

DELAWARE VALLEY CHAPTER

As mentioned in our April issue, a large SID group visited Naval Air Development Center, Warminster, PA, on February 26 for a "tour, talk and demo." Shown above, left to right and looking at the NADC Scene Generator System, are: William Mulley, SID Director; Charles Halstead, Chairman; Robert Blair, Vice Chairman; Nathan Rubin, Secretary; and Karl Quiring, Treasurer. Thanks for the excellent photograph. On February 21, Bill Mulley also participated in a Scientific Engineering Technologies (SET) seminar for high school students on engineering as a career. He presented to two sessions, some 300 students, the aims and goals of SID as a Director of our Society.

Editor's Note: We are able to provide a 2nd issue, besides the March 1981 journal, with color on front and back covers thanks to two aids from SID Members: (1) Good pictures as cover material; (2) Cooperative advertisers buying 4-color ads. **Information Display** is coming closer to being self-sustaining, and your Editor is most grateful to you SID Members, the readers.

INFORMATION DISPLAY

MAY 1981

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Information Display

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New High-Density Large-Screen 4-Color LCD System is demonstrated by SID Members Theodore B. Aitken and Dr. Robert C. Tsai of The Singer Company, Librascope Division, Glendale, CA. This is said to be the largest liquid crystal display with such high resolution — 8 million pixels available for presentation on a 48" x 48" screen.

Two smectic liquid crystal light valves (SLCLVs) present data in three colors on a fourth background color. The SLCLVs are optically addressed by a Nd: YAG laser controlled by a modulator and deflection system under the direction of a microprocessor. A flashing pointer in the system enables the display operator to enter, modify, or delete alphanumeric and graphic data. Each of the two light

valves can be operated both in a bright field mode (black image on color background) or in a dark field mode (color image on black background). With red, green, yellow, and black available as either background or image colors, a wide variety of color combinations can be generated. Because each light valve can generate 2048 x 2048 addressable pixels within a 1" x 1" data format, the system has extremely high resolution — 2500 TV lines per inch. With the raster scan mode, 2500 alphanumeric characters can be generated within a second.

A detailed description of this new LCD system by Bob Tsai, manager of this project at Singer/Librascope, begins 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 August 10. If you miss that, try for the November issue NOTE: We also welcome feature articles on interesting projects.

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High Data Density 4-Color LCD System by Dr. Robert C. Tsai The Singer Company, Librascope Division, Glendale, CA

Abstract

A large-screen LCD system, including a high resolution and high contrast laser-addressed liquid crystal color display, has been developed for acquisition and exploitation of high density alphanumeric and graphic data. The display system consists of two smectic liquid crystal light valves (SLCLV) which are thermally addressed by a single laser selectively. Each light valve can generate 2048x2048 addressable pixels within a 1" x 1" data format. There are 8x10⁶ pixels available for data presentation.

The laser writing system consists of the laser, a modulator for formation of discrete data elements on the SLCLV, a 2 axis galvanometer deflection unit, and beam splitting optics to multiplex the writing laser on each SLCLV. A closed-loop galvo deflection system can position the focused laser beam to an accuracy of 0.1% across the screen. Laser focus lens is an f/8.0 telecentric design to produce a 1" x 1" data format on the SLCLV with spot size less than 0.0004". Color images from each light valve are superimposed onto the screen by a wide angle f/8.0 projection lens. This lens, with 48X magnification, relays the combined color image to a 48" x 48" screen with less than 0.1% distortion. The possible contrast of the display is up to 60 to 1. The overall dimensions of the rear-projected color display are 60" x 52" x 31".

Current CRT or CRT-driven large screen displays do not provide enough resolution elements to display massive amounts of information. This new large screen color LCD with smectic liquid crystal light valves has been developed by Singer to handle high data density graphic and alphanumeric presentations for status summary, simulation, tactical and strategic combat situations.

This paper describes an ultra-high resolution 4-color liquid crystal projection system which utilizes two smectic liquid crystal light valves (SLCLV) to present data in three colors on a fourth background color. The SLCLVs are optically addressed by a Nd:YAG laser through the control of a modulator and deflection system which is powered by a microprocessor. A flashing pointer is included in the system to provide the interactive features which enable the operator to enter, modify, or delete alphanumeric and graphic data on request.

Principle of Operation

Smectic Liquid Crystal Light Valve (SLCLV)

Both Schiff-based and biphenyl families of the smectic liquid crystals have been investigated in this study. These mixtures exist in a smectic state at room temperature. They may be highly scattered or highly transparent depending on whether molecules are in an ordered structure or not. The structure of the SLCLV is shown in Figure 1. Liquid crystals are sandwiched between two substrates coated with vacuum sputtered indium tin oxide transparent electrode and the organic surfactant. Dow Corning's alkoxysilane, 1,2-e.g., N, N-dimethyl-N-octadecyl-3-aminopropyltrimethoxysilyl chloride and carboxylate chromium complexes were tested to induce a homeotropic alignment of the liquid crystal molecules.

Indium tin oxide coating (ITO). Transparent conductive coatings of SnO₂ doped In₂O₃ were vacuum sputtered on the substrate surface. High optical transmission in the visible spectrum and high absorption at the Nd:YAG laser wavelength are essential to ensure the

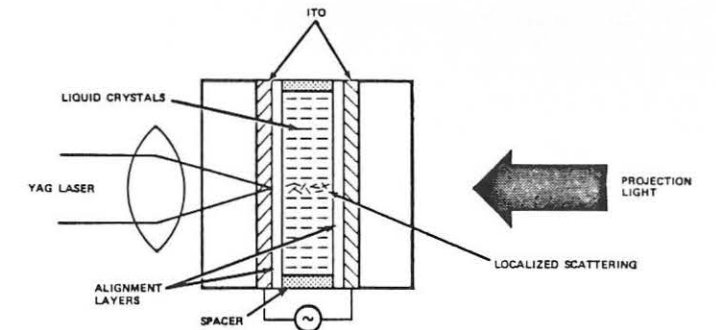


Figure 1. Storage mode liquid crystal light valve.

performance of the light valve. In-house sputtered ITO coating has a sheet resistance of less than 2Ω/□ and yet has high optical transmission. The optical characteristics of sputtered ITO thin film are shown in Figure 2.

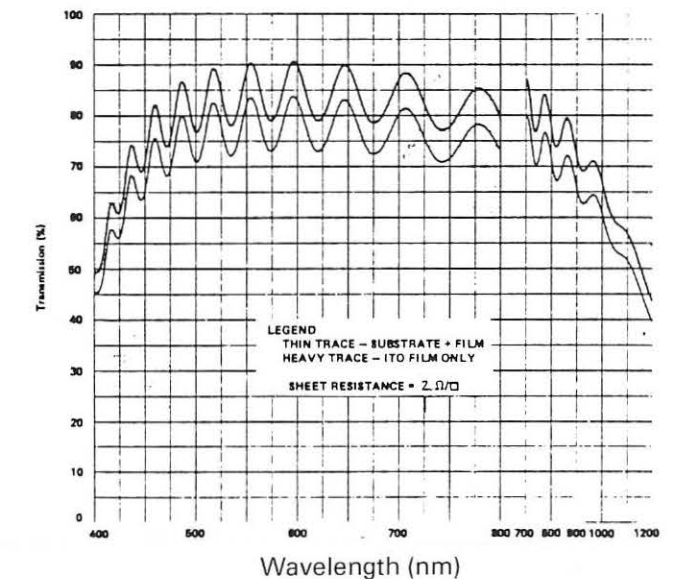


Figure 2: Optical characteristics of vacuum sputtered In₂O₃/SnO₂ thin film.

