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engineering NEWS

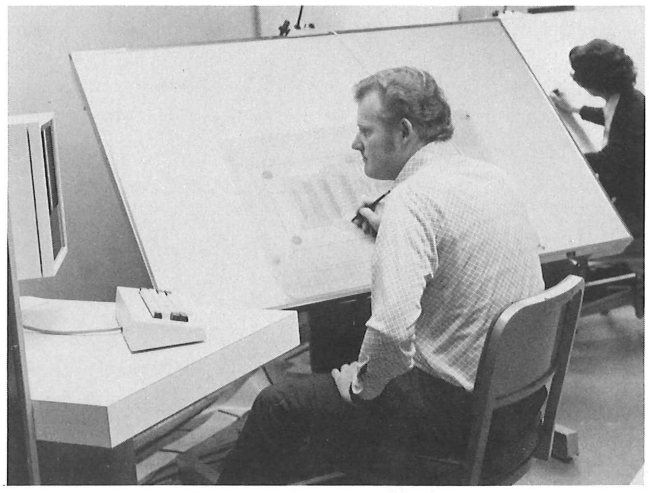
Joyce Lekas editor 6601 • Dave K Morton associate editor 6071

ECB Design Layout Goes Electronic

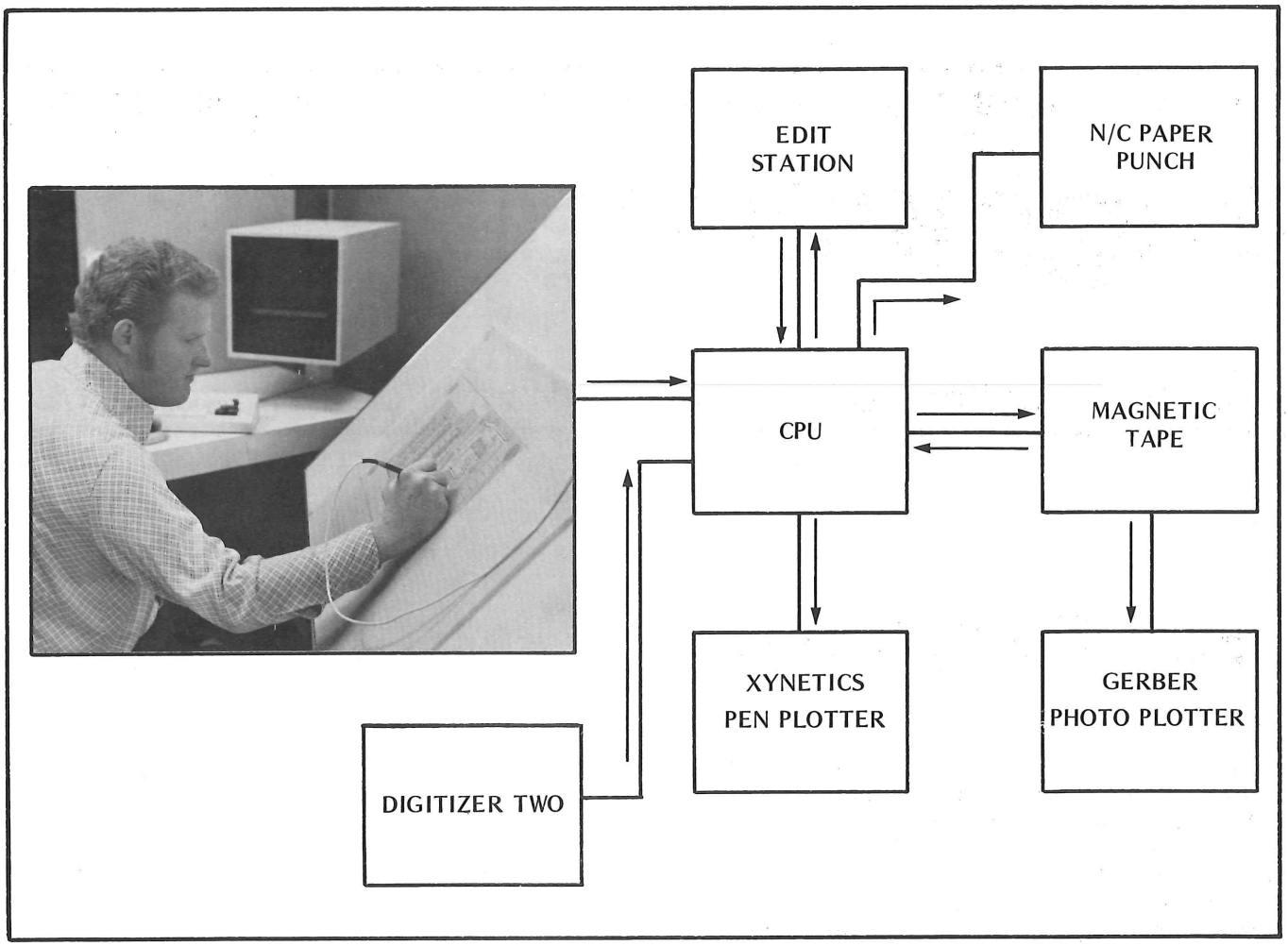
The printed circuit board area in the lower level of building 50 has something new in operation of great interest to all ECB design groups. The Computer Aided Design system, (CAD), can produce finished mylar film of an ECB design in a fraction of the time presently required for an all-manual layout. Previously, the placement of all components, pads, runs, etc. on the surface of the mylar was done by hand, involving substantial time in positioning and re-positioning. This new system, called the 'APPLICON Interactive Graphic System,' can electronically duplicate the necessary positioning details. Working from the initial layout of a new design, the system operator electronically describes the circuit to a computer, and mylar film of that design is automatically produced. A separate output makes the paper tapes used for later N/C routing and drilling of the completed boards in the ECB Prototype Lab, (See ENGINEERING NEWS, Oct. '74).

