

EDITOR'S PROFILE of this issue

from a historical perspective ...

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

January, 1968:

Cover: Burton McMurtry of Sylvania demonstrates a laser at their Mountain View facility.

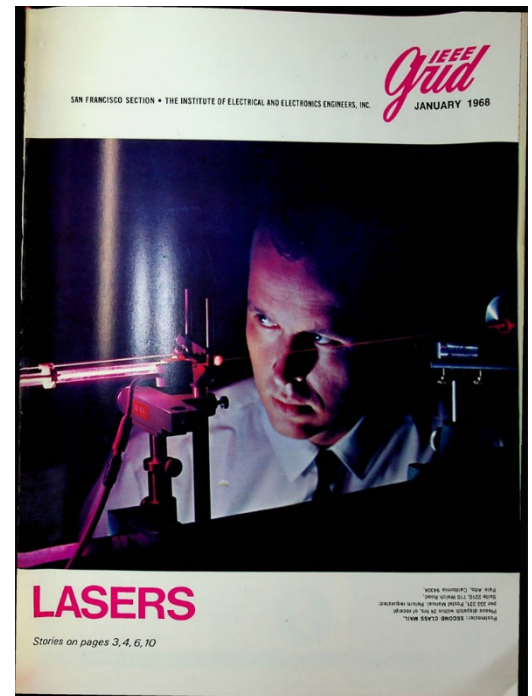
Page 18: A profile of some of the work being done by Prof. John McCarthy of Stanford at the Stanford Artificial Intelligence Lab (SAIL) that he founded in 1963; it influenced Xerox-PARC in the areas of user interfaces. It was shut down in 1983.

Page 18: The book "Electronics in the West: The First Fifty Years" by Jane Morgan is published. With a foreword by Fred Terman, it is in print in time for the planned opening of the Foothill Electronics Museum, and covers many of the people (and technical developments) in a story format suitable for the school children expected to visit the Museum. It parallels my own research and sources that are a part of my IEEE DL talk "The Origins of Silicon Valley". At 194 pages, this hard-cover book costs \$4.95.

Page 20: Varian Associates announces a 4 MeV linear accelerator for radiotherapy of cancer, an offspring of Prof. William Hansen's work on linear accelerators. The largest accelerator, at 2 miles long (and \$114 million), has just been completed in the hills behind the Stanford campus. Today, all radiation treatment for cancer uses Varian linear accelerators.

Page 22: Nobel Prize winner Robert Hofstadter joins Stanford's physics department with a focus on the second-largest linear accelerator, the Mark III at 30 feet long and using three klystrons (to just fit into the building).

Page 22: Regis McKenna joins National Semiconductor as Marketing Sales Manager. Regis became famous for his work promoting Intel's microprocessors, and then working with Steve Wozniak and Steve Jobs to promote Apple's first computer. He will be credited as the man who put Silicon Valley on the map.



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@ieee.org

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JANUARY 1968

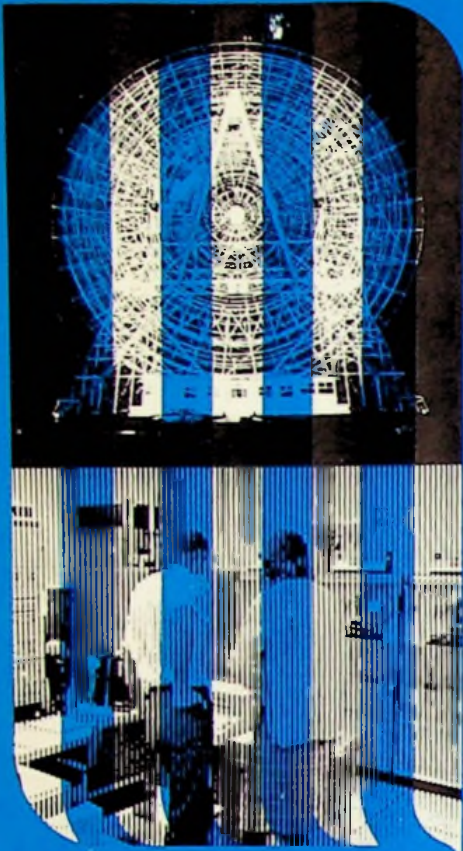


LASERS

Stories on pages 3, 4, 6, 10

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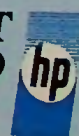
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MEETING

AEROSPACE & ELECTRONIC SYSTEMS (Story on page 12) A tour of IBM production facilities and a discussion of IBM products and capabilities.

January 25, Thurs. 7:30 PM, IBM plant, Monterey & Cottle Rd., San Jose. (Enter Gate 1 and assemble in lobby of Bldg. 010—No dinner. Please call Al Hastings at 742-9387 or 742-7287 if you plan to come, as attendance is limited.

ANTENNAS & PROPAGATION (Story on page 15) Integral equation formulation of a log-periodic antenna. Don Johnstone, senior engineer, Sylvania Electric Products.

January 11, Thurs. 8 PM, Lockheed Auditorium, Bldg. 202, 3251 Hanover St., Palo Alto. Dinner 6:00 PM, Stickney's Town & Country Village, Palo Alto. Dinner Reservations: Dr. Glenn Keitel, 294-6414, ext. 2206 by Jan. 10. (Order from menu)

AUTOMATIC CONTROL (Story on page 15) Signals & Systems adaptive closed loop control systems. Dr. Otto J. M. Smith, professor of electrical engineering, University of California, Berkeley.

January 16, Tues. 8 PM, University of Santa Clara, Engineering Center, Room 551. Dinner: 6:30 PM LeBoeuf (old Luccas) across from the University. No reservations required. Order from the menu.

CIRCUIT THEORY (Story on page 4) Integrated frequency selective amplifiers. Prof. W. Howard and William Walsh, University of Calif., Berkeley.

January 17, Wed. 8 PM, Room 134 McCullough Bldg., Stanford University. Dinner: 6 PM, Red Cottage, 1706 El Camino, Menlo Park. Dinner reservations: Red Cottage, 322-7384 by noon Jan. 17. Order from menu.

COMMUNICATION TECHNOLOGY Full day symposium on "Digital Data Communications." 1. Techniques in high speed digital data transmission by A. Lender, Lenkurt Electric Co. 2. Adaptive equalization by R. W. Lucky, Bell Telephone Labs, Inc. 3. Error control by A. Kohlenberg, Codex Corp. 4. Designing multiple computer systems by E. T. Eiselein, IBM Corp.

January 17, 1968, Wednesday, SF Hilton Hotel, Mason & O'Farrell, San Francisco. Registration fee \$10.00 (luncheon included). Reservations: George Griffith 591-8461 ext 525; Ed Combs 397-1471 or Milton Seymour 593-8491. Mail check to Milton Seymour, 935 Washington St., San Carlos.

COMPUTER/IM (Story on page 15) Applications of on-line computers to laboratory instrumentation systems. Dr. Kay Magleby, Hewlett-Packard.

January 23, Tues. 8 PM, Room 134 McCullough Bldg., Stanford University. Dinner: 6:15 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. Dinner Reservations: Merrilee Ressel, 321-3300 ext. 451 by noon Jan. 23. (Order from menu).

EAST BAY SUBSECTION (Story on page 4) Tour of Lawrence Radiation Laboratory, Berkeley. Lee Davenport, LRL, Berkeley.

January 29, Mon. 7:30 PM, Lawrence Radiation Lab, Berkeley. A map showing the starting place for the tour with directions how to get there will be mailed to each person who makes a reservation. No dinner. Tour reservations are limited to 60 persons. Oakland: Ruth Emerson 835-8500 ext. 337; San Francisco, Mary Vilter, 399-4974; San Jose, Linda Jarrett, (408) 291-4567, by Jan. 22.

ELECTROMAGNETIC COMPATIBILITY (Story on page 12) Analytical survey of electromagnetic interference specification limits. Carl B. Pearlston, Jr., staff engineer, Aerospace Corp.

January 17, Wed. 8 PM, Hewlett-Packard Auditorium (microwave entrance) 1501 Page Mill Rd., Palo Alto. Dinner: 6 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. (Order from menu). Dinner reservations: A. R. Carlson, 326-7000 by noon Jan. 17.

ENGINEERING IN MEDICINE & BIOLOGY/ISA Instrumentation for intensive care units. Jerome Russell, director of research data facility, Presbyterian Medical Center, San Francisco and John Osborn, M.D., of the professional staff, Presbyterian Medical Center.

January 8, Mon. 8 PM, Room M 106, Stanford Medical Center. Social hour at 6 PM, dinner at 6:30 PM, Dinah's Shack. (Order from menu). Dinner reservations: Dick Cress or Margaret Margia, 241-2310 by noon, Jan. 8.

INFORMATION THEORY Decision criteria for a class of impossible objects. David Huffman, prof. of computer sciences at Univ. of Calif. at Santa Cruz; current research in switching theory and signal design.

January 18, Thurs. 8:30 PM, SRI Main conference room B, 333 Ravenswood Ave., Menlo Park. Dinner: 6:15 PM at L'Auberge, 4826 El Camino, Redwood City. (Order from menu). Dinner reservations: Mrs. Rachel Bingham 321-3300 ext. 453.

CALENDAR

MAGNETICS (Story on page 15) Flux reversal in magnetic films. Dr. F. B. Humphrey, professor electrical engineering, Calif. Institute of Technology.

January 9, Tues. 8 PM, PH 104, Stanford University. Dinner: 6:15 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. (Order from menu). Dinner reservations: Mrs. L. Walker, 321-7250 ext. 2043 by noon Jan. 8.

NUCLEAR SCIENCE (Story on page 16) The role of on-line computer control of processes and experiments. A brief demonstration of on-line process control, followed by a general discussion.

January 16, Tues. 8 PM, Main Plant, IBM, Monterey & Cottle Rd., San Jose. Dinner: 7 PM, IBM Cafeteria. No reservations required.

PARTS, MATERIALS & PACKAGING Epoxy packaging of semiconductors. James A. Corzine, reliability manager, discreet components, Fairchild Semiconductor, Mt. View.

January 24, Wed. 7:30 PM, Hewlett-Packard Conference room 5 M, 1501 Page Mill Rd., Palo Alto. No dinner.

POWER (Story on page 16) Management information systems. What's in it for the engineer? David M. Sage, senior information systems analyst, PG&E Co.

January 9, Tues. 7:30 PM, Engineers' Club of San Francisco, Pine & Sansome Sts., SF. Cocktails at 5:30 PM, dinner at 6:30 PM. Reservations: Engineers' Club, 421-3184 by Jan. 8.

RELIABILITY (Story on page 16) Reliability allocation, prediction and failure rate establishment techniques. Fred Tatar, Philco-Ford, Palo Alto.

January 25, Thurs. 8 PM, PH 104, Stanford University. Meet the speaker at 6 PM. Dinner at 7:00 PM, Stanford View Restaurant, 1921 El Camino, Palo Alto. (Order from menu). Dinner reservations: H. Caldwell or Adeline Fako, 966-3342 by Jan. 24.

SANTA CLARA VALLEY SUBSECTION (Story on page 15) Tour of Pacific Telephone Co. accounting center.

January 17, Wed. 7:30 PM, PTT Center, 485 Monroe St., San Jose. (2 blocks south of Valley Fair Shopping Center. Monroe intersects Stevens Creek Blvd. opposite entrance to Valley Fair). No dinner. Reservations for tour: Miss Chris Mazzeo, 291-4014 by Jan. 15.

SYSTEMS SCIENCE & CYBERNETICS (Story on page 16) The application of systems methods. Robin R. Reynolds, chief, power operation maintenance div. State Water Project.

January 15, Mon. 8 PM, San Francisco State College, 1600 Holloway, Rm. 201 Science Bldg. (enter campus through Tapia St. gate). Dinner 6:15 PM, Red Chimney Steak House, No. 3 Stonestown, San Francisco. (Order from menu). Dinner reservations: Margie Hensley, 324-4701 by 4 PM Jan. 12.

VEHICULAR (Story on page 16) Applications of nonreciprocal ferrite components for vehicular communications systems. Dr. Perry H. Vartanian, Jr., vice president and manager of components operations, Melabs.

January 15, Mon. 8 PM, Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto. No host cocktails at 6 PM, dinner at 6:45 PM. (Order from menu). Dinner reservations: Mrs. Nathan, 349-3111, ext. 220 by noon, Jan. 15.

SANTA CLARA VALLEY SUBSECTION CALENDAR

January 17, 1968— How a computer Prepares Your Telephone Bill; Tour of Pacific Telephone's Accounting Center, San Jose.

February 21, 1968— Electronics and Medicine in Space Exploration; Engineers Week; Joint Meeting with the Santa Clara Valley Engineer's Council and Santa Clara County Medical Association, San Jose.

March 20, 1968— Engineering Careers; Joint Meeting with San Jose State College Student Branch, San Jose.

April 17, 1968— Pioneer's Night (Fifth Annual); Joint Meeting with San Francisco Section, location to be selected.

May 15, 1968— FMC's Electric Drive for Military Vehicles, San Jose.

On the cover...

Dr. Burton J. McMurtry, of Sylvania Electronic Systems checks a laser at the company's Mountain View laboratories. He is manager of both Sylvania's Equipment Engineering Laboratories and its Electro-Optics Laboratory which works chiefly in laser research.

Dr. McMurtry received his Master and Doctor degrees in electrical engineering at Stanford University. In 1964 he was awarded the Alfred E. Noble prize given annually by five American engineering societies for the best paper published in one of their publications by a writer under 30 years of age.

Laser Applications to be Course Subject at Berkeley

"Lasers and Their Engineering Applications," an intensive five-day course designed to provide a thorough grounding in the fundamentals of laser theory operations, and applications, will be given February 26 - March 1, 1968, by the Engineering Extension and the College of Engineering, University of California, Berkeley.

The course will open with a brief review of pertinent aspects of quantum physics.

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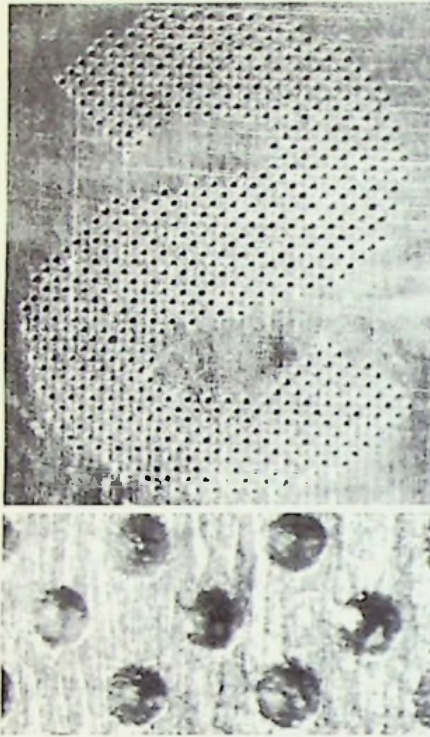
RCA laboratories in Princeton, New Jersey, under the direction of Dr. K.H. Fischbeck (Senior member, IEEE) has been having some encouraging results in experiments with the use of lasers for etching metals in the production of printing plates. Although the basic approach seems adaptable to various printing processes, the chief interest at present is in the production of gravure cylinders. (*Gravure is an intaglio method—one in which the image lies below the plate surface in the form of cells in which the ink rests until the time of transfer directly to paper.*)

RCA is the developer and manufacturer of Videocomp, a system which "sets type" from perforated paper tape through exposure of a type image displayed on a cathode ray tube. Dr. Fischbeck said that the laser is being studied as a possible means to permit generation of printing plates directly from Videocomp output in which electronic signals are available defining the location of each intended ink spot within an image area. Presently available lasers provide sufficient power density to etch a gravure cavity in less than a microsecond. Research is being devoted to the determination of the feasibility of computer control of laser radiation for this purpose. A typical standard newspaper page would require approximately six million of these cavities. Present gas lasers are capable of pulsing rates of from 10 to 100,000 pulses/second. A laser operating at 50,000 pulses/second could create the page image in about 120 seconds.

The nature of the cavities so produced promises to be very suitable since there is no cratering or ridge around the edge. The laser pulse has less than a millionth of a second duration and the metal becomes a vapor with no significant liquid stage.

Plate etching would not necessarily

have to occur in the same plant where image signals are generated, but could occur at a distance and in more than one satellite printing plant.



Laser-etched image showing the freedom from cratering and ridges necessary for the production of gravure printing cylinders.

	OFFSET	LETTER PRESS	GRAVURE
Material	Nickel	Aluminum	Copper
Volume excised cc per joule	10-5	3.4 x 10-5	2 x 10-5
Etch Depth in Microns	2	800	40
Fractional Area Etched	0.2	0.2	0.1
Volume Removed, cc	.25	35	0.3
Watt Hours Req. per page	6.4	200.	4.2

Circuit Theory Chapter Desensitized Frequency Selective Amplifiers

The Circuit Theory chapter will hear William J. Walsh and W. G. Howard of UC Berkeley on Wednesday, January 17 at 8 pm at The Red Cottage in Menlo Park. Dinner is at 6:00 pm, same place.

Their subject is: Desensitized frequency selective amplifiers for integrated circuits.

A close examination of classical selective amplifier circuits shows their incompatibility with integrated circuit realization. A reformulation of sensitivity concepts for selective amplifiers to include both linear and nonlinear temperature variations of circuit parameters leads to general conclusions regarding the complexity of desensitized circuits. In addition, the proposed sensitivity formulation allows computer optimization of circuit performance. Examples of such optimized circuits using recently obtained temperature data for monolithic elements will be presented.

William J. Walsh is presently a Research Assistant for the Electronics Research Laboratory, University of California, Berkeley. His research interests include integrated circuits, computer graphics, and digital computer applications.

William Gates Howard, Jr. was born in Boston, Massachusetts, on November 6, 1941. He received the B.E.E. (with distinction) and M.S. degrees in electrical engineering from Cornell University in 1964 and 1965 respectively. He received the Ph.D. degree from the University of California, at Berkeley in June 1967.

East Bay Subsection Tour Of Lawrence Radiation Laboratory

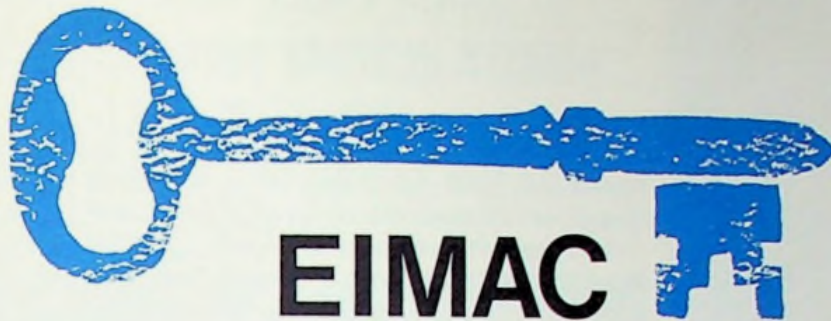
The East Bay Subsection will sponsor a tour of Lawrence Radiation Laboratory in Berkeley on Monday, January 29th at 7:30 pm. The tour will include visits to the Bevatron, the 88 inch cyclotron, the heavy ion linear accelerator, the 184 inch cyclotron, and the liquid hydrogen bubble chamber. The tour will be conducted in groups of five or six persons which will give everyone ample opportunity to ask questions. Each participant will be given several booklets describing the functions and uses of each of the projects at the start of the tour. The tour is limited to 60 persons, so reserve a place early. Reservation deadline is January 22nd. See meeting calendar for further details.

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SYLVANIA LASER VIBRATION-ANALYZER ASSISTS IN SPACE VEHICLE DESIGN TESTING

Sylvania Electric Products Inc. has developed for the National Aeronautics and Space Administration a laser device to measure the vibrations of space-vehicle models undergoing simulated flight tests.

This laser vibration-analyzer is being produced by Sylvania Electronic Systems (SES), an operating group of the company, under a contract from NASA's Ames Research Center. The SES-Western Division is headquartered in Mountain View.

Jesse R. Lien, vice president and general manager of SES-West, reports that the laser unit will make measurements merely by projecting a beam onto the surface of the model. It will eliminate the need to attach strain gauges or other mechanical sensors to the vibrating surface.

Mr. Lien said the analyzer is designed to measure vibration rates from 10 to 2,000 cycles-per-second (cps) to meet NASA requirements. However, the maximum range of the equipment can be extended to 700,000 cps.

The laser beam is bounced from the surface of the model into an analyzing receiver. The frequency of the reflected beam changes as vibrations begin. Calculation of the beam-frequency change, called Doppler shift, reveals the amount and rate of vibration.

"The Sylvania unit will permit study of vibrating surface areas as small as one millimeter in diameter," Mr. Lien said. "Moreover, although glossy surfaces reflect laser beams best, the Sylvania instrument will perform even with dull objects so that no polishing of surface areas is required."

Sylvania's Western Division has been engaged in laser research for many years. In 1965 the company announced development of two techniques whereby all of the energy of a high-power, multi mode laser can be obtained at a single frequency. The techniques are called the frequency-modulated (FM) laser and the super-mode laser. The FM laser was conceived at Stanford University by Dr. Stephen E. Harris, an engineering consultant to Sylvania and developed by him and Russel Targ, a Sylvania staff member. It consists of a conventional laser containing a phase modulator inside its Fabry-Perot cavity.

The super-mode laser was conceived by Gail A. Massey, also a Sylvania staff member. It is used when a monochromatic optical signal is desired. The output from an FM laser is passed through a second phase modulator driven 180 degrees out of phase and with the same modulation index as the first modulator.

The FM and super-mode lasers give optical sources having power output comparable to conventional lasers but

with spectral characteristics which are superior and unique. At the time of their discovery it was predicted these lasers should find use in a variety of applications as optical information carriers, as local oscillators in optical heterodyne receivers, in optical radars, and as tools for performing further research in optics and other fields.

Sylvania Laser/Computer Program Controls Apollo Tracking System

Sylvania's laboratories are designing a computer program for automatic controls of a laser tracking system during the launching of Apollo Saturn V moon probes. During liftoff and the first minute of flight, the narrow beam laser tracker will provide high-precision information on vehicle motion, according to Dr. James E. Storer, director of the Applied Research Laboratory. He explained that the less precise radar beam is plagued by clutter from ground objects when attempting to track targets near the surface of the earth. A retro-reflector mounted on the Saturn V instrument unit will bounce the laser beam back to the tracker. A computer with the Sylvania-designed program will determine vehicle range from angle and distance data supplied by various beam sensors in the tracking system.

The processor will determine position, velocity and acceleration of the vehicle. The computer output will provide instructions to servos controlling the pointing of the tracker. Calibration data stored in the processor will correct for any inherent mechanical errors in the aiming system.

Sylvania has a number of other laser projects in progress. There is a wide-band laser modulator with a data capacity equivalent to one communications channel handling simultaneously more than 100,000 telephone conversations or 100 television broadcasts.

The laser research at Sylvania's Mountain View laboratories has been directed by Dr. Burton J. McMurtry, manager of the company's Equipment Engineering Laboratories. In a recent interview he predicted uses of lasers for internal medicine and in oceanology explorations, possibly as a replacement for underwater radar.

General Motors Research Using Reflected Light Technique to Study Semiconductors

A new technique for studying the surface properties of semiconductors has been announced in which the surface is illuminated with light from two sources. The surface reflects light from the first source into a sensitive detector, and the reflected light is modulated by rapidly changing the intensity of the second source. Measurements of the reflected light at various wavelengths enable a more detailed description of the physical and electronic properties of the semiconductor.

In their report to an international semiconductor conference at Brown University, Drs. Edward Wang, Walter Albers, Jr., and Carl Bleil, all of the General Motors Research Laboratories, said that the new optical technique has several advantages over other methods. For example, it extends the scope of surface studies by reflectance modulation to very low temperatures and to a variety of ambient atmospheres. Other methods require either electrodes or electrolytes to alter the semiconductor's surface potential.

Reflectivity measurements are used by physicists to investigate the electronic energy band structure in solids.

Heflin, Pappenfus Named to WESCON Board

Two Peninsula electronics executives have been named to the board of directors of the Western Electronic Show and Convention.

Ernest W. Pappenfus, vice president, engineering and manufacturing, Granger Associates, and William H. Heflin, president, Fisher Research Laboratory, have been named to four-year terms.