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Writing/erasing mechanism. At normal operation, the liquid crystal temperature is biased a few degrees below the smectic-nematic transition. Switching between states is done by heating a region of the assembly so that the liquid crystal changes to the nematic or isotropic states. The local heating effect on the LC molecules is achieved by focusing a laser beam onto the ITO coating. Absorbed laser energy causes the LC molecules to transform into the isotropic state and to possess a randomly oriented order. If the cooling is slow, LC molecules will align themselves and produce a clear state due to the boundary condition induced from the alignment layer on the light valve substrates. However, if the cooling is rapid, they will not be able to align themselves in time and therefore assume the random orientation to form a highly scattered state. This will show as a dark image on the screen if the light valves are projected by the projection optics to the screen.

To erase selectively, an ac bias is applied simultaneously with the laser scan. Liquid crystal molecules respond to the electric field and align into the field direction while still in the nematic state to erase the previously written image.

Bulk erase is also possible by applying an ac bias across the light valve with higher amplitude or to raise the light valve temperature to nematic state externally and then to erase by ac bias. The typical writing and erasing rate per pixel element is about 5 microseconds, and the time delay for the erase is about 1 msec for each erase.

Due to the inherent characteristic of the smectic liquid crystals, the written image on the light valves can be stored in the display for hundreds of hours without degrading the contrast.

Twelve levels of the gray scale have been generated digitally with the microprocessor control. This is achieved by laser intensity and ac bias amplitude modulation.

Optic design. A writing system consisting of a focus lens and a relay lens was designed to focus infrared energy from the Nd:YAG laser upon the SLCLVs. The entrance pupil of the scanning focus lens is located sufficiently in front of the lens to enable placement of the last deflection mirror without the mirror striking the lens or its housing. The telecentric focus lens is designed to work at f/8.0 for 1.06 μ wavelength. A schematic of the scanning lens is shown in Figure 3. The laser spot diameter is approximately 0.0004" at 50% power level.

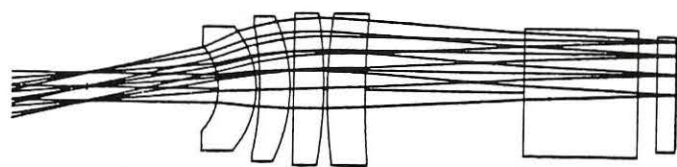


Figure 3. Computer ray trace of the laser writing focus lens.

Light valve images are projected to the screen by means of light source optics and a projection system. A f/8.0 telecentric wide angle projection lens is designed to project the 1" x 1" image on the SLCLV onto a 48" x 48" screen with distortion of less than 0.1%. The projection lens has modulation transfer function of 50% at 40 line pairs per mm. A contrast of greater than 25 to 1 is typical for the color system. However, contrast greater than 60 to 1 has been achieved with black-and-white images.

Color generation: Two SLCLVs are used in this display system to produce 4 colors. Information can be displayed in 3 colors with a fourth one as background. Figure 4 illustrates the optical arrangement of the system. The YAG laser beam is directed to address an assigned light

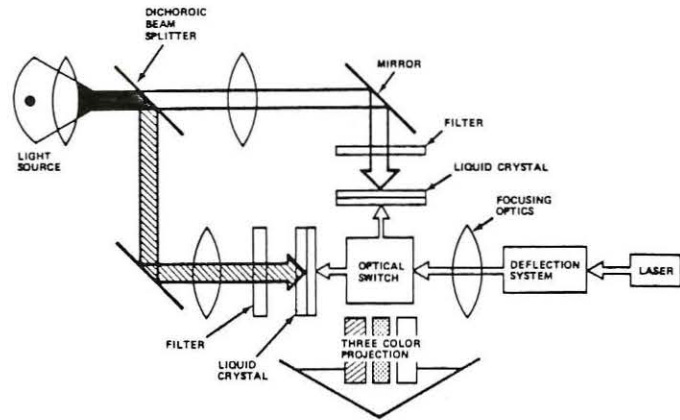


Figure 4. The functional diagram of the 4-color liquid crystal large screen projection system.

valve channel by means of a proprietary optical channel-selecting element. Either light valve can be addressed selectively or simultaneously to create a color spectrum between the two prime colors determined by the color filters inserted in each light valve projection path.

Through the illumination optics, the two SLCLVs are projected separately through a color filter to generate two colors (red and green) of different images on the screen. The third color image (yellow) is obtained by superimposing two identical images from both of the liquid crystal light valves. The fourth color (black) is produced by blocking off the projection light by the same image in both channels. Each light valve can be operated in both bright field mode (black image on color background) or in the dark field mode (color image on a black background). Therefore, an interesting variety of color combinations can be generated by this scheme.

Results

Figure 5 is a photomicrograph of a portion of the light valve with image of resolution test pattern. Lines and spaces on Figure 5 are 0.0004 inches wide. A resolution of 2500 TV lines per inch on the SLCLV has been demonstrated.

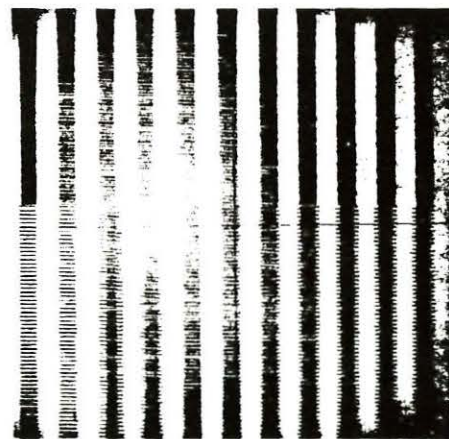


Figure 5. Photomicrograph of liquid crystal data cell with stored resolution test pattern. Lines and spaces are 0.0004 inch wide.

In general, the line width of the written information is a function of operating temperature, laser power, and the writing speed. With a contrast writing speed at constant temperature, the line width of a written image is a linear function of the laser power. Figure 6 is the data collected from a Schiff-based smectic liquid crystal mixture.

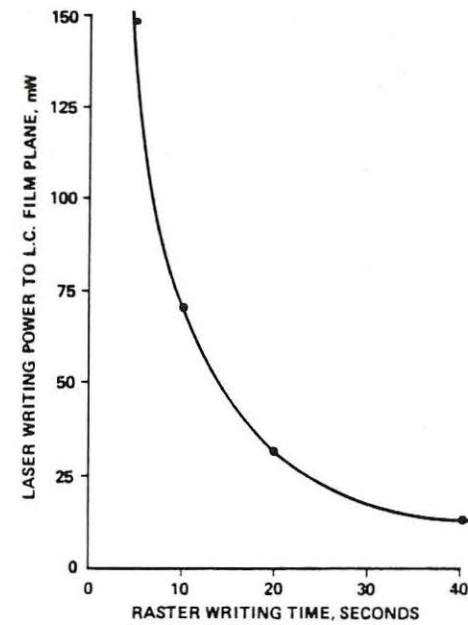


Figure 6. Lineal writing time to produce a 1.2 cm x 1.2 cm 1024 line raster versus laser writing power.

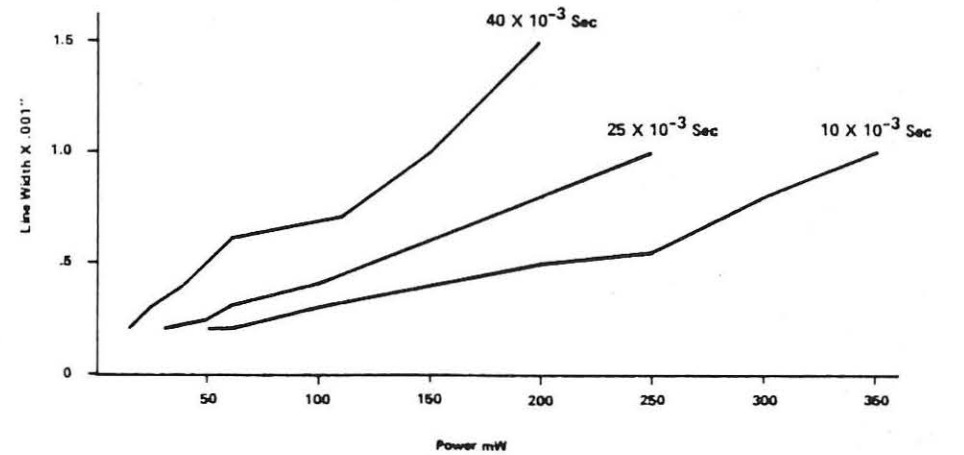


Figure 7. Liquid crystal line width versus laser writing power at constant raster write rate. Numbers shown on the curves indicate the time for a single scan.

