated Life—Approx. 500,000 operations.
No. 23-1—Normally open.

SERIES 30

Midget Silent Action

Sub-Miniature, non-snap, momentary contact, single pole, single throw type.
O.D. ¾" dia., 63/64" high.
Mounting Bushing ¼" x 32 thread.
Rated .10 amp., 115 V., AC., non-inductive.
Rated Life—Approx. 300,000 operations.
No. 30-1—Normally open.

Grayhill Test Clips

SERIES 16

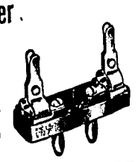
Completely insulated.
Even hinge pin is insulated.
Low contact resistance (approx. .0015 ohm)—.038" silver overlay on contact surfaces
Terminals—silver plated
Finger grips—molded phenolic

No. 2-0 Threaded Stud
No. 2-1 Banana Plug
No. 2-4 Threaded Stud with Insulating Washers
No. 2-6 Pin Plug

SERIES 2

The basic spring clip is available in several styles of mounting as illustrated. Mounted on panel of test equipment, they permit fast lead connections without manual opening and closing of jaws or clamps. Also useful in bread board work and laying out of harnesses.

Grayhill Plug-In Adapter

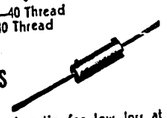


Designed for testing resistors, capacitors, and similar pig-tail type components on standard test equipment. Banana Plug spacing—¾" centers. No. 2-2 Plug-In Adapters.

Grayhill Stand-Off Insulators

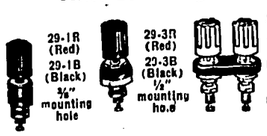
Mica-filled phenolic bodies for low loss at high frequencies, high dielectric strength, low moisture absorption and fungus resistance. Silver plated brass solder terminals. Front of panel length—15/16"
Diameter 5/16"
No. 18-1—Female, No. 4—40 Thread
No. 18-2—Male, No. 4—40 Thread

Grayhill Coil Forms



Molded of mica-filled phenolic for low loss at high frequencies, low moisture absorption, high dielectric strength and resistance to fungus growth. Tinned Copper wire leads. Patented anchor posts.
Dimensions—Length—.500" to 1.000"
Dia.—.125" to .250"
Lead wire diameter—.025" to .040"

Series 29 Binding Posts



- Metal parts—Nickel Plated
- Molded parts—Phenolic to MIL-P-14
- Washers—Non-turn "D"
- Cross-hole—Flush
- Integral solder lug
- Color—Red or Black as specified

Grayhill Diode Holder

Provides a tight snap fit within gold-plated, phosphor bronze, spring tension clips. Molded phenolic base has non-turn projection.

Clips—.635" center to center
Overall dims.—lgth.—15/16", width—⅜" height—⅜"

No. 17-1—Molded Diode Holder

Grayhill Printed Circuit Test Jacks

SERIES 31

For use on printed circuits as a test point to feed AF, RF, and Pulse signals, check and feed DC voltages, monitor signals during test, alignment, etc. For use with standard .081"-.0825" phone tip plugs. Rivets to board like an eyelet.
Dims.—¼" high, rivet dia.—.114"
No. 31-1—For 1/16" board
No. 31-2—3/32" board
No. 31-3—For ⅛" board

Plastic Sleeves

for Series 31 Test Jacks

Snap-on, plastic insulators lock in place over Grayhill Test Jacks.
Dimensions Dia.—.245" Height—.290"
No. 31B—Plastic Sleeves, available in 8 colors for coding.

Grayhill

505 Hillgrove Avenue, La Grange, Illinois
Phone: Fleetwood 4-1040

Grayhill Mating Insulating Washers

To insulate jacks with ⅜" dia. bushings from mounting panel. Back of panel washer has indexing hole fitting non-turn tab of the jack. Shoulder dimensioned for 1/16" min. panel thickness.
No. 21878-1 Indexing Washer, Natural Mica-filled Phenolic
No. 21878-2 Indexing Washer, Black Electrical Grade

Grayhill Molded Insulating Washers

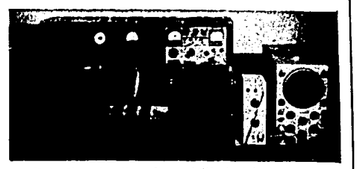
Available in sizes for No. 6 to ⅜" screw in natural mica-filled phenolic or black electrical grade insulating material.

NEY

offers all three

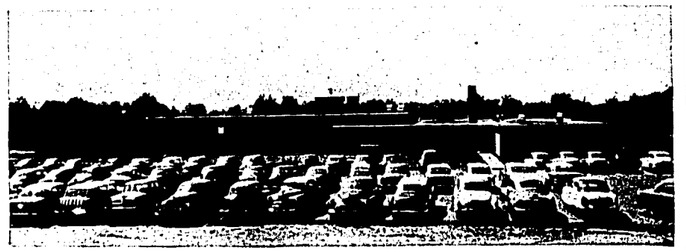
RESEARCH AND DEVELOPMENT

As a manufacturer of precious metal products for more than 144 years, THE J. M. NEY COMPANY has accumulated a vast store of information on the properties and uses of precious metals and their alloys in many fields. Ney's Research Department has facilities for subjecting experimental and standard alloys to a full range of chemical, physical, electrical, mechanical and metallographic tests as well as tests simulating actual and accelerated conditions. Ney Research Department services and facilities are freely available to Design and Production Engineers.



Potentiometer linearity and life test instrument using standard oscilloscope.

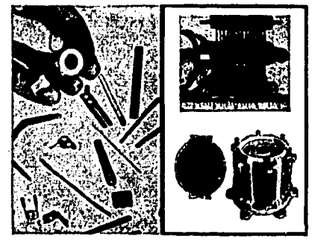
COMPLETE MANUFACTURING FACILITIES



Ney has just built this modern new plant to give you even better products and better service. Ney manufacturing facilities include wire drawing equipment, two and four high rolling mills, punch presses up to 50 tons, automatic screw machines up to 1⅞" capacity, cold-heading, wire-forming, welding and soldering equipment and a complete tool room. Efficient organization of these facilities means economical handling of large or small quantity production of the simplest part or the most intricate assemblies.

PRODUCTS TO YOUR SPECIFICATIONS

Ney has a long list of important accomplishments in the development of sliding contacts, slip rings and assemblies, commutator segments and assemblies, brush and brush holder assemblies, and precious metal resistance wire. Ney engineers are available for consultation on all problems involving the use of precious metals to improve your products.



Write for your copy of Ney Data Book, "NEY PRECIOUS METALS" *(Bulletin R-12) or call our Engineering Department outlining your needs.*

NEY'S small parts play a BIG part in precision instruments

THE J. M. NEY COMPANY

P. O. BOX NO. 990 • DEPT. N • HARTFORD 1, CONNECTICUT

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Switches & Contacts—Class 56

Directory II. Components

56. Switches & Contacts.

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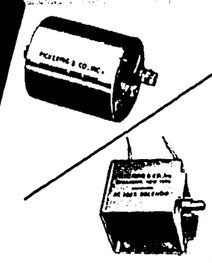
PICKERING

solenoids



for DC circuits

pickering engineering service is available for special applications where pickering standard solenoids do not apply.

PICKERING & CO., INC.

manufacturers of world-famous electro-magnetic phonograph cartridges and audio equipment.

OCEANSIDE, L. I., NEW YORK

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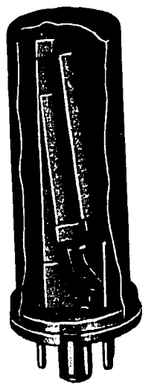
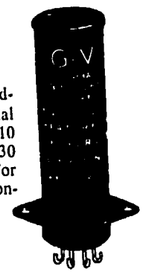


▶ Thermal Time Delay Relays

Stainless steel mechanism welded into a single integral structure for unequalled resistance to vibration and shock. Heater built inside expanding member for maximum efficiency and protection. Rolling contact action for positive operation.

NEW INDUSTRIAL RELAYS
Low cost timing relay for Industrial Controls, Heating Equipment, Communications, Air Conditioning, Electronics. Available from stock in standard heater voltages and time delays.

HERMETICALLY SEALED TYPE—Adjustable time delay • Miniature and octal sizes—metal shells • Time Delays—1/10 sec. to 5 min. • Heater voltages up to 230 • Fully temperature compensated • For industrial and military applications • Contact ratings up to 6 amp.



TYPICAL USES Delaying plate voltage application • Producing hold-over interval after interruption of power • Delaying automatic shut-down until a fault has continued for a specified period.

Notably Efficient • Widely Used

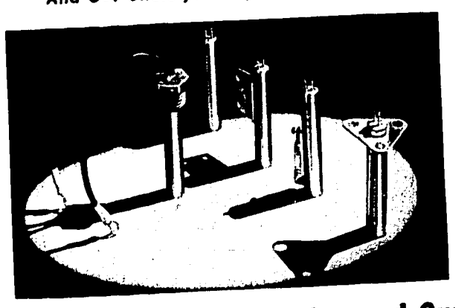
G-V® Precision Thermal Devices

A quality line skillfully designed and thoroughly field-tested.

G-V Thermal Relays Have Proved Performance Advantages—

- So reliable that the country's principal producers of electronic equipment have adopted them as production components!
- So reliable that they have been used on hundreds of government contracts!
- So reliable that they have been in successful field use for over three years!

And G-V offers you helpful engineering cooperation and the most complete technical data service.



▶ Electrical Thermostats

Features: Hermetically sealed • Adjustable or fixed temperature • Rapid in response—metal shell is the sensing element • Wide variety of sizes and mounting forms • Exposure to –70° C. does not change setting • High shock and vibration resistance • Current rating—1 amp. to 10 amp. • Stable setting and precise control.

Voltage Sensing and Current Sensing Relays—Thermal Type ▲

Features: Responds to changes in current or voltage • Currents .015 to 5 amp • Voltages 2 to 230 volts • Time constants—1 sec. to 200 sec. • Adjustable operating point • Minimum differential • Independent of ambient temperature • Independent of frequency • Hermetically sealed in metal shell • Miniature size • Small, light, and noiseless.

Typical Uses: Over- or under-voltage alarm or cut-off • Overload protection • Voltage or current regulation.

Write for bulletin and help with your particular problems.

G-V CONTROLS INC.
48 Hollywood Plaza, East Orange, New Jersey

Greatly expanded production facilities assure prompt deliveries.

For details, circle #394 on Reader Service Card.

Special and Standard

POLLAK CONTROLS

Accurate, Dependable, Long Life

Nearly a half century of experience in specialized design and production of precision components . . .

RELAYS
COAXIAL
COMMUNICATIONS
COMPUTER, POWER CIRCUIT
HIGH VOLTAGE
MINIATURE
MINIATURE HERMETICALLY SEALED
PULSE

SOLENOIDS
MINIATURE
PLUNGERS FOR PUSH OR PULL
300 CUSTOM TYPES FROM 20 STANDARD PARTS
DOUBLE ACTING

SWITCHES
IMPULSE
MOMENTARY
PUSH PULL
ROTARY SELECTOR
TOGGLE

OUR ENGINEERS CAN HELP SOLVE YOUR PROBLEMS
Take advantage of POLLAK free engineering design service. Our factory-trained engineers are available to help you solve difficult relay, switching and electrical control problems.

WE INVITE YOUR INQUIRY

JOSEPH POLLAK CORPORATION
DEPT. B
75-95 Freeport Street
Boston 22, Mass.

For details, circle #395 on Reader Service Card.

Directory II. Components

56. Switches & Contacts.

Sivers Lab., Sweden, 10, Waveguide
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Ulanet Co., George, 416 Market St., Newark 5, N.J., 75
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Wind Turbine Co., 248 E. Market St., West Chester, Pa., 10
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Tel: OWen 6-3110

TR tubes: See class 63

Tags & markers: See class 87

Tape & labels, adhesive: See class 87

Tape, magnetic recording: See class 49

Tape recorders: See class 16

Telephone relays: See class 52

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Television tuners: See class 60

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5. Bellows
10. Bimetal
15. Hermetically sealed

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FREED

MIL-T-27A POWER, FILAMENT, PULSE & AUDIO TRANSFORMERS

FOR IMMEDIATE DELIVERY FROM STOCK

POWER TRANSFORMERS-STANDARD
All primaries 105/115/125 v., 60 c.p.s.

Cat. No.	Hi Volt Sec.	ct	DC Volts	DC Amps	Filament #1 Volt	Filament #1 Amp.	Filament #2 Volt	Filament #2 Amp.	MIL Case Size
MGP1	400/200	√	185	.070	6.3/5	2	6.3	3	HA
MGP2	650	√	260	.070	6.3/5	2	6.3	4	JB
MGP3	650	√	245	.150	6.3	5	5.0	3	KB
MGP4	800	√	318	.175	5.0	3	6.3	8	LB
MGP5	900	√	345	.250	5.0	3	6.3	8	MB
MGP6	700	√	255	.250					KB
MGP7	1100	√	419	.250					LB
MGP8	1600	√	640	.250					NB

FILAMENT TRANSFORMERS-STANDARD
All primaries 105/115/125 v., 60 c.p.s.

Cat. No.	Secondary Volt	Secondary Amp	Test VRMS	MIL Case
MGF1	2.5	3.0	2,500	EB
MGF2	2.5	10.0	2,500	GB
MGF3	5.0	3.0	2,500	FB
MGF4	5.0	10.0	2,500	HB
MGF5	6.3	2.0	2,500	FB
MGF6	6.3	5.0	2,500	GB
MGF7	6.3	10.0	2,500	JB
MGF8	6.3	20.0	2,500	KB
MGF9	2.5	10.0	10,000	JB
MGF10	5.0	10.0	10,000	KB

PULSE TRANSFORMERS

Cat. No.	Blocks Osc.	Int. Coupling	Low. Pow. Out.	Pulse Voltage Kilovolts	Pulse Duration Microseconds	Duty Rate	No. of Wdgs.	Test Volt. KVRMS	Char. Imp. Ohms
MPT1	√	√		0.25 0.25 0.25	0.2-1.0	.004	3	0.7	250
MPT2	√	√		0.25 0.25	0.2-1.0	.004	2	0.7	250
MPT3	√	√		0.5 0.5 0.5	0.2-1.5	.002	3	1.0	250
MPT4	√	√		0.5 0.5	0.2-1.5	.002	2	1.0	250
MPT5	√	√		0.5 0.5 0.5	0.5-2.0	.002	3	1.0	500
MPT6	√	√		0.5 0.5	0.5-2.0	.002	2	1.0	500
MPT7	√	√	√	0.7 0.7 0.7	0.5-1.5	.002	3	1.5	200
MPT8	√	√	√	0.7 0.7	0.5-1.5	.002	2	1.5	200
MPT9	√	√	√	1.0 1.0 1.0	0.7-3.5	.002	3	2.0	200
MPT10	√	√	√	1.0 1.0	0.7-3.5	.002	2	2.0	200
MPT11	√	√	√	1.0 1.0 1.0	1.0-5.0	.002	3	2.0	500
MPT12	√	√	√	0.15 0.15 0.3 0.3	0.2-1.0	.004	4	0.7	700

AUDIO TRANSFORMERS
Freqe resp 300 to 10000 cps ± 2 DB — All Case Sizes AJ

Cat. No.	Application	Impedance Prim. Ohms	Impedance Ct.	Impedance Sec. Ohms	Impedance Ct.	DC Current Prim. & Sec. at Max. Unbal. MA.	Test VRMS	Max Level DBM
MGA1	Single or P.P. Plates to Single or P.P. Grids	10K	\	90K Split	\	10 10	15	
MGA2	Line to Voice Coil	600 Split		4, 8, 16		0 0	33	
MGA3	Line to Single or P.P. Grids	600 Split		135K	\	0 0	15	
MGA4	Line to Line	600 Split		600 Split		0 0	15	
MGA5	Single Plate to Line	7.6K 4.8T		600 Split		40 40	33	
MGA6	Single Plate to Voice Coil	7.0K 4.8T		4, 8, 16		40 40	33	
MGA7	Single or P.P. Plates to Line	15K	\	600 Split	\	10 10	33	
MGA8	P.P. Plates to Line	24K	\	600 Split	\	10 1	30	
MGA9	P.P. Plates to Line	60K	\	600 Split	\	10 1	27	

Send for further information on these units, or special designs. Also ask for complete laboratory test instrument catalog.

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1713 Weirfield Street
Brooklyn (Ridgewood) 27, New York

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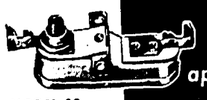
Rugged, Precision MINIATURE THERMOSTATS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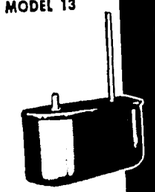
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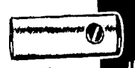
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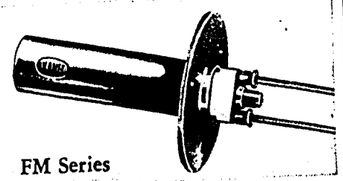

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General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., New York, 15
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Tubes, vacuum (special purpose): See class 62

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59. Transformers.

5. Audio
10. Current limiting
15. 400 cps
20. Geophysical
25. Hermetically sealed
27. High voltage
30. Horizontal output & flyback
35. Intermediate frequency
40. Isolation
43. Microwave
45. Power
50. Precision matched
55. Pulse
60. Radio Frequency
65. Saturable
70. TV deflection
75. TV impedance matching
80. Toroidal
85. Ultrasonic
90. Variable
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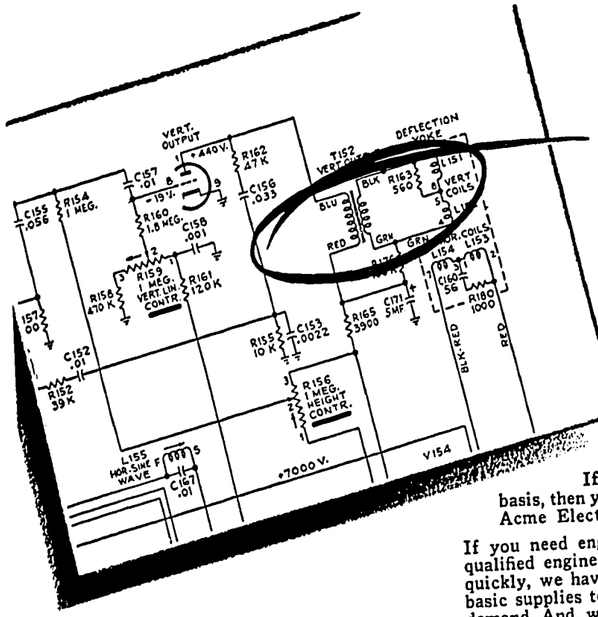

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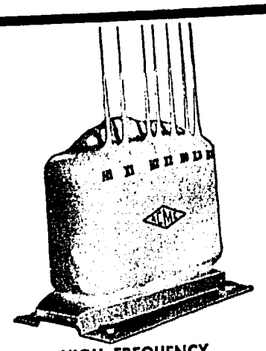
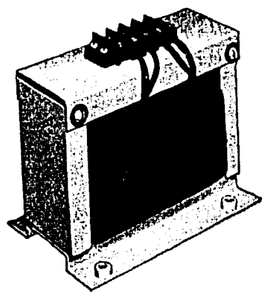


HIGH FREQUENCY AVIATION TRANSFORMER



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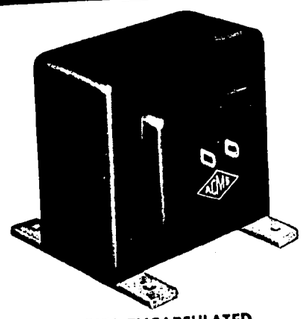
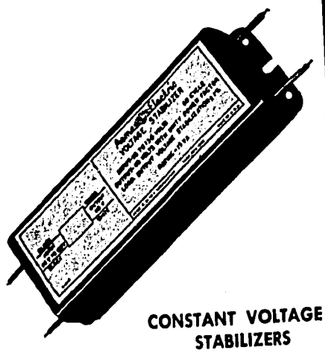


EPOXY ENCAPSULATED TRANSFORMERS



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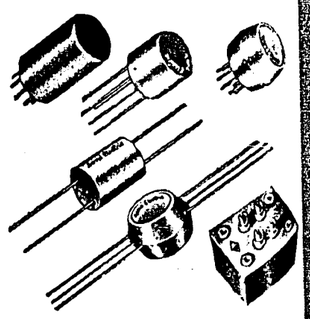

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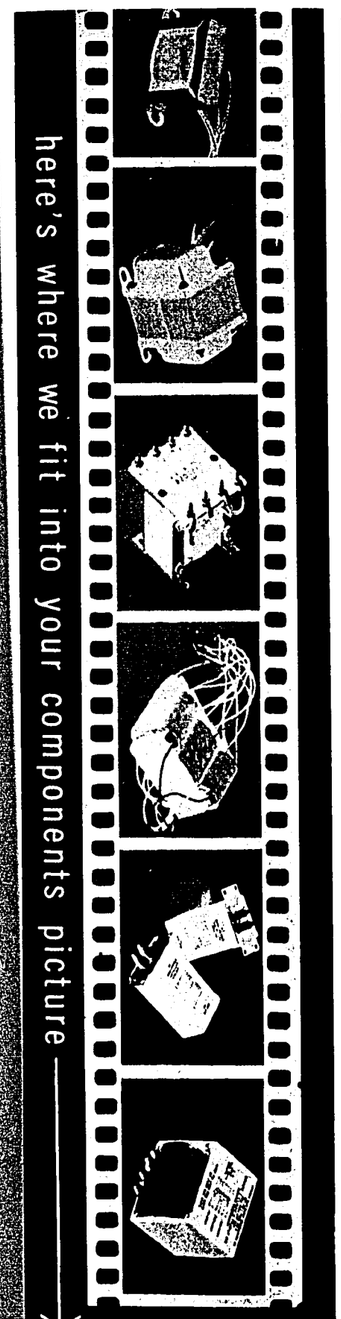

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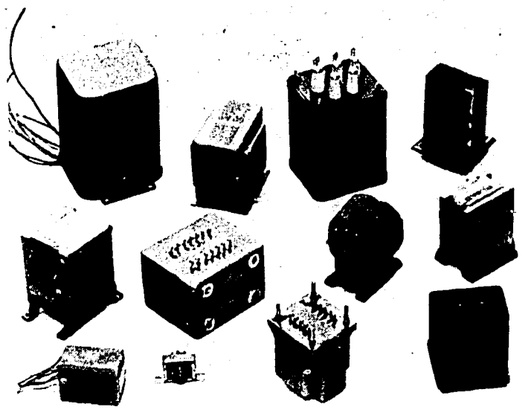

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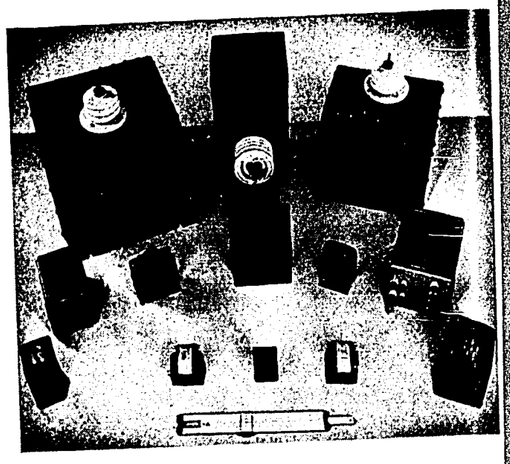

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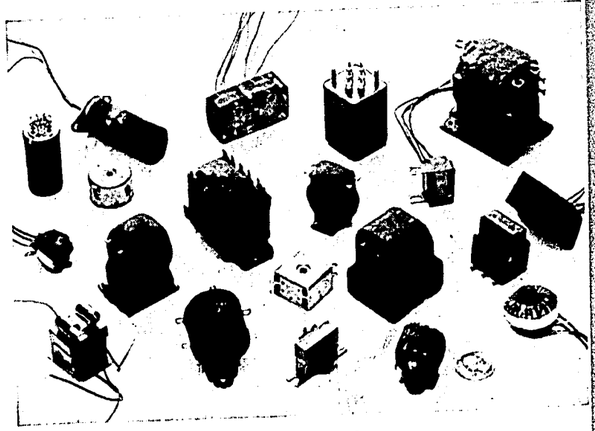

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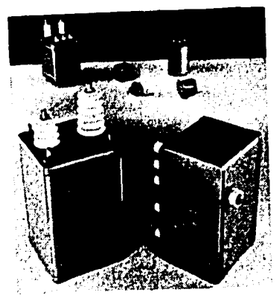
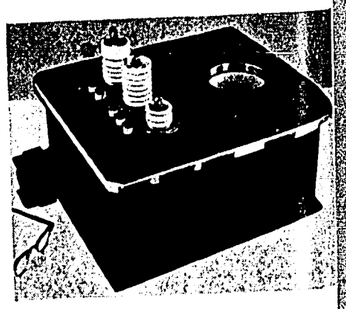
1. Engineers, experienced in communications circuitry and transformer design, who know how to *design* for special problems of weight, size, temperature, high voltage, etc.
2. A streamlined plant, equipped to *produce* your specialty in the quantity you want.
3. Strict standards of quality control, with complete facilities to *test* the product in our plant, including facilities for qualification tests in accordance with MIL-T-27A.



PULSE



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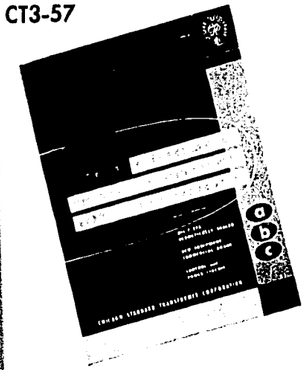
CT3-57



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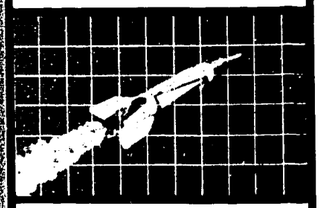

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For details, circle #402 on Reader Service Card.

Directory II. Components

59. Transformers.

Communication Equipment & Engineering Co., Ill., 40
Communication Parts, Ill., 60, 80
Connecticut Telephone & Electric Co., Conn., 80
Consolidated Radio Products Co., Ill., 5, 55
Crest Transformer Corp., Ill., 5, 10, 15, 25, 27, 40, 45, 60, 65, 95
Crosley Div., Avco Mfg. Corp., Ohio, 5, 15, 25, 30, 35, 80
Cycle Transformer Corp., N.J., 5, 15, 20, 25, 27, 40, 45, 55, 65, 85
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Daystrom, Inc., N.J., 15, 50, 55, 65, 80
Defiance Engineering & Microwave Corp., P.O. Box 488, Beverly, Mass., 43
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Tel: WAlker 2-8100
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Dormeyer Industries, Ill., 5, 10, 15, 40, 45
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Electran Mfg. Co., 1901 Clybourn Ave., Chicago 14, Ill., 5, 10, 15, 25, 27, 40, 45
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Tel: BIttersweet 8-4596
Electrical Windings, Inc., Ill., 5, 15, 25, 30, 35, 40, 45, 50, 75
Electro Engineering Works, 401 Preda St., San Leandro, Calif., 5, 10, 15, 25, 27, 40, 45, 50, 55, 65, 85, 95
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Electronic Products, N.Y., 5, 15, 20, 25, 27, 40, 45, 85
Electronic Tube Corp., Pa., 55
Elliott Brothers (London) Ltd., England, 65

ELECTRAN Transformers

Transformers, Saturable Reactors, Chokes, Special Windings and Electronic Devices. Milliwatts to 50 KVA, single or polyphase in all frequencies.

Complete design and engineering service. All modern techniques, encapsulation, casting, military and commercial construction.

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Write for Bulletin 53A

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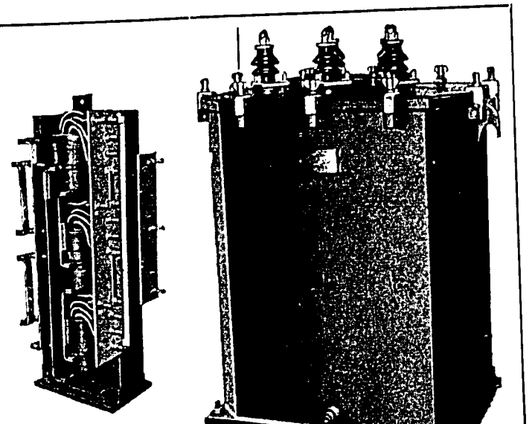
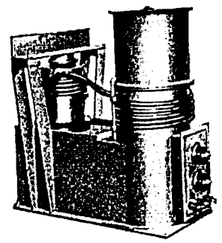
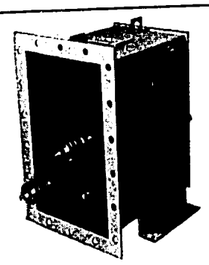


Low Voltage Rectifier Plate Transformer

Modulation Transformer

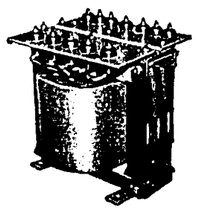


Pulse Transformer



Charging Reactor

Filament Transformer



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TRANSFORMERS AND INDUCTORS for ELECTRONICS

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Moloney engineers are pioneers in the use of grain-oriented, high permeability, silicon steel for transformer cores. This engineering background and experience enables the Moloney Electric Company to produce highest quality transformers that offer the maximum in reliability, endurance and efficiency with a minimum of size and weight.

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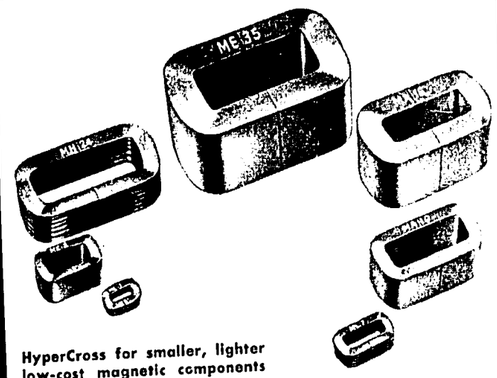

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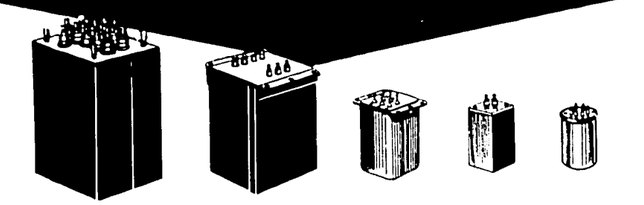

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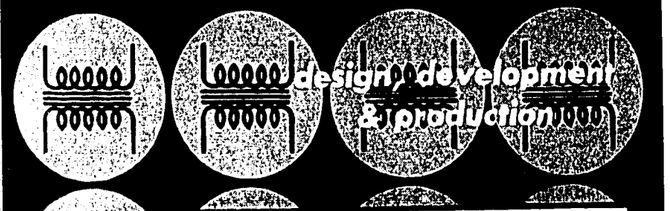

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Lyndhurst, New Jersey
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Directory II. Components

59. Transformers.

El-Rad Mfg. Co., Ill., 30, 35, 55, 60, 70, 85
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Tel: DIckens 5-7531
Era Electric Corp., 314 Valley Brook Ave., Lyndhurst, N.J., 5, 10, 15, 25, 27, 40, 45, 65, 80, 90, 95
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Essex Electronics, N.J., 35, 55, 60
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Fairfield Engineering Corp., Conn., 15, 45, 65
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Gates Electronic Co., 2090 Barnes Ave., New York 62, N.Y., 15, 25, 27, 45, 90
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General Coil Products Corp., N.Y., 35, 60, 75, 85, 90
General Coil & Transformer Co., N.J., 5, 10, 15, 25, 35, 40, 45, 50, 65, 90, 95

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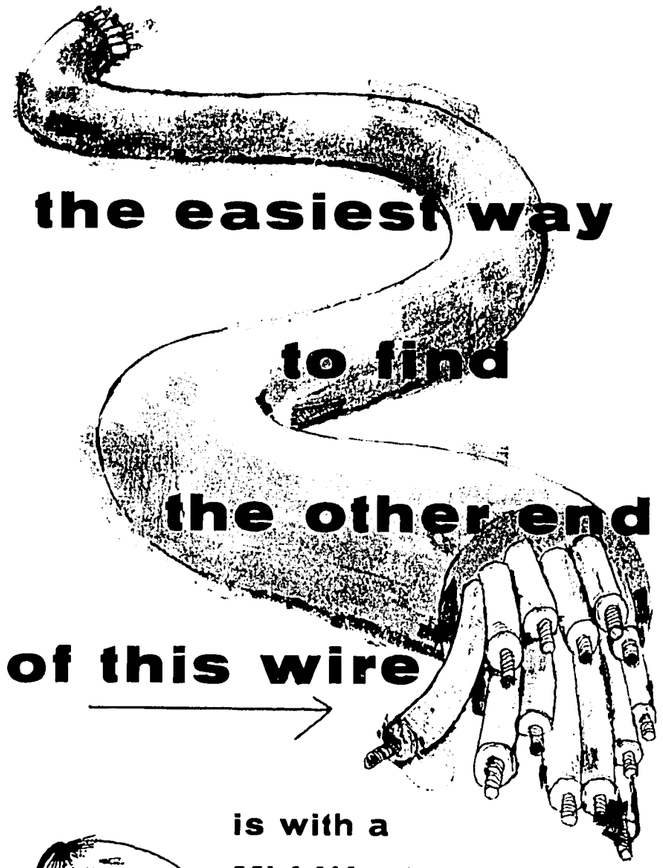

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unit

The circuitry of this transistorized unit simplifies circuit checking on aircraft, computer, missile or similar complicated electrical installations by permitting normal conversation through headsets in areas of high noise level, at a distance, or on opposite sides of walls or partitions. At the same time the unit provides an oscillator circuit for transmitting a simultaneous audible checking signal.

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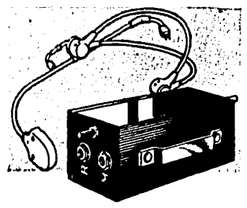

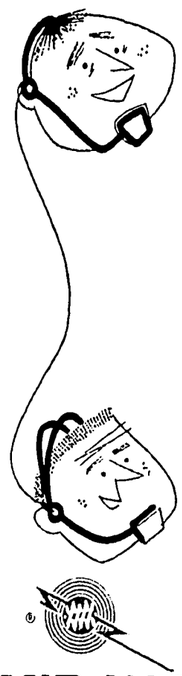

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59. Transformers.

General Controls Co., Calif., 10
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General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 25
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General Instrument Corp., Automatic Mfg. Div., 829 Newark Ave., Elizabeth, N.J., 35, 60
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General Magnetics, Inc., 135 Bloomfield Ave., Bloomfield, N.J., 65
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Tel: PIlgrim 8-2400
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 5, 15, 20, 80, 85, 90
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Tel: TRowbridge 6-4400
General Transformer Co., Ill., 5, 10, 15, 20, 25, 35, 40, 45, 70, 75, 90, 95
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Hindle Transformer Co., Inc., N.J., 15, 25, 27, 40, 45, 65
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I-T-E Circuit Breaker Co., Pa., 27, 45
Inductor Engineering, Inc., Del., 5, 15, 25, 27, 40, 45, 55, 80, 85

Directory II. Components

59. Transformers.

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International Resistance Co., Pa., 50
Ironbound Operating Co., N.J., 5, 10, 15, 20, 25, 30, 40, 45, 50, 55, 60, 70, 75, 90
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K-V Transformer Corp., Conn., 5, 10, 15, 20, 25, 27, 40, 45, 55, 65, 85
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Langevin Mfg. Corp., N.Y., 5, 15, 20, 25, 35, 40, 45, 55, 60, 65, 80, 95
Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville 6, N.J., 15, 25, 27, 45, 55
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Tel: MAtawan 1-2600
Leonard Electric Products Co., Inc., N.Y., 5, 25, 30, 35, 60, 70, 75, 80
Lepace Mfg., N.Y., 5, 15, 25, 40, 45, 50
Lieco, Inc., 3610 Oceanside Rd., Oceanside, N.Y., 43
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Lindberg Engineering Co., Ill., Filament
Litton Industries, 336 N. Foothill Rd., Beverly Hills, Calif., 5, 15, 20, 25, 27, 40, 45, 50, 55
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MaCarr, Inc., N.Y., 45, 65
Magnatran, Inc., N.J., 5, 10, 15, 27, 45
Magnavox Co., Ind., 5, 15, 25, 45, 55, 80
Magnetic Amplifiers, Inc., 632 Tinton Ave., New York 55, N.Y., 15, 25, 65, 80, 95
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Tel: CYpress 2-6610
Magnetic Development Co., N.Y., 80
Magnetic Research Corp., 3160 W. El Segundo Blvd., Hawthorne, Calif., 55, 65, 95
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Muter Co., Ill., 5, 35, 60
NJE Corp., N.J., 15, 25, 27, 45, 55, 65, 95

For details, circle #408 on Reader Service Card.

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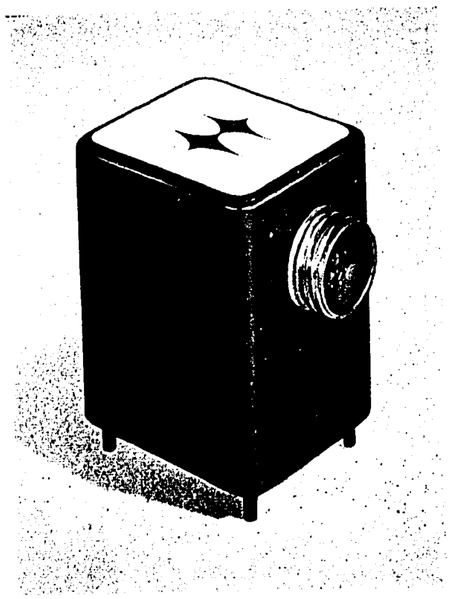
transistorized

DC to DC Transformers



The Ramo-Wooldridge Corporation is in volume production on fully transistorized dc to dc transformers which cover a wide range of power requirements and which exhibit significant advantages over former electro-mechanical power conversion methods.

Suitable for use in high-performance aircraft, missile systems and other applications in severe environmental conditions, the units are potted in epoxy resin and sealed. They are designed to operate in a temperature range of −55°C to 70°C and to withstand extremes of shock and vibration.

Ramo-Wooldridge dc to dc transformers provide power conversion at high efficiency—from 80% to 90%—with low noise generation. Units in production are designed for inputs ranging from 6 to 50 volts and regulated or unregulated outputs of up to several hundred watts.

DC to dc transformers for special applications to meet more rigid performance or environmental specifications, or to operate in higher power ranges, are available through the Ramo-Wooldridge Special Design Service.

For additional information, please forward a description of your requirements to: Director, Electronic Instrumentation Division, The Ramo-Wooldridge Corporation, Box 8405, Denver 10, Colorado

The Ramo-Wooldridge Corporation

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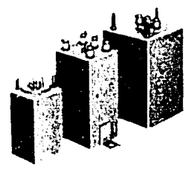
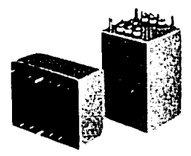
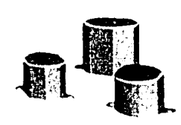
TRANSFORMERS FILTERS·SERVO AND MAGNETIC AMPLIFIERS

Made to Military and Commercial Specifications for 60, 400, 1000 cycles and other frequencies. Cased and potted or cast in resin.







Power and Audio Transformers; Magnetic Amplifiers; Modulators; High Pass, Low Pass, Band Pass and Band Rejection Filters.

Consult us for Special Designs, Applications and Subminiaturization. Prototypes given immediate attention.

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KUTZTOWN, PA.

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Phone ORange 6-7719
Great Neck Plaza, N. Y.
Phone HUnter 2-5212

ABERCORN AERO, LTD.
464 St. John St., Montreal, P.Q.
Phone AVenue 8-9246

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59. Transformers.

Narda Corp., 160 Herricks Rd., Mineola, L.I., N.Y., 43
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Tel: PIoneer 6-4650

National Aircraft Corp., Calif., 5, 15, 25, 27, 40, 45, 55, 65, 80, 95

National Co., Mass., 35, 60

National Electronics Corp., Calif., 5, 25, 27, 45 50, 55, 65

Network Mfg. Corp., N.J., 27

New England Transformer Co., Mass., 5, 10, 20, 25, 27, 35, 40, 45, 55, 60, 70, 75, 80, 85, 90, 95

New York Coil Co., Inc., Pa., 5, 25, 27, 45, 65

New York Transformer Co., Inc., N.J., 5, 10, 15, 20, 25, 27, 40, 45, 50, 55, 80

North Hills Electric Co., Inc., 402 Sagamore Ave., Mineola, L.I., N.Y., Video
See ads on pages 319, 451
Tel: PIoneer 7-0555

Northern Electric Co., Ltd., Canada, 5, 25, 43, 45, 55, 80

Nothelfer Winding Labs., Inc., N.J., 10, 15, 40, 65, 80, 95

Ogden Coil & Transformer Co., Ill., 5, 25, 27, 40, 45

Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 90
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Tel: ORchard 5-2600

Optimized Devices, Inc., N.Y., 85

Ortho Filter Corp., 196 Albion Ave., Paterson 2, N.J., 5, 10, 15, 25, 27 ,40, 45, 50, 55, 65, 80
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Tel: MUlberry 4-5858

Osborne Electronic Sales Corp., Ore., 5, 10, 15, 25, 30, 35, 40, 43, 45, 50, 55, 65, 80, 85, 90, 95

Osborne Transformer Corp., Mich., 15, 27, 40, 65, 80, 85

Oxford Electric Corp., Ill., 5, 15, 45

PCA Electronics, Inc., Calif., 55, 80, 85

Packard-Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 55
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Palo Alto Engineering Co., Calif., 5, 10, 15, 25, 40, 45, 55

Partridge Transformers, Ltd., England, 5, 15, 25, 27, 40, 45, 50, 55

Pearson Electronics, Calif., 55

Penn-East Engineering Corp., P.O. Box 240, Kutztown, Pa., 15, 25, 45
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Tel: OVerbrook 3-7308

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Perkin Engineering Corp., Calif., 45, 65, 95

Peschel Electronics, Inc., 13 Garden St., New Rochelle, N.Y., 27
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Tel: NEw Rochelle 6-3342

Polyphase Instrument Co., Pa., 5, 15, 25, 35, 40, 50, 55, 65, 80

Poughkeepsie Coil Co., Inc., 24 Charlotte St., Binghamton, N.Y., 80
See ad on page 318
Tel: 9-0523

Power Industries, Ill., Custom Made

Precise Measurements Co., Millbrook Lane, R.D. #1, Flemington, N.J., 27
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Tel: FLemington 900

Pulse Engineering, Inc., Calif., 5, 15, 25, 27, 50, 55, 65, 80

Qutronic Transformer Corp., N.Y., 5, 10, 15, 20, 25, 40, 45, 50, 65, 80

R.K. Manufacturing, Ill., 5, 10, 15, 20, 25, 45, 50, 55, 65

Radio Components Ltd., Canada, 15, 30, 35, 55, 60, 65, 70, 75, 80

Radio Corp. of America, N.J., 30, 70

RCA Victor Co., Ltd., Canada, 5, 30, 35, 45, 60, 65, 70, 75

Radio Engineering Products, Ltd., 1080 University St., Montreal, Quebec, Canada, 5, 25, 50, 80
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Tel: UNiversity 6-6887

Radio Industries, Inc., Ill., 35, 55, 65

Raeco, Ind., 5, 10, 15, 25, 27, 40, 45, 50, 55, 65, 80, 90, 95

Ramo-Wooldridge Corp., 5730 Arbor Vitae St., Los Angeles 45, Calif., DC to DC
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Tel: OR 8-0311

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Ranson Research, Calif., 55

Raypar, Inc., Ill., 5, 27, 30, 35, 40, 45, 60, 70

Raytheon Mfg. Co., Equip. Sales Operations, Mass., 5, 15, 25, 27, 35, 40, 43, 45, 50, 55, 60, 65, 80, 85, 95

Richmond Engineering Co., Conn., 5, 15, 25, 40, 45, 55

Rogers Majestic Electronic Tubes and Components, Canada, 55, 60, 65, 85

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SNC Manufacturing Co., Inc., Wis., 5, 15, 25, 27, 40, 45

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Saratoga Industries, N.Y., 5, 10, 15, 25, 27, 40, 45, 55, 65, 80, 85, 90, 95

Savage Transformers, Ltd., England, 5, 10, 15, 20, 25, 27, 40, 45, 50, 65, 85

Servomechanisms, Inc., Calif., 5, 20, 25, 40, 45, 50, 65, 80, 85, 90, 95

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Sivers, Lab, Sweden, 43

Sola Electric Co., 4633 W. 16th St., Chicago 50, Ill., 95
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Tel: BIshop 2-1414

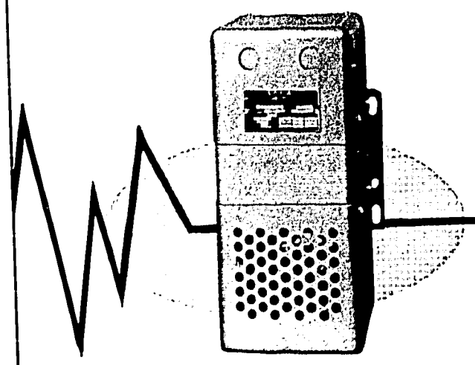
Sorensen & Co., Inc., Conn., 95

Southwestern Industrial Electronics Co., 2831 Post Oak Rd., P.O. Box 13058, Houston, Texas., 20, 25, 27, 45, 50, 80
Multiple pages of additional data on 22-23
Tel: MOhawk 7-6611

Specialties, Inc., N.Y., 5, 15, 25, 45, 55

SOLA AC and DC VOLTAGE REGULATION...

Automatic, instantaneous, maintenance-free



Sola Constant Voltage Transformers and Regulated DC Power Supplies provide dependable regulated output voltage which is unaffected by changes in input voltage. Sola transformers are static-magnetic regulators with completely automatic, continuous regulation. Response time is usually 1.5 cycles or less. There are no moving or renewable parts to require maintenance. Sola Regulated DC Power Supplies are built around these transformers, in combination with germanium rectifiers and high capacitance filter sections.

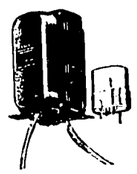
Sola Constant Voltage Transformers

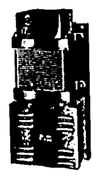
HARMONIC-NEUTRALIZED TRANSFORMER *designed for use with equipment requiring a stabilized source of undistorted voltage. Available in capacities from 60va to 2000va. These units provide ±1% regulated output with less than 3% harmonic distortion.*

ADJUSTABLE, HARMONIC-NEUTRALIZED TRANSFORMER *for selecting any voltage from 0-130, stabilized within ±1%, with total harmonic distortion less than 3%. One outlet variable from 0-130v and one outlet fixed at 115v. Portable for use in shop and laboratory.*

PLATE AND FILAMENT TRANSFORMER *delivers filament and plate voltages regulated within ±3% or less, with line voltage variations from 100-130v. Filament windings of 5v and 6.3v. Units are available from stock in three different ratings to cover most power supply requirements.*

FILAMENT TRANSFORMER *provides a compact source of 6.3v supply regulated within ±1% to extend filament life and improve tube efficiency. Available in ratings from 2.4a to 25a for operation of extensive banks of electron tubes. (Write for Circular 11-CVF-269 for further information.)*





CUSTOM-DESIGNED *units can be manufactured in quantity orders, from 1 va to 25,000va to suit your individual specifications. Custom designs can include special voltage ratios, special frequencies, compensation for frequency variation, multiple output voltage, three-phase service and military specifications.*

Write for Circular 11-CV-170E for further information on Sola Constant Voltage Transformers

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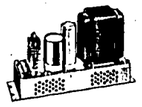
Sola Constant Voltage DC Power Supplies

For intermittent... variable... pulse... or high current loads

Sola DC supplies combine Sola CV Transformers, germanium power rectifiers and high-capacitance filters. They are compact, low-weight units for handling loads in the "ampere" range; and for intermittent and pulse loads. They offer many important advantages in DC power supply:

- Ripple voltage of approximately 1% (rms) or less.
- Output regulation of ±1% or less with ±10% line voltage variations.
- Minimum output voltage change with wide, rapid load changes.
- Ability to withstand high, short-time overloads without damage to components.
- Exceedingly low output impedance.

FIXED DESIGNS *available in six stock models with ratings ranging from 24v @ 6a to 250v @ 1 a. Compact size, low weight, and moderate price in proportion to power output and performance.*



VARIABLE DESIGNS *offer adjustable, regulated source of DC test voltages for design development. Accessory handles provide portability and self-stacking. Six models ranging from 5v @ 7a to 400v @ 0.6a.*

Write for Bulletin 11-CV-235 for further information on Sola DC Power Supplies

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Directory II. Components

59. Transformers.

Spencer-Kennedy Laboratories, Inc., 1320 Soldiers Field Rd., Boston 35, Mass., 75
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Sprague Electric Co., Mass., 55 & Switching
Standard Electrical Products Co., Ohio, 5, 15, 20, 25, 27, 45, 50, 65, 80, 90, 95
Standard Electronics Div. Radio Eng. Lab., Inc., N.Y., 5, 10, 15, 25, 27, 40, 45, 50, 55, 60, 65, 80, 85, 90, 95
Sterling Transformer Corp., N.Y., 5, 15, 25, 40, 45, 85
Stromberg-Carlson, Div. Gen. Dynamics Corp., N.Y., 5
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Superior Electric Co., 8000 Bradley Ave., Bristol, Conn., 15, 90, 95
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Tel: LUdlow 2-9561
Sylvania Electric Products Inc., Dept. F24P, 1740 Broadway ,New York 19, N.Y., 43, 50, 55, 60, 85
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Tel: JUdson 6-2424
Symphony Electronics Corp., Calif., 5
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Tel: LIncoln 1-3600
Telectro Industries Corp., N.Y., 5, 25
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Tensor Electric Development Co., Inc., N.Y., 5, 10, 15, 20, 25, 27, 35, 40, 45, 50, 55, 65, 80, 85
Thermador Elec. Mfg. Co., Calif., 5, 10, 15, 20, 25, 45, 50, 55, 60, 65, 80, 85, 90, 95
Timely Instruments & Controls Corp., Calif., 25, 65, 80, 95
Torocoil Co., Ohio, 80
Torwico Electronics, Inc., 1090 Morris Ave., Union, N.J., 5, 15, 35, 40, 45, 50
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Tel: ELizabeth 4-5650
Transformers, Inc., 200 Stage Rd., Vestal, N.Y., 5, 15, 20, 25, 27, 40, 45, 50, 55, 65, 80, 85
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Tel: 8-3311
Transformer Technicians, Inc., Ill., 5, 10, 15, 20, 25, 40, 45, 55, 65, 95
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Tresco, Inc., 3834-28 Terrace St., Philadelphia 28, Pa., 5, 15, 25, 27, 40, 45, 55, 65
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Tel: TExas 0-5381
U.S. Electronics Corp., N.J., 5, 25, 35, 40, 45
United Transformer Corp., 150 Varick St., New York 13, N.Y., 5, 10, 15, 20, 25, 27, 40, 45, 50, 55, 65, 80, 85, 90, 95
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Tel: ALgonquin 5-3500
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Vibration Research Labs., Inc., 97 Lake Ave., Tuckahoe, N.Y., 15, 25, 27, 45, 65, 80
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60. Tuners.

5. AM tuners
10. FM tuners
15. Klystron
20. Microwave
25. TV tuners
30. UHF & VHF

A.R.F. Products, Inc., Ill., 10, 20
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Aircom, Inc., 354 Main St., Winthrop 52, Mass., 20
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Bogen Co., Inc., David, N.J., 5, 10
Browning Laboratories, Inc., Mass., 5, 10
Budd-Stanley Co., Inc., Dept. IRE, 43-01 22nd St., Long Island City 1, N.Y., 20
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Tel: STillwell 6-1706
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D X Radio Products Co., Ill., 25, 30
Daystrom, Inc., N.J., 5, 10
De Mornay-Bonardi, 780 S. Arroyo Pkwy., Pasadena, Calif., 20
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Tel: RYan 1-7416
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Douglas Microwave Co., Inc., 252 E. 3rd St., Mt. Vernon, N.Y., 20
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Dunn Engineering Associates, Inc., 186 Massachusetts Ave., Cambridge, Mass., 20
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General Electronic Laboratories, Inc., 18 Ames St., Cambridge 42, Mass., 25, 30
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For further information on any of the products advertised in this issue, circle the appropriate number on the Reader's Service Card at the back of the book.

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Heath Co., 305 Territorial Rd., Benton Harbor 4, Mich., 5, 10
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Hemisphere Electronics Corp., N.Y., 20
Hewlett-Packard Co., 4277 D Page Mill Rd., Palo Alto, Calif., 20
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J-V-M Engineering Co., 4632 S. Lawndale Ave., Lyons, Ill., 15, 20, 30
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Omega Laboratories, Inc., Mass., 20
Packard-Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 20
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Pilot Radio Corp., N.Y., 10
Polytechnic Research & Development Co., Inc., 202 Tillary St., Brooklyn 1, N.Y., 20
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Premier Instrument Corp., 52 W. Houston St., New York City 12, N.Y., 20
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Radar Design Corp., 210 Fifth Ave., New York 10, N.Y., 20
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Saratoga Industries, N.Y., 5, 10
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Sivers Lab., Sweden, 20
Sperry Gyroscope Co. of Canada, Ltd., Canada, 15, 20
Standard Coil Products, Ltd., Canada, 25, 30
Stromberg-Carlson, Div. Gen. Dynamics Corp., N.Y., 5, 10
Tarzian, Inc., Sarkes, Rectifier Div., Dept. P-4, 415 N. College Ave., Bloomington, Ind., 25, 30
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Tuning forks: See class 75

Turntables: See class 18

Vacuum tube parts: See class 97

Vacuum tube rectifiers: See class 51

Vacuum tube voltmeters: See class 72

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61. Vacuum Tubes, Receiving.

5. Cathode-ray & TV picture
10. Miniature
15. Standard types, glass & metal
20. Sub-miniature

Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., 10, 15, 20
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Bendix Aviation Corp., Red Bank Div., Eatontown, N.J., 10, 15, 20
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C B S-Hytron, Div. Columbia Broadcasting System, Inc., Mass., 5, 10, 15, 20
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Chatham Electronics, Div. of Tung-Sol Electric, Inc., 630 W. Mt. Pleasant Ave., Livingston, N.J., 10, 15, 20
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Chromatic Television Laboratories, Inc., N.Y., 5
Du Mont Labs., Inc., Allen B., N.J., 5
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Raytheon Mfg. Co., Receiving & C-R Tube Op., Mass., 5, 10, 15, 20
Rogers Majestic Electronic Tubes and Components, Canada, 5, 10, 15, 20
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Stromberg-Carlson Company, Calif., 5
Stromberg-Carlson Company, N.Y., 5
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Tung-Sol Electric, Inc., 95-8th Ave., Newark 4, N.J., 5, 10, 15, 20
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Vacuum Tube Products Co., Calif., 5
Varian Associates, 611 Hansen Way, Palo Alto 2, Calif., Klystron
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Tel: DAvenport 5-5631
Waterman Products Co., Inc., 2445 Emerald St., Philadelphia 25, Pa., 5
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Tel: GArfield 6-8600
Westinghouse Electronic Tube Div., N.Y., 5, 10, 15, 20

62. Vacuum Tubes, Special Purpose.

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10. Geiger-Mueller
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Aerolux Lights Corp., 655 Eleventh Ave., New York 36, N.Y., 10, 25, 30
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Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., 5, 10, 25, 30, 35
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Amperite Co., Inc., 561 Broadway, New York 12, N.Y., 30
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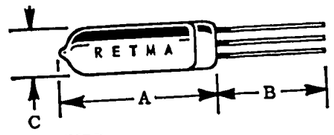
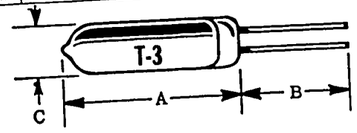


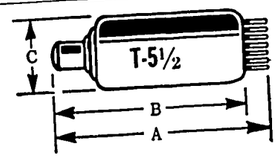
R.E.T.M.A. TYPE

TYPE	NOM.	TOLERANCE	NOM TEST PT.	CURRENT IN μa MIN.	MAX.	PEAK	REGULATION	DIMENSIONS A	B	C
5950	700 V	± 15 V	25 μa	5	100	150	14 V per 100 μa	1.825 Max.	1⅛ Min.	.400
5641	900 V	± 18 V	25 μa	5	100	150	18 V per 100 μa	1.825 Max.	1⅛ Min.	.400
6143	1200 V	± 24 V	25 μa	10	100	150	24 V per 100 μa	1.825 Max.	1⅛ Min.	.400
6119	2000 V	±100 V	25 μa	15	100	150	40 V per 100 μa	1.825 Max.	1⅛ Min.	.400



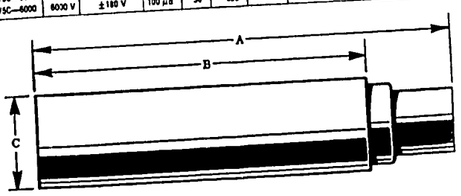
T-3 SIZE

TYPE	NOM.	TOLERANCE	NOM TEST PT.	CURRENT IN μa MIN.	MAX.	PEAK	REGULATION	DIMENSIONS A	B	C
GV3B— 400	400 V	±10 V	50 μa	5	150	300	10 V per 150 μa	1.880 Max.	1¼ Min.	.400
GV3B— 500	500 V	±10 V	50 μa	5	100	150	12 V per 100 μa	1.880 Max.	1⅛ Min.	.400
GV3B— 600	600 V	±10 V	50 μa	5	100	150	13 V per 100 μa	1.880 Max.	1⅛ Min.	.400
GV3B— 700	700 V	±15 V	50 μa	5	100	150	13 V per 100 μa	1.880 Max.	1⅛ Min.	.400
GV3B— 800	800 V	±15 V	50 μa	5	100	150	15 V per 100 μa	1.880 Max.	1⅛ Min.	.400
GV3A— 900	900 V	±15 V	50 μa	10	250	350	25 V per 250 μa	1.880 Max.	1⅛ Min.	.400
GV3A—1000	1000 V	±20 V	50 μa	10	250	350	30 V per 250 μa	1.880 Max.	1⅛ Min.	.400
GV3A—1200	1200 V	±30 V	50 μa	10	250	400	40 V per 250 μa	1.880 Max.	1⅛ Min.	.400
GV3A—1500	1500 V	±30 V	50 μa	15	300	500	50 V per 300 μa	1.880 Max.	1⅛ Min.	.400
GV3A—1800	1800 V	±40 V	50 μa	15	300	500	65 V per 300 μa	1.880 Max.	1⅛ Min.	.400
GV3A—2000	2000 V	±50 V	50 μa	15	300	500	75 V per 300 μa	1.880 Max.	1⅛ Min.	.400



T-5½ SIZE

TYPE	NOM.	TOLERANCE	NOM TEST PT.	CURRENT IN μa MIN.	MAX.	PEAK	REGULATION	DIMENSIONS A	B	C
GV5B— 700	700 V	± 20 V	100 μa	10	250	350	25 V per 250 μa	2.70 Max.	2.47 Min.	.750
GV5B— 900	900 V	± 25 V	100 μa	10	300	500	30 V per 300 μa	2.70 Max.	2.47 Min.	.750
GV5B—1000	1000 V	± 30 V	100 μa	10	300	500	35 V per 300 μa	2.70 Max.	2.47 Min.	.750
GV5A—1200	1200 V	± 38 V	100 μa	10	400	600	40 V per 400 μa	2.70 Max.	2.47 Min.	.750
GV5A—1500	1500 V	± 50 V	100 μa	15	600	800	50 V per 800 μa	2.70 Max.	2.47 Min.	.750
GV5A—2200	2200 V	± 65 V	100 μa	20	800	1000	40 V per 1000 μa	2.70 Max.	2.47 Min.	.750
GV5A—2500	2500 V	± 75 V	100 μa	25	1000	1200	50 V per 1000 μa	2.70 Max.	2.47 Min.	.750
GV5A—3000	3000 V	± 90 V	100 μa	30	1000	1250	80 V per 750 μa	2.70 Max.	2.47 Min.	.750
GV5C—4020	4000 V	±120 V	100 μa	30	750	1000	100 V per 600 μa	2.70 Max.	2.47 Min.	.750
GV5C—5010	5000 V	±150 V	100 μa	30	600	1200	150 V per 500 μa	2.70 Max.	2.47 Min.	.750
GV5C—6000	6000 V	±180 V	100 μa	30	500	1200				



METAL

TYPE	VOLTAGE RANGE	TOLERANCE	NOM. TEST POINT	CURRENT MAX.	MIN.	REGULATION 100-1000 μa	DIMENSIONS A	B	C
M105B	6 KV-10 KV	±500 V	500 μa	1000 μa	50 μa	7½%	8½	5	1¼
M105	10 KV-20 KV	±500 V	500 μa	1000 μa	100 μa	10%	8½	5	1¼
M108	10 KV-20 KV	±500 V	500 μa	1000 μa	100 μa	7%	9½	6	1¼
M125	20 KV-25 KV	±500 V	500 μa	1000 μa	100 μa	10%	7½	6	1¼
M128	20 KV-27 KV	±500 V	500 μa	1000 μa	100 μa	7%	9½	8	1¼

Glass-Sealed Deposited Carbon Resistors

TYPE	RESISTANCE	TOLERANCE %	VOLTAGE COEF. %/V	TEMP. COEF. %/°C	MAX. W.V.	WATTAGE	MAX. TEMP. °C	DIMENSIONS A (MAX)	B (MAX)	C (MIN)	LEAD DIAM
RX1	10⁵ to 10¹¹ ohms	2,5,10 Note 1 & 7	-0.03 Note 4	±0.15	1000	Note 5	100	1⅛	.20	1	.020 ±.002
RX2	1 Meg to 50 Meg.	1,2,5,10,20 Note 2	-.0002	-0.05	3000	1	200	2	.413	1½	.022 ±.005
RX3	1 Meg to 200 Meg.	1,2,5,10,20 Note 3	-.0002	-0.05	10,000	3	200	3¼	.413	1½	.022 ±.005
RX4	200 ohm to 1 Meg.	1,2,5	-.0002	-0.05	600	5	300	2	.413	1½	.022 ±.005
RX5	200 ohm to 200 Meg.	1,2,5 Note 6	-.0002	-0.05	2000	10	300	3¼	.413	1½	.022 ±.005
RX6	100 ohm to 500 K.	1,2,5	-.0002	-0.05	150	.3	200	½	.156	1½	.016 ±.002
RX7	100 ohm to 1 Meg.	1,2,5	-.0002	-0.05	500	.5	200	1⅛	.187	1½	.016 ±.002
RX8	100 ohm to 10 Meg.	1,2,5	-.0002	-0.05	750	2	200	1⅛	.240	1¼	.020 ±.002

NOTE 1: 2% tolerance available only below 10^{11} ohms.
2: 1%, and 2% tolerance available only below 20 meg.
3: 1%, 2%, and 5% tolerance available only below 100 meg.
4: below 10^{11} ohms.
5: RX1 wattage is reciprocal of resistance in megohms
6: 1%, 2%, and 5% available only below 1 meg.
7: 5% available only below 5×10^{11} ohms.

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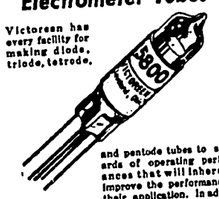

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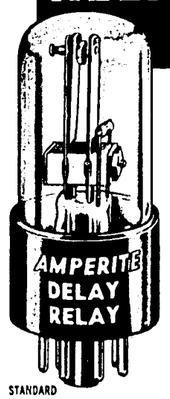

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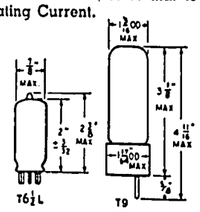

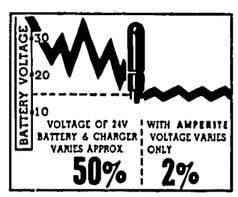

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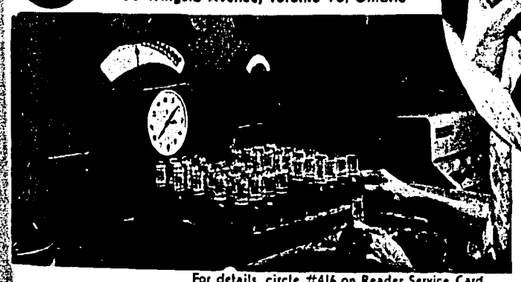

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Nuclear Consultants, Inc., N.Y., 10
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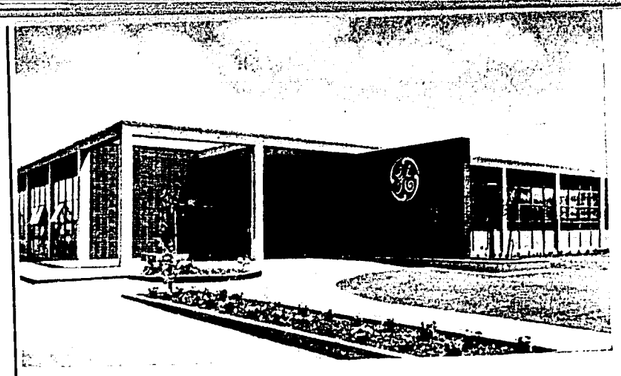

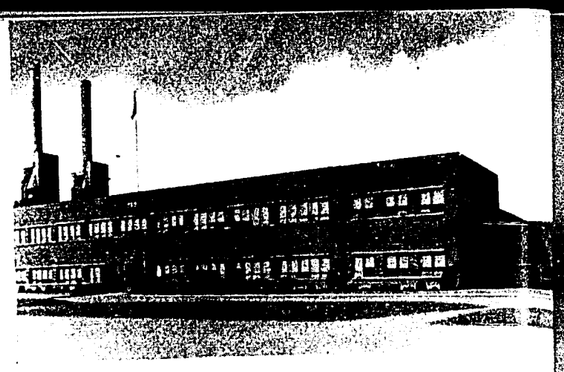

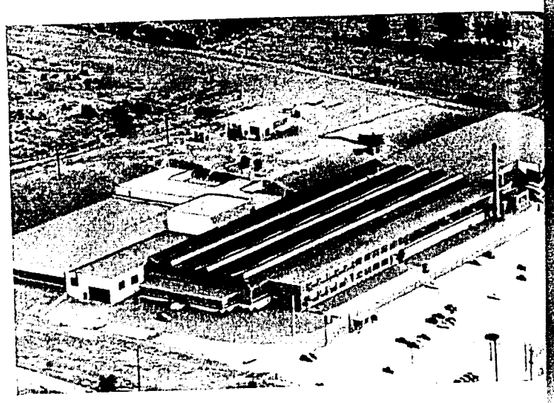

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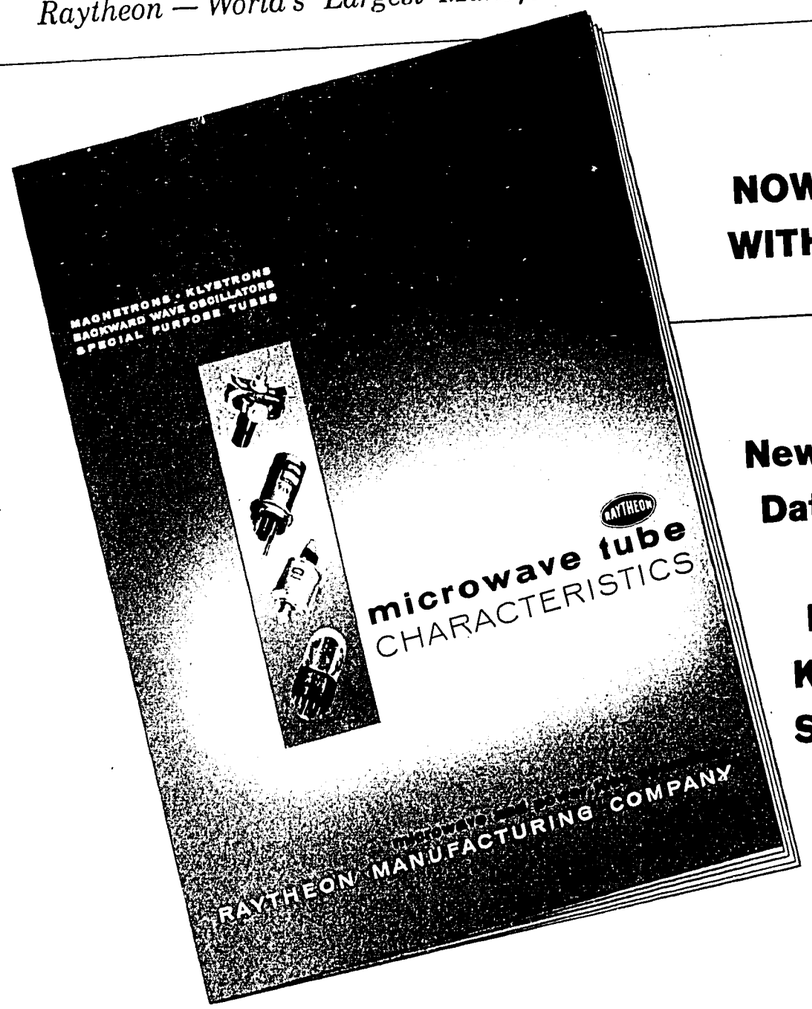

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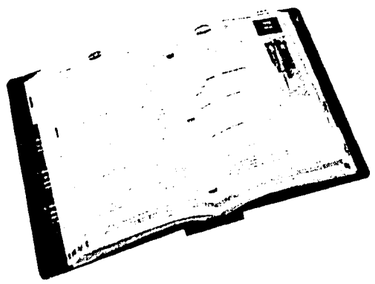

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64. Vibration Controls.

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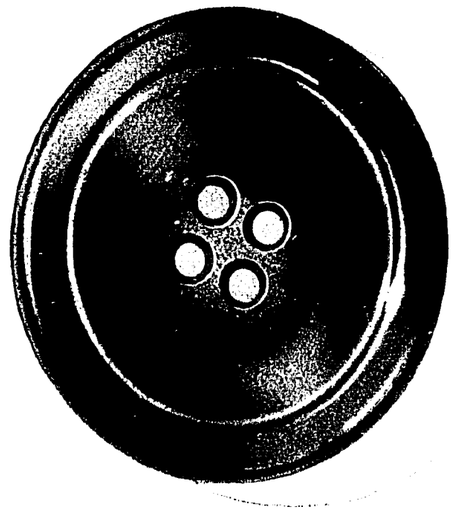

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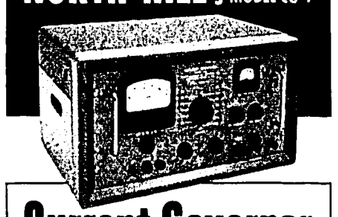
NORTH HILL'S MODEL CG-1



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75. Terminations
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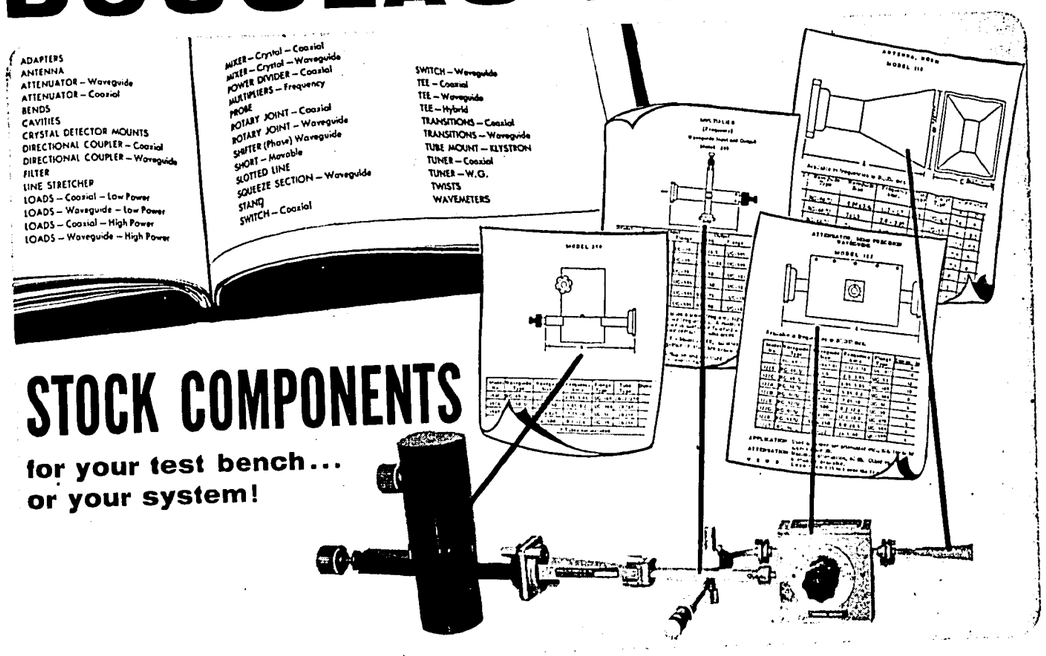

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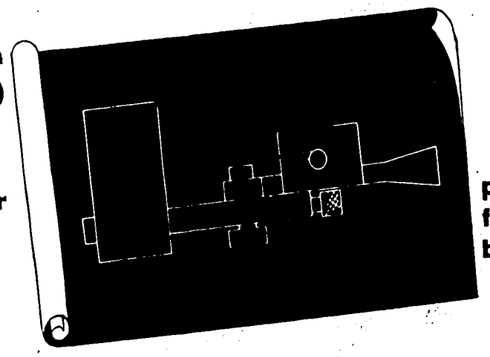

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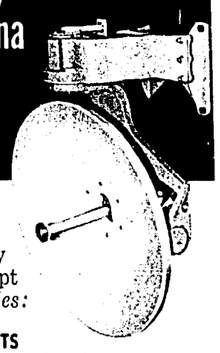

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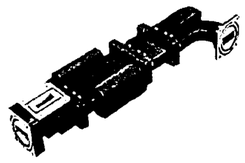

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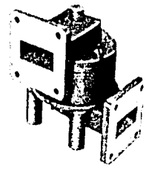

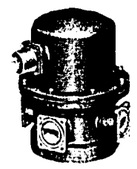

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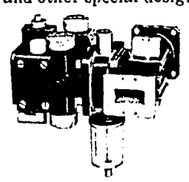

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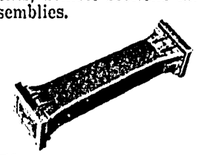

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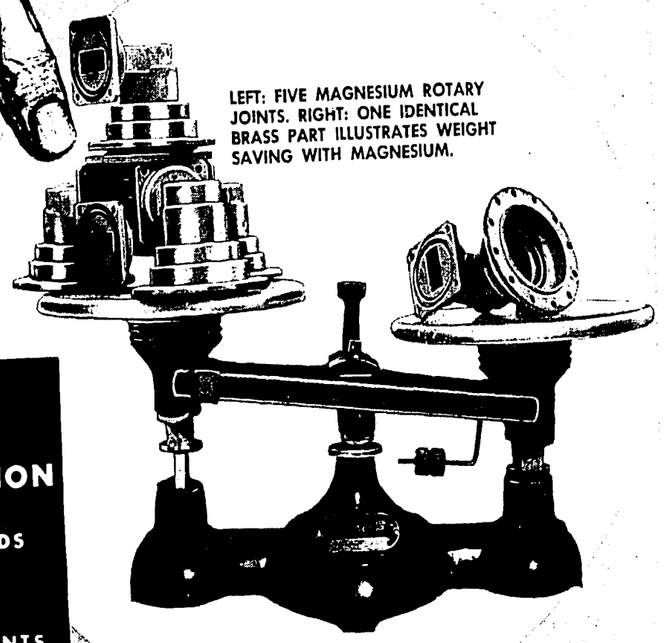
Tel: TExas 0-6401
Electron Laboratories, N.Y., 3, 5, 30, 60
Electronic Specialty Co., 5121 San Fernando Rd., Los Angeles 39, Calif., 5, 20, 25, 35, 40, 55, 70
See ad on page 185
Tel: CHapman 5-3771
Elliott Brothers (London) Ltd., England, 15, 20, 40, 60, 75
Emerson & Cuming, Inc., Mass., 75
F-R Machine Works, Inc., 26-12 Borough Pl., Woodside 77, N.Y., 3, 5, 10, 15, 20, 25, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80
Multiple pages of additional data on 55-58
Tel: AStoria 8-2800

how to save weight with magnesium··

MERIDIAN 'Pointed the Way' FIRST!

THRU DEVELOPMENT OF NEW TECHNIQUES



LEFT: FIVE MAGNESIUM ROTARY JOINTS. RIGHT: ONE IDENTICAL BRASS PART ILLUSTRATES WEIGHT SAVING WITH MAGNESIUM.

MAGNESIUM COMPONENTS IN CURRENT PRODUCTION

- MIXERS
- ANTENNA FEEDS
- ROTATING JOINTS
- BENDS AND TWISTS
- RIDGE GUIDE COMPONENTS
- TRANSITIONS
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***CUSTOM BUILDERS AND DESIGNERS OF:**

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DUPLEXERS • MULTIPLIERS
ROTARY JOINTS • BENDS
TWISTS • OTHER COMPLEX COMPONENTS & ASSEMBLIES

Application-engineered microwave parts and complex assemblies are our specialized field. We'll manufacture components to your prints ...or we will design and integrate them into your application.

You can depend on J-V-M for close coordination, guaranteed electrical performance and "know how" that is attested by innumerable assemblies ranging from dc. to 40,000 mc. now in industrial and military use.

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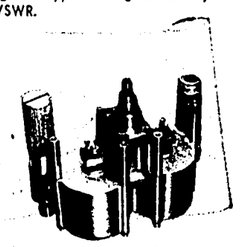
1. Variable vane directional coupler . . . sliding vane type . . . high directivity—low VSWR.



2. Pre-selector-mixer...S band...50 ohm input impedance . . . high Q double-tuned ganged cavities...detector output . . . frequency stable from −55° to +85°C.

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Get full information on J-V-M standard or custom-engineered microwave parts and components, also complex mechanical assemblies. Request catalog today.

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4632 LAWNDALE AVENUE, LYONS, ILLINOIS
(Chicago Suburb)

For details, circle #426 on Reader Service Card.

Directory II. Components

66. Waveguides & Accessories.

Federal Manufacturing & Eng. Corp., N.Y., 55
Fiber Glass Industries, Inc., N.Y., 35, 55
Filmohm Corp., N.Y., 75
Frequency Standards, Inc., N.J., 3
Gabriel Electronics Div., The Gabriel Co., 135 Crescent Rd., Needham Heights 94, Mass., 35, 60
See ad on page 260
Tel: NEedham 3-0005
Gar Precision Parts, Inc., Conn., 3, 5, 20, 25, 35, 40, 55, 60, 65
General Bronze Corp., N.Y., 3, 5, 20, 25, 35, 40, 55, 60, 65, 70, 75
General Communication Co., 681 Beacon St., Boston 15, Mass., 3, 70
See ad on page 495
Tel: COpley 7-6030
General Electric Co., Broadcast & Mil. Elect. Prods. Dept., N.Y., 3, 5, 55
General Electric Co., Heavy Military Electronic Equip. Dept., N.Y., 3, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80
General Electric Co., Power Tube Dept., Bldg. 267, Schenectady 5, N.Y., 3, 25
See ad on page 446
Tel: FRanklin 4-2211
General Electronic Laboratories, Inc., 16 Ames St., Cambridge 42, Mass., 3, 5, 10, 15, 20, 25, 35, 60
See ad on page 193
Tel: UNiversity 4-8500
Gombos Co., John, N.J., 3, 5, 10, 15, 20, 25, 35, 40, 60, 75, 80
Gorham Mfg. Co., Bronze Div., R.I., 3, 5, 20, 25, 35, 40, 55, 60, 70, 75, 80
Gramatan Instrument Co., N.Y., 3, 5, 10, 15, 20, 25, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80
Graphite Metallizing Corp., N.Y., 5, 60
Gray Manufacturing Co., Conn., 15
Hansen Electronics Co., Calif., 75
Hemisphere Electronics Corp., N.Y., 5, 15, 30, 35
Hewlett-Packard Co., 4277 D Page Mill Rd., Palo Alto, Calif., 5, 10, 15, 20, 35, 40, 50, 70, 75
Multiple pages of additional data on 3-14
Tel: DAvenport 5-4451
I-T-E Circuit Breaker Co., Pa., 5, 20, 25, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80
International Projector Corp., N.J., 5, 55
International Telemeter Corp., Dept. K, 2000 Stoner Ave., Los Angeles 25, Calif., 80
See ad on page 526
Tel: GRanite 8-7751
Interstate Electronics, Inc., N.Y., 5, 55
J-V-M Engineering Co., 4632 S. Lawndale Ave., Lyons, Ill., 3, 5, 10, 15, 20, 25, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80
See ad on page 455
Tel: LYons 3-7990
Jones Electronics Co., Inc., M.C., Conn., 20

LIECO MICROWAVE
DESIGNERS AND MANUFACTURERS

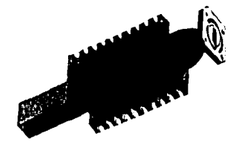
WAVEGUIDE SECTOR SCAN ROTARY JOINTS

Model No.	Freq. Band kmc/s	Model No.	Freq. Band kmc/s
27EI	2.60- 3.95	27JI	8.20-12.4
27FI	3.95- 5.85	27KI	12.4 -18.0
27GI	5.85- 8.20	27LI	18.0 -26.5
27HI	7.05-10.0	27MI	16.5 -40.0

Rotation ±90%
Frequency 40% band
VSWR 1.15 Max.

NEW HIGH POWER WAVEGUIDE DUMMY LOADS for MILLIMETER FREQUENCY BANDS

Model No.	Freq. Band kmc/s	Avg. Power watts	Length in.
19LI	18.0-26.5	125	5
19MI	26.5-40.0	50	4
19NI	33.0-50.0	40	3½
19PI	50.0-75.0	30	3
19QI	60.0-90.0	25	2½



LIECO has recently opened a magnesium department and is producing magnesium waveguide assemblies.

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Additional Items
Upon Request
Lynbrook 9-6920
ROckville Centre 6-7620

LIECO INC.
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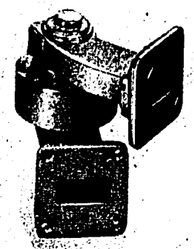
For details, circle #427 on Reader Service Card.



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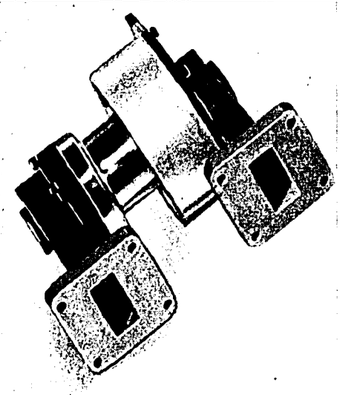
These are just a few of the hundreds of rotating joints that have established NRK as the No. 1 source for such assemblies. Whatever your need for radar or microwave components, you will find at NRK complete facilities and matchless experience for designing and manufacture.



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Chicago 41, Illinois

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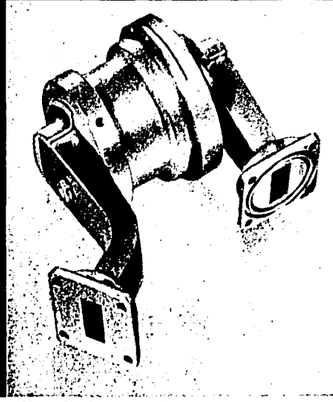

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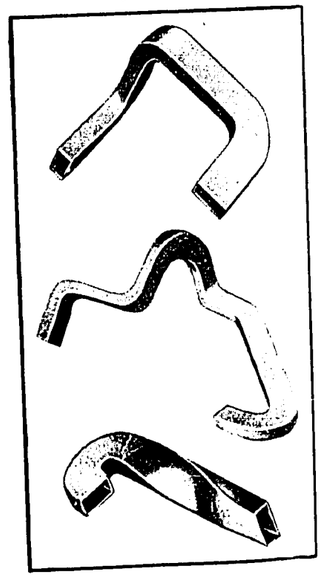
has long been recognized as the outstanding source for formed waveguides in the country. If you have requirements for bent and formed waveguide sections — waveguides with as many as seven or eight different bends in one continuous section of tubing—in different planes and with sharp radii; if your assemblies call for waveguide tubing to be twisted, offset, tapered, expanded or call for a transition from rectangular to round; then we wish to bring to your attention our exceptional ability as specialists in bending and forming waveguide tubing in all sizes.