A PDP 11/35 central processing unit controls the system, with most of the peripherals operating in a time sharing mode. Data inputs to the processor are two separate 'digitizers,' each with its own keyboard and Tektronix 611 display unit. The digitizer is a special layout table with a grid of electronic elements buried under its surface, and a handheld electronic pen for interfacing with this grid. By properly pressing the pen down against the various features of a drawing mounted on the table, the operator determines the X and Y coordinates of these features and instructs the CPU to establish all positional data in its memory. Circuit runs are simulated with the pen by indicating the beginning point, the ending point, and any turning point in the run. Digitized information is displayed on the 611, allowing layout errors to be noted and corrections made with the pen.

The system will recognize components because of a 'symbol recognition' language, allowing the operator to simply make graphic symbols with the pen, rather than having to explain each command in detail. Another important feature is a 'teach' mode of operation, enabling the creation of a desired symbol with the pen to correspond with a specific work demand or procedure. There is a 'library file' of programmed information for each possible component, (i.e., ¼watt resistor) including the appropriate soldering pad sizes, dimensions between component leads, specific shapes, etc. Making the correct graphic symbol for a part will automatically transfer all of this related information into the memory. An 'edit' station also interfaces with the CPU, providing for additions, modifications, or deletions to information stored in memory. This station uses a Tek 611 display as well, complete with a hard copy unit.



CAD OPERATORS AT WORK



THE CAD DIGITIZER (NUMBER ONE) INTERFACING WITH THE *APPLICON* SYSTEM

What this new system means to the ECB designer is the possibility of a 2 hour board layout time instead of 1 week. Total projected cost savings of 65% per board are also involved. Considerable evaluation and planning preceded the development of the CAD system, which is providing limited support for 3 or 4 ECB design groups, with full support expected in about 6 months. Several unique features, in addition to its high degree of operating efficiency, resulted in the 'APPLICON' system being chosen instead of its competitors. As this technology progresses, the necessary operating personnel will come from existing ECB design groups.