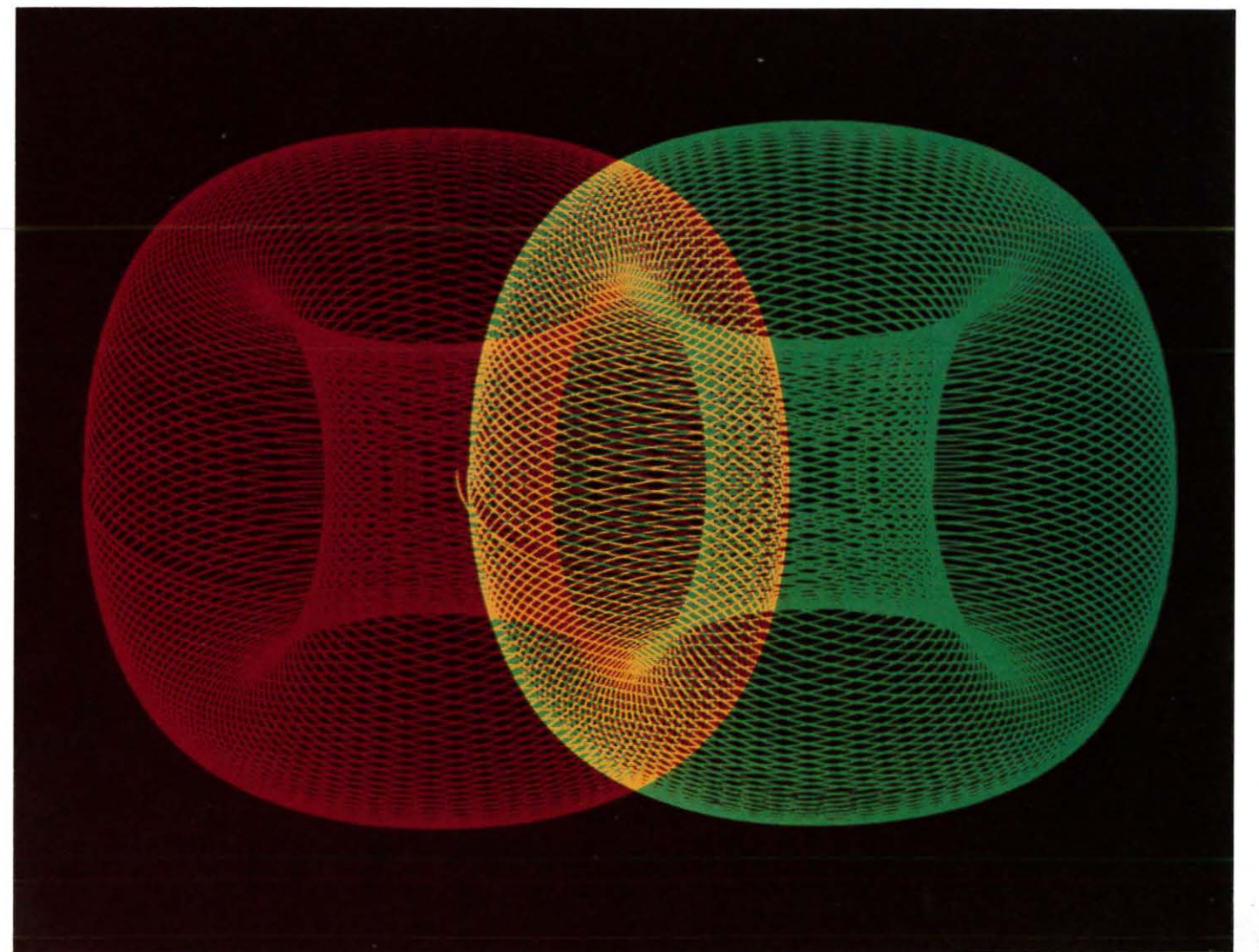


Figure 8. Three-color computerized graphics.

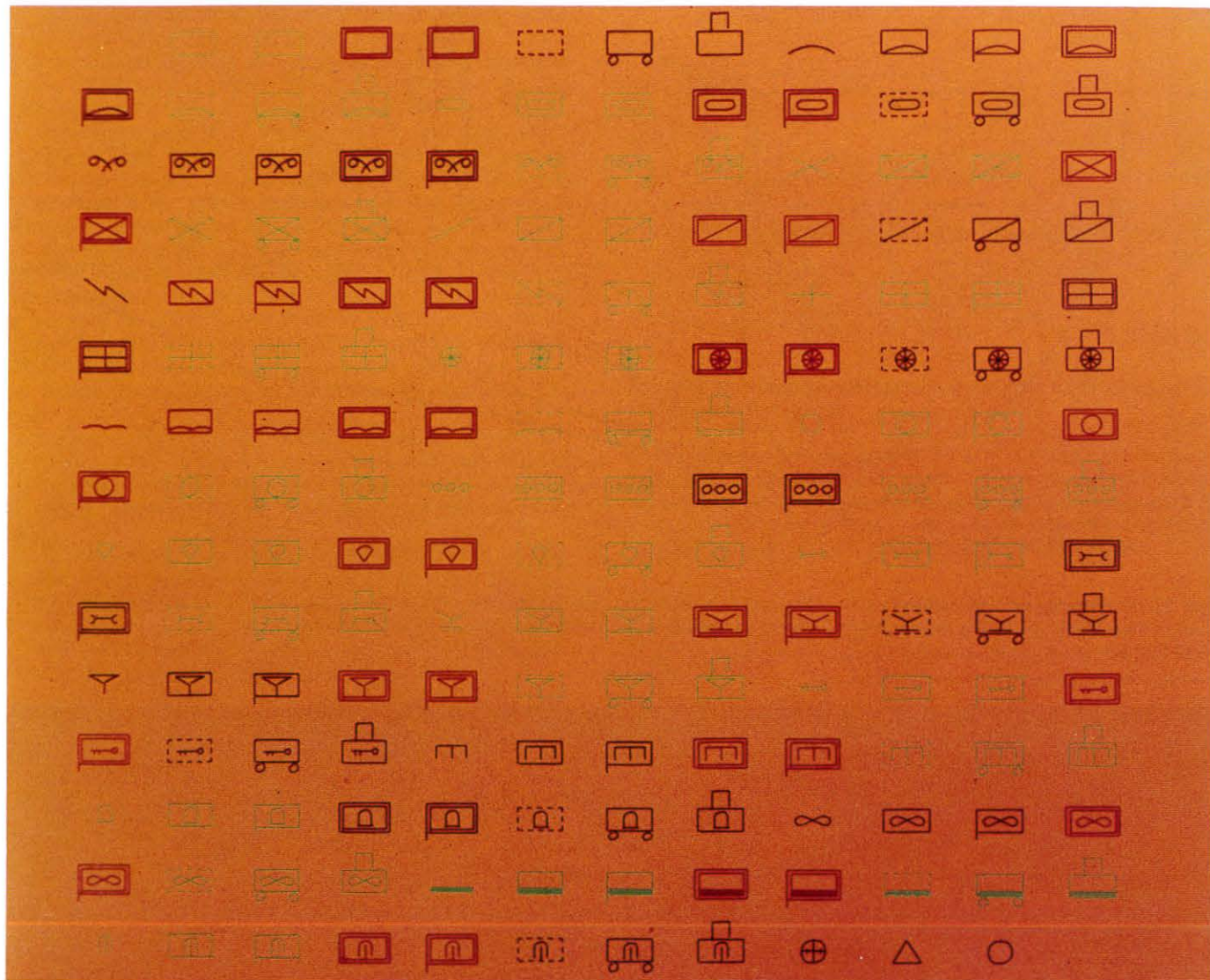


Figure 9. Random access writing of the 3-color Army symbols.

