EDITOR’S PROFILE of this issue
from a historical perspective ...
with Paul Wesling, SF Bay Area Council GRID editor (2004-2014)

February, 1967:
Cover: Shown is an example of Large Scale Integration (LSI).
Page 7: Although the Silicon Valley Engineering Council (SVEC) officially started in 1988, we have evidence of a predecessor (the Santa Clara Valley Engineers Council) back in 1967. During Engineers Week, the SCVEC put on a 2-day seminar ($2 per day, or $3 for both days) on Electric Autos, and a dinner ($4.25). Back then, SJSU was “San Jose State College” ....
meeting reminder

Aerospace & Electronic Systems, Thursday, February 23
Audio & Electroacoustics, Thursday, February 16
Antennas & Propagation, Tuesday, February 21
Automatic Control, Tuesday, February 21
Circuit Theory, Wednesday, March 1
Computer, Tuesday, February 28
East Bay Subsection, Monday, February 27
Engineering in Medicine & Biology, Tuesday, February 21
Information Theory, Thursday, February 16
Instrumentation & Measurement, Wednesday, February 8
Parts, Materials & Packaging, Tuesday, February 21
Power, Tuesday, February 14
Reliability, Thursday, February 16
Santa Clara Valley Subsection/SCV Engrs. Council,
  Friday & Saturday, February 24/25
Rare Curiosity Wanted.

To some each wave is alike. To others each one is different. If you possess the curiosity and zest to discover differences in the seemingly similar, you may be the type of rare individual we welcome at ATI. We have an open door for dedicated engineers who yearn to pit their ability and knowledge against the accepted as well as the unknown.

Applied Technology Incorporated is conducting a special talent search for rare individuals. We seek engineers at all levels of experience. ATI develops and manufactures electronic reconnaissance, surveillance and active countermeasures systems.

We're the growing one—and you can grow with us.

APPLIED TECHNOLOGY INCORPORATED
3410 HILLVIEW AVE. • STANFORD INDUSTRIAL PARK • PALO ALTO • CALIFORNIA

We have positions in many disciplines open now.

For technical interview appointment ask for:
- Dr. John Grigsby, Vice Pres. Eng.
- Dr. Forrest Fulton, Staff Scientist
- Dr. David Leeson, Staff Scientist
- Mr. Charles Zumba, Director of Systems Eng.

Call collect:
(7:30 a.m. to 5:30 p.m.)
(415) 326-6400 or 321-5135

An Equal Opportunity Employer
One thing you get from your Neely sales engineer is tactical assistance in the West. He gets there in time to answer your measurement needs—with the fast delivery of Hewlett-Packard instrumentation and prompt answers to maintenance and service needs. He offers a wide range of Hewlett-Packard instruments—more than 1500, in fact—and supports them with product training seminars, personal application assistance and always a prompt response to your phone call.

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
evaluating semiconductors?

use one of these Tektronix transistor curve tracers to meet your needs

The performance range of the Type 575 enables you to evaluate the dynamic characteristics of most semiconductor devices.

Several transistor characteristic curves may be displayed including the collector family of NPN or PNP devices in a common base or a common emitter configuration with forward or reverse biasing. The Type 575 features collector sweep supply ranges continuously variable from 0 to 20 V at 10 A, or 0-200 V at 1 A. A base or emitter step generator, operating at either 2 or 4 times the line frequency, provides 4 to 12 steps per family of characteristic curves in single or repetitive display modes. The step generator provides voltage increments from .01 V/step to 0.2 V/step or current increments from .001 mA/step to 200 mA/step.

Choose the Type 575 MOD 122C transistor curve tracer for evaluating higher voltage devices.

The Type 575 MOD 122C has the same features of the Type 575 plus the capability of diode breakdown test voltage variable from 0 to 1500 V at 1 mA and a much higher collector supply voltage of up to 400 V at 0.5 A.

For evaluating high current semiconductors, add the Type 175 High Current Adapter to either of these curve tracers.

The Type 175 features collector sweep supply ranges of 0-200 A at 0-20 V and 0-40 A at 0-100 V. The Type 175 step generator provides current ranges from 1 mA/step to 1000 mA/step and voltage steps from 0.5 to 10 V/step with driving resistance selectable from 11 values ranging from 0.5 ohms to 1 k ohm. Other resistance values may be added externally.

Type 575 Transistor Curve Tracer (including accessories) .......... $1075
Type 575 Transistor Curve Tracer MOD 122C (including accessories) ............... $1325
Type 175 High Current Adapter (including accessories) ............... $1475

For more information call your Tektronix field office.

Tektronix, Inc. SAN FRANCISCO FIELD OFFICES
3750 FABIAN WAY • PALO ALTO, CALIF. • Phone: 326-8500
1709 MT. DIABLO BLVD. • WALNUT CREEK, CALIF. • Phone: 935-6101
From Oakland, Berkeley, Richmond, Albany and San Leandro: 254-5353
MEMBERSHIP

Following are the names of individuals who have been elected to current membership:

M.A. Arbib B. Lindberg
J.J. Beer R.C. Lucas
A.B. Bergh J.V. McDaniel
H.M. Blume, Jr. W.V. Mansfield
M.J. Bondi S.Y. Matsuo
E.R. Carlisle J.A. Mohlman
P.L. Carter H.J. Mullery
H.S. Crafts K. Nishimura
E.R. Crossman L.K. Russell
E. Ekonomi H.F. Schmid
P.A. Fialer A.G. Seymour
J.R. Flexer A. Tom
D.F. Hall P.A. Fialer
O. Hatcher, Jr. R.J. Scott
K. Hidaka A.C.M. Wang
W.J. Hill L.L. Webb
S.T. Hsu C. Welch
D.C. Jones H.J. Mullery

J.W. Jones

HELP THE SECTION GROW
BRING IN A NEW MEMBER

MEETING AHEAD

ANNUAL PIONEERS' NIGHT

Pioneers' Night, 1967, will be observed by a joint meeting of the San Francisco Section and Santa Clara Valley Subsection on April 7th at the student center of Foothill College, Los Altos Hills.

Members, their families and guests are cordially invited to be the guests of the Perham Foundation and Foothill College at a no-host dinner to be followed by an illustrated review of the Foothill Electronics Museum project, a special planetarium show, and tours of the OSCAR project and the new Foothill observatory. Reserve this date on your calendar and watch for more details in the GRID next month.

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

COVER

Illustrated is an example of "large scale integration," the term for high complexity monolithic integrated circuits, containing several hundred transistors and resistors in an area about 0.1 inch square. The February Computer chapter meeting will consider the engineering problems and use of computer aids in the design of such complex components.
At the February 8th meeting of the Instrumentation & Measurements chapter, Dr. Kenneth B. Mallory, head of the instrumentation and control group at SLAC, will use the beam guidance system as a focus to discuss instruments, data-handling equipment and timing and display systems for the accelerator.