System output data is transferred to one of two magnetic tape units, which also serve as archive storage in case a dump of on-line computer information should accidently occur. One output using on-line data is a Xynetics 1050 Pen Plotter table, one of the fastest, most accurate pen plotters made. It produces a paper overlay of the completed layout, which is then placed on top of the original artwork, verifying the component placement and run layout data stored in memory. After a 'design rules check' has been electronically performed, necessary information is retrieved from the magnetic tape, and positive mylar film is produced by a Gerber 40 Photo Plotter.

TEKTRONIX AWARDS GRANT

Tektronix has made a research grant available to the Oregon Graduate Center. This $50,000 grant is intended to involve OGC faculty and students in applied research of interest to the company, and also to further good informal communication between Tek and the center. Anticipated activities include consultation regarding minor problems where OGC facilities and expertise can save Tek the time and money of developing similar processes; OGC research seminars presenting existing and proposed research developments; and assistance on some applied research projects of mutual interest.

Wim Velsink, director of Tek Labs and chairman of the Tektronix Research Committee, and Harley Perkins, Technical Educational director, will coordinate the project for the company. Further information can be obtained from Harley at ext. 6186.

Help With Packing

Complete assistance in the packaging of special-care items for shipping is available from the Packaging Design group in building 50. Service is limited to non-catalog items, (i.e. magnetic computer tape, static-sensitive semi-conductor devices, etc.). For more information, contact Sil Arata at ext. 6585.

Gates Goes To Fluke

John Gates, manager of Digital Measurement Products, has left Tektronix to assume duties as Engineering Vice President with John Fluke Mfg. Co. in Seattle. January 24th was his last day at Tek. He begins at Fluke on February 10th.

After receiving his BA, (physics), from Oberlin College and his MSEE from Case Institute of Technology, John worked briefly for Hickok Electrical Engineering Co. In 1960 he came to Tek, first performing design work for the Advanced Circuits research group, and then working on the 560 series and 545B instruments. He helped organize the engineering capabilities of Sony/Tek in 1965-'66, working with engineering personnel in both the U.S. and Japan. John then assumed, (at various times), the engineering management of the portable oscilloscope group, the 5000 series group, the accessories group, the curve tracer group, the custom modification group, and the medical instruments group. The 200 series, 300 series, 430 series, 465, 475, 576, 577, 408, 412, and 5000 series instruments were developed during this period. In November, 1974, John traded the portable instruments for engineering supervision of the Signal Processing Instruments, (7912 and the DPO).

Admitting that he really only left the area, "because the weather is better in Seattle," John said he will really miss Tektronix and the friends he made. John's contributions to the company's effort were many. He will be missed.

Engineer Instructs

George Wilson, Integrated Circuits Engineering, is teaching an IC design course at the University of Washington in Seattle two days a week this winter quarter. Involving basic to advanced material on bi-polar, MOS, and I^2L devices, the 3 credit-hour class is offered on a graduate level.

Equipment Inventory Control

Instrument Control has started an extensive program in engineering for better use of the company's Test and Measurement Equipment inventory, (TME). Previously, a significant number of instruments manufactured at Tektronix were being tagged for in-house use, possibly duplicating existing equipment that was simply tucked away somewhere, overlooked. This swelled an already costly inventory, and increased the number of customer back-orders for the same equipment. Dollar sales suffered as a result.

One part of the new program involves management aid techniques. A master list of all TME instruments assigned to engineering, (both manufactured in-house and purchased outside) is available from Instrument Control. A list of TME noted by budget center will be issued to budget center managers, and small index cards, one for each individual instrument, sent to group managers. Each of these cards serve the same purpose an automobile title does. If an instrument is later transferred, the corresponding card is filled out and sent to Instrument Control. A title card will then be issued to the new TME user.

A second phase involves engineering-built equipment. Prior to ER, all A and B phase builds will have to be submitted to Instrument Control by the project manager for cataloging. This equipment is sent to the Cal./Cert. Lab to verify its bench use capability. If acceptable, it will be used as pool equipment. A parent design group wanting this equipment to stay in their area will have to submit an approved RFE. Although engineering-built instruments will be treated like production items, the initial design group will have first preference.