The laser power required to form 60 to 1 contrast at different writing speeds is shown in Figure 7. The horizontal axis indicates the time required to perform raster scan of 1024 TV lines on 1/2" x 1/2" format on the SLCLV.

The laser writing of the liquid crystal light valve can be in raster or random access modes. The writing speed per pixel for a 2048 x 2048 line display is typically 5u sec. With the raster scan mode, 2500 alphanumeric characters can be generated within a second.

A black and white photo of a 3-color graphic pattern is shown in Figure 8. These images were generated from a microprocessor which then controls the deflection system and laser intensity to write on the SLCLV in random access mode.

A 3-color Army symbol presentation is shown in Figure 9. The images shown on both figures were generated within 1/2" x 1/2" format (1024 x 1024 pixels) on the light valves with registration accuracy of less than 1/2 of the pixel element.

Acknowledgements

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PHOTO RESEARCH

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SID CALENDAR JULY TO SEPTEMBER 1981

1981		
July	1	Proceedings, Volume 22, No. 3, 1981, Mailed
	20	Quarterly Chapter Rebates Mailed
September	16-18	Eurodisplay 81 — The First European Display Research Conference, Munich, Germany

OTHER EVENTS

1981		
June	14-18	National Computer Graphics Association Conference, Baltimore, MD
	17-19	International Conference on Optical Radiation Measurements of Fluorescent and Retroreflective Materials, Minneapolis, MN
	18	20th Annual ACM Symposium (NBS and ACM), College Park, MD
	22-26	1st International Congress on Advances in Non-Impact Printing Technologies, Venice, Italy
	24-26	Computer Industry Trade Expo, Atlantic City, NJ
June July	29-30 1	ACM IEEE Design Automation Conference, Nashville, TN.
August	17-22	5th International Congress of Cybernetics and Systems, Mexico City
	24-28	SPIE Annual International Technical Symposium & Exhibit, San Diego, CA
	26-29	National Small Computer Show, New York, NY
November	1-4	DPMA's 30th International Conference & Business Exposition, San Francisco, CA

1982		
January	18-20	Pacific Telecommunications Conference, Honolulu, HI



SOCIETY FOR INFORMATION DISPLAY
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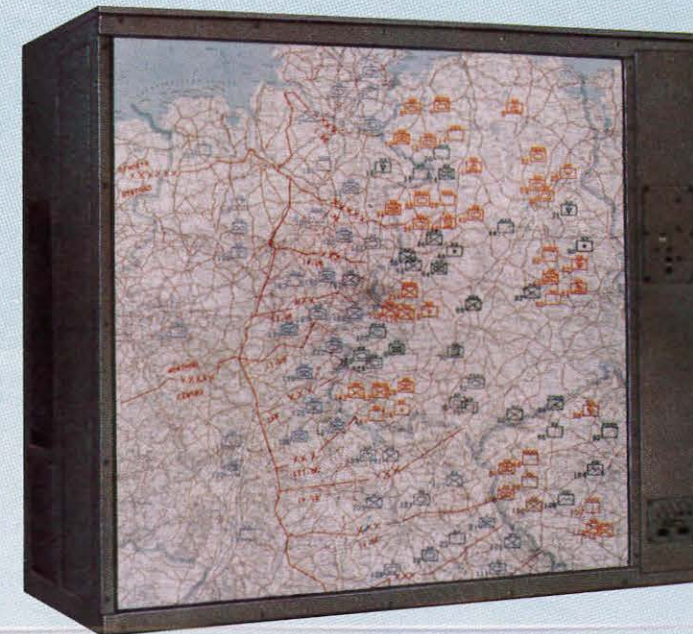
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	<input type="checkbox"/> ← Send mail tocheck one (home or business) → <input type="checkbox"/>						Title or Position		
	RESIDENCE	Firm Name, Agency or Institution							
		Number	Street				Number	Street	Mail Station
		City	State	Zip Code		City	State	Zip Code	
Area Code		Home Telephone				Area Code	Business Telephone	Ext.	
OCCUP.	Principal Product of your Division or Department								
	Primary Field of Interest								
	Secondary Field of Interest								
GRADE	By-laws section "Membership Qualifications and Privileges" and information for sustaining members sent on request.								
	Application for: <input type="checkbox"/> Member* <input type="checkbox"/> Assoc. Member <input type="checkbox"/> Student Member <input type="checkbox"/> Sustaining Member <small>*Bachelor's Degree or equivalent in a Field related to Information Display. If equivalent, explain and give three (preferably member) references.</small>								
EDUCATION	College or University	Location	Dates	Major Course	Degree Received	Date			
	College or University	Location	Dates	Major Course	Degree Received	Date			
	Other Schools (Names, Dates, Degrees)								
PROFESSIONAL EXPERIENCE	Other Technical Society Affiliations								
	Title of Most Recent Paper, Date and Place Published								
	SID Symposia or Technical Meeting Attendance — List Locations and Year								
	Dates — Current Employment First, Followed By Previous Experience, Patents, Other Publications, Etc.								
REMITTANCE	Remittance Enclosed — Payable to the Society for Information Display								
	Includes subscription to SID JOURNAL and PROCEEDINGS OF THE SID. (Students receive SID JOURNAL)								
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<input type="checkbox"/> Sustaining Membership \$300.00 _____									
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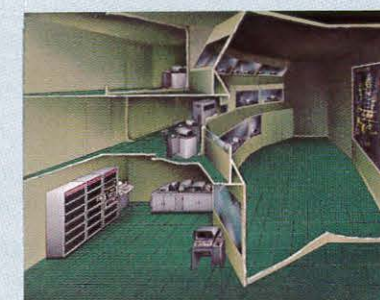
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System is shown here in vertical self-contained configuration, with a 48x48-inch image area.



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SEE DEMONSTRATIONS DAILY AT U.S. PAVILION STAND C19 AT THE PARIS AIR SHOW, 4-14 JUNE '81



Burroughs new S 590 document encoding system, designed for fast and easy operation, provides greater productivity and reliability than previous systems in its class. The S 590 can encode documents with either magnetic or optical characters for later high speed electronic

Burroughs Introduces High Speed S 590 MICR, OCR Document Encoding System

Burroughs Corporation, Detroit, has broadened its range of magnetic and optical character encoding machines with introduction of the high speed S 590 document encoding system.

The S 590 is said to provide banks, thrift institutions, and business organizations with greater productivity and reliability in encoding documents for electronic reading by other machines for automatic entry of data into computers.

The new S 590 is a single pocket encoder designed for users with high volume proof and encoding requirements. This new machine, like other models in Burroughs "S" Series of advanced document management systems, can encode documents in either Magnetic Ink Character Recognition (MICR) or Optical Character Recognition (OCR) type fonts.

The principal MICR use of the new system will be in proof of deposit operations which prepare MICR encoded documents for subsequent electronic processing. The system will also be applied to proof and receipting operations involving OCR encoded utility bills, insurance premium notices, credit card slips, and loan coupons.

Contributing to the S 590's productivity are fast and easy document insertion and an advanced electronic keyboard design that prevents jamming of keys and is easy to operate, according to Burroughs.

New electronic component design increases reliability of the S 590, which requires 42 percent less power and produces 55 percent less heat than previous systems.

The S 590, whose control system is based on advanced microprocessor technology, utilizes programmable read only memory (PROM). This feature provides the machine with a fully programmed MICR/OCR code line with from 1 to 8 fields. Once identified and defined, the PROM program sequences the encoding operation automatically.

processing. The system will be used in proof and receipting operations involving checks, utility bills, insurance premium notices, credit card slips, and loan coupons.

In addition, the PROM contains two independent sets of parameters which allows altering of the machine's operation to satisfy the particular need for each user.