Specialists in Forming Waveguide Tubes



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Directory II. Components

66. Waveguides & Accessories.

Kearfott Co., Inc., 1378 Main Ave., Clifton, N.J., 3, 5, 10, 15, 20, 25, 40, 55, 60, 70
See ad on page 36
Tel: GRegory 2-1000

Kearfott Co., Western Division, 253 North Vinedo Ave., Pasadena, Calif., 3, 5, 10, 15, 20, 25, 35, 40, 50, 55, 60, 65, 70, 75, 80
See ad on page 37
Tel: STanley 7-1178

Kennedy & Co., D. S., 155 King St., Cohasset, Mass., 25, 35, 50, 55, 60, 75, 80
See ad on page 262
Tel: COhasset 4-1200

Kent Corp., F. C., 64 Howard St., Irvington, N.J., 55
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Tel: ESsex 3-5500

Kerr Laboratories, Ltd., England, 3

Kings Electronics Co., Inc., 40 Marbledale Rd., Tuckahoe 7, N.Y., 5, 20, 25, 30, 35, 40, 55, 60
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Tel: SWiftwater 3-5000

Kinney Co., Inc., Joseph, Pa., 55

Lambda-Pacific Engr., Inc., Calif., 55, 80

Land-C-Air Sales Co., N.Y., 3, 5, 20, 25, 30, 55, 60

Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville 6, N.J., 25, 55
See ads on pages 478, 496, 500
Tel: MAtawan 1-2600

Leach & Garner Co., Mass., 55

Lieco, Inc., 3610 Oceanside Rd., Oceanside, N.Y., 3, 5, 10, 15, 20, 25, 30, 35, 40, 55, 60, 65, 70, 75, 80
See ad on page 455
Tel: ROckville Centre 6-7620

Litton Industries, 336 N. Foothill Rd., Beverly Hills, Calif., 60
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Tel: CRestview 4-7411

Litton Industries, Components Div., Calif., 60

Loral Electronics Corp., N.Y., 3

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Mendelsohn Speedgun Co., Inc., Fourth Ave., Haskell, N.J., 3, 50, 55
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Tel: TErhune 5-3224

Meridian, Inc., Conn., 5, 30, 40, 55, 60, 65, 70

Meridian Metalcraft, Inc., 8739 S. Millergrove Dr., Whittier, Calif., 5, 10, 15, 25, 40, 55, 60, 65, 70, 75, 80
See ad on page 454
Tel: OX 2-3761, RA 3-1508

Microlab, 71 Okner Pkwy., Livingston, N.J., 15, 45, 75
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Tel: LIvingston 6-5577

Microtech, Inc., Conn., 5, 15, 20, 25, 35, 40, 55, 65, 75, 80

Microwave Associates, Inc., Mass., 3, 5, 10, 15, 20, 35, 40, 45, 50, 60, 65, 70, 75

Microwave Development Labs., Inc., Mass., 3, 5, 10, 15, 20, 25, 40, 45, 55, 60, 65, 70, 75, 80

Microwave Eng. Labs., Calif., 10, 70

Microwave Radiation, Calif., 15, 20, 25, 35

Motorola, Inc., Ill., 3

Mytron, Inc., Mass., 55

N.R.K. Mfg. & Engineering Co., 4601 W. Addison St., Chicago 41, Ill., 5, 10, 20, 25, 35, 40, 55, 60, 70, 75, 80
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Tel: SPring 7-2970

Narda Corp., 160 Herricks Rd., Mineola, L.I., N.Y., 3, 5, 10, 15, 20, 25, 35, 40, 45, 50, 55, 65, 75, 80
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Tel: PIoneer 6-4650

Northeast Electronics Corp., N.H., 10

Northern Electric, Canada, 3, 5, 55, 60, 80

Omega Labs., Mass., 5, 40, 55, 65, 70, 80

Polymer Corp. of Penna., 2140 Fairmont Ave., Reading, Pa., 75.
See ad on page 594
Tel: FRanklin 6-7241

Polytechnic Research & Development Co., Inc., 202 Tillary St., Brooklyn 1, N.Y., 3, 10, 15, 20, 40, 50, 75
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Tel: ULster 2-6800

Portchester Instrument Corp., 114 Wilki..s Ave., Port Chester, N.Y., 3, 5, 10, 15, 20, 25, 35, 40, 50, 55, 60, 65, 70, 75, 80
See ad on this page
Tel: WEstmore 9-4092

Premier Instrument Corp., 52 W. Houston St., New York 12, N.Y., 3, 5, 10, 15, 20, 25, 35, 40, 60, 70, 75, 80
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Tel: GRamercy 5-3520

Prodelin, Inc., N.J., 35, 55, 80

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Radar Design Corp., 210 Fifth Ave., New York 10, N.Y., 5, 10, 15, 20, 25, 35, 40, 50, 75
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Tel: MUrray Hill 5-1422

Raytheon Mfg. Co., Special Microwave Devices, Mass., ferrite isolators

Reeves Instrument Corp., N.Y., 60

Sage Laboratories, Inc., Mass., 3, 15, 20, 25, 35, 40, 50, 60, 65, 70, 75

Saratoga Industries, N.Y., 3, 20, 55

Schutter Corp., Carl W., N.Y., 5, 10, 15, 20, 35, 40, 55, 60, 75

Sierra Electronics Corp., 3885 Bohannon Dr., Menlo Park, Calif., 10, 20
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Tel: DAvenport 6-2060

Sims Castings Corp., N.Y., Precision Castings

Sivers Lab., Sweden, 3, 5, 15, 20, 35, 40, 50, 55, 60, 65, 70, 75

Specialists in
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for
Microwave Link Systems

Complete Facilities for ECONOMICAL *Manufacturing*

- Machine Shop
- Tool Department
- Brazing
- Aluminum Dip Brazing
- Plating
- Paint Finishing
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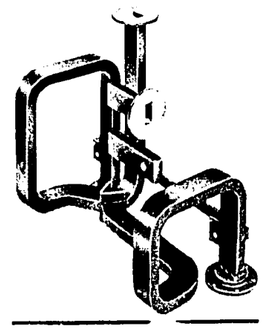

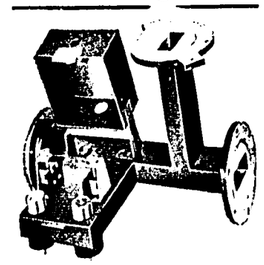

PORTCHESTER
INSTRUMENT Corp.

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Complete facilities for ENGINEERING MICROWAVE TEST & PRODUCTION of

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- Microstrip Components
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- Bends
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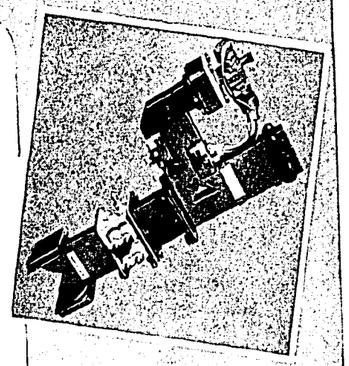

Waveguide components from your drawings and specifications — or developed to meet your needs.

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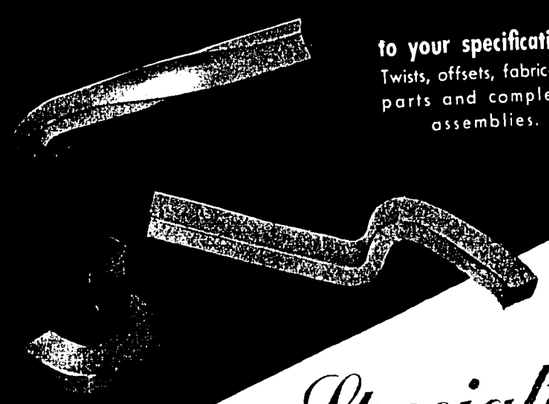
to your specifications
Twists, offsets, fabricated parts and completed assemblies.



Specialty
AUTOMATIC MACHINE
CORPORATION

100 GERRISH AVENUE
CHELSEA 50, MASS.
Telephone CHelsea 3-6160

For details, circle #432 on Reader Service Card.

66. Waveguides & Accessories.

Specialty Automatic Machine Corp., 100 Gerrish Ave., Chelsea 50, Mass., 55
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Tel: CHelsea 3-6160

Sperry Gyroscope Co. of Canada, Ltd., Canada, 3, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, Isolators

Standard Electronics Div. Radio Eng. Lab., Inc., N.Y., 3, 25

Standard Metals Corp., Mass., 55

Standard Microwave & Instrument Corp., N.Y., 5, 40, 55, 65, 70, 80

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Surface Conduction, Inc., N.Y., 80

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Telectro Industries Corp., N.Y., 35, 70

Telerad Mfg. Corp., 5, 10, 15, 20, 25, 30, 35

Terpening Co., L. H., N.Y., 65, 80

Texas Instruments Incorporated, 6000 Lemmon Ave., Dallas 9, Tex., 25, 30, 40, 55
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Tel: FLeetwood 2-1781

Thompson Products, Inc., Electronics Div., Ohio, 70

Trad Electronics Corp., 1001 First Ave., Asbury Park, N.J., Crystal Detector Mount
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Tel: PRospect 6-7445

Transitron, Inc., Div. Van Norman, Ind. Inc., 186 Granite St., Manchester, N.H., 3, 75
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Tel: NAtional 5-9701

U.S. Engineering Co., Calif., 5, 30, 60

Univox Corp., 102 Warren St., New York 7, N.Y., 80
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Tel: WOrth 2-5630

Uniwave, Inc., N.Y., 3, 5, 10, 15, 20, 25, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80

Virginia Electronics Co., D.C., 15

Visual Electronics Corp., N.Y., 20, 25, 30, 35, 55

Wac Line, Inc., Ohio, 50, 75

Waltham Horological Corp., Mass., 5, 40

Waveline, Inc., N.J., 3, 5, 10, 15, 20, 25, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80

White Electron Devices, Inc., Roger, 9 Fourth Ave., Haskell, N.J., 25, 70
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Tel: TErhune 5-5333

Whitting & Davis Co., Inc., Mass., 5, 15, 20, 25, 35, 50, 55, 75, 80

Wire & Cables: See class 83

Wire harnesses & wire mesh: See class 83

Wire, magnetic recording: See class 49

Wire recorders: See class 16

X-ray tubes: See class 62

Yokes, deflection: See class 29

1958 IRE DIRECTORY

DIRECTORY III CONTROLS & INSTRUMENTS

16 major groups
141 products

The products and services of the radio-electronics industry have been organized into four basic directories:

I. Communications
II. Components
III. Control & Instruments
IV. Materials & Services

Within these four basic directories, 100 major product and service groups are numbered consecutively throughout. Under each of these 100 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 769 sub-products in alphabetical order, consult the eight-page 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 four major directory groups will be found on pages 1, 151, 255, 287, 459, and 521.

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!

LICENSE NO. 25
MACHOL EDGE INDEX PATENT #2680630

For complete list of products and services, arranged alphabetically for fast reference, see the eight-page pink section preceding page.

1	COMPLETE DATA SPREADS
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255	DIRECTORY I COMMUNICATIONS
287	DIRECTORY II COMPONENTS
459	DIRECTORY III CONTROLS & INSTRUMENTS
521	DIRECTORY IV MATERIALS & SERVICES

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80	Radio Frequency Test Equip.	503
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BALLANTINE VOLTMETERS

Famous for SENSITIVITY • ACCURACY • STABILITY

AUDIO to 150 kc — MODEL 300

Voltage Range..... 1mv—100v
Frequency Range..... 10cps—150kc
Accuracy..... 2% ENTIRE RANGE
Input Impedance..... ½ meg shunted by 30μμf

SUB-AUDIO to 150 kc — MODEL 302C

Battery Operated

Voltage Range..... 100 μv—1000v
Frequency Range..... 2cps—150kc
Accuracy..... 3% 5cps—100kc
5% elsewhere
Input Impedance..... 2 meg shunted by 25 μμf*
*Shunt capacitance, 10μμf on all ranges except two most sensitive ranges

PEAK-to-PEAK — MODEL 305

Voltage Range..... 1mv—1000v pk-to-pk
Frequency Range..... 10cps—100kc (sine wave)
Pulse width..... 3μsec—250μsec
Min Rep Rate..... 20 pulses per sec
Accuracy..... 5% for pulses
Input Impedance..... 2 meg shunted by 15 μμf*
*Shunt capacitance, 8 μμf on all ranges except two most sensitive ranges

AUDIO to 2 mc — MODEL 310A

Voltage Range..... 100 μv—100 v
Down to 40 μv at reduced accuracy
Frequency Range..... 10 cps—2 mc
As null detector 5 cps.—4 mc
Accuracy..... 3% 10 cps—1 mc
5% elsewhere
Input Impedance..... 2 meg shunted by 15 μμf*
*Shunt capacitance, 8 μμf on all ranges except two most sensitive ranges

AUDIO to 6 mc — MODEL 314

Voltage Range..... 1mv—1000v
(100μv—1mv without probe)
Frequency Range..... 15cps—6mc
Accuracy..... 3% 15cps—3mc
5% elsewhere
Input Impedance..... 11 meg shunted by 7.5 μμf
(1 meg shunted by 25 μμf without probe)

INFRASONIC to 30 kc — MODEL 316

Voltage Range..... 20 mv—200 v pk-to-pk
Frequency Range..... 0.05 cps—30 kc
(Down to .01 cps with corrections)
Accuracy..... 3% ENTIRE RANGE
Input Impedance..... 10 meg shunted by 19 μμf
or 40 μμf depending on setting

TRUE RMS INDICATION — MODEL 320

Voltage Range..... 100 μv—320 v
Frequency Range..... 5 cps—500 kc
Accuracy..... 3% 15 cps—150 kc
5% elsewhere
Stability of Internal Calibrator..... 0.5%
Input Impedance...
10 megs shunted by 25 μμf below 10 mv
10 megs shunted by 8 μμf above 10 mv

DC & AC PRECISION CALIBRATOR — MODEL 420

Voltage Range..... 0-10 v RMS; Pk-to-Pk; or DC
Frequency (Std. Model)..... 1 kc
(other values on special order)
Accuracy (long term)...Better than 0.5% above 1 mv
Distortion and Hum..... Less than 0.5%
Setting Resolution...Approaches 0.01% above 10 mv
Output Impedance (AC)..... 2-20 ohms depending on range setting

SENSITIVE INVERTER — MODEL 700

For Measuring DC Voltages when combined with any AC Voltmeter

Voltage Range..... 1μv—100v DC
Ratios DC Input to RMS Output..... 1:100 & 10:1
Accuracy..... 1% 100μv—100v
Input Resistance..... >10 meg for 1:100
50 meg for 10:1

DECADE AMPLIFIER — MODEL 220B

For Increasing the Sensitivity of any AC Voltmeter by 10 or 100 times

Voltage Range..... 10μv—50mv
Frequency Range..... 10cps—150kc
Accuracy..... 2% ENTIRE RANGE
Input Impedance..... 5 meg shunted by 15μμf

DIRECT READING CAPACITANCE METER — MODEL 520

Capacitance Range..... 0.01 μμf to 12 μf
in 9 decade ranges covering over a billion to 1
Accuracy..... 2% above 0.1 μμf
5% below 0.1 μμf
Capacitor Power Factor..... 0.15
Test Frequency..... 1 kc

Each Ballantine Voltmeter has only one voltage scale, with decade range switching, which provides the same accuracy of reading at all points on the logarithmic voltage scale. A linear decibel scale is also provided for use by acoustical engineers. Each Voltmeter also may be used as a high gain wide band amplifier.

ACCESSORIES are available for all voltmeters to extend voltage measurements down to 20 μv and up to 10 kv, and to measure currents from 0.1 μamp to 10 amp, and to provide DC from the Model 300 Voltmeter to drive external recorders or remotely located meters.

WRITE FOR MORE DETAILED INFORMATION TO—

BALLANTINE LABORATORIES, INC.
102 Fanny Road, Boonton, New Jersey

Directory III. Controls & Instruments

Accelerometers: See class 58

Admittance meters: See class 80

Ammeters: See class 42

Attenuators: See class 22

Atmospheric test chambers: See class 71

67. Audio Frequency Test Equipment.

3. AF signal
5. Beat frequency oscillators
10. Distortion & noise analyzers
15. Intermodulation meters
20. Output power meters
25. RC oscillators
27. Sound level
30. Spectrum analyzers
35. Square wave generators
40. Telegraph test
45. Voltmeters-audio frequency

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Antlab., Inc., Ohio, 35 & Fork Control Modulators
Audio Instrument Co., Inc., N.Y., 15
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B J Electronics Div., Borg Warner Corp., 3300 Newport Blvd., Santa Ana, Calif., 30
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Control Electronics Co., Inc., 1925 New York Ave., Huntington Station, L.I., N.Y., Phase Meter
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Oltronix Co., Ga., 25
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- vibration and sound analyses
- noise analyses
- geophysical investigations
- servo analyses
- frequency response analyses
- harmonic and cross modulation investigations
- monitoring communications channels
- analyzing characteristics of AM, FM and pulsed signals
- checking telemetering or carrier current systems for distortions, hum, noise, microphonics, interference, channel spillover
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- and many special applications

Accurate . . . rapid, exceedingly flexible and discriminating, Panoramic Instruments are PROVED PERFORMERS in plants, laboratories and military applications. Simple to operate . . . easy to interpret . . . they have helped to speed research and development projects . . . solve production testing problems.

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PANORAMIC
RADIO PRODUCTS, INC.

the pioneer is the leader

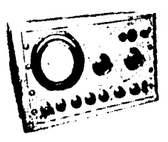
PANORAMIC INSTRUMENTS

Panoramic Waveform & Spectrum Analyzers

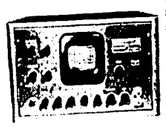
These automatic heterodyne scanning receivers present a visual display of both the frequency and amplitude of the waveform content of an electrical voltage or any parameter which is converted into an electrical voltage. Their easily read panoramic display provides a rapid, reliable method of detecting defects, checking variations, making adjustments, testing production, improving product design and solving many other measurement problems. A broad range of instruments satisfies a great variety of applications, which are even further extended by combining carefully designed accessory equipments with basic analyzers to form instrumentation systems which offer unique advantages.

Model LF-2, Subsonic (0.5 cps-2250), features 0.1 cps to 20 cps resolution, 40 db dynamic range, six scanning widths, permanent ink-on-paper recordings, high stability.

Model LP-1a, Sonic (40 cps-20 kc), features both linear and log amplitude scales, 60 db dynamic range, directly read, broad logarithmic frequency scale and a three-step scanning range selector and tuning control which permits selection and magnification of linear segments 200, 1000 or 5000 cps wide centered anywhere between 0 and 20 kc for sharp detailed analysis of components closely spaced in frequency. Optional companion recorder allows permanent ink-on-paper recordings over extended periods.



Model SB7aZ, Ultrasonic (1 kc-300 kc), features both linear and log amplitude scales, exceptionally stable displays, continuously variable sweepwidth, center frequency and resolution controls which facilitate overall observation of a band 200 kc wide or highly detailed analysis of selected narrow bands.

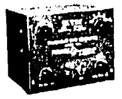


Panalyzors and Panadaptors (RF, VHF and UHF) feature continuously variable sweepwidths, resolution and scan rates; long or short persistence displays, linear or log amplitude scales. Offer the advantages of wide scan display yet permit examination of closely adjacent signals. Special features vary with model and type selected. 5 models in 23 different types fulfill almost every need from low-cost general purpose instruments to those for highly special applications.

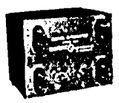
Model SPA-1, Microwave (50 mc-4000 mc), features two tuning heads (RF-2 from 50 mc to 250 mc; RF-3 from 220 mc to 4000 mc in five ranges) with a single tuning control dial having an accuracy of ±1%, continuously variable resolution, sweep rate and differential markers,—100 dbm sensitivity.

Panoramic Accessory Instruments

Models G-2 and G-3, Sweep Generators, convert the LP-1a and SB-7aZ, respectively, into single line response curve tracers, discriminate against noise and hum, show response to fundamental frequency only, and assure accurate frequency response measurements.



Model TW-1, Triangular Wave Generator, operates with either sonic or ultrasonic analyzers and sweep generators to produce a continuously variable (0.05 to 60 per sec.) linear bi-directional time base enabling the establishment of the proper scan rate to insure presentation of a true response.



Model SW-1, Signal Alternator, permits observation of two independent inputs either for comparison or calibration purposes. With high persistence indicators, alternate displays can be viewed simultaneously thus allowing a very high degree of readability on small differences in frequency and/or amplitude.

Panoramic Special Instruments

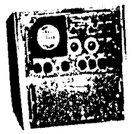
Model TFA-1, Time-Frequency Analyzer, in combination with one of the analyzers (subsonic through microwave) or telemetering indicator, provides a complete history of the time occurrence of transient waveform components, in addition to frequency and amplitude information.

Model PDA-1, Spectral Power Density Analyzer, used in combination with one of the analyzers (subsonic through microwave) measures the spectral power density of random information by translating transient voltage amplitudes of a complete data sample into an integrated continuous plot of total power vs. frequency.

Model SF-1, Synchronous Frequency Analyzer, has many application possibilities and is excellent for dynamic balance analysis. Automatically tracks a frequency component derived from a rotating or oscillating source and provides simultaneously a visual plot of component frequency vs. component amplitude.

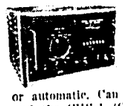
Panoramic Telemetering Test Instruments

These instruments are specifically designed to provide a simple, reliable, almost instantaneous, method of checking FM/FM Telemetering Systems.

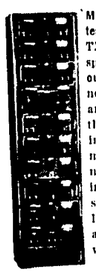


Model TM1-1a, Telemetering Indicator, provides a visual display of the frequency and amplitude of composite signal components. Scans spectrum logarithmically from 350 cps to 85 kc, or linearly, any 100 cps to 20 kc segment centered anywhere between 400 cps and 70 kc. Permits measurement of spurious frequencies down 40 db. Features 20 db linear and 40 db log amplitude scales; 2 mv full scale sensitivity; automatic optimum resolution.

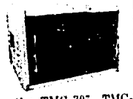
Model TMC-1, Telemetering Subcarrier Deviation and Three Point Calibrator, is a dual purpose instrument, which: (1) Sequentially furnishes upper limit, center and lower limit frequencies channel by channel for all RDB channels as outputs for discriminator calibration. Limits are ±5% for all channels and ±15% for upper five, others optional, with an accuracy of 0.02%. Channel switching can be either manual or automatic. (2) Establishes maximum deviation limits and center frequency of subcarrier oscillators. An internal signal switcher permits alternate display, on the screen of the TMI-1a, of subcarrier vs. calibrating marker from the built-in channel selector of the TMC-1 which automatically establishes proper center frequency and sweepwidth of the selected channel for comparison with deviation or spread of subcarrier.



Model TMC-307, Seven Point Telemetering Frequency Calibrator, sequentially furnishes seven equally spaced frequencies for all RDB channels singly, as outputs for discriminator calibration. Limits and accuracy are the same as the TMC-1. Switching can be either manual or automatic. Can also be used in combination with the TMI-1a and the CHS-1 (Channel Selector), for multipoint calibration of subcarrier oscillators, 0.02% accuracy.



Model TMC-211, Simultaneous Eleven Point Telemetering Frequency Calibrator, differs markedly from the TMC-1 and TMC-307 in that it provides 11 equally spaced frequencies for **all RDB channels simultaneously** as outputs for discriminator calibration. All channels can be sampled in as little as 2½ secs. Is with an accuracy of **0.002%**, stability of .0005%. Limits are the same as the TMC-1 and TMC-307. Channel switching may be manual, semi-automatic or complete automatic. On automatic, switching is controlled synchronously and cycling time is adjustable. Can also be used in combination with the TMI-1a and the CHS-1 for simultaneous multipoint calibration of subcarrier oscillators. The instrument can be remotely controlled from a central station with subcarrier channels oriented to various locations.



Model CHS-1, Telemetering Channel Selector automatically establishes the correct center frequency, sweepwidth and resolution for any RDB channel selected for display on the screen of the TMI-1a. An internal signal switcher permits alternate display of subcarriers vs. external calibrating markers, available from the TMC-307, TMC-211 or other source, for visual comparison of linearity or spread of subcarrier.

NEW ADDRESS: 528 SOUTH FULTON AVENUE, MT. VERNON, NEW YORK
Phone: OWENS 9-4600 • Cables: Panoramic, Mount Vernon, N. Y. State

Directory III. Controls & Instruments

67. Audio Frequency Test Equipment.

Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mt. Vernon, N.Y., 5, 10, 15, 30
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Probescope Co., Inc., 44-05 30 Ave., Long Island City 3, N.Y., 10, 30
See ad on this page
Tel: RAvenswood 6-7241
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Radio Corp. of America, Electron Tube Div., Section I22Q, 415 South Fifth St., Harrison, N.J., 25
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Tel: HUmboldt 5-3900
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RCA Victor Co., Ltd., Canada, 5, 10
Radio Engineering Products, Ltd., 1080 University St., Montreal, Quebec, Canada, 40
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Tel: UNiversity 6-6887
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Raytheon Mfg. Co., Equip. Sales Operations, Mass., 30
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Shasta Div., Beckman Instruments, Inc., Calif., 25, 45
Skiatron Electronics & TV Corp., N.Y., 25, 35, 40
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Solartron, Inc., 10761 Burbank Blvd., N. Hollywood, Calif., 3, 25, 35, 45
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Tel: STanley 7-5081
Southwestern Industrial Electronics Co., 2831 Post Oak Rd., P.O. Box 13058, Houston, Tex., 3, 25, 45
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Tel: MOhawk 7-6611
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Spectrum Instruments, Inc., N.Y., 25
Spencer-Kennedy Laboratories, Inc., 1320 Soldiers Field Rd., Boston 35, Mass., 35
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Tel: AL 4-5400
Stelma, Incorporated, Conn., 10, 35, 40, & Teleprinter Message Gen.
Stoddart Aircraft Radio Co., Inc., 6644-C Santa Monica Blvd., Hollywood 38, Calif., Wave Analyser
See ads on pages 294, 512
Tel: HOllywood 4-9294
Suffolk Products Corp., N.Y., 30
Summit Electronics, Inc., N.J., 35, 40
Taller-Cooper, Inc., N.Y., 3
Technical Products Co., Instrument Div., Calif., 5, 10, 27, 30
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Teletronics Lab., Inc., N.Y., 3, 25, 45
Transformers, Inc., 200 Stage Rd., Vestal, N.Y., A C Ratiometer
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Transval Engineering Corp., Calif., 5
Wang Laboratories, Inc., 37 Hurley St., Cambridge 41, Mass., 3, 25, 35, 40
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Tel: UNiversity 4-8380
Waveforms, Inc., N.Y., 25, 45
Weightman & Associates, Calif., 30
Weinschel Engr. & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 3, 35, 45
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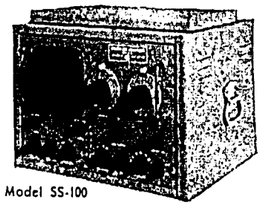
Tel: LOckwood 4-0122
Weston Electrical Instrument Corp., N.J., 45
Wright Engineering Co., Calif., 45

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 152-153.

WIDE RANGE SPECTRUM ANALYZER



Model SS-100

SPECTRUM ANALYZERS

MODEL SS-5	1 cycle to 5 KC Resolution to 2 cycles.
MODEL SS-100	13.5 cycles to 110 KC Resolution to 27 cycles.
MODEL SS-500	5 KC to 500 KC Resolution to 150 cycles.
MODEL UR-10	100 KC to 10 MC Resolution to 500 cycles.

TELEMETERING CALIBRATORS

Telemetering calibrators designed to give 11 separate crystal controlled calibrating frequencies for the 18 telemetering subcarrier channels. Each channel is a self contained unit with separate plug-in oven controlled crystal oscillators. Oscillator accuracy .0001 %

MINIATURE and MULTIPLE CHANNEL OSCILLOSCOPES

Automatic Tracking Spectrum Analyzers . . . Automatic Phase Plotters . . . Synchronous Sweep Generators . . . Calibrated Noise Sources . . . Probe Oscilloscope . . . 9 to 100 KC Calibrator.

PROBESCOPE CO.
44-05 30th Avenue, Long Island City, N.Y.
RAvenswood 6-7241

For details, circle #435 on Reader Service Card.

68. Automatic Control Equip.

5. Burglar-alarm & protective systems
10. Combustion & smoke-nuisance controls
15. Electronic remote controls
20. Photo electric
25. Positioning equipment
30. Production controls, counting & sorting equipment
35. Qualitative controls
40. Quantitative controls
45. Vacuum controls
50. Variable speed controls

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ACF Industries, Inc., Erco Div., Md., 15, 25, 35, 40
A.R.F. Products, Inc., Ill., 15
Ace Instrument Co., Inc., N.Y., 10, 15, 25
Acme Electric Corp., 449 Water St., Cuba, N.Y., 50
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Acoustica Associates, Inc., Dept. IRE, Shore Rd., Glenwood Landing, L.I., N.Y., 40
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Adler Electronics, Inc., N.Y., 15
Advanced Electronics, Inc., Conn., 40
Aerojet General Corp., Calif., Infrared Systems
Aeronca Research Div., Md., 5, 15, 20, 25, 30, 35, 40, 45, 50
Air-Marine Motors, Inc., 369 Bayview Ave., Amityville, N.Y., 25-Remote
See ad on page 298
Tel: AMityville 4-3700
Airborne Accessories Corp., N.J., 25
Airborne Instruments Laboratory, Inc., 160 Old Country Rd., Mineola, L.I., N.Y., 25, 35
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Tel: PIoneer 2-0600
Airmec, Ltd., England, 20
Alden Electronic & Impulse Recording Equipt. Co., Alden Research Center, Westboro 6, Mass., 25
See ad on page 270
Tel: FOrest 6-4467
Alfred Electronics, 897 Commercial St., Palo Alto, Calif., 45
See ad on page 155
Tel: DAvenport 4-4368.
YOrkshire 7-8177
Allegany Instrument Co., Md., 15, 20
Allied Industrial Electronics of Canada, Ltd., Canada, 15, 20, 50
Allied Radio Corp., Dept. 35-58, 100 N. Western Ave., Chicago 80, Ill., 20; Kit
See ad on page 622
Tel: HAymarket 1-6800
All-Tronics, Inc., 45 Bond St., Westbury, L.I., N.Y., 15, 25, 35, 40
See ad on page 347
Tel: EDgewood 3-3090
Altair Company, Calif., 5, 15, 20, 25
American Instrument Co., Inc., Md., 15
American Mach. & Foundry Co., N.C., 20, 25, 30, 35, 40, 50
American Mach. & Foundry Co., Defense Prods. Group, 1101 N. Royal St., Alexandria, Va., 10, 15, 25, 30, 35, 40
See ad on page 274
Tel: KIng 9-9110

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

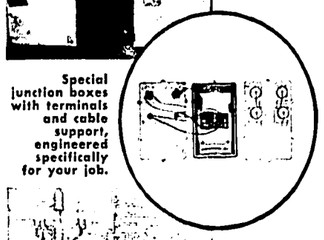
← For details, circle #434 on Reader Service Card.

America's critical northern defense projects, the DEW line and White Alice, are reaching completion. Hughey & Phillips helped Western Electric and the Blaw Knox Companies solve severe requirements by engineering and fabricating complete ready-to-install kits.
These kits include

- SLEET MELTER POWER & CONTROL CIRCUITS
- SPECIAL LIGHTING AND CONTROL CIRCUITS
- TOWER OBSTRUCTION LIGHTING
- LAMP FAILURE ALARM SYSTEMS
- EMERGENCY TELEPHONE CIRCUITS

This practical experience and knowledge is available to you in solving problems in these or similar systems employing photo-electric control units, beacon flashers, obstruction lamp failure indicator and controls. Complete systems will be engineered, fabricated and packaged in a kit for your *specific job.*

System being packaged for shipment


Special junction boxes with terminals and cable support, engineered specifically for your job.

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For details, circle #436 on Reader Service Card.

Analogue Controls, Inc., N.Y., 15, 25, 30
Antlab, Inc., Ohio, 50
Askania Regulator Co., Ill., 10, 25
Assembly Products, Inc., Wilson Mills Rd., Chesterland 33, Ohio, 50
See ad on page 395
Tel: HAmilton 3-4436
Ateliers De Montages Electriques, France, 25
Atlas Precision Products Co., Pa., 25
Atwood, Wilfrid L., Ohio, 15, 20, 25
Automatic Control Co., Minn., 15, 40
Automation Products Co., Mich., 10, 15, 20, 30
Automatic Switch Co., N.J., 15
Automatic Temperature Control Co., Inc., Pa., 15, 25, 30
Autonetics Div., N. American Aviation, Inc., Calif., 25, Armament Flight Control
Autotron, Inc., Ill., 20
B J Electronics Div., Borg Warner Corp., 3300 Newport Blvd., Santa Ana, Calif., 15, 30
See ad on page 31
Tel: KI 5-5581
Bailey Electronic Lab., P. A., Industrial Div., Conn., Automatic Gain Controls
Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 20, 30, 35, 40
See ad on page 476
Tel: UNiversity 4-0101
Barber-Colman Co., Dept. 58D, 1856 Rock St., Rockford, Ill., 25
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Tel: 8-6833
Barnes Development Co., Pa., 30
Barnes Engineering Co., Conn., 25
Barton Electronics, Inc., Conn., 5, 20, 30, 35
Baso, Inc., Wis., 10
Bendix Aviation Corp., Cincinnati Div., Ohio, Density Gauges
Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N.J., 20, 30, 35
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Tel: ATlas 8-2000
Bergen Laboratories, N.J., 25
Berkshire Laboratories, Greenville, N.H., 30
Bogue Electric Mfg. Co., N.J., 15, 20
Borg-Warner Corp. Research Center, Ill., 25
Briggs Associates, Inc., Pa., 15, 20, 25, 30, 35, 40
Bristol Engineering Corp., Electronics Div., Pa., 15, 30, 35, 40
Bristol Co., Conn., 10, 15, 25, 30, 35, 40, 45, 50
Browning Laboratories, Inc., Mass., 5
C G Electronics Corp., N.M., 15
California Technical Industries, Calif., 35
Camden Electronics, Inc., N.J., 15, 20
Canoga Corp., Calif., 15
Central Sales & Mfg. Corp., N.J., 45
Century Engineers, Inr., Calif., 5, 25, 30, 35, 40, 50
Chapin Electronics, Inc., Mass., 5
Chicago Aerial Industries, Inc., Ill., 20, 25
Chisholm Industries, Ltd., Canada, 5, 10
Clary Corp., Calif., 15, 25, 30, 35, 40, 45, 50
Connecticut Telephone & Electric Co., Conn., 25, 50
Consolidated Avionics Corp., N.Y., 50
Consolidated Electrodynamics Corp., Calif., 45
Consolidated Vacuum, N.Y., 45
Continental Communications, Inc., Ill., 15
Control Electronics Co., Inc., 1925 New York Ave., Huntington Station, L.I., N.Y., 25, 30, 40
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Tel: HAmilton 7-7961
Cook Co., Frank R., Colo., 15, 20, 25, 30
Corbin Corp., Md., 5
Cosmo Engineering Labs., Inc., N.J., 50
Cramer Controls Corp., Conn., 30
Crystal Research Products, N.J., 20, 40
Curtiss-Wright Corp., Electronics Div., Carlstadt, N.J., 40, 50
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Tel: GEneva 8-4000
Dasol Corp., N.Y., 15, 30
Daystrom, Inc., N.J., 10, 15, 20, 30, 35, 40
Daystrom Pacific Corp., Calif., Gyros
Daytronic Corp., Ohio, 15, 25, 30
Decker Aviation Corp., Pa., 5, 15, 30
Deltron Inc., Pa., 5, 20
Design Tool Corp., N.Y., 25
Detectolab, Inc., Ill., 15, 30
Devol Research Co., Conn., 15, 25, 30, 40
Devtronics, Inc., N.J., 15
Doelcam Div., Minneapolis-Honeywell Reg. Co., Mass., 25
Domont Labs., Inc., Allen B., N.J., 15
Dunlap Electronics, Iowa, 15, 20, 30
Dunn Engineering Associates, Inc., 186 Massachusetts Ave., Cambridge 39, Mass., 40
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Tel: UNiversity 4-0400
Dynapar Corp., Ill., 15, 25, 30, 40, 50
Eagle Signal Corp., Ill., 30
Eastern Chemical Corp., Pa., 15, 40
Eastern Industries, Inc., 100 Skiff St., Hamden 14, Conn., 25, 50
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Tel: CHestnut 8-3841
Ed-Berl Products, Inc., N.Y., 5
Electric Eye Equipment Co., Ill., 15, 20, 25, 30
Electric Regulator Corp., Conn., 50
Electro Devices, Inc., Servospeed Div., N.J., 50
Electro Instruments, Inc., Calif., 15
Electro Products Laboratories, Inc., Ill., 15, 25, 40
Electro-Pulse, Inc., 11861 Teale St., Culver City, Calif., 30
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Tel: TExas 0-8006
Electrola, Inc., Ill., 15, 20
Electron-Machine Corp., Fla., 15, 20, 25, 30, 35, 40
Electron-Radar Products, Ill., 10, 20
Electronic Control Corp., Mich., 5, 10, 20, 30
Electronic Machine Parts, Inc., N.Y., 20
Electronic Measurements Co., Inc., Lewis St. & Maple Ave., Eatontown, N.J., 15
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Tel: EAtontown 3-0300

Directory III. Controls & Instruments

68. Automatic Control Equipment.

Electronic Processes Corp. of Calif., Calif., 15
Electronic Research Labs., Mass., 45
Electronics Corp. of America, Mass., 10, 15, 20, 30, & Automatic Burner Controls
Elliott Brothers (London) Ltd., England, 15, 25
El-Tronics, Inc., Pa., Humidity Element & Indicating Instr.
Endevco Corp., Calif., 5, 25, 30, 40
Engineering Specialties, Ohio, 50
Ernst Mfg. Co., Mich., 20
Etelco, Ltd., England, 30
Fairfield Engineering Corp., Conn., 15, 20, 25, 50
Farmer Electric Products Co., Inc., Mass., 20
Feedback Controls, Mass., 15, 25, 40, 50
Fenwal, Inc., Mass., 15, 30
Ferranti Electric, Inc., N.Y., 25
Ferranti Electric Ltd., Canada, 15, 25, 40, 50
Ferrarra, Inc., Mich., 15, 25, 50
Fidelity Instrument Corp., Pa., 25, 50
Fielden Inst. Div., Pa., 15, 25, 35, 40
Fire Control Co., Inc., Del., 5
Fischer & Porter Co., Pa., 10, 15, 30, 35, 40, 45
Fisher Research Lab., Inc., Calif., Metal Detectors
Fisher Scientific Co., Pa., 15, 20
Fleetwood Laboratories, Inc., N.Y., 30, X-Ray Thickness Gauging
Fuchs Impulse Motors Co., Harry, N.Y., 15, 25
G A P Instrument Corp., N.Y., 25
Gates Electronic Co., 2090 Barnes Ave., New York 62, N.Y., 50
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Tel: TYrone 2-6490
General Automatics, Inc., Calif., 5, 15, 25, 30
General Communications, Inc., Wis., 15
General Controls Co., Calif., 10, 25, 30, 45
General Electric Co., Apparatus Sales Div., N.Y., 10, 15, 20, 25, 45, 50
General Electric Co., Broadcast & Mil. Elect. Prods. Dept., N.Y., 15, 35, 40
General Electric Co., Computer Dept., Ariz., 30
General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 20
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Tel: VAlley Stream 5-6363
General Mills, Inc., Mechanical Div., Minn., 15, 25, Guidance Control
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 50
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Tel: TRowbridge 6-4400
Giannini & Co., Inc., G. M., Datex Div., Calif., 25
Giannini & Co., Inc., G. M., Calif., 15, 25, 45
Graham Transmissions, Inc., Wis., 50
Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J., 5
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Tel: LIberty 8-2800
Gulton Industries, Inc., Vibro-Ceramics Div., 212 Durham Ave., Metuchen, N.J., 10
See ad on page 184
Tel: LIberty 8-2800
Haledy Electronics Co., N.Y., 15, 20
Hammarlund Mfg. Co., Inc., N.Y., 15, 30
Hansen Co., Wm., Mich., 30
Hastings-Raydist, Inc., Va., 45
Hehn, Lester C., N.Y., 20
Hewlett-Packard Co., 4277D Page Mill Rd., Palo Alto, Calif., 30, 40
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Tel: DAvenport 5-4451
Hewson Co., Inc., N.J., 5, 15
Hi-Video, Inc., N.Y., 15
Hill Associates, Inc., James J., Fla., 15
Hillyer Instrument Co., Inc., N.J., 25
Hoover Electronics Co., Md., 15, 20, 30, 35, 40
Hughey & Phillips, Inc., 3200 N. San Fernando Blvd., Burbank, Calif., 20
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Tel: VIctoria 9-1104
Humphrey, Inc., Calif., 50
Hupp Electronics Co., Ill., 20
Hycon Eastern, Inc., 75 Cambridge Pkwy., Cambridge 42, Mass., 50
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Tel: UNiversity 4-7200
I-L-S Instrument Corp., Ohio, 30
Indikon Co., Mass., 15, 25, 30
Industrial Electronic Controls Co., N.Y., 20
Industrial Electronic Engineers, Calif., 15, 30, 35, 40
Industrial Electronics Co., Mass., 5, 10, 15, 20, 25, 30
Industrial Electronics, Mich., 20, 30
Industrial Electronics of Canada, Ltd., Canada, 15, 20, 25, 30, 50
Industrial Nucleonics Corp., Ohio, 30
Industrial Research Lab., Md., 5, 15, 20, 25, 30, 40, 45, 50
Jordan Co., Inc., Wis., 15, 25, 50
Kearfott Co., Inc., 1378 Main Ave., Clifton, N.J., 15, 20, 25
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Tel: GRegory 2-1000
Kidde Ultrasonic Div., Walter, N.J., 5, 10, 20
Kurman Electric Co., Inc., 191 Newel St., Brooklyn 22, N.Y., 5, 15, 20
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Tel: EVergreen 3-8000
Laboratory for Electronics, Inc., Mass., 25, 30
Larson Instrument Co., N.Y., 20, 30, 35
Lear, Inc., Mich., 15, 25
Librascope, Inc., Calif., 15, 25, 30, 50
Lytle Engineering & Mfg. Co., N.M., 15, 25
MacLaren & Co., Inc., F. B., N.Y., 15, 20, 25, 35, 40, 50
Magnavox Co., Ind., 30
Magnecord, Ill., 5
Magnetic Amplifiers, Inc., 632 Tinton Ave., New York 55, N.Y., 20, 25, 50
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Tel: CYpress 2-6610
Manning, Maxwell & Moore, Inc., Conn., 15, 25
Maurer, Inc., J. A., N.Y., 20
McKay Electric Co., 19790 Stahelin Ave., Detroit 19, Mich., 50
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Tel: KEnwood 5-6971
Mercoid Corp., Ill., 45
Mid-Century Instrumatic Corp., N.Y., 25
Minneapolis-Honeywell Reg. Co., Boston Div., Mass., 25
Minneapolis-Honeywell Reg. Co., Minn., 10
Minneapolis-Honeywell Reg. Co., Industrial Div., Pa., 40, 45
Minneapolis-Honeywell Reg. Co., Ordnance Div., Minn., 25, 50
Morecroft Design Eng., J. H., Calif., 15
Multi-Tron Laboratory, Inc., Ill., 20
NRC Equip. Corp., 287 Charlemont St., Newton Highlands, 61, Mass., 45
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Tel: DEcatur 2-5800
NRD Instrument Co., Mo., 30
Nagog Associates, Inc., Mass., 15, 20, 30
Naniloa Corp., Ohio, 15, 25, 30
Natl. Scientific Labs., D.C., 30, 35, 40
National Standard Corp., Conn., 5, 10, 15, 20, 25, 30, 35, 40, 45, 50
Neutronic Associates, Dept. I, 93-14 101st Ave., Ozone Park 17, N.Y., 5
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Tel: VIrginia 7-7703
Norden-Ketay Corp., N.Y., 15, 25
Norden-Ketay Corp., Gyromechanisms Div., N.Y., Gyroscope
North Electric Co., Ohio, 15, 25, 30, 40
Norwood Controls Unit, Mass., 40
Nuclear Consultants, Inc., N.Y., 15, 30
Nuclear-Electronics Corp., Pa., 5, 20
Nuclear Research Corp., Pa., 40
Oakton Engineering Corp., Ill., 15
Olympic Radio & TV, N.Y., 15, 20
Opad Electric Co., 69-8 Murray St., New York 7, N.Y., 50
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Tel: BEekman 3-7548
Parks Laboratory, Calif., 10, 15, 20, 30
Parsons Co., R. M., Electronics Div., Calif., 15
Performance Measurements Co., Mich., 25, 30
Perma-Power Co., Ill., 15
Peschel Electronics, Inc., 13 Garden St., New Rochelle, N.Y., 15, 30, 50
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Tel. NEw Rochelle 6-3342
Philips Electronics, Inc., N.Y., 30, 35, 40
Photo-Crystals, Inc., Ill., 5, 10, 20
Photographic Products, Inc., Calif., 5, 30
Photovolt Corp., N.Y., 20
Post Machinery Co., Electronic Prods. Div., Mass., 15, 20, 30
Potter Aeronautical Corp., N.J., 30
Practical Electronics Mfg., Co., Ill., 20
Pratt & Whitney Co., Inc., Conn., 25, 30, 35, 40

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

68. Automatic Control Equipment.

Precision Scientific Co., Ill., 45
Production Research Corp., N.Y., 5
Pylon Electronic Development Co., Ltd., Canada, 15
Quarie Controllers, Mass., 35, 40
Radio Communication Co., Wis., 5, 15, 20
Radio Specialty Mfg. Co., Ore., Gyros
Ram Meter, Inc., Mich., 15, 30
Reeves Instrument Corp., Sub. Dynamics Corp. of America, N.Y., 25, & Gyros
Remington Rand Div. Sperry Rand Corp., N.Y., 25
Ripley Co., Inc., 1 Factory St., Middletown, Conn., 5, 10, 15, 20, 30
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Tel: DIamond 6-6679
Robertshaw-Fulton Controls Co., Aeronautical Div., Calif., 40
Robinette Co., W. C., Calif., 15, 35, 50
Rust Industrial Co., Inc., N.H., 15
Scaico Controls, Inc., N.J., 15, 45
Scantlin Electronics, Inc., Calif., 5, 20, 30, 35, 40
Schafer Custom Engineering, P., Calif., 5
Schirmer-National Alarm Co., N.J., 5, 10, 15, 20, 30
Sela Electronics Co., N.Y., 35
Sensory Incorporated, N.J., 10, 15, 20, 25, 30, 40
Servo Corp. of America, N.Y., 25
Servomechanisms, Inc., Calif., 15, 25, 50
Servo-Tek Products Co., N.J., 25, 50, 72
Shand & Jurs Co., Calif., 15, 25
Sigma Instruments, Inc., Mass., 20, 30
Simmonds Aerocessories, Inc., N.Y., 40
Simplex Equip. Corp., N.J., 15
Skiatron Electronics & TV Corp., N.Y., 15, 20, 25
Solartron Electronic Group, Ltd., England, 30
Solartron, Inc., 10761 Burbank Blvd., N. Hollywood, Calif., 35
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Tel: STanley 7-5081
Soroban Engineering, Inc., Fla., 15
Sperry Gyroscope Co., Aeronautical Equip. Div., N.Y., 15, 50
Sperry Gyroscope Co., Air Armament Div., N.Y., 25 & Fire Control Systems
Sperry Gyroscope Co., Marine Div., N.Y., Marine Gyros
Sperry Gyroscope Co. of Canada, Ltd., Canada, 15, 25, 35, 40
Sperry Piedmont Co., Div. of Sperry Rand Co., Va., Gyro Compass
Stereatronics, Inc., Mass., 30
Stranberg Engineering Labs., Inc., N.C., 25, 30, 40
Streeter-Amet, Ill., 30
Stromberg-Carlson, Div. Gen. Dynamics Corp., N.Y., 15, 25, 35, 40
Summit Electronics, Inc., N.J., 15, 25, 30
Syntron Co., Pa., 25, 30
Systems Development, Inc., N.Y., 15, 25, 50
Systron Corp., Calif., 30, 35, 40
Taller-Cooper, Inc., N.Y., 5, 10, 15, 20, 25, 30
Technical Apparatus Builders, 109 RV Liberty St., New York 6, N.Y., 15, 25
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Tel: REctor 2-6249
Telectron Co., Fla., 15
Tensitron, Inc., Mass., 40
Thompson Products, Inc., Electronics Div., Ohio, 15
Transdyne Corp., N.Y., 15, 20, 35, 40
Transval Eng. Corp., Calif., 5, 15, 25, 50
Ultrasonic Corp., Mass., 15, 25
Union Switch & Signal Div. Westinghouse Air Brake Co., Braddock Ave., Pittsburgh 18, Pa., 15
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Tel: CHurchill 2-5000
Univox Corp., 102 Warren St., New York 7, N.Y., 15
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Tel: WOrth 2-5630
Uniwave, Inc., N.Y., 5, 20, 30
Vacuum Tube Products Co., Calif., 45
Varo Mfg. Co., Inc., Tex., 15
Vectrol Engineering, Inc., Conn., 25, 50
Veeco Vacuum Corp., N.Y., 45
WAC Line, Inc., Ohio, 15, 25, 30, 50
Walkirt Co., Calif., 30
Wallson Associates Ltd., 961 Frelinghuysen Ave., Newark, N.J., 25
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Tel: TAlbot 4-2600
Wang Laboratories, Inc., 37 Hurley St., Cambridge 41, Mass., 15, 25, 50
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Tel: UNiversity 4-8380
Waveline, Inc., N.J., 5
Welch Manufacturing Co., W. M., Ill., 20
Weltronic Co., Ill., 30 & Welding Controls
West Instrument Corp., Ill., Temperature Controls
Westinghouse Electric Corp., Pa., 20
Whittaker Gyro, Div. Telecomputing Corp., Calif., Gyros
Wilson & Co., G. C., W.Va., 20
Worner Electronic Devices, Ill., 5, 10, 15, 20, 25, 30
Wright Engineering Co., Calif., 25, 30
Yellow Springs Instrument Co., Inc., Ohio, Temperature Controllers

Beat frequency oscillators: See class 67

Bolometers: See class 77

69. Bridges & Decades.

5. Bridges, capacitance	25. Decades, capacitance
10. Bridges, impedance	30. Decades, impedance
15. Bridges, inductance	35. Decades, inductance
20. Bridges, resistance	40. Decades, resistance

Acton Laboratories, Inc., Mass., 10
Aero Electronics Co., Ill., 35
Aerovox Corp., Mass., 25, 30, 40
Allegany Instrument Co., Inc., Md., 40
Allied Radio Corp., Dept. 35-58, 100 N. Western Ave., Chicago 80, Ill., 5, 20, 25, 40, Kits
See ad on page 622
Tel: HAymarket 1-6800

69. Bridges & Decades.

Alpha Instrument Co., Conn., 5, 10, 15, 20
American Metrix Corp., N.J., 5, 10, 15, 20, 25
Barker & Williamson, Inc., Pa., 35
Barnes Development Co., Pa., 20
Beckman Instruments, Inc., Berkeley Div., Calif., 20, 35
Biddle Co., James G., Pa., 20
Bogue Electric Mfg. Co., N.J., 15
Boonton Electronics Corp., N.J., 5
Boonton Radio Corp., Intervale Rd., Boonton, N.J., 10
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Tel: DEerfield 4-3200
Boutros Inst. Lab., Mo., 20, 40
Bristol Engineering Corp., Electronics Div., Pa., 5, 25, 35
Burr-Brown Research Corp., Ariz., 5, 30
Cinema Engineering, Calif., 40
Clarostat Mfg. Co., Inc., N.H., 40
Clegg Laboratories, Inc., N.J., 5, 10, 15, 20
Clough-Brengle Co., Ill., 5, 10, 15, 20
Coast Coil Co., Calif., 35
Compagnie Generale De Metrologie, France, 10
Consolidated Electrodynamics Corp., Calif., 20
Cornell-Dubilier Electric Corp., 333 Hamilton Blvd., S. Plainfield, N.J., 5, 25, 40
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Tel: PLainfield 6-9000
Daven Company, N.J., 20, 40
Daystrom Instrument, Pa., 5
Dice Co., J. W., N.J., 20
Dmeter Manufacturing Co., Inc., N.Y., 40
Dubrow Development Co., N.J., 40
Eastern Precision Resistor Corp., 675 Barbey St., Brooklyn 7, N.Y., 20, 40
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Tel: HYacinth 5-0133
Electro-Measurements, Inc., Ore., 5, 10, 15, 20, 25, 30, 35 40
Electronic Applications N.Y., 5
Electronic Instrument Co., Inc., N.Y., 25, 40
Electronic Measurements Co., Inc., Lewis St. & Maple Ave., Eatontown, N.J., 40
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Tel: EAtontown 3-0300
Electronic Plastics Co., Calif., 5, 20
Fairchild Electrotechnics, Calif., 40
Fidelity Amplifier Co., Ill., 40
Fielden Instrument Div., R-F C Co. Pa., 5, 20
Forway Industries, Inc., N.J., 5, 20
Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 5, 15, 25, 35
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Tel: EVergreen 6-1300
Furzehill Laboratories, Ltd., England, 15, 40
General Electric Co., Apparatus Sales Div., N.Y., 5, 10, 15
General Electric Co., Broadcast & Mil. Elect. Prods. Dept., N.Y., 5, 10
General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 5, 10, 15, 20, 25, 30, 35, 40
See ad on Cover 4
Tel: TRowbridge 6-4400

Directory III. Controls & Instruments

69. Bridges & Decades.

General Resistance, Inc., 577 E. 156th St., New York 55, N.Y., 20, 40
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Tel: CYpress 2-1500
Gertsch Products, Inc., 3211 S. La Cienega, Los Angeles 16, Calif., Bridge Null
See ad on page 509
Tel: TExas 0-2761
Gray Instrument Co., Pa., 20, 40
Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J., 5, 10
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Tel: LIberty 8-2800
Harrison Laboratories, Inc., B. M., Mass., 20
Hauman Instruments Co., Inc., Mass., 25, 40
Hazelton Instrument Co., N.Y., 20
Heath Co., 305 Territorial Rd., Benton Harbor 4, Mich., 5, 10, 20, 25, 40
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Tel: WAlnut 5-0051
Hewlett-Packard Co., 4277D Page Mill Rd., Palo Alto, Calif., 10, 40
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Tel: DAvenport 5-4451
Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland 8, Ohio, 5, 10
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Tel: LIberty 1-8060
Hycor Div., International Resistance Co., Calif., 20, 35, 40
Indikon Co., Mass., 5
Industrial Development Labs., Inc., N.J., 5, 20
Industrial Instruments, Inc., N.J., 5, 10, 20, 25, 40
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International Telephone & Telegraph Corp., Industrial Products Div., 100 Kingsland Rd., Clifton, N.J., 5, 10, 15, 25, Megohm, VHF, Wheatstone
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Tel: NUtley 2-3600
Julie Research Laboratories, Inc., N.Y., 20
Kahn & Co., Inc., Conn., 25
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Leeds & Northrup Co., Pa., 5, 10, 15, 20, 25, 40
MacLeod & Hanopol, Inc., Mass., 5
Marconi Instruments, 44 New St., New York 4, N.Y., 5, 10, 15, 20
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Marconi Instruments, Ltd., St. Albans, Hertfordshire, England, 5, 10, 15, 20
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Millivac Instrument Corp., N.Y., 20
Muirhead & Co., Ltd., England, 5, 10, 15, 20, 25, 35, 40
Muirhead Instruments, Inc., N.Y., 5, 10, 15, 20, 25, 40
Nagog Associates, Inc., Mass., 5, 15, 20, 40
Network Mfg. Corp., N.J., 5
Nichols, Ltd., R. H., Canada, 5, 10, 15, 20, 30, 35, 40
Non-Linear Systems, Inc., Calif., 20, Digital
Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 40
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Tel: ORchard 5-2600
Painton & Co., c/o British Electronic Sales, N.Y., 40
Performance Measurements Co., Mich., 20
Photographic Products, Inc., Calif., 35, 40
Physics Research Labs., Inc., P.O. Box 555, Hempstead, L.I., N.Y., 20, 40
See ad on this page
Tel: IVanhoe 3-8299
Precise Development Corp., N.Y., 5, 15, 20, 25, 35
Precision Capacitors, Inc., Calif., 25
Radex Corp., Ill., 10
Radio Corp. of America, Commercial Electronic Products, Dept. X-94, Bldg. 15-1, Front & Cooper Sts., Camden 2, N.J., 5, 10, 15, 20
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Tel: WOodlawn 3-8000
Research Instrument Co., Ore., 10, 20, 30, 40
Robco Mfg. Co., Inc., N.Y., 15
Rubicon Co., Pa., 20, 40
Saratoga Industries, N.Y., 15, 35
Shallcross Manufacturing Co., Pa., 20, 25, 40
Shasta Div., Beckman Instruments, Inc., Calif., 10, 20, 35
Simmonds Aerocessories, Inc., N.Y., 5, 25
Southwestern Industrial Electronics Co., 2831 Post Oak Rd., P.O. Box 13058, Houston 19, Tex., 10
Multiple pages of additional data on 22-23
Tel: MOhawk 7-6611
Sprague Electric Co., Mass., 5

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OTTO WOLFF precision standard resistors offer the following features:

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69. Bridges & Decades.

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See ad on page 497
Tel: REctor 2-8163
Summit Electronics, Inc., N.J., 5, 10, 15
Superior Instruments Co., N.Y., 5, 20
Sylvania Electric Products Inc., Dept. F24P, 1740 Broadway, New York 19, N.Y., 5
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Tel: JUdson 6-2424
Tech Laboratories, Inc., N.J., 5, 10, 15, 20, 40
Telex, Inc., Minn., 40
Torocoil Co., Ohio, 35
U.S. Electronics Development Corp., Calif., 25
United Transformer Corp., 150 Varick St., New York 13, N.Y., 35
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Tel: ALgonquin 5-3500
Waters Manufacturing, Inc., Boston Post Rd. (Rte. 20), Wayland, Mass., 15
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Tel: ELmwood 8-2777
Weston Electrical Instrument Corp., N.J., 5, 10, 20
Wright Engineering Co., Calif., 25

Burglar alarm systems: See class 68

Calibrators, TV: See class 82

Cardiographs: See class 76

Chambers, atmospheric test: See class 71

Combustion controls: See class 68

70. Computers & Counters.

5. Analog to digital converters
7. Card to tape converters
10. Computers, analog
15. Computers, digital
20. Counters, continuous
22. Counters, mechanical
25. Counters, pre-set
30. Data reduction equipment
32. Digital to analog converters
35. Drums, magnetic
40. Electronic calculators

ACF Industries, Inc., Avion Div., N.J., 32
ACF Industries, Inc., Erco Div., Md., 10, 15
Advance Electronics Lab., Inc., 249-259 Terhune Ave., Passaic, N.J., 20
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Tel: GRegory 2-5622
Airborne Instruments Laboratory, Inc., 160 Old Country Rd., Mineola, L.I., N.Y., 7
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Tel: PIoneer 2-0600
Airflyte Electronics Co., 535 Avenue A, Bayonne, N.J., 5, 32
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Tel: HEmlock 6-2230

70. Computers & Counters.

Alcor Electronics Corp., N.Y., 20, 25
Alden Electronic & Impulse Recording Equipt. Co., Alden Research Center, Westboro 6, Mass., 30
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Tel: FOrest 6-4467
Allegany Instrument Co., Inc., Md., 10, 15, 30, 40
Alwac Corp., Calif., 15, 35
Amerac, Inc., Mass., 20, 22
American Hydromath Corp., N.Y., 10
American Machine & Foundry Co., Elecns. Div., Mass., Data Processing, Display Sys.
American Machine & Foundry Co., Defense Prods. Group, 1101 N. Royal St., Alexandria, Va., 5, 10, 15, 30, 32
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Tel: KIng 9-9110
American Molded Products Co., Ill., 25
Analogue Controls, Inc., N.Y., 5, 10, 15, 30, 40
Andersen Laboratories, Inc., 501 New Park Ave., W. Hartford 10, Conn., 35
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Tel: ADams 3-4491
Anelex Corp., Mass., High Speed Printers
Applied Electronics Corp., Mass., 32, Shaft Position Encoders
Arma Div., American Bosch Arma Corp., N.Y., 20
Arnoux Corp., Calif., 30
Askania Regulator Co., Ill., 10, 15
Atlas Precision Products Co., Pa., 10
Atomic Laboratories, Inc., Calif., 10
Austin Co., N.Y., 5, 15, 20, 30
Automatic Temperature Control Co., Inc., Pa., 22
Autonetics Div., N. American Aviation, Inc., Calif., 10, 15
B J Electronics Div., Borg Warner Corp., 3300 Newport Blvd., Santa Ana, Calif., 5, 20, 25, 30, 35
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Tel: KI 5-5581
Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 5, 15, 25, 32
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Tel: UNiversity 4-0101
Beckman Instrument Div., Calif., 5, 10, 15, 30
Beckman Instruments, Inc., Scientific Inst., Div., Calif., 5, 15, 30, 32
Bendix Aviation Corp., Bendix Computer Div., Calif., 5, 15, 40
Bendix Aviation Corp., Cincinnati Div., Ohio, 20, 25
Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N.J., 5
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Tel: ATlas 8-2000
Benson-Lehner Corp., Calif., 5, 30, 40
Bergen Laboratories, N.J., 10, 35
Beckman Instruments, Inc., Berkeley Div., Calif., 5, 7, 10, 20, 25, 30, 32
Berkeley Enterprises, Inc., Mass., 15, 35
Bill-Jack Scientific Instrument Co., Calif., 10
Boesch Manufacturing Co., Inc., 45 River St., Danbury, Conn., 22, 25
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Tel: PIoneer 3-5571
Borg Corp., George W., Borg Equipment Div., 120 S. Main St., Janesville, Wis., 22
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Tel: PLeasant 4-6616
Bosch, Inc., M. Ten., N.Y., 10
Bowmar Instrument Corp., Ind., 15, 20, 22
Briggs Associates, Inc., Pa., 10, 15, 20
Bristol Co., Conn., 5, 32
Buffalo Instrument Corp., N.Y., 22
Bunnell & Co., J. H., N.Y., Tape Readers
Burroughs Corp., Mich., 5, 7, 10, 15, 20, 25, 30, 32, 35, 40
Burroughs Corp., Electrodata Div., Calif., 15, Tape Units
Burroughs Corp., Electronic Instruments Div., Pa., 20
Cal-Air Engineering, Inc., Calif., 5, 10, 15, 30, 32, 40
Century Engineers, Inc., Calif., 5, 10, 15, 25, 30
Chadwick-Helmuth Co., Calif., Electronic Multiplier
Chicago Aerial Industries, Inc., Ill., 10, 15
Clary Corp., Calif., 15, 20, 22, 30, 40
Coleman Engineering Co., Inc., Calif., 5, 30, 32
Computer Control Co., Inc., 92 Broad St., Babson Park, Wellesley 57, Mass., 5, 7, 15, 20, 25, 30, 32, 35, 40
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Tel: WEllesley 5-6220
Computer-Measurements Corp., Calif., 20, 25
Computing Devices of Canada, Ltd., Canada, 5, 10, 15, 20, 32
Connecticut Telephone & Electric Co., Conn., 5
Consolidated Avionics Corp., N.Y., 5, 7, 10, 15, 20, 25, 30, 32, 40
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Cook Co., Frank R., Colo., 10
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Corbin Corp., Md., 10, 15, 40
Curtiss-Wright Corp., Electronics Div., Carlstadt, N.J., 10
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Devol Research Co., Conn., 5, 32, 35
Digital Instrument Co., Fla., 20, 25
Digitronics Corp., Albertson Ave., Albertson, L.I., N.Y., 7, 15, 35
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Dynapar Corp., Ill., 5, 20, 25, 30
Eagle Signal Corp., Ill., 25
Educational Research Corp., Mass., 15, 40

Directory III. Controls & Instruments

70. Computers & Counters.

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Electro Instruments, Inc., Calif., 5, 32
Electro-Mec Laboratory, Inc., 47-51 33rd St., Long Island City, N.Y., 5
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Tel: STillwell 6-3402
Electro-Pulse, Inc., 11861 Teale St., Culver City, Calif., 5, 20, 25
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Electronic Engineering Co. of Calif., Calif., 7, 30
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Endevco Corp., Calif., 5, 20, 22, 25, 32
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Tel: HIllside 5-4314
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Tel: NUtley 2-3600
Feedback Controls, Inc., Mass., 5, 10, 30
Ferranti Electric, Inc., N.Y., 5, 7, 15, 30, 32, 35, 40
Ferranti Electric Ltd., Canada, 5, 7, 10, 15, 30, 32, 35
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Fischer & Porter Co., Pa., 5, 30
Ford Instrument Co., N.Y., 10, 15, 30
Foto-Video Labs., Inc., N.J., 20
Franklin Electronics, Inc., Pa., 5, 10, 30
G A P Instrument Corp., N.Y., 22
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General Ceramics Corp., Dept. ID., Crows Mill Rd., Keasbey, N.J.
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Tel: VAlley 6-5100
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Giannini & Co., Inc., G. M., Calif., 5, 32
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Hewlett-Packard Co., 4277D Page Mill Rd., Palo Alto, Calif., 20, 25, 30, 32
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Tel: DAvenport 5-4451
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Hoover Electronics Co., Md., 5, 15, 25, 30, 32, 40
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Hycon Eastern, Inc., 75 Cambridge Pkwy, Cambridge 42, Mass., 30
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Industrial Electronics of Canada, Ltd., Canada, 10
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Industrial Research Lab. Div. of Aeronca, Md., 5, 30
Instrument Development Laboratories, Inc., Mass., 5
Intercontinental Electronics Corp., N.Y., 10
International Business Machines Corp., N.Y., 7, 15, 35, 40
International Telephone & Telegraph Corp., Industrial Products Div., 100 Kingsland Rd., Clifton, N.J., 5
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Tel: NUtley 2-3600
Jacobs Instrument Co., Md., 5, 15, 20, 32
Julie Research Laboratories, Inc., N.Y., 5, 30, 32
Kearfott Co., Inc., 1378 Main Ave., Clifton, N.J., 5, 10, 15, 20, 22, 25, 32
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Tel: GRegory 2-1000
Kidde & Co., N.J., 10
Kin Tel, 5725 Kearny Villa Rd., San Diego 12, Calif., 5, 10, 15, 32
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Tel: BRowning 7-6700
Laboratory for Electronics, Inc., Mass., 20, 25, 35
Librascope, Inc., Calif., 5, 7, 10, 15, 20, 22, 25, 30, 32 35, 40
Litton Industries, 336 N. Foothill Rd., Beverly Hills, Calif., 5, 10, 15, 32
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Tel: CRestview 4-7411
Logistics Research, Inc., Calif., 15, 30, 35, 40
Loral Electronics Corp., N.Y., 5, 10, 30, 32, 40
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MacLaren & Co., Inc., F. B., N.Y., 10
MacLeod & Hanopol, Inc., Mass., 5
Magnavox Co., Ind., 5, 7, 15, 30, 40
Magnavox Research Laboratories, Calif., 5, 7, 10, 15, 30, 32, 40

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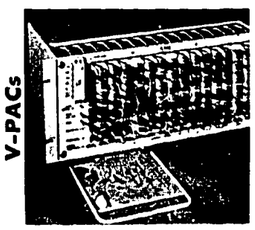

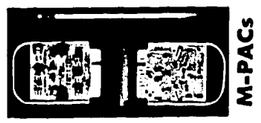

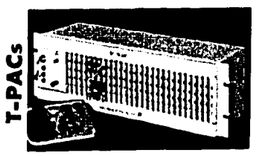

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WESTWOOD, LOS ANGELES, CALIF. GR 8-8705

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

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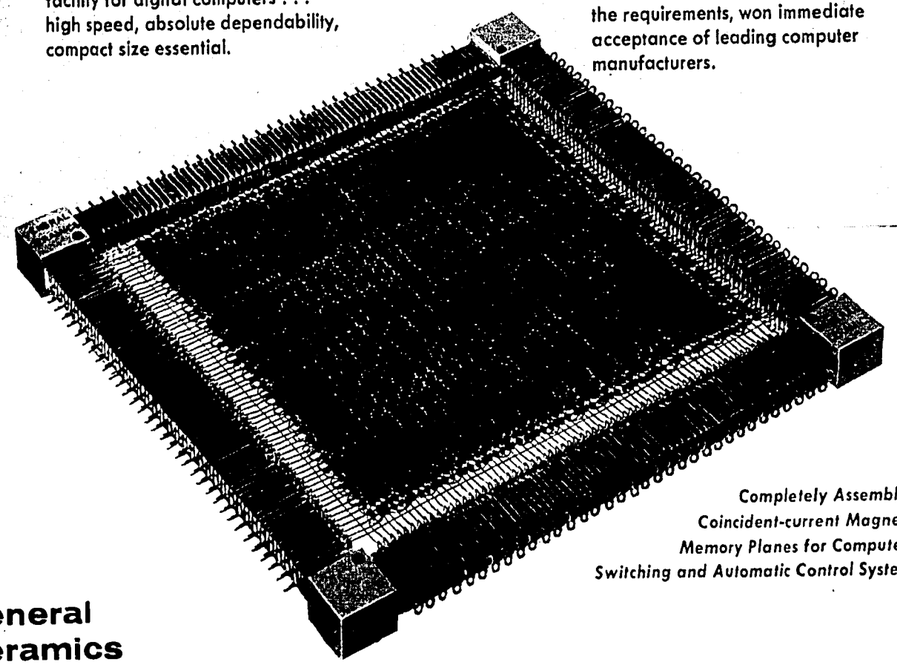

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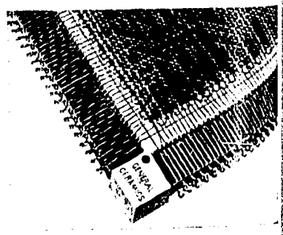

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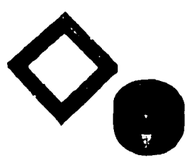

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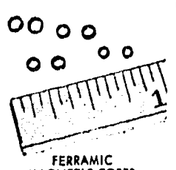

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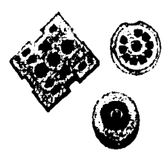

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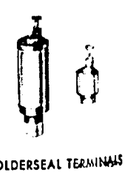

SOLDERSEAL TERMINALS

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Directory III. Controls & Instruments

70. Computers & Counters.

Magnetic Amplifiers, Inc., 632 Tinton Ave., New York 55, N.Y., 10
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Tel: CYpress 2-6610
Magnetics Research Co., N.Y., 15, 25
Maurer, Inc., J. A., N.Y., 30, Photographic
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Missouri Research Laboratories, Inc., Mo., 32
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Moseley Co., F. L., 409 N. Fair Oaks Ave., Pasadena, Calif., 30
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Tel: RYan 1-0208
NRD Instrument Co., Mo., 20, 25
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Navigation Computer Corp., 1623 Snyder Ave., Philadelphia 45, Pa., 5, 15, 20, 25, 30, 32, 40
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Tel: HOward 5-7700
Non-Linear Systems, Inc., Calif., 5, 32
Norden-Ketay Corp., N.Y., 5, 10
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Northeastern Engineering, Inc., N.H., 20
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Nuclear Consultants, Inc., N.Y., 20, 25
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Philips Electronics, Inc., N.Y., 10
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Potter Instrument Co., Inc., N.Y., 5, 20, 22, 25, 30
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Ramo-Wooldridge Corporation, 5730 Arbor Vitae St., Los Angeles 45, Calif., 5, 15, 30
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Tel: OR 8-0311, OR 2-0171
Ranson Research, Calif., 15, 20, 25, 30, 40
Reeves Instrument Corp., Sub. Dynamics Corp. of America, N.Y., 10
Remington Rand Div. Sperry Rand Corp., N.Y., 5, 7, 15, 30, 32, 35, 40
Remington Rand Univac, Div. of Sperry Rand Corp., Pa., 15
Research, Inc., Minn., 10
Royal-McBee Corp., N.Y., 15
Scantlin Electronics, Inc., Calif., 15, 25, 40
Seismograph Service Corp., Okla., 10
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Servomechanisms, Inc., Calif., 10
Servonics, Inc., Va., 5
Sigma Instruments, Inc., Mass., 20
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Soroban Engineering, Inc., Fla., 15, 30
Spencer Manufacturing Co., Ill., 25
Sperry Gyroscope Co., Calif., 10
Sperry Gyroscope Co., Air Armament Div., N.Y., 10, 15
Sperry Gyroscope Co., Marine Div., N.Y., 15
Sperry Gyroscope Co., Surface Armament Div., N.Y., 10, 15
Sperry Gyroscope Co. of Canada, Ltd., Canada, 5, 10, 15, 32
Sprague Electric Co., Mass., Magnetic Shift Registers
Standard Electric Time Co., Mass., 10
Stavid Engineering, Inc., N.J., 10, 30
Stelma, Incorporated, Conn., 25
Stereatronics, Inc., Mass., 20, Binary Cel's
Stranberg Engineering Labs., Inc., N.C., 20
Streeter-Amet, Ill., 5, 20
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Sunvic Controls, Ltd., England, 5, 10, 20, 25, 30
Sylvania Electric Products, Inc., Dept. F24P, 1740 Broadway, New York 19, N.Y., 15
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Systron Corporation, Calif., 20, 25, 30, 32
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Tare Electronics Inc., N.Y., 10, 30
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Telemeter Magnetics, Inc., Calif., 7, 15, 20, 25, 30, 40
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Texas Instruments Incorporated, 6000 Lemmon Ave., Dallas 9, Tex., 5, 10, 15, 20, 25, 30
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Tel: FLeetwood 2-1781
Ultrasonic Corp., Mass., 10, 15, 30
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U.S. Time Corp., N.Y., Gyroscopes
Vectron, Inc., 1607 Trapelo Rd., Waltham 54, Mass., 10
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Tel: TWinbrook 3-8700
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Walkirt Co., Calif., 15, 20, 25
Wang Laboratories, Inc., 37 Hurley St., Cambridge 41, Mass., 5, 10, 15, 25, 30, 40
See ad on this page
Tel: UNiversity 4-8380
Wright Engineering Co., Calif., 5, 20, 25, 35

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For details, circle #440 on Reader Service Card.

Counters: See class 70

Counting & Sorting Equipment: See class 68

Crystal testers: See class 72

Data recorders: See class 20

Data storage mechanisms: See class 20

Decades: See class 69

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

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Aluminum Sulfate
Ammonium Carbonate
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Ammonium Phosphate
Antimony Trioxide
Barium Acetate
Barium Carbonate
Barium Fluoride
Barium Nitrate
Benzene
Boric Acid
Cadmium Chloride
Cadmium Nitrate
Cadmium Sulfate
Calcium Carbonate
Calcium Chloride
Calcium Fluoride
Calcium Nitrate
Calcium Phosphate
Ether, Petroleum
Hydrochloric Acid
Hydrofluoric Acid
Lithium Carbonate
Lithium Chloride
Lithium Nitrate
Lithium Sulfate
Magnesium Carbonate
Magnesium Chloride
Magnesium Oxide
Manganous Carbonate
Methanol
Nickelous Chloride
Nickelous Nitrate
Nickelous Sulfate
Nitric Acid
Potassium Dichromate
Potassium Hydroxide
Radio Mixtures
Silicic Acid
Sodium Carbonate
Sodium Chloride
Sodium Hydroxide
Sodium Phosphate Dibasic
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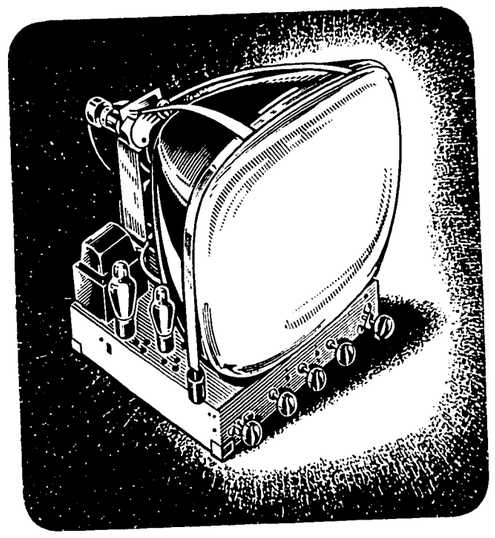

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Directory III. Controls & Instruments

Delay lines: See class 34

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71. General Laboratory Equipment & Supplies

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10. Chemicals
15. General laboratory equipment
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25. Shielded enclosures

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Aerolux Lights Corp., 655 Eleventh Ave., New York 36, N.Y., Custom Glass
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Tel: CIrcle 6-5324

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Fisher Scientific Co., Pa., 10, 15

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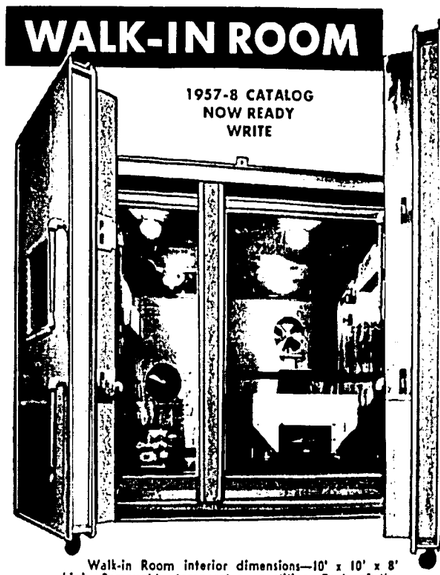
General Chemical Div., Allied Chemical & Dye Corp., N.Y., 10

WALK-IN ROOM



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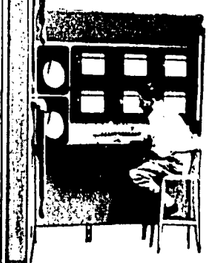
HYDRAULICS, Inc.
NEW YORK



Walk-in Room interior dimensions—10' x 10' x 8' high. Removable temperature partition. Each of the two sections can be operated at different temperatures. Temperature range —100°F to +400°F.—Altitude—can be built to 100,000 feet or higher.—Separate air lock for entrance of personnel without upsetting altitude run.—Rain in either or both compartments at rate of 4" per hour.—Humidity—20% to 100%. Chamber constructed sectionally for ease of installation.

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- HUMIDITY
- HI or LO TEMP.
- SAND and DUST
- SUNSHINE
- RAIN
- SALT SPRAY
- IMMERSION
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40 Matinecock Ave Port Washington, N Y

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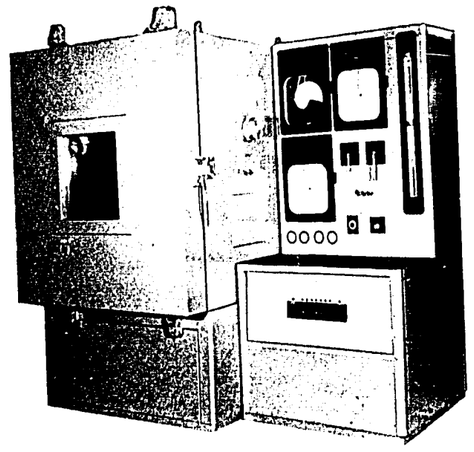
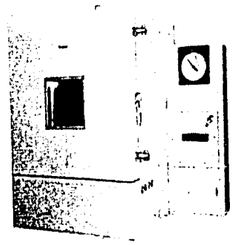
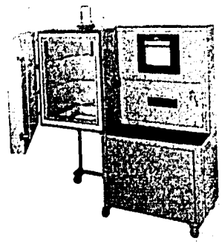


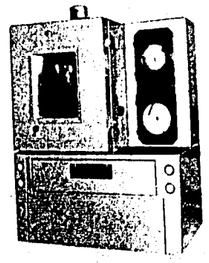
3 x 3 x 4 Altitude Temperature — Humidity Chamber, +300°F. to −100°F., 20-98% humidity, 100,000-ft. altitude.



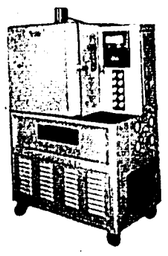
4 x 4 x 4 High-Low Temperature Chamber, +300° F. to −100° F., completely self-contained.



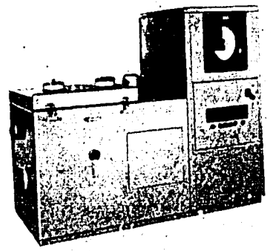
Combination Temperature-Vibration Chamber, +500° F. to −100° F., 8, 27, and 64 cu. ft. sizes.



Program Controlled Temperature — Humidity Chamber, +250°F. to −100° F. temperature, 20-95% humidity.



Portable 4 cu. ft. Test Chamber, range +250° F. to −100° F.



High-Low Temperature Chamber, CB Series, +250° F. to −100° F.

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Industron Co., N.Y., 15
International Optical Co., Inc., N.Y., Optic Devices & Glass
International Radiant Corp., 40 Matinecock Ave., Port Washington, N.Y., 5
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Tel: POrt Washington 7-3184
Jarrell-Ash Co., Mass., Fluoro Meter
Kollmorgen Optical Corp., Mass., 15
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Mackay, Inc., A. D., N.Y., 10
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Multi-Amp Corp., N.J., 15
Murphy & Miller, Inc., Ill., 5
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40. Galvanometers
45. Insulation testers
50. Mass spectrometer
55. Multimeters
60. Null indicators
65. Ohm & meghom meters
70. Pyrometers
72. Racks—aging
73. Resistor testers
74. Spectrometers
78. Stroboscopes
80. Tansistor testers
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84. Ultrasonic testers
85. Vacuum guages
86. Vacuum tube testers
88. Vacuum tube voltmeters
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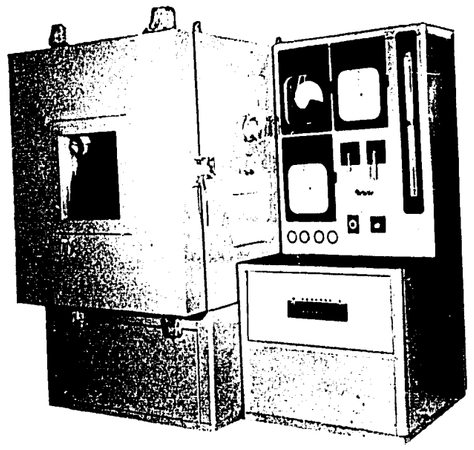
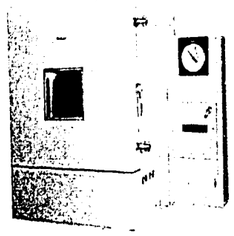
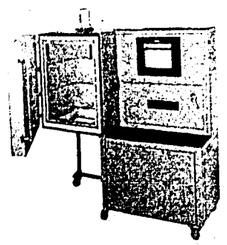


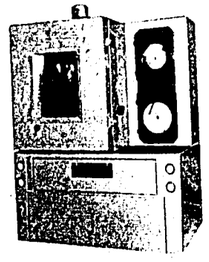
3 x 3 x 4 Altitude Temperature — Humidity Chamber, +300°F. to –100°F., 20-98% humidity, 100,000-ft. altitude.



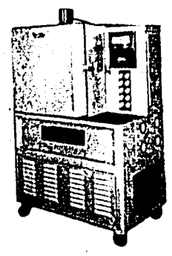
4 x 4 x 4 High-Low Temperature Chamber, +300° F. to –100° F., completely self-contained.



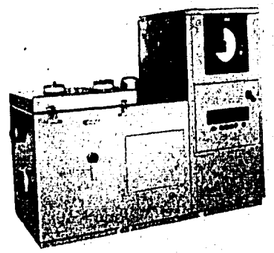
Combination Temperature-Vibration Chamber, +500° F. to –100° F., 8, 27, and 64 cu. ft. sizes.



Program Controlled Temperature — Humidity Chamber, +250°F. to –100° F. temperature, 20-95% humidity.



Portable 4 cu. ft. Test Chamber, range +250° F. to –100° F.



High-Low Temperature Chamber, CB Series, +250° F. to –100° F.

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International Radiant Corp., 40 Matinecock Ave., Port Washington, N.Y., 5
See ad on page 473
Tel: POrt Washington 7-3184
Jarrell-Ash Co., Mass., Fluoro Meter
Kollmorgen Optical Corp., Mass., 15
Lennard Co., Inc., P. M., N.Y., 5, 15, 20, 25
Lindgren & Assoc., Inc., Erik A., Ill., 25
Mackay, Inc., A. D., N.Y., 10
Manson Laboratories, Inc., 207 Greenwich Ave., Stamford, Conn., 15
See ad on page 494
Tel: DAvis 4-6783
Metal Textile Corp., 647 E. First Ave., Roselle, N.J., 20
See ad on page 598
Tel: CHestnut 5-3000
Miller Dial & Name Plate Co., Calif., 10
Multi-Amp Corp., N.J., 15
Murphy & Miller, Inc., Ill., 5
NRC Equip. Corp., 287 Charlemont St., Newton Highlands 61, Mass., 5
See ad on page 580
Tel: DEcatur 2-5800
Network Mfg. Co., N.J., 15
Nuclear Consultants, Inc., N.Y., 10
Nuclear Corp. of America, N.Y., 10, 25
Pancro Mirrors, Inc., Calif., Front Surface Mirrors
Perfection Mica Co., 1322 N. Elston Ave., Chicago 22, Ill., 5, 20, 25
See ad on page 599
Tel: EVerglade 4-2122
Philips Electronics, Inc., N.Y., 15
Photographic Products, Inc., Calif., 15
Precision Scientific Co., Ill., 5, 15
Probescope Co., 44-05 30 Ave., Long Island City 3, N.Y., 15
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Science Electronics, Inc., Mass., 15
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Shielding, Inc., 30 Reade St., Riverton, N.J., 25
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Sperry Gyroscope Co., Air Armament Div., N.Y., 5
Stark Electronic Sales Co., Canada, 25
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Swift Textile Metalizing & Laminating Corp., Conn., 20
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United Electrodynamics, Calif., 5
Valtronic Corp., N.Y., 15, Formica Lab Units
Welch Manufacturing Co., W. M., Ill., 15
Westlake Plastics Co., Pa., 20, 25
York Co., Inc., Otto H., N.J., 20, 25

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35. Electrometers
40. Galvanometers
45. Insulation testers
50. Mass spectrometer
55. Multimeters
60. Null indicators
65. Ohm & meghom meters
70. Pyrometers
72. Racks—aging
73. Resistor testers
74. Spectrometers
78. Stroboscopes
80. Transistor testers
82. Ultrasonic generators
84. Ultrasonic testers
85. Vacuum guages
86. Vacuum tube testers
88. Vacuum tube voltmeters
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Allison Laboratories, Calif., Audiometer & Calibrators
All-Tronics, Inc., 45 Bond St., Westbury, L.I., N.Y., 5, 10, 72, 73, 80, 86
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Alto Scientific Co., Calif., 88
Amerac, Inc., Mass., 5
American Chronoscope Corp., N.Y., 5, 55, 88
American Electronic Labs., Inc., Pa., 80

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American Metrix Corp., N.J., 5, 10, 35, 40, 55, 60, 65, 73, 80, 86, 88
American Optical Co., Instrument Div., N.Y., 50, 74
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Analogue Controls, Inc., N.Y., 5, 60
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Audio Instrument Co., Inc., N.Y., Galvanometer Shunts, Tone Burst Test Set
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TRANSISTOR BETA, h_{fe}, I_{CO} TESTER Model KT-1

This portable transistor tester measures Beta, h_{fe} and I_{CO}. Light weight, it is completely self-contained with its own 1Kc oscillator and battery power supply. Utilizes printed circuit construction . . . has provisions for collector waveform observation and meter overload protection.

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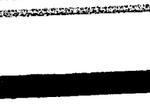
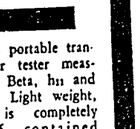
Model KP-1 measures all *h* parameters . . . has provisions for measuring transistor reverse characteristics and external measurement of I_{CO}. It is designed for wide range of test conditions — range of I_C and I_E variable from 1.0 to 300ma — range of V_C from 0 to 100 volts — frequency range from 100 cps to 200 kc.



TRANSISTOR TEST SET Model GP-4

Model GP-4 tester is designed for measuring — *h* parameters and equivalent T coefficients . . . NPN and PNP junction and surface barrier transistors . . . grounded base or emitter circuits . . . alpha and beta cut-off . . . I_{CO} and C_C. Test frequency is from 100 cps to 1 mc.



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Model LK-1 is a compact battery-powered instrument for measuring the temperature of power transistors. Because of its temperature range . . . 35° to 85° C . . . it is particularly adaptable to temperature measurement of germanium transistors. Tester accuracy is ±1° C.; battery life is approximately 250 hours. It is available with a number of sensing elements.

