The IEEE
Newsletter
The Magazine of the North Jersey Section

24 pt Tempo Heavy

NEWARK AIRPORT INSPECTION TRIP

18 pt Century Bold

SATURDAY, NOVEMBER 20, 1965

10:00 – 12:00 A.M.

Advance Registration is Required

10 pt TR Bold

Further Details on Page 3

NOVEMBER 1965 Volume 12 / Number 3

3-c to 1.5-Mc Frequency Meter and Discriminator for only $565 in U.S.A.

If 0.2% accuracy is adequate for your frequency-measuring needs, you will benefit in several ways by using this handy little instrument instead of a more costly counter. The dollar saving alone, of course, is substantial. And, if you want a permanent record of frequency drift or change, just connect a recorder to the instrument's output terminals and you have your data. As a bonus, you have an instrument that is also a highly linear, low-noise, pulse-count discriminator for incidental-fm or fm-deviation measurements. With a wave analyzer, you can measure individual components of incidental fm.

The usable frequency range, particularly for frequency-drift and incidental-fm measurements, can be extended upwards to thousands of megacycles per second if the unknown frequency is heterodyned against a stable frequency. This gives a proportionate increase in resolution. At 100 Mc/s, frequency drift and incidental fm can be measured to at least one part in 10^9.

The reason you get 0.2% accuracy in an instrument with a meter is because the first one or two digits of a measurement are transferred to a calibrated switch while the meter interpolates to establish the last two significant figures. Thus, the meter scale is effectively expanded by a factor of 10. When measuring 125.6 kc/s, for instance, the INTERPOLATION OFFSET FREQUENCY switch is set to 1.2 and the meter indicates .56, the last two significant figures.

Measure to 15 Mc/s With Our New **Scaler**

Connect GR's new Type 1156-A Decade Scaler to the Type 1142-A Frequency Meter and Discriminator and you can measure directly to 15 Mc/s. This scaler is a completely self-contained 10:1 divider of any input frequency up to 100 Mc/s. A five-position input attenuator provides sensitivities of 0.1, 0.2, 0.5, and 1 volt, peak to peak, at 50 ohms; and 1 volt, peak to peak, at 500 ohms. Output is a 20-mA square wave that delivers 1 volt into a 50-ohm load, sufficient to operate most counters without amplification. Height of the instrument is only 1¾ inches. Price is $490.

SPECIFICATIONS
Type 1142-A Frequency Meter and Discriminator

Frequency Range — 3 c/s to 1.5 Mc/s in five decade ranges.

Input Sensitivity — 20 mV from 20 c/s to 150 kc/s, rising to 200 mV at 3 c/s and 1.5 Mc/s (except for very short pulses). Impedance: 100 kΩ, dropping to a minimum of 5 kΩ above 500 kc/s.

As a Frequency Meter — Logarithmic meter maintains constant accuracy; calibrated interpolator effectively expands meter scale by a factor of 10. Higher frequency measurements can be made by heterodyne techniques.

As a Discriminator — Output is 15V, full scale. Low noise; residual fm is down more than 100 dB.

Accuracy — In the "direct" mode, 1% of reading. In the "interpolate" mode, 0.2% of full scale.

Recorder Outputs — Adjustable from 1-mA to 5-mA; interpolator output for high-Z recorders. Voltage is proportional to frequency deviation.

Write for Complete Information

GENERAL RADIO COMPANY
WEST CONCORD, MASSACHUSETTS

Sales Engineering Office in NEW YORK: Brood Avenue at Linden, Ridgefield, New Jersey
George G. Ross • J. P. Eadie • Tom H. Mujica • Richard K. Eskeland • Roger C. Parmenter
Tel: N. Y. 212—964-2722 • N. J. 201—943-3140 • TWX: 710—489-7641

LOCAL SERVICE AND REPAIR

For your convenience, the New York Office has a Service Department, manned by factory-trained service engineers. This Department can supply prompt and efficient repairs or recalibration of any G-R equipment. Considerable time can be saved by taking advantage of these facilities.