Examples of the variability are encode line formatting, proofing methods, customized check digit generation and verification, field data capacity checks, print line formatting, and pre-programmed transit codes.

The S 590 is designed for fast, easy operation. A new feature called document overlap allows insertion of a second document in the drop-and-align station before completion of the preceding encoding cycle.

Documents which pass through the system are clearly visible at all times. Encoding and audit trail printing occur in parallel, and the last printed line on the audit tape is always visible to the operator.

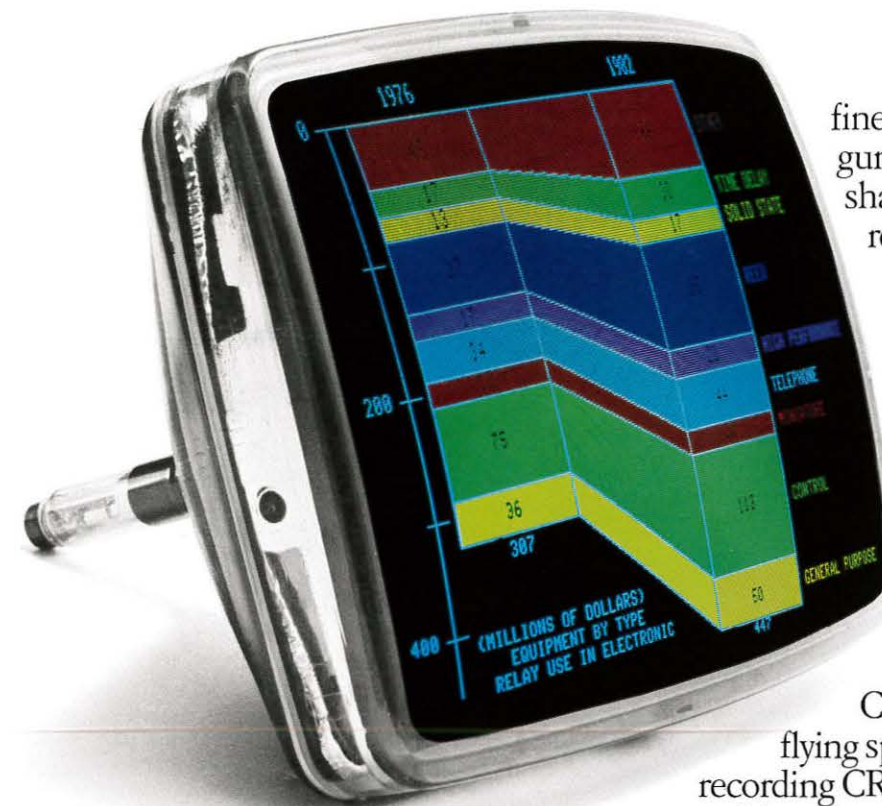
Contributing to ease of operation, as well as operator training, is a set of specially designed communications lights which guide the operator step by step through the encoding operation.

Productivity in the encoder is enhanced through an electronically buffered, standard 10-key keyboard. The buffer stores both numeric and control information for up to 21 print positions.

Based on the PROM program, fields are encoded in a controlled index sequence on the S 590. Exception item encoding as well as normal proof of deposit encoding may be accomplished by selecting the field keys only for fields to be encoded outside the sequence. No program changes are required. Documents are transported through the new encoder at 75 inches per second. This, combined with this S 590 audit tape lister which prints at 2.5 lines per second, provides this new electronic system a rated speed of up to 70 documents per minute for encoding a 12-character amount field.

Preprogramming, automatic sequence selection, transport speed and keyboard buffering give the S 590 balanced throughput, enabling the operator to maintain the highest level of productivity.

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And, combined with our ultra-fine pitched shadow mask, the gun system produces a picture so sharp, it actually encourages reading fine print.

Another Mitsubishi innovation is our internal magnetic shield. It not only more efficiently eliminates exterior magnetic forces, but makes the unit much easier to service. Not to mention what the magnetic shield does for a purer image, in both monochrome and color.

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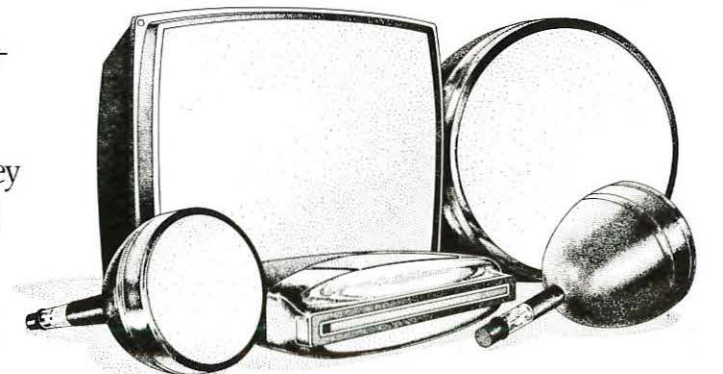
Because each of our high-resolution color CRTs actually discriminates among 64 distinct colors.

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Our precision electron gun system insures that each beam is perfectly aligned with the shadow mask.



MITSUBISHI ELECTRIC COLOR CATHODE RAY TUBES



Versatec 440-30 Multi-Leave Remote Plotting Controller supports remote electrostatic plotting and printing.

Remote Plotting Controller Offers Hasp Multi-Leaving Remote Job Entry And Plotting

Operating as a Hasp multi-leaving remote job entry (RJE) work station, the new Versatec 440-30 Remote Plotting Controller provides remote electrostatic plotting and printing with any Versatec printer/plotter. Input data is processed and compressed, then transmitted over dial or leased lines in compressed raster format to the controller. The Versatec controller decompresses raster data and controls plotting or printing.

Versatec Versaplot™ software, used on the host computer, allows data compaction in one or two dimensions. One-dimensional compaction reduces the amount of data to be transmitted by several times over vector data. Two-dimensional compaction further reduces data volume by 20 to 60%. The 440-30 can output print data at speeds to 1000 LPM. Plot speed is determined by transmission rate, plot size and complexity, available host time, and selected data compaction scheme.

A console with CRT display and keyboard provides "sign-on" and versatile operator control at the remote site. Console and printer/plotter can be active simultaneously. Multi-leaving allows console data input independently of console data output. Data are serially input at rates from 2400 through 19.2K baud, and output in parallel at rates to 18,000 bytes per second.

The controller carries its own data-link trace facilities and self-test diagnostics. Performance evaluation and troubleshooting are said to be simplified through selftests of memory, controls, and indicators with exercisers for printing character sets and plotter test patterns.

Software. Versaplot™, a system of Fortran-callable subroutines compatible with basic pen plotter routines, supports plotting of virtually any graphic representation on any Versatec plotter or printer/plotter. Fully compatible with IBM software and system protocol, Versaplot requires no operating system modification. Versaplot is fully integrated for use with IBM OS, VS and CMS operating systems. Extended graphic capabilities include grid overlay, area shading and toning.

Output devices available include electrostatic printers, plotters, and printer/plotters in paper widths to 72 inches, print speeds to 1000 LPM and plot speeds to 34 square feet per minute. Remote plotting performance varies with the speed of the communications line and plot complexity.

Options. Vector-to-Raster Converters (VRC models 400-3 or 4--5) can be added for systems receiving data in vector form.

Controls and displays. The console CRT displays control, status, and error messages. The separate controller has front panel controls for Power ON/OFF, RESET and MODE with diagnostic controls, MODE and INTERRUPT. Front panel displays indicate Power ON/OFF (LED) and status.

Dimensions and weight. Controller dimensions are 5¼" (13.3 cm) high, 19" (48.3 cm) wide and 16¼" (41.3 cm) deep. CRT console dimensions are 14" (35.6 cm) by 17" (43.2 cm) by 20" (50.1 cm).

