

Information Display

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New Thermally Addressed Dye Display—This is the Kylex 288 x 357 element (102,816 pixel) LCD incorporated into a fully functional portable terminal. Also shown are SID members Dr. David H. Davies, vice president, technology; Jim Wells, manufacturing manager; Gordon Force, director, electronic engineering; and Dr. Sun Lu, chief scientist and inventor of the concept. These are principals in the Kylex team responsible for development of this new display technique.

The terminal, because of the compactness of the LCD that's foldable back into the device, is attache case sized (3.5" x 15" x 17") and yet has all the functions of a full CRT terminal.

The 6" x 7" LCD (fully populated with 0.015" x 0.015" pixel) is possibly the largest direct view panel LCD ever made. The device is based on the Kylex TADD technology. TADD is an acronym for Thermally Addressed Dye Display. The principle of this effect is the activation of phase changes in a smectic LC layer that has dichroic dye incorporated into it. The dye is oriented by the LC layer. The result is almost unlimited multiplexibility and in fact fully operational 6" x 7" matrix LCDs with 512 x 576 elements have been made this way.

Thanks to Dave Davies for this cover story and the additional technical details on page 3.

FRONT COVER MATERIAL WELCOMED: Every month **Information Display** usually features one or more active members of SID and the products with which they are most closely associated. Please send a glossy print and appropriate captions so that you, too, can be on our front cover. Send your material to Ted Lucas, Editor, P.O. Box 852, Cedar Glen, CA 92321, or to our National Office Manager, June Friend, for Information Display, 654 North Sepulveda Blvd., Los Angeles, CA 90049. Next deadline for material from you is February 10 for the March issue. If you miss that, try for the April issue. **NOTE:** We also welcome feature articles on interesting projects.

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Kylex portable display terminal fits into an attache case because of its compact LCD.

TADD Technology Utilized in KT-111 Portable Display Terminal

Kylex's thermally addressed dye display (TADD) technology is said to exceed the multiplexing capability of other liquid crystal displays and to surpass conventional LCD technology in image contrast, view cone and brightness. Further, TADD retains the image when the electrical field is removed.

TADD introduces a "guest" dye molecule which is attached to the "host" liquid crystals. The dye mirrors the physical structure of the liquid crystal while following the orientation of the liquid crystal molecules. As a result, the dye is not visible unless in a particular orientation to the viewer. The ability to address and alter an individual pixel by the combination of electrical and thermal effects makes the TADD distinctive in large area thin displays.

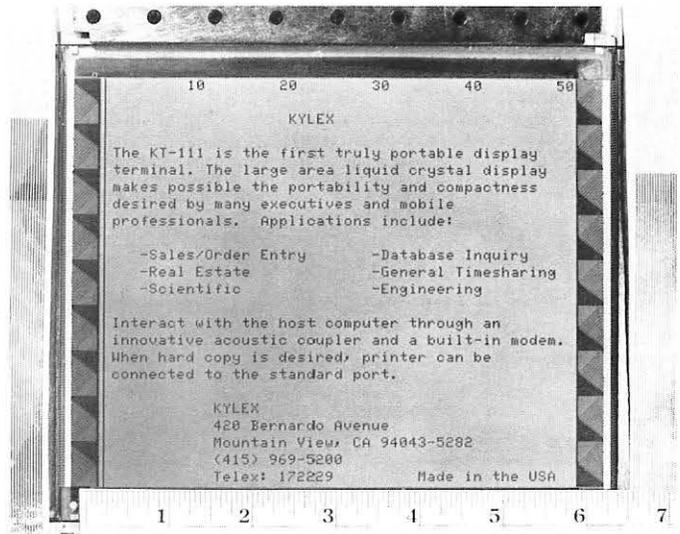
In the Kylex display, each pixel is addressed by a combination of a row signal and a column signal. The multiplexing electronics required to generate the signals are the row drivers, column drivers, and a control module. The row drivers provide the current pulses for heating the rows of the TADD panel and converting the liquid crystal material into the isotropic state where the molecules are randomized.

The column drivers provide the voltage signal that is applied to each pixel during the initial stage of its cool down cycle. These drivers are characterized by medium voltage, low current, and static discharge tolerance.

The control module is a microprocessor based system that consists of a Z80-A central processing unit, 4K bytes of read/write memory, 16K bytes of read only memory, and associated peripheral interface devices. These devices support the display and communication and keyboard interfaces.

The control function of the TADD panel controls the correct pulse width for a given row. The data comes from a temperature sensor plus the use of an algorithm for estimating the row temperature in the cell. By the combined use of this control function, the TADD panel can be kept within optimum thermal operating conditions and minimum energy for writing.

Kylex is fabricating displays in an array of pixels configuration which has 288 rows and 357 columns (102,816 pixels) utilizing glass substrates which are 6" x 7". By 1982 Kylex will be supplying displays with more than 160,000 pixels. Displays with more than 400,000 pixels and areas as large as 8½" x 11" will be available using TADD technology.



Picture of a display as written by the novel TADD technique.

It should be noted that the TADD effect allows this multiplexibility without the potentially expensive and defect prone TFT or Si MOS FET arrays and without bulky expensive scanned lasers etc. The display is fabricated with simple X,Y electrode lithographic patterning. As a result of the simple cell construction, pixel defects are very rare.

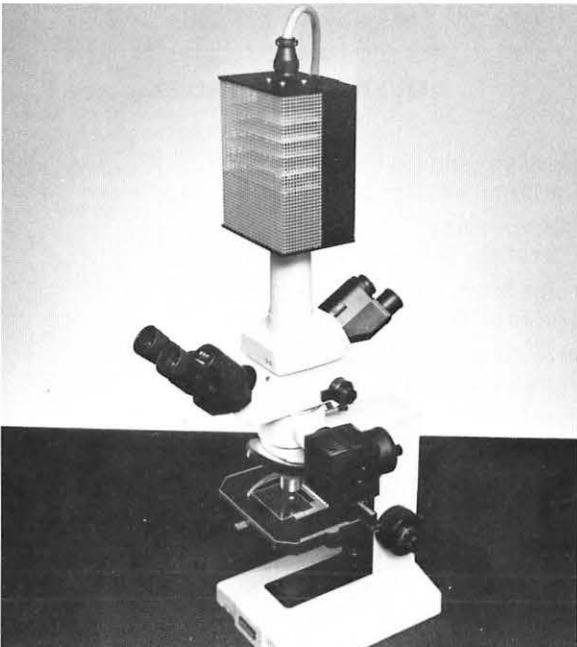
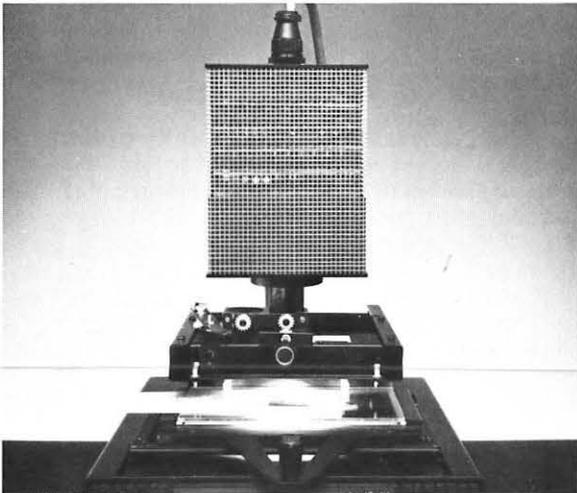
The display operates at about 1000 alphanumeric characters/sec and consumes power only when the elements are written. This results from another unique advantage of the concept, the permanent memory. Once written, the display can be completely disconnected from the drive and power supplies and yet still retain the message content as can be seen in the display held by Davies. The memory is such that displays written over a year ago still retain their original message with no degradation.

Because of the novel use of dye in the smectic state, the display has a 180° view cone and a contrast ratio exceeding 10:1. Both black/white and colored systems have been demonstrated.

Kylex, Mountain View, CA, was acquired in December 1981 by the 3M Company.

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Datacopy Camera Applications:
 Top: C321 reading an 8½ x 11-inch document. Center: C321 reading microfilm. Bottom: C321 reading through a microscope.

New Electronic Camera For Image Capture and Digitizing from Datacopy

Datacopy Corporation, Palo Alto, CA, has recently introduced a solid state electronic camera for facsimile, image processing, microfilm, CAD/CAM, O CR, computer/communications/graphics, and a wide range of other applications.

The model C321 camera has resolution at the image plane (35 mm) of 4.5 million picture elements (pels) in a 1,720 x 2,592 format.

Pels are output from the camera at a 2MHz rate, each consisting of 8 bits parallel representing 256 levels of gray.

Any 35 mm lens can be used with the C321 camera, for applications ranging from reading through a microscope to imaging a scene. With a commercially available 35 mm lens, imaging an 8½" x 11" page gives a resolution in the object plane of 200 dots per inch. For applications where true gray scale is required, an illumination compensator option is available. This option calibrates the system for lens anomalies and non-linearity in lighting.

The C321 camera with optics, mechanical assembly, and electronics is integrated in a compact package (7" x 5" x 4") said to be operationally equivalent to large, expensive, flat-bed and laser scanners/readers.

