EDITOR'S PROFILE of this issue

from a historical perspective …

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

September, 1965:

Cover: These are the rough plans for the Foothill Electronics Museum, to be constructed at Foothill College in Los Altos. More details on page 3. I visited it several times, and at one point it had a full-sized Chuck-E-Cheese animatronic "rat".

Page 4: A listing shows all the chapter officers for the SF Bay Area IEEE groups. Charles "Bud" Eldon is shown as heading up the Future Engineers Show.

Archive of available SF Bay Area GRID Magazines is at this location:
https://ethw.org/IEEE_San_Francisco_Bay_Area_Council_History

IEEE Grid

September 1965
SAN FRANCISCO SECTION
INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS

ANNUAL DIRECTORY ISSUE

meeting reminder

Aerospace and Electronic Systems, Thursday, October 28

Communications Technology, Wednesday, September 22

Computer, Tuesday, September 28

Nuclear Science, Monday, September 20

Parts, Materials, and Packaging, Tuesday, September 28

Santa Clara Valley Subsection, Saturday, October 16

POSTMASTER: RETURN REQUESTED—
SUITE 3210 701 WELCH ROAD PALO ALTO CALIFORNIA

When this headline was current news...
digital recording tapes
had a packing rate of 200 bpi.

Today, 800 bpi is standard;
improvement in tape and base is the reason.

In analyzing the sensational development of EDP over the past decade, most of us naturally talk in terms of improvement of hardware. But when you stop to examine them, the contributions made by tape manufacturers have been quite remarkable.

The tape of today *looks* like the tape of 1954 . . . but think of the differences: improved oxide coatings to increase total capacity, reduce fluctuations in performance; much stronger binders to reduce dropouts and flaking, lengthen tape life; smoother surfaces to give longer, error-free wear; thinner coatings and better production controls to guarantee reel-to-reel uniformity.

Working hand in hand with the tape manufacturers during this time has been Du Pont. Improvements in the uniformity, stability and overall reliability of the base of MYLAR* have played a vital role in making possible the sophisticated tape in use today. Continuing cooperation of research and development facilites assures continuing improvements in the future. Your guarantee of the most advanced tape is the manufacturer's brand and a base of MYLAR polyester film.

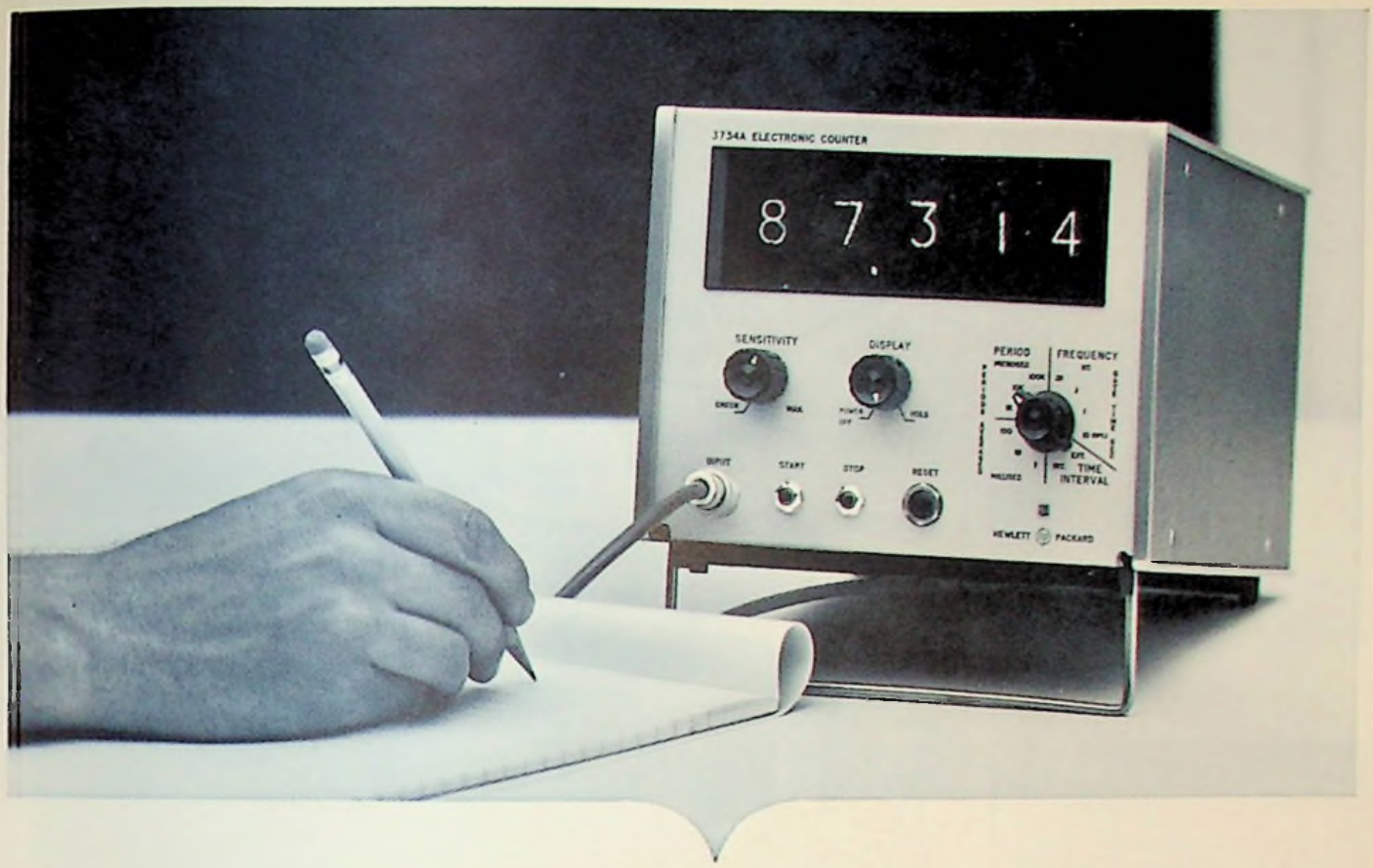
*Du Pont's registered trademark for its polyester film

DU PONT

only DU PONT makes MYLAR® POLYESTER FILM

Better Things for Better Living ...through Chemistry

At the base of all tape improvements: Mylar®



General Purpose Counter—only $1075!

New compact, solid-state, 2 mc electronic counter

Here's the new Hewlett-Packard Model 3734A Counter—only 8" wide and 6" high—ideal for bench use, yet easily rack mounted (with room for another modular hp instrument in a standard rack width).

Measure frequency—2 cps to 2 mc
Measure period and multiple period average
Measure frequency ratio and multiple ratio
Measure time interval
Make cumulative measurements

With five-digit in-line readout, the 3734A displays any of these measurements in clear, easily read numerals. High sensitivity and a one-megohm input impedance assure accurate measurement of signals as low as 100 mv rms. The decimal is automatically positioned.

The internal time base is a stable 100 kc oscillator—an external time base may be used if desired.

Display storage provides a continuous display of the most recent measurement, changing only when the count actually changes; a display control, adjustable 0.2 to 5 seconds, can be used to set the period of time between the end of one count and the start of the next. A reset disable function permits cumulative measurements.

Front-panel pushbuttons provide convenient manual control in time interval mode—for electrical operation there are separate start-stop inputs on the rear panel.

The size of the counter and a tilt stand provided for easy viewing make it ideal for bench use. At only 12½ pounds, it is excellent for portable applications. Price: hp 3734A, $1075*.

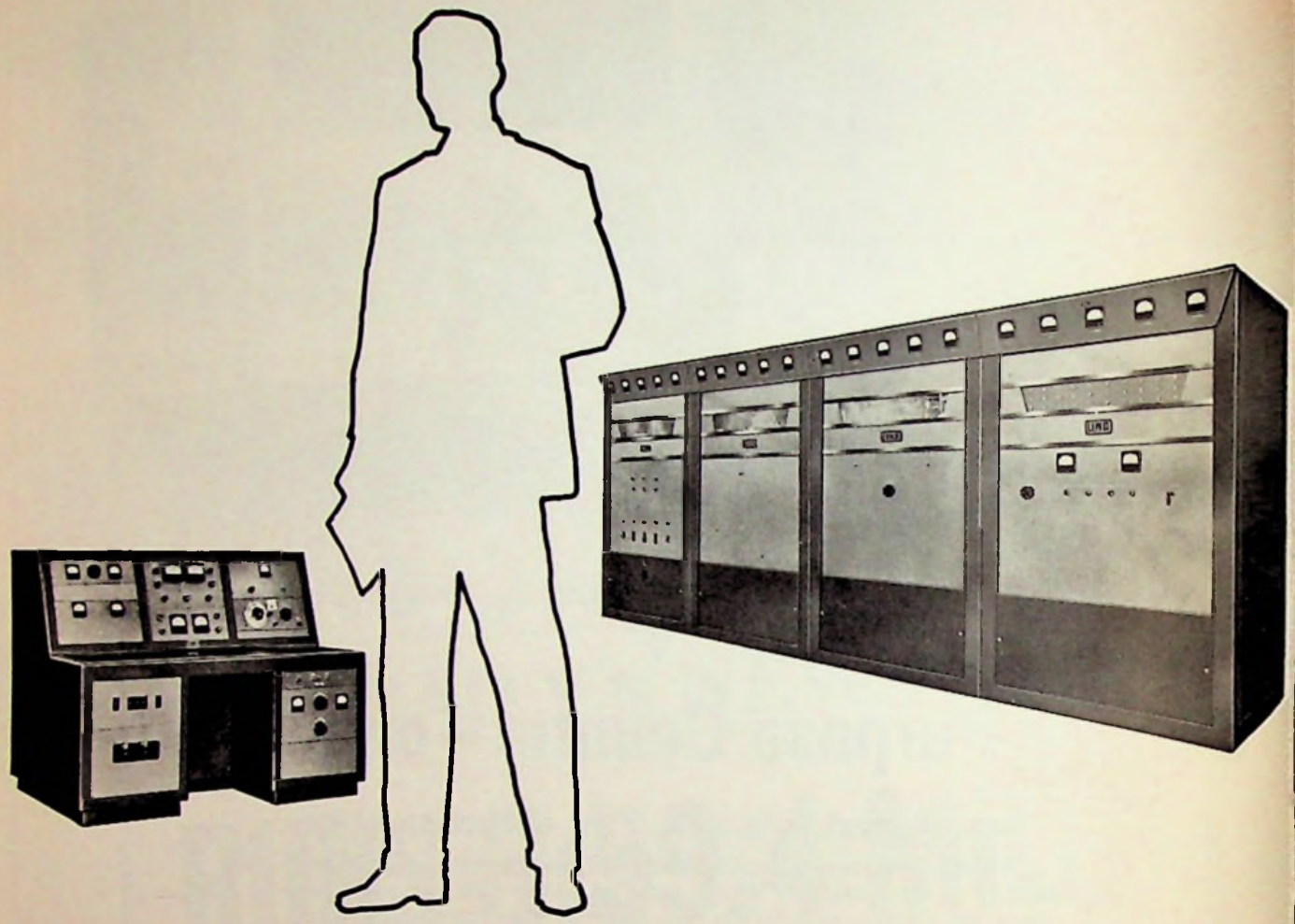
Ask your Hewlett-Packard field engineer for a demonstration, or write for complete information to Hewlett-Packard, Palo Alto, California 94304, Tel. (415) 326-7000; Europe: 54 Route des Acacias, Geneva; Canada: 8270 Mayrand Street, Montreal.