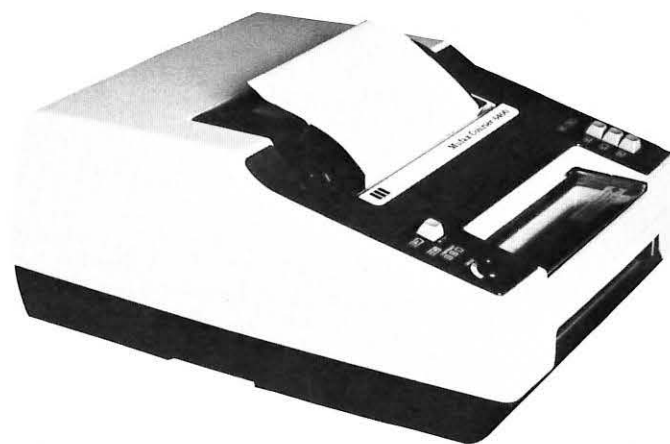
According to Versatec product marketing manager, Janet Berryhill, "The 440-30 remote plotting controller gives remote plotting users the speed and reliability of electrostatic plotting and printing with the control and error correction of HASP multileaving. Complex graphics, detailed maps, and high quality printout can be produced at remote sites, far from the computer but close to the user, at a practical system and data communications cost."

New High Speed FAX System

A new high speed facsimile system that can transmit and receive standard size business documents from one location to another, anywhere in the world in 30 seconds, has been announced by the Data Communications Division, Muirhead, Inc., Mountainside, NJ.

The Muirhead MUFAX K 6400 transceiver features a unique method of data compression based on skipping white spaces (SWS) which means users only pay for transmission of the document's contents, not any white space. It is also fully compatible with all CCITT Group 2 equipment; thus it can communicate with all recent facsimile systems on a worldwide basis.

Operation is simple. An optional feeder attachment permits automatic transmission of up to 30 documents, completely unattended by an operator. Reception is similarly fully automatic, on a 24-hour basis, permitting unattended international communications over all time zones.



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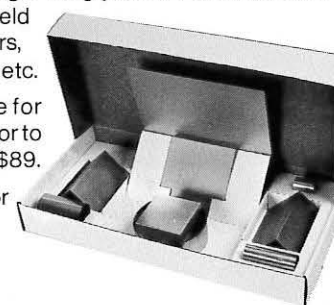
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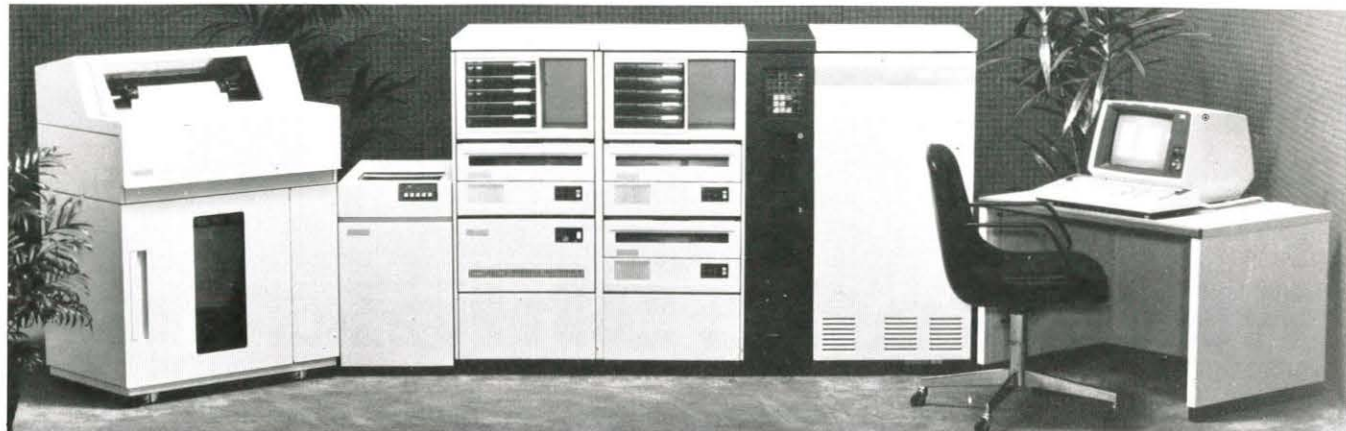


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THE TRW-FUJITSU COMPANY'S (TFC) 8500 multi-tasking, multi-user family of small general purpose information systems will operate as a stand-alone unit, on-line to a central computer, or in a TFC 8500

TRW-FUJITSU Introduces Firm's First Computer System Since Company's Formation

The TRW-Fujitsu Company, Los Angeles, recently introduced its first computer system since the joint venture began in May 1980.

Designated the TFC 8500, the multi-tasking, multi-user data processing system is said to be a complete family of small general purpose information systems with the capabilities normally associated with large systems, according to Jack Andersen, vice president, systems marketing for TRW-Fujitsu.

"It is exceptionally flexible and upgradable: the entry level starts with a single workstation and may be expanded to 80 local and remote workstations. The system will operate as a stand-alone unit, on-line to a central computer, or in a TFC 8500 network. It can perform batch, on-line, or distributed processing applications. This unusual range of capabilities, including complete software compatibility throughout all configurations, is made possible through advanced computer design concepts and the use of Fujitsu's LSI circuits," Andersen points out.

The 8500 family of information systems is intended for several markets. The maker believes that the system will find extensive application in distributed, networked, and stand-alone environments. "Large corporations will use the 8500 at headquarters, divisions, branch sales offices and warehouses for local processing and exchanging data with the company's central computer," Andersen says.

"It will also be marketed to first-time users, as well as small and medium sized companies that want to upgrade their present equipment with enhanced capabilities, such as data communications, high level languages and sophisticated data base management."

The main storage unit uses 64K MOS LSI devices and has 256K-bytes of system memory. Add-on storage units permit expansion up to a maximum of 2 megabytes. The storage cycle time is 400 nanoseconds per two bytes.

The central processing unit contains a one-chip, 10,000-gate microprocessor and 700-gate-per-chip high-speed bipolar LSI circuits and features virtual memory capabilities.

The system is delivered with such high-level languages as Fortran, Cobol, and RPG. There will be application programs for wholesale distributors, manufacturers, retailers, construction, and CPAs, as well as insurance, hospital administration, and property management. In addition, there will be management science and engineering programs available for graphic presentation, time-series forecasting, linear programming, management analysis and review, statistical analysis, material information retrieval, and account log analysis.

network. The systems can perform batch, on-line or distributed processing applications.

Peripherals include disk storage, display and printer work stations, magnetic tape units, and line printers.

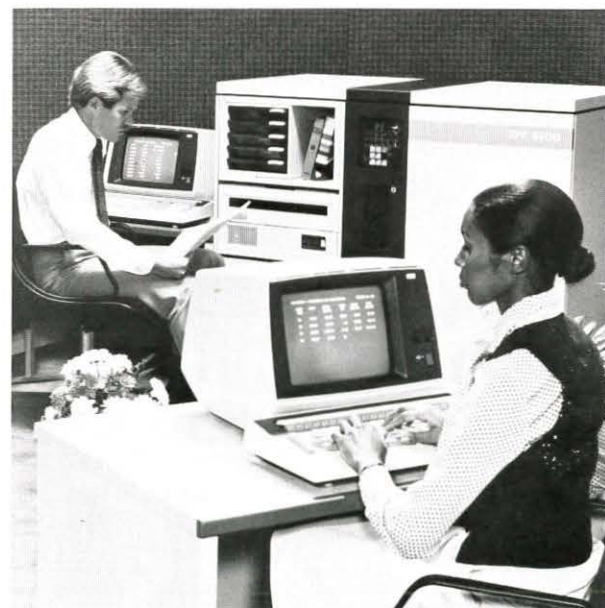
Up to eight magnetic disk storage devices in any combination of fixed and removable cartridge units may be connected up to a maximum storage size of 800 megabytes.