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Generates the r_{22}, r_{12}, and h_{12} families of characteristic curves of low-power transistors and semiconductor diodes for display on an auxiliary oscilloscope.

This Plotter combines the precision and versatility of laboratory equipment with the ease and speed of operation and the ruggedness needed for production testing and sorting of transistors and semi-conductor diodes. It has proved invaluable for transistor matching, production testing, quality control, transistor circuit design and applications, semi-conductor research and development, and educational use for laboratory work in semi-conductors.

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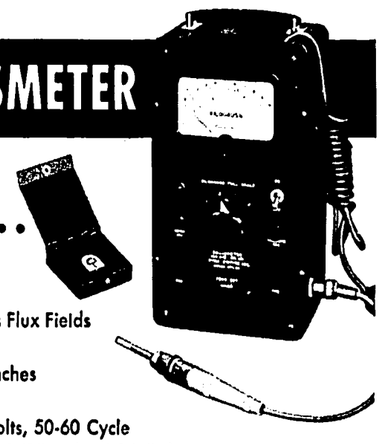
D-79 GAUSSMETER



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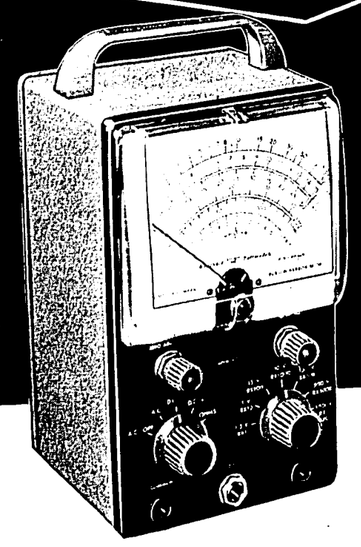

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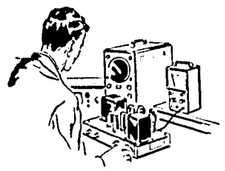

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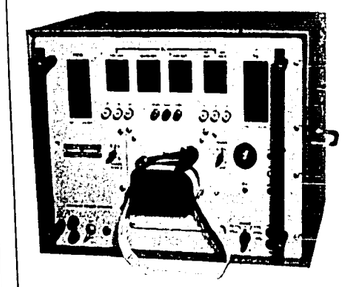

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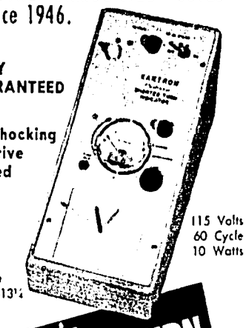

115 Volts 60 Cycle 10 Watts

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MODEL	MANDREL SIZE	PRICE
101-D	5/32"x7/32"x2"	$175.00
101-E	7/64"x7/64"x1 3/8"	185.00
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				RANDOM NOISE		
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PP-3.5/4-A	3,500 watts	4,000 watts	800	500	1,500	AP-5-A
PP-7/8-A	7,000 watts	8,000 watts	1,200	840	2,520	AP-10-A
PP-20/20-C	22,000 watts	22,000 watts	3,500	2,500	7,500	AP-20-A
PP-40/40-B	44,000 watts	44,000 watts	5,000	3,500	10,500	AP-40-A
PP-60/80-A	60,000 watts	80,000 watts	7,000	5,000	15,000	AP-60-A
PP-90/140-A	90,000 watts	140,000 watts	12,500	8,800	26,400	AP-60-A
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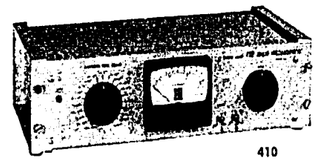
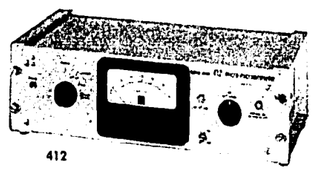


410



412

MODEL 410, 20 Ranges from 3×10^{-13} to 10^{-3} ampere full scale (two per decade). Input grid current $< 5 \times 10^{-14}$ ampere, input drop < 5 mv. Drift < 2% of full scale in 24 hours, except 3×10^{-13} range, 4%. Accuracy 2% of full scale on 10^{-3} to 10^{-8} ranges, 4% on other ranges. Rise time to 67% of final value is 4 seconds on 3×10^{-13} range, 1 second on 10^{-11} range, with 5000 mmf across input. Full Scale Output, five volts; noise < 2% of full scale. $490.00.

MODEL 412, Single range from 10^{-13} to 10^{-7} ampere. Drift < 5% of a decade in 24 hours. Accuracy 0.2 decade. Rise time to 90% of final value is 6 seconds for currents between 10^{-13} to 10^{-12} ampere and < 2 seconds for currents between 10^{-12} and 10^{-7} ampere—with 5000 mmf across input. Full Scale Output, six volts; noise < 30 mv rms. $465.00

MODEL 411, 17 Ranges from 10^{-11} to 10^{-3} ampere full scale (two per decade). No Switching Transients. Input grid current $< 5 \times 10^{-14}$ ampere, input drop < 5 mv. Drift < 2% of full scale per week on all ranges. Accuracy, 2% of full scale on 10^{-3} to 10^{-7} ranges, 4% on other ranges. Rise time to 67% of final value is 4 seconds on 10^{-11} range, 1 second on 10^{-10} range, with 5000 mmf across input. Full Scale Output, ten volts; noise < 2% of full scale. $535.00

MODEL 410-C Identical to 410 except that meter-relay with adjustable contact replaces standard panel meter. 5-ampere internal relay operates from meter contacts. $625.00

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MODEL 220, Line operated, transistorized, useful as preamplifier. Ranges, Eight: 0.03, 0.1, 0.3, 1, 3, 10, 30 and 100 volts full scale. Drift < 3 mv per hour with moderate ambient temperature variations. Output, Two separate single-ended outputs: ± 5 volts and ± 1 milliampere for full scale meter deflection on any range. Frequency response is dc to 60 cps on 30 mv range, rising to 300 cps on 100 volt range. $400.00

MODEL 200B, Battery operated, portable. Ranges, Eight: 8, 20, 80, 200, 800 mv and 2, 8, 20 volts full scale. Drift < 1 mv per hour. Not sensitive to temperature variation. Battery Life 400 hours or better. $335.00

MODEL 210, Line operated. Ranges, Five: 0.8, 2, 8, 20, 80 volts full scale. Drift < 1% of full scale. Output 10 volts for full scale meter deflection on any range; impedance 8600 ohms. $325.00

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ACCESSORIES permit above DC VTVM's to measure higher voltages, low currents and high resistances. Voltage Dividers have ratios of 100:1 and 1000:1—permit measurements to 20 kv. Decade Shunts permit measurements from 10^{-3} to 5×10^{-14} ampere. Regulated Voltage Supply permits measurements from 10^4 to 10^{16} ohms.

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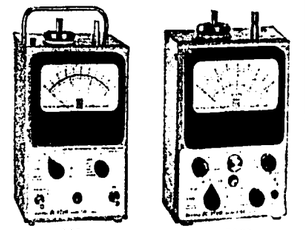

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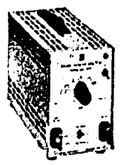

AC DECADE ISOLATION AMPLIFIER Model 102B also useful as general purpose broad-band preamplifier. Decade Gains, 0.1, 1, 10, 100, and 1000. Mid-band gain accuracy 2%. Input Impedance is > 400 meg, 3 mmf. Output Impedance is < 50 ohms, 20 mfd. Frequency Response (two position band width switch provided):

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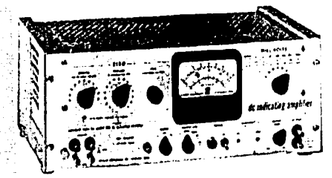

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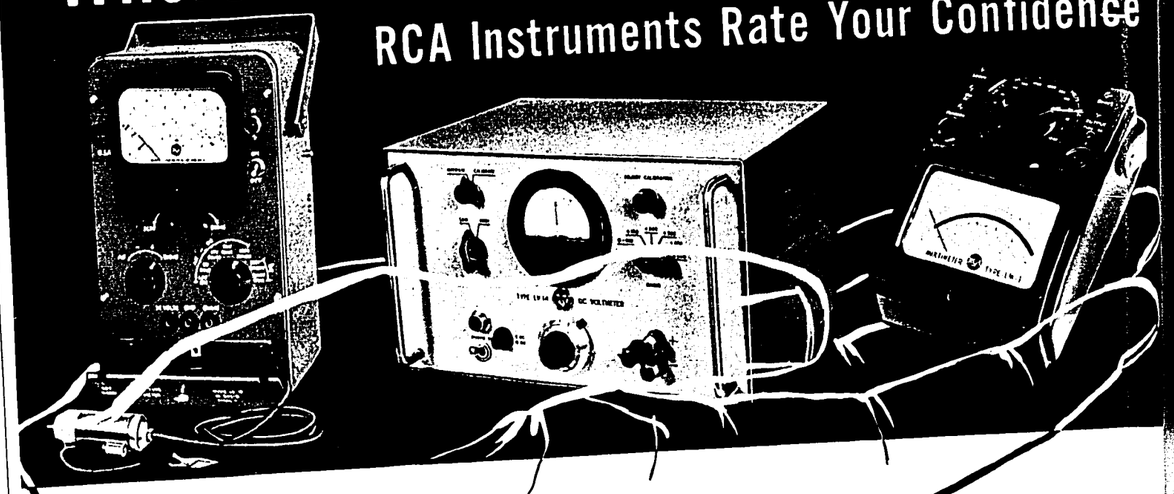

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Frequency Response: ±1.0 db, 18 cps to 700 MC. Relative Measurements: possible to 1000 MC.

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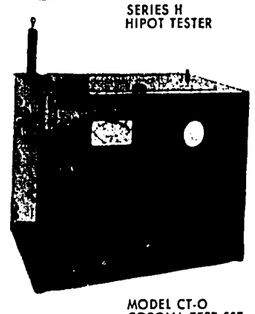

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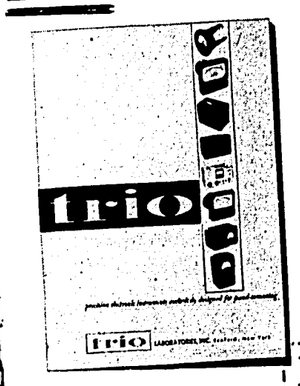

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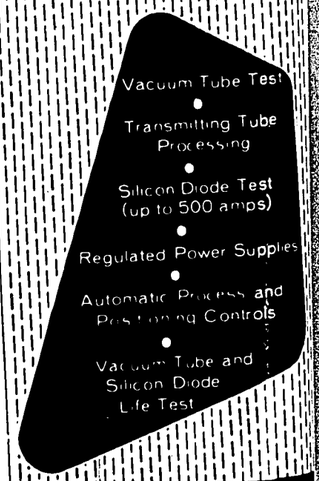

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Southwestern Industrial Electronics Co., 2831 Post Oak Rd., P.O. Box 13058 Houston, Tex., 5, 10, 15, 20
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Tel: MOhawk 7-6611
Technicraft Labs., Inc., Conn., 77
Telephonics, Corp., N.Y., 5, 10, 15, 20
Texas Instruments Incorporated, 6000 Lemmon Ave., Dallas 9, Tex., 5, 10, 15, 20
Multiple pages of additional data on 88-89
Tel: FLeetwood 2-1781
United Electrodynamics, Calif., 5, 10, 15, 20
Universal Atomics Corp., N.Y., 5, 10
Universal Transistor Products Corp., N.Y., 5

74. Graphic Recorders.

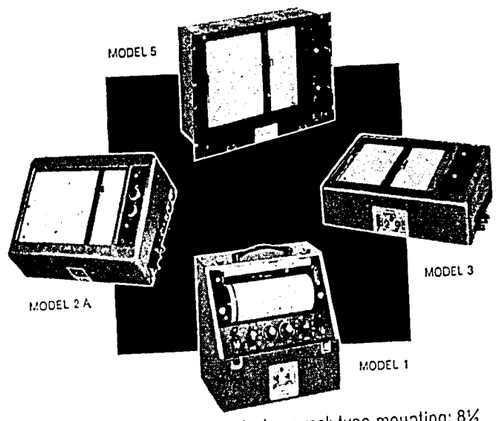
5. Charts & papers
10. Ink writing
15. Inkless types
20. Fixed speed types
25. Variable speed types

Acton Laboratories, Inc., Mass., 15, 25
Airborne Instruments Laboratory, Inc., 160 Old Country Rd., Mineola, L.I., N.Y., 25
See ad on page 154
Tel: PIoneer 2-0600
Alden Electronic & Impulse Recording Equipt. Co., Alden Research Center, Westboro 6, Mass., 5, 15, 20, 25
See ad on page 270
Tel: FOrest 6-4467
Alden Systems Co., Mass., 15, 20, 25
Alfax Paper & Eng. Co., Washington St., Westboro 6, Mass., 5
See ad on page 270
Tel: FOrest 6-4467
Antlab, Inc., Ohio, Antenna Pattern
Automatic Temperature Control Co., Inc., Pa., 10
Boehme, Inc., H. O., N.Y., 10
Bristol Co., Conn., 5, 10, 15, 20, 25
Brush Electronics Co., Ohio, 5, 10, 15, 20, 25
Century Electronics & Instruments, Inc., Okla., 5, 15, 25
Consolidated Electrodynamics Corp., Calif., 15, 25
Dalmo-Victor Co., Div. of Textron, Inc., Calif., 10, 20
Daystrom, Inc., N.J., 5, 10, 20, 25
Du Pont de Nemours & Co., E. I., Photo Products Dept., Del., 5
Edin Company, Inc., Mass., 5, 10, 15, 20, 25
Electro Instruments, Inc., Calif. 5
Elliott Brothers (London) Ltd. England, 5, 10, 15, 20, 25
Epic, Inc., N.Y., 15
Fielden Instrument Div., R-F C Co., Pa. 5, 10, 20, 25
Fischer & Porter Co., Pa., 10
Fisher Scientific Co., Pa., 10, 25
Fuchs Impulse Motors Co., Harry, N.Y., 15, 20, 25
General Electric Co., Apparatus Sales Div., N.Y., 10, 15
Grass Instrument Co., Mass., 10
Gray Manufacturing Co., Conn., 20, 25
Haloid Co., N.Y., 5
Hamilton Watch Co., Pa., 20, 25
Hogan Laboratories, Inc., N.Y., 5, 15, 20, 25
Houston Technical Laboratories, Tex., 10, 25
International Projector Corp., N.J., 15
Larson Instrument Co., N.Y., 15, 20, 25
Librascope, Inc., Calif., 20, 25
Logistics Research, Inc., Calif., 5, 10, 20, 25
Manning Maxwell & Moore, Inc., Conn., 5, 10, 20, 25
Massa Laboratories, Inc., Mass., 10, 15, 25
McLaurin-Jones Co., Mass., 5
Mid-Century Instrumatic Corp., N.Y., 10, 15, 20, 25
Mid-West Coil & Transformer Co., 1642 N. Halsted St., Chicago 14, Ill., 15
See ad on page 436
Tel: MIchigan 2-4055
Midwestern Instruments, Okla., 5, 15, 20, 25
Minneapolis-Honeywell Reg. Co., Industrial Div., Pa., 5, 10, 20, 25
Minneapolis-Honeywell Reg. Co., Ordnance Div., Minn., 15
Moseley Co., F. L., 409 N. Fair Oaks Ave., Pasadena, Calif., 10, 25
See ad on page 486
Tel: RYan 1-0208
Nichols, Ltd., R. H., Canada, 10, 15, 20, 25
Offner Electronics, Inc., Ill., 5, 10, 15, 20, 25
Photographic Products, Inc., Calif., 15, 25
Photovolt Corp., N.Y., 15
Photron Instrument Co., Ohio, 10, 25

THE MOSELEY

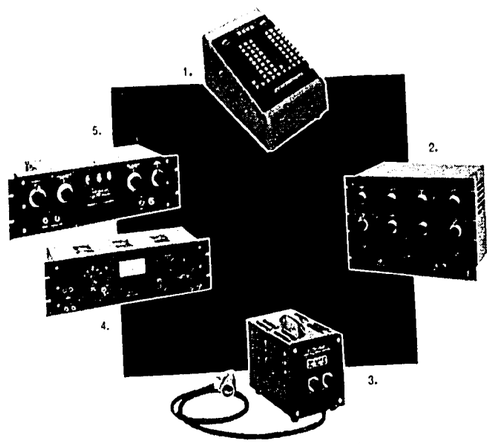
AUTOGRAF
trade mark

X-Y RECORDER



Five Models: Portable, desk, or rack type mounting; 8½ x 11 or 11 x 16½ size paper with vacuum holddown; Input filters; Ranges: 5 mv to 500 volts, continuous; Zero offset; Up to 2 meg-ohms input resistance; Better than ±0.25% accuracy and resolution; Curve Follower available.

ACCESSORIES



1. Model 40A Keyboard; Self-contained.
2. Model 30A Card or Model 50 Tape Translator.
3. Model F-1 Curve Follower Adaptor.
4. Model 60 Logarithmic Converter-Amplifier.
5. Model 51 Step Input; Scale factors: 1 to 200 steps/inch.

Complete information will be furnished on request.

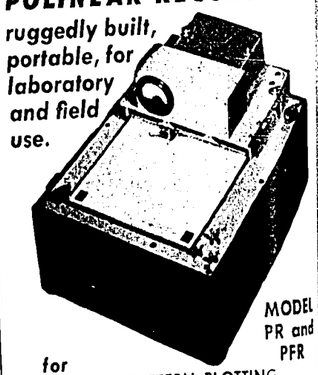
F.L. MOSELEY CO.
409 N. FAIR OAKS AVENUE
PASADENA, CALIFORNIA

For details, circle #456 on Reader Service Card.

74. Graphic Recorders.

Precise Measurements Co., Millbrook Lane, R.D. #1, Flemington, N.J., 15, 20, 25
See ad on page 384
Tel: FLemington 900
Precision Recording Chart Co., N.J., 5
Reeves Instrument Corp., N.Y., 10, 15, 25
Sanborn Co., 175 Wyman St., Waltham 54, Mass., 5, 15, 25
See ad on page 224
Tel: TWinbrook 4-6300
Scientific-Atlanta, Inc., Ga., 5, 10
Seismograph Service Corp., Okla., 15, 20
Skiatron Electronics & TV Corp., N.Y., 15
Sound Apparatus Co., Stirling, N.J., 5, 10, 15, 20, 25
See ad on page 486
Tel: MIll 7-0600
Sunvic Controls, Ltd., England, 5, 10, 25
Technical Products Co., Instrument Div., Calif., 5, 20
Telecomputing, Div. of Telecomputing Corp., 10, 25
Texas Instruments Incorporated, 6000 Lemmon Ave., Dallas 9, Tex., 10, 20, 25
Multiple pages of additional data on 88-89
Tel: FLeetwood 2-1781
Varian Associates, 611 Hansen Way, Palo Alto 2, Calif., 5, 10, 20, 25
Multiple pages of additional data on 64-65
Tel: DAvenport 5-5631
West Instrument Corp., Ill., 10, 25, Temperature
Westronics Inc., Tex., 5, 10, 20, 25

Polar Recorder *and*
POLINEAR RECORDER
ruggedly built, portable, for laboratory and field use.



MODEL PR and PFR

for
BEAM PATTERN PLOTTING
of antennas, microphones, loudspeakers, ultrasonic devices;
FREQUENCY RESPONSE RECORDS
of microphones, loud speakers, filters, amplifiers, and television circuits.

Both recorders can be furnished with circuits for ac or ac-dc signal recording. Chart size 8½" x 11". Convenient linkage to oscillators, analyzers, rotational devices, test-turntables.

The POLAR RECORDER PR has selsyn-driven rotary movement; the POLINEAR RECORDER PFR has polar and linear synchronous-driven turntable. Descriptive literature available.

Designers and Manufacturers of Graphic Recorders

SOUND APPARATUS CO.
Stirling, New Jersey
Southern Representative: RICH ELECTRONICS, INC. 212 Northwest 8th Ave., Miami, Fla.
For details, circle #457 on Reader Service Card.

Directory III. Controls & Instruments

Impedance meters: See class 80

Insulating materials: See class 89

Insulation testers: See class 72

Integrators, pulse count See class 78

Intermodulation meters: See class 67

Ionization chambers: See class 78

Laboratory equipment & supplies: See class 71

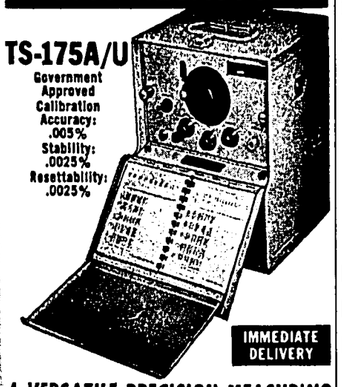
75. Laboratory Standards of Frequency & Time.

5. Elapsed time measuring equip.
10. Primary standards of frequency
15. Primary standards of time
20. Secondary standards of frequency
25. Secondary standards of time
30. Tuning forks

ACME Telectronix, Div. of Nea Service, Inc., Ohio, 20, 30
Aero Instrument Co., Calif., 5, 20
Aeronca Research Div., Md., 5, 10, 15, 20, 25
Airmec, Ltd., England, 5, 10, 15
Alden Electronic & Impulse Recording Equipt. Co., Alden Research Center, Westboro 6, Mass., 20, 25
See ad on page 270
Tel: FOrest 6-4467
American Chronoscope Corp., N.Y., 5
American Time Products, Inc., 580 Fifth Ave., New York 36, N.Y., 20, 30
See ad on page 488
Tel: PLaza 7-1430
B J Electronics Div., Borg Warner Corp., 3300 Newport Blvd., Santa Ana, Calif., 10, 20
See ad on page 31
Tel: KI 5-5581
Ber...en Laboratories, N.J., 5
Beckman Instruments, Inc., Berkeley Div., Calif., 20
Bliley Electric Co., Union Station Building, Erie, Pa., 20
See ads on pages 342, 343
Tel: ERie 22-287
Borg Corp., George W., Borg Equipment Div., 120 South Main St., Janesville, Wis., 20
See ad on page 156
Tel: PLeasant 4-6616
Bristol Engineering Corp., Electronics Div., Pa., 25
Browning Laboratories, Inc., Mass., 10, 15
Clary Corp., Calif., 5
Collins Radio Co., 855 35th St. N.E., Cedar Rapids, Iowa, 10, 20
Multiple pages of additional data on 49-54
Tel: EM 3-0281
Colortone Electronics, Inc., 200 Frank Rd., Hicksville, L.I., N.Y., 20
See ad on this page
Tel: WElls 8-0500
Computer-Measurements Corp., Calif., 5, 20, 25
Consolidated Avionics Corp., N.Y., 5, 10, 15, 20, 25
Continental Communications, Inc., Ill., 20, WWV Receivers

WIDE-RANGE FREQUENCY METER 85-1000 MEGACYCLES

TS-175A/U
Government Approved Calibration Accuracy: .005% Stability: .0025% Resettability: .0025%



IMMEDIATE DELIVERY

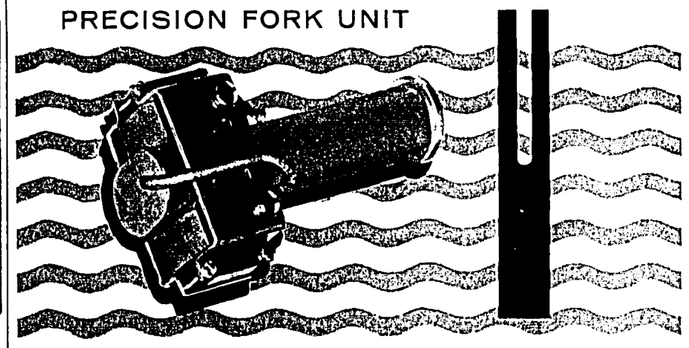
A VERSATILE PRECISION MEASURING INSTRUMENT *Recommended Applications:*

- Precise Measurements of Frequencies
- Production Testing
- Alignment of Transmitters and Receivers
- Laboratory Testing
- Portable Field Testing
- A Secondary Frequency Standard
- Signal Generator Calibration
- U.H.F. and V.H.F. Television Alignment

COLORTONE
ELECTRONICS, Incorporated
200 Frank Road Hicksville, N.Y.

For details, circle #458 on Reader Service Card.

PRECISION FORK UNIT



NEW FORK UNIT DESIGNED FOR HIGH ENVIRONMENTAL VIBRATION USES. SENSIBILITY TO EXTERNAL FORCES IS REDUCED AT LEAST ONE ORDER OF MAGNITUDE THROUGH VIBRATION RANGE OF 2 TO 2000 CPS WITHOUT SHOCK MOUNTS. INHERENT STABILITY IS AT LEAST 1 PART IN 1 MILLION ±5°C OR 1 PART IN 10 MILLION WITH OVEN. FORK FREQUENCIES 1000 TO 5000 CPS.

LONG TERM DRIFT LESS THAN $5/10^6$ PER YEAR.

TIMES FACSIMILE CORPORATION
540 West 58th St., New York 19, N.Y.—1523 L St., N.W., Washington 5, D.C.
For details, circle #459 on Reader Service Card.

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

FREQUENCY STANDARDS

PRECISION FORK UNIT
TYPE 50

Size 1" dia. x 3¾" H. Wght., 4 oz.*
Frequencies: 240 to 1000 cycles
Accuracies:—
Type 50 (±.02% at —65° to 85°C)
Type R50 (±.002% at 15° to 35°C)
Double triode and 5 pigtail parts required
Input, Tube heater voltage and B voltage
Output, approx. 5V into 200,000 ohms
*3⅛" high
400 - 1000 cy.

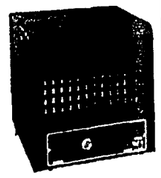
FREQUENCY STANDARD
TYPE 50L

Size 3¾" x 4½" x 5½" High
Weight, 2 lbs.
Frequencies: 50, 60, 75 or 100 cycles
Accuracies:—
Type 50L (±.02% at —65° to 85°C)
Type R50L (±.002% at 15° to 35°C)
Output, 3V into 200,000 ohms
Input, 150 to 300V, B (6V at .6 amps.)

PRECISION FORK UNIT
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 and output same as Type 50, above
*3½" high
400 to 500 cy. optional

FREQUENCY STANDARD
TYPE 2005

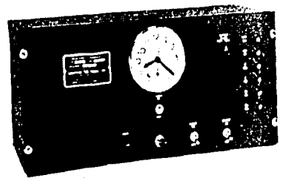


Size, 8" x 8" x 7¼" High
Weight, 14 lbs.
Frequencies: 50 to 400 cycles (Specify)
Accuracy: ±.001% from 20° to 30°C
Output, 10 Watts at 115 Volts
Input, 115V. (50 to 400 cycles)

FREQUENCY STANDARD
TYPE 2007T
TRANSISTORIZED

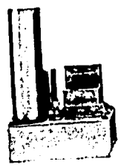
Size 1½" dia. x 4½" H. Wght. 7 ozs.*
Frequencies: 240 to 1000 cycles
Accuracies:—Same as 2003, above
Type 2007S—Silicon type
Input, 28V.
Output, Multitap, 75 to 100,000 ohms
*3½" in 2007S, 400 to 800 cycles.

FREQUENCY STANDARD
TYPE 2121A



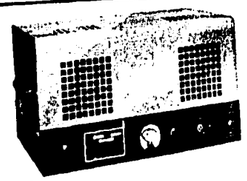
Size
8¾" x 19" panel
Weight, 25 lbs.
Output: 115V
60 cycles, 10 Watt
Accuracy:
±.001% from 20° to 30°C
Input, 115V (50 to 400 cycles)

FREQUENCY STANDARD
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.

FREQUENCY STANDARD
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 cycles
Accuracy: (±.002% at 15° to 35°C)
Output: 115V, 75W. Input: 115V, 50 to 75 cycles.

ACCESSORY UNITS
for TYPE 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 20 KC.
M—Power Amplifier, 2W output.
P—Power supply.

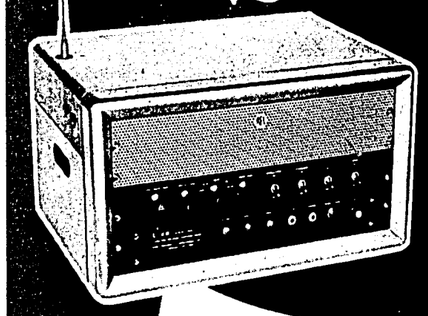
This organization makes frequency standards within a range of 30 to 30,000 cycles. They are used extensively by aviation, industry, government departments, armed forces—where maximum accuracy and durability are required.

WHEN REQUESTING INFORMATION
PLEASE SPECIFY TYPE NUMBER

American Time Products, Inc.
580 FIFTH AVENUE, NEW YORK 36, N. Y.

For details, circle #460 on Reader Service Card.

Measurement Standards



NEW
MODEL 1051
C-R-A-M
UNIT

Calibrator - Receiver - Amplifier - Mixer

The Model 1051 combines four functions. As a 10 kc to 500 mc frequency standard, it delivers sub-harmonics of a 10 mc oscillator to ±0.0005% accuracy. Discrete sine wave frequencies of 10, 50, 100, 200 kc and 1, 2, 10 mc available from rear terminals. Its 5 mc WWV receiver has a sensitivity of 5 microvolts. The amplifier and mixer sections provide a gain of several hundred times and a comparison of external signals up to 1000 mc or a comparison of external with internal signals. Price $760.

MODEL 531

MODEL 541A

MODEL 459

Crystal Impedance Meters

Four units now available to measure resonance and anti-resonance resistance of quartz crystals, including those covered by Spec. MIL-C-3098B. Capacitance, inductance and performance index (PI) of the crystal can be determined.

Model 531 (TS-683/TSM) covers range of 10-140 mcs, employing 13 calibrating resistors and an anti-resonance adapter for 10-150 ohm crystals. Price $590.

Model 541A (TS-710/TSM) for 10-1100 kc range crystals having resistances from 200 ohms to 0.5 megohms. Power dissipated in the crystal is measured. Built-in VTVM and ohmmeter provided. Price $860.

Model 459 (TS-330/TSM) covers 1-15 mc frequency range for crystals having resonance resistances from 0 to 9900 ohms. Price $695.

Model 1207 (AN/TSM-15) covers frequency range of 75-200 mcs for 10-125 ohm crystals. Crystal voltage at series resonance is measured and power calculated. Built-in ohmmeter.

All models were developed under Signal Corps technical requirements for the national crystal testing standardization program.

Performance of all models is rigidly guaranteed. Prices are net f.o.b. Boonton, N.J. and subject to change without notice.

SEND FOR TECH. DATA
For additional information, including application data, write or phone DE 4-3100. Demonstrations available by local representatives.

RFL Radio Frequency LABORATORIES, INC.
Boonton, New Jersey, U.S.A.

For details, circle #461 on Reader Service Card.

Directory III. Controls & Instruments

75. Laboratory Standards of Frequency & Time.

Control Electronics Co., Inc., 1925 New York Ave., Huntington Station, L.I., N.Y., 20, 25
See ad on page 346
Tel: HAmilton 7-7961

D & R, Ltd., Calif., 20

Daystrom, Inc., N.J., 5

De Mornay-Bonardi, 780 S. Arroyo Pkwy., Pasadena, Calif., 20
Multiple pages of additional data on 130-131
Tel: RYan 1-7416

Dimco-Gray Co., Ohio, 5

Dunlap Electronics, Iowa, 20

Dynapar Corp., Ill., 5

Electro-Pulse, Inc., 11861 Teale St., Culver City, Calif., 5, 20, 25
See ad on page 492
Tel: TExas 0-8006

Electronic Applications, N.Y., 20 & Tuning Pitch Gen.

Elk Electronic Labs., Inc., N.Y., 5, 20

F-R Machine Works, Inc., 26-12 Borough Pl., Woodside 77, N.Y., 20
Multiple pages of additional data on 55-58
Tel: AStoria 8-2800

Furzehill Laboratories, Ltd., England, 20

Gaertner Scientific Corp., Ill., 5

General Electric Co., Apparatus Sales Div., N.Y., 5

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 10, 15, 20, 25, 30
See ad on Cover 4
Tel: TRowbridge 6-4400

Gibbs Mfg. & Research Corp., Wis., 5

Hamilton Watch Co., Pa., 5, 15, 25, 30

Haydon Co., A. W., Dept. IRE, 240 N. Elm St., Waterbury 20, Conn., 5
See ad on page 398
Tel: PLaza 6-4481

Hewlett-Packard Co., 4277D Page Mill Rd., Palo Alto, Calif., 5, 20, 25
Multiple pages of additional data on 3-14
Tel: DAvenport 5-4451

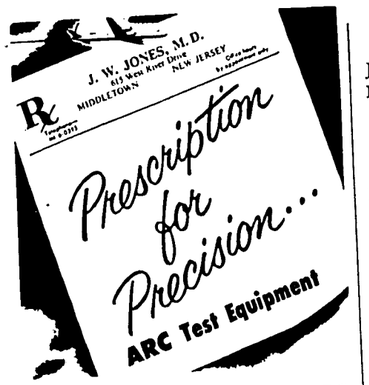
Hill Electronic Engr. & Mfg. Co., Inc., Pa., 10, 20

Hycon Eastern, Inc., 75 Cambridge Pkwy., Cambridge 42, Mass., 10, 20
Multiple pages of additional data on 140-141
Tel: UNiversity 4-7200

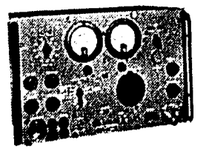
Industrial Test Equipment Co., 55 E. 11 St., New York 3, N.Y., 10, 20
See ad on page 509
Tel: GRamercy 3-4684

Industrial Timer Corp., N.J., 5

International Telephone & Telegraph Corp., Industrial Products Div., 100 Kingsland Rd., Clifton, N.J., 10, 20
Multiple pages of additional data on 76-79
Tel: NUtley 2-3600



Radio technicians and pilots trust ARC test equipment to keep airborne instruments in tune for precision navigation and communication.

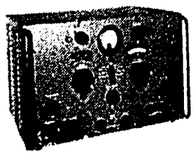


Type H-14A Signal Generator

Has two uses: (1) It provides a sure and simple means to check omnirange and localizer receivers in aircraft on the field, by sending out a continuous test identifying signal on hangar antenna. Tuned to this signal, individual pilots or whole squadrons can test their own equipment. The instrument permits voice transmission simultaneously with radio signal. (2) It is widely used for making quantitive measurements on the bench during receiver equipment maintenance.

Type H-16 Standard Course Checker

Measures the accuracy of the indicated omni course in ARC's H-14A or other omni signal generator to better than ½ degree. It has a built-in method of checking its own precision.



Type H-12 Signal Generator (900-2100 mc)

Equal to military TS-419/U, and provides a reliable source of CW or pulsed rf. Internal circuits provide control of width, rate and delay of internally-generated pulses. Complete specifications on request.

Dependable Airborne Electronic Equipment Since 1928

Aircraft Radio Corporation

Boonton, New Jersey

Omni/ILS Receivers • Course Directors • UHF and VHF Receivers and Transmitters • LF Receivers and Loop Direction Finders • 10-Channel Isolation Amplifiers • 8-Watt Audio Amplifiers • Interphone Amplifiers • Omnirange Signal Generators and Standard Course Checkers • 900-2100 Mc Signal Generators

For details, circle #462 on Reader Service Card.

75. Laboratory Standards of Frequency & Time.

Jacobs Instrument Co., Md., 20, 25
Kay Electric Co., Dept. ID-9, 14 Maple Ave., Pine Brook, N.J., 20
Multiple pages of additional data on 44-45
Tel: CAldwell 6-4000
Lampkin Laboratories, Inc., Fla., 20
Lewis Co., Inc., E. B., Conn., 20
Lytle Engineering & Mfg. Co., N.M., 5
Manson Laboratories, Inc., 207 Greenwich Ave., Stamford, Conn., 10, 20
See ad on page 494
Tel: DAvis 4-6783
Marconi Instruments, 44 New St., New York 4, N.Y., 10
See ad on page 518
Tel: HAnover 2-0197
Marconi Instrument, Ltd., St. Albans, Hertfordshire, England, 5, 10, 20
See ad on page 518
Tel: SAint Albans 5-6161
Metronix, Inc., Conn., 20
Muirhead & Co., Ltd., England, 30
Muirhead Instruments, Inc., N.Y., 20, 30
Naniloa Corp., Ohio, 5
Narda Corp., 160 Herricks Rd., Mineola, L.I., N.Y., 5, 10, 17, 30, 35, 45
See ad on page 496
Tel: PIoneer 6-4650
National Co. Mass., 10
New London Instrument Co., Inc., Conn., 20
Norrman Laboratories, Ernst, Wis., 5, 10, 15, 20, 25
Northeastern Engineering, Inc., N.H., 20, 25
Northern Engineering Laboratories, Inc., Wis., 20
Nuclear-Electronics Corp., Pa., 5, 20
Olympic Radio & Television, Inc., N.Y., 20
Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mt. Vernon, N.Y., 20
See ad on page 462
Tel: OWens 9-4600
Parsons Co., R. M., Electronics Div., Calif., 5, 25
Philamon Laboratories, Inc., 90 Hopper St., Westbury, L.I., N.Y., 20, 30
See ad on page 48
Tel: EDgewood 3-1700
Polytechnic Research & Development Co., Inc., 202 Tillary St., Brooklyn 1, N.Y., 10, 20
Multiple pages of additional data on 32-33
Tel: ULster 2-6800
Potter Aeronautical Corp., N.J., 5
Potter Instrument Co., Inc., N.Y., 5, 10
Presto Recording Corp., N.J., 20
Probescope Co., Inc., 44-05 30 Ave., Long Island City 3, N.Y., 10, 20
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Radio Frequency Laboratories, Inc., Boonton, N.J., 20
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Ranson Research, Calif., 5, 20, 25
Riverbank Laboratories, Dept. of Engineering, Ill., 20, 25, 30
Rutherford Electronics Co., Calif., 25
Scantlin Electronics, Inc., Calif., 5, 25
Servo Corp. of America, N.Y., IR Radiation Standard
Specific Products Co., P.O. Box 425, 21051 Costanso St., Woodland Hills, Calif., WWV
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Tel: DI 0-3131
Standard Electric Time Co., Mass., 5
Sticht Co., Inc., Herman H., 27 Park Pl., New York 7, N.Y., 5
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Systron Corporation, Calif., 5, 20, 25
Teletronics Laboratory, Inc., N.Y., 5, 20
Times Facsimile Corp., 540 W. 58th St., New York 19, N.Y., 30
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Tel: JUdson 2-3030
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Uniwave, Inc., N.Y., 5
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Marker generators, microwave: See class 77

Marker generators, radio frequency: See class 80

Marker generators, TV: See class 82

76. Medical Equipment.

5. Cardiographs
10. Diathermy
15. Electronic cauterizing
20. Electro-encephalographs
25. Stimulators

American Machine & Foundry Co., Defense Prods. Group, 1101 N. Royal St., Alexandria, Va., 20
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Birtcher Corp., Calif., 5, 10, 15, 20, 25
Century Electr. & Inst., Inc., Okla., 5, 20
Decker Aviation Corp., Pa., 5
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Electro-Pulse, Inc., 11861 Teale St., Culver City, Calif., 25
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General Electric Co., X-Ray Dept., Wis., 5, 10
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Hamilton Watch Co., Pa., 5, 20
Harmon Electronics Co., Mo., Special Medical Scopes
Horwitron Electro-Medical Co., Pa., 25
Industrial Electronics of Canada, Ltd., Canada, 5, 10, 15, 20

Directory III. Controls & Instruments

76. Medical Equipment.

Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., Audiometers
See ad on page 381
Tel: LUdlow 4-6200
Jarrell-Ash Co., Mass., Blood Cell Counters
Kay Electric Co., Dept. ID-9, 14 Maple Ave., Pine Brook, N.J., Cardialyser
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Tel: CAldwell 6-4000
Levinthal Electronic Products, Inc., Calif., 5, 25
Liston-Becker Plant, Beckman Insts., Inc., Conn., Carbon Dioxide Analysers
Maico Co., Inc., Minn., Audiometers
Marconi Instruments, Ltd., St. Albans, Hertfordshire, England, 10, 15, 20
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Tel: SAint Albans 5-6161
Mendelsohn Speedgun Co., Inc., Fourth Ave., Haskell, N.J., 5, Ballisto
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Tel: TErhune 5-3224
Mooradian High Frequency Labs., N.J., 10, 15, 25
Nagog Associates, Inc., Mass., 15, 25
Offner Electronics, Inc., Ill., 5, 20
Panseal, Inc., N.J., 5
Raytheon Mfg. Co., Equip. Sales Operations, Mass., 5, 10
Sanborn Co., 175 Wyman St., Waltham 54, Mass., 5
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Tel: TWinbrook 4-6300
Sperry Gyroscope Co. of Canada, Ltd., Canada, 25
Taber Instrument Corp., N.Y., 5
Teca Corp., N.Y., 25 Electro-Myograph
Tektronix, Inc., Ore., 25
Victory Engineering Corp., 114 Springfield Rd., Union, N.J., Thermistor Hypodermic
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Tel: MUrdock 8-7150
Wappler, Inc., N.Y., 10, 15, 25
Yellow Springs Instrument Co., Inc., Ohio, Dermohmmeter

Megohm meters: See class 72

Meters: See class 42

Micro-ammeters: See class 42

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77. Microwave & Radar Test Equipment.

5. Bolometers
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15. Marker generators
17. Mixers
20. Oscillators
25. Pulse generators
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35. SWR meters
40. Time delay generators
45. Wavemeters

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Aircom, Inc., 354 Main St., Winthrop 52, Mass., 10, 20, 30, 35, 45
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Tel: DEerfield 4-1800
Airtron, Inc., Dept. 1, 1101 W. Elizabeth Ave., Linden, N.J., 17
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Alford Manufacturing Co., 299 Atlantic Ave., Boston 10, Mass., 30
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Alfred Electronics, 897 Commercial St., Palo Alto, Calif., 20
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Bruno-New York Industries Corp., Dept. IRE-57, 460 West 34th St., New York 1, N.Y., 5, Broadband Power Meters
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Central Research Laboratories, Inc., Minn., Dielectrometer
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Control Electronics Co., Inc., 1925 New York Ave., Huntington Station, 15, 25, 40
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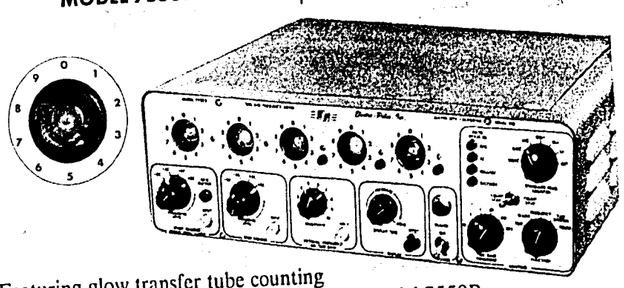
Electro-Pulse presents the new

MODEL 7550B

- 5¼" x 17" Panel Size
- Crystal Accuracy
- Measures 0.1 CPS—100 KC
- Measures 10 μs—1.2 days



Featuring glow transfer tube counting techniques and printed wiring throughout, Model 7550B offers optimum reliability, economy, and accuracy for general purpose use in frequency and time measurement.

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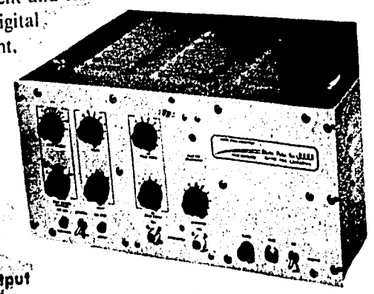

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0.1 to 5 μs pulse width
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Dave Gilbertson Company
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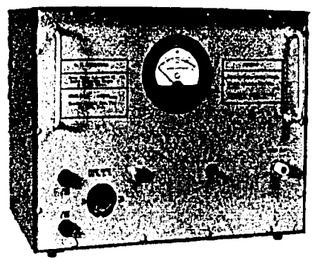

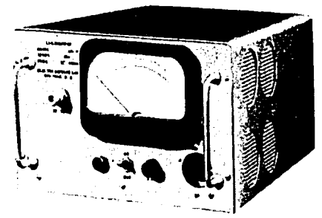

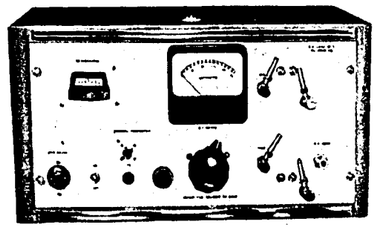

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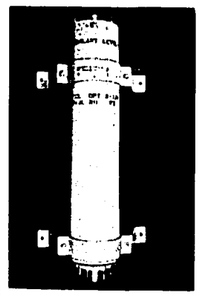

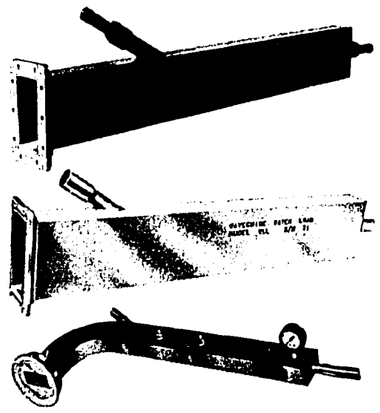

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Electro-Pulse, Inc., 11861 Teale St., Culver City, Calif., 10, 15, 20, 25, 40
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Electromation Co., 1646 18th St., Santa Monica, Calif., 20
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F-R Machine Works, Inc., 26-12 Borough Pl., Woodside 77, N.Y., 5, 7, 10, 15, 17, 20, 25, 30, 35, 45
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Tel: AStoria 8-2800

Federal Manufacturing & Eng. Corp., N.Y., 25

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Frequency Standards, N.J., 10, 17, 45

General Bronze Corp., N.Y., 30

General Communication Co., 681 Beacon St., Boston 15, Mass., 5, 10, 20, 25, 45
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Tel: COpley 7-6030

General Electric Co., Apparatus Sales Div., N.Y., 10, 25

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 5, 10, 20, 25, 30, 40
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Tel: TRowbridge 6-4400

Gertsch Products Inc., 3211 S. La-Cienega, Los Angeles 16, Calif., Peak Pulse Voltmeter
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Tel: TExas 0-2761

Gibbs Mfg. & Research Corp., Wis., 10

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Gray Mfg. Co., Conn., 10, 15, 25, 40

Haydon Mfg. Co., Inc., Conn., 40

Hemisphere Electronics Corp., N.Y., 5, 30

Hewlett-Packard Co., 4277D Page Mill Rd., Palo Alto, 5, 7, 10, 15, 17, 20, 25, 30, 35, 40, 45
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State-of-the-Art Engineering Techniques
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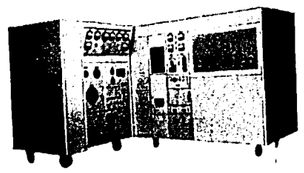

Precision-engineered Modulators to operate magnetrons, klystrons, and other pulse-modulated tubes . . . also designed to test pulse transformers and pulse-forming networks. A variety of standard models cover a wide range of power levels — from kilowatts to tens of megawatts. All models readily adaptable to meet individual specifications.

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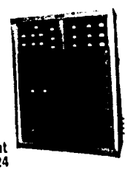
AC and/or DC types, single- or multiple-output units. We will be glad to analyze and quote on your problem, or to send literature on request.



Highly Regulated, Multiple-Output H-V Power Supply, Model M-224

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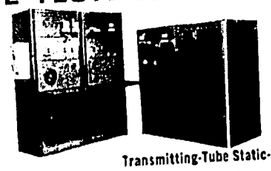

Designed to perform MIL or special-purpose tests, for virtually every type of tube: high-power vacuum diodes, triodes and tetrodes; C-R tubes; phototubes; magnetrons, thyratrons and gas tubes.

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Standard and custom-built trigger or pulse sources, of the time-, width-, and frequency-modulated varieties and widely differing complexities. Single- or multiple-output models to test pulse-coded systems, to synchronize pulse-test equipments, and for all types of laboratory work. Portable units for bench or rack mounting.

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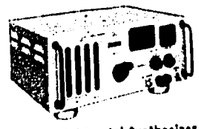

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Ultra-stable frequency standard, and high-level milli-microsecond pulse source for harmonic measurements. Stability of parts in 10^9 per day; jitter-free pulse and sine-wave outputs; fundamental adjustable ±25 cps with full stability; direct readout, accurate ±0.01%; built-in balanced Mixer; and many other unusual and valuable features.

100-KC DIVIDER/OSCILLATOR

A companion to the 1-mc Harmonic Reference Oscillator also usable as an independent 100-kc Oscillator. Has jitter-free pulse and sine-wave outputs, integral Mixer and Beat-Frequency Amplifier.

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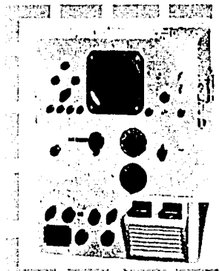

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MODEL PCX-1 PULSE POWER CALIBRATOR is an extremely precise instrument for calibrating pulse power measuring devices in the 925- to 1225-mc frequency range and for measuring power between −10 and +63 dbm to within 0.5 db. It is the first in a series which includes similar calibrators designed for the 3000-mc, 5000-mc and 9000-mc bands.

This equipment employs a new method which permits far greater accuracy (other than calorimetric) than heretofore achieved. It establishes a measurement reference level at the time of each use. Ease of operation is assured by the notch-and-reference-line display, by the automatic centering of pulses on the display, and by the direct reading of power measurements.

The removable bisectional cover, frame construction, hinged and pivoted subchassis assure easy accessibility for servicing.

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Compact, lightweight — available in Radial; parallel connector configuration.

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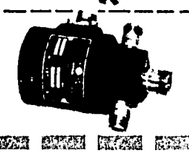
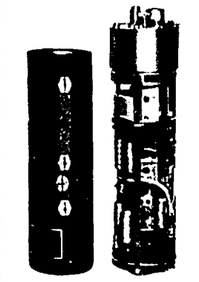
28 V. DC., 110 V. DC. — Compact, lightweight — available in Radial, spring return; Radial, transfer; parallel connector configuration.

115 V. AC., 60 cycle. — Compact, lightweight — available in Radial, spring return; parallel connector configuration.



GENERAL CHARACTERISTICS — See Above

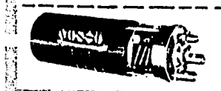


"S" BAND BEACON — Model RCX

Radar Beacon RCX is a miniature S-band transponder equipment for use in tracking missiles, drones and other types of aircraft. It has greater selectivity and sensitivity than the Model RBX (below) 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. The equipment includes Receiver-Transmitter RCX-1, Power Supply RCX-2, Junction Box RCX-3 and the necessary interconnecting cables and mounting brackets.

PERFORMANCE CHARACTERISTICS

Receiver Selectivity: a 3-cavity preselector; ±3.5 mc at −3 db; ±15 mc at −40 db (including X-band rejection filter. Receiver Sensitivity: −45 dbm. Receiver Codes: (a) Single pulse 0.25-usec duration or greater; (b) Double pulse 0.25-usec duration, 3-usec spacing; (c) Double pulse 0.75-usec duration, 10-usec spacing. Environmental Ratings: will withstand 200 G's acceleration and 400 G's shock.



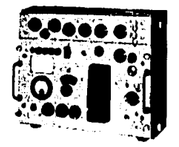
"S" BAND BEACON — Model RBX

A highly miniaturized receiver-transmitter for missile applications to facilitate radar tracking. Supplied with power supply, cable and antenna (not shown).

"X" BAND TEST EQUIPMENT

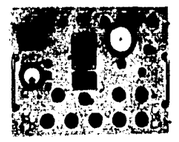
TEST SET BHS (AN/UPM-10A)

A portable microwave signal generator for testing and adjusting beacon equipment and radar systems operating in the range of 8500 to 9600 MC. Measures power and frequency of external signals. Supplies pulse-modulated, square-wave-modulated or unmodulated signals of known power and frequency. Also supplies frequency-modulated signals.



NEW! MODEL BDX FOR GREATER ACCURACY

Greater frequency accuracy (±1 mc from 8500 to 9600 mc). Greater power level accuracy (±1.5 dbm without correction curves). Repetition rates high enough to measure recovery time with assurance (up to 50,000 PPS). Operates with or without an auxiliary trigger. More rugged and dependable. The only complete signal tester for beacon work.



GENERAL COMMUNICATION COMPANY

681 Beacon Street, Boston 15, Massachusetts

For details, circle #466 on Reader Service Card.

Directory III. Controls & Instruments

77. Microwave & Radar Test Equipment.

Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland 8, Ohio, 10, 15, 20, 25
See ad on page 502
Tel: LIberty 1-8060

Hoover Electronics Co., Md., 15, 25, 40

Hycon Eastern, Inc., 75 Cambridge Pkwy., Cambridge 42, Mass., 20
Multiple pages of additional data on 140-141
Tel: UNiversity 4-7200

International Telephone & Telegraph Corp., Industrial Products Div., 100 Kingsland Rd., Clifton, N.J., 10, 15, 20, 35, 40, 45, Spectrum Analyzer
Multiple pages of additional data on 76-79
Tel: NUtley 2-3600

I-T-E Circuit Breaker Co., Pa., 30

J-V-M Engineering Co., 4632 S. Lawndale Ave., Lyons, Ill., 5, 10, 17, 30, 45
See ad on page 455
Tel: LYons 3-7990

Jacobs Instrument Co., Md., 25, 40

Jetronic Industries, Inc., Pa., 25, 45

Jones Electronics Co., M. C., Conn., 35

Kay Electric Co., Dept. ID-9, 14 Maple Ave., Pine Brook, N.J., 10, 15, 20, 25, 45
Multiple pages of additional data on 44-45
Tel: CAldwell 6-4000

Kearfott Co., Inc., 1378 Main Ave., Clifton, N.J., 5, 7, 10, 15, 17, 20, 25, 30, 35, 40, 45
See ad on page 36
Tel: GRegory 2-1000

Kearfott Co., Western Division, 253 North Vinedo Ave., Pasadena, Calif., 10, 17, 45
See ad on page 37
Tel: STanley 7-1178

Kerr Laboratories, Ltd., Wayne, England, 10, 20, 45

Laboratory for Electronics, Mass., 20

Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville 6, N.J., 10, 25, 45
See ads on pages 478, 496, 500
Tel: MAtawan 1-2600

Levinthal Electronic Products, Inc., Calif., 7, 25

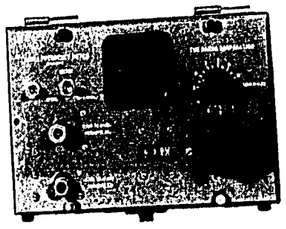
Lieco., Inc., 3610 Oceanside Rd., Oceanside, N.Y., 17
See ad on page 455
Tel: ROckville Centre 6-7620

Loral Electronics Corp., N.Y., 10, 20, 25

Magnetic Research Corp., 3160 W. El Segundo Blvd., Hawthorne, Calif., 25
Multiple pages of additional data on 128-129
Tel: OSborne 5-1171

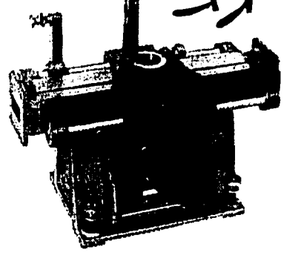
Manson Laboratories, Inc., 207 Greenwich Ave., Stamford, Conn., 25
See ad on page 494
Tel: DAvis 4-6783

Ah precision!



FREQUENCY METER MODEL 802B

Range of 2350 to 10,500 megacycles covers the most used frequencies. Veeder-root digital counter provides accurate, legible readings which are referred to calibration charts for frequency in megacycles to rated accuracy of 0.2% without calculation. Completely self-contained with built-in detector and indicating meter.



SLOTTED LINES
MODELS 219 THROUGH 224

Six portable models, incorporating carriage drive mechanism integral with wave guide assembly measures VSWRs and impedances from 2600 to 18,000 megacycles per second, covering wave guide sizes from 3 X 1½ inches to .702 X .391 inches. Can be used with all standard military and commercial RF probes and detectors.

COMPLETE LINE OF COAXIAL AND WAVEGUIDE INSTRUMENTS INCLUDES:

DIRECTIONAL COUPLERS
TERMINATIONS
FREQUENCY METERS
HORNS
TUNERS
ECHO BOXES
SLOTTED LINES
BENDS
ATTENUATORS
STANDARD REFLECTIONS
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contains much valuable data →

the narda corporation

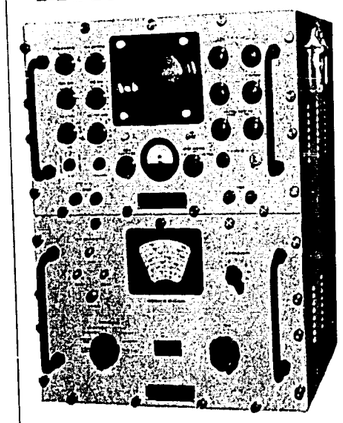
160 HERRICKS ROAD, MINEOLA, N. Y. • PIONEER 6-4650

COMPLETE INSTRUMENTATION FOR MICROWAVE AND UHF

For details, circle #467 on Reader Service Card.

Lavoie **LA-18**

SPECTRUM ANALYZER



10.0 to 16,000 mc

- **no heads to change**
- **rugged construction**
- **stable triode oscillators**

The Lavoie spectrum analyzer, now in use in dozens of laboratories and depots brings laboratory precision to the field technician. MIL-T-945A ruggedness and dependability...simplicity of operation allows production-line application – with repeatable results, as well as attendant advantages of stability and fine resolution.

Special models to 42,000 mc
Information on request

LA-18A Specifications

Calib. Freq. range: 10.0 to 16,000 mc
Sensitivity: for 2:1 S/N ratio at 25 mc B.W.

(generally exceeded over most of band)	–75 dbm, 10-1000 mc
	–60 dbm, 1-4 kmc
	–50 dbm, 4-8 kmc
	–40 dbm, 8-16 kmc

Calib. accuracy: ±1% at L.O. freq.
Spectrum width: 0.5 to 25 mc, var.
Resolution: 10 kc at 3 db points
Detection: Linear or sq. law
Sweep: 0.5 to 30 cps
Attentuators: 0-60 db, internal
0-100 db, external

Write for complete brochure

Lavoie Laboratories, Inc.
Matawan-Freehold Road
Morganville 6, N. J.
MAtawan 1-2600

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Directory III. Controls & Instruments

77. Microwave & Radar Test Equipment.

Marconi Instruments, 44 New St., New York 4, N.Y., 7, 45
See ad on page 518
Tel: HAnover 2-0197

Marconi Instruments, Ltd., St. Albans, Hertfordshire, England, 5, 10, 20, 25, 30, 35, 45
See ad on page 518
Tel: SAint Albans 5-6161

Maxson Corp., W. L., Maxson Instrument Div., N.Y., 20

McPherson Engineering Co., N.Y., 25

Measurements Corp., Box 180, Boonton, N.J., 25
See ad on page 510
Tel: DEerfield 4-2131

Mendelsohn Speedgun Co., Inc., Fourth Ave., Haskell, N.J., 17, 20 Cavities
See ad on page 331
Tel: TErhune 5-3224

Meridian, Inc., Conn., 5, 10, 15, 20, 25, 30, 45

Meridian Metalcraft, Inc., 8739 S. Millergrove Dr., Whittier, Calif., 17
See ad on page 454
Tel: OX 2-3761, RA 3-1508

Mico Instrument Co., 79 Trowbridge St., Cambridge 38, Mass., 45
See ad on page 579
Tel: KIrkland 7-8660

Micro Time Labs., Calif., 40

Microwave Associates, Inc., Mass., 5, 7, 10, 17, 20, 30

Microwave Development Labs., Inc., Mass., 10, 17, 45

Microwave Eng. Labs., Calif., 17

Microwave Radiation Co., Inc., Calif., 17

Millen Mfg. Co., James, 150 Exchange St., Malden 48, Mass., 10, 35, 45
See ad on page 600
Tel: MAlden 4-4108

Missouri Research Laboratories, Inc., Mo., 15, 40

Moloney Electric Co., 5390 Bircher Blvd., St. Louis 20, Mo., 25
See ad on page 434
Tel: EVergreen 3-3300

N.R.K. Mfg. & Engineering Co., 4601 W. Addison St., Chicago 41, Ill., 17
See ad on page 456
Tel: SPring 7-2970

Narda Corp., 160 Herricks Rd., Mineola, L.I., N.Y., 5, 10, 17, 30, 35, 45
See ad on page 496
Tel: PIoneer 6-4650

New London Instrument Co., Conn., 20

Northeast Electronics Corp., N.H., 35

Northeast Scientific Corp., 617 Concord Ave., Cambridge 38, Mass., 15, 25
See ad on page 382
Tel: KIrkland 7-1778

Northeastern Engineering, Inc., N.H., 10, Spectrum Analyser

Northern Electric Co., Ltd., Canada, 25

Omega Labs., Mass., 10, 20, 25, 30, 45

Packard-Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 15, 25, 40
See ad on page 216
Tel: BRadshaw 2-2171

Perkin Engineering Corp., Calif., 25

Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 20, 25, 35, Spectrum Analyzers
Multiple pages of additional data on 73-74
Tel: EXeter 2-4500

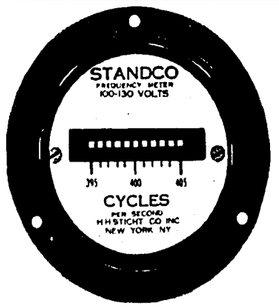
Polytechnic Research & Development Co., Inc., 202 Tillary St., Brooklyn 1, N.Y., 5, 7, 10, 15, 20, 30, 35, 45
Multiple pages of additional data on 32-33
Tel: ULster 2-6800

Portchester Instrument Corp., 114 Wilkins Ave., Port Chester 12, N.Y., 5, 7, 10, 17, 20, 45
See ad on page 457
Tel: WEstmore 9-4092

Potter Inst. Co., N.Y., 10, 15, 25, 40

Premier Instrument Corp., 52 W. Houston St., New York 12, N.Y., 17
See ad on page 458
Tel: GRamercy 5-3520

Radar Design Corp., 210 Fifth Ave., New York 10, N.Y., 10, 17, 30, 45
See ad on this page
Tel: MUrray Hill 5-1422



"STANDCO"
VIBRATING REED
FREQUENCY METERS
ACCURACY ±.5%
RUGGED—DEPENDABLE

Normal Frequencies:
25, 50, 60 or 400 cycles
Special Ranges:
from 15-1500 cycles

AVAILABLE IN FOLLOWING TYPES:

- **PANEL MOUNTING:** 3½" flush bakelite, metal or hermetically sealed cases. Meet all MIL specs.
- **SWITCHBOARD MOUNTING:** 7¼" round surface, or 4½" square semi-flush cases.
- **PORTABLES:** In large or small cases.

Write for Bulletin 805

HERMAN H. STICHT CO., INC.
27 PARK PLACE, NEW YORK 7, N. Y.

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MUrray Hill 5-1422

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TO: MICROWAVE Engineers on the SPOT

√ check *RADAR** for

specials

standards

COMPONENTS AND TEST EQUIPMENT:

√ **48 hour delivery on standards (in U.S.)**

√ **Specialized DESIGN STAFF and model shops for "speedy" specials**

***RADAR Design Corporation**
210 FIFTH AVE. • NEW YORK 10, 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 major classification. Complete addresses will be found in the Alphabetical Directory.

Directory III. Controls & Instruments

77. Microwave & Radar Test Equipment.

Radiation, Inc., Fla., 10, 45

Radio Corp. of America, Commercial Electronic Products, Dept. X-94, Bldg. 15-1, Front & Cooper St., Camden 2, N.J., 25

See ad on page 482

Tel: WOodlawn 3-8000

Ext. PC 2735

RCA Victor Co., Ltd., Canada, 20, 25

Rese Engineering, Inc., Pa., 25, [illegible]

Rutherford Electronics Co., [illegible] 20, 25, 40

Sage Laboratories, Inc., Mass., [illegible] 30, 45

Saratoga Industries, N.Y., [illegible] X-Band Test

Servo Corp. of America, N.Y., 5

Sierra Electronic Corp., 3885 Bohannon Dr., Menlo Park, Calif., 7, 35

Multiple pages of additional data on 34-35

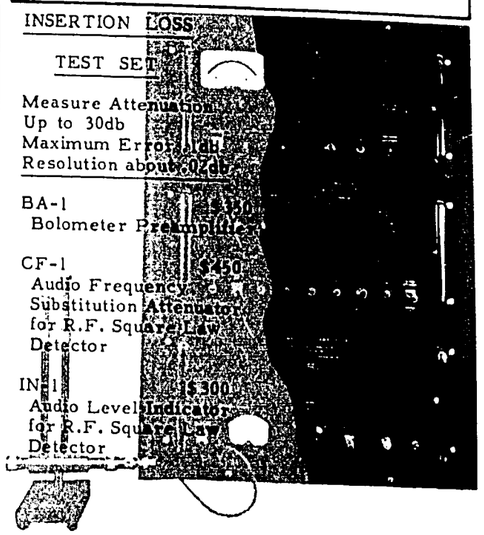
Tel: DAvenport 6-2060

Sivers Lab., Sweden, [illegible] 20, 25, [illegible] 40, 45

Solartron Electronic Group, Ltd., England, 20, 25, 35, 40

Manufacturer of Coaxial Attenuators
Since 1947
Many Standard Models Covering DC - 10 KMC Available
Using Our Own Metal Film and Cracked Carbon Film
Resistors. Connectors: "N", "BNC", "C" & "7/8"

HOW TO MEASURE ATTENUATION UP TO 30db



Write for detailed performance specifications to:

WE CO — Weinschel Engineering, Kensington, Maryland

For details, circle #472 on Reader Service Card.

SIGNAL GENERATOR
SG-153 1800-4000 mc

1800-4000 MC ±1%, continuous. Multipurpose lab. and production precision signal source, pulse mod., internal and external mod. provisions, line Freq. FM, complete sync IN and OUT provisions. Output +4 to 130 dbm, continuously variable.

HV INSULATION TESTER
T-4

0 to 15 KVDC output, continuously variable, meter for voltage and leakage current; SAFE: NON-DESTRUCTIVE TESTS — 150 ua max. test current. No capacitive errors. Tests ignition harnesses, components, transformers etc.

SIGNAL GENERATOR
SG-161 900-2100 mc

900-2100 MC ±1% continuous. Multipurpose lab. and production precision signal source, pulse mod. internal and external mod. provisions. Complete sync IN and OUT facilities. Output +4 to 130 dbm, continuously variable.

Q-PROBE
3-40 mc Circuit Probe

Low-cost oscilloscope attachment for RF scope displays 3 to above 30 MC, continuously variable, high sensitivity; sync output locks scope sweep. Views RF signals; checks two-tone patterns. SSB carrier nulls, filters, RF squegging, parasitics, overall Xmitter mod. characteristics.

SWEEP GENERATOR
SG-132 15-400 mc

Precision Sweep and CW, 15 to 400 MC, .01% CW accuracy WIDE deviation, 40% OF ANY CENTER FREQUENCY. Integral dc scope, crystal markers. Output flatness 0.25 db; 400 cps internal AM to 50%; extreme sweep linearity, 4 to 130 dbm output, continuously variable.

SIGNAL GENERATOR
SG-109 400-1000 mc

400 to 1000 MC ±1% Multipurpose lab. and production precision signal source; continuous pulse and amplitude mod., internal and external mod. provisions; complete sync IN and OUT facilities. Output +4 to −130 dbm continuously variable.

TRANSITRON INC.
186 GRANITE ST. MANCHESTER, N.H.
(Div. of Van Norman Industries)

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25 Chittenden Ave., New York 33 New York

Leonard D. Allen, Inc.
2401 S. State St., Syracuse New York State

Electrical Components & Services
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Electrodesign
738 Notre Dame St., W., Montreal Canada

Paramount Agencies
Box 7051, Garland Sta., Spokane Oregon, Wash., Idaho, W. Montana

Fred A. Pease Co.
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2419 S. Grand Ave., Los Angeles Calif., Ariz., Nev.

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6022 N. Rogers Ave., Chicago Ill., Iower Wisc., Iowa

Telesco International Corp.
36 W. 40th St., New York World, except U.S. & Canada

CAVITY OSCILLATOR ASSY.
2-4 KMC

2 to 4 KMC ±1% continuous tuning Klystron coax. cavity assy; +6 to −130 dbm output, piston attenuator; complete level monitoring facilities. For inclusion in new equipment or test equipment. Modifications available to customers specifications.

MULTISPEED AIRCRAFT ACTUATOR T-113

Rotary actuator assembly including solenoid speedshift for high-torque applications. Typical of Transitron-developed special electromechanical devices incorporating motor and gear drives. Extensive engineering and production facilities for design and manufacture to customers specs, available.

OSCILLATOR CAVITY ASSY.
1-2 KMC

1 to 2 KMC ±1% continuously tuning Klystron coax. cavity assembly; +3 to −130 dbm output; piston attenuator, level monitoring meter and bolometer facilities. For additions to or inclusion in new or test equipment. May be modified to customer's specifications.

T/R SWITCHES
Models 2000 & 3000

TRANSMIT-RECEIVE Switches, 1 KW max. power, 3 to 30 MC, no tuning adjustments, no RF relays; Low VSWR; insertion loss less than 1 S-unit; no TVI; Model 2000 has integral receiver muting relay. Low cost, high efficiency. Widely used in communications and amateur equipment.

TRANSDUCER
TD 132

High precision reciprocating mechanism. Driver unit for precision sweep mechanisms, FM cavity oscillators, magnetron sweeping etc., 20 to 30 cycle input; up to ½ in. peak-peak deflection, 0.5 lb. loading approximately. COMPLETELY BALANCED dynamically — No vibration. No susceptibility to external shock and vibration.

VHF ACCESSORIES

Complete line of VHF terminations, detectors, attenuators, probes, impedance matching pads; operating range to 500 MC with low VSWR; BNC connectors. For use with all HF and VHF 50 and 75 ohm signal and sweep generators.

For details, circle #471 on Reader Service Card.

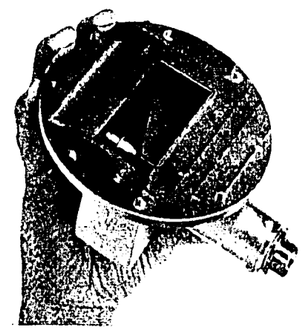
Now! ..... GNW-A SERIES

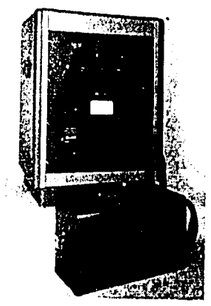
a miniature noise source

for in flight calibration and test of aircraft and missile microwave receivers

- Compact, miniaturized construction
- Rugged, can be made to mil specs.
- Excess noise ratio of up to 18db
- Low firing voltage

Available Today.—in production quantities, for use in radars, microwave relays, other equipment. Units can be provided to meet all specifications for shock, vibration, humidity and temperature cycling. Tubes fire and operate at conventional voltages.





ELECTRONIC MICROWAVE SWEEP GENERATOR to use with Recorders, Oscilloscopes and Reflectometers for rapid test of broadband microwave components and systems.

ROGER WHITE standard Gas Tube Noise Sources, permit precise noise figure measurements in coax or waveguide.

Other ROGER WHITE components . . .

ROGER WHITE Backward Wave Oscillator Tubes are now offered in ruggedized models for aircraft and guided missile use, covering frequencies from 4 to 26 kmc.

GAS TUBE ABSORBTION ATTENUATORS For electron AGC, modulation or switching of Microwave signals.

TRAVELING WAVE TUBES. Broadband high gain microwave amplifier tubes for frequencies between 700 & 12000 Megacycles.

ROGER WHITE
ELECTRON DEVICES
92 FOURTH AVENUE, HASKELL, NEW JERSEY

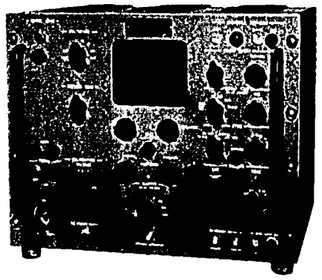
For details, circle #473 on Reader Service Card.

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

Lavoie

OSCILLOSCOPES

Where dependability counts . . . you'll find a Lavoie oscilloscope.



From Atlas to Redstone,

missile programs find the Lavoie LA-239C oscilloscope outperforms other scopes where it really counts . . . in the field. This ruggedness was a basic design goal, with the high performance circuitry that provides answers quickly and accurately. And now there's another instrument: The LA-259. This brand-new militarized scope offers all the desirable features of its predecessor, PLUS new features that users asked for: DC amplifier, higher accelerating potential, faster calibration and 5-inch tube. Write for complete information.

Condensed Specifications — LA-259

Response: DC to 15 mc, useful to 30 mc. Transient, .018 microsec. rise

Accelerating potential: 10 KV

Sweep range: 0.1 microsec/cm to 0.1 sec/cm

Sensitivity: 20 mv/cm

Internal trigger generator, markers, regulated supply.

Rack Mountable, portable.

Lavoie Laboratories, Inc.

Matawan-Freehold Road
Morganville 6, N. J.
MAtawan 1-2600

For details, circle #474 on Reader Service Card.

77. Microwave & Radar Test Equipment.

Solartron, Inc., 10761 Burbank Blvd., N. Hollywood, Calif., 25, 30, 35
See ad on page 292
Tel: STanley 7-5081

Spectralab Instruments, Calif., 20

Spencer-Kennedy Laboratories, Inc., 1320 Soldiers Field Rd., Boston 35, Mass., 25
See ad on page 352
Tel: AL 4-5400

Sperry Gyroscope Co. of Canada, Ltd., Canada, 5, 10, 17, 25, 30

Sticht Co., Inc., Herman H., 27 Park Pl., New York 7, N.Y., 10
See ad on page 497
Tel: REctor 2-8163

Stoddart Aircraft Radio Co., Inc., 6644-C Santa Monica Blvd., Hollywood 38, Calif., 25
See ads on pages 294, 512
Tel: HOllywood 4-9294

Systron Corp., Calif., 10

Technical Apparatus Builders, 109 RV Liberty St., New York 6, N.Y., 25
See ad on page 386
Tel: REctor 2-6249

Technitrol Engineering Co., Inc., Pa., 25

Telerad Mfg. Corp., 5 Mounts, 10

Teletronics Laboratory, Inc., N.Y., 5

Televiso Corp., Ill., 25

Telonic Industries, Inc., 73 N. 2nd Ave., Beech Grove, Ind., 15, 20, 25
See ad on page 511
Tel: STate 6-9239

Transitron, Inc., Div. Van Norman Ind., Inc., 186 Granite St., Manchester, N.H., 10, 20
See ad on page 498
Tel: NAtional 5-9701

Triplett Electrical Inst. Co., Ohio, 15

Universal Atomics Corp., N.Y., 25

Uniwave, Inc., N.Y., 5, 10, 30, 45

Varian Associates, 611 Hansen Way, Palo Alto 2, Calif., 20
Multiple pages of additional data on 64-65
Tel: DAvenport 5-5631

Vectron, Inc., 1607 Trapelo Rd., Waltham 54, Mass., 10, 15, 20, 45, Spectrum Analysers
See ad on page 244
Tel: TWinbrook 3-8700

Visual Electronics Corp., N.Y., 10, 45

WAC Line, Ohio, 30, 45

Wang Laboratories, Inc., 37 Hurley St., Cambridge 41, Mass., 25, 40
See ad on page 471
Tel: UNiversity 4-8380

Waveline, Inc., N.J., 10, 17, 30, 35, 45

Wave/Particle Corp., Calif., 17, 20, 25

Weinschel Engr. & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 20, 25
See ads on pages 297, 499
Tel: LOckwood 4-0122

White Electron Devices, Inc., Roger, 92 Fourth Ave., Haskell, N.J., 20
See ad on page 499
Tel: TErhune 5-5333

Milli-ammeters See class 42

Multimeters: See class 72

Multi-vibrators: See class 80

Noise analyzers: See class 67

78. Nuclear Equipment.

5. Beta gauges
10. Crystals
15. Dosimeters
20. Ionization chambers
25. Ionization gauges
30. Particle accelerators
35. Pulse count integrators
40. Radiation detectors
45. Scalers
50. Survey meters

Airborne Instruments Laboratory, Inc., 160 Old Country Rd., Mineola, L.I., N.Y., 40
See ad on page 154
Tel: PIoneer 2-0600

Airmec, Ltd., England, 40

Air-O-Tronics, Calif., 20

American Electronics Mfg., Inc., Calif., 35, 40, 45, 50

Ateliers De Montages Electriques, France, 35, 50

Atomic Labs., Inc., Calif., 20, 30, 40, 50

Automatic Coil Winder & Elec. Equip. Co., Ltd., England, 5, 25, 40, 50

B J Electronics Div., Borg Warner Corp., 3300 Newport Blvd., Santa Ana, Calif., 5, 10, 15, 20, 25, 30
See ad on page 31
Tel: KI 5-5581

Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 10, 40, 45, 50
See ad on page 476
Tel: UNiversity 4-0101

Bausch & Lomb Optical Co., N.Y., 15

Bendix Aviation Corp., Ohio, 5, 10

Boutros Inst. Lab., Mo., 20

Chatham Electronics, Div. of Tung-Sol Electric, Inc., 630 W. Mt. Pleasant Ave., Livingston, N.J., 40, 50
See ad on page 75
Tel: LIvingston 6-1100

Computing Devices of Canada, Ltd., Canada, 35, 45

Connecticut Telephone & Electric Co., Conn., 15, 40, 50

Consolidated Electrodynamics Corp., Calif., 25

Corning Glass Works, N.Y., 15

Curtiss-Wright Corp., Electronics Div., Carlstadt, N.J., 5, 50
See ad on page 394
Tel: GEneva 8-4000

Daystrom, Inc., N.J., 15, 20, 40, 45, 50

Decker Aviation Corp., Pa., 20, 25, 40

Detectolab, Inc., Ill., 5, 10, 15, 20, 25, 30

Douglas Radio Labs., Mass., 45

Eastman Kodak Co., N.Y., 15, 40

Eldorado Electronics Co., Calif., 15, Converters & Integrators

Electrical & Physical Instrument Corp., N.Y., 35, 45

Electronic Instrument Co., Inc., N.Y., 40

Electronic Products Co., N.Y., 40

Electronic Research Labs., Mass., 25

Elgin National Watch Co., Ill., 15

Engineering Specialties, Ohio, 35

Enslein, Kurt, 96 Greenaway Rd., Rochester 10, N.Y., 35, 45
See ad on page 536
Tel: HIllside 5-4314

Etelco, Ltd., England, 40, 45, 50

Fisher Research Lab., Inc., Calif., 40

Franklin Electronics, Inc., Pa., 35

Fretco, Inc., Pa., 10

Directory III. Controls & Instruments

78. Nuclear Equipment.

General Electric Co., Apparatus Sales Div., N.Y., 15, 40

General Electric Co., X-Ray Dept., 5, 15, 20, 40

Hamner Electronics Co., Inc., P.O. Box 531, Princeton, N.J., 35, 45
See ad on page 313.
Tel: PEnnington 7-1320

Hansen Co., Wm., Mich., 50

Heath Co., 305 Territorial Rd., Benton Harbor 4, Mich., 40
See ad on page 478
Tel: WAlnut 5-0051

Hewlett-Packard Co., 4277 D, Page Mill Rd., Palo Alto, Calif., 45
Multiple pages of additional data on 3-14
Tel: DAvenport 5-4451

Hillcrest Labs., Mass., 45

Hupp Electronics Co., Ill., 40

I-L-S Instrument Corp., Ohio, 45

Industrial Nucleonics Corp., Ohio, 5, 20

Jacobs Instrument Co., Md., 45

Jordan Electronics, Inc., Calif., 20, 40, 50

Laboratory for Electronics, Mass., 45

Mackay, Inc., A. D., N.Y., 10

Manufacturers Engineering & Equipment Corp., Pa., 20

Menlo Research Lab., Calif., 40, 50

Minneapolis-Honeywell Reg. Co., Industrial Div., Pa., 35

Multi-Tron Lab., Inc., Ill., 25, 30, 40

NRC Equip. Corp., 287 Charlemont St., Newton Highlands 61, Mass., 25
See ad on page 580
Tel: DEcatur 2-5800

NRD Instrument Co., Mo., 5, 20, 35, 40, 45, 50

Nichols, Ltd., R. H., Canada, 50

Nuclear-Chicago Corp., Ill., 10, 15, 20, 25, 35, 40, 45, 50

Nuclear Consultants, Inc., N.Y., 5, 20, 35, 40, 45, 50

Nuclear Corp. of America, N.Y., 5, 15, 20, 25, 30, 35, 40, 45, 50

Nuclear-Electronics Corp., Pa., 20, 35, 40, 45, 50

Nuclear Instrument & Chemical Corp., Ill., 5, 20, 35, 40, 45, 50

Nuclear Research Corp., Pa., 5 Gammer Gauges, 40

Nucleonic Co. of America, N.Y., 5, 15, 20, 25, 35, 40, 45, 50

Pacific Electro-Nuclear Co., Calif., Pulse Height Analyser

Pacific Transducer Corp., Calif., 15, 40

Paterson Moos Div., Univ. Winding Co., N.Y., 5, 10, 15, 20, 25, 40, 45, 50

Philips Electronics, Inc., N.Y., 10, 35, 40, 45, Impulse Generators

Potter Aeronautical Corp., N.J., 45

Pratt & Whitney Co., Inc., Conn., Radiation Gages

Q Circuits Co., Calif., 40, 45, 50

Radiation Counter Laboratories, Inc., Ill., 5, 20, 35, 40, 45, 50

Radiation Instrument Development Lab., Ill., 35, 40, 45, 50

Radiation Research Corp., N.Y., Radiation Sources

Radio Craftsmen, Inc., Calif., 40

Ramo-Wooldridge Corporation, 5730 Arbor Vitae St., Los Angeles 45, Calif., 35
See ad on page 438
Tel: OR 8-0311, OR 2-0171

Reed-Curtis Nuclear Industries, Inc., Calif., 5, 20, 25, 40, 45, 50

Robco Mfg. Co., Inc., N.Y., 20

Robertshaw-Fulton Controls Co., Aeronautical Div., Calif., 5

Sierra Electronic Corp., 3885 Bohannon Dr., Menlo Park, Calif., 25
Multiple pages of additional data on 34-35
Tel: DAvenport 6-2060

Sivers Lab., Sweden, Pulse Height Analyzers

Spectrum Instruments, Inc., N.Y., 35

Standard Crystal Co., 1714 Locust St., Kansas City 6, Mo., 10
See ad on page 340
Tel: VIctor 2-6841

Stromberg-Carlson, Div. Gen. Dynamics Corp., N.Y., 15, 35

Technical Associates, Calif., 15, 20, 40, 45, 50

Technical Measurement Corp., Conn., 10, 35, 40, 45

Tracerlab, Inc., Mass., 5, 10, 15, 20, 25, 35, 40, 45, 50

Universal Atomics Corp., N.Y., 5, 20, 35, 40, 45, 50

Universal Transistor Products Corp., N.Y., 15, 20, 35, 40, 50

Vacuum Tube Products Co., Inc., Calif., 25

Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 15, 20, 40, 45, 50
See ad on page 444
Tel: ENdicott 1-6200

Welch Manufacturing Co., W. M., Ill., 25

Westlake Plastics Co., Pa., 40

Weston Electrical Instrument Corp., N.J., 40

Null indicators: See class 72

Ohm meters: See class 72

Oscillators, beat frequency: See class 67

Oscillators, microwave: See class 77

Oscillators, RC: See class 67

Oscillators, radio frequency: See class 80

79. Oscilloscopes—Cathode-Ray.

5. General purpose
10. Oscilloscope cameras
15. Oscillosynchroscopes
20. Recording oscillographs
25. Special UHF & pulse analysis equipment
30. Time & voltage calibrators

Aeroquip Corp., Mich., Hydrauliscope

Airmec, Ltd., England, 5, 10

Allegany Instrument Co., Inc., Md., 10, 20

Allied Radio Corp., Dept. 35-58, 100 N. Western Ave., Chicago 80, Ill., 5, Kits
See ad on page 622
Tel: HAymarket 1-6800

American Electronic Labs., Inc., Pa., 5

American Metrix Corp., N.J., 15

Approved Electronic Instrument Corp., N.Y., 5, Kits

Aremac Associates, Calif., 10

Beam Instruments Corp., N.Y., 5, 10

Beckman & Whitley, Inc., Calif., 10

Berkshire Laboratories, N.H., 30

Brush Electronics Co., Ohio, 20

Cascade Research Corp., Calif., Z-Scope Impedance Plotter

Central Research Laboratories, Inc., Minn., 20, 25

Century Electronics & Instruments, Inc., Okla., 20

Century Engineers, Inc., Calif., 5

Chicago Aerial Industries, Inc., Ill., 10

Compagnie Generale De Metrologie, France, 5

Consolidated Electrodynamics Corp., Calif., 20

Cossor (Canada) Ltd., Canada, 5, 10

Daystrom, Inc., N.J., 5

Dubrow Development Co., N.J., 15

Dumont Labs., Inc., Allen B., N.J., 5, 10, 20

Dunlap Electronics, Iowa, 30

Eastern Precision Resistor Corp., 675 Barbey St., Brooklyn 7, N.Y., 5, 25
See ad on page 214
Tel: HYacinth 5-0133

Edgerton, Germeshausen & Grier, Inc., Mass., 25

Edin Company, Inc., Mass., 20

Electro-Medical Lab., Inc., Vt., 10

Electro-Pulse, Inc., 11861 Teale St., Culver City, Calif., 30
See ad on page 492
Tel: TExas 0-8006

Electronic Instrument Co., Inc., N.Y., 5, 30

Electronic Tube Corp., Pa., 5, 10, 15, 20

Fairchild Camera & Instrument Corp., Ind. Camera Div., N.Y., 10

Furzehill Laboratories, Ltd., England, 5

Gallay Labs., N.J., 25

General Communication Co., 681 Beacon St., Boston 15, Mass., 25
See ad on page 495
Tel: COpley 7-6030

General Electric Co., Broadcast & Mil. Elect. Prods. Dept., N.Y., 5, 25

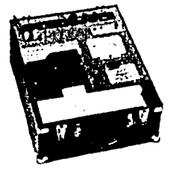
Hamilton Watch Co., Pa., 20

Hazelton Instrument Co., N.Y., 5

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

HICKOK **ELECTRONIC Test Instruments** HICKOK

9 TUBE TESTERS FILL ALL REQUIREMENTS



MODEL 123A

CARDMATIC TUBE TESTER
Automatic Tube Testing Machine

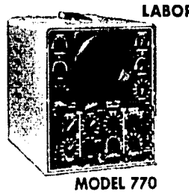
Model 123A: An automatic tube test to laboratory accuracy that instantly selects any tube to meet the exact requirements of your specific circuit application. Ideal for production line use by factory personnel, or for TV service companies.