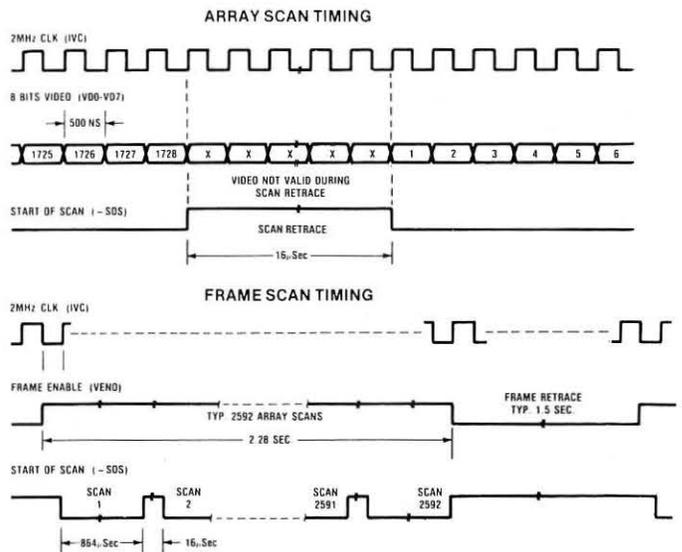
A unique integral scanning mechanism allows the 35mm equivalent image field to record 4.5 megapixels in a mere 2 seconds by moving a solid state array which serves as the camera's "film."

The scanning mechanism synchronously moves a factory installed illuminator across the image when the illuminator option is provided.

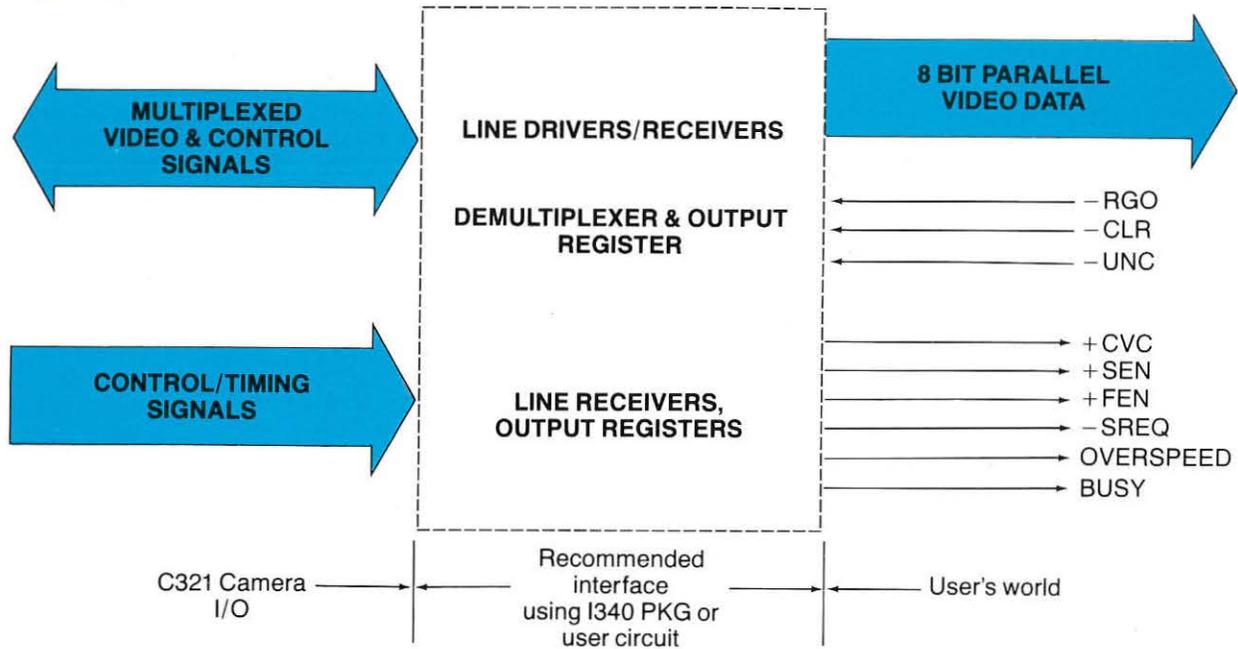
For end-users' applications, the model 340 image-processing unit can be used to control and process the raw signals from the camera. This option compensates for illumination intensity variations via microprocessor control.

Electrical Signal Interface

All control and picture data signals are multiplexed and pass through a single cable between the C321 camera and the host equipment. Inside the host equipment, interface circuitry must be included for multiplexing a START OF SCAN control signal to the camera and for de-multiplexing clock, picture data, and control signals from the camera.



Interfacing this Electronic Camera



Specifications

Camera

Lens Mounting	Standard 35mm lenses (interchangeable)
Illumination:	Self-scanning moving-slit light source
Size:	5.1" x 5.2" x 7.2" (12.95cm x 13.21cm x 18.29cm)
Cable:	10-foot length terminated with Cannon DP25P connector

Electrical

Image Plane	
Picture Elements:	1728 x 2592 pixels
Image Plane Size:	25.9 x 38.8 mm
Image Plane Resolution:	33 line pairs per mm
Dynamic Range:	200:1
Linearity (Gamma):	1.0
Digital Output:	TTL compatible
Scan Rate:	880 microseconds for 1728 elements

Frame Rate:	2 seconds minimum
Video Rate:	2 MHz
Geometric Distortion:	None (except lens distortion; see lens spec.)
Geometric Stability:	Zero drift
Blooming:	None
Blemishes:	None

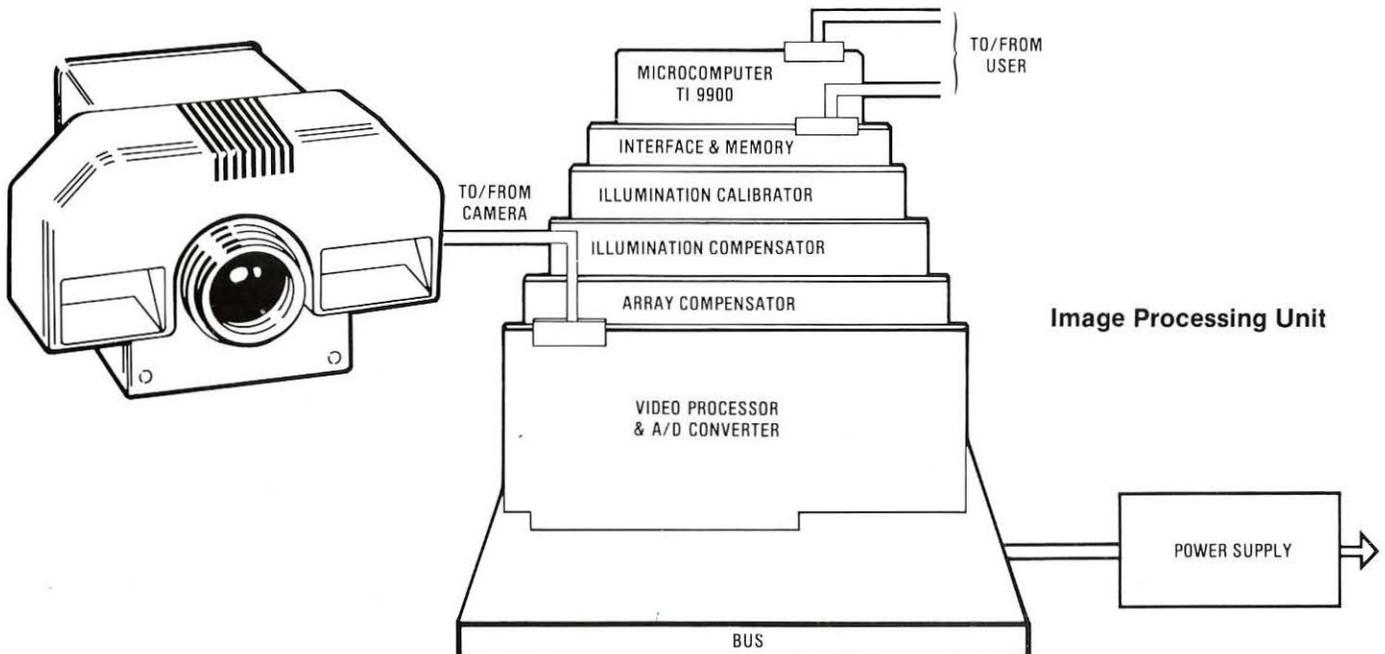
General

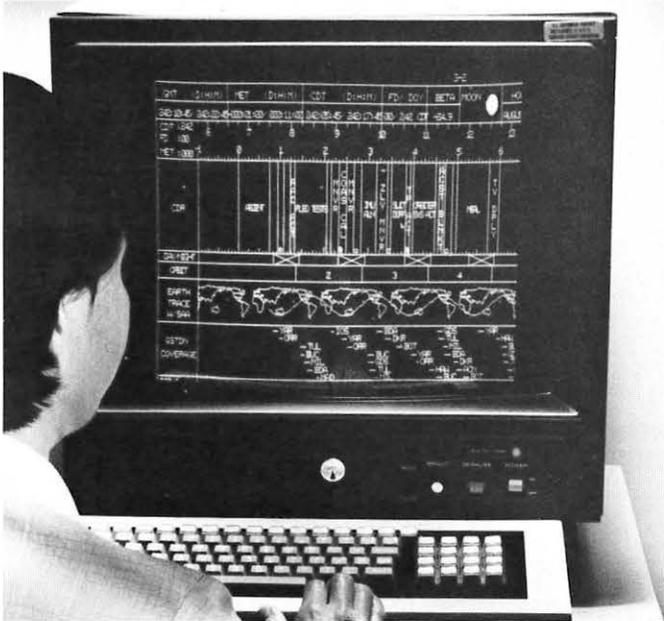
Power:	110-125 volts AC 50/60 Hz; 300 VA
Temperature:	0 to 50°C operating -10 to 75°C storage
Humidity:	0 to 95% non-condensing

Output Signals

Clock:	2 MHz square wave
8-Bit Video:	Digital video on 8 lines, 256 levels of grey
Start of Scan:	Low-level signal during array scan of 1728 photodiodes
Frame Enable:	High-level signal during 2592 array scans. Minimum time for frame is 2.28 seconds

Note: Frame time can be increased to suit the application





Sanders computer graphic system displays space shuttle crew's flight activities on large-screen wall displays and video control consoles in the NASA mission control center, Houston.

