

EDITOR'S PROFILE of this issue

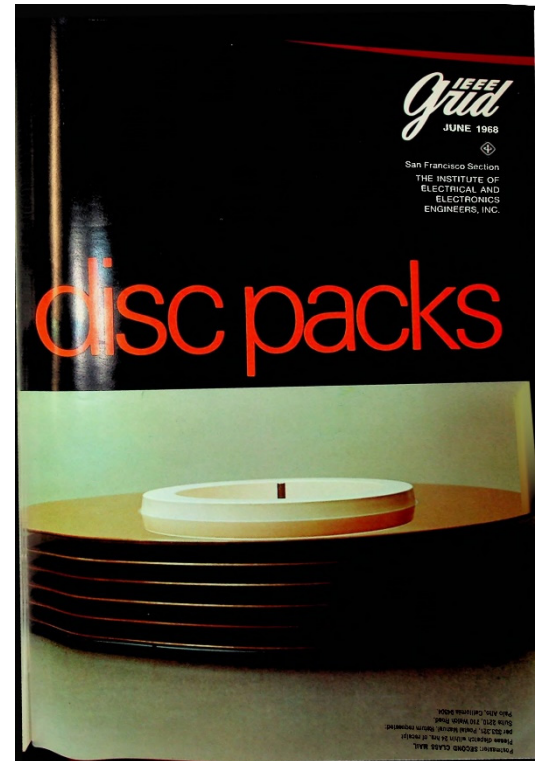
from a historical perspective ...

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

June, 1968:

Cover: The 7-high disk pack (with 12 recording surfaces) is shown by Memorex.
More on page 8.

Page 12 shows a photo of the organizers and panelists at the SCV Pioneers
Dinner; they include Fred Terman, Gordon Moore, and William Shockley.



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

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@iee.org

IEEE
Grid

JUNE 1968



San Francisco Section
THE INSTITUTE OF
ELECTRICAL AND
ELECTRONICS
ENGINEERS, INC.

disc packs



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Western Electronic Show and Convention is sponsored by Region 6 (represented by the Los Angeles Council and San Francisco Section) of the Institute of Electrical and Electronics Engineers, and the Western Electronic Manufacturers Association



Tranquilizer

If you've tried to put together a mixer/detector circuit for broadband microwave equipment, you know what a headache it is. No more. With HP's new 33800A Series Mixer/Detector modules most of the grief is gone.

Here's why. The 33800A's are miniaturized by hybrid/IC construction for simplicity and convenience. Just plug them in. No fabrication problem. You've got economy for superior performance—there is nothing similar to the 33800A's available.

As detectors, the 33800A's have tangential sensitivity of -50 dBm, 2 to 12.4 GHz; output of 3 mv/ μ W. As mixers, they display noise figures of 7.5 dB, IF impedance of 100 ohms and VSWR of 2:1.

Price: 33801A and 33802A (negative or positive output): \$125. 33803A (matched pair mixer service, 33801A and 33802A): \$275.

For more details call your local HP field engineer or write Hewlett-Packard, 1101 Embarcadero Road, Palo Alto, California 94303. Tel. (415) 327-6500.

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CALENDAR

AEROSPACE & ELECTRONIC SYSTEMS

Annual barbeque steak dinner and winetasting. See page 16, May Grid.

June 5, Wed. 6:30 PM, Paul Masson Historic Mountain Winery, Saratoga. No phone reservations; mail check for \$4.75 per person to Al Hastings, 3940 Grove Ave., Palo Alto 94303, no later than May 20th. Limited capacity.

CIRCUIT THEORY

Story on page 2

Computer Aided Circuit Design. Panel Discussion: Prof. Don Pederson, UC Berkeley; John Orchard, Lenkurt Electric; Prof. Ron Rohrer, UC Berkeley; and Dr. Gabor C. Temes, Ampex.

June 26, Wed. 8 PM, Room 134 McCullough Bldg., Stanford. Dinner: 6:00 pm. Red Cottage, 1706 El Camino, Menlo Park. Order from menu. Reservations: Mrs. Stressner, 367-3112 by June 25.

ENGINEERING MANAGEMENT

Story on page 4

Role of top executives in management development. Third of three series on Engineering Management Training. Dr. John V.N. Granger, Granger Associates.

June 12, Wed. 8 PM, Kozy Grotto, 210 Hope Street, Mountain View (across from P.O.). (Note change in location.) Dinner: 6:30 pm. Order from menu. Reservations: Gloria Gray, 948-9157 by June 10.

RELIABILITY

Story on page 6

Parts Screening Techniques. B.D. Croghan, Lockheed MSC, Sunnyvale.

June 20, Thurs. 8 PM, PH 104, Stanford University. Dinner: Stanford View Restaurant, 1921 El Camino, Palo Alto. Relax, 6-6:45 pm; dinner, 6:45 pm. Reservations: Adeline Fako or Hal Caldwell, 966-3342 by June 18. Choice of Barbeque Chicken or Steak, \$3.00.

SAN FRANCISCO SECTION

San Francisco Section Annual Meeting. Honoring newly elected Fellows of the Institute, and introducing the 1968-69 officers of the Section. See page 12, May Grid.

June 7, Fri., Palo Alto Hills Golf and Country Club, 3000 Alexis Drive, Palo Alto. Cocktails from 6:30 pm, dinner at 8 pm and dancing until after midnight. Music by Jack Fisher and his orchestra. Tickets will be available at \$7.50 per person. Dress informal. Make reservations through Section office, 327-6622.

VEHICULAR TECHNOLOGY

Story on page 6

Recent FCC actions on the UHF mobile services. Ney R. Landry, Engineer in Charge, 12th District, FCC.

June 17, Mon. 8 PM, The Shadows Restaurant, 213 Second Avenue, San Mateo. No host cocktails, 6 pm; dinner 7 pm, \$4.50 including tax and tip. Reservations: Mrs. Joan Black, 349-3111, Ext. 220 by Noon June 14th.

On the cover

Memorex Mark I Disc Pack

Memorex's venture into non-tape fields beginning with the development of the Mark I Disc Pack in 1966, is a natural outgrowth of their intensive research and development program. Story on page eight.

IEEE
Grid

volume 14
number 10

JUNE 1968

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Circuit Theory Features Panel On Computer Aided Circuit Design

See
Calendar.

The four panelists for this June 26, 1968 discussion will be Donald O. Pederson, Henry J. Orchard, Ron A. Rohrer, and Gabor C. Temes. Donald O. Pederson is the Section treasurer, a professor in the EE Dept., UC Berkeley, a member of the Ad Com for circuit theory, a member of the Committee on Solid State Center, and has been chairman and vice-chairman of the East Bay Subsection. Henry J. Orchard received the degrees of B.Sc. and M.Sc. in mathematics from the University of London in 1946 and 1951 respectively. In 1961 he emigrated to the United States and joined Lenkurt Electric Co. in San Carlos, California as a consultant in network design. Presently he is in the Advanced Development department in charge of circuit research and scientific computing. Ron A. Rohrer is an assistant professor of EE at UC Berkeley. Born in Oakland, California on August 19, 1939, he received the S.B. (1960) from M.I.T. and the M.S. (1961) and Ph.D. (1963) from UC Berkeley, all in EE. Before returning to Berkeley, he taught at the University of Illinois (Urbana) and the State University of New York (Stony Brook) and held an NAS-NRC postdoctoral fellowship at the Polytechnic Institute of Brooklyn. Gabor C. Temes received the Diploma in Engineering from the Technical University of Budapest in 1952 and the Diploma in Physics from Eotvos University, Budapest, in 1954. In 1956 he passed the Professional Candidate Examination of the Hungarian Academy of Science. He received the Ph.D. degree in EE from the University of Ottawa, Ontario, Canada, in 1961. He is now a Consultant to the Ampex Corp., and is a Sessional Lecturer at Stanford and at the University of Santa Clara. Dr. Temes is a Registered Professional Engineer in the Province of Ontario, and a Senior Member of the IEEE.



