

# EDITOR'S PROFILE of this issue

*from a historical perspective ...*

with Paul Wesling, SF Bay Area Council GRID editor (2004-2014)

June, 1965:

Cover: Local IEEE members are on the program committee for this summer's WESCON, which will be held at San Francisco's Cow Palace.

Page 7: The retirement of Fred Terman, sponsor of the mid-Peninsula electronics industry and "Father of Silicon Valley", is announced. He goes on to consult with various universities and regional teams, including a group from New Jersey. His final report sets out how a graduate-level institution can be founded near Bell Labs, RCA, Johnson & Johnson and other companies; however, the committee's conclusion is that "Silicon Valley" cannot be replicated there. (The report itself is in the Terman Engineering Library at Stanford.)

Page 8: the (IRE) Component Parts Group and the (IRE) Product Engineering and Production Group are merging to form the IEEE Parts, Materials & Packaging Group, with Charles "Bud" Eldon (PEP founder) as its chair. The new group goes on to become the Components, Hybrids & Manufacturing Technology (CHMT) Society, then Components, Packaging & Manufacturing Technology (CPMT) Society, and finally the Electronics Packaging Society. I took over this Society's publications in 1976, serving as VP for nearly 3 decades.



Archive of available SF Bay Area GRID Magazines is at this location:

[https://ethw.org/IEEE\\_San\\_Francisco\\_Bay\\_Area\\_Council\\_History](https://ethw.org/IEEE_San_Francisco_Bay_Area_Council_History)

At time of scanning, the bound volumes are held by Paul Wesling.

July, 2021

Contact [p.wesling@ieee.org](mailto:p.wesling@ieee.org)

WESCON  
"team session"  
technical program  
innovation announced



IEEE  
*Grid*

June 1965  
SAN FRANCISCO SECTION  
INSTITUTE OF ELECTRICAL  
AND  
ELECTRONICS ENGINEERS

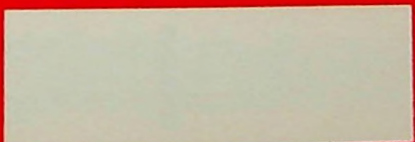
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attend WESCON  
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Aug. 24-27  
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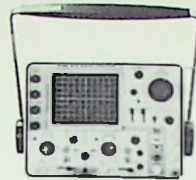
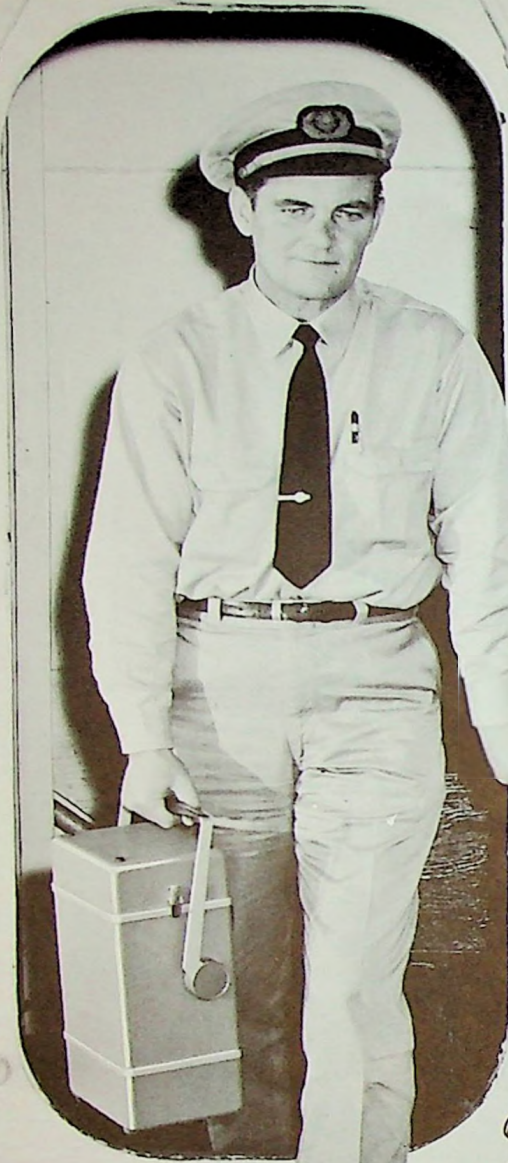


**meeting reminder**

- June 16 (Wednesday) Santa Clara Valley Subsection, Aerospace and Electronic Systems (Aerospace, Military Electronics, Space Electronics and Telemetry, Aerospace and Navigational Electronics), Electron Devices
- June 17 (Thursday) Information Theory, Vehicular Communications
- June 22 (Tuesday) Engineering Management, Space Electronics and Telemetry