Space Shuttle Shown on Sanders Computer Display System

A graphic display system that enables computer-generated information on the space shuttle crew's flight activities to be displayed directly on large-screen wall displays and video control consoles in the National Aeronautics and Space Administration's mission control center has been installed by Sanders Associates, Inc. Nashua, NH.

Unlike the previous method which required NASA personnel to make a paper or "hard" copy of the computer-displayed data and place it in front of a television camera, the Sanders Graphic 8 "drives" the projectors

for the large-screen control room displays which depict the same information that is displayed on the Graphic 8 console. The system also makes the information available to mission control personnel on their video monitors.

The newly installed Graphic 8 is part of NASA's crew activities planning system (CAPS), a computerized system for planning the crew's activities for each flight to help maximize their efficiency while in space.

Schedules for eating, sleeping, exercising, performing various experiments and other information are stored in a Harris/7 computer and displayed on Sanders Graphic 7 consoles, along with other information such as ground track, earth orbit number, daylight and darkness cycles, and proximity to ground stations.

"The Sanders Graphic 7 display systems used with CAPS are high-resolution stroke/refresh type displays which were installed in the late 1970s when stroke compatible raster scan, or digital television, display technology was not widely available," according to Robert Allaire, unit manager of developmental engineering at Sanders Information Products Division.

"Consequently, NASA personnel had to make a hard copy of the displayed data and place it in front of a television camera for transmission and display on the control room consoles and the large-screen wall displays.

"Our Graphic 8 System, which is a high resolution (1024 by 1024) raster scan display, provides the versatility to go from a 1024 by 1024 line resolution to NASA's 945-line standard format. Now, as the information is received from the CAPS computer, it can be displayed by the flick of a switch on the Graphic 8, which in turn drives the large screen displays and the mission control room's video channel 72.

"We have not only eliminated the need for the hard copy process but have also provided NASA with the capability of displaying any changes in the crew's activities as they occur—without waiting for the hard copy process," adds Allaire. "In addition, the Flight Activities Officer now has the use of a versatile and powerful interactive graphic display that is on-line to the mission control center."

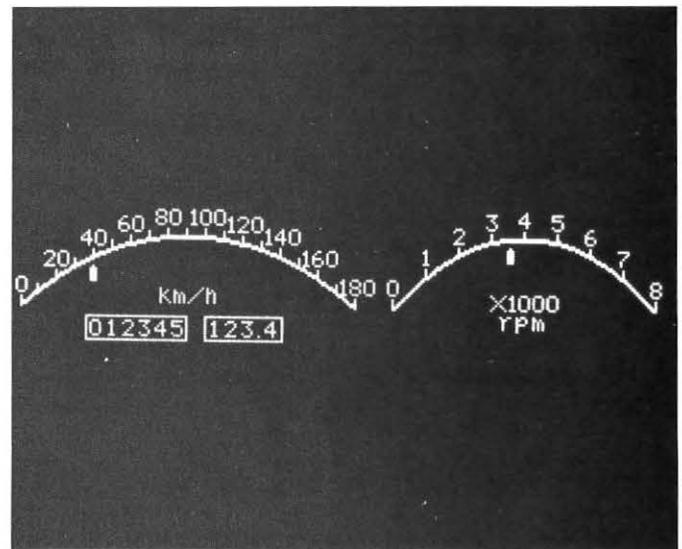


RCA Issues Brochure on Photomultipliers For Applied Spectroscopy

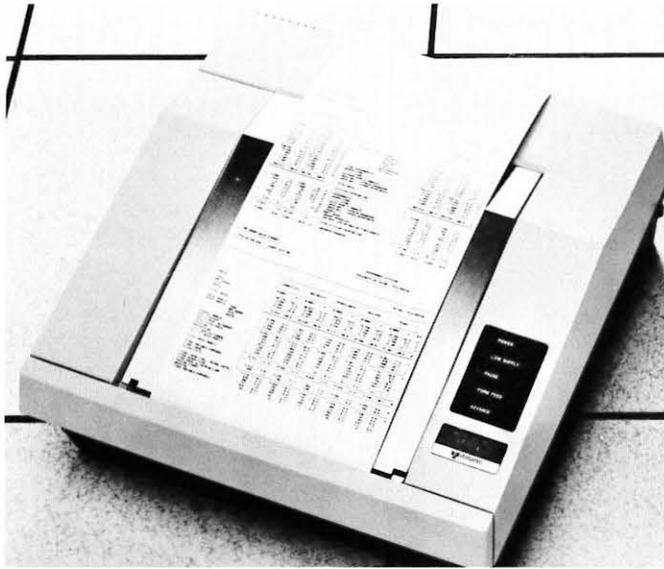
A new six-page color brochure, describing RCA photomultipliers for spectrophotometry, radiometry, and densitometry applications, has been released by RCA Electro-Optics and Devices, Lancaster, PA.

The brochure, PMT-200, contains tabulated data and outline configurations for RCA's line of 28 mm (1 1/8") diameter, side-window photomultipliers (PMTs) and integrated photomultiplier assemblies (IPAs). These photomultipliers cover the useful range from 165 to 930 nanometers; they include types having enhanced anode stability, antihysteresis design, negative electron affinity (NEA) photocathodes as well as the high gain characteristics associated with side-window photomultipliers.

The brochure also features compact solid-state power supplies, magnetic shields, and sockets suitable for use with these devices.



Automobile dashboards are typical applications for new 240-character graphic fluorescent indicator panel from NEC Electron Div., Sunnyvale, CA.



Versatec's new V-80 printer/plotter.

Versatec Provides V-80 Printer/Plotter Options

Its new electrostatic printer/plotter offers more than three times faster printing speed and almost five times more character resolution than competitively priced 300 lpm matrix impact printers, according to Versatec, a Xerox company, Santa Clara, CA. The V-80 prints a 132-column 11" x 8½" page in seven seconds at 1000 lpm. The 132-column format can be printed without character compression or reduced resolution. A 16 x 24 character cell provides 384 points to define a character. Competitive matrix impact printers are said to offer no more than 9 by 9 character cells with 81 points available to define a character.

New V-80 options include RS-232C serial interface, long line drivers and receivers, underline capability, 96 ASCII character sets in three fonts (Gothic, Roman or Courier), 124-character set for scientific/engineering applications, and plug-in PROM configurators for nine languages.

According to V-80 product manager, Dale Richmond, "V-80 offers OEM and end-users faster, quieter printing, better character resolution, and more options than competitively priced matrix impact printers. While the user

gains additional plotting and CRT hard copy capabilities, V-80 offers better price/performance in many printing-only applications."

The V-80 prints 1000 lpm, plots an 11" x 8½" page with 200 point-per-inch resolution in seven seconds, and with optional controller, produces a hard copy from CRT or video source in twenty seconds or less. The non-impact writing process uses only seven moving parts for reliable, quiet operation.

Improved Electrostatic Writing

A negative pressure toning system maintains image contrast and dries output. Toner is drawn across three developer channels in series. A vacuum channel removes excess toner and dries the paper before the paper exits the machine. The back plate electrode, a conductive plastic membrane, is pressed against the back of the paper by a plastic foam strip that maintains positive paper/head contact without adjustment.

The etched and plated head precisely forms square dots for finer line and character quality. Servo-controlled paper drive provides maximum vertical point-to-point deviation of 2 mils (0.05mm). Horizontal deviation is within 1½ mils (0.04mm).

Toner and concentrate are packaged in sealed cartridges. The seal is pierced when the cartridge is inserted into the machine. A flexible membrane reseals the opening when the cartridge is removed. Concentrate is added by an electrically operated valve. A LED indicates when paper is low.

Electronic Design

The V-80 is designed to meet UL 114 specifications. Microprocessor and LSI components have been used to reduce circuitry requirements. Printed circuit boards plug in to a single motherboard. The power supply has over-voltage protection, controlled turn-on characteristics, short circuit protection and full international voltage capabilities. Linear power supplies and all DC coupling minimize electrical noise and protect logic components.

Minimum Size

The V-80 is 24" wide by 24" deep by 10" high (61.0 by 61.0 by 25.4 cm). Weight is 75 pounds (34 kg). The printer/plotter can be placed on a desktop, carried on a floor stand, or be recessed in a computer system console. Output is presented on a 9° sloped platen for easy viewing.