Long-term TME procurements will only be processed from an approved RFE. Engineering groups will be asked to submit a quarterly equipment-need forecast, and incoming RFE's will be compared to the appropriate manager's forecast. A thorough review of in-house availability will be conducted prior to any new TME purchase. Short-term instrument needs can still be satisfied by checking the necessary units out of Instrument Control's loaner pool, (see article by Ray Barrett). If an item cannot be found in the loaner pool, they will try to locate and negotiate a loan from another area. Individuals should not transfer, give, or loan TME from one group to another for extended periods. Excess items should be turned into Instrument Control for re-distribution, according to approved equipment needs. After an RFE approval, all TME requirements should be directed to Instrument Control. For more information, contact Chuck Corbridge at ext. 7880.

BETTER MESH FOR LESS

CRT mesh for the 5000, 7000 and 460 series storage scopes is being built in-house now on a limited basis, and will completely replace outside purchases by March. The 100 line/inch stainless steel mesh is an electroformed material, and has been developed to replace the woven mesh presently purchased outside the company. The reason for the in-house effort is to eliminate dependence on outside manufacturers; to improve quality; to reduce cost; and to make better use of existing technology and manpower within the company.

Mesh dimensions are critical, and even minor stress distortions in woven mesh cause CRT resolution problems. The electroformed technique developed at Tek is a processing improvement which will insure a better quality storage display.

The new mesh is produced by a photosensitizing and chemical etch process, similar to the process used in forming electronic circuits on the surface of a silicon wafer. The model shop designed and built a master mask which is used to make mylar artwork. Ultraviolet light through the mylar transfers the mesh design to the surface of a stainless steel medium, coated with a photoresistive solution. A nickel film is later deposited on the surface, sticking to the mesh pattern. The photoresistive solution is stripped away, leaving the nickel plated stainless steel mesh.

This operation is being done in the electroformed mesh area of building 48, with some production units now being shipped. After 100% production capability is reached, the technology will be enlarged to include replacement of other purchased meshes.

Call for papers

•28th Annual Conference on Engineering in Medicine and Biology, September 20-24, 1975

SPONSOR: The Alliance for Engineering in Medicine and Biology will sponsor this conference, to be held in the Fairmont Hotel in New Orleans, Louisiana.

TOPICS: Invited and contributed papers will be reviewed and selected for presentation. In addition, Poster Sessions will be held if there is adequate interest. Sessions will include these topics:

Artificial Organs
Biomechanics
Biomathematics
Biomaterials
Clinical Instrumentation
Research Bioinstrumentation
Biological Systems Analysis
Engineering in Health Care Delivery Systems
Bioengineering Roles in Industry, Government and Universities

ABSTRACT: Due by April 1, 1975

OTHER: Scientific and commercial exhibits will be another feature of the conference.

Send abstract to:
Patricia I. Horner
Conference Coordinator
28th ACEMB
Suite 1350
5454 Wisconsin Avenue
Chevy Chase, Maryland 20015

•1975 IEEE International Symposium on Electromagnetic Compatibility, October 7-9, 1975

SPONSOR: IEEE Group on Electromagnetic Compatibility will sponsor this symposium, to be held at the El Tropicano Motor Hotel in San Antonio, Texas.

TOPICS: Papers dealing with Interference Generation, Suppression, Control and Compatibility in the following areas are requested. Topics of interest include, but are not limited to:

Power
Satellite
Aerospace
Computer
Measurement Techniques
EMP
Grounding and Bonding
Hazards and Pollution
Environmental

ABSTRACT: Three copies of paper summaries (300 words, not an abstract), must be submitted by March 1, 1975.

OTHER: Authors will be notified of acceptance by March 31, 1975. Complete papers, (typed and ready for reproduction in the symposium record) will be due July 15, 1975.

Send summaries to:
Gus Van Steenberg
Southwest Research Institute
P.O. Drawer 28510
San Antonio, Texas 78284

•IEEE Region 6 Technical Conference on Communications Technology, May 7-9, 1975

SPONSOR: IEEE Region 6 will sponsor this conference being held in Salt Lake City, Utah.