An error checking and correction code for main storage and disk storage, as well as a retry function for processor and peripheral units, allows automatic error recovery. Various diagnostic functions and programs automatically check the system and provide input for effective preventive maintenance.

The keyboard display unit features a 12-inch, 1920 character screen, an alphanumeric keyboard, 10 keypad and 24 program function keys.

Two types of printer workstations are available: a desktop version capable of printing 120 characters a second and a high speed, 180 cps bi-directional printer.

The small number of state-of-the-art high density IC circuits use considerably less power, it is claimed, than conventional 16K and 1,000 gate devices. As a result of this and other design features, the TFC 8500, unlike most large computers, does not need a special cooling system. This combination of technology and packaging makes the computer compact and efficient, the maker claims.



THE TRW-FUJITSU COMPANY'S 8500 family of small general purpose information systems has the capabilities normally associated with large systems. System configurations range from a single workstation up to 80 workstations.

Chapter News

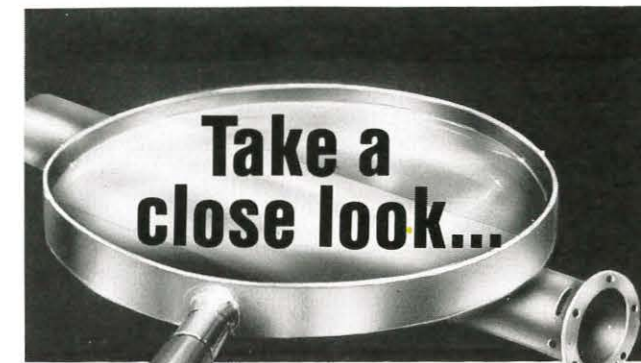
LOS ANGELES CHAPTER on March 26 enjoyed a discussion of the Voyager encounters with Jupiter and Saturn. Accompanying the talk by Jack Guiliano, Voyager Science Office, Jet Propulsion Laboratory, were color slides, computer animation, and a 16mm movie showing scenes previously unknown to man on those huge, remote planets. Thanks to Gordon Kramer for his usual excellent notices as Chapter Program Chairman.

SAN DIEGO CHAPTER on February 25 found it fascinating to hear and see a program entitled "Optical Video Disc Technology: Principles and Development, Presentation and Demonstration." Featured were Dr. William V. Smith and Terry Bochante, DiscoVision Associates, Inc., Costa Mesa, CA. According to John Lipscombe, chapter chairman, and George Unangst: "SID Members commented on how informative this meeting was."

On March 10, Richard Thoman, of General Dynamics Electronics, San Diego, described the principles of operation of the General Dynamics full color large screen display. Dick Thoman, long time SID Member, is a Western Director of our Society.

MID-ATLANTIC CHAPTER on March 31, the meeting was held at the New York Air Traffic Control Center, McArthur Field. J. Ferrara, and two additional supervisors from the ATC, provided a discussion of human factors problems experienced by air traffic controllers in handling situations with high traffic density in the New York area and in neighboring states within the jurisdiction of this air traffic control center. According to Bill McLaughlin, SID Treasurer, this presentation and tour of the ARTCC facility was very enlightening and was enjoyed by the 52 SID Members and their guests.

(Continued on page 24)



magnetic shielding requires precision manufacturing

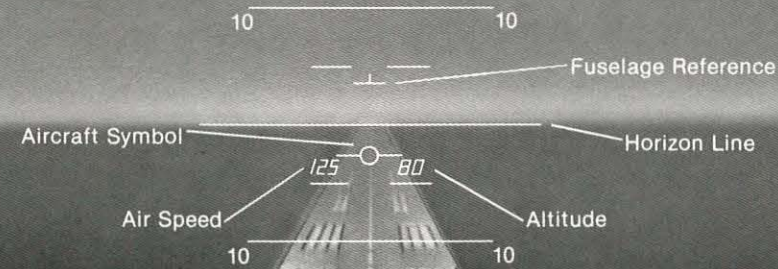
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Syntronic also designs and makes precision yokes and focus coils for navigation systems, weather radar, weapon systems and other CRTs used on most aircraft flying today.



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Precision yokes for exacting displays

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Fiber Optic Link Tested for Missile Guidance

A fiber optics communications system that will enable a safely concealed gunner to remotely direct a guided missile to a battlefield target is under development for the U.S. Army by Hughes Aircraft Company, Canoga Park, CA.

In the advanced development program called Integrated Fiber-Optic Communications Link (IFOCL), Hughes, the prime contractor, and its principal subcontractor, ITT Electro-Optical Products Division, are working on techniques that would enable a fine fiber-optic thread to be used to communicate between a launcher and a missile in flight.

Program officials say the system has the potential to provide the basis for a low-cost "lock-on-after-launch" antiarmor missile with extended range and immunity to enemy countermeasures.

The concept calls for the missile with an imaging seeker in its nose to be fired in the direction of a known enemy

Prime Computer Improves Screen Formatting

Prime Computer, Inc., Natick, MA, says it's painting a clearer picture for programmers who design screen formats. Its new Forms Editor (FED) software enhancement provides ease-of-use and compatibility for existing users of FORMS, Prime's Forms Management System for screen formatting and terminal management. FED's four new features — 'screen painting', user menu, HELP facility and 'skeletons' formats — improve Prime's competitive position in the marketplace, the manufacturer claims.

"With 'screen painting,' the programmer can design formats directly on Prime's block mode PT45 terminal without first laying out the form on paper or code language statements," according to Leslie Chasen, Prime's marketing product manager for FORMS. "Application development is easier because the format is displayed on the screen exactly as it will appear when the program is executed."

The Forms Editor is menu-driven providing easy-to-follow steps for the user who creates screen formats. Furthermore a comprehensive HELP facility offers a tutorial on each FED function so users can quickly retrieve information necessary to complete tasks whether they're creating or modifying a form.

Another time-saving FED feature is 'skeletons' which allows users to store the basic design of a format. This stored information can then be used as the foundation for other formats, thus eliminating the need for the user to retype all the format when changes or additions are desired.

"With the Forms Editor, Prime continues its commitment to provide tools that are easy-to-learn, easy-to-use and which improve programmer productivity," says Chasen. "In addition, because it is not necessary to learn a language to create screen formats, FED permits non-programmers to participate in the development process."

FORMS is a major component of Prime's current software product group for developing screen format applications in business, manufacturing and educational environments. Because FORMS can interface with COBOL, RPG, PL/1 or FORTRAN, users can select the language most suited to the application. In addition, programmers can choose the data management method — index sequential (MIDAS), DBMS, or sequential files — which best organizes their data.

The Forms Editor will be available on PRIMOS, Prime's operating system for its 32-bit 50 Series Systems.

force. The scene viewed by the missile would be communicated back to a gunner over a single strand of the optical fiber which is payed out from a spool in the aft end of the missile. The gunner viewing the scene on a video-type display selects a target and guidance commands are automatically transmitted to the missile over the fiber-optic link.

The most promising aspect of a fiber-optic missile communications system is its ability to transmit the wideband signals required for video images. Metal wires or coaxial cables are capable of transmitting such signals under certain conditions, but they are not suitable for tactical missile applications because of bulk, lack of strength or other operational limitations, according to David S. Fox, IFOCL program manager for Hughes.

Other advantages of the fiber optic missile communications system, according to Fox, are:

- Lower missile cost and greater system reliability are possible because much data processing is done at the launcher, enabling the missile electronics to be simplified.

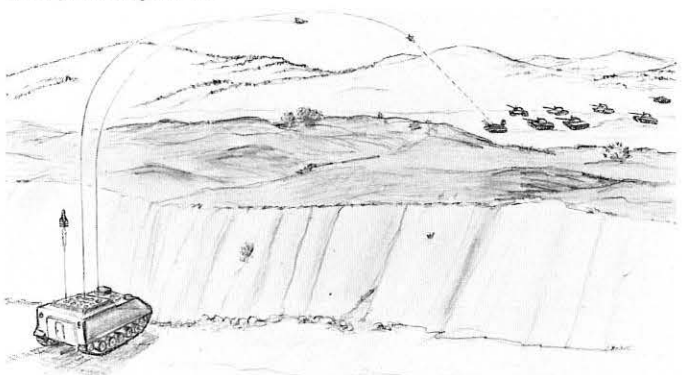
- Optical signals cannot be detected or interfered with by enemy counter-measure jamming.