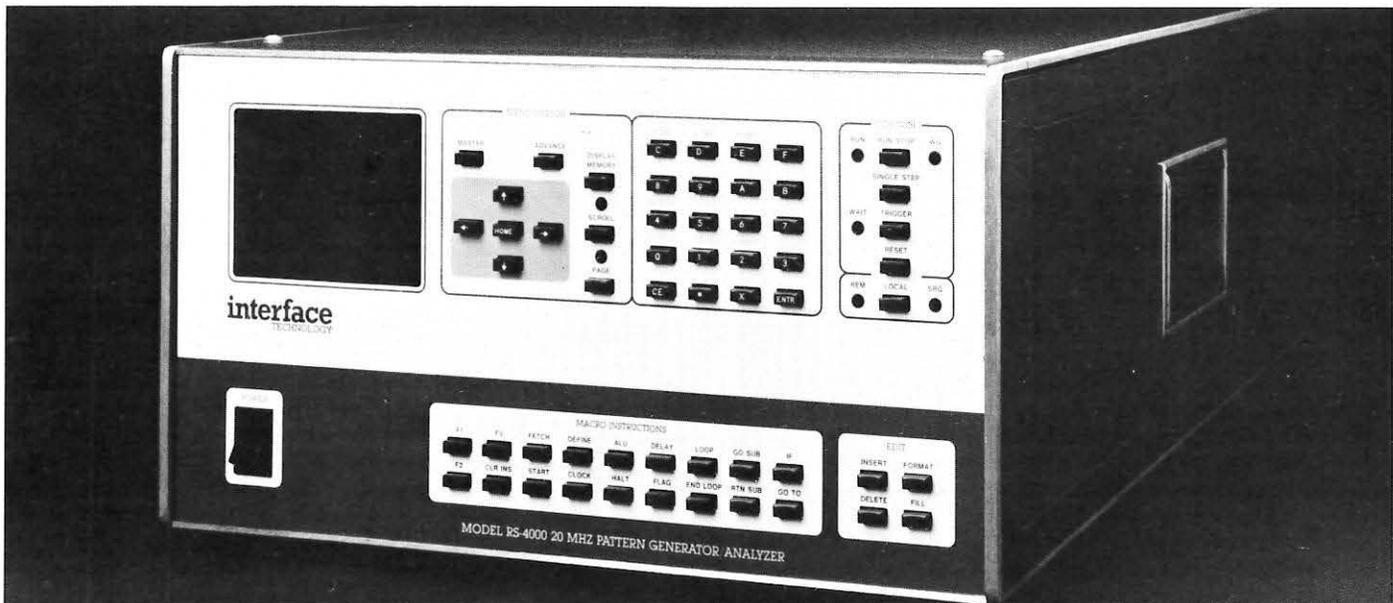
New Hand Held UDT S-351 Radiometer/Photometer Opens Up Many Applications

The new S-351 hand held radiometer/photometer offered by United Detector Technology, Culver City, CA is said to be specifically designed for field service applications such as fiber optics, photocopiers, medical instrumentation and CSTV monitoring.

The S-351 is built to withstand the rigors of field use and its design concepts ensure a minimum of operator skill for accurate measurements, the maker claims. Direct readout in radiometric or photometric terms from 10 picowatts to 2 milliwatts is provided. This range can be extended by factors of 10, 100, or 1,000 with available attenuators.

Wavelength range of the S-351 is 200 to 2,000 nanometers with various detector heads. The 1.25" x 3.75" x 5.75" unit operates from a rechargeable battery and includes a 3½ digit backlit LCD display, six gain ranges and an extension cable for remote use of the detector head. Five models are available with different sensor heads.





New Dual-Microprocessor Test Subsystem Has Features For Use As Signal Generator, Comparator & Recorder

Interface Technology, Inc., a Dynatech Company, San Dimas, CA, recently announced its new Model RS-4000 20 MHz pattern generator/analyzer, a digital signal generator and test subsystem which employs a dual microprocessor architecture to provide the multiple functions of a digital word generator, a comparator and a logic recorder in a single unit.

The RS-4000 is designed specifically to provide word generator and timing simulator digital output capabilities along with digital input, compare, and record capabilities for use in complex digital testing. It is capable of generating, testing, and recording anywhere from 16 to more than 512 simultaneous channels. Test rates to 20 MHz may be achieved with parallel input and output pattern depths to 2048 words. Serial modes of input and output operation are also available.

The new unit may be used either as a benchtop instrument or as a subsystem within an automatic test system. It is completely programmable by any operator regardless of skill level or previous programming experience; according to the manufacturer.

Interface Technology also states that programs may be pre-stored on floppy disks for simple call-up by file names; programs may be generated in any of several high level prompted operating modes; and programs may be developed at the MACRO language level.

In every case, users have access to all stimulus memories, expected value memories, mask memories and record memories contained in the instrument.

Users are prompted through and assisted in the programming of various modes, data tables and control parameters by a menu-driven user interface, using a keyboard and CRT display. A standard LSI microprocessor aids in the prompting and display formatting and also handles the programming protocol for the integral bit slice microprocessor.

"We envision numerous applications for the RS-4000," explained Stanley P. Kubota, Interface manager of sales and marketing. "It can be used to test ICs, hybrid circuits, and printed circuit cards; to generate complex digital signals for testing charge coupled devices; to modulate RF synthesizers; and to control and synchronize test systems. It can be used either as a bench instrument for

laboratory evaluation or built into a large ATE system. It can be used to record a large number of parallel channels for monitoring of digital boards or systems, and it even can be used to upgrade existing automatic PC board, IC or in-circuit testers to give them a 10 MHz functional testing capability."

The RS-4000 has a high speed control section which executes any test function. Its integral bit slice microprocessor has 20 output flag and pulse lines, 20 input flag and pulse lines, and 18 arithmetic and logic outputs for these purposes. The bit slice microprocessor has a repertoire of 16 instructions, with 1024 words of program memory, multi-level subroutines and loop counters and offers an instruction execution time of 200 nanoseconds.

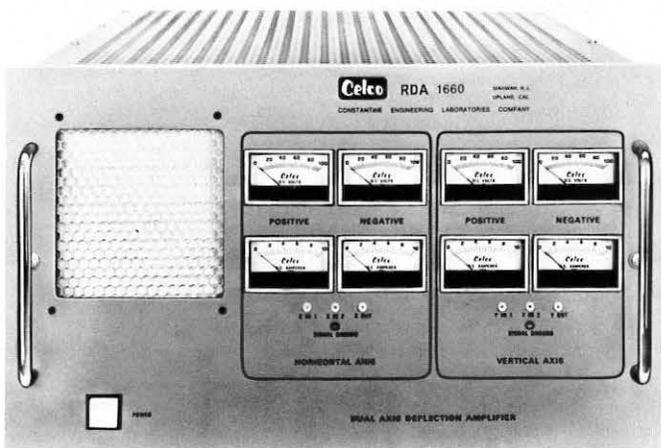
The word generator control section is capable of all standard word generator and timing simulator mode functions, with addressing control to 4K words, burst modes, continuous tables from non-contiguous memory locations, and data rates to 20 MHz.

Operation of the RS-4000 is said to be simple, using the front panel CRT and a menu technique which prompts users with messages and uses LEDs to indicate operator inputs and status. A hierarchy of operation modes is provided ranging from high level machine languages for detailed test control to simple word generator stimulus, logic recorder and test modes. Input, output, and test tasks may be either serial or parallel. TTL input and output logic levels may be tri-state or bi-directional with window or edge sampled comparisons. Synchronizing pulse outputs from the bit slice or word generator section may be programmed.

The I/O data card section of the RS-4000 provides five optional card types for user plug-in. These include the 16 channel universal I/O, the 32 channel tristate I/O, the 64 channel output and the 64 channel input cards. As many as four of these cards can be plugged into the main chassis and up to 12 more cards can be added in an expansion chassis. A 100 MHz timing generator card provides for general purpose timing generation with 10 nanosecond resolution and for a timing simulator format with 12 output channels and 256 time transitions.

Other options for the RS-4000 include an expansion chassis, a remote control configuration without front panel or CRT, a rack mount configuration, and a floppy disk port for program storage or recall.

Other standard features include IEEE 488, serial ASCII and 16-bit parallel interfaces for remote control; and a video output jack that can be used to drive a large monitor or video printer.

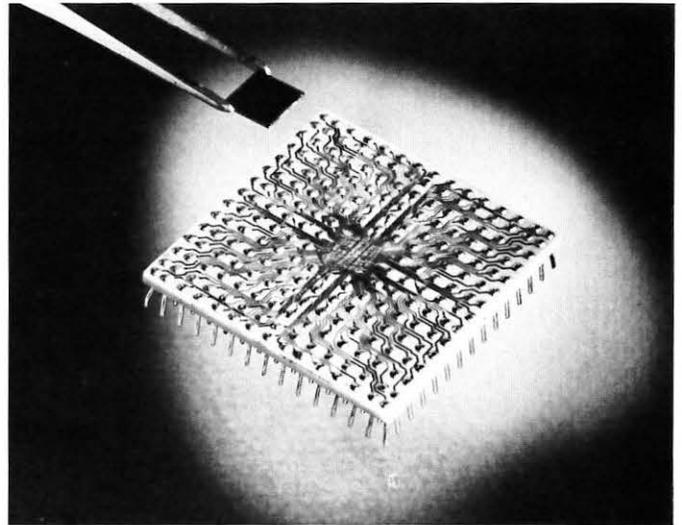


CELCO X-Y Amplifier Features High Deflection Speed Plus Wider Bandwidth for CRT Displays

CELCO, Mahwah, NJ, recently introduced its Model RDA-1660 (60 volts, 16 amperes) X-Y deflection amplifier, offering designers of CRT displays the fastest deflection speeds on the market. This amplifier also has wider bandwidth capability (dc to 1.4MHz) and excellent linearity (0.02%) never before possible, the maker states.