MODEL 539B

PORTABLE TUBE TESTER
Most Accurate

Model 539B: Features simplicity of operation in providing a complete and accurate evaluation of electron tubes. Has Mutual Conductance circuits, 6 micromho ranges, 4 AC Signal voltages, metered line voltage, metered grid voltage and other important features.

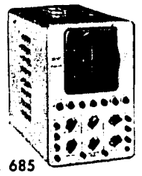
7 OSCILLOSCOPES MEET SPECIALIZED REQUIREMENTS



MODEL 770

LABORATORY CATHODE RAY OSCILLOSCOPE
Wide Range . . . Versatile

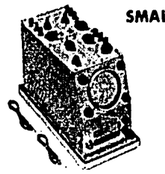
Model 770: Provides unusually wide range of DC to 5 MC. 10 M.V. RMS per inch sensitivity. Built-in calibrating voltages. New flat-faced tube. Illuminated calibrated screen. Mumetal shield. Shock mounted. This highly stable 'Scope is laboratory quality throughout.



MODEL 685

INDUSTRIALS' 5-INCH PORTABLE

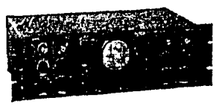
Model 685: DC amplifiers and DC to 750KC response. Sensitivity is 20 MV RMS per inch. Shock mounted amplifiers and good circuit design provide excellent stability for use in all phases of electronic work. The illuminated calibrated screen and ideal design features will please many an industrial who would expect to pay much more for this quality and completeness.



MODEL 385

SMALLER SIZE LABORATORY OSCILLOSCOPE
3-Inch Portable

Model 385: DC to 4 MC, within 3 db, 0.75 RMS volts per inch sensitivity. Sweep circuit oscillator; 3 cycles to 50 KC. Input impedance: vertical and horizontal amplifiers; 2.2 megohms—25 mmf. Features replaceable circuit sections. High quality throughout. Also available in portable, moisture-proof, weather-proof aluminum carrying case as preferred by field engineers.

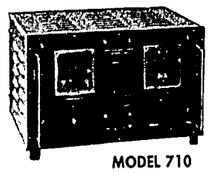


MODEL 387R

INDUSTRIAL LABORATORY OSCILLOSCOPE
3-Inch Rack Mount

Model 387R: Popular rack-mount style in an accurate 3-inch oscilloscope. Features identical vertical and horizontal amplifiers. DC to 500 KC response. 10 MV RMS sensitivity. Designed to permit versatile use in all phases of electronic work.

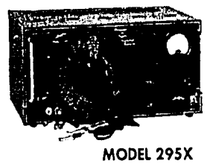
11 GENERATORS WITH SPECIALIZED FUNCTIONS



MODEL 710

SINE-SQUARE WAVE GENERATOR
For Laboratory & Industrial Use

Model 710: Provides an accurately calibrated source of sine wave and square wave functions over a wide frequency range. Sine wave total harmonic distortion below 1%. Hum level better than 90 db down. Square wave rise time less than .1 Microsecond. 20 cycles to 1 MC in five ranges on both sine and square waves.

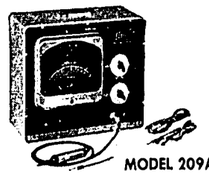


MODEL 295X

MICROVOLT SIGNAL GENERATOR
125 KC to 175 MC on Fundamentals

Model 295X: Ideal for mobile radio and other communication equipment design and maintenance. Output 0.1 microvolt to 100,000 microvolts. 125 KC to 175 MC continuous on fundamentals. 400 cycle modulation—approximately 30%. Attenuation down to 0.1 microvolt—no external attenuator pad required. Vernier Control permits hairline settings. Silverplated copper cage shielding. Test leads are furnished.

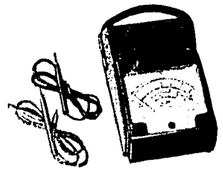
5 VTVM and VOM INSTRUMENTS



MODEL 209A

TRUE VACUUM TUBE
Laboratory Size and Accuracy

Model 209A: Contains large 9" meter with zero-center scale. Highly accurate for servicing industrial electronic equipment. DC Volts: 0-1200 in 6 ranges. AC Peak-to-Peak Voltage: 0-1200 V. in 6 ranges. Capacitance 0.1 to 10,000 MMF in 2 ranges, 0-1000 MF in 5 ranges. 50 MH to 100 henries. 0.1 ohm to 10,000 megohms in 7 ranges.



MODEL 455

NEW VOLT-OHM-MILLIAMMETER
You Can't Burn It Out!

Model 455: New design portable VOM. Includes all practical ranges. Features patented protection system which protects both the meter and associated circuits from damage due to accidental overload. Quality designed for utility and attractiveness. Neoprene carrying case available.

HIGHLY ACCURATE DC and AC PORTABLE INSTRUMENTS

MODEL 14

Ammeters, Milliammeters, Microammeters, Voltmeters, Millivoltmeters, Volt-Ammeters. Thermometers are contained in a phenolic case lined with heavy steel shell which shields from the effects of stray magnetic fields. Scale divisions are spaced equal distances apart. Accuracy within ½ of 1%. On special order, Model 14 can be supplied with a calibration chart to provide accuracy to 0.2%. Also available is a complete line of pocket portables.

METERS

The many special movements developed by HICKOK are: electrodynamometers, self-contained frequency meters, galvanometers, true logarithmic deflections, special curves for special purposes and ruggedized designs for highest shock tests. Full technical information on the complete line of HICKOK instruments and test equipment is available on request. Kindly list details of your requirements and ask for Catalogs No. 32 and 33.

THE HICKOK ELECTRICAL INSTRUMENT COMPANY
10514 DUPONT AVENUE • CLEVELAND 8, OHIO
HIGHEST QUALITY ELECTRICAL AND ELECTRONIC TEST INSTRUMENTS

Directory III. Controls & Instruments

79. Oscilloscopes—Cathode-Ray.

Heath Co., 305 Territorial Rd., Benton Harbor 4, Mich., 5
See ad on page 478
Tel: WAlnut 5-0051

Heiland Div., Minneapolis Hon. Reg. Co., Colo., 20

Hewlett-Packard Co., 4277D Page Mill Rd., Palo Alto, Calif., 5, 15
Multiple pages of additional data on 3-14
Tel: DAvenport 5-4451

Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland 8, Ohio, 5, 15, 30
See ad on page 502
Tel: LIberty 1-8060

Hughes Aircraft Co., Florence & Teale Sts., Culver City, Calif., 5
Multiple pages of additional data on 66-69
Tel: TExas 0-7111

Hughes Products, International Airport Sta., Los Angeles 45, Calif., 5
Multiple pages of additional data on 66-69
Tel: OR 2-5011

Hycon Electronics, Inc., Calif., 5

Industrial Television Inc., N.J., 5, 15

International Electronics Corp., N.Y., 5

International Telephone & Telegraph Corp., Industrial Products Div., 100 Kingsland Rd., Clifton, N.J., 5, 15, 25
Multiple pages of additional data on 76-79
Tel: NUtley 2-3600

Jackson Electrical Instrument Co., Ohio, 5

Laboratory for Electronics, Inc., Mass., 5

Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville 6, N.J., 5, 30
See ads on pages 478, 496, 500
Tel: MAtawan 1-2600

Loral Electronics Corp., N.Y., 5

Marconi Instruments, Ltd., St. Albans, Hertfordshire, England, 25
See ad on page 518
Tel: SAint Albans 5-6161

Massa Laboratories, Inc., Mass., 20

Maurer, Inc., J. A., N.Y., 10

Midwestern Instruments, Okla., 20

Millen Mfg. Co., Inc., James, 150 Exchange St. Malden 48, Mass., 5, 15
See ad on page 600
Tel: MAlden 4-4108

Miller Instruments, Inc., Calif., 20

Mullard, Overseas, Ltd., England, 5, 10, 25

National Scientific Laboratories, Inc., D.C., 20, 25

Nichols, Ltd., R. H., Canada, 20

Optomechanisms, Inc., N.Y., 10

Owen Laboratories, Inc., Calif., 30

Photographic Products, Inc., Calif., 10

Precise Development Corp., N.Y., 5, 15

Precision Apparatus Co., Inc., N.Y., 5

Probescope Co., Inc., 44-05 30 Ave., Long Island City 3, N.Y., 5
See ad on page 463
Tel: RAvenwood 6-7241

Radio City Products Co., Inc., Pa., 5

Radio Corp. of America, N.J., 5

RCA Victor Co., Ltd., Canada, 5

Railway Communications, Inc., Mo., 5, 12, Channel

Rutherford Electronics Co., Calif., 30

Sanborn Co., 175 Wyman St., Waltham 54, Mass, 20
See ad on page 224
Tel: TWinbrook 4-6300

Seismograph Service Corp., Okla., 20

Simpson Electric Co., Ill., 5

Skiatron Electronics & TV Corp., N.Y., 20, 25, 30

Solartron Electronic Group, Ltd., England, 5, 15, 20, 25, 30

Solartron, Inc., 10761 Burbank Blvd., N. Hollywood, Calif., 5
See ad on page 292
Tel: STanley 7-5081

Southwestern Industrial Electronics Co., 2831 Post Oak Rd., P.O. Box 13058, Houston 19, Tex., 20
Multiple pages of additional data on 22-23
Tel: MOhawk 7-6611

Stark Electronic Sales Co., Canada, 5

Technical Apparatus Builders, 109 RV Liberty St., New York 6, N.Y., 30
See ad on page 386
Tel: REctor 2-6249

Tektronix, Inc., Ore., 5, 15, 25, 30

Telechrome, Inc., 28 Ranick Dr., Amityville, L.I., N.Y., 10, 30
See ad on page 236
Tel: LIncoln 1-3600

Televiso Corp., Ill., 15

Triplett Electrical Instrument Co., Ohio, 5

Ultrasonic Corp., Mass., 25

Waterman Products Co., Inc., 2445 Emerald St., Philadelphia 25, Pa., 5
Multiple pages of additional data on 142-143
Tel: GArfield 6-8600

Phase meters: See class 80

Photo electric controls: See class 68

Production control equipment: See class 68

Pulse count integrators: See class 78

Pulse generators: See class 77

Pyrometers: See class 72

"Q" meters: See class 80

R C oscillators See class 67

Radiation detectors: See class 78

80. Radio Frequency Test Equipment.

5. Field strength meters
10. Impedance & admittance meters
15. Marker generators
20. Multi-vibrators
25. Oscillators
30. Phase meters
35. "Q" meters
40. RF power output meters
42. RF signal generators
45. Signal generators, AM
50. Signal generators, FM
55. Sweep generators

A.R.F. Products, Inc., Ill., 15, 45, 50, 55

Acton Laboratories, Inc., Mass., 30

Adler Electronics, Inc., N.Y., 42

Advance Electronics Lab., Inc., 249-259 Terhune Ave., Passaic, N.J., 30
See ad on page 505
Tel: GRegory 2-5622

Aeronautical Instrument & Radio Co., N.J., 15

Airborne Instruments Laboratory, Inc., 160 Old Country Rd., Mineola, L.I., N.Y., 42
See ad on page 154
Tel: PIoneer 2-0600

Aircraft Radio Corp., Boonton, N.J., 42, 45
See ad on page 490
Tel: DEerfield 4-1800

Airmec, Ltd., England, 25, 30, 42, 45

Alford Manufacturing Co., 299 Atlantic Ave., Boston 10, Mass., 10
See ad on page 507
Tel: HAncock 6-2150

Allied Radio Corp., Dept. 35-58, 100 N. Western Ave., Chicago 80, Ill., 42, 45, 50, 55, Kits
See ad on page 622
Tel: HAymarket 1-6800

Amerac, Inc., Mass., 5, 25, 40, 42

American Metrix Corp., N.J., 10, 15, 25, 35, 40, 42, 45, 50, 55

Andrew Antenna Corp., Ltd., Canada, 30

Andrew Corp., 363 E. 75th St., Chicago 19, Ill., 30
See ad on page 258
Tel: TRiangle 4-4400

Approved Electronic Instrument Corp., N.Y., 5, UHF Generator

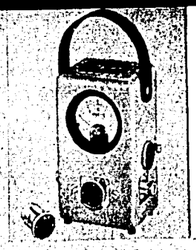
Automatic Coil Winder & Elec. Equip. Co., Ltd., England, 25, 35, 42, 45, 50

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

BIRD COAXIAL LINE INSTRUMENTS

"Thruline" DIRECTIONAL RF WATTMETERS

MODEL 43



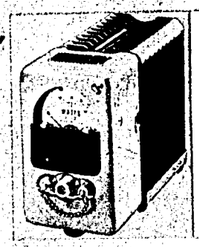
Direct Reading

25-1000 megacycles . . . 10W — 100KW . . . "thru" type . . . for power measurement in complete systems under operating conditions . . . insert between transmitter and antenna or load to provide an accurate and simple means of measuring direct or reflected power . . . plug-in elements determine full scale power range and frequency range. Get Bulletins W-400 for detailed specifications.

Model	Line	Impedance	Frequency Range	Full Scale 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	Rima Std.
460	3⅛	50 ohms	200-500 mc	1; 2.5; 5; 10 25; 50 KW	Flange
480	3⅛	51.5 ohms	400-1000 mc		Sleeve Bullet
490	6⅛	51.5 ohms	200-500 mc	25; 50 and 100 KW	

"Termaline" RF ABSORPTION WATTMETERS

MODEL 611



Accurate

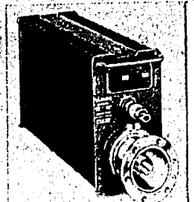
30-500 megacycles . . . ½ watt-5 KW . . . "load" type . . . portable . . . direct reading wattmeter . . . accuracy ±5% of full scale . . . non-radiating load for power measurement. For complete specification on all available models, write for Bulletins TW-600.

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)

"Termaline" RF LOAD RESISTORS

MODEL 888



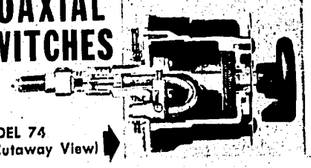
Reflection-Free

Designed to terminate 50 ohm coaxial line with minimum reflection . . . low VSWR . . . non-radiating . . . water cooled ratings 2500 W to 50 KW . . . air cooled ratings to 1500 W . . . ratings can be increased by forced air externally applied. For detailed specifications get Bulletins R-800.

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.

COAXIAL SWITCHES



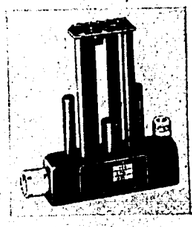
MODEL 74 (Cutaway View)

Dependable

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. Bulletin CS-6 contains full specifications.

Model	74	71B	72R	72-2
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.			

COAXIAL RF FILTERS



Rugged

High pass . . . low pass . . . band pass . . . band elimination . . . designs utilize both distributed and lumped constant . . . feature low insertion loss and high stop band attenuation . . . many designs available . . . "know-how" and physical facilities for quantity production . . . Get Bulletin CF-6.

	Low Pass	Low Pass	Low Pass	Low Pass	High Pass	Band Pass
Model*	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	500-2000 mc	1900-4000 mc	100-390 mc	33.7-39.7 mc 120-1000 mc
Max. Power	100W	100W	150W	100W	50W	25W
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

*Other model specs on request.

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BIRD ELECTRONIC CORPORATION

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Directory III. Controls & Instruments

80. Radio Frequency Test Equipment.

B J Electronics Div., Borg Warner Corp., 3300 Newport Blvd., Santa Ana, Calif., 25, 45, 50, 55
See ad on page 31
Tel: KI 5-5581

B & K Manufacturing Co., Ill., 42

Babcock Radio Engineering, Inc., Calif., 42, 50

Barker & Williamson, Inc., Pa., 40, 45

Bellaire Electronics, Inc., N.J., 5

Benco Television Associates, Ltd., Canada, 5

Bird Electronic Corp., 1800 E. 38th St., Cleveland 14, Ohio, 40
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Tel: EXpress 1-3535

Blonder-Tongue Labs., Inc., N.J., 5

Boonton Electronics Corp., N.J., 25, 40

Boonton Radio Corp., Intervale Rd., Boonton, N.J., 35, 42, 45, 50, 55
See ad on page 506
Tel: DEerfield 4-3200

Bruno-New York Industries Corp., Dept. IRE-57, 460 West 34th St., New York 1, N.Y., 42
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Tel: LOngacre 4-5930

Brunswick Instruments, N.J., 40

Budelman Radio Corp., 375 Fairfield Ave., Stamford, Conn., 40
See ad on page 269
Tel: FIreside 8-9231

Bulova Watch Co., Inc., Dept. D A-776, 40-06 62nd St., Woodside 77, N.Y., 25
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Tel: NEwtown 9-5700

Burr-Brown Research Corp., Ariz., 25

California Technical Industries, Calif., Circuit & Cable Testers

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Computing Devices of Canada, Ltd., Canada, 20, 25

Connecticut Telephone & Electric Co., Conn., 42, 45, 50

Control Electronics Co., Inc., 1925 New York Ave., Huntington Station, L.I., N.Y., 30, 42
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Electro Impulse Laboratory, Inc., 208 River St., Red Bank, N.J., 40
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Tel: SHadyside 1-0404

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Elk Electronic Labs., Inc., N.Y., 5, 35, 42, 45, 50

Emerson Radio & Phonograph Corp., Md., 40, 42, 45, 50

Empire Devices Products Corp., Amsterdam, N.Y., 5
See ad on page 508
Tel: VIctor 2-8400

Enflo Corporation, N.J., 7, Teflon

Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio, 15
See ad on page 275
Tel: WAlnut 1662

F-R Machine Works, Inc., 26-12 Borough Pl., Woodside 77, N.Y., 10, 40, 42
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Tel: AStoria 8-2800

Fairbanks Wire Co., Inc., N.Y., 30, 50, 55, High Temperature

Federal Manufacturing & Eng. Corp., N.Y., 42

Ferranti Electric Ltd., Canada, 12, 15

Ferris Instrument Co., N.J., 25, 42, 45, 50, 55

Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 35
See ad on page 428
Tel: EVergreen 6-1300

General Communication Co., 681 Beacon St., Boston 15, Mass., 25, 40, 42, 50
See ad on page 495
Tel: COpley 7-6030

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 10, 20, 25, 42, 45, 55
See ad on Cover 4
Tel: TRowbridge 6-4400

Gertsch Products, Inc., 3211 S. La Cienega, Los Angeles 16, Calif., Frequency Meter
See ad on page 509
Tel: TExas 0-2761

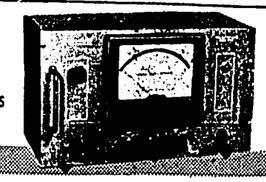
Gramatan Instrument Co., N.Y., 25

Gray Manufacturing Co., Conn., 15, 45, 50, 55

PHASE METERS, DELAY LINES COUNTERS by ADVANCE

PHASE MEASURING INSTRUMENTS

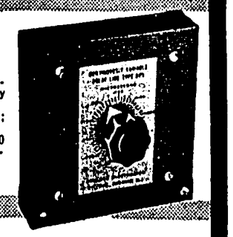
500 MC to .00001 CPS
Accuracy 0.1°



Type 405 Series: Type 405L, from 1 cps to 20 kc; Type 405, from 8 cps to 100 kc; Type 405H, from 8 cps to 500 kc.
Type 205 & 205A: From 100 kc to 15 mc.
Type 202: From 10 cps to 500 mc.

DELAY LINES—CONTINUOUSLY VARIABLE STEP VARIABLE AND FIXED

Continuously Variable Delay Lines: Resolution time less than ½ millimicrosecond. Type 50J Series—delay over 1 microsecond; Type 600 Series—delay over 100 microseconds; Type 800 Series—delay over 1000 microseconds.
Step Variable Delay Lines with equal input and output impedance available; total time delay over 25 microseconds, with bandwidth over 10 mc.
Fixed Delay Lines with time delay from fractional microsecond to over 1000 microseconds; impedance from 50 ohms up to several thousand ohms.
Special Delay Lines to meet JAN specifications.



COUNTERS

Decimal Counters with counting rate over one million counts per second. Time Interval Counters, Frequency Counters, Phase Angle Counters and Universal Counters; special counters for application in various industries.

Write for complete catalog.

ADVANCE Electronics Lab., Inc.
249-259 Terhune Ave., Passaic, N. J.

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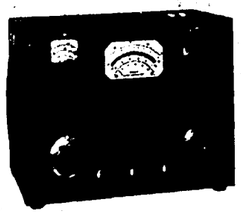
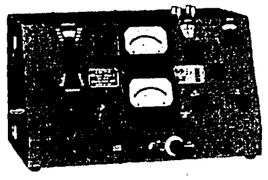
BRC ELECTRONIC TEST and MEASURING INSTRUMENTS

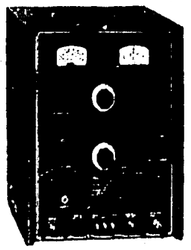


Q METER TYPE 190-A

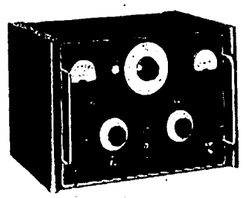


Q METER TYPE 260-A

RX METER TYPE 250-A



SWEEP SIGNAL GENERATOR TYPE 240-A



FM-AM SIGNAL GENERATOR TYPE 202-E

RF VOLTAGE STANDARD TYPE 245-A

UNIVERTER TYPE 207-E

FILM GAUGE TYPE 255-A

Q METERS					
Type	Freq. Range	Q Range	Tuning Capacity Range	Q Accuracy	Price
260-A	50 kc to 50 mc	10 to 625	30-450 mmf	5% to 30 mc	$775.
190-A	20 mc to 260 mc	5 to 1200	7.5 to 100 mmf	7% to 100 mc	$760.

FM-AM SIGNAL GENERATORS						
Type	Freq. Range	Output Range	Modulation FM	Modulation AM	Application	Price
202-E	54-216 mc	0.1 to 200,000 μv	0-240 kc	0-50%	General	$1090.
202-F	175-250 mc	0.1 to 200,000 μv	0-240 kc	0-100%	Telemetering	$1075.

SWEEP SIGNAL GENERATOR						
Type	Freq. Range	Output Range	Modulation FM	Modulation AM	Markers	Price
240-A	4.5 to 120 mc	1.0 to 300,000 μv CW 1.0 to 100,000 μv	±1% to ±30% Center Freq.	30%	Crystal & Pip.	$1585.

OMNI-RANGE SIGNAL GENERATOR (Crystal Monitored)					
Type	Freq. Range	Output Range	Modulation	Application	Price
211-A	88-140 mc	0.1 to 200,000 μv	0-100% am	Omni-Range Rcvrs.	$1800.

GLIDE SLOPE SIGNAL GENERATOR					
Type	Freq. Range	Output Range	Modulation	Application	Price
232-A	329-335 mc	1.0 to 200,000 μv	0-100% am	Glide Slope Rcvrs.	$1700.

WIDE BAND IMPEDANCE MEASURING EQUIPMENT—RX Meter					
Type	Freq. Range	R Range	C Range	L Range	Price
250-A	0.5 to 250 mc	15 to 100,000 ohms	0-20 μμf	0.001 μh-100 mh	$1320.

RF VOLTAGE STANDARD					
Type	Freq. Range	Calibrated Out.	Output Impedance	Application	Price
245-A	0.1 to 1,000 mc	0.5,1.0,2.0 μv	50 ohms	Calibrates Signal Generators	$360.

UNIVERTERS						
Type	Freq. Range	Output Range	Modulation FM	Modulation AM	Accessory to	Price
207-E	0.1 to 55 mc	0.1 to 100,000 μv	0-240 kc	0-50%	202-Band202-C	$390.
207-F	0.1 to 55 mc	0.1 to 100,000 μv	0-240 kc	0-50%	202-D	$380.
203-B	0.1 to 25 mc	1.0 to 100,000 μv	1.5 to 30 mc	30%	240 A	$380.

FILM GAUGE			
Type	Measures	Thicknesses	Price
255-A	Non-magnetic Metals	0.000004" to 0.0002"	$450.

RX METER:
Wide Frequency Band RF Bridge

Q METERS:
Low, Medium, High and Very High Frequencies

UNIVERTERS:
Low, Medium and High Frequency Converters

SIGNAL GENERATORS:
Frequency and Amplitude Modulated for Aircraft Navigation, Mobile and TV Receivers, Precision broad band sweeps with markers

SIGNAL GENERATOR CALIBRATORS:
RF Voltage Standard in the low microvolt range over a wide frequency range

METAL FILM GAUGE:
Measures metal film and plating thicknesses

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Boonton, New Jersey

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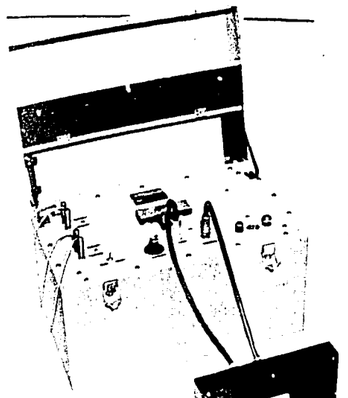
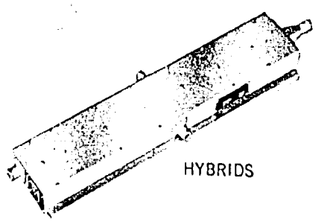
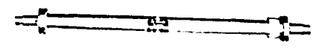


AUTOMATIC IMPEDANCE PLOTTERS



HYBRIDS



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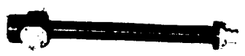
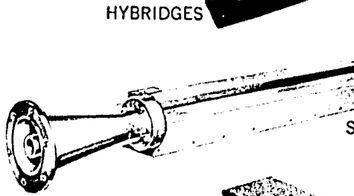


RF TRANSFORMERS



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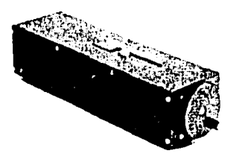
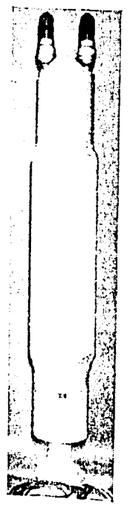


CALIBRATED RF ATTENUATORS

PRECISION TAPERED REDUCERS



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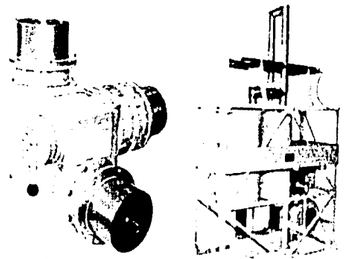

COAXIAL SWITCHES

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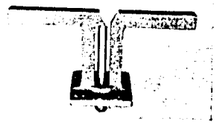

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Directory III. Controls & Instruments

80. Radio Frequency Test Equipment.

Heath Co., 305 Territorial Rd., Benton Harbor 4, Mich., 25, 35, 42, 45, 55
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Tel: WAlnut 5-[illegible]51

Hewlett-Packard Co., 4[illegible]D Page Mill Rd., Palo Alto, Calif., [illegible] 15, 25, [illegible] 40, 42, 45, 55
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Tel: DAvenport 5-4451

Hickok Electrical Instrument Co., 1 5[illegible] Dupont Ave., Cleveland 5, Ohio, 5, [illegible] 15, 25, 42, 45, 50, 55
See ad on page 5[illegible]
Tel: LIberty 1-[illegible]

Hill Associates, Inc., [illegible]

Hill Electronic Engr. & M[illegible] Pa., 25

Hycon Eastern, Inc., 75 Cambridge Pkwy., Cambridge 42, Mass., 25
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Tel: MAtawan 1-2600

Mackay Radio & Telegraph Co., Marine Div., N.J., 5, Comparison Type

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

Directory III. Controls & Instruments

80. Radio Frequency Test Equipment.

Marconi Instruments, 44 New St., New York 4, N.Y., 10, 35, 40, 42, 45, 50, FM Deviation Monitor
See ad on page 518
Tel: HAnover 2-0197

Marconi Instruments, Ltd., St. Albans, Hertfordshire, England, 5, 10, 25, 35, 40, 45, 50, 55
See ad on page 518
Tel: SAint Albans 5-6161

McPherson Engineering Co., N.Y., 5, 42

Measurements Corp., Box 180, Boonton, N.J., 5, 42, 45, 50
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Tel: DEerfield 4-2131

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Moseley Co., F. L., 409 N. Fair Oaks Ave., Pasadena, Calif., 42
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Tel: RYan 1-0208

Munston Manufacturing & Service, Inc., N.Y., 45, 50

Nagog Associates, Inc., Mass., 15, 30

Nems-Clarke, Inc., Dept. H-13, 919 Jesup Blair Dr., Silver Spring, Md., 5, 30
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Tel: JUniper 5-8300

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Tel: EXeter 2-4500

Polytechnic Research & Development Co., Inc., 202 Tillary St., Brooklyn 1, N.Y., 10, 40, 42
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Radio Corp. of America, Commercial Electronic Products, Dept. X-94, Bldg. 15-1, Front & Cooper St., Camden 2, N.J., 40, 42, 45
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Tel: WOodlawn 3-8000
Ext. PC 2735

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Sensitive Research Instrument Corp., 310-316 Main St., New Rochelle, N.Y., 5
See ad on page 369
Tel: BEverly 5-2300

Shasta Div., Beckman Instruments, Inc., Calif., 25

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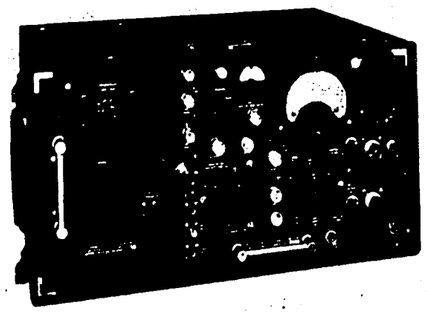
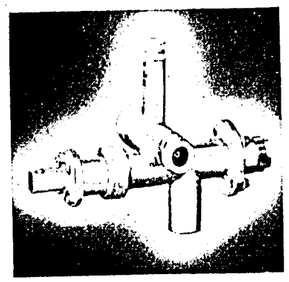


NOISE AND FIELD INTENSITY METER, Model NF-105
(Commercial equivalent of AN/URM-7) 150 KC to 1000 MC

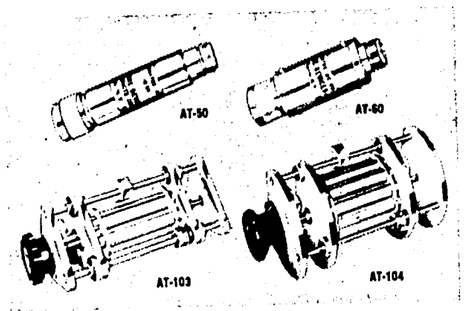
Four quick-change tuning heads • Single knob tuning for easy scanning Built-in impulse generator serves as calibrator • Carrier and peak reading VTVM • Aural slideback • Coaxial step attenuators • Regulated "A" and "B" supply.



COAXIAL CRYSTAL MIXER, Model CM-107

Broad Band, Fixed Tuned • 225 MC to 5600 MC in 8 models • Input and L.O. VSWR better than 2 to 1 • L.O. rejection at IF output better than 30 DB.

CRYSTAL DETECTOR, Model DT-123 also available.



UHF ATTENUATORS, Models AT-50, AT-60

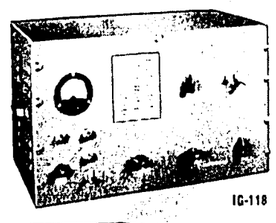
50 ohm resistive T-networks of concentric line construction.
FREQUENCY RANGE:
AT-50: DC to 4000 MC.
AT-60: DC to 3000 MC.
VSWR: Better than 1.2 at all frequencies.
ACCURACY: ±½ DB.
RATED POWER:
AT-50: 1W continuous, 1KW peak
AT-60: 2W continuous, 2KW peak

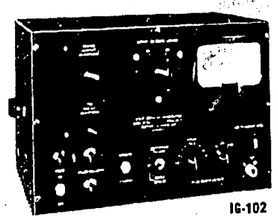
STEP ATTENUATORS, Models AT-103, AT-104

These units use AT-50 pads in 6 step and 12 step coaxial turret arrangements respectively.

COAXIAL TERMINATION, Model TE-80

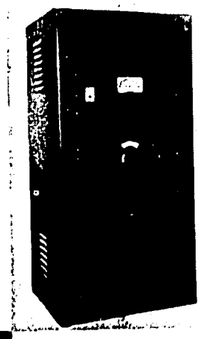
1 watt, DC to 4000 MC, also available





VARIABLE FREQUENCY POWER SUPPLY, Model VP-400

POWER OUTPUT: 500 watts
VOLTAGE REGULATION: 2%, no load to full load
HARMONIC DISTORTION: 5% maximum, total, (to 400W).



UHF IMPULSE GENERATORS, Models IG-102, IG-115, IG-118

Model	Flat Spectrum (±½ DB)	Peak Output Level	Repetition Rate
IG-102	10 KC to 1000 MC	70,000 μV/MC	2.5 to 2500 cycles
IG-115	10 KC to 1000 MC	100,000 μV/MC	60 cycles
IG-118	100 MC to 10,000 MC	9,000 μV/MC	2.5 to 2500 cycles

POWER DIVIDERS, Model PD-90

FREQUENCY RANGE: 800 to 10,000 MC in 5 models, also available.

For complete engineering data, please send for our new Catalog No. 356

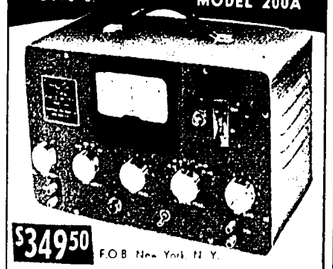
edp

EMPIRE DEVICES PRODUCTS CORPORATION
AMSTERDAM, NEW YORK

Manufacturers of FIELD INTENSITY METERS • DISTORTION ANALYZERS • IMPULSE GENERATORS COAXIAL ATTENUATORS • CRYSTAL MIXERS

For details, circle #480 on Reader Service Card.

PHAZOR PHASE METER MODEL 200A
Pat. Pend.



$349.50 F.O.B. New York N.Y.

Measures phase shift in transformers, amplifiers, filters, and phase displacement networks.
- Measures from 0 to 360 degrees.
- Readings not affected by noise and harmonics.
- Phase shifts of the order of .01 degree can be measured employing special circuit techniques.
- Measures in-phase and quadrature components separately.

Manufacturers of PHASE METERS • NULL DETECTORS • IMPEDANCE COMPARATORS • POWER OSCILLATORS • VACUUM TUBE VOLTMETERS • FREQUENCY STANDARDS • AUTOMATIC HI-POT
Other Electronic Test Equipment

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For details, circle #481 on Reader Service Card.

a complete line of instruments for precise measurements

FREQUENCY
- From 50 kc to 30 kmc
- Accuracy — 1 Part in 10^7
- Models for Lab & Field
- Direct Reading

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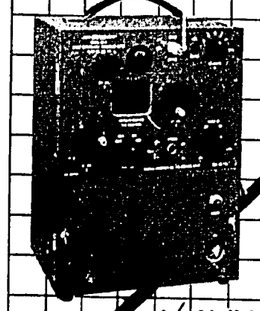
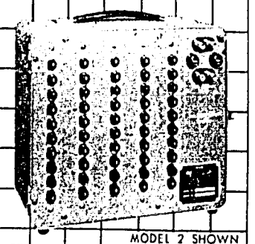


FM-3 SHOWN

- Null Indicators
- Bridge Transformers
- Standard RatioTran*
- *(AC Voltage Dividers)



MODEL 2 SHOWN

VOLTAGE RATIO

write • phone • wire

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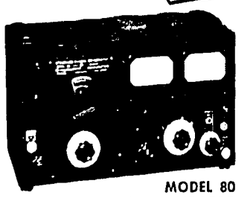
3211 SO. LA CIENEGA
LOS ANGELES 16, CALIFORNIA

For details, circle #482 on Reader Service Card.

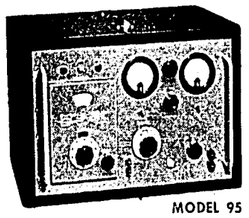
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

MEASUREMENTS CORPORATION

Laboratory Standards

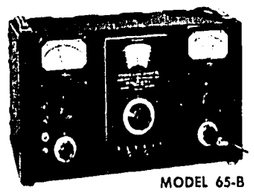


MODEL 80
STANDARD SIGNAL GENERATOR



MODEL 95
FM STANDARD SIGNAL GENERATOR

MODEL 210 SERIES
FM STANDARD SIGNAL GENERATOR



MODEL 65-B
STANDARD SIGNAL GENERATOR

MODEL 67
PEAK-TO-PEAK VOLTMETER

STANDARD SIGNAL GENERATORS

MODEL	FREQUENCY RANGE
65-B	75 Kc to 30 Mc
80	2 Mc to 400 Mc
80-R	5 Mc to 475 Mc
82	20 Cycles to 200 Kc 80 Kc to 50 Mc
84-R	300 Mc to 1000 Mc
84-TVR	400 Mc to 1000 Mc
95	50 Mc to 400 Mc
210-Series	25 Mc to 200 Mc

SQUARE WAVE GENERATORS

MODEL	FREQUENCY RANGE
71 72	6 to 100,000 Cycles 5 Cycles to 5 Mc

PULSE GENERATOR

MODEL	FREQUENCY RANGE
79-B	60 to 100,000 pulses per second

VHF FIELD STRENGTH METER

MODEL	FREQUENCY RANGE
58-AS	15 Mc to 150 Mc

HIGH FREQUENCY BARRETTER

MODEL	FREQUENCY RANGE
202-C	2 Mc to 1000 Mc

VACUUM TUBE VOLTMETERS

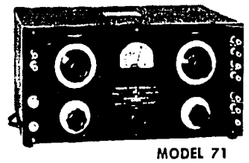
MODEL	FREQUENCY RANGE
62	30 cps to over 150 Mc
67	5 to 100,000 sine-wave cps.

MEGACYCLE "GRID-DIP" METERS

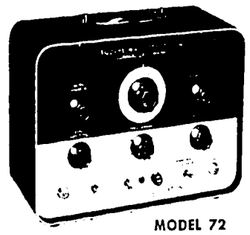
MODEL	FREQUENCY RANGE
59 LF	0.1 Mc to 4.5 Mc
59	2.2 Mc to 420 Mc
59 UHF	420 Mc to 940 Mc

CRYSTAL CALIBRATORS

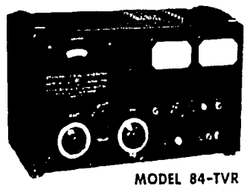
MODEL	FREQUENCY RANGE
111	250 Kc to 1000 Mc
111-B	100 Kc to 1000 Mc



MODEL 71
SQUARE WAVE GENERATOR



MODEL 72
SQUARE WAVE GENERATOR



MODEL 84-TVR
STANDARD SIGNAL GENERATOR

MODEL 59
MEGACYCLE "GRID-DIP" METER

MODEL 111
CRYSTAL CALIBRATOR

MEASUREMENTS CORPORATION
BOONTON NEW JERSEY

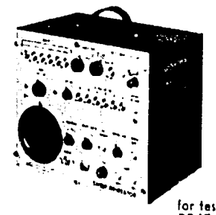
VARIABLE RATE AUDIO and VIDEO SWEEPS

Telonic

"... sweeping the industry"

	MODEL VR1-C	MODEL AR1
. center freq.	below 15 kc-15mc	20 cps - 20 kc
. sweep width	15-kc-15mc	100 cps - 20 kc
. output	1v.-p.-p.	1v RMS
. sweep rate	below 1 cpm to 60 cps	
. flatness	± 5%	± 5%
. zero base line	. horiz. sweep voltage	
. crystal markers		

VARIABLE RATE AVAILABLE IN MODELS TO 250 mc.



for testing RF-IF and Video Amplifiers, Filters and Antenna Systems

SWEEPS FOR IF, VHF, UHF

★ **"L" Models**
1-200 mc electronic sweeps

★ **"H" Models**
Heterodyne sweeps—ultra wide sweep widths

★ **"S" Models**
200-1200 mc—high output

★ **"E" Models**
900-2300 mc—ultra range mc

★ Radar IF Test Set
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★ Special designs standard with Telonic
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★ Attenuators

WRITE, WIRE OR PHONE FOR COMPLETE CATALOG AND DETAILED INFORMATION

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Directory III. Controls & Instruments

80. Radio Frequency Test Equipment.

Sierra Electronic Corp., 3885 Bohannon Dr., Menlo Park, Calif., 10, 40
Multiple pages of additional data on 34-35
Tel: DAvenport 6-2960

Simpson Elec. Co., 17, 5, 15, 45, 5, 55

Siver Lab., Sanders Assoc., Nashua, N.H., 10

Solar Electronic Corp., 1-11, 1-12, Laird, 25, 30, 42, 45, 55

Spectrol-Electronics Instruments, Calif., 25, 42

Sperry Gyroscope Co., Div. of Sperry Rand Canada, 40, 50

Sprague Electric Co., Metal Reference Locator

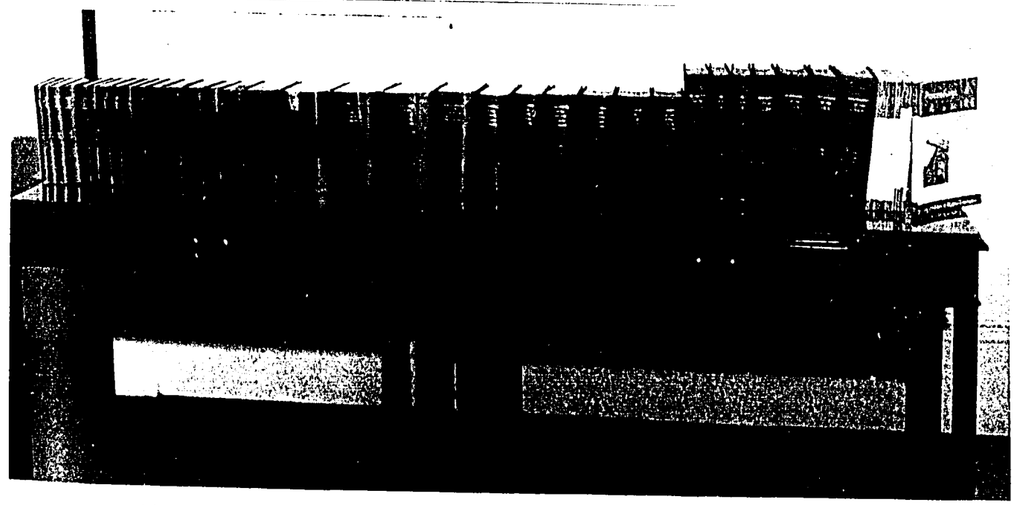
Stark Electronic Sales Co., 1-11, 1-12, 5, 45

States Company, Conn., Electronics

Stoddart Aircraft Radio Co., Inc., 6644 Santa Monica Blvd., Hollywood 38, Calif., 5
See ads on pages 204, 512
Tel: HOllywood 4-9294

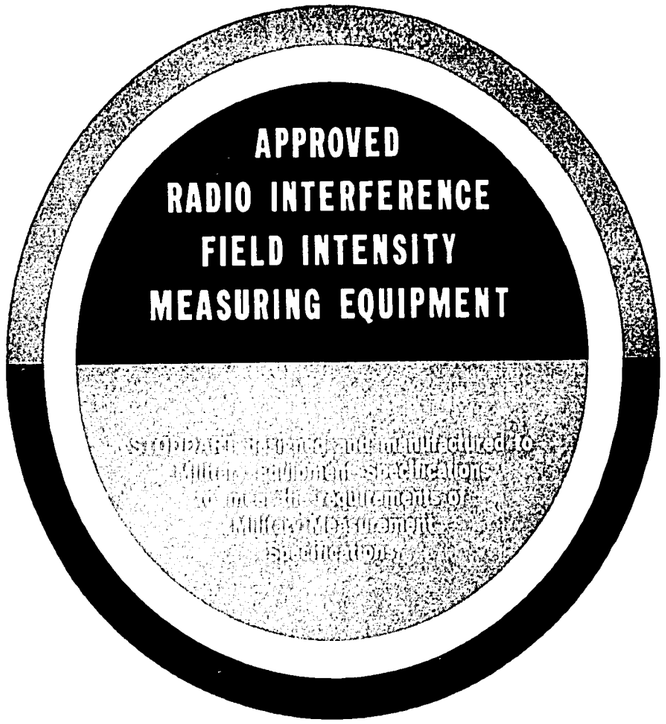
Telechrome, Inc., 28 Ranick Dr., Amityville, L.I., N.Y., 20, 25, 30, 42, 50
See ad on page 236
Tel: LIncoln 1-3600

Telectro Industries Corp., N.Y., 5, 25



FORTY-FIVE YEARS OF RADIO-ELECTRONIC HISTORY

are recorded in "Proceedings of the IRE." The photo above shows the issues from 1912 through 1947—ten 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-five 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"?



APPROVAL DATA

STODDART & MILITARY TYPE	FREQUENCY	MIL-I-16910 (Ships)	MIL-I-6181	S.A.E.	A.S.A.	C.I.S.P.R.
NM-40A (AN/URM-41)	30cps-15Kc	CLASS '1'	Not Req'd	Not Req'd	Not Req'd	Not Req'd
NM-10A (AN/URM-6B)	14Kc-250Kc	CLASS '1'	Not Req'd	Not Req'd	C63.2 (Proposed)	Not Req'd
NM-20B (AN/PRM-1A)	150Kc-25Mc	CLASS '1'	CLASS '1' *CATEGORY 'A'	Not Req'd	C63.2 (Proposed)	**
NM-30A (AN/URM-47)	20Mc-400Mc	CLASS '1'	CLASS '1' *CATEGORY 'A'	APPROVED	C63.3 (Proposed)	**
NM-50A (AN/URM-17)	375Mc-1000Mc	CLASS '1'	CLASS '1' *CATEGORY 'A'	Not Req'd	C63.3 (Proposed)	Not Req'd

*MIL-I-6181C (Proposed)
**Can be supplied to C.I.S.P.R. Recommendations
S.A.E. (Society of Automotive Engineers)
A.S.A. (American Standards Association)
C.I.S.P.R. (Comite International Special des Perturbations Radioelectriques) (International Special Committee on Radio Interference)

STODDART'S **5** self-contained Radio Interference Measuring Equipments, each designed for its specific frequency range, provide:
5 instruments, which can be used by—
5 engineers, to measure over—
5 different frequency ranges, at—
5 different locations, at—
1 time.

FEATURES:

- Each equipment performs Quasi-Peak, Peak, and Average (Field Intensity) measurement functions.
- Approved for use by all Departments of the U. S. Department of Defense.
- Commercial and military equipments are identical.
- Precision laboratory equipment with rugged all-weather design for field use.
- Immediate delivery from stock.

—Serving 33 countries in radio interference control—

STODDART
AIRCRAFT RADIO CO., INC.

6644 Santa Monica Blvd., Hollywood 38, California HOllywood 4-9294

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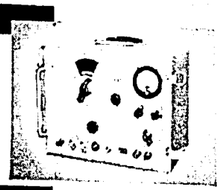
Tomorrow's Circuitry

SG-25 STANDARD SIGNAL GENERATOR

Equivalent to AN/URM-25D. For alignment of radio receivers, measurements of receiver sensitivity and selectivity, and in all radio frequency voltage measurement work.

- Frequency Range: 10 KC to 50 MC in 8 bands
- Calibrated Output: 0.1 to 100,000 microvolts into 50 ohms
- High Output: 2.0 volts, 500 ohms impedance

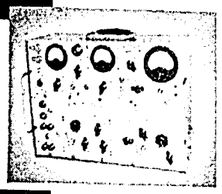
SG-26 STANDARD SIGNAL GENERATOR



Equivalent to AN/URM-26B. For alignment of radio receivers, measurements of receiver sensitivity and selectivity, and in all radio frequency voltage measurement work.

- Frequency Range: 4 to 405 MC in 6 bands
- Calibrated Output: 0.1 to 100,000 microvolts into 50 ohms
- Output Impedance: 50 ohms nominal

RT-500 RECEIVER-TRANSMITTER TESTER



Equivalent to AN/TRM-1. Laboratory-quality portable instrument, designed to measure performance on transmitting and receiving equipment.

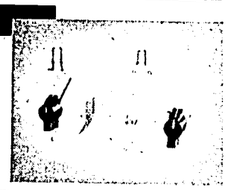
- Frequency Range: 190 KC to 400 MC
- Signal Generator Output: 2.5 to 100,000 microvolts into 50 ohms
- Transmitter Tester Power Range: 3 to 100 watts
- Volt/Milliwatt Meter: multi-range meter measures AC, DC volts and milliwatts

PO-400 PULSE OSCILLOSCOPE

Equivalent to AN/USM-38. Precision portable oscilloscope for analyzing amplitude and time characteristics of complex electrical waveforms.

- Transient Response: 0.06 microseconds (rise time)
- Square Wave Response: less than 5% drop at 50 cycles
- Deflection Sensitivity: 0.1V RMS per inch
- Sweep: 1 to 100,000 microseconds per inch, triggered or recurrent

AT-120 R. F. STEP ATTENUATOR



Designed for use in output systems of signal generators, precision microvolters, IF strips of microwave receivers, etc.

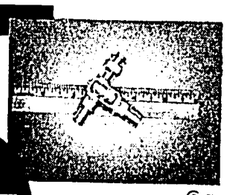
- Frequency Range: 0 to 1000 MC
- Attenuation Range: up to 120 db in ten steps
- Output Impedance: 50 ohms standard, 75 ohms optional
- VSWR: 1.1 up to 500 MC, 1.2 up to 1000 MC

CS-200 SERIES COAXIAL SWITCHES

For all types of coaxial switching.

- Positions: up to 12
- Nominal Impedance: 5 ohms
- VSWR: 1.2 up to 500 MC, 1.3 up to 1000 MC
- Cross-talk for 12 Position: greater than 75 db down at 1000 MC

CM-300 CRYSTAL DETECTOR MOUNT



For general purpose in RF monitoring 50 or 75 ohm coaxial systems. Can be used with Trad Attenuator AT-120.

- Frequency Range: 10 to 1000 MC
- Accuracy: ½ db
- Impedance: available in 50, 75, 100, 150 and 225 ohms
- Maximum Signal Output: 2.5 V RMS

Trad has a complete, diversified line of electronic products, some of which are listed here. All products are available for speedy delivery. Trad's national representative organization is now being expanded. Interested reps may write or call George Trad at Prospect 6-7445 for appointment.

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TRAD ELECTRONICS CORPORATION
1001 First Ave.
Asbury Park, N. J.

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Directory III. Controls & Instruments

80. Radio Frequency Test Equipment.

[illegible]

Telonic Industries, Inc., 73 N. 2nd Ave., Beech Grove, Ind., 55, 56, 4, 55
See ad on page 333
Tel: SUnset 4-5514

Trad Electronics Corp., 1001 First Ave., Asbury Park, N.J., 45, 55
See ad on page 513
Tel: PRospect 6-7445

Transitron, Inc., Div. Van Norman Ind. Inc., 180 Granite St., Manchester, N.H., 15, 25, 42, 45, 54, 55
See ad on page 456
Tel: NAtional 5-6771

Transvision, Inc., [illegible]

Triplett Electrical Instrument Co., [illegible] 15, 42, 45, 54, 55

United Technical Laboratories, N.J., [illegible] 55

Vari-L Co., Inc., 452 Fairfield Ave., Stamford, Conn., 55
See ad on page 322
Tel: FIreside 8-6091

Varian Associates, 611 Hansen Way, Palo Alto 2, Calif., 25
Multiple pages of additional data on 64-65
Tel: DAvenport 5-5631

Wang Laboratories, Inc., 37 Hurley St., Cambridge 41, Mass., 15
See ad on page 471
Tel: UNiversity 4-8380

Weinschel Engineering & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 25, 40
See ads on pages 297, 499
Tel: LOckwood 4-0122

Wickes Engineering & Construction Co., N.J., 15, 55

Recorders, graphic: See class 14

Recording galvanometers: See class 73

Remote controls: See class 68

SWR meters: See class 77

Scalers: See class 78

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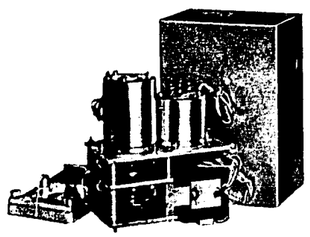
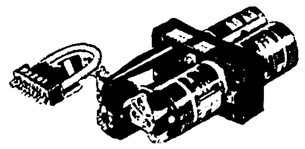
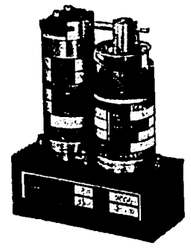


An incremental synchro positioner before wiring to header and hermetic sealing. The synchro rotor is stepped in one or fifteen degree increments clockwise or counterclockwise depending upon which of four coils is momentarily energized by a d-c pulse. The synchro can be rotated any number of degrees or revolutions. Cylindrical member next to the synchro resets it to electrical zero if a pulse is applied to "reset" circuit.



Type 9 motor-driven induction generator driving two Type 11CT synchros through gear train having ratio of 1500:1. Slip clutch permits one control transformer to operate when second control transformer has shaft restrained by stops. Cams close two switches during specified degrees of synchro rotation.



SERVO ASSEMBLY—Type 9 motor-driven induction generator driving a Type 11 synchro through a gear train having a ratio of 12,000:1. Rear shaft of synchro carries contact arm which restricts shaft rotation against adjustable stops and closes switch during the specified arc.

control problems like yours

...with but one solution

Typical of all Transicoil solutions are the three illustrated here. They "do the job right" because each is designed for a single application... by a company whose major function is to provide complete servo assemblies precisely engineered and manufactured to solve individual servo control problems.

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Directory III. Controls & Instruments

81. Servo-Mechanisms.

5. Controls
7. Couplings
10. Gears, gear-trains, etc.
12. Magnetic clutches
15. Servo amplifiers
20. Servo motors & generators

ACF Industries, Inc., Avion Div., N.J., 15

ACF Industries, Inc., Erco Div., Md., 7, 10, 12, 15

Adler Electronics, Inc., N.Y., 5, 15

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Aeroflex Research, Inc., N.Y., 15

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Airpax Products Co., Middle River, Baltimore 20, Md., Demodulator
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Tel: MU 6-9100

Alden Electronic & Impulse Recording Equipt. Co., Alden Research Center, Westboro 6, Mass., 10
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Tel: FOrest 6-4467

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All-Tronics, Inc., 45 Bond St., Westbury, L.I., N.Y., 5, 10, 15
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Tel: EDgewood 3-3090

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American Research & Mfg. Corp., Md., 5, 15

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Automatic Temperature Control Co., Inc., Pa., 5, 15

Barber-Colman Co., Dept. 58D, 1856 Rock St., Rockford, Ill., 5, 15, 20
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Tel: 8-6833

Bell Aircraft Corp., P.O. Box 1, Buffalo 5, N.Y., 5, 15
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Tel: NIagara Falls 7851

Belock Instrument Corp., N.Y., 5, 10, 12, 15

Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N.J., 15, 20
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Bogue Electric Mfg. Co., N.J., 15

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Bowmar Instrument Corp., Ind., 10

Briggs Associates, Inc., Pa., 5, 15

Bristol Co., Conn., 5, 15

Brush Electronics Co., Ohio, 15

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Cal-Tronics Corp., Calif., 5

Century Engineers, Inc., Calif., 5, 10, 15, 20

Chicago Aerial Industries, Inc., Ill., 5, 15

Clary Corp., Calif., 5

Clifton Precision Prods. Co., Inc., Marple at Broadway, Clifton Heights, Pa., 20
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Tel: MAdison 6-2101

Computing Devices of Canada, Ltd., Canada, 7, 10, 15

Consolidated Avionics Corp., N.Y., 5, 15

Control, A Div. of Magnetics, Inc., Dept. Y-38, Box 391, Butler, Pa., 5, 15
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Tel: 71-745

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Control Electronics Co., Inc., 1925 New York Ave., Huntington Station, L.I., N.Y., 5, 15
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Tel: HAmilton 7-7961

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Corbin Corp., Md., 5

Custom Gear Co., Ind., 10

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Daco Mach. & Tool Co., N.Y., 10

Dalmo-Victor Co., Div. of Textron, Inc., Calif., 10

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Devol Research Corp., Conn., 5, 15

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Dynamic Instrument Corp., 50 New York Ave., Westbury, L.I., N.Y., 5, 12, clutch brakes
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Greenleaf Mfg. Co., Div. Mandrel Ind., Inc., 7814 Maplewood Ind. Ct., St. Louis 17, Mo., 15, 20
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Howard Industries, Inc., Wis., 20

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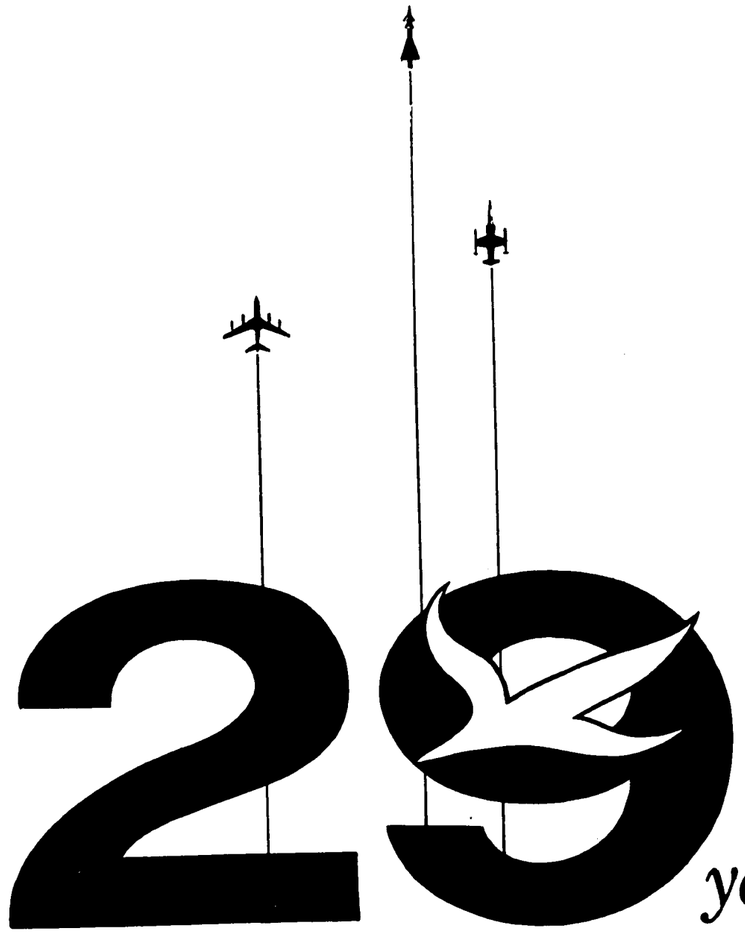

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Simmonds Aerocessories, Inc., N.Y., 5
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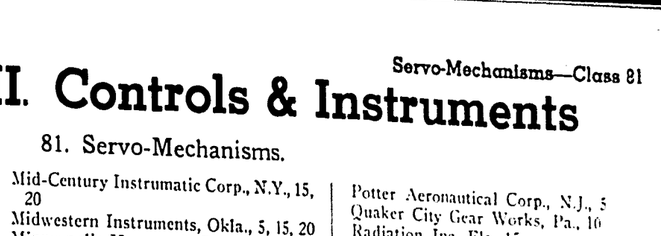

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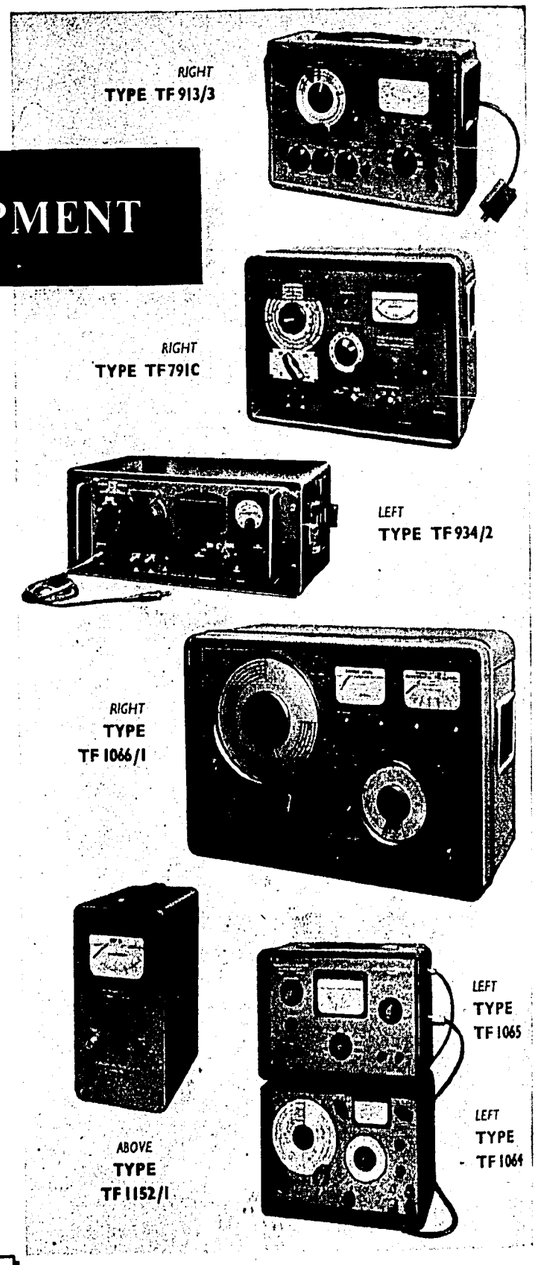

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Signal generators, AM & FM:
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Signal generators, TV:
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Slotted lines:
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Smoke nuisance controls:
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Sorting equipment:
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Spectrum analyzers:
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Speed controls:
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Telegraph test equipment:
See class 67

82. Television Test Equipment.

5. Synchronizing generators
10. TV calibrators
15. TV marker generators
20. TV signal generators
25. TV sweep generators
30. UHF-VHF generators

Allied Radio Corp., Dept. 35-58, 100 N. Western Ave., Chicago 80, Ill., 20, 25, Kits
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Measurements Corp., Box 180, Boonton, N.J., 20, 30
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Telechrome, Inc., 28 Ranick Dr., Amityville, L.I., N.Y., 5, 10, 15, 20, 25, 30
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Tel: UNiversity 4-8380
Wickes Engineering & Construction Co., N.J., 5, 15, 20, 25, Color TV Test

Test chambers: See class 71

Test equipment, audio frequency: See class 67

Test equipment, general: See class 72

Test equipment, microwave & radar: See class 77

Test equipment, radio frequency: See class 80

Test equipment, television: See class 82

Time delay generators: See class 77

Timing motors: See class 44

Tuning forks: See class 75

Vacuum controls: See class 68

Vibration analyzers: See class 72

Vibration controls: See class 64

Voltmeters: See class 42

Voltmeters, audio frequency: See class 67

Voltmeters, vacuum tube: See class 72

Volume level meters: See class 42

Wattmeters: See class 42

Wavemeters: See class 77

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. To this end, the product grouping follows the pattern of the IRE Professional Groups, broadly. The result is a division of all products and services into four fundamental indexes into which 100 basic classifications have been organized.

For detailed identification, these 100 products and services, grouped in the 4 indexes, are further defined into 769 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 used in "Communications" whether components or complete apparatus form the first fundamental group. Yet, the same manufacturer and product 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, preceding the product system in the pink pages introducing the company index. 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

1958 IRE DIRECTORY
DIRECTORY IV MATERIALS & SERVICES

18 major groups
165 products

The products and services of the radio-electronics industry have been organized into four basic directories:

I. Communications
II. Components
III. Controls & Instruments
IV. Materials & Services

Within these four basic directories, 100 major product and service groups are numbered consecutively throughout. Under each of these 100 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 769 sub-products in alphabetical order, consult the eight-page 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 four major directory groups will be found on pages 1, 151, 255, 287, 459, 521.

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!

LICENSE NO. 25
MACHOL EDGE INDEX PATENT #2680630

For complete list of products and services, arranged alphabetically for fast reference, see the eight-page pink section preceding page 1.

1 COMPLETE DATA SPREADS
151 ALPHABETICAL COMPANY LIST
255 DIRECTORY I COMMUNICATIONS
287 DIRECTORY II COMPONENTS
459 DIRECTORY III CONTROLS & INSTRUMENTS
521 DIRECTORY IV MATERIALS & SERVICES

INDEX TO MATERIALS & SERVICES DIRECTORY:

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84	Ceramics	531
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97	Vacuum Tube Parts	595
98	Education	603
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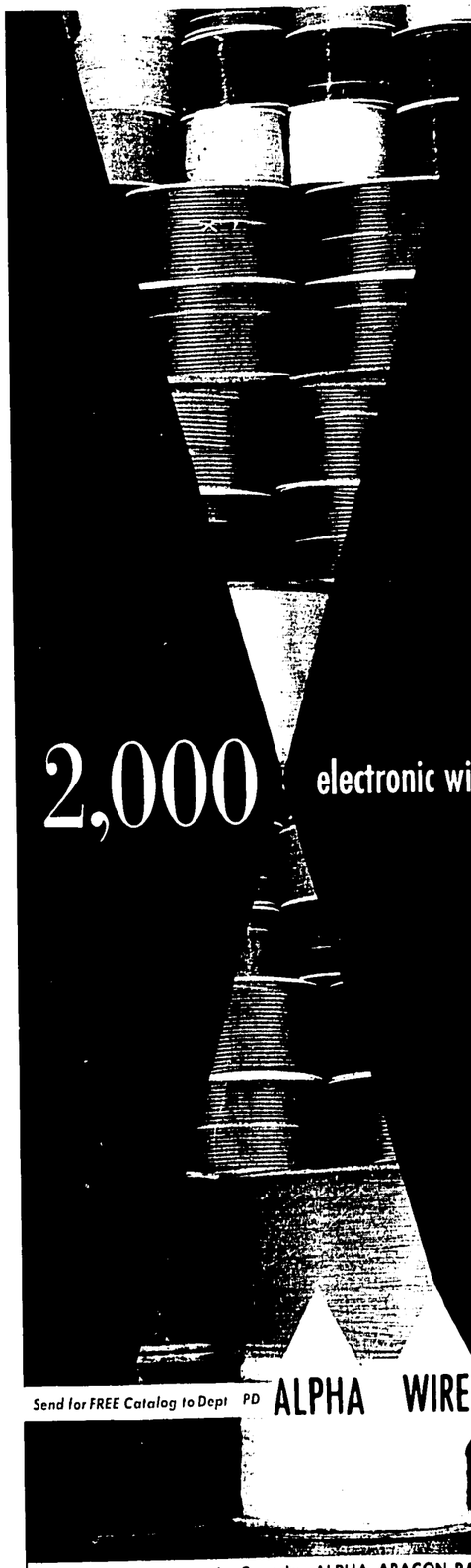

ELECTRONIC WIRE
- High Temperature Wire
- Teflon Wire
- Sub-Miniature Wire
- MIL-W-5086 Aircraft Wire
- MIL-C-7078 Aircraft Wire
- MIL-W-16878B Hook-up Wire
  - Type B
  - Type C
  - Type D
  - Type E Teflon Insulation
- MIL-W-76A Hook-up Wire
  - Type LW
  - Type MW
  - Type HW
  - Type MW Glass Braid
  - Type MW Nylon Jacket
  - Type MW Shielded
- Antenna Wire
- RG-Coaxial Cable
- Rubber Sheathed Service Cord
- Cord Sets
- Tinned Copper Shielding & Bonding
- Bus-Bar
- Tinned Copper Wire
- Magnet Wire
- Test Lead Wire
- Hi-Voltage Wire
- Shielded Microphone
- Shielded Multi-Conductor Cable
- Shielded Speaker Cable
- Multi-Conductor Flexible

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- PVC-744 Plastic Tubing per Spec. MIL-I-7444A
- PIF-130 Plastic Impregnated Fiberglass Tubing per Spec. MIL-I-3190, NEMA-VS1, ASTM-D372
- TFN-250 Teflon Tubing
- SRF-200 Silicone Rubber Coated Fiberglass Tubing
- SFS-400 Silicone Impregnated Fiberglass Sleeving
- HTF-1200 High Temperature Fiberglass Sleeving
- PVC-60 Low Temperature Plastic Tubing
- PLE-70 Polyethylene Tubing
- VTS-135 Varnish Impregnated Tubing & Sleeving

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For details, circle #492 on Reader Service Card.

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Agents in Principal Electronic Manufacturing Areas

For details, circle #493 on Reader Service Card.

Directory IV. Materials & Services

Adhesive cable & tapes: See class 87

Alloys: See class 35

Aluminum: See class 32

Anodes: See class 37

Bearings: See class 87

Blowers: See class 24

Books: See class 99

Brushes, motor: See class 87

Bushings: See class 87

Cabinets: See class 25

Cable clips: See class 87

83. Cable & Wire.

3. Aluminum
5. Antenna feeder line
7. Clad wire
10. Co-axial cables
15. Copper, bare
20. Enamel coated
25. Low-loss, high-frequency types
30. Magnet wire
32. Microphone
34. Plated
35. Precious & rare metals wire
40. Preformed wire harnesses
45. Rubber insulated
50. Shielded
55. Synthetic insulated
57. UHF
60. Wire mesh
65. Woven wire braid

A-K Manufacturing Co., Inc., [illegible] 20, 25, 40, 45, 50, 55, 65

Accurate Insulated Wire Corp., Conn., 32, 45, 50, 55

Acme Wire Co., Conn., 20, 50

Aerolite Electronics Corp., N. J., 40

Airtron, Inc., Dept. 1, 1101 W. Elizabeth Ave., Linden, N.J., 10, 40, 50
See ad on page 453
Tel: HUnter 6-1000

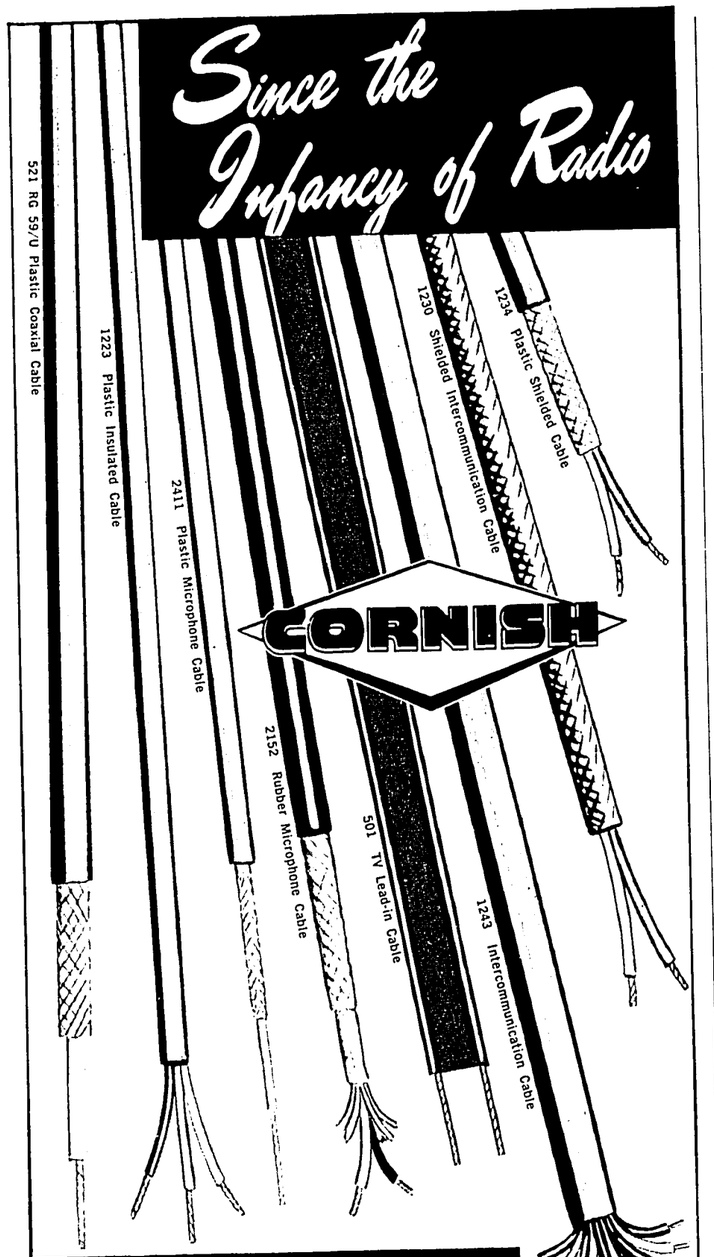
Alden Products Co., 140 N. Main St., Brockton 64, Mass., 40, 50, 55
See ad on page 324
Tel: BRockton 160

Allied Allegri Co., Inc., N.J., 40

Alpha Metals, Inc., N.J., 35

Alpha Wire Corp., Dept. PD, 200 Varick St., New York 14, N.Y., 10, 15, 20, 25, 30, 32, 34, 45, 50, 55, 57, 60, 65
See ad on page 522
Tel: ALgonquin 5-5400

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.



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♦ Stock carried

For details, circle #494 on Reader Service Card.

83. Cable & Wire.

Aluminum Co. of America, Pa., 5

American Communication Corp., N.Y., 10, 32, 50

American Electric Cable Co., Mass., 3, 5, 7, 10, 15, 25, 32, 34, 40, 50, 55, 57, 65

American Leonic Mfg. Co., Pa., 5, 15, 34

American Steel & Wire Co., Div. U.S.S., Ohio, 20, 30, 32, 45, 50, 55

American Super-Temperature Wires, Inc., W. Canal St., Winooski, Vt., 5, 10, 30, 50, Multiconductor Teflon Insulated
See ad on page 523
Tel: UNiversity 2-9636

Amphenol Electronics Corp., 1830 S. 54 Ave., Chicago 50, Ill., 5, 10, 25, 32, 40, 50, 55, 57
See ad on page 202
Tel: BIshop 2-1000

Anaconda Wire & Cable Co., N.Y., 3, 5, 7, 10, 15, 20, 45, 50, 55, 67, 65

Anchor Specialty Mfg Co., N.J., 40

Andrew Corp., 363 E. 75th St., Chicago 19, Ill., 5, 57
See ad on page 258
Tel: TRiangle 4-4400

Ansonia Wire & Cable Co., R.I., 32 & Plastic Insulated Types

Asco Wire & Cable Co., Conn., 20, 30

Automatic Coil Co., 415 Bedford Ave., Brooklyn 11, N.Y., 40
See ad on page 317
Tel: STagg 2-3333

Baker & Co., Inc., N.J., 7, 35, 60

Beam Instruments Corp., N.Y., 3, 5, 7, 10, 15, 20, 25, 30, 32, 34, 40, 45, 50, 57

Beckley Electric Co., Inc., N.Y., 40

Belden Manufacturing Co., Ill., 3, 5, 10, 15, 20, 25, 30, 32, 34, 45, 50, 55, 57, 65

Benmar Co., Ohio, 10, 40

Berkshire Electric Cable Co., Mass., 3, 5, 7, 10, 15, 25, 32, 34, 35, 40, 50, 55, 57, 65

Bernco Engineering Corp., Ind., 40

Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 3, 5, 10, 15, 20, 25, 30, 32, 34, 35, 40, 45, 50, 55, 57, 65
See ad on page 525
Tel: WAlker 5-6980

Boston Insulated Wire & Cable Co., Mass., 10, 25, 45, 50, 55, 57

Brand & Co., Inc., William, Conn., 5, 10, 25, 32, 50, 55, 57

Cadre Industries Corp., N.Y., 40

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Camden Wire Co., Inc., N.Y., 15, 34

Canadian Westinghouse Co., Ltd., Canada, 5, 10, 57

Channel Master Corp., N.Y., 5, 57

Chase Brass & Copper Co., Inc., Conn., 10, 15, 30, 45, 50, 65

Chester Cable Corp., 50A Hill St., Chester, N.Y., 7, 10, 15, 25, 32
See ad on page 186
Tel: HOmestead 9-2141

Clark Cable Corp., Ohio, 40, 45

Coaxial Connector Co., Inc., 37 N. 2nd Ave., Mt. Vernon, N.Y., 5
See ad on page 326
Tel: MOunt Vernon 8-6416

Cohn Corp., Sigmund, 121 S. Columbus Ave., Mt. Vernon, N.Y., 3, 20, 34, 35
See ad on page 525
Tel: MOunt Vernon 4-5300

Coils-Electronics Co., Pa., 40

Directory IV. Materials & Services

83. Cable & Wire.

Columbia Wire & Supply Co., Ill., 3, 5, 7, 10, 15, 20, 25, 30, 32, 34, 40, 45, 50, 55, 57, 65

Continental Wire Corp., Conn., 10, 32, 50, 55

Cooper & Sons, Inc., Joseph B., N.Y., 35

Copperweld Steel Co., Pa., 7, 15, 20

Copperweld Steel Co., Flexo Wire Div., N.Y., 5, 7, 34

Cornish Wire Co., Inc., 50 Church St., New York 7, N.Y., 32, 40, 45, 50, 55, 57
See ad on page 524
Tel: BArclay 7-5140

Crescent Co., Inc., R.I., 10, 32, 40, 45, 50

Dana-Beach Co., N.Y., 20, 30, 50, 55 & Resistance Alloy

Driver Co., Wilbur B., 1875 McCarter Highway, Newark 4, N.J., 20, 35
See ad on page 160
Tel: HUmboldt 2-5550

Eagle Electronics Corp., Conn., 10, 25, 40, 50, 55

Eastern Insulated Wire Corp., N.J., 5, 40, 45, 55, 65, Cord Sets

Electri-Cord Mfg. Co., Inc., N.Y., Cord Sets

Electric Auto-Lite Co., Mich., 3, 10, 15, 20, 30, 34, 40, 45, 50, 55, 57, 65

Electrical & Physical Instrument Corp., N.Y., 10

Electronic Parts Mfg. Co., Inc., N.J., 7, 15, 65

Elgin National Watch Co., Ill., 35

Empire Electronics Co., Inc., N.J., 40

Essex Wire Corp., Ind., 3, 15, 20, 25, 30, 32, 40, 45

Essex Wire Corp., Cords Ltd. Div., Ill., Cord Sets

Etelco, Ltd., England, 55

Fairchild Elect. Prod. Div., Fairchild Camera & Instr. Corp., Vt., 10, 40

Fretco, Inc., Pa., 5, 25, 57

Garfield Wire Div., Overlakes Corp., N.J., 15, 20, 30

Garron Aircraft Supply, Inc., N.Y., 40, 65

Gavitt Wire & Cable Co., Mass., 10, 40, 45, 50, 55, 65

General Cable Corp., N.Y., 3, 5, 10, 15, 20, 25, 30, 32, 45, 50, 55, 57

General Cement Mfg. Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 5, 50
See ad on page 586
Tel: 2-6695

General Electric Co., Lamp Wire & Phosphors Dept., Ohio, 35

General Electric Co., Wiring Devices Dept., R.I., 40

General Insulated Wire Works, Inc., Div. Gen. Cable Corp., R.I., 10, 45, 50, 55

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 10
See ad on Cover 4
Tel: TRowbridge 6-4400

Gilbert Manufacturing Co., N.Y., 3, 5, 7, 10, 15, 20, 25, 30, 32, 34, 40, 45, 50, 55, 57, 65

Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J., 10, 50
See ad on page 194
Tel: Liberty 8-2800

Haller, Raymond & Brown, Inc., 40, 50

Hamlin & Hyman, N.Y., 7, 35

Harrison Electric Co., N.Y., 40

Harvard Wire & Cable Div., Cord & Supply Co., N.Y., 5, 20, 35, 25, 45, 50, 55

Hi-Lo TV Antenna Corp., Ill., 5, 10, 32, 40, 45, 50

Hitemp Wires, Inc., 1200 Shames Dr., Westbury, L.I., N.Y., 10, 20, 30, 50, 65
High Temperature
See ad on page 192
Tel: EDgewood 3-4600

Houlihan Co., E. J., Ill., 40

Hudson Wire Co., Winsted Div., Conn., 20, 30

Hudson Wire Co., Ossining, N.Y., 3, 5, 15, 20, 30, 34, 35, 50, 55, 60
See ad on page 190
Tel: OSsining 2-4710

Indium Corp. of America, N.Y., 35

Inductor Engineering, Inc., Del., 40

Industrial Accessories, N.J., 10, 40, 45, 50

Inland Electronics Corp., Ill., 40

ELECTRONIC WIRE • CABLE
INSULATING SLEEVING • TUBING

SELECT THE RIGHT MATERIAL FOR YOUR APPLICATION

All specifications shown • Largest variety and number in Electronics.

NEW THE "IN-STOCK" LINE

"Teflon" Tubing — More Sizes
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MIL & JAN Specs.—JAN-C-76, MIL-W-76A, MIL-W-16878B, MIL-W-7080, MIL-C-7078, MIL-W-12349, MIL-E-031C

Write for FREE Catalog and Product Bulletins. See our Listings in "Radio Electronic Master"

BIRNBACH RADIO CO. INC.
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WIRE • CABLE • JACKS and PLUGS

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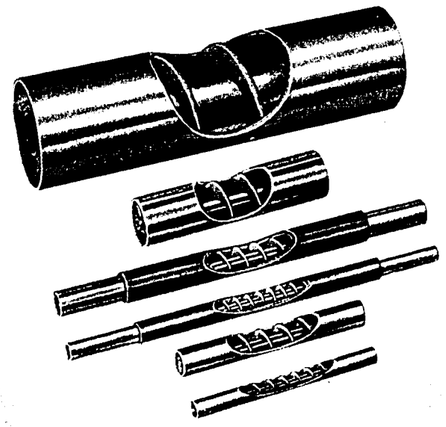
SIGMUND COHN CORP. 121 So. Columbus Avenue • Mount Vernon, N.Y.

For details, circle #496 on Reader Service Card.

NEW **AMPLI-VISION-TELCON HELICAL MEMBRANE CABLES**

FOR EVERY HIGH FREQUENCY APPLICATION



Combining low attenuation with minimum VSWR, Ampli-Vision Telcon Helical Membrane Cables have perfect characteristics for RF use . . . uniform frequency response . . . low temperature coefficient for all electrical characteristics . . . low noise level . . . high signal handling capacity . . . utmost flexibility permitting ease of installation . . . perfectly matched fittings and terminations . . . ALL THIS AT LOW COMPETITIVE PRICES.

Ampli-Vision-Telcon HM series cables consist of an inner copper conductor separated from an aluminum outer sheath by a helical polyethylene membrane. This cable is furnished either with a bare aluminum sheath or a vinyl protective sheath extruded over the aluminum.

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Cable Code	AV6	AV4	AV7	AV8	AV9	AV11	AV10
Characteristic Impedance (Ohms)	75	75	75	50	50	50	50
Nominal Diameter	½"	¾"	1½"	½"	¾"	1½"	3⅛"
Attenuation (db/100 ft.) 1 Mc/s 1000 Mc/s	0.073 2.7	0.048 1.8	0.024 1.05	0.083 2.9	0.054 2.0	0.026 1.15	0.0115 0.67
Power Rating (Kw) 1 Mc/s 1000 Mc/s	12 0.33	21 0.57	59 1.35	13 0.37	24 0.66	66 1.5	230 4.3
Max. R.F. Voltage Kv.	1.3	2.2	4.5	1.3	3.0	5.5	12
Weight Lbs./1000 ft.:	96	233	575	150	240	630	2360

A complete line of other types of coaxial cables is also available from Ampli-Vision. For complete information write to Dept. K.

ampli-vision

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a subsidiary of

Paramount Pictures Corporation

For details, circle #497 on Reader Service Card.

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- Pure Platinum
- 1 & 2½% Gallium Gold
- 1% Antimony Gold

High purity aluminum—99.99% for silicon rectifiers

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Mfr. of Wire and Strip Braid and Strand

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West Coast Representative: Harry Appleton Co., Inc., 136 San Fernando Rd., Los Angeles 31, Calif.

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HIGH TEMPERATURE CABLE...

Suitable for operating temperatures up to 650° with nickel-clad copper conductor and laminated insulation having superior dielectric strength and moisture resistance. In AWG sizes 22 thru 4/0. In accordance with MIL-C-25038.

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High Temperature and Moisture Resistant Electrical Cable. Lewis "EXFLEX" Cable, single and multi-conductor, superior for circuits on hinged or pivoted parts. Resistant to abrasion and temperaures to 500°F.

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with nickel-chrome conductor and laminated insulation for operation at 500°F. extensively used by central stations to maintain proper temperatures in pipe lines exposed to wide variations in ambient temperature.

GLASS & ASBESTOS INSULATED HEATING CABLE...

with stainless steel braided shield for special high temperature applications, used by atomic energy facilities.

CUSTOM CONSTRUCTED CONTROL CABLES AND THERMOCOUPLE-WIRE CABLES...

with segregated circuits individually shielded, and with over-all shielding or with special shielding and jacketing.

FIRE-RESISTANT AND HIGH TEMPERATURE RESISTANT CABLE...

for circuits required to operate in 2000°F. flame for fifteen minutes. Excellent for fire-detector circuits and for use in temperatures up to 600°F.

THERMOCOUPLE WIRE AND EXTENSION WIRE...

in iron-constantan, copper-constantan and chromel-alumel to MIL specifications or in custom constructions. Twisted and shielded, cabled, shielded and jacketed. Multi-pair cables, shield and jacketed for missile applications.

RESISTANCE ELEMENT AND UNITS...

Core-wound flexible heating element and units for low wattage appliances as heating-pads, sealers, curling-irons, toys, wire marking machines, etc. Insulations of asbestos or glass or in combinations of both.

By utilizing and combining the various qualities of fire, heat, abrasion and moisture resistance of asbestos, glass, silicones and Teflon*, we have developed many special wires and cables for avionic and electronic applications. We invite inquiries for cables and wire constructed to customers' specifications for special applications.

* DuPont Trade Mark

the LEWIS ENGINEERING COMPANY

WIRE DIVISION

NAUGATUCK, CONNECTICUT

For details, circle #499 on Reader Service Card.