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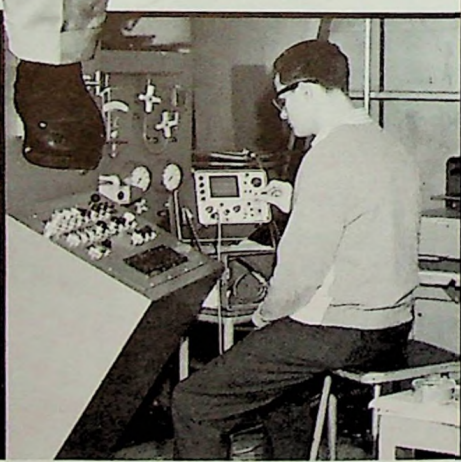
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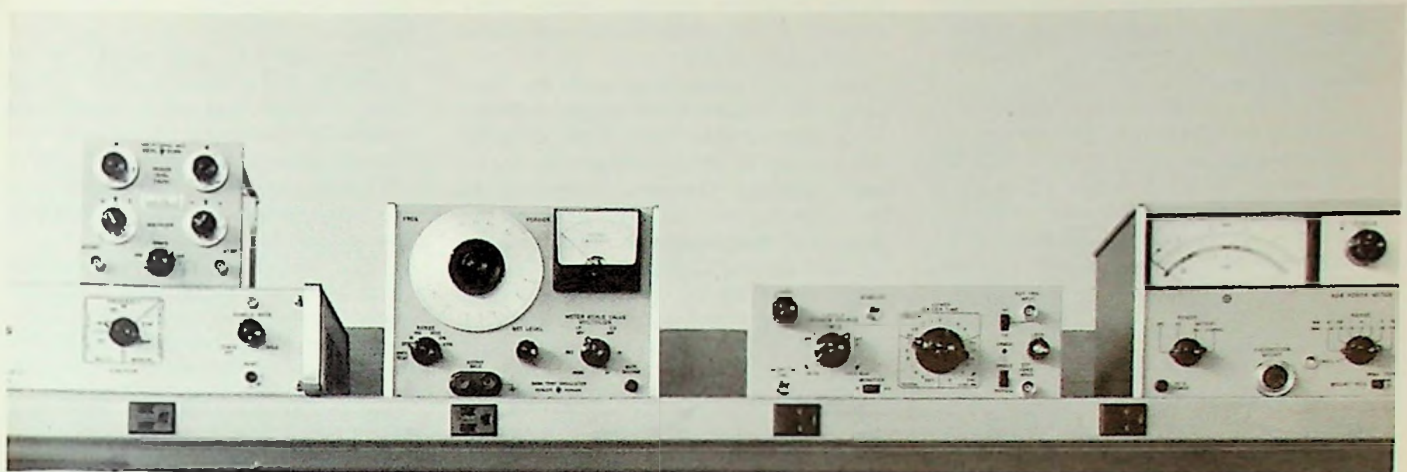
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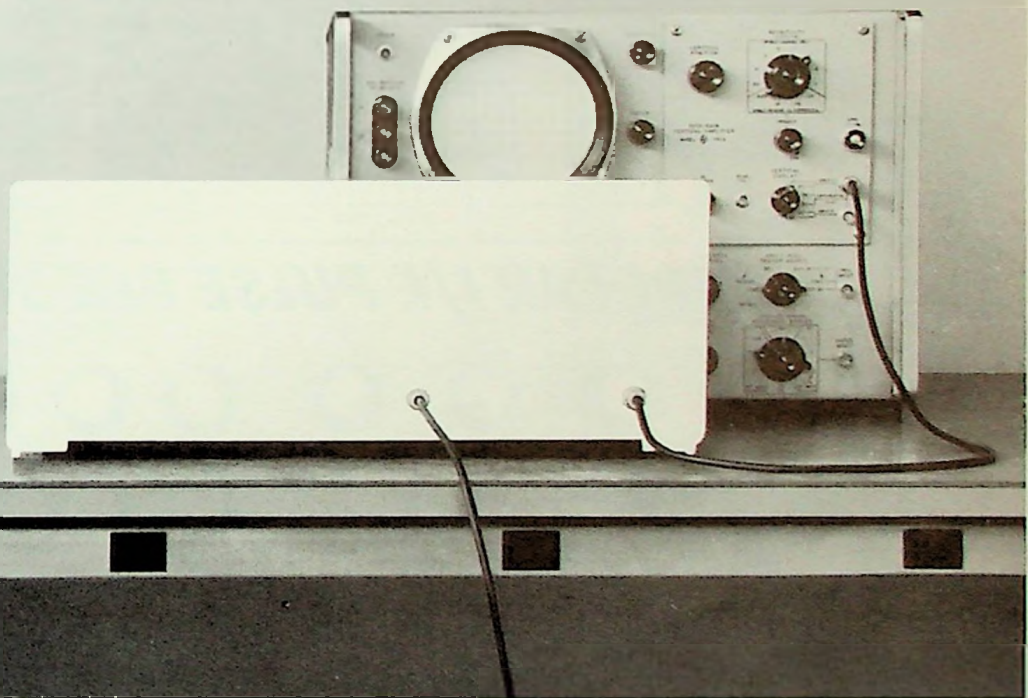


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**TEAM TECHNICAL SESSIONS TO BE INDUSTRY INNOVATION AT WESCON/65, COW PALACE, AUGUST 24-27**

Wescon has announced a technical program for its August 24-27 meeting at the Cow Palace that departs dramatically from previous convention presentations.

Of 25 technical sessions scheduled, all but five will feature "project teams" of engineers discussing a single project or program, it was announced by Drs. Donald Dunn and Richard Johnson, program co-chairmen, and Eugene L. Rogers, vice-chairman. Five "special" sessions will feature authors and panelists individually invited to participate, they said.

Twenty of the sessions were selected from proposals made by companies, universities, and military or private research centers, the chairmen reported. Each is to be made up entirely of papers authored by engineers from the proposing organizations or colleagues and consultants from other organizations contributing to the project under discussion.

The change, as explained by Dunn, is the difference between a convention made up of many submitted papers grouped under loose-fitting session titles, and one made up of specific session subjects, each one covered in considerable depth by closely related papers.

"In other words, the Wescon program is made up of 'session units' instead of the traditional 'single paper units,'" Dunn said.

Another innovation, new to Wescon, will be a continuing series of motion picture film presentations, to be shown on a regular schedule during each day of Wescon. They will be presented as a regular part of the technical program in a "film theater" at the Cow Palace. About 17 films were selected by the technical program committee for showing, and they will make up a six-hour program each day.

One major technical field trip has been planned, a two-hour tour of the Stanford Linear Accelerator Center (SLAC). The two-mile-long accelerator has a 15-billion-volt potential, largest in the world.

Wescon convention director John McCullough also confirmed arrangements for two concurrent symposia to be held during Wescon week in San Francisco. The IEEE Group on Electron Devices will hold a two-day, three-session symposium at the Fairmont Hotel August 23 and 24, and EDN will present the sixth annual International Electronic Circuit Packaging Symposium on the 23rd and 24th

at the San Francisco Hilton. The packaging meeting will present about 22 papers.