The CELCO RDA-1660 provides a 16 ampere change through a $20\mu\text{H}$ deflection yoke in less than $6\mu\text{s}$.

Other features include dc centering and damping controls, current limiting, monitoring of deflection input signals, output current and power supply voltages for both axes, and four integrated, highly regulated, current limited power supplies.



An experimental chip carrier with 216 connector pins makes it possible to supply power and information to IBM's experimental 5000-circuit logic chip—one of the most complex bipolar logic chips fabricated by the company. The new chip carrier permits a very large number of signals to be routed to the chip, thereby smoothing the way for further progress VLSI technology.

IBM Engineers Fabricate Pin-Grid Chip Carrier with 216 Pins

An experimental circuit package recently described by IBM engineers demonstrates new and more efficient ways of fabricating the very large number of electrical pathways needed to route signals and power to microchip terminals. These techniques smooth the way for bringing very dense logic chips into practical usefulness.

The experimental package was designed in support of an experimental bipolar microprocessor chip containing close to 5000 circuits and 354 terminal pads. Thin film wiring is used to fashion the 200 signal pathways and 16 power connections joining the pins and the pad array. The thin film metallization process is based on the technology used in manufacturing IBM's family of high density memory chips, including the 64K-bit and 72K-bit chips.

The use of multilevel wiring and selective placement of the pads that join the chip to the carrier extend the technology of IBM's standard chip carriers. These techniques greatly increase the number of signal and power leads that can be connected to the chip.

An IBM chip carrier is a square sheet of ceramic that serves as a substrate for one or more chips. Electrical signals and power reach the chip through pins on the underside of the ceramic, which are connected to the next higher level of packaging, such as a printed circuit card or board.

Chips are mounted face down on the substrate by IBM's flip-chip process, in which an array of metal terminal pads on the surface of the chip is soldered to a similar array on the substrate.

The pad array connection technique is the key to routing large numbers of signal and power leads to the chip. This capability is critical to the progress of integrated circuit technology, because the number of signal pathways required increases with the number of circuits on the chip.

Finding room for electrical wiring on the substrate surface, especially in the pad array itself, is a major challenge. The closely spaced array has room for only one wiring connection to pass between adjacent pads, making it extremely difficult to reach pads in the interior. By using three levels of insulated wiring, however, the area available for connection pathways can effectively be tripled.



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Marathon's Testsharing Improves System Throughput, Productivity

As implemented in Marathon™, developed by Computer Automation, Irvine, CA, testsharing is a radical departure from conventional automatic test system architectural approaches. The manufacturer claims that this new system provides total modularity and configuration flexibility to meet a user's diverse needs.

Testsharing is contrary to automatic test equipment (ATE) industry trends, which are to continually augment tester performance and increase the number of tasks performed by each loaded circuit board tester. Increases in performance are purported to provide easily traceable benefits such as shorter test times for individual boards and higher board throughput, while additional tasks usually are used to demonstrate greater productivity of the equipment or an operator.

Unfortunately, these benefits are not mutually compatible. Since a good amount of potential test time is consumed on tasks not related directly to production testing, actual throughput can decrease despite faster test execution speeds. Also, tasks such as test program generation and simulation conflict and become background tasks which must be scheduled for non-production hours. This approach has also resulted in very large increases in ATE prices with few real benefits and questionable reliability and flexibility since so many functions were dependent on a single piece of very complex electronic equipment.

Testsharing, with its inherent segmentation between production and production support functions, addresses and solves these problems. Marathon's high performance test stations are dedicated only to production needs . . . namely testing. All other functions, such as simulation, test program generation, program storage, test data generation, rework tracking, and management reporting are handled by the resource manager. So, with testsharing there is never a conflict between production and production support—both are handled by independent dedicated systems which work together to satisfy overall test requirements.

Testsharing required IPD to successfully use two classes of software not commonly employed in an automated test environment, in addition to the efficient dedicated operating systems employed in more conventional test and simulation stations. These included a multi-user operating system for implementation of the resource manager and a flexible high speed communications facility for passing data and programs between computer-based modules. Fortunately, both had been developed by other divisions of Computer Automation.

As in all ATE environments, work in a testsharing system begins with test program generation. The Marathon resource manager provides up to four independent programmer work stations, supported by one of the most comprehensive program development facilities in the industry. Included in this facility are such tools as Majic™,



Marathon functional test stations are derived from the Capable 4900 line of real-time functional testers. These stations offer test pattern speeds of up to 16 MHz data rate, 4 MHz test cycle rate, and up to 1024 pins with interchangeable high-speed programmable interfaces.

a proprietary macro-based test language designed to ease programming, and schematic and screen editors which provide extensive graphics support to speed data input and program design.

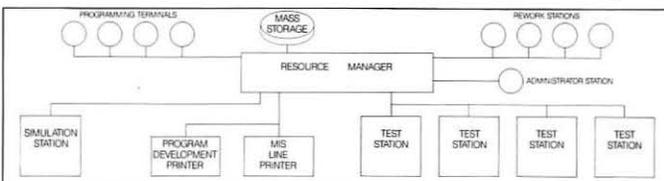
After a program is developed, it must be debugged and tested. The resource manager can download any test program to a simulation station, where it is executed on a priority basis. The Marathon simulation station can easily accommodate simulation of boards with complexities to 400 integrated circuits or more.

Once simulation and debugging are completed, the test program is ready for use in a production environment. The finished program is transferred to the resource manager, and placed in the test program library. All programs in the library can be protected from tampering and unauthorized changes by a built-in security system, if management desires.

In the production mode, test station operators input the part number or other description of the board to be tested. This is communicated to the resource manager, which downloads the proper test program to the test station from the library. The program is executed, the board is tested, and results of the test are displayed locally at the test station and then passed back to the resource manager for storage in the data base. Test results are typically filed in the data base by circuit board serial number, but other nomenclature convenient to management may be selected.

The data base in the resource manager serves several useful functions. Information here can be accessed directly from up to four paperless rework stations, greatly speeding repair of defective boards. The data can also be used to provide both summary and detailed reports on faults and trends, test department throughput and test station productivity, to name a few. These reports can be tailored to meet management needs.

Several other advantages accrue directly from test-sharing. For example, because of task segmentation, overall test environment reliability is improved. The failure of a single test station or even the resource manager does not effect the operation of the other modules in a Marathon system, since all operate independently. Also, task segmentation eliminates the conflict between production and production support activities in the test environment.



Typical Marathon Configuration—Marathon users can select exactly the capabilities they require to implement a global solution to their test problems. Up to four computer-based stations for simulation and prefunctional and functional testing can be specified, along with a wide range of resource manager options including up to four test program generation terminals, up to four paperless rework terminals, various line printers for reporting requirements, and mass storage to 1.2 billion bytes.

Olivetti Introduces Multitasking/Multiuser Minicomputer

Olivetti Corporation, Tarrytown, NY, recently introduced the S6000 business system, a 16 bit minicomputer with multiuser and multitasking capabilities. The S6000 is designed to offer the cost effectiveness and user orientation of a minicomputer with performance capabilities usually associated with larger, more expensive computers.

Important features of the S6000 are described by the manufacturer as the following: ability to expand to 24 external peripherals, including terminal displays, printers, tape drives, etc; ability to expand to one megabyte (MB) of memory; support of a variety of printers connected through both RS232 serial interface and parallel interface. Printers include quality printers for word processing, matrix printers and line printers. Speeds range from 30 characters per second (cps) to 300 lines per minute (1pm). Supporting BASIC, PASCAL, LISP and Assembler programming languages, a comprehensive text editing software package and optional data communication capability are other features.

The S6000 system is available in several configurations. The S6030—a floppy disk based system that can support up to 768K of memory and a variety of external peripherals. S6051—A 10MB disk based system (5 fixed/5 removable) that can support up to 1MB of memory, additional disk storage and a variety of external peripherals (terminals, printers and tape drives) to a maximum of 24. S6081—A 30MB (15MB removable) disk based system with the same capabilities as the S6051. S6082—A 45MB (15MB removable) disk based system with the same capabilities as the S6051. S6083—A 90MB (15MB removable) disk based system with the same capabilities as the S6051.

All the hardware configurations of the S6000 are



Olivetti's S6000 business system, a 16 bit minicomputer said to offer the cost effectiveness and user orientation of a minicomputer with performance capabilities usually associated with larger, more expensive computers.

supported by the Olivetti mini-operating system (OMOS). OMOS supports several users on the system at the same time, all running the same or different programs. The operating system offers both multitasking and multi-programming, thus allowing the system to print a file while the user edits another.

Olivetti also has announced the first of several application software packages to be released for the S6000. A complete management information system includes sales order processing, accounts receivable, inventory management, accounts payable, general ledger and payroll. A comprehensive word processing system is also available.

The S6000 is available as a complete turnkey system including hardware, system and application software, installation, training and service support. Additionally, the system is suited for software houses or other organizations interested in developing their own application software, the maker claims.