TOPICS: Original papers, covering all areas of communications technology, are invited.

ABSTRACTS: Send a 50 word abstract to:
Stanley Moss
Technical Conference Chairman
Dept. of Bio-Engineering
2059 Merrill Engineering Bldg.
Mail Code 3500
University of Utah
Salt Lake City, Utah 84112

Scientific Computer Center

—EX Without Fear

Let's say that you're a typical engineer and only occasionally use a computer. You have a MAIN file that contains your main program, and a SUBS file that contains subroutines called from your main program. You also have calls to the 4010 plot routines in your main program, and calls to the scientific subroutine package. The problem is, however, you're afraid to use the computer because it's been a long time since the computer class, and you don't remember much about LINK, FTN, and ATTACH. Fear no more!

Simply enter the —EX command. The computer will ask what files you want, and you then enter MAIN, SUBS, PLOT 10, and SSP. That's all there is to it. Your program will be compiled, linked, and executed. Write-ups of the —EX command are available from the computer room, or—call Norma at ext. 5194, and she'll mail you one.

Mag Tape Library

We have a new method for using the magnetic tape library. If you want to know what tapes are assigned to you in the library, just type TAPES on your terminal. The computer will respond with the tape name(s), tape number(s), and the date(s) issued.

When you need a new tape assigned, just type NEWTAPE. The program will ask for a tape name, whether it will be a 7 track or a 9 track tape, and finally what length of tape you want. After it receives answers, the computer will assign a tape number. This number can then be used immediately if necessary.

If you wish to delete tapes or add your own personal tapes to the library, you must still come to the Computer Center. For further information, call Bob at ext. 5104.

Equipment checkout procedure

by Ray Barrett

Instrument Control's 'loaner pool' of Test and Measurement equipment is primarily, but not exclusively, for the use of engineering personnel. It operates from an 'open door honor system.' Even though it has never been a published fact, it has been assumed that "everyone" knew and understood this system, and the procedure for using it. In the face of tighter budget administration and increased control over new equipment purchases, we feel we should clarify the policies and procedures for using Instrument Control's equipment loaner pool.

1. Similar to a library, each item available for checkout has a card.

a. If the instrument you want does have an attached card, simply fill in your name and phone extension legibly. No other information is necessary. After completing the card, deposit it in the box located on the counter for this purpose. It's that simple.

b. If the instrument does not have a checkout card, it is NOT available. This is very important because Instrument Control also provides shipping and receiving service for Measurement Standard's Cal./Cert. Lab in the same area, resulting in the movement of equipment belonging to different departments and customers.

2. To return an instrument, simply place it on the 'incoming' shelf. Please do NOT return it to the stock shelves, or reattach the original checkout card. We will do that.

3. The checkout period is only for as long as you actually need the equipment, up to a MAXIMUM of 4 weeks. If your need exceeds this limit and a FIRM termination date is foreseen, an extension of the loan may be negotiated. This is subject to the number of available items and the demand on them.

4. Do NOT loan pool equipment to other individuals, even though you are finished with it before the 4 week period has expired. Return it to Instrument Control, 1st level of building 50.

It costs money to send out reminders, second notices, and finally to have to go find an instrument that should have been returned weeks earlier. Your cooperation will help greatly to trim our operating expenses.

more moves

Some new and some updated addresses are available for groups moving into building 58. As before, these are tentative.