Directory IV. Materials & Services

83. Cable & Wire.

International Telemeter Corp., [illegible] 2000 Stoner Ave., Los Angeles 25, Calif., 10, 35
See ad on page 526
Tel: GRanite 6-5201

Jersey Specialty Co., [illegible] Ohm

Jetrold Electronics Corp., Dept. HF-8, #2, 23rd & Chestnut Sts., Philadelphia 3, Pa., 10
See ad on page 534
Tel: LOcust 4-0757

Kaiser Aluminum & Chemical Sales, Inc., III., 3, 5, 7, 10, 35, 45, 55, 57

Keiser Industries, Inc., Pa., 40

Kings Electronics Co., Inc., 40 Marbledale Rd., Tuckahoe 7, N.Y., 40
See ads on pages 529, 565
Tel: SWitzwater 3-5000

Knickerbocker Automotive Co., N.Y., 15, 20, 30, 45

Kulite Tungsten Corp., N.J., 37

Leach & Garner Co., Industrial Div., Mass., 7, 34, 35

Lenz Electric Manufacturing Co., Ill., 10, 25, 32, 50, 55, 57, 60, 65

Lewis Engineering Co., 52 Rubber Ave., Naugatuck, Conn., Heating cable, Insulated, Hi-temp. Hook-up, Thermocouple and Resistance types.
See ad on this page
Tel: PArk 9-5253

Little Falls Alloys, Inc., N.J., 3, 7, 34

Lowell Insulated Wire Corp., R.I., 32, 45, 50, 55

M & G Metal Products Co., Ill., 35

Mackay, Inc., A. D., N.Y., 3, 35

MacLeod & Hanopol, Inc., Mass., 4

Magnet Wire, Inc., N.Y., 5, 15, 30, 2

Manger Electric Co., Conn., 30, Wire Leads

Medical-Electronics Development Co., N.Y., 60

Metals & Controls Corp., Cont. Plate Div., Mass., 7, 35

Metz Refining Co., N.Y., 35

Microdot Inc., Calif., 10

Miljan, Inc., Calif., 40, Teflon

Modelectric Products Co., Inc., N.J., 4

Montgomery Co., Conn., 3, 15, 32, 34, 60

Montrose Products Co., Inc., Mass., 1

Morton Electronics Corp., Cable Sets, P., 10, 32, 40, 45, 55 & Cord Sets

Mutual Electronic Industries Corp., United Cable Div., N.Y., 3, 35, 57, Stretch Type

Nesor Alloy Prod. Co., Dept. MF-1, 282 Halsey St., Newark 2, N.J., 5, 15, 30, 50, 65
See ad on page 526
Tel: MItchell 2-1685

New Products Co., Calif., 35, 50

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

- No radiation
- Low attenuation
- Excellent frequency response
- Uniform electrical properties over wide temperature variations
- Unlimited operating life
- Continuous 1000′ lengths

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FINEST LINE OF HIGH FREQUENCY CABLES IN THE COMMUNICATIONS FIELD!

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Polyvinyl Chloride compounds o o o for 60°, 80°, and 105° C applications
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Teflon o o o extruded type, high temperature constructions
Nylon Jackets o o o for chemical and abrasion resistance

HYRAD o o o
A new development by Sequoia with unusual properties for continuous high temperature applications

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Tinned copper, stranded or solid.

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Type C for 1000-v application
Type D for 3000-v application

With extruded Teflon insulation
Type E for 600-v application
Type EE for 1000-v application

MIL-W-76A
With Vinyl insulation
Type LW for 300-v application
Type MW for 600-v application
Type HW for 600-v and 2400-v application

Also MIL-W-5086, MIL-W-7078, NAS-702

COLOR CODING

Up to 3 spiral stripes, using 10 standard NEMA colors

SHIELDED CONSTRUCTIONS

Tinned-copper braiding in accordance with military requirements and to fit specialized needs.

TELEPHONE CABLES

Aerial duct and inside constructions in accordance with standard R.E.A. and Western Electric specifications. Full color code and longitudinal shielding available.

SPECIALTY CABLES

Single- or multi-conductor cable constructions with any combination of wire type, shielding and jacketing tailored to meet specific customer requirements.

TEFLON*

Extruded Type — 600-v and 1000-v, types E and EE of MIL-W-16878B
Color coded constructions available
For high temperature (200° C) and low-loss applications
Extreme chemical resistance

HYRAD

Hyrad insulation is a new development by Sequoia Process Corporation.
A modified polyethylene (irradiated) to provide increased resistance to high temperatures and chemical attack. Retains the high-voltage, low-loss characteristics of conventional polyethylene.
Features absence from cold- and hot-flow; does not shrink during soldering; non-toxic; and is rated for continuous operation at 135° C, 20-hour cumulative service at 200° C. Color coded, solid or cellular types available in miniature and standard coaxial cables, special cables, and sleeving or tubing.

* A trademark of E. I. du Pont de Nemours & Company (Inc.)

SEQUOIA WIRE COMPANY

Facilities approved for automatic government source inspection

Redwood City 1, California — 2201 Bay Road—EMerson 9-0331

SOUTHERN CALIFORNIA
11830 West Pico Blvd., West Los Angeles — BRadshaw 2-0124 and GRanite 9-1358

REPRESENTATIVES IN OTHER PRINCIPAL CITIES — 4424

For details, circle #501 on Reader Service Card.

Directory IV. Materials & Services

83. Cable & Wire.

Ney Co., J. M., Dept. N., P.O. Drawer 990, Hartford 1, Conn., 35
See ad on page 425
Tel: CHapel 2-2281

Northern Electric Co., Ltd., Canada, 3, 10, 15, 32, 45, 50, 55

Okonite Co., N.J., 3, 5, 10, 25, 32, 45, 50, 55, 57, 65

Pacific Automation Products, Inc., Calif., Cable & Cable Systems

Perfection Mica Co., 1322 N. Elston Ave., Chicago 22, Ill., 50
See ad on page 599
Tel: EVerglade 4-2122

Permacel Tape Corp., N.J., 20, 30

Phalo Plastics Corp., Mass., 3, 5, 10, 25, 32, 40, 50, 55, 57

Phelps Dodge Copper Products Corp., 300 Park Ave., New York 22, N.Y., 10, 15, 20, 25, 30, 45, 50, 55
See ad on page 528
Tel: PLaza 1-3200

Plastoid Corp., N.Y., 5, 10, 32, 50, 55, 57, 65

Precision Tube Co., Inc., Pa., 10, 50

Progress Electronics Co., 296 Broadway, New York 7, N.Y., 10
See ad on page 328
Tel: WOrth 2-8041

Radio Wire Mfg., Co., Ind., 30, 55

Rea Magnet Wire Co., Inc., Ind., 3, 15, 20, 30

Revere Corp. of America, Sub. of Neptune Meter Co., Conn., 50, 55

Rex Corp., 240 Hayward Rd., West Acton, Mass., 7, 10, 25, 32, 34, 35, 40, 50, 55, 57
See ad on page 530
Tel: COlonial 3-7721

Rockbestos Products Corp., Conn., 10, 30, 50, 55, 57

Rockland Insulated Wire & Cable Co., Inc., N.Y., 10, 25, 32, 40, 50, 55, 57

Roesch Cable Div., Douglas, Hall-Scott, Inc., 40, 45, 50, 55

Rome Cable Corp., Rome, N.Y., 3, 15, 20, 30, 45, 50, 55

Runzel Cord & Wire Co., Ill., 15, 40, 50, 55

Saxton Products, Inc., N.Y., 3, 5, 7, 10, 15, 20, 25, 30, 32, 50, 55, 57, 65

Schuyler Manufacturing Corp., N.J., 60

Secon Metals Corp., N.Y., 3, 20, 30, High Temp., 34 Gold & Silver, 35

Sequoia Wire Corp., 2201 Bay Rd., Redwood City 1, Calif., 3, 10, 15, 25, 32, 50
See ad on this page
Tel: EMerson 9-0331

Sprague Electric Co., Mass., 30

Standard Metals Corp., Mass., 7, 34, 35

Surface Conduction, Inc., N.Y., 5

Surprenant Mfg. Co., 172 Sterling St., Clinton, Mass., 3, 10, 25, 32, 40, 50, 55, 57
See ad on page 232
Tel: 2180

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

For Unequalled Quality and Performance of the highest standard

Specify REX

ELECTRONIC & COMMUNICATION PRODUCTS

WIRES & CABLES

MILITARY SPECIFICATION WIRES

JAN-C-76 — Types WL-SRIR, SRHV-SRRF
MIL-W-76A — Types LW-FX-MW-HF-HW
MIL-W-16878B — Types B-C-D-N
MIL-C-915 — Types SRI-MRI

Above constructions include P.V.C. Nylon or Polyethylene insulation, with or without Nylon Jacket. Also, shielded construction with P.V.C. or Nylon Jacket. Insulated in solid colors or stripes.

MISCELLANEOUS WIRES AND CABLES

Complete facilities for design and manufacture to customers specifications.

HIGH TEMPERATURE WIRES

Rex-KF® — MIL-W-12349. Insulated with Polytrifluoromonochloroethylene for 1000 volt service at operating temperatures from —65°C to +175°C. 17 solid colors and 10 striping colors in 1, 2, or 3 stripes.

Teflon Insulated Wires — MIL-W-16878 — Types E — EE

For 600 and 1000 volt service at operating temperatures from —65°C to +200°C. 10 solid colors and 10 striping colors in 1, 2 or 3 stripes.

COAXIAL CABLES

To MIL-C-17B and Commercial Specifications

MICROWALL WIRES AND CABLES

Type JR — 300 volt service
Type FJR — 1000 volt service
Both have exceptionally small OD and operate at temperatures from —50°C to +125°C. Has solid polyamide insulation — highly resistant to abrasion.

UNDERWRITER'S APPROVED WIRE

Types TF-TFF-AWM. 80° to 105°C.

TELEPHONE WIRES AND CABLES

All plastic types. Exchange area (aerial, duct and direct burial), One pair distribution wire ("C" Rural), Rural Distribution Wire (all R.E.A. listed), Urban Distribution Wire, Inside Wiring Cable.

UHF INSULATION

REXOLITE #1422

Rigid, thermosetting cast plastic offering exceptional electrical properties at ultra-high frequencies. Can be machined to extremely close tolerances. Available in rod or sheet form.

REXOLITE #2200

Offers virtually the same high electrical properties as Rexolite #1422 plus exceptionally high impact strength. Can be hot or cold punched for low cost fabrication. Available in sheet form only.

COPPER CLAD REXOLITE

An outstanding addition to the field of printed circuits. Combines the fine electrical properties of Rexolite #2200 with good chemical resistance and punchability. Available in sheets with copper on one or both sides.

ELECTRICAL TUBING

REXTRUDE #105

A polyvinyl plastic tubing with exceptional insulating characteristics at high operating temperatures. Underwriters Laboratories approved and rated for —30°C to +105°C.

REXTRUDE #1000

Vinyl plastic tubing to Military Specification MIL-I-631. Offers exceptional resistance to tear and abrasion. Has excellent elasticity permitting stretch over lugs and splices.

OTHER PRODUCTS

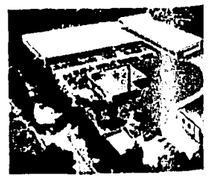
RIGID AND FLEXIBLE PLASTIC EXTRUSIONS OF ALL TYPES.

REX WIRE & CABLE

Send for complete technical data
Manufactured by

THE REX CORPORATION

240 HAYWARD ROAD, WEST ACTON, MASS.



For details, circle #502 on Reader Service Card.

Directory IV. Materials & Services

83. Cable & Wire.

Sylvania Electric Products Inc., Dept. F 24P, 1740 Broadway, New York 19, N.Y., 7, 35
Multiple pages of additional data on 25-30
Tel: JUdson 6-2424
T A Mfg. Corp., Calif., 40
Techniques, Inc., N.J., 25, 57
Tech-Ohm Resistor Corp., N.Y., 5, 7, 10, 45
Telectron Co., Fla., 40
Teletronic Laboratories, Inc., Calif., 40
Tensolite Insulated Wire Co., Inc., 198 Main St., Tarrytown, N.Y., 10, 25, 30, 50, 55, 65
See ad on page 246
Tel: MEdford 1-2300
Tevco Insulated Wire, Calif., 10, 15, 25, 32, 50, 55, 57, 65
Times Wire & Cable Co., Inc., Conn., 5, 7, 25, 32, 34, 40, 50, 57
Transradio, Ltd., England, 10, 25, 50, 55
Trimm, Inc., [illegible] W. Lake St., Libertyville, Ill., [illegible]
See ad on page [illegible]
Tel: Libertyville [illegible]
[illegible]
Unicon Corp., [illegible] Warren St., New York 7, N.Y., [illegible]
See ad on this page
Tel: WOrth 2-5630
Varflex Corp., [illegible]
Varo Electric Wire & Cable Co., R.I., 5, 10, 15, 25, 32, 35, 50, 55, 57, [illegible]
Varoma Electronics Co., Inc., 40
Ward Products Corp., Ohio, 5
Warren Wire Co., Vt., 5, 10, 15, 50, 55
Western Gold & Platinum Co., Calif., [illegible]
Western Insulated Wire Co., Calif., 7, 15, 32, 45, 50, 55
Wheeler Insulated Wire Co., Inc., Conn., 20, 30, 55
White Dental Mfg. Co., Industrial Div., N.Y., 35
Wright Engineering Co., Calif., 10
York Co., Inc., Otto H., N.J., 60, Knitted

UNIVOX CORPORATION

Research, Development, Design and Manufacture

Coaxial cable and multiconductor cable assemblies for airborne and other applications where impedance, capacity and operating conditions are critical.

Airborne control and recording systems

102 Warren Street • New York • Worth 2-5630
4301 W. Jefferson Blvd. • Los Angeles • Republic 4-4163

For details, circle #503 on Reader Service Card.

Cans: See class 87

Caps, vacuum tube: See class 97

84. Ceramics.

5. Coil forms
10. Custom fabrication
12. Ferrites
15. Insulators
17. Metallized
20. Proprietary forms

Advanced Vacuum Prods., Inc., Sub. General Ceramics Corp., Dept. ID, 430 Fairfield Ave., Stamford, Conn., 15
See ad on page 358
Tel: DAvis 4-2148
Aerovox Corp., Mass., 10, 12, 20
Allied Plastics Supply Corp., 75 Cliff St., New York 38, N.Y., 10, 15
See ad on page 584
Tel: BEekman 3-7377
American Feldmuehle Corp., 11 W. 42 St., New York, 36, N.Y., 17, alumina
See ad on page 532
Tel: PEnnsylvania 6-9751
American Lava Corp., Cherokee Blvd. & Mfrs. Rd., Chattanooga 5, Tenn., 5, 10, 15, 17
See ad on page 182
Tel: AM 5-3411
Anderson Associates, H. V., N.J., 17 & Glass
B G Corp., N.J., 10, 15, 17, 20
Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 15
See ad on page 525
Tel: WAlker 5-6980

During the past seven years, the radio-electronic industry's spectacular growth has been paced by the increase of advertising pages in the annual IRE DIRECTORY.

In the 1949 edition, 158 advertisers took 133 pages. In the 1958 IRE DIRECTORY, the number of advertisers mushroomed to 555 and advertising pages numbered 414—an increase of 312% over the '49 edition.

The IRE DIRECTORY sells year 'round by serving over 50,000 IRE members who daily are developing and perfecting remarkable new devices. To sell ahead, put your product story before radio-electronic engineers who are planning ahead . . . in the 1959 IRE DIRECTORY.

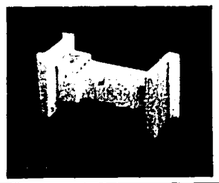
Engineers are educated to specify and buy.

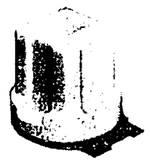
IRE DIRECTORY

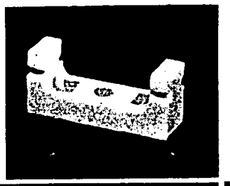
Published by
The Institute of Radio Engineers
Adv. Dept., 72 W. 45th St., New York 36, N. Y. MUrray Hill 2-6606

Goodness! Such growth!

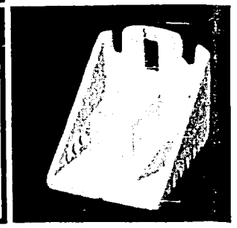
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

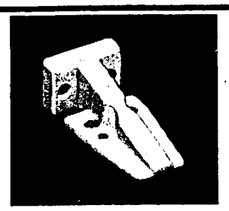


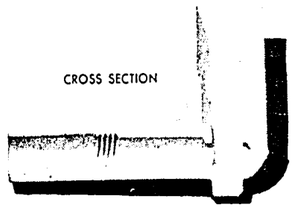




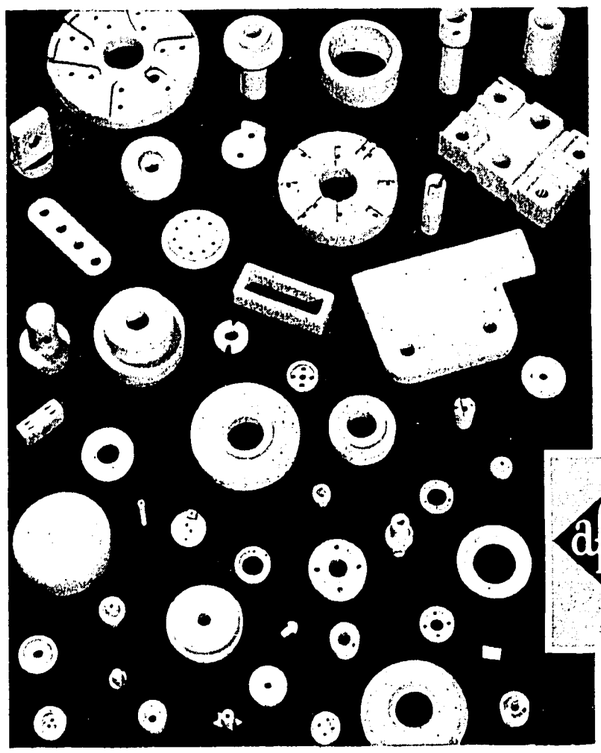
For exacting applications...
precision parts to your specifications
of HYPALOX... high purity aluminum oxide.







Hypalox alumina ceramics
up to 99% purity



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

National Representatives: **COLUMBIA TECHNICAL CORP.** 61-02 31st Ave., Woodside 77, N.Y.

For details, circle #504 on Reader Service Card.

Directory IV. Materials & Services

84. Ceramics.

Cambridge Thermionic Corp., 440 Concord Ave., Cambridge 38, Mass., 5, 15
See ad on page 548
Tel: TRowbridge 6-2800

Centralab Div. of Globe Union, Inc., 920Y E. Keefe Ave., Milwaukee 1, Wis., 5, 10, 12, 15, 17, 20
See ad on page 206
Tel: WOodruff 2-9200

Ceramaseal, Inc., P.O. Box 25, New Lebanon Center, N.Y., 17
See ad on page 359
Tel: WEst Lebanon 3-5851

Ceramic Specialties Co., Ohio, 15
Consolidated Electrodynamics Corp., Calif., 15
Coors Porcelain Co., Colo., 5,10,15,17,20
Crowley Div., Aerovox Corp., N.J., 12
Crucible Steel Co. of America, Pa., 12
Daystrom, Inc., N.J., 17
Decatur Electronic Industries Corp., N.Y., 15
Diamonite Products Mfg. Co., Ohio, 5, 10, 12, 15, 17, 20
Duncan Precision Electroforming, C. L., Ga., 10, Electroforming
Electronic Mechanics, Inc., N.J., 5, 10, 15, 17, 20
Emerson & Cuming, Inc., Mass., 20

Fair-Rite Products Corp., P.O. Box 358, Commercial Row, Wallkill, N.Y., 12
See ad on page 337
Tel: WAllkill 3-2632

Ferroxcube Corp. of America, N.Y., 12
Filmohm Corp., N.Y., 17
Frenchtown Porcelain Co., N.J., 10, 15, 17, 20
Fretco, Inc., Pa., 15
Gemloid Corp., N.Y., 10

General Ceramics Corp., Dept. ID, Crows Mill Rd., Keasbey, N.J., 5, 10, 12, 15, 17, 20
See ads on pages 334, 470
Tel: VAlley 6-5100

General Electric Co., Electronic Components Dept., N.Y., 12, 20
Isolantite Mfg. Corp., N.J., 5, 10, 15, 17, 20

Kearfott Co., Inc., 1378 Main Ave., Clifton, N.J., 5, 10, 12, 15, 17, 20
See ad on page 36
Tel: GRegory 2-1000

Krystinel Corp., N.Y., 12
Lapp Insulator Co., Inc., Radio Specialties Div., N.Y., 15
Lundey Associates, Inc., Mass., 17
Mansol Ceramics Co., N.J., 10, 15, 17
Maryland Lava Co., Md., 5, 10, 15
McDowell Electronics, Inc., N.J., 10
Metal Powder Association, N.Y., 12
Metaplast Co., Inc., N.Y., 17

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 5, 15
See ad on page 600
Tel: MAlden 4-4108

Miller Co., Calif., 5
Mitronics, Inc., N.J., 15, 17
Mycalex Corp. of America, 125 Clifton Blvd., Clifton, N.J., 15
Multiple pages of additional data on 80-81
Tel: PRescott 9-3362
National Co[illegible], N.J., 5, [illegible], 17
National Co[illegible], 5, 15, 20
National Moldite Co., 1410 Chestnut Ave., Hillside 5, N.J., 12
See ad on page 208
Tel: WAverly 6-2[illegible]
Perfection Mica Co., 1322 N. Elston Ave., Chicago 22, Ill., 12
See ad on page 509
Tel: Everglade 4-2122
Pfaudler & Co., O. E., Conn., 5, 15
Porcelain Products, Inc., Ohio, 15
Radio Corp. of America, N.J., 12
Raytheon Mfg. Co., Ceramic Sales, Foundry Ave., Waltham 54, Mass., 5, 10, 15, 17, 20
See ad on page 534
Tel: TWinbrook 3-5860

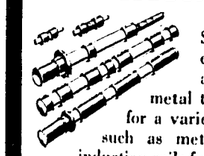
Raytheon Mfg. Co., Microwave & Power Tube Operations, Section PT-35, Foundry Ave., Waltham 54, Mass., 10, 12, 15, 17
See ad on page 448
Tel: TWinbrook 3-5860

Rogers Majestic Electronic Tubes and Components, Canada, 12
St. Eloi Corporation, Ohio, 10

Stupakoff

Metallized

CERAMICS



Stupakoff specializes in the application of metal to ceramic parts for a variety of purposes, such as metallized ceramic induction coils for radio receivers and transmitters; metallized ceramic shafts for air-tuning condensers; metallized plates for fixed rigid assemblies; printed circuits; ceramic trimmer condensers; terminals and terminal boards; strain and lead-in insulators; and many other ceramic-to-metal products.

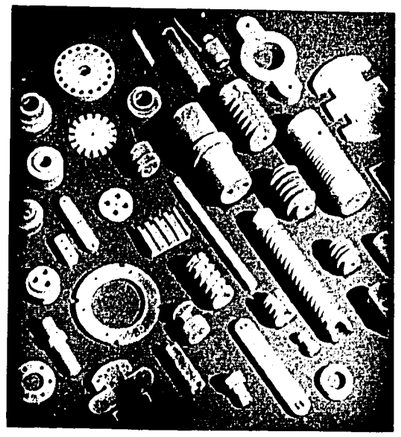
Stupakoff high-precision ceramic assemblies offer many opportunities to reduce costs, increase production and improve electrical and electronic equipment. Further details will gladly be sent upon request.

STUPAKOFF DIVISION OF
The CARBORUNDUM Company
LATROBE, PENNSYLVANIA

For details, circle #505 on Reader Service Card.

steatite, ceramic & lava insulators

for electrical and electronic applications



Custom-molded, extruded or machined to close tolerances to meet your exact specifications. Prompt delivery at low cost on large or small orders.

FIND OUT TODAY. Illustrated bulletin with complete technical data will be sent on request.

Superior Steatite & Ceramic Corp.
85 West Forest Avenue, Englewood, N.J.
West Coast Representative:
Yarbrough Sales Co., 2636 Mission St., San Marino, Calif.
For details, circle #506 on Reader Service Card.

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

Which ceramic characteristics do you need . . .

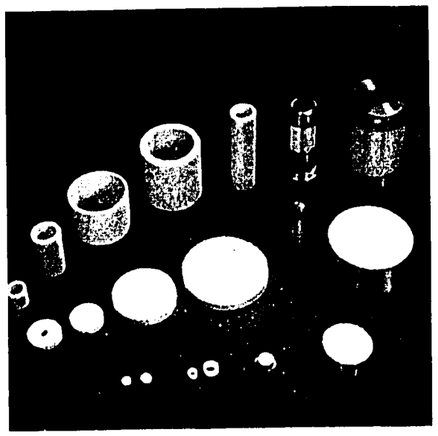
Characteristic	Material								
	Electrical Porcelain	Steatite	Fused Quartz	Magnesia	Cordierite	Glass Bonded Mica	Raytheon R-95 High Alumina	Forsterite	Zircon
Dielectric Constant (1 mc)	6-7	5.5-6.5	3.7	5.8	4-5	7-8	9	6.5	9
Power Factor (1 mc)	.009	.0008	.00035	.0008	.008	.002	.001	.0002	.0014
Loss Factor (1 mc)	.055	.004	.0013	.004	.03	.016	.009	.0014	.013
Water Absorption (%)	0-1.0	0-.01	0	16	3-8	0.5	0.0	0-.01	0-.01
Tensile Strength (p.s.i. x 10^3)	2.6	13	8	2.8	3	8	25	10	10
Flexural Strength (p.s.i. x 10^3)	11	20	—	6	7-10	18	45	12	18.5
Compressive Strength (p.s.i. x 10^3)	30-65	65	200	48	50-95	25	250	80	80
Dielectric Strength (volts/mil)	100-200	250	200	65	200	245	450	250	200
Hardness, Moh's scale	7.5	7.5	5	6	7	—	9	7.5	8
Modulus of Elasticity (p.s.i. x 10^6)	10	14	4	—	5	—	42	—	21
Specific Gravity	2.4	2.6	2.2	3.0	2.5	—	3.7	2.8	3.7
Linear Thermal Expansion 20-100°C (in./in./°C x 10^{-6})	3.6	6	.20	9.4	2.5-4	—	6.2	8.5	2.5-5
T_E Value (°C)*	—	450°-800°	—	—	750°	—	980°	990°	700°

*T_E is that temperature at which the volume resistivity reaches 1 Meg.

Approximate characteristics of "electronic" ceramic materials. Source: manufacturer sales literature

Reprinted from Electronic Design, November 1, 195

How Raytheon R-95 High-Alumina Ceramic can save you money—do a better job



For details, circle #507 on Reader Service Card.

Consider well the unusual properties present in Raytheon R-95 High-Alumina Ceramic. If your needs are for a less specialized material, you may find a satisfactory performer at lower cost.

However, when you require a material with remarkably *high resistance to high temperature, shock and vibration; high dielectric strength* and *high electrical resistance at all temperatures; extreme hardness; high mechanical strength* and *positive sealing capability*—then you will surely want to be familiar with the ratings of Raytheon's R-95. Proper application of this superior material assures continuing design and assembly economy, particularly where ceramic seals are a factor.

Ceramic parts manufactured from Raytheon R-95 High Alumina are available, either alone or as hermetic ceramic-to-metal assemblies, in accordance with your specifications. The assemblies can be soft or hard soldered into your production in your own plant.

Send sketches or drawings outlining dimensions and tolerances, together with operational conditions. We will be pleased to supply information and help on any of your ceramic needs.

Write for complete specification sheet and your copy of *Ceramics in Electronic Design*, comprehensive questions and answers on the growing role of ceramics in modern design. No cost or obligation, of course.

RAYTHEON MANUFACTURING COMPANY

RAYTHEON

Excellence in Electronics

Ceramic Sales **Waltham 54, Massachusetts**

Directory IV. Materials & Services

84. Ceramics.

Saxonburg Ceramics, Pa., 5, 10, 15, 20
Solar Manufacturing Corp., Calif., 10, 15, 17
Sphere Co., Inc., N.J., 10
Star Porcelain Co., N.J., 5, 15
Steward Manufacturing Co., D. M., Tenn., 5, 10, 12, 15, 17, 20
Stupakoff Div. Carborundum Co., Dept. P, Box 390, Hillview Ave., Latrobe, Pa., 5, 10, 15, 17
See ads on pages 242, 360, 533, 558, 601
Tel: KEystone 7-3331
Superex Electronics Corp., N.Y., 5, 12
Superior Porcelain Co., W.Va., 15
Superior Steatite & Ceramic Corp., 85 W. Forest Ave., Englewood, N.J., 5, 10, 15
See ad on page 533
Tel: ENglewood 3-4555
Sylvania Electric Products Inc., Dept. F24P, 1740 Broadway, New York 19, N.Y., 5, 12
Multiple pages of additional data on 25-30
Tel: JUdson 6-2424
Syncor Products Co., Mass., 5, 15
Telectro Industries Corp., N.Y., 17
Telemeter Magnetics, Inc., Calif., 12
Thermo Materials, Inc., Calif., 5, 10, 12, 15, 17
Thomas & Sons Co., R., Ohio, 5, 10, 15, 20
United Insulator Co., Ltd., England, 5, 10, 15, 17, 20
United Mineral & Chemical Corp., N.Y., 5, 10, 15, 17, 20
U.S. Ceramic Tile Co., Diamonite Div., Ohio, 5, 10, 15, 20
U.S. Engineering Co., Calif., 12
U.S. Stoneware Co., Alite Div., Akron 9, Ohio, 5, 10, 17, 20
See ad on page 95
Tel: ME 3-3224
Vitroseal Corp., Ind., 15
Western Gold & Platinum Co., Calif., 10, 17
Westlake Plastics Co., Pa., 5, 40, 45, 50
Yale & Towne Mfg. Co., Powdered Metal Div., Ill., 12
Zenith Plastics Co., Sub. Minn. Mining & Mfg. Co., Calif., 20

Chemicals: See class 71

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Goodfriend, Lewis S., N.Y., 5
Gordon, Herman L., D.C., 10, 15, 25 & Patent Attorney
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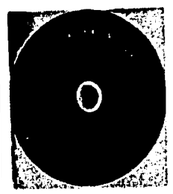

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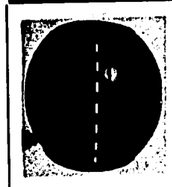

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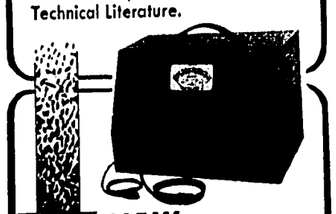

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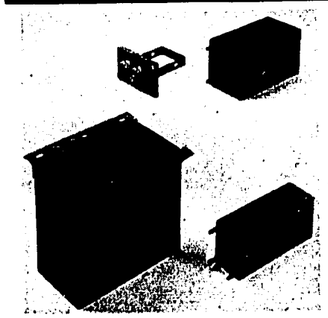

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Scheidel Manufacturing Co., N.Y., 45
Schloer, Inc., H. C. Modern Design Div., N.Y., 5, 40
Schoene Electronics Lab., Ind., 5
Scovill Manufacturing Co., Conn., 5, 35

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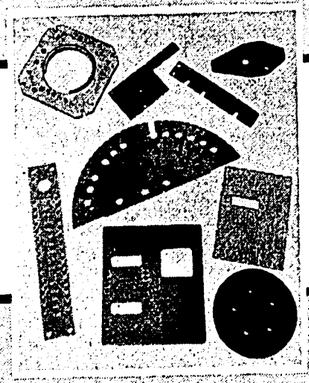

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Sel-Rex Corp., Dept. IRE-57, Precious Metals Div., 75 River Rd., Nutley 10, N.J., 10
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Tri-Dex Electronics, Calif., 5, 45

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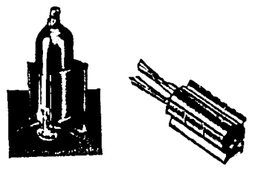

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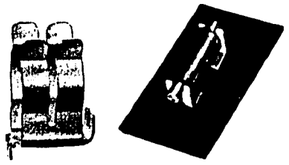

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86. Fabricators & Services.

U.H.F. Resonator Co., Wis., 35
Underwood Electric & Mfg. Co., Inc., Ill., 5
United Electrodynamics, Calif., 5, 40
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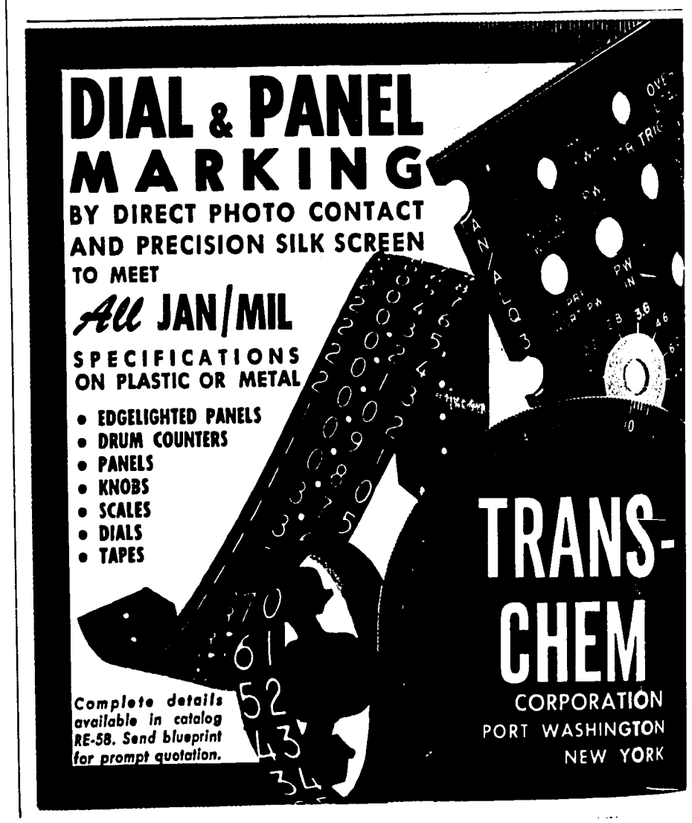

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Directory IV. Materials & Services

Flexible shafts: See class 87

Fungus preventatives: See class 91

Fungus-proofing services: See class 86

Fuses: See class 37

Gaskets: See class 87

Getters: See class 97

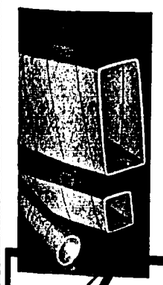
Grids & grid wire: See class 97

Grilles: See class 87

Grommets: See class 87

Guns and Gun parts, CRT: See class 97

Hardening & heat-treating: See class 86



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AMP, Inc., Pa., 69
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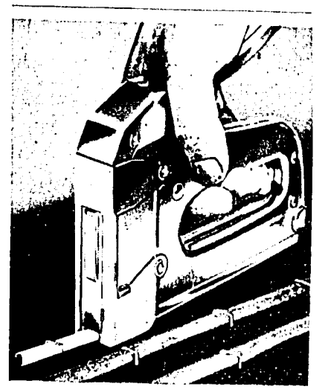

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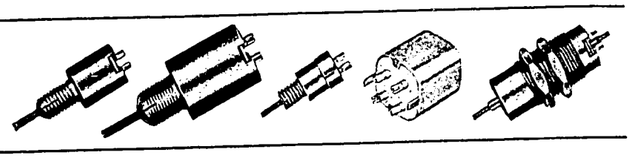

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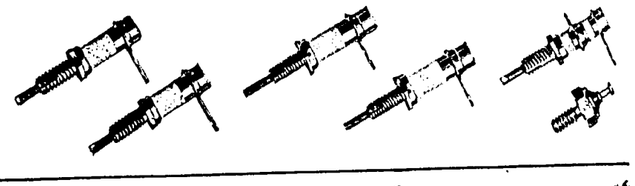

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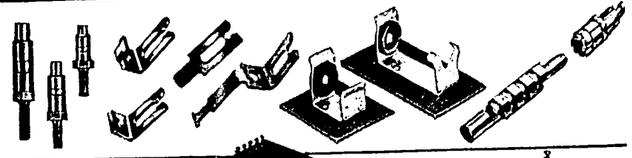

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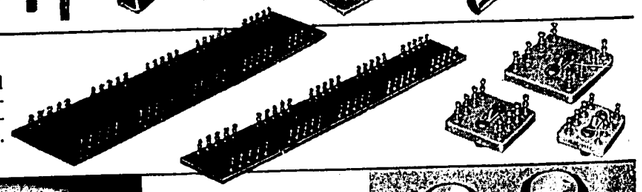

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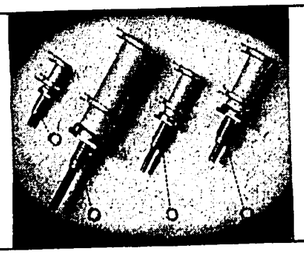

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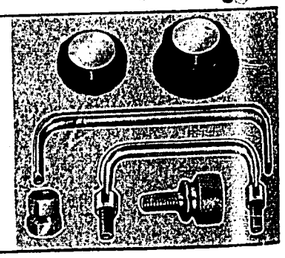

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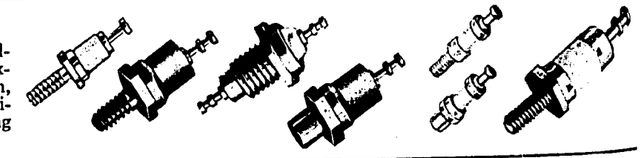
Wide variety of stand-off and feed-through models in Teflon and ceramic. Extremely resistant to shock, vibration, moisture and temperature. Solder terminals hold even after prolonged soldering operations.



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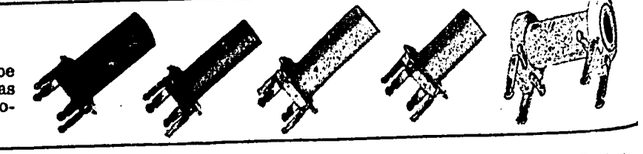
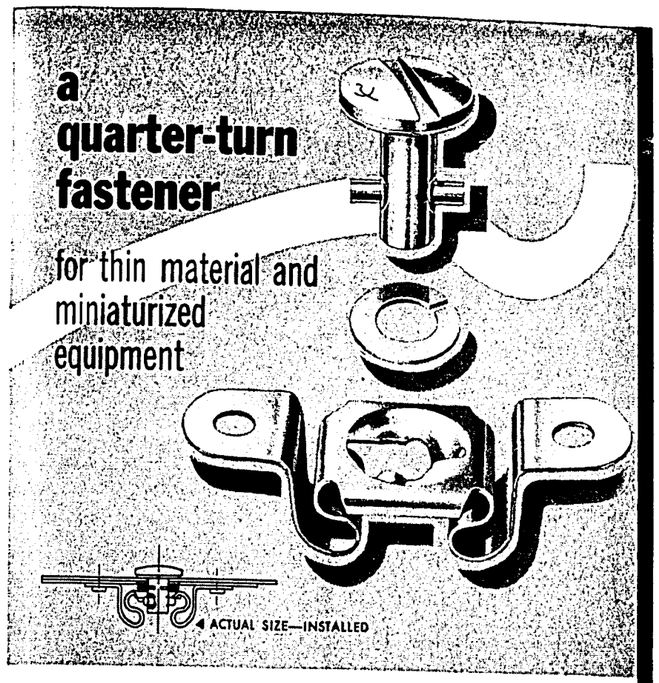


For details, circle #539 on Reader Service Card.



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Avery Adhesive Label Corp., Calif., 5, 45
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Tel: NEvada 2-2000

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

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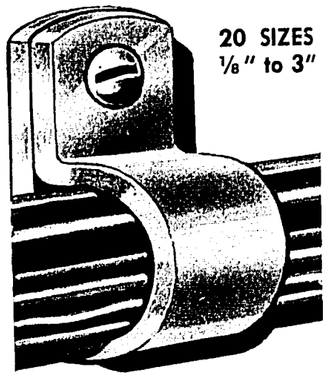
PLASTIC CLAMPS



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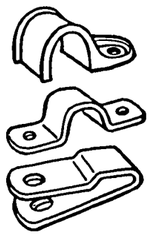

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933 George St., Chicago 14

Phone GRaceland 7-8220

For details, circle #541 on Reader Service Card.

Circon Component Co., Santa Barbara Municipal Airport, Goleta., Calif., 21, 39, 54, 57, 69
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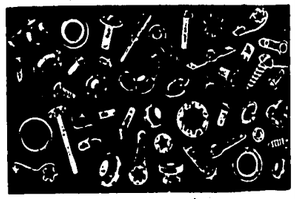
HARDWARE for INSTRUMENTS ELECTRONICS • AUTOMATION



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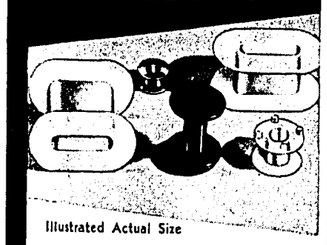
GRC small NYLON COIL BOBBINS



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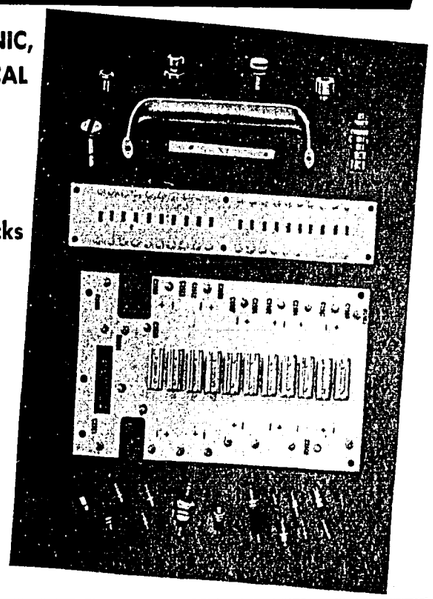

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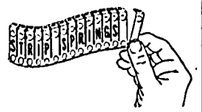

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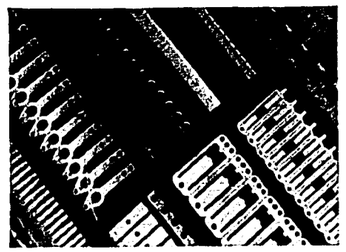

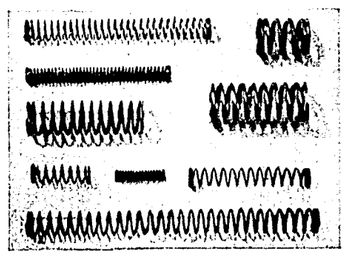

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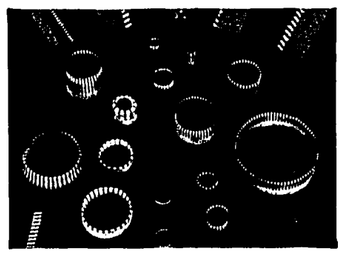

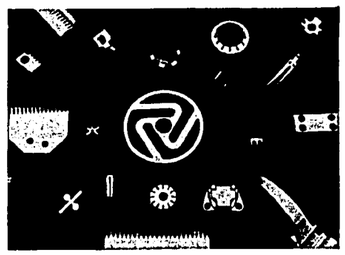

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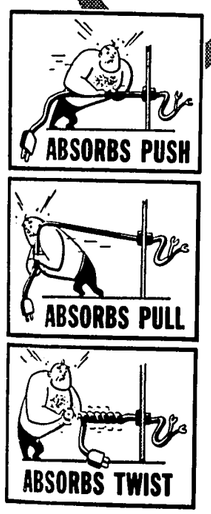

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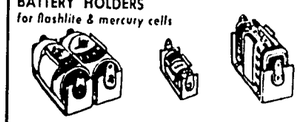
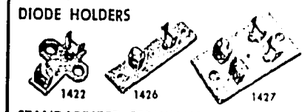
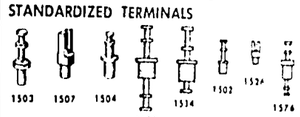
BATTERY HOLDERS
for flashlite & mercury cells



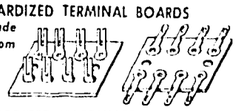
DIODE HOLDERS



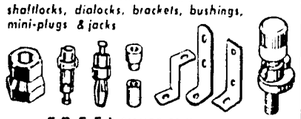
STANDARDIZED TERMINALS



STANDARDIZED TERMINAL BOARDS
readi-made and custom built



STANDARDIZED HARDWARE
shaftlocks, dialocks, brackets, bushings, mini-plugs & jacks



FREE! CATALOG OF STOCK ITEMS

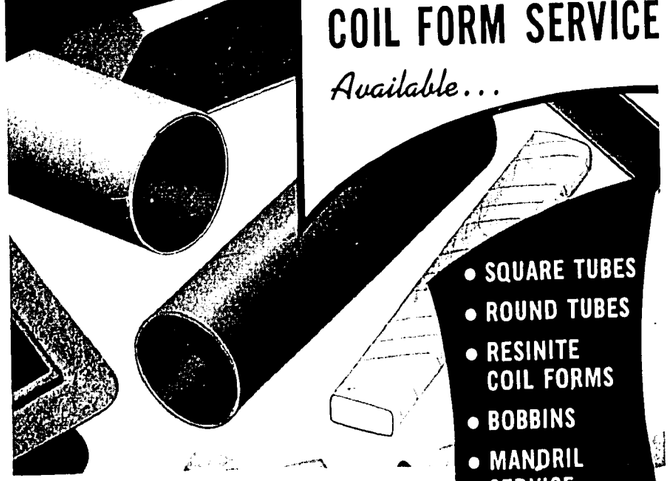
KEYSTONE ELECTRONICS CORP.
423 BROOME ST., NEW YORK 13, N. Y. • WO. 2-2789

For details, circle #547 on Reader Service Card.

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

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.

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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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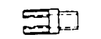
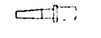
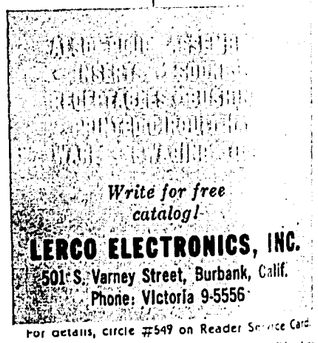
number

for service and quality

Lerco

ELECTRONIC HARDWARE

MOLDED INSULATED STANDOFFS	
TEFLON SNAP-LOCK TERMINALS	
STANDARD TERMINALS	
DIODE CLIPS	
TAPER PIN TERMINALS	
TERMINAL BOARDS	



Write for free catalog!

LERCO ELECTRONICS, INC.
501 S. Varney Street, Burbank, Calif.
Phone: Victoria 9-5556

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PERMANENT MARKINGS

PANELS-DIALS
CHASSIS-SCALES
SCHEMATIC DIAGRAMS

WRINLAY PRINTING—(MIL-M-13231) A direct print with a rich relief. A low cost method for achieving: Beauty of Design, Close Tolerance, Printing on Wrinkle enamels.

PHOTO-WRINLAY—(MIL-M-13231) Markings etched through the painted surface. Looks like engraving at low cost.

ENGRAVING—Our Pantographic Division is unequaled for high quality and accuracy.

LUMINESCENT & RADIO ACTIVE COATINGS—In compliance with specification AN-L-1A and others.

GIVES ACCURACY PERMANENCE AND BEAUTY OF DESIGN

OTHER FACILITIES
DRAFTING—DESIGNING—METAL PREPARATION—SPRAY FINISHING—PHOTOGRAPHY

Descriptive brochure and samples on request.

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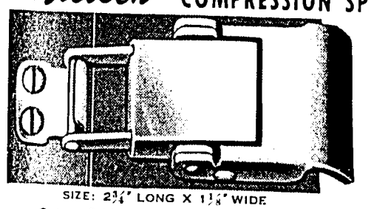
SERVING THE AIRCRAFT AND ELECTRONIC INDUSTRIES
NEW EASTERN PLANT — 999-A Stewart Avenue, Garden City, L.I., N.Y.
WESTERN PLANT — 1715 Berkeley Street, Santa Monica, Calif.

For details, circle #550 on Reader Service Card.

"Nielsen" COMPRESSION SPRING DRAW PULL CATCHES WITH SPRINGS CONCEALED



SIZE: 2¾" LONG X 1¼" WIDE

SIGNAL CORPS NO. SC-B-83314

70-Pound Tension at ⅛" Deflection, the established application dimension.

Withstands 600-Pound Pull Test.

Nielsen Catches Carry "Certification of Compliance".

Get our Folders on Standard Catches and Draw Bolts and other Compression Spring Catches

NIELSEN HARDWARE CORP. 770 Wethersfield Ave., HARTFORD 14, CONN.
AFFILIATED WITH NIELSEN TOOL & DIE CO.
FOR QUALITY HARDWARE — GOOD SERVICE TO YOUR SPECIFICATION

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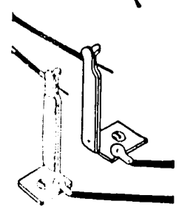
Rapid **TEST CLIPS**

for MOTORS, COILS, ELECTRICAL UNITS



- Positive Connection • Long Life
For Any Size Lead, Solid or Braided Wire.
Tension Spring for Quick, Easy Setting.
40 amp. Polished brass • Angle or straight

Write for literature

Rapid SPECIALTIES COMPANY
327 W. HURON ST., CHICAGO 10, ILLINOIS

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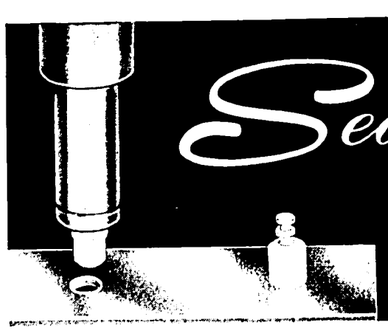
Directory IV. Materials & Services

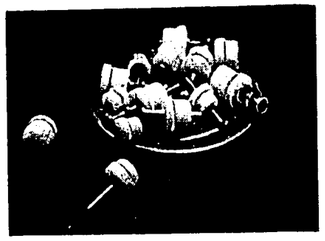
87. Hardware & Findings

National Tel-Tronics Corp., 52 St. Casmir Ave., Yonkers, N.Y., 66, 69, 84
See ad on page 544
Tel: YOnkers 8-6400
New Hermes Engraving Machine Corp., 13-19 University Pl., New York 3, N.Y., 45
See ad on page 570
Tel: SPring 7-7220
Nielsen Hardware Corp., 770 Wethersfield Ave., Hartford 14, Conn., 21
See ad on this page
Tel: JAckson 2-8145
Norrich Plastics Corp., 109 W. 18th St., New York 11, N.Y., 9, 13, 16, 39
See ad on page 413
Tel: WAtkins 4-8300
North Hills Electric Co., Inc., 4 Sagamore Ave., Mineola, L.I., N.Y., 14, 16
See ads on pages 314, 315
Tel: Ploneer 7-4588
Perfection Mica Co., 1322 N. Elston Ave., Chicago 22, Ill., 30
See ad on page 550
Tel: EVergladе 4-2323
Photo Chemical Products, Inc., 999-A Stewart Ave., Garden City, L.I., N.Y., 45
See ad on this page
Tel: LU 5-6200

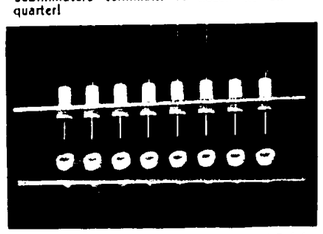
Sealectro "PRESS-FIT"* TEFLON† TERMINALS



Miniature "Press-Fit" terminals. Hundreds of different types and sizes.



Subminiature terminals. A dozen fit on a quarter!



"Press-Fit" terminals. (Below) Test-Point Breakaway connections with two-piece jacks and plugs used for patch-cord board.

• Let *Sealectro* solve your terminal problems with original, genuine, tried-tested-perfected Teflon "Press-Fit" terminals and proper installation. Take advantage of real engineering collaboration. Use our specialized and outstanding production facilities for variety, uniformity, and fastest deliveries.

MINIATURES

One-piece stand-offs and feed-thrus. Simplest, fastest, cheapest installation. No threads, nuts, washers required. Eliminate breakage, shattering, vibration, fungus, corrosion and other drawbacks. Choice of lugs and metal finishes. Hundreds of standard types.

SUBMINIATURES

Smallest insulated terminals available for miniaturization programs. Despite diminutive size, these terminals withstand severest-service conditions as found in guided missiles, radar, communications gear, electronic computers and industrial electronics. Wide choice of types and lugs.

CONNECTORS

Two-section (male and female) terminals for breakaway connections such as for multiple plugs and receptacles, plug-in crystal diodes and similar components, flybacks, plug-in coils and forms, etc. Jack and plug members "Press-Fit" into chassis holes, casings, strips, etc.

TEST-POINT JACKS

Rugged miniature test-point jacks featuring either (SKT-8 and SKT-9) stamped brass or (SKT-10) machined beryllium-copper contact members. Take standard instrument test probe or a companion plug. Ideal for test points on metal panels, permitting connections to circuitry or components for external testing. Used on metal panels for cost-reducing and unbreakable patch-cord boards.

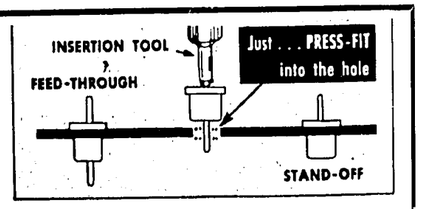
TAPER-PIN TERMINALS

Another Sealectro "First"—the logical partnership of "Press-Fit" installation ease with taper-pin solderless connections. Plus the self-insulating feature, which means mounting directly in metal, thus eliminating usual phenolic board with its troublesome and costly breakage. "Press-Fit" taper-pin terminals are available in stand-offs and feed-thrus. Also in high-voltage types with longest leakage path.

IN EIGHT COLORS!

Sealectro "Press-Fit" terminals are available in eight RETMA color-code colors—brown, blue, red, orange, yellow, green, gray and white, for color-coding as well as for added eye appeal in any assembly.

Install them FAST and TO LAST



Fastest, simplest, cheapest installation in three steps: (1) Punch or drill hole with standard machining; (2) Countersink entrance edge according to Sealectro's time-tested specs; (3) With insertion tool in chuck of drill-press or arbor press, center over hole and apply pressure. Press-Fit, that's it! And genuine "Press-Fit" terminals stay put—for good!

Samples and Data

Write on business stationery for sample terminals, as well as helpful engineering literature. Our local field engineer will gladly call if you wish.

* Reg. Trademark, Sealectro Corporation.

† Reg. Trademark, E. I. Du Pont de Nemours & Co

Sealectro CORPORATION

Manufacturers of "PRESS-FIT" TERMINALS

610 FAYETTE AVE., MAMARONECK, N.Y. • MAmaroneck 9-7800

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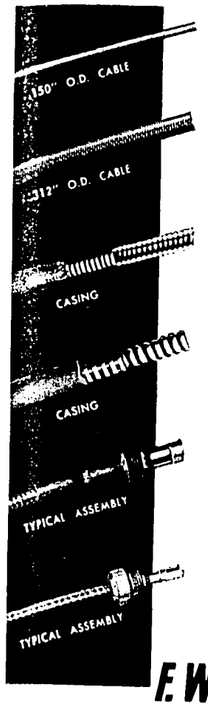
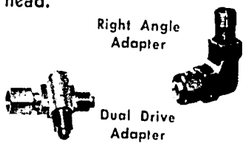
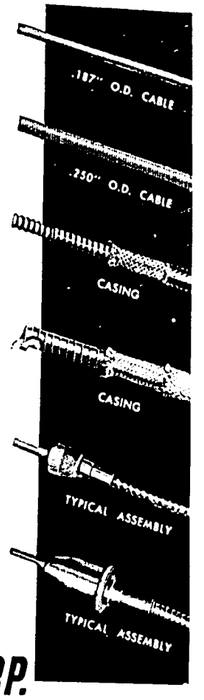
FLEXIBLE SHAFTING

ENABLES YOU TO TRANSFER POWER OVER, UNDER, AND AROUND OBSTACLES ECONOMICALLY AND EFFICIENTLY

Circle Ess Flexible Shafts offer economical construction and low maintenance costs for remote control applications. Many manufacturers reduced expenditures, and saved space by using flexible shafting to eliminate alignment problems and ALL gearing. For complete information about Circle Ess Flexible Shaft assemblies and our Adapters used with Flexible Shafts write to us on your letterhead.







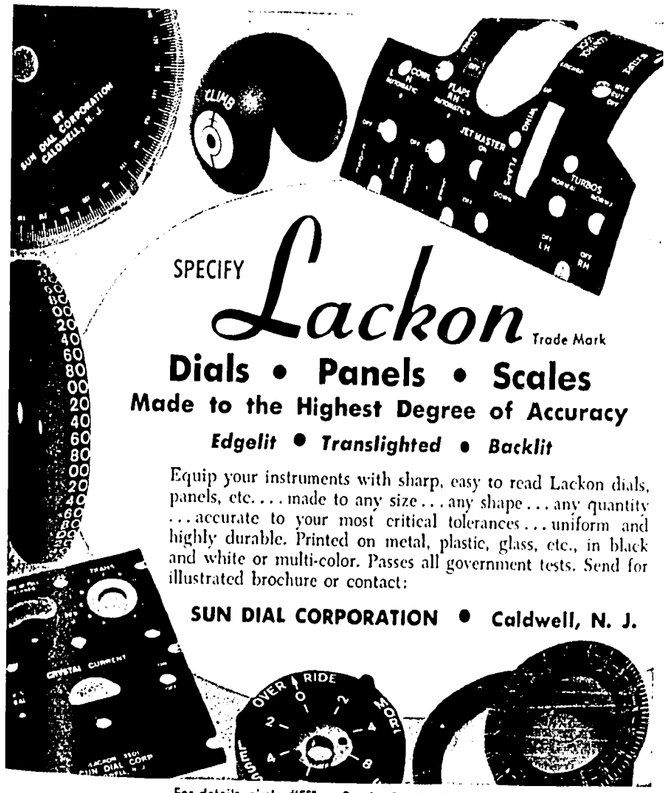
ASK FOR BULLETIN 400R

F. W. STEWART CORP.

4311-13 RAVENSWOOD AVENUE · CHICAGO 13, ILLINOIS

WEST COAST PLANT 1638 So FLOWER STREET LOS ANGELES 15 CALIFORNIA

For details, circle #554 on Reader Service Card.



For details, circle #555 on Reader Service Card.

Directory IV. Materials & Services

87. Hardware & Findings

Precision Paper Tube Co., Charleston St., Chicago 47, Ill.
See ad on page 558
Tel: ARmitage 6-

Quality Name Plate Co., N.Y., Is, 42, 45

Radio Frequency Laboratories, Inc., Boonton, N.J., 64
See ad on page 489
Tel: DEerfield 4-4

Rapid Specialties Co., 307 W. Huron St., Chicago 10, Ill., 75
See ad on page 555
Tel: DElaware 7-144

Reese, Inc., J. Ramsey, N.Y., Is, 27, 51, 54, 57, 69, 72

Rexnite Corp., Jersey City, N.J., Tube Co., 17, 15

Rex Corp., 340 Harvard Rd., West Acton, Mass., 16
See ad on page 560
Tel: COlonial

Rosan, Inc., Culver

Rubatex Div., Va., 27

Russell Gasket Co., Division of Co., 2130 St. Clair Ave., Cleveland Ohio, 15, 27,
See ad on page
Tel: MAin

S & B Sp

Sampson

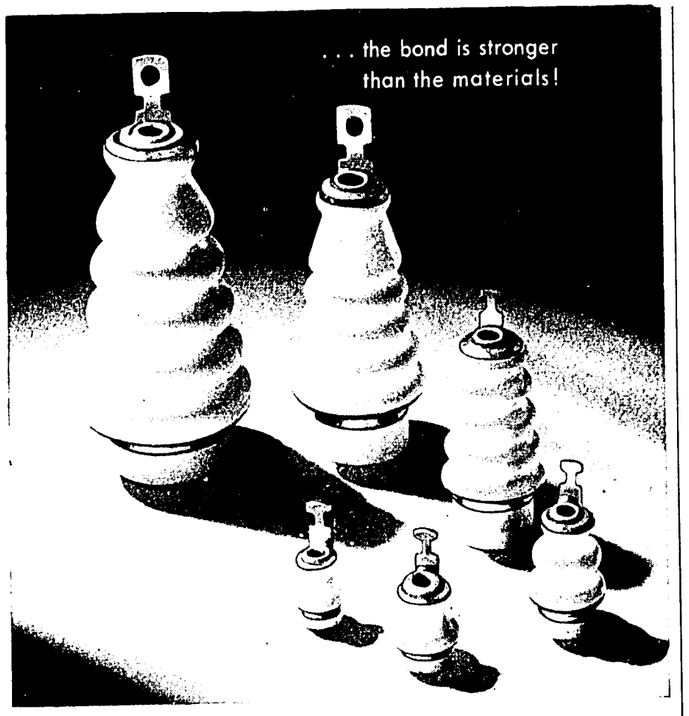
Sawyer,

Schaf

Schm

Sealectro Corp., 610 Fayette Ave., Mamaroneck, N.Y., 69, 72,
See ad on page 556
Tel: MAmaroneck 9-78

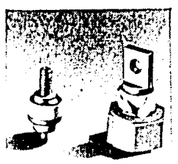
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory



Stupakoff

METAL-BONDED

ALUMINA TERMINALS



Right Sample of a Stupakoff Alumina Terminal in test rig, torsion-tested to destruction. The failure occurred in the ceramic, not in the bond.

Left is similar terminal before testing.

Amazing bond-strength, and unequalled high-temperature ceramic-to-metal adherence are two outstanding characteristics of Stupakoff Alumina Terminals. Available in six standard stock sizes and many special designs, these terminals provide assurance of stronger, tighter, soft-soldered assemblies. The alumina body is a Stupakoff development, processed under rigidly controlled conditions.

The new Stupakoff metal-bond technique (patent applied for) should not be confused with the ordinary silver metallizing process. This is not a plating, but an intimate bonding of ceramic and metal. Its effectiveness is proved by the photograph at the left, showing the results of a typical torsion test. Ultimate failure of the terminal occurred in the ceramic and not in the bond.

Because the bond remains hermetically tight well beyond the temperature limits of soft solder, assembly processes are simplified and more dependable.

Write for full information and prices on Stupakoff Metal-Bonded High Alumina Terminals.

STUPAKOFF DIVISION OF

The CARBORUNDUM Company

WRITE DEPT. P LATROBE, PENNSYLVANIA

For details, circle #556 on Reader Service Card.

★STAR

PERFECT ALIGNMENT

of Electronic Components—in Seconds! . . . Speeds Production and Servicing.

★Star Tube Pin Straighteners featuring inserts of #303 stainless steel. Precision drilled and counterbored to exacting specifications.

MINIATURE TYPES

JE-13 with 8 holes for 7-pin tubes, and JE-15 with 10 holes for 9-pin tubes.

JE-13B with 8 holes for 7-pin tubes, and JE-15B with 10 holes for 9-pin tubes.

SUB-MINIATURE TYPES

JE-5 with 9 holes for 8-pin tubes.

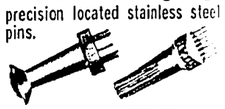
JE Mark IV with 7 inline holes for pinch-base tubes.

JE-31

SPECIAL FOR BURROUGHS TUBE

27 holes of .043 diameter in two pin circles, designed exclusively for use with Burroughs Beam Switching Tube, Types 6700-6701.

★Star Socket Wiring Plugs precision located stainless steel pins.



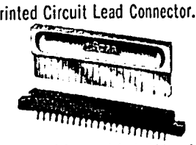
MINIATURE

JE-10 with 7 pins and JE-9 with 9 pins.

SUB-MINIATURE

JE-7 inline for pinch-base tube sockets.

★Star Inline Wiring Plug for Printed Circuit Lead Connector.



JE-35 precision cast to hold terminals of printed circuit lead connector inline during wiring procedure. May be used while unit is manually or dip soldered.

★STAR EXPANSION PRODUCTS

Division of

STAR PRECISION DEVICES, INC.

142 Liberty St., New York 6, N. Y., WOrth 4-5420

For details, circle #557 on Reader Service Card.

JEWEL BEARINGS

SAPPHIRE STYLI

SAPPHIRE INSULATORS

SAPPHIRE WINDOWS

SPECIALTIES

SWISS JEWEL COMPANY

LAFAYETTE BLDG.
PHILADELPHIA 6, PA.

SCREW MACHINE PRODUCTS

CHART DRIVE MOVEMENTS

ESCAPEMENTS

PINIONS AND GEARS

PIVOTS

HERMAN D. STEEL COMPANY

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PHILADELPHIA 6, PA.

ESTABLISHED IN 1920 AND SERVING INDUSTRY EVER SINCE

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PROTECT YOUR PRODUCT

at point of strain

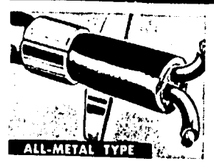
Protect product saleability too—by insuring long life for cords, cables and conductors. Genuine "GRIPMASTER" Strain Reliefs provide these vital features—

- ★ Anchor cords to housing
- ★ Eliminate taping or threading
- ★ Prevent unraveling
- ★ Prevent cord pull damage
- ★ All sizes and styles
- ★ Easy to apply
- ★ Inexpensive

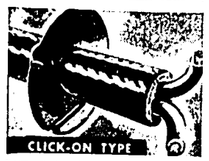
Gripmaster Strain Reliefs are "tremendous traffic" that make good products better!

Ask for samples.

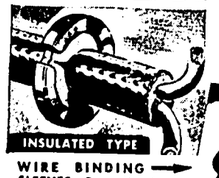
4 WAYS TO END ALL CORD AND CABLE SERVICE FAILURES *Economically*



ALL-METAL TYPE



CLICK-ON TYPE



INSULATED TYPE

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

CORD & CABLE RELIEF SPECIALISTS

118 AMSTERDAM AVE., PASSAIC, NEW JERSEY

For details, circle #559 on Reader Service Card.

Directory IV. Materials & Services

87. Hardware & Findings

Sparta Mfg. Co., Div. of U.S. Ceramic Tile Co., Dept. IRED, Dover, Ohio, 27, 39
See ad on page 560
Tel: DOver 4-2561

Star Expansion Products Div. of Star Precision Devices, Inc., 142 Liberty St., New York 6, N.Y., 21, 54, & Tub. Pin Straighteners
See ad on page 558
Tel: WOrth 4-5420

Steel Co., Herman D., Lafayette Bldg., Philadelphia 6, Pa., 39
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Tel: WA 5-1990

Stevens Walden, Inc., 21

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Stewart Corp., F. W., 4[illegible] Brookwood Ave., Chicago [illegible], 22
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Tel: GRaceland [illegible]

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Stupakoff Div., Carborundum Co., The, P. Box [illegible], Hillcrest Ave., [illegible], Pa., 14
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Tel: El[illegible]

Sun-X, Inc., [illegible]

Sun Dial Corp., P.O. Box [illegible], Caldwell, N.J., [illegible]
See ad on page 597
Tel: CAldwell [illegible]

Superior Electric Co., 383 Bradley Ave., Bristol, Conn., 69
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Tel: LUdlow [illegible]

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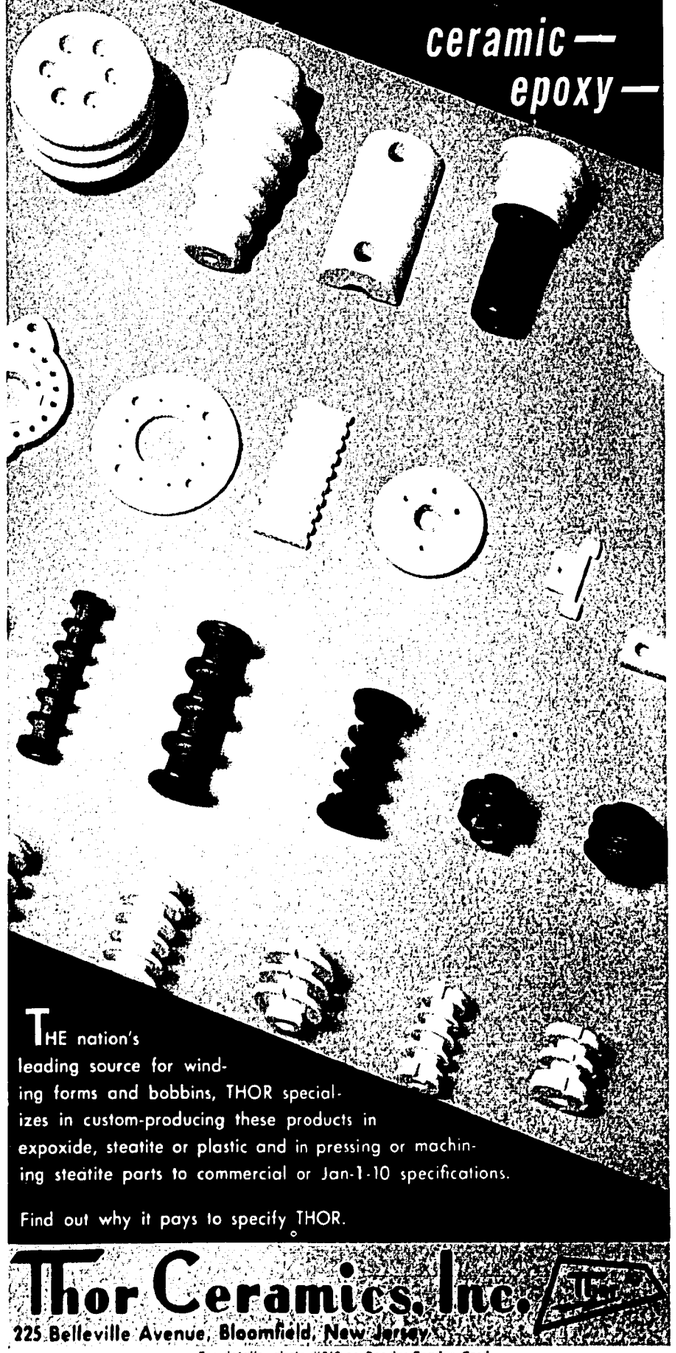

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Sweet Manufacturing Co., Mass., 21, 51, 60

Swiss Jewel Co., Lafayette Bldg., Philadelphia 6, Pa., 39 & Synthetic Jewels
See ad on page 559
Tel: LOcust 3-1990

Syncor Products Co., Mass., 14, Fused Quartz

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Technical Apparatus Builders, 109 RV Liberty St., New York 6, N.Y., 75, 80
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Techron Corp., Mass., 45

Telerad Mfg. Corp., 27 Microwave Uses

Textile Thread Co., Mass., 36

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Thermo Materials, Inc., Calif., 14

Thompson-Bremer & Co., Ill., 21, 39, 57, 58, 72

Thomson Industries, Inc., N.Y., 9

Thor Ceramics, Inc., 225 Belleville Ave., Bloomfield, N.J., 14
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Tel: POrt Washington 7-3881

Transradio, Ltd., England, 18

Tri-Dex Electronics, Calif., 66

Tubular Rivet & Stud Co., Mass., 54

U.H.F. Resonator Co., Wis., 39

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United-Carr Fastener Corp., Mass., 21, 57

United Mineral & Chemical Corp., N.Y., 54

United Shoe Machinery Corp., Mass., 9, 21, 33, 54, 72

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Tel: PRescott 7-3337

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Wolfe Co., Franklin C., Calif., Seals Static

Worcester Pressed Steel Co., Mass., Pressure Cylinders

Z & W Mfg. Corp., Electronics Div., Ohio, 39

Zierick Mfg. Corp., N.Y., 12, 69, 72

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88. Heating Equipment.

S. Brazing, [illegible] Inc. & Welding

Dielectric [illegible] Inc.

Acoustical Associates, Inc., [illegible] Shore Rd., Glenwood Landing, L.I., N.Y., 5
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Tel: GLen Cove [illegible]

Alpha Instrument [illegible]

American [illegible] 5, 10, 12

American [illegible]

American Industrial [illegible]

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Tel: COhasset [illegible]

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Lake Service Co., [illegible]

Lepel High Frequency Laboratories, Inc., 37th Ave., Woodside 77, N.Y., [illegible]
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Litton Engineering Laboratories, P.O. Box 349, Grass Valley, Calif., [illegible]
See ad on page 579
Tel: 1730

Marion Elec. Inst. Co., N.H., 15

McDowell Electronics, Inc., N.J., 5, 15

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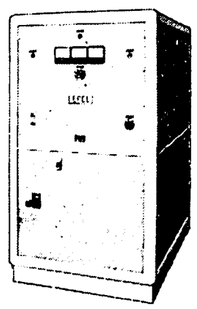
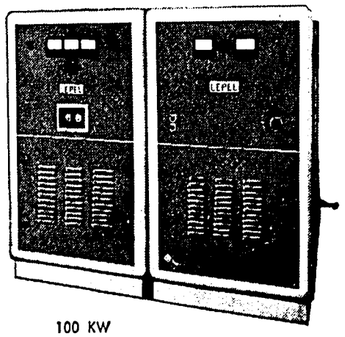


30 KW
INDUCTION HEATING UNIT



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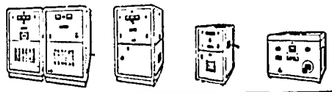

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15. Ceramic
20. Cotton tapes
25. Fiberglass tapes
30. Fiberglas tubing
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36. Microwave shielding
38. Paper
40. Plastic
45. RF shielding materials
50. Rubber
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Formica Corp., 4532-7 Spring Grove Ave., Cincinnati 32, Ohio, 40
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Integrated Mica Corp., N.Y., 35 & Mica
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Isolantite Mfg. Corp., N.J., 15
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Laboratory equipment & supplies: See class 71

90. Laboratories & Custom Builders.

5. Individual item builders
10. Pilot run plants
15. Research & development labs.
20. Testing & certifying organizations

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90. Laboratories & Custom Builders.

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Aerolux Lights Corp., 655 Eleventh Ave., New York 36, N.Y., 5, 15
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Aerotest Labs, Inc., N.Y., 15, 20
Aircom, Inc., 354 Main St., Winthrop 52, Mass., 5, 15
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Tel: OCean 3-3096
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Tel: UNiversity 4-0101
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Tel: DEerfield 4-1432
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Battelle Memorial Institute, Ohio, 15
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Bendix Aviation Corp., York Div., Pa., 5, 10, 15
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Borg-Warner Corp. Research Center, Ill., 15
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Tel: PErshing 5-6167
404 Melrose Dr., North Syracuse 12, N.Y.
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Collins Radio Co., Western Div., Calif., 15
Columbia University, Lamont Geo. Observatory, N.Y., 15
Community Engineering Corp., Pa., 5, 10
Compass Communications Corp., N.Y., 5
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Dunn Engineering Associates, Inc., 186 Massachusetts Ave., Cambridge 39, Mass., 5, 15
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Electronic Teaching Laboratories, D.C., 5, Language Teaching Aids
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F-R Machine Works, Inc., 26-12 Borough Pl., Woodside 77, N.Y., 5, 15
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Fairchild Guided Missiles Div., N.Y., 15
Farnsworth Electronics Co., Ind., Missile Electronics
Federal Telecommunication Labs., N.J., 15
Ferranti Electric Ltd., Canada, 5, 15
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Oltronix Co., Ga., 5
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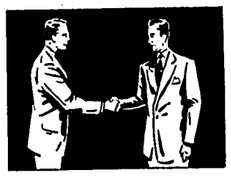

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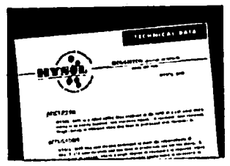

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Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 15
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Tel: ENdicott 1-6200
Virginia Electronics Co., D.C., 5, 10, 15
Vitro Laboratories, N.J., 5, 10, 15
Wallson Associates Ltd., 961 Frelinghuysen Ave., Newark, N.J., 5, 15
See ad on page 484
Tel: TAlbot 4-2600
Wang Laboratories, Inc., 37 Hurley St., Cambridge 41, Mass., 5, 10, 15
See ad on page 471
Tel: UNiversity 4-8380
Waters Manufacturing, Inc., Boston Post Rd. (Rte. 20), Wayland, Mass., 20
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Tel: ELmwood 8-2777
Weinschel Engineering & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 15
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Tel: LOckwood 4-0122
West Coast Electronics Co., Calif., 5, 10, 15, Military Electronics
Westgate Laboratory, Inc., Ohio, 15
Westinghouse Electric Corp., Air Arm Div., Md., 15, Military Electronics
Wheeler, Harold A., 122 Cutter Mill Rd., Great Neck, L.I., N.Y., 15
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Whitol Laboratories, Calif., 15
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Yellow Springs Instrument Co., Inc., Ohio, 5, 15
Zenith Plastics Co., Sub. Minn. Mining & Mfg. Co., Calif., 15, 20

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91. Lacquers, Paints, Compounds & Waxes.

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General Plastics Corp., N.J., 10
Hardman Co., Inc., H. V., N.J., 30
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APPLICATIONS: Diodes, Transistors, Rectifiers, Transducers and Capacitors.
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EP-681—Flexible casting resins to meet MIL-16923B, Type "C".
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Techniques, Inc., N.J., 15
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Tel: SOuth 8-0907

Directory IV. Materials & Services

92. Machinery & Tools.

5. Aluminizers
7. Battery chargers
10. Coil winding machines
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25. Marking & engraving machines
27. Molding machinery
28. Printed circuit machinery
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40. Vacuum pumps
45. Vibration exciters
50. Welders & brazers
55. Wire strippers

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Branson Ultrasonic Corp. & Branson Instruments, Inc., Conn., Ultrasonic Cleaner
Bruno-New York Industries Corp., Dept. IRE-57, 460 W. 34th St., New York 1, N.Y., Pig-Tailor
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Bunnell & Co., J. H., N.Y., Tape Winders
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Cavitron Equipment Corp., N.Y., 32
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Christie Electric Corp., Calif., 7
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Cobehn, Inc., N.J., High Velocity Spray Cleaning Equip.
Coil Winding Equipment Co., 19 Maxwell Ave., Oyster Bay 9, N.Y., 10
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Consolidated Electrodynamics Corp., N.Y., 40
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Contact, Inc., Mass., 30, Resistance Type
Cosa Corp., N.Y., 10, 20, 25, Terminal Production Mach.
Dee Electric Co., 1648 W. Haddon St., Chicago 22, Ill., Solder Pots
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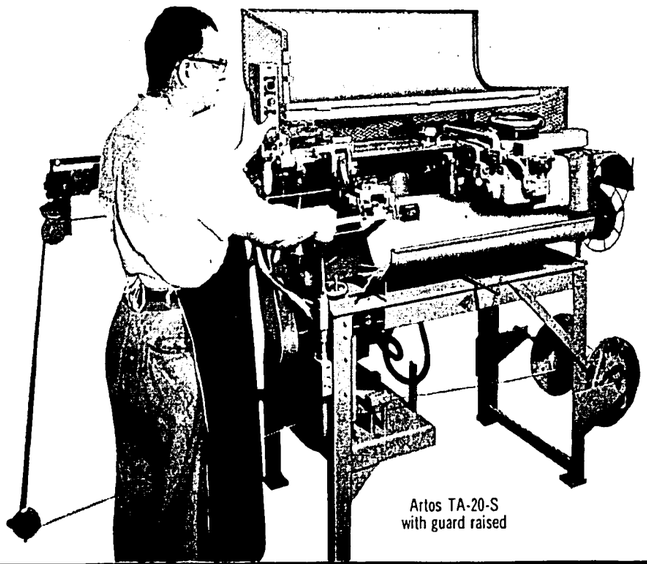
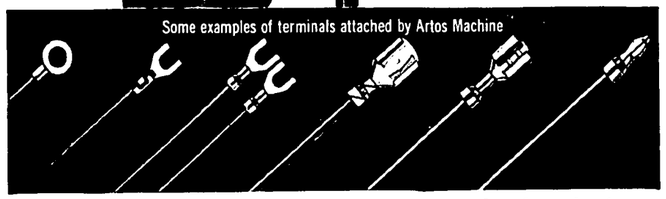
THE *NEW* ARTOS AUTOMATIC wire-stripping and TERMINAL-ATTACHING MACHINE



Artos TA-20-S
with guard raised



This new Artos TA-20-S brings still greater speed and production economy to large-quantity users of wire leads with terminals attached. It *automatically* performs the following services *all in one operation:*

1. Measures and cuts wire to predetermined lengths.
2. Strips one or both ends of wire.
3. Attaches practically any prefabricated terminal in strip form, to one end of wire.
4. Marks finished wire leads with code numbers and letters. (Optional attachment not standard part of machine.)

ALL OPERATIONS ARE AUTOMATIC. Machine can be operated by unskilled labor. It is easily set up and adjusted for different lengths of wire and stripping. Die units for different type terminals simply and quickly changed. Production speeds up to 3,000 finished pieces per hour.

ARTOS MACHINES ARE USED by electric appliance, automotive, aircraft, electronics and other industries that want automation in the production of wire leads in quantity. Agents throughout the world.

Engineering consultation and recommendations given without obligation.

WRITE FOR BULLETIN ▶ No. 655 on the Artos TA-20-S

ARTOS ENGINEERING CO.

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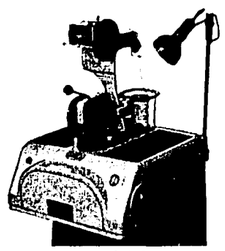
Comparison is the best test of excellence. See for yourself why BOESCH manufactures the world's most superior winding machines.



Model SM

Ask for the new BOESCH Catalog 57A on your company letterhead NOW.

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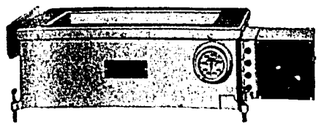
DEE PRINTED CIRCUIT SOLDER POTS WITH MECHANICAL TYPE DIAL THERMOMETERS



25 SIZES MEET ALL REQUIREMENTS

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All components except the elements may be serviced easily without taking the pot apart. High-low heat switch so that pot may be used for hand dipping or fast machine dipping without excessive cycling.

DEE SOLDER POTS

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DEE ELECTRIC CO.
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Chicago 22, Ill.

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Directory IV. Materials & Services

92. Machinery & Tools.

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Duro Specialty Co., Inc., Mass., Pin Straighteners
E-Z-Way Templates, Calif., 25, Templates
Eastern Industries, Inc., 100 Skiff St., Hamden 14, Conn., aircraft pumps
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Tel: CHestnut 8-3841
Edmund Scientific Corp., N.J., TV Tube Scope
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Electric Soldering Iron Co., Inc., Conn., 30 & Pots
Electric Trading Co., N.Y., 40
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Engineering Developments, Inc., R.I., Cut Illuminated Magnifiers
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Federal Tool Engineering Co., [illegible] Pompton Ave., Cedar Grove, N.J.
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Fidelity Chemical Pr[illegible]
Fisher Scientific Co., [illegible]
Gardner-Denver Co., [illegible] Tools
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Graphic Systems, N.Y., Printed Circuit Boards
Green Instrument Co., Inc., Mass., [illegible]
Greeg Electric Mfg. Co., Inc., Mass., [illegible]
Griffin Co., John, Minn., Transparent Symbol Stamps
Gulton Industries, Inc., Vibro-Ceramics Div., 212 Durham Ave., Metuchen, N.J., 30, 32
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Tel: LIberty 8-2800
Haloid Co., N.Y., 27, 55
Hard N' Tuff, N.Y., Steel Hardening Metals

Acoustica's low cost Ultrasonic Cleaning Console (PP-1) entirely self-contained mobile machine cleans completely assembled relay assemblies in above photo. Features three gallon cleaning tank, recirculating filter system, reliable magnetostrictive transducer with 1600 watt peak power generator. Operates immediately from 115V, 50-60 cps, as delivered.

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APPLICATIONS

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DRILLING Ultrasonic motion, reciprocating rather than rotary, makes possible drilling of the most intricately shaped holes in hard as well as brittle materials, including glass, ceramics, tool steel, jewels, and carbides.

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- ☐ PLATING
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DESIGNERS AND MANUFACTURERS OF ULTRASONIC SYSTEMS FOR ALL INDUSTRIES

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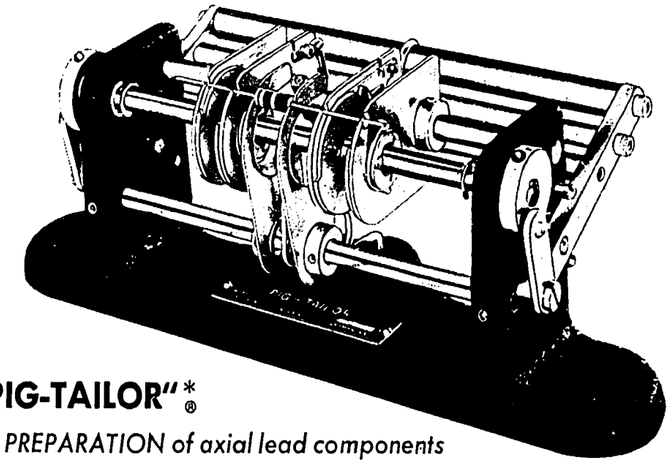

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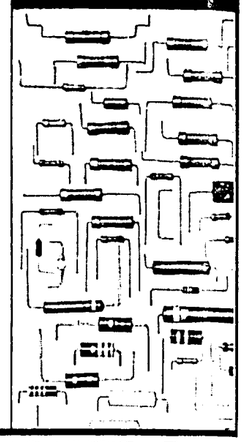
For PREPARATION of axial lead components

PREPARED COMPONENTS IN SECONDS WITH THE "PIG-TAILOR"!



"PIG-TAILORING"

. . . . a revolutionary new mechanical process for higher production at lower costs. Fastest PREPARATION and ASSEMBLY of Resistors, Capacitors, Diodes and all other axial lead components for TERMINAL BOARDS, PRINTED CIRCUITS and MINIATURIZED ASSEMBLIES.

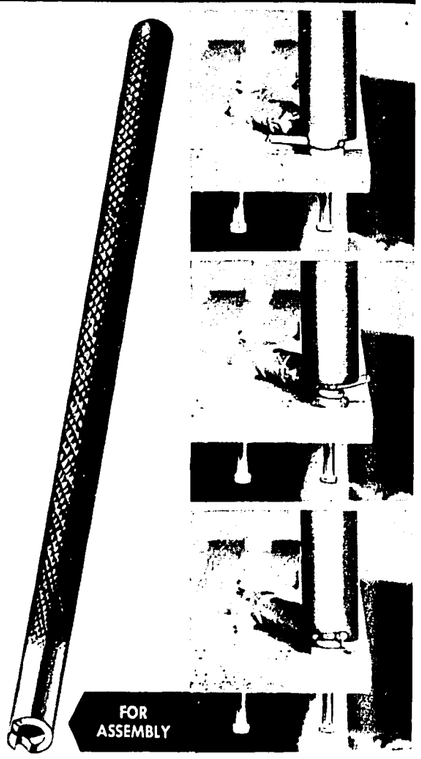
The "PIG-TAILOR" plus "SPIN-PIN"—accurately MEASURES, CUTS, BENDS, EJECTS & ASSEMBLES both leads simultaneously to individual lengths and shapes—3 minute set-up—No accessories—Foot operated—1 hour training time.

PIG-TAILORING provides:

1. Uniform component position.
2. Uniform marking exposure.
3. Miniaturization spacing control.
4. "S" leads for terminals.
5. "U" leads for printed circuits.
6. Individual cut and bend lengths.
7. Better time rate analysis.
8. Closer cost control.
9. Invaluable labor saving.
10. Immediate cost recovery.

PIG-TAILORING eliminates:

1. Diagonal cutters!
2. Long-nose pliers!
3. Operator judgment!
4. 90% operator training time!
5. Broken components!
6. Broken leads!
7. Short circuits from clippings!
8. 65% chassis handling!
9. Excessive lead tautness!
10. Haphazard assembly methods!



"SPIN-PIN"* ® Close-up views of "SPIN-PIN" illustrate fast assembly of tailored-lead wire to terminal.

* PATENT PENDING

Write for illustrated, descriptive text on "PIG-TAILORING" to Dept. IRE-57

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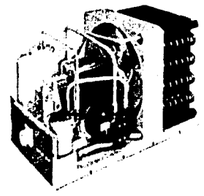
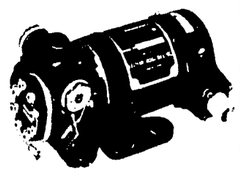
eliminate the "BUGS" with Eastern aviation products





PRESSURIZATION
Eastern pressurization units for airborne electronic equipment are available in many capacities to handle a broad range of requirements. Units consist of an air pump and motor assembly, pressure switch, check valve, tank valve, and terminal connectors. They meet government specifications and can be modified to your needs.

COOLING UNITS
Hold temperatures to safe operating limits in liquid cooled electronic tubes or similiar devices. By virtue of long experience and using standard component parts, Eastern can suit your specific needs at a minimum cost for equipment.

AIRCRAFT PUMPS
Precision-built to rigid government specifications, a broad selection among Eastern pumps offers flexibility to your choice. Modifications can be made, or custom-made units designed to suit your project. Trim in size, light in weight, Eastern Aircraft Pumps give reliable long-term service.

REFRIGERATION-TYPE
Enable specified components to be held to fairly constant temperatures by use of various types of refrigeration units. Because of the variation in methods possible, Eastern units fill every requirement where the use of a refrigeration cycle is called for.

Write for Aviation Products Catalog, Bulletin 330

Eastern INDUSTRIES, INC.
100 SKIFF STREET
HAMDEN 14, CONN.

For details, circle #574 on Reader Service Card.

NO CAMS . . . NO GEARS

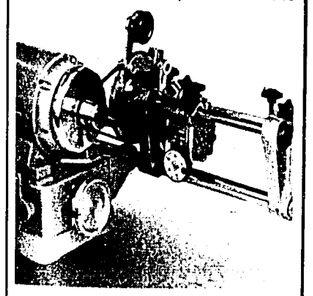
NO LOSS *of time with*

AUMANN

High Precision

COIL WINDING ASSEMBLIES

Infinitely adjustable to precise wire size



Quick changeover from one bobbin or wire size to another. Extremely versatile. Simple to operate. Single and multiple winding. For heavy duty in plant and laboratory.

ALL TYPES OF COIL WINDING MACHINES

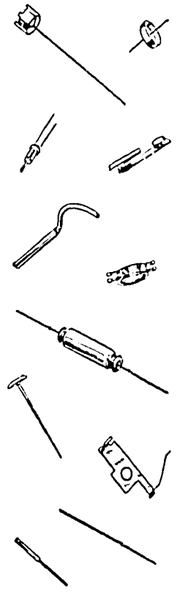
Include specifications when inquiring

INDUSTRIAL WINDING MACHINERY CO.

Suite 3410, 120 Wall St., New York 5, N.Y.
WHitehall 3-1754

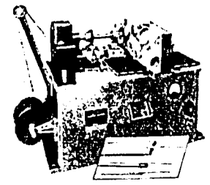
For details, circle #575 on Reader Service Card.

Precision Welds

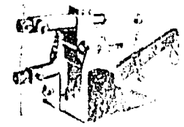


AUTOMATIC precision combined forming and welding operations that are accomplished on "TWEEZER-WELD" equipment have revolutionized the Electronic and Instrument industries.

Brochure Mailed on Request



Automatic Welder
3600 welds per hour.



Model TW—1 Low Inertia Welding Head (can be furnished with either capacitor discharge power supply or standard 1 KVA controls).

TWEEZER-WELD GUN

• Contract Welding Service Available

Millions of small parts have been made on TWEEZER WELDERS

TWEEZER-WELD

FEDERAL TOOL ENGINEERING COMPANY

1381 POMPTON AVENUE, CEDAR GROVE, NEW JERSEY

For details, circle #576 on Reader Service Card.

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

Directory IV. Materials & Services

92. Machinery & Tools.

Harder Co., [illegible] roidal

Hardman Co., Inc., [illegible] Pumps

Hermes Plastics, Inc., N.Y.

Hexacon Electric Co., N.Y.

High Speed Hammer Co., [illegible] 25, 55

High Vacuum Equipment Co., [illegible] 40

Hillyer Instrument Co., Inc., N.Y.

Hoffman Co., P. R., Pa., 20

Hoover Electronics Co., Md., [illegible]

Huck Manufacturing Co., Mich., [illegible] draulic & Pneumatic Pull Guns

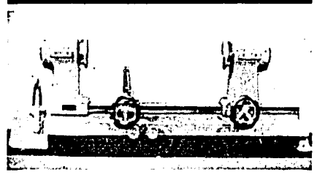
Hull-Standard Corp., Hatboro, Pa., 5, 40, Vacuum-Pressure Impregnation & Molding Presses
See ad on page 194
Tel: OSborne 5-5000

Ideal Industries, Inc., Ill., 25, 30, 35

Industrial Electrical Works, Inc., Neb., Extension Cord Reels

Industrial Winding Machinery Co., 120 Wall St., Suite 3410, New York 5, N.Y., 10, Re-Winders
See ad on this page
Tel: WHitehall 3-1754

GLASS WORKING LATHES



MODEL HSA

$1695.00 f.o.b. Grass Valley, Calif.

GENERAL SPECIFICATIONS

Maximum length overall	63½"
Maximum width overall	18½"
Maximum length spindle nose to spindle nose	36½"
Height	20½"
Radial clearance above apron	9"
Spindle hole diameter	2⅝"
Approximate shipping weight	550 pounds
Net weight	Approx. 400 pounds

STANDARD EQUIPMENT

Variable speed pulley assembly
Two face plates
One collet draw-in bar
One twelve-fire single jet adjustable oxygen-gas or oxygen-hydrogen burner
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
¼ h.p. Motor, 110 volt, single phase, single speed, 60 cycle, AC
Face plate wrench
Two motor belts
One motor pulley

DO YOU KNOW?

That a first class glassblowing job requires accurate alignment of rotational axes between the headstock and footstock?

That variable spindle speed gives another dimension to your technique?

That simple chucking attachments supply versatility for wide varieties of applications?

That special chucking for your industrial procedures, or laboratory practices are available?

That Litton jet-mix fires are universally used in glassblowing to prevent reducing conditions?

That Litton Lathes have been the standard of the vacuum tube industry for 22 years, and have been constantly improved?

That you can get these precision tools at reasonable cost, in eight sizes, with swing from 8" to 42", and working length from 20" to 75½"?

Let us send you complete specifications and prices on our line of equipment and tools for the Vacuum Tube industry and for general research and development laboratory use.

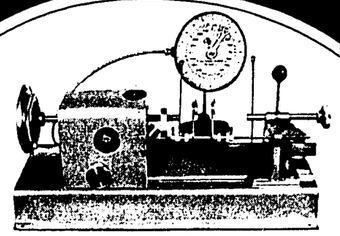
3238

Litton Engineering Laboratories
Grass Valley, California • P. O. Box 949

For details, circle #577 on Reader Service Card.

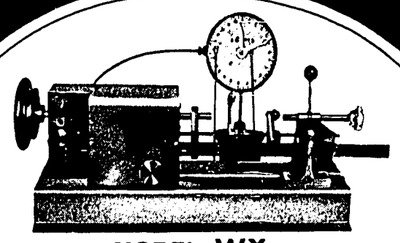
All-purpose, versatile... ideal for laboratory and experimental use

From a wide variety of fine coil winding equipment for every need: Model W, available with adjustable cam traverse, winds every coil pattern except toroids. WX has a continuously variable feed or gain control; allows rapid set-up without changing gears.



MODEL W

The Models W and WX are the only commercial machines capable of winding Lattice-Bobbin-Interleaved-Single Layer-Bank-Interwoven coils.



MODEL WX

The perfect machine to cut costs and still provide exact set-up gear ratios for standard production machines. The Model WX and W are equally suitable for high production.

We'll be pleased to send you complete information. Write or phone

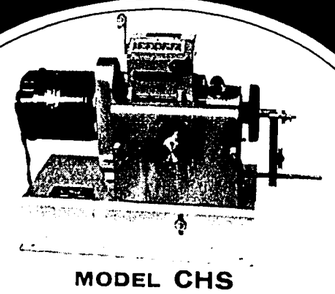
Coil Winding Equipment Co.

OYSTER BAY N.Y. – OYster Bay 6-1285

For details, circle #578 on Reader Service Card.

Outstanding production speed...superior trouble-free performance

From a complete line of high speed coil winders for every possible application: Model CHS bobin winder features continuous speed adjustments up to **13,000 RPM.** Customers report production of over **7000** space wound coils per day by Model MP.

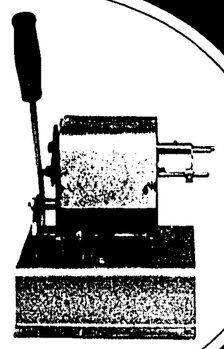


MODEL CHS

Compact, dependable. Meets any demand for high speed coupled with precision performance.

MODEL MP

For the most rapid production of hand wound or space wound coils of relatively few turns. Traverse easily adjusted; non-linear windings may be produced.



We'll be pleased to send you complete information. Write or phone:

Coil Winding Equipment Co.

OYSTER BAY N.Y. – OYster Bay 6-1285

For details, circle #579 on Reader Service Card.

Directory IV. Materials & Services

92. Machinery & Tools.

International Press & [illegible] Inc., N.J., 25

International Telephone & Telegraph Corp., Industrial Products Div., 7 Kingsland Rd., Clifton, N.J., 7
Multiple pages of additional data on 76-79
Tel: NUtley 2-3600

Johnson & Hoffman Mfg. Corp., 81 2nd St., Mineola, N.Y., 50
Multiple pages of additional data on 82-83
Tel: PIoneer 2-3333

Joyce Associates, N.Y., Special Slide Rules

Kahle Engineering Co., 1357 N. 7th St., North Bergen, N.J., 10, 35, 40, 50, Crystal Furnaces, Rate Growers, Pullers, Diode Beading Machines
See ad on page 578
Tel: UNion 7-0500

Kahn & Co., Inc., Conn., 15

Kanthal Corp., Conn., 5

Kemode Mfg. Co., Inc., N.Y., 30, Cartridge-Heated

Kinner Mfg. Div., N.Y. Air Brake Co., Mass., 40

Koh-I-Noor Pencil Co., Inc., N.J., Drafting Pencils & Pens

Kuss Industries, Inc., Pa., 28

Kwikheat Mfg. Co., Calif., 50

L.A.B. Corp., N.Y., 45

Lear, Inc., Calif., 40

Lee Electric & Mfg. Co., Calif., 7

Lehigh Engineering Associates, N.J., 25

Lenert Eng. Co., Inc., Ind., Reactors

Lepel High Frequency Labs., Inc., 54-18 37th Ave., Woodside 77, N.Y., 50
See ad on page 562
Tel: HAvemeyer 9-4588

Linde Co., N.Y., 30, 50

Ling Electronics, Inc., 5125 W. [illegible] Blvd., Los Angeles 16, Calif., 4
See ad on page 4[illegible]
Tel: WEbster [illegible]

Litton Engineering Laboratories, P.O. Box 949, Grass Valley, Calif., [illegible], 4
See ad on page 576
Tel: 17-[illegible]

Litton Industries, Magnetron Div., Mass., 45

Luxo Lamp Corp., N.Y., Work Lamps

M-B Mfg. Co., Conn., 15, Perforators

MacKay, Inc., A. D., N.Y., 1, 15, 17, 20, 25, 30

Marlboro Machine Co., N.H., 25

Matthews & Co., Inc. H., Pa., 25

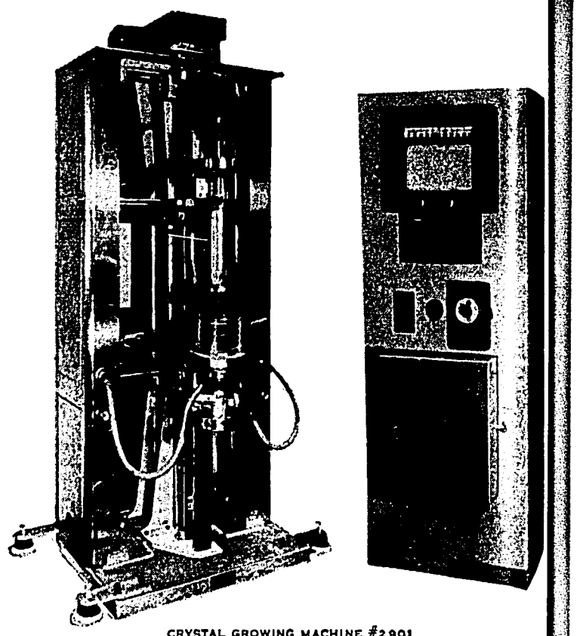
McKay Electric Co., 19700 Stahelin Ave., Detroit 19, Mich., 7
See ad on page 293
Tel: KEnwood 5-6971

McKeown Co., Inc., Robert, N.J., 70

Metal Fabricators Corp., Mass., 20, 50

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

need semiconductor production equipment?



CRYSTAL GROWING MACHINE #2901
FOR GERMANIUM AND SILICON CRYSTALS

KAHLE'S
MACHINE DESIGN,
DEVELOPMENT AND FABRICATION
SERVICES
ARE THE NO-RISK ANSWER

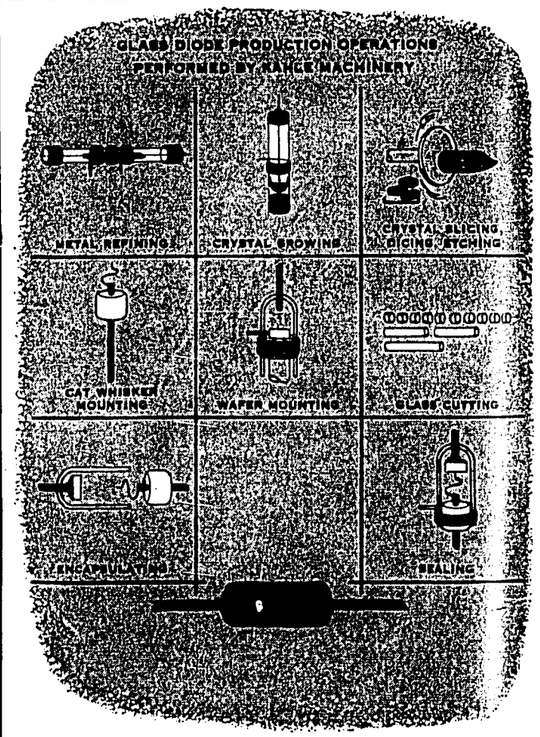
When you work with Kahle, the end result is assured . . . because all Kahle Machines are tested under *your* actual production conditions before shipment. In addition each machine is the result of Kahle's continuous experience which dates back to the days of the old carbon lamp.

But Kahle is modern, too . . . having *already* manufactured machines for every semiconductor production process. Their outstanding production records achieved for leading companies are available for your inspection.

Economy is another mark of a Kahle machine . . . hundreds of standard models can help solve your problems . . . when required, a special design is quickly and effectively created.

Relieve your engineering staff . . . assign the design, development and fabrication of production machinery and equipment to Kahle.

For an individual analysis of your problem, write outlining details.



For details, circle #580 on Reader Service Card.

KAHLE

ENGINEERING COMPANY

GENERAL OFFICES:
1357 SEVENTH STREET
NORTH BERGEN, N. J.

PLANTS:
SEVENTH STREET, NORTH BERGEN, N. J.
HUDSON AVE., UNION CITY, N. J.

DESIGNERS AND BUILDERS OF SPECIAL AUTOMATIC AND SEMI-AUTOMATIC EQUIPMENT FOR ALL INDUSTRIAL OPERATIONS

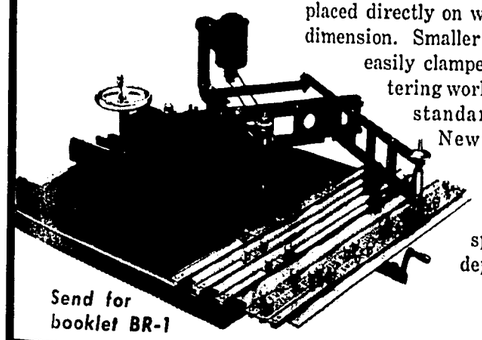
Now—

NO plate too small— 213B

NO panel too big

NO size limits on engraving

The new ENGRAVOGRAPH Model I-R takes up only 2 feet of bench space and engraves anything from tiny nameplates to giant panels. Engraving chassis can be detached from base and placed directly on workpiece of any dimension. Smaller plates can be easily clamped in a self-centering workholder which is standard equipment. New sturdy pantograph construction; heavy duty cutter spindle; two-way depth regulator.



Send for booklet BR-1

new hermes ENGRAVING MACHINE CORP.
13-19 University Place, New York 3, N.Y.

For details, circle #581 on Reader Service Card.

Directory IV. Materials & Services

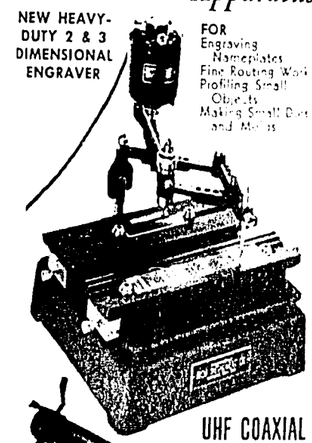
92. Machinery & Tools.

Mico Instrument Co., 79 Trowbridge St., Cambridge 38, Mass., 10, 20, 25
See ad on this page
Tel: KIrkland 7-8660
Micro Balancing, Inc., N.Y., Balancing Mach.
Micromech Mfg. Corp., N.J., 20, Wafering Machines
Miller Electric Mfg. Co., Inc., Wis., 5
Mitchell Industries, Inc., Tex., 30
Model Rectifier Corp., 1065 Utica Ave., Brooklyn 3, N.Y., 7
See ad on page 381
Tel: HYacinth 5-4600
Multi-Tron Laboratory, Inc., Ill., 5, 35
NRC Equip. Corp., 287 Charlemont St., Newton Highlands 61, Mass., 5, 15, 40, Exhaust Dollies
See ad on page 580
Tel: DEcatur 2-5800
Nageldinger & Co., John, N.Y., Pressure Regulators, Gas Valves & Accessories
Namco Machinery, Inc., N.Y., 20
Nelson Tool Co., Inc., N.Y., 20
New Hermes Engraving Machine Corp., 13-19 University Pl., New York 3, N.Y., 25
See ad on this page
Tel: SPring 7-7220

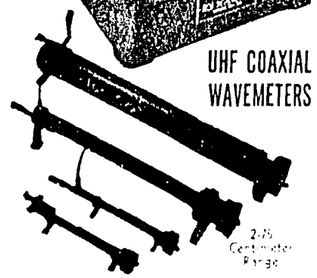
MICO *Precision Apparatus*

NEW HEAVY-DUTY 2 & 3 DIMENSIONAL ENGRAVER

FOR Engraving Nameplates, Fine Routing Work, Profiling Small Objects, Making Small Dies and Molds



UHF COAXIAL WAVEMETERS



2.75 Centimeter Range

Send for Illustrated Catalogs

MICO INSTRUMENT CO.
79 Trowbridge St. Cambridge 38, Mass.

For details, circle #562 on Reader Service Card.

NRC EQUIPMENT CORPORATION

A SUBSIDIARY OF

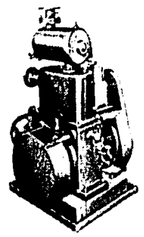
NATIONAL RESEARCH CORPORATION

287 Charlemont St., Newton Highlands 61, Mass.

SALES OFFICES: Atlanta • Boston • Chicago • Cleveland • Detroit • Houston • Los Angeles • New York • Palo Alto • Pasadena • Pittsburgh • Washington, D.C.

HIGH VACUUM COMPONENTS, EQUIPMENT, and SYSTEMS

Mechanical Vacuum Pumps



NRC Model 100M

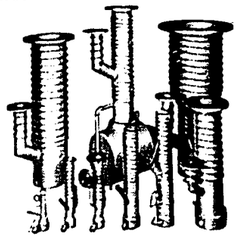
Because of the Gas Ballast feature, these pumps maintain their original high efficiency even when pumping 100% water, or other condensable vapors. Therefore, expensive oil purifiers and frequent and costly oil changes are not needed. NRC pumps have paid for themselves in three years from oil savings alone.

Model	Capacity CFM	Ultimate Vacuum Gas Ballast Off mm. Hg (A)	Ultimate Vacuum Gas Ballast On mm. Hg (A)	Price (B)
SINGLE STAGE				
2-S	1.25	3×10^{-3}	Less than one half millimeter of mercury	$155
4-S	3.3	3×10^{-3}		225
6-S	6.75	3×10^{-3}		315
15-S	11.6	3×10^{-2}		475
30-S	29.5	3×10^{-3}		800
100-S	100	3×10^{-3}		1500
200-S	202	1×10^{-2}		2500
400-S	403	5×10^{-3}		4000
DOUBLE STAGE				
2D	1.25	5×10^{-5}	2.5×10^{-2}	$215
4D	3.3	5×10^{-5}	2.5×10^{-2}	280
6D	6.75	5×10^{-5}	2.5×10^{-2}	425
15D	14.75		2.5×10^{-2}	750
30M	29.5	3×10^{-3}	3×10^{-3}	1300
100M	100	3×10^{-3}	3×10^{-3}	2150
200M	202	3×10^{-3}	3×10^{-3}	3500
400M	403	3×10^{-3}	3×10^{-2}	5900

Note A: McLeod gauge reading

Note B: F.O.B. Newton, Mass. Price includes pump, base, v-belt drive, and motor

Diffusion and Booster Pumps



NRC Booster and Diffusion Pumps

While NRC high vacuum diffusion and booster pumps are unsurpassed for through-put, blank off, and forepressure tolerance, they are especially outstanding for reliability. They offer long, trouble-free life, and are easy to maintain. Narcoil pumping fluids are unusually stable, have excellent pumping characteristics, and are low-priced. Narcoil-10 is $10.50 per gallon and Narcoil-40 is $38.50 per gallon.

Model	Blank-Off, mm. Hg (C)	Max. Speed Liters/Sec.	Tolerable Forepressure mm. Hg	Pumping Fluid	Price (D)
DIFFUSION PUMPS					
G-2-M (A)	8×10^{-7}	30	0.50	Mercury	$225
H-2-P	2×10^{-7}	80	0.25	Narcoil 40	125
A-2-P (B)	2×10^{-6}	85	0.20	DC 703	165
H-4-P	5×10^{-7}	300	0.31	Narcoil 40	235
H-6-P	5×10^{-7}	730	0.20	Narcoil 40	410
H-10-P	5×10^{-7}	1900	0.19	Narcoil 40	820
H-16-P	5×10^{-7}	5500	0.30	Narcoil 40	1450
BOOSTER PUMPS					
B-1	1×10^{-4}	8	0.30	Narcoil 10	$ 70
B-2	1×10^{-4}	85	0.85	Narcoil 10	205
B-4	1×10^{-4}	260	1.30	Narcoil 10	360
B-6	1×10^{-4}	530	0.90	Narcoil 10	1090
B-12	1×10^{-4}	3500	0.90	Narcoil 10	2250

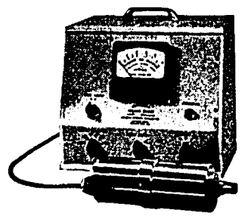
Note A: Glass pump

Note B: Air-cooled. Price includes blower

Note C: Untrapped ion gauge, except for G-2-M

Note D: Includes initial charge of pumping fluid

Vacuum Gages



NRC Model 520

NRC vacuum gauges are outstanding for their accuracy and ability to withstand hard usage. The NRC Model 520 shown above is an all-purpose gauge with uniquely wide range and accuracy. Its ruggedized new circuitry eliminates troublesome components, minimizes contamination effects and provides highly stable linear amplification.

Model	Type	Range mm. Hg	Price complete with head(s)
NRC HIGH VACUUM GAUGES			
501	Thermocouple Head	10^{-3} to 1.0	$11.00
507	Ionization Head	2×10^{-8} to 5×10^{-3}	24.00
510	Alphatron® Ionization	10^{-3} to 10.	545.00
515	Logarithmic Alphatron® Ionization	10^{-3} to 10.	275.00
516	Pirani	10^{-3} to 1.0	175.00
520	Alphatron® Ionization	10^{-4} to 10^{3}	575.00
701	Thermocouple	10^{-3} to 1.0	120.00
710	Thermocouple Ionization	2×10^{-8} to 1.0	481.00

NRC HIGH VACUUM SYSTEMS

Write us about your problem if you are seeking ways to improve your product quality and cut costs.

As one of the pioneers and leaders in the design and manufacture of many kinds of high vacuum systems, NRC Equipment also can supply standard and specially engineered equipment such as:

Vacuum Furnaces, Vacuum Coaters

Freeze Driers, Impregnators, Vacuum Driers

Vacuum Analytical Equipment (for measuring gas content of metals)

Specially engineered vacuum systems

Leak detection apparatus

For details, circle #583 on Reader Service Card.

Directory IV. Materials & Services

92. Machinery & Tools.

New York Engineering Co., N.Y., Vacuum Impregnating Equip.
Nichols, Ltd., R. H., Canada, 7
Nixon Gear & Machine Co., Inc., N.Y., Fine Pitch Gears
Norma Pencil Corp., N.Y., Pencils
North Electric Co., Ohio, 7
North Hills Electric Co., Inc., 402 Sagamore Ave., Mineola, L.I., N.Y., 10
See ads on pages 319, 451
Tel: PIoneer 7-0555
Numberall Stamp & Tool Co., N.Y., 25
Oryx Sales Co., Calif., 30
Peer, Inc., Mich., 7, 50
Pickett & Eckel, Inc., Calif., Slide Rules
Pioneer Machine Works, N.J., 35
Plisco, William B., N.Y., 27
Popper & Sons, Inc., 300 Fourth Ave., New York 10, N.Y., 25
See ad on this page
Tel: OREgon 4-5500
Pratt & Whitney Co., Inc., Conn., 20
Preis Eng. Mach. Co., H. P., N.J., 25
Pres Industrial Equipment, Ltd., N.Y., Component Taping Mach. & Lead Straightener
Printed Electronics Corp., Mass., 27, Printed Circuit Machinery
Production Tool & Fixture Co., 37 W. Main St., Oyster Bay, L.I., N.Y., 20
See ad on this page
Tel: OYster Bay 6-0009
Radial Cutter Mfg. Co., N.J., 20, Saws
Radio Frequency Laboratories, Inc., Boonton, N.J., Magnetizers & Demagnetizers
See ad on page 489
Tel: DEerfield 4-3100
Rapid Electroplating Process, Inc., Ill., Portable Electro-Platers
Raytheon Mfg. Co., Equip. Sales Operations, Mass., 7, 32, 50
Red Point Corp., Calif., 20, 27, 40, Impregnators & Encapsulators
Rex Rheostat Co., 3 Foxhurst Rd., Baldwin Rd., Baldwin, L.I., New York 10, N.Y., 10
See ad on page 582
Tel: BAldwin 3-5160
Royson Engineering Co., Pa., 50
S & B Machine & Tool Co., Inc., N.J., 20, 35 & Graphite Boats
Schirmer-National Alarm Co., N.J., 7

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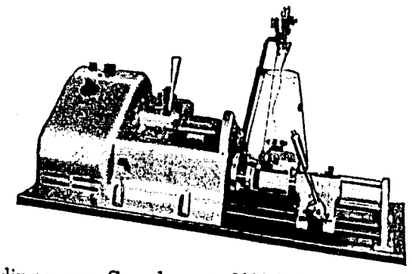
Gearless BOBBIN WINDER
Adjustable Winding Length

Gears eliminated by new pitch selector; no gear changing between jobs required. Merely set selector lever at desired pitch and wind all types of random wound bobbin coils, solenoids, repeater and relay coils up to 2" OD using 27 to 46 gauge wire.



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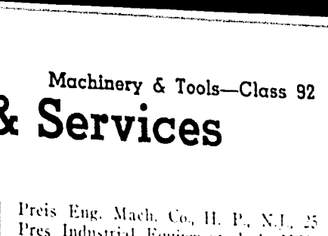

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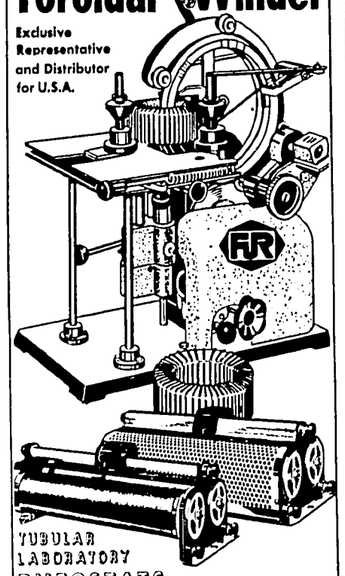
Exclusive Representative and Distributor for U.S.A.



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REX RHEOSTAT CO. BALDWIN, N. Y.

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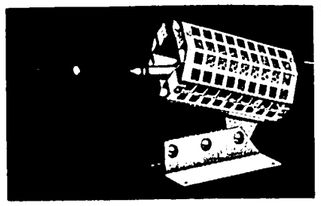

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92. Machinery & Tools.

Schloer, Inc., H. C., Modern Design Div., N.Y., 45
Scientific Electric, N.J., 50, Electrostatic Spray Equip.
Sheffield Corp., Ohio, 32
Shipley Company, Inc., Mass., 28
Specialties, Inc., N.Y., 10
Speedway Mfg. Co. Div., Thor Power Tool Co., Ill., 20
Spinform, Inc., Mass., 27
Stanley Tools, Conn., 30 & Screw Drivers
Stevens Mfg. Co., Inc., George, 6022 N. Rogers Ave., Chicago 30, Ill., 10, 55
See ad on page 581
Tel: JUniper 8-1300
Stevens-Walden, Inc., Mass., 20
Stokes Corp., F. J., Pa., 5, 15, 27, 35, 40
Syntron Co., Pa., 7
Technical Apparatus Builders, 109 RV Liberty St., New York 6, N.Y., 5, 7
See ad on page 386
Tel: REctor 2-6249
Thomas Instrument Co., N.Y., 55
Ultra-Violet Products, Inc., Calif., Invisible Inks & UV Lamps
Ungar Electric Tools, Inc., Calif., 30
United Shoe Machinery Corp., Mass., 20
U.S. Dynamics Corp., Mass., 7
U.S. Electrical Tool Co., Ohio, 20
U.S. Tool Co., Inc., N.J., 20
Unitek Corp., Weldmatic Div., Calif., 50
Universal Mfg. Co., Inc., N.J., 10
Universal Winding Co., R.I., 10
Vacumet, Ill., 5, 40

Kinney VACUUM EQUIPMENT for ELECTRONIC

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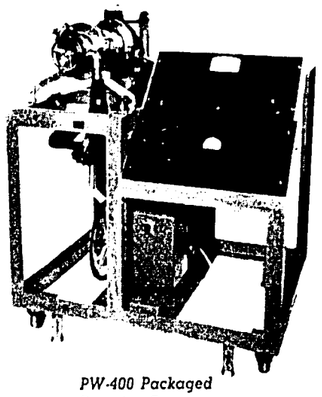
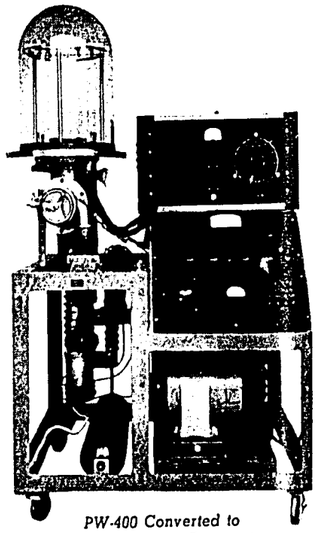


PW-400 Packaged Pumping System

Shown at the left is the versatile Kinney PW-400 4" Packaged Pumping System. This system will reach pressures close to 10^{-7} mm of mercury with liquid nitrogen in the cold trap. The intake manifold can be oriented horizontally, vertically, or at any angle between the horizontal and vertical — quickly and conveniently. The Kinney PW-400 can be employed for pumping out various high vacuum systems: furnaces, electronic tubes, etc.

Shown at the right is the PW-400 with the larger Kinney KC-15 two-stage gas ballasted mechanical Pump plus 2 KVA packaged power supply, bell jar and base plate assembly. The Kinney PW-400 is thus converted to a very efficient laboratory Vacuum Evaporator. Other Kinney products of interest to electronic plants are: laboratory and industrial sizes of Transistor Drying Ovens, High Vacuum Gages, Valves, Oil Diffusion Pumps, Large Vacuum Metalizers, and High Vacuum Furnaces of all types.



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VACUUM EQUIPMENT DIVISION
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Manufacturing and Engineering
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Directory IV. Materials & Services

92. Machinery & Tools.

Vacuum-Electronic Engineering Co., N.Y., 40
Vacuum Equip. Div. New York Air Brake Co., 3650 Washington St., Boston 30, Mass., 5, 35, 40
See ad on page 582
Tel: JAmaica 4-3220
Vacuum Tube Products Co., Inc., Calif., 5, 35, 40, 50
Valtronic Corp., N.Y., 50, Stored Energy Welders
Veeco Vacuum Corp., N.Y., 35, 40
Viking Instruments, Inc., Conn., 55
Virginia Electronics Co., D.C., 30
Wales-Strippit Co., Unit Houdaille Ind., Inc., N.Y., 20, 28
Wall Mfg. Co., P., Pa., 30
Wasco Electric Products Corp., Ill., 30
Weightman & Associates, Calif., 55
Welch Manufacturing Co., W. M., Ill., 40
Weller Electric Corp., Pa., 30
Westinghouse Electric Corp., Pa., 7
Whitney Metal Tool Co., Ill., 20, Punches & Dies
Wilder Mfg. Co., Inc., Dept. E, Mechanic St. & Erie R.R., Port Jervis, N.Y., 30-Holder only & Tray, Shelf, Track Trucks
See ad on page 582
Tel: 3-2291
Worklon, Inc., N.Y., Acid Resistant Fabrics
Wright Engineering Co., Calif., 45
Wybar Electronics, Inc., N.Y., 55
Zenith Optical Laboratory, N.Y., 5

Magazines: See class 99

Manufacturers representatives: See class 100

Markers and tags: See class 87

Mesh, wire: See class 83

Metal stamping & spinning: See class 86

93. Metals.

5. Alloys
10. Copper
15. Ferrous
17. Metallic oxides
20. Non-ferrous, excluding copper
25. Powdered
30. Precious & rare

Allegheny Ludlum Steel Corp., Pa., 5, 15
Allied Chem. & Dye Corp., Genl. Chem. Div. Baker & Adamson Prods., N.Y., 17
Alpha Metals, Inc., N.J., 5, 20, 30 & High Purity
Alpha-Loy Corp., Ill., 20, 25
Aluminum Co. of America, Pa., 20, 25, 30
American Brass Co., Conn., 5, 10
American Metal Co., Ltd., 61 Broadway, New York 6, N.Y., 5, 10, 20, 25, 30
See ad on this page
Tel: BOwling Green 9-1800
American Platium Works, N.J., 25, 30
American Silver Co., Inc., N.Y., 5, 10, 15, 20, 30, Copper Tape
American Steel & Wire Co., Div. U.S.S., Ohio, 15
Anchor Metal Co., Inc., N.Y., 5, 20, 25, 30
Anderson Associates H. V., N.J., 25 Precision
Angus-Campbell, Inc., Calif., 5
Antara Chemicals Div., Gen. Aniline & Film Corp., N.Y., 25
Anthony & Co., J. L., R.I., 5, 15, 25, 30
Baker & Co., Inc., N.J., 5, 25, 30
Beryllium Corp., Tuckerton Rd., Reading, Pa., 5 Beryllium Copper

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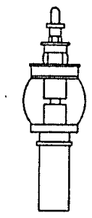

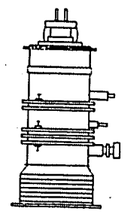

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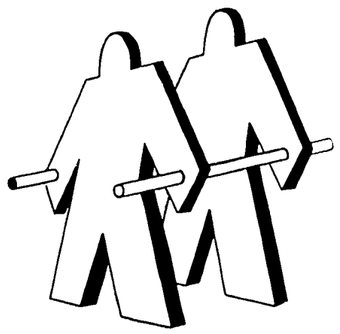

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Directory IV. Materials & Services

93. Metals.

Brainin Co., C. S., [illegible] W. [illegible], Mt. Vernon, N.Y., [illegible]
See ad on page [illegible]
Tel: MOunt Vernon [illegible]

[illegible]

Cohn Corp., Sigmund, [illegible] S. Columbus Ave., Mt. Vernon, N.Y., [illegible]
See ad on page 555
Tel: MOunt Vernon 4-55[illegible]

Columbian Carbon Co., Magnesium Chloride Unit, 380 Madison Ave., New York 17, N.Y., 17
See ad on page 584
Tel: MUrray Hill 7-58[illegible]

[illegible]

Cooper & Sons, [illegible]

[illegible]

Cross Co., H., 15 Beekman St., New York 38, N.Y., 5, 20
See ad on this page
Tel: COrtlandt 7-047[illegible]

[illegible]

Driver Co., Wilbur B., 1875 M[illegible] Highway, Newark 4, N.J., 5, 2[illegible]
See ad on page [illegible]
Tel: HUmboldt [illegible]

Driver-Harris Co., [illegible] Harrison, N.J., 5, N[illegible]
See ad on page [illegible]
Tel: HUmboldt [illegible]

[illegible]

Federated Metals Div., [illegible] 5, 20, 2[illegible]

[illegible]

Gibson Refining Co., [illegible]

[illegible]

Hardy Metallurgical Corp., [illegible]

Harris & Ford, [illegible] NY, 5, [illegible]

Hard [illegible] NY, [illegible]
Compounds

Harmon, Paul [illegible] & Co., N.Y., 20

Hessel Prodgt. Inc., Mt. Vernon & Stainless Steel [illegible]

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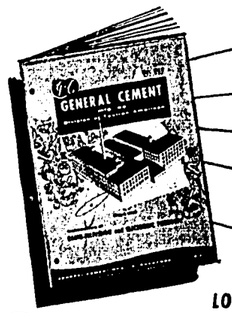

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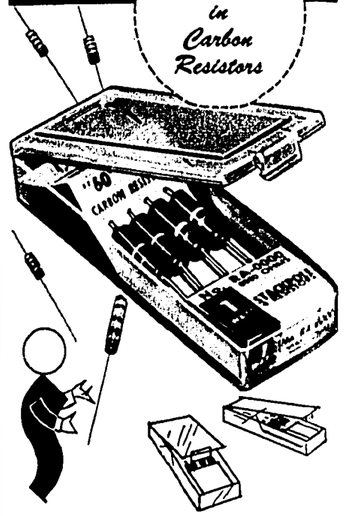

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Directory IV. Materials & Services

93. Metals.

Indiana Steel Products Co., Valparaiso, Ind., 5, 15
See ad on page 364
Tel: 2-5601

Indium Corp. of America, N.Y., 5, 20, 25, 30

International Nickel Co., Inc., N.Y., 5, 20, 30

Jarrell-Ash Co., Mass., 30

Kaiser Aluminum & Chemical Sales, Inc., Ill., 5, 20

Kinney Co., Inc., Joseph, Pa., C. C. Steel & Invar, Stainless Steel Clad Copper

Kulite Tungsten Corp., N.J., 5, 17, 20, 25

Leach & Garner Co., Industrial Div., Mass., 30

Magnetic Powders, Inc., Pa., 25

Magnetics, Inc., Dept. Y-39, P.O. Box 391, Butler, Pa., 5, 25
Multiple pages of additional data on 46-47
Tel: 7-1745

Magnus Metal Div., Natl. Lead Co., N.Y., 20 Brass & Bronze Foundries

Mallory & Co., Inc., P. R., Ind., 5, 25

Metal Hydrades, Inc., Mass., 5, Powdered, 25

Metal Powder Association, N.Y., 17, 25

Metals & Controls Corp., Gen. Plate Div., Mass., 5, 30, Clad

Metz Refining Co., N.Y., 5, 25, 30

Montgomery Co., Conn., 5, 10

National Lead Co., N.Y., 20, Nickel-Chromium

National Moldite Co., 1410 Chestnut Ave., Hillside 5, N.J., 15, 17, 25
See ad on page 208
Tel: WAverly 6-2123

National-U.S. Radiator Corp., Plastic Metals Div., N.Y., 17, 25

Nesor Alloy Prod. Co., Dept. MF-1, 282 Halsey St., Newark 2, N.J., 5, 10, 30
See ad on page 526
Tel: MItchell 2-1682

New Jersey Zinc Co., N.Y., 25

Ney Co., J. M., Dept. N., P.O. Drawer 990, Hartford 1, Conn., 30
See ad on page 425
Tel: CHapel 2-2281

Olin Mathieson Chemical Corp., Electrical Div., Conn., 10, 20

Paul & Stein Bros., Inc., F. H., N.Y., 20

Penn Precision Products, Inc., Pa., 5, 10

Perfection Mica Co., 1322 N. Elston Ave., Chicago 22, Ill., 5, 25
See ad on page 599
Tel: EVerglade 4-2122

Permo, Inc., Ill., 30

Phelps Dodge Copper Products Corp., 300 Park Ave., New York 22, N.Y., 5, 10
See ad on page 528
Tel: PLaza 1-3200

Philadelphia Bronze & Brass Corp., Pa., 10, 20

Plastic Metals Div. Natl. U.S. Radiator Corp., Pa., 25

Precision Tube Co., Inc., Pa., 5, 10, 20, Tubing Only

Production Metals, Inc., N.Y., 10, 20

Republic Foil & Metal Mills, Inc., Conn., 20

Research Chemicals, Inc., Calif., 30

Revere Copper & Brass, Inc., N.Y., 5, 10, 20

St. Eloi Corporation, Ohio, 5, 30

Scovill Manufacturing Co., Conn., 5, 20

Sel-Rex Corp., Dept IRE-57, Precious Metals Div., 75 River Rd., Nutley 10, N.J., 5, 10, 30
See ad on page 585
Tel: Nutley 2-5200

Somers Brass Co., Inc., Conn., 5, 10, 15, 20

Standard Metals Corp., Mass., 5, 30

Stieh Chemicals, Inc., N.Y., Mercury

Technic, Inc., Ill., 30

Technic, Inc., R.I., 30

Texas Instruments Incorporated, 6000 Lemmon Ave., Dallas 9, Tex., 30
Multiple pages of additional data on 88-89
Tel: FLeetwood 2-1781

United Mineral & Chemical Corp., N.Y., 5, 17, 20, 30

Victor Electric Wire & Cable Corp., R.I., 10

Waterbury Rolling Mills, Inc., Conn., Copper Base

Western Gold & Platinum Co., Calif., 5, Brazing Low Vapor Pressure, 30

Westinghouse Electric Corp., Pa., 5

Yale & Towne Mfg. Co., Powdered Metal Div., Ill., 25

Moisture-proofing: See class 86

Motors: See class 44

94. Moulded Products.

5. Insulators
10. Knobs & parts
15. Proprietary mouldings

Accurate Electronics Corp., Ohio, 5, 10, 15

Acton Laboratories, Inc., Mass., 10

Admiral Plastics Corp., N.Y., 5, 10, 15

Airflyte Electronics Co., 535 Ave. A, Bayonne, N.J., 15
See ad on page 325
Tel: HEmlock 6-2230

Airtron, Inc., Dept. 1, 1101 W. Elizabeth Ave., Linden, N.J., 15
See ad on page 453
Tel: HUnter 6-1000

Alden Products Co., 140 N. Main St., Brockton 64, Mass., 5, 10, 15
See ad on page 324
Tel: BRockton 160

Allied Plastics Supply Corp., 75 Cliff St., New York 38, N.Y., 5, 10
See ad on page 584
Tel: BEekman 3-7377

American Lava Corp., Cherokee Blvd. & Mfrs. Rd., Cattanooga 5, Tenn., 5
See ad on page 182
Tel: AM 5-3411

American Molded Products Co., [illegible]

American Plastics Corp., N.Y., [illegible]

Armel Electronics, Inc., N.Y., 15

Auburn Manufacturing Co., Conn., 15

Bacon Industries, Inc., Mass., Silicone Rubber

Bigelow Reinforced Plastics, N.Y., 5, 15

Brilhart Plastics Corp., N.Y., 5, 10, 15

Centralab, Div. of Globe Union, Inc., 920Y E. Keefe Ave., Milwaukee 1, Wis., 5
See ad on page 206
Tel: WOodruff 2-9200

Ceramic Specialties Co., Ohio, 5

Collectron Corp., 304 E. 45 St., New York 17, N.Y., 15
See ad on page 327
Tel: MUrray Hill 9-7120

Continental Diamond Fibre Div., of the Budd Co., Inc., Del., 5, 10

Crane Packing Co., Ill., 5, Teflon

Cutler-Hammer, Inc., Wis., 10

Dale Products, Inc., 1318 28th Ave., Columbus, Neb., 10, 15
See ads on pages 146, 147
Tel: LOcust 4-3131

Davies Molding Co., Harry, Ill., 10, 15

Dimco-Gray Co., Ohio, 10, 15

Dixon Corp., R.I., 15, Teflon Rulon Only

Eby Company, Hugh H., Pa., 10, 15

Elco Corp., Pa., 15

Electronic Mechanics, Inc., N.J., 5

Electronic Plastics Corp., 675 Barbey St., Brooklyn 7, N.Y., 10, 15
See ad on page 570
Tel: HYacinth 5-0133

Electronic Tube Corp., Pa., 10

Emeloid Co., Inc., N.J., 10

Enflo Corporation, N.J., 5, 15, Teflon

Erwood, Inc., Ill., 10

Fastex Div., Illinois Tool Works, Ill., 15

Fawn Plastics Co., Inc., Md., 5, 10, 15

Flexrock Company, Pa., 5, 10, 15

Fluorocarbon Products, Inc., [illegible]

U.S. Gasket, N.J., 5, 10, 15

Formica Corp., 4532-7 Spring Grove Ave., Cincinnati 32, Ohio, 5, 10
See ad on page 588
Tel: KIrby 1-3670

Garde Manufacturing Co., R.I., 5, 15

Gee Lar Manufacturing Co., 400 S. Wyman St., Rockford, Ill., 5, 10
See ad on page 586
Tel: 5-9548

Gemloid Corp., N.Y., 15

Be sure to consult the advertisements for data you cannot get from listings. If you need still further information, circle the appropriate numbers on the Reader Service Card at back of book.

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Formica offers larger sheets, and more sheet sizes. Standard length-width dimensions: 36 x 36, 36 x 42, 36 x 60, 36 x 72, 36 x 84 and 36 x 96 inches in most grades; and 24 x 42, 24 x 84 and 24 x 96 inches in XX and XXX grades only. Thickness from .010" to 6".

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A wide variety of standard and special grades, shapes and sizes of tubing and rod is available for every industrial use. Standard rolled tubing sizes from 3/32" to 14" I.D.; wall thickness from 1/32" to 2". Standard diameter rods from ⅛" to 2". Tube and rod lengths up to 36".

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Select your best grade from the complete Formica line: XP-47, XXXP-36, LE, FF-55, FF-89-1, FF-91-1, CE and YN-25. Many of these can be cold punched, thus eliminating the dimensional change and dissipation of electrical properties resulting from hot punching. For complete information, write for Copper Clad Technical Data, form 656.

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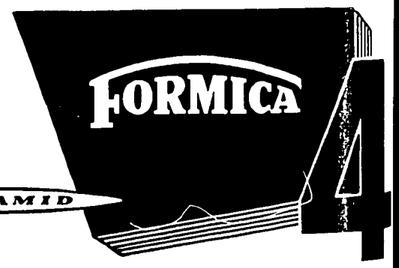

For details, circle #596 on Reader Service Card.

Directory IV. Materials & Services

94. Moulded Products.

General Cement Mfg. Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 5, 10
See ad on page 586
Tel: 2-6695

General Components, Inc., 225 E. 144th St., New York 51, N.Y., 5, 10
See ad on page 551
Tel: Motthaven 5-0740

General Products Corp., N.Y., 10, 15

General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., 5, 10
See ad on Cover 4
Tel: TRowbridge 6-4400

Glastic Corp., Ohio, 5

Globe Electrical Mfg. Co., Calif., 5, 15

Goe Engineering Co., Calif., 5

Grayhill, Inc., 505 Hillgrove Ave., La Grange, Ill., 5, 10, 15
See ad on page 424
Tel: FLeetwood 4-1040

Gries Reproducer Corp., 168 Beechwood Ave., New Rochelle, N.Y., 5, 15
See ad on page 551
Tel: NEw Rochelle 3-8600

Gulliksen Mfg. Co., W. M., Mass., 5, 10

Hydro Molding Co., Inc., 100 Sharron Ave., Plattsburgh, N.Y., 10
See ad on page 590
Tel: 2598

Industrial Accessories, N.J., Gaskets
Industrial Devices, Inc., N.J., 5, 10, 15
Insulation Products Co., Pa., 5, 10
Isolantite Mfg. Corp., N.J., 5
Jan Hardware Mfg. Co., Inc., N.Y., 5, 10
Johnson Co., E. F., Minn., 10
Kurz-Kasch, Inc., Ohio, 10, 15
Lamtex Ind., Inc., N.Y., 15
Leviton Mfg. Co., Inc., N.Y., 5, 10, 15
Mandex Manufacturing Co., Inc., Ill., 15
Mansol Ceramics Co., N.J., 5
McMillan Industrial Corp., Mass., 15

Methode Mfg. Corp., 7447 W. Wilson Ave., Chicago 31, Ill., 5, 15
See ad on page 388
Tel: UNderhill 7-9600

Mica Fabricating Co., N.J., 5

Milton Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 5, 10
See ad on page 600
Tel: MAlden 4-4108

Molded Insulation Co., Pa., 5, 10, 15
Molding Corp. of America, R.I., 5, 10, 15
Morton Electronics Corp., Chester, Pa., 15
Moxness Products, Inc., Wis., 15

National Moldite Co., 1410 Chestnut Ave., Hillside 5, N.J., 5, 15
See ad on page 208
Tel: WAverly 6-2123

Norrich Plastics Corp., 109 W. 18th St., New York 11, N.Y., 5, 10
See ad on page 413
Tel: WAtkins 4-8360

Northwest Plastics, Inc., Minn., 5, 15
Norton Laboratories, Inc., N.Y., 5, 10, 15
Owens-Illinois, Ohio, 15
Permacel Tape Corp., N.J., 5
Pfannkuch & Co., O. E., Conn., 10
Plasteck, Inc., Okla., 5, 10, 15
Plisco, William B., N.Y., 10, 15
Porcelain Products, Inc., Ohio, 5
Quality Engraving Co. of Long Island, N.Y., 10
Remler Co., Calif., 10, 15
Rogan Brothers, Ill., 5, 10, 15
Seamless Rubber Co., Conn., 10, 15
Shamban Engineering Co., Calif., 5
Sherwin-Williams Co., Ohio, 10, 15, 20, 25, 30
Silicone Insulation, Inc., N.Y., 5
Silleocks-Miller Co., N.J., 5, 10, 15
Slater Electric & Mfg. Co., N.Y., 15
Spartan Coach & Mfg. Co., Ill., 10

Sparta Mfg. Co., Div. of U.S. Ceramic Tile Co., Dept. IRED, Dover, Ohio, 15
See ad on page 593
Tel: DOver 4-2380

Specialty Insulation Mfg. Co., Inc., N.Y., 10
Star Porcelain Co., N.J., 5, 15
Stevens Products, Inc., N.J., 5
Steward Manufacturing Co., D. M., Tenn., 5
Superior Porcelain Co., W.Va., 5
Thal, Bernard, Mass., 5, 10, 15
U.S. Ceramic Tile Co., Diamonite Div., Ohio, 5, 10, 15
Victor Electric Wire & Cable Corp., R.I., 15
Viking Industries, Inc., Calif., 5, 15
Weightman & Associates, Calif., 15
Western Gold & Platinum Co., Calif., 5
Westlake Plastics Co., Pa., 5, 10, 15
Whitso, Inc., Ill., 5, 10, 15

Nameplates: See class 87

Nuts: See class 87

Packaging: See class 86

Paints: See class 91

Phosphors: See class 97

Pins & prongs: See class 97

Plastic fabrication & molding: See class 86

95. Plastics.

5. Extrusions
10. Raw powders
15. Rods
20. Sheets
25. Tubes

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Ace Plastic Co., N.Y., 5, 15, 20, 25
Allied Chem. & Dye Corp., Barrett Div., N.Y., 10

Allied Plastics Supply Corp., 75 Cliff St., New York 38, N.Y., 5, 10, 15, 20, 25
See ad on page 584
Tel: BEekman 3-7377

American Plastics Corp., N.Y., 5, 15, 25
American Products Mfg. Co., Inc., La., 20, 25
Anchor Industrial Co., Inc., N.Y., 5, 10, 15, 25
Angus-Campbell, Inc., Calif., 15, 20, 25
Arlin Mfg. Co., Mass., 20
Auburn Manufacturing Co., Conn., 20
Baer Co., N. S., N.J., 15, 20, 25
Barwood Mfg. Co., Inc., L. J., Mass., 15, 20, 25
Bigelow Reinforced Plastics, N.Y., 20
Borden Co., Resinite Dept., Calif., 5, 10, 15, 20, 25
Canadian Research Institute, Canada, 20
Celanese Corp. of America, N.J., 20

Cleveland Container Co., 6201 Barberton Ave., Cleveland 2, Ohio, 25
See ad on page 210
Tel: OL 1-4500

Comco Plastics, Inc., N.Y., 15, 20, 25

Commercial Plastics Co., 933 George St., Chicago 14, Ill., 5, 15, 20, 25
See ad on page 550
Tel: BElmont 5-1030

Continental Diamond Fibre Div. of the Budd Co., Inc., Del., 15, 20, 25
Cortland Industries, Inc., Ill., 15, 20, 25
Crane Packing Co., Ill., 5, 15, 20, 25
Davis Plastics Co., Joseph, N.J., 5, 10, 15, 20, 25
Dixon Corp., R.I., 5, 15, 20, 25 Teflon, Rulon Only
Dow Corning Corp., Mich., 10
Du Pont De Nemours & Co., E. I., Del., 20
Durez Plastics Div., Hooker Electrochemical Co., N.Y., 10
Dynamic Gear Inc., N.Y., 20

Eastern Precision Resistor Corp., 675 Barbey St., Brooklyn 7, N.Y., 15
See ad on page 214
Tel: HYacinth 5-0133

Electrical Insulation Co., Inc., N.Y., 15, 20, 25

Electronic Plastics Corp., 675 Barbey St., Brooklyn 7, N.Y., 15, 20, 25
See ad on page 570
Tel: HYacinth 5-0133

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Directory IV. Materials & Services

95. Plastics.

Emerson & Cuming, Inc., Mass., 15, 20
Emerson Plastics Corp., N.Y., 5, 15, 20, 25
Enflo Corporation, N.J., 5, 15, 20, 25, Teflon
Essex Wire Corp., Carolina Industrial Products Div., N.C., 5, 15, 25
Farley & Loetscher Mfg. Co., Plastic Div., Iowa, 20
Fawn Plastics Co., Inc., Md., 15, 20, 25
Ferranti Electric, Inc., N.Y., 15
Fiber Glass Industries, Inc., N.Y., 5, 15, 20, 25
Fibre Fabricators Co., Inc., Ill., 15, 20, 25
Flexrock Company, Pa., 5, 15, 20, 25
Fluorocarbon Products, Inc., Div. of U.S. Gasket, N.J., 5, 15, 20, 25
Formica Corp., 4532-7 Spring Grove Ave., Cincinnati 32, Ohio, 15, 20, 25
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Tel: KIrby 1-3670
Gemloid Corp., N.Y., 5
General American Trans. Corp., Ill., 5, 15, 20, 25
General Chemical Div., Allied Chemical & Dye Corp., N.Y., 10
General Electric Co., Laminated Prods. Dept., Ohio, 15, 20, 25
General Tire & Rubber Co., Industrial Prods. Div., Ind., 5
Glasply Corp., N.Y., 20, 25
Glastic Corp., Ohio, 15, 25
Great American Industries, Inc., Rubatex Div., Va., 20
Hermes Plastics, Inc., N.Y., 20
Hexcel Products, Inc., Md., Glass & Cotton Phenolic Honeycomb
Houghton Laboratories, Inc., 322 Houghton Ave., Olean, N.Y., 15, 20, 25
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Tel: 2-2176
Insulating Fabricators, Inc., N.J., 15, 20, 25
Insulating Fabricators of New England, Inc., Mass., 15, 20, 25
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Kellog Co., M. W., N.J., 10, 15, 20, 25
Keystone Plastics, Inc., N.J., 5, 15, 25
Koppers Co., Inc., Pa., 10
Lamtex Ind., Inc., N.Y., 25
Lee Chemical Corp., Walter, N.Y., 5, 15, 20, 25
Long, Inc., Thomas J., N.Y., 15, 20, 25
Mansol Ceramics Co., N.J., 25
Markel & Sons, L. Frank, Norristown, Pa., 5, 25
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Tel: BRoadway 2-8960
Maryland Lava Co., Md., 15
Mesa Plastics Co., Calif., 10
Mica Fabricating Co., N.J., 15, 20, 25
Micarta Fabricators, Inc., Ill., 15, 20, 25
Midwest Plastic Products Co., Ill., 20
Minnesota Mining & Mfg. Co., Irvington Div., N.J., 5, 15, 25
National Tel-Tronics Corp., 52 St. Casimir Ave., Yonkers, N.Y., 15, 20, 25
See ad on page 544
Tel: YOnkers 8-6400
National Vulcanized Fibre Co., Dept. JJ, Maryland Ave. & Beech St., Wilmington 99, Del. 15, 20, 25
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Tel: OLympia 5-6371
Natvar Corp., N.J., 5, 20, 25
New England Laminates Co., Inc., Conn., 20
New Hermes Engraving Machine Corp., 13-19 University Pl., New York 3, N.Y., 20
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Tel: SPring 7-7220
Norrich Plastics Corp., 109 W. 18th St., New York 11, N.Y., 15, 20, 25
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Northwest Plastics, Inc., Minn., 25
Nuclear Corp. of America, N.Y., 5
Olin Mathieson Chemical Corp., Electrical Div., Conn., 20
Pawling Rubber Corp., N.Y., 5, 25
Penn Fibre & Specialty Co., Inc., Pa., 15, 20, 25
Permonite Mfg. Co., Ill., 15, 20, 25
Polymer Corp. of Penna., 2140 Fairmont Ave., Reading, Pa., 5, 10, 15, 20, 25
See ad on page 594
Tel: FRanklin 6-7241
Precision Paper Tube Co., 2502 W Charleston St., Chicago 47, Ill., 15
See ad on page 554
Tel: ARmitage 6-5207
Preservation Packaging, Inc., N. . .
Printfoil, Inc., N.Y., 5, 15, . . 25
Radar Design Corp., 210 Fifth Ave., New York 10, N.Y., 15, 25, 28, Dielectrics for Microwave
See ad on page 497
Tel: MUrray Hill 5-1422
Raybestos-Manhattan, Inc., P. . . 25
Resin Industries, Inc., Calif., 5, 15, . . 25
Rex Corp., 240 Hayward Rd., West Acton, Mass., 5, 15, 25
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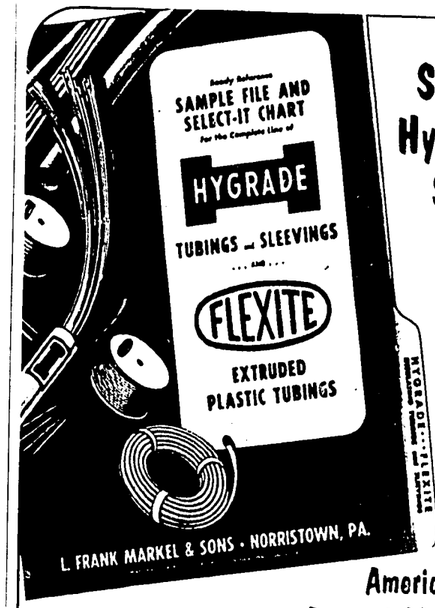
Richardson Co., Ill., 15, 20, 25
St. Regis Sales Corp., N.Y., 15, 20, 25
Saxton Products, Inc., N.Y., 15
Scheidel Manufacturing Co., N.Y., Laminations
Shamban Engineering Co., Calif., 5, 15, 20, 25
Silicone Insulation, Inc., N.Y., 15, 20, 25
Sillcocks-Miller Co., N.J., 5, 20, 25



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	P-214-B	G	G	F	F	F	P
	PC-208-D	G	P	P	F	P	P
	XX-324-P	E	G	G	G	F	P
	XXP-209-G	E	E	G	G	G	P
	XXX-409-P	G	E	E	E	G	P
	XXXP-455	E	E	E	E	E	P
	E-2040	G	E	E	E	E	P
	Y-2500	G	F	G	G	F	G
	CE-578-P	G	G	F	G	P	P
	LE-675-P	G	G	F	G	P	P
	N-1-852	G	E	G	E	E	P
	G-1-801	F	P	G	F	P	P
	G-3-821	E	F	G	F	F	P
	G-5-813	G	F	G	G	F	E
	G-6-833-A	F	G	E	E	F	E
	G-7-832	F	G	E	E	G	E
	G-8-881	F	G	G	G	P	E
	G-10-865	E	G	E	E	E	E
	GP-9100-A	F	G	F	G	P	G
	GP-9104	F	G	G	F	P	G
	GP-9202	G	G	G	G	P	P
	GP-9204	F	G	G	G	P	E
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	Bone	F	G	P	P	P	E
	Peerless	F	G	P	P	P	E

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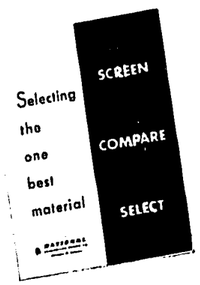

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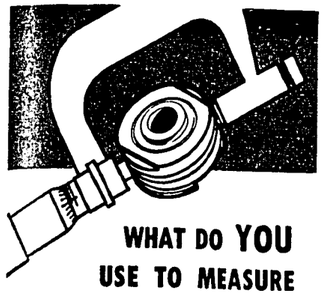

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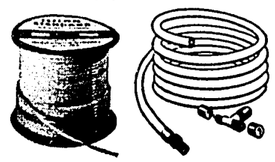

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Directory IV. Materials & Services

95. Plastics.

Sparta Mfg. Co., Div. of U.S. Ceramic Tile Co., Dept. IRED, Dover, Ohio, 15, 20, 25
See ad on this page
Tel: DOver 4-2380

Spaulding Fibre Co., Inc., N.Y., 15, 20, 25

Surprenant Mfg. Co., 172 Sterling St., Clinton, Mass., 5, 25
See ad on page 232
Tel: 2180

Synthane Corp., Pa., 15, 20, 25

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Varflex Corp., N.Y., 5, 25

Victor Electric Wire & Cable Corp., R.I., 5

Westinghouse Electric Corp., Pa., 15, 20, 25

Westlake Plastics Co., Pa., 5, 15, 20, 25

Willson Camera Co., Inc., Pa., Laminations

Wilmington Fibre Specialty Co., Del., 15, 20, 25

Zenith Plastics Co., Sub. Minn. Mining & Mfg. Co., Calif., 20

Precious metals: See class 93

Prongs, vacuum tube: See class 97

Proprietary forms, ceramic: See class 84

Proprietary molding, plastic: See class 94

Publishing: See class 99

Pumps, vacuum: See class 92

Racks: See class 28

Representatives, manufacturers: See class 100

Research laboratories: See class 90

Retaining rings: See class 87

Rivets: See class 87

Sales & service: See class 100

Screws: See class 87

Shaft locks: See class 97

Shafts, flexible: See class 87

Shielded enclosures: See class 71

Shielding materials, RF: See classes 71 & 89

Shields, tube: See class 97

Sockets: See class 55

Soldering Irons & Guns: See class 92

96. Solder.

5. Acid core
10. Fluxes
15. Plain
20. Precious metal
25. Pre-forms
30. Rosin core

Alpha Metals, Inc., N.J., 5, 10, 15, 20, 25, 30

Alpha-Loy Corp., Ill., 5, 10, 15, 20, 25, 30

Aluminum Co. of America, Pa., 10

American Metal Co., Ltd., 61 Broadway, New York 6, N.Y., 15, 20
See ad on page 583
Tel: BOwling Green 9-1800

American Platinum Works, N.J., 20, 25

American Silver Co., Inc., N.Y., 20

Anchor Metal Co., Inc., N.Y., 5, 10, 15, 20, 25, 30

Anderson Associates, H. V., N.J., 10, Precious Metal Films

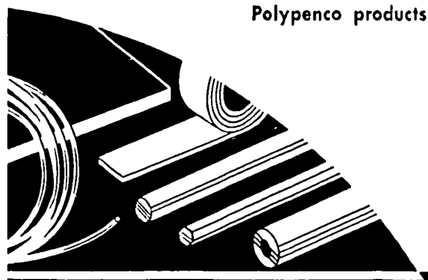
Anthony & Co., J. L., R.I., 20

Art Wire & Stamping Co., 21 Boyden Pl., Newark 2, N.J., 25
See ad on page 595
Tel: HUmboldt 4-2100

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each major classification. Complete addresses will be found in the Alphabetical Directory.

Design today for tomorrow's products . . .

Select **POLYPENCO®** Industrial Plastics



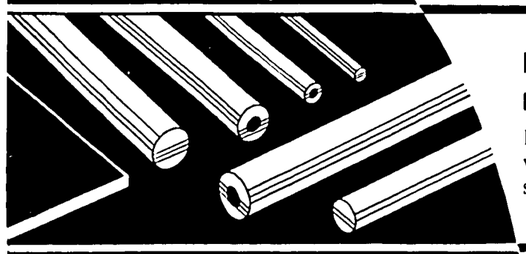
Polypenco products and engineering service are your answer to new developments, improved quality, lower costs.

Industrial plastics with distinctive quality and performance:

POLYPENCO NYLON STOCK SHAPES

Rod • Strip • Tubing • Tubular bar • Hexagonal bar • Plate

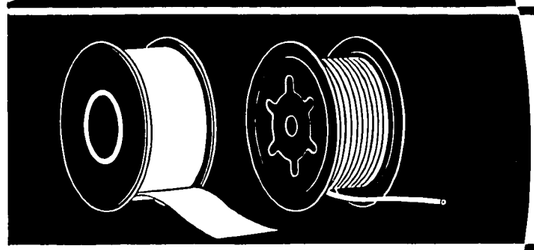
Highest quality nylon available from stock for fast, economical machining on standard metalworking equipment, insuring close production control. Wide ranges of sizes immediately available from nationwide warehouse stock.



POLYPENCO TEFLON* STOCK SHAPES

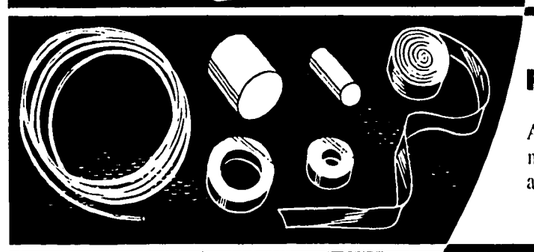
Rod • Tubing • Tubular bar • Sheet

Easily machinable stock shapes in wide variety of sizes with uniform, controlled density and maximum dimensional stability.



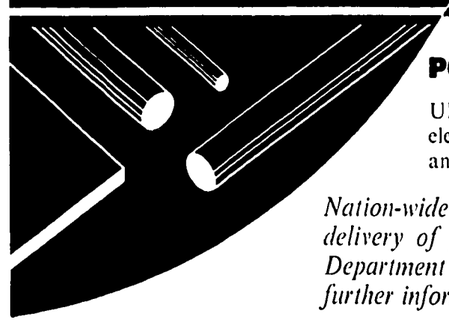
POLYPENCO TEFLON TAPE AND SPAGHETTI TUBING

Dielectric materials with superior performance properties. Tape is supplied from stock in thicknesses of .001" to 0.125" in widths up to 12". Spaghetti tubing is available in AWG wire sizes #30 to #0. Both available in 10 fade-proof colors.



FERROTRON® Ferromagnetic Materials

A superior powdered iron-filled plastic material for electromagnetic design. Available in rigid cores and flexible rod and tape.



POLYPENCO Q-200.5 (cross-linked polystyrene)

UHF insulating material with outstanding electrical properties for electronic, communication and allied applications. Available in rod and plate.

Nation-wide stocking and service points assure prompt delivery of your order. Let Polymer's Technical Service Department help on your design problems. Write today for further information.

THE POLYMER CORPORATION OF PENNSYLVANIA

Reading, Pennsylvania

Export: Polypenco, Inc., Reading, Penna., U.S.A.

*DuPont trademark

POLYPENCO

For details, circle #600 on Reader Service Card.

Directory IV. Materials & Services

96. Solder.

Baker & Co., Inc., N.J., 10
Chase Brass & Copper Co., Inc., Conn., 5, 20
Chemalloy Electronics Corp., Calif., 15
Fluxless Aluminum
Cooper & Sons, Inc., Joseph B., N.Y., 20
Crane Co., Torrey S., Conn., 5, 10, 15, 20, 25, 30
Dearmeter Products Co., Colo., 10
Division Lead Co., Ill., 5, 10, 15, 20, 25, 30
Eutheven Solders Ltd., England, 5, 10, 15, 25, 30, Aluminum Solder & Fluxes
Federated Metals Div., A.S.F. Co., N.Y., 5, 10, 15, 20, 30
Foto-Video Labs., Inc., N.J., 5, 15
Fusion Engineering Co., Ohio, 5, 10, 15, 20, 25, 30
General Cement Mfg. Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 10, 30
See ad on page 586
Tel: 2-6695
General Findings & Supply Co., Industrial Div., Mass., 25
Glaser Lead Co., Inc., N.Y., 5, 10, 15, 20, 25, 30
Handy & Harman, N.Y., 10, 20
Indium Corp. of America, N.Y., 15, 25
International Nickel Co., Inc., N.Y., 10
Kester Solder Co., 4219 Wrightwood Ave., Chicago 39, Ill., 5, 10, 15, 25, 30
See ad on page 200
Tel: BElmont 5-1601
Leach & Garner Co., Industrial Div., Mass., 20
Leviton Mfg. Co., Inc., N.Y., 5, 10, 15
London Chemical Co., Inc., Ill., 10, 15, 30
Mackay, Inc., A. D., N.Y., 20
Mansol Ceramics Co., N.J., 25
Metals & Controls Corp., Gen. Plate Div., Mass., 20
Metz Refining Co., N.Y., 20
Mico Instrument Co., 79 Trowbridge St., Cambridge 38, Mass., 10, Non-Corrosive Solder Paste
See ad on page 579
Tel: KIrkland 7-8660
Multicore Sales Corp., N.Y., 10, 30
National Lead Co., N.Y., 5, 10, 15, 25, 30
Ney Co., J. M., Dept. N., P.O. Drawer 990, Hartford 1, Conn., 20
See ad on page 425
Tel: CHapel 2-2281
Ruby Chemical Co., Ohio, 5, 15, 30
Shandon Laboratories, Inc., N.J., 10
Shipley Company, Inc., Mass., 30
Spinform, Inc., Mass., 25
Standard Metals Corp., Mass., 20
Superior Flux & Manufacturing Co., Ohio, 10
Transcal Engineering Corp., Calif., 10

Spacers & insulators, vacuum tube: See class 97

Spinning, metal: See class 86

Springs: See class 87

Stamping, metal: See class 86

Strain reliefs: See class 87

Surplus dealers: See class 100

Tags & markers: See class 87

Tape, adhesive: See class 87

Tape, insulating: See class 89

Tape, lacing: See class 87

Tape, magnetic recording: See class 49

Terminals: See class 87

Test clips: See class 87

Testing services: See class 90

Tools: See class 92

Tube clamps & shields: See class 97

Tube sockets: See class 55

Tuning forks: See class 75

Vacuum pumps: See class 92

97. Vacuum Tube Parts.

5. Anodes
10. Envelopes, glass
15. Envelopes, metal
20. Getters
25. Grids & grid wire
30. Guns & gun parts
32. Lead wires
35. Phosphors
40. Pins & Prongs
42. Shaft locks
45. Spacers & insulators
50. Stampings
55. Tube caps
57. Tube sockets
58. Tube shields
70. Tubing, ceramic

Advanced Vacuum Prods., Inc., See General Ceramics Corp., Dept. IDz, Fairfield Ave., Stamford, Conn., Envelopes, Ceramic
See ad on page 358
Tel: Davis 4-2148

Alpha Ley Corp., Ill., 5

American Brass Co., Conn., 40, 50, 55, 57

American Feldmuehle Corp., 11 W. 42 St., New York 36, N.Y., 45, alumina envelopes
See ad on page 532
Tel: PEnnsylvania 6-9751

American Lava Corp., Cherokee Blvd. & Mfrs. Rd., Chattanooga 5, Tenn., 45, 50, 70
See ad on page 182
Tel: AM 5-3411

American Standard TV Tube Corp., N.Y., 30

Arcodectric Switch Div., British Electronic, N.Y., 60

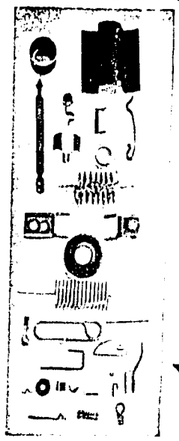
Priced Right! WIRE FORMS

& Metal Stampings

STRAIGHTENING & CUTTING
Perfect straight lengths to 12 ft.
.0015 to .125 diameter

WIRE FORMS
.0015 to .125 diameter

SMALL METAL STAMPINGS
.0025 to .075 thickness .062 to 3 inches

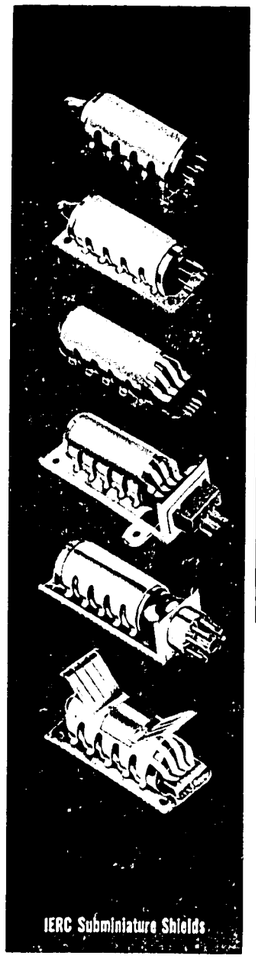


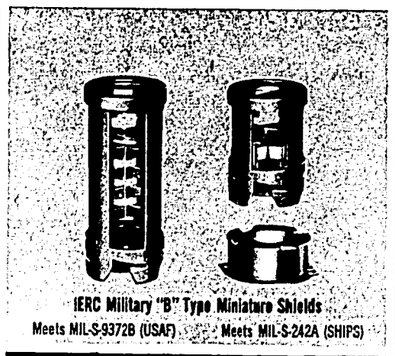
Write for illustrated folder,
Send Blueprints or Samples for Estimate.

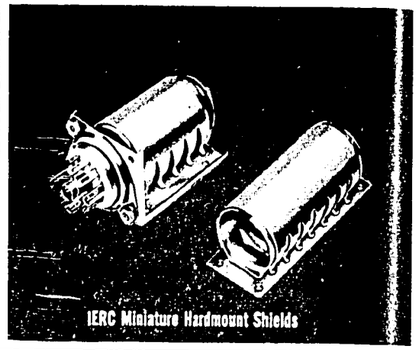
ART WIRE & STAMPING CO.

21 BOYDEN PLACE NEWARK 2, N.J.

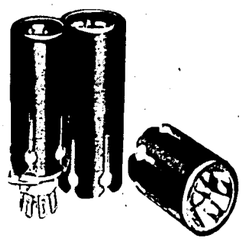
For details, circle #680 on Reader Service Card.

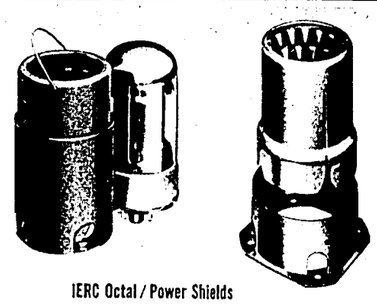

IERC Subminiature Shields

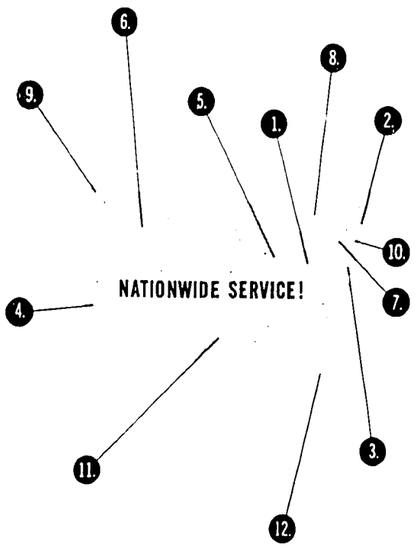

IERC Military "B" Type Miniature Shields
Meets MIL-S-9372B (USAF) Meets MIL-S-242A (SHIPS)


IERC Miniature Hardmount Shields

IERC Heat-Dissipating Electron Tube Shields give maximum cooling, retention, shock protection and longest tube life!


IERC "TR" Shields Meets MIL-S-19786A (NAVY)


IERC Octal / Power Shields



CHOOSE IERC—THE ONLY COMPLETE LINE OF HEAT-DISSIPATING ELECTRON TUBE SHIELDS FOR MINIATURE, SUBMINIATURE, OCTAL & POWER SIZE TUBES!

For fast service by a highly trained Engineer-representative to solve your electron tube failure and reliability problems, call the nearest Sales Office in your area as listed below.

1. **BOCKENSTEDT ASSOCIATES** — 336 No. Roberts Blvd., Dayton 2, Ohio — FUlton 1322
2. **HATHAWAY ELECTRONICS, INC.** — 238 Main St., Cambridge 42, Mass — Kirkland 7-038 Branch: Canaan, Conn.
3. **WILLIAM JONES** — 1107 Echo Court North, Hampton Village, Towson 4, Md — VAlley 3-2434. Branch: Phila., Pa.
4. **G. S. MARSHALL COMPANY** — 2065 Huntington Dr., San Marino, Calif — RYan 1-6781 Branches: San Diego, Redwood City, Calif., Tucson, Ariz.
5. **MAGNUSON ASSOCIATES** — 3347 W. Irving Park Rd., Chicago 18, Ill — KEystone 9-755
6. **FRED A. PEASE CO.** — P.O. Box 1566, Denver 1, Colo. — FRemont 7-2336
7. **REED-TOLLEFSON CORPORATION** — 2815 Monroe Ave., Rochester, N.Y. — HIllside 0450
8. **R-O-R ASSOC. LTD., J. S. ROOT** — 1470 Don Mills Rd., Don Mills, Ont., HIckory 4-44
9. **DON SMITH SALES CO.** — 2320 No. 45th St., Seattle 3, Wash. — EVergreen 3160
10. **THE B. B. TAYLOR CORPORATION** — 241 Sunrise Hwy., Rockville Centre, N.Y. — Rockville Centre 4-6000
11. **THOMSON ENG. SERVICE** — 2712 W. Mockingbird Lane, Dallas 35, Tex. — EDison 6-53
12. **ARTHUR H. LYNCH & ASSOC.** — 35 W. North Shore Ave., Fort Myers, Fla. — EDison 2

PATENTED OR PATS PEND CROSS-LICENSED WITH NORTH AMERICAN AVIATION, INC

International
electronic research corporation
145 West Magnolia Boulevard, Burbank, California

European Sales: Bo Palmblad Aktiebolag, Torkel Knutssonsgatan 29, Stockholm, Sweden • Inter-Technique, 81 rue Escudier, Boulogne (Seine), France

For details, circle #602 on Reader Service Card.

CLAMPS TO MEET YOUR SPECIFICATIONS

Augat offers a complete line of transistor and component clips, tube clamps and potentiometer clamp rings for use in the electronic industry.

In addition, prompt attention is given to your inquiries on clamp requirements made to your specifications.

For quick, efficient service, call our representative in your area or write for catalog.

AUTOMATIC GEN. SALES
6550-B Troost
Kansas City 10, Mo.
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BALL ASSOCIATES
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Orchard Park, N. Y.
Western New York State

FLOYD FAUSETT & CO.
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RICHARD F. KIMBALL
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Dallas 29, Texas
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2601 First Ave.
Seattle, Washington
Washington, Oregon

MOSS SALES CO.
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Greeley, Colorado
Colorado, Utah, Wyoming, New Mexico, W. Nebraska, Montana, Southern Idaho

ALLEN NACE COMPANY
7601 Parkview Rd.
Brecksville, Ohio
Ohio

NORTHPORT ENG. INC.
186 North Fairview
St. Paul, Minnesota
Minnesota, N. Dakota, S. Dakota

STANLEY B. PIERCE
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Norwood, Mass.
New England States

DAVID ROSS COMPANY
534 El Camino Real
San Carlos, California
N. California, Nevada

DAVID SONKIN ASSO.
Lucas Building
10 Fiske Place
Mt. Vernon, New York
Metropolitan New York, Long Island, Northern New Jersey

TANT ENTERPRISES
16254 Meyers Rd.
Detroit, Michigan
Illinois, Michigan, Wisconsin, Indiana

PAUL F. WILEY
1632 Silverlake Blvd.
Los Angeles 26, Cal.
Southern California, Arizona

AUGAT BROS. INC.
33 PERRY AVE • ATTLEBORO, MASS.
For details, circle #603 on Reader Service Card.

Directory IV. Materials & Services

97. Vacuum Tube Parts

Art Wire & Stamping Co., 21 Boyden Pl., Newark 2, N.J., 5, 25, 45, 50
See ad on page 505
Tel: HUmboldt 4-2
Asheville Schoolmaster
45
Atlas E-E Corp., 47 Prospect St., Woburn, Mass., 42, 59, 60, 65
See ad on page 540
Tel: WOburn 2-58
Augat Brothers, Inc., 33 Perry Ave., Attleboro, Mass., 60
See ad on this page
Tel: 1-2202
B G Corp., N J., 45
Baker & Co., Inc., N J., 25
Bead Chain Mfg. Co., 60 Mountain Grove St., Bridgeport 5, Conn., 40
See ad on page 361
Tel: EDison 4-4124
Bardow Mfg. Corp., N J., 32
Bartlett Corp., Calif.,
Briegs Associates, Inc., Pa., 20
Buckbee Mears Co., Minn., 25, IX
Marks, Tube Mesh
Calcon Mfg. Co., Inc., Pa., 32
Central Electronic Manufacturers, N J., 5, 10
Communication Accessories Co., Highway 50 & 71 Bypass, Lee's Summit, Mo., 65
Multiple pages of additional data on 49-54
Tel: BRoadway 1-1700
Continental Diamond Fibre Div.
Budd Co., Inc., Del., 45
Coors Porcelain Co., Colo., 45, Ceramic Envelopes
Corning Glass Works, N Y., 10
Diamonite Products Mfg. Co., Ohio, 45, Ceramic Envelopes
Driver Co., Wilbur B., 1875 McCarter Highway, Newark 4, N.J., 25, 32
See ad on page 160
Tel: HUmboldt 2-5550
DuMont Labs., Inc., Allen B., N J., 40, 60, 65
Eby Company, Hugh H., Pa., 45
Elco Corp., Pa., 60, 65

Instrument Specialties Co., 50 A
Bergen Blvd., Little Falls, N J.
See ad on page 55
Tel: Little Falls
International Electronic Research
135 W. Magnolia Blvd., Burbank, Calif., 5, 65, Heat Dissipators
See ad on page 596
Tel: VIctoria

TUBE COMPONENTS

- Tungsten Lead Wires, Hard Glass
  Also molybdenum, Kovar
  copper or copper-clad
- Transmitter Tube Bases
  Designed to your specifications
- Heater Elements
  Hand wound molybdenum & tungsten
  Stampings and spinnings for all inside parts of transmitter tubes.

ELECTRONIC MFG. CO.
20 ORANGE STREET
NEWARK 2, N.J.
MITCHELL 2-3034

For details, circle #604 on Reader Service Card.

Code numbers shown after each firm refer to product or service classification of each major classification. Complete addresses will be

METEX Data for Designers

- RF Shielding
- Wave Guide Gaskets
- Heat Dissipating Tube Shields

METEX Electronic Weatherstrip

Knitted, metallic wire structure combines maximum *conductivity* for efficient performance with inherent *resiliency* that assures continuous line contact between imperfect mating surfaces. Interlocked loops, of continuous wire strands, assures maximum *cohesion*. Available in continuous lengths in more than 500 shapes and sizes to meet all installation requirements.

Type	Size	METEX PART NUMBER Monel	Aluminum	Silver Plated Brass
□ Rectangular	1/8" x 1/8"	10-199	10-204	10-230
□ Rectangular	1/8" x 5/32"	10-194	10-182	10-338
○ Round	1/8" dia.	10-006	10-035	10-118
○ Round	3/16" dia.	10-020	10-029	10-253
○ Round	1/4" dia.	10-024	10-032	10-337
Single Fin	1/8" dia. 3/8" o/a	10-008	10-095	10-343
Single Fin	1/8" dia. 5/8" o/a	10-061	10-339	10-340
Single Fin	3/16" dia. 5/8" o/a	10-058	10-066	10-288
Single Fin	1/4" dia. 5/8" o/a	10-109	10-341	10-342

Standard strips shown above available from stock without minimum charge. Other types available on order.

METEX Choke Flange Gaskets

The controlled resiliency and compressibility of METEX *Knitted Wire* Gaskets for standard Waveguide Choke-Flanges insure complete metallic contact, flange to flange. Assures RF-tight joint when distortion makes choke inefficient. Supplements choke to prevent RF leakage at high power levels. Eliminates leakage at other than choke frequencies.