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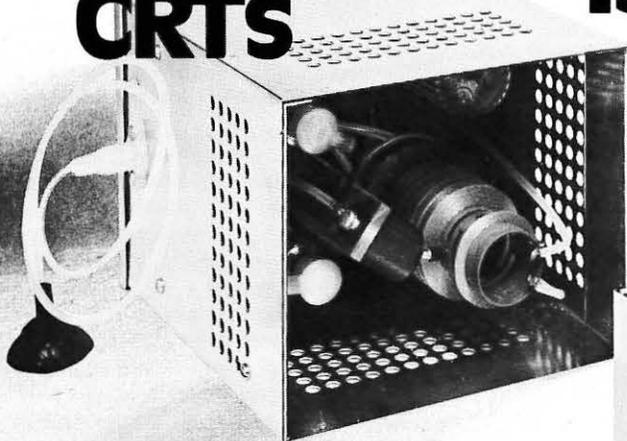
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SID CALENDAR
JANUARY to JULY 1982

1982		
January	4 20	Proceedings, Volume 22, No. 4, 1981, Mailed Quarterly Chapter Rebates Mailed
	20-21	SID 1982 International Symposium Program Committee Meeting, Town & Country Hotel, San Diego
	22	National Board Meeting, Town & Country Hotel, San Diego, CA
February	15	National Ballot Mailed
March	5	Post-Deadline Papers for SID 1982 International Symposium
April	1 12	Proceedings, Volume 23, No. 1, 1982, Mailed National Ballot Return Deadline
	20	Quarterly Chapter Rebates Mailed
	May	9
10		National Board Meeting, San Diego, CA.
10-14		SID 1982 International Symposium, Town and Country Hotel, San Diego, CA.
July	1	Proceedings, Volume 23, No. 2, 1982, Mailed
	20	Quarterly Chapter Rebates Mailed

OTHER EVENTS

1982		
January	12-14	DPMA Conference on Information Systems Productivity, Atlanta, GA
	21-26	National Audio-Visual Association Convention, Anaheim, CA
April	4-5	Office Systems Research Conference, San Francisco
	5-7	Office Automation Conference, San Francisco
	22-25	New York Computer Show & Office Equipment Exposition, Nassau Coliseum, Uniondale, Long Island, NY

GREETINGS TO NEW SID MEMBERS!

Each month you'll find a roster of new SID Members, listed by Chapters with the Chapters in alphabetical order. If your name — or a friend's — should have been listed and was inadvertently omitted, please let June Friend or your Editor know immediately. We'll make amends in the next issue. See the front cover for your choice of addresses to which to send vital data.

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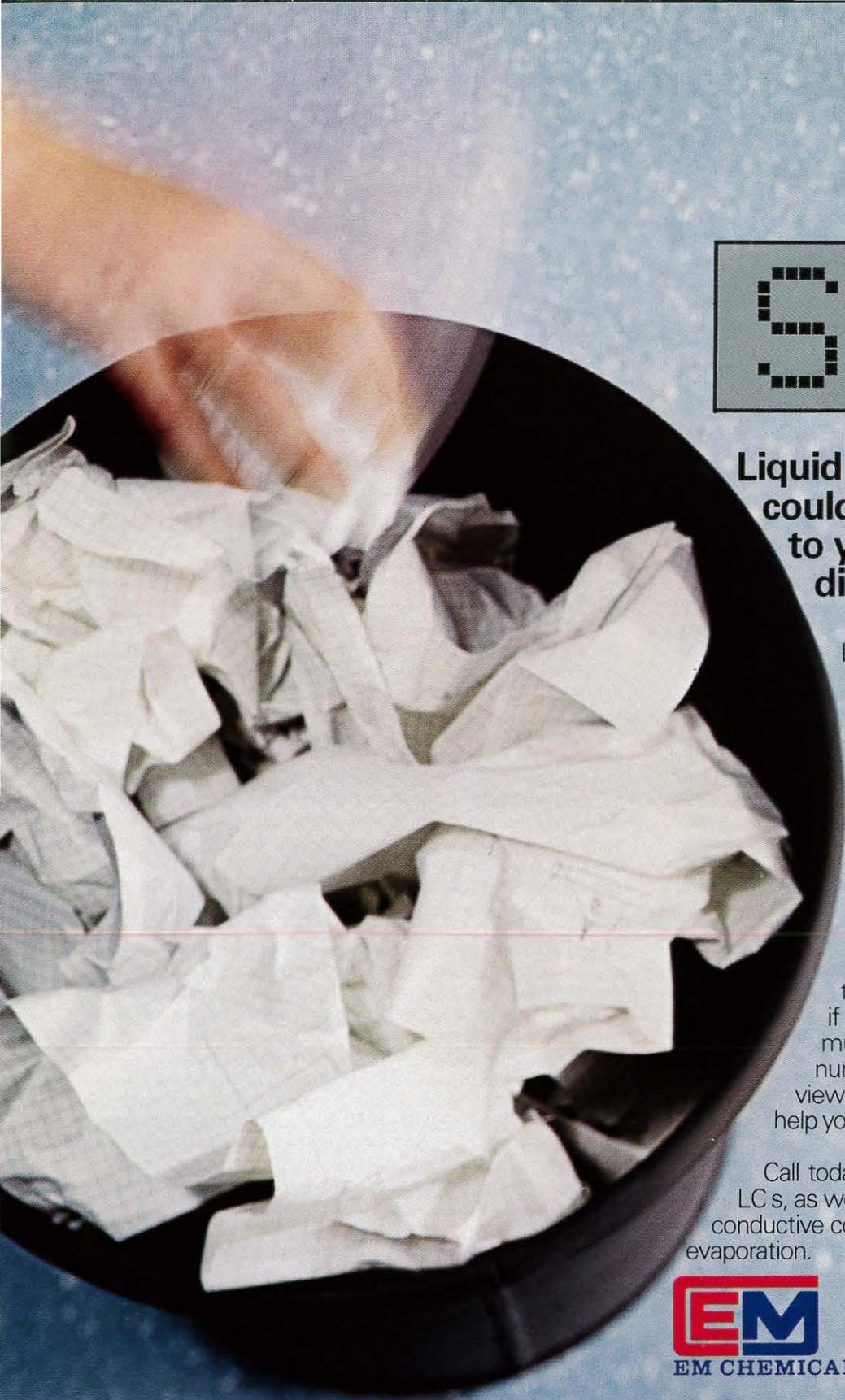
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Lear Siegler Introduces New Integral Modem For ADM 32 Smart Terminal

A new integral modem for its ADM 32 smart terminal has recently been introduced by Lear Siegler, Inc., Data Products Division, Anaheim, CA.

The modem is a single circuit board specifically designed to mount inside the ADM 32 enclosure. It can be installed either at the factory or in the field. For operation, the telephone line is plugged directly into the rear of the ADM 32 housing. This eliminates the need for a telephone or external modem. User commands are given via the terminal keyboard.

The new modem operates at full duplex in either a high speed mode (1200 baud) or low speed (300 baud). At high speed, the operation can be asynchronous or synchronous and is compatible with the Bell 212A modem. At low speed it is compatible with existing 103 and 113 type modems.

"This microprocessor-based integral modem offers a host of user-convenient features typically found on stand alone modems only," says Philip W. Shires, marketing and sales vice president at Lear Siegler. "The automatic dialing and re-dialing features of the modem make it advantageous in virtually any data communications environment."

The 32 modem's powerful autodialer will store five 30-digit numbers in its non-volatile memory, as well as the last number dialed. Numbers not stored can be keyed from the terminal keyboard.

"Instant redialing," Shires added, "of any number saves valuable time in making connections. With a dial forever command, the modem will re-dial a number until the connection is completed. Special characters may also be inserted into the number stream to direct the autodialer to pause or wait for specific intervals or to recognize a second dial tone."

Additional features of the ADM 32 include detached keyboard, conversation or block mode operation, two



Lear Siegler's ADM 32 smart terminal is now available with an integral modem capable of operating at either 1200 or 300 baud. The new modem eliminates the need for a telephone and an acoustic coupler by enabling the telephone line to be plugged directly into the terminal.

pages of memory, programmable function keys, visual attributes, complete editing, X-ON, X-OFF, smooth scroll, 25th status line, business graphics, serial printer port, program mode, personality, typewriter tabs, self test, numeric keypad, white or green screen, and options like polling and addressing, a 15-inch screen, and a 6-position tilt mechanism.

The integral modem is one of four new products recently introduced by Lear Siegler. The other include the ADM 21 video display terminal which offers smart terminal features at low cost; the ADM 24 which is similar in operation to the ADM 21, but is housed in an ergonomic enclosure; and the ADM 36 ANSI standard terminal.

Fortune Systems Develops Low-Cost Motorola MC68000 Based Microcomputer

Fortune Systems Corporation, San Carlos, CA, recently introduced its first product, a desktop system based on the Motorola MC68000. This Fortune 32:16 is said to be a low cost, flexible system which can handle all the requirements of a one-person office and expand to a complete system for a small to medium-sized business or department of a large corporation.

The Fortune 32:16 features an operating system derived



This desktop system is the Motorola MC68000 based Fortune 32:16.

from Bell Labs' proven UNIX™ system and has a full range of business application software packages. To make it extremely easy to use, even for the novice, Fortune Systems has developed a comprehensive set of user-oriented support aids encompassing everything from the initial system set-up to application conversion.

The basic Fortune 32:16 model includes a 32-bit microprocessor with a 16-bit data path, expandable memory (128KB-1MB); 1MB 5¼-inch floppy disk drive; keyboard; and a 12-inch video display. A Winchester disk drive, with optional 5, 10, or 20 Mbytes of storage, is available for applications requiring more storage capacity.

Fortune Systems' single-user configuration has been designed to be readily expandable in an inexpensive fashion to a multi-user, multi-application system. The basic configuration can serve the small business, professional, and/or the department of a large corporation. This basic system can also be field upgraded to a multiple user, time-shared system that can be networked using Xerox's Ethernet™.

A full range of business application software packages is available, including general accounting and distribution, forecasting, budgeting, and financial modeling. In addition, the Fortune 32:16 is claimed to provide a word processing capability functionally equivalent to commercially available word processors. The Fortune 32:16 supports the most widely used languages—Basic, Cobol, Fortran, Pascal and C.

The system's alphanumeric video display has a 12.9 inch, non-glare, tilt and swivel screen, 80 columns wide by 25 lines deep. The user has a choice of amber, green and blue overlays for the black-and-white screen.

New Signature Verification System— Aid To Preventing Computer Crime

"The biggest problem in computer use today is how to protect the computer from unauthorized users," says Harry L. White, president of Sycon, Inc. Santa Clara, CA, and developer of the compact and convenient Signature Dynamics Verification System.

"Computer access codes and passwords are no longer enough to prevent unauthorized persons from gaining access to your computer files," explains White. "That's why we're reading daily about computer-related thefts ranging from the \$21 million missing from Wells Fargo Bank to the Manhattan school students who dialed into a Canadian corporation data system and erased some files. With my system, we can provide an answer to this problem for corporate managers, bankers and businessmen who want to prevent the theft of money or valuable information - and at the same time assure accountability of those who are authorized to use the computer."

"The Spreading Danger of Computer Crime" was the cover story in a recent issue of *Business Week*. The article points to three major reasons why the risk of computer fraud is increasing. First is the growing popularity of personal computers; over 500,000 have been sold and each can provide access to private data banks. Second, as a consequence of teaching computer language as early as grade school, students have been challenged to crack the computer codes of others just for the fun of it. And finally, the proliferation of business computers has put terminals within easy reach of everyone in an office - not just those authorized to use them. Even remote terminals at regional offices offer access to central computer files; some can communicate by telephone with computers of other companies and government agencies in distant cities.

While automatic teller machines are certainly a convenient way to bank, the machine can't tell whether the person who punches in the personal identification number (PIN) is using a lost or stolen card. To avoid forgetting their PIN access number, about 20% of the users write it directly on their card. Another 70% carry it somewhere else in their wallet or purse. The rest use a number readily found in their wallet, like a birthdate or house number, making it easy for a thief to obtain all the information he requires to withdraw money from the machine.

Perhaps the greatest target of computer fraud is the banking industry's Electronic Funds Transfer System. Special codes and hardware that electronically scramble a funds transfer message are no protection against non-authorized employees with access to these safeguards. Even changing the codes every day isn't foolproof; today's code is often taped to the front of the terminal to make life a little easier for the authorized operator. Reported losses from fraud ran over \$100 million last year.

Al Zipf, retired executive vice President of Bank of America and member of the Sycon board of directors declares, "The time has come for banks and financial institutions to use a more positive verification technique. We need a quick, easy to use, on-site verification system. There should be no cumbersome code numbers to memorize and no danger of forgery if you lose your ID card. As far as I am concerned, Sycon's signature verifier meets all those requirements."

The Signature Verifier is based on the simple principle that the way a person signs his name is unique. As he moves the tip of an ordinary ballpoint pen across the signature pad, many measurements are instantly taken: including the amount of time the writer takes, the pressure he exerts, the velocity and acceleration of the pen tip and the order in which he dots his i's and crosses his t's.

Enrollment in the system consists of merely writing one's name 5 or 10 times, quickly allowing a set of parameters to be calculated and stored as the individual's signature profile. This profile can either be encoded on the magnetic strips of a plastic credit card sized signature card (Model SD-10) or stored in a remote computer (Model DT-20).

To use the verification system, one simply signs in on the Signature Verifier signature pad and passes the plastic card through a groove on the top of the unit. Signature parameters are analyzed by the built-in micro-processor and immediately compared to the individual's profile.

Dr. Hewitt Crane of SRI International has been a pioneer in signature verification and is the primary inventor of the patented Sycon system. Beginning in the early 1970s, using a pressure-sensitive pen connected to a large computer, Dr. Crane established the practicality of the concept. With the introduction of microprocessors, a major step forward in technology was possible - the refinement of the Signature Verifier into a compact unit roughly the size of a briefcase and usable with any ballpoint pen.

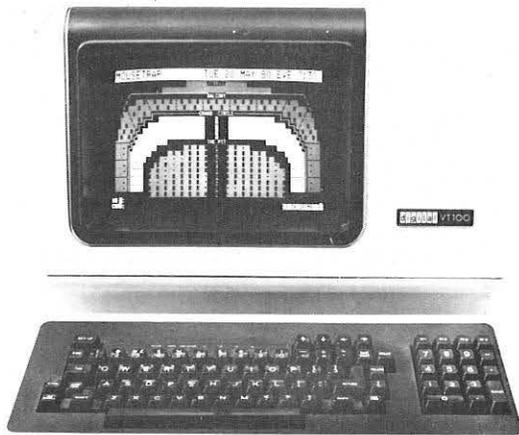
Harry L. White became aware of Dr. Crane's work in 1976. Their close working relationship led to an agreement with SRI in January 1980, giving Sycon exclusive worldwide rights to the signature verification technology, as well as the first crack (or right of the first refusal) at anything else SRI develops in that area of personal identification/verification.

Signature Verifier Applications

For the burgeoning computer industry, White groups those needs into three general areas: physical access, data access and bank/financial transactions. **Physical Access** relates to areas of special sensitivity or high value that can be closed to unauthorized personnel. If the signature and profile don't match, the door will remain locked to the computer rooms, drug vaults, nuclear power plants, research laboratories, communications centers, bank vaults and construction project tool sheds. **Data Access** refers to company computer files that store confidential personnel and payroll information, customer accounts, sales schedules, inventory, manufacturing cost data and other classified information a competitor might benefit from knowing.



Signature verification system developed by Sycon, Inc., Santa Clara, CA.



Self-contained box office system is computerized.

Computerized Box Office System

A ticket sales and reservation system for Britain for theatre, sport and other entertainment arenas is said to be the most advanced program of its kind. Easily operated by existing box office staff, the system is described as offering total control of ticket inventory and accounting procedures without sharing a large computer.

BOCS (Box Office Computer System) consists of a minicomputer equipped with dual cartridge disks to store the seat plans, a line printer to produce accounting and statistical reports, video terminals to display seat plans and select seats, and ticket printers at the points of sale.

Tickets, which may show event name, performance time and price in addition to standard ticket details, are produced under computer control using continuous roll paper stock at about one-fifth the cost of conventional tickets. Plans showing the sold/unsold/reserved status of seats are displayed on the video terminals. This allows multiple access so that postal and counter sales can proceed simultaneously. A full report of the house is obtained immediately the last ticket is sold, and agencies can be invoiced automatically.

BOCS can also be linked to a viewdata system, so that people can purchase tickets by telephone using continuously updated information available in their homes.

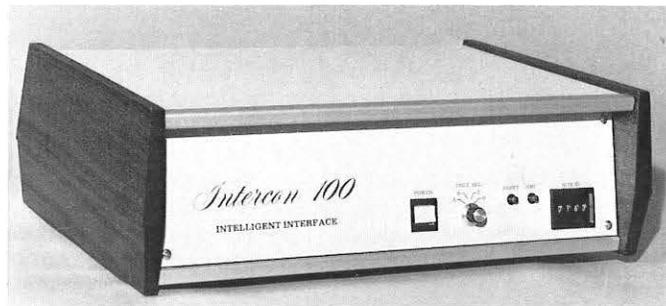
Inquiries are welcomed by the manufacturer, Space-Time Systems, 10 Long Acre, London WC2E 9LN England.



IEE Announces 80 Character Vacuum Fluorescent With Descending Characters

The Industrial Products Division of Industrial Electronic Engineers, Inc., (IEE), Van Nuys, CA, has introduced a 1 line of 80-character module as an addition to its FLIP line of full electronics alphanumeric vacuum fluorescent display modules. Engineered for the electronic display of typewritten information, this module (Model 3600-04-080) utilizes a 5x12 dot matrix to display the full 96-character ASCII set with accurate representation of lower case descenders on the letters g, j, p, q and y. The module also boasts European ECMA-7 overlay characters, bi-directional bus operation, support of ASCII control codes and operation from a single 5 volt source at 1.3 amps. The characters are a bright (175 fL) blue-green color filterable to blue, green, aqua or yellow and are readable at a distance and over a 150° viewing angle.

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Low Cost Protocols for DEC Vax, PDP-11 Or CP/M Micros

Intercon Research Corporation, Huntsville, AL, recently introduced its Intercon 100 Intelligent Interface, said to offer a low cost synchronous communication link between DEC VAX, PDP-11s with RSX-11M or microcomputers with CP/M and Control Data or IBM host mainframes via either dedicated or dial up lines at data rates up to 9600 BPS. The Intercon 100 is a microprocessor-based stand-alone device with self-contained protocols and asynchronous/ synchronous data conversion.

Software handlers are available for use with RSX-11M or CP/M, providing simple installation without changes to the operating system.

The unit is based on an Intel 8085A with communications controlled by four 8251A USARTS. The 8085A operates under a PROM based monitor and controls all protocol functions, code conversion and modem management and provides self test capability. Power-up automatically boots the system from PROM and sets up communications to the mini or micro computer. A software handler running in the mini or micro computer as a task under the operating system manages communications between the operator's terminal and the Intercon 100. Operator messages and communications option menus are resident in the handler as is an asynchronous protocol assuring integrity of the data stream between the Intercon 100 and the mini or micro computer. This approach allows the local computer to communicate with the Intercon 100 as though it were an asynchronous terminal at data rates up to 9600 BPS, while communication between the Intercon 100 and the remote host computer proceeds at up to 4800 BPS dial up or 9600 BPS on dedicated lines.

Message buffering is provided in the Intercon 100 by two 2K RAM buffers. Protocols are resident in 2716 EPROMS. Sockets are available for up to ten 2716s allowing up to four board resident protocols. A front panel switch allows protocol selection. Site addresses may be set for those protocols which require them. A four digit thumbwheel switch mounted on the front panel is provided for this purpose.

New CRT Connectors Catalog

A new catalog No. CC-106, recently released by Connector Corporation, Chicago, contains 32 dimensional drawings, illustrations and technical data on the firm's 7-pin, 8-pin and 14-pin CRT connectors, some of which are new.

C/C's original automatic recovery spark gap design and wraparound PC contact design, said to be highly reliable, are offered on many designated connector types. Wire lead specifications and/or variations in spark gap voltages and ground positions may also be obtained.

A free copy of catalog No. CC-106 may be obtained from M. Rakos, Sales Department, Connector Corporation, 6025 N. Keystone Avenue, Chicago, Illinois 60646, phone (312) 539-3108, TWX 910 221-6059.



Thinking about Color for Avionics Displays? Think Syntronic Deflection Yokes

Cockpit displays in color are the hottest thing in avionics. Why? Because color increases the amount of information a pilot can absorb in a finite time frame. Think of the myriad uses of color. Emergencies or targets highlighted by red. Normal status is white or green. Sky shown in blue with the ground in brown tones. Almost anything displayed mechanically now can be displayed on a color CRT, with no parallax, a condensed format and less clutter on the instrument panel.

But color displays are many times more complex than monochromatic displays because of the critical interface between CRT, yoke and circuitry. And avionic quality displays are too demanding for conventional color TV type yokes.

That's where Syntronic helps the display engineer. For several years, Syntronic Instruments, Inc., the leader in precision yokes for military and industrial displays has been working with major international manufacturers of full-color shadow mask tubes to develop high performance color yokes. High resolution, color purity and convergence, along with faster speed for more display information, all combine to make

deflection yoke design a truly challenging task. Syntronic now offers the yoke design capability *and* the technical assistance needed for today's and tomorrow's top quality color avionics displays.

If you're thinking *color*, think Syntronic Instruments. Call Dave Brown at 312-543-6444 for more information.



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Distributor Turns TeleVideo CRT Units Into Low-Cost Graphics Terminals

MQI Computer Products, Fountain Valley, CA, one of the peripheral industry's first full-service distributors, is fast evolving into an original equipment manufacturing/distributorship. The company is establishing a notable graphics niche in the "smart" or programmable CRT terminal marketplace developed over the last several years by TeleVideo Systems Inc. of Sunnyvale, CA.

MQI recently introduced its own graphics display versions of TeleVideo CRT terminals. The MQI Autograph series emulates Tektronix's 4010, 4014 and 4013 terminals and is fully compatible with Tektronix's Plot 10 graphics software. The Autograph line is an ASCII-based system with 512 x 250 dot matrix resolution and programmable controls.

MQI produces its graphics terminals in partnership with DataType of Britain, TeleVideo's largest international distributor. MQI is one of TeleVideo's biggest distributors in the United States.

The Autograph terminals are designed for "preview" or "scatchpad" uses in business, scientific and engineering applications. They offer many of the features of higher cost terminals, but provide only medium-resolution imaging.

Because graphics provide such an attractive tool for condensing and manipulating unwieldy amounts of computer data, users everywhere are demanding direct graphic access to computer systems. But access tends to be limited by the high costs of graphics peripherals. One way of lowering these costs is to eliminate a certain amount of performance "overkill" that simply is not necessary in many types of trial-and-error graphics manipulations, according to MQI.

For example, in preparing a graph of sales figures to display at a meeting, a marketing manager will typically summon bar, graph and pie charts before deciding to print one transparency. Likewise, an engineer developing a three-dimensional overview may want to decide if front-rear projections and subsidiary drawings can all be included on one page. Having selected a graph, the same engineer could next view various sizes of labels before choosing a final image. These are all "preview" graphics applications that demand only medium-resolution displays.

"We know we are tapping into a significant segment of graphics use," says Avery Blake, MQI's vice president of marketing. "Low-cost terminals may even be the biggest growth area in the graphics market. People are quickly realizing what the graphics concept means in terms of day-to-day work. As computing power becomes less expensive and more accessible, users are suddenly swamped by acres of numerical printout. A graph is an easy-to-read summary that saves time and increases efficiency. So nearly everyone wants graphics.

"We are providing less expensive windows on the graphics world. If you simply want to view and manipulate graphics output, you may not need a 780 x 1,024-line display. You also may not be able to afford one. And looked at another way, with a large investment in the overall data processing installation, it probably doesn't pay to price your staff out of access to a graphics system," he explained.

"All sorts of companies are coming to this conclusion. One of our happiest customers is a subsidiary of ComSat, the communications satellite company. They have a sophisticated graphics system with high-resolution screens and printers, but they have included MQI terminals in their installation because a large number of users do not need high-resolution graphics."

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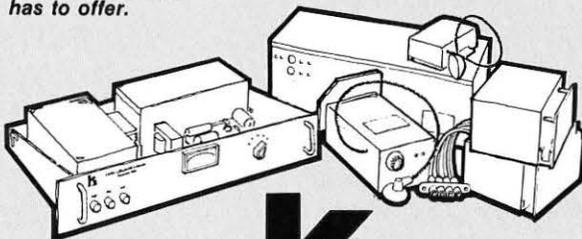
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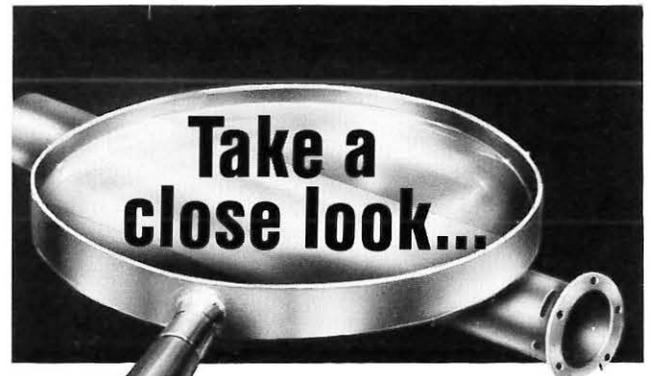


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Chapter News

NEW ENGLAND CHAPTER on November 19 enjoyed a presentation in Lexington, MA, entitled "Review of the Proceedings at the First European Display Research Conference — Eurodisplay '81." This discussion was provided by Alfred J. McIntyre, Fasfax Corporation, Nashua, NH, who is also Chapter Secretary. Thanks to him and to Gordon Spencer, Chapter Chairman, who presided at the meeting, for furnishing this report.

BAY AREA CHAPTER on November 17 had a large technical meeting addressed by Judit K. Florence, staff engineers, Singer—Link, Sunnyvale, and hosted by that company. Title of her paper was "Real-Time Digital Visual Simulation for Pilot Training," a subject on which Judit is truly expert because she has been working with digital images generation hardware for the past 10 years. She described a high performance graphics system for generating complex images representing the pilot's out-of-the-window view. The data base which describes the outside world is stored digitally, and the perspective image corresponding to the pilot's instantaneous position and attitude is calculated 30 or 60 times a second. The final image is displayed on a high resolution, raster-scan color TV and is presented to the viewer through infinity image optics.

Judit's discussion included system performance characteristics versus training requirements and display system performance characteristics. She also provided a demonstration of the visual system. Her entire program was enthusiastically received, according to Mike Rehms,

Chapter Chairman. Rit Lyon, Vice-Chairman, was the presiding officer at this meeting.

MINNESOTA/ST. PAUL CHAPTER on November 20 heard a presentation on "Demand Printing" by Peter Preksto of Intran Corporation. The Intran Metagraphics font center is a major resource for the Xerox 9700 electronic printing system, a medium resolution dot-matrix laser printer. Using the ECRM Autocon laser digitizing camera, two computer systems and advanced edge detection software, Metagraphics can digitize logos, signature, special characters, and entire fonts for use on the Xerox 9700.

The font center in Minneapolis was opened in November as a result of Intran's acquisition of a Washington, DC firm specializing in full page composition and font manipulation software for electronic printing systems. Also, Metagraphics recognized that the 9700 is maturing beyond new utility printing into a demand publishing system, complete with graphics in place merged with text. Metagraphics is presently developing software to scan and print these graphics.

The visit to Intran included a presentation on the 9700 system itself, special electronic printing applications, and on the hardware and software used in the font center. All steps from original art to printed page were displayed or demonstrated.

On December 10, Todd Olson of Computerland, Minneapolis, discussed the new IBM personal computers. Thanks to Allen Taylor, Chapter Chairman, for these reports.

EDITOR'S NOTE: With the addition of two new Sustaining Members this month, this roster has reach a total of 68, an all-time high. Also as our faithful readers notice, we're hailing new SID Members in each issue as our Society continues to grow and flourish.

But we need to renew a plea for HELP, particularly from Chapter Officers.

- 1. Please send in Technical Meeting Reports promptly. Only three Chapters provided reports for this issue.*
- 2. We're trying to improve the calibre of Information Display by getting more original technical material. Please tell us what you're doing for the benefit of SID's farflung membership.*

INFORMATION DISPLAY

JANUARY 1982

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