E. H. Heflin

E. W. Pappenfus

Both new directors represent the Northern California area. They join John C. Beckett, government relations manager, Hewlett-Packard Co. and Emmet G. Cameron, vice president, corporate development, Varian Associates, as the Northern members of the eight-man volunteer board.

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Quality Control Engineers

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with background and experience in the preparation of quality assurance bids and proposals preferred.

Components Engineers

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Each year's Symposium stresses some special theme. This year the subject is "Vehicular Communication Command and Control."

From the myriad of subjects this suggests, a few examples follow:

System Technology: 1. New approaches to overall system command and control technology, 2. System design to support personal communications, 3. Portable or mobile control centers, 4. Command and control requirements in special environments (e.g. riots).

Functional Technology: 1. Automatic location techniques, 2. Real time frequency control, 3. Using computers to support the communications function.

Hardware/Software Technology: 1. Digital communications with mobile units, 2. Radio or radar aids to control, 3. Directional vehicular antennas, 4. Computer software for map storage and display, 5. Transponders.

Send a 500 word summary of your paper by 15 January, 1968 to the Technical Program Chairman: Mr. Carroll R. Lindholm, The RAND Corporation, 1700 Main Street, Santa Monica, California 90406.

Acceptance or rejection will be announced by 15 February, 1968. Full text of the paper will be required by 15 March, 1968, to meet the pre-program publishing schedule.

National Telemetry Conference

1968 IEEE National Telemetry Conference, April 9-11, Houston, Texas (sponsored by Aerospace and Electronics Systems and Communications Technology Groups). Thirty-five word abstracts in five copies to be submitted by December 7, 1967 to Lewis Winner, 152 W. 42nd Street, New York, N.Y. 10036.

Spring-Joint Computer Conference

1968 Spring Joint Computer Conference, Atlantic City, N.J., April 30-May 2, 1968. Submit original paper (in five copies) on any aspect of the computer or information processing field, from hardware to software and theory or practice, to: Prof. T. R. Bashkow, Dept. of Electrical Engineering, 1312 S.W. Mudd, Columbia University, New York, N.Y. 10027.

International Microwave Symposium

1968 IEEE G-MTT International Microwave Symposium, May 20-22, 1968, Detroit, Mich. Submit summaries and abstracts on TEM and waveguide components, through millimeter wave-

lengths, integrated and solid state circuits, microwave acoustics, and other areas of microwave theory and techniques, to: Prof. G. I. Haddad, Chairman of Tech. Program Committee, Dept. of Electrical Engineering, Univ. of Michigan, Ann Arbor, Mich. 48105.

Precision Electronic Measurements

1968 Conference on Precision Electronic Measurements, June 25-28, 1968, Boulder, Colorado. Submit six copies of 500-1000 word summary to: Donald S. King, Aerospace Corp., P. O. Box 95085, Los Angeles, Calif. 90045, by February 12, 1968.

Conference On Communication

1968 IEEE Conference on Communication, June 12-14, 1968, Philadelphia, Pa. Original papers are invited describing significant contributions to communications technology. Deadline for submission is January 15, 1968. Send to: R. S. Caruthers, ITT Corp., 320 Park Ave., New York, N.Y., 10022.

Summer Power Meeting

The 1968 Summer Power Meeting of the Power Group of the Institute of Electrical and Electronics Engineers is scheduled to be held June 23 through June 28 at the Sherman House in Chicago, Illinois. The technical program will encompass all subjects falling within the power field. Authors should advise the Technical Conference Services Office of IEEE Headquarters without delay if they expect to submit a paper. IEEE Headquarters will furnish the author a Declaration of Intent form, and IEEE Power Group Author's Guide and model paper kits for the typing of the manuscript.

The deadline date for submittal of papers to be considered for presentation at the Summer Power Meeting is February 9, 1968.

Papers should be prepared and mailed in accordance with the instructions given in the IEEE Power Group Author's Guide. Only an original of each paper need be submitted. Preprints will be made of all papers that receive approval for presentation. The discussions and closure received on a Transactions Paper will be reviewed and approved by the appropriate Technical Committee prior to publication of the paper in POWER APPARATUS AND SYSTEMS.

Authors are responsible for preparing their own slides, which should be of the standard 2" x 2" size. Projectors for other size slides will be available only by special arrangements with the committee.

IEEE REGION SIX CONFERENCE

MAY 20, 21, 22, 1968

FINAL CALL FOR PAPERS

Conference Theme:
**Electronics
Serving Mankind**

Session Topics:
ENERGY SOURCES
BIOMEDICAL ENGINEERING
EDUCATION
SIMULATION
TRANSPORTATION
COMPUTERS
AEROSPACE
COMMUNICATIONS
LASERS
OCEANOGRAPHY

Author's Schedule:

Feb. 1—Notification to Authors of abstract acceptance. Mail manuscript packets to Authors.

March 11—Closing date for final manuscripts. Accepted manuscripts will be published in the Conference Record which will be available to all Conference attendees.

for further information write to:
Program Chairman
IEEE Region 6 Conference
P.O. Box 831
Portland, Oregon 97207

G-7 RELIABILITY

San Francisco Group Chapter Meetings

OCTOBER 19th, 1967—PH104, Stanford University, Lecture—Computerized Circuit Analysis—Its Role in Reliability, Speaker—Art Schmid—Planning Research Corporation.

NOVEMBER 16th, 1967—Lockheed Missiles & Space Co., Bldg. 104, Sunnyvale, Field Trip—Reliability Failure Analysis Lab, Host—Ross Bumstead, LMSC. (See November Grid for specifics).

JANUARY 25, 1968—PH104, Stanford University, Lecture—Reliability Allocation, Prediction, and Failure Rate Establishment Techniques, Speaker—to be announced.

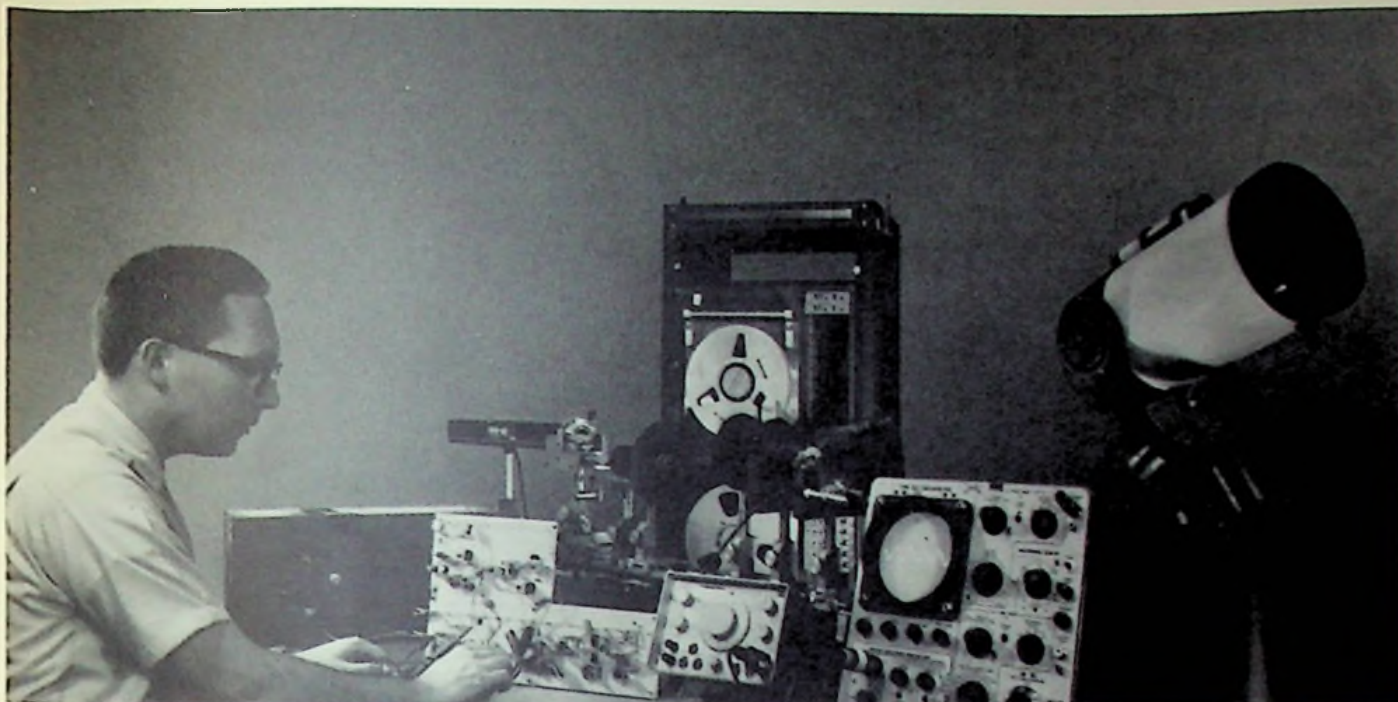
FEBRUARY 15, 1968—PH104 Stanford University, Lecture—Relia Analysis by Computer Methods, Speaker—William Abbott, LMSC.

MARCH 21, 1968—PH104 Stanford University, Lecture—Maintainability Techniques, (specific title to be announced), Speaker—J. T. Decker, Sylvania Electric Products, Inc.

APRIL 18, 1968—PH104 Stanford University, Lecture—Design Review Techniques, Speaker—to be announced.

MAY 16, 1968—PH104, Stanford University, Lecture—Relia Physics, Speaker—Dr. R. G. Stewart, LMSC.

JUNE 20, 1968—PH104 Stanford University, Lecture—Part Screening Techniques, Speaker—Ben Croghan, LMSC.



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Nuclear Effects

- Information storage memory systems.
- Detector development.
- Large-scale digital and analog systems.

Computer Technology

- Development of programs for computer-aided design.
- Computer Graphics.
- Large time-shared computer systems.
- Use of on-line computers in physics, chemistry and biomedical research.

Systems Design and Development

- Laser Systems.
- Nanosecond data acquisition systems.

Instrumentation

- Solid state and integrated circuit design.
- Ultra-wideband oscillography.
- Space research instrumentation.

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Spectra Physics Leader In Basic Products For Gas Laser/Optics Fields

Spectra Physics, Inc., of Mountain View, California was founded in 1961 and embarked on a venture to develop the world's first commercial gas laser. The founders were a small group of scientists and businessmen who brought together an unusually broad range of electro-optics capabilities into the field of lasers in its infancy.

Spectra Physics today offers more than 25 basic products in the gas laser and optics fields. A few of the discoveries reported by the company's scientists are:

1. The first high-gain laser transition at 3.39 microns in a helium-neon mixture;
2. New visible laser wavelengths in helium-neon using a unique prisortuned optical resonator;
3. The first ion laser;
4. An R-F induction excitation method for lasers.

Spectra Physics, because of its outstanding technical capabilities and production philosophy based on quality products, enjoys a position of leadership in the gas laser market. The firm has a world-wide network of sales and service facilities and outsells its nearest competitor by three times.

SCHEDULE

Communication Technology

Digital Data Communications Symposium

Wednesday, January 17, 1968, San Francisco Hilton

(Refer to Dec. Grid for complete details)

9:00 A.M., Registration; 9:30 A.M., Introduction; 9:45 A.M., "Techniques in High Speed Digital Data Transmission", A. Lender, *Lenkurt Electric Co., Inc.*; 10:45 A.M., Coffee Break; 11:00 A.M., "Adaptive Equalization", R. W. Lucky, *Bell Telephone Laboratories*; 12 Noon, Luncheon. 1:30 P.M., "Convolutional Coding for Burst Channels", A. Kohlenberg, *Codex Corporation*; 2:30 P.M., "Designing Multiple Computer Communication Systems", E. T. Eiselen, *International Business Machines Corporation*.

C. G. GRIFFITH

(Chairman, Comtech Group) Program Chairman

Laser Safety Will Be Subject Of Cincinnati Conference

In an effort to evaluate laser safety programs, a Conference on Laser Safety has been planned for January 29-31, 1968, in Cincinnati, Ohio. The program will include not only seminars, but also actual laboratory exercises.

The Medical Laser Laboratory of The Children's Hospital Research Foundation of the Medical Center of the Uni-

versity of Cincinnati, together with the United States Public Health Service, Bureau of Disease Prevention and Environmental Control, National Center for Urban and Industrial Health, Occupational Health Program, and the Department of Environmental Health of the University of Cincinnati College of Medicine, will act as sponsors.