- The "lock-on-after-launch" capability provided for the missile means that it can be launched from either ground vehicles or helicopters in defilade without exposing the crews to enemy fire.

- With the missile's entire flight under control of a gunner, there is greater confidence in optimum target selection than with some other "lock-on-after-launch" concepts.

In an earlier phase of the program, Hughes and its team member, ITT, demonstrated success in overcoming two of the primary technological hurdles in development of the system — the development and fabrication of long lengths of a thin fiber-optic cable (0.012 in. or 300 microns in diameter) with unusually high tensile strength (200,000 psi) and low signal transmission loss both in the wound and unwound condition; and the ability to pay out long lengths of the optical fiber at simulated missile velocities without snapping or snarling.

In recent rocket sled test at Holloman Air Force Base, NM, the fiber was successfully payed out at high speed as a simulated video signal transmitted through it. The maximum signal loss was less than 4 db per kilometer over the graded index-type fiber, which has a glass interior and plastic jacket.



Missile Link — Artist's concept illustrates a potential application of an Army missile communications system employing fiber optics which provides a secure two-way link between the launcher (safely hidden in defilade) and the missiles which are being fired in rapid succession. Seekers in the nose of each missile provide views of the target scene in the launcher on a video-type display. A gunner can then assess prior battlefield damage and select new targets. Commands to direct successive missiles to targets are sent back over the single optical fiber strand which is payed out from a spool in the aft end of the missile. Hughes Aircraft Company and ITT Electro-Optical Products Division, its principal subcontractor, are working on the fiber-optic system under contract from the U.S. Army Communications Research and Development Command.

New RF Switch for Video

Standard Communications Corp., Los Angeles, has just introduced the RFS-10 radio frequency switch, designed to connect any one of five different RF signals to the same output. It is primarily used for switching up to five different pieces of video equipment to the same television set in a simple effective manner. It can be used on a similar way with graphic displays.

Tangled cables are eliminated by the RFS-10. Without this unit they must be sorted, disconnected, and reconnected to permit program changing. Several RFS-10 switches may be used in combination with splitters, amplifiers, and attenuators to accomplish almost any required result, the maker claims.

An associated device is the MCC-3 master control console, designed to permit selectable distribution of five different RF signals to three separate locations.

In a typical application the MCC-3 will be connected to five signal inputs such as standard broadcast TV, pay TV, video recorder, game and a satellite receiver.

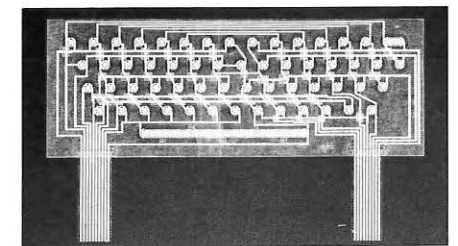
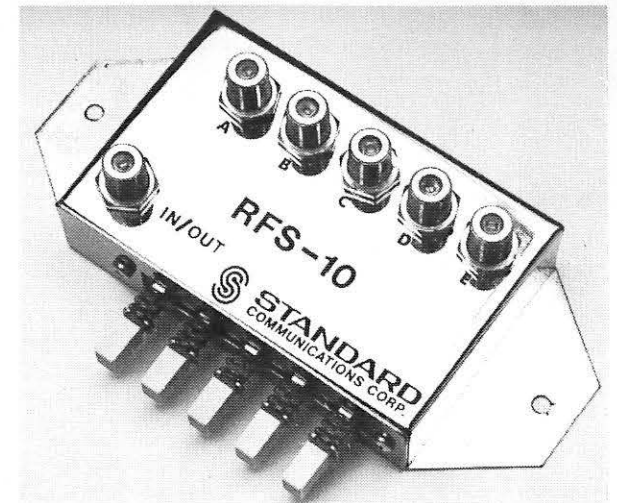
The three switched outputs will be connected to the projection TV, remote TV and the video recorder. Any of the five programs can be selected at the MCC-3 for distribution as required.

Electrical Specifications:

Type of switching
Push button — automatic return

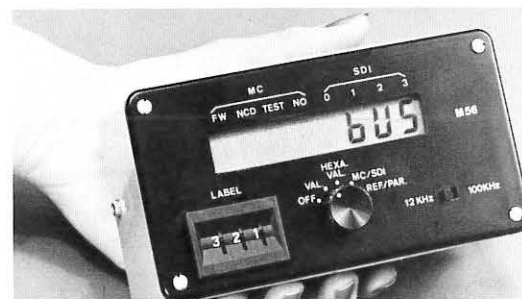
Switch description:
Single pole — 5 positions

Isolation between any input and output:
Greater than 60 dB



58 Key Membrane Switch Keyboard — Xymox Division of W.H. Brady Co., Milwaukee, has introduced a new stock product, the 58 key membrane switch keyboard designed for use with most ASCII applications. It is available in 8 x 8 bus matrix and will function with a variety of stock keyboard encoders. Stock faceplates in white, black, tan, grey, light blue and light green are available with the keyboard. Custom graphics faceplates may also be ordered for this flat surface keyboard.

Interface To Distribute Hand-Held Arinc 429 Bus Monitor



Interface Technology, Inc., San Dimas, CA, a Dynatech company, has signed a distribution agreement with SFENA DNI of France to market that company's hand-held Micro Dits AAM56 ARINC 429 Bus Monitor instrument in the United States. The instrument will be marketed as Interface Technology's Model M56.

The Model M56 instrument allows quick and simple monitoring and readout of digital information transfer systems and is intended for use in those aspects of avionics development where monitoring and display of 32-bit serial bus transmissions are required, such as in system integration testing, flight line maintenance and on-board troubleshooting.

"We view the M56 monitor as an ideal companion to our new Model 429 ARINC Bus Analyzer," explains Stanley Kubota, Interface manager of sales and marketing. "The M56 simplifies the task of verifying the received data by performing required translations from serial binary transmission to engineering units such as degrees, knots, feet, pounds and so forth."

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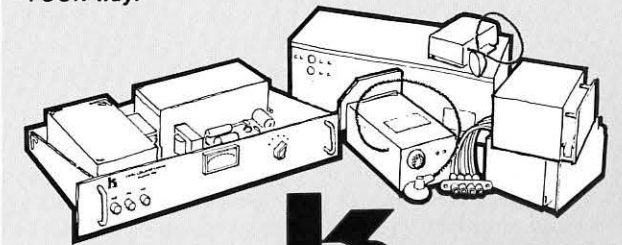
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Megatek Introduces Two Graphics Work Stations Offering 1024x1024 Resolution For CAD/CAM Use

Two new members of the WHIZZARD 6200 graphics workstation family have been introduced by Megatek Corporation San Diego, to provide high resolution 1024x1024 raster displays for critical computer-aided design and manufacturing work.

The two new models are the WHIZZARD 6245, which employs a 20-inch black and white monitor, and the WHIZZARD 6255, which has a 19-inch color monitor. Each is said to offer low cost, high performance features similar to those in the WHIZZARD 6250 workstation introduced late last year.

The 6245 includes a 20-inch monitor with 1024x1024 resolution, operating non-interlaced at a 60 Hz refresh rate. It is packaged with a keyboard and joystick control in a desk style cabinet. The terminal includes a graphics processor, display list memory, an RS-232 serial asynchronous interface, and room for optional modules. Available options include additional display list memory, a hard copy output, and a data tablet.

The 6255 consists of a 19-inch color monitor also offering 1024x1024 resolution. It is packaged with a keyboard and joystick control in a desk style cabinet. The terminal may have a data tