

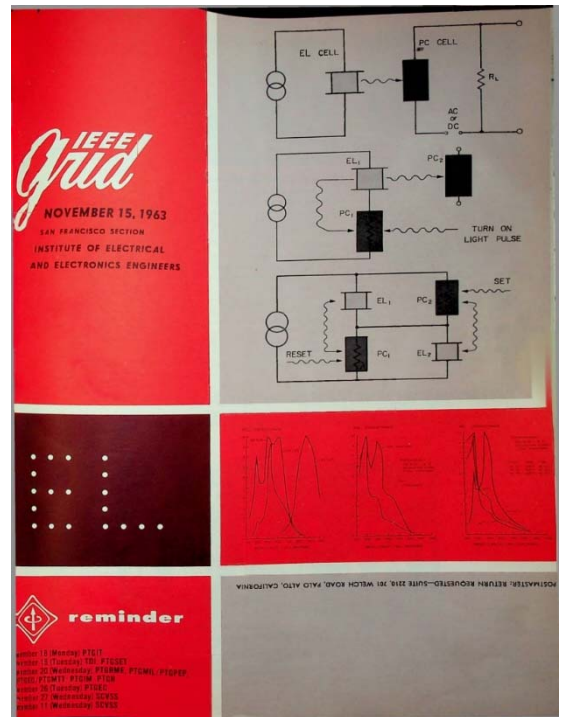
EDITOR'S PROFILE of this issue

from a historical perspective ...

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

November, 1963 (mid-month):

Cover: Shown are circuit elements and characteristics of devices for optoelectronics. More on page 3.



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

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

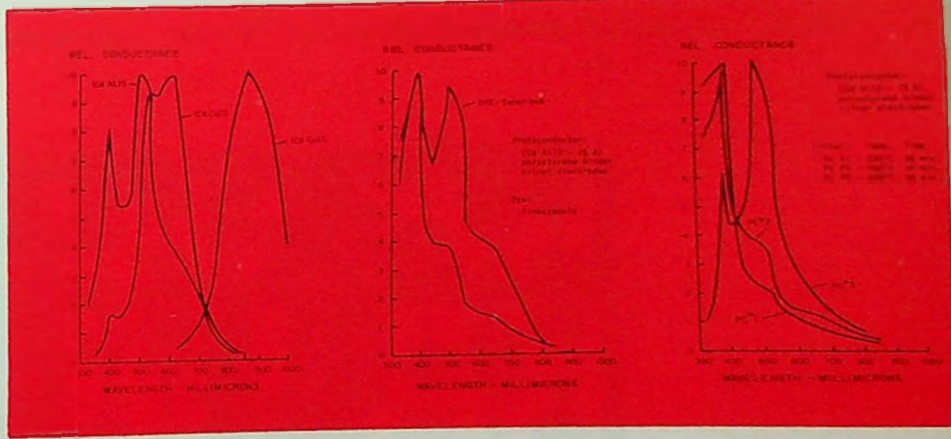
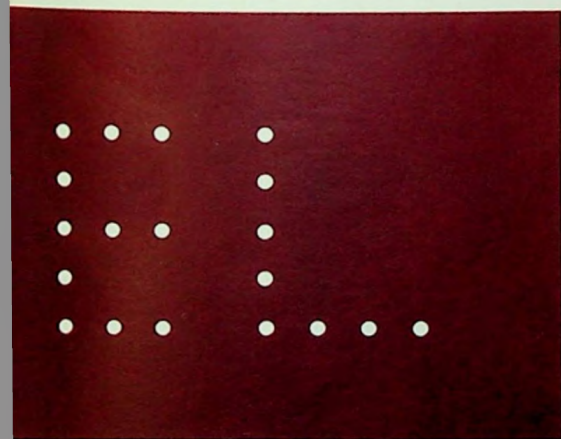
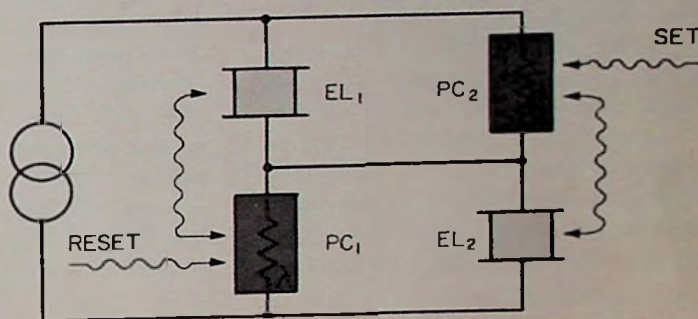
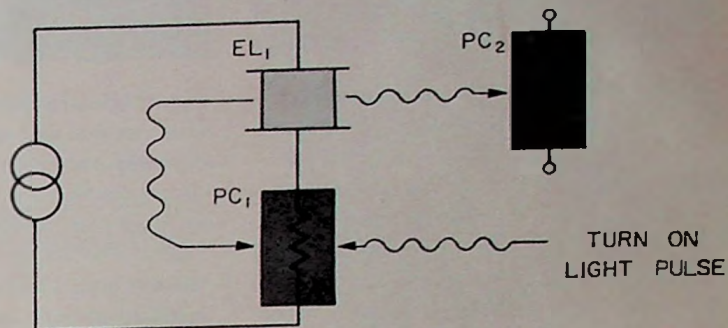
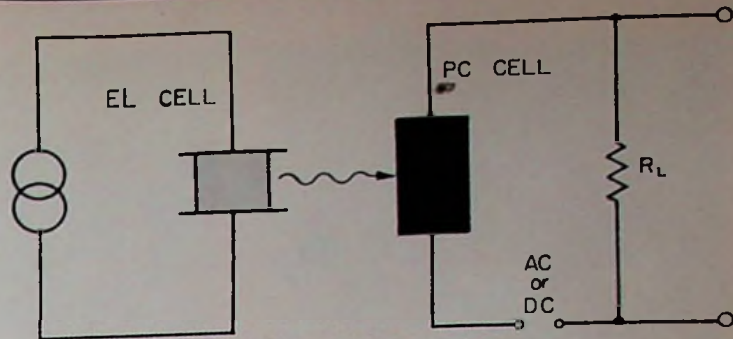
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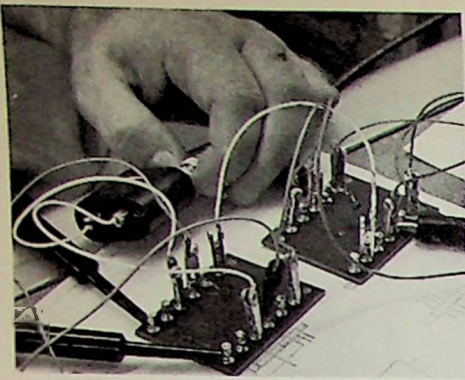


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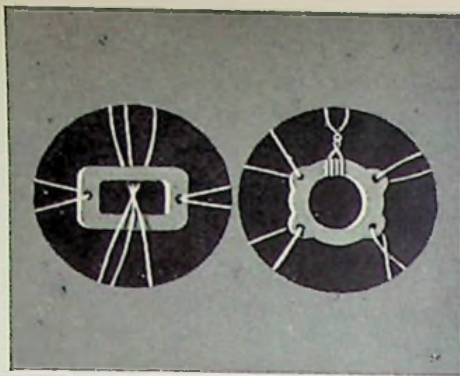
reminder

- member 18 (Monday) PTGIT
- member 19 (Tuesday) TDI, PTGSET
- member 20 (Wednesday) PTGBME, PTGMIL/PTGPEP, PTGED/PTGMTT, PTGIM, PTGR
- member 26 (Tuesday) PTGEC
- member 27 (Wednesday) SCVSS
- member 11 (Wednesday) SCVSS



Despite the tremendous speed and ravenous appetite of today's most advanced computers, scientists at Lockheed Missiles & Space Company's Computer Research Laboratories feel that there is room for a great deal of improvement. They have dedicated themselves to the discovery and development of ways to increase the speed and reliability of computers while simplifying their operation.

Though today's computer circuits are capable of operating at speeds measured in tens of nanoseconds, the useful computation rate is far slower. One of the roadblocks hindering speed is the need for the computer to wait for the carryovers from one column of figures to catch up with the main calculation. A possible an-



swer to this problem is modular arithmetic, which avoids carryover. Based on the ancient Chinese Remainder Theorem, this concept is being re-examined at Lockheed for potential computer applications.

Lockheed's Computer Research Laboratories are studying a very broad group of related computer research areas, and the company can boast that an unusual number of its specialists are at the very forefront of their specific fields.

Among the major areas of research being undertaken at this time are basic physical phenomena, such as phonons; quantum mechanics; switching theory; residue arithmetic (number system research); threshold logic and pattern recognition and logic design techniques.

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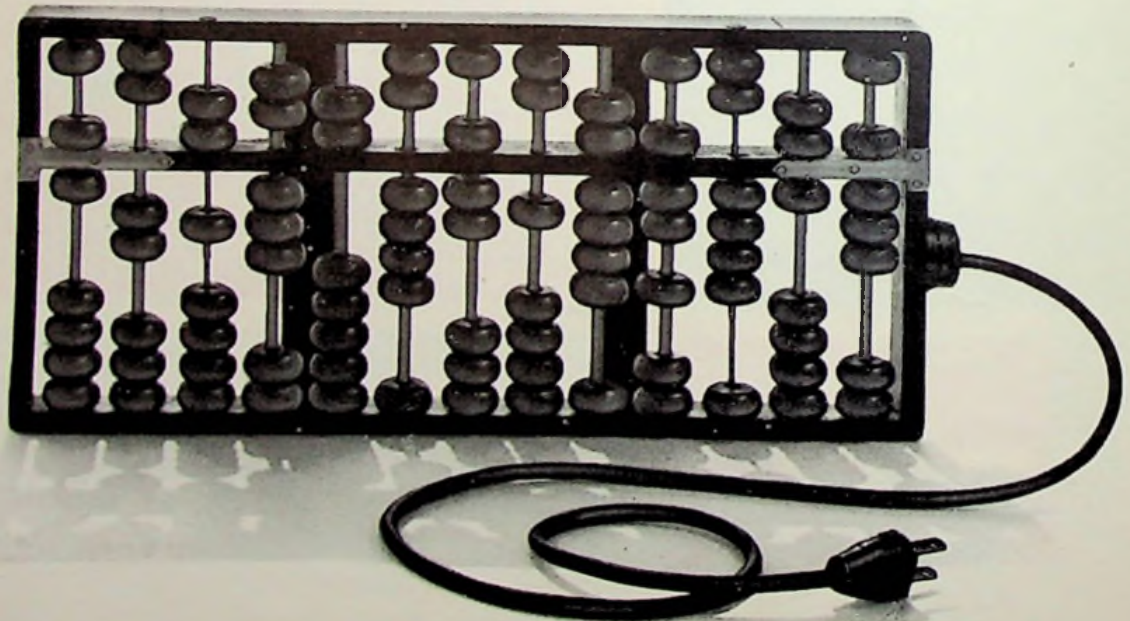
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cover

Cover design is made up of elements
of the technology of optoelectronics, a
new field for military and space com-
ponents which is the subject of the
November 20 joint meeting of the PTC

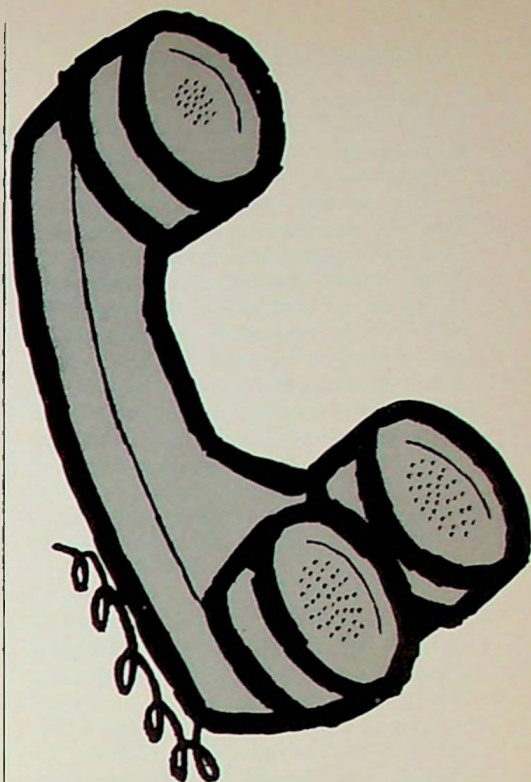
chapters on Military Electronics and
Product Engineering and Production.
For more on the field and meeting, see
the Meeting Calendar and article on
page 3.

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COMMUNICATION DIV./PTGCS

For the past several years the AIEE Communications Division and the IRE Professional Group on Communications Systems have held parallel and closely related interests. During the 1962-63 program year, considerable discussion took place between the officers of the division and the professional group concerning the desirability of actively merging the two activities. When it became apparent that the two national organizations would effect their merger, the local officers of the division and the professional group reached the decision that considerable mutual benefit would result from joint program and meeting effort. As a result, most of the meetings during the past year were combined.

During the course of the year, further discussion with members and section and division officers indicated that a formal merger of the two communications activities was a logical next step. Since there was some question as to the exact mechanism by which this should be effected, the group and division officers, with the assistance of the section executive secretary, combined their efforts as a committee to do the footwork needed to merge. This brings us to the present.

Within the next few weeks, all known past members of the AIEE Communications Division will be informed by direct mail (if their mailing address is available) and by Grid of the desirability of their formally becoming PTGCS members. In addition, formal notice of an election meeting will be given all of the advance publicity reasonably possible via our normal channels of communication in an all-out effort to be sure that everyone concerned is informed. This election will then choose officers and formally bring into existence a single, communications - oriented Professional Technical Group on Communications Systems. The support of all members and interested persons is earnestly sought to bring about the best and most useful combination of these two activities.

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MEETING CALENDAR

SANTA CLARA VALLEY SUBSECTION

8:00 P.M. • Wednesday, November 27

Medical Electronics

Dr. Noel Thompson, Palo Alto Medical Research Foundation, Palo Alto Medical Clinic

Place: Lockheed Auditorium, 3251 Hanover St., Palo Alto
No dinner

SANTA CLARA VALLEY SUBSECTION

8:00 P.M. • Wednesday, December 11

Sun Seeker (Two Axis Solar Servo System)

John W. Cecil, flight control electronics, Lockheed MSC

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

TECHNICAL DIVISIONS

Industrial

7:30 P.M. • Tuesday, November 19

Precision Measurements Utilizing Servo-Manometer Techniques

Eugene Glassey, president, Exactel Instrument Co., Mountain View

Place: Pacific Gas & Electric Co., 245 Market St., San Francisco, Room 232

PROFESSIONAL TECHNICAL GROUP CHAPTERS

Bio-Medical Electronics

8:00 P.M. • Wednesday, November 20

Automatic Recognition of E.C.G. Abnormalities: Advances and Problems

Dr. J. von der Groeben, Dept. of Medicine, Stanford University

Place: Room M-112 Medical School Bldg., Palo Alto-Stanford University Medical Center

Dinner: 6:00 P.M., Red Cottage Restaurant, 1706 El Camino Real, Menlo Park
Reservations: Con Rader, 326-1970, Ext. 328, by November 19

Electron Devices

8:00 P.M. • Wednesday, November 20

High Frequency Limitations of Transistors

Helmut Wolf, Fairchild Semiconductor

Place: Physics 101, Stanford University

Dinner: 6:15 P.M., Rick's Swiss Chalet, 4085 El Camino Way, Palo Alto (No reservation required)

Electronic Computers

8:00 P.M. • Tuesday, November 26

Automatic Data Acquisition and Inquiry System

Donald Hamilton, ADA computer operations supervisor,

Lockheed Missiles and Space Company, Sunnyvale

Eldon Wesley, western regional product assurance administration,

Radio Corporation of America, Los Angeles

Place: General Electric Computer Laboratory, 310 De Guigne Drive, Sunnyvale

Dinner: 6:30 P.M., Old Plantation, El Camino and Bernardo, Sunnyvale (No reservation required)

Information Theory

8:00 P.M. • Monday, November 18

Spectral Properties of a Binary Random Progress

James A. McFadden, visiting professor, Elec. Eng., Stanford University

Place: Stanford Research Institute, Bldg. 1, 333 Ravenswood Ave., Menlo Park

Dinner: 6:00 P.M., Meland's Steak House, 630 Donohoe, East Palo Alto

Reservations: Mrs. Kelly, 326-6200, Ext. 2945, by November 15

Instrumentation and Measurement

8:15 P.M. • Wednesday, November 20

Automatic Transistor Testing

Charles Askanas, manager, instrument division, Fairchild

Place: Hewlett-Packard, 1501 Page Mill Road, Palo Alto

Dinner: 6:00 P.M., L'Omelette, 4170 El Camino Real, Palo Alto

Reservations: 958-8233

Military Electronics

8:00 P.M. • Wednesday, November 20

(Joint meeting with PTCPEP, see below)

Product Engineering and Production

8:00 P.M. • Wednesday, November 20

Opto Electronics: A New Technology for Military & Space Components

W. Brooks, Opto Electronics Devices, Inc.

Place: Lockheed Auditorium, 3251 Hanover St., Palo Alto

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

Reservations: Victor Conrad, 326-4000, Ext. 2212

Reliability

8:00 P.M. • Wednesday, November 20

Field Trip to International Business Machines, San Jose

Tour directed by R. A. Shaw, IBM Manager, Quality Control

Place: IBM, Monterey and Cottle Roads, San Jose

Space Electronics and Telemetry

8:15 P.M. • Tuesday, November 19

PCM Decommutation

Charles Jamgotchian, Telemetrics, Los Angeles

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

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

Reservations: Robert H. Light, 968-6211, Ext. 2024, by noon, November 19

national news

IEEE INSURANCE PROGRAM

Complete information kits on the IEEE insurance program, including the group life insurance plan for members and their eligible dependents (underwritten by New York Life Insurance Co.) and accidental death and dismemberment coverage for members and their spouses (underwritten by American Casualty Co.), may be obtained by writing to: Administrator, IEEE Insurance Program, 1120 Connecticut Ave., N.W.—Suite 920, Washington, D.C.

IEEE SPECTRUM

Beginning January 1, 1964, all members of the IEEE except students will receive, as part of their membership, a new publication, the *IEEE Spectrum*, devoted to news of the institute and technical articles of general interest.

Electrical Engineering will be discontinued with the December, 1963, issue. *Proceedings of the IEEE* will continue to be published on a subscription basis only for \$6.00 per year for members and will become more technical and specialized. Student members will continue to receive the *IEEE Student Quarterly*.

national news

WINTER POWER MEETING

The IEEE Winter Power Meeting will be held February 2-7 at the Statler-Hilton Hotel, New York City. The event takes over the 1964 date of the former AIEEE Winter General Meeting and offers a week-long technical program on power apparatus and systems.

It sets the stage for the IEEE International Convention of March, 1964, provides a regular annual forum on power systems subjects, and brings new unity to technical activities of the Power division.

Additional information may be obtained from Edward C. Day, assistant staff secretary, IEEE, Box A, Lenox Hill Station, New York 21, N.Y.

Power-oriented section members are reminded that a completed subscription order form for *Power Apparatus and Systems* automatically makes them members of the San Francisco chapter of the Professional Technical Group on Power now being formed. If they have not yet completed the order form recently mailed, they are urged to do so and mail it with a check for \$6.00 to the section office. Additional forms and explanatory news letters are available from the office.

meeting ahead

OPTOELECTRONICS

Optoelectronics is a technology which combines optical elements, light emitters, and photosensitive materials to yield solid-state devices with application in information systems for both signal processing and data display. The recent improvements in electroluminescent (EL) and photoconductive (PC) materials as well as new fabrication techniques have made practical the application of optoelectronic devices for military and space systems. Display devices are, perhaps, the best-known part of the optoelectronics technology.

W. Brooks, product specialist at Opto-Electronic Devices, Inc., will review the status of this technology, discuss its future potential, and demonstrate several O/E devices at the joint meeting of PTGMIL and PTCPEP on November 20 in the Lockheed auditorium.

meeting ahead

AUTOMATIC TESTING

On November 20, George Askanas will discuss the problems of automatically testing modern semiconductor devices—particularly transistors—before the PTG on Instrument and Measurement chapter.

Mr. Askanas is manager of the instrumentation division of Fairchild Semiconductor Company, and can therefore speak with authority concerning the problems of testing huge quantities of semiconductor devices.

In particular, the various criteria evaluating the parameters of the device, together with commonly used techniques for measuring them, will be discussed. The principles of the digital technique peculiar to Fairchild's methods will be shown, as well as the special problems which can make seemingly simple measurements subject to large errors.

meeting ahead

SPECTRAL PROPERTIES

The complete determination of the spectral density of a binary random process requiring a detailed knowledge of the probability laws of the axis crossings will be discussed by Prof. James A. McFadden at the November meeting of the PTG on Information Theory chapter.

A member of the faculty at Purdue University, Dr. McFadden became a full professor there in 1961. He has spent his summers at Lincoln Laboratory, Bell Telephone Laboratories, and at the applied research laboratory, Sylvania Electric Products, Waltham, Mass. He is currently a visiting professor at Stanford University.

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meeting ahead

MEDICAL ELECTRONICS

The general field of medical electronics today will be covered by Dr. Noel Thompson, Palo Alto Medical Research Foundation of the Palo Alto Medical Clinic, at the November meeting of the Santa Clara Valley Subsection.

Dr. Thompson is chief of the medical electronics division of the foundation and a part-time physician with the clinic. He holds an M.D. from UCLA and an M.S. in electrical engineering from Stanford University, having earned these degrees in 1955 and 1961, respectively, following undergraduate work at Stanford. His unique background has led to broad experience in designing research equipment and wide publication in the field.

meeting ahead

TRANSISTOR LIMITATIONS

The high-frequency limitations of transistors will be the subject of Helmut Wolf, Fairchild Semiconductor, at the November meeting of the PTC on Electron Devices chapter.

Improvements in transistor technology have brought them into consideration for use at frequencies above 1,000 megacycles. Several factors determine the upper frequency limit of transistors. The influences of geometrical tolerances, diffusion profiles, choice of the semiconductor, and the efficiency of heat removal from the active area of a transistor on the frequency limitation and on the high-frequency output power will be discussed, together with circuit configurations necessary to operate transistors at several gigacycles.

Present and possible future work leading to more competitive transistors operating at higher powers and higher frequencies will also be discussed.

Statement of ownership, management and circulation (Act of October 23, 1962, Section 4369, Title 39, U.S. Code): IEEE GRID is published semi-monthly September through June. Mailing office: 394 Pacific Ave., Fifth Floor, San Francisco. Headquarters office: Suite 2210, 701 Welch Rd., Palo Alto. Publisher: San Francisco Section, Institute of Electrical and Electronics Engineers. Editor: James D. Warnock. Owner: San Francisco Section, Institute of Electrical and Electronics Engineers. No bondholders, mortgagees, or other security holders. Average number of copies of each issue during preceding 12 months: 7,500 printed; 7,000 to members and subscribers; 400 advertisers' and courtesy copies. Single issue nearest to filing date: 7,700 printed; 7,421 members and subscribers; 179 advertisers' and courtesy copies. (Signed) James D. Warnock, Executive Editor, October 1, 1963.

section notes

BULLETIN BOARD NOTICES

Carrying the meeting calendar information that appears in both issues of Grid for the month, but mailed early in the month, bulletin board notices are printed and distributed regularly by the section office to nearly 400 members who have agreed to post them on the 687 bulletin boards of their firms or organizations. If you would like to be added to the mailing list, call or write the section office, indicating how many copies you would like to post each month in locations where they will attract the attention of members who have missed the Grid or of non-members who may wish to attend meetings or to join IEEE.

section notes

REGULAR TUESDAY LUNCHEON

A special luncheon table is reserved every Tuesday at the San Francisco Engineers Club for members of IEEE. Club membership is not required and a cash ticket may be purchased from the cashier for \$2.00, including tax. No reservations are required.

IEEE members are invited to drop in for lunch whenever they are in the San Francisco area on Tuesdays. The club occupies the 15th floor at 206 Sansome St., San Francisco.

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INDUSTRIAL TOUR

The International Business Machine complex, located at Monterey and Cottle roads in San Jose, will be covered by speakers and a tour during the November 20 meeting of PTGR.

This San Jose complex houses the basic research lab, advanced development lab, development lab, western regional education center, and the manufacturing and assembly plant for small and intermediate-size computers using disc-type storage units. In addition, disc storage units used in any IBM computers built within the U.S. are manufactured here. The education center trains IBM sales personnel, customer engineers, and executives of customer companies. In addition, it offers job training and personal development programs for IBM employees.

The job training and the quality control methods used in manufacturing, assembly, and testing of equipment to maintain the inherent reliability of the equipment design is of special interest to the Reliability Technical Group. Of equal interest is the training given to the IBM customer engineers to improve the maintenance techniques, thus keeping any equipment downtime to a minimum resulting in a high availability.

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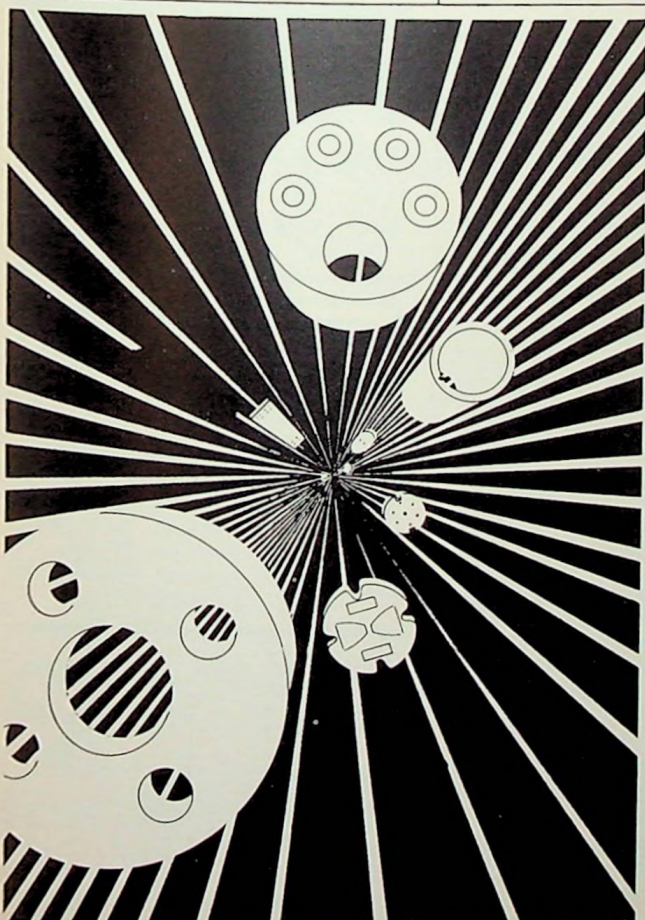
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meeting ahead

DATA ACQUISITION

System application and technical implementation problems involved in the design and construction of large-scale automatic data acquisition and inquiry systems will be presented at the November meeting of the PTG on Electronic Computers.

Donald Hamilton of Lockheed will discuss the original problem, i.e., obtaining data regarding work in progress with minimum lag time, that led to the development of Lockheed's ADA (Automatic Data Acquisition) system. Examples of this type of problem are shop order location, purchase order status, and material inventory status. The resulting system uses over 200 special input stations (usually operated by a factory production work) which presently transmits an average of 32,000 messages a day. Mr. Hamilton has been with the ADA project from the early planning stages and is presently ADA computer operations supervisor.

Eldon Wesley of RCA, manufacturer of the ADA system, will discuss the technical problems and results in the system implementation. It is essentially a real-time system operating around the clock. Special input devices for data entry and inquiry were developed, together with their buffers and computer-input scanners. The system uses two RCA 301 computers, one for processing incoming data or inquiries, and one for updating the various files and preparing data for output. The system is designed to operate at a reduced capability if one of the 301's is off the air for any reason. Wesley is the western regional product assurance administrator in charge of keeping the ADA system functioning correctly.

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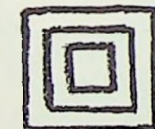
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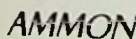
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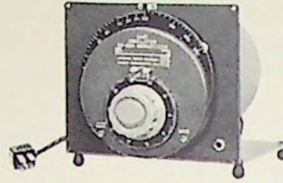
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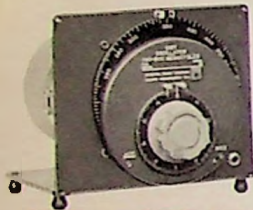


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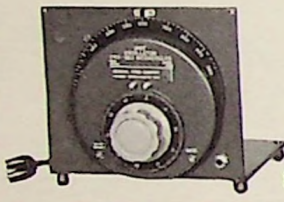
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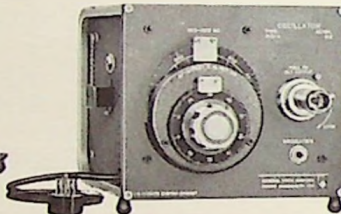
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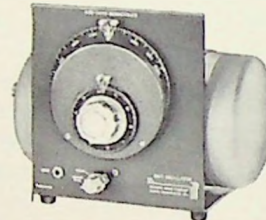
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