The IEEE **Newsletter**

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P.O. Box 275 — Morris Plains, N. J.
Telephone: FOxcroft 6-1580

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ABOUT ADDRESS CHANGES

It is not necessary to inform the North Jersey Section when you change your mailing address. The NEWSLETTER and other section mailings use a list provided by IEEE's national headquarters in New York. This means the Section has no need to maintain a mailing list or addressing plates. Section membership records are changed when Headquarters notifies us.

**REPORT ALL ADDRESS CHANGES TO:
INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS INC., 345 EAST 47th STREET
NEW YORK, N. Y. 10017**

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Executive Committee Meeting
at Verona Public Library
November 3
December 1

NORTH JERSEY CALENDAR

Tuesday, November 16
COMTEC GROUP *See p. 5*
"Defense Communication Satellite Systems"
Fred J. Altman, System Sciences Corp.
8:00 P.M. — ITT Federal Labs Auditorium, Nutley

Thursday, November 18
POWER GROUP *See p. 5*
"Industrial Ground Relaying . . ."
E. C. Soares, Industrial Engineering Services
J. J. Stamato, Jersey Central - N. J. Power & Light Co.
R. Smithley, Federal Pacific Electric Co.
7:30 P.M. — Punch Bowl Room, Jersey Central - N. J. Power & Light Co., Morristown

NORTH JERSEY SECTION

NEWARK AIRPORT INSPECTION TRIP

Saturday Morning November 20, 1965 10:00 - 12:00 A.M.

The North Jersey Section IEEE has arranged with the Port of New York Authority to conduct an inspection trip of the facilities of Newark Airport on Saturday morning, November 20, 1965. The trip will include an inspection of the control tower, communication facilities, radar installation, runway lighting installations, and a tour of a hangar and a jet airliner. Guides and engineering personnel will be made available by the Port Authority to conduct the tour and answer our questions — so COME ON OUT!

For tickets and further information, write:
A. P. ZIMMERMAN
Room 3B - 220A
Bell Telephone Labs, Inc.
Whippany, N. J.

TOUR DETAILS

Bus transportation is required since private cars will not be permitted on the field. For this reason, a nominal charge of 75 cents per person will be required to offset the cost of the charter buses that will be used. The buses will pick up the members at two locations; one in the center of Newark and the other at the west end of the main passenger terminal at the airport according to the following schedule:

Leave Public Service Terminal,
Pine Street, Newark
9:30 A.M. Promptly.

Leave Airport Passenger Terminal
and begin tour
10:00 A.M.

Return Passenger Terminal
12:00 P.M.

Return Pine Street, Newark
12:15 P.M. (approx.)

Public parking facilities for members' cars are available in the vicinity of both pick-up points at moderate cost.

EARLY REGISTRATION FOR THIS TOUR IS ESSENTIAL!

Please send me ..... tickets at $0.75 each for the Newark Airport Inspection Trip.

Name .....

Address .....

.....

I will meet the tour bus at: (please check one)
☐ Pine Street, Newark
☐ Airport Passenger Terminal

Registration Deadline — NOVEMBER 12, 1965

Please enclose stamped, self-addressed envelope for a prompt return of your tickets.

MTT GROUP

NEW SOLID-STATE MICROWAVE AMPLIFIERS AND OSCILLATORS

by
R. S. Engelbrecht
Bell Telephone Laboratories, Inc.
Murray Hill, New Jersey

Increasingly, active semiconductor devices are replacing vacuum tubes in critical microwave system applications. Two recent advances in this field will be discussed in this talk:

1) Wideband transistor amplifiers have been developed for frequencies up to about 4 Gc.

2) Direct generation of microwave power has recently been accomplished with bulk semiconductors utilizing transit-time phenomena such as the "Gunn Effect."

The talk is to be given at 8:00 P.M. on Wednesday, November 17, 1965 at Bell Telephone Laboratories' Arnold Auditorium. There will be a pre-meeting dinner at 6:30 P.M. at Wally's Tavern on the Hill. See October issue for map.

STUDENT AFFAIRS

NCE Student Chapter Begins Active Year

With a central theme to link its programs and a new slate of officers to guide it, the Student Chapter at Newark College of Engineering has entered the 1965-66 academic year.

The engineer's relationship with the industrial world will flavor the majority of the chapter's speaking programs during the coming meetings. Coordinating these programs will be the new officers: Ron Poinsett has been elected as chairman; his vice-chairman will be William Hnat; and serving as secretary and treasurer will be Albert Nawy and Richard Salkie, respectively.

The first meeting of the chapter on September 24th was highlighted by an address from Mr. Walter Glomb, the chairman of the North Jersey Section. Engineer Glomb initiated the students to the work ahead by discussing the engineer and the IEEE. His talk was well received.

The October eighth program included an address by a spokesman from the National Aeronautics and Space Administration. At this meeting the students heard about the engineer's role in industry.

ANNUAL STUDENTS' NIGHT

FRIDAY, DECEMBER 3rd
7:30 P.M.
FAIRLEIGH DICKINSON UNIVERSITY GYMNASIUM
TEANECK

On the program:
Recruiter — Roadblock or Booster?

EXECUTIVE COMMITTEE COLUMN

HOW MUCH DO YOU KNOW ABOUT THE NORTH JERSEY SECTION OF IEEE?

Here is a quiz just for fun. No prizes are being offered. And after you've completed the quiz you won't have to rate yourself as "genius" or "nincompoop". The intent of the quiz is to give members a better understanding of the Section.

1. The North Jersey Section membership is approximately
   a) 3,000 b) 5,000 c) 7,500 d) 15,000
2. The Section has how many technical Group Chapters?
   a) 4 b) 6 c) 8 d) 10
3. The Section has how many Standing Committees?
   a) 4 b) 6 c) 8 d) 10
4. The Section has how many engineering college Student Chapters?
   a) 4 b) 6 c) 10 d) 12
5. Approximately how many events, including lectures, study programs, inspection trips, dinners and student meetings, were sponsored by the Section last year?
   a) 40 b) 50 c) 60 d) 75
6. The Section's Executive Committee consists of how many members?
   a) 3 b) 8 c) 15 d) 22
7. How many issues of the Section's publication, the Newsletter, were sent to you last year?
   a) 3 b) 6 c) 10 d) 12

ANSWERS TO QUIZ

Question — *Correct Answer*

1. b) The Section has approximately 5,000 members.
2. b) The Section has six group chapters, as listed below:
   Automatic Control
   Communication Technology
   Computer
   Engineering Writing and Speech
   Microwave Theory and Technique
   Power
   In addition to these, the Section also sponsors a number of joint Metropolitan Group Chapters with nearby Sections in New York and New Jersey. Chapter meetings are announced in the Newsletter and on bulletin boards. If you are interested in participating more fully in the activities of any Chapter, contact any member of the Executive Committee.
3. c) The Section has eight Standing Committees.
   Awards
   Education
   History and Procedures
   Membership
   Nominations
   Program
   Publications
   Student Affairs
   If you are interested in participating in the work of any of these committees you should contact a member of the Executive Committee.
4. a) The Section has four Student Chapters, as listed below:
   Fairleigh Dickinson University
   Newark College of Engineering (Day)
   Newark College of Engineering (Evening)
   Stevens Institute of Technology
5. c) Last year the Section sponsored approximately 60 events. These included lectures on dozens of technical subjects, three study courses, inspection trips to Newark Airport and Shea Stadium, a Fellow Recognition Banquet and a Student Night.
6. d) The Executive Committee has 22 members. It consists of 7 elected officers, the chairmen of the 8 Standing Committees and the 6 Group Chapters and a Group Coordinator. The names of the Executive Committee members are listed near the front of the Newsletter. These are the people to blame if you are not satisfied with Section performance.
7. c) You should have received 10 issues of the Newsletter from September to June last year. The Section's year begins on July 1.

STEPHEN A. MALLARD
Section Vice Chairman

POWER GROUP

Industrial Ground Relaying Can Be More Sensitive

Speakers: *Eustace C. Soares*
Consulting Engineer
Industrial Engineering Service
Jersey City

John J. Stamato
Assistant System
Relay Engineer
Jersey Central - New Jersey
Power and Light Company
Morristown

Richard Smithley
Manager of Consulting
Engineering
Federal Pacific
Electric Company
Newark

Date: Thursday,
November 18, 1965

Time: 7:30 P.M.

Place: Punch Bowl Room
Jersey Central - New Jersey
Power and Light Company
Madison Avenue at
Punch Bowl Road
Morristown, New Jersey

COMTEC GROUP

Defense Communication Satellite Systems

Speaker: Fred J. Altman

Place: ITT Federal Laboratories
Auditorium
Nutley, New Jersey

Date: Tuesday,
November 16, 1965

Time: 8:00 P.M.

The planning for both the Interim and the Advanced Defense Communication Satellite Program (DCPS) will be reviewed briefly. Detailed discussion will center on system aspects such as the following:

Satellite deployment, replenishment, visibility, bunching, conjunctions, and scheduling, stressing results of computer simulations.

Power budgets and statistical variations, adapted performance.

Problems of multiple access to a wideband hard-limiting heterodyne repeater.

Mr. Frederick J. Altman is director of the Systems Technology Division of System Sciences Corporation, Falls Church, Virginia, formerly ITT Intelcom and still affiliated with Communication Systems, Inc. of Paramus. Previous to his present work on the Defense Communication Satellite Program and other space-oriented projects he spent 16 years with ITT Federal Laboratories working chiefly on Doppler radar and tropospheric scatter projects. He has an M.S. degree from M.I.T. and has participated in several international conferences of the International Telecommunications Union.

PARTS, MATERIALS & PACKAGING GROUP RELIABILITY GROUP

Date: November 16, 1965
Place: Schweber Electronics, Westbury, L. I.

There will be a buffet from 6:00 P.M. to 7:45 P.M. The meeting will start at 8:00 P.M. The speakers will be Messrs. D. Feldman and M. C. Wooley of Bell Telephone Laboratories. For further details contact:

W. A. JASSON
Grumman Aircraft Engineering Corporation
Advanced Space Systems — Plant 5
(516 LR 5-7255)
Bethpage, L. I., New York

N. Y. POWER & INDUSTRIAL DIVISION

Two round table meetings are planned by the Power & Industrial Division of the IEEE. The meetings will be held at 6:30 P.M. on Tuesday, November 23, 1965 at Con Edison Co., 4 Irving Place, New York City. Refreshments will be served at 6:00 P.M. The program for that evening will be as follows:

Meeting No. 1
Grounding Practices on 277/480 Volt Systems

Meeting No. 2
New Concepts in Urban Underground Distribution

For further information, please call Ralph Droste at: 212—CH 4-8000, ext. 694.

Metropolitan Information Theory Group
Organization Meeting

Date: November 5, 1965
Time: 3:00 P.M.
Place: East and West Board Room (10 fl.)
United Engineering Center
345 East 47th Street, New York

The IEEE has approved the formation of a joint Chapter of the IEEE Information Theory Group in the North Jersey, New York and Long Island sections. The agenda for this organization meeting will be:

(a) Election of Officers
(b) Adoption of By-Laws
(c) Appointment of Committees
(d) Discussion of activities Chapter

Persons interested in actively participating in this Chapter by serving on committees, etc., are requested to contact the acting chairman, *Jack K. Wolf*, Polytechnic Institute of Brooklyn, 333 Jay Street, Brooklyn, New York (phone 212-643-3843) prior to the meeting.

N. Y. COMTEC
THE STATUS OF SOLID-STATE DEVICE TECHNIQUES IN RADIO RELAY SYSTEMS

SPEAKER:

L. G. Abraham, Director, Transmission Engineering Planning Center, Bell Telephone Laboratories.

The meeting will be held at 7:00 P.M. on *Wednesday, November 17, 1965* at the Willkie Memorial Building, 20 West 40 Street, New York City and admission is free.