Dr. Mallory has been on the accelerator staff since its conception as "Project M". For the past 20 years he has been at Stanford working with accelerators and other microwave projects.

The Stanford Linear Accelerator, first energized over its two mile length in May, 1966, has been operating since December 1966 at 95% of its full capacity of 20 Bev (billion electron volts). Interest from the scientific research field has created a long backlog of particle physics research experiments on the SLAC calendar. An interesting sidelight is that its 220 KV supply is one of the area’s largest power services.

Dr. Pierre van Rysselbergh of Stanford University and Prof. Raymond Kado of UCLA will discuss electrodes—theory and practice of bio-potential measurement—at the February 21 meeting of the Engineering in Medicine & Biology chapter.

The meeting will concentrate on the basic phenomena associated with metal-electrolyte and metal/metal salt electrolyte systems. Prof. Kado will present experimental data on noise, stability, and impedence of representative types from the various classes of electrodes useful for potential measurements. Dr. van Rysselbergh will then discuss the electrochemical processes underlying these phenomena.

Dr. van Rysselbergh is chairman of the commission on electrochemistry of the International Union for Pure and Applied Chemistry and lecturer in chemistry and chemical engineering at Stanford University.

(Continued on page 8)
NOMINATIONS FOR 1967-68 PROGRAM YEAR ANNOUNCED BY SECTION COMMITTEE

Nominations for section officers for the 1967-68 program year have been announced and will appear on a postcard ballot to be received by the voting membership in May.

CHAIRMAN
Fred J. MacKenzie

Fred J. MacKenzie, present vice-chairman and program chairman and former secretary and treasurer of the section, former membership chairman of the IRE section; a member. Active in WEMA and Wescon, Los Angeles Section operating & finance committee, 1959-60. A member of the IEEE committee on membership and transfers and former member of the PTG MIL administrative committee. University of Chicago and Northwestern University, Infra-red communications lab, 1947-49. Consolidated Electrodynamics Corp., Cal Tech Synchrotron Lab. Administrative engineer, communication and radio physics laboratories, Stanford Research Institute.

VICE-CHAIRMAN
J. E. Barkle

J. E. Barkle, present secretary and former treasurer of the section, former chairman of the Power chapter, for which he also served as organizer; a senior member. Present chairman, professional education committee. B.S. in EE, Carnegie Institute of Technology, Westinghouse Electric Corp., Loggers and Mill Supply Co. Member, Edison Electric Institute, electrical systems and equipment committee, active in IEEE committee affairs, author of several technical papers on power generation, transmission and system protection, chief electrical engineer, power and industrial division, Bechtel Corp., San Francisco.

SECRETARY
John B. Damonte

John B. Damonte, present section treasurer, present chairman and former vice-chairman of the membership committee, former chairman of the Antennas & Propagation chapter, a senior member. Manager, microwave engineering dept., Dalmo Victor Co., Belmont since 1958, formerly assistant director of research, supervisor of microwave section, research lab, and research microwave engineer. LMSC since 1966. University of California, 1948-50 as research engineer and teaching assistant. B.S. and M.S., UC. Author and co-author of numerous papers in the antenna and microwave fields.

There are two nominees for the office of treasurer:

TREASURER
Burton J. McMurtry

Burton J. McMurtry, head optics dept., EDL, Sylvania Electronic Systems, Mountain View. Dr. McMurtry received the B.A. (1956) and B.S. (1957) in Electrical Engineering from Rice University. The M.S. (1959) and the Ph.D. (1962) in Electrical Engineering from Stanford University. He joined the Sylvania Microwave Tube Laboratory, Mountain View, in 1957 and participated in the Honors Cooperative Program with Stanford University from 1957 to 1961. From 1957 to 1959 he was engaged in the theoretical analysis (continued on page 18)

TREASURER
Donald O. Pederson

Donald O. Pederson, dept. of electrical engineering, University of California, Berkeley, received the B.S. degree from North Dakota Agriculture College, Fargo, N. D., in 1948, and the M.S. and Ph.D. degrees in electrical engineering from Stanford University, in 1949 and 1951, respectively. From 1951 to 1953, he was a research associate at the electronics research laboratory, Stanford, and, from 1953 to 1955, he was a member of the technical staff at Bell Telephone Laboratories, Murray Hill, N.J. Since 1955, he has been a faculty member of the dept. of (continued on page 18)

There is one nominee for the office of Section/WESCON Director:

SECTION/WESCON DIRECTOR
E. W. Pappenfus

E. W. Pappenfus, vice-president, engineering and manufacturing, Granger Associates, Palo Alto. Held various offices, including section chairman, in Cedar Rapids Section, IEEE. Chairman, Cedar Rapids communications symposium. Member, papers review committee—3 years, Fellow in IEEE. Chairman, Future Engineers Show committee, 1965 WESCON. Member, communications systems disciplines committee, IEEE. Member, radio com- (continued on page 18)
CONTROL THEORY

Modern control theory is challenging the role of classical control analysis and design. A conference on the place of this theory in the education of undergraduate and graduate engineers was held at the University of Santa Clara during August 1966, sponsored by the National Science Foundation, with 35 college professors in attendance. Professor Richard Dorf, who directed the conference, will report on some of its results at the February 21 meeting of the Automatic Control chapter. One of the questions which will be discussed by Dr. Dorf and a panel of engineers from industry will be the applicability of the time-domain and state-space methods compared to the more classical frequency domain methods.

Richard C. Dorf is chairman of the department of electrical engineering at the University of Santa Clara. Prior to accepting his present appointment, he taught at Clarkson College and the University of Edinburgh, Scotland, as well as at the U.S. Naval Postgraduate School, where he received the Ph.D. degree. Dr. Dorf has been active as a consultant to Sylvania-EDL West, Advanced Technology Labs., Philco, Mobility Systems, Inc., and the Southwestern Research Institute.

EBSS ON PG&E SYSTEM

A panel discussion of the PG&E 500 KV system will be the subject of the February 27 meeting of the East Bay Subsection at 7:30 p.m. in the PG&E service center at 4801 Oakport Street, Oakland.

The panel members taking part will be T. R. Ferry, supervisor communication engineering; M. A. Kirsch, manager, line construction; E. G. Lambert, supervising electrical engineer, transmission; H. J. Stefanetti, manager, transmission & distribution, operating; and J. N. Yllaraz, supervising substation engineer, operating.

Each of the panel members will present an approximate 15 minute delivery covering their phase of this tremendous and totally new project. Their discussion will include some of the major problems that have arisen during the development and construction program along with solutions.

The audience will derive an excellent overall picture of line design, construction, operation and maintenance, as well as substation and communication facilities.

The panel presentation will be followed (Continued on page 8)
GET A HORSE?

The electric auto is back despite the powerful forces that have ridiculed and camouflaged its virtues. The ground swell of technological advancement could not be suppressed indefinitely. The analysis of efficient power utilization in the field of the private car has taken on the aspect of a crash program within the last year. The public is aroused and the government has become aware that America is ready for the next generation of locomotion. With the concentrated effort of industry and government, the assault has at last started on the major problem in the development of the electric car, and energy source unit, the battery or fuel cell.