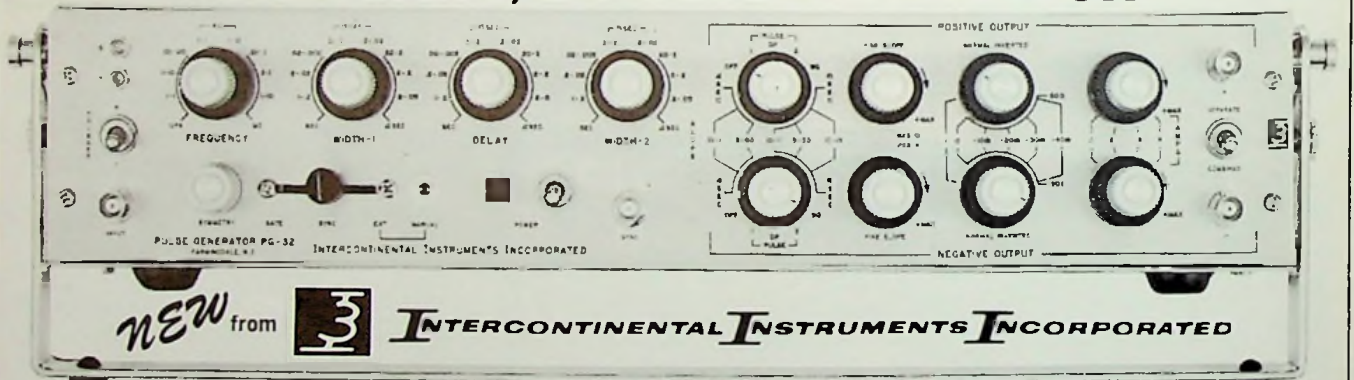
"Wescon has welcomed the two symposia," McCullough said, "because they provide the vital 'specialist-to-specialist' meeting environment within specific disciplines." He indicated the two events represent the kind of cooperative effort that Wescon will encourage in future years.

The exhibit at Wescon/65 will present about 1,050 product and equipment displays, all at the Cow Palace. They are departmentalized into seven interest categories, following a pattern set by the show in 1964 in Los Angeles. Anticipated attendance during the four-day show and convention is more than 35,000 persons, according to Don Larson, general manager.

The 11th annual Distributor-Manufacturer-Representative Conference, traditionally held the day previous to Wescon, has been scheduled for Monday, August 23, at the Jack Tar Hotel. About 400 persons will participate.

The July and August issues of the Grid-Bulletin, jointly published by the San Francisco Section and Los Angeles District, will be devoted entirely to Wescon and include the full technical program.

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section news

STUDENT COUNSELING

Nearly 1,000 San Mateo County high school students were counseled on careers as electrical/electronic engineers or electronic technicians at two booths sponsored by the San Francisco Section during the week of May 3-7 at county fairgrounds.

Nearly 15,000 students were counseled in 80 trades, occupations, and professions during the second annual occupational guidance center sponsored by the San Mateo County Industry-Education Council, superintendent of schools, and high school districts.

Counseling students in the IEEE booths were Dick Ollins, Ron Church, and Sam Terisi, Hewlett-Packard; Irwin Roth and Jack Willis, Ampex Corp.; George Phillips, Eitel-McCullough, Inc.; Fred Beale and Glenn Welsh, Lenkurt; Philip Fire, Sylvania; Alex Tseng, SLAC; Dick Honey and Jeffery Ball, SRI; Roy Hurd, Heald's Engineering College; John Bruce, University of Santa Clara; and Victor Siegfried, LMSC.

A similar event in which the Section plans to take part is tentatively scheduled for February 14-18, 1966, at the Santa Clara County Fairground, under the sponsorship of the county community educational resources council and office of education. About 30,000 high school students will be counseled during the event, an estimated 2,000 of them in electrical/electronic engineering and related fields.

In cooperation with the secondary education and education and student relations committees, the section office is developing a card file of members willing to serve occasionally as high school or college counselors. If you would like your name added, please call the section office.

The section hopes to greatly expand its counseling programs in the years ahead.

cover

Prominent IEEE members have traditionally played a major role in formation of the Wescon technical program, this year departing from the format of the past. Technical program steering committee headed by, from left, Co-Chairman H. Richard Johnson (Watkins-Johnson), Vice-Chairman Eugene L. Rogers (Microwave Electronics), and Co-Chairman Donald A. Dunn (Stanford Electronics Labs) made final selection of program sessions. Dunn was chairman of the San Francisco Section in 1961. Johnson is a Fellow.

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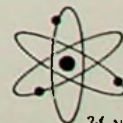
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## ACOUSTIC WAVES

The Electron Devices chapter June meeting will continue the discussion of acoustic wave interactions initiated by Dr. Robert Adler of Zenith Corp. at the February meeting.

Prof. Calvin F. Quate, Stanford University, will discuss acoustic waves at microwave frequencies, beginning with the problems of generating and transmitting these waves through crystals at room temperature. These films can be used efficiently to convert electromagnetic energy into acoustic energy; at 3 Kmc the intrinsic loss per centimeter of path length can be less than 1 db. These two facts open up a number of interesting applications for acoustic wave devices at microwaves.



Calvin F. Quate

A large part of the talk will be devoted to the traveling wave parametric interactions between acoustic waves and electromagnetic waves. All of the parametric systems, as classified by Barnes in terms of co-flow coupling, can be examined. In particular, parametric coupling with optical waves can be used to explain the Bragg diffraction of coherent light (Brillouin scattering) and the generation of intense sound beams from laser light.

Bragg diffraction of light from acoustic columns provides a means for deflecting, frequency shifting, and modulating a laser beam. It also furnishes an excellent probe for studying the properties of the acoustic column.

The generation of sound from laser light beams is a classical case of a parametric backward-wave oscillator and the start oscillator conditions, and other characteristics can be described in terms familiar to those in the field of microwaves. This phenomena accounts, in part, for the damage that occurs in transparent crystals when subjected to intense laser pulses.