ASESA FLANGE NO.	METEX PART NO.	GASKET MATERIAL	REFERENCE WAVEGUIDE ASESA NO.	NOMINAL O.D.	MATERIAL
UG-40/U	MT 17/4	Monel	RG-52/U	1 x 1/2	Brass
UG-40A/U	MT 266-2	Monel	RG-52/U	1 x 1/2	Brass
UG-42/U	MT 74-2	Monel	RG-51/U	1 1/4 x 5/8	Brass
UG-52A/U	MT 307-1	Monel	RG-51/U	1 1/4 x 5/8	Brass
UG-54A/U	MT 406-1	Monel	RG-48/U	3 x 1 1/2	Brass
UG-136/U	MT 17-15	Aluminum	RG-67/U	1 x 1/2	Aluminum
UG-136A/U	MT 266-4	Aluminum	RG-67/U	1 x 1/2	Aluminum
UG-137A/U	MT 307-3	Aluminum	RG-68/U	1 1/4 x 5/8	Aluminum
UG-148B/U	MT 358-1	Monel	RG-49/U	2 x 1	Brass
UG-343A/U	MT 426-1	Monel	RG-50/U	1 1/2 x 3/4	Brass
UG-406A/U	MT 358-2	Aluminum	RG-95/U	2 x 1	Aluminum
UG-440A/U	MT 426-2	Aluminum	RG-106/U	1 1/2 x 3/4	Aluminum
			RG-91/U	.702 x .391	Brass
UG-541A/U	MT 157-2	Monel	RG-107/U	.702 x .391	Silver
UG-585/U	MT 406-2	Aluminum	RG-75/U	3 x 1 1/2	Aluminum

Standard RF gaskets shown above available from stock without minimum charge. Other RF gaskets available on order.

METEX Heat Dissipating Tube Shields

METEX Resilient Cooling Sleeves for subminiature tubes combine high heat conducting ability with inherent vibration dampening and shock absorbing properties. Provides an efficient, practical and economical method of conducting heat away from the tube envelope, directly to a heat sink. Aluminum alloy wire assures maximum thermal conductivity with minimum weight. Thermal peaks and valleys are leveled out assuring consistency of thermal performance among tubes.

METEX Part No.	Tube Envelope	HEIGHT
MT-204E-1	T3-1; T3-6; T3-7	1"
MT-204E-2	T3-2; T3-5; T3-8	1 5/16"
MT-204E-3	T3-3	1 1/2"
MT-204E-5	T3-4	1 11/16"

Sizes shown available from stock. Other sizes available on special order.

METEX Engineers will be glad to work with you on any problems involving RF Shielding or Heat Dissipation in electronics or related equipment. No obligation, naturally!

ELECTRONICS DIVISION

METAL TEXTILE CORP.

ROSELLE • NEW JERSEY

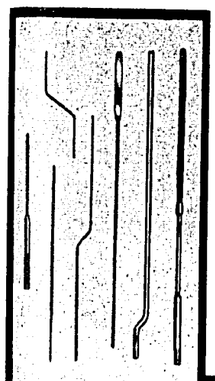
6-097

For details, circle #605 on Reader Service Card.

It's dke for

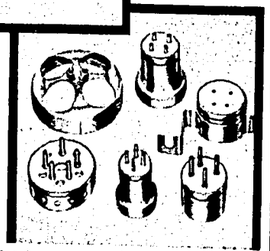
PRECISION COMPONENTS

OF TUNGSTEN, MOLY, NICKEL CLAD WIRE, ALLOYS, KOVAR*



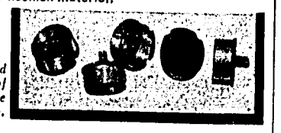
dke lead in wires

Quality controlled throughout production with Tungsten hard glass leads produced under General Electric Timing Control. Each tungsten lead is microscopically inspected for flaws. DKE offers highest quality and LOW PRICES. Send drawings for quotations and let us prove the economy of our prices.



dke tube bases

The Engineering Company can give you immediate delivery on following bases: 50 Watts, 3303B, 412 Industrial Base, Giant 7 Pin Bayonet, 4310 Four Pin Jumbo, Tetrode, Hydrogen Thyratron Bases in both Aluminum and Copper up to 6.50 dia. etc. All bases to JAN-1A/MIL-E-1B and subjected to weights and strength tests. We can also supply bases with moulded inserts, made of Miconel or Resinox material.



*Registered trademark of Westinghouse Electric Corp.

dke hydrogen thyratron tube bases

Call or write for quotations on your specific requirements

THE **engineering** CO.

27 Wright Street, Newark 5, New Jersey

For details, circle #606 on Reader Service Card.

Directory IV. Materials & Services

97. Vacuum Tube Parts.

Johnson & Hoffman Mfg. Corp., 31 E. 2nd St., Mineola, N.Y., 5, 25, 30, 45, 50, 70
Multiple pages of additional data on 82-83
Tel: PIoneer 2-3333

Kemet Co., Div. Union Carbide Corp., Ohio, 20, 25

Kimble Glass Co., Ohio, 10, 70

King Laboratories, Inc., N.Y., 20, 30, 50

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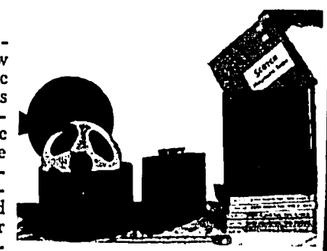

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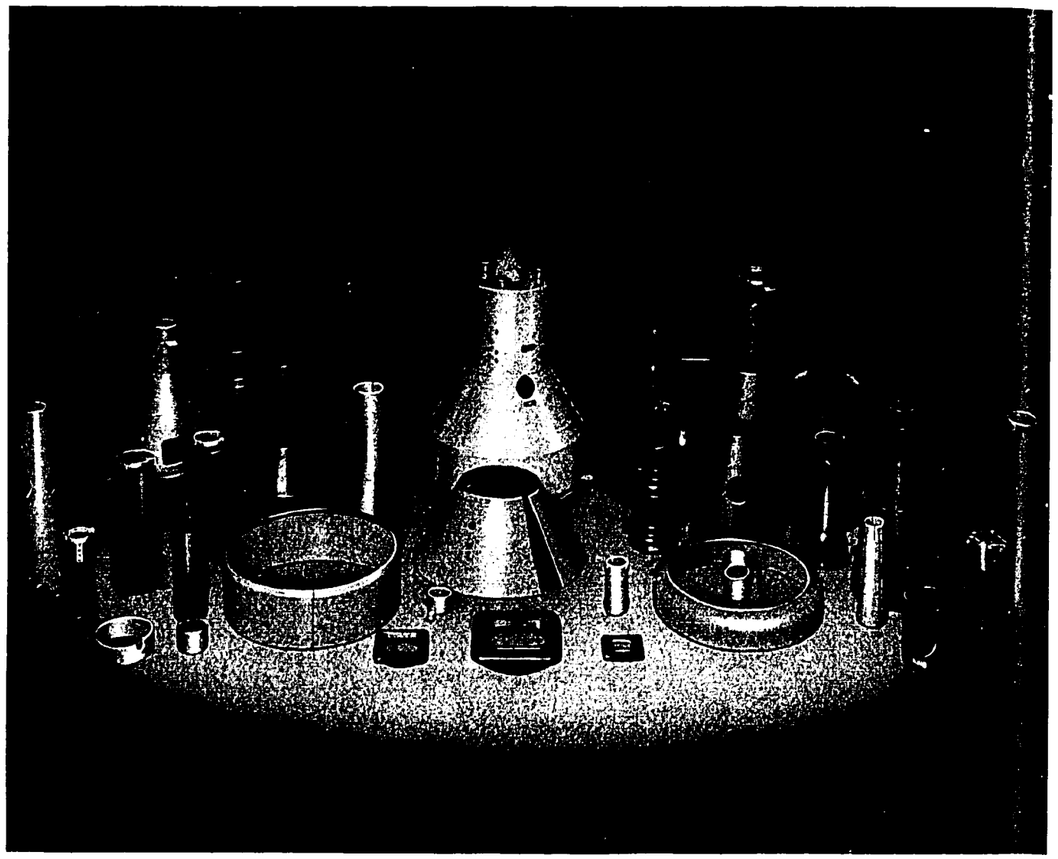

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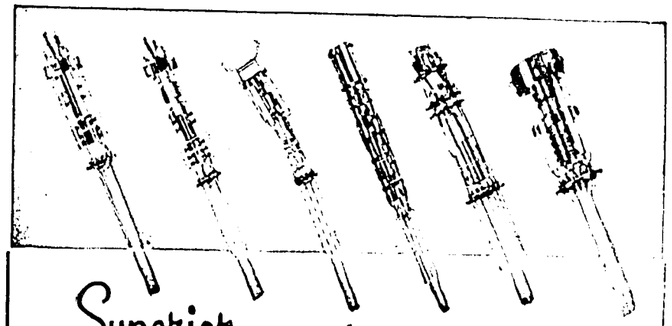

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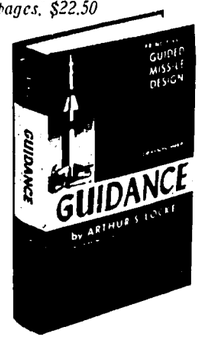

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Special issues on special subjects are more than usually helpful, but every issue of "Proceedings of the IRE" is filled with facts and figures!

DIRECTORY IV. MATERIALS AND SERVICES

Class 100. Distribution

5. Export & Import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales and service
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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, and distributors. Many of these firms are identified further by the initials REP, as member of "The Representatives," or NEDA, as member of the National Electronic Distributors Association. For convenience in locating distributional firms, the listings are arranged by states, and grouped into nine major sections of the United States, as follows:

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Aikins Electronic Supplies, Inc., 531 Broad St., New London, Conn., 10 (NEDA)

Aikins Electronic Supplies, Inc., 98 Water St., Norwich, Conn., 10 (NEDA)

Ammrad Co., 843 Grand Ave., New Haven 11, Conn., 10
Tel: UN 5-4508

Bond Radio Supply, 439 W. Main St., Waterbury, Conn., 10 (NEDA)

Bridge Company, Ray, 15 Chatham Dr., S. Norwalk, Conn., 15
See ad on page 607
Tel: TEmple 8-3111

Eastern Electronics Sales Corp., 288 Grand Ave., New Haven Conn., 15
Tel: MAin 4-9829

Electrical Manufacturers Service, 409 Orange St., New Haven, Conn., 15

Electrical Supplies, Inc., 225 Walnut St., Hartford 1, Conn., 10
Tel: JA 7-7111

Electronics Associates, Inc., 200 Fifth St., Stamford, Conn., 15
Tel: DAvis 4-7300

Equipment Sales Co., Inc., P.O. Box 6098, New Haven 17, Conn., 15
Tel: CHestnut 8-5581

Graybar Electric Co., Inc., 25 Union St., New Haven 7, Conn., 10

Graybar Electric Co., Inc., 453 New Park Ave., West Hartford 6, Conn., 10

Hammond, Inc., John S., 34 Lincoln Ave., Greenwich, Conn., 15

Hatry of Hartford, Inc., 203 Ann St., Hartford 3, Conn., 10 (NEDA)

Hatton & Co., Arthur T., 1000 Farmington Ave., W. Hartford 7, Conn., 15 (REP)
Tel: ADams 3-3613

Lavin Associates, Henry, P.O. Box 196, Meriden, Conn., 15 (REP)
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Tel: MItchell 9-2129

Nief, Paul W., 15 Oak St., Westport, Conn., 15 (REP)
Tel: CApitol 7-3834

Sales Engineering Co., Sugar Lane, Newtown, Conn., 15
Tel: GA 6-2664

Seyd, Ernest K., Long Hill Rd., Andover, Conn., 15 (REP)
Tel: COventry-Pilgrim 2-6604

Sprague Electrical Supplies, Inc., Park & Railroad Aves., Bridgeport 4, Conn., 10
Tel: EDison 6-2535

United Electronic Supply Corp., 49 East Main St., New Britain, Conn., 10 (NEDA)

Westchester Electric Supply Co., Inc., 181 Stillwater Ave., Stamford, Conn., 10 (NEDA)

Westconn Electronics, Inc., 195 Colorado Ave., Bridgeport, Conn., 10 (NEDA)

Whitehead, John F., 34 Broadway, North Haven, Conn., 15 (REP)
Tel: CEdar 9-1633

Yale Radio-Electronics Co., 1215 Main St., Hartford 3, Conn., 10 (NEDA)

MAINE

Graybar Electric Co., Inc., Center & Commercial Sts., Portland 3, Me., 10

Maine Electronic Supply Corp., 148 Anderson St., Portland, Me., 10 (NEDA)

Maine Electronic Supply Corp., 494 Broadway, Bangor, Me., 10 (NEDA)

Radio Supply Co., Inc., 26 Cross St., Auburn, Me., 10 (NEDA)

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MASSACHUSETTS

Abbett, Frank, 16A Eaton Square, Needham, Mass., 15 (REP)
Tel: NEedham 3-5470

Akeroyd, Arthur E., 2311 John Hancock Bldg., Boston, Mass., 15 (REP)
Tel: HAncock 6-2433

Anderson Sales Co., 177 State St., Boston 9, Mass., 15 (REP)
Tel: CA 7-2980

Automation & Electronics, 25A Grant St., Waltham 54, Mass., 10, 25
Tel: TWinbrook 3-7000

Boeing, John E., P.O. Box 186, Arlington 74, Mass., 15 (REP)
Tel: MIssion 8-2900

Bridge, Ray, 100 Memorial Dr., Cambridge, Mass., and 99 Highland Ave., Somerville 43, Mass., 15 (REP)
See ad on this page
Tel: UNiversity 4-3696

Broger Instrument Sales Co., Inc., 48 Pearl St., Brookline 47, Mass., 15 (REP)
Tel: BEacon 2-4804

Brown, Kenneth L., 54 Atherton Rd., Brookline, Mass., 15 (REP)
Tel: BEacon 2-3969

Burlingame Associates, 974 Main St., Waltham, Mass., 15
Tel: TWinbrook 4-1955

C & I Distributors, Inc., 228 Pleasant St., Northampton, Mass., 10 (NEDA)

Chamberlin, Harold, Civilian Air Terminal, Bedford Airport, Bedford, Mass., 15 (REP)
Tel: CRestview 4-0044

Coakley, Tim, 148 Needham St., Newton Highlands 61, Mass., 15 (REP)
Tel: DEcatur 2-4800

Craig Corp., 50-58 Eastern Ave., Somerville 13, Mass., 10, 20
Tel: CApitol 7-3458

Cramer Electronics, Inc., 811 Boylston St., Boston 16, Mass., 10 (NEDA)

Cushing, T. F., 349 Worthington St., Springfield, Mass., 10 (NEDA)

DeMambro Radio Supply Co., 1095 Commonwealth Ave., Boston 15, Mass., 10 (NEDA)

DeVeer Sales Engineering Co., 82 Broadway, Cambridge, Mass., 15 (REP)
Tel: TRowbridge 6-5101

Durrell Distributors, 222 Mystic Ave., Medford, Mass., 10 (NEDA)

Electrical Supply Corp., 205 Alewife Brook Pkwy., Cambridge 38, Mass., 10 (NEDA)
See ad on page 606
Tel: UNiversity 4-6300

Electro Sales, 50 Eastern Ave., Boston 15, Mass., 10, 20

Friedman Associates, M. W., 98 Osborne Path, Newton Centre 59, Mass., 15
Tel: BIgelow 4-9794

Gentry, Richard L., 470 Main St., Medford, Mass., 15 (REP)

Gerber, Harry, 48 Pearl St., Brookline, Mass., 15 (REP)
Tel: BEacon 2-2425

Gerber Radio Supply Co., 1900 Columbus Ave., Boston 19, Mass., 10 (NEDA)

Gibson Engineering Co., 1018 Commonwealth Ave., Boston 15, Mass., 15
Tel: ASpinwall 7-5074

Goldman-Reiss & Co., 256 Aspinwall Ave., Brookline 47, Mass., 15
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Goldman, Wm. W., 145 University Rd., Brookline, Mass., 15 (REP)
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SCarsdale 5-1050

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Tel: Prospect 6-2262

Gray, Inc., Robert W., 572 Washington St., Wellesley 81, Mass., 15 (REP)
Tels: WEllesley 5-5296 & 5-0191

Graybar Electric Co., Inc., 287 Columbus Ave., Boston 16, Mass., 10

Graybar Electric Co., Inc., 108 Grove St., Worchester 1, Mass., 10

Graybar Electric Co., Inc., 32 Patton St., Springfield 4, Mass., 10

Greene, Inc., Dan, P.O. Box 124, Cambridge 38, Mass., 15 (REP)
See ad on page 606
Tel: UNiversity 4-2220

Hankins Co., Donald T., 161 Massachusetts Ave., Boston 15, Mass., 15

Harris Co., Stanley A., 317 Chestnut St., Needham 92, Mass., 15 (REP)
Tel: NEedham 3-4780-81

Harvey Radio Laboratories, Inc., 447 Concord Ave., Cambridge 38, Mass., 10, 20

Hathaway Electronics, Inc., G. M., 238 Main St., Cambridge 42, Mass., 15 (REP)
Tel: ELiot 4-1751

Hendrickson, William A., 291 First Parish Rd., Scituate, Mass., 15
Tel: SCituate 652

Hooker, Samuel C., 397 Highland Ave., Winchester, Mass., 15 (REP)
Tel: WInchester 6-2745

Hubert, Alexander, Mfrs. Sales Rep., P.O. Box 143, Brookline 46, Mass., 15
Tel: ASpinwall 7-2467

Imtra Corp., 58 Charles St., Cambridge 41, Mass., 5

Lake Service Corp., 89 Brighton Ave., Boston 34, Mass., 20
Tel: STadium 2-5868

Lavin, Henry Associates, 82 Curve St., Needham, Mass., 15
See ad on page 606
Tel: NEedham 3-3446

MacDonald-Wadman Co., Inc., 459 Stuart St., Boston 16, Mass., 10, 15
Tel: COmmonwealth 6-2336

Mayer Co., A. W., 895 Boylston St., Boston 15, Mass., 10 (NEDA)

Mosher & Peyser Co., 945 Great Plain Ave., Needham 92, Mass., 15 (REP)
Tel: NEedham 3-5060

Muddle Associates, John V., 509 Worcester Rd., Framingham, Mass., 15 (REP)
Tel: TRinity 3-7091

Perron & Co., Ray, 1870 Centre St., Boston 32, Mass., 15 (REP)
Tel: FAirview 3-1008

Pray Sales, W. B., 44 Washington St., Wellesley Hills 82, Mass., 15 (REP)
Tels: WEllesley 5-3199 & 5518

Purinton, Inc., Richard, 43 Leon St., Boston 15, Mass., 15 (REP)
Tel: GArrison 7-6006

Radio Maintenance Supply Co., 80 Thomas St., Worcester 8, Mass., 10 (NEDA)

Reynolds, Harrison, 97 Locksley Rd., Lynnfield, Mass., 15 (REP)
Tel: LYnnfield Center 4-3885

Rodgers Associates, 198 Old Farm Rd., Springfield 9, Mass., 15 (REP)
Tel: REpublic 3-8428

Saunders & Co., N. B., 66 Westland Rd., Weston 93, Mass., 15 (REP)
Tel: TWinbrook 4-6071

Scott, Michael, 90 Edmunds Rd., Wellesley Hills 82, Mass., 15 (REP)
Tel: WEllesley 5-0102

Segel, Charles, 1262 Commonwealth Ave., Boston 34, Mass., 15 (REP)
Tel: BEacon 2-2555

Segel Co., Inc., H. P., 386 Washington St., Brookline 46, Mass., 15 (REP)
Tel: BEacon 2-7525

Smith & Purdy Associates, 944 Main St., Walpole, Mass., 15
See ad on this page
Tel: MOntrose 8-2460

Soundco Electronic Supply Co., 147 Dwight St., Springfield 3, Mass., 10 (NEDA)

Springfield Radio Co., Inc., 405 Dwight St., Springfield 3, Mass., 10 (NEDA)

Stevens & Co., K. C., 235 Bedford St., Lexington 73, Mass., 15 (REP)
Tel: VOlunteer 2-1812

Sturgeon, Inc., Paul R., 25 Huntington Ave., Boston 16, Mass., 15 (REP)
Tel: COmmonwealth 6-7705

Sydlee Electronic Supply Co., 453 Worthington St., Springfield, Mass., 10 (NEDA)

Thal, Bernard, 791 Tremont St., Boston 18, Mass., 15
Tel: COmmonwealth 6-1236

Ware Radio Supply Co., 913 Centre St., Brockton 11, Mass., 10 (NEDA)

Waters & Drew, Inc., P.O. Box 208, Arlington 74, Mass., 15 (REP)
See ad on this page
Tel: MIssion 8-3510

White, P. H., 945 Great Plain Ave., Needham, 92, Mass., 15 (REP)
Tel: NEedham 3-3676

Willson Sales Co., 4 Arrowhead Rd., Marblehead, Mass., 15 (REP)
Tel: NEptune 8-4016

Yewell, Paul G., Middlesex Turnpike, Burlington, Mass., 15 (REP)
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Graybar Electric Co., Inc., 194 Richmond St., Providence 3, R.I., 10

VERMONT

Graybar Electric Co., Inc., 325 West St., Rutland, Vt., 10

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Tel: ENdicott 8-7603

Delaware Electronics Supply Co., 220 W. 4th St., Wilmington 1, Del., 10
Tel: OLympia 4-7932

Graybar Electric Co., Inc., 915 South Heald St., Wilmington 1, Del., 10

Radio Electric Service Co. of Delaware, Inc., 3rd & Tatnall, Wilmington, Del., 10 (NEDA)

Snyder Co., V. A. Inc., See listing in New Jersey section.

DISTRICT OF COLUMBIA

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Tel: RE 7-7900

Burlingame Associates, 1028 Connecticut Ave., N.W., Washington, D.C., 15
Tel: DEcatur 2-8000

Electronic Wholesalers, Inc., 2345 Sherman Ave., Washington, D.C., 10 (NEDA)

Foley, E. J., 1711 Massachusetts Ave., N.W., Washington 6, D.C., 15
Tel: COlumbia 5-6505

Gallant, Inc., 261 Constitution Ave., Washington 1, D.C., 20
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Harbison & Masi, Inc., 734 15th St., N.W., Washington 5, D.C., 15
Tel: STerling 3-1763

Horman Associates, Inc., 2017 "S" St., N.W., Washington 9, D.C., 15
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Tel: DEcatur 2-5705

Jodon, Inc., F. R., 8510 Beech Tree Rd., Washington 14, D.C., 15
Tel: OLiver 2-4406

Shilt, Noble C., 3308 14th St., N.W., Washington 10, D.C., 15 (REP)
Tel: COlumbia 5-3938

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Tel: EXport 3-0386

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BNC Industrial, 180 Spring St., Paterson 3, N.J., 5, 10, 25
Tel: MU 4-4012

Bancroft, Hartley S., 209 Cooper St., Westmont, N.J., 15 (REP)
Tel: CO 5-5215

Banfield Associates, Carroll S., 104 Mountain Way, Rutherford, N.J., 15
Tel: WEbster 9-6784

Barker Sales Co., P.O. Box 108, Fort Lee, N.J., 5, 15

Barker Sales Co., 996-8 Edgewater Ave., Ridgefield, N.J., 15 (REP)
Tel: WHitney 3-2477

Berger Electronics Supply, 241 Bloomfield Ave., Bloomfield, N.J., 10 (NEDA)

Bludworth Marine Div., Kearfott Co., Inc., 1500 Main Ave., Clifton, N.J., 5, 20

Boenecke Associates, 638 Penn St., Camden 2, N.J., 15 (REP)
Tel: WOodlawn 4-8650

Boonton Electric Supply Corp., 266 Myrtle Ave., Boonton, N.J., 10
Tel: DEerfield 4-5050

Border, Barrett, 10 Highwood Ave., Tenafly, N.J., 15 (REP)
Tel: ENglewood 3-2354

Braddock, Edward, P.O. Box 305, Haddonfield, N.J., 15
Tel: HA 9-0087

Bremmam, F. X., 180 Glenridge Ave., Montclair, N.J., 15 (REP)
Tel: PIlgrim 6-4640

Bressler, Jules J., 4808 Bergenline Ave., Union City, N.J., 15 (REP)
Tel: UNion 4-9577

Cerf & Co., Art, 744 Broad St., Newark 2, N.J., 10 (REP)
Tel: MItchell 2-6734

Columbia Distributors, Inc., Columbia Heights, Columbia, N.J., 10 (NEDA)

Dealers Electronics Co., Inc., 317 [illegible] St., Union City, N.J., 10 (NEDA)

Dixon, Samuel A., 208 [illegible] Ave., Barrington, N.J., 15 (REP)
Tel: LIncoln 7-7383

Eastern Radio Corp., 1074 Main Ave., Clifton, N.J., 10 (NEDA)

Economy Electronics, 777 Communipaw Ave., Jersey City, N.J., 10 (NEDA)

Electronic Marketers, Inc., 25-27 Hoyt St., Newark 4, N.J., 10 (NEDA)

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Tel: WEstfield 2-8200

Federated Purchaser, Inc., 114 Hudson St., Newark 3, N.J., 15
Tel: MArket 4-3915

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Tel: PIlgrim 6-6717

Finlay, Robert, 307 Lincoln Bldg., Ridgewood, N.J., 15 (REP)
Tel: OLiver 2-0088

Foley, Andrew A., 640 Federal St., Camden 3, N.J., 15 (REP)
Tel: WOodlawn 6-2550

Fredericks, C. Wm., Jr., 1100 White Horse Pike, Oaklyn, N.J., 15 (REP)
Tel: COllingswood 5-6332

Galasso, David P., 921 Bergen Ave., Jersey City 6, N.J., 15 (REP)
Tel: OLdfield 9-7277

Garten & Associates, Louis A., 645 Eagle Rock Ave., W. Orange, N.J., 15
Tel: REdwood 1-1800

Gawler-Knoop Co., 178 Eagle Rock Ave., Roseland, N.J., 15
Tel: CAldwell 6-4545

Graybar Electric Co., Inc., 2454 Main Ave., Clifton, N.J., 10

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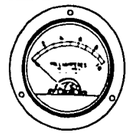

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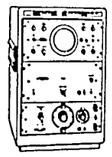

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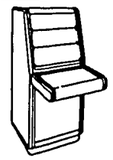

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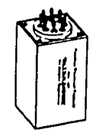

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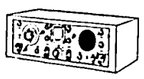

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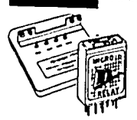

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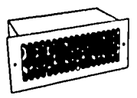

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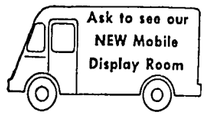

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Tel: Market 2-5817

Holliday-Hathaway Co., Inc., 9 Lincoln Ave., Rutherford, N.J., 15
See ad on page 610
Tel: WE 9-7217

Hughes Co., Kenneth E., 4808 Bergenline Ave., Union City, N.J., 15 (REP)
See ad on this page
Tel: UNion 7-3204

Instrument Masters, Inc., Hamburg Turnpike, Riverdale, N.J., 10, 20
Tel: TErbune 5-3739

International Distributing Co., 185 Central Ave., East Orange, N.J., 10 (NEDA)

Jersey Electronic Distributing Co., 524-528 21st Ave., Paterson 3, N.J., 10 (NEDA)

Kearns Electronic Prods. Co., Harrisburg & Atlantic, Atlantic City, N.J., 10 (NEDA)

Keefe Electronic Sales Co., 228 E. Kings Highway, Haddonfield, N.J., 15 (REP)
Tel: HA 9-4650

L & M Associates, 22[illegible] Fairlawn, N.J., 5, 20
Tel: FAirlawn 4-7[illegible]

Leader Electronic Supply [illegible] Lock St., Newark 4, N.J., [illegible]

Lippman & Co., Aaron, [illegible] St., Newark 4, N.J., [illegible]

Maguire & Co., J. [illegible] Camden 2, N.J., [illegible]
Tel: WO [illegible]

Marcy Associates, [illegible] Commerce, N.J., [illegible]
Tel: MArket [illegible]

Masters TV Supply Co., [illegible] Ave., Somerville, N.J., 10 (NEDA)

Mickenfuss, Thomas E., [illegible] Haddonfield, N.J., 15 (REP)
Tel: HAddonfield [illegible]

Miller, Harry, 27 Mechanic St., [illegible] Bank, N.J., 15 (REP)
Tel: REd Bank 6-[illegible]

Moyer, Harold A., P.O. Box 14, Haddonfield, N.J., 15 (REP)
Tel: HAddonfield 9-[illegible]

Murray American Corp., 15 Commerce St., Chatham, N.J., 5, 20

Nidisco-Jersey City, Inc., 713 Newark Ave., Jersey City 6, N.J., 10
Tel: OLdfield 3-2[illegible]

North, George R., Suite 403, Broadway-Stevens Bldg., Camden, N.J., 15 (REP)
Tel: WOodlawn 4-1181
Park Electronic Corp., 187 Speedwell Ave., Morris Plains, N.J., 10 (NEDA)
Pyramid Supply Co., 345 W. Market St., Newark 7, N.J., 10 (NEDA)
Schwartz, Adolph, 15 Exchange Pl., Jersey City 2, N.J., 15 (REP)
Tel: DElaware 3-2424
Sherwood Distributors, Inc., 1255 Liberty Ave., Hillside, N.J., 10 (NEDA)
Shulan, Wally, 880 Bergen Ave., Jersey City 6, N.J., 15 (REP)
Tel: SWarthmore 5-2220-1
Simberkoff, J. A., 68 Hudson St., Hoboken, N.J., 15 (REP)
Tel: OLdfield 6-5211-2-3
Simberkoff, S. W., 68 Hudson St., Hoboken, N.J., 15 (REP)
Tel: OLdfield 6-5211-2-3
Snyder Co., V. A. Inc., 2165 Morris Ave., Union, N.J., 15
See ad on page 613
Tel: MUrdock 8-6100
Union Television Parts Co., 403 Watchung Ave., Plainfield, N.J., 10 (NEDA)
Variety Electronics Corp., 1 State St., Bloomfield, N.J., 10
Tel: PI 8-1700
William Radio Supply Co., 265 Woodbridge Ave., New Brunswick, N.J., 10 (NEDA)
Williams Co., Carl B., 154 S. Main St., Phillipsburg, N.J., 10 (NEDA)
Williams, Victor W., 1100 White Horse Pike, Oaklyn 6, N.J., 15 (REP)
Tel: COllingswood 5-6332

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Aaron, Paul D., Professional Bldg., Port Washington, N.Y., 15 (REP)
Tel: POrt Washington 7-5670
Adelman Co., Leon L., 25 Chittenden Ave., New York 33, N.Y., 15
See ad on this page
Tel: TOmpkins 7-1145
Adirondack Radio Supply, 32 Guy Park Ave., Amsterdam, N.Y., 10 (NEDA)
Adson Radio & Electronics Co., 189 Greenwich St., New York 7, N.Y., 10
Tel: BA 7-3629
Aeroconomy Agency, P.O. Box 1001, Schenectady 1, N.Y., 15
Tel: FRanklin 2-8426
Airex Radio Corp., 64 Cortlandt St., New York 7, N.Y., 5, 10, 15, 20, 25
Tel: COrtlandt 7-2137
Aironic Accessory, Inc., 161 Orinoco Dr., Brightwaters, N.Y., 15
Tel: BAyshore 7-3953
Air Waves Electronic Radio Dist. Co., 43 Hudson Ave., Albany 7, N.Y., 10 (NEDA)
Allen Electronics Co., 90 Brook St., Garden City, N.Y., 5, 10, 20, 25
Tel: PI 1-2445
Allied Electronic Sales, 74 Cortlandt St., New York 7, N.Y., 5, 20
Tel: BArclay 7-5839
Allied International Co. Fed., Inc., U.S.A., 230 Park Ave., New York 17, N.Y., 5, 20
Allen, Inc., Ned, P.O. Box 575, Binghampton, N.Y., Chenango Bridge, N.Y., 15 (REP)
Tel: 68-4261
Allen, Inc., Leonard D., 2401 S. State St., Syracuse 5, N.Y., 15 (REP)
Tel: GRanite 8-4195
Altec Service Corp., 161 Sixth Ave., New York 13, N.Y., 20
Tel: AL 5-3636
AMA Electronics Corp., 1635 Bedford Ave., Brooklyn 25, N.Y., 10 (NEDA)
American Advancement Corp., 50 Broadway, New York 4, N.Y., 5, 15
Tel: WH 3-1680
American Electronic Supply, Inc., 482 St. Paul St., Rochester 10, N.Y., 10 (NEDA)
American Elite, Inc., 7 Park Ave., New York 16, N.Y., 5
Tel: MUrray Hill 4-6739
American Laubscher Corp., 250 W. 57th St., New York 19, N.Y., 5
Tel: JUdson 6-7474
Amplitel, Inc., 342 W. 40th St., New York 18, N.Y., 15, 20
Tel: BRyant 9-0710
Anasac Corp., 80 Wall St., New York 5, N.Y., 5, 15
Tel: HAnover 2-6855
Arrow Electronics, Inc., 525 Jericho Turnpike, Mineola, L.I., N.Y., 5, 10, 20 (NEDA)
Tel: PIoneer 6-8686
Associated Commodity Corp., Woolworth Bldg., 50th Floor, New York 7, N.Y., 5
Tel: WOrth 4-4192
Associated Television Service Corp., 86-06 37th Ave., Jackson Hts. 72, N.Y., 20
Tel: IL 8-8800
Atlas Electronics Corp., 1317 First Ave., New York 21, N.Y., 10 (NEDA)
Atlas Screw & Specialty Co., Inc., 450 Broome St., New York 13, N.Y., 10, 15
Audio-Video Corp., 324 Central Ave., Albany 6, N.Y., 10, 20
Tel: 3-1167
Auriema, Inc., A. D., 89 Broad St., New York 4, N.Y., 5
Tel: BO 9-7750
Avnet Electronic Supply Co., Inc., 36 N. Moore St., New York 13, N.Y., 10
See ad on page 632
Tel: BEekman 3-5780
Barry Electronics Corp., 512 Broadway, New York 12, N.Y., 10, 25
Tel: WAlker 5-7000
Baum, Sydney H., 70-15 Fleet St., Forest Hills 75, N.Y., 15 (REP)
Tel: BOulevard 3-8101
Bay Electronic Distributors, 2712 Ave. U, Brooklyn, N.Y., 10 (NEDA)
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Berndt Radio Co., W. E., 655 S. Warren St., Syracuse, N.Y., 10 (NEDA)
Bettan Sales, Marty, 167-16 73rd Ave., Flushing 66, N.Y., 15
Tel: OLympia 7-6659
Bichman Radio Co., 492 Atlantic Ave., Brooklyn 17, N.Y., 10 (NEDA)
Bittan, D. R., 104 S. Central Ave., Valley Stream, L.I., N.Y., 15 (REP)
Tel: LOcust 1-2444
Blair-Steinberg Co., 45 S. Broadway, Yonkers, N.Y., 15 (REP)
See ad on page 612
Tel: YOnkers 3-0150
Boro Electronics, Inc., 69-18 Roosevelt Ave., Woodside 77, N.Y., 10 (NEDA)
Breuer, R. E., 250 W. 57 St., New York 19, N.Y., 15 (REP)
Tel: COlumbus 5-0440
British Industries Corp., 80 Shore Rd., Port Washington, N.Y., 5, 15
Tel: POrt Washington 7-7700
Bronx Wholesale Radio, 472 E. Fordham Rd., Bronx 58, N.Y., 10 (NEDA)
Brown Assoc., Jack, 207 Rosedale Rd., Yonkers, N.Y., 15
Tel: SPencer 9-7330
Brown Co., Irv, 1500 Carroll St., Brooklyn 13, N.Y., 15 (REP)
Tel: HYacinth 3-1379
Burlingame Associates, 103 Lafayette St., New York 13, N.Y., 15
Tel: DIgby 9-1240
Burlingame Associates, 514 University Bldg., Syracuse, N.Y., 15
Tel: GRanite 4-7409
Camber, Marty, 1700 York Ave., New York 28, N.Y., 15 (REP)
Tel: ENright 9-4222
Cardinal Electronics Co., 1220 Jerome Ave., Bronx 52, N.Y., 10, 20
Tel: LU 8-5550-1-3
Carduner Sales Corp., 80 Shore Rd., Port Washington, N.Y., 15 (REP)
Tel: POrt Washington 7-7700
Case Electronic Supply Co., Inc., 82 St. Paul St., Rochester 4, N.Y., 10 (NEDA)
Chanrose Radio Distributors, Inc., 170-16 Jamaica Ave., Jamaica 3, N.Y., 10 (NEDA)
Tel: OLympia 8-2900
Chief Electronics, Inc., 14 N. Bridge St., Poughkeepsie, N.Y., 10 (NEDA)
C B S International, 485 Madison Ave., New York 22, N.Y., 5
Tel: PLaza 1-2345
Columbia Electronics, 9013 5th Ave., Brooklyn 9, N.Y., 20
Tel: SHore Road 5-4528
Communications Equipment Co., 343 Canal St., New York 13, N.Y., 10
Tel: CAnal 6-4882
Components Sales Corp., 218 E. Hartsdale Ave., Hartsdale, N.Y., 15
See ads on pages 607, 613
Tel: SCarsdale 5-1050

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Tel: LE 5-2900
Coronet Electronics, Inc., 120 Liberty St., New York 6, N.Y., 10
Tel: CO 7-3760
Cottone & Co., A., 340 Canal St., New York 13, N.Y., 25
Tel: DI 9-2188
Dalis, Inc., H. L., 35-35 24th St., Long Island City 6, N.Y., 10
Tel: YE 2-3535
Davis Electronics Corp., 204 Main St., Hempstead, N.Y., 10 (NEDA)
Delsam Radio-TV, 2665 Grand Concourse, New York 68, N.Y., 20
Tel: CYpress 8-3657
Deri Radio Co., 17 Hudson St., New York, N.Y., 5, 10, 25
Tel: WAlker 5-2364
Donahue, Dillon D., 105 Smith Lane, Syracuse 5, N.Y., 15 (REP)
Tel: 76-2035
Drexler, Chester, 3 Lee Dr., S. Farmingdale, L.I., N.Y., 15 (REP)
Tel: CHapel 9-8206
Dymac, Inc., 2329 Main St., Buffalo 14, N.Y., 10 (NEDA)
E. A. K. Research Labs., P.O. Box 62, Tarrytown, N.Y., 15
E.R.A., Inc., 340 Great Neck Rd., Great Neck, N.Y., 15 (REP)
Tel: HUnter 2-9320
Egert Co., Samuel S., 97 Reade St., New York 13, N.Y., 15 (REP)
Tel: WOrth 4-6996
Electric City Radio Supply, 1566 State St., Schenectady 4, N.Y., 10 (NEDA)
Electronic Laboratories & Supply Co., 1415-19 Oriskany St. W., Utica 4, N.Y., 10 (NEDA)
Electronic Surplus Brokers, 148 Chambers St., New York 7, N.Y., 5, 25
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Electronic Tube Sales, Inc., 74 Cortlandt St., New York 7, N.Y., 5, 10, 25
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Tel: AXtel 7-3525
Electronic Supply Corp., 41-08 Greenpoint Ave., Long Island City 4, N.Y., 10 (NEDA)
Electrovert, Inc., 489 Fifth Ave., New York 17, N.Y., 5
Tel: MUrray Hill 2-2492
Ellis & Assoc., Harold R., 217-27 47th Rd., Bayside 61, N.Y., 15
Tel: MUrray Hill 2-5844
Emeltone Electronics Co., 71 W. Broadway, New York 7, N.Y., 5, 10, 25
Tel: REctor 2-1696
Empire Electronics Co., 74 Cortlandt St., New York 7, N.Y., 25
Tel: WOrth 2-5272
Energy Control Co., Inc., 5 Beekman St., New York 38, N.Y., 15, 20
Tel: BArclay 7-0457
Epco Electronics, Inc., 140 Liberty St., New York 6, N.Y., 10
Tel: WOrth 2-1573
Farber Assoc., Maury, 417 Root Bldg., 70 W. Chippewa St., Buffalo 2, N.Y., 15 (REP)
Tel: MOhawk 3543-4
Federal Electronics, Inc., 188 State St., Binghamton, N.Y., 10 (NEDA)
Federated Purchaser, Inc., 66 Dey St., New York 7, N.Y., 10 (NEDA)
Finkelstein, Harry, 53 N. Park Ave., Rockville Centre, L.I., N.Y., 15 (REP)
Tel: ROckville Centre 6-6500
Fischer Distributing Co., Inc., 211 W. 19th St., New York 11, N.Y., 10
Tel: CHelsea 2-1800
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Fishner, Stanley, 120 Colonel Dr., P.O. Box 1012, Rome, N.Y., 15
Tel: ROme 6302
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Tel: 447
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Tel: HA 2-5844
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Forrest, Vernard J., 102 Warren St., New York 7, N.Y., 15 (REP)
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Tel: BArclay 7-4977
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Tel: HY 7-2887
Friedman Co., Adolph, 519 S. 5th Ave., Mt. Vernon, N.Y., 15, 20
Tel: MOunt Vernon 4-4866
Fulton County Distributing Co., 16 Bleecker St., Gloversville, N.Y., 10
Tel: GLoversville 5-2515
Gancher Co., Louis, 467 W. Broadway, New York 12, N.Y., 25
Tel: GRamercy 7-4755
Genesee Radio & Parts Co., 205 Genesee St., Buffalo 3, N.Y., 10 (NEDA)
Ginsbury, Ltd., Sylvan, 8 W. 40th St., New York 23, N.Y., 5
Tel: LOngacre 4-7585
Gould Sales Co., Stephen, 519 S. 5th Ave., Mt. Vernon, N.Y., 15, 20
Tel: MO 8-7137
Graybar Electric Co., Inc., 40 Van Woert St., Albany 4, N.Y., 10
Graybar Electric Co., Inc., 180 Perry St., Buffalo 4, N.Y., 10
Graybar Electric Co., Inc., 1 South St., Garden City, L.I., N.Y., 10
Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N.Y., 10
Graybar Electric Co., Inc., 21-15 Bridge Plaza North, Long Island City 1, N.Y., 10
Graybar Electric Co., Inc., 186 North Water St., Rochester 4, N.Y., 10
Graybar Electric Co., Inc., 327 North West St., Syracuse 1, N.Y., 10
Green Tele-Radio Dist., Inc., 472 Sutter Ave., Brooklyn 7, N.Y., 10
Tel: HYacinth 5-0200
Greenberg, Jerry, 29 Woodmere Blvd., Woodmere, L.I., N.Y., 15 (REP)
Tel: FRanklin 4-3748
Greenwich Sales Co., 59 Cortlandt St., New York 7, N.Y., 5, 25
Tel: DIgby 9-3813
Greylock Electronic Supply Co., Inc., 75-13 Utopia Pkwy., Flushing, L.I., N.Y., 10 (NEDA)
Gross Associates, Inc., Adolph L., 514 Broadway, New York 12, N.Y., 15
Tel: WOrth 6-0800
Gross Co., Joseph A., 25 Beaver St., New York 4, N.Y., 5, 15
Tel: WH 4-4392
Haas Electronics Co., 862 Southern Blvd., Bronx 59, N.Y., 10
Tel: DAyton 9-1466
Hallock Radio & TV Service, A. E., 110 Beekman Ave., N. Tarrytown, N.Y., 20
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Harvey Radio Co., Inc., 103 W. 43rd St., New York 36, N.Y., 10
Heitz, Inc., Karl, 480 Lexington Ave., New York 17, N.Y., 5, 10
Tel: ELdorado 5-5691
Hi-C Radio Electronics, 109 State St., Rochester 4, N.Y., 10 (NEDA)
Hicks, W. M., 4 Spruce St., Roslyn, N.Y., 15 (REP)
Tel: MAnhasset 7-6150
Hi-Fidelity Center, Inc., 324 Central Ave., Albany 6, N.Y., 10
Tel: 3-1167
Hoffman & Co., H. L., 804 Newbridge Ave., Westbury, L.I., N.Y., 15 (REP)
Tel: EDgewood 4-5600
Holliday-Hathaway Co., Inc., 270 Park Ave., New York 17, N.Y., 15
Tel: MU 8-5858
Hub Electronics Corp., 249 Tarrytown Rd., White Plains, N.Y., 5, 10
Tel: WHite Plains 6-3121
Hudson Radio & TV Corp., 37 W. 65th St., New York 23, N.Y., 5, 10, 20
Tel: TRafalgar 3-2900
Huron Electronic Supply Co., Inc., 324-326 N. Oak St., Buffalo, N.Y., 10 (NEDA)
Hy-Grade Electronics, Inc., 9216 Church Ave., Brooklyn 36, N.Y., 10 (NEDA)
ITV, Inc., 370 Seventh Ave., New York 1, N.Y., 10, 20
Tel: LAckawanna 4-8891-2
Industro, Inc., 649 Broadway, New York 12, N.Y., 5, 10, 15
Tel: OREgon 7-8400
Instrument Center, 55 Reade St., New York 7, N.Y., 5, 15
Tel: WOrth 4-1290
Intelex Systems, Inc., 22 Thames St., New York 6, N.Y., 5, 15
Tel: BOwling Green 9-3800
International Standard Trading Corp., 22 Thames St., New York 6, N.Y., 5
Tel: BO 9-3800
Island Radio Distributors, 412 Fulton St., Hempstead, L.I., N.Y., 10 (NEDA)
Jackson Co., Robert W., 833 Ellicott Sq. Bldg., Buffalo 3, N.Y., 15 (REP)
Tel: MAdison 3306-7
Johnson Agencies, Inc., 111 Mt. Hope Ave., Rochester 20, N.Y., 15
Tel: HAmilton 6-1090
Joseph & Associates, Ben, 43 S. Middleneck Rd., Great Neck, N.Y., 15
Tel: HUnter 7-9395
Kaelber & Mack, 1 Park Ave., Manhasset, N.Y., 15 (REP)
Tel: MA 7-1459 & MA 7-0225
Kahpan Sales Corp., 1261 Broadway, New York 1, N.Y., 15 (REP)
Tel: MUrray Hill 4-7772
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Tel: MOunt Vernon 4-5577
Kubrick & Yurman, 200 W. 34th St., New York 1, N.Y., 15
Tel: BRyant 9-6517
Laco Electronics Co., Inc., 4924 4th Ave., Brooklyn 20, N.Y., 10
Tel: HYacinth 2-5920
Lafayette Radio, 100 6th Ave., New York 13, N.Y., 5, 10, 20
Tel: REctor 2-8600
Lamb Co., Robert F., 1807 Elmwood Ave., Buffalo 7, N.Y., 15
Tel: BEdford 3757
Land C-Air Sales Co., 140 Marbledale Rd., Tuckahoe, N.Y., 15 (REP)
Tel: WOodbine 1-4700
Landes Electronic Fasteners, 510 W. Broadway, New York 12, N.Y., 10, 15, 20
Tel: ALgonquin 4-4593
Landis, B. C., 81-11 Roosevelt Ave., Jackson Heights 72, N.Y., 15 (REP)
Tel: ILlinois 8-7900
Landsberger Co., 550 Fifth Ave., New York 36, N.Y., 15
Tel: PLaza 7-3638
Lanzendorf, Oren G., 513 Cumberland Ave., Syracuse 10, N.Y., 15
Tel: GRanite 2-4195
Leeds Co., Gerard G., 12 Crampton Lane, Great Neck, N.Y., 15
Tel: HUnter 2-7784
Leonard Radio, Inc., 69 Cortlandt St., New York 7, N.Y., 10 (NEDA)
Le Roy, Gordon C., Rt. 1, Phelps, N.Y., 15 (REP)
Tel: KIngswood 8-4891
Levison, Melvin S., 105 [illegible] Blvd. Hewlett, N.Y., 15 (REP)
Tel: FRanklin [illegible]
Levison, Melvin S., [illegible] York 17, N.Y., 15
Tel: MUrray [illegible]
Lichter, Wm., 20 [illegible] lyn, N.Y., 15 (REP)
Tel: ROslyn [illegible]
Lohkemper, Otto A., [illegible] New Hyde Park, L.I., N.Y.
Majestic International Sales [illegible] Washington St., Brooklyn, N.Y.
Marron, George P., 4455 E. [illegible] Dewitt 14, N.Y., 15 (REP)
Tel: 75-[illegible]
Masline Electronics, Inc., [illegible] Clinton Ave., Rochester 4, N.Y., 10 (NEDA)
Metropolitan Supply Corp., 1133 Broadway, New York 10, N.Y., 5, 10, 15, 25
See ad on page 443
Tel: CHelsea 3-1105
Midway Radio & Television Corp., 60 W. 45th St., New York 36, N.Y., 10 (NEDA)
Miller, Ben, 256-01 41st Dr., Little Neck 63, N.Y., 15 (REP)
Tel: BAyside 4-4073
Milo Radio & Electronics Corp., 200 Greenwich St., New York 7, N.Y., 10 (NEDA)
Morse Sales, Irv, 150 Broadway, New York 38, N.Y., 15 (REP)
Tel: COrtlandt 7-2913
National Radio Distributors-Manhattan, 1799 First Ave., New York 28, N.Y., 10 (NEDA)
National Radio Distributors Corp., 1165 Southern Blvd., Bronx 59, N.Y., 10 (NEDA)
Newhope Corp., 6 E. 39th St., New York 16, N.Y., 15
Tel: LExington 2-7372
New Yorker Electronics Co., [illegible] St., New York 10, N.Y., 5, [illegible]
Tel: OREgon 4-5120
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Tel: CIrcle 5-5700
Peerless Radio Dist., Inc., 92-32 Merrick Rd., Jamica 33, L.I., N.Y., 5, 15 (NEDA)
Tel: REpublic 9-6080
Peet & Co., D. R., 146 University Ave., Rochester 5, N.Y., 15
Tel: HAmilton 6-8910
Progress Electronics Co., 296 Broadway, New York 7, N.Y., 10
See ad on page 328
Tel: WOrth 2-8041
RMC Associates, 236 E. 75th St., New York 21, N.Y., 15, 20
Tel: TRafalgar 9-2023
R & S Electronic Sales Corp., P.O. Box 217, Hempstead, N.Y., 10, 15, 20
Tel: PRimrose 5-7852
Radio Equipment Corp., 147 Genesee St., Buffalo, N.Y., 10 (NEDA)
Radio Electric Products, Inc., 186 E. Genesee St., Buffalo, N.Y., 10 (NEDA)
Radio Kits, Inc., 120 Cedar St., New York 6, N.Y., 10
Tel: BEekman 3-6686-7-8
Radio Research Instrument Co., 550 Fifth Ave., New York 36, N.Y., 10, 25
See ad on page 278
Tel: JUdson 6-4691
Radio Wire Television, Inc., 100 Sixth Ave., New York 13, N.Y., 10 (NEDA)
Radiophon Corp., 509 Madison Ave., New York 22, N.Y., 5, 15
Tel EL 5-5198
Reagan Co., Inc., J. A., 242 Hackett Blvd., Albany 8, N.Y., 15 (REP)
Tel: 8-5155
Reese, Inc., J. Ramsey, 71 Murray St., New York 7, N.Y., 10, 15
Tel: WOrth 2-4059
Resistor Wholesalers Corp., 71 Murray St., New York 7, N.Y.
Tel: WOrth 2-7862
Richter Corp., William, 790 Linden Ave., Rochester 10, N.Y., 15
Tel: HIllside 5-0580
Roberts & O'Brien, P.O. Box 1076, Syracuse 1, N.Y., 10 (NEDA)
Rochester Radio Supply Co., 600 E. Main St., Rochester, N.Y., 10 (NEDA)
Rockbar Corp., 650 Halstead Ave., Mamaroneck, N.Y., 5, 10, 15
Ross, Milton, 550 Fifth Ave., New York, N.Y., 15 (REP)
Tel: JUdson 6-0653
Ryerson Assoc., Inc., J. D.. 412 E. Genesee St., Syracuse 2, N.Y., 15
Tel: GRanite 6-8344
Saftler, Perry, 157 E. 57th St., New York 19, N.Y., 15 (REP)
Tel: CIrcle 7-3855-6-7
Sanford Electronics Corp., 157 Chambers St., New York, N.Y., 10 (NEDA)
Sargent, Robert E., 42 Oak Ave., Tuckahoe, N.Y., 15 (REP)
Tel: WOodbine 1-4700
Saxton Products Corp., 1661 Boone Ave,. Bronx 60, N.Y., 5, 10, 15
Saxton Products Corp.
Tel: Wyandotte 1-0120
Schweber Electronics, 122 Herricks Rd., Mineola, N.Y., 10
See ad on page 304
Tel: PIoneer 6-6520
Scott Co., George G., 6 Stuart Dr. W., Glen Cove, N.Y., 15
Tel: ORiole 6-2088
Shaw Co., S. A., 444 Kneeland Ave., Yonkers, N.Y., 15 (REP)
Tel: YOnkers 3-5700
Slate & Co., 2755 Webster Ave., New York 58, N.Y., 10 (NEDA)
Smith, Howard F., 259 W. 14th St., New York 11, N.Y., 15 (REP)
Tel: CHelsea 2-2398
Sonkin Associates, David, 10 Fiske Pl., Mount Vernon, N.Y., 15 (REP)
Tel: MOunt Vernon 8-9809-10-11
Sonocraft Corp., 115 W. 45th St., New York 36, N.Y., 10
Spellman Co., Fred, 200 Plandome Rd., Manhassett, N.Y., 15 (REP)
Tel: MAnhassett 7-3399
Sprung Associates, Joseph, 254 W. 31st St., New York 1, N.Y., 15 (REP)
Tel: LOngacre 5-1820
Stack Electronics, 25 State St., Binghamton, N.Y., 10 (NEDA)
Stallman of Ithaca, Inc., 123-131 S. Tioga St., Ithaca, N.Y., 10 (NEDA)
Standard Parts Corp., 277 N. Franklin St., Hempstead, N.Y., 10 (NEDA)
Stang Sales Co., 1 Crestwood Lane, New Rochelle, N.Y., 15 (REP)
Tel: NE 6-6622
State Labs., Inc., 649 Broadway, New York 12, N.Y., 5, 10, 15
See ad on this page
Tel: ORegon 7-8400
Stelka, Inc., P.O. Box 671, Jamaica, N.Y., 5, 10, 15, 20, 25
Tel: HO 5-0654
Summit Distributors, Inc., 916 Main St., Buffalo, N.Y., 10 (NEDA)
Sun Radio & Electronics Co., Inc., 650-6th Ave., New York 11, N.Y., 10 (NEDA)
Sussman, Jules, 130 Lafayette St., New York 13, N.Y., 15 (REP)
Tel: WOrth 2-7766
Swank, Wally B., 2310 Bellevue Ave., Syracuse 4, N.Y., 15 (REP)
Tel: GRanite 8-2141
Sylvan-Wellington Co., 269 Canal St., New York 13, N.Y., 10 (NEDA)
Tab, 111 Liberty St., New York 6, N.Y., 5, 10, 25
Tel: REctor 2-6245
Tallen Co., Inc., 159 Carlton Ave., Brooklyn 5, N.Y., 25
Tel: TRiangle 5-8241-2
Taylor, Benjamin, 241 Sunrise Blvd., Rockville Center, L.I., N.Y., 15 (REP)
Tel: ROckville Centre 4-6000
Taylor Co., E. E., 465 Central Ave., Albany 5, N.Y., 10 (NEDA)
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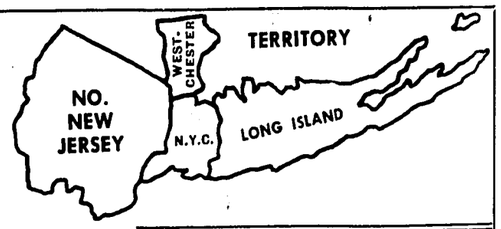

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Travco Associates, 148-03 Hillside Ave., Jamaica 35, N.Y., 15
Tel: OLympia 7-8630
Tri-Par Distributing Co., 1558-1558A White Plains Rd., Bronx, N.Y., 10 (NEDA)
Trojan Electronic Supply Co., 15 Middleburg St., Troy, N.Y., 10 (NEDA)
Troy Television, 3-117th St., N. Troy, N.Y., 10 (NEDA)
Unisco, Inc., 179 Dyckman St., New York 40, N.Y., 15
Tel: LO 9-4200
United Electronic Supply Co., 181 West End Ave., New York City, N.Y., 10 (NEDA)
Wadsworth Mfg. Assocs., 509 Balsam St., Liverpool, N.Y., 15 (REP)
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Weiland, George H., 76-49 168th St., Flushing 66, N.Y., 15 (REP)
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Weinberg, Harry, 60 E. 42nd St., New York 17, N.Y., 15 (REP)
Tel: VAlley Stream 5-3677
Weiss & Associates, Wm. W., 1780 Broadway, New York 19, N.Y., 15 (REP)
Tel: CIrcle 6-5777
Westchester Electronic Supply Co., Inc., 602 Mamaroneck, White Plains, N.Y., 10 (NEDA)
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Tel: DIgby 9-2277
Westrex Corp., 111 8th Ave., New York 11, N.Y., 5
Tel: CHelsea 3-2300
Wilco Radio Distributors, 383 E. 138th St., Bronx 54, N.Y., 10 (NEDA)
Wilgreen Industries, 99 Murray St., New York 7, N.Y., 10
Tel: WOrth 4-2490
Willgold Electronic Sales Corp., 100 N. Village Ave., Rockville Centre, N.Y., 15 (REP)
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Wolf, O. C., 15 Centennial Dr., Syracuse, N.Y., 15 (REP)
Tel: SYracuse 4-7723
Wolfe-Marsey Sales Co., 74 Park Ave., Rochester 7, N.Y., 15 (REP)
Tel: GReenfield 3-9088
Woolf Associates, Irving W., 1860 Broadway, New York 23, N.Y., 15 (REP)
Tel: CIrcle 6-0120
Zauderer Associates, 21 Bertel Ave., Mount Vernon, N.Y., 15
See ad on page 616
Tel: MOunt Vernon 4-7385
Zimmerman, Wilson H., 112 Dewitt St., Syracuse, N.Y., 15 (REP)
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Almo Radio Co., 913 Arch St., Philadelphia, Pa., 10 (NEDA)
American Industrial Sales Co., Presidential A-710, Philadelphia 31, Pa., 15
Tel: TRinity 7-4605
Andco Sales-Engineering, 5823 Greene St., Philadelphia 44, Pa., 15 (REP)
Tels: 4-9100 & 4-5300
Atlantic Distributing Co., 256 Ohio River Blvd., Pittsburgh 2, Pa., 10 (NEDA)
B. & R. Electric Co., St. Marys, Pa., 10 (NEDA)
Baker Radio Electric, 111 Johns St., Johnstown, Pa., 10 (NEDA)
Barbey Co., Inc., George D. Second & Penn Sts., Reading, Pa., 10 (NEDA)
Barnett Bros. Radio Co., 622 Arch St., Philadephia 6, Pa., 10 (NEDA)
Barno Radio Co., 927 Walnut St., McKeesport, Pa., 10 (NEDA)
Beil, Thomas H., 3623 Jacksonwald Ave., Reading, Pa., 15 (REP)
Tel: 5-6837
Benge, J. R., 25 S. Easton Rd., Suite 200, Glenside, Pa., 15 (REP)
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Bigelow, Louis, 417 Oak Lane, Wayne, Pa., 15 (REP)
Biggs & Co., J. Alan, P.O. Box 450, Dolyestown, Pa., 15 (REP)
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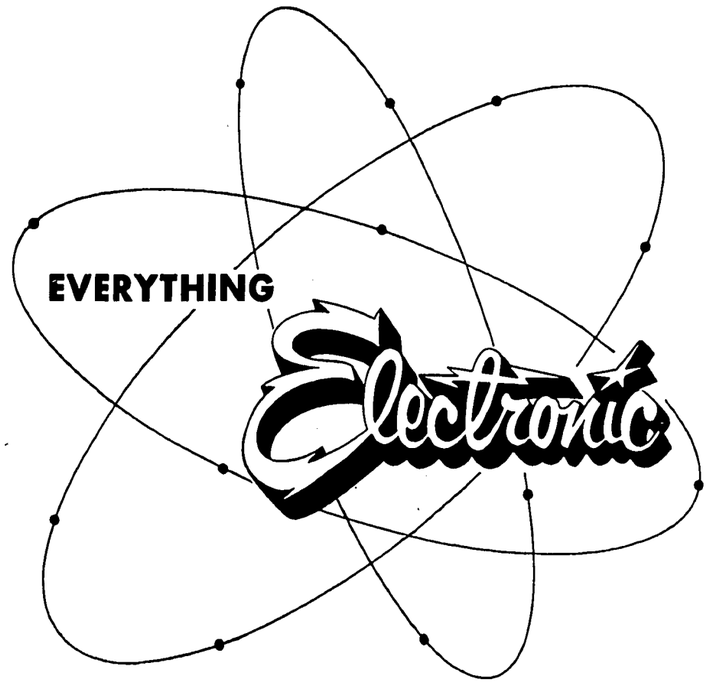
Borden Co., C. C., 3644 N. Lawrence St., Philadelphia 40, Pa., 15
Tel: GArfield 6-9800
Brookfield & Co., 53 Cricket Ave., Ardmore, Pa., 15 (REP)
Tel: MIdway 2-6911
Tel: TRinity 7-9090
Brown, Donald G., 25 S. Easton Rd., Suite 200, Glenside, Pa., 15 (REP)
Tel: TUrner 7-1325
Burlingame Associates, 222 Long Lane, Upper Darby, Pa., 15
Tel: SHerwood 7-9080
Buss Radio Electric Supply, 431 W. Broad St., Bethlehem, Pa., 10 (NEDA)
CRT Distributing Co. of Pa., 13 S. St., Philadelphia 3, Pa., 15 (REP)
Cameradio, 1121 Penn Ave., Pittsburgh, 22, Pa., 10
See ad on page 618
Tel: EXpress 1-4600
C B C Electronics Co., Inc., 2nd N. Howard St., Philadelphia 30, Pa., 5, 10, 15
Tel: GArfield 3-2797
Cooper, Richard J., 3507 Wellington, Philadelphia 49, Pa., 15 (REP)
Tel: MAyfair 4-5486
Cordray Sales Co., W. H., 18 W. Chelten Ave., Philadelphia 44, Pa., 15 (REP)
Tel: VIctor 8-0447
Duncan & Associates, William I., 5452 Charles St., Philadelphia 24, Pa., 15
Edmunds, E. J., 101 N. Lexington Ave., Havertown, Pa., 15 (REP)
Tel: HIlltop 6-6472
Electronic Parts Co., 5744 Baum Blvd., Pittsburgh 6, Pa., 10 (NEDA)
Erdman, Kenneth B., 7908 High School Rd., Elkins Pk., Philadelphia, Pa., 15 (REP)
Tel: MAjestic 5-5099
Factory Enterprises, Inc., 3431 Butler St., Pittsburgh 1, Pa., 5, 10
Tel: MUseum 1-1199
Tel: MUseum 1-6364
Fairbanks Co., H. J., Waybar Bldg., 1615 Darby Rd., Havertown, Pa., 15 (REP)
Tel: GRanite 2-2467
Faries, James P., 1531 Spruce St., Philadelphia 2, Pa., 15 (REP)
Tel: KIngsley 5-1205
Feagley, Charles W., P.O. Box 111, Easton, Pa., 15
Tel: 3-0641
Friedman, Martin, 1006 Western Saving Fund Bldg., Philadelphia 7, Pa., 15 (REP)
Tel: PEnnypacker 5-4778
Garrigues, S. Wayne, 320 Shadeland, Drexel Hill, Pa., 15 (REP)
Tel: CLearbrook 9-1213
Graybar Electric Co., Inc., 1941 Hamilton St., Allentown, Pa., 10
Graybar Electric Co., Inc., 15 Willow St., Greensburg, Pa., 10
Graybar Electric Co., Inc., 1038 South 13th St., Harrisburg, Pa., 10
Graybar Electric Co., Inc., 910 Cherry St., Philadelphia 7, Pa., 10
Graybar Electric Co., Inc., 900 Ridge Ave., Pittsburgh 12, Pa., 10
Graybar Electric Co., Inc., 333 Buttonwood St., West Reading, Pa., 10
Hardy Associates, Norman, 2103 Glenview St., Philadelphia 49, Pa., 15
Tel: DE 8-0716
Hatfield Co., R. E., 165 E. King St., Lancaster, Pa., 15
Tel: 7-5177
Herbach & Rademan, Inc., 1204 Arch St., Philadelphia 7, Pa., 10 (NEDA)
Hevner, Donald S., 1105 Ormond Ave., Drexel Hill, Pa., 15 (REP)
Tel: SUnset 9-4411



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Tel: EVergreen 6-3130

Humes Sales Co., David, 7416 Shisler St., Philadelphia 11, Pa., 15 (REP)
Tel: FIdelity 2-5348

Jeffries, Samuel A., 105 Forrest Ave., Narberth, Pa., 15 (REP)
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Tel: MUseum 3-3300

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Tel: TUrner 4-8198

Lazar Radio Co., Nat., 4231 Lancaster Ave., Philadelphia 4, Pa., 10 (NEDA)

Leban & Graham, 1414 Manoa Rd., Philadelphia 31, Pa., 15 (REP)
Tel: MIdway 2-0668-69

Lectronic Distributors, Inc., 727 Arch St., Philadelphia, Pa., 10 (NEDA)

Lectronic Research Labs., 715 Arch St., Philadelphia 6, Pa., 5, 10, 25
Tel: MArket 7-6771

Leff Radio Parts Co., M., 247 W. 8th Ave., W. Homestead, Pa., 10 (NEDA)

Lewis, Herman, 16222 68th Ave., Philadelphia 26, Pa., 15 (REP)
Tel: LIvingston 8-1281

Lowery, L. D., P.O. Box 115-50 E. Wynnewood, Pa., 15 (REP)
Tel: MIdway 2-9100

MacDonald, Inc., Samuel K., 1531 Spruce St., Philadelphia 2, Pa., 15 (REP)
See ad on page 619
Tel: KIngsley 5-1205

Mahoney, J. J., 1531 Spruce St., Philadelphia 2, Pa., 15 (REP)
Tel: KIngsley 5-1205

Malta Co., Victor S., 1135 Slocum St., Philadelphia 50, Pa., 15
Tel: WA 4-8688

Mansfield Co., M. V., 5732 Baum Blvd., Pittsburgh 6, Pa., 10 (NEDA)

Marks Parts Co., 317 Braddock Ave., Braddock, Pa., 10 (NEDA)

Metropolitan Distributors, 113 S. Beatty St., Pittsburgh, Pa., 10 (NEDA)

Miller, Clifford P., 121 N. Broad St., Philadelphia 7, Pa., 15 (REP)
Tel: LOcust 4-2151

Mustico, John, 312 Bewley Rd., Havertown, Pa., 15 (REP)
Tel: HIlltop 6-1961

Naudain, L. Parker, 846 Suburban Station Bldg., Philadelphia 3, Pa., 15 (REP)
Tel: RIttenhouse 6-3185
Tel: RIttenhouse 6-3790

Nixon Co., 4850 Lancaster Ave., Philadelphia 31, Pa., 15
Tel: GR 7-2040

Nolan & Associates, J. J., 314 W. Sparks St., Philadelphia 20, Pa., 15 (REP)
Tel: WAverly 4-1595

Directory IV. Materials & Services

Newson & Associates, C. H., 150 Terminal Ave., Philadelphia 18, Pa., 15 (REP)
Tel: CHestnut Hill 8-0282
Tel: CHestnut Hill 8-0770

Paragon Sales Co., 111 S. 22nd St., Philadelphia 3, Pa., 15 (REP)
Tel: RIttenhouse 6-7060

Pearson Sales, R. T., 1125 Old York Rd., Abington, Pa., 15 (REP)
Tel: TUrner 7-0186-87

Perna, Frank J., 1029 Drexel Ave., Drexel Hill, Pa., 15 (REP)
Tel: SUnset 9-9045

Peters, Inc., A. A., 231 N. 7th St., Allentown, Pa., 10 (NEDA)

Podolny, James H., 4716 Coleridge St., Pittsburgh 1, Pa., 15 (REP)
Tel: HIland 1-0800

Quilan Co., D. G., 4700 Frankford Ave., Philadelphia 24, Pa., 15 (REP)
Tel: JEfferson 3-6767

Radio Distributing Co., 915 S. 13th St., Harrisburg, Pa., 10 (NEDA)

Radio Electric Shop, 631 S. 60th St., Philadelphia 43, Pa., 20
Tel: GRanite 6-8125

Radio Parts Co., 6339 Penn Ave., Pittsburgh 6, Pa., 10 (NEDA)

Randall Co., Ken, 121 N. Broad St., Philadelphia 7, Pa., 15 (REP)
Tel: LOcust 4-2151

Robinson Co., I. E., 7404 W. Chester Pike, Upper Darby, Pa., 15
Tel: FI 2-7017

Rosen & Co., Inc., Raymond, Parkside Ave. at 51st St., Philadelphia 31, Pa., 10 (NEDA)

Satterthwaite, W. F., P.O. Box 664, Havertown, Pa., 15 (REP)
Tel: SUnset 9-9600

Scarborough, George G., P.O. Box 513, 50 E. Wynnewood St., Wynnewood, Pa., 15 (REP)
Tel: MIdway 2-9100

Scranton Radio & Television Supply Co., 419 Poplar St., Scranton 9, Pa., 10 (NEDA)

Sharon Electronics Supply, 1336 E. State St., Sharon, Pa., 10 (NEDA)

Shelps, George A., 1625 Spruce St., Philadelphia 3, Pa., 15 (REP)

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Snyder Co., V. A., Inc., See listing in New Jersey section.

Sparks, Inc., J. H., 1618 N. Broad St., Philadelphia, Pa., 10 (NEDA)

Steinberg & Co., Albert, 2520 N. Broad St., Philadelphia 32, Pa., 10 (NEDA)

Stinson Co., J. T., 219 Sagamore Rd., Havertown, Pa., 15 (REP)
Tel: HIlltop 7-0922

Stratton Co., C. H., 514 E. Wadsworth St., Philadelphia 19, Pa., 15 (REP)
Tel: CHestnut Hill 7-7869

Stuchell, H. E., Jr., P.O. Box 115, 50 E. Wynnewood Rd., Wynnewood, Pa., 15 (REP)
Tel: MIdway 2-9100

Sylvester, R. A., P.O. Box 513, 50 E. Wynnewood Rd., Wynnewood, Pa., 15 (REP)
Tel: MIdway 2-9100

Technical Representation, 25 S. Easton Rd., Glenside, Pa., 15
Tel: TUrner 7-1352

Television Parts Co., 509 5th Ave., New Brighton, Pa., 10 (NEDA)

Tydings Co., 5930 Baum Blvd., Pittsburgh, Pa., 10 (NEDA)

Trinkle Sales, P.O. Box 40A, Hatfield, Pa., 15 (REP)
Tel: PArkway 3-9425

Wagner Electronic Supply, Sidney, 4632 N. 5th St., Philadelphia 40, Pa., 10 (NEDA)

Warren Radio, Inc., 1315 Peace St., Erie, Pa., 10 (NEDA)

White Co., Harry J., 1839 W. Albanus St., Philadelphia, Pa., 15 (REP)
Tel: DA 9-1880

Wholesale Electronic Supply Co., 503 N. Chester Rd., Swarthmore, Pa., 10 (NEDA)

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MIDDLE ATLANTIC

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SOUTH ATLANTIC

Florida

Williamsport Radio Supply, Inc., 518 W. Third St., Williamsport 28, Pa., 10 (NEDA)

Zimmerman Wholesalers, 104 W. Peter St., Uniontown, Pa., 10 (NEDA)

SOUTH ATLANTIC

FLORIDA

Baldwin, Inc., Vance, 494-6 N.W. 54th St., Miami, Fla., 10 (NEDA)

Barfield Instrument Corp., 4101 N.W. 29th St., Miami 42, Fla., 10, 20
Tel: NE 4-9771

Bassett, Inc., Rex, 1314 N.E. 17th Court, P.O. Box 7127, Ft. Lauderdale, Fla., 5, 10
Tel: LOgan 4-3028

Bay Co., The, 2045 Liberty St., Jacksonville, Fla., 10 (NEDA)

Certified Electronic Dist., Inc., 3112 S.E. 45th Ave., Fort Lauderdale, Fla., 10 (NEDA)

Cooper Radio Co., P.O. Box 669-Station A, St. Petersburg, Fla., 10 (NEDA)

East Coast Radio & TV Co., Inc., 1900 N.W. Miami Ct., Miami 36, Fla., 10 (NEDA)

Electronic Supply, 61 N.E. 9th St., Miami, Fla., 10 (NEDA)

Gamble Electronic Distributors, 1605 S.W. 8th St., Miami, Fla., 10 (NEDA)

Geartner Co., Jack, 823 86th St., Miami Beach, Fla., 15
Tel: Union 6-6664

Goddard Distributors, Inc., 1309 N. Dixie, West Palm Beach, Fla., 10 (NEDA)

Graybar Electric Co., Inc., 845 North West Sixth Ave., Fort Lauderdale, Fla., 10

Graybar Electric Co., Inc., 1563 Jessie St., Jacksonville 6, Fla., 10

Graybar Electric Co., Inc., 2111 North West 22nd Ave., Miami 52, Fla., 10

Graybar Electric Co., Inc., 400 Pittman St., Orlando, Fla., 10

Graybar Electric Co., Inc., 1950 First Ave., South, St. Petersburg 3, Fla., 10

Graybar Electric Co., Inc., 801 North Rome Ave., Tampa 6, Fla., 10

Grice Radio & Electronic Supplies, Inc., 300 E. Wright St., Pensacola, Fla., 10 (NEDA)

Hammond Electronics, Inc., P.O. Box 3671, Orlando, Fla., 10 (NEDA)

Herman Radio Supply Co., P.O. Box 358, Allapattah Sta., Miami 42, Fla., 10 (NEDA)

Jaudon, Wm. C., 207 W. Alfred St., Tampa, Fla., 15 (REP)
Tel: 24-4221

Leader Electronic Distributors, Inc., 3411 S. Dale Mabry, Tampa, Fla., 10 (NEDA)

Miami Electronics Dist., Inc., 419 N.W. 79th St., Miami, Fla., 10 (NEDA)

Peard Electronic Supply Co., 535 Washington St., Jacksonville, Fla., 10 (NEDA)
Radio Accessories Co., 417 E. Platt St., Tampa, Fla., 10 (NEDA)
Radio-TV Parts, Inc., 2611 N.W. 21st Terrace, Miami 42, Fla., 10 (NEDA)
Sanders Electronics Co., 3408 N.W. 7th Ave., Miami, Fla., 10 (NEDA)
Southeast Audio Co., 1125 Roselle St., Jacksonville, Fla., 10 (NEDA)
Telesonic Supply, 224-26 South Blvd., Tampa, Fla., 10 (NEDA)
Thompson, John F., 322 Riverside Dr., Ormond Beach, Fla., 15 (REP)
Tel: CLinton 3-5853
Thurow Distributors, Inc., P.O. Box 1529, Tampa, Fla., 10 (NEDA)
Walder Radio & Appliance Co., 1809 N.E. Second Ave., Miami 36, Fla., 10 (NEDA)
Wallace Assoc., Inc., Stanley K., P.O. Box 67, Lutz, Fla., 15 (REP)
Tel: WEbster 9-3241

GEORGIA

Adair, Clark, 1426 High Point Place, N.E., Altana 6, Ga., 15 (REP)
Tel: TRinity 5-3979
Burwell, H. W., 422 Ponce De Leon Ave., N.E., Atlanta 3, Ga., 15 (REP)
Tel: ATwood 2127
Cartwright & Bean, 3223 Cains Hill Pl., N.W., Atlanta 5, Ga., 15 (REP)
Tel: CEdar 7-2273
Duckett Sales Co., Grady, 26 E. Andrews Dr., N.E., Atlanta 5, Ga., 15 (REP)
Tel: CEdar 3-5308
Electronic Distributors, Inc., 995 Riverside Dr., Macon, Ga., 10 (NEDA)
Fausett, Floyd, 777 Pinehurst Ter., S.W., Atlanta 10, Ga., 15 (REP)
Tel: PLaza 3-3104
Graybar Electric Co., Inc., 333 North Ave., N.W., Atlanta 2, Ga., 10
Graybar Electric Co., Inc., 1341 Eleventh Ave., Columbus, Ga., 10
Graybar Electric Co., Inc., 2601 Whitaker St., Savannah, Ga., 10
Hayden, Paul, 118 W. Nabell Ave., P.O. Box 331, East Point, Ga., 15 (REP)
Tel: POplar 7-9646
Hollingsworth & Still, 508 Whitehead Bldg., Atlanta, Ga., 15 (REP)
Tel: MU 8-5878
Jackson Electronic Supply Co., 840 Marietta St., N.W., Atlanta, Ga., 10 (NEDA)
Joyner & Assocs., J. E., P.O. Box 341, Station A, Atlanta 10, Ga., 15 (REP)
Joyner, J. E., Jr., P.O. Box 341, Station A., Atlanta, Ga., 15 (REP)
Tel: PLaza 8-4910
McCorvey, V. Avis, 215 Church St., Decatur, Ga., 15 (REP)
Tel: DRake 7-6167
Millar Assoc., James, 1036 Peachtree St., N.E., Atlanta 9, Ga., 15 (REP)
Tel: TRinity 6-0919
Millar, James, 1036 Peachtree St., N.E., Atlanta 9, Ga., 15 (REP)
Tel: TRinity 6-0919
Millar, J. Robert, 1036 Peachtree St., N.E., Atlanta 9, Ga., 15 (REP)
Tel: TRinity 6-0919
Murphy & Cota, 2110 Peachtree Rd., N.W., Atlanta 9, Ga., 15 (REP)
Tel: TRinity 6-3020
Nickerson Co., Frank C., 1150 Zonolite Rd., N.E., Atlanta 6, Ga., 15 (REP)
Tel: TRinity 5-8908
Nilson, M. N., Div. Wallace Assoc., Inc., 1808 Willis Mill Rd., S.W., Atlanta 11, Ga., 15 (REP)
Tel: PLaza 5-5973 & 8-2220
Odom, H. J. Wallace Assoc., 2151 Beecher Rd., Atlanta, Ga., 15 (REP)
Tel: RAymond 8463
Pepper, John B., 1429 Peachtree St., N.E., P.O. Box 7036, Station C., Atlanta 9, Ga., 15 (REP)
Tel: TRinity 4-8266
Prestwood Electronics Co., 1445 Greene St., Augusta, Ga., 10 (NEDA)
Radio Sales & Service Co., 1326 First Ave., Columbus, Ga., 10 (NEDA)
Smith Co., Maitland K., 208 Fourteenth St., N.W., Atlanta, Ga., 15 (REP)
Tel: TRinity 5-8031
Specialty Distributing Co., 425 Peachtree St., N.E., Atlanta 8, Ga., 10 (NEDA)
Taylor Co., Inc., Morris F., 2396 Connally Dr., P.O. Box 308, East Point, Ga., 15 (REP)
Tel: POplar 1-5353

MARYLAND

American Distributing Co., 1200 N. Fulton Ave., Baltimore 17, Md., 10 (NEDA)
Ansell Engineering Co., 8416 Georgia Ave., Silver Spring, Md., 15
Barnhill & Associates, R. B., 19 W. Pennsylvania Ave., Towson 4, Md., 15 (REP)
Tel: VAlley 5-3431
Daniels, Inc., L. J., P.O. Box 6864, Baltimore 4, Md., 15
Tel: PLaza 2-7694
Graybar Electric Co., Inc., 3701 East Monument St., Baltimore 5, Md., 10
Hoffman & Co., Inc., H. L., 310 E. 25th St., Baltimore 7, Md., 15, 20
Tel: BElmont 5-8073
Houck, J. W., P.O. Box 6844, Towson 4, Md., 15 (REP)
Tel: VAlley 5-4441
Kann-Ellert Electronics, Inc., 9 S. Howard St., Baltimore 1, Md., 10 (NEDA)
Lienau & Co., Chas. W., 9427 Georgia Ave., Silver Spring, Md., 15 (REP)
Tel: JUniper 7-5888
Radio Electric Service Co., 3 N. Howard St., Baltimore 1, Md., 10 (NEDA)
Spartana Co., A. R., 239 N. Gay St., Baltimore, Md., 10 (NEDA)
Taylor Co., Morris F., 9431 Georgia Ave., P.O. Box 111, Silver Spring, Md., 15 (REP)
Tel: JUniper 9-4002
Wilkinson, Inc., Robert L., 707 Stevenson Lane, Towson 4, Md., 15 (REP)
Tel: VAlley 3-7800-01
Zimmerman Wholesalers, 162 Bedford St., Cumberland, Md., 10 (NEDA)
Zimmerman Wholesalers, 114 E. Washington St., Hagerstown, Md., 10 (NEDA)

NORTH CAROLINA

Adams, Thomas N., 601 N. Elm St., Greensboro, N.C., 15 (REP)
Tel: 2-6838
Allied Electronics, Inc., 413-415 Hillsboro St., Raleigh, N.C., 5, 10
Tel: 3-4627
Atcheson, Stewart E., 601 N. Elm St., Greensboro, N.C., 15 (REP)
Tel: 2-6863
Butters, John T., 4924 Oleander Dr., Wilmington, N.C., 15 (REP)
Tel: 5749
Dalton-Hege Radio Supply Co., Inc., 924 W. 4 St., Box 1008, Winston-Salem, N.C., 10 (NEDA)
Freck Radio & Supply Co., 38 Biltmore Ave., Asheville, N.C., 10 (NEDA)
Graybar Electric Co., Inc., 221 Patton Ave., Asheville, N.C., 10
Graybar Electric Co., Inc., 303 South Duke St., Durham, N.C., 10
Graybar Electric Co., Inc., 761 Planters St., Rocky Mount 3, N.C., 10
Graybar Electric Co., Inc., 120 West Morehead St., Charlotte 1, N.C., 10
Graybar Electric Co., Inc., 955 Brookstown Ave., Winston-Salem 1, N.C., 10
Highsmith & Co., James L., 737 Providence Rd., Charlotte 7, N.C., 15
Tel: FRanklin 7-2546
Howard & Co., Foy M., 2908 Avondale Ave., Charlotte 3, N.C., 15 (REP)
Tel: FRanklin 5-6646
Johannesen Electric Co., Inc., 312-314 N. Eugene St., Greensboro, N.C., 10 (NEDA)
Longs Distributing Co., Inc., 260 Biltmore Ave., Asheville, N.C., 10 (NEDA)
Manufacturers Sales Agency, 4929 Oleander Dr., Wilmington, N.C., 15
Tel: 5749
Murphy & Cota, 2036 Norton Rd., Charlotte, N.C., 15 (REP)
Tel: EDison 2-7356
Radiotronic Distributors, Inc., 208 N. College St., Charlotte, N.C., 10 (NEDA)
Southeastern Radio Supply, 411-15 Hillsboro St., Raleigh, N.C., 10 (NEDA)
Victor Radio-TV Supply Co., 837 Main Ave., S.W., Hickory, N.C., 10 (NEDA)
Wallace Assoc., Stanley K., 5621 Murray Hill Rd., Charlotte 3, N.C., 15 (REP)
Tel: FRanklin 5-5188
Womack Electric Supply Co. of Goldsboro, 405 W. Walnut St., Goldsboro, N.C., 10 (NEDA)
Womack Electronic Supply Co., Inc., 304 S. Dillard St., Durham, N.C., 10 (NEDA)
Womack Electronics, Inc., 105 Marigold St., Rocky Mount, N.C., 10 (NEDA)
Womack Radio Supply Co., Inc., 654 N. Main St., High Point, N.C., 10 (NEDA)

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Dixie Radio Supply Co., 1700 Laurel St., Columbia, S.C., 10 (NEDA)
Florence Radio Supply, Inc., 355-65 N. Irby St., Florence, S.C., 10 (NEDA)

Directory IV. Materials & Services

Graybar Electric Co., Inc., 710 Lady St., Columbia, S.C., 10
Graybar Electric Co., Inc., 302 West Washington St., Greenville, S.C., 10
Hemcor, Inc., 481 Union St., Spartanburg, S.C., 10 (NEDA)
Horlacher & Barrett, 1905 Main St., Columbia, S.C., 10 (NEDA)

VIRGINIA

Bristol Radio Supply Corp., 31 Moore St., Bristol, Va., 10 (NEDA)
Cain Electronics Co., 14th & Monticello Ave., Norfolk 10, Va., 10 (NEDA)
General Supply Co., 4215 Huntington Ave., Newport News, Va., 10 (NEDA)
Graybar Electric Co., Inc., 1081 West 35th St., Norfolk 8, Va., 10
Graybar Electric Co., Inc., 10 South Sixth St., Richmond 19, Va., 10
Graybar Electric Co., Inc., 601 Salem Ave., Roanoke 5, Va., 10
Johnston-Gasser Co., Inc., 3023 W. Marshall St., Richmond 21, Va., 10 (NEDA)
Leonard Electronic Supply Co., 405 Shenandoah Ave., Roanoke, Va., 10 (NEDA)
Mattsons Electronics, Inc., 2224 Chamberlayne Ave., Richmond, Va., 10 (NEDA)
Meridian Electronics, Inc., 1001 W. Broad St., Richmond 20, Va., 10 (NEDA)
Radio Equipment Co., 821 W. 21st St., Norfolk 10, Va., 10 (NEDA)
Radio Parts Distributing Co., 128 W. Olney Rd., Norfolk 10, Va., 10 (NEDA)
Radio Supply Co., Inc., 2009 Williamson Rd., Roanoke, Va., 10 (NEDA)
Radio Supply Co., 711 Granby St., Norfolk 10, 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, Va., 10 (NEDA)
Rucker Electronic Products Co., 1213 Wilson Blvd., Arlington 9, Va., 10 (NEDA)
Southern Electric Corp. of Staunton, 818 Greenville, Staunton, Va., 10 (NEDA)
Virginia Radio Supply Co., 715 Henry Ave., Charlottesville, Va., 10 (NEDA)
Womack Radio Supply Co., Inc., 513 Wilson, Danville, Va., 10 (NEDA)

WEST VIRGINIA

Bluefield Supply Co., Princeton Ave. at S. Mercer St., Bluefield, W.Va., 10 (NEDA)
Chemcity Radio & Elec. Co., 103 Clendenin St., Box 2066, Charleston 1, W.Va., 10 (NEDA)
Dixie Appliance Co., 232 Bluefield Ave., Bluefield, W.Va., 10 (NEDA)
Electronic Supply, Inc., 422 Eleventh St., Huntington 1, W.Va., 10 (NEDA)

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Meyers Electronics, Inc., P.O. Box 3009, 813 Bluefield Ave., Bluefield, W.Va., 10 (NEDA)
Mountain Electronics, Inc., 708 Bigley Ave., Charleston, W.Va., 10 (NEDA)

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ILLINOIS

Allied Radio Corp., Dept. 35-58, 100 N. Western Ave., Chicago 80, Ill., 10 (NEDA)
See ad on page 622
Tel: HAymarket 1-6800

Amco Engineering Co., 7333 W. Ainslie St., Chicago 31, Ill., 15
Tel: UNderhill 7-8500
Angel & Co., Inc., Jay C., 2743 W. Peterson Ave., Chicago 41, Ill., 15 (REP)
Tel: UPtown 8-0653
Arpio Sales, Inc., 4305 N. Lincoln Ave., Chicago, Ill., 10 (NEDA)
Bauman & Bluzat, 2753 North Ave., Chicago 47, Ill., 15, 20
Bauman, Robert, 6025 N. Keystone, Chicago 30, Ill., 15 (REP)
Tel: KEystone 9-3108
Beier, Leroy W., 6518 W. North Ave., Chicago 35, Ill., 15 (REP)
Tel: BErkshire 7-2420
Bierhaus Sales Co., Jim, 4804 W. Madison St., Chicago 44, Ill., 15 (REP)
Tel: AUstin 7-2089
Bluzat, Rene, 2842 N. Cicero Ave., Chicago 41, Ill., 15 (REP)
Tel: PEnsacola 6-2238
Booth & Assoc., Claude, 400 W. North Ave., Chicago 39, Ill., 15 (REP)
Tel: CApitol 7-2810

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Brouillette & Assoc., W. G., 549 W. Quincy St., Chicago 44, Ill., 15 (REP)
Tel: MAnsfield 6-0499
Bruce, Harold, P.O. Box 115, Springfield, Ill., 10 (NEDA)
Bruning Co., A. H., 2215 W. Wilson Ave., Chicago 25, Ill., 15 (REP)
Tels: EDgewater 4-0089-90-91
Burgoyne, William E., 7001 N. Clark St., Chicago 26, Ill., 15 (REP)
Tel: HOllycourt 5-2112
Caine Sales Co., 3020 N. Cicero Ave., Chicago 41, Ill., 15 (REP)
Tel: SPring 7-4022
Chaunceys, Inc., 4740 W. Chicago Ave., Chicago 51, Ill., 10 (NEDA)
Clears Co., Gene T., 435 Indianwood Blvd., Park Forest, Ill., 15 (REP)
Tel: SKyline 5-8359
Cole, Gerard MCL, 6514 W. Higgins Rd., Chicago 31, Ill., 15 (REP)
Tel: SPring 4-3535
Cozzens Co., Warren B., 845 Chicago Ave., Evanston, Ill., 15 (REP)
Tel: DAvis 8-4800
Cumming & Associates, Bruce, 6029 W. Belmont Ave., Chicago 34, Ill., 15 (REP)
See ad on this page
Tel: MErrimac 7-3770
Delta Distributing, 2357 York St., Blue Island, Ill., 10 (NEDA)
Diethert Co., Inc., Russ, 2030 W. Montrose Ave., Chicago 18, Ill., 15 (REP)
Tel: LOngbeach 1-6831
Dolin Sales, D., 3553 W. Peterson Ave., Chicago, Ill., 15 (REP)
Tel: JU 8-3738
Doyle Co., William J., 7002 N. Western Ave., Chicago 45, Ill., 15 (REP)
Tel: RO 1-3130 & RO 1-3131
Ellinger Sales Corp., 6540 Northwest Highway, Chicago 31, Ill., 15 (REP)
Tel: ROdney 3-1570
Ellinger, Wm. H., 6571 N. Olmsted Ave., Chicago 31, Ill., 15 (REP)
Tel: ROdney 3-4154
Engineered Sales Co., Inc., 3592 Milwaukee Ave., Chicago 41, Ill., 15 (REP)
Tel: PEnsacola 6-0555
Engle, Karl D., 4724 N. Sheridan Rd., Chicago 40, Ill., 15 (REP)
Tel: UPtown 8-6363
Felleisen, Theodore E., 5841 W. Montrose Ave., Chicago 34, Ill., 15 (REP)
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Fitzsimmons Associates, Inc., 6124 Milwaukee Ave., Chicago, Ill., 15 (REP)
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Tel: LO 1-4257

G-C Electronics Mfg. Co., Div. of G-C Textron, Inc., 400 S. Wyman St., Rockford, Ill., 10
See ad on page 586
Tel: ROckford 2-6695

Gassner & Clark Co., 6644 N. Western Ave., Chicago 45, Ill., 15 (REP)
Tel: ROgers Park 4-6121

Gebhard Co., Harry W., 5129 W. Devon Ave., Chicago 30, Ill., 15 (REP)
Tel: ROdney 3-3636

Gianaras, Alec K., 2345 W. Devon Ave., Chicago 45, Ill., 15 (REP)
Tel: AMbassador 2-2100

Golden Co., Jerry, 2750 W. North Ave., Chicago 47, Ill., 15
Tels: EV 4-5959-60

Graybar Electric Co., Inc., 850 West Jackson Blvd., Chicago 7, Ill., 10

Graybar Electric Co., Inc., 704 South Adams St., Peoria 2, Ill., 10

Graybar Electric Co., Inc., 405 North MacArthur Blvd., Springfield, Ill., 10

Green & Associates, Loren F., 5218 W. Diversey Ave., Chicago 39, Ill., 15 (REP)
Tel: PAlisade 5-6824

Grove Electronic Supply Co., 4103 W. Belmont Ave., Chicago 41, Ill., 10 (NEDA)

Halinton, Harry, 5500 W. Devon Ave., Chicago 30, Ill., 15 (REP)
Tel: ROdney 3-2132

Haskell Assoc., 202 N. Marion, Oak Park, Ill., 15 (REP)
Tel: EU 6-5741

Hausten Co., Dave, 607 E. Willow Ave., Wheaton, Ill., 15 (REP)
Tel: WHeaton 8-7321

Herberger Radio Supply, 136 First Ave., Peoria, Ill., 20 (NEDA)

Higgins Co., Royal J., 10105 S. Western Ave., Chicago 43, Ill., 15 (REP)
Tel: CEdarcrest 3-7388

Hill & Gray, Inc., Ralph M. & Gordon E., 41½ Harrison St., Oak Park, Ill.
Tel: EUclid 3-0373

Howard Electronic Sales, 4140 Archer Ave., Chicago 32, Ill., 10 (NEDA)

Hunter Associates, Thomas B., 4441 W. Irving Pk. Rd., Chicago 41, Ill., 15 (REP)
Tel: SPring 7-2500

Hutmacher, Ray R., 6647 N. Oliphant Ave., Chicago 31, Ill., 15 (REP)
Tel: NEwcastle 1-3248

Joseph Radio Parts, Inc., Irving, 5959 W. Fullerton, Chicago, Ill., 10 (NEDA)

Kadel Sales Associates, Inc., 5875 N. Lincoln Ave., Chicago 45, Ill., 15 (REP)
Tel: LOngbeach 1-3042

Karo Margolin, Inc., 13 W. Hubbard St., Chicago 10, Ill., 15 (REP)
Tel: WHitehall 4-6345

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Tel: GLen Ellyn 2297

Knaggs, H. W., 7593 Meiba Lane, Belleville, Ill., 15 (REP)
Tel: EXpress 7-2398

Krueger, Ringland M., 5300 W. Lawrence Ave., Chicago 30, Ill., 15 (REP)
Tel: PEnsacola 6-3107

Langhaus, Marvin, 2215 S. St., Louis, Chicago 23, Ill., 15 (REP)
Tel: ROckwell 2-6321

Linz, William M., 6322 N. Cicero Ave., Chicago 30, Ill., 15 (REP)
Tel: MUlberry 5-2022

Lombard, Vernon, Box 355, Grays Lake, Ill., 15 (REP)
Tel: ROundlake-Kimball 6-1760

Lukko Sales Corp., 4900 N. Elston Ave., Chicago, Ill., 10 (NEDA)

Lurtz Electric Co., 219-221 N. Illinois St., Belleville, Ill., 10 (NEDA)

McBride Sales Co., J. L., 328 E. Burlington St., Riverside, Ill., 15 (REP)
Tel: RIverside 7-8131

Magnuson Associates, 3347 W. Irving Pk. Rd., Chicago 18, Ill., 15 (REP)
Tel: KEystone 9-7555

Magnuson Co., Edward, 3349 W. Irving Park Rd., Chicago 18, Ill., 15 (REP)
Tel: JUniper 8-2613

Marsland & Co., Hugh, 6699 Lincoln Ave., Chicago 45, Ill., 15
Tel: ORchard 6-1100

McCarthy, L. C., 7117 Addison St., Chicago 34, Ill., 15 (REP)
Tel: KIldare 5-7976

Melvin Electronics, Inc., 541 Madison St., Oak Park, Ill., 10 (NEDA)

Merquip Co., 5904 W. Roosevelt, Chicago, Ill., 10 (NEDA)

Mid-States Electronic Co., 5028 Broadway, Chicago, Ill., 10 (NEDA)

Mulay, Sam J., 4000 W. North Ave., Chicago 39, Ill., 15 (REP)
Tel: BElmont 5-7411

Mykoy, Inc., Wheeling & Hintz Rds., Wheeling, Ill., 10 (NEDA)

Nagel, Inc., Arthur, 6566 Sheridan, Chicago, Ill., 10 (NEDA)

Nation Wide Radio, 574 W. Randolph, Chicago 6, Ill., 10 (NEDA)

Necker, Ernest J., 6514 W. Higgins Rd., Chicago 31, Ill., 15 (REP)
Tel: SPring 4-3535

Newark Electric Co., 223 W. Madison St., Chicago, Ill., 10 (NEDA)

Olson Radio Warehouse, 623 W. Randolph St., Chicago, Ill., 10 (NEDA)

Relay Sales, Inc., P.O. Box [illegible] U, W[illegible] Chicago, Ill., 10, 20
See ad on page 491
Tel: WEst Chicago 1100

Rollin Associates, 1551 [illegible] Avenue, Chicago 51, Ill., 15 (REP)
Tel: HUmboldt 6-2486

Ritter, Ralph, 5800 W. Montrose Ave., Chicago 34, Ill., 15 (REP)
Tel: MUlberry 5-7430

Robarbot, Robert A., 1415 Howard St., Chicago 26, Ill., 15 (REP)
Tel: ERiarcate 4-5400

Rose & Co., J. K., 2323 W. Devon Ave., Chicago 45, Ill., 15 (REP)
Tel: AMbassador 2-5554

Rothschild, Paul A., 221 W. Hubbard St., Chicago 10, Ill., 15 (REP)
Tel: SUperior 7-7919

Roussey, Ralph E., 2200 N. Manheim Rd., Melrose Pk., Ill., 15 (REP)
Tel: GL 5-2796

Saffro & Gottleman Co., 5209 N. Kimball Ave., Chicago 25, Ill., 15 (REP)
Tel: JU 8-0905

Sarkis, Henry & Co., 5[illegible] N. [illegible] Ave., Chicago 45, Ill., 15 (REP)
Tel: ARdmore 1-3774

Schubert, Arthur J., 5[illegible] Skokie, Ill., 15 (REP)
Tel: ORchard 5-75[illegible]

Star Electronic Dist., [illegible] sted St., Chicago, Ill.