How does this development compare with what we have today?

There is no basis for comparison yet. We are on the verge of the engineering breakthrough which will make possible the prototype that you can compare to today's cars.

Many writers have erroneously made comparisons between the limited range of the 'electric' vs. the gasoline powered vehicle. This brings to mind a similar comparison made 63 years ago. At that time it was said that a horse was a far superior form of transportation than an airplane.

You see, a horse on one tank full of hay could run all day and the airplane was lucky to fly one mile at great cost and risk to the pilot!

If we review the major scientific and technological advancements which have taken man into space in six years, is it too hard to imagine these same scientific and technical forces solving the one problem limiting the electric auto: an improved energy source?

Why do we need one?

Now that most people have been convinced that the family car is the worse offender in polluting our environment, we are offered the solution "put a gas mask on your car or yourself".

So what about it?

This subject can only be explained by engineers, scientists and industrialists who are even now working behind locked doors to provide progress in transportation.

All who attend the Santa Clara Valley Engineers' Council symposium on the electric automobile during engineers' week, Feb. 23, 24, 25, 1967 will be privileged to look behind the curtain at your new transporter — the electric automobile. Remember February 23, 24, 25, 1967 at San Jose State College.

Rausch-Lang electric automobile, circa 1910, owned by Edward Zalinsky, San Francisco. This chain-driven sedan has been known to attain speeds of upwards of 15-16 miles per hour. At a slightly lower cruising speed, the Rausch-Lang has a range of 30-35 miles — on the level. This vintage electric auto will be on display during National Engineers Week, February 19-25, 1967 at Morris Daily Auditorium, San Jose State College. It will also be one of many exhibits of interest in a national symposium on the modern day electric automobile at the same location, February 24 & 25. Sponsors of the symposium are the Santa Clara Valley Engineers Council, which is composed of the major engineering societies in the Valley, and San Jose State College.

SYMPOSIUM FEES

Pre-registration — Received on or before Monday, Feb. 20, 1967.
$2.00 — for Friday session
$2.00 — for Saturday session
$4.25 — for Friday and Saturday sessions and Saturday banquet
$6.25 — for Friday and Saturday sessions
$5.25 — for Saturday session and Saturday banquet
$4.25 — Banquet only

Registration after Feb. 20, 1967:
$2.00 — for Friday session
$2.00 — for Saturday session
$4.25 — for Saturday banquet
(Reservations required)

No session charge to students or wives.

Symposium Program Committee:

Santa Clara Valley Engineers Council: Donald B. Scollon, Tudor Engineering — chairman; Hugh C. Ross, Ross Engineering Corp. — vice chair.
PACKAGING DIGITAL SYSTEMS

Robert Snyder, supervisor, product design, Philco-Ford WDL, will discuss electronic packaging of ground digital systems at the February 21 meeting of the Parts, Material & Packaging chapter at the cafeteria/library, 3825 Fabian Way, Palo Alto.

Mr. Snyder will discuss the activities involved in ground digital system design, after completion of electrical design, including documentation and fabrication. Considerations involved in design philosophy due to the transition of a computer originally designed for military into industrial/commercial usage will also be considered.

The speaker holds an MSME from the University of Santa Clara, a BA in industrial management from CCNY, and a BSME from Rutgers. He holds three patents in high speed counters and has several pending on interconnection methods. He also serves as instructor in business administration at UC Extension.

MORE EMB

Stanford University. He is particularly noted for his contributions to the thermodynamics of irreversible processes, and is the author of many publications in electrochemistry.

Prof. Kado, senior engineer at the brain research institute and assistant professor in anatomy, UCLA, is known for his contributions in flow meters, instrumentation, and studies of the impedance of nervous system tissue.

MORE EBSS

Allowed by a question and answer period. Each of the panel members has followed this project in his own field from the start and this, coupled with years of background experience, provides an exceptionally qualified panel to present a picture of the PG&E Company 500 KV system.

LARGE SCALE ARRAYS

The design problems in obtaining large bi-polar and MOS silicon arrays using computer aided design much attention at the fall joint computer conference, '66, in San Francisco and will at the international solid state circuits conference in Philadelphia in February. The San Francisco IEEE Computer chapter has arranged for participants of these conferences to present a discussion of the latest information on the subject on February 28.

Dr. Peter B. Meyers, formerly vice president of research at Bunker-Ramo and presently manager of advanced technology research at Magnavox, will act as moderator for the presentations and discussion. Dr. Meyers organized a discussion session on this subject for the ISSCC, 1967, and has made an extensive review of state of the art.

The first speaker, Dr. Richard Petriz, director of the semiconductor research and development laboratory of Texas Instruments. An active participant in the FJCC and the ISSCC on subjects related to the topic of this meeting, he will present a discussion touching on the materials technology base of large scale integration. He will further present his views on selected topics including development of languages for computer algorithms for segmenting large data files.

The second speaker, Dr. Hugh Mays, formerly of IBM, is in charge of the computer aided array design project at Fairchid Semiconductor Research. He will also actively participate in the program at the ISSCC. He will present his views on the use of computers to help design large scale arrays of logic.

An outline of a computer aided design system will be presented. This system makes extensive use of CRT's for man-machine interaction. An examination of existing and projected computer aided design costs indicates that they will be too high to make discretionary wiring techniques practical for any very special L.S.I. applications. Therefore, the system to be discussed is based on the premise that design costs can be spread over many units.

CIRCUIT PACKAGING

A call for technical papers to be presented at the 1967 International Electronic Circuit Packaging Symposium in San Francisco was issued this week.

The eighth annual symposium will be presented by the Western Electronic Show and Convention on August 21 and 22, concurrent with WESCON in San Francisco.

Prospective authors are invited to submit 250-word abstracts of proposed IEC Packaging Symposium papers by March 15, according to T. Glen Boe, chairman of the two-day program. A papers selection committee will make up the program based on the abstracts, and full manuscripts will be due June 15. Boe said.

Abstracts on subjects of current circuit packaging interest should be addressed to: Papers selection committee, c/o WESCON, 701 Welch Road, Palo Alto, 94304.

The symposium was presented on the University of Colorado campus in the years 1960-64. In 1965 it was held in San Francisco, concurrent with WESCON, and in 1966 in Los Angeles again was a special feature of WESCON week.

At the request of Cahners Publishing Co., originators of the symposium, WESCON assumed full sponsorship of the event starting last year.

The papers selection committee, which has served the symposium since its inception, retains responsibility for program content.

t e c t i o n n e w s

ON METHODOLOGY

Dan Teicherow, professor and head of division of organization sciences at Case Institute, will address a dinner meeting of the Association for Computing Machinery, January 19, at the Tangent, University near Alma, Palo Alto.

Teicherow, formerly professor of management, Stanford, will discuss methodology information system design including development of languages for stating problems in as non-procedural form as possible, development of computer algorithms for segmenting large problems and structuring data files.