ELECTRON DEVICES GROUP
Recent Developments in Solid-State Microwave Generators

Presented By: *Dr. Bernard C. DeLoach*
Bell Telephone Laboratories
Murray Hill, New Jersey
Date: November 18, 1965
Time: 8:00 P.M.
Place: General Telephone and Electronics Labs.
208-20 Willets Point Boulevard
Bayside, Long Island
Pre-Meeting Dinner: Kam Fong Restaurant
(6:00 P.M.)
19-11 Francis Lewis Boulevard
(near Willow Point Boulevard)
Whitestone, Long Island

NEW JERSEY COAST SECTION

Date: Wednesday, November 17
Time: 8:15 P.M.
Place: Little Silver Fire House, Prospect Avenue, Little Silver, New Jersey
Speaker: *Thomas D. Truitt*
Director, Advanced Development Department
Electronic Associates, Inc.
Title: Basic Hybrid Programming
Pre-Meeting Dinner: Pleasant Valley Inn
State Highway No. 34
Holmdel, New Jersey
6:00 P.M.

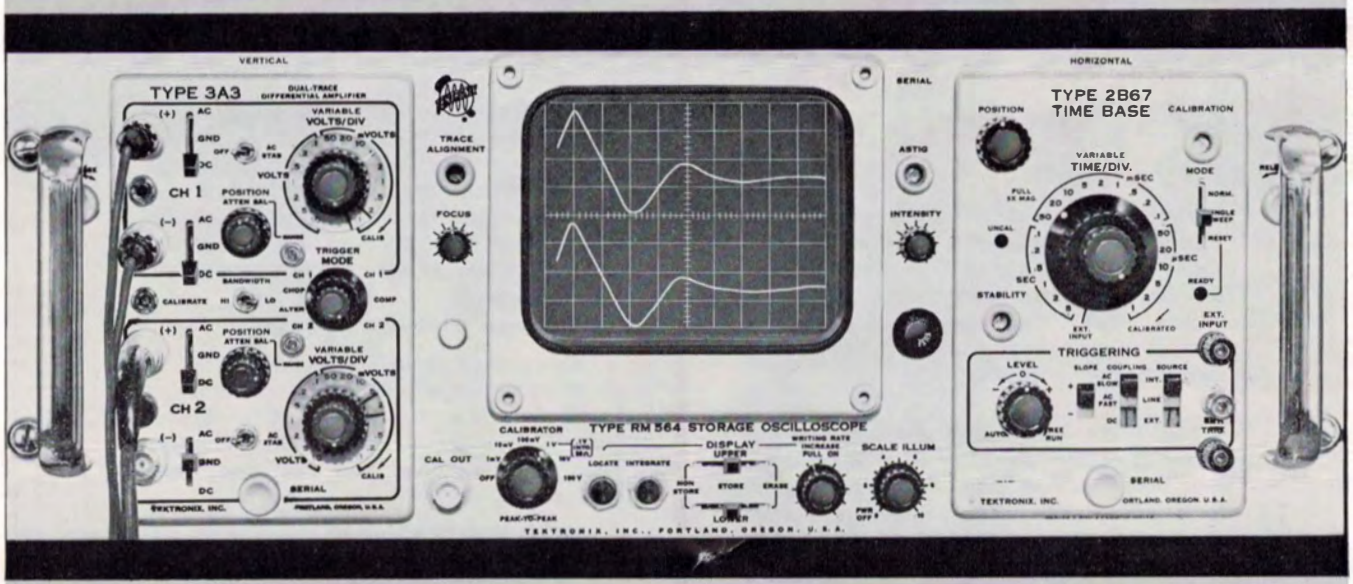
For reservations call (201) 542-1441.

Type RM564 TEKTRONIX general-purpose oscilloscope

with added feature of

STORAGE

SPLIT-SCREEN / permits simultaneous operation as a storage oscilloscope and as a conventional oscilloscope



■ presents stored or conventional displays—The Type RM 564 presents full-screen stored displays or full-screen conventional displays. Or—with the split-screen—stored displays can be presented on either the upper or lower half of the crt with conventional displays on the other half.

■ saves film—The Type RM564 permits detailed waveform analysis and simplified waveform comparisons, in many instances, without resorting to photography. Just store and analyze—for periods up to one hour, with quick erase in less than one-fourth second.

■ trace photography is easier and can cost less—Stored displays can be recorded at one's convenience, without the need for high-speed lens or film.

■ accepts combinations of 20 plug-in units—The Type RM564 adapts easily to such applications as multi-trace, low level differential, sampling, spectrum analysis, others—including matched X-Y displays using the same type amplifier units in both the amplifier and time-base channels.
Plug-in units offer capabilities from 100μV/cm sensitivity (3A3) and 10MHz passband (3A1, 3A6), to 0.5 μsec/cm sweep rate (3B1, 3B3) and sweep-delay applications (3B1, 3B2, 3B3).

■ saves space—The Type RM564 occupies **only 7 inches** of standard **rack height**, yet has a full 8-cm by 10-cm display area.

■ operates simply and reliably—Although capable of many sophisticated measurements, the Type RM564 retains the operating convenience of a conventional oscilloscope.

Display shows ability of the Type RM564 to store single-shot events. Waveforms represent displacement of leaf springs due to imparted shocks given them during test. Split-Screen Facility—with independent storage and erase of upper and lower half of the crt—permits easy comparison of test waveforms to a reference display.

Type RM564 Oscilloscope	$1035
Type 3A3 Dual-Trace Differential Amplifier Unit	790
Type 2B67 Time-Base Unit	210
18 other plug-in units available.	
Type 564 Cabinet Model also available with same performance specifications	950

U.S. Sales Prices f.o.b. Beaverton, Oregon
Oscilloscope prices without plug-in units

Tektronix, Inc.

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NEW INSTRUMENTS

HEWLETT-PACKARD OFFERS A LOW-COST, GENERAL PURPOSE COUNTER

Model 3734A is a compact new solid-state 2-mc electronic counter which makes a wide variety of measurements. With a built-in crystal time reference it measures frequency, makes period observations, calculates the average of multiple periods up to 100,000, and measures time intervals.

The 3734A indicates the ratio of two frequencies, or multiples of ratios. It will totalize random events over long or short periods, by local or remote control. Readout storage provides continuous display of the most recent measurement, even while the instrument is making a new measurement.

The high sensitivity and high input impedance of the HP Model 3734A Electronic Counter enable it to make accurate measurements of signals as low as 100 millivolts.

The compact form factor and light weight of Model 3734A make it especially suitable for experimental use. Seven inches high, it is only 11" deep and less than 8" wide. Model 3734A weighs 12½ pounds and costs $1075.

SANBORN MODEL 8875A FEATURES AMPLIFICATION OF LOW LEVEL SIGNALS

As a differential wideband, dc amplifier, the 8875A is used with modern data acquisition systems employing such devices as digital voltmeters, digital printers, analog digital converters, magnetic data recorders, oscillographs, and other readout instrumentation. The 8875A is packaged for use as a single-channel amplifier as well as for multi-channel use in 19-inch wide 10-unit banks.

Design characteristics of the Model 8875A make it particularly suitable for amplifying very low level signals such as those derived from thermocouples, dc excited strain gages, dc excited vibration sensors, and similar transducers.

The Model 8875A is a completely solid-state amplifier. It offers high gain (1-1000) with vernier control for variable settings between fixed steps, high rejection of common mode signals, and *extremely accurate amplification of low level signals in the presence of noise.* Since no chopper is used, complete freedom is obtained from intermodulation distortion caused by signals having harmonics in the vicinity of the chopper frequency.

Each 8875A Amplifier includes an integral power supply and measures only 4-3/4" high by 1-9/16" wide by 15" deep. The 8875A is priced at $495.00. And for complete details call or write your RMC Field Engineer.

HEWLETT PACKARD hp R·M·C SALES DIVISION

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