*Data subject to change without notice. *Price in U.S.A. f.o.b. Palo Alto, California. For price in other countries, call your local hp sales office.*

HEWLETT PACKARD hp NEELY SALES DIVISION

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

Can you fit yourself into this LING picture?



LING ELECTRONICS
NEEDS SENIOR DESIGN ENGINEERS
experienced in high power supplies and vibration test equipment.

Basic Prerequisites:

(a) BSEE from a recognized school or college.

(b) Strong academic and theoretical background with ability to effect practical application (Applicants probably have several patent applications).

(c) Proven development background, and approximately 10 years of experience in high power supplies or a related field. (Our immediate work assignments would involve superregulated D.C. & A.C. supplies ranging in power from 10 kw to 1 megawatt).

(d) Capability of assuming project responsibility from inception to completion.

(e) Some experience with a proprietary product line.

Job Responsibilities:

(a) Design and production liaison for new solid state high-power supplies.

(b) Participation in applied research leading to the development of new products.

(c) Scheduling, budgeting and following-up of Engineering development programs in the product section.

These outstanding, well-paying positions offer contentment in the form of recognition for the Engineer with creative capabilities. We are located in the residential community of Anaheim, California–a great entertainment center, close to the beaches, and all forms of outdoor recreation. Send your resume to Bob Knapp, Personnel Administrator, Ling Electronics, A Division of LTV Ling Altec, Inc., 1515 South Manchester Avenue, Anaheim, California.

We are an equal opportunity employer

LING Electronics

A DIVISION OF LTV LING ALTEC, Inc.
1515 S. MANCHESTER AVENUE, ANAHEIM, CALIFORNIA 92803 (714)774-2000

IEEE Grid
volume 12
number 1
september, 1965

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

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

Members: send address change promptly to
IEEE, Box A, Lenox Hill Station, New York, N.Y.
Send copy of letter to Section Office

executive editor:
JAMES D. WARNOCK

advertising director:
ERNESTO A. MONTANO

editorial & advertising assistant:
MRS. JEAN HELMKE

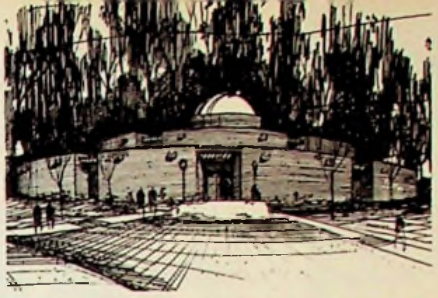
subscriptions:
$4.00 (members); $6.00 (others);
overseas, $7.00 per annum

contents

san francisco section officers

Second class postage paid at San Francisco

advertising



cover story

ELECTRONICS MUSEUM

The board of directors of the Perham Foundation recently approved preliminary architect's plans for the Foothill Electronics Museum to be built at Foothill College in Los Altos Hills.

Also approved was the $250,000-fund-raising program in the electronics and space industries which is being handled by John R. Doscher & Associates of Santa Clara.

The announcement was made by Ralph M. Heintz, Jr., president of the foundation. The architects are Kump, Masten and Hurd, of San Francisco, who also designed all of the Foothill College buildings.

The museum will be a part of the Foothill College Space-Science Center. The plans call for a two-tier, semi-circular set of ten modular units, each 2,000 square feet in area. The buildings will be one-story brick structures of varying ceiling heights built into the side of a hill. At the top of the hill is the new observatory building, which houses a 16-inch reflecting telescope. The observatory sets the theme of the Space-Science Center.

The Perham Foundation will build the first five units of the museum at a cost of $250,000 and will deed the buildings to Foothill College. Half of the space will be used to display the Perham Collection of historical electronic devices and artifacts. The collection will also be deeded to the college.

The other half of the space will be used for the display of contemporary electronic and space exhibits to be provided by industries in the Peninsula area.

Upon completion, the museum will be managed by the office of community services of the college with the foundation serving in an advisory capacity. Community services manages the Foothill College planetarium, which was visited last year by 26,000 elementary school children. Dr. Ervin Harlacher, director of the office of community services, expects similar use of the museum.

In addition, the museum will be used by the college and by industry for educational programs. It will also

(Continued on page 10)

SAN FRANCISCO SECTION DIRECTORY 1965-66

SECTION OFFICERS


Melchor


Hulse

Chairman: **Jack L. Melchor,** hp associates, 620 Page Mill Road, Palo Alto, 321-8510

Vice Chairman: **E. H. Hulse,** Lawrence Radiation Laboratory, Bldg. MT 170-C, P.O. Box 808, Livermore, 447-1100, Ext. 8034


MacKenzie


Barkle

Secretary: **Fred J. MacKenzie,** Stanford Research Institute, 333 Ravenswood Ave., Menlo Park, 326-6200, Ext. 2147

Treasurer: **J. E. Barkle,** Bechtel Corp., 220 Bush St., San Francisco 4, 433-4567, Ext. 2497


Warnock


Leifer

Executive Secretary: **James D. Warnock,** IEEE, 701 Welch Road, Palo Alto, 327-6622

EXECUTIVE COMMITTEE

Those above and:

Section-WESCON-Director: **Meyer Leifer,** Energy Systems Inc., 3180 Hanover St., Palo Alto, 326-1640 (through June, 1967)

Section - WESCON - Director and Junior Past Chairman: **John C. Beckett,** Hewlett-Packard Co., 1501 Page Mill Road, Palo Alto, 326-7000 (from Nov. 15, 1965, through June, 1969)

Section-WESCON-Director: **John S. McCullough,** Litton Industries, Inc., 960 Industrial Road, San Carlos, 591-8411 (through Nov. 15, 1965)


Beckett


McCullough


Smith


Hopkin

Director-at-Large: **Otto J. M. Smith,** Electrical Engineering Dept., University of California, Berkeley 20, 845-6000, Ext. 2661

Director-at-Large: **Arthur M. Hopkin,** Electrical Engineering Dept., University of California, Berkeley 20, 845-6000, Ext. 3068


Longerbeam


May

East Bay Subsection Chairman: **Gordon T. Longerbeam,** Lawrence Radiation Laboratory, L-107, Room 5000, P.O. Box 808, Livermore, 447-1100, Ext. 8048

Santa Clara Valley Subsection Chairman: **John J. May,** Lockheed Missiles & Space Co., Dept. 91-35, Bldg. 519, Sunnyvale, 742-9155


McCloskey


Kaste

Fresno Subsection Chairman: **T. W. McCloskey,** Pacific Gas & Electric Co., San Joaquin Division, Fresno, 268-0441


Hochgesang


Zeidler

Group Coordinator: **Victor E. Kaste,** General Electric Co., 5000 Shellmound St., Oakland 8, 654-7120

Organizational Planning: **Charles F. Hochgesang,** Bechtel Corp., 220 Bush St., San Francisco 4, 433-4567, Ext. 2844


Hoover


Aas

Publications Advisor: **Howard Zeidler,** Stanford Research Institute, 333 Ravenswood Ave., Menlo Park, 326-6200, Ext. 3284

STANDING COMMITTEES

AWARDS: William Hoover, Granger Associates, 1601 California Ave., Palo Alto, 321-4175

COORDINATOR, LOCAL NATIONAL CONFERENCES: Arthur M. Hopkin, Electrical Engineering Dept., University of California, Berkeley 20, 845-6000, Ext. 2661


Kaisel


Eldon

EDUCATION AND STUDENT RELATIONS: Eugene A. Aas, Sandia Corp., P.O. Box 969, Livermore, 447-5100, Ext. 2671

FELLOWS AND NATIONAL NOMINATIONS: Stanley J. Kaisel, Microwave Electronics Corp., 3165 Porter Drive, Palo Alto, 321-1770

FUTURE ENGINEERS SHOW: Charles Eldon, Hewlett-Packard Co., 1501 Page Mill Road, Palo Alto, 326-7000

(Continued on page 6)

50 Mc portability

with Dual-Trace and Sweep Delay

Here's the new portable oscilloscope for DC-to-50 Mc applications. It operates almost anywhere —and under severe environmental conditions. It's small and light—with overall dimensions of 7¼" high x 12½" wide x 22½" deep (including extended carrying handle), and weighs less than 29 pounds.

Performance features include:

Bandwidth (with new P6010 Probe)
- 20 mv/div through 10 v/div > 50 Mc
- 10 mv/div > 45 Mc
- 5 mv/div > 40 Mc
- 1 mv/div > 25 Mc (Channels cascaded)

Sweep Rates—5 sec/div to 10 nsec/div (with 10X Mag.)

Calibrated Sweep Delay—50 sec to 1 μsec.

CRT—New 4" rectangular, operating at 10 kv.

X-Y Operation—DC to > 5 Mc, 5 mv/div through 10 v/div.

Triggering—To 50 Mc, from Channel 1 or combined signals (both sweeps).

Type 453 Oscilloscope U.S. Sales Price f.o.b. Beaverton, Oregon . . . **$1,950**

new 453 from tektronix

Goddard

Damonte

HISTORICAL: Earl Goddard, 2522 Webster St., Palo Alto, 325-2522

MEMBERSHIP: John Damonte, Dalmo Victor, 1515 Industrial Way, Belmont, 591-1414

PROGRAM: E. H. Hulse, Lawrence Radiation Laboratory, Bldg. MT 170-C, P.O. Box 808, Livermore, 447-1100, Ext. 8034

Kirby

Savage

PUBLIC RELATIONS: David Kirby, Hewlett-Packard Co., 1501 Page Mill Road, Palo Alto, 326-7000

SAN FRANCISCO ENGINEERING COUNCIL: Delegate: Charles F. Hochgesang, Bechtel Corp., 220 Bush St., San Francisco 4, 433-4567 Ext. 2844

SECONDARY EDUCATION: Jack Savage, Lawrence Radiation Laboratory, P.O. Box 808, Livermore, 447-1100, Ext. 8116

SUBSECTIONS:

(Chairmen: See Executive Committee)

EAST BAY: Vice Chairman: **W. H. Peterson,** Pacific Gas & Electric Co., 1625 Clay St., Oakland, 835-8500; Secretary-Treasurer: **R. Tremaine,** 1338 Reliez Valley Road, Lafayette, 939-0663

SANTA CLARA VALLEY: Vice Chairman: **Don McCauley,** Philco WDL, 3875 Fabian Way, Palo Alto, 326-4350, Ext. 4757; Secretary-Treasurer: **Robert J. Membreno,** Rogers Engineering Co., 16 Beale St., San Francisco 5, YU 6-6546

FRESNO: Secretary-Treasurer: **Charley W. Townsend,** Pacific Gas & Electric Company, San Joaquin Division, Fresno, 268-0441

GROUP CHAPTERS

AEROSPACE AND ELECTRONIC SYSTEMS: Chairman: **Robert H. Light,** United Technology Corp., Kern

Light

Welch

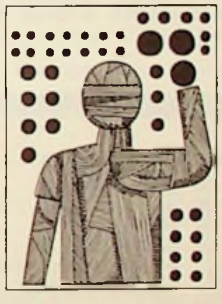
Bldg., Room 40, P.O. Box 358, Sunnyvale, 739-4880, Ext. 2894; Vice Chairman: **Stephen H. Marx,** Philco WDL, 3825 Fabian Way, Palo Alto, 326-4350, Ext. 6048; Secretary: **Eric J. Swarthe,** Lockheed Missiles & Space Co., Dept. 65-40, Bldg. 104, Sunnyvale, 742-8148; Treasurer: **Kenneth H. Crandall,** Lockheed Missiles & Space Co., Dept. 62-57, Bldg. 152, FAC-1, Sunnyvale, 742-2873

ANTENNAS AND PROPAGATION: Chairman: **William J. Welch,** Electrical Engineering Dept., University of California, Berkeley 20, 845-6000, Ext. 3539; Vice Chairman: **Charles E. Phillips,** Granger Associates, 1601 California Ave., Palo Alto, 321-4175; Secretary-Treasurer: **Claes T. Elfving,** Sylvania EDL, Bldg. 4, P.O. Box 205, Mountain View, 966-3551

(Continued on page 8)

WHERE CAN MAN GO...IN ELECTRONICS?

Electronics is a discipline unlike any other. For whatever name we give to these fast paced times in which we live—the Age of Space, the Age of Mass Communications, the Age of Transportation—electronics plays a vital role. Through advances in this single key technology, advances in all others are brought nearer to reality. And nowhere is this truth more evident than at Lockheed, where to all programs, electronics is essential. Research. Development. Systems. At Lockheed, those knowledgeable in the nuances of electronics help to further man's achievement upon this planet. They bring practicality to investigative ocean vehicles such as Lockheed's Deep Quest, a two-place research submarine. They permit land vehicles of the future to achieve reality. And they extend the reach of mankind heavenward through spacecraft systems such as Agena. Undersea, on land, and in space environments, Lockheed electronic systems control and guide, communicate and compute. Now, generalists and specialists, experienced and interested in a broad spectrum of electronics assignments, are invited to write Mr. K. R. Kiddoo, Professional Placement Manager, Sunnyvale, California. Lockheed is an equal opportunity employer.



LOCKHEED
MISSILES & SPACE COMPANY
A GROUP DIVISION OF LOCKHEED AIRCRAFT CORPORATION


Buntenbach


Dorf


Woodruff


Newcomb


Fong


Waters

AUDIO: Chairman: **Rudolph W. Buntenbach,** Lockheed Missiles & Space Co., Dept. 60-30, Bldg. 104, Sunnyvale, 742-1565; Vice Chairman: **James G. Hussey,** General Radio Co., 1186 Los Altos Ave., Los Altos, 948-8233; Secretary-Treasurer: **Marc Brun,** Lockheed Missiles & Space Co., Dept. 81-65, Bldg. 153, Sunnyvale, 742-7287

AUTOMATIC CONTROL: Chairman: **Richard C. Dorf,** Electrical Engineering Dept., University of Santa Clara, 296-3360, Ext. 226; Vice Chairman: **A. Stratton McAllister,** Electrical Engineering Dept., San Jose State College, 394-6414, Ext. 2612; Secretary-Treasurer: **Robert P. McIntosh,** IBM, Monterey and Cottle Roads, San Jose, 227-7100, Ext. 3453

BROADCASTING: Chairman: **Roger Woodruff,** KRON-TV, 929 Mission St., San Francisco 3, 421-1100; Vice Chairman: **Paul Gregg,** Bauer Electronics, 1663 Industrial Road, San Carlos, 591-9466

CIRCUIT THEORY: Chairman: **Robert W. Newcomb,** Electrical Engineering Dept., Stanford University, 321-3300, Ext. 268, Vice Chairman: **William J. Kerwin,** NASA-Ames Research Center, Moffett Field, M213-4, 961-1111, Ext. 2924; Secretary Treasurer: **Daniel Nemirow,** Ampex Corp., 401 Broadway, MS 3-29, Redwood City, 367-3167

COMMUNICATION TECHNOLOGY: Chairman: **F. S. Beale,** Lenkurt Electric Co., 1105 County Road, San Carlos, 591-8461, Ext. 768. Vice Chairman: **Robert S. Howland,** Pacific Telephone Co., 111 No. Market St., San Jose 13, 291-4039; Secretary-Treasurer: **Charles G. Griffith,** Lenkurt Electric Co., 1105 County Road, San Carlos, 591-8461, Ext. 525


Beale


Davidow

COMPUTER: Chairman: **William H. Davidow,** General Electric Computer Laboratory, 310 Deguigne Drive, Sunnyvale, 739-8000, Ext. 273; Vice Chairman: **Rex Rice,** Fairchild Semiconductor, 4001 Junipero Serra Blvd., Palo Alto, 321-7250, Ext. 253, **Harold E. Petersen,** IBM Corp., Advance Dev. & Research Lab, 2670 Hanover St., Palo Alto, 327-2300

ELECTROMAGNETIC COMPATIBILITY: Chairman: **Arthur Fong,** R&D Laboratories, Microwave Division, Hewlett-Packard Co., 1501 Page Mill Road, Palo Alto, 326-7000, Ext. 2524; Vice Chairman: **Gordon Westwood,** Carl A. Stone Associates, 800


Rader


Fuller


Howland


Aboudara


Fire


Horn

N. San Antonio Road, Palo Alto, 321-2724; Secretary-Treasurer: **Eric R. Isacson**, Lockheed Missiles & Space Co., Dept. 62-23, Bldg. 152, Sunnyvale, 742-6472

ELECTRON DEVICES: Chairman: **William E. Waters**, Microwave Electronics, 3165 Porter Drive, Palo Alto, 321-1770; Vice Chairman: **Richard W. Soshea**, hp associates, 620 Page Mill Road, Palo Alto, 321-8510; Secretary: **Daniel Dow**, Varian Associates, 611 Hansen Way, Palo Alto, 326-4000, Ext. 3141; Treasurer: **Donald K. Winslow**, Hansen Laboratories, Stanford University, 323-2411

ENGINEERING IN MEDICINE AND BIOLOGY: Chairman: **Con Rader**, Beckman Instruments, 1117 California Ave., Palo Alto, 326-1970, Ext. 328; Vice Chairman: **Noel P. Thompson**, Palo Alto Research Foundation, 860 Bryant Ave., Palo Alto, 326-8120; Secretary-Treasurer: **Gerald Pressman**, Stanford Research Institute, 333 Ravenswood Ave., Menlo Park, 326-6200, Ext. 2343

ENGINEERING MANAGEMENT: Chairman: **W. Dale Fuller**, Lockheed Missiles & Space Co., Dept. 55-80, Bldg. 106, 742-0962; Vice Chairman: **William E. Evans, Jr.**, Stanford Research Institute, 333 Ravenswood Ave., Menlo Park, 326-6200, Ext. 3772; Secretary-Treasurer: **Frank Wheeler**, Hewlett-Packard Co., 395 Page Mill Road, Palo Alto, 326-1755, Ext. 444.

ENGINEERING WRITING AND SPEECH: Chairman: **Robert S. Howland**, Pacific Telephone Co., 111 No. Market St., San Jose 13, 291-4039; Vice Chairman: **Frank Mansur**, Lockheed Missiles & Space Co., Dept. 51-40, Bldg. 101, Sunnyvale, 743-2244; Secretary: **R. E. Fry**, Pacific Telephone Co., Airborne Bldg., Room 224, San Francisco International Airport, San Francisco 28, 588-9000, Ext. 200; Treasurer: **D. W. Matthews**, Lockheed Missiles & Space Co., Dept. 66-26, Bldg. 171 (STC), Sunnyvale, 739-4510, Ext. 2301

INDUSTRY AND GENERAL APPLICATIONS: Chairman: **D. N. Aboudara**, Bay Area Rapid Transit District, 814 Mission St., San Francisco 3, 986-1818; Vice Chairman: **William Blinn**, Bechtel Corp., 101 California St., San Francisco 11, 433-4567; Secretary-Treasurer: **J. A. Hall**, Standard Oil Co., 571 Market St., San Francisco 5, 434-7700, Ext. 4363

INFORMATION THEORY: Chairman: **Philip Fire**, Sylvania Electric Products, P.O. Box 205, Mountain View, 966-3865; Vice Chairman: **James J. Spilker, Jr.**, Philco WDL, 3825 Fabian Way, Palo Alto, 326-4350, Ext. 4101; Secretary-Treasurer: **Elwyn Berlekamp**, Electrical Engi-

(Continued on page 10)

Price

Maninger

neering Dept., University of California, Berkeley 20, 845-6000, Ext. 3306

INSTRUMENTATION AND MEASUREMENT: Chairman: **Harrison Horn**, 3470 Janice Way, Palo Alto, 326-0931; Vice Chairman: **James G. Hussey**, General Radio Co., 1186 Los Altos Ave., Los Altos, 948-8233; Secretary: **Bill Millwitt**, Pulse Engineering, 560 Robert Ave., Santa Clara, 248-6040; Treasurer: **J. Magleby**, Hewlett-Packard Co., 1501 Page Mill Road, Palo Alto, 326-7000, Ext. 2282

MICROWAVE THEORY AND TECHNIQUES: Chairman: **Vernon G. Price**, SLAC, Stanford, 854-3300, Ext. 396; Vice Chairman: **Howard Poulter**, Hewlett-Packard Co., 1501 Page Mill Road, Palo Alto, 326-7000, Ext. 2129; Secretary: **Edwin Oxner**, Melabs, 3300 Hillview Ave., Palo Alto, 326-9500, Ext. 253; Treasurer: **David K. Adams**, Stanford Research Institute, 333 Ravenswood Ave., Menlo Park, 326-6200, Ext. 3903

NUCLEAR SCIENCE: Chairman: **R. C. Maninger**, Lawrence Radiation Laboratory, P.O. Box 808, Livermore, 447-1100, Ext. 8053; Vice Chairman: **R. E. Finnigan**, Electronic Associates, 4151 Middlefield Road, Palo Alto, 321-7801; Secretary-Treasurer: **E. F. Laine**, Lawrence Radiation Laboratory, L-121, P.O. Box 808, Livermore, 447-1100, Ext. 8058

POWER: Chairman: **James J. McCann**, Pacific Gas & Electric Co., 245 Market St., San Francisco 6, 781-4211; Vice Chairman: **James B. Tice**, General Electric Co., 235 Montgomery St., San Francisco 6, 434-2211; Secretary-Treasurer: **Roland K. Grannis**, K. M. Ryals Co., 9 First St., San Francisco 5, 986-1625

PARTS, MATERIALS, AND PACKAGING: Chairman: **Harmon R. Traver**, Mechrolab Div., Hewlett-Packard Co., 1062 Linda Vista, Mountain View, 967-5796; Vice Chairman: **Ronald K. Church**, Hewlett-Packard Co., 1501 Page Mill Road, Palo Alto, 326-7000; Secretary Treasurer: **John H. Hauser**, Lockheed Missiles & Space Co., Dept. 55-35, Bldg. 153, Sunnyvale, 742-7314

McCann

Traver

King

Radue

RELIABILITY: Chairman: **Tom King**, Lockheed Missiles & Space Co., Dept. 91-40, Bldg. 537, Sunnyvale, 742-7616; Vice Chairman: **Stuart A. Bessler**, Decision Studies Group, 460 California Ave., Palo Alto, 327-4212; Secretary-Treasurer: **Kenneth E. Sladky**, Dalmo Victor Co., 1515 Industrial Way, Belmont, 591-1414, Ext. 345

VEHICULAR COMMUNICATIONS: Chairman: **Paul F. Radue**, Western California Telephone Co., P.O. Box 157, Los Gatos, 356-1111; Vice Chairman: **James H. Eakin**, Farinon Electric Co., 935 Washington St., San Carlos, 593-8491; Secretary-Treasurer: **Ben K. Wright**, Kaar Engineering Co., 2989 Middlefield Road, Palo Alto, 326-5050

section notes

BULLETIN BOARD NOTICES

Carrying the meeting calendar information that appears in **Grid**, but mailed in the preceding month, bulletin board notices are printed and distributed regularly by the section office to nearly 500 members who have agreed to post them on the 860 bulletin boards of their firms or organizations. If you would like to be added to the mailing list, call or write to section office, indicating how many copies you would like to post each month in locations where they will attract the attention of member or non-member engineers.

MORE ELECTRONICS MUSEUM

be open to the public on a scheduled basis.

Heintz said that the aim of the foundation is to make the museum the foremost facility of its type on the West Coast. "It is particularly appropriate that the museum will be located in the center of the electronics industry in Northern California," he said.

Completion is expected in mid-1967.

STUDENT BRANCHES

Smith

Hurd

Fresno State College
Fresno, (209) 222-5161
Counselor: **James H. Smith**

Heald Engineering College
1215 Van Ness Ave.
San Francisco 9, 673-5500
Counselor: **Roy O. Hurd**

Marxheimer

Glover

San Francisco State College
1600 Holloway Ave.
San Francisco 32, 584-2300, Ext. 706
Counselor: **Rene B. Marxheimer**

San Jose State College
San Jose 14, 294-6414, Ext. 2019
Counselor: **Ed C. Glover**

Eidson

Wattenburg

Stanford University
Stanford, 323-2441, Ext. 312
Counselor: **John C. Eidson**

University of California
Berkeley 20, 845-6000, Ext. 2662
Counselor: **Willard Wattenburg**

Nettesheim

Bouldry

University of Santa Clara
Santa Clara, 296-3360, Ext. 227
Counselor: **Henry Nettesheim**

U.S. Naval Postgraduate School
Monterey, (408) FR 2-7171, Ext. 513
Counselor: **John M. Bouldry**

meeting ahead

NUCLEAR SCIENCE

Guy A. Armantrout, Lawrence Radiation Laboratory, Livermore, will address the Nuclear Science chapter on state-of-the-art detectors for nuclear spectroscopy at its September 20 meeting.

The lecture will survey the manufacture and applications of a number of different types of semiconductor radiation detectors currently being used for nuclear spectroscopy. Special emphasis will be placed on large volume Ge Li drifted detector gamma-ray spectrometers and the work which is being carried out on detector development at LRL Livermore.

Armantrout

Farina

meeting ahead

COMPUTER CHAPTER

Subsystem level MOS integrated devices will be Donald E. Farina's subject at the Computer chapter's meeting on September 28. He is manager of the subsystems components operation at General Micro-electronics Inc., Santa Clara.

MOS integral circuits with high functional complexity have been fabricated with upwards of 600 MOS devices contained in one silicon chip. These MOS subsystem devices can provide significant cost reduction over that of conventional double diffused integrated circuits. The purpose of the presentation will be to describe some of these accomplishments, and to discuss some of the new logic and circuit design techniques that are made possible by the unique properties of the MOS devices.

Specifically, synchronous delay and temporary MOS gate memory are used to form logic operators that dissipate power only during the clock pulse time. Therefore, low speed (10 Kc) logic systems dissipate only 20 μw per NAND function, as compared to 2 mw at medium speed (1 mc).

The MOS devices used are very small. A half adder function requires the same die area as a bonding pad and a J-K flip-flop—0.008 x 0.008 inches. Consequently, a 40 NAND gate complex function can be accommodated in a die area of 0.065 x 0.065

(Continued on page 20)

MEETING CALENDAR

September 20, Monday, 8:00 P.M.—Nuclear Science

State of the art detectors for nuclear spectroscopy
Guy A. Armantrout, Lawrence Radiation Lab
Place: Hap's Restaurant, Pleasanton
Dinner: 6:30 P.M., Hap's
Reservations: 447-1100, Ext. 8011, by Sept. 17

September 22, Wednesday, 7:00 P.M.—Communications Technology

Strafilcher String Trio—entertainment and social event
The Trio: Dr. E. Engleman, M.D.; Chalmers Smith, Attorney; Craig Vittetoe, Teacher and Writer
Place: Paul Masson Winery, Saratoga (see map on page 13)
Dinner: Barbecue at 7:00 P.M., on the patio of the Paul Masson Winery
Reservations: Robert Howland (408) 291-4039, George Griffith, 591-8461, Ext. 525, by Sept. 21. Price: Approx. $4.50

September 28, Tuesday, 7:30 P.M.—Parts, Materials, and Packaging

Stanford Linear Accelerator Tour
Speaker and Guide: Douglas Wm. Dupen, head of technical and public information department, SLAC
Place: Administration Bldg., SLAC, 3101 Sand Hill Road, Menlo Park

September 28, Tuesday, 8:00 P.M.—Computer Chapter

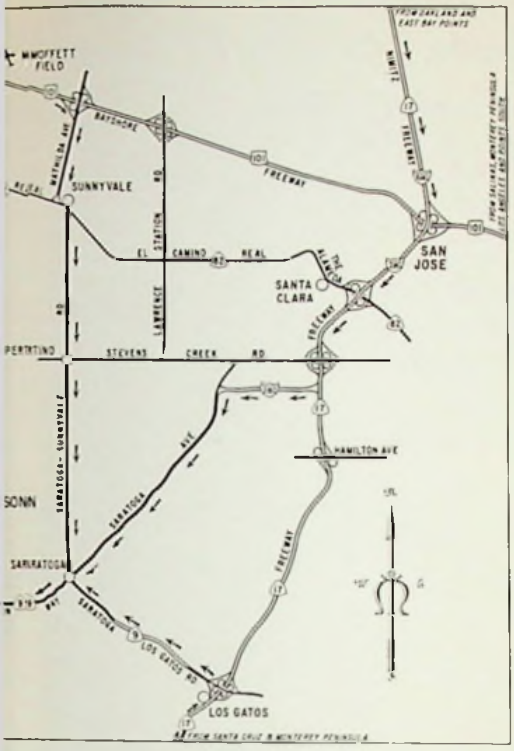
Subsystem level MOS integrated devices
Donald E. Farina, Manager of the Sub-Systems Components Operation, General Micro-electronics, Inc., Santa Clara
Place: GE Computer Lab, 310 Deguigne Dr., Sunnyvale
Dinner: 6:15 P.M., Old Plantation, El Camino and Bernardo, Sunnyvale
Reservations: Dr. Wendell Sander, 321-7250, Ext. 257, by Monday, Sept. 27

October 16, Saturday, 5:00 P.M.—Santa Clara Valley Subsection

Oceanography
James M. Snodgrass, division head special developments, Scripps Institute of Oceanography
Place: Officers' Club, U.S. Naval Postgraduate School
Dinner: 7:00 P.M., (same); cost: $3.75 each
Reservations: Lt. Cmdr. Passantino in Monterey at 624-9371 or Lt. Shortal in Carmel at 372-9133; Art Wells in San Francisco at JU 6-4074 or Don McCauley in Palo Alto, 326-4350, Ext. 4757 or Ext. 5841, at least one week in advance

October 28, Thursday, 8:00 P.M.—Aerospace and Electronic Systems

Mariner IV
(Speaker to be announced)
Place: Lockheed Auditorium, Palo Alto, Bldg. 202
No dinner



meeting ahead

COMTECH

The Communications Technology chapter will start its season with a wine-tasting, barbecue, and chamber music program at the Paul Masson Winery in Saratoga on Wednesday, September 22.

Following dinner, a half-hour program of chamber music will be presented by the Strafilcher String Trio. Chairman F. S. Beale will give a brief prospectus of the technical programs scheduled for the coming year.

meeting ahead

SLAC REVISITED

The Parts, Material, and Packaging chapter (made up of former members of Product Engineering and Production and Component Parts) will tour the Stanford Linear Accelerator, including the klystron gallery and accelerator housing, at 7:30 p.m. on Tuesday, September 28.

The first 700-foot section of the accelerator has been successfully turned on to test the various components and systems involved.

Speaker and guide will be Douglas Wm. Dupen, head of technical and public information dept., SLAC. The group will assemble at the administration building, 3101 Sand Hill Road, directly across from the Sharon Heights Golf Club.

Thirty-three sections make up Region 6, largest in IEEE.

TENTATIVE PROGRAM SCHEDULE

San Francisco Section, 1965-66

SECOND:

Tuesday:
Fresno Subsection
Engineering in Medicine and Biology, EMB (G-18)
Power, P (G-31)

Wednesday:
Instrumentation and Measurement, IM (G-9)
Industry and General Applications, I&GA (G-34)

Thursday:
Broadcasting, B (G-2)
Vehicular Communications, VC (G-6)

THIRD:

Monday:
Nuclear Science, NS (G-5)

Tuesday:
Antennas and Propagation, AP (G-3)
Reliability, R (G-7)
Automatic Control, AC (G-23)

Wednesday:
Santa Clara Valley Subsection
Circuit Theory, CT (G-4)

Thursday:
Audio, A (G-1)
Information Theory, IT (G-12)
Microwave Theory and Techniques, MTT (G-17)

FOURTH:

Monday:
East Bay Subsection

Tuesday:
Engineering Writing and Speech, EWS (G-26)
Engineering Management, EM (G-14)
Computer, Comp (G-16)
Parts, Materials and Packaging, PMP (G-21)

Wednesday:
Communication Technology, Comtech (G-19)
Electron Devices, ED (G-15)
Electromagnetic Compatibility, EMC (G-27)

Thursday:
Aerospace and Electronic Systems, AES (G-10)

Those groups planning only four or five meetings during the year (September through June) should consult other chapters assigned the same night, to stagger their meetings by months. Appropriate joint meetings should also be arranged whenever possible.

Most Section meetings will be joint with subsections or chapters. When not joint, they will be scheduled during the first week of month whenever possible to avoid conflicts. Contact Program Chairman Ed Hulse or Group Coordinator Victor Kaste (see directory) to arrange joint meetings with the Section.

The closing date for meeting material has been moved from the 20th to the 15th of the preceding month in order to advance the publication date, effective with the October issue. Those members not receiving the Grid by the 5th of the month are asked to call the Section/Grid office, 327-6622.

san francisco section

RURAL ELECTRIFICATION CONFERENCE

The 9th annual rural electrification conference of the IEEE was held at the St. Francis Hotel, San Francisco, on May 24-25. The conference was sponsored by the rural electric committee of the IEEE Industry and General Applications Group with the effective cooperation of San Francisco and Sacramento sections. Ten papers were presented covering overhead and underground lines, motors, motor over-current protection, sponsored research, some specific uses of electricity on the farm, and foreign developments in rural electrification. Three presentations were not accompanied by papers.

One of the highlights of the meeting was the awarding of a certificate and a $100 prize to Dr. Naim M. Abou-Taleb, U.N.E.S.C.O. expert in Mexico, for his paper "Problems Facing Developing Countries in Their Planning for Rural Electrification."

section inputs

CHANGE OF ADDRESS

If you plan to change your address, notify headquarters and the section office at least three weeks in advance of the effective date.

WESTERN ELECTRONIC SALES GAIN IN '65 AFTER '64 DROP

The sales curve of the western electronics industry is turning upward again, following a slowdown during 1964.

Most companies in the West are forecasting higher sales this year, to bring total output for 1965 to $3.840 billion, according to the Western Electronic Manufacturers Association (WEMA). Factory sales in the 13 western states dropped last year to $3.735 billion from the $3.875 billion in 1963.

WEMA President William H. Heflin noted that percentage increase of western sales will be parallel to the industry's national growth of 2.5 to 3 percent. The association predicts total U.S. sales for 1965 will rise to $16.4 billion, from last year's volume of $16 billion.

Employment in the West's electronics companies stood at 236,500 at the beginning of the year, Heflin said, 12,000 fewer employees than a year earlier.

Although WEMA did not attempt to forecast employment trends, Heflin said that "many companies are stepping up their hiring activity again to handle increasing production and research."

Sales and employment figures were derived from a survey conducted by WEMA during the first quarter of this year.

The Los Angeles metropolitan area holds the largest concentration of electronics manufacture, with 1964 sales of $2.150 billion and employment of 143,000. The San Francisco bay area accounted for $800 million last year, with employment of 45,000.

Arizona continues to be the fastest-growing complex of electronics, the WEMA survey disclosed. Sales for 1964 in that state totaled $265 million, an increase of 13.2 percent over the previous year. Year-end employment stood at 17,100.

Figures for other areas of the West last year included $175 million in sales and 10,800 employment for San Diego; $165 million in sales and 9,400 employment for the Pacific Northwest; and sales of $180 million and employment of 11,200 in the balance of the West.

TUCSON, HUACHUCA SECTIONS HOST REGION 6 IN 1966 ANNUAL CONFERENCE, APRIL 26-28

Technical papers are solicited for the 1966 IEEE Region 6 annual conference which will take place April 26-28, 1966, in Tucson, Ariz., at the Pioneer International Hotel. The conference will feature an exceptional program of technical papers and invited speakers.

Among the speakers will be: Dr. Richard Bellman, Rand Corporation; Dean W. L. Everitt, University of Illinois; and Dr. W. G. Shepard, University of Minnesota.

Among the session chairmen will be: Dr. N. Abramson, Harvard University; Dr. J. A. Aseltine, Space Technology Laboratories; Dr. A. V. Balakrishnan, University of California at L. A.; Dr. S. Buschbaum, Bell Telephone Laboratories; Mr. Igor Bazovsky, Litton Industries; Professor Leopold Felsen, Polytechnic Institute of Brooklyn; Dr. J. C. Hancock, Purdue University; Dr. N. Hilberry, University of Arizona; Dr. L. E. Killion, Scientific Advisor, USAEPG; Dr. E. W. Kimbark, Bonneville Power Administration; Dr. G. A. Korn, University of Arizona; Dr. G. Leitmann, University of California; Dr. I. A. Lesk, Motorola Semiconductor Products Div.; Professor J. H. Mulligan, New York University; Dr. A. Papoulis, Polytechnic Institute of Brooklyn; Dr. D. O. Pederson, University of California; Dr. M. E. Van Balkenburg, University of Illinois; and Dr. J. R. Wait, National Bureau of Standards.

Topics include: communications systems, medical electronics, automatic control, circuit theory, quantum electronics, integrated circuits, solid state device technology, basic sciences, military electronics, information theory, engineering education, nuclear generation of power, electromagnetics, digital computers, hybrid and analog computers, reliability, system theory, solid state and gaseous plasmas, optimal control, atmospheric electricity, high voltage DC transmission of power, and propagation of pulses, (in man-made or natural wave guides).

Submission of papers should include a cover letter containing the name and address and telephone number of the author and the author's affiliation. Authors are requested to submit three copies of a 300-500-word summary of their paper. Carbons or Xerox copies may be used. They are also requested to submit four copies of a 35-50-word abstract of their paper. Carbons or Xerox copies may be used.

Submission of the summaries and abstracts should be sent on or before December, 1965, to: Dr. L. O. Huelsman, c/o Department of Electrical Engineering, University of Arizona, Tucson, Arizona 85721.

Authors will be notified of the status of their papers as soon as the technical program committee has completed its review. This should not be later than January, 1966. At the time of notification of acceptance, authors will receive any appropriate editorial comments and instructions for preparing the final manuscript.

The papers presented at the IEEE 1966 Region Six annual conference will be published in the convention records. Copies of the convention records will be mailed to participants following the meeting. Abstracts of the papers will be made available at the time of the conference.

Papers will be presented at a three-day meeting composed of four sessions each morning and four sessions each afternoon. All sessions are presently planned to be unclassified and will cover submitted papers as well as specially invited papers.

MANUFACTURER / REPRESENTATIVE INDEX

Abacus Div. Whittaker Corp. ..... Dietrich-Heffner Assoc.
Aerospace Research, Inc. ..... SMA/West
Aertech ..... Jay Stone & Assoc.
Alfred Electronics ..... Moxon Electronics
American Electronic Labs ..... SMA-WEST
Amprobe Instrument Corp. ..... T. Louis Snitzer Co.
Antlab, Inc. ..... Jay Stone & Assoc.
Applied Magnetics Corp. ..... The Thorson Co.
Applied Research, Inc. ..... Jay Stone & Assoc.
ASCAM, Inc. ..... Frauman Associates
Astro Communication Laboratory ..... Costello & Co.
Astrodata, Inc. ..... Moxon Electronics
Autronics Corp. ..... The Thorson Co.

Bausch & Lomb, Inc., Elect. Sect. ..... Perlmuth
Beattie-Coleman, Inc. ..... T. Louis Snitzer Co.
Beckman/Berkeley Division ..... V. T. Rupp Co.
Beckman/Computer Operations ..... V. T. Rupp Co.
Behlman/Invar Electronics ..... T. Louis Snitzer Co.
Benrus Built-Instruments ..... Dietrich-Heffner Assoc.
Blaw-Knox ..... The Thorson Co.
Bryant Computer Products ..... Costello & Co.
Burr-Brown Research Corp. ..... W. K. Geist Co.
Burroughs Corp., Electron. Comp. Div. ..... Tech-Ser, Inc.

Cambridge Scientific Industries, Inc. ..... Dietrich-Heffner Assoc.
Century Electronics & Instruments ..... V. T. Rupp Co.
Ceramaseal, Inc. ..... Wadsworth-Pacific Mfg. Assoc.
Cimron Corporation ..... Moxon Electronics
Clairex Corp. ..... Moxon Electronics
Collectron Corporation ..... Costello & Co.
College Hill Industries (form. Speidel) ..... Perlmuth
Comcor, Inc. ..... Moxon Electronics
Computer Instruments Corp. ..... Components Sales
Computer Measurements Co. ..... Moxon Electronics
Cook Electric-Data-Stor Div. ..... Costello & Co.
Corning Electronic Devices ..... Costello & Co.
Curry, McLaughlin & Len Inc. ..... Kipp Assoc.
Custom Materials, Inc. ..... Jay Stone & Assoc.
Cybetronics, Inc. ..... Data Associates

Dahl Electronics Associates ..... Data Associates
Data Equipment Co. ..... Moxon Electronics
Datamark, Inc. ..... Costello & Co.
Datamec Corporation ..... Moxon Electronics
Dielectric Products Eng. Co. ..... Jay Stone & Assoc.
Digital Devices, Inc. ..... Costello & Co.
Digitronics Corp. ..... Components Sales Calif.
Dynaplex Corp. ..... Components Sales

Electronic Engineering Co. ..... Data Associates
Electronic Products, Inc. ..... Jay Stone & Assoc.
Electronic Research Associates, Inc. ..... Tech-Ser, Inc.
Electro Switch Corp. ..... Willard Nott & Co.
Elgenco, Inc. ..... V. T. Rupp Co.
Emcor, Ingersoll Products Div. ..... T. Louis Snitzer Co.
Eppley Laboratory, Inc. ..... W. K. Geist Co.

Fabri-Tek, Inc. ..... Costello & Co.
Fairchild Scientific Products ..... Moxon Electronics
Fifth Dimension, Inc. ..... Perlmuth Electronics

Glow-Lite Corp. ..... Wadsworth-Pacific Mfg. Assoc.

Hallmark Standards, Inc. ..... T. Louis Snitzer Co.
Holex, Inc. ..... The Thorson Co.
Holt Instruments Laboratories ..... W. K. Geist Co.
Honeywell-Denver Div., Lab Standards ..... Geist
Honeywell, Mpls., Enclosures ..... W. K. Geist Co.
Houston Omnigraphic Corp. ..... V. T. Rupp Co.
Hyletronics Corp. ..... The Thorson Co.

Keithley Instruments ..... T. Louis Snitzer Co.
Kepco, Inc. ..... V. T. Rupp Co.
Kinetics Corporation ..... The Thorson Co.

Lambda Electronics Corp. ..... Jay Stone
Landis & Gyr, Inc. ..... Recht Assoc.
Lind Instruments, Inc. ..... The Thorson Co.
Lockheed Electronics Co. ..... Data Associates

Magnetic Shield Division, Perfection Mica ..... Frauman Associates
Marconi Instruments ..... Moxon Electronics
Maury Microwave Corp. ..... Kipp Assoc.
McLean Engineering Labs ..... T. Louis Snitzer Co.
Measurements ..... O'Halloran Assoc.
Melcor Electronics Corp. ..... Components Sales Calif.
Metex Electronics, Inc. ..... Frauman Associates
Metron Instrument Co. ..... Components Sales Calif.
Micro Instrument Co. ..... Jay Stone & Assoc.
Microsonics, Inc. ..... SMA/WEST
Microwave Associates ..... Elliott Recht Assoc.
Microwave Electronics Corp. ..... Jay Stone & Assoc.
Microwave Physics Corp. ..... Kipp Assoc.
Millitest Corp. ..... Components Sales Calif.
Motorola, Inc., Communications Div. ..... Frauman Associates

N-H Microwave ..... SMA/WEST

Pac. Communications & Electronics ..... Artwel Elec.
George A. Philbrick Researches, Inc. ..... Tech-Ser, Inc.
Philco Corp., SSPO ..... Jay Stone & Assoc.
Polarad Electronic Instruments ..... T. Louis Snitzer
Potter and Brumfield ..... Elliott Recht Assoc.
Precision Mechanisms Corp. ..... Components Sales
Probescope ..... SMA/WEST

Qualitron Corp. ..... Wadsworth-Pacific Mfg. Assoc.
Quan-Tech Labs ..... Jay Stone & Assoc.

Raytheon-Rayspan ..... Perlmuth Electronics
Remanco Inc. ..... Jay Stone & Assoc.
Rixon Electronics, Inc. ..... Costello & Co.
Rohde & Schwarz Sales Co. ..... W. K. Geist Co.
Rowan Controller Co: ..... Artwel Electric
Royal McBee Corp., Ind. Prod. Div. ..... Costello
Rutherford Electronics ..... Moxon Electronics

Saegertown-Western ..... Wadsworth-Pacific Assoc.
Sage Laboratories ..... The Thorson Co.
Sandefur Engineering Co., Inc. ..... Tech-Ser, Inc.
Sangamo Electric, Elect. Sys. Div. ..... Perlmuth
Scott, Inc., H. H. ..... W. K. Geist Co.
Sierra Electronic Div., Philco ..... T. Louis Snitzer Co.
Singer/Metrics/Gertsch ..... Dynamic Associates
Sonex Corp. ..... Perlmuth
Stewart Engineering Co. ..... Perlmuth Electronics
Straza Industries ..... Costello & Co.
Systems Research Corp. ..... Moxon Electronics

Tally Corp. ..... Moxon Electronics
Technipower, Inc. ..... Dietrich-Heffner Assoc.
Telonic Industries & Eng. ..... T. Louis Snitzer Co.
Tempress Research Co. ..... Tech-Ser, Inc.
Tenney Engineering, Inc. ..... The Thorson Co.
Test Equipment Corp. ..... V. T. Rupp Co.
Texas Instruments, Ind. Prod. ..... V. T. Rupp Co.
Trygon Electronics, Inc. ..... Moxon Electronics
Trymetrics Corp. ..... T. Louis Snitzer Co.

United Telecontrol Elec., Inc. ..... Frauman Associates
Universal Voltronics Corp. ..... Dietrich-Heffner Assoc.
Uptime Corporation ..... Costello & Co.
Utah Research & Development Co. ..... The Thorson Co.

Wang Laboratories ..... Frauman Associates
Warren Components ..... Wadsworth-Pacific Mfg. Assoc.
Weinschel Engineering, Inc. ..... Jay Stone & Assoc.
Weldmatic Div.—Unitek Corp. ..... Tech-Ser, Inc.
Western Microwave Labs ..... Kipp Assoc.
Wiltron Co. ..... O'Halloran Assoc.
Wyle Laboratories ..... V. T. Rupp Co.

Zissen Technical Associates ..... Tech-Ser, Inc.