Stemm, R. Edward, [illegible] Chicago 41, Ill., [illegible]
Tel: [illegible]

Stemm, Ray A., [illegible] Chicago 5, Ill., [illegible]
Tel: WEbster 9-[illegible]

Stolz Assoc., Inc., [illegible] W. [illegible] Chicago, Ill., 20 (NEDA)

Strauss, Max, 425 [illegible] Ill., 15 (REP)
Tel: WEllington 3-[illegible]

Stuttevant Co., P. V., [illegible], Ill., 15
Tel: TErrace 4-2000

Suter TV Supply, Inc., 501 W. [illegible] Springfield, Ill., 10 (NEDA)

Suter TV Supply, Inc., 109 N. Park St., Bloomington, Ill., 10 (NEDA)

Swinke & Co., W. F., 541 Diversey Pkwy., Chicago, Ill., 15 (REP)
Tel: BIttersweet 8-4[illegible]

Tatro & Assocs., Frank B., 6022 N. Rogers Ave., Chicago 30, Ill., 15 (REP)
Tel: KEystone 9-4535
Taylor Co., Robert F., 308 W. Washington St., Chicago 6, Ill., 15 (REP)
Tel: ANdover 3-1808
Tri-City Radio Supply Co., 1919 Fourth Ave., Rock Island, Ill., 10 (NEDA)
Twist Co., John G., 5232 W. Diversey Ave., Chicago, Ill., 15 (REP)
Tel: SPring 7-2205
U.S. Radio & Television Supply, 6346 S. Ashland Ave., Chicago, Ill., 10 (NEDA)
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Warner, Dayton L., 15423 Honore Ave., Harvey, Ill., 15 (REP)
Tel: EDison 1-6247
Whitmore & Assocs., R. C., 605 N. Michigan Ave., Chicago 11, Ill., 15 (REP)
Tel: MOhawk 4-1904
Withers & Ropek, 5439 W. Division St., Chicago 51, Ill., 15 (REP)
Tel: AUstin 7-7292

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Bieberich, Walter W., 2817 Plaza Dr., Ft. Wayne 5, Ind., 15 (REP)
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Tel: BElmont 0191
Bowman & Associates, Jess, 257 Lincolnway, Valparaiso, Ind., 10 (NEDA)
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Tel: ANgola 793
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Tel: CLifford 1-3222 & 1-0225
Devoe, Leslie M., 4010 Washington Blvd., Indianapolis 5, Ind., 15 (REP)
Tel: ATwater 3-1395
Esse Radio Co., 42 W. South St., Indianapolis 25, Ind., 25
Tel: MElrose 4-8328
Fishman Associates, Paul B., 4440 N. Campbell Ave., Indianapolis 26, Ind., 15 (REP)
Tel: LIberty 6-5477
Graham Electronics Supply, Inc., 102 S. Pennsylvania Ave., Indianapolis, Ind., 10 (NEDA)
Graybar Electric Co., Inc., 2110 North Fares Ave., Evansville 7, Ind., 10
Graybar Electric Co., Inc., 6445 Indianapolis Blvd., Hammond, Ind., 10
Graybar Electric Co., Inc., 1300 West 16th St., Indianapolis 2, Ind., 10
Hoemig Sales Co., C. N., Butler Court, Ft. Wayne, Ind., 15 (REP)
Tel: ANthony 2083
Homsher, Burt F., 2018 Jessie Ave., Ft. Wayne 7, Ind., 15 (REP)
Tel: EAstbrook 4920
MacNabb Co., Vernon C., 820 E. 64th St., Indianapolis 20, Ind., 15 (REP)
Tel: CLifford 5-6770
MacPherson-Thomas, Inc., 5226 N. Keystone Ave., Indianapolis, Ind., 15 (REP)
Tel: CLifford 1-6915
Midwest Electronics Supply Co., 2016 Webster St., Ft. Wayne 8, Ind., 10 (NEDA)
Paul Sales Co., 2609 Broadway, Fort Wayne, Ind., 15
Tel: HArrison 0589
Reinhardt, Kenneth G., R.R. 10, Box 319L, Indianapolis 19, Ind., 15 (REP)
Tel: UNiversity 2-4001
Schulz Co., Edwin A., 721 Sherwood Dr., Indianapolis 20, Ind., 15 (REP)
Tel: CLifford 5-1993
Southern Charles D., 1605 Lincoln Tower, Ft. Wayne, Ind., 15 (REP)
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Tel: KEnwood 3-7700-01
Butchart, Rod., 11327 Stockwell, Detroit 24, Mich., 15 (REP)
Tel: LAkeview 6-6551
Electric Products Sales Co., 427 E. Michigan Ave., Lansing 29, Mich., 10 (NEDA)
Electronic Supply Corp., P.O. Box 430, Battle Creek, Mich., 10 (NEDA)
Ericksons Electronic Wholesale, 23525 Woodward Ave., Ferndale 20, Mich., 10 (NEDA)
F. G. S. Electronics Supply Co., Inc., 1142 S. Gratiot, Mt. Clemens, Mich., 10 (NEDA)
Eldredge, Elton M., 18230 Grand River Ave., Detroit 23, Mich., 15
Tel: VErmont 6-4191
Electro-Mec Associates, 109 E. 9th Mile Rd., Ferndale 20, Mich., 15, 20
Tel: JOrdan 6-4766
Ferguson Radio Supply Co., 2306 Puritan Ave., Detroit 38, Mich., 10 (NEDA)
Fulton Radio Supply Co., 1208 Greenwood Ave., Jackson, Mich., 10 (NEDA)
Fulton Radio Supply Co., 2710 Alpha St., Lansing, Mich., 10 (NEDA)
Glendale Electronic Supply Co., 12866 Woodward Ave., Detroit 3, Mich., 10 (NEDA)
Graybar Electric Co., Inc., 15045 Hamilton Ave., Detroit 3, Mich., 10
Graybar Electric Co., Inc., 2424 Kansas Ave., Flint 6, Mich., 10
Graybar Electric Co., Inc., 432 Monroe Ave., N.W., Grand Rapids 2, Mich., 10
Graybar Electric Co., Inc., 421 East Elm St., Lansing 10, Mich., 10
Henschen-Jensen & Co., 2842 W. Grand Blvd., Detroit 2, Mich., 15 (REP)
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Tel: UNiversity 3-2135
Lee, William S., 22128 Grand River Ave., Detroit 19, Mich., 15 (REP)
Tel: KEnwood 3-7700
Liddle, Edwin F., 18925 Grand River Ave., Detroit 23, Mich., 15 (REP)
Tel: VErmont 7-5310
Lifsey Distributing Co., 1409 N. Saginaw, Flint 3, Mich., 10 (NEDA)
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Merchant, R. C., 18411 W. McNichols, Detroit 19, Mich., 15 (REP)
Tel: KEnwood 5-6000
Milsk Co., Robert, 19371 James Couzens Highway, Detroit 35, Mich., 15 (REP)
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Tel: TOwnsend 9-0649
Nordstrom & Co., R. C., 580 N. Woodward Ave., Birmingham, Mich., 15 (REP)
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Offenhauer Co., 227 W. Washtenaw, Lansing 25, Mich., 10 (NEDA)
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Pasmore, C. H., 11833 Hamilton Ave., Detroit 3, Mich., 15 (REP)
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Pontiac Electronic Supply Co., 248 E. Pike St., Pontiac, Mich., 10 (NEDA)
Radio Electronic Supply, 505 Jefferson, S.E., Grand Rapids, Mich., 10 (NEDA)
Radio Parts Co., 803 S. Washington St., Saginaw, Mich., 10 (NEDA)
Radio Specialties Co., Inc., 456 Charlotte Ave., Detroit 1, Mich., 10 (NEDA)

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Robbins, Inc., Sam, 230 E. First, Flint 2, Mich., 15
Tel: CEdar 5-7310
Shaffer Co., Grant, 14241 Fenkell Ave., Detroit 27, Mich., 15 (REP)
Tel: BRoadway 3-5390
Shand Radio Specialties, 2608 Leith St., Flint 6, Mich., 10 (NEDA)
Spencer Co., Willard, 20158 Santa Rosa Dr., Detroit 21, Mich., 15
Tel: UN 3-5189 & 3-4842
Straits Distributors, Inc., 412 N. Main St., Cheboygan, Mich., 10 (NEDA)
Thorpe, Jack M., 640 Hidden Lane, Detroit 36, Mich., 15 (REP)
Tel: TUxedo 4-4360
Warren Radio Co., 308 W. Columbia, Battle Creek, Mich., 10 (NEDA)
Warren Radio Co., 713 Portage St., Kalamazoo, Mich., 10 (NEDA)
Wedemeyer Electronic Supply Co., 213-217 N. Fourth Ave., Ann Arbor, Mich., 10 (NEDA)
West Side Radio & TV Supply, 7521 Wyoming Ave., Dearborn, Mich., 10 (NEDA)
Zaffina Co., Lawrence, 7351 Gratiot Ave., Detroit 13, Mich., 15 (REP)
Tel: WAlnut 1-2885

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Allied Supply Co., Inc., 359 W. Monument Ave., Dayton 2, Ohio, 10 (NEDA)
Atkind, Irving, 821 Burman Ave., Dayton, Trotwood, Ohio, 15
Baier, Julia, 12429 Cedar Rd., Cleveland 6, Ohio, 15 (REP)
Tel: FAirmont 1-5644
Bear Corp., Neal, 3435 Streetsboro Rd., W. Richfield, Ohio, 15
Tel: OLiver 9-3331
Boehme Associates, B-4 Talbott Bldg., Dayton 2, Ohio, 15
Tel: FUlton 8188
Brauer, Walter J., 15631 Lakewood Heights Blvd., Cleveland 7, Ohio, 15 (REP)
Tel: LAkewood 1-7268
Buckeye Electronics Dist., Inc., 242 E. Long St., Columbus 15, Ohio, 10 (NEDA)
Burroughs Radio, Inc., 218 E. Second St., Mansfield, Ohio, 10 (NEDA)
Burroughs Radio, Inc., 2705 Fulton Rd., N.W., Canton 9, Ohio, 10 (NEDA)
Burtner Co., Robert K., P.O. Box 529, Far Hills Branch, Dayton 9, Ohio, 15
Tel: OXmoor 3980
Cousino, Inc., 2107 Ashland Ave., Toledo 2, Ohio, 10
Tel: CH 3-4208
Daugherty Co., F. A., 1120 Croyden Rd., Cleveland 24, Ohio, 15 (REP)
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Electronic Supply Corp., 134 E. Long St., Columbus 15, Ohio, 10 (NEDA)
Goory Sales Co., 19555 Henry Rd., Cleveland 26, Ohio, 15 (REP)
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Graybar Electric Co., Inc., 975 East Tallmadge Ave., Akron 10, Ohio, 10
Graybar Electric Co., Inc., 115 West McMicken Ave., Cincinnati 10, Ohio, 10
Graybar Electric Co., Inc., 1100 East 55th St., Cleveland 3, Ohio, 10
Graybar Electric Co., Inc., Third & Chestnut Sts., Columbus 15, Ohio, 10
Graybar Electric Co., Inc., 332 West Monument Ave., Dayton 1, Ohio, 10
Graybar Electric Co., Inc., 923 Washington St., Portsmouth, Ohio, 10
Graybar Electric Co., Inc., 1333 East Manhattan Blvd., Toledo 8, Ohio, 10
Graybar Electric Co., Inc., 602 West Rayen Ave., Youngstown 1, Ohio, 10
Greenleaf, Clifton T., Jr., 14702 Detroit Ave., Cleveland 7, Ohio, 15 (REP)
Tel: LAkewood 1-8468
Groshan Camera Center, Inc., 331 Cleveland Ave., N., Canton 2, Ohio, 10, 20
Tel: GLendale 4-7651
Hausfeld Radio Supply, 116 N. Third St., Steubenville, Ohio, 10 (NEDA)
Herrick Co., George L., 14326 Lorain Ave., Cleveland 11, Ohio, 15
Tel: WInton 1-4406
Howards Electronic Supply, 135-17th St., Toledo 2, Ohio, 10 (NEDA)
Hughes-Peters, Inc., 111-117 E. Long St., Columbus 15, Ohio, 10 (NEDA)
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Levin & Associates, Sid, 6252 Mayfield Rd., Cleveland 24, Ohio, 15 (REP)
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Lifetime Electronics, 1501 Adams St., Toledo 2, Ohio, 10 (NEDA)
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Main Line Distributors, Inc., 350 S. Erie St., Toledo, Ohio, 10 (NEDA)
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Tel: JAckson 6-4323
Neal Bear Corp., 3435 Streetsboro Rd., W. Richfield, Ohio, 15 (REP)
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Olsen Co., John O., 16201 Shaker Blvd., Cleveland 20, Ohio, 15 (REP)
WYoming 1-2624
Olson Radio Warehouse, Inc., 275 E. Market St., Akron 8, Ohio, 10 (NEDA)
Oros, Edward C., 1194 Croyden Rd., Cleveland 24, Ohio, 15 (REP)
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Pioneer Electronic Supply Co., 2115 Prospect Ave., Cleveland 15, Ohio, 10 (NEDA)
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Tel: HUdson 8-4855
Radio Specialties, 136 Pine Ave., S.E., Warren, Ohio, 10 (NEDA)
Rauer, Frank W., 4144 Marvin Ave., Cleveland 9, Ohio, 15 (REP)
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Schroeder, Henry J., 2309 Prospect Ave., Cleveland 15, Ohio, 15 (REP)
Tel: MAin 1-5075
Scott, Ernest P., 1836 Euclid Ave., Cleveland 15, Ohio, 15 (REP)
Tel: TOwer 1-2626
Srepco, Inc., Box 7, North Dayton Sta., Dayton 4, Ohio, 10 (NEDA)
Steffen, Delbert, 1836 Euclid Ave., Cleveland 15, Ohio, 15 (REP)
Tel: TOwer 1-2626
Steinbergs, Inc., 633 Walnut St., Cincinnati 2, Ohio, 10 (NEDA)
Sun Radio Co., The, 110 E. Market St., Akron 8, Ohio, 10 (NEDA)
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Tel: WInton 1-1333
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Graybar Electric Co., Inc., 1140 North Irwin Ave., Green Bay, Wis., 10
Graybar Electric Co., Inc., 103 North Park St., Madison 5, Wis., 10
Graybar Electric Co., Inc., 180 North Jefferson St., Milwaukee 2, Wis., 10
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Millers Electronic Supply, 1321 N. Broadway, Menomonie, Wis., 10 (NEDA)
Northern Radio & Television Co., 708 S. Broadway, Green Bay, Wis., 10 (NEDA)
Radio Distributors, 701 E. Johnson St., Madison 3, Wis., 10 (NEDA)
Radio Parts Co., Inc., 940 N. 27th St., Milwaukee 8, Wis., 10 (NEDA)
Radio Service & Supply Co., Inc., P.O. Box 895, Wausau, Wis., 10 (NEDA)
Standard Radio Parts Co., 1244 State St., Racine, Wis., 10 (NEDA)
Stark Radio Supply Co., 131 S. 6th St., La Crosse, Wis., 10 (NEDA)
Taylor Electric Co., 4080 N. Port Washington Rd., Milwaukee, Wis., 10 (NEDA)

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Tel: TRemont 9-6015
Radio Dist. & Supply Co., 125-27 W. 10th St., Anniston, Ala., 10 (NEDA)

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Graybar Electric Co., Inc., 360 Farmington Ave., Louisville 13, Ky., 10
Peerless Electronic Equipment Co., 2210 S. 7th St., Louisville 8, Ky., 10 (NEDA)
Radio Equipment Co., 480 Skain Ave., Lexington 34, Ky., 10 (NEDA)
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Graybar Electric Co., Inc., 1116 Magnolia St., New Orleans 13, La., 10
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Hale & McNeil, P.O., Box 23-421 Walnut St., Monroe, La., 10 (NEDA)
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Louisiana Radio & Television Dist., Inc., 1645 Plank Rd., Baton Rouge, La., 10 (NEDA)
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Clark Radio Supply Co., 620 Broad St., Bristol, Tenn., 10 (NEDA)
Curle Radio Supply Co., 439 Broad St., Chattanooga 2, Tenn., 10 (NEDA)
Engelman Co., Al, 3205 Crump Ave., Memphis 12, Tenn., 15 (REP)
Tel: GLendale 8-6263
Graybar Electric Co., Inc., 1474 Lamar Ave., Memphis 4, Tenn., 10
Graybar Electric Co., Inc., 125-16th Ave., North, Nashville 3, Tenn., 10
Randolph & Cole, 1213 McGavock St., Nashville 3, Tenn., 10 (NEDA)
Roden Electrical Supply Co., 808 N. Central Ave., Knoxville, Tenn., 10 (NEDA)
Roden Electrical Supply Co., 104 E. State St., Bristol, Tenn., 10 (NEDA)
Rush Co., L. K., P.O. Box 1418, Jackson, Tenn., 10 (NEDA)

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Dukes Radio Co., P.O., Box 1227, Sioux City 2, Iowa, 10 (NEDA)
Friday-Lynch Radio Co., 429 W. Second St., Ottumwa, Iowa, 10 (NEDA)
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Tel: EMpire 4-2491
Gifford-Brown, Inc., 1326 Walnut, Des Moines, Iowa, 10 (NEDA)
Graybar Electric Co., Inc., 206 East Fifth St., Davenport, Iowa, 10

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Iowa Radio Corp., 1212 Grand Ave., Des Moines 9, Iowa, 10 (NEDA)
McDermott Elec. Supply Co., D. A., 200 Ballou St., Waterloo, Iowa, 10 (NEDA)
Mid-State Distributing Co., 1201 Grand Ave., Des Moines, Iowa, 10 (NEDA)
Radio Trade Supply Co., 1224 Grand Ave., Des Moines 9, Iowa, 10 (NEDA)
Ray-Mac Supply Co., 307 Ninth St., S.E., Mason City, Iowa, 10 (NEDA)
World Radio Laboratories, 3415 W. Broadway, Council Bluffs, Iowa, 10 (NEDA)
Vrbik, Jerry, 615 Guaranty Bank Bldg., Cedar Rapids, Iowa, 15 (REP)
Tel EM 4-0833

KANSAS

Acme Radio Supply, 412 E. 10th St., Topeka, Kan., 10 (NEDA)
Excel Distributors, 118 W. Second St., Wichita 2, Kan., 10 (NEDA)
Graybar Electric Co., Inc., 424 North Rock Island Ave., Wichita 2, Kan., 10
Interstate Electronic Supply Corp., 325 W. 4th St., Hutchinson, Kan., 10 (NEDA)
Interstate Electronic Supply Corp., 230 Ida St., Box 2018, Wichita 1, Kan., 10 (NEDA)
See ad on this page
Tel: HO 4-8185
Koenig Sales Co., G. L., 6359 Antioch Ave., Merriam, Kan., 15 (REP)
Tel: HEdrick 2-3166
Radio Supply Co. of Salina, 736 N. Santa Fe, Salina, Kan., 10 (NEDA)
Radio Supply Co., Inc., 115 Laura Ave., Wichita, Kan., 10 (NEDA)
Radio Supply Co. of Great Bend, Box 371, Great Bend, Kan., 10 (NEDA)
Terwilliger Sales Co., P., 7133 W. 80th St., Overland Pk., Kan., 15 (REP)
Tel: NIagara 2-2421
Western Distributors, 227 Santa Fe, Salinas, Kan., 10 (NEDA)

MINNESOTA

Bauman Co., 3033-35 Lyndale Ave., S., Minneapolis 8, Minn., 10 (NEDA)
Bonn Co., Lew, 1211 La Salle Ave., Minneapolis 4, Minn., 10 (NEDA)
Crossley Associates, Inc., 842 Raymond Ave., St., Paul 14, Minn., 15, 20
Tel: MIdway 6-7881
Electronic Center, Inc., 107 Third Ave., N., Minneapolis 1, Minn., 10 (NEDA)
Electronic Distributing Co., 856 Raymond Ave., St. Paul 14, Minn., 10 (NEDA)
Elliott & Hanson Co., 119 First Ave., N.W., Rochester, Minn., 10 (NEDA)
Engilbretson Co., William, 906 Ottawa Ave., St. Paul 7, Minn., 15
Tel: CA 2-2338
Gibb Co., Clark R., 1409 Hennepin, Minneapolis 3, Minn., 15
Tel: FE 8-2550

100. Distribution.
5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Graybar Electric Co., Inc., 1730 West Michigan St., Duluth 6, Minn., 10
Graybar Electric Co., Inc., 824 South Fourth St., Minneapolis 15, Minn., 10
Graybar Electric Co., Inc., 717 North Prior Ave., St. Paul 4, Minn., 10
Hoffman, Edward, 1641 Scheffer Ave., St. Paul 16, Minn., 15 (REP)
Tel: MIdway 9-3371-1979
Kirkeby, Marvin H., 437 Oliver Ave., S., Minneapolis 5, Minn., 15
Tel: FEderal 6-4945
Marshall Co., Robert W., 6106 Excelsior Blvd., Minneapolis 16, Minn., 15
Tel: WEst 9-6444
Northwest Radio, 123 E. First St., Duluth 2, Minn., 10 (NEDA)
Northwest Radio & Electronic Supply Co., 52 S. 12th St., Minneapolis, Minn., 10 (NEDA)
Stark Radio Supply Co., 17 N. 2nd Ave., E. Duluth, Minn. (NEDA)
Stark Radio Supply Co., The, 71 S. 12th St., Minneapolis 4, Minn., 10 (NEDA)
Stark Radio Supply Co., 246 W. Kellog Blvd., St. Paul 2, Minn., 10 (NEDA)

MISSOURI

Acme Radio Supply, 829 S. 10th St., St. Joseph 7, Mo., 10 (NEDA)
Ashe Radio Co., Walter, 1125 Pine, St. Louis 1, Mo., 10 (NEDA)
Bettis Co., Maury E., 406 W. 34th St., Kansas City, Mo., 15 (REP)
Tel: LOgan 1-0772-3
Brotherson Co., M., 515 N. Byers Ave., Joplin, Mo., 10 (NEDA)
Burstein-Applebee, 1012 McGee St., Kansas City, 6, Mo., 10 (NEDA)
Central Missouri Distributing Co., 324 E. Capitol St., Jefferson City, Mo., 10 (NEDA)

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WEST NORTH CENTRAL

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Missouri

Clemenson Co., Robert E., 436 E. 79th St., Kansas City 10, Mo., 15 (REP)
Tel: JAckson 3-3005
Ebinger Electronics, Inc., 2501-03 S. Jefferson, St. Louis, Mo., 10 (NEDA)
Elliott Co., Arthur K., 211 Westport Rd., Kansas City 11, Mo., 15 (REP)
Tel: LOgan 1-9594-95
Farris, R. W., 406 W. 34th St., Kansas City 11, Mo., 15 (REP)
Tel: LOgan 1-7495
Fixman Engineering Co., Gordon, 8160 Stanford Ave., St. Louis 24, Mo., 15
Tel: PArkview 5-5219
Florence, L. F., 406 W. 34th St., Kansas City, Mo., 15 (REP)
Tel: LOgan 1-7282
Forristal-Young Sales Co., 4057 Broadway, Kansas City 11, Mo., 15
Tel: VAlentine 1-5330
Four-State Radio & Supply Co., 201 Main St., Joplin, Mo., 10 (NEDA)
Fry & Co., Inc., W. E., 406 W. 34th St., Kansas City 11, Mo., 15 (REP)
Tel: JEfferson 1-5236
Gordon Co., J. C., 1118 Pine St., St. Louis 9, Mo., 10 (NEDA)
Graybar Electric Co., Inc., 1644 Baltimore Ave., Kansas City 8, Mo., 10
Graybar Electric Co., Inc., 600 South Taylor Ave., St. Louis 10, Mo., 10
Graybar Electric Co., Inc., 524 St. Louis St., Springfield, Mo., 10
Harris-Hanson Co., 2814 S. Brentwood Blvd., St. Louis 17, Mo., 15, 20
Tel: MIssion 7-4350
Interstate Supply Co., 4445 Gustine Ave., St. Louis 16, Mo., 10 (NEDA)
Kathrinus, Norman W., 4356 Duncan Ave., S., St. Louis 10, Mo., 15 (REP)
Tel: OLive 2-7005
Kay Sales Co., 2600 Grand Ave., Kansas City 8, Mo., 15 (REP)
See ad on page 628
Tel: BAltimore 1-3800-1-2-3
Kelly, William G., 5934 Prospect, Kansas City 30, Mo., 15 (REP)
Tel: HIland 4-2013
Larrabee Co., Fred H., 4638 Nichols Pkwy., Kansas City, Mo., 15 (REP)
Tel: LOgan 1-2520
Leemark Associates, P.O. Box 8467, Kansas City 14, Mo., 15
Tel: JAckson 3-9299
Lowell, Theodore B., P.O. Box 21, Normandy Branch, St. Louis 21, Mo., 15 (REP)
Tel: EVergreen 5-7803

Manhattan Radio & Equipment, Inc., 2538 Grand Ave., Kansas City, Mo., 10 (NEDA)
Maynard, Lee, 139 N. Central Ave., Clayton 5, Mo., 15 (REP)
Tel: PArkview 5-3723
McGrade Co., E. W., P.O. Box 8876, Kansas City 15, Mo., 15 (REP)
Tel: RAndolph 2-0758
Myers, Zell, 4538 Main St., Kansas City 11, Mo., 15 (REP)
Tel: JEfferson 1-7221
Radio Supply Co. of Kansas City, 3627 S. Main, Kansas City, Mo., 10 (NEDA)
Radio & Television Supply, Inc., 810 W. 16th St., Sedalia, Mo., 10 (NEDA)
Radonics, 5040 Easton Ave., St. Louis 13, Mo., 10 (NEDA)
Reed Radio & Supply Co., Harry, Main Post Office Box 149, Springfield, Mo., 10 (NEDA)
Roes, H. Courtney, 2601 Cherry, Kansas City 8, Mo., 15 (REP)
Tel: BAltimore 1-0866
Roes, Herbert A., 2601 Cherry, Kansas City 8, Mo., 15 (REP)
Tel: 1-0866
St. Joseph Radio & Supply Co., 922 Francis, St. Joseph 54, Mo., 10 (NEDA)
Schmitz Co., J. O., 406 W. 34th St., Kansas City 11, Mo., 15 (REP)
Tel: LOgan 1-9824
Scholz, Paul G., 210 W. 8th St., Kansas City 6, Mo., 15 (REP)
Tel: HArrison 1-7111
Schryver Sales Co., C. H., 4550 Main St., Kansas City 11, Mo., 15 (REP)
Tel: LOgan 1-4826-7
Sebright, Russ D., 7283 Natural Bridge, St. Louis 21, Mo., 15 (REP)
Tel: EVergreen 2-8258
Somers & Co., F. C., Grand Ave., Bank Bldg., Kansas City 8, Mo., 15 (REP)
Tel: GRand 1-1355
Suedekum Electronic Supply Co., 2215 Broadway, Box 221, Cape Girardeau, Mo., 10 (NEDA)
Thibau, A. R., 519 Mfg. Bldg., Kansas City 5, Mo., 15 (REP)
Tel: VIctor 2-7057
Tri-State Electronics, Inc., P.O. Box 218, Poplar Bluff, Mo., 10 (NEDA)
Van Sickle Radio Co., 1113 Pine St., St. Louis 1, Mo., 10 (NEDA)
Walters Radio Supply, 3645 Main, Kansas City, Mo., 10 (NEDA)
Young, Logan C., 8147 Delmar St., St. Louis 24, Mo., 15 (REP)
Tel: PArkview 5-7701

NEBRASKA

Central Radio Supply, 518 W. First St., Hastings, Neb., 10 (NEDA)
Graybar Electric Co., Inc., 3626 Martha St., Omaha 5, Neb., 10
Hicks Radio Co., 1422 O. St., Lincoln 8, Neb., 10 (NEDA)
J-B Distributing Co., 1616 Cass St., Omaha 2, Neb., 10 (NEDA)
Leuck Radio Supply, 243 S. 11th St., Lincoln, Neb., 10 (NEDA)
Radio Equipment Co., 2852 Douglas St., Omaha 2, eNb., 10 (NEDA)
Sidles Co., 7302 Pacific, Omaha, Neb., 10 (NEDA)

NORTH DAKOTA

Bristol Distributing Co., 419 N. Pacific Ave., Fargo, N.D., 10 (NEDA)
Radio Equipment Co., 624-2nd Ave., N., Fargo, N.D., 10 (NEDA)

SOUTH DAKOTA

Burghardt Radio Supply, 12 N. Broadway, Watertown, S.D., 10 (NEDA)
Graybar Electric Co., Inc., 300 North Phillips, Sioux Falls, S.D., 10
McKenzie Distributors, Inc., 209 S. 1st Ave., Sioux Falls, S.D., 10 (NEDA)
Warren Radio Supply, 115 S. Indiana Ave., P.O. Box 958, Sioux Falls, S.D., 10 (NEDA)

WEST SOUTH CENTRAL

ARKANSAS

Carlton Wholesale Radio, Inc., 606 E. Capital, Box 828, Little Rock, Ark., 10 (NEDA)
Lavender Radio Supply Co., Inc., 520 E. 4 St., P.O. Box 1168, Texarkana, Ark. 10 (NEDA)
Graybar Electric Co., Inc., 417 Byrd St., Little Rock, Ark., 10
White Radio Supply Co., David, 1222 Main St., Little Rock, Ark., 10 (NEDA)
Wise Radio Supply, 1001 Towson Ave., Fort Smith, Ark., 10 (NEDA)

NEW MEXICO

Valley Engineering Co., 601 Cedar St., Los Alamos, N.M., 10 (NEDA)

OKLAHOMA

Graybar Electric Co., Inc., 12 East California St., Oklahoma City 2, Okla., 10
Graybar Electric Co., Inc., 2406 East 12th St., Tulsa 4, Okla., 10
Muskogee Electronic Supply Co., 211 Callahan, Muskogee, Okla., 10 (NEDA)
Radio, Inc., 1000 S. Main St., Tulsa 3, Okla., 10 (NEDA)

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Radio Supply Inc., 724 N. Hudson, Oklahoma City, Okla., 10 (NEDA)
Reynolds Radio Supply Co., 909½ C Ave., Lawton, Okla., 10 (NEDA)

TEXAS

All-State Distributing Co., 2411 Ross Ave., Dallas 1, Tex., 10 (NEDA)
Ammon & Woods Associates, 5602 E. Mockingbird Lane, Dallas 6, Tex., 15
Tel: TAylor 3-1191
Anderson, George E., 1901 Griffin St., Dallas 2, Tex., 15 (REP)
Tel: RIverside 5931
Antle-Smith Sales, 9305 Addis St., P.O. Box 35402, Dallas, Tex., 15 (REP)
Tel: FLeetwood 7-7279
Aymond Co., Edward F., 4312 Maple Ave., Dallas 19, Tex., 15 (REP)
Tel: LAkeside 6-5233
B & L Radio & TV Supply, 2424 Texas Ave., Lubbock, Tex., 10 (NEDA)
Barnes Co., Arnold, 5526 Dyer St., Dallas 6, Tex., 15
See ad on page 629
Tel: EM 1-6716
Berthold Sales Co., 4409-4411 Maple Ave., Dallas 19, Tex., 15 (REP)
Tel: LAkeside 6-8329
Branum Co., 1518 Slocum St., P.O. Box 10204, Dallas 7, Tex., 15 (REP)
Tel: RIverside 1-4995
Campion, Robert M. Jr., 9002 Chancellor Row, Dallas 35, Tex., 15 (REP)
Tel: FLeetwood 7-4095
Campion, Robert M. Sr., 9002 Chancellor Row, Dallas 35, Tex., 15 (REP)
Tel: FLeetwood 7-4095
Central Electronics, 4117 Maple Ave., Dallas 19, Tex., 10 (NEDA)
Corry Co., Hal F., 6315 Hillcrest Ave., Dallas 5, Tex., 15 (REP)
Tels: LAkeside 8-9172 & 8-9128
Crabtrees Wholesale Radio Television 2608 Ross Ave., Dallas 1, Tex., 10 (NEDA)
Crockett, John I., 2204 Griffin, Dallas 2, Tex., 15 (REP)
Tels: RIverside 5764 & 5777
Crockett-Lund Co., 2204 Griffin St., Dallas, Tex., 15 (REP)
Tel: RIverside 2-5764
Delzell-Maynard Sales Co., 2013 Cedar Springs, Dallas 1, Tex., 15 (REP)
Tel: JU 2411
Denison Radio Supply, 310 W. Woodard, Denison, Tex., 10 (NEDA)
Diehl Radio & TV Supply, 2120 Seventh St., Port Arthur, Tex., 10 (NEDA)
Electronic Equipment Co., 917-19 Florence St., Fort Worth 3, Tex., 10 (NEDA)
Electronic Equip. & Engineering Co., 805 S. Staples St., Corpus Christi, Tex., 10 (NEDA)
Electronic Headquarters, 310 Willow St., Austin, Tex., 10 (NEDA)
Franklin Co., Robert E., 1905 Chartree St., Houston, Tex., 10 (NEDA)
Graybar Electric Co., Inc., 1601 South Treadaway, Abilene, Tex., 10
Graybar Electric Co., Inc., 601 E. Second Ave., Amarillo, Tex., 10
Graybar Electric Co., Inc., 104 N. Collins, Arlington, Tex., 10

Directory IV. Materials & Services

Graybar Electric Co., Inc., 214 E. Third St., Austin, Tex., 10
Graybar Electric Co., Inc., 2155 Highway 90, Beaumont, Tex., 10
Graybar Electric Co., Inc., 1311 Agnes St., Corpus Christi, Tex., 10
Graybar Electric Co., Inc., 717 Latimer St., Dallas 26, Tex., 10
Graybar Electric Co., Inc., 3513 Rosa St., El Paso, Tex., 10
Graybar Electric Co., Inc., 1107 Foch St., Fort Worth 7, Tex., 10
Graybar Electric Co., Inc., 1702 Cullen Blvd., Houston 3, Tex., 10
Graybar Electric Co., Inc., 1223, N. Hackberry St., San Antonio 8, Tex., 10
Guenther, John B., 4533 N. Central Expressway, Dallas 5, Tex., 15 (REP)
Tel: LAkewood 8-6286
H & L Radio Supply Co., 1608-10 Commerce, Fort Worth, Tex., 10 (NEDA)
Hall, Inc., R. C. & L. F., P.O. Box 2434, Houston, Tex., 10 (NEDA)
Hargis-Austin, Inc., 410 Baylor, P.O. Box 716, Austin, Tex., 10 (NEDA)
Hargis Co., Inc., The, 1205 Washington Ave., P.O. Box 526, Waco, Tex., 10 (NEDA)
Heidenreich Co., 6115 Denton Dr., Dallas, Tex., 15 (REP)
Tel: FL 2-3389
Industrial Associated Electronics, 5911 E. Lancaster Ave., Ft. Worth 12, Tex., 10
Tel: JEfferson 2056
Klicpera, M. F., P.O. Box 3113, Houston 1, Tex., 15 (REP)
Tel: JAckson 2-8459
Lamps Electronics, Ltd., 828 Brooklyn, San Antonio, Tex., 10 (NEDA)
Lavender Radio & TV Supply, Inc., 503 E. Oakwood, Box 822, Tyler, Tex., 10 (NEDA)
Lawrence Sales Co., P.O. Box 13026, Dallas 20, Tex., 15
Tel: FL 27484
Lenert Co., Inc., 1420 Hutchins, Houston 3, Tex., 10 (NEDA)
Lieberman, Henry, 1511 Bryan, Dallas, Tex., 15 (REP)
Tel: PR 2225
McKinney Sales Co., Jack F., 1330 N. Industrial Blvd., Dallas, Tex., 15 (REP)
Tel: RIverside 1-1368
McNicol, C. C., 811 N. Estrella St., El Paso, Tex., 10 (NEDA)
Montague Radio Distributing Co., 760 Laurel St., Box 3045, Beaumont 1, Tex., 10 (NEDA)
Nesbitt Co., Robert E., 1925 Cedar Springs, Dallas, Tex., 15 (REP)
Tel: RIverside 7-5824
Packard, Dave, 5526 Byer St., Dallas 6, Tex., 15 (REP)
Tel: FOrest 8-5051
R & R Electronic Co., 707 Adams, Amarillo, Tex., 10 (NEDA)
R & R Electronic Co., P.O. Box 325, Abilene, Tex., 10 (NEDA)

100. Distribution.
5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

R & R Supply Co., Inc., P.O. Box 329, Lubbock, Tex., 10 (NEDA)
Radio & Television Parts Co., 118-120 Seventh St., San Antonio 2, Tex., 10 (NEDA)
Rio Radio Supply Co., 608-10 S. Broadway, McAllen, Tex., 10 (NEDA)
Schoonmaker Co., J. Y., 5328 Redfield Ave., Dallas 35, Tex., 15 (REP)
Tel: LAkeside 6-7238
Scooters Radio Supply, S. Freeway & Vickery, Fort Worth, Tex., 10 (NEDA)
Sherman Electronics Supply, Inc., 722 San Pedro, San Antonio 1, Tex., 10 (NEDA)
Smith, Dolores, P.O. Box 35331, Airlawn Station, Dallas 35, Tex., 15 (REP)
Tel: FLeetwood 7-1727
Smith, J. Earl, P.O. Box 35331, Airlawn Station, Dallas 35, Tex., 15 (REP)
Tel: FLeetwood 7-1727
South Texas Radio Supply Co., Inc., 204 Martinez St., San Antonio, Tex., 10 (NEDA)
Southern Radio Supply, 3004 Ross Ave., Dallas 1, Tex., 10 (NEDA)
Spears Co., Mitchell, 3801 Westcliff Rd., S., Ft. Worth 9, Tex., 15, 20
Tel: WAlnut 6-4444-45
Standard Radio Supply, Inc., 309 Lavaca, Box 778, Austin, Tex., 10 (NEDA)
Sterling Radio of Beaumont, Inc., Box 4164, Station A, Beaumont, Tex., 10 (NEDA)
Sterling Radio Products Co., 1616 McKinney Ave., Box 1746, Houston 1, Tex., 10 (NEDA)

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Stiles Electronic Supply, 1700 Wyoming St., P.O. Box 856, El Paso, Tex., 10 (NEDA)
Suttons Wholesale Electronics, Bill, Box 1505, Fort Worth 2, Tex., 10 (NEDA)
Tele-Radio, Inc., 1721 Waugh Dr., Houston, Tex., 10 (NEDA)
Texport Co., 726 Meadows Bldg., Dallas 6, Tex., 15 (REP)
Tel: EMerson 8-6114
West Texas Radio Supply, Box 1578, Amarillo, Tex., 10 (NEDA)
Wicks Radio Equipment Co., 513-15 S. Staples St., Corpus Christi, Tex., 10 (NEDA)
Wilkinson Brothers, 2406 Ross Ave., Dallas 1, Tex., 10 (NEDA)
Wilks, Ernest L., 1212 Camp St., Dallas 2, Tex., 15 (REP)
Tel: RIverside 7-2637
Willison-Hart & Co., 1821 W. Alabama, Houston 6, Tex., 15 (REP)
Tel: JAckson 8-1634
Yount, W. J., 2731 Taylor St., Dallas 26, Tex., 15 (REP)
Tel: EXpress 1-0988

MOUNTAIN

ARIZONA

Art Electronics Supply, Inc., P.O. Box 2549, Tucson, Ariz., 10 (NEDA)
Elliott Electronics, Inc., 418 N. 4th Ave., P.O. Box 5081, Tucson, Ariz., 10 (NEDA)

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Listings are arranged by states under sections of the country as indicated in upper right-hand corner. Index to states appears on page 605.

Graybar Electric Co., Inc., 1700 N. 22nd Ave., Phoenix, Ariz., 10
Graybar Electric Co., Inc., 212 S. Park Ave., Tucson, Ariz., 10
Radio Parts of Arizona, 214 S. 11th Ave., P.O. Box 6345, Phoenix, Ariz., 10 (NEDA)
Standard Radio Parts, 218 N. 1st Ave., Tucson, Ariz., 10 (NEDA)

COLORADO

Bowen Co., R. G., 721 S. Broadway, Denver 23, Colo., 15 (REP)
Tel: RAce 2-4641
Cluphf & Associates, Stan, 7825 W. Colfax Ave., Denver 15, Colo., 15 (REP)
Tel: BElmont 3-6025
Connors Co., W. H., 375 Birch St., Denver 20, Colo., 15 (REP)
Tel: DExter 3-7628
Electronic Parts Co., 1322 Lincoln St., Denver, Colo., 10 (NEDA)
Fistells Electronics Supply Co., 1001 Bannock St., Denver, Colo., 10 (NEDA)
Golliher, W. B., 1003 Grandview Ave., Boulder, Colo., 15 (REP)
Tel: HIllcrest 2-7899
Graybar Electric Co., Inc., 630 W. Vermijo Ave., Colorado Springs, Colo., 10
Graybar Electric Co., Inc., 104 Wazee Market, Denver 4, Colo., 10
Hyde, Dick, 1341 Cherokee St., Denver, Colo., 15 (REP)
Tel: CHerry 4-7471
Koether-Cox Co., 120 W. 13th Ave., Denver 4, Colo., 15 (REP)
Tel: MA 3-3544
McCloud & Raymond Co., 5528 E. Colfax Ave., Denver 20, Colo., 15 (REP)
Tel: FLorida 5-3525.
Moss, Gordon G., 1530 13th Ave., P.O. Box 428, Greeley, Colo., 15 (REP)
Tel: GReeley 770
Moss, Leroy G., 1530 13th Ave., P.O. Box 428, Greeley, Colo., 15 (REP)
Tel: GReeley 770
Nelson Co., A. J., P.O. Box 5502, Denver 17, Colo., 15 (REP)
Tel: KEystone 4-6751
Pearson & Co., Mel, 1011 S. Josephine St., Denver 9, Colo., 15 (REP)
Tel: SP 7-7878-8646
Peyser & Co., 1501 N. Weber St., Colorado Springs, Colo., 15 (REP)
Tel: ME 4-3401
Walker Radio Co., L. B., 620 Broadway, Denver, Colo., 10 (NEDA)
Walker Radio Co., L. B., 100 N. Victoria Ave., Pueblo, Colo., 10 (NEDA)
Williams Co., Allen I., 124-126 W. 12th Ave., Denver 4, Colo., 15 (REP)
Tels: MAin 3-0343 & AComa 2-0200

IDAHO

Graybar Electric Co., Inc., 1325 Idaho St., Boise, Idaho, 10
A & J Distributing Co., 0119 9th St., Lewiston, Idaho, 10 (NEDA)
Kopke Electronics Co., 3113 Rosehill St., Boise, Idaho, 10 (NEDA)
Schwendiman Distributing Co., 380 E. St., Idaho Falls, Idaho, 10 (NEDA)
United Electronics Wholesalers, 328 Third St., E., Twin Falls, Idaho, 10 (NEDA)

MONTANA

Graybar Electric Co., Inc., 604 E. Aluminum St., Butte, Mont., 10

NEVADA

Radio & Sound Supply, 25 E. California St., P.O. Box 2031, Las Vegas, Nev., 10 (NEDA)

UTAH

Ballard Supply Co., 3109 Washington Blvd., Ogden, Utah, 10 (NEDA)
Gates Co., F. Y., 200 S. Main St., Room 822, Salt Lake City 1, Utah
Graybar Electric Co., Inc., 336 N. Third West St., Salt Lake City 13, Utah, 10
O'Loughlins Radio Supply, 113 E. 3rd S. St., Salt Lake City 1, Utah, 10 (NEDA)

WYOMING

Houge Radio & Supply Co., 4012 Central Ave., Cheyenne, Wyo., 10 (NEDA)

PACIFIC

CALIFORNIA

Aaron, Bertram D. P. E., 12032 Wilshire Blvd., Los Angeles 25, Calif., 15 (REP)
Tels: GRanite 8-2410 & BRadshaw 2-6785
Ampex Audio, Inc., 1020 Kifer Rd., Sunnyvale, Calif., 15, 20
Appleton, Harry, 136 San Fernando Rd, Los Angeles 31, Calif., 15 (REP)
Tel: CApitol 5-5513
Arbuckle, Jack C., 500 E. 19th, Bakersfield, Calif., 10 (NEDA)

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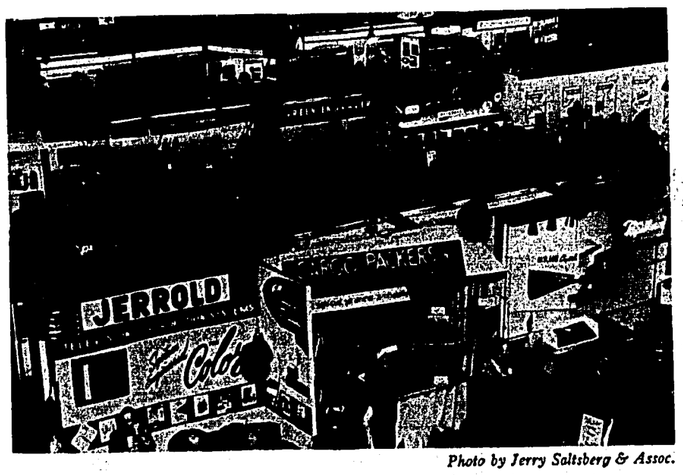

Photo by Jerry Saltsberg & Assoc.

The annual Radio Engineering Show draws an attendance of more than 55,000 radio-electronic engineers from this country and abroad. The photograph at left shows the floor of the Kingsbridge Armory, where the 1956 show was held. The 1958 Radio Engineering Show will be held at the New York Coliseum from March 24 through March 27.

Directory IV. Materials & Services

Arbuckle, Jack C., 2349 Kern St., Fresno, Calif., 10 (NEDA)
Ault Associates, Charles E., 906 Willow Rd., Menlo Park, Calif., 15 (REP)
Tel: DAvenport 6-1760
Avnet Electronic Supply Co., Inc., 8966 National Blvd., Los Angeles 34, Calif., 10
See ad on page 632
Tel: TExas 0-6141
Barron, Bert, 408 S. Alvarado, Los Angeles 57, Calif., 15 (REP)
Tel: DUnkirk 5-1715
Barron Co., W. J., 817 S. Hoover St., Los Angeles 5, Calif., 15 (REP)
Tel: DUnkirk 7-5258
Barstow & Doran, Inc., 1406-08 S. Grand Ave., Los Angeles 15, Calif., 15 (REP)
Tels: RI 9-0438 & 8-6191
Becker, Herbert, 1140 Crenshaw, Los Angeles 19, Calif., 15 (REP)
Tel: WEbster 1-1257
Belchamber, Philip A., 1401 Middle Harbor Rd., Oakland 20, Calif., 15 (REP)
Tel: GLencourt 1-4460
Berman Co., Jack, 1141 S. La Cienega Blvd., Los Angeles 35, Calif., 15 (REP)
Tel: OLeander 5-8920
Boniface, Robert L., 3939 Lankershim Blvd., N. Hollywood, Calif., 15 (REP)
Tel: STanley 7-0721
Brandt Co., E. W., 1355 Market St., San Francisco 3, Calif., 15 (REP)
Tel: HE 1-0484
Bray, Bob, 2234 W. 11th St., Los Angeles 6, Calif., 15 (REP)
Tel: DUnkirk 9-3173
Carter, Jack, 2234 W. 11th St., Los Angeles 6, Calif., 15 (REP)
Tel: DUnkirk 9-3173
Cochrane, Irving M., 408 S. Alvarado St., Los Angeles 5, Calif., 15 (REP)
Tel: DUnkirk 5-1715
Costello, Joseph D., 3406 W. Washington Blvd., Los Angeles 18, Calif., 15 (REP)
Tel: REpublic 3-9175
Dalton Associates, C. R., 132 El Camino Real, San Carlos, Calif., 15 (REP)
Tel: LYtell 1-2654
Davis Electronics, Inc., P.O. Box 1247, Burbank, Calif., 5, 10, 15
Davis Sales Co., George, 5432 E. Beverly Blvd., Los Angeles 22, Calif., 15 (REP)
Tel: RAymond 3-3594
Dejarnatt Radio Supply, 223 Fulton St., Fresno, Calif., 10 (NEDA)
Dunlap Wholesale Radio Co., 27 N. Grant St., Stockton, Calif., 10 (NEDA)
Eber Electronics, 160 10th St., San Francisco, Calif., 10 (NEDA)
Edwards Co., Jackson, 6047 Hollywood Blvd., Los Angeles 28, Calif., 15 (REP)
Tel: HOllywood 5-1141

100. Distribution.
5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Eichorn & Melchior, Inc., 749 Bryant St., San Francisco, Calif., 15 (REP)
Tel: DO 2-1038
Electronic Supply Corp., 2085 E. Foothill Blvd., Pasadena, Calif., 10
Elmar Electronics, Inc., 140 11th St., Oakland 7, Calif., 10 (NEDA)
Emmet Co., Frank A., 2837 W. Pico Blvd., Los Angeles 6, Calif., 15 (REP)
Tel: REpublic 1-8211
Empire Electronic Dist., Inc., 37 E. Union St., Pasadena 1, Calif., 10
Tels: RY 1-7671 & SY 6-0121
Erlanger, Claude M., 4217 W. Jefferson Blvd., Los Angeles 16, Calif., 15 (REP)
Tel: REpublic 1-2238
Falck Co., Fred W., 2311 W. Burbank Blvd., Burbank, Calif., 15 (REP)
Tel: VI 9-4298-5148
Feldman, Henry, 1244 S. Grand Ave., Los Angeles 15, Calif., 15 (REP)
Tel: RIchmond 9-8803
Fetty, Charles R., 7407 Melrose Ave., Los Angeles 46, Calif., 15 (REP)
Tel: WEbster 3-7276
Frazar & Hansen, Ltd., 301 Clay St., San Francisco 11, Calif., 5
Tel: EXbrook 2-5112
French, Sherwood P., 141 Walter Hays Dr., Palo Alto, Calif., 15 (REP)
Tel: DAvenport 3-0597
Gates Co., Howard A., 1819 Harmon Place, Glendale 8, Calif., 15, 20
Tel: CHurchill 9-5360
Geist, William K., 3177 Glendale Blvd., Los Angeles 39, Calif., 15 (REP)
Tel: NO 5-8910
Gilbert, Maurice B., 1608 Centinela Ave., Inglewood 3, Calif., 15 (REP)
Tel: ORegon 8-5767
Graybar Electric Co., Inc., 101 Van Ness Ave., Fresno 2, Calif., 10
Graybar Electric Co., Inc., 800 W. 16th St., Long Beach 13, Calif., 10
Graybar Electric Co., Inc., 210 Anderson St., Los Angeles 54, Calif., 10
Graybar Electric Co., Inc., 1911 Union St., Oakland 7, Calif., 10
Graybar Electric Co., Inc., 1900-14th St., Sacramento 1, Calif., 10
Graybar Electric Co., Inc., 655 S. H St., San Bernardino, Calif., 10
Graybar Electric Co., Inc., 720 State St., San Diego 1, Calif., 10
Graybar Electric Co., Inc., 1750 Alameda St., San Francisco 1, Calif., 10
Graybar Electric Co., Inc., 301 French St., Santa Ana, Calif., 10

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Hansen-Brazan, Inc., 1406 S. Grand Ave., Los Angeles 15, Calif., 15 (REP)
Tel: RIchmond 8-6191
Hansen, Chas. A., 1406 S. Grand Ave., Los Angeles 15, Calif., 15
Harmon Co., W. S., 121 N. Robertson Blvd., Beverly Hills, Calif., 15 (REP)
Tel: CRestview 6-3027 & BRadshaw 2-3321
Harriss Sales Co., L. H., 383 Brannan St., San Francisco 7, Calif., 15 (REP)
Tel: YUkon 6-1084
Heeger, Inc., 1011 Venice Blvd., Los Angeles 15, Calif., 15 (REP)
Tel: DUnkirk 7-6995
Hill, James J., 420 S. Pine St., San Gabriel, Calif., 15 (REP)
Tel: CUmberland 3-6555
Hill, Jerry T., 420 S. Pine St., San Gabriel, Calif., 15 (REP)
Tel: CUmberland 3-6555
Hodges, Elmer C., 921 Bryant St., San Francisco 3, Calif., 15 (REP)
Tel: UNderhill 1-2367
Inland Electronics Suppliers, Inc., 843 Divisadero, Fresno, Calif., 10 (NEDA)
Jurin, Sydney, 4853 Oakwood Ave., Los Angeles 4, Calif., 15 (REP)
Tel: HOllywood 5-5507
Kierulff Electronics, Inc., 820 W. Olympic Blvd., Los Angeles 15, Calif., 10
Tel: RIchmond 7-0271
Kittleson, H. A., 416 N. Labrea, Los Angeles 36, Calif., 15 (REP)
Tel: WEbster 3-7371
Knight, W. Bert, 10377 W. Pico Blvd., Los Angeles 64, Calif., 15 (REP)
Tel: BRadshaw 2-0381
Koessler Sales Co., 818 N. Fairfax Ave., Los Angeles 46, Calif., 15 (REP)
Tel: OLive 3-1605
Lebell Co., Frank, 988 Market St., San Francisco 2, Calif., 15 (REP)
Tel: GRaystone 4-1069
Logan Sales Co., Les, 130 Eighth St., San Francisco, Calif., 15 (REP)
Tel: HEmlock 1-0692
Luscombe Engineering Co., 17 W. California, Pasadena, Calif., 15 (REP)
Tels: RYan 1-5556 & SYcamore 5-6463
Mann, Martin, 14751 Keswick St., P.O. Box 442, Van Nuys, Calif., 15 (REP)
Tels: STanley 3-2850 & STate 0-6911

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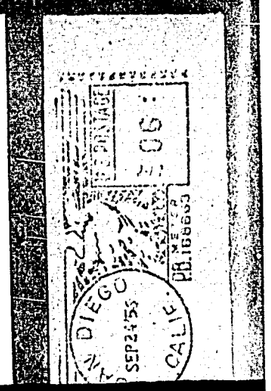

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TELEPHONE: CYPRESS 6-6611

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Tel: REpublic 2-0145

Marshall Co., G. S., 2065 Huntington Dr., San Marino, Calif., 15 (REP)
Tels: SYcamore 5-4304 & RYan 1-6781

Marshank, David N., 7422 Melrose Ave., Los Angeles 46, Calif., 15 (REP)
Tel: WEbster 8-2591

Marshank, Norman J., 4722 Melrose Ave., Los Angeles 46, Calif., 15 (REP)
Tel: WEbster 8-2591

Mauldin Co., C. W., 441 W. California Ave., Palo Alto, Calif., 15 (REP)
Tel: DAvenport 4-2135

McCarthy Associates, 1055 E. Walnut, Pasadena, Calif., 15 (REP)
Tels: RY 1-8810 & ST 2-8272

Meyer & Ross, 113 Tenth St., San Francisco 3, Calif., 15 (REP)
Tel: HEmlock 1-0652

Mid-California Distributors, 1239 F St., Fresno, Calif., 10 (NEDA)

Miller Co., Gerald B., 1550 N. Highland Ave., Hollywood 28, Calif., 15 (REP)
Tel: HOllywood 2-1195

Mitchell, Charles H., 9015 Wilshire Blvd., Beverly Hills, Calif., 15 (REP)
Tel: BR 2-6635

Moson Sales, G. E., 422 Lajolla Ave., San Mateo, Calif., 15 (REP)
Tel: FIreside 5-2866

Moulthrop Co., F. W., 575 Tenth St., San Francisco, Calif., 15 (REP)
Tel: MA 1-0722

Moulthrop & Hunter, 165 11th St., San Francisco 3, Calif., 15 (REP)
Tel: HEmlock 1-2624

Moxon Sales, G. E., 7553 Melrose Ave., Los Angeles 46, Calif., 15 (REP)
Tel: WEbster 8-2565

Moye Co., Robert G., 3289 Fletcher Dr., Los Angeles 65, Calif., 15
Tel: CL 5-7128

Nace, Charles J., 10377 W. Pico Blvd., Los Angeles 64, Calif., 15 (REP)
Tel: BRadshaw 2-0101

National Police Equip. Co., 806 S. Robertson Blvd., Los Angeles 35, Calif., 10, 15
Tel: CRestview 4-7266

Neely Enterprises, 3939 Lankershim Blvd., N. Hollywood, Calif., 15 (REP)
Tel: STanley 7-0721

Newman, Harold L., 420 Market St., San Francisco 11, Calif., 15 (REP)
Tel: YUkon 6-3897

Nickerson & Rudat, 381 Brannan St., San Francisco 7, Calif., 15 (REP)
Tel: YUkon 2-2982

Nott & Co., L. A., 1061 Howard St., San Francisco, Calif., 15 (REP)
Tel: HEmlock 1-4738

Olander & Co., Roland, 7225 Beverly Blvd., Los Angeles 36, Calif., 15 (REP)
Tel: WEbster 5-1211

Owens, Lee H., 2331 W. Washington Blvd., Los Angeles 18, Calif., 15 (REP)
Tel: REpublic 5-0203

Perlmuth Electronic Associates, 2419 S. Grand Ave., Los Angeles 7, Calif., 15 (REP)
Tel: RIchmond 7-4321

Pflieger, Robert L., 1652 Laurel St., San Carlos, Calif., 15 (REP)
Tel: LYtell 1-0396

Ponder & Best, Inc., 814 N. Cole Ave., Hollywood 38, Calif., 15
Tel: HO 9-6251

Possner, Joseph B., 1223 Venice Blvd., Los Angeles 6, Calif., 15 (REP)
Tel: DU 8-0508

Purdy Co., William J., 312 7th St., San Francisco 3, Calif., 15 (REP)
Tel: UNderhill 3-3300

Radio Parts Co., 2060 India, San Diego, Calif., 10 (NEDA)

Radio Products Sales, Inc., 1501 S. Hill St., Los Angeles, Calif., 10 (NEDA)

Radio Specialties, 3530 Chester, Bakersfield, Calif., 10 (NEDA)

Rissi, Al J., 2724 S. Peck Rd., Monrovia, Calif., 15 (REP)
Tel: RYan 1-5621 & HIllcrest 6-2135

Resitron Laboratories, Inc., 2908 Nebraska Ave., Santa Monica, Calif., 15
Tel: EXbrook 3-5217

Roberts & Associates, Inc., E. V., 5068 W. Washington Blvd., Los Angeles 16, Calif., 15 (REP)
Tel: WEbster 8-2541

Ross, David H., 534 El Camino Real, San Carlos, Calif., 15 (REP)
Tel: LYtell 3-8224

Rupp, Vern T., 307 Parkman Ave., Los Angeles 26, Calif., 15 (REP)
Tel: DUnkirk 7-8224

San Francisco Radio & Supply Co., 1282 Market St., San Francisco 2, Calif., 10 (NEDA)

Saul & Associates, H. M., 5015 San Vicente Blvd., Los Angeles 19, Calif., 15 (REP)
Tel: WEbster 8-3591

Schad Electronic Supply, Inc., 156 W. San Fernando St., San Jose, Calif., 10 (NEDA)

Schoenduve, Howard W., 7407 Melrose Ave., Los Angeles 46, Calif., 15 (REP)
Tel: WEbster 3-7276

Scope Distributors, Inc., 5168 S. Vermont Ave., Los Angeles, Calif., 10 (NEDA)

Scott Radio Supply, Inc., 266 Alamitos Ave., Long Beach 2, Calif., 10 (NEDA)

Shepherd Wesco, [illegible] Ave., Los Angeles [illegible]
Tel: WE [illegible]

Sinai Co., [illegible] San Francisco [illegible]
Tel: UNderhill [illegible]

Snitzer Co., T. [illegible] Blvd., Los Angeles [illegible] (REP)
Tel: WEbster 8-2074

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Tel: HOllywood 9-6278

Spraggins Co., S. L., 373 S. Robertson Blvd., Beverly Hills, Calif., 15 (REP)
Tels: CR 1-7155 & BR 2-6527

Stern & Co., L. R., 4109 Burbank Blvd., Burbank, Calif., 15 (REP)
Tels: VIctoria 9-1195-96-97

Stevens Co., Thomas L., 5333 S. Sepulveda Blvd., Culver City, Calif., 15 (REP)
Tels: EXmount 8-5768-9 & TExas 0-1383

Stolaroff, M., 4622 W. Slauson Ave., Los Angeles 43, Calif., 15 (REP)
Tel: AXminster 3-6226

Stone, Carl A., Jr., 1102 S. Western Ave., Los Angeles 6, Calif., 15 (REP)
Tel: REpublic 2-8103

Stone Sales Co., R. L., 8971 National Blvd., Los Angeles 34, Calif., 15 (REP)
Tel: TExas 0-5973

Strassner, Conrad R., 1865 N. Western Ave., Los Angeles 27, Calif., 15 (REP)
Tel: HOllywood 2-0916

Strassner, Ellard E., 1865 N. Western Ave., Los Angeles 27, Calif., 15 (REP)
Tel: HOllywood 2-0916

Strassner, Richard A., 1865 N. Western Ave., Los Angeles 27, Calif., 15 (REP)
Tel: HOllywood 2-0916

Television Radio Supply Co., 326 Market St., San Francisco, Calif., 10 (NEDA)

Tompkins, Wm. M., 941 Newell Rd., Palo Alto, Calif., 15 (REP)
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Tubergen, John B., 2232 W. [illegible] St., Los Angeles 6, Calif., 15 (REP)
Tel: DUnkirk [illegible]

Valley Radio Supply [illegible] Bakersfield, Calif. [illegible]

Vaughan Co., C. [illegible] Pasadena, Calif. [illegible] (REP)
Tel: SYcamore [illegible]

Vermilya, Robert H., [illegible] Ave., San [illegible] (REP)
Tel: A[illegible]

Wallace, Don C. [illegible] Angeles 15, Calif. [illegible]
Tel: RIchmond 7-[illegible]

Wallace, Wm. H., [illegible] Angeles 15, Calif. [illegible]
Tel: RIchmond 7-[illegible]

Weatherred Co., P. V., [illegible] Fernando Rd., Glendale 1, Calif. (NEDA)

Weber Co., W. [illegible] Los Angeles [illegible]
Tel: [illegible]

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Weightman & Associates, 4101 Burbank Blvd., Burbank, Calif., 15 (REP)
Tel: VIctoria 9-2435

Wenger Co., E. C., 1450 Harrison St., Oakland, Calif., 10 (NEDA)

Wesrep Corporation, 2022 S. Sepulveda Blvd., Los Angeles 25, Calif., 15
See ad on this page
Tel: BRadshaw 2-3757

White & Co., 788 Mayview Ave., Palo Alto, Calif., 15
Tel: DAvenport 3-4455

Whitehead Radio Co., 4686 Long Beach Blvd., Long Beach 5, Calif., 10 (NEDA)

Wiley Co., Paul F., 1632 Silverlake Blvd., Los Angeles 26, Calif., 15 (REP)
Tel: NOrmandy 3-8028

Wood Co., Ash M., 11938 E. Garvey Blvd., El Monte, Calif., 15 (REP)
Tel: CU 3-1201

Wresco, 140 Ninth St., San Francisco, Calif., 10 (NEDA)

Zack Radio Supply Co., 1424 Market St., San Francisco 2, Calif., 10 (NEDA)

OREGON

Burcham Co., Don H., P.O. Box 4098, Portland, Ore., 15 (REP)
Tel: CApitol 7-3830

Carlson, Hatton & Hay, Inc., 96 E. Tenth Ave., Eugene, Ore., 10 (NEDA)

Central Distributors, 1331 N.W. Couch St., Portland 9, Ore., 10 (NEDA)

Graybar Electric Co., Inc., 2180 Sixth Ave., West, Eugene, Ore., 10

Graybar Electric Co., Inc., Park & Flanders Sts., Portland 8, Ore., 10

Harolds Radio Supply, 320 S.W. Court Ave., Pendleton, Ore., 10 (NEDA)

Minthorne, Roger M., 7521 N.E. Glisan, Portland 16, Ore., 15 (REP)
Tel: ALpine 3-0010

Portland Radio Supply Co., 1234 S.W. Stark, Portland 4, Ore., 10 (NEDA)

Saelens Radio Co., Inc., 1605 N.W. Everett St., Portland 9, Ore., 10 (NEDA)

United Radio Supply, Inc., 22 N.W. Ninth Ave., Portland, Ore., 10 (NEDA)

Walker Co., Verl G., P.O. Box 1586, Medford, Ore., 10 (NEDA)

Weber, Dale G., 234 Sherlock Bldg., Portland 4, Ore., 15 (REP)
Tel: CA 8-5403

Willamette Radio Supply, 2460 State St., Salem, Ore., 10 (NEDA)

WASHINGTON

Backer, James J., 221 W. Galer, Seattle 99, Wash., 15 (REP)
Tel: ALder 6470

C. & G. Radio Supply Co., 2502-6 Jefferson Ave., Tacoma 2, Wash., 10 (NEDA)

DBA/Paramount Agencies, S. 121 Monroe St., Spokane 4, Wash., 15 (REP)
Tel: TEmple 8-2287

Dooley Co., J. K., 3606 Magnolia Blvd., Seattle 99, Wash., 15 (REP)
Tel: ALder 3208

Drake Assocs., Rush D., 1806 Bush Pl., Seattle, Wash., 15 (REP)
Tel: CApitol 8545

Geiger Radio, W. A., 1101 Columbia, Ellensburg, Wash., 10 (NEDA)

General Radio, Inc., 100 Wall St., Seattle 1, Wash., 10 (NEDA)

Graybar Electric Co., Inc., King & Occidental Sts., Seattle 4, Wash., 10

Graybar Electric Co., Inc., 1033 W. Gardner Ave., Spokane 1, Wash., 10

Graybar Electric Co., Inc., 2112 A St., Tacoma 1, Wash., 10

Haight Co., Fred H., 3212 Eastlake Ave., Seattle 2, Wash., 15 (REP)
Tel: EAst 1818

Lanphear Co., William R., 2823 35th W. Seattle 99, Wash., 15 (REP)
Tel: ALder 5979

Lee Co., Inc., Dave M., 2517 Second Ave., Seattle 1, Wash., 15 (REP)
Tel: MAin 5512

Marsh Agencies, Inc., 2601 First Ave., Seattle 1, Wash., 15 (REP)
Tel: MAin 8761-62

Merritt, Ron, 120 W. Thomas St., Seattle, Wash., 15 (REP)
Tel: GArfield 6644

Northwest Electronics, Inc., N. 102 Monroe St., Spokane, Wash., 10 (NEDA)

Northwestern Agencies, Inc., 4130 First Ave., S., Seattle 4, Wash., 15 (REP)
Tel: ELliot 8882

Parsons & Co., C. B., 3028 First Ave., Seattle 1, Wash., 15 (REP)
Tel: MUtual 3933

Porter, Burt C., 4310 Roosevelt Way, Seattle 5, Wash., 15 (REP)
Tel: MElrose 6828

Pringle Radio Wholesale, 2514 Colby, Everett, Wash., 10 (NEDA)

Seattle Radio Supply, Inc., 2117 Second Ave., Seattle 1, Wash., 10 (NEDA)

Stroum Co., Samuel N., 1612 Broadway, Seattle, Wash., 15 (REP)
Tel: FRanklin 7515

Taylor Distributing Co., Inc., E. 206 Augusta, Spokane 21, Wash., 10 (NEDA)

Tel-Electric Distributors, Inc., 734 N. Division, Spokane 2, Wash., 10 (NEDA)

Western Electric Supply Co., 717 Dexter Ave., Seattle 9, Wash., 10 (NEDA)

Wible Radio Supply, Inc., 2360 S. Fawcett Ave., Tacoma, Wash., 10 (NEDA)

Widdekind, M. K., 222 First Ave., N., Seattle 9, Wash., 15 (REP)
Tel: ELliot 6981

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ALASKA

Yukon Radio Supply, Inc., Box 406, Anchorage, Alaska, 10 (NEDA)

CANADA

Armstrong, Ltd., A. T. R., 700 Weston Rd., Toronto 9, Canada, 15 (REP)
Tel: ROger 2-7535

Eldon, Ltd., 1624 W. Third Ave., Vancouver 9, B.C., Canada, 15 (REP)
Tel: BAyview 2898

Electro Sonic Supply Co., Ltd., 543 Yonge St., Toronto, P.O. Ont., Canada, 10 (NEDA)

Northern Electric Co., Ltd., 1600 Norte Dame St., W., Montreal, P.Q., Canada, 10, 15

Pointon, Chas. W., 6 Alcina Ave., Toronto 10, Ont., Canada, 15 (REP)
Tel: OLiver 7984

Pointon, Chas. W., 6 Alcina Ave., Toronto 10, Ont., Canada, 15 (REP)
Tel: OLiver 7984

Spilsbury & Tindall, Ltd., 120 E. Cordova St., Vancouver 4, B.C., Canada, 5, 15, 20
Tel: TAtlow 4131

HAWAII

Brenna & Browne, 141 Ohua Ave., P.O. Box 2098, Honolulu, Hawaii, 15 (REP)
Tel: 937035

Piety, Gene, 2030 Home Rule St., Honolulu 17, Hawaii, 15 (REP)
Tel: 83105

MEXICO

Oskam, W. P., 153-405 Chapultepec Ave., Mexico 6, D.F., 15 (REP)
Tel: 46-10-50 & 46-12-29

Jones, Kenneth, Apartado 2250, Mexico 1, D.F., 15 (REP)
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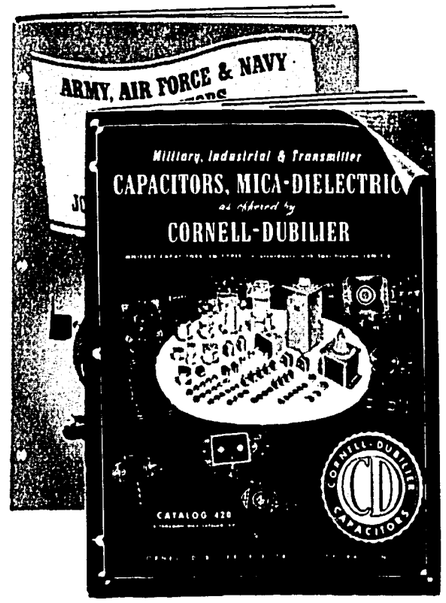

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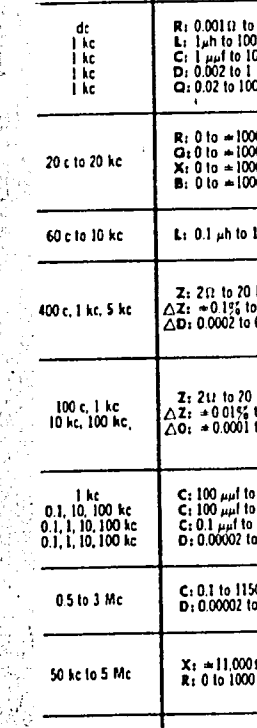
dc	R: 1 to 1,111,111Ω	0.5% as limit bridge 0.25% by null method	Production testing and inspection or laboratory work.	1652-A Resistance Limit Bridge $495
dc	R: 0.1 to 1,000,000 MΩ	±3% to 1000 MΩ ±4% to 100,000 MΩ	Measures high resistance — insulation, volume resistivity, etc.	544-B Megohm Bridge a-c power supply, $365 battery operated, $250
60 c	C: 5 μμf to 1100 μf D: 0 to 50%	±1% ±1.5% of full scale	Production-test tool — measures ungrounded capacitors	740-B Capacitance Test Bridge $265
60 c	C: 0 to 11,000 μf D: 0 to 60%	±1% ±2%	Testing insulators, bushings, cables, grounded capacitors	1611-A Capacitance Test Bridge $550
dc 1 kc 1 kc 1 kc 1 kc	R: 0.001Ω to 1 MΩ L: 1μh to 100 h C: 1 μμf to 100 μf D: 0.002 to 1 Q: 0.02 to 1000	±1% ±2% ±1% ±20% ±20%	Completely self-contained, general-purpose laboratory and production bridge	650-A Impedance Bridge $270
20 c to 20 kc	R: 0 to ±1000Ω G: 0 to ±1000 μmho X: 0 to ±1000Ω B: 0 to ±1000 μmho	±1% ±1% ±1% ±1%	Directly measures quadrature components of any impedance, 0 to ∞	1603-A Z-Y Bridge $370
60 c to 10 kc	L: 0.1 μh to 1 h	±0.2%	Variety inductance measurements	667-A Inductance Bridge, $510
400 c, 1 kc, 5 kc	Z: 2Ω to 20 MΩ ΔZ: ±0.1% to ±20% ΔD: 0.0002 to 0.075	±0.1%	Rapid components testing, sorting to close tolerances — dials read % difference between unknown and external standard.	1604-B Comparison Bridge $450
100 c, 1 kc 10 kc, 100 kc,	Z: 2Ω to 20 MΩ ΔZ: ±0.01% to ±10% ΔO: ±0.0001 to ±0.1 radian	±0.01%	Panel meters simultaneously indicate % differences in magnitude and phase angle between unknown and external standard — precision and speed in one instrument	1605-A Impedance Comparator $790
1 kc 0.1, 10, 100 kc 0.1, 1, 10, 100 kc 0.1, 1, 10, 100 kc	C: 100 μμf to 1.15 μf C: 100 μμf to 1150 μμf C: 0.1 μμf to 1050 μμf D: 0.00002 to 0.56	±0.2% of full scale ±0.2% of full scale ±0.2% (substitution) ±2%	For capacitance standardization, precision measurements, dielectric tests and studies	716-CM Capacitance Bridge $600
0.5 to 3 Mc	C: 0.1 to 1150 μμf D: 0.00002 to 0.56	±0.2% ±0.2%	High-frequency model of 716-C	716-CMS1 Capacitance Bridge $580
50 kc to 5 Mc	X: ±11,000Ω at 100 kc R: 0 to 1000Ω	±2% (X-range varies inversely as frequency) ±1%	Measures impedances of antennas, transmission lines, low impedances simply and directly at R-F	916-AL Radio-Frequency Bridge $620
400 kc to 60 Mc	X: ±5,000Ω at 1 Mc R: 0 to 1000Ω	±2% (X-range varies inversely as frequency) ±1%	Improved model — same uses as 916-AL but for higher frequencies	1606-A Radio-Frequency Bridge $620
460 kc to 40 Mc	C: 0 to 1000 μμf G: 0 to 100 μmhos at 1 Mc B: ±6000 μmhos at 1 Mc	±0.2% (G & B ranges vary directly as frequency) ±2%	Measures high impedances, parallel components, chokes, resonant impedance, solution conductivity, etc.	821-A Twin-T Bridge $620
10 to 165 Mc	X: ±200Ω at 100 Mc R: 0 to 200Ω	±5% (X-range varies inversely as frequency) ±2%	For measurements on either lumped or coaxial circuits	1601-A V-H-F Bridge, $520
1 kc	μ: 0.001 to 10,000 rp: 50Ω to 20MΩ gm: 0.02 to 50,000 μmho	±2% ±2% ±2% } at mid ranges	Adaptors furnished with instrument for measuring characteristics of receiving tubes and transistors	561-D Vacuum Tube Bridge (also measures transistor low-frequency parameters) $850

Slotted Line and Admittance Meter for Measurements to 5000 MC

20 to 1500 Mc	B: ±0.2 to ±1000 mmho. G: 0.2 to 1000 mmho X: ±1 to ±5000Ω R: 1 to 5000Ω	±3% ±3% ±3% ±3%	For impedance and VSWR measurements on coaxial lines, antennas, networks and components — 1602-B U-H-F Admittance Meter, $295
300 to 5000 Mc	VSWR, impedance, power	±1½% or better	874-LBA Slotted Line, $220



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