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Split Laser Beam Technique Increases Holograms Depth of Field

The depth of field of holograms has been increased to four feet (1.2 meters) through a new technique. Previously, the practical limit with normal exposure times was about a one-foot (or 0.30-meter) field depth.

The increased depth of field was obtained by splitting the illuminating laser beam successively several times and lighting different sections of the subject with different portions of the beam. In this manner it is possible to illuminate more area and obtain greater depth of field using normal hologram exposure times. The mean distances traveled by the reference beam and by each part of the split illuminating beam to reach the holographic plate are equal, as when making conventional holograms. Interference patterns are recorded on the plate by the reference beam and the illuminating beams. The image is recreated in the normal manner by shining a laser beam on the back of the plate at the reference angle.

The new technique was devised at Bell Telephone Laboratories by D. O. Melroy.

An Event From the Past in Electronic Countermeasures



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In the early days of World War II there was evidence of an enemy radar on Kiska. A B-24D containing radar investigation equipment began a series of solitary missions. The ferret found the signal, homed in on it, and set in motion plans to eliminate the radar.

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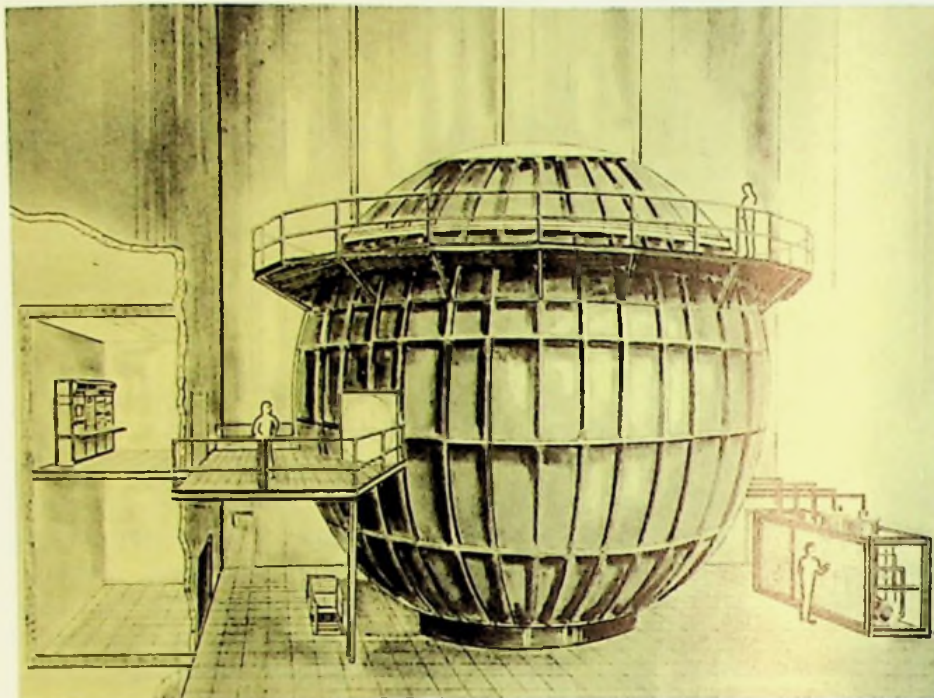
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SPACE SIMULATION CHAMBER



To make sure spacecraft and spacecraft assemblies can reach the Moon and beyond and withstand the severe heat and cold that they must pass through, the Space & Re-entry Systems Division of Philco-Ford Corporation has designed a new 39.5 foot diameter spherical space simulation chamber. The facility, which will be completed in September 1968, will be located in a new building located at the Philco-Ford site in Palo Alto, California.

"Frontiers In Electronics" Theme Of Aerospace And Electronic Systems Winter Convention

Dr. Walter F. Leverton, vice president and general manager of the Satellite Systems Division of Aerospace Corp., has been named technical program chairman of the ninth annual Winter Convention on Aerospace and Electronic Systems (WINCON).

Theme for the Feb. 13-15 program, to be held at the International Hotel, Los Angeles, is "Frontiers in Electronics." S. F. Eyestone, president of North American Rockwell's Autometrics Division, is general chairman.

Purpose of the national conference is to update aerospace and electronic systems 'generalists' on current technical developments, problems and solutions. Nationally prominent aerospace industry leaders chair the technical sessions, which are selected for their broad interest and include a classified session co-sponsored by the Air Force and the Aerospace Corp.

Dr. Leverton has named thirteen men to the technical program committee: Dr. Carlton W. Miller, associate general manager, Satellite Systems Division, Aerospace Corp.; Dr. Robert Ashby, vice-president, Technology, Autonetics; Dr. Malcolm Currie, vice president, Research and Development, Hughes Aircraft Co.; Dr. John Hult, associate head, Electronics Dept., Rand Corp.;

John H. Cover, assistant manager, Satellite Systems Laboratory, Hughes Aircraft Co.; Dr. William Russell, assistant general manager, Space Vehicles Division, TRW Systems; John Scull, division manager, Guidance Control Division, Jet Propulsion Laboratories; Fred Stevens, vice president, Nortronics, Northrop Corp.; T. W. Stephens, vice president, Santa Monica Program Subdivision, McDonnell Douglas Corp.; Dr. G. E. Solomon, vice president, Systems Laboratories, TRW Systems; Dr. Kenneth G. Halvorsen, technical director, Beckman Instruments; Robert H. Scherer, vice president and general manager, Space and Defense Systems Group, Control Data Corp.; and Dr. M. T. Weiss, TRW Systems.

Dr. Leverton is a leading scientist in crystal growth and semi-conductor materials and devices. He has been with Aerospace Corp. since 1960 working in the area of satellite systems engineering. He holds several patents in the semi-conductor materials and devices area, and has had numerous technical articles published in Physical Review, the Journal of Applied Physics and other publications. Dr. Leverton is a senior member of the IEEE, and the American Institute of Aeronautics and Astronautics, and the American Physical Society.

Pearlston To Discuss Compatibility Specifications With EMC Chapter Jan. 17

Carl B. Pearlston, Jr., Staff Engineer in the Electronics Division, Aerospace Corporation, will discuss the current state of electromagnetic compatibility specifications at the January 17 meeting of the Electromagnetic Compatibility chapter.

Mr. Pearlston has been active in preparing a general EMC specification for space systems since joining Aerospace in 1964. Previous experience with Northrop Corporation, where he was responsible for electromagnetic compatibility efforts, and as consultant with General Electric and Filtron Company on military and missile system programs, has given him ample insight into the evolution of interference limits. A graduate of the Naval Academy, Mr. Pearlston has an MA degree from Long Beach State College, and is active in UCLA Extension discussion programs.

Entitling his talk "An Historical, Analytical Survey of EMI Specification Limits", Mr. Pearlston analyzes the criteria of such limits in the light of current environment and sensitivity of modern equipment. The progress from early empirical tests upon which original limits were based to more rational testing practices and limits, in the development of the newer MIL standards 461 and 462, will make an interesting discussion of where the art of EMC is headed.

Aerospace & Electronics Systems To Tour IBM Facilities

The Aerospace & Electronics Systems chapter will conduct a tour of the IBM production facilities on January 25th. The tour will be followed by a discussion of IBM products and capabilities, covering System 36 architecture. Input/output auxiliary storage devices and processors; tele-processing capabilities and graphics.

Those interested in attending are asked to call Al Hastings at 742-9387 or 742-7287, since the capacity of attendance is somewhat limited.

Membership

The San Francisco Section welcomes the following new members:

F. J. Jean	R. L. McCullough
L. Katzeff	P. F. Offermann
C. E. Luchessa	D. Whitman
D. MacLean	G. F. Will

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Project Engineer (Recording) EE or Physics degree plus 5 years' experience. Must have knowledge of the processes of magnetic recording.

Development Engineer BSEE plus 2 years' experience with previous logic design experience preferred. Must be digital oriented.

Electronic Engineer (Senior) Digital oriented with knowledge of production equipment. BSEE required with mechanical experience desired.

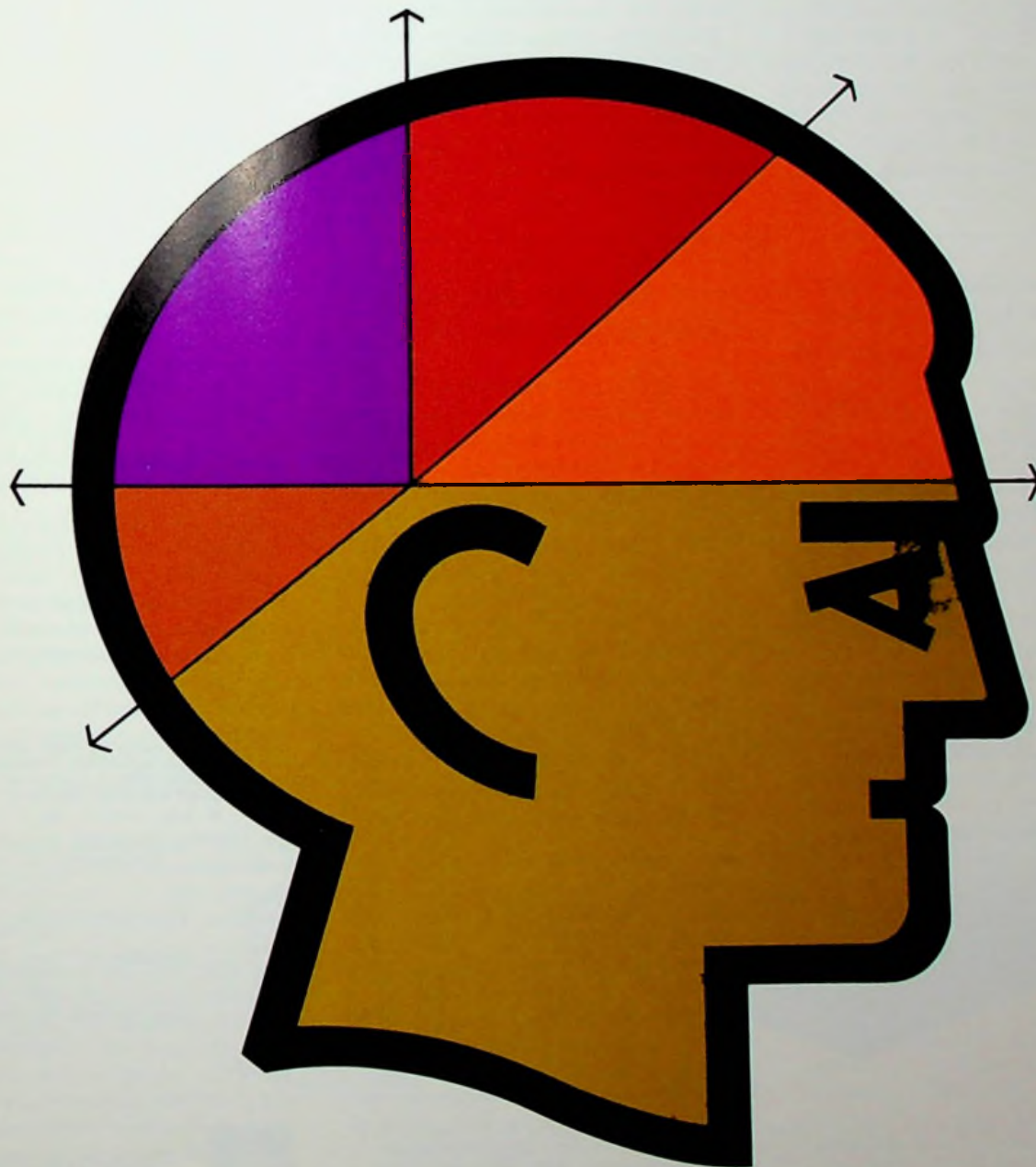
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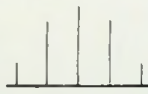








Quick Selection Guide to Spectra-Physics Gas Lasers

Here is the new generation of CW gas lasers, the *working* generation. These are the lasers being built into today's systems, the lasers that will be doing tomorrow's jobs. Look these over, match one to your needs; integrate its precision and dependability into your own operations. Your major benefit, aside from the utility of the laser itself, will be the satisfaction of using a

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For further information and literature, please write us at 1255 Terra Bella, Mountain View, California 94040. In Europe, Spectra-Physics, S.A., 18, rue Saint-Pierre, Box 142, 1701 Fribourg, Switzerland.

HELIUM-NEON	MODEL	POWER TEM ₀₀ 632.8nm milliwatts	LENGTH overall inches	INSTANTANEOUS SPECTRUM		APPLICATION
				axial modes center @ 4.7 x 10 ⁻⁴ Hz 632.8nm	axial mode spacing MHz	
	125	50	75		83	STABILITE FAMILY General purpose for exacting applications such as holography, Raman Scattering, signal processing. Specially suited for factory installations, original equipment manufacturers and military systems configurations. Most appropriate STABILITE for a particular application is often determined by price/power/size considerations. STABILITE: Spectra-Physics' Trademark for He-Ne Gas Lasers
	124	15	32		214	
	123	7.0	22		341	
	122	3.0	16		517	
	119	0.1	9		1500	
	130B	1.0	14		500	

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MODEL 140 SPECIFICATIONS

Gas	Argon	Beam Ripple (full power)	Less than 1.5% rms (120 and 360 Hz)																		
Minimum Output Power	2 watts, CW, TEM ₀₀ , all wavelengths	Beam Noise	Less than 2% (20–23 MHz)																		
Output Wavelengths (single color, selectable with prism)	<table border="1"> <thead> <tr> <th>Wavelength</th> <th>Approx. Power*</th> </tr> </thead> <tbody> <tr><td>488.0 nm</td><td>900 mw</td></tr> <tr><td>514.5 nm</td><td>900 mw</td></tr> <tr><td>496.5 nm</td><td>60 mw</td></tr> <tr><td>476.5 nm</td><td>60 mw</td></tr> <tr><td>457.9 nm</td><td>25 mw</td></tr> <tr><td>501.7 nm</td><td>25 mw</td></tr> <tr><td>472.7 nm</td><td>15 mw</td></tr> <tr><td>465.8 nm</td><td>15 mw</td></tr> </tbody> </table>	Wavelength	Approx. Power*	488.0 nm	900 mw	514.5 nm	900 mw	496.5 nm	60 mw	476.5 nm	60 mw	457.9 nm	25 mw	501.7 nm	25 mw	472.7 nm	15 mw	465.8 nm	15 mw	Radiated RFI	Less than 20 μv/m at 300 m per FCC regulations.
Wavelength	Approx. Power*																				
488.0 nm	900 mw																				
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501.7 nm	25 mw																				
472.7 nm	15 mw																				
465.8 nm	15 mw																				
		Size (inches)	60 long x 16 wide x 15 tall (optical axis 7 inches above bottom)																		

*(relative powers vary with excitation level)

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LASER TECHNICAL BULLETINS: #1. Optical Properties of Lasers as Compared to Conventional Radiators. #2. Properties of Laser Resonators Giving Uniphase Wave Fronts. #3. Some Demonstration Experiments in Optics Using a Gas Laser. #4. Noise in Lasers and Laser Detectors. #5. Optical Systems for Laser Beams. ALSO: New STABILITE 6-page color brochure. "GAS LASERS," an article by Dr. A. Bloom, reprinted from the joint issue of *Proceedings of the IEEE* and *Applied Optics*, Oct.-'66.



Spectra-Physics

Dr. Humphrey Will Discuss Flux Reversal In Magnetics Films

Dr. F. B. Humphrey, professor of electrical engineering at the California Institute of Technology, will discuss flux reversal in magnetic films at the Jan. 9 meeting of the Magnetics chapter.

A better understanding of the dynamic processes important to magnetic flux reversal has been of interest ever since the digital computer has made such a profitable use of magnetic materials. The various models of flux reversal mechanisms will be reviewed, summarizing older ideas and criticizing them in light of new results obtained by dynamic Kerr magneto optic pictures with 10-8 sec exposure time. The remarkably fast flux reversal in laminated flat films of permalloy layers separated by silicon monoxide will also be summarized.

Dr. Humphrey is presently teaching and doing research on magnetic films at Cal Tech where he has built the world's most sensitive torque magnetometer.

Computers and Instrumentation: On Line Computers

Dr. Kay B. Magleby, engineering manager of the Palo Alto Division of Hewlett-Packard, will discuss the application of on-line computers to instrumentation and data acquisition systems at the January 23 meeting of the Computer and Instrumentation & Measurements chapters. Dinner will be at 6:15 at Rick's Swiss Chalet in Palo Alto, meeting at 8 pm. in Rm. 134, McCullough Bldg., Stanford University.

The speaker has developed a variety of systems utilizing an instrumentation computer. These systems have automated the data acquisition task, improved the accuracy of the measurements, improved the analysis and testing techniques and reduced the time and labor required to obtain the desired results. Dr. Magleby will discuss a variety of systems which are currently being used in a working laboratory. Emphasis will be placed on a logic module testing system, a computing data acquisition system, a microwave network analysis and design system and a gas chromatograph analysis system.

Dr. Magleby received his MS and PhD degrees from Stanford University in 1960 and 1964. He came to HP Co. in 1958 and became the first Hewlett-Packard Company engineer to work on sampling oscilloscopes. He has contributed to the 8405A Vector Voltmeter project as well as starting the 2116A Computer project. He is now engineering manager for Dymec (now Palo Alto Division).

Otto Smith To Address AC On Adaptive Closed Loop Controls

Dr. Otto J. M. Smith will speak on adaptive closed loop controls at the Jan. 16 meeting of the Automatic Control chapter, in the University of Santa Clara Engineering Center at 8 PM on Tuesday, January 16. Dinner is at LeBoeuf (Old Lucca's) across the street at 6:30.



A nonperturbed adaptive system is one in which the command signal and the response signal are compared and the difference minimized. The error in performance can be linearly transformed into a form in which it is a sum of products of adjustables times measurables. The absolute value of this error can be minimized using linear programming to find the values of the adjustables in the compensator. Alternatively, the square of the error can be minimized by a gradient method called error decomposition. The sensitivity functions or the slopes of the error with respect to each adjustable are the measurables appearing in the transformed error func-

tion. The product of each measurable times the error is the incremental change in the corresponding adjustable.

Both of these methods will adjust a closed loop system automatically to be stable and to have the correct transference to pass the commands and to reject the noise or load disturbances. The system is slowly adaptive to process changes, disturbance spectrum changes, and command spectrum changes. It is globally convergent from any initial condition.

Machines of this type are equivalent to linear estimators and statistical synthesizers combined.

Dr. Smith is professor of electrical engineering and computer sciences at the University of Calif. in Berkeley. He is a Fellow of the IEEE and of the American Association for the Advancement of Science. He received his Ph.D. in 1941 from Stanford University. He is the author of "Feedback Control Systems", and has published over 80 papers on this and related subjects. He has just returned from Australia where he was visiting senior research Fellow in economics at Monash University, Melbourne, Victoria.

Santa Clara Valley Subsection To Pac. Telephone Accounting Center

January 17, 1968 Santa Clara Valley Subsection is visiting the San Jose Accounting Center of Pacific Telephone. This office is responsible for the preparation and mailing of telephone bills for most of Central California.

The San Jose Accounting Center processes nearly 17,000,000 calls and prepares approximately 1,000,000 bills each month. They use IBM 7074 large scale computers for this immense job. The computers maintain a record on magnetic tape for each of the customers billing name and address, the number of extension phones, directory listings, charges for long distance calls, total monthly charges and many other things.

In order to keep the accounts up to date, the computers post information daily. This information may be orders for telephone services, long distance calls, payments of bills, etc. Some of these items come to the Accounting Office in the form of punched cards or punched paper tape. Since the 7074 Computers process only magnetic tape, the information on the punched card or paper tape must first be transferred to magnetic tape.

Some of the machines used for this purpose are the IBM Models 360 and 1401 and the RCA Spectra 7015.

Antennas And Propagation To Hear Don Johnstone On Antenna Current Distribution



D. L. Johnstone, a Senior Engineer in the Antenna Laboratory, Sylvania Electronic Systems—Western Division, Mountain View, will discuss a method for finding the current distributions on a log-periodic antenna when he addresses the Antennas and Propagation chapter, Jan. 11.

Starting with Maxwell's equations, one can derive an integral equation which relates the antenna driving voltage to the current at any point on the antenna. With the aid of a computer, this equation can be solved numerically for the current distribution. Once the current distribution on the antenna is known, it is only a matter of a few simple calculations to obtain the antenna gain, input impedance and radiation patterns.

The meeting will be held on Thursday, January 11 at 8 pm in the Lockheed auditorium, Bldg. 202, 3251 Hanover Street, Palo Alto. Dinner: 6:00 at Stickneys, Town and Country Village, Palo Alto. Reservations must reach Glen Keitel by January 10 at 294-6414, Ext. 2206.

Power Group To Match Skills With The Computer

David M. Sage, Senior Information System Analyst for P.G.&E. will be the speaker for the January 9th meeting of the Power Chapter to be held at the Engineers Club in San Francisco. Mr. Sage's talk will be titled "Management Information Systems—What's in it for the Engineer".

Management Information Systems are subject to much study in the Power Industry. Mr. Sage will discuss the implementation of the systems as he has experienced in P.G.&E.'s program, which has been in effect for a period of two (2) years. Some Sub-Systems, which will be discussed, are Employee and Payroll, Material and Forecasting.

Where does the Engineer stand in this picture? Can the diverse and creative activities that an Engineer pursues be systemized as can a payroll? While many computational and clerical duties will fall ax to the computer with no feeling of remiss to the Engineer, what are the activities that are impractical

to systemize? P.G.&E.'s approach is to provide a system that will back up the Engineer on a unique problem to make background information available to him in a form that is detailed as well as easily readable. The secret to this system is a carefully planned information base.

Mr. Sage received his B.S. in E.E. from the University of New Hampshire in 1958. He spent six (6) years with I.B.M. gathering experience in data processing and information systems, related to Engineering-Problems, before joining P.G.&E.'s staff.

This talk should provide interesting background material to those planning to attend the Educational Course announced by Bill Slimak, Educational Committee Chairman, at the last meeting. The lecture series starting in the Spring, will be titled *PRACTICAL COMPUTER APPLICATIONS IN THE POWER INDUSTRY*

P.H. Vartanian On Applications Of Nonreciprocal Ferrite Components For Vehicular Communications

The Vehicular Chapter will hear Perry H. Vartanian of Melabs on Monday, January 15 at 8:00 at Rick's Swiss Chalet in Palo Alto. Dinner is at 6:45.

Recent technology advances have resulted in the availability of nonreciprocal components such as isolators and circulators for the 100-600 MHz portion of the spectrum. These passive components generally have the characteristic of permitting low loss power transfer for one direction of transmission and high loss for the opposite direction.

A new development, the ISODUCTOR, is a transistor size circulator that is designed for use in transistor power circuits to isolate output stages from effects of load mismatches. This device will be discussed and demonstrated.

Connection of several transmitters to a single antenna, or alternately close proximity of two transmitting antennas, often results in the generation of intermodulation products. Use of isolators has been found to eliminate these spurious products. Design and use of isolators in transmitter combiners will be discussed.



SC&C Group To Hear Robin Reynolds Jan 15 On State Water Project

Mr. Robin Reynolds, Chief of Power Operation, State Water Project, will describe the application of systems methods in the state's huge water project to the chapter on Systems, Science, and Cybernetics on Monday, January 15, at 8 pm. The meeting will be held at San Francisco State College, 1600 Holloway, Room 201, Science Bldg.

Dinner will be at The Red Chimney Steak House No. 3 in Stonestown. Dinner reservations must reach Margie Hensley at 324-4701 no later than 4 pm, January 12.

The State Water Project is one of the largest physical projects yet conceived for conservation and transportation of water.

The unprecedented design involves tremendous flows of water with no on-line storage, demanding conceptualization of an entirely new system of real-time computer control of the aqueduct feature. This system is in a latter phase of research and development and will soon be placed into operation.

A wide dispersion of activities coupled with the requirement for a high degree of system reliability required several support systems. These systems which are presently entering the implementation phase, were formulated by consultants. They are: a management information systems, a maintenance management system, and a

spare parts and inventory management system.

The magnitude and number of people involved in the operation of the project are such that systems approaches have been found to be necessary in practically all areas of control and management.