REPRESENTATIVE DIRECTORY

Artwel Electric, Inc.
1485 Bayshore Blvd.,
San Francisco; 586-4074

Components Sales California, Inc.
Palo Alto; 326-5317

Costello & Company
535 Middlefield Road,
Palo Alto; DA 1-3745

Data Associates
1160 Terra Bella Avenue,
Mountain View; 961-8760

Dietrich-Heffner Associates
2555 Park Blvd.,
Palo Alto; 321-4321

Dynamic Associates
1011-D Industrial Way,
Burlingame; 344-2521

Frauman Associates
1285 Terra Bella
Mountain View; 961-2070

Geist Co., W. K.
Box 746, Cupertino;
968-1608, 253-5433

Kipp Associates
90 Stadler Drive
Woodside: 851-0123

Moxon Electronics
15 - 41st Avenue.
San Mateo; 345-7961

O'Halloran Associates
3921 E. Bayshore,
Palo Alto; 326-1493

Perlmuth Electronics
1285 Terra Bella Ave..
Mt. View; 961-2070

Recht Associates, Elliott
175 S. San Antonio Road.
Los Altos; 941-0336

Rupp Co., V. T.
1182 Los Altos Avenue,
Los Altos; 948-1483

SMA/WEST
(Scientific Marketing Assoc.)
1094 West Evelyn Ave.,
Sunnyvale; 245-2500

Snitzer Co., T. Louis
1020 Corporation Way.
Palo Alto; 968-8304

Stone & Assoc., Jay
140 Main Street.
Los Altos; 948-4563

Tech-Ser, Inc.
800 San Antonio Rd..
Palo Alto; 326-9800

The Thorson Company
2443 Ash Street,
Palo Alto; 321-2414

Walter Associates
Box 790. Menlo Park;
323-4606

Wadsworth-Pacific Mfg. Assoc., Inc.
71 Parker Avenue, Atherton;
321-3619

Willard Nott & Co.
1485 Bayshore Blvd.
San Francisco; 587-2091

educational notes

UC BIOMEDICAL GRANT

A grant totalling nearly $500,000 to support graduate and postdoctoral training in biomedical engineering has been awarded to the College of Engineering at the University of California at Berkeley, George J. Maslach, dean of the college, has announced.

The grant, by the National Institutes of Health, is the first such NIH award to an engineering college in California.

Extending over a five-year period, the grant will ultimately provide stipends for 15 doctoral candidates and four postdoctoral researchers in biomedical engineering.

Dr. Irving Fatt, professor of petroleum engineering and assistant dean of the college, will be responsible for administering the grant program.

"Bioengineering," said Dean Fatt, "is a relatively new field, in which we seek to apply the principles of engineering analysis and design to solve critical problems in the medical and life sciences. A substantial research program is already underway at Berkeley.

"The training grant meets a special need for student support, because the requirements for the Ph.D. in biomedical engineering are more arduous and take longer to meet than in most other engineering fields."

Besides Dean Fatt, eleven faculty members of the College of Engineering will participate in the training program. Their specialties include electrical, industrial, and mechanical engineering and mineral technology.

Faculty specialists in a number of life science fields will also join in the interdisciplinary effort. Included are molecular biology optometry, medical physics, physiology, and zoology.

In addition to the stipends of some $3,800 a year for each doctoral candidate, and up to $7,800 a year for postdoctoral researchers, the grant provides for tuition, laboratory supplies, and costs of publication of findings.

Recipients of the NIH stipends will be selected from outstanding applicants on a nationwide basis.

los angeles district

AES WINTER CONVENTION

A. S. Jerrems, technical director, aerospace group, Hughes Aircraft Company, has been elected chairman of the 1966 Winter Convention on Aerospace and Electronic Systems, to be held at the International Hotel, Los Angeles, on February 2, 3, and 4, 1966.

(Continued on page 19)

16 FELLOWS NAMED

Sixteen members of sections in Region Six were honored late in 1964 when they were elevated to the grade of Fellow. The San Francisco Section, largest in the region, led with nine Fellows, one of whom, George Matthaei, has since moved to Santa Barbara.

The Fellows, by section, and their citations follow:

Hawaii: Carl H. Williams; development of low-cost power distribution systems.

Orange County: Nicholas A. Begovich; controlled phased array radars.

Portland: Everett J. Harrington, power circuit breakers and the application of high voltage capacitors.

San Francisco: William Culshaw; microwave optics, interferometers and gas lasers. Charles P. Ginsburg; video recording techniques and equipment. Willis W. Harman; engineering education in the fields of electron dynamics, linear systems and communication theory. G. Leslie Hill; power circuit protection and the testing of electrical insulation. Ernest S. Kuh; active and passive circuit theory and engineering education. George L. Matthaei; theory and design of microwave networks and parametric amplifiers. Alexander M. Poniatoff; outstanding leadership in the magnetic recording industry. Donald H. Preist; extending the limits on power and frequency in communication and radar. Calvin F. Quate; theory and design of low noise amplifiers.

San Gabriel Valley: Roy W. Gould; theory of microwave tubes.

Santa Monica Bay: George R. Brewer; electron dynamics and ion propulsion. Harry G. Romig; quality control. George F. Smith; areas of electron emission, storage tubes and lasers.

MORE AES

The annual event, formerly the Winter Convention on Military Electronics, has taken on a new name for next year to reflect the broadened scope of the meeting. It is co-sponsored by the Los Angeles District and the group on Aerospace and Electronic Systems (AES).

1966 will mark the seventh year that the winter convention has been held in Los Angeles. The AES sponsoring group represents the merger of four former IEEE groups—Military Electronics, Aerospace, Space Electronics and Telemetry, and Aerospace and Navigational Electronics.

MORE COMPUTER

inches including 14 bonding pads. Because of the greatly reduced number of process steps, this function should be cheaper than a double diffused epitaxial flip-flop requiring the same die area.

Farina will consider new computer systems organizations that have become economical for the first time. In particular, the use of digital differential analyzers with distributed memory for airborne computer applications in lieu of a GP computer will be discussed. Cost reductions of 10 to 30 times can be realized through the use of DDA techniques in a typical navigation computer application. In addition, this computer can be 10 to 100 times faster than that obtainable with conventional integrated circuits. Because of the extremely small size of MOS shift registers, the memory can be distributed within each integrator, obviating the need for magnetic drums or delay lines.

Following the presentation, Professor James Angell of Stanford University will summarize and comment on the salient points, and will then encourage the audience to provide observations and questions.

Farina received his BS degree in electrical engineering from New York University in 1953 and did graduate work in physics and mathematics at Adelphi College. He was group leader of digital circuit development in the computer systems department at Sperry Gyroscope Corporation. Previous to his present position, he was supervisor of the digital device development group at Fairchild Research & Development Laboratory.

Advertisers Index

Classified Advertising

CLASSIFIED ADVERTISING RATES

Members: $15 for 1st col.-inch, $10 for 2nd, $5 for each additional. Non-members: $20 for 1st col.-inch, $15 for 2nd, $10 for each additional. 10% frequency discount for 10 consecutive ads. None to exceed total of 4 col.-inches. Special type or logos not carried. Non-commissionable. Deadline 15th of month.

Write or call: Ernesto A. Montano, IEEE Grid, Suite 2210, 701 Welch Rd., Palo Alto, Telephone (415) 327-6622.

Positions Wanted

Scientific Apparatus Glassblower

15 yrs. exp. custom, mod., fab., glass-to-metal, to-ceramic, graded step seals, purchasing, equip. maint., administration, supervision. Particularly interested new, unique R&D problems. Trained School of Ceramics, Alfred, N.Y.

Box GB, The IEEE Grid

Office for Lease

Whelan Bldg., Stanford Professional Center. 701 Welch Rd., Palo Alto, (opposite Old Barn), including air-conditioning, 5-day janitorial service, electricity, putting green, lunch room, and off-street parking. Ideal for one man and secretary. Call Jack Whelan, 323-0724, or Section Office, 327-6622.

For Sale

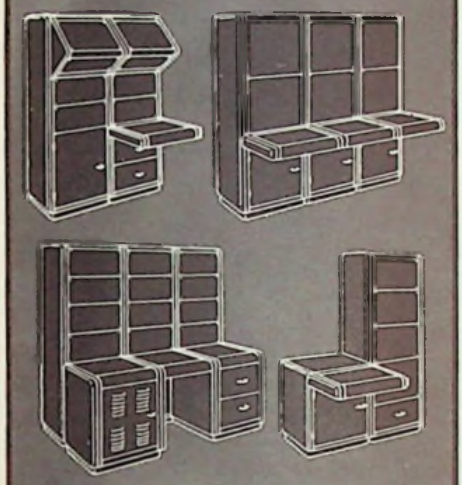
ULTRASONIC CLEANERS
White Room Equipment
(Write for complete catalog)
SARA Scientific Sales Co.
P.O. Box 321, San Francisco 94101
(415) MA 6-5440, GA 1-3172

telecommunications

GEN. BLAKE JOINS SRI

Lt. Gen. Gordon A. Blake, USAF. retiring director of the National Security Agency, Fort Meade, Md., joined Stanford Research Institute, Menlo Park, in June as head of a new research project on international telecommunications.

BUILD



...CUSTOM ELECTRONIC ENCLOSURES FROM STANDARD LOW COST PARTS

With Stantron's modular approach, build-up your own custom electronic enclosure package from standard low-cost component parts in Stantron's new 70-page catalog. Starting with the basic frame module, available in ball corner or new "square corner" models, you create the over-all design from a wide variety of doors, slides, panels and all other necessary components.

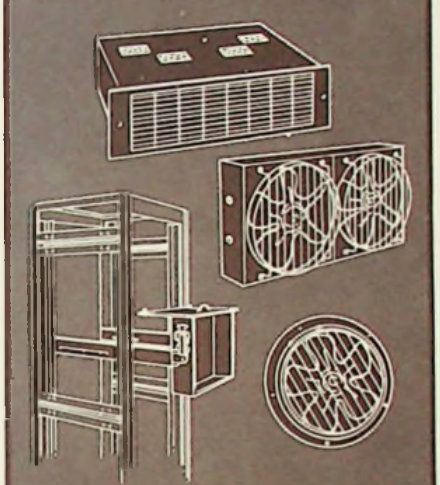
Easy to wire and install, Stantron enclosures feature 4-sided corner posts with weight/load capacities to 3,035 lbs. . . . heavy-duty panel mounting angles with tapped mounting holes that adapt for direct mounting of accessories . . . and handsome styling.

For custom enclosures without custom fabrication costs, write to Stantron. Our new catalog will be sent to you.

STANTRON MODULAR ELECTRONIC HOUSING SYSTEM

DIVISION OF WYCO METAL PRODUCTS
6914 BECK AVE., NORTH HOLLYWOOD, CALIF.

BUILD



...ENCLOSURES WITH FANS, BLOWERS, SLIDES AVAILABLE AT ONE SOURCE

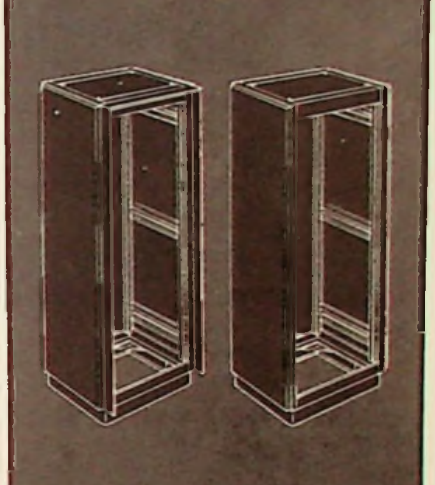
No worry about making the pieces fit with Stantron's modular electronic housing systems. And, save money and time with everything supplied by Stantron including many models of high-performance centrifugal blowers and propeller type exhaust and intake fans, and new types of solid bearing slides.

From frames, doors and sides, to chassis/equipment slides, panels, drawers, pontoon bases, fans, blowers, even touch-up paints . . . select only what you need to build custom enclosure packages from standard low-cost parts. Many Stantron accessories are distinctively designed, and all are built for rugged, long-life use. Write today for full details.

STANTRON MODULAR ELECTRONIC HOUSING SYSTEM

DIVISION OF WYCO METAL PRODUCTS
6914 BECK AVE., NORTH HOLLYWOOD, CALIF.

BUILD



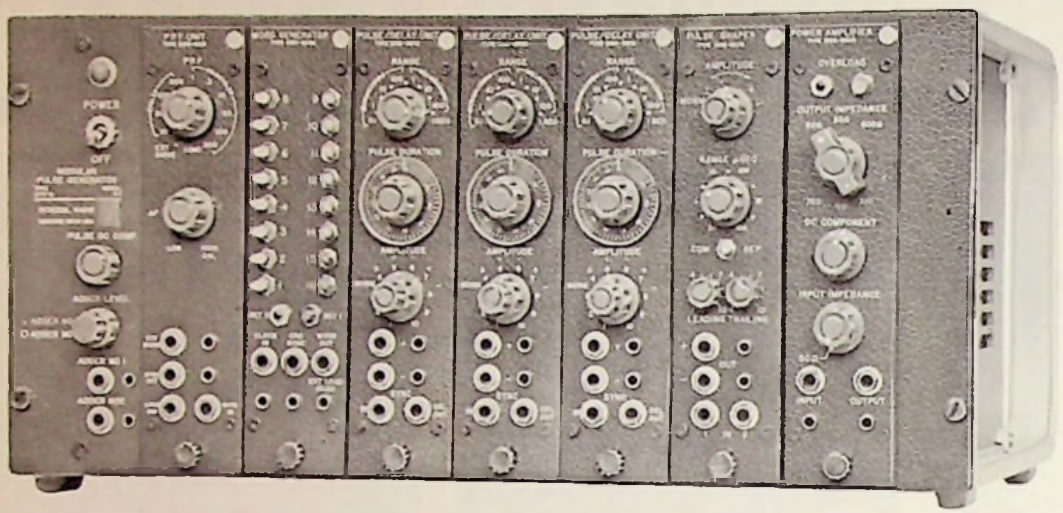
...ENCLOSURES WITH STANTRON'S NEW SQUARE CORNER FRAMES

Stantron now provides "square corner" design frames with optional shadow box fronts for its modular electronic housing systems. These rugged, versatile basic and wedge-shaped frames, available in 19" and 24" widths, and 18⅝", 22⅛", 25⅝" and 30⅞" deep, are used with "square corner" work/writing desk frames and side panels. All other standard Stantron accessories may be used with the new type frame design.

Users can develop square cornered or ball cornered custom packages from low-cost component parts. Write for information on the new "square corner" design and Stantron's modular enclosure concept.

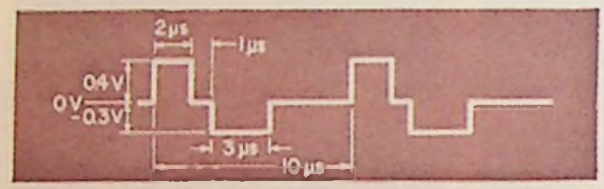
STANTRON MODULAR ELECTRONIC HOUSING SYSTEM

DIVISION OF WYCO METAL PRODUCTS
6914 BECK AVE., NORTH HOLLYWOOD, CALIF.

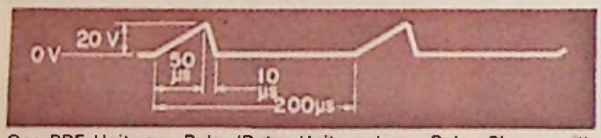


Type 1395-A Modular Pulse Generator containing three Pulse/Delay Units and one each of the PRF Unit, Word Generator, Pulse Shaper, and Power Amplifier modules.

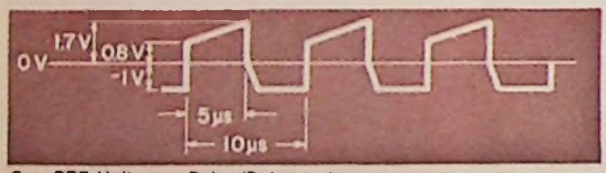
PULSES MADE TO ORDER



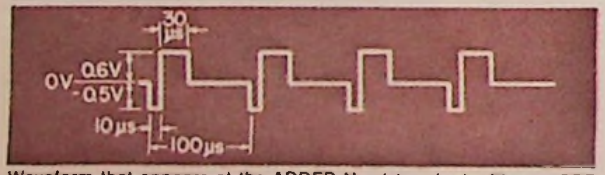
One PRF Unit and three Pulse/Delay Units operating at 100 kc/s. The positive and negative pulses are controlled by separate Pulse/Delay Units; the third unit controls the delay between the pulses.



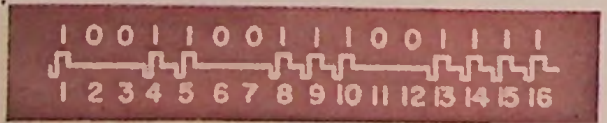
One PRF Unit, one Pulse/Delay Unit, and one Pulse Shaper with the PRF Unit set for 5 kc/s. Rise and fall times are independently variable



One PRF Unit, one Pulse/Delay Unit, and one Pulse Shaper. Prf is 100 kc/s, and the zero-volt level is adjusted by the main chassis PULSE DC COMPONENT control.



Waveform that appears at the ADDER No. 1 terminal with one PRF Unit driving two Pulse/Delay Units at 10 kc/s. Amplitudes and durations of positive and negative pulses can be independently adjusted.



Pattern produced when a word generator is connected between the PRF Unit and the first Pulse/Delay Unit of the example given above, with switches set as shown.

This new pulse generator can produce thousands of different pulse shapes as single pulses, in bursts, or as trains of pulses. You can even form the desired pulses into binary patterns or words up to 112 bits long. The pulses can be amplified internally, delayed in time, or have noise or sine waves added to them. Amplitudes, durations, and delays of all segments of complex pulses are independently controllable; positive and negative outputs are available simultaneously. Whatever you may need — rectangular pulses, doublets, pulses with pedestals, ascending staircases, descending staircases, triangles, trapezoids, etc. — this instrument can do the job for you.

This instrument has been designed in modular form so that you can order only the pulse-generating capability you require. The various circuits that generate and shape the pulses are packaged in five separate modules, and as many as seven of these can be inserted in the main frame of the generator.

The main frame contains a power supply and other circuits that are common to all modules. As each module is inserted, electrical connections are made through mating of a plug and jack. Two ADDER busses with their corresponding output controls and jacks are included on the main frame to provide signals that represent the "sum" of outputs from the individual modules.

Modules from which you can now custom build your own pulse generator include:

PRF UNIT — provides internally generated repetition rates from 2.5 c/s to 1.2 Mc/s, from dc to 2 Mc/s when driven externally. Price: $150

PULSE/DELAY UNIT — delays input pulses from 100 ns to 1 second and adjusts amplitude, polarity, and duration. Price: $165

PULSE SHAPER — adjusts rise and fall times from 100 ns to 10 ms, either individually or simultaneously. Limit of 3 per frame. Price: $375

POWER AMPLIFIER — delivers 20-volt pulses of either polarity into a 50-ohm load. Limit of one per frame. Price: $250

WORD GENERATOR — produces binary words up to 16 bits long; as many as seven modules can be cascaded to provide 112-bit capability. Price: $400

MAIN FRAME (without modules) — Price: $500

50 ANNIVERSARY

GENERAL RADIO COMPANY

WEST CONCORD, MASSACHUSETTS

Sales Engineering Office in SAN FRANCISCO: 1186 Los Altos Avenue, Los Altos, Calif. 94022
James G. Hussey • Allan L. Abbott • David M. Lloyd