Pederson



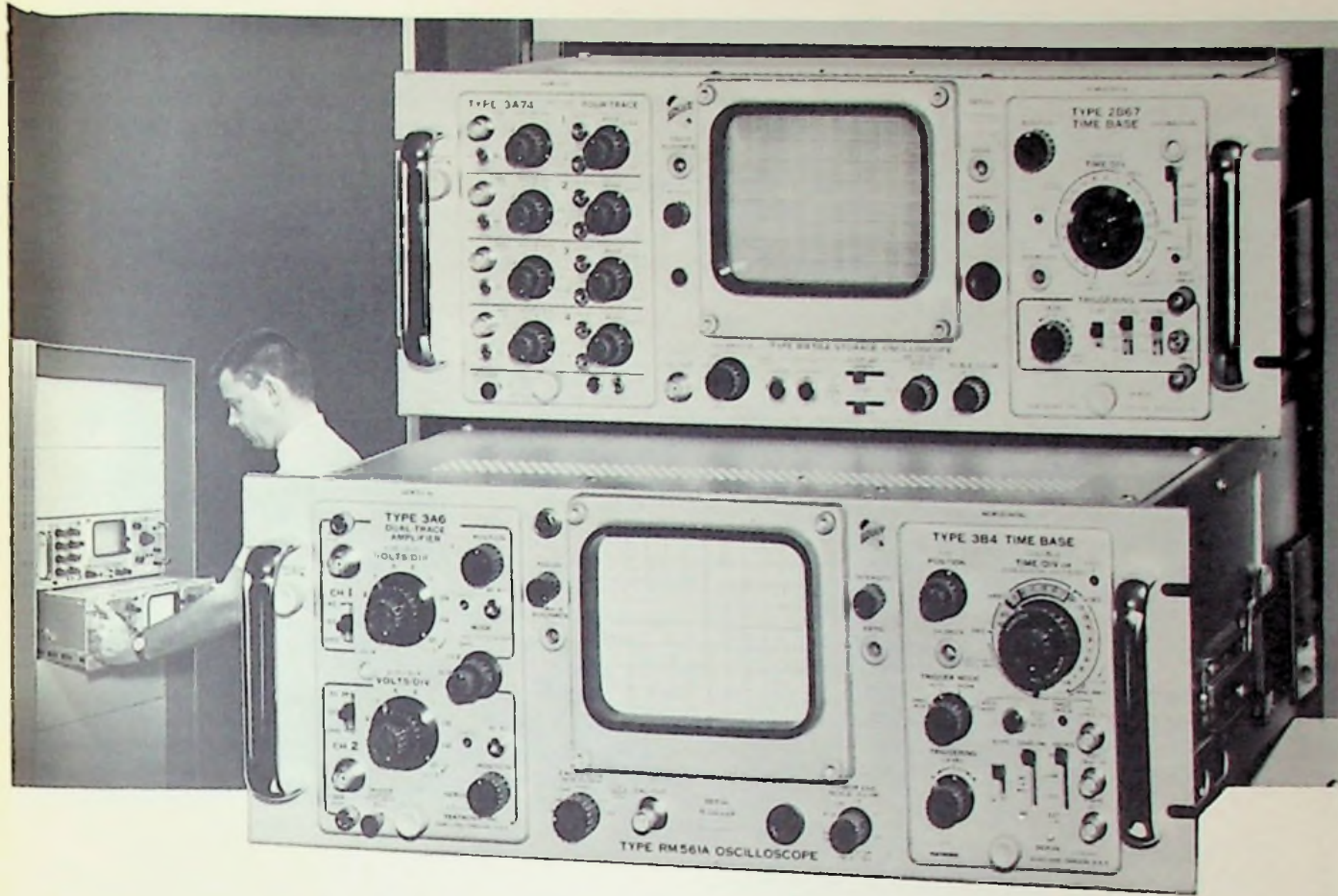
Orchard



Rohrer



Temes



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The **Type RM561A** 7-inch high rack-mount oscilloscope provides conventional oscilloscope performance with measurement capabilities extending from DC through 1 GHz with appropriate plug-in units. It has an 8 by 10-cm CRT with a bright P31 phosphor and an illuminated, internal graticule.

The measurement system illustrated consists of the Type RM561A with the Type 3B4 Time-Base Plug-in and the Type 3A6 Dual-Trace Amplifier. The Type 3B4 provides versatile triggering and calibrated sweep speeds from 5 s/div to 50 ns/div. A direct-reading magnifier provides up to X50 magnification about the center of the CRT. The Type 3A6 Dual-Trace Amplifier has DC-to-10 MHz bandwidth and 35-ns risetime over its 10 mV/div to 10 V/div deflection range.

Type RM561A Oscilloscope	\$ 580
Type RM561A MOD 171A (Includes slide-out tracks)	\$ 630
Type 3B4 Time Base	\$ 425
Type 3A6 Dual Trace Amplifier	\$ 525

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The plug-ins shown in the Type RM564 are the Type 2B67 Time-Base Unit that has calibrated sweep speeds from 5 s/div to 1 μ s/div extending to 200 ns/div with the X5 magnifier, and the Type 3A74 Four-Channel Amplifier that provides DC-to-2 MHz bandwidth over its 20 mV/div to 10 V/div calibrated deflection range.

Type RM564 Storage Oscilloscope	\$1025
Type RM564 MOD 171A (Includes slide-out tracks)	\$1075
Type 2B67 Time-Base	\$ 225
Type 3A74 Four-Channel Amplifier	\$ 625

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Management Training Series Features Granger

The Engineering Management Chapter will meet for the third and final meeting of their three part series on management training at the Kozy Grotto, 210 Hope Street, Mountain View, at 8:00 pm on Wednesday, June 12th. See Calendar.

The speaker will be Dr. John V. N. Granger, who received his Ph.D. in Applied Physics from Harvard. He is president of Granger Associates, which he formed in August, 1956. Dr. Granger is the author of numerous published papers on aircraft antennas and airborne communications. He served as director of WESCON, 1959-63, WESCON Convention Director in 1961, and chairman of WESCON Executive Committee in 1963. He held the office of Secretary-Treasurer and was a member of the Executive Committee of the San Francisco Council of WEMA in 1966, and served as Vice President and Director for the S.F. Council of WEMA for 1967. He is a Fellow of IEEE, has been an active member of IEEE since 1954, and most recently has been a member of the IEEE Operating Committee-TAB in 1965, Member-at-large, IEEE Awards Board, 1965-66, member of the IEEE Board of Directors and Executive Committee, member of the 1966 IEEE Finance Committee, member of the 1966 and

1967 Edison Medal Committee and is serving as Chairman of the 1967 IEEE Finance Committee and Treasurer of IEEE for 1967.



Granger

Second of Management Development Series Reviewed

The second meeting of the IEEE Engineering Management Chapter series on management development was held May 8th. Dr. Gary Williams, of the Stanford Graduate School of Business, gave a well-received talk to an audience of 37 on "Management Education for the Technical Man." He emphasized four points: 1) the need for continuing education to match continual growth in responsibilities and scope, 2) the great importance to bringing *relevance*, in terms of human values, to all aspects and levels of management, 3) the real need to provide the wives of managers an accompanying education for understanding and similar growth, and 4) the importance of being aware of and understanding the *social* as well as business problems which a manager must face.

In discussing the responsibilities of business in society as a whole, Dr. Williams indicated his belief that top executives in general have a greater understanding of this role than does the middle management group. This subject provided a pertinent bridge to the meeting of the group in June, at which a prominent top executive, Dr. John V. N. Granger, will discuss the role of the top executive in continuing management development.

