EDITOR'S PROFILE of this issue

from a historical perspective …

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

October, 1963:

Cover: The drawing depicts a factory application of electronics, with closed circuit television, automatic production, and computer-controlled equipment. This is the topic of a meeting of the fledgling Industrial chapter (becomes IES). More on page 5.

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. July, 2021 Contact p.wesling@ieee.org

IEEE Grid

OCTOBER 1, 1963

SAN FRANCISCO SECTION

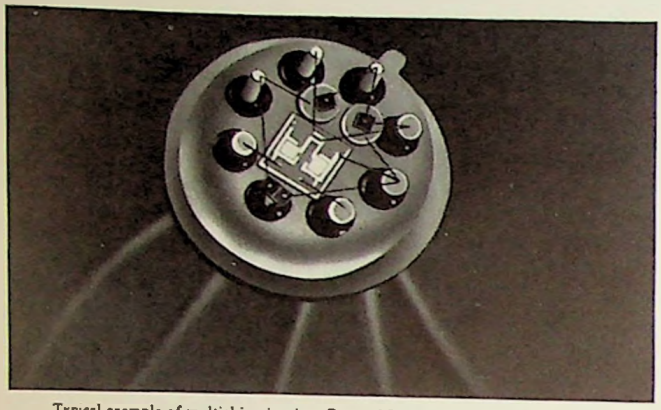
INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS

reminder

October 8 (Tuesday) TDI, PTGCS
October 9 (Wednesday) PTGBME, PTGEM
October 10 (Thursday) PTGIT
October 23 (Wednesday) SCVSS,
PTGMTT/PTGCT/PTGCS

Microcircuitry... PLUS Isolation of Components

GI MULTICHIPS: The Advantages of Packaged Circuitry—with "Three-Dimensional Freedom" in the Location of Circuit Elements



Typical example of multichip circuits: General Instrument NC-8C Flip-Flop, Eccles-Jordan cross-coupled inverter circuit capable of operation up to 20 mc.

WHEN A HEAT-sensitive circuit component must be placed closely adjacent to another component that *generates* heat—and on the *same substrate*—it is rather obvious that circuit performance and reliability may be compromised...

IT IS EQUALLY obvious, of course, that this problem frequently cannot be evaded in the familiar, fully-integrated "monolithic" microcircuit in which various types of components *must* be mounted and interconnected on a single surface. By its very nature, a monolithic Integral Circuit Package, if it is to retain its highly desirable advantage of extreme miniaturization, cannot always permit ideal isolation of components—either physically, electrically or thermally.

The Advantages of GI Multichips

THERMAL TRANSFER—like intercoupling of components, especially between input and output circuits, and various other limitations of the monolithic, common-substrate ICP—can readily be avoided by utilizing General Instrument's highly advanced technology of *multichip* microcircuits.

THIS FREEDOM of layout gives you the opportunity not only to separate temperature-sensitive elements from heat-producing elements but also to isolate input and output components of a circuit and any other elements whose parasitic intercoupling, electrically, electromagnetically or electrostatically might be undesirable. Component isolation, in fact, can closely approach that of conventional, discrete elements on a conventional circuit board—with only a fraction of the bulk and weight. And there are other advantages, as well...

The Ideal Substrate for EACH Component

MONOLITHIC ICP's, naturally enough, must be produced on a single substrate material which is a reasonable *compromise* between the *ideal* characteristics for each resistor, capacitor, diode, transistor or other component comprising the finished circuitry. No such compromise is necessary in GI multichip technology. Since we batch-manufacture a number of *identical* components on each silicon wafer (which are later diced apart and assembled to produce your finished circuit) the base material for each type of component can be selected to have the optimum parameters for *that* particular component and no other.

...YOUR Design, at Low Cost!

EVEN WHERE the foregoing considerations do not apply, many design engineers have welcomed the opportunities inherent in the GI multichip technology because it permits them to make minor (or, for that matter, *major*) modifications in design without entailing excessive tooling-up costs. The multichip technique allows you to specify virtually any arrangement of virtually any practical micro-components at a total tooling-up cost of no more, usually, than a few hundred dollars. A fully integrated monolith created to your own specs—even if the modifications represented only relatively slight changes from a standard, "off-the-shelf" circuit—would run to many thousands...

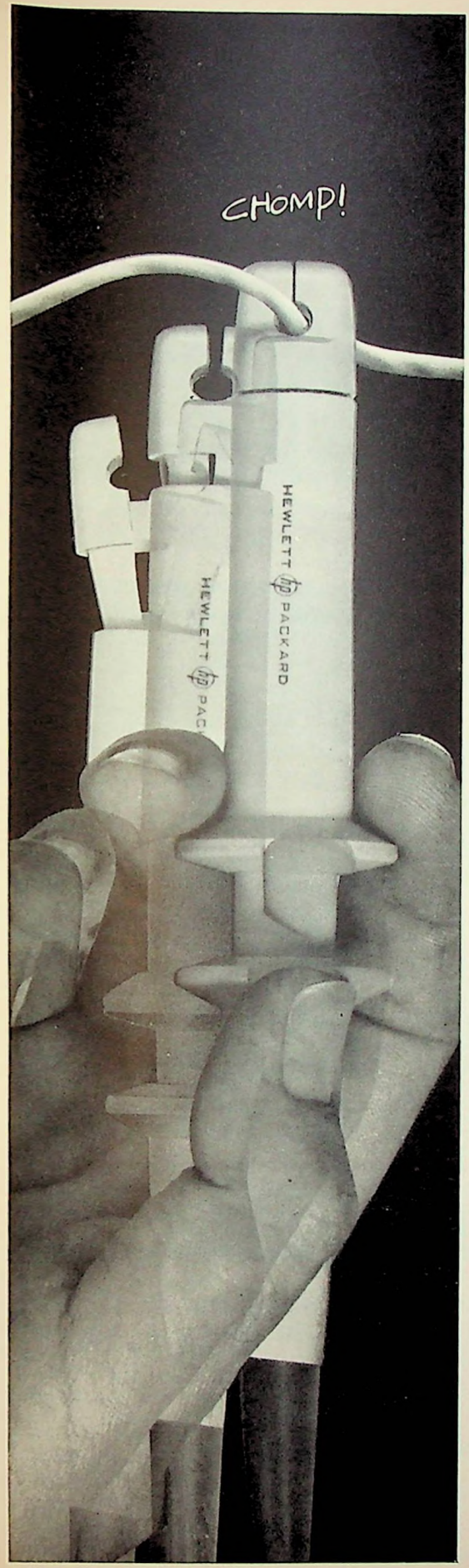
Get BOTH Sides of the WHOLE Story

PLEASE DON'T get us wrong. This advertisement happens to touch on a few of the advantages of GI multichip ICP's. But we also manufacture fully integrated *monolithic* microcircuits for the many standardized applications where a standardized monolith is eminently suited. We have no especial axe to grind in favoring *either* type—and will be happy to give you experienced and completely unbiased advice, without obligation, whenever you may be in doubt about which type to choose.

MEANWHILE, if you'd like to know more about the specific advantage of GI multichips—and there *is* a great deal more to the story—a word from you will bring interesting, useful, complete data and literature. For promptness, please write to Jerry Fishel at the address below.

GENERAL INSTRUMENT CORPORATION
SEMICONDUCTOR PRODUCTS GROUP
65 Gouverneur Street, Newark 4, New Jersey

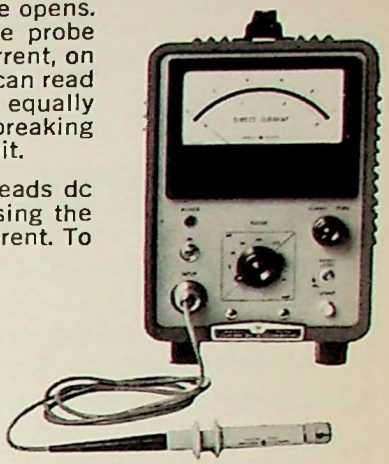
GENERAL INSTRUMENT



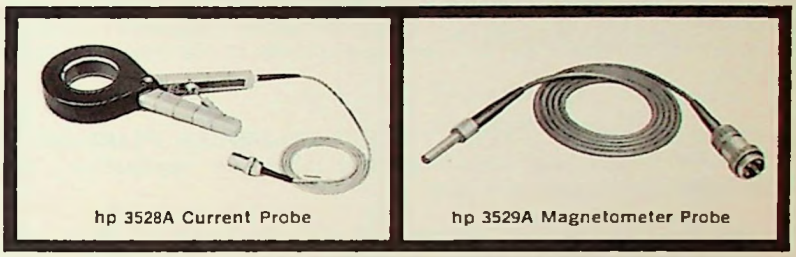
CLAMP AROUND THE LEAD:

and measure dc current 0.1 ma to 10 amps, without breaking circuit leads, without loading the circuit.

Pull back the probe flange, the probe opens. Aim it at a lead and let loose. The probe closes. Now you can measure dc current, on a bare or insulated wire . . . and you can read it directly, even in the presence of equally strong ac on the same wire, without breaking a lead and without loading the circuit.



The hp 428B Clip-on DC Ammeter reads dc current directly in 9 ranges by sensing the magnetic flux induced by the dc current. To measure the sum or difference of currents flowing through two separate wires, you simply clamp the probe around them both . . . and read. The standard 428B has a range of 0.1 ma to 10 amps and lets you read dc currents on wires up to 5/32" in diameter. A recorder, oscilloscope output is provided on the 428B.



hp 3528A Current Probe

hp 3529A Magnetometer Probe

The hp 3528A Current Probe ($450 with degausser) lets you measure dc current in conductors up to 2½" in their maximum dimensions . . . even pipes, multiconductor cables, lead-sheathed cables, microwave waveguide.

The hp 3529A Magnetometer Probe ($75) is useful in applications ranging from acoustical transducer design to study of the Zeeman effect; it measures the direction or magnitude of any magnetic field with 1 milligauss sensitivity.

Look at the 428B specs, then call your hp field engineer or write direct for a single data sheet which describes all its capabilities.

428B SPECIFICATIONS

Current Range:	1 ma to 10 a full scale in 9 ranges
Accuracy:	±3%, ±0.1 ma
Probe Inductance:	<0.5 μh introduced into measured circuit
Probe Induced-Voltage:	<15 mv peak into measured circuit
AC Rejection:	ac with peak value less than full scale affects meter accuracy less than 2% at frequencies above 5 cps and different from carrier (40 kc) and its harmonics; (on 10 range, ac is limited to 4 a peak)
Recorder/Oscilloscope Output:	app. 1.4 v across 1400 ohms full scale; frequency response dc to 400 cps
Probe Insulation:	300 v maximum
Price:	hp 428B, $600 (cabinet); hp 428BR, $605 (rack mount) (428A also available; same as 428B except range: 3 ma to 1 ampere full scale; no recorder output, $500)

Data subject to change without notice. Prices f.o.b. factory.

8595

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CONTACT OUR FIELD SALES OFFICES, NEELY ENTERPRISES—Los Angeles, 3939 Lankershim Blvd., North Hollywood, TR 7-1282 and PO 6-3811; San Francisco, 501 Laurel St., San Carlos, 591-7661; Sacramento, 2591 Carlsbad Ave., 482-1463; San Diego, 1055 Shafter St., AC 3-8103; Scottsdale, 3009 N. Scottsdale Rd., 945-7601; Tucson, 232 So. Tucson Blvd., MA 3-2564; Albuquerque, 6501 Lomas Blvd., N.E., 255-5586; Las Cruces, 114 S. Water St., 526-2486. • LAHANA & CO.—Denver, 1886 S. Broadway, PE 3-3791; Salt Lake, 1482 Major St., HU 6-8166 • ARVA, Inc.—Seattle, 1320 Prospect St., MA 2-0177; Portland, 2035 S.W. 58th Ave., CA 2-7337 • EARL LIPSCOMB ASSOCIATES—Dallas, 3605 Inwood Rd., FL 7-1881 and ED 2-6667; Houston, 3825 Richmond Ave., MO 7-2407.

High-Speed Oscilloscopes *with General-Purpose Utility*

Type 580A Series with a Type 82 Dual-Trace Unit

■ **DUAL-TRACE OPERATION** with 4 operating modes and independent controls for each channel—for individual attenuation, positioning, inversion, and ac or dc coupling as desired.

■ **PASSBAND** typically DC-TO-85 MC (3-db down) at 100 mv/cm (12-db down at 150 Mc), and typically DC-TO-80 MC (3-db down) at 10 mv/cm.

■ **CALIBRATED SENSITIVITY** in 9 steps from 100 mv/cm to 50 v/cm, and in *10X Amplifier Mode*, from 10 mv/cm to 5 v/cm, variable between steps.

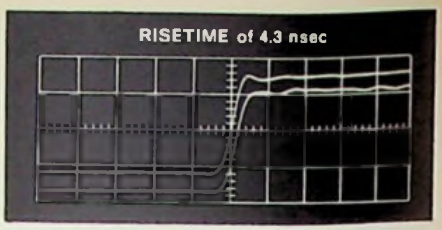
■ **INTERNAL AND EXTERNAL TRIGGERING** to 150 Mc.

■ **SWEEP RANGE** from 10 nsec/cm to 2 sec/cm.

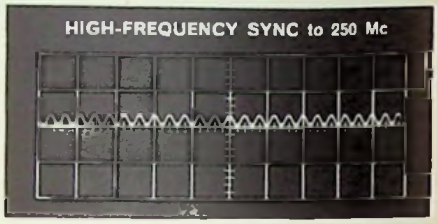
■ **SUPPLIED SMALL SIZE PASSIVE PROBES** increase input R to 10 megohms and decrease input C to approximately 7 pf., with risetime (of probe, plug-in unit, oscilloscope) at over-all sensitivity of 100 mv/cm at approximately 4½ nsec.

PLUS

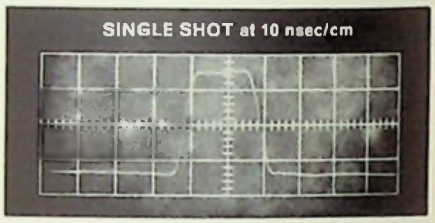
■ **COMPATIBILITY WITH 17 LETTER-SERIES PLUG-INS** to permit differential, multi-trace, sampling, other laboratory applications—when used with Type 81 adapter.



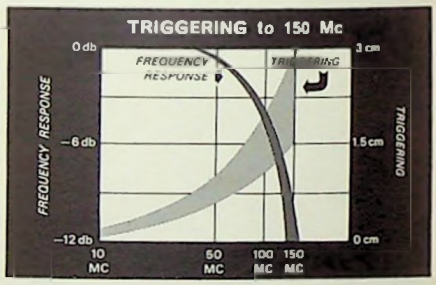
Dual-trace display of input and output pulses of a transistor amplifier at 10 nsec/cm—with lower trace delayed 1 nsec by amplifier under observation. Type 585A/82 combination can display time coincidence between input channels with no measurable difference at 10 nsec/cm.



Display of a 250 Mc Sine Wave at 10 nsec/cm, using the H. F. Sync Mode. In this mode, the Type 585A/82 combination can display steady signals from 5 Mc to 250 Mc, with a fraction of a cm of displayed amplitude.



Display of a fast transient at 10 nsec/cm, using single-sweep operation and the Tektronix C-19 Camera. Single-sweep feature of the Type 585A/82 combination facilitates photographic recording of most one-shot phenomena.



Typical frequency response and internal triggering characteristics of Type 585A/82 combination—showing minimum number of cm necessary for triggering.

Type RM585A Oscilloscope, illus. . . $1825

Type 585A Oscilloscope $1725

Types RM585A and 585A have 2 modes of calibrated sweep delay ranging from 1 μsec to 10 seconds.

Type 581A Oscilloscope. $1425
No sweep-delay capabilities . . . but other features similar to Type 585A Oscilloscope.

Type 82 Dual-Trace Unit . . . . . $ 650

Type 86 Single-Trace Unit . . . . . $ 350

Type 81 Plug-In Adapter . . . . . $ 135

Adapter allows insertion of Tektronix letter-series plug-ins. Band-width (to 30 Mc) and Sensitivity depend upon plug-in used.

Oscilloscope Prices without plug-in units.

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contents

cover

Two plant tours (Industrial Division/Energy Systems, Inc., and PTGEM / Microwave Electronics Corp.) being scheduled for early October, the cover portrays an industrial application of electronics to factory production utilizing closed circuit television and electronic data processing of automatic production and control equipment. Cover drawing courtesy of Western Electronic Manufacturers Association.

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MEETING CALENDAR

SANTA CLARA VALLEY SUBSECTION

8:00 P.M. • Wednesday, October 23

Space Power Systems (a panel discussion)
Speakers: Dr. Y. C. Lee, technical director, power systems, research & development div., Lockheed MSC, moderator
Dr. Nathan Snyder, chief scientist, Kaiser Aircraft & Electronics
Frank J. Thomas, asst. mgr., engineering div., Aerojet General Nucleonics
Robert H. Watson, staff scientist, auxiliary power, Lockheed MSC
Dr. A. E. Levy-Pascal, staff scientist, electrochemical, Lockheed MSC
Place: Lockheed Auditorium, Bldg. 202, 3251 Hanover, St., Stanford Industrial Park, Palo Alto

TECHNICAL DIVISIONS

Industrial

7:30 P.M. • Tuesday, October 8

Recent Examples of High-Power Electronic Systems (presentation and plant tour)
Speaker: Vernon L. Smith, chief engineer, RF systems div., Energy Systems, Inc.
Place: Energy Systems, Inc., 3180 Hanover St., Palo Alto (formerly Radiation at Stanford)

PROFESSIONAL TECHNICAL GROUPS

Bio-Medical Electronics

8:00 P.M. • Wednesday, October 9

Brain Waves and Signal Identification
Speaker: Walter J. Freeman, associate professor of Physiology, University of California, Berkeley
Place: Life Sciences Bldg., Room 2507, University of California
Dinner: 6:40 P.M., Spenger's Restaurant, University Ave. at the Freeway, Berkeley
Reservations: Con Rader, 326-1970, Ext. 328

Communications Systems

8:00 P.M. • Tuesday, October 8

Automatic Waveform Equalization for Data Transmission Purposes
Speaker: Dr. Emil Hopner, manager, advanced information retrieval technology, advanced systems development div., IBM, San Jose
Place: Room 1164, 760 Market St., San Francisco
Dinner: 6:00 P.M., Bardelli's Restaurant, 243 O'Farrell St. (near Powell), San Francisco
Reservations: Mrs. Manzi, LY 1-8461, Ext. 430

Engineering Management

8:00 P.M. • Wednesday, October 9

The Founding and Development of Microwave Electronics Corporation (presentation and plant tour)
Speaker: Dr. Stanley F. Kaisel, president, MEC
Place: Microwave Electronics Corp., 3165 Porter Drive, Stanford Industrial Park, Palo Alto

Information Theory

8:00 P.M. • Thursday, October 10

Maximum-Distance Q-Nary Codes
Speaker: Dr. Richard C. Singleton, senior research mathematical statistician, Stanford Research Institute
Place: Stanford Research Institute, No. 1 Conference Room, 333 Ravenswood, Menlo Park
Reservations: Mrs. B. Kelly, 326-6200, Ext. 2944

Microwave Theory & Techniques

8:00 P.M. • Wednesday, October 23

(Joint with PTGCT and PTGCS)
Some Microwave Filter Design Concepts and Their Application to the Design of Microwave Devices
Speaker: Dr. George L. Matthaei, Stanford Research Institute
Place: P.H. 100, Stanford University
For further information contact: Leo Young, Stanford Research Institute, DA 6-6200

Vernon L. Smith

meeting ahead

HIGH-POWER SYSTEMS

The first scheduled meeting of the Industrial Division will be held on October 8, at Energy Systems, Incorporated, 3180 Hanover Street, Palo Alto (formerly Radiation at Stanford).

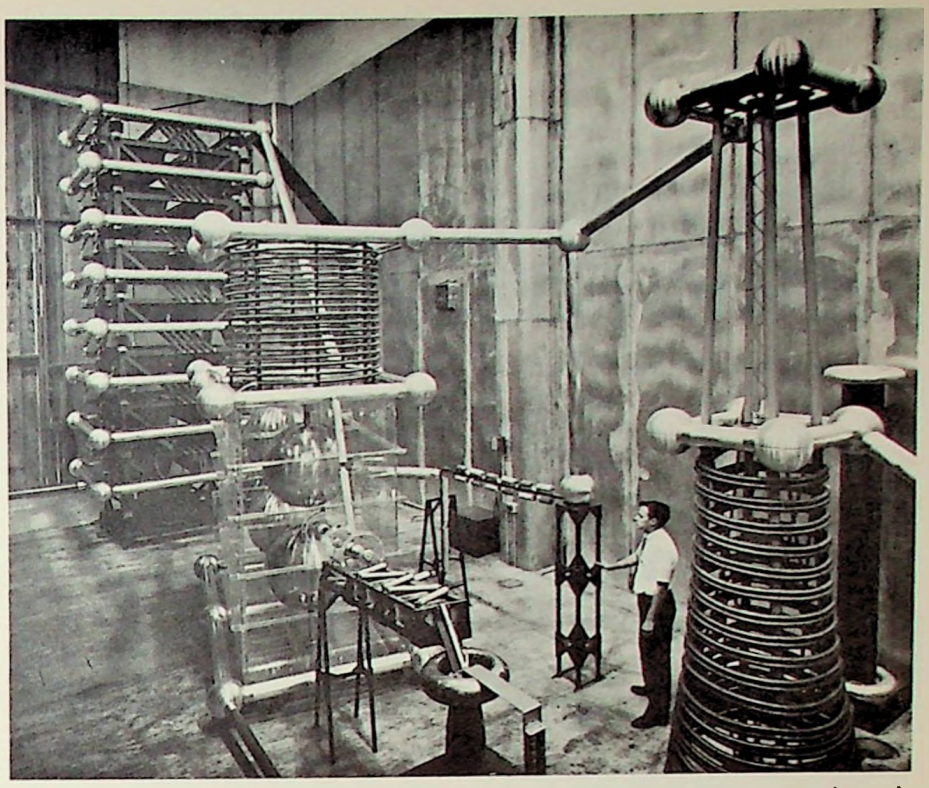
The meeting will consist of a presentation with slides by Vern Smith, chief engineer-RF systems division, showing recent examples of high-power electronic systems, such as high-voltage d-c power supplies, high-power RF transmitters, high-voltage switching systems, high-voltage triggered arc gaps, and high-power LASERS. A plant tour will follow where several examples of each of the equipments can be seen in various stages of assembly. The meeting will start at 7:30 p.m.

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.



High-voltage triggered arc gap for D.C. fault conversion at Energy Systems, Inc. (formerly Radiation at Stanford) site of the October meeting of the Industrial Division.

Stanley F. Kaisel

meeting ahead

MANAGEMENT IN ACTION

Dr. Stanley F. Kaisel, president of Microwave Electronics Corp., will host PTGEM on October 9 at the MEC facility in Stanford Industrial Park. Dr. Kaisel will discuss the founding and development of MEC and then showcase the facility for PTGEM members and their guests.

Dr. Kaisel started his electronics career at Washington University in St. Louis where he received his B.S. degree in electrical engineering in 1943. He worked for RRL at Harvard prior to return to Stanford University where he worked as a research associate concerned with linear accelerators and traveling wave tubes. During this period, he completed his studies for advanced degrees and was awarded the M.A. and Ph.D. in electrical engineering. He then joined RCA Princeton Laboratory to continue his work in the field of TWT. In 1951 he returned to Stanford to spend the next four years with the electronics research laboratory. In 1955 he joined Litton to learn more of the industrial phase of tube research and development.

In 1959, Dr. Kaisel, Arthur L. Webb, and Hugh W. Jamieson officially launched Microwave Electronics into the microwave tube and solid-state device business.

Administration building and plant of Microwave Electronics Corporation, Stanford Industrial Park, scene of a presentation by Dr. Stanley F. Kaisel and a plant tour for the October meeting of PTGEM.

meeting ahead

WAVEFORM EQUALIZATION

Automatic waveform equalization for data transmission purposes will be the subject of Dr. Emil Hopner before the October meeting of PTGCS.

Delay and amplitude distortion prevent effective utilization of transmission facilities for data transmission purposes. The speaker will describe automatic means of signal distortion correction and report on experiments performed by the advanced systems development division laboratories of IBM. The related theoretical considerations will also be discussed.

Dr. Hopner is manager of advanced information retrieval technology, advanced systems development division, IBM, San Jose. He joined IBM in 1955 in Poughkeepsie in the speech recognition program. In 1956 he transferred to San Jose research and was appointed to the data transmission and communications project. He was directly responsible for the development of IBM's data transmission subset.

During the latter part of 1958 Dr. Hopner was appointed manager of the data transmission project. During 1959 he initiated studies and advanced development activities on the problem of high-speed data transmission over high-frequency radio lengths. His group did significant work in the development of self-correcting codes for adjacent errors in data transmission. During 1960 Dr. Hopner continued his work with the CCITT, a committee of the International Telecommunications Union, assisting them with their data transmission problems and tests.

In June, 1961, Dr. Hopner was transferred to the IBM Lab at Peekskill, New York, as manager of computer communications. In January, 1963, he returned to San Jose.

grid inputs

NEW CLASSIFIED SECTION

In response to many requests, and primarily as a service to the membership, the Grid will offer a classified advertising section beginning with the November issues. Every appropriate category of ad will be carried, including business and professional cards, consulting services, positions available, positions wanted, and products. Rates for members will be $15 for the first column-inch, $10 for the second inch, and $5 for each additional inch, not to exceed a total of 4 inches. Special type or logos will not be carried. Nonmembers will be charged $20 for the first inch, $15 for the second inch, and $10 for each additional inch.

meeting ahead

Q-NARY CODES

Maximum distance q-nary codes will be the subject of Dr. Richard C. Singleton before the meeting of PTGIT on October 10.

Dr. Singleton is senior research mathematical statistician, mathematical sciences dept., Stanford Research Institute.

A q-nary error-correcting code is based on an alphabet of q symbols, where $q = 2$ in the usual binary case. A q-nary code with q^k code words of length $n = k + r$ digits can have no greater Hamming distance d than $r + 1$. Codes with $d = r + 1$ (maximum distance codes) will be discussed in detail. Some of these codes are related to orthogonal latin squares; the Reed-Solomon codes form another subclass. Several new types will also be reported on, and construction techniques given for them. A number of interesting properties of these codes will be described.

Dr. Singleton received the B.S. and M.S. degrees in electrical engineering from the Massachusetts Institute of Technology in 1950. He received the M.B.A. degree from Stanford University's Graduate School of Business in 1952, and the Ph.D. degree in mathematical statistics from Stanford in 1960.

meeting ahead

BRAIN WAVES

Professor Walter J. Freeman's talk before the October 9 meeting of PTGBME will concern brain waves and signal identification and will deal with the isolation of the sources of localized signals from particular cell populations within the brain which is considered as a volume conductor. He will describe measurements made utilizing computer techniques correlated with the behavior of laboratory animals which have chronically implanted electrodes.

Professor Freeman received his M.D. from Yale University in 1954 after graduate studies at Johns Hopkins University and post-doctoral work at UCLA.

Those interested in sharing rides from Palo Alto should meet in front of Room M-112 of the Stanford Medical School at either 5:20 p.m., if attending the dinner, or at 6:30 p.m. if going directly to the meeting.

For those willing to pay 50 cents, parking on the campus is available after identification of medical electronics or IEEE is given to the gate attendant.

The meeting is open to all those interested. The PTGBME chapter plans to hold 7 meetings this year on the 2nd Wednesday of every month through May, with the exception of January. One or two of the future sessions will be held in San Francisco or Berkeley; the locations of the other meetings will be normally at the Stanford School of Medicine at 8 p.m. in Room M-112. Call the secretary, Con Rader, at 326-1970; ext. 328, if you do not receive notice prior to meeting time.

events of interest

PAPERS CALL

October 18—Statement, in quadruplicate, indicating the contributions made by the paper which warrant its inclusion in the IEEE International Convention program; 100-word abstract in quadruplicate, title of paper, name and address; 500-word summary in quadruplicate, title of paper, name and address. Indication must be made regarding technical area of paper from the following: basic sciences and techniques, power, industry and industrial applications, communication, electronic systems, computers and data processing, instrumentation, materials, components and production processes, biomedical electronics, and professional activities. Address all material to Ferdinand Hamburger, Jr., chairman, 1964 technical program committee, IEEE, Box A, Lenox Hill Station, New York 21.

Lee *Edwards*

grid swings

IT IS REPORTED:

Burgess Dempster, newly elected chairman of the board of Siliconix, has announced the election of **Richard E. Lee** as president, **Thomas S. Edwards** as vice president, and **Arthur D. Evans** as vice president.

Evans *Wilson*

Guy W. Wilson has been named manager of marketing services of Esterline Angus Instrument Co., Indianapolis.

Hunter *Hohm*

Gould Hunter has been appointed personnel manager for Watkins-Johnson Co., Palo Alto.

Harry Hohm has been appointed president of Shelly Associates, Inc., consulting and manufacturing engineers, El Segundo.

Elkind *Bibbens*

Charles Elkind has been promoted to the new position of communications manager of the components division of International Business Machines Corp., Poughkeepsie, N.Y.

Terry E. Bibbens has joined Applied Technology, Inc., Palo Alto, as applications engineer, marketing dept.

events of interest

IEEE

October 14-16—**Materials Handling Conference.** Chamberlain Hotel, Fort Monroe, Va. IEEE/ASME. Program: R. C. Tench, Rm. 800, C&O Bldg., Huntington 1, W. Va. No proceedings.

October 21-23—**East Coast Conference on Aerospace & Navigational Electronics (ECCANE).** Emerson Hotel, Baltimore. PTG-ANE Baltimore Section. Program: Richard Allen, Martin-Marietta Corp., Baltimore 3. Proceedings.

October 28-30—**Machine Tools Conference.** Sheraton-Gibson, Cincinnati. IEEE. Program: W. L. Wachs, Cincinnati Milling Machinery Co., 4701 Marburg Ave., Cincinnati 9. No proceedings.

October 28-30—**National Electronics Conference.** McCormick Place, Chicago. IEEE et al. Program: H. W. Farris, NEC, 228 LaSalle St., Chicago 1. Order proceedings from NEC.

October 28-30 — **Symposium on Adaptive Statistical Inference.** (In conjunction with NEC.) Committee on Discrete System Theory, IEEE. Program: Laveen Kanal, Philco Science Labs, Blue Bell, Pa.

October 29-31—**10th Annual Mtg. PTG-NS, Intn'l Symposium on Plasma Phenomena & Meas.** El Cortez Hotel, San Diego. PTG-NS. Program: Robert DeLosh, Bendix Systems Div., Ann Arbor, Mich. IEEE Transactions on Nuclear Science, after conf.

October 31-November 1 — **1963 Electron Devices Meeting.** Sheraton-Park Hotel, Washington, D.C. PTG-ED. Program: Mason Clark, hp associates, Palo Alto. No proceedings.

November 4 — **Western Appliance Technical Conference.** Biltmore Hotel, Los Angeles. IEEE. Information: H. W. Rice, Robertshaw Controls Co., 1601 S. Manchester Ave., Anaheim. No proceedings.

November 4-6—**NEREM (Northeast Research & Engineering Meeting).** Commonwealth Armory, Somerset Hotel, Boston, Mass. Region 1. Program: A. O. McCoubrey, c/o Boston Section, IEEE, 313 Washington St., Newton, Mass. Order digest from IEEE Boston office.

November 11-13—**Radio Fall Meeting.** Hotel Manger, Rochester, N.Y. IEEE/EIA. Program: V. M. Graham, EIA Engr. Dept., 11 W. 42nd St., New York 36. No proceedings.

November 12-15—**9th Annual Conf. on Magnetism and Magnetic Materials.** Chalfonte-Haddon Hall, Atlantic City. PTGMTT/IEEE-AIP, Program: W. L. Shevel, Jr., IBM Mag. Res. Dept., Yorktown Heights, N.Y. Proceedings in Journal of Applied Physics, P.O. Box 1897, Baltimore.

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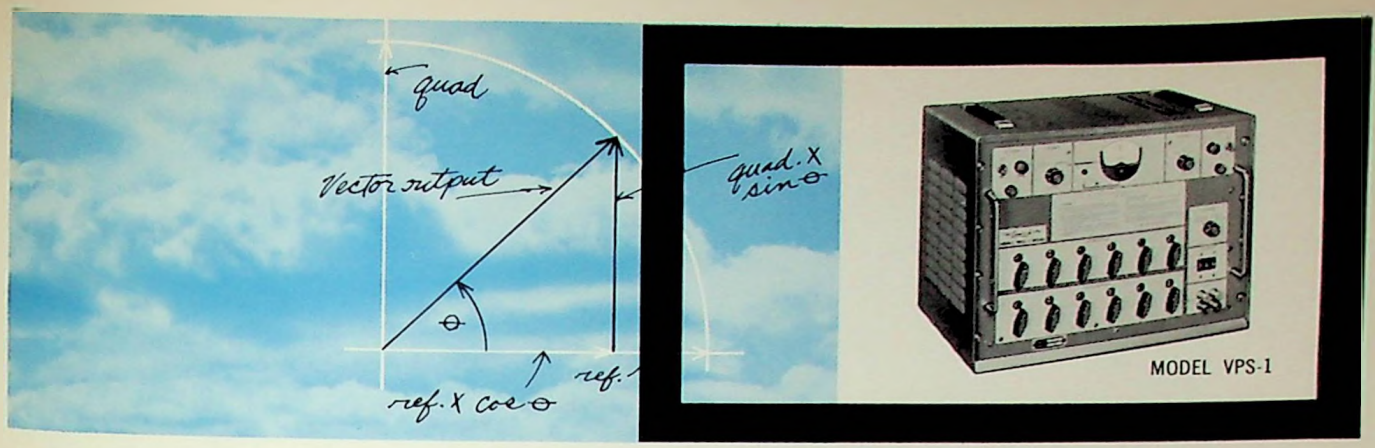

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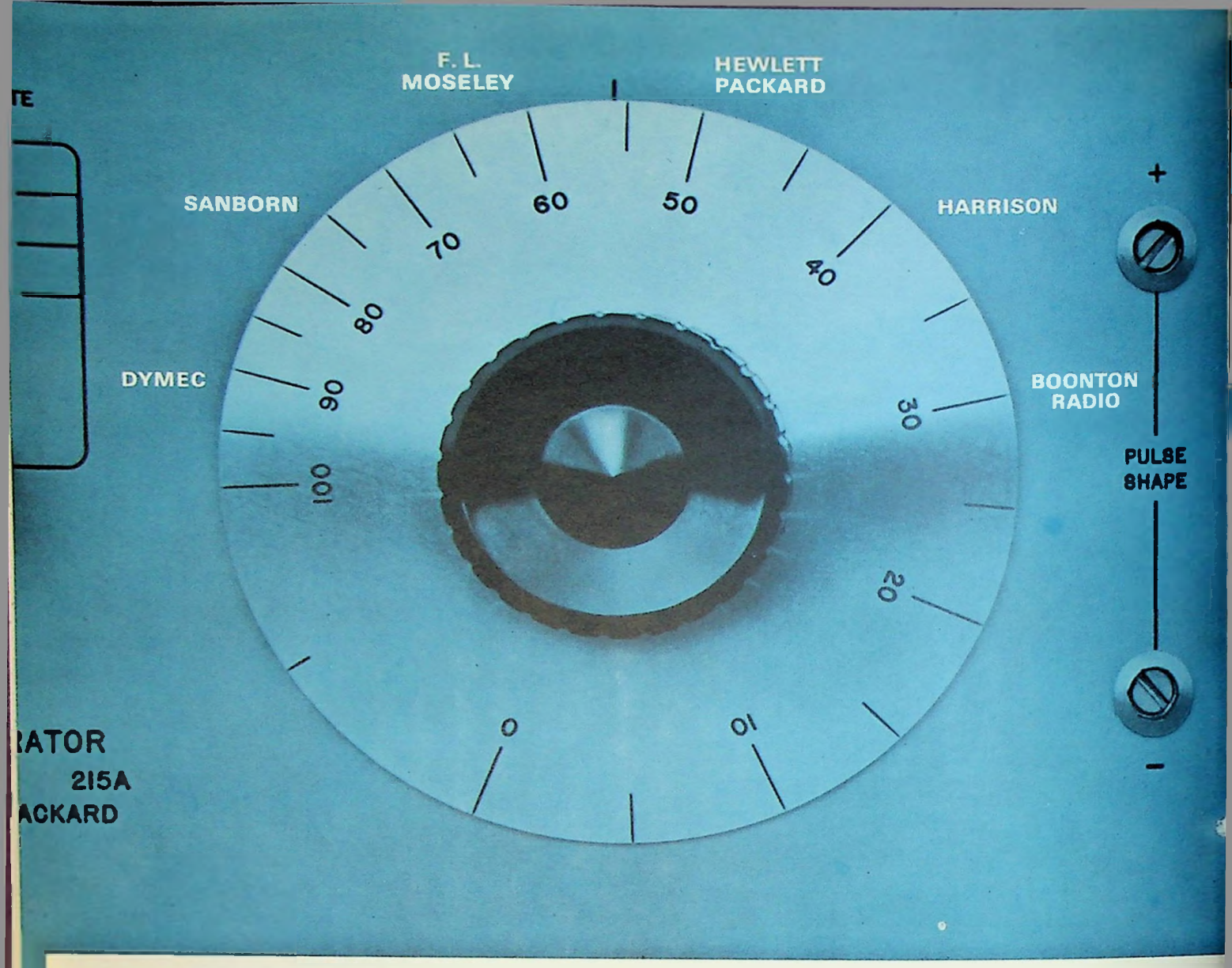

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