Department		Effective Date
Accessories Engineering	58-079	2-24-75
Capital Budget	58-061	2-28-75
Communications, Engineering	58-639	3-22-75
Communications, Marketing	58-699	3-22-75
Communications, Staff	58-694	3-22-75
Contract Administration	58-302	2-28-75
Digital Measurement Products Eng.	58-157	3-13-75
Electrical Standards	58-188	3-17-75
Fleet Operations	58-017	2-28-75
Industrial Instruments	58-188	3-17-75
Instrument Control	58-188	3-17-75
International Marketing	58-202	2-28-75
Management Development	58-012	2-28-75
Marketing Development	58-252	2-28-75
Packaging Design	58-289	3-17-75
Prototype Machine Shop	58-289	3-17-75
Purchasing (Paul Tripp)	58-064	2-28-75
Reprographics	58-038	3-7-75
Switch & Relay Design	58-021	3-10-75
Switch & Relay Prototype	58-021	1-27-75
Tek Cyber 73 computer terminal	58-173	2-28-75
	58-532	2-28-75
Television Manufacturing	58-683	4-1-75
U.S. Sales	58-203	2-28-75
Xerox & Mail Room	58-084	3-14-75
	58-626	3-14-75

Other Changes:	To	Date
Industrial Support Staff	50-490	3-7-75
Leon Orchard's staff	50-440	3-7-75
Oliver Dalton's staff	50-440	3-7-75
5000 Series Engineering	50-490	3-7-75

46-55 MAUREEN HEISLER

Equipment Information

News space is available in the TEKWEEK classifieds for advertising in-house test equipment needs, materials, or services. Instrument surpluses can also be reported.

IN PRINT...

Ross Speciale, Laboratory Oscilloscope group, and **B.J. Orth** co-authored an article printed in the Oct. 3rd '74 issue of ELECTRONICS LETTERS. The text is a short, in-depth proof of the recently introduced definition of fundamental even-odd mode waves for nonsymmetrical parallel coupled lines in nonhomogeneous media.

Additions to Library

ALMANAC OF BUSINESS AND INDUSTRIAL FINANCIAL RATIOS
Leo Troy

ELECTRONIC WARFARE, SPECTRUM MANAGEMENT, TELECOMMUNICATIONS, AND ELECTROMAGNETIC COMPATIBILITY DEFINITION OF TERMS AND REFERENCE BOOK
Andy Hish Associates 1974

NEREM RECORD 1972-1973
IEEE 1973

PERSPECTIVE: A NEW SYSTEM FOR DESIGNERS
Jay Doblin
Whitney Publications, Inc. 1956

PHOTOCHEMISTRY
A. Davidson
Springer-Verlag 1969

THE PHYSICS OF LIQUID CRYSTALS
P. G. deGennes
Clarendon Press 1974

PROGRAMMING IN BASIC, THE TIME SHARING LANGUAGE
Mario V. Farina
Prentice-Hall 1968

RETURN ON CAPITAL AS A GUIDE TO MANAGERIAL DECISIONS
National Assoc. of Accountants 1959

SEMICONDUCTOR MEASUREMENT TECHNOLOGY; Measurement Problems in Integrated Circuit Processing and Assembly
Harry A. Schafft
National Bureau of Standards 1974

STATISTICS: AN INTUITIVE APPROACH 3rd Edition
Weinberg and Schumaker
Brooks/Cole Publishing Co. 1973

WHAT COMPUTERS CAN DO, A Guide for the Plain Man
M. J. Cooper
Brandon/Systems Press Inc. 1970

ADSORPTION, SURFACE AREA, AND POROSITY
S.J. Gregg and K.S.W. Sing
Academic Press 1967

GLOSSARY OF COMPUTING TERMINOLOGY
C. L. Meek
Macmillan Information 1972

LASER PARAMETER MEASUREMENTS HANDBOOK
H. G. Heard
Wiley 1968

LINEAR INTEGRATED NETWORKS FUNDAMENTALS
George S. Moschytz
Van Nostrand Reinhold Co. 1974

MODERN ELECTROMAGNETIC FIELDS
P. Silvester
Prentice-Hall 1968

MODERN REFRIGERATION AND AIR CONDITIONING Andrew D. Althouse, et al Goodheart-Willcox Co. 1968

PL/1 FOR BUSINESS APPLICATIONS Mary Ellen Anderson
Prentice-Hall 1973

PASSIVE AND ACTIVE NETWORK ANALYSIS AND SYNTHESIS
Aram Budak
Houghton Mifflin Co. 1974