

IEEE *Grid*

JUNE 1966

SAN FRANCISCO SECTION
INSTITUTE OF ELECTRICAL
AND
ELECTRONICS ENGINEERS



Aloha-Attend

IEEE  1966

OCEAN ELECTRONICS
SYMPOSIUM

HONOLULU

August 29-30-31



The growth of world-wide demand for Varian products in commercial, military, and industrial markets is providing new career opportunities for engineers. The following positions are among those now available:

<p style="text-align: center;">APPLICATION ENGINEER</p> <p>Provide support to marketing functions in the chemical, electronic, and vacuum fields. Duties will include new equipment evaluation, analysis of customer requirements and samples, and direct support of field sales activities.</p>	<p style="text-align: center;">LINEAR ACCELERATOR DESIGN</p> <p>Electrical engineering positions with design responsibilities on special electron linear accelerator projects. Requires B.S. or M.S. in E.E. and microwave engineering experience in areas such as high voltage, pulse, and servo circuits; microwave structure and electron gun design; beam optics; etc.</p>	<p style="text-align: center;">ELECTRICAL ENGINEER OR PHYSICIST</p> <p>Electrical Engineer or Physicist for product development in the field of Electron Paramagnetic Resonance. Requirements include: MS and 3 years experience including instrument development; or PhD. A specific knowledge of EPR and microwave and transistor circuits is desirable.</p>
<p style="text-align: center;">DEVELOPMENT ENGINEER</p> <p>Responsible for design and development of precision electronics equipment. Should have aptitude for advanced concepts important to frequency standards. Hydrogen masers and magnetometers. BS or MS in Physics or EE and desire to progress in growing division.</p>	<p style="text-align: center;">TUBE ENGINEERS</p> <p>Experience in design, development, or manufacture of klystrons, BWOs, or TWTs. Should be familiar with microwave techniques and vacuum tube engineering. Experience in systems and evaluation helpful.</p>	<p style="text-align: center;">MICROWAVE ENGINEER</p> <p>MSEE or equivalent. Requires understanding of electromagnetic and semiconductor device theory. Determine properties of and design techniques for microwave semiconductor devices.</p>

Many other technical and professional openings also exist and all inquiries will be welcomed. Successful candidates for these positions will work with technical staff members noted in the industry. Varian is one of the leading employers in Northern California, noted for its unique living, cultural, and educational environment.

For consideration of your qualifications, submit a resume in confidence to:

Technical Employment Manager



611 Hansen Way • Palo Alto, California

an equal opportunity employer

REAL MEASURE OF PERFORMANCE:

Exclusive with the 175A Oscilloscope:

20 MHz bandwidth at 1 mv/cm sensitivity, 50 MHz at 10 mv/cm, dual-channel!

4-channel 40 MHz bandwidth plug-in!

Plug-in recorder, pushbutton trace recordings with 30 MHz bandwidth!

Plug-in trace scanner for high resolution recording on external x-y recorder!

Time mark generator plug-in for 0.5% accuracy time measurements!

Mixed sweep for error-free time interval measurements!

Measurement performance is what you get with the 175A 50 MHz Scope, performance not available elsewhere. The performance spotlighted above is yours with the 175A... high sensitivity and bandwidth for dual- or 4-channel broadband measurements, inexpensive recordings of signals (improves signal to noise ratio of noisy signals, plus it gives clear recordings of dim low-duty-cycle signals), the unique benefits of a delay generator plug-in... all exclusive with the 175A. And 14 plug-ins to choose from, for maximum versatility to match your specific application.

And every combination of scope and plug-ins gives you Hewlett-Packard design and manufacturing quality. Backed up, too, by your Hewlett-Packard field engineer, who can help solve your measurement problem with a scope or with other tools from the broad line of high-quality instrumentation he offers.

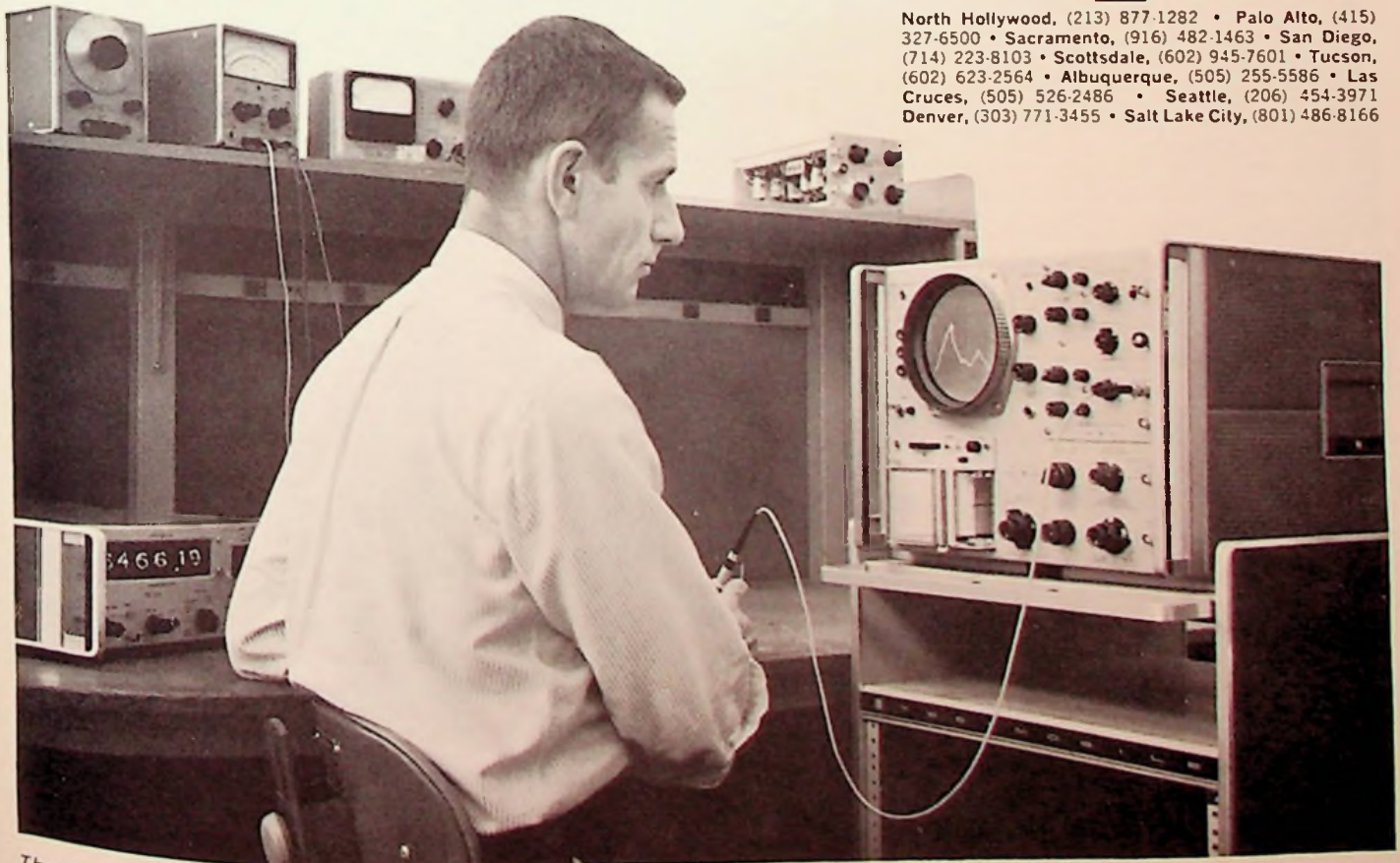
Give him a call. Take a look at the 175A Scope. A comparison with other scopes will show you the real measure of performance you get exclusively from Hewlett-Packard.

- 175A Oscilloscope, \$1325
- 1755A 50 MHz Dual-Trace Vertical Amplifier, \$575
- 1754A Four-channel Vertical Amplifier, \$595
- 1784A Recorder Plug-in, \$775
- 1782A Trace Scanner, \$425
- 1783A Time Mark Generator, \$130
- 1781B Delay Generator, \$325

Prices f.o.b. factory.

**HEWLETT
PACKARD**  **NEELY**
SALES DIVISION

North Hollywood, (213) 877-1282 • Palo Alto, (415) 327-6500 • Sacramento, (916) 482-1463 • San Diego, (714) 223-8103 • Scottsdale, (602) 945-7601 • Tucson, (602) 623-2564 • Albuquerque, (505) 255-5586 • Las Cruces, (505) 526-2486 • Seattle, (206) 454-3971 • Denver, (303) 771-3455 • Salt Lake City, (801) 486-8166



The 175A Scope, 1755A Vertical Amplifier Plug-in and 1781B Sweep Delay Generator give you the exclusive 20 and 50 MHz dual-channel performance listed above—for only \$2225!



The growth of world-wide demand for Varian products in commercial, military, and industrial markets is providing new career opportunities for engineers. The following positions are among those now available:

<p style="text-align: center;">APPLICATION ENGINEER</p> <p>Provide support to marketing functions in the chemical, electronic, and vacuum fields. Duties will include new equipment evaluation, analysis of customer requirements and samples, and direct support of field sales activities.</p>	<p style="text-align: center;">LINEAR ACCELERATOR DESIGN</p> <p>Electrical engineering positions with design responsibilities on special electron linear accelerator projects. Requires B.S. or M.S. in E.E. and microwave engineering experience in areas such as high voltage, pulse, and servo circuits; microwave structure and electron gun design; beam optics, etc.</p>	<p style="text-align: center;">ELECTRICAL ENGINEER OR PHYSICIST</p> <p>Electrical Engineer or Physicist for product development in the field of Electron Paramagnetic Resonance. Requirements include: MS and 3 years experience including instrument development; or PhD. A specific knowledge of EPR and microwave and transistor circuits is desirable.</p>
<p style="text-align: center;">DEVELOPMENT ENGINEER</p> <p>Responsible for design and development of precision electronics equipment. Should have aptitude for advanced concepts important to frequency standards. Hydrogen masers and magnetometers. BS or MS in Physics or EE and desire to progress in growing division.</p>	<p style="text-align: center;">TUBE ENGINEERS</p> <p>Experience in design, development, or manufacture of klystrons, BWOs, or TWTs. Should be familiar with microwave techniques and vacuum tube engineering. Experience in systems and evaluation helpful.</p>	<p style="text-align: center;">MICROWAVE ENGINEER</p> <p>MSEE or equivalent. Requires understanding of electromagnetic and semiconductor device theory. Determine properties of and design techniques for microwave semiconductor devices.</p>

Many other technical and professional openings also exist and all inquiries will be welcomed. Successful candidates for these positions will work with technical staff members noted in the industry. Varian is one of the leading employers in Northern California, noted for its unique living, cultural, and educational environment.

For consideration of your qualifications, submit a resume in confidence to:

Technical Employment Manager



611 Hansen Way • Palo Alto, California

an equal opportunity employer

REAL MEASURE OF PERFORMANCE:

Exclusive with the 175A Oscilloscope:

20 MHz bandwidth at 1 mv/cm sensitivity, 50 MHz at 10 mv/cm, dual-channel!

4-channel 40 MHz bandwidth plug-in!

Plug-in recorder, pushbutton trace recordings with 30 MHz bandwidth!

Plug-in trace scanner for high resolution recording on external x-y recorder!

Time mark generator plug-in for 0.5% accuracy time measurements!

Mixed sweep for error-free time interval measurements!

Measurement performance is what you get with the 175A 50 MHz Scope, performance not available elsewhere. The performance spotlighted above is yours with the 175A...high sensitivity and bandwidth for dual- or 4-channel broadband measurements, inexpensive recordings of signals (improves signal to noise ratio of noisy signals, plus it gives clear recordings of dim low-duty-cycle signals), the unique benefits of a delay generator plug-in...all exclusive with the 175A. And 14 plug-ins to choose from, for maximum versatility to match your specific application.

And every combination of scope and plug-ins gives you Hewlett-Packard design and manufacturing quality. Backed up, too, by your Hewlett-Packard field engineer, who can help solve your measurement problem with a scope or with other tools from the broad line of high-quality instrumentation he offers.

Give him a call. Take a look at the 175A Scope. A comparison with other scopes will show you the real measure of performance you get exclusively from Hewlett-Packard.

- 175A Oscilloscope, \$1325
- 1755A 50 MHz Dual-Trace Vertical Amplifier, \$575
- 1754A Four-channel Vertical Amplifier, \$595
- 1784A Recorder Plug-in, \$775
- 1782A Trace Scanner, \$425
- 1783A Time Mark Generator, \$130
- 1781B Delay Generator, \$325

Prices f.o.b. factory.

**HEWLETT
PACKARD**  **NEELY**
SALES DIVISION

North Hollywood, (213) 877-1282 • Palo Alto, (415) 327-6500 • Sacramento, (916) 482-1463 • San Diego, (714) 223-8103 • Scottsdale, (602) 945-7601 • Tucson, (602) 623-2564 • Albuquerque, (505) 255-5586 • Las Cruces, (505) 526-2486 • Seattle, (206) 454-3971 • Denver, (303) 771-3455 • Salt Lake City, (801) 486-8166



The 175A Scope, 1755A Vertical Amplifier Plug-in and 1781B Sweep Delay Generator give you the exclusive 20 and 50 MHz dual-channel performance listed above—for only \$2225!

Up in Seattle, we make basic tools for precision electronic measurement. We make them well. If you think you'd like to help us make them even better and live in the Great Northwest too, let's talk.

For almost a generation, we (The John Fluke Mfg. Co., Inc.) have been one of the world's leaders in metrology. Recently, the demand for our quality instrumentation has created a number of unusually fine professional employment opportunities.

So if you want to join a medium size, well-respected company where your contribution stands out and your identity means something to everyone from the president on down, this is a grand opportunity. Our engineers work in a sophisticated technical environment with great personal freedom to pursue design problems as they see fit. We pick up the total tab on a company-sponsored graduate program for eligible personnel at the University of Washington (now widely regarded as one of the 10 best universities in the Nation).

But, though the job is the main thing, living in the Pacific Northwest shouldn't be ignored either. About 85% of our employees live on wooded acres within 10 minutes of the plant. You can buy twice the house in Seattle for the same dollars you spend in San Francisco or Los Angeles. And the taxes aren't too steep either (there is no state income tax).

Schools are good. The State of Washington ranks among the first three in literacy and number one

in terms of college graduates per thousand population. Art, theatre and music flourish in the great new Seattle Center, built for the World's Fair.

If the outdoors is your after hours bailiwick, Washington State offers great skiing (with short lift lines), the nation's best boating, outstanding hunting and fishing (sometimes, the other guy on the stream is five miles away), and fine hiking and climbing.

The company offers in addition to your salary (which is as good or better than anywhere else) profit sharing, medical insurance, and retirement benefits. So if all this excites you and you fit one of the job descriptions below, write our Engineering Manager, Mr. Ted Thomsen, in confidence. Interviews will be arranged in Los Angeles, San Francisco, or Seattle at your convenience. Please address Mr. Thomsen at P. O. Box 7428, Seattle, Washington.

Design or Senior Engineers with communication theory background and/or interest in digital circuits. Preferably an MSEE. Minimum experience, two years. Should be familiar with digital circuit design and frequency calibration techniques.

Design or Senior Engineer with minimum of one year's experience in feedback, digital and analog circuitry. Applicant

should be familiar with differential amplifiers, amplifier and feedback design, AC-DC converters, and state of the art measurement instruments. MSEE desired.

Associate Engineer with good scholastic record and BSEE. No experience necessary. Applicant should have an interest in analog and/or digital circuit design and knowledge of solid state circuitry.

Electronic Package Design Engineer with either BSEE or BSME. Applicant should be familiar with packaging methods in the MHz to 10 GHz region. Two to six years' experience with good mechanical design aptitude required.

Industrial Engineer with three years' experience in electronics or associated industry. Should possess a BSIE. A BSEE or BSME is acceptable if applicant has industrial experience. Candidate must have knowledge of methods, value, and process analyses, and work simplification.

Senior Production Engineer with four years' experience. Should be a mechanical engineer familiar with electronics or an electronic engineer familiar with mechanical engineering. Applicant must possess a BSME or BSEE. Must be able to carry new product from design to production.

AN EQUAL OPPORTUNITY EMPLOYER



Published monthly except July and August
by San Francisco Section,
Institute of Electrical and Electronics Engineers

address all mail to
IEEE, Suite 2210, 701 Welch Road
Palo Alto, California 94304
Telephone: (415) 327-6622

Members: send address change promptly to
IEEE, 345 East 47th St., New York, N.Y. 10017
Send copy of letter to Section Office

executive editor:
JAMES D. WARNOCK

advertising director:
ERNESTO A. MONTANO

editorial & advertising assistant:
MRS. JEAN HELMKE

subscriptions:
\$4.00 (members); \$6.00 (others);
overseas, \$7.00 per annum

contents

- The Section-Membership—3
- Remarks from the Chairs—4
- Meetings Ahead—5,6
- Meeting Calendar—5
- Events of Interest—6,7,9,10,11,12,16
- Educational Notes—8,9
- WEMA News—10
- Student Branch News—11
- Region 6 News—12
- WESCON News—12
- Grid Swings—13,14
- Mfgr./Rep. Index—15
- Advertisers Index—16
- Classified Advertising—16

san francisco
section officers

Chairman: Jack L. Melchor
 Vice Chairman: E. H. Hulse
 Secretary: Fred J. MacKenzie
 Treasurer: J. E. Barkle
 Membership Chairman: John Damonte,
 Dalmo Victor, 591-1414

Publications Advisor:
 David Kirby
 Hewlett-Packard, 326-7000

Executive Secretary:
 James D. Warnock,
 Section Office, Suite 2210, 701 Welch Road
 Palo Alto, California, 327-6622

Second class postage paid at San Francisco

advertising

California & National: E. A. Montano, IEEE,
 701 Welch Rd., Palo Alto, Calif. (415) 327-6622
 East Coast: Cal Hart, Martin & Hart,
 25 W. 43rd St., New York, N.Y., LW 4-1290



Cristal



Huntley

the section

MEMBERSHIP

The following members have recently
been transferred to the grade of Senior
Member:

- Edward G. Cristal
- Wright H. Huntley, Jr.

Following are the names of individuals
who have been elected to current
membership:

- | | |
|-----------------------|---------------|
| R.L. Castleberry, Jr. | R.F. Helmke |
| C.E. Cunningham | V.H. Reynolds |
| J.L. Dake | L.E. Walker |

*Share the
responsibility*

FOR THE SECTION
AND YOUR GROUP
CHAPTER

Take part in the
membership pledge
program. Bring in
at least one new
member in '66.

grid errata

PAST SECTION CHAIRMEN

More past section chairmen than met
the eye were present at the April 20
pioneers' night meeting and appeared
in the photograph in the May Grid.

They were Donald I. Cone, 1926-27;
Leonard Fuller, 1927-28 through 1930-
31; Ralph Heintz, 1931-32; Charles
Litton, 1932-33 and 1933-34; Frederick
E. Terman, 1938-39, and L.E. Reukema,
1947-48 and 1948-49.

cover

The Ocean Institute, Makapu, Oahu,
will be the locale of one of the field
trips of the symposium described on the
sign held by the young Polynesian lady
at Sea Life Park. Note the leaping
dolphins in the left background. The
institute's "Man-in-the-Sea" program
directed by Taylor A. Pryor, also a
state senator, one of the new breed of
islanders leading Hawaii to scientific
excellence. See page 7 for more on
the symposium.

BRILL
OAKLAND • MOUNTAIN VIEW



YOUR RCA
DISTRIBUTOR
FOR TUBES
SEMI-CONDUCTORS
TEST
EQUIPMENT

Available off-the-shelf for
immediate delivery from
both our Oakland and Mt.
View warehouses.



BRILL
ELECTRONICS

OAKLAND - 610 E. 10th St. Phone 834-5888
MOUNTAIN VIEW - 1065 Terra Bella Phone 961-1500



Melchor

Granger

remarks from the chairs

CHAIRMAN'S FAREWELL

Dr. Jack L. Melchor, general manager of -hp associates- and section chairman, ends his term of office June 30. He speaks with broad section experience, having served previously as treasurer, secretary, vice-chairman and in other section and WESCON capacities. In his parting remarks he calls for broadening technical seminars and activities.

The past year, during which I was privileged to serve as your section chairman, has been a banner year for our industry and our section—now the largest within IEEE. With increased military business, many of us have delayed plans for expanding our non-military markets. There is no better time to explore new markets than during booming sales, and no worse time than when facing cutbacks, or exceedingly rough competition. Creative engineering and engineering management should be looking toward new spheres of influence on the periphery of their company's area of interest. It is time to dust off plans that were made two years ago under economic duress, and assess their value in light of today's technology.

The past year has opened new vistas in microwave and optical fields, in communications and in data assimilation, processing, and display. Technological time compression accelerates, as discoveries and applications, once taking years, now occur in weeks. We stand on the brink of technological and sociological revolution, gazing into the Golden Sixties' twilight years. Collectively, we must master our impending environment. Our profession will provide many needs of this era, and direct technological revolution toward benefit of all society.

While youth flails for social guidance amid technological mystery, engineers move toward sophisticated

remarks from the chairs

GRANGER GIVES BACKGROUND ON DUES INCREASE

Dr. J.V.N. Granger, president of Granger Associates, Palo Alto, is a member at large of the IEEE board of directors and member of the executive and finance committees. A Fellow, past chairman of the former Palo Alto Subsection, and past director of WESCON, he represented the San Francisco Section in 1962 merger discussions. The following remarks were requested by Grid and the membership committee to provide background regarding the recently announced dues increase.

President Shepherd's letter of April 8 informed the membership of the board of directors action of March 25 approving an increase in dues effective January 1, 1967. A full discussion of the financial basis for this decision will appear in the June issue of *Spectrum*. Because of the many questions raised by section members about this move, a few words of further explanation are appropriate.

After three years of merger, the institute continues to operate at a loss. The budgeted loss for 1966 is approximately \$200,000. (Many members do not realize that the IRE suffered a loss of about the same amount in the last year prior to the merger.)

At the time the merger was undertaken, a temporary operating loss was expected during the "shake-down" period. It was recognized

specialties. Through broader self-education, the technical-social gap needs bridging. Time awaits the scientific universalists, when understanding and interests meld between varied physical and social sciences. It is our role to usher in the age of scientific universalism—through professional and avocational deeds, attitudes and contemplations. Serious consideration should be given the broadening of technical seminars to include social implications and value of work reported. Our section, with its extensive group chapters, can provide leadership during the ensuing knowledge explosion.

Thank you for your support during the past year; and many thanks to your executive committee, to the chairmen and vice-chairmen of our various special committees, to our subsections and chapters and to our office staff. I'm sure that you'll extend the same support to your new officers and delegates-elect.

JACK L. MELCHOR

that dues income would decline (\$5 to \$10 per year for each AIEE member and \$15 to \$25 for the 10,000 who belonged to both AIEE and IRE), but expected that savings in operating costs would offset this factor. This expectation has been borne out. For the four years through 1966, operating savings amount to \$1,000,000, while dues losses add up to \$900,000. The continued losses are due entirely to an unexpected loss of advertising revenue—a net decline of approximately \$1,200,000 for the four years through 1966, as compared with the net advertising revenues of both societies in 1962. This loss of revenue is attributable in part to a change in DOD regulations regarding allowability of advertising costs, and in part to the affects of the change in publications patterns which occurred with the merger. While advertising income is currently on the rise, it is unrealistic to expect that this trend will solve the problems. Only a dues increase can insure continued strength for the institute.

Some facts:

- Dues presently (1966) provide only 37 per cent of total income. After the dues increase, this will rise to a little over 50 per cent.
- Publications budgets are rising at a tremendous rate. The institute published nearly 18,000 pages of technical material in the *Proceedings* and the transactions in 1965, more than 85 per cent of that in the transactions. The technical content of the transactions has risen 20 per cent/year since the merger, and that rate of increase must continue if the institute is to continue to provide publications leadership in the face of the expanding scope of the technology of primary interest to its members.
- The sections and regions (particularly those outside the U.S.)

SECTION ANNUAL MEETING

All past chairmen of the San Francisco Section and its predecessors have been invited to sit at a special head table at the June 15 annual meeting at the Bold Knight in Sunnyvale.

Also especially seated will be newly-elected officers of the section, 1966 Fellows, and incoming chairmen of the subsections and chapters.

Dr. Frederick E. Terman, one of the most honored members of IEEE, past chairman of the San Francisco Section (IRE) and past president of IRE, will report on his recent educational exchange visit to the U.S.S.R. under the sponsorship of the U.S. Office of Education.

"There is an enormous effort in education," said Dr. Terman, "from the first grade on up. Educators seem dedicated to their profession. And the individual, as a student, is very important.

"There is also constant attention to developing and improving courses and teaching techniques. While most institutions are required to follow curricula prescribed in great detail by the state, certain schools are permitted to experiment."

The annual event will honor 1966 Fellows and 1966-67 officers of the section, subsections and chapters. In addition to reservations for couples, tables of eight may be reserved for subsections, chapters, committees and companies by calling Mrs. Jean Helmke, 327-6622.

need increased direct financial support, and greater support for their technical programs—perhaps in the form of a bureau of outstanding lecturers whose travel costs are subsidized.

- The last dues increase for former AIEE members, in 1956, was revoked with the merger. Former IRE members have not had a dues increase for 18 years.

The institute is strong. A more reliable income base will add greatly to its strength. It is responsive to the needs of its members. President Shepherd's letter solicits comments and suggestions from the members to guide the board of directors, the publications board, the technical activities board, and the sections committee in planning the expanded institute program our expanding profession demands.

J.V.N. GRANGER



Dr. Terman in Moscow. The Bolshoi Theatre is shown in the background, with the Hotel Metropole at right of the photograph.

Meeting Calendar

JUNE 8, WEDNESDAY, 8:00 PM — Instrumentation & Measurement
Why and what-for of digital integrated circuit specification and testing

Dick Crippen, Fairchild Semiconductor

Place: Hewlett-Packard Co., 1501 Page Mill Rd., Palo Alto (visitors' entrance)

Dinner: 6:00 PM, L'Omelette, 4170 El Camino Real, Palo Alto

No reservations required.

JUNE 9, THURSDAY, 7:30 PM — Vehicular Communications
Close frequency spaced mobile repeater system design

James W. Corn, area engineering services manager, Motorola Communications & Electronics, Inc., Burlingame

Place: College of San Mateo, Bldg. 11, Room 130, Science Lecture Hall

No dinner

JUNE 15, WEDNESDAY, 8:00 PM — San Francisco Section/All Subsections and Chapters, ladies night
Annual meeting honoring 1966 Fellows; installation of 1966-67 Section Officers
Engineering education in Russia

Dr. Frederick E. Terman, vice president and provost emeritus, and advisor to the president, Stanford University

Place: The Bold Knight, 769 No. Mathilda Ave., Sunnyvale (2 blocks west of Bayshore)

Social hour: 6:00 PM (refreshments 65c)

Dinner: 7:00 PM — roast sirloin of beef, \$4.50 incl. tax & tip

Reservations: Mrs. Jean Helmke, Section Office, 327-6622 by June 13

Tables of eight may be reserved for Subsections, Chapters, Committees and Companies

ELECTRONIC ENGINEERS

Why Not
MOVE OUT and MOVE UP?

be appreciated at
UNITED CONTROL IN
SEATTLE
the easiest-to-appreciate
climate in America



UNITED CONTROL

Living is great in the Pacific Northwest. We have year-round golf, five months of excellent mountain skiing within 45 miles, hunting, fishing... REAL OUTDOOR LIVING. A Wonderful place to raise your family. Good housing available five minutes from the office.

ELECTRONIC ENGINEERS

(Several Levels)

Capable of preliminary design and equipment development involving advanced systems concepts and hardware techniques for control equipment used in aircraft and missiles. Analysis of closed loop control systems and computer simulations. Must have demonstrated ability in design—both analytic and hardware—development, and preparation for release to manufacturing of hardware consisting of such special basic building blocks as: Integrating amplifiers, logic circuitry, voltage comparators, inverters, flip-flops, choppers, and other special purpose circuitry.

United Control Corporation, together with its 750 employees, enjoys the reputation of being one of the Pacific Northwest's most modern, well equipped, financially sound, professionally managed firms in the electronic industry.

Send your resume in confidence to: Don Vawter



UNITED CONTROL

Redmond, Washington 98052

an equal opportunity employer



EMC Symposium committee: (left to right) G. Ottinger, LMSC, chairman; A. Fong, Hewlett-Packard Co., technical programs; W. Coe, MacDonald Associates, finance; R. Snyder, Hewlett-Packard Co., arrangements; J. Kirk, LMSC, publication; B. Cooperstein, Sylvania, secretary; G. Westwood, Fairchild, arrangements; P. Gagner, Filtron, exhibits; R. Holman, Genisco, public relations and publicity.

events of interest

EMC SYMPOSIUM

Final plans for the Eighth IEEE Symposium on Electromagnetic Compatibility, July 11-13, San Francisco Hilton, have been announced.

Keynote speaker will be Brig. Gen. J.S. Bleymaier, commander of the Air Force western test range, Vandenberg AFB. Formerly deputy commander for manned systems at the space systems division in Los Angeles, he has been in charge of comprehensive EMC programs with the Titan missile and at both the Atlantic and Pacific test ranges.

Banquet speaker will be Dr. Frederick E. Terman, vice president and provost emeritus and assistant to the president, Stanford University.

Subjects of technical papers will range from education in EMC to its predictability. Theme of the exhibits will be "What's new in EMC." As a special exhibit, the Air Force FSM-173-D antenna pattern analyzer aircraft will be at San Francisco International Airport for viewing and demonstration. There will be a full program for the ladies.

Guy L. Ottinger is chairman of the committee for the event. Members are John A. Eckert and Richard B. Schulz, vice chairmen; Benard Cooperstein, secretary; Arthur Fong, John E. Maynard, Ben Weinbaum, A. Humphrey Sullivan, Jr., and Hollis Favors, technical program; Gordon Westwood and Ross Snyder, arrangements; Peter F. Spencer and Daniel C. Fogard, exhibits; Fred J. Nichols, public relations and publicity; William G. Coe, finance; and Richard H. Stone, publications.

Advance registration and registration at the door are \$8 and \$10 for members; \$10 and \$12 for non-members; and \$2 for student members. Tickets for the luncheon are \$4.50 and for the banquet \$7.50. Additional copies of the symposium digest may be ordered at \$5. Make checks payable to 1966 EMC Symposium and mail to William G. Coe, MacDonald Associates, P.O. Box 1383, San Carlos, Calif. 94070, who may also be called at 593-6057 for advance technical program or additional information.



Bleymaier



Corn

meeting ahead

MOBILE RELAY VC

James W. Corn, engineering services manager, Motorola Communications & Electronics, Inc., Burlingame, will review the advantages and disadvantages of the mobile relay vehicular communications system at the June 9 meeting of the Vehicular Communications chapter. A method of increasing the utility and reliability of the mobile relay system by designing with close spacing between the transmitter and receiver frequencies will be presented.

Design factors such as transmitter wide band noise, receiver desensitization and antenna coupling will be discussed as well as application of selectivity increasing devices. A typical system design will be described and slides of several systems will be shown.

A graduate of Spartan School of Radio & Electronics, Tulsa, Oklahoma, and the U.S. Navy Aviation Radio and Radarman's School, Mr. Corn previously served Motorola in military electronics development, semiconductor device development, two-way radio sales engineering, and vehicular communications systems engineering.

events of interest

SUMMER POWER

New Orleans is the site of the IEEE 1966 Summer Power Meeting. Registration at the Jung Hotel is estimated at 1500.

Registration will begin at the Jung Hotel on July 10 through July 14. Registration fees have been set at \$13 for members, \$15 for non-members, \$2 for ladies, and no charge for student members.



Scripps Institute research vessel "Flip" demonstrated its unusual underwater observation capability off the beach at Waikiki recently, part of the growing ocean technology of the Pacific and Hawaii.

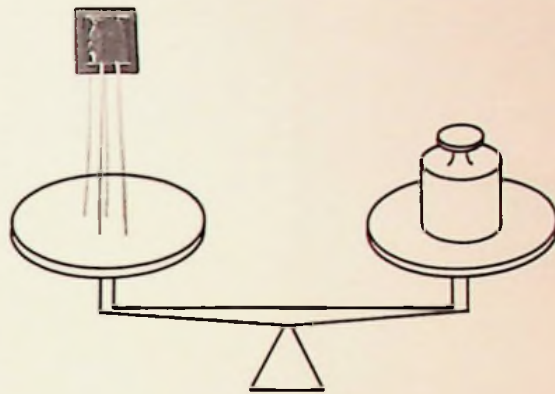
events of interest

OCEAN SYMPOSIUM

From the response received so far there is considerable interest in ocean electronics and it appears that the IEEE 1966 Ocean Electronics Symposium will be well attended. This was reported by Robert R. Hill, general chairman of the event to be held in Honolulu, Hawaii, this coming August 29 through 31. The symposium is scheduled the week following WESCON to allow as many as possible to visit Hawaii for the first IEEE meeting exclusively devoted to ocean electronics.

Advance programs have been mailed to members of the Aerospace and Electronic Systems and the Geoscience groups. Others may obtain a copy of the program by writing the IEEE Ocean Electronics Symposium Headquarters, 1441 Kapiolani Boulevard, Suite 1320, Honolulu, Hawaii 96814 (telephone 963-931).

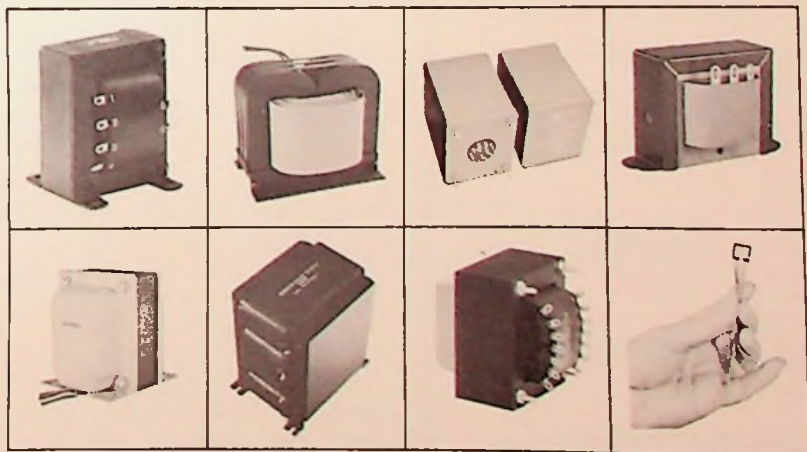
Four technical sessions are scheduled with thirty papers to be presented by outstanding speakers. Rear Admiral O. D. Waters, Jr., oceanographer of the Navy is the invited key-note speaker and Dr. Robert Frosch of ARPA the final luncheon speaker. A panel discussion of key leaders in the field of ocean technology will be chaired by Maj. Gen. Edmond H. Leavy (USA Ret.), a past president of ITT. A unique adjunct to the meeting will be field trips of scientific facilities on Oahu and the neighbor islands of Kauai, Maui and Hawaii.



Transformers by the ounce...

or by the pound. Whatever you need, whether a miniature audio transformer in a fraction of a cubic inch, or a heavy-duty 10 KVA transformer for continuous operation—Tranex can make it, for prototype or production. And quite possibly we can save you some or all of the time and expense usually associated with custom transformers.

Shown below are just a few of the custom transformers we've made. Each one was originally designed and manufactured for a customer who couldn't find what he wanted on the shelf. Can we tell you more? Drop us a note today at 1599 Stierlin Road, Mountain View, California. Or call us at (415) 968-9292.



HELP THE SECTION GROW
BY PLEDGING YOURSELF TO
BRING IN A NEW MEMBER.

TRANEX

prototype and specialty production transformers • quality and quantity • milliwatt to 10 KVA

ENGINEERS

B.S., M.S., Ph.D.

Urgent Requirements
by Our Clients in
Commercial Product
Areas for Experienced
Hardware & Software

COMPUTER ENGINEERS

and

PROGRAMMERS

and in

COMMUNICATIONS
MICROWAVE SYSTEMS
DISPLAY SYSTEMS
DIGITAL INSTRUMENTS
SEMICONDUCTORS
CONTROLS & SERVOS

for personal and
confidential referrals
to client management,
at no cost to you,
please submit resume.

*Englert
and
Company*

Management Consultants

220 California Ave.
Palo Alto, Calif.
(415) 326-7390



16,000 high school and junior high students visited the San Mateo County Occupational Guidance Center held at the county fairgrounds May 2 through 6 under the sponsorship of the San Mateo County Industry-Education Council. The section manned and sponsored booths on electrical/electronic engineering and electronic technician, two of more than 80 presented by trade associations and professional societies. Here Prof. A.M. Hopkin, UC electrical engineering dept., talks to one of 40 student groups, each of whom had 50 minute counseling sessions.



Harmon Traver, Paeco, Hewlett-Packard Co., PMP chapter chairman, counsels prospective electronic techs. Other section members serving in the two booths during the week were Jack Sayage, Lawrence Radiation Lab, section secondary education chairman; Warren Davis, PT&T; Jim McCann, PG&E, Power chapter chairman; Norman Weed and Claes Elfing, both of Sylvania; Ron Church and Howard Poulter, both of HP; John Eidson, Hansen Lab, Stanford; Fred Beale, Lenkurt; Dick Honey, SRI; John Damonte, Dalmo Victor; Roy Hurd, Heald Engineering College; and Victor Siegfried, LMSC.

educational notes

UC EXTENSION OFFERINGS DEPEND UPON YOUR RESPONSE

University of California Engineering Extension plans to offer a variety of package programs, short courses and conferences for the professional engineer in the late spring and summer:

Direct Energy Conversion and Plasma Engineering—latest developments in direct energy conversion systems and plasma engineering applications. A three to four day short course, June 1966.

Engineering the Environmental Model—simulation equipment, its design, reliability and quality control with emphasis on latest developments, associated instrumentation, and laboratory practices. A two day short course, July 1966.

Welding and Casting for the Professional Engineer—recent advances and techniques in the field of welding technology; electron beam, laser and arc welding. New techniques in casting applied to old and newer materials; vacuum

arc and electron beam melting. A three day short course, July 1966.

Modern Automatic Control Engineering—introductory and advanced information on techniques in modern automatic control engineering and instrumentation in engineering systems and processes. A five day short course, Aug. 29—Sept. 2, 1966.

Review Courses in Civil, Electrical and Mechanical Engineering for the Professional Registration Examination. If there is sufficient interest, these courses will be offered in the late summer and early fall prior to the November 1966 examination (classes to meet alternate Saturdays 9:30—12:00 noon, 1:00—3:30 p.m.).

Reliability Engineering—system and component reliability as influenced by the variables of manufacture, assembly, and established quality control. Application of statistical and probability

FJCC APPOINTMENTS

The general committee to plan and execute details for the 1966 Fall Joint Computer Conference in San Francisco November 8-10 has been announced.

Headed by R. George Glaser, general chairman, the steering group has been meeting since early in the winter and this month completed virtually all appointments to carry out the principal functions for the big technical conference and exhibit at civic center.

educational notes

CAL AC COURSE

A five-day short course, "Modern Automatic Control Engineering," will be given August 19 to September 2 by Engineering Extension and the College of Engineering at the University of California Berkeley campus.

The course is intended to provide introductory and advanced information on techniques of control engineering for the professional engineer. Yasundo Takahashi, professor of mechanical engineering at Berkeley, will head the instructional staff.

Tuition is \$185. Further information may be obtained from Engineering Extension, University of California, 2223 Fulton St., Berkeley, California 94720.

theory to simple and advanced reliability studies. A five day short course, Sept. 1966.

Surface Coatings for Metals in Aggressive Environments—mechanisms of adhesion, corrosion prevention, and environmental control. A four to five day short course, September 1966.

Engineering Applications of Statistical Theory—formulation and application of probabilistic models to analysis of equipment performance, experimental data, and stochastic processes. A four weekend package program, Sept. 1966.

Photogrammetric Digitizing Applied to Cadastral Surveys and Engineering Projects—a two to three day short course originally planned for summer but now rescheduled for Dec. 1966.

Early written inquiries concerning these programs will be used as a measure of the interest shown by the professional engineer. Dates are provisional and the lack of response for a specific program will result in cancellation of plans to offer the program. Announcements of programs for which a definite need is established for the professional engineer will be sent one month in advance of the scheduled program date. To indicate your interest in one or more of the courses offered and be placed on the list to receive announcements, write: Engineering Extension, University of California, Berkeley, California 94720.

Reliability Engineers

RELIABILITY DESIGN REVIEW

Experienced with small electrical components and semiconductors. Prepare procurement, test and design specifications.

RELIABILITY ANALYSIS

Experienced in circuit design and analysis. Perform detailed reliability analyses of complex electronic parts and circuits and recommend improvements in design reliability.

RELIABILITY TEST ENGINEERING

Prepare test procedures for electrical and electronic packages and coordinate procedures with test laboratories, conduct proofing of test procedures and test equipment.

RELIABILITY AND INSPECTION

Perform mechanical and structural reliability analyses. Provide for inspection planning and review prints to determine inspection attributes. Experience in metallurgy and NDT helpful.

NON-DESTRUCTIVE TESTING

Background in electronics and applied physics plus knowledge of instrumentation related to the use of X-rays, sound waves, electrical fields and optics.

ORDNANCE TESTING

Environmental and field testing of pyrotechnic and explosive ordnance including design of test apparatus, preparation of procedures, and maintenance of test records and data.

Degree and appropriate experience required.

Write Mr. K. R. Kiddoo, Professional Placement Manager, Lockheed Missiles & Space Company, P.O. Box 504, Sunnyvale, California.

LOCKHEED

MISSILES & SPACE COMPANY

A GROUP DIVISION OF LOCKHEED AIRCRAFT CORPORATION

Product: CHALLENGE!



RECEIVERS L AND S BAND

Frequency: 1435-1535 Mc and
2200-2300 Mc
Frequency
Stability: $\pm 0.0005\%$
Sensitivity: $4 \mu\text{V}$ at 6 db $\frac{S+N}{N}$ ratio (2 μV
with preamplifier module)
Interference
Control: MIL-I-26600
Power Supply: 115 vac, 400 cps, or 28 vdc
Temperature: -55°C to $+72^\circ\text{C}$ (operating)
Size: 7.50" x 2.50" x 4.0"

Company: PROGRESSIVE!

RS ELECTRONICS CORPORATION is engaged in the design and manufacture of airborne RF equipment. Our field of activity covers transmitters, receivers and decoders for command and telemetry; associated test equipment; as well as IF amplifiers. With the forthcoming move of telemetry to the UHF bands, our engineers are faced with new and unusual assignments. The miniaturized airborne receiver shown above is a recently completed design. Other jobs in this area are waiting to be done.

We would like to add two senior engineers to our staff. In a small company, they will be exposed to a wide range of responsibilities. They will manage projects, they will do design work, they will be in touch with management and customers. They will be compensated accordingly. If you are that flexible, please mail your resume or contact our Engineering Manager, Mr. John Isabeau, at 795 Kifer Road, Sunnyvale, California.

Telephone
(408) 739-3230

Or Write



RS ELECTRONICS

Corporation

795 Kifer Road
Sunnyvale, California 94086

an equal opportunity employer



Ed Crosse of Lenkurt Electric (at left above) explains preparation of material lists using an automatic design engineering program to PMP members at their April meeting. Tom Bean (at right), manager of automatic design engineering for Lenkurt describes ADE. He was assisted by Crosse, Doug Vandever, and Ron De Lora, also staff members. Photos by Harmon Traver.



w e m a n e w s

1966 DIRECTORY

A completely updated "who's who" in electronics manufacturing in the western states has been published by WEMA.

The 380 members of WEMA throughout the west are listed in the directory, with detailed information for each company on management personnel, principal products, numbers of employees, how securities are traded and how products are marketed.

In addition, there is a product cross-reference section which lists companies engaged in manufacture of specific components, instruments and systems.

Member companies account for more than 80 percent of the total electronics sales volume in the west.

The new directory may be obtained from WEMA, 780 Welch Rd., Palo Alto, 327-9300. Price per copy is \$5.

events of interest

JACC

The seventh annual joint automatic control conference, sponsored by AIAA, ASME, ISA, IEEE, and AIChE, will be held on the campus of the University of Washington, Seattle, Washington, August 17-19.

The technical program will consist of more than 100 papers presented in more than 20 different technical sessions. About one fourth of these will be invited papers dealing with the following subjects: control system components, applications of control theory, review of control theory, process control applications, education in automatic control, and data acquisition systems.

The three-day, IEEE 1967 Winter Convention on Military Electronics (WINCON '67) will be held February 7, 8 and 9 at the International Hotel in Los Angeles, according to Dr. A.M. Zarem, Electro-Optical Systems, Inc., 300 N. Halstead St., Pasadena, chairman of next year's event.

SCIENTISTS

(B.S., M.S., & Ph.D.)

Senior level openings available for persons with advanced degrees in Electrical Engineering or Physics, preferably with several years experience in one or more of the fields listed below.

Optical systems
Lasers, gaseous and solid-state
Signal processing systems
Noise in lasers, detectors

A demonstrated capability for organizing and leading group research and development, and/or a strong background in individual experimentation is needed.

Openings also exist for electronic circuit solid-state engineers with B.S. and M.S. degrees. 1-3 years experience in the following solid-state circuit areas is desirable:

Receivers
Transmitters
Audio-video

Applicants should be able to demonstrate project level ability. U.S. citizenship required for all positions.

Send resume to:

A. Carollo
ZENITH RADIO RESEARCH CORP.
4040 Campbell Avenue
Menlo Park, California
an equal opportunity employer

AREA PAPERS WINNERS

"Depolarization of nervous tissue by means of an electrostatic field" by Michael R. Radisich, University of Santa Clara, and "A convergent method for solving polynomial equations" by John B. Moore of the same student branch were first prize winners, respectively, in the undergraduate and graduate divisions of the area IEEE student papers contest on April 1.

The contest, held at San Francisco State College, was jointly sponsored by the San Francisco and Sacramento Sections as part of the Region 6 and IEEE competitions.

Other prize winners in the undergraduate division were "Hardware for the handicapped" by Richard N. Belaustigui of the University of Nevada, second place; and "Bandwidth considerations of a frequency modulated signal with specific applications to the land mobile service" by Dale J. Mischynski of Sacramento State College, third place.

Also winning prizes in the graduate division were "Measurement of the mean energy for electron-hole pair formation in silicon by low-energy electron movement" by Carroll B. Norris, Jr., Stanford University, second place; and "Intermodulation distortion: a controllable parameter in the analysis of the intelligibility of clipped speech" by William J. Lannes III, U.S.N.P.G. School, Monterey, third place.

Undergraduate judges were Dino Ciarlo and Frank Inami, Lawrence Radiation Laboratory; teller was Carlton Furnberg, Sandia Corp. Graduate judges were Joseph Nanevich, SRI; Thomas Burgess, Jr., LRL; and Herbert Johnston, Sandia Corp.; teller was James B. Wright, Sandia Corp.

Prizes were presented by E.H. Hulse, LRL, vice chairman of the San Francisco Section. Arrangements for the dinner and meeting were handled by Prof. Rene Marxheimer, San Francisco State, and Eugene Aas, education and student relations chairman, San Francisco Section.

events of interest

POWER GENERATION

Peaking and emergency power supply concepts will be covered at one of the technical sessions scheduled for the 1966 ASME-IEEE Power Generation Conference to be held in Denver from September 18-22.

The technical program is nearly completed. Papers to be considered for inclusion in the program should be received before June 20 by E. G. Norell, technical program chairman, Sargent & Lundy, 140 South Dearborn Street, Chicago, Illinois 60603.



Your
Western Source
For This Famous Brand . . .

NOW IN STOCK . . . IN DEPTH!!

WESTERN DISTRIBUTORS FOR OVER 150 FAMOUS BRANDS

INDUSTRIAL, COMMERCIAL & ELECTRONIC COMPONENTS & EQUIPMENT

TEXAS INSTRUMENTS
SEMICONDUCTORS

Catalog Available On Request

R. V. WEATHERFORD CO.

Sales and Service Warehouses

6921 San Fernando Rd., Glendale, Calif. 91201 (213) 849-3451	1651 So. State College Blvd., Anaheim, Calif. 92805 (714) 532-6741 • 547-7521
3240 Hillview Ave Palo Alto, Calif. 94304 (415) 321-5373	7903 Balboa Blvd. San Diego, Calif. 92111 (714) 278-7400
1917 North 25th Drive Phoenix, Arizona 85002 (602) 272-7144	1095 E. Third St. Pomona, Calif. 91766 (714) 823-1261 • 331-7515



IF YOU DRIVE,
**FREE
GARAGING**

Become a pampered guest at the luxurious

Hotel Mayfair in downtown Los Angeles, where everyone is a guest of honor. Elegant decorator rooms with air conditioning, King Sized beds, TV, Direct Dial phones.. Heated Olympic swimming pool and terrace with food and bar service

Marvelous meals in The Jesters and Butlery Rooms

Nightly entertainment in the atmospheric Piano Lounge

Easy access to the Freeways and close to all activities — Reasonable, pocketbook pleasing rates start at \$8



HOTEL
Mayfair
resort living downtown

HOTEL *Mayfair*
Phone: (Area Code 213) HUBbard 3-4100
TWX: (Area Code 213) 483-7270
1256 W. Seventh St.
LOS ANGELES / CALIFORNIA

MORE SWINGS

Tymshare, Inc., Los Altos, a computer time-sharing service, has added two systems analysts to its staff: Verne Van Vlear and James L. Ryan.

Robert D. Gray has been appointed director for security systems product management at Sylvania Electronic Systems, Mountain View.

Joseph Dietz, western regional sales manager, Fairchild Instrumentation, Palo Alto, has been promoted to product service manager.

John P. Gates has been appointed manager of manufacturing and engineering for Stewart-Warner Microcircuits, Inc., Sunnyvale, was formerly manager of digital integrated circuits for Fairchild Semiconductor, Mountain View.



Purl

Davis

Dr. O. Thomas Purl, manager of the electron devices div., Watkins-Johnson Co., Palo Alto, has been elected a vice president.

Thomas E. Davis, former vice president-marketing, Ampex Corp., Redwood City, has been named vice president, general manager of the company's new audio/video communications division.

Raymond R. Bourret has been promoted to vice president of manufacturing for Pacific Plantronics, Santa Cruz.

Alan W. Drew has been appointed president and chief executive officer of Friden, Inc., San Leandro.

Raytheon Company will expand integrated circuit production at Mountain View, establish a circuit facility at Santa Ana, and move a transistor assembly activity from Mountain View to Paso Robles.

Hewlett-Packard Company, Palo Alto, has announced the consolidation of its advanced research and development activities into a new organization known as HP Laboratories and headed by Dr. Bernard M. Oliver, vice president of research and development, to engage in advanced research activities in electronic, medical and chemical instrumentation. Sections and their managers include solid-state physics, John M. Atalla; physical electronics, Donald L. Hammond; electronics research, Paul E. Stoft; and medical and chemical instrumentation research, John M. Cage.

Union Carbide Electronics, Mountain View, announces the appointment of Jay Stone & Associates, Los Altos, as northern California representative for its line of operational amplifiers.

William B. Allen has been named director of engineering for the Sierra Electronic operation of Philco Corp's communications and electronics division, was formerly chief engineer of the video and instrumentation division for Ampex Corp.

Micro Systems, Inc., Pasadena, has formed a bio-medical instrumentation group and named Eph Konigsberg to the position of product manager.

Joseph I. Davis has been appointed general manager for southern California operations of Litton Industries' melonics systems development division, Sunnyvale, was formerly manager of data management systems for Litton's data systems division.

Harold A. Page has been named manager of manufacturing engineering and physical design for Melabs, Palo Alto, was formerly manager of mechanical engineering and documentation for Applied Technology, Inc., Palo Alto.

Dr. David B. James and Charles A. Piercey have been named vice presidents of Ultek Corp., Palo Alto.

Stellarmetrics, Inc. Santa Barbara, has received \$55,000 in contracts from Douglas Aircraft for solid state micro-coders or commutators for aerospace telemetry.

R.M. Hoffman Co., Sunnyvale, has been named northern California representative for Force Limited, Santa Monica.

GENISCO TECHNOLOGY CORPORATION

has established a technical and sales facility in The Bay Area to represent the products and services of its

ELECTRONIC COMPONENT DIVISION and GENISTRON DIVISION

For R.F. Interference FILTERS, WAVE FILTERS, PRECISION RESISTORS, CURRENT PROBES, R.F.I. PROGRAM MANAGEMENT or R.F. ENGINEERING SERVICES

Contact our office at 378 Cambridge Avenue Palo Alto, California Tel: 415-321-9242 TWX: 415-492-9291

DEPENDABILITY . . .

That means you can count on us to supply competent, technical talent at a reasonable price. We really do what we promise.



Personnel available to work on your premises or in our design office

BARAN & ASSOCIATES

1155 CRANE
MENLO PARK, CALIF.
324-1615

"We are the job shop"

TYPESETTING
for your
WESCON DISPLAY
is better when done
PHOTOGRAPHICALLY
by **Iconotype**
296-6915, SANTA CLARA, CALIFORNIA

EPR SPECTROMETER SYSTEMS
A COMPLETE PRODUCT LINE
EPR at 35 G, EPR at 9.5 G, in the

Manufacturer / Representative Index

us: Div. Whittaker		Magnetic Shield Division,	
rp)	Dietrich-Heffner Assoc.	Perfection Mica	Frauman Associates
tronics, Inc.	Frauman Associates	McLean Engineering Labs	T. Louis Snitzer Co.
space Research, Inc.	SMA/ West	Measurements	O'Halloran Assoc.
sch	Jay Stone & Assoc.	Melcor Electronics Corp.	Components Sales Calif.
ican Electronic Labs	SMA-WEST	Metex Electronics, Inc.	Frauman Associates
edd Dynamics, Inc.	J. D. Kennedy Co.	Metron Instrument Co.	Components Sales Calif.
edd Magnetics Corp.	The Thorson Co.	Micro Instrument Co.	Jay Stone & Assoc.
Communication Laboratory	Costello & Co.	Micro-Power Inc.	Walter Associates
onics Corp.	The Thorson Co.	Microlab-FXR Div. of Microlab	L & M Engineering
		Microsonics, Inc.	SMA/ WEST
man/ Systems Division	V. T. Rupp Co.	Microwave Electronics Corp.	Jay Stone & Assoc.
man/ Invar Electronics	T. Louis Snitzer Co.	Millitest Corp.	Components Sales Calif.
us: Built-Instruments	Dietrich-Heffner Assoc.	Motorola, Inc.	
-Kinnox	The Thorson Co.	Communications Div.	Frauman Associates
d-Rex Div. of			
merican Enka Corp.	L & M Engineering	Nanosecond Systems	V. T. Rupp Co.
nt Computer Products	Costello & Co.	N-H Microwave	SMA/ WEST
Brown Research Corp.	W. K. Geist Co.		
		Omnispectra Inc.	Walter Associates
bridge Scientific			
dustry, Inc.	Dietrich-Heffner Assoc.	PRD Electronics	T. Louis Snitzer Co.
ga Corporation	Jay Stone & Assoc.	Polarad Electronic Instruments	T. Louis Snitzer
erry Electronics & Instruments	V. T. Rupp Co.	Precision Mechanisms Corp.	Components Sales
magnetics, Inc.	Wadsworth-Pacific Mfg. Assoc.	Probescope	SMA/ WEST
aseal, Inc.	Wadsworth-Pacific Mfg. Assoc.		
ctron Corporation	Costello & Co.	Quan-Tech Labs	Jay Stone & Assoc.
mag Electronic Devices	Costello & Co.		
mm Materials, Inc.	Jay Stone & Assoc.	RHG Electronics Lab	Walter Associates
tronics, Inc.	Data Associates	Ram Electronics, Inc.	Jay Stone & Assoc.
		Reeves-Hoffman Div. of	
Technology Corp.	T. Louis Snitzer Co.	Dynamics Corp. of America	L & M Engineering
ctric Products Eng. Co.	Jay Stone & Assoc.	Remanco Inc.	Jay Stone & Assoc.
all Devices, Inc.	Costello & Co.	Rixon Electronics, Inc.	Costello & Co.
ronics Corp.	Components Sales Calif.	Rohde & Schwarz Sales Co.	V. T. Rupp Co.
plex Corp.	Components Sales	Roytron Division, Litton Indus.	Costello
radio Electronics	T. Louis Snitzer Co.	Sage Laboratories	The Thorson Co.
ronic Engineering Co.	Data Associates	Scott, Inc., H. H.	W. K. Geist Co.
ronic Products, Inc.	Jay Stone & Assoc.	Sierra Electronic Div., Philco	T. Louis Snitzer Co.
ro Switch Corp.	Willard Nott & Co.	Singer/ Metrics/ Gertsch	Dynamic Associates
oco, Inc.	V. T. Rupp Co.	Sony Corp., Ind. Prod.	V. T. Rupp Co.
or-Borg-Warner Corp.	T. Louis Snitzer Co.		
ey Laboratory, Inc.	W. K. Geist Co.	Taylor-made Laboratories	Data Associates
		Technipower, Inc.	Dietrich Heffner Assoc.
-Tek, Inc.	Costello & Co.	Telonic Industries & Eng.	T. Louis Snitzer Co.
ohm Corp.	Walter Associates	Tenney Engineering, Inc.	The Thorson Co.
		Texas Instruments, Ind. Prod.	V. T. Rupp Co.
Components	Wadsworth Pacific Mfg. Assoc.	T R W Instruments	V. T. Rupp Co.
-Lite Corp.	Wadsworth-Pacific Mfg. Assoc.	Trymetrics Corp.	T. Louis Snitzer Co.
lline/ Hallmark	T. Louis Snitzer Co.		
		United Precision	
mark Standards, Inc.	T. Louis Snitzer Co.	Plastics, Inc.	Wadsworth-Pacific Mfg. Assoc.
ax, Inc.	The Thorson Co.	Universal Voltronics Corp.	Dietrich-Heffner Assoc.
Instruments Laboratories	W. K. Geist Co.	Uptime Corporation	Costello & Co.
eywell-Denver Div., Lab Standards	Geist	Utah Research & Development Co.	The Thorson Co.
eywell, Mpls., Enclosures	W. K. Geist Co.		
ston Omnigraphic Corp.	V. T. Rupp Co.	Vero Corporation	Wadsworth-Pacific Mfg. Assoc.
tronics Corp.	The Thorson Co.		
		Wang Laboratories	Frauman Associates
co, Inc.	V. T. Rupp Co.	Warren Components	Wadsworth-Pacific Mfg. Assoc.
tics Corporation	The Thorson Co.	Watkins-Johnson Co.	L & M Engineering
		Weinschel Engineering, Inc.	Jay Stone & Assoc.
ebda Electronics Corp.	Jay Stone	Wiltron Co.	O'Halloran Assoc.
Instruments, Inc.	The Thorson Co.	Wyle Laboratories	V. T. Rupp Co.
heed Electronics Co.	Data Associates		

Representative Directory

Components Sales California	Frauman Associates	O'Halloran Associates	The Thorson Company
Palo Alto; 326-5317	P. O. Box 357, Menlo Park; 322-8461	3921 E. Bayshore, Palo Alto; 326-1493	2443 Ash Street, Palo Alto; 321-2414
Costello & Company	Geist Co., W. K.	Rupp Co., V. T.	Walter Associates
25 Middlefield Road, Palo Alto; DA 1-3745	Box 746, Cupertino; 968-1608, 253-5433	1182 Los Altos Avenue, Los Altos; 948-1483	175 S. San Antonio Road, Los Altos; 941-3141
Frauman Associates	Kennedy Co., J.D.	SMA/WEST	Wadsworth-Pacific Mfg.
160 Terra Bella Avenue Mountain View; 961-8760	770 Welch Road, Palo Alto; (415) 327-0413	(Scientific Marketing Assoc.) 1094 West Evelyn Ave., Sunnyvale; 245-2500	Assoc., Inc. 71 Parker Avenue, Atherton; 321-3619
Dietrich-Heffner Associates	L & M Engineering	Snitzer Co., T. Louis	Willard Nott & Co.
555 Park Blvd., Palo Alto; 321-4321	2620 The Alameda Santa Clara; 243-6661	1020 Corporation Way, Palo Alto; 968-8304	1485 Bayshore Blvd. San Francisco; 587-2091
Frauman Associates		Stone & Assoc., Jay	
111 Industrial Way, Sunnyvale; 344-2521		140 Main Street, Los Altos; 948-4563	

Think big...

and plan ahead!

tell 30,000

western

engineers

about your

products, services

or staff needs!

July Grid-Bulletin

closes June 17.

August issue closes

July 15.

Send contracts,

orders to IEEE,

701 Welch Rd.,

Suite 2210,

Palo Alto.

Send mounted

plates, copy to set to

IEEE

3600 Wilshire

Blvd.,

Los Angeles, 90005

ENGINEERING SCIENCES
PERSONNEL SERVICE
AGENCY

582 MARKET STREET
SAN FRANCISCO, CALIF. 94104
SUtter 1-5720

Successor in San Francisco to
Engineering Societies
Personnel Service, Inc.

ENGINEERS, SCIENTISTS
AND TECHNICIANS

at every level in every field of
Industry—Business—Government
—Education—Plant—Field—
Laboratory—Office—School

JOBS FOR MEN MEN FOR JOBS

Fast referral service: phone, write, wire
A local, regional, and national
market place for engineering
jobs and men

events of interest
A & P SYMPOSIUM

The 1966 International Antenna and Propagation Symposium (December 5 through 7, 1966) will be held in conjunction with the USA 1966 Fall URSI meetings (December 7 through 9). The symposium headquarters will be the Cabana Motor Hotel, Palo Alto.

The G-AP and URSI technical programs will be separately arranged except for appropriate coordination. Authors are invited to submit 400 to 600 word summaries of papers for presentation at the G-AP sessions. Papers are solicited in all theoretical, experimental and developmental fields of interest to G-AP such as: plasma physics, scattering and diffraction, electromagnetic theory, radio physics, radio astronomy, radar astronomy, radio wave propagation, and antennas.

Summaries only of accepted papers will be printed in the symposium digest.

Mail summaries to: Ray L. Leada-brand, chairman, technical program committee, 1966 International Symposium on Antennas and Propagation, Radio Physics Laboratory, Stanford Research Institute, Menlo Park, Calif.

Deadline for receipt of summaries is August 1, 1966. Authors will be notified of acceptance or rejection by September 1, 1966.

Classified Advertising

CLASSIFIED ADVERTISING RATES

Members: \$15 for 1st col.-inch, \$10 for 2nd, \$5 for each additional. Non-members: \$20 for 1st col.-inch, \$15 for 2nd, \$10 for each additional. 10% frequency discount for 10 consecutive ads. None to exceed total of 4 col.-inches. Non-commissionable. Deadline 15th of month.
Write or call: Ernesto A. Montano, IEEE Grid, Suite 2210, 701 Welch Rd., Palo Alto, Telephone (415) 327-6622.

Positions Available

SALES ENGINEER

for
Antennas, Antenna Systems,
R. F. Components
Electronic Sales Background
Bay Area and Pac. NW Region
Salary and Expenses

Call for Appointment
or write

Andrew Corp.

701 Welch Road, Palo Alto
323-3139

PHYSICIST — ACOUSTICS

If you have an interest and ability in acoustics and have a B.S. or M.S. in Physics with a Math minor, Altec has an interest in you. Position includes design of all phases of acoustics and electronic components and systems.

Send resume to

ALTEC LANSING

1515 S. Manchester Avenue, Anaheim, California
Attention: G.H. Enzenauer, Non-Defense, An Equal Opportunity Employer

DEVELOPMENT ENGINEER

ITT Microwave at Mountain View has urgent need for one qualified engineer to join a team working on commercial microwave systems. Experience in multiplex or related fields would be considered excellent background for a position in our baseband and supervisory development group. Experience of the order of 4-8 years will command an attractive salary. Please telephone the Engineering Manager at 2319 Charleston Road; Tel. 961-8700. Enjoy the benefits of small company environment.

ADVERTISERS INDEX

Baran Associates	14
Brill Electronics	3
Clark Printing Service	12
Engineering Sciences Personnel Services	16
Englert and Co.	8
Fluke Mfg. Co.	2
General Radio Co.	Cover 4
Genisco Technology Corp.	14
Grid-Bulletin	15
Iconotype	14
Kaiser Aerospace & Electronics Co.	13
Lockheed Missiles & Space Co.	9
Mayfair Hotel	11
Neal, Stratford & Kerr	16
Neely Sales Div. HP Co.	1
RS Electronics	10
Tektronix, Inc.	Cover 3
Tranex	7
Tung-Sol Electric Co.	12
United Control	6
Varian Associates	Cover 2
R.V. Weatherford Co.	11
Western Gold & Platinum Co.	13
Zenith Radio Research Corp.	10

Plan now to
attend

W
E
S
C
O
N

AUGUST
23-26



& per se and
but it is not true that
\$ per se quality

If quality is important
put your pre WESCON
printing in the creative
& experienced hands of

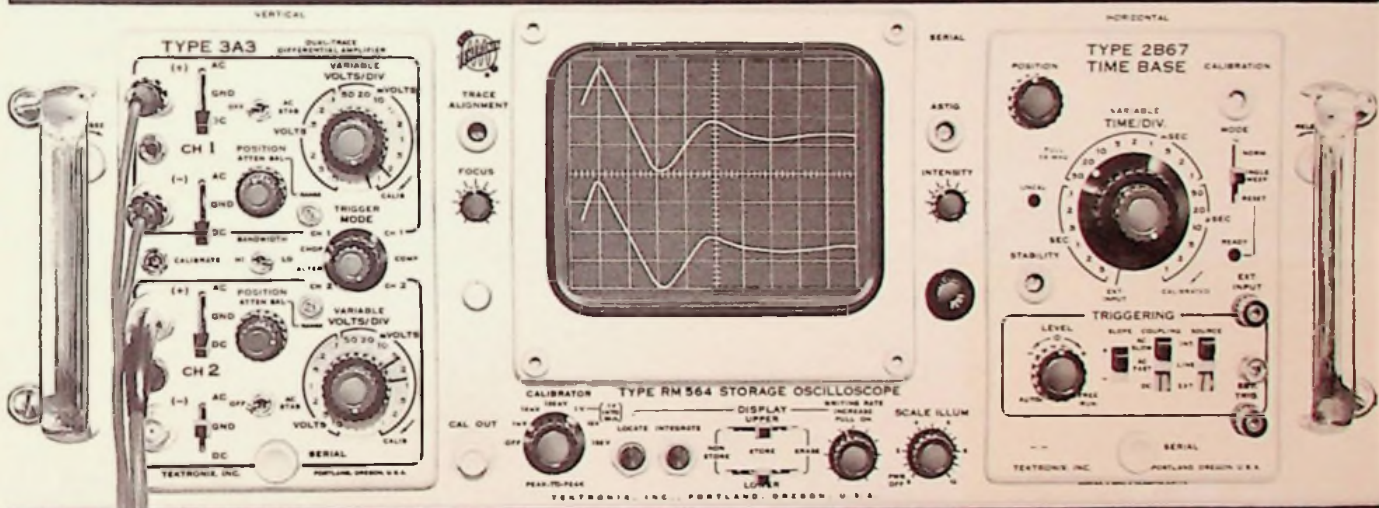
NEAL, STRATFORD & KERR
Printers Lithographers Designers
1025 Sansome St., S. F. 781-5886

Type RM564 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 RM564 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 100 μ V/cm sensitivity (3A3) and 10MHz passband (3A1, 3A6), to 0.5 μ sec/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	\$960
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	875
U.S. Sales Prices f.o.b. Beaverton, Oregon	
Oscilloscope prices without plug-in units	

Tektronix, Inc.

FOR A DEMONSTRATION, PLEASE CALL YOUR TEKTRONIX FIELD ENGINEER



Thousands of these Oscillators are in use today

HIGH OUTPUT BROAD RANGE LOW COST



All these oscillators have typical outputs in the order of several hundred milliwatts. All have single-dial control and an input jack for a modulating signal. All are available for rack- or bench-mounting. All operate from any of several compact, inexpensive power supplies that range in price from \$65 for the basic unregulated supply to \$170 for the unit providing regulated dc heater and plate voltages. Another power supply, the Type 1263-C Amplitude-Regulating Power Supply (\$425), provides 1-kHz square-wave modulation and levelled output for any oscillator except the Type 1208-C. For 100% pulse and square-wave modulation, the Type 1264-A Modulating Power Supply (\$285) is available for use with any oscillator except Types 1208-C and 1211-C.



Type 1218-B
\$595 in U.S.A.

Typical output >300 mW over most of frequency range. Calibration accuracy $\pm 1\%$.



Type 1209-C
\$330 in U.S.A.

Typical output >250 mW over most of range. Calibration accuracy $\pm 1\%$.



Type 1208-C
\$295 in U.S.A.

Typical output >400 mW over most of range. Calibration accuracy $\pm 2\%$.



Type 1211-C
\$375 in U.S.A.

Typical output >300 mW over entire range, >1 W from 0.7 to 5 MHz. Calibration accuracy $\pm 2\%$.

**900 MHz
to
2 GHz**

**450
to
1050 MHz**

**250
to
960 MHz**

**180
to
600 MHz**

**65
to
500 MHz**

**50
to
250 MHz**

**0.5
to
50 MHz**



Type 1361-A
\$315 in U.S.A.

Typical output >200 mW over most of the range. Calibration accuracy $\pm 1\%$.



Type 1209-CL
\$330 in U.S.A.

Typical output >500 mW over most of the frequency range. Calibration accuracy $\pm 1\%$.



Type 1215-C
\$250 in U.S.A.

Typical output >200 mW over most of range. Calibration accuracy $\pm 1\%$.

*Write for complete information.
Also ask about our new series of
"sync-able," low-frequency,
high-performance oscillators.*

SAN FRANCISCO OFFICE
626 San Antonio Road, Mountain View, California 94040
Tel: 415 948-8233 TWX: 910 370-7459

GENERAL RADIO
WEST CONCORD, MASSACHUSETTS