In crystals which are piezoelectric, parametric coupling can be used to

(Continued on page 6)

## MEETING CALENDAR

## SANTA CLARA VALLEY SUBSECTION

7:00 P.M. • Wednesday, June 16

Wine-tasting dinner—ladies' night—outdoor steak dinner served

*Charles McKenna, host*

Place: Paul Masson Vineyards, Saratoga

Dinner: Evening, at the vineyard

Reservations: John May, 742-9155, or Don McCauley, 326-4350, Ext. 4757

## GROUP CHAPTERS

## Aerospace and Electronic Systems

8:00 P.M. • Wednesday, June 16

(Joint meeting of Aerospace, Military Electronics, Space Electronics and Telemetry, and Aerospace and Navigational Electronics, which are merging)

Thermoelectricity—the key to effective temperature control of components

*Bobby D. Johnson, national sales manager, International Energy Conversion, Inc.*

Place: Lockheed Auditorium, Bldg. 202, 3251 Hanover Street, Palo Alto

Dinner: 6:30 P.M., Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto

Reservations: Ralph Franks, 743-0525, by June 15

## Electron Devices

8:00 P.M. • Wednesday, June 16

Acoustic waves at microwave frequencies

*Calvin F. Quate, professor of applied physics and EE, Stanford*

Place: PH 101, Stanford University

Dinner: 6:00 P.M., Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto

Reservations: Mrs. Williams, 854-3300, Ext. 557, by June 15

## Engineering Management

8:00 P.M. • Tuesday, June 22

Computer aids to management

1) The administrative terminal system; *T. R. Runyan, marketing representative, Data Processing Division*

2) The chemistry program; *Dr. Richard S. Hirsch, manager of simulation and human factors, Los Gatos Laboratory*

3) The Stanford teaching terminal; *Dr. Hirsch*

Place: IBM West Coast Systems Laboratory, 6450 Guadalupe Mines Road, Los Gatos, near intersection of Hicks Road and Coleman. Use entrance opposite employee's parking lot

No dinner

## Information Theory

8:10 P.M. • Thursday, June 17

Recursive optimum nonlinear Bayes estimation

*Dr. Peter Swerling, independent consultant*

Place: SRI Conference Room B, 333 Ravenswood Avenue, Menlo Park

Dinner: 6:20 P.M., The Red Cottage, El Camino Real, Menlo Park

Reservations: Miss B. Serrano, 321-3399, Ext. 450, by June 16

## Military Electronics

8:00 P.M. • Wednesday, June 16

(Joint with Aerospace and Space Electronics and Telemetry, see above)

## Space Electronics and Telemetry

8:00 P.M. • Wednesday, June 16

(Joint with Aerospace and Military Electronics, see above)

## Space Electronics and Telemetry

8:15 P.M. • Tuesday, June 22

Pioneer spacecraft mission

*Emanuel H. Gross, project engineer, NASA Ames Research Center*

Place: Lockheed Auditorium, Bldg. 202, 3251 Hanover Street, Palo Alto

Dinner: 6:15 P.M., El Camino Bowl, 2025 El Camino Real, Mountain View

Reservations: C. Jamgotchian, 697-7774 by noon, June 21

## Vehicular Communications

7:30 P.M. • Thursday, June 17

Design of mobile telephone systems

*W. P. Fisher, Pacific Telephone Co., San Francisco*

Place: Pacific Telephone Auditorium, 140 New Montgomery Street, San Francisco

Dinner: 6:00 P.M., Rod's Frontier Restaurant, 30 Kearney Street, San Francisco

Reservations: Sue Day, 593-8491, by June 16

meeting ahead

### VALLEY WINE TASTING

Santa Clara Valley Subsection members and their ladies will enjoy a wine tasting and steak dinner at the Paul Masson Vineyards in Saratoga on June 16. Charles McKenna will be host.

Subsection officers for the coming year will be presented.

Because of limited parking and dining accommodations, reservations will be required and may be made by calling John May, 742-9155, or Don McCauley, 326-4350, Ext. 4757.



Peter Swerling

meeting ahead

### INFORMATION THEORY

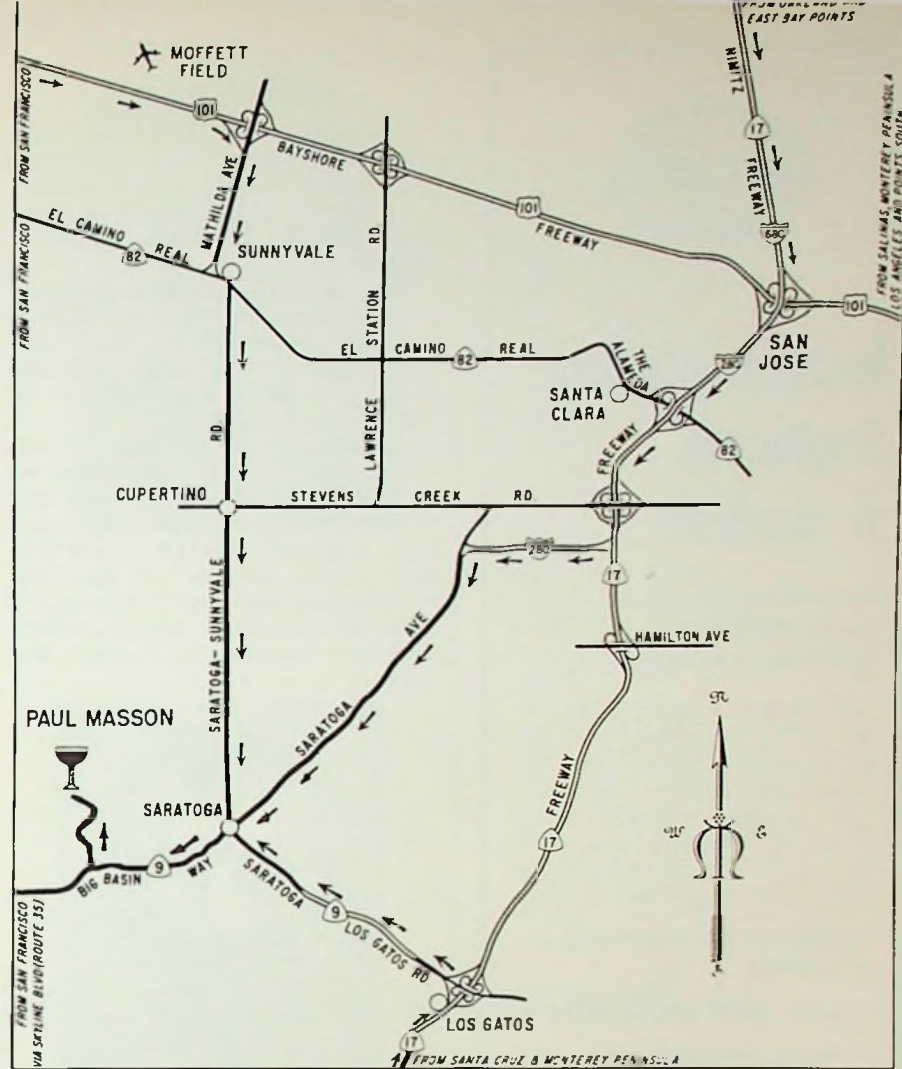
Dr. Peter Swerling, consultant, will address the June meeting of the Information Theory meeting on the subject of "recursive optimum non-linear Bayes estimation."

A recursive formulation will be stated for obtaining minimum mean square estimates of parameters upon which the observed data depend non-linearly, the form taken by this formulation exhibited in the case where the observation noise is white and additive.

By a limiting process, integro-differential equations are derived for the a posteriori probability distribution of the parameters and for the minimum mean square error estimates.

Using series expansions of the observation functions, the equations satisfied by the optimum parameter estimates are transformed into a set of non-linear partial differential equations, the solutions to which directly yield the minimum mean square parameter estimates.

The speaker is a graduate of Cal Tech, Cornell University, and UCLA, and before becoming an independent consultant in 1964, was a staff member of the RAND Corp., Conductor Corp., and the control systems laboratory of the University of Illinois. Theory of random noise, especially as applied to radar performance, has been his major field of research.



meeting ahead

### COMPUTERS IN MANAGEMENT DECISION MAKING COME OF AGE

The extension of the use of computers from principally clerical tasks to the role of assisting in management and management decision making has been a major objective of the computer industry. IBM's recent progress in this field will be demonstrated at the June meeting of the Engineering Management chapter at the IBM West Coast Systems Laboratory in Los Gatos.

T. R. Runyan, marketing requirements representative, Data Processing Div., will present and demonstrate a time sharing, real time, multi-processing system developed and marketed for the processing of unstructured data. Known as the administrative terminal system (ATS), the system can be used in technical writing, engineering changes, proposal preparation, source data entry, computer programming, and keypunching.

Dr. Richard S. Hirsch, manager of simulation and human factors, Los Gatos Laboratory, will present a random access image display employing a typewriter and a 1620 computer. He

will also demonstrate the "Stanford Teaching Terminal," the operation of one end of an experimental, on-line, remote input link between IBM and Stanford University for the purpose of investigating programmed teaching techniques.

Finding the laboratory: Consult local map for 6450 Guadalupe Mines Road, Los Gatos, which is near the intersection of Guadalupe Mines Road, Hicks Road, and Coleman. Alternatively, take Highway 17 to the Camden exit, which is 7½ miles from Bayshore Freeway. Exit at Camden, turn left to pass under freeway, drive 3½ miles on Camden to intersection of Hicks Road. (There is one troublesome intersection in this stretch. If in doubt, bear to the right.) Follow Hicks Road to the second stop sign. Continue straight ahead on Coleman, across narrow concrete bridge. Turn sharp right at next corner, drive one-quarter mile to 6450 Guadalupe Mines Road—the IBM ASD Laboratory on the left. Use entrance opposite employees' parking lot.





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*meeting ahead*

## PIONEER MISSION

Emanuel H. Gross, project engineer, NASA Ames Research Center, will discuss the Pioneer spacecraft mission at the June 22 meeting of the Space Electronics and Telemetry chapter.

Primarily concerned with spacecraft communication problems, Mr. Gross is a former staff member of the Wright Air Development Center and Dalmo Victor Co. He is a graduate of the University of Toledo.

He will discuss the launch, orientation, scientific, and engineering requirements of Pioneer and the subsystems for power, communication, data handling, orientation, and thermal control. As part of the DSIF tracking and data distribution, he will describe deep space nets, space flight operation facilities, and other data centers.



E. H. Gross

## MORE ACOUSTIC WAVES

convert energy from a microwave source into sound waves throughout the bulk of a crystal. This scheme holds promise of generating sound beams for greater intensity than can be generated with surface couplers.

Prof. Quate received the B.S. degree in electrical engineering from the University of Utah in 1944 and the Ph.D. degree from Stanford University in 1950. He became a member of the technical staff in the research department of the Bell Telephone Laboratories, Murray Hill, N.J., in 1949 and was engaged in research on electron dynamics in the microwave frequency region. In 1959 he joined the Sandia Corporation in Albuquerque, New Mexico. In September 1961 Dr. Quate was appointed Professor of Applied Physics and Electrical Engineering at Stanford University.

Since that time he has been engaged in research activities concerned with the interactions which can occur between electrons, electromagnetic waves, and acoustic waves.



B. D. Johnson

*meeting ahead*

## THERMOELECTRICITY

The newly merged Aerospace and Electronic Systems chapter (Aerospace, Military Electronics, Space Electronics and Telemetry, and Aerospace Navigational Electronics) will hear a discussion of thermoelectricity, "the key to effective temperature control of electronic components," at the June meeting.

Bobby D. Johnson, national sales manager of International Energy Conversion, Inc., Dallas, will discuss the background and basic theory of thermoelectric cooling and the application of systems in black boxes, semiconductor components, infrared detectors and sources, dew point indicators, and general uses.

The company was organized in 1963 by a group of former Texas Instruments staff members and is one of the few specializing entirely in the development and production of thermoelectric devices and associated power supplies/temperature control equipment used in laboratory, industrial, and military applications.

Mr. Johnson was previously engineering manager of the thermoelectric department at Borg Warner's Pesco Products Div. In this capacity he directed a major program involving new product development and the refinement of production techniques.

## UNIQUE

educational opportunities for the engineer are offered by the technical sessions of WESCON, August 24-27, Cow Palace. Clear your decks now to attend. Direct questions about tickets and reservations to

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**DR. TERMAN RETIRES**

Dr. Frederick E. Terman, vice president and provost of Stanford University, internationally famous radio engineer, and chief sponsor of the mid-Peninsula electronics industry, retires from the university at the end of the academic year August 31.

He received the first of a series of many retirement honors at the Stanford Campus Conference with a scroll extending the alumni association's "heartfelt thanks for his insight, industry, and inspiration."

"He has added immeasurably to the strength and stature of Stanford University," the resolution said, "through his untiring service since 1925, and as a teacher, department head, dean of the school of engineering, vice president and provost, and acting president in 1964.

"He has devoted his career to the task of drawing out the fullest possible potential in men, programs, and institutions."

Dr. Terman's famous "Radio Engineer's Handbook," written during his early years as an instructor, has been translated into 21 foreign languages, including (without credit) Russian.

His World War II work as director of Harvard's Radio Research Institute resulted in radar-jamming techniques which confounded the enemy and aided immeasurably the Allied war effort.

When Dr. Terman received the coveted Lamme Medal in 1964 from the American Society of Engineering Education, the ASEE's citation accurately summarized Dr. Terman's career: "... a distinguished educator ... (honored) for excellence in teaching and contributions to the art of teaching; contributions to research and technical literature, for achievements which contribute to the advancement of the profession, and for engineering administration."

His career spans 40 years as teacher, author, and administrator—most of the time at his alma mater and many times as adviser to various governmental departments.

He won his Bachelor's and Engineer's degrees in 1920 and 1922 at Stanford, and then studied under famed scientist Prof. Vannevar Bush at Massachusetts Institute of Technology to win his Sc.D. in 1924. Dr. Terman returned to Stanford in 1925 to teach electrical engineering and 12 years later became the head of his department.

For his World War II work at Harvard, he was decorated both by the British and the United States govern-



Frederick E. Terman

ments; the latter awarded him its highest civilian honor, the Medal for Merit. After the war he returned to head Stanford's School of Engineering, when he also began to lead the Stanford Industrial Park's development as an electronic manufacturing and research center. He was named Stanford provost in 1955, vice president in 1959, and served as acting president in 1964.

Among his writings are his definitive treatise on transmission line

theory, written with W. S. Franklin. His "Radio Engineering" has been reprinted and revised five times, most recently in 1955, to cover then-current innovations in the electronics field. Of his "Radio Engineer's Handbook," a wag, probably apocryphal, once remarked, "Every 'ham' on the face of the globe has carried that in his hip pocket at one time or another."

Dr. Terman is the son of the late Lewis Madison Terman, the famed Stanford psychologist whose pioneer work with "IQ tests" and long-range studies of gifted children are world-famous. They formed one of the few father-and-son listings in the annals of the National Academy of Sciences.

Chairman of the San Francisco Section (IRE) in 1939, Dr. Terman is also a past president of IEEE (IRE). Among the many honors he has received from the society are the Fellow grade, the Medal of Honor (1950), and the Founders Award (1963).

Dr. Terman's retirement life promises to be no less active than his academic career—he is a director of Hewlett-Packard Co., Ampex Corporation, and Watkins-Johnson Co.; vice chairman of Stanford Research Institute; and a consultant to or board member of innumerable governmental and educational agencies.

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## ANOTHER MERGER

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- Space instrumentation and space phenomena
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Abstracts of 100 to 300 words are



W. P. Fisher

*meeting ahead*

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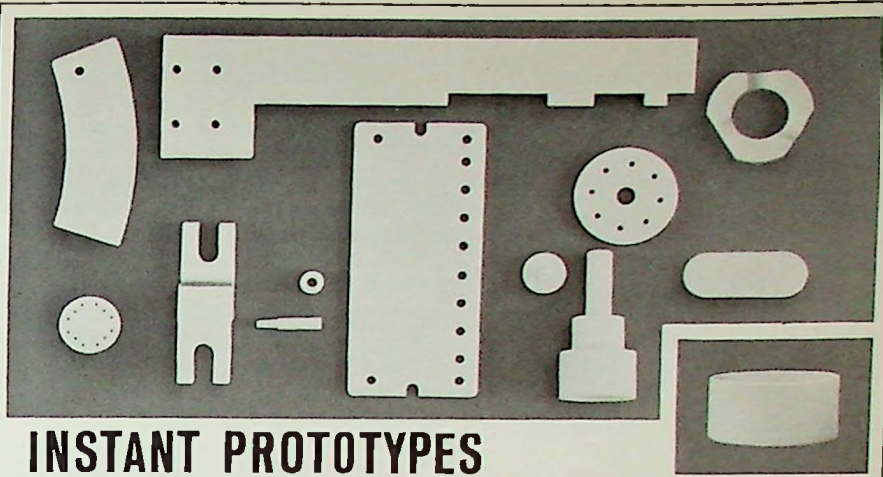
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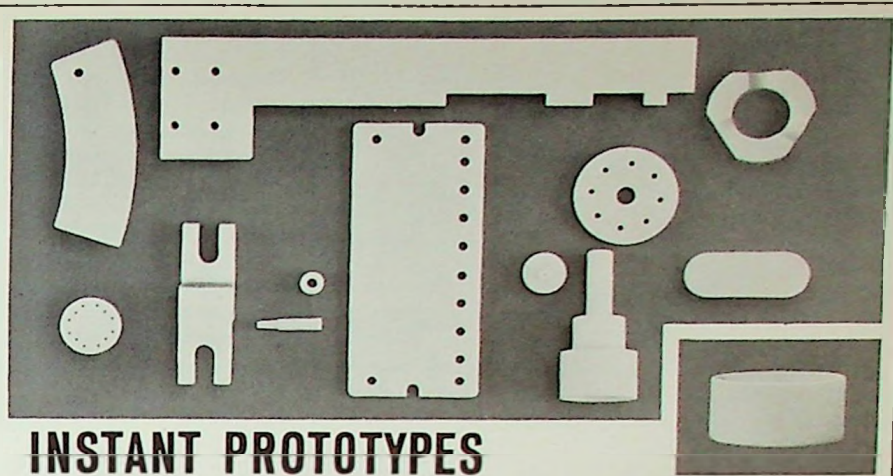
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### NEW WEEF PROGRAM

A new program to inform high school and junior high school guidance counselors about opportunities for students considering careers in electronics, was announced this week by the trustees of the Western Electronic Education Fund.

Two special grants of \$2,500 each were awarded to Arizona State University, Tempe, and Montana State College, Bozeman, to conduct seminars for guidance counselors in their states, according to Ellis F. King, chairman of the fund's board of trustees.

King, who is professor of electrical engineering at UCLA, said the \$5,000 in special grants are in addition to annual grants for scholarships. He announced scholarship funds of \$22,500 were awarded to 33 colleges and universities in 11 western states for the 1965-66 school year. Thirty schools share \$21,000 this year.

The WEEF board of trustees made the special grants to Arizona State and Montana State after reviewing proposals from 20 schools for additional ways to promote electronic engineering as a career.

"The 'counselor education' program will be conducted this year on an experimental basis," King said. "If it is successful, and if funds are available, it may be continued and expanded to other states."

The fund is an outgrowth of a scholarship program begun in 1952 by the Western Electronic Manufacturers Association. It is supported by contributions from individual electronics companies and the Western Electronic Show and Convention (Wescon).

Trustees, in addition to King, are C. Lester Hogan, general manager, Motorola Semiconductor Division, Phoenix; Stanley F. Kaisel, president, Microwave Electronics Corp., Palo Alto; and Howard Vollum, president, Tektronix, Inc., Portland.

Colleges and universities that received grants this year from WEEF include:

Arizona—Arizona State University, University of Arizona.

California—California Institute of Technology, California State Polytechnic College (Pomona and San Luis Obispo campuses), Harvey Mudd College, Long Beach State College, Loyola University, San Diego State College, San Jose State College, Stanford University, University of California (Berkeley, Davis, Los Angeles, and Santa Barbara campuses), University of the Pacific, University of San Fran-

### EE COUNSELING BOOK

"Engineering can be a most rewarding career, because it influences the whole structure of our civilization," says a former dean of the college of engineering at the University of California in Berkeley. John R. Whinnery, at present professor of electrical engineering, is editor of a new book, "The World of Engineering," published in April by McGraw-Hill.

The book is intended as an aid for high school graduates thinking of entering the engineering profession, for beginning students, and for their counselors. But because of its broad coverage, it will prove to be of considerable general interest to the educated layman as well.

Three other members of the college of engineering faculty at Berkeley contributed chapters to the book. L. R. Talbot, professor of aeronautical sciences, writes on "Energy Sources and Energy Conversion"; Charles Susskind, assistant dean of the college and director of its office of research services, writes on "Bioengineering"; and Morrough P. O'Brien, dean emeritus of the college and consulting engineer, writes on "The Engineering of Large Systems."

"Engineering can be an exciting profession," said Prof. Whinnery, "because of the rapidity of change in the tools used by engineers, and the products and systems they turn out. It is also a varied profession, with places for persons with a range of talents including the most analytic, the inventive, and the ability to work with people and society in using to the best advantage the products of the profession."

Late President Herbert Hoover contributed the prologue to "The World of Engineering," and Frederick E. Terman, vice president of Stanford University, prepared the chapter on "Engineering Growth and the Community."

Prof. Whinnery said, "The examples the authors used in some of the chapters . . . may be thought of as snapshots of the state of the art, of a present problem, or of an ingenious solution, and as such will remain valid after there are new problems or better solutions."

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cisco, University of Santa Clara, University of Southern California.

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**MORE SWINGS**

Dr. Leopoldo B. Valdes has been named manager of the newly created semiconductor devices research and development dept. at Watkins-Johnson Co., Palo Alto. The new activity has been formed within the electron devices division, of which Dr. Rolf W. Peter is manager.

Dr. Benjamin Epstein, Palo Alto consultant, has been awarded the electronics division award of the American Society for Quality Control for technical contributions to the reliability and quality control.

David D. Meacham has joined Pearson Electronics, Palo Alto, as chief engineer, having formerly been project engineer at Energy Systems, Inc., Palo Alto.

**MORE WEEF**

New Mexico — University of New Mexico.

Oregon — Linfield College, Oregon State University, Reed College.

Utah — University of Utah and Utah State University.

Washington — University of Washington and Washington State University.

Wyoming — University of Wyoming.



Dr. Richard F. Post, physicist at Lawrence Radiation Laboratory, Livermore, demonstrates "nuclear fusion, fact and fantasy" at the April meeting of the Nuclear Science chapter in Pleasanton.

*the section*

**MEMBERSHIP**

Following are the names of members who have recently entered our area, thereby becoming members of the San Francisco Section:

- |                     |                      |
|---------------------|----------------------|
| J. Anderson         | R. E. Jachowski      |
| D. B. Armstrong     | C. W. Joe            |
| T. G. Ashmore       | S. Kejrwal           |
| L. V. Benson        | E. H. Kopf           |
| C. Berger           | H. S. Lala           |
| H. C. Beardman, Jr. | A. U. Lamm           |
| B. F. Borow         | H. D. Limbaugh       |
| F. D. Brandt        | P. A. Lindfors       |
| E. S. Bussy, Jr.    | P. A. Logan          |
| H. H. Carmel        | R. W. May            |
| J. S. Chadwick      | T. L. Mayes, Jr.     |
| J. N. Dahl          | R. T. McBride        |
| M. S. Dayton        | R. L. McCreary       |
| R. C. Davi          | R. J. Meddaugh       |
| J. W. Davis         | M. A. Medina         |
| G. E. Deadrick      | M. A. Metzler        |
| Charles W. Diem     | R. W. Moore          |
| D. W. Drews         | P. E. Oshorn         |
| R. C. Durbeck       | J. K. Ouimet         |
| R. D. Fenn          | N. B. Palmquist, Jr. |
| L. V. Franklin, Jr. | J. Pearlman          |
| R. L. Franks        | J. C. Perryman       |
| R. G. Gallager      | I. A. Pinkis         |
| J. E. Gardner       | R. A. Schmitter      |
| G. D. Grant         | D. L. Scofield       |
| C. C. Green         | D. K. Shaffer        |
| J. P. Grim, Jr.     | R. A. Singer         |
| R. R. Harrington    | R. Singh             |
| N. L. Harvey        | J. C. Ulrich         |
| R. L. Hickling      | K. Urbach            |
| G. D. Hornbuckle    | D. B. Warner         |
| G. W. Howe          | P. B. Whitehead      |
| H. D. Huskey        | R. W. Wolverson      |
| D. M. Inouye        | E. E. Wood           |

J. L. Zygielbaum

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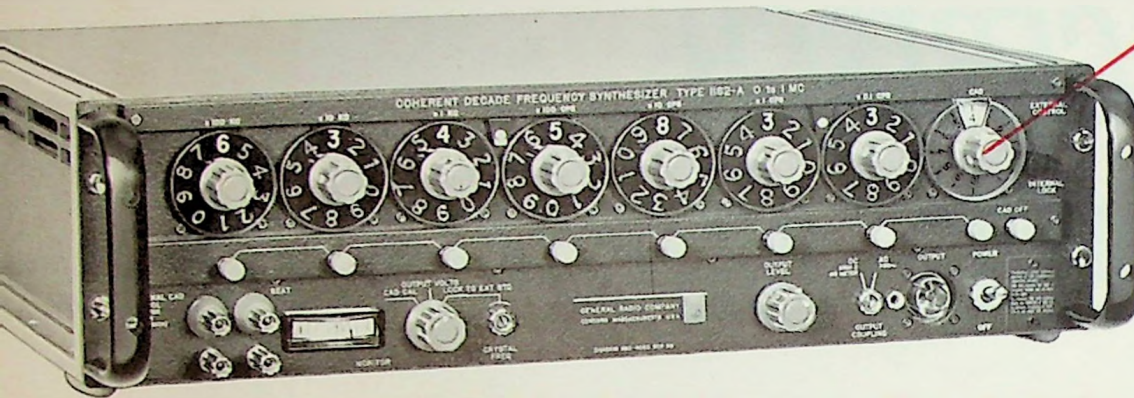


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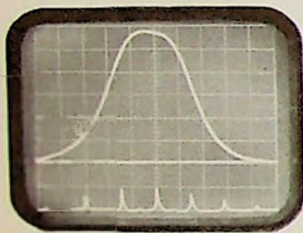
# Sweep a fraction of a cycle or a frequency band of several kilocycles ...as slow or as fast as you wish with these Frequency Synthesizers



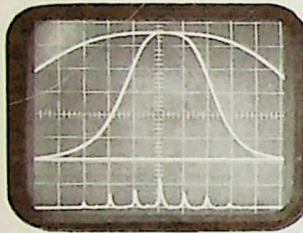
## The Continuously Adjustable Decade (CAD)

An optional module of GR's new Coherent Frequency Synthesizers allows manual or electronic sweeping of the frequency range, entirely or partially, at sweep widths as great as 1 Mc/s. Control range is selectable, in decade steps, by pushbuttons. With this CAD module and some simple external circuitry, you can perform a variety of sweep-frequency measurements, complete with precision markers.

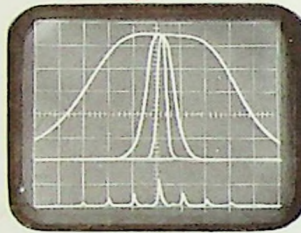
## For Oscilloscope Presentation...



1.5-c MARKERS  
3-c Pass Band



1.0-c MARKERS  
3-c and 10-c Pass Bands

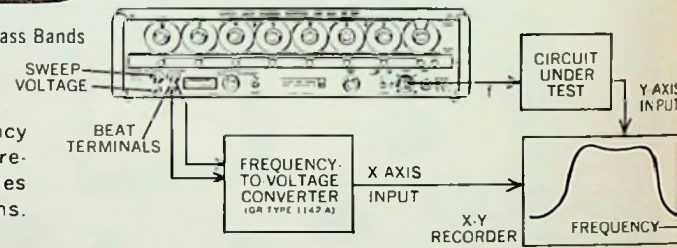


10-c MARKERS  
3-c, 10-c, 50-c Pass Bands

Here GR's 100-kc synthesizer is sweeping 3-, 10-, and 50-cycle filter pass bands. Notice that the center-frequency and side-frequency markers (generated with the aid of simple external circuits) are precisely located on the bottom trace.

## For X-Y Recording...

Sweeping the CAD also produces a directly proportional frequency at the BEAT terminals. This frequency, when applied to a frequency-to-voltage converter such as the GR Type 1142-A, provides a linear x-axis whose scale length is selectable by pushbuttons. The scale length can be set from millicycles to kilocycles.



## Now let's take a look at some of the other features of these GR synthesizers

Frequency is quickly and precisely set by dials on the digit-decade modules; it takes less time than dialing a telephone number. As few as 3 and as many as 7 of these modules can be supplied on an instrument. Each additional module increases frequency resolution by a factor of 10. A new remotely programmable module can be substituted for any of the standard modules to provide local/remote operation of any or all decades up to, and including, the 100-kc-per-step decade. A third module, the Continuously Adjustable Decade, can be included to provide manual or electronic sweeping of a range as great as 1 Mc/s or as small as desired. The CAD also adds two or more significant figures in selection of frequency.

All the synthesizer's signals are frequency coherent

with the output of a single, built-in, room-temperature primary crystal oscillator. Output level is adjustable up to 2 volts into 50 ohms. The 3 basic models produce maximum frequencies of 100 kc/s, 1 Mc/s, and 12 Mc/s, respectively. Each can be ordered initially with the minimum of 3 digit-decade modules; additional decades, the continuously adjustable decade, and/or remotely programmable modules can be ordered as the need arises.

All these features of GR's new frequency synthesizers provide the laboratory or production-test area with a significantly new measuring capability at a reasonable price. Prices start at \$3200 for a 100-kc model with 3 digit-decade modules. A total of 60 standard models are presently offered.

Please write for complete information.



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