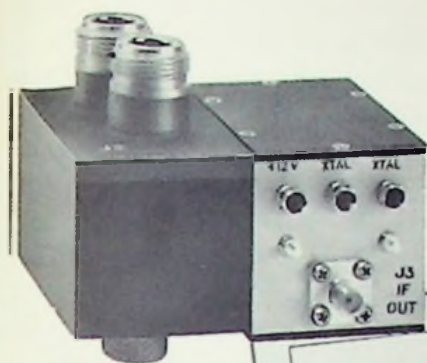
Computers for Professional Engineers Course Offered At Berkeley

Six authorities from the University of California, Berkeley, and IBM will make up the instructional staff of an intensive six-day short course, "Computers for Professional Engineers," to be offered June 24 to 29 at the UC Berkeley campus.

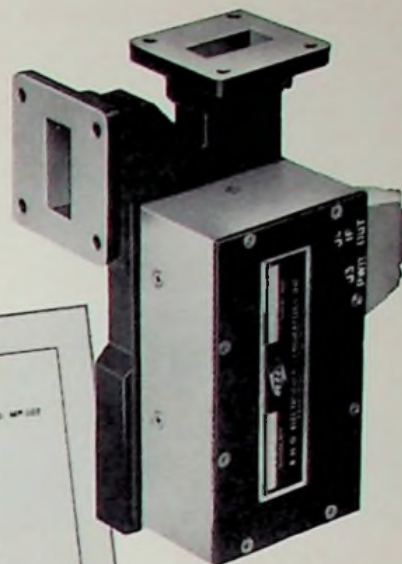
They are David M. Auslander, Robert R. Donaldson and C. D. Mote Jr., all assistant professors of mechanical engineering; James A. Baker, head of the Lawrence Radiation Laboratory mathematics and computing group; Stuart P. Stone, a physicist at the laboratory; and Roger Bakke, advisory engineer for the control system development center at IBM's San Jose, California, Facility.

The course is designed to acquaint practicing engineers with digital computers and their use in the solution of a variety of problems. It will cover the basic principles of computers, Fortran and current computer applications.

The enrollment fee of \$250 includes computer time, texts and notes. For a detailed program description write to Continuing Education in Engineering, University of California Extension, Berkeley, Cal. 94720; or call (415) 642-4151.



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RHG provides the microwave engineer with a complete line of Microwave Receivers and Receiver Components (Catalog 67a), all solid state FM Microwave Relay Equipment (Catalog 67b), Mixer Preamplifiers (Bulletin MP-102), Solid State IF Amplifiers (Bulletin IFA-103), Logarithmic IF Amplifiers (Bulletin LA-101). Send for one or all of these catalogs or see EEM Section 3400 for comprehensive listing.

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Vehicular Technology to Hear About FCC and UHF Mobile Services

On Monday, June 17th, Ney R. Landry will address the Vehicular Technology Chapter. Mr. Landry will give an informal talk covering general information on the two-way communication services and FCC's responsibilities in this field. A question and answer period will follow the talk.

Mr. Landry was a radio operator in the Navy for four years. He attended a technical school in Los Angeles and was with the FCC Intelligence Division in 1940. He served as radio engineer in the sub office in San Diego from 1950 to 1955, when he was sent to San

Francisco as assistant engineer in charge there. Since 1964 he has been Engineer in Charge of the 12th District, Federal Communications Commission.

The meeting will be held at the Shadows Restaurant in San Mateo. See calendar for details.

Reliability Specialist on Parts Screening Techniques

Mr. Ben D. Croghan, Reliability Specialist with Lockheed Missiles & Space Company, Sunnyvale, will address the Professional Group for Reliability on "Parts Screening Techniques" Wednesday, June 20. Mr. Croghan over the past seven years has been instrumental in organizing and implementing the successful parts screening program used on both the Polaris and Poseidon missile systems.

Mr. Croghan will cover many aspects of parts screening among which will be the necessary criteria for developing screening methods for particular part types, the advantages and disadvantages of parts screening, misconceptions of the results of screening, specifics of the

approach used to screen parts for Polaris and Poseidon, and the results of a screening program for a large order of a specific transistor part type.

The meeting will be held in the Physics Lecture Hall, Room 104, Stanford University, 8 pm, June 20 (See Calendar.).

San Francisco Section Chairman, Fred J. MacKenzie, greets Lynn Holmes, IEEE vice president prior to his addressing a joint meeting of San Francisco Section and East Bay Subsection in Berkeley on May 7th. Attendance included a cross section of active officers and members from various levels within IEEE.



SEVENTH ANNUAL RELIABILITY AND MAINTAINABILITY CONFERENCE

**JACK TAR HOTEL
SAN FRANCISCO, CALIFORNIA**

JULY 15-17, 1968

PROGRAM OUTLINE

The Seventh Annual Reliability and Maintainability Conference will provide engineers and program managers with an outstanding opportunity to update their knowledge of the highly reputable techniques that have been developed within each specialist discipline and also to develop a thorough understanding of the integration trend.

The theme of the program is Reliability, Maintainability and Safety Achievement Through Program Optimization. The keynote address by Barry Shillito, Assistant Secretary of the Navy—Installations and Logistics, will stress the role of integrated logistics planning as a program optimization discipline. The management panel, headed by General D.W. Graham, Director of Maintainability for the Air Force Logistics Command, will analyze and interpret the lessons which are being learned from operational experience, particularly in Southeast Asia. The currently extremely important topic of product liability will be the subject of the management lunch presentation by J. Paul Coie. Mr. Coie is President of the Washington State Bar Association and an internationally recognized authority on the legal aspects of a company's liability for the reliability and other characteristics of its products. The banquet presentation will be made by Jerome Lederer. His subject will be "Manned Space Risk Management."

Circling 22,000 miles above us are the twenty-eight satellites of the United States Defense Communications Satellite System.

Nineteen of them were built right here. And in June 1968, another eight will have joined this ring around the world.

About the same time, one of the first satellites with a built-in rocket will take its place high above the Indian Ocean, relaying communications from the United Kingdom to Australia. Our name's on that one, too.

When our first astronauts land on the moon, they'll carry with them a Lunar Surface Magnetometer. For a year, it will measure the moon's magnetic field and note magnetic influences from the sun. It only weighs 17.3 pounds, yet it contains a digital computer and more than 7,000 components. Our name's on that one, too.

In August, the Pioneer D satellite

will carry another of our magnetometers into close orbit around the sun. Next year, the Mariner spacecraft will take off for Mars with our radio subsystem. And the next time you read data on radiation in the atmosphere, chances are the readings will come to you with the compliments of our Solid State Space Radiation Monitoring System.

All of the projects here are out of this world. Whether it's designing a sequence generator to pre-program the functions of a space vehicle or inventing a mechanically despun satellite antenna to focus radio transmission on the earth.

The next time you're watching the stars on a clear night when you can see forever, wouldn't you like to say: "I think that's one of mine." Here, you can.

Here are some of the positions waiting for you to start on your own satellite. If you're interested, we'd like

to hear from you.

These are some jobs now open in Palo Alto, California:

Data Communication Engineers

Systems Integration
Systems Design Development
Circuit Design

Support Engineers

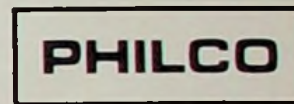
Manufacturing
Electronic Packaging
Quality Assurance
Quality Control

Programmers

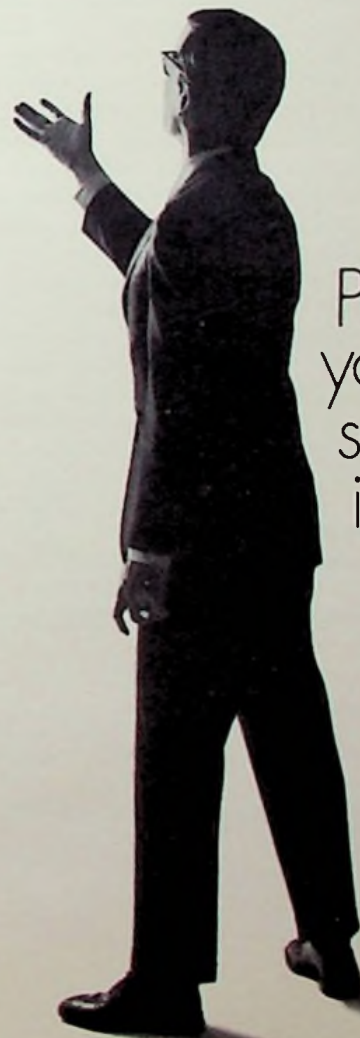
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satellite
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Memorex Marks Sixth Year



Disc Certifier. At special certifiers designed by Memorex, each individual disc is checked to insure against any surface errors. Any error is cause for rejection of entire disc.

With the completion of a new, \$3,000,000 Disc Pack plant at Santa Clara, California, Memorex Corporation marks its sixth year.

The new plant, which triples Memorex production capacity in Disc Packs, is capable of producing fully a third of the world's requirement for this newest memory storage device. The disc pack is truly the hottest item in the field of magnetic memory storage today. The firm's first disc pack facility at Hawthorne, California has been in operation for two years.

Today with 34 offices around the globe, Memorex also produces precision magnetic tape for computers, broadcast and closed circuit television and instrumentation applications. In the non-tape fields, Memorex produces through their Peripheral Systems Division, the Memorex 630 Series Disc Drive, the device which operates the disc pack as the recording device.

In 1962, after 18 months of product development, Memorex began marketing precision magnetic computer tape. From this ground zero beginning, Memorex moved to the number two position in the industry within a three year period. The success of their computer tape allowed them

to extend their research and development operations to include the full spectrum of precision magnetic tape. Share of market for these later introductions was consonant with Memorex's accomplishment in the computer tape field. However, according to Lawrence L. Spitters, President of Memorex, the corporation's rise in the industry was not due merely to a demanding market and a lack of suppliers. Memorex's success hinged on two critical factors: the high performance reliability of their products and a marketing philosophy geared to service the seldom filled needs of each individual customer.

Since its beginning, Memorex has maintained the highest ratio of quality control to production personnel in the industry—in fact, nearly one half of those employed in manufacturing are quality control people. The recruitment of the best creative, technical and research talent in the industry has made it a company of highly competent specialists. Also, as Memorex certification standards are the highest in the field, very often equipment that is exact enough to gauge these standards does not exist. Therefore, Memorex engineers have had the task of redesigning existing equipment or developing completely new measuring devices.

As a super-clean environment is a prime factor in the production of error-free precision magnetic recording media, all manufacturing operations are conducted under stringent, clean-room conditions. Specially designed absolute air filters screen out impurities down to 3/10 micron. Employees who enter production areas first don lint-free dacron caps and garments (surgically cleaned in Memorex's own clean-room laundry) then pass through air showers that vacuum away any dust they may be carrying.

This undeviating approach to quality manufacturing has been coupled with a research and development program—equally exacting and technologically advanced—to improve existing products and initiate more sophisticated and efficient recording devices.

Realizing the high rate of industrial and technological growth in Europe, Memorex entered that market in 1964. At that time, the firm initiated—and still maintains—a marketing philosophy based on the attitude that Memorex become a permanent part of the business community of the various countries serviced. Memorex initiated Telex service from all their international offices to the Santa Clara plant. 100% air cargo shipment, the establishment of technical centers and the recruitment of highly trained sales representatives has paralleled in Europe the customer-oriented marketing philosophy that Memorex maintains at home. Memorex now serves half of the European market for video tape and nearly a third of the market for computer tape.

Memorex's venture into non-tape fields beginning with the development of the Mark I Disc Pack in 1966, is a natural outgrowth of their intensive research and development program.

The firm entered the computer hardware market in January of 1968 with the introduction of the Memorex 630 Series Disc Drive (the equipment which utilizes the disc pack as a recording device).

Pack Assembly. A memorex employee carefully assembles disc into a pack. The completed disc pack will undergo thorough QC tests before it is released.



Ultrasonic Cleaner. All component parts of Memorex Disc Packs are ultrasonically cleaned to remove microscopic particles that cannot be visually detected.



Quality Control Laboratory. Each coated disc must pass a thorough examination. Here we conduct a microscopic check for any surface errors.



Vehicular Technology Group Conference

The 19th Vehicular Technology Group Conference will be held December 3-4 at the San Francisco Hilton Hotel. Papers are solicited in all theoretical, experimental and developmental fields concerning Mobile Communications, Personnel or Pedestrian Communications, Automotive Electrical or Electronics Engineering, Mobile Supervisory and Alarm Systems, and Mobile Teleprinting and Data Transmission. All papers presented will be published in the Conference record, and will be reviewed for the possibility of publication in the IEEE VT transactions.

All authors are invited to submit a 50-word abstract and a 500-word resume or full paper to the Conference Technical Program Chairman:

Mr. W. G. Chaney, Lenkurt Electric, 1105 County Road, San Carlos, California 94070 (415)-591-8461

Deadline for consideration is July 1, 1968.

Conference on Circuits & Systems

The Second Asilomar Conference on Circuits & Systems will be held Wednesday thru Friday, October 30 thru November 1, 1968, at the Asilomar Hotel and Conference Grounds, Pacific Grove, California. It is cosponsored by the Naval Postgraduate School, at the University of Santa Clara, with the participation of the IEEE Groups on Circuit Theory and Automatic Control. It will be devoted to the presentation and discussion of new ideas and developments in the general areas of circuits and system theory. Papers are invited for presentation in twenty to thirty minutes, to be received in abstract form prior to September 13 in duplicate, and sent to:

Prof. Shu-Gar Chan, Code 52Cd, Department of Electrical Engineering, Naval Postgraduate School, Monterey, California

A full Conference Record (limited to ten single-spaced pages per paper) shall be published as an IEEE publication and made available to attendees, IEEE members and libraries through the IEEE.

Call for papers

1968 Hybrid Microelectronics Symposium

The 1968 Hybrid Microelectronics Symposium will be held at the O'Hare Inn, Chicago, Illinois, October 28-29, 1968. A forum for presentation of recent advances in hybrid microelectronics, the symposium aims at interaction of disciplines associated with hybrid microelectronics. Papers are solicited in the areas of ceramics, thin and thick films, active devices, monolithic circuits, material investigations, materials selection and processing, packaging, electrical, mechanical, and thermal design, test procedures, failure analyses, equipment and systems applications. Papers in other relevant areas are welcome. Submit a 300-word abstract by June 1, 1968, to:

Dr. A. H. Mones, IBM Corporation, E. Fishkill Facility, Route 2, Hopewell Junction, New York

Conference on Circuit and System Theory

The 1968 (6th) Annual Allerton Conference on Circuit and System Theory will be held October 2-4, 1968 at Monticello, Illinois, co-sponsored by the Circuit Theory and the Automatic Control Groups of the IEEE. Papers which present new results in information processing, communication sciences, control systems and networks are invited.

Authors should submit a title, a 50-word summary, and a 500-word abstract prior to August 1, 1968. All manuscripts are to be sent to T.N. Trick, Department of Electrical Engineering, University of Illinois, Urbana, Illinois 61801. Accepted papers will be limited to 10 single-spaced pages and will be printed in the Proceedings. Special sheets for the preparation of the copy for the Proceedings will be sent to each author. Copies of the 1963, 1964, 1965, 1966, and 1967 Proceedings are available upon request for \$10.00 each from Mrs. Rosa Townsend, Department of Electrical Engin.

International Electron Devices Meeting

The Annual Technical Meeting of the Electron Devices Group will be held at the Sheraton-Park Hotel in Washington, D.C., on Wednesday, Thursday, and Friday, October 23-25, 1968. This is the annual electron device meeting covering research, development, design and manufacture of Integrated Electronics, Solid State Devices, Electron Tubes, Imaging and Display Devices, Quantum Electronic Devices, and Energy Conversion Devices.

Prospective authors must submit an informative, unambiguous abstract, without figures, appropriate to a 20-minute paper, before August 1, 1968. For more information, please contact:

Donald A. Chisholm, Program Chairman, 1968 International Electron Devices Meeting, Bell Telephone Laboratories, Murray Hill, New Jersey 07974

1968 Fall URSI Meeting

Papers are solicited in all theoretical, experimental and development fields of interest to the following URSI Commissions: Radio Measurement Methods and Standards; Radio Propagation in Non-Ionized Media; Ionospheric Radio; Magnetospheric Radio; Radio and Radar Astronomy; Radio Waves and Transmission of Information; and Radio Electronics. Authors are invited to submit, in duplicate, 200 word abstracts of papers for presentation at URSI sessions to: Mr. Leon J. Ricardi, MIT, Lincoln Laboratory, P.O. Box 73, Lexington, Mass. 02173, by June 21, 1968. Please state commission preferences.

G-AP papers are desired in the following topics: Antennas, electromagnetic theory, radio wave propagation, scattering and diffraction, radar astronomy, radio astronomy, plasma physics, and radio physics. Authors are invited to submit 400 to 600 word summaries of papers for presentation at G-AP sessions to: Mr. Leon J. Ricardi, Lincoln Laboratory, MIT, P.O. Box 73, Lexington, Mass. 02173, by June 1, 1968.



Student Branch/Excom Meet in Lively Session

Attendees at the recent Student Branch/Excom meeting: Gordon Longerbeam, Student Branches Coordinator, SF Section; Rene Marxheimer, Student Branch Counselor, San Francisco State College; Dave Cammack, Student Branch Chairman, San Francisco State College; Don Pederson, Treasurer San Francisco Section; Jack Barkle, Vice Chairman San Francisco Section; Ron Rohrer, Student Branch Counselor, University of California; Gene Franklin, Student Branch Counselor, Stanford University; Art Heers, Chairman Student Branch, Stanford University; Stan Kiesel, Director Region 6; Gary Swanson, Student Branch Chairman, University of California; John Bouldry, Student Branch Counselor, US Naval Postgraduate School; Ted Kuligowski, Student Branch Chairman, US Naval Postgraduate School; Charles Sedam, Director, San Francisco Section; Fred McKenzie, Chairman San Francisco Section; Tim Healy, Student Branch Counselor, Santa Clara University; Bob Hesse, Student Branch Chairman, Santa Clara University; Ed Hulse, Jr. Past Chairman, San Francisco Section; Howard Turner, Chairman Santa Clara Valley Sub-section.

On April 15, 1968, members of the Executive Committee of the San Francisco Section, the Director of Region Six, and Student Branch Chairmen and Advisors of Student Branches within the San Francisco Section held a dinner meeting to discuss the relationships between the Section and the Branches.

The meeting was called to promote the relationship between the Section and Student Branches, and to explore some possible appropriate activity that the Section and the Student Branches could participate in jointly.

A great deal of discussion centered around the value of the Student Papers Contest as the major, or perhaps only, activity which brings the students into contact with the Institute as a whole.

A variety of opinion was expressed, but the prevailing opinion seemed to be that the Papers Contest is of diminishing importance to the Students.

The opinion seems to be that the contest is valuable to those who participate, but that participation is extremely low, at least in the San Francisco Bay Sub-Region (San Francisco and Sacramento Sections). It was agreed that this question should be further pursued at the Sixth Regional meeting in Portland during May.

The remainder of the meeting centered around a free-wheeling discussion of what the Student Branches are doing, with the discussion producing some very enlightening things about today's engineering students.

Finally, the group discussed activity which the Student Branches and the Section could sponsor jointly which would meet the needs of the Students, and perhaps the regular membership and the Bay community at large as well. A very interesting idea proposed by Gordon Longerbeam which we hope to pursue further is joint sponsorship of a National meeting in the area to promote communications between the Technological community, and the public at large. Such a meeting would hopefully involve technological leaders from the Bay Area, and noted spokesmen from such fields as government, social sciences, economics, political science, and education.

Computer Sciences Corporation Developing Computer Operated Ticket Selling System

The Computicket system being developed by Computer Sciences Corporation will make ticket purchasing as simple and routine as cashing a check or doing the weekly marketing.

In each city or area served by Computicket there will be a large-scale computer complex linked by telephone circuits to several hundred terminal units located in banks, supermarkets, department stores and other commercial and retail concerns. The terminal units will be used not only to query the central computer on seat availability but to print the admission tickets as well.

Here's how Computicket will work: Suppose a family of four decide they'd like to see the baseball game to be played in their city on the coming Saturday night. The next time the housewife goes shopping, she stops by a Computicket service outlet.

There she indicates she wants four \$3.50 seats in the first tier behind third base for Saturday night's game. The Computicket operator, an employee of the bank or store, transmits this information to the computer simply by pressing buttons on his terminal console.

The computer immediately scans its record of unsold seats in the indicated section for the specified event and date. When it has located the best group of four seats, it signals the terminal unit to print a message showing which seats

are being offered and indicating that the total collection to be made is \$14.

Upon the customer's acceptance, the Computicket desk operator signals the computer to print the tickets at the terminal. The entire transaction has been accomplished in less than one minute.

HAI K(Y)U POEM

*Negative resistance
Can be of assistance
In trying to foil
The loss in a coil.*

John A. C. Bingham

Government Surveys Indicate Technical Personnel Not Up To Date

Wesley Taft Benson CPA

Three reports on use of technical information tell about the same story, i.e., many scientists and engineers do not use published sources of information. This conclusion was reached by the sponsors of the surveys upon which the reports are based. Our Government supports about two thirds of all research and development in the United States and for this reason is a primary source of scientific information. An attempt has been made to get around this problem by setting up information dissemination programs to both Government and private industry. It was a surprise to many that scientists and engineers had no knowledge of these services. The Dept. of Defense study found that in private industry 43 to 63 percent of technical people questioned had no idea about these programs.

The survey put out by NASA found that over one half of the companies questioned had a technical library and a program to keep it up to date. These organizations wanted to save the time of their scientific personnel by having a well stocked source of technical information. In contrast with this, many companies had no library resources and therefore the individual scientist had to gather his own information.

For those who are interested, there is now available a memorandum on sources of technical data published by the Government. Send SI to MAPI, 1200 - 18th Street NW, Washington, D.C. 20036. The title is "Research and Development Sources in Federal Government". This memorandum is especially valuable in that all of the main libraries where scientific information may be obtained are listed. This together with the names and addresses of men who may be contacted makes the possession of this reference paper a must.

The memorandum lists six government agencies where technical information may be obtained:

1. *Library of Congress, National Referral Center for Science and Technology.* This has been called the "information desk of the scientific world". It directs those who need assistance to organizations or individuals who have specific knowledge of the subject in question.

2. *Department of Commerce, National Bureau of Standards, Institute for Applied Technology.* Established in 1964, the Institute is a part of the National Bureau of Standards. It cooperates with industry generally but is mostly interested in activities related to the National Bureau of Standards.

3. *National Aeronautics and Space Administration, Office of Technical Utilization.* This contains a tremendous flow of new information coming from the 75,000 scientists who contribute to the NASA mission. This rapidly growing field of knowledge is kept up to date in this library.

4. *U. S. Atomic Energy Commission, Division of Technical Information.* This gives primary emphasis on reporting results of research and development on projects sponsored by the AEC.

5. *Department of Defense Information Services.* The DOD Information Centers are set up for the collection, analysis and distributing scientific information developed by or for the Department of Defense. This group is interested in specialized areas of technical knowledge most of which is related to 22 subject fields.

6. *Department of Commerce, Office of State Technical Services.* The State Technical Service Act of 1956 was passed by Congress to encourage the States of the Union to set up their own technical service offices. Programs developed by these agencies vary a good deal and are turned over to an institution of higher learning to be administered. Names and addresses of officials heading up these programs in each state are given in the MAPI memorandum referred to above.

SCUPAC

The Santa Clara University Power Advisory Council will be holding a three week course, from August 5 thru August 23, 1968, on mathematics, computer programming and analytical techniques for electric power networks. The program is designed for practicing utility engineers, programmers, mathematicians, and educators who are concerned with the planning, design, and operation of electrical systems.

The program's objectives are to familiarize the participants with the present state of computer technology; to provide a sound mathematical foundation for network and system analysis so as to enlarge the understanding of modern analytical techniques; and to attempt to probe the future problems of system planning.

For specific information, please contact: Professor J. A. Peterson, School of Engineering, University of Santa Clara, Santa Clara, Calif. 95053, Telephone: (408) 246-3200, Ext. 226, 227.

New Members

The Section welcomes the following new members:

W. E. Erickson J. W. McMains
W. T. Frost T. C. Pittman
D. Gilon J. R. Yelverton
P. T. Yun

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These eminent engineering pioneers gathered at the April 17 dinner meeting co-sponsored by the section and Santa Clara Valley Subsection for a fascinating set of reminiscences. Participants, standing from left to right, were Dr. Frederick E. Terman, vice president and Provost of Stanford; Charles A. Powell, prominent in early utility systems; Donald I. Cone, early telephone systems power engineer for P.T. & T.; Almon W. Copley, retired Westinghouse engineer; L. E. Reukema, UC professor emeritus; Joseph Cox, retired engineering manager of Westinghouse; and Alert M. Opsahl, first oscillograph in USA and lightning studies. Panelists, seated from left to right, were Gordon Moore, Director, R & D Lab at Fairchild; moderator Charles Susskind, assistant Dean of Engineering, UC, Berkeley; Gerald Pearson, professor of electrical engineering, Stanford; John Woodyard, associate professor, UC, Berkeley; William Shockley, consultant, Bell Telephone Labs; and John Linvill, professor of electrical engineering, Stanford.

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WESCON Schedules Packaging Symposium

Twenty technical papers aimed at "state of applications" in electronic packaging will attract more than 500 engineers to WESCON's kickoff technical conference August 19 and 20. The 1968 Electronic Circuit Packaging Symposium—the ninth annual event of its kind—will be held at the Statler Hilton Hotel in Los Angeles.

Morgan Sparks, executive director of Bell Telephone Laboratories' semiconductor components division, will keynote the two-day symposium.

Emphasis on new techniques for design and production problem-solving will characterize the symposium sessions, it was announced by Edward J. Lorenz (IBM/Poughkeepsie), chairman of the 12-man program selection committee.

The tentative program lineup includes: *Beam Lead Interconnection Technology*, *New Hybrid Microelectronic Packaging Techniques*, *Packaging Design—Testing and Analysis*, *Linking the Electronics*, and *Meeting the Challenge in Electronic Packaging*.

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EMTECH has an attractive opening for a senior-level engineer with interest and demonstrated ability in marketing and product development plus experience in the design and test of microwave components and systems.

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Officers of the newly formed San Francisco Section Chapter of the Education Group. From left to right they are J. E. Thomsen, Cabrillo College, Program chairman; J. R. Ward, USNP School, Treasurer; C. L. Thacker, Cogswell Polytechnical College, chairman; R. P. Loomba, San Jose State College, Vice chairman; and R. B. Marxheimer, San Francisco State College, Secretary. The first meeting of this Chapter was held at Ricky's on Saturday, May 4, 1968.

Panel Highlights Government Interest in Radiation From Electronic Equipment

Over 100 participants attended the special panel discussion on "Biological Effects of Microwaves: Future Research Directions" held during the 1968 Microwave Power Symposium, which was organized by the International Microwave Power Institute in Boston recently. Lt. Col. A. M. Burner, chief of the radiobiology division of the U.S. Air Force directorate of research and development at Brooks Air Force Base, Texas, was the panel chairman.

A transcript of the discussion has been published and may be ordered from San Francisco Press, Inc., 255 12th Street, San Francisco, Calif. 94103. (\$4.50 postpaid.)

In addition to Dr. Burner, panel participants were Dr. R. L. Carpenter, Department of Biology at Tufts University, Dr. J. W. Howland, University of Rochester School of Medicine and Dentistry, and Dr. Charles Susskind, College of Engineering, University of California.

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Remember These Dates

June 25-27, 1968: Second Annual IEEE Computer Conference, International Hotel, Los Angeles, Calif. (IEEE, 345 E. 47th St., New York, N.Y. 10017)

June 25-28, 1968: 1968 Conference on Precision Electromagnetic Measurements, National Bureau of Standards Laboratories, Boulder, Colo. (IEEE, 345 East 47th St., New York, N.Y. 10017)

June 17-20, 1968: 1968 American Society for Engineering Education Meeting, University of California at Los Angeles. (Lewis Winner, 152 W. 42nd St., New York, N.Y. 10036)

1968 (2nd) SOLID STATE DEVICES CONFERENCE SEPTEMBER 3-6

The Institute of Physics and The Physical Society in collaboration with The Institute of Electrical Engineers, The Institute of Electrical and Electronics Engineers, United Kingdom and Republic of Ireland Section, is arranging a 2nd Conference on Solid State Devices from 3-6 September, 1968 to be held at the University of Manchester Institute of Science and Technology, Manchester, England.

Further details and application forms will be available from the Meetings Officer, The Institute of Physics and The Physical Society, 47, Belgrave Square, London, S.W. 1 England in April/May, 1968.

People

Edward Combs to Retire

Edward Combs, Technical Director and former vice-president, engineering of Lynch Communication Systems Inc. will retire effective as of May 1, 1968.



In April 1967 Combs' resignation as vice-president was accepted and in keeping with his wish to concentrate upon technical matters he was named Technical Director.

Combs holds seven patents for inventions in the telecommunications field and is the author of many published papers and articles dealing with the application of telecommunication systems and related subjects.

MVR Appoints Bernard Brenner Vice President of Engineering

MVR Corporation, pioneer developer and manufacturer of the VIDEO-DISC™, TV Disc Recorders, announced the appointment of Bernard M. Brenner as Vice President of Engineering. Mr. Brenner joins MVR from Ampex Corp. where he served as Manager of Engineering for the Instrumentation Division.

He will be responsible for the engineering on the firm's Disc Recorders (Stop Action and Slow Motion) for a number of applications as well as MVR's developments in the fields of random access data terminal display and information retrieval.

Mr. Brenner is a Member of the IEEE and is the holder of several magnetic recorder patents.

Larry Porter Elected ERA President

Larry Porter, of the Porter Company, has been elected 1968 president of the Southern California Chapter of the Electronic Representatives Association (ERA).

Other 1968 ERA officers include: Howard Schoenduve, of Felty/Schoenduve Inc., who is the new chapter Vice President, and Harrison Frank of Halbar Associates, Treasurer.



Guy Rader Joins Walter Assoc.

Guy Rader has recently joined Walter Associates, as a Microwave Field Engineer. His new responsibilities will include handling special requirements and providing technical services.

Rader came to Walter from ESL, Inc., working with leading engineers in the microwave field, designing and building broadband hybrids, unusual multi-throw switches and worked on projects covering the whole spectrum of microwave gear available. At Sylvania, he was responsible for broad beam forming networks, building microwave devices and working with strip-line devices.

Vaughn Williams New Director Of Engineering at Pelmec

Mr. Vaughn Williams has been appointed Director of Engineering of Pelmec Division of Quantic Industries, Inc., manufacturer of ordinance devices and aerospace components.

Mr. Williams, a chemical engineering graduate of Ohio University, formerly held engineering and administrative positions with Lockheed Propulsion Company, Rocket Power, Inc., Atlantic Research Corporation, and Goodyear Atomic Corporation.

Jerome Brandt Joins Western Microwave Labs.

Jerome L. Brandt has joined Western Microwave Laboratories, Inc., as director of marketing. Previously, Mr. Brandt was president of the industrial firm of J.L. Brandt Associates in Palo Alto for two years. Before that he had been a managing partner in Gruye/Brandt Associates since 1962.



Brandt holds a BS degree in engineering from the University of Alabama and an MS in industrial management from Stevens Institute of Technology.

ComTech Award



The Annual IEEE ComTech Achievement Award with an honorarium of \$300 is awarded this year to Paul G. Edwards. The citation reads "For outstanding contributions to the engineering and planning of communication systems."

Until recently, Mr. Edwards was associated with MITRE Corporation as Department Head, Communications Systems and Techniques. Prior to that time, Mr. Edwards was with the Bell Telephone System. His most recent assignment was the organization and direction of the Merrimack Valley Laboratories at North Andover, Mass. He holds 39 patents and has published seven major papers in this field.

He received his BSEE in 1924 and EE in 1929 from Ohio State University, and is a Fellow of the IEEE.

Mr. Edwards is presently residing in Carmel Valley, and is now a member of the San Francisco Section.

Stanford Professors Honored

Two more Stanford University engineers, Prof. Gerald L. Pearson of the Electrical Engineering Department and Trustee Dean A. Watkins, have been elected to the National Academy of Engineering (NAE).

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Major Staff Changes at MEC, a Teledyne Company

John Blake, former Director of Marketing at Microwave Electronics, has been promoted to Assistant General Manager, according to Dr. Stanley Kaisel, President of the Palo Alto based Company. At the same time Michael Lewis, former Director of Marketing at Filters, Inc., has assumed responsibilities as Manager of Marketing Administration.

Dr. Stanley F. Kaisel announced the appointment of Henry I. Kolm as Director of Marketing for Microwave Electronics, a Teledyne Company.

Mr. Kolm joined MEC in 1962 as a Contract Administrator.

Prior to joining MEC, he was employed with Westinghouse Electric for 7 years as a Sales Engineer, and from 1959 to 1962, with Ampex Corporation in Contract Administration.

Mr. Kolm received his BSEE in 1952 from Virginia Polytechnical Institute.



Sylvania Appoints McCoy Manager Advanced Systems

Dr. Jerome D. McCoy has been appointed Manager of Advanced Systems for the Security Systems Organization (SSO) of Sylvania Electronic Systems, an operating group of Sylvania Electric Products Inc. He is responsible for generating and implementing advanced concepts, techniques, and capabilities in the design of electronic security alarm and protection devices.

William Butler Director Product Management at Memorex

William H. Butler has been appointed to the newly created position as Director of Product Management, Memorex Corporation.

Mr. Butler joined Memorex in January of 1967 as Product Manager for closed-circuit video tapes and in July, 1967, he was promoted to Product Manager—Video Tapes.

In addition to receiving his bachelors degree in electrical engineering from Stanford University, Mr. Butler earned a master of science in administration.

Rosen Elected A Vice President Of Watkins-Johnson

Bernard Rosen was elected a vice president of Watkins-Johnson Co. and retains the title of manager of the Systems Division. He has taken a leading part in the development of W-J's program in microwave communications and testing systems for both commercial and military applications.

Mr. Rosen holds a Master's in Electrical Engineering from Brooklyn Polytechnic Institute.

Ronald J. Mackay has been appointed assistant to the administrative director.

Mackay will assist Stuart G. Whitelsey, Jr., administrative director, with certain business operations of the company.



Meyer Leifer receives plaque from Fred MacKenzie, Section Chairman, at the April 17 Pioneer's Night Meeting. The plaque was presented to Mr. Leifer in appreciation of his services as a member of the WESCON Board. He served in more positions on the Board than any other Director; was Chairman of the Board in 1965; Executive Committee Director in 1965 and also served as a Director in 1962-63.

O'Halloran Associates Appoints Bach

The appointment of Robert J. Bach as Sales Engineer with O'Halloran Associates, California electronic manufacturers, representative firm, has been announced by President John F. O'Halloran.

After a short indoctrination period at the firm's North Hollywood headquarters, Bach has been assigned to key accounts in the San Francisco Bay area. His office is located in Palo Alto.



California Microwave New Sunnyvale Firm

A new electronics company, California Microwave, Inc., has its office and laboratory located at 1188 Elko Drive, Sunnyvale, and operations are under way. Incorporation is expected to be completed by mid-May.

The company will design, manufacture and sell solid-state microwave components and subsystems. The principals are Dr. Leeson, president; Drew R. Lance, chief engineer, signal sources; Edward E. Sox, chief engineer, microwave components, Theo. Granstedt III, operations manager; and Alfred F. Kenrick, marketing manager.

California Microwave intends to pursue both the defense and commercial markets, with the majority of sales expected to go to radar, electronic countermeasures, and communications applications.



From left to right: Sox, Granstedt, Leeson, Kenrick, Lance

Manufacturer / Representative Index

A. D. Data Systems	W. K. Geist Co.	IKL, Inc.	Components Sales Calif.
Adret Electronics	W. K. Geist Co.	Inland Testing Laboratories	W. K. Geist Co.
Aerotech	Jay Stone & Assoc.	Instrumentation Technology Corporation	Components Sales Calif.
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Data Technology Corp.	T. Louis Snitzer Co.		
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Elgenco, Inc.	V. T. Rupp Co.		
Emcor-Borg-Warner Corp.	T. Louis Snitzer Co.		
EMI Gencom Div., Whittaker Corp.	O'Halloran Assoc.		
Eppley Laboratory, Inc.	W. K. Geist Co.		
F. A. M. Engineering	Jay Stone & Assoc.		
Feedrail Products	Far West Industrial Sales		
Genisco Systems, Inc.	King Engineering		
Gibbs Mfg. & Rsch. Corp.	W. K. Geist Co.		
Gombos Microwave	Walter Assoc.		
Guidline Instruments	T. Louis Snitzer Co.		
Hallmark Standards, Inc.	T. Louis Snitzer Co.		
Houston Instrument, Div. Bausch & Lomb	V. T. Rupp Co.		

Representative Directory

Abbott Engineering Co. 2600 El Camino Real Palo Alto; 327-0830	O'Halloran Associates 3921 E. Bayshore, Palo Alto; 326-1493	Willard Nott & Co. 1485 Bayshore Blvd. San Francisco; 587-2091
Bill Coe & Assoc. P. O. Box 1383 San Carlos; 593-6057	Rupp Co., V. T. 1182 Los Altos Avenue, Los Altos; 948-1483	Snitzer Co., T. Louis 1020 Corporation Way, Palo Alto; 968-8304
Components Sales California 3980 Fabian Way Palo Alto; 326-5317	King Engineering Co., Inc. 525 Grant Street San Mateo; 342-9645	Stone & Assoc., Jay 140 Main Street, Los Altos; 948-4563
Far West Industrial Sales P.O. Box 11134 Palo Alto; 321-3943	L & M Engineering 2620 The Alameda Santa Clara; 243-6661	Geist Co., W. K. Box 746, Cupertino; 968-1608, 253-5433
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ADVERTISER/AGENCY INDEX

Bel Air Sands Motor Hotel	13
EMTECH Corp.	13
Englert and Company	11
FireSide Thrift (Raymond L. Sines & Associates)	12
Holiday Inn	12
Neely Sales Div. HP Co. (Lennen & Newell, Inc.)	1
Philco-Ford (Meltzer, Aron and Lemen, Inc.)	7
RHG Electronics Laboratory (Samuel H. Goldstein)	5
Stanford Linear Accelerator Center (Hal Lawrence Inc.)	4
Sylvania (Hal Lawrence Inc.)	Back Cover
Tektronix, Inc. (Hugh Dwight Advertising Inc.)	3
Walter Associates (Stadler/Cowman Advertising)	14
Wanlass Electric Co. (Leland Oliver Co.)	Inside Back Cover
Western Electronic Show and Convention	Inside Front Cover

Memorex to Receive Presidents "E" Award

Memorex Corporation of Santa Clara, California, manufacturer of precision magnetic tape and magnetic coated discs, has been designated by Secretary of Commerce C. R. Smith to receive President Johnson's Export "E" Award for its success in promoting foreign sales of U.S. products, the U.S. Department of Commerce announced today.

The company established a technical services facility in London to provide engineering assistance for its large European market. The firm also has sales offices in ten major European cities and distributors in Australia, Canada, Costa Rica, India, Argentina, Colombia, Peru, Venezuela and the Philippines.

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BRING IN A NEW MEMBER.**

THE WANLASS PARAFORMER™

As shown by Equation #1, electromotive force, and hence the transfer of electrical energy can be achieved in two ways: (1) by flux coupling, or (2) by parametric coupling. Existing passive devices such as transformers and ferroresonant transformers depend almost exclusively on the flux coupling term of Equation #1. However, Wanlass Electric has now invented a new component, the Paraformer™, which operates exclusively on the basis of parametric coupling and consequently is a device in which the flux coupling or mutual inductance is zero. (Thus, all energy is passed by the $i \frac{dL}{dt}$ term of Equation #1.)

$$E = \frac{d}{dt} (Li) = \underbrace{\frac{L di}{dt}}_{\text{Flux Coupling Term}} + \underbrace{i \frac{dL}{dt}}_{\text{Parametric Coupling Term}}$$

Equation #1

The relative advantages of the new device are summarized in the following table.

	Transformer	Ferroresonant Transformer	Paraformer™
All Passive Device	Yes	Yes	Yes
All Static Device	Yes	Yes	Yes
Number of Components	3 (Two coils & a core)	5 (three coils, a core & a capacitor)	4 (Two coils, a core & a capacitor)
Multiple secondaries permissible	Yes	Yes	Yes
Line Isolation	Yes	Yes	Yes
Voltage Transformation	Yes	Yes	Yes
Line Voltage Regulation	None	±1%	±¼%
Line Filtering (Noise)	No	Slight	Over 50 db attenuation
Load Filtering (Noise)	No	Slight	Over 50 db attenuation
Overload Protection	No	Partial	Yes
Low Line Voltage Protection	None	None	Yes

As will be noted from Table I, the Paraformer™ is inherently a line voltage regulator and line power filter. In fact, the Paraformer's most useful property appears to be its ability to prevent load voltage fluctuations from reaching the line and line voltage fluctuations from reaching the load. As will be noted from the above table, such fluctuations (noise, distortions, etc.) are attenuated by over 50 db for frequencies from a few cycles per second up to 1 megacycle per second.

Having noted the outstanding advantages of the Paraformer™, it is perhaps appropriate to note the simplicity of the device.

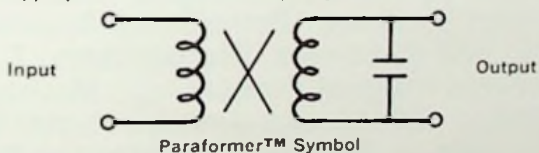


Figure 1

As shown in Figure 1 (see also Fig. 2), the Paraformer consists only of a primary winding, a secondary winding, a magnetic core and an AC capacitor. **NO OTHER COMPONENTS** are used. After reviewing the symbol, it is perhaps important to restate that the Paraformer™ is not a ferroresonant transformer. The mechanism for energy transfer is entirely different and most of the basic characteristics are entirely different. Table II highlights some of these differences.

Relative to Table II, the test results observed for the Paraformer are most easily understood if one thinks of this device as a power oscillator which is parametrically pumped by the line and hence is phase locked to the line frequency. (For instance, shorting the output of any oscillator causes the oscillations to stop, thus accounting for the results observed in Test #1.)

TEST	OBSERVATIONS		
	Transformer	Ferroresonant Transformer	Paraformer™
1. Short circuit output terminals	High load currents	Twice rated load current	Zero load current
2. Remove output capacitor		Output voltage decreases by 25%	Output voltage goes to zero
3. Apply low input voltage (e.g. 50% of normal)	Low output voltage (e.g. 50%)	Low output voltage (e.g. 50%)	Output voltage goes to zero
4. Apply voltage to output terminals instead of input terminals	Bilateral Operation (Voltage observed on input terminals)	Bilateral Operation (Voltage observed on input terminals)	Unilateral Operation (no voltage observed at input terminals)
5. Measure phase shift through device	Constant at 180°	Highly variable (varies with load)	Constant at 90°

Figure #2 depicts the design of one version of the Wanlass Paraformer™ (two C-Cores rotated 90°).

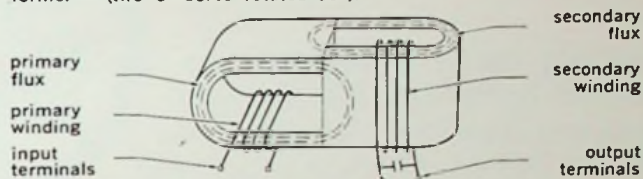


Figure #2

Note that the geometry is such that the primary flux does not link the secondary winding and that the secondary flux does not link the primary winding. (Accordingly, the classical flux coupling is zero). However, note that the primary flux does modulate the reluctance associated with the secondary flux, and hence the primary does modulate the inductance of the secondary. This modulation can be achieved only by transferring electrical power from the primary to the secondary. This power in turn sustains the secondary oscillations and delivers power to the load. It is this unique parametric power transfer mechanism that makes the Paraformer™ a revolutionary new component.

ORDER A PARAFORMER™ TODAY AND SEE FOR YOURSELF

Knowing that every conceptually new component must be carefully tested by prospective users before it can be included within their own equipment, Wanlass Electric has available for immediate delivery a 60 watt Paraformer (Model PEC-60). May we suggest that you buy one of these units and satisfy yourself relative to its amazing properties. When you place your order, be sure to ask for our new book entitled "The Wanlass Paraformer™". This treatise on the subject of parametric power conversion discusses the theory and application of parametric devices and will assist you in evaluating your PEC-60.



PEC-60 SPECIFICATIONS

Input Voltage	115 VAC ±10%, 60 Hz, 1ϕ (50-150 VAC input voltage range dependent upon load current)
Output Voltage	117 VAC, 60 Hz, 1ϕ
Output Capacity	60 Va
Noise Attenuation	Over 50 db (0-1 MHz)
Line Regulation (±10%)	±0.25%
Load Regulation (0-FL)	±1.5%
Size (approx)	6½" L x 4" W x 3½" H
Weight (approx)	10 lbs.
Price (including book)	\$95.00

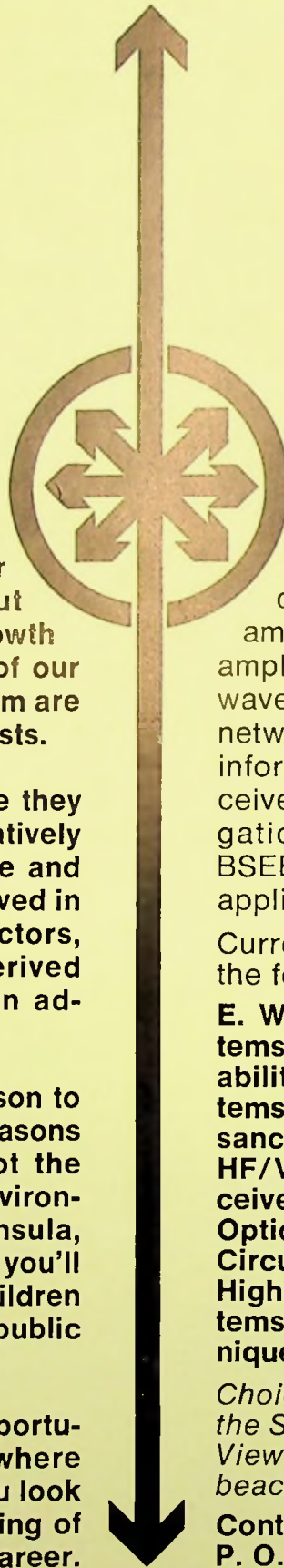
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