Nuclear Science Chapter: "Digital Computer Control Present and Future"

Digital computers are rapidly becoming smaller, faster, less expensive to run and easier to program. These advances make their utilization "on-line" in control loops quite attractive. Already computers are being used to monitor operating conditions, to collect and reduce data, and in some cases, to use the reduced data to affect the operating conditions. The future holds ever-expanding opportunities and their applications for those persons who could incorporate them into their systems.

At the January 16 meeting of the Nuclear Science chapter, a staff member of IBM's Controlled Systems Analysis Group will discuss the present status of computers in control systems and plans for their utilization in the near future. Following the talk, the speaker and other engineers from IBM will answer questions relating to digital computer control. In addition, a computer controlled process for making ethylene will be demonstrated.

Dinner will be available in the IBM Cafeteria prior to the meeting for those wishing this. No reservations are required.

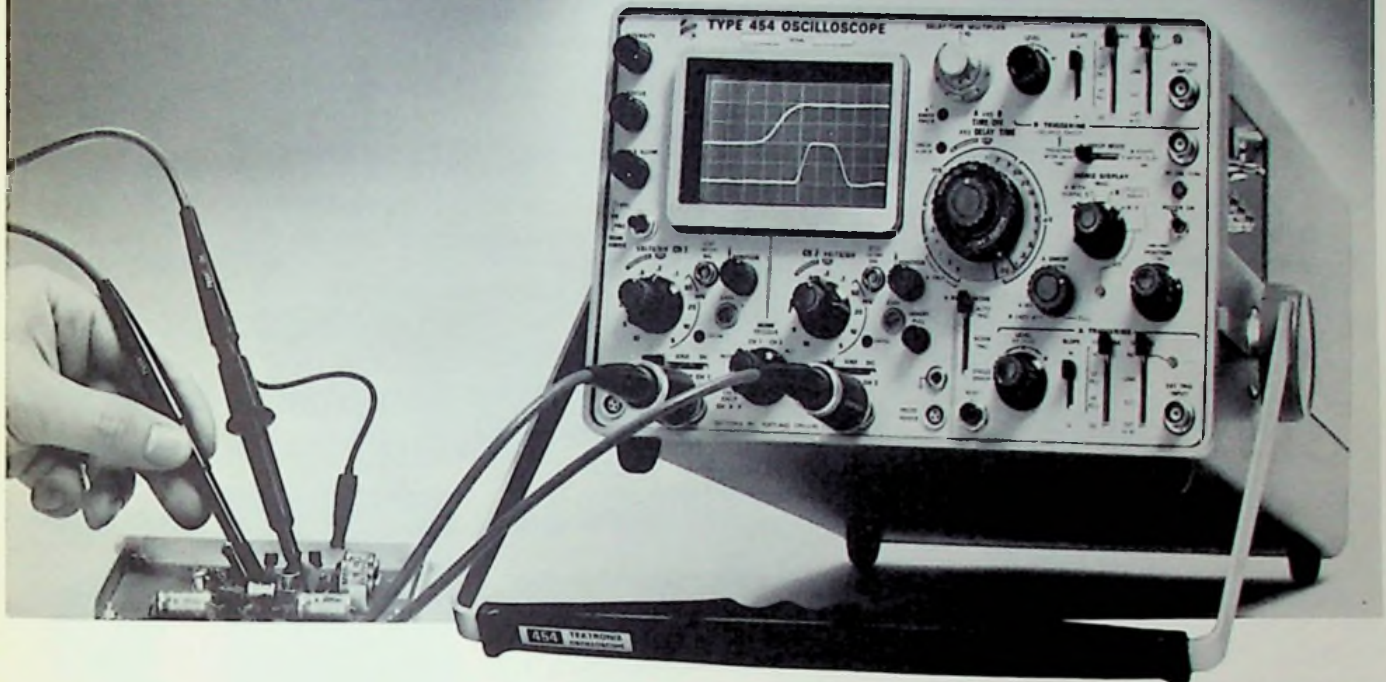
Reliability To Hear F. Tater On Mechanized Approach To Reliability Assurance

Frederick Tater is a senior engineer at Philco-Ford in the Space and Re-Entry Systems Reliability Dept. He will demonstrate the utility of a flexible and broadly applicable system of mechanized approaches in the field of Reliability Assurance. Specifically he will present the capabilities and input requirements of programs in use at Philco which calculate component failure-rates, system reliability estimates, and demonstrated reliability. Because these programs have been formulated for versatile adaptability to specific user requirements and preference in assessment technique, the subject matter will be of interest and assistance to all those engaged in Reliability Analysis.

The meeting will be in Ph 104, Stanford Univ. on Thurs. Jan 25 at 8 pm. Dinner is at Stanford View Restaurant, 1921 El Camino, Palo Alto at 7 pm.

150 MHz, 2.4 ns

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The Tektronix Type 454 is an advanced new portable oscilloscope with DC-to-150 MHz bandwidth and 2.4-ns risetime performance where you use it — at the probe tip. It is designed to solve your measurement needs with a dual-trace vertical, high performance triggering, 5-ns/div delayed sweep and solid state design. You also can make 1 mV/div single-trace measurements and 5 mV/div X-Y measurements.

The vertical system provides the following dual-trace performance, either with or without the new miniature P6047 10X Attenuator Probes:

Deflection Factor*	Risetime	Bandwidth
20 mV/div to 10 V/div	2.4 ns	DC to 150 MHz
10 mV/div	3.5 ns	DC to 100 MHz
5 mV/div	5.9 ns	DC to 60 MHz

*Front panel reading. With P6047 deflection factor is 10X panel reading.

The Type 454 can trigger internally to above 150 MHz. Its calibrated sweep range is from 50 ns/div to 5 s/div, extending to 5 ns/div with the X10 magnifier on both the normal and delayed sweeps. The delayed sweep has a calibrated delay range from 1 μ s to 50 seconds.

For a demonstration, contact your nearby Tektronix field engineer, or write: Tektronix, Inc., P. O. Box 500, Beaverton, Oregon 97005.

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Pulse fidelity

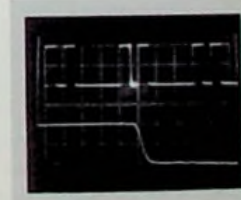
This double-exposure photograph shows the same 12-ns-wide pulse displayed on the Type 454 (upper display) and on a 7-ns, 50-MHz oscilloscope (lower display). Note the difference in detail of the pulse characteristics displayed on the Type 454 with its 2.4-ns risetime performance.



10 ns/div

5 ns/div delayed sweep

The delayed sweep is used to measure individual pulses in digital pulse trains. The Type 454 with its 1 μ s-to-50 s calibrated delay time, 5-ns/div sweep speed and 2.4-ns risetime permits high resolution measurements to be made. Upper trace is 1 μ s/div; lower trace is 5 ns/div.



Double Exposure

X-Y

The upper display is a 150-MHz signal that is 50% modulated by a 2 kHz signal. The lower display is an X-Y trapezoidal modulation pattern showing the 150-MHz AM signal vertically (Y) and the 2 kHz modulation signal horizontally (X). Straight vertical line is the unmodulated carrier. Multiple exposure.



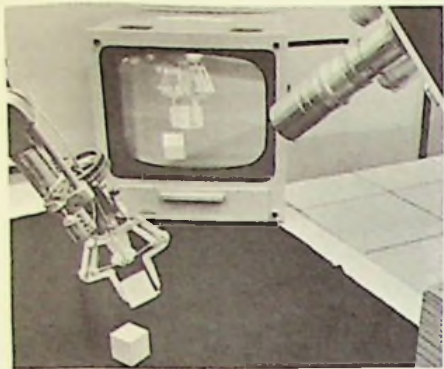
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Computers can't think...BUT



Stacking Blocks is easy for two-year olds, but this computerized arm-hand (left) and TV camera "eye" (right) find it a tough assignment.

Computer experts hate to hear their machines called "electronic brains" because, they say, a computer can't think. It can only do what its human "programmer" tells it to.

But they may have to get used to it if computer scientists at Stanford and a few other research centers succeed in making the complex machines "do intellectual work" as described by Prof. John McCarthy in the University's 1967-68 Annual Financial Report.

As principal investigator for the Computer Science Department's Artificial Intelligence Project, Prof. McCarthy points out that present computers are of limited usefulness. "Present computer programs are not really intelligent and have very limited ability to recognize patterns," he said.

"For example, no one has yet written a computer program capable of identifying people in a picture—something a child can do readily. Although humans are able to perform such tasks without effort, we don't fully know how to specify such tasks as a precise sequence of steps to be carried out by a computer."

His description of a "hand-eye" research project is a good illustration of the enormous complications presented in attempting to computerize a simple task. The hand-eye research involves a mechanical arm and hand linked by computer to a TV camera. The first objective is to get them to work together to stack blocks, as a two-year old might. Later, more difficult tasks can be undertaken.

"One of the first programs to be written using the camera," said Prof. McCarthy, "locates cube-shaped blocks by starting at the bottom of the (TV) picture and examining each horizontal line a point at a time until it finds a light spot. If the computer reads the full field of view, it will receive 333 times 250, or 83,250 numbers, each of which gives the light intensity in one direction

from the camera. The problem is to reduce this huge mass of information into a few essential statements. Such a description of the scene can be used by (another) program that finds blocks and stacks them with the aid of (the) artificial arm and hand.

"All this is just a first step toward a long range goal of being able to make computers do useful work," said the Stanford scientist. "Through this process we envisage computers performing such tasks as driving cars and automatically constructing houses. The results . . . could be useful in probing space, including the exploration of Mars."

Other thinking tasks the Stanford researchers are prodding computers to do include chess-playing, speech recognition, and a "Heuristic Dendral program" aimed at better understanding of the hypothesis-forming process of human thought.

"We write chess programs," said Prof. McCarthy, "not because it is important that computers play good chess, but because chess provides a good means for comparing our ideas about the processes of intelligence with human performance."

"While the machine can look at several thousand positions in choosing its move—many times as many as a human examines—it wastes most of this effort in examining positions which a human does not bother with for various good reasons. Our new program will contain several strategies intended to reduce the amount of waste motion."

There also is no way to speak or write to a computer, he said, except by punched cards or teletyped symbols. In this research the computer's "ear" is a microphone. It picks up air pressure changes that the computer records at the rate of 20,000 per second.

"If we plot these changes in pressure as a time versus pressure graph, we will see a speech wave," said the Stanford investigator. "Depending on the shape of the mouth (vocal tract) this waveform takes different shapes. Phoneticians have . . . classified the sounds we produce according to the shape of our vocal tract. There are about 40 such different sounds (phonemes) in English. When these programs are completed we expect the computer to listen to a speaker and print the corresponding string of phonemes."

"Although our work in the artificial intelligence laboratory thus far has been exceedingly complex," Prof. McCarthy concluded, "we still are on the outermost frontier. We have a long way to go."

Computer Analyzes Chemicals

A solvent analysis system has been introduced in Los Angeles that reduces the time required to analyze operating samples of metal cleaning solvents being used in the area.

The new system was installed by the Dow Chemical Company as a result of accelerated research being done in its laboratories to help industry to comply with Rule 66, which requires Los Angeles industry to use organic solvents that do not contribute to smog problems or else to install expensive equipment to control the amount and content of the solvent vapors that escape into the atmosphere. The system also can be programmed to handle other chemical products.

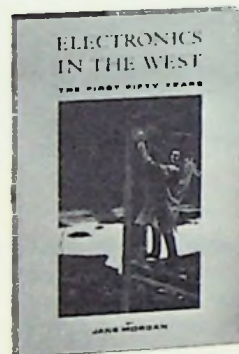
The new system employs a gas chromatograph equipment located at Dow's Los Angeles sales office and an IBM computer at the company headquarters in Midland, Mich.

Electronics In The West

NEW BOOK FOR YOUNG READERS

BY

JANE MORGAN



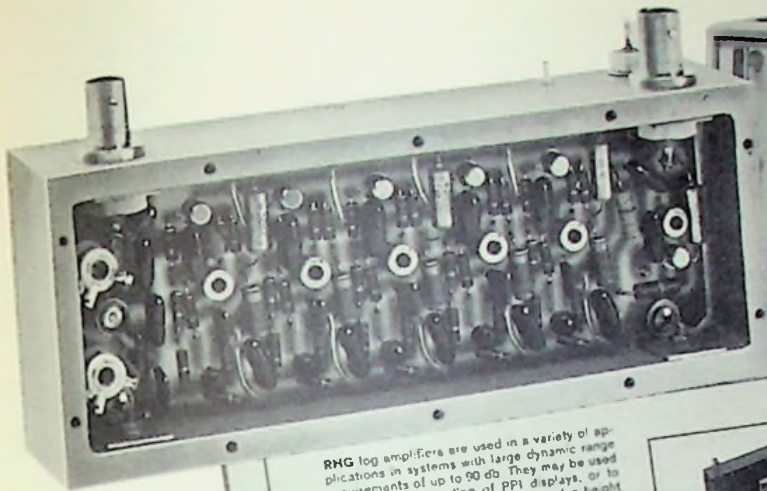
This new book, just off the press, emphasizes the romantic side of the West's heavy contribution to the development of electronics. While written with the young reader in mind, it makes entertaining reading for adults as well.

In his foreword, Dr. C. R. Timpany, former Superintendent of Santa Clara County Schools, points out the interrelationship of the book with field trips to the Perham Museum.

Through the efforts of John Satterstrom of the County Office of Education, National Defense Act Funds were obtained and Mrs. Jane Morgan was engaged to write the book.

The preface is written by Frederick E. Terman, Provost Emeritus of Stanford University. Leonard F. Fuller, recently of Stanford and former head of Electrical Engineering at UC Berkeley, was technical advisor.

The publisher is National Press Books, located at 850 Hansen Way in Stanford Industrial Park in Palo Alto. The price is \$4.95.



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Varian Introduces Cancer Therapy Accelerator

Varian Associates has recently announced the development and full-scale production of a new 4 MeV linear accelerator for radiotherapy of cancer.

The compact, easy-to-operate accelerator features a radiation intensity of 350 rads per minute, emerging from a 3-mm focal spot and full rotation around the patient. Advanced microwave techniques and solid-state electronics have been used extensively to provide for simple, minimum maintenance operation.

Previous linear accelerators have been of such complexity and cost, both to purchase and install, that their usage has been limited to only the largest medical centers around the world.

"Priced to compete with large Cobalt 60 units, the new Clinac 4 provides higher energy radiation with a resultant skin sparing effect, minimum dose to healthy tissue, and more than twice the radiation intensity resulting in shorter patient treatment time," stated Norman Austin, development manager of Varian's Radiation Division.

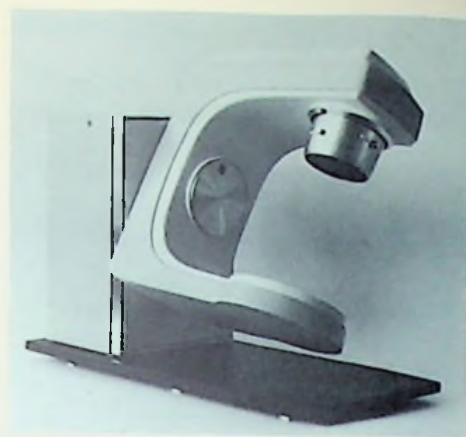
"As a result, despite its reduced cost, the Clinac 4 offers significant advantages in the treatment of cancer. In addition, improved operational effi-

ciency and simplified operation make possible the treatment of 60 to 80 patients per day.

"The Clinac 4 represents a saving of \$75,000 to \$100,000 compared with larger linear accelerators now in daily use at more than 50 major medical centers around the world," Mr. Austin observed. "Not only is the purchase price substantially reduced, but the hospital construction costs also are lower because of the Clinac 4's compact size. In many instances it can be installed in place of older equipment with little or no remodeling."

The unit is controlled from a compact desk top console which permits the operator to communicate with the patient, to preset and monitor the radiation dose and time the treatment. A unique interlock system verifies accelerator start-up sequence to give the operator a simple automatic checkout. A ready light signals when all interlock conditions have been satisfied, and, at this point, a single push button starts the treatment sequence.

A modern patient treatment couch allows patient positioning at the machine isocenter 47 inches above floor level. Use of the Clinac 4's optional



Varian Associates' new 4 MeV Clinac 4 provides 350 rads/minute, 360° rotation, and 3-mm focal spot in the price range of Cobalt 60 equipment.

rotation therapy mode provides a dose during rotation variable from 1/2 to 5 rads per degree.

The rotating clinical X-ray head from which the radiation emerges includes the beam defining collimators, an optical light projection system, and a unique optical range finder permitting instantaneous determination of target-skin distance. The X-ray field sizes are continuously adjustable up to 32 x 32 cm at the isocenter.

Measuring 103 inches long overall by 93 inches tall and 46 inches wide, the Clinac 4 occupies only 50 square feet of treatment room floor space. A rotating gantry houses the accelerator waveguide structure and magnetron powered microwave system, while the support structure houses the heat exchanger, rotation drive, and all auxiliary systems.

1968 Conference on Precision Electromagnetic Measurements June 25-28 at Boulder, Colorado

Several new areas will be accented at the biennial conference on Precision Electromagnetic Measurements which will be held June 25-28, 1968 at the National Bureau of Standards Laboratories in Boulder, Colorado, sponsored by the IEEE Instrumentation and Measurement Group and the National Bureau of Standards.

The scope of the conference continues to cover basic precision measurements at frequencies ranging from DC through microwaves and lasers and the precise measurement of time and frequency.

For the first time, however, the conference will devote major attention to the rapidly developing field of automated precision measurements, required for example, in large scale electronic systems such as steerable arrays.

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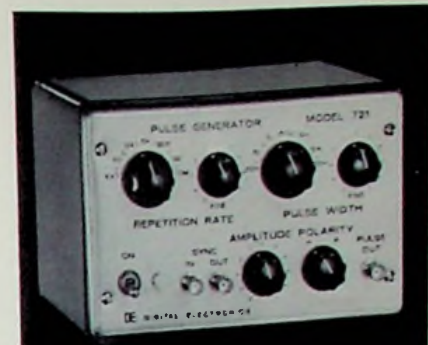
Manufacturer / Representative Index

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C. Components Sales California 3980 Fabian Way Palo Alto; 326-5317	L & M Engineering 2620 The Alameda Santa Clara; 243-6661	Stone & Assoc., Jay 140 Main Street, Los Altos; 948-4563
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VARIAN NAMES IVOR BRODIE VACUUM RESEARCH DIRECTOR

Dr. Ivor Brodie has been appointed Director of Research for the Vacuum Division of Varian.

Dr. Brodie joined Varian in 1962 where he first worked in microwave tube research; later he moved to Varian's Central Research Laboratories. One of his last projects in Central Research was directing the development of the electrostatic printing process which resulted in Varian's remarkable new STATOS graphic recorders.

MALONEY JOINS SEDILLO



Sedillo Company, manufacturers representative, has announced that Mr. M. J. Maloney has joined the staff as a territory sales manager. Mr. Maloney formerly was manager,

Digital Engineering Department of Link Group, General Precision, Inc., in Palo Alto and Sunnyvale. This addition to the staff makes Sedillo Co. one of the strongest representatives in Northern California in the computer & computer peripheral equipment field.

SIERRA PROMOTES POSPISIL

Richard E. Pospisil has been appointed Manager of Engineering for Sierra Electronic Operation, Communications and Electronics Division, Philco-Ford Corporation.

Mr. Pospisil will direct Sierra's development programs leading to advanced test instruments. Sierra manufactures a broad line of telecommunications test equipment, RF power generation and measurement equipment and infrared instruments for nondestructive testing.

MELABS APPOINTS MESSNER

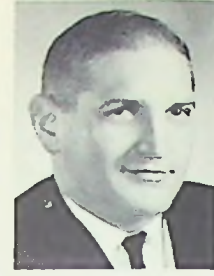
Mr. Don E. Messner has been appointed Engineering Group Leader, Solid State Products by MELABS, Palo Alto electronics manufacturer.

He will be leading a group of engineers and technicians in the expansion and development of MELABS microwave solid state components product line. Initial emphasis will be on solid state sources and frequency translators.

He is a member of I.E.E.E. and the I.E.E.E. Group on Microwave Theory and Technique.



MEMOREX APPOINTS DEL FAVERO



John P. Del Favero has been appointed to the newly created position of Executive Vice President, Supplies Division, Memorex Corporation. Memorex is said to produce the widest line of precision magnetic media in the world.

Mr. Del Favero has been employed for the past eleven years by International Business Machines, where he has held general management and engineering management positions.

In addition to receiving a bachelor's degree in chemical engineering from Stanford University, Mr. Del Favero earned his master's degree in business administration from the Stanford Business School.

ROBERT HOFSTADTER TO HEAD STANFORD HEPL

Prof. Robert Hofstadter, Nobel Prize physicist, has been named director of the High Energy Physics Laboratory (HEPL) at Stanford University.

HEPL contains the billion-volt Mark III linear electron accelerator, predecessor of the two-mile machine at the Stanford Linear Accelerator Center (SLAC).

The laboratory also was the scene of the research which earned Prof. Hofstadter a share of the 1961 Nobel Prize in physics. He used the accelerator to bombard the nuclear particles, protons and neutrons with high-energy electrons. By carefully observing the scattering of the electrons, he obtained the most accurate measurements of the nuclear particles ever produced.

NSC APPOINTS REGIS McKENNA

Donald Valentine, Marketing Director of National Semiconductor Corporation, announced today the appointment of Regis McKenna to the post of Marketing Services Manager.

In his new position, McKenna will be responsible for advertising publicity, public relations, direct mail and a variety of marketing services functions.

New Rep Firm Formed

The formation of RDP INSTRUMENTS, INC., a new Manufacturers Representative firm, was announced recently by Ben Cerruti and Gerald Olson. Covering the California-Nevada market area, RDP INSTRUMENTS will specialize in representing manufacturers of test instruments. The Northern Division office, managed by Mr. Cerruti, is located at 999 Commercial St., Palo Alto.

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PAMPERIN TO DALMO VICTOR



John H. Pamperin has joined Dalmo Victor, a Textron division, as APS-109 program director, according to John A. Chartz, executive vice president of the Belmont-based aerospace electronic systems firm.

Pamperin will be responsible for directing and coordinating all activities of the engineering, manufacturing, product assurance and business functions associated with the expanding APS-109 program. Dalmo Victor recently received a \$25 million follow-on contract to produce the AN/APS-109 Radar Homing and Warning System for the F-111A.

Major, typical projects in which the firm is currently engaged include the steerable communication antennas for both the lunar and command service modules of NASA's Apollo spacecraft, an automatic checkout system for railroad diesel-electric locomotives, an automatic aircraft wiring analyzer for the Air Force, low light level TV systems for the military, and the AN/APS-109 Radar Homing and Warning System for the Air Force F-111A fighter.

J. N. NEVILLE TO MELABS



MELABS has announced the appointment of Joe N. Neville as Engineering Group Leader. Mr. Neville will head a team of engineers and technicians in diversifying MELABS' Filter product line. Major responsibilities include developing product applications for the elliptic digital filter, a filter produced by MELABS under license from the Bendix Corporation, miniaturizing filter structures, and developing components, such as diplexers and multiplexers, associated with these new products.

Mr. Neville received his A.A. from the Milwaukee School of Engineering and his B.A. in Physics from San Jose State College. He has published several articles on the subject of Laser ECM.

IE & CI Chapter Announces Officers



Lance Pennington

The officers of the newly formed chapter on Industrial Electronics & Control Instrumentation are as follows: Chairman, Lance Pennington, Bechtel Corp.; Vice Chairman, William E. Chainey, Moore Associates; Secretary, M. B. Wittry, General Electric Co.; Financial Officer, Sigurd Anderson; Membership Chairman, Larry Brown, Applied Radiation Corp., Arrangements Officer—Paul Stone, Moore Associates.

The remaining offices are by appointment and these will be announced at their February meeting.

Mr. Pennington is in the Mining & Metals Div. at Bechtel, and is assistant to the chief engineer. He plans to promote a variety of interests through this Chapter, furnishing current status of pertinent data to the members and the needs, as seen by representatives of the group, for new and/or different control equipment and methods to the vendor manufacturers.

All indications point toward this becoming a very active Chapter.

New Technical Documents Released by EIA Engineering

The Electronic Industries Association's Engineering Department has issued four EIA Recommended Standards and a new publication of the Joint Electron Device Engineering Council.

The new documents are as follows: RS-128-A, "Metal Encased Fixed Paper Dielectric Capacitors for DC Application," a revision of RS-128, is \$5.50. RS-267-A, "Axis and Motion Nomenclature for Numerically Controlled Machines," a revision of RS-267, is \$4.00. RS-318-1 (Supplement No. 1 to RS-318), "Characterization of a Reverse Recovery Test Fixture," is priced at \$1.00. RS-337, "General Specification for Glass-Coated Thermistor Beads and Thermistor Beads in Glass Probes and Glass Rods (Negative Temperature Coefficient)," is available for \$2.00. JEDEC Publication 63, "Preferred Lead Configuration for Triode or Triode-Connected Field-Effect Transistors," is 25 cents.

The publications can be ordered from the EIA Engineering Department, 2001 Eye Street, N. W., Washington, D. C. 20006. Minimum order is \$1.00.

Industry and General Applications Group Hears Moon Yuen, Chooses J. A. Wells

At the recent IGA annual meeting in Pittsburgh, Penna., Moon Yuen of Bechtel Corporation presented a paper on "Static No-Break Power for Critical Loads in a Modern Oil Refinery."

J. Arthur Wells, Artwell Electric, was chosen Region Six member-at-large for the IGA Council.

ELECTRONICS IN THE WEST

THE FIRST FIFTY YEARS

by Jane Morgan

This is the first comprehensive history of the Bay Area electronics industry.

Extensive original research and many personal interviews have created a completely factual and highly exciting account of the electronics pioneers and developers, their inventions and their commercial successes.

Leonard F. Fuller, technical advisor. Preface by Frederick E. Terman.

194 pages, hardbound, \$4.95.

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- Transmitters
- Servo circuitry
- Audio-video

A demonstrated capability for organizing and leading group research and development and/or strong background in individual experimentation is highly desirable.

U.S. citizenship required for all positions
Send resume to, or call, Mr. A. Carollo

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- Senior Electronic Design Engineers
- Senior Project Engineers

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ELECTRONIC ASSOCIATES, INC.

Scientific Instruments
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State Survey Shows Most Citizens Approve Atom Power Plants

A majority of Californians favor nuclear power plants according to information released today by Gene A. Blanc, Coordinator of the state's Atomic Energy Development and Radiation Protection Office.

Blanc said the information was obtained through a public attitude survey which has provided a detailed picture of public opinion on a wide variety of subjects dealing with atomic power as a prime source of electrical energy for California.

"I am particularly pleased that an overwhelming number of Californians feel the State and its utilities should lead the nation in promoting and utilizing atomic power developments.

"Basically, we determined that a majority of California citizens would not object to a nearby atomic power plant, nor would they object to close relatives working in such a facility."

"According to the data, the response is even more favorable for such plants when all the facts about plant construction, operations and safety are presented. Californians likewise expressed strong confidence in utilities to build and operate safe plants and the government's regulation of such operations."

Blanc also said, "In the area of public information, we found out that the public wishes to know more about plant safeguards, waste disposal, pollution control and radiological safety practices."

Career Guidance Institute

Each year the Education Office of Santa Clara County sponsors a Career Guidance Institute for high school students of the area. Last year over 15,000 students attended the institute to obtain an insight into possible careers and speak with persons working in the professions represented. IEEE has participated in this interesting and worthwhile program through our membership in the Santa Clara Valley Engineers' Council (SCVEC).

This year the Career Guidance Institute will be held at the Santa Clara County Fairground, February 27 through March 8, 1968. The SCVEC participation on March 4, 5, 6 and 7 offers an opportunity to tell students about our profession and perhaps help them in their decision about a career choice. Persons who are interested in attending on any one of these 4 days between 9AM & 2 PM should contact Mr. George Gayer, Chairman, Career Guidance and Speakers Committee, SCVEC office: 735-2141, home: 323-9857.

Electronic "Dominoes" Teaching Aid Shown to Science Teachers

At their recent Convention, the National Science Teachers Association members were shown a new electronic teaching aid called "dominoes" by Macalaster Scientific Corporation, a Raytheon subsidiary.

These dominoes are said to make child's play of space-age electronics and are expected to streamline the teaching of electronic theory in schools. More than 90 different experiments in electronics are possible with a single set of electronic dominoes, including several variations of AM radio receivers, an electronic thermometer, a fire alarm, directional signals, a light measurement device, a voltage divider, a rectifier, and an amplifier.

The various circuits are quickly and easily assembled and disassembled. The individual units are held together by built-in magnets, which also assure proper electrical contact. Each domino contains a circuit element, such as a transistor, inside a container of clear plastic. The symbol for the element is imprinted on the top of the domino. A completed circuit thus displays on its top the appropriate circuit diagram for easy checking.

The magnetically joined circuit elements eliminate the maze of wires and the solder that usually accompany experiments in beginning electronics. For each experiment there is a diagram of the circuit provided in an instruction book, in domino format. To complete the experiment, the student is required to assemble the dominoes into an identical configuration.

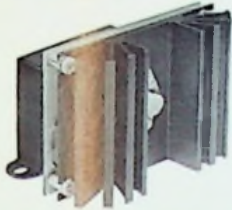
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NEW CONCEPTS IN POWER CONVERSION

R-3000

SOLID STATE AC VOLTAGE REGULATORS



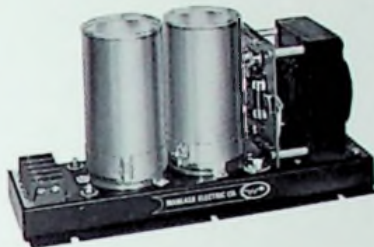
Designed Especially for OEM Application.
Two Lines Available.

SPECIFICATIONS

	R-3100	R-3200
Type of Voltage Regulation	True RMS	Peak
Regulation Technique	Peak Clipping	Peak Clipping
Type of Reference	RMS Sensor	Zener Diode
Input	100-130 VAC	100-130 VAC
	47-63 Hz	47-63 Hz
	115 VAC	115 VAC (RMS)
Output Line Regulation ($\pm 10\%$ line variation)	$\pm 0.5\%$	$\pm 1.0\%$
Load Regulation (10% to Full Load)	$\pm 0.5\%$	$\pm 1.0\%$
Frequency Regulation (47-63 Hz)	$\pm 0.5\%$	$\pm 1.0\%$
Power Factor Regulation (+0.7 to -0.7)	$\pm 0.5\%$	$\pm 1.0\%$
Phase Shift	None	None
Response Time	10-50 μ sec	10-50 μ sec
Models Available	15-1000 va	15-1000 va

LX

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Now...A low cost Power Supply with 1% Line and Load Regulation, Minimum Ripple, 3% Output Voltage Adjustability, Frequency Insensitive with 47-63 Cycle Operation. 45 Standard Models, 4-240 vdc 0-25 Amps.

Three Lines Available

60-LX	60 watts output	\$85 each
120-LX	120 watts output	\$125 each
200-LX	200 watts output	\$170 each

IC

INTEGRATED CIRCUIT POWER SUPPLIES



Designed Specifically for Original Equipment Applications.

THE IC PRODUCT LINE

After a careful analysis of existing power supply product lines, Wanlass Electric concluded that there was an important omission in these lines, namely, the low-cost quality supply for use by OEM's with their integrated circuits. The Wanlass IC line is aimed specifically at this market. This line features a quality series regulator but no frills... no expensive package, no unnecessary precision components, 0.25% regulation not 0.05%, 5 millivolts ripple not 1 millivolt, overvoltage protection is available as an option.

7.5 Amp Model	\$105.00
15 Amp Model	\$150.00

RF-1300

DYNAMICALLY FILTERED AC VOLTAGE REGULATOR



Designed especially for Precision Laboratory AC Line Regulation.

SPECIFICATIONS

Line Regulation	95-130 volts input
	$\pm 0.1\%$ for $\pm 10\%$ input variation
Load Regulation	$\pm 0.1\%$ for zero to full load
Dynamic Filter	No residual SCR or overvoltage transients
Distortion	Less than 3%
Response	Regulator - 30 milliseconds. Dynamic Filter - less than 1 microsecond
Output Voltage Adjustment	110-120 volts
Frequency	50 or 60 cps
Remote Sensing	Programmable
Current Limiting	Standard feature

Model	Power Rating	Price (including Exclusive Dynamic Filter)
RF-1310	1000 va	\$500
RF-1330	3000 va	\$800
RF-1350	5000 va	\$1100

R-2000

MULTI-FREQUENCY AC VOLTAGE REGULATOR



Ideal for Use with Locally Generated Power where Frequency is not held constant.

SPECIFICATIONS

Line Regulation	100-130 volts input
	$\pm 0.5\%$ for $\pm 10\%$ volts input variation
Load Regulation	$\pm 0.5\%$ for 10% to full load
Output Voltage	Adjustable
Frequency Insensitive	110-120 volts
	Wide range including 47-63 cps operation
Power Factor	Typically 1.0 to 0.7 lagging
Insensitive	30-100 milliseconds
Response	0.50°C
Operating Temperature	$\pm 1/2\%$ after warm up
Stability	No Zero Load
No Zero Load	Better Efficiency
Circulating Currents	Inherently Self limiting
Current Limitation	No "spikes"
No SCR Circuits	Variable Inductor Element
Magnetic Techniques	

Model	Power Rating	Price
R-2002	250 va	\$125
R-2005	500 va	\$205
R-2010	1000 va	\$270
R-2030	3000 va	\$425

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P-1405 500 va Line Conditioners ... \$275.00

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No.	NAME
29893	EMPLOYEES OF SYLVANIA IN MOUNTAIN VIEW SYLVANIA ELECTRONIC WEST.
HK 5318	YEUNG KA MUI

(TRANSLATION)

18th August, 1967.

Dear Parents,

One month has passed away, wish this month, we are fine, please don't worry.

I received your HK\$45 (US\$8) and HK\$96 for books, thank you very much.

I finished elementary schooling, and had our graduation ceremony, now I am in Yip Tong English School in Grade 7, my monthly stipend is HK\$56 (US\$9.82).

In my final exam I passed all subjects, I am very happy.

I wish you happiness. I also wish foster parents a happy summer holiday.

Your foster child,
Ka Mui

No.	NAME
29893	EMPLOYEES OF SYLVANIA IN MOUNTAIN VIEW SYLVANIA ELECTRONIC WEST.
HK 5318	YEUNG KA MUI

(TRANSLATION)

Sept. 1967.

Dear foster parents,

It's been one month since I last wrote you. I wish you all good health. We are fine here, please don't worry.

In Aug. I received thru Plan monthly grant of HK\$45 (US\$8) and 5 yards of printed cloth. Thanks a lot.

I am back in school on 12th Sept. and now I am studying in Yip Tong high school. I have bought all schoolbooks which are in English, and I only have two books in Chinese. They are Chinese history and Chinese reading. I found that the lessons are very difficult and I have to study hard, otherwise I can't catch up.

Foster father, Takeo Ichiki visited us in Dec. last year. How are you? Are you happy with work? I think about you. Hope you would write me when you have time.

foster parents

No.	NAME
29893	EMPLOYEES OF SYLVANIA IN MOUNTAIN VIEW SYLVANIA ELECTRONIC WEST.
HK 5318	YEUNG KA MUI

(TRANSLATION)

October, 1967.

Dear foster parents,

I haven't written for a month and I hope you are well and foster brother is in good health. We are fine, please don't worry.

Thru the Plan in September, I collected a monthly grant of HK\$45.-(US\$8) and 1 tin peanut oil, my family and I are grateful.

It was our Chung Yeung Festival on October 12, September 9 of lunar calendar. Many people went up to mountain. In Chinese version this could avoid of catastrophe. Many of us went to visit our ancestors' graves, it is a good thing. Schools closed for a day but no holiday for my parents. My sister and brother also had a day off.

It has been two years since...

Yeung Ka Mui

Ka Mui—oldest of four children—is one of the more fortunate children of Korea. She emigrated with her parents when the Communists overran their home in China. Her father, because of illness, cannot work full time and earns only 80¢ a month. Ka Mui's mother is employed as a seamstress and janitoress and makes about \$22.00 per month with overtime.

Ka Mui, through the Foster Parents organization, receives a cash grant of \$8.00 a month and additional financial assistance for education, clothes, and textbooks (plus packages of food and clothing).

Now 15 years old, Ka Mui was adopted in December, 1963, by 3500 Sylvania employees in Mountain View and Santa Cruz.

We are proud to have Ka Mui in the Sylvania family.

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