The meeting is scheduled for 8, with dinner at 7 and social hour at 6.
The Power chapter of the San Francisco Section is sponsoring a series of lectures on grounding principles and practices starting February 21.

Eight lectures are planned covering all aspects of basic principles and practical methods of system and equipment grounding. The major elements concerned in the protection of stations, transmission lines and distribution systems will be covered. Code requirements, corrosion problems, and electrostatic hazard control will be treated in some detail.

The lectures will be conducted on a level to provide useful and practical information to experienced engineers in the power and industrial field. Each lecture will be presented by an engineer who is well qualified in the field being discussed.

The lectures will be given in San Francisco on Tuesdays from 6:00 to 8:00 PM starting on February 21 and continuing through April 25, with the exception of March 14 and April 11, when the regular monthly Power chapter meetings are scheduled. The exact meeting location will be announced later. A list of lecture subjects and speakers follows.

I February 21
Basic Principles of Grounding, S.V. Lyon, General Electric Co.

II February 28

III March 7
Distribution System Grounding (Lecturer to be announced)

March 14
Power Chapter Meeting—No lecture scheduled.

IV March 21

V March 28
Industrial Plant Grounding, Moon H. Yuen, Bechtel Corporation.

VI April 4
Control of Industrial Electrostatic Hazards, (Lecturer to be announced).

April 11
Power chapter Meeting—No lecture scheduled.

VII April 18
Corrosion problems in Relation to Grounding, Roy Dean, Pacific Gas & Electric Co.

VIII April 25

The course is open to the public. However, enrollment will be limited to a convenient class size for maximum effectiveness. Advance registration will be given preference in the event of over enrollment. For further information, contact the course coordinator or one of the professional education committee:

Wm. J. Slimak,
Course coordinator, P.G.&E. Co.
Telephone 781-4211, Extension 2529

Joel Kitchens
Committee chairman, Bechtel Corp.
Telephone 433-4567, Extension 3365

Jean V. Kresser
Westinghouse Electric Corp.
Telephone 392-5353, Extension 315

S. V. Lyon
General Electric Co.
Telephone 434-2211, Extension 406

Donald Nielsen
P.G.&E. Co.
Telephone 781-4211, Extension 4134

For advance registration, use the form below. Make checks payable to IEEE—San Francisco chapter, Power Group, and mail to: Wm. J. Slimak, Pacific Gas & Electric Company, 245 Market Street, San Francisco, Calif. 94106

ADVANCE REGISTRATION FORM

Name (print) ____________________________________________

Firm ____________________________________________ Position __________

Business Address ________________________________________

Phone ________________________________________

Home Address ________________________________________

Member of: (circle) IEEE, ASME, AIME, AJCE, Other __________

THE GRID

... is the best electronic/electrical engineering recruiting medium in northern California. Use it when you need manpower.
SOUL SEARCHING BY SYSTEMS TYPES PLANNED FEB. 7-9

"Are electronic systems creating a new and better world ... or just a different one?" This question will be one of the key queries posed at the eighth annual winter convention on aerospace and electronic systems (WINCON) to be held February 7 through 9, Los Angeles.

"It is becoming clear that scientists and engineers engaged in complex system developments for space and for the military must now contemplate a broader role," according to Dr. A.M. Zarem, 1967 WINCON chairman and president of Electro-Optical Systems, Inc., a subsidiary of Xerox Corporation. "That role must be directed toward the realization of the socio-economic goals of our nation and of mankind as well," he said.

WINCON '67 will attempt to do this by relating the theme "new horizons in electronic systems" to a broad spectrum ranging from tactical military needs to society's problems in health, education and transportation. The meeting at the International Hotel is expected to draw approximately 4,000 and will feature many speakers from non-electronic fields.

An overview of the convention's concern with cybernetics, bionics and man/machine interfaces will be found in the opening session, "the brain—ultimate challenge to the systems engineer." This newly initiated lecture will be one in a continuing annual series to honor the memory of the late Dr. John von Neumann, Hungarian mathematician who was instrumental in computer development and a student of the interface and similarity between computer and human systems.

A total of 16 classified and unclassified sessions will be held during the three day meeting, with subjects ranging from electronic systems for meteorology to horizons in computer technology to bionics. In this latter session entitled "bionic systems—a technology in transition," it will be explained that scientists must first develop better techniques for observing human systems if man is to successfully adapt electronics to the image of living organisms. Use of psychological knowledge as a basis for system design is still generations behind the electronic state-of-the-art. Therefore, the demand is for improved methodology in obtaining the psychological inputs.

This responsibility rests equally upon the shoulders of the engineer and the psychologist, according to Dr. Malcolm Currie, WINCON technical program chairman and vice president and associate manager of the research and development division, Aerospace Group, Hughes Aircraft Co. "Subjects which were alien to yesterday's electrical engineering curriculum—metallurgy, advanced chemistry, biology—must now be mastered in order to perform today's engineering tasks and those of the future."

Dr. Currie also noted that the demands on the engineer are transcending the purely technical and extending into the world of business and social needs. "In systems applications, one must also concern himself with how a function can be performed within the political and economical constraints of the world." In information displays, for example, integrated circuits are paving the way for significant technological advances. Yet, in areas such as education, teachers are still inclined to reject such aids as displays on the grounds that they impair creativity, according to one paper which will be aired in the session on information display systems.

Aside from the regular sessions and the von Neuman lectures, two additional speakers will talk during the opening luncheon on February 7 and the banquet on February 8. While the banquet speaker has not yet been named, luncheon attendees are scheduled to hear noted physicist Dennis Gabor who will talk on "the future of western civilization." Dr. Gabor is chairman of applied electronics, Imperial College of Science and Technology, University of London.

Participants in the first annual von Neumann lecture will be Nobel Laureate Sir John Eccles, member, Institute for Biomedical Research, E. R. F., American Medical Association, Chicago; Dr. Richard Bellman, professor of mathematics, engineering and medicine at the University of Southern California, and Dr. Dean E. Wooldridge, research associate at the California Institute of Technology. Moderator will be Dr. George M. Austin, M.D., head of the division of neurosurgery, University of Oregon Medical School.

WINCON is sponsored by the IEEE Group on Aerospace and Electronic Systems and the Los Angeles Council, IEEE. (The AIAA is co-sponsor of one session.) The concurrent classified symposium is sponsored by the USAF Systems Command, research and technology division, scientific and technical liaison office, Los Angeles, and Hughes Aircraft Co.

Registration fees are $12 for IEEE or AIAA members, $15 for nonmembers. The fees include a copy of the convention record. Additional copies of the record will be available during the convention for $7. Registration material may be obtained by writing to the IEEE, Suite 1920, 3600 Wilshire Blvd., Los Angeles, 90005. Industry sponsorship has replaced exhibits as part of the convention format.

6. "Darkening Skies of Santa Clara Valley", Herbert C. Johnson, senior engineer, Bay Area Air Pollution Control District.


Saturday, Feb. 25, 1967

9:00AM Registration and displays open


10:00AM Presentation of papers and discussion


12:00 M Lunch

2:00PM Presentation of papers and discussion


5:30PM Cocktail Party

7:30PM Banquet (San Jose State Dining Hall)

"The Electric Automobile —New Engineering Breakthrough".

from IEEE spectrum, January 1967

Lockheed Missiles & Space Company.

CHALLENGES

• AN OPTICAL TRACKING AND RANGING SYSTEM for NASA which provides orbiting space vehicles with angle, rate and range information to accomplish space rendezvous and docking operations.

• WIDE BAND OPTICAL COMMUNICATION SYSTEM to carry real-time television from the moon to earth.

• ADVANCED SOLAR REFERENCE SENSORS for the Nimbus Meteorological Satellite.

• LOW-LIGHT-LEVEL TELEVISION SYSTEMS that "see in the dark."

• AN INFRA-RED STELLAR MAPPING PROGRAM using a twenty-four inch Newtonian telescope in the ITT Astronomical Observatory.

OPPORTUNITIES

We are currently seeking a number of imaginative engineers who are challenged by highly sophisticated Circuitry and Hardware problems, and who can offer a solid background of electro-optical experience in the following areas:

• ELECTRO OPTICS CIRCUIT DESIGN Requires analog and digital solid state circuitry experience in airborne or space craft electro-optical systems.

• OPTICAL PHYSICS Requires extensive experience in propagation, detection, tracking, ranging, radiometry, spectrometry, coherent and incoherent sources, modulation and image evaluation techniques.

• ELECTRO-OPTICAL SYSTEMS Requires an up-to-date electronics background with sufficient knowledge of optics to make major design decisions. Experience in project management and customer liaison required.

For a confidential interview, call HENRY P. FELDMANN, EM 7-2211 or send resume to:

IT&T FEDERAL LABORATORIES

A DIVISION OF INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

15151 BLEDSOE STREET, SAN FERNANDO, CALIF.

An equal opportunity employer
Dredging vessels aligned by special gas laser instruments have begun round-the-clock excavation at the bottom of San Francisco Bay for the trans-bay tube portion of the BART trans-bay line. This is the first time lasers have been used for ranging a group of dredges working simultaneously on marine excavation. The laser equipment is a new product of Spectra-Physics, Inc. of Mountain View.

The dredges are excavating a trench approximately 20,000 feet long varying in depth of excavation from 15 feet to 85 feet and from 35 feet to 135 feet beneath the surface of the water across the bottom of the Bay between San Francisco and Oakland. Into this trench will be placed the pre-fabricated tube sections forming the tube for the rapid transit vehicles.

Because of the precision required in the sinking and placing of the tube sections and the critical size and shape of the trench, it is necessary that the personnel aboard the dredges know their exact position at all times. Any deviation, if only a few feet from the planned alignment, would result in a trench unsuitable for criteria of the project. Because of the precision required, because the planned alignment consists of two tangent sections, three horizontal spirals, and two horizontal curves, and because both ends of the project are metropolitan areas, it was impracticable, if not impossible, to utilize conventional ranging systems. Various conventional ranging systems for dredges include telephone pole-like range towers, which must be erected specially, intersecting sextant angles, which lack the accuracy required, triangulation, which requires constant manning, or trilateration, which requires the use of distance measurement equipment as well as constant manning.

Model LT-2 laser-transit instruments have been put in position at triangulated points along the water’s edge, on the Ferry Building, on freeway structures, on buildings, on certain Bay Bridge Piers, on sea towers in the Bay, on waterfront piers, at the Oakland Mole, and elsewhere as necessary to satisfy the ranging and alignment requirements. Alignment of the visible laser beams is accomplished by horizontal angles from other known triangulation points. The beams are projected out over the surface of the water at pre-determined ranges and personnel on the dredges visually bring their vessels into location on the beams. The laser light is fanned vertically but is thin horizontally (approximately six inches in azimuth at one mile) and can be seen only by one who is directly in its path. The laser beams are visible in bright sunlight as well as at night, and in moderate haze or light rain.

In addition to accurate surface positioning of the dredges, there is a need for vertical control. There is a tidal differential of more than seven feet occurring about every six hours. The exact tide level, therefore, must be known by the operators on the dredges if they are to excavate to an accurate depth at the bottom. To permit them to determine the tide levels at all times, separate laser-transit instruments on the shore, piers, or towers are being posi—

(Continued on page 16)
In the face of rising costs, these new power modules bring the cost per watt of 0.05% regulated DC to an all-time low!

MC-65 SERIES is a new line of all-silicon AC-DC power modules — specifically designed to give you more watts per dollar. A wide range of different voltage and current models is available. So, if you’re interested in better power supplies at budget prices — and who isn’t — write for information on these new Technipower modules today!

- 314 models, outputs 3 to 152VDC, up to 750 watts.
- Regulation ±0.05%.
- Temperature coefficient 0.015%/°C typical.
- Ripple 2mV RMS.
- Temperature rating 65°C.
- Not damaged by output shorts or overloads.
- No turn-on/turn-off overshoot.
- Designed to meet MIL specifications.

Your inquiry will also bring you a copy of the latest Technipower catalog, giving complete data and prices for more than 4000 power modules and lab supplies.
FAR OUT & DOWN TO EARTH

160 Mc INTERMEDIATE FREQUENCY
Freq. Range GHz........... 0.5-12
Min. Gain db................. 20 or 25
Min. BW MHz................... 40 or 50
Signal VSWR................... 1.3-2

60 Mc INTERMEDIATE FREQUENCY
Freq. Range GHz........... 0.5-12
Min. Gain db................. 25
Min. BW MHz................... 18
Signal VSWR................... 1.3-2

30 Mc INTERMEDIATE FREQUENCY
Freq. Range GHz........... 125-12
Min. Gain db................. 25
Min. BW MHz................... 14
Signal VSWR................... 1.3-2

RSE’s receivers and transmitters are far out—all over the world—in aircraft, in drones, in buoys, and overhead in satellites. This far out equipment is the result of the technological sophistication that characterizes our staff.

The mixer preamplifier above is down to earth. It is a small, stable workhorse with replaceable diodes. It is a valuable new addition to our line of equipment. It is the result of careful design and production by our staff.

RF CIRCUIT ENGINEERS
DIGITAL CIRCUIT ENGINEERS
SYSTEMS ENGINEERS

RS Electronics has positions available for work on a large number of long term programs, which include L and S Band Receivers and Transmitters, FM Signal Generators, and High Frequency Counters.

If you are technically qualified and interested in these fields, RS Electronics is interested in you.

Call (408) 739-3230 for interview.

R S ELECTRONICS
CORPORATION
795 KIFER ROAD
SUNNYVALE, CALIF. 94086
An Equal Opportunity Employer

GRID SWINGS

IT IS REPORTED:

Anampex Corporation has received a contract for approximately $2,000,000 from Bell Telephone Labs to develop a videotape system to be used to store and retrieve maintenance data for the NIKE-X weapons systems, being developed for the U.S. Army to provide high speed access to a large file of maintenance data stored on video tape.

George W. Marshall has joined Western Microwave Laboratories, Inc., Santa Clara, as components sales manager, reporting to the marketing vice president.

Robert F. Dies has been named marketing services manager of Union Carbide Electronics, Mountain View, in charge of product marketing, order precessing, and customer service.

Finn Jorgensen has been named to the new position as manager, recording research, Memorex Corp., Santa Clara.

Herschell C. Stansch has been appointed project engineer at Applied Technology Inc., Palo Alto, after association with Hewlett Packard for nine years, most recently serving as a project manager with the Dymec division.

Memorex Corp., Santa Clara, has announced completion of a 100,000 sq. ft. addition, along with a 40,000 sq. ft. facility under construction more than doubling its space for research, development, manufacturing, quality control and tape testing departments.


The Sierra Electronic Operation of Philco-Ford Corp. has been awarded a contract for an infrared nondestructive testing system for inspection, recording and evaluation of bonding flaws in helicopter rotor blades of Boeing’s Vertol division.

Kaiser Aerospace & Electronics Corp., Palo Alto, has dedicated a new 72,800 square-foot electronics plant adjoining its development laboratories at 1681 Page Mill Road.

Keith Rutherford has been appointed to the newly-created post of sales manager at Zeltux, Inc., Concord.

Philco-Ford Corporation has announced establishment of a space and re-entry systems division to headquarter in Palo Alto.
John E. Gerling has joined the applications engineering staff of Watkins-Johnson Co., Palo Alto, and will be primarily concerned with products of the space communication section.

Joseph T. D’Amico has been named director of material for the microelectronics division of the Philco-Ford Corporation, Santa Clara.

Stanford’s $4,460,000, 116,000 sq. foot space engineering and science building and related facilities will be begun early in 1967 and completed about two years later to serve 50 faculty members, 40 research associates, and 180 graduate students from a dozen departments, Air Force and NASA grants, along with the corporate gift program, making it possible.

Hans Mynlieff has been appointed southwestern regional sales manager of the Philco-Ford microelectronics division, Santa Clara.

Hewlett-Packard Co. reported an increase in net earnings from $13,678,000 in 1965 to $17,445,000, a gain of 28 per cent.

Robert E. Ankers has been named director of marketing and field offices, Washington, D.C., for Applied Technology, Inc., Palo Alto.

Harry E. Page has been promoted to director of manufacturing and John W. King to manager of production manufacturing, Applied Technology, Palo Alto.

Applied Technology, Inc., has been awarded a $1,768,000 contract by the U.S. Air Force for electronic equipment for the B-52 series aircraft, bringing the electronic firm’s current backlog to an all-time high of $26 million. This figure represents a 200 per cent increase over the backlog at this time last year.

James E. Rogers has been promoted to manager of the newly formed applications engineering department of Pulse Engineering, Inc., Santa Clara.

**NEW...**

- Series 256 Brass Clips for single or dual plastic transistors
- Type 170 Aluminum Insulating Wafer for 70-3 transistors
- Delta Cast 153 Filled Epoxy Casting System with four times thermal conductivity of unfilled systems and high dielectric strength

Write for DISTRIBUTOR PRODUCTS Catalog No. 1967.

**ENGLERT and COMPANY**

Management Consultants
2555 Park Boulevard
Palo Alto, Calif.
(415) 326-7390
MORE SWINGS
Lockheed Missiles & Space Co., Sunnyvale, has received an $85,000 contract from Far West Laboratory for Educational Research and Development (U.S. Office of Education) in San Francisco, to design a computerized system by which all public schools in northern California and most of Nevada could draw mutually on new findings in educational research. The award marks the first time federal funds earmarked for educational research and development have been administered through a contract with private industry.

Ultek Corp., Mountain View, has announced the appointment of Robert Yarborough as national sales manager; Eric Eklund as western regional sales manager; and Bert Allen as midwest regional manager.

United Control Corp., Seattle, has announced receipt of a $900,000 contract for avionics equipment for the Air Force's giant C-5A military jet transport, designed and built by the Lockheed-Georgia Co., the largest aircraft of its kind to be put in production.

MORE MED SCHOOL COMPUTER installation will be used for further systems research and other special applications.

Through the process of "time-sharing," the medical computer will constantly monitor scores of scientists' instruments, which will be located in the Medical Center and connected by cables to the machine. The system will permit a dialogue between doctor and computer during the experiments.

Hewlett-Packard employees of its Delcon Division, western service center, and Datamec Division have moved into a new, two-building, 65,000 square-foot facility at Logue Avenue and Middlefield Road in Mountain View.

William S. O'Hare has joined Applied Technology, Inc., Palo Alto, as a senior systems engineer, formerly serving Airtronics, General Precision, Raytheon, and Westinghouse Electric.

Bill D. McNary has been appointed director of microwave components at Huggins Laboratories, Sunnyvale, formerly serving as manager of manufacturing for high power microwave tubes at Varian/Eimac, San Carlos.

Jack Pyle Co., San Mateo, components sales representatives, has acquired Birnbaum Sales Corp., Redwood City.

MORE LASER RANGING USE tioned to project a flat, fanned-out beam parallel to the surface of the water. The tide can be checked by observing the beam at a calibrated staff on the deck of the dredge vessel. The staff is adjusted relative to the present draft of the vessel.

Outstanding Engineers
Enthusiastic acceptance of Avantek products has created several opportunities for outstanding engineers.

SENIOR DEVELOPMENT ENGINEER with a thorough knowledge of design and application of stripline circuitry to work on the development of broadband, solid-state, microwave amplifiers. MSEE desired. Experience with microwave transistors is desirable but not required.

SENIOR DEVELOPMENT ENGINEER with experience in the design of broadband, solid-state, RF amplifiers in the 1 to 1000 MHz region. A high degree of technical capability and creativity is required.

For the right engineers Avantek offers:

- Stock equity in a growing new firm.
- Development work on state-of-the-art products from concept through production.
- Small company atmosphere where a person's contribution is known and appreciated.

For interview appointment call Collect or send resume to Leonard D. Seader, V.P. Engineering Avantek, Inc.

3001 Copper Road
Santa Clara, California
(408) 739-6170
An equal opportunity employer
Finn Jorgensen has been named to the new position as manager, recording research, Memorex Corp., Santa Clara.

Elmar Kolehmainen has been named manager of value engineering at Dalmo Victor, a Textron Division, Belmont, and will be responsible for implementing value engineering programs and training. Prior to joining Dalmo Victor, he was a value engineering specialist at Lockheed and manager of engineering services at Melabs, Palo Alto.

Lockheed Missiles & Space Co., Sunnyvale, has received a $24,500 contract from the State Department of Professional and Vocational Standards to produce a system for increased application of electronic data processing techniques to the administration of 700,000 occupational licenses.

Lapel buttons for all higher grades now on hand at the section office suite 2210, 701 Welch Road, Palo Alto 9 to 5 Monday through Friday (no mail orders, please)

...a lasting and rewarding career for yourself with the largest and fastest growing aerospace electronics corporation in the Pacific Northwest. While you're at it, establish a way of life for your family that is based on the finest combination of cultural and natural advantages in the country. United Control needs men who want a chance to be recognized, while working on projects vital to aerospace technology. This is the kind of action you'll be involved with at United Control. Outside the plant, 20 minutes from culturally and industrially booming Seattle, Washington, life can be as varied as you want to make it. Golf year 'round, cruise on hundreds of miles of sheltered Puget Sound and Lake Washington, enjoy clean air...space...a fine home. For full details on career opportunities with United Control, send your resume to Mr. D. G. Vawter, Employment Manager.
and design of traveling-wave amplifiers, klystrons, and interdigital backward-wave oscillators. In 1959 and 1960 he developed and programmed generalized traveling-wave tube design procedures for the IBM 704 digital computer. Also during that time he used the computer for work on some electromagnetic scattering problems with Dr. E. T. Jaynes of Stanford University. In 1960 and early 1961 he worked on the theoretical analysis and design of millimeter-wave backward-wave oscillators. From April 1961 until June 1962 he was engaged in research under the direction of Professor A. E. Siegman at Stanford University, and during the 1961-62 academic year he was the Raytheon Fellow. In mid-1961 he and Professor Siegman conducted conclusive optical heterodyne experiments involving microwave difference frequencies; those experiments demonstrated for the first time that the ruby laser generally oscillates at more than one frequency simultaneously. His subsequent photomixing experiments produced time-resolved, high resolution spectroscopic information about the output of ruby lasers. From June 1962 until December 1963 he was head of the Optical Device Department at the Mountain View Components Laboratory of Sylvania’s Microwave Device Division. In that position he contributed to programs on traveling-wave phototube (TWP) analysis and development, optical heterodyne demodulation, high frequency optical mixing, FM demodulation, and scanable TWP’s. In May 1964 he was selected as the recipient of the 1963 Alfred Noble Prize. Dr. McMurtry has authored papers in the fields of micro-

section bylaws provide that “additional nominations by petition may be submitted no later than April 1 to the section executive committee for inclusion on the ballot. To be valid, such petitions shall carry the signatures of no fewer than 25 voting members of the section and include a statement of the willingness of the candidate to serve. Election shall be by mail ballot and shall be completed by May 15, only ballots received prior to 5 p.m. on that date being considered valid. The incoming officers shall assume the duties on or before July 1 on a date fixed by the outgoing executive committee.”

Members of the nominating committee, appointed by Section Chairman E. H. Hulse, were Jack L. Melchior, chairman; P. D. Lacy, V. E. Kaste, E. F. Carter, and A. J. Morris.
Manufacturer | Representative Index

Representative Directory

Bill Coe & Assoc.

P. O. Box 1383
San Carlos; 593-6057

Components Sales California
Palo Alto; 326-5317

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

Dynamics Associates
101 Industrial Way, Burlingame; 344-2521

Gest Co., W. K.
Box 746, Cupertino; 984-3543

King Engineering Co., Inc.
525 Grant Street
San Mateo; 424-9465

L & M Engineering
2620 The Alameda
Santa Clara; 243-6661

Nickerson-Gray & Assoc., Inc.
P. O. Box 11295
Palo Alto; 326-0152

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

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

Snitzer Co., T. Louis
1020 Corporation Way
Palo Alto; 956-8304

Stone & Assoc., Jay
140 Main Street
Los Altos; 948-4583

Walter Associates
75 S. San Antonio Road
Los Altos; 941-3141

Wadsworth-Pacific Mfg. Assn., Inc.
71 Parker Avenue, Atherton; 321-3015

SYSTEMS ENGINEERS
STANFORD RESEARCH INSTITUTE
333 Ravenswood
Menlo Park, California
an equal opportunity employer

has a limited number of openings for qualified younger men interested in developing as Systems Engineers. These openings result from increasing demand for SRI to provide an unbiased review of military system and technique developments.

SELECTED CANDIDATES
will join small project teams currently performing analyses of Anti-Ballistic Missile Radar Systems, evaluating the potential of current and projected Missile Systems, and defining the characteristics of a new Radar Instrumentation System.

THIS WORK
will be performed under the guidance and leadership of experienced Senior Engineers with backgrounds in the fields of electronic circuit design, detection theory, ECM/ECCM, Antennas, Guided Missiles, and operations research.

AT SRI,
important programs such as these are performed by small teams formed of specialists in appropriate technical areas, who are encouraged to find the "best" solutions independent of the constraints of product lines and management biases.

SUBMIT YOUR RESUME, in confidence, stating salary history to:

H. J. Snider
Personnel Coordinator

f e b r u a r y , 1 9 6 7
An Interview at Your Convenience

Western Microwave is a dynamic, 4-year-old company located in Palo Alto-Stanford Industrial Park. We produce a variety of Microwave components, devices and systems—some commercial, some defense-related—and we're growing fast, including our brand-new facilities which will open soon! At the start, we had 6 people. Last year we had 95 and today, just over 300. First year sales hit a low five figures—they're now several million. We're on the way up!

ENGINEERS

• Openings on all levels from entry to technical management
• Openings in both systems and components engineering
• These are R & D positions primarily
• Openings in both systems and components engineering
• Solid state circuit design RF and IF design
• Analog and digital circuit design
• AC audio and video amplifier work
• Develop amplifiers/oscillators/filters
• Transmitters and receivers

LIBERAL
Salaries & Benefits

GENEROUS
and easy relocation

PROFESSIONALISM

To arrange
An Interview at Your Convenience
please contact or send your resume to
Mr. Warren Enos

Western Microwave
1045 DiGiulio
Santa Clara, California

EQUAL OPPORTUNITY EMPLOYER

Serving the electronic industry

Two new books, one an electronics textbook and the other a reliability engineer's handbook, have been published by faculty members of the Stanford School of Engineering.

"Circuits, Devices, and Systems" (John Wiley & Sons, 776 pp., $11.95) authored by Prof. Ralph J. Smith of the Electrical Engineering Department is now available in bookstores. It is intended as a first course in electrical engineering for all engineering students.

"Reliability Handbook" (McGraw-Hill, 688 pp., $22.50) was edited by Prof. W. Grant Ireson, head of the Department of Industrial Engineering. Each of 17 sections in the book was written by an authority on the subject, and the book provides coverage of all aspects of reliability from design stage to field use and maintenance. It contains detailed information on mathematical and statistical techniques used in designing, conducting and evaluating test programs.

HELP THE SECTION GROW BRING IN A NEW MEMBER

ADVERTISERS INDEX

Amplex Corp........................................Cover 3
Applied Technology Inc..................................Cover 2
Avantek..................................................16
Baran Associates......................................20
Bel Air Sands Motel.....................................16
Eimac..........................................................4
Electromagnetic Tech. Corp................................16
Engineering Sciences Personnel Services...............14
Engleit and Company......................................15
Ferro Enameling............................................14
ITT Research Institute.......................................13
ITT Federal Laboratories.....................................11
Lenkurt Electric.............................................18
Lockheed Missiles & Space Co.............................12
Neeley Sales Div. HP Co.................................1
RS Electronics..............................................14
Stanford Research Institute.................................19
Techimpower..................................................13
Tektronix, Inc..............................................19
Transworld Airlines.........................................13
United Control..............................................17
Wakefield Engineering.......................................15
Walter Associates, Inc.....................................18
Western Microwave Labs, Inc..................................20

EDUCATION NOTES

WELDING SERIES


CLASSIFIED ADVERTISING RATES


PRODUCTS

ELNETIC

ELECTRONICS, INC.

Serving the electronic industry with transformers designed specifically for its products.

ULTRA SHIELDED • POWER AUDIO • MINIATURE • SUBMINIATURE • CHOKES • COMMERCIAL • MILITARY

2100 ZENO PLACE • VENICE, CALIF

392-3047

SALES INC. • ASA ASSOCIATES

1337 MIDDLETON COURT LOS ALTOS, CALIF

(415) 968-4986

INSTRUMENTATION AND RFI/EMI SERVICES

McDONALD ASSOCIATES

San Carlos, California (415)593-6057

DEPENDABILITY . . .

That means you can count on us to supply competent, technical talent at a reasonable price. We really do what we promise.

THE GRID

"We are the job shop"...is the best electronic/electrical engineering recruiting medium in northern California.

Use it when you need manpower.

W E L D I N G S E R I E S

Two new books, one an electronics text and the other a reliability engineer's handbook, have been published by faculty members of the Stanford School of Engineering.

"Circuits, Devices, and Systems" (John Wiley & Sons, 776 pp., $11.95) authored by Prof. Ralph J. Smith of the Electrical Engineering Department is now available in bookstores. It is intended as a first course in electrical engineering for all engineering students.

"Reliability Handbook" (McGraw-Hill, 688 pp., $22.50) was edited by Prof. W. Grant Ireson, head of the Department of Industrial Engineering. Each of 17 sections in the book was written by an authority on the subject, and the book provides coverage of all aspects of reliability from design stage to field use and maintenance. It contains detailed information on mathematical and statistical techniques used in designing, conducting and evaluating test programs.

HELP THE SECTION GROW BRING IN A NEW MEMBER

ADVERTISERS INDEX

Amplex Corp........................................Cover 3
Applied Technology Inc..................................Cover 2
Avantek..................................................16
Baran Associates......................................20
Bel Air Sands Motel.....................................16
Eimac..........................................................4
Electromagnetic Tech. Corp................................16
Engineering Sciences Personnel Services...............14
Engleit and Company......................................15
Ferro Enameling............................................14
ITT Research Institute.......................................13
ITT Federal Laboratories.....................................11
Lenkurt Electric.............................................18
Lockheed Missiles & Space Co.............................12
Neeley Sales Div. HP Co.................................1
RS Electronics..............................................14
Stanford Research Institute.................................19
Techimpower..................................................13
Tektronix, Inc..............................................19
Transworld Airlines.........................................13
United Control..............................................17
Wakefield Engineering.......................................15
Walter Associates, Inc.....................................18
Western Microwave Labs, Inc..................................20

EDUCATION NOTES

WELDING SERIES


CLASSIFIED ADVERTISING RATES


PRODUCTS

ELNETIC

ELECTRONICS, INC.

Serving the electronic industry with transformers designed specifically for its products.

ULTRA SHIELDED • POWER AUDIO • MINIATURE • SUBMINIATURE • CHOKES • COMMERCIAL • MILITARY

2100 ZENO PLACE • VENICE, CALIF

392-3047

SALES INC. • ASA ASSOCIATES

1337 MIDDLETON COURT LOS ALTOS, CALIF

(415) 968-4986

INSTRUMENTATION AND RFI/EMI SERVICES

McDONALD ASSOCIATES

San Carlos, California (415)593-6057

DEPENDABILITY . . .

That means you can count on us to supply competent, technical talent at a reasonable price. We really do what we promise.

THE GRID

"We are the job shop"...is the best electronic/electrical engineering recruiting medium in northern California.

Use it when you need manpower.
Company sponsored programs have created exceptional opportunities on the technical staff at Ampex Corporation, leader in magnetic tape recording. Specific openings exist at all levels in projects which vary from future generation instrumentation recorders to Videofile — an exciting program in which video images are processed through a computer memory. Typical of the technical experience we seek are the following specializations:

- Information Display
- Closed Circuit Television
- Signal Processing Circuity
- Servo Controls and Analysis
- Logic Design for Data Processing
- Precision Mechanisms and Kinematics
- Magnetic Recording Heads

Qualified candidates should have at least a B.S. and 3 years appropriate experience. These positions are on the San Francisco Peninsula with a dynamic industry leader having a distinct commercial emphasis on sales.

For a prompt, confidential review of your qualifications, kindly respond in detail to

J. R. Doolittle, Industrial Relations Manager

AMPEX CORPORATION
401 Broadway
Redwood City, California 94063

An equal opportunity employer.
EIMAC, a division of Varian, is one of the world’s leading producers and designers of electron power tubes and directly related component products. In addition, an expanding variety of EIMAC microwave devices of small size and great ruggedness are opening new possibilities for electronic countermeasure, airborne communication equipment, and telemetering.

Current key positions include these challenging door openers:

<table>
<thead>
<tr>
<th>APPLICATIONS ENGINEERS</th>
<th>SENIOR TELEMETRY ENGINEER</th>
</tr>
</thead>
<tbody>
<tr>
<td>To provide highly technical marketing support for our Tube Group sales engineering effort. BSEE desirable, not necessary; engineering tube experience required.</td>
<td>To develop RF and MW electronic subsystems for aerospace and military applications in telemetry transmitters, cavity oscillators, and amplifiers. BSEE desirable, with 4–6 years’ experience.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POWER SUPPLY ENGINEER</th>
<th>SENIOR QUALITY CONTROL ENGINEER</th>
</tr>
</thead>
<tbody>
<tr>
<td>To design magnetic and solid-state circuitry with emphasis on DC-DC converters, miniaturized power supplies, and associated circuits. BSEE with 2 to 3 years’ experience.</td>
<td>Senior position involving all aspects of a tube manufacturing quality control and reliability program. B.S. with 3 to 7 years’ experience.</td>
</tr>
</tbody>
</table>

EIMAC offers an outstanding benefits program coupled with a professional engineering environment.

For immediate consideration, send your résumé to:
Mr. R. A. Reidburn
(415) 592-1221

EIMAC
a division of varian
301 Industrial Way • San Carlos, California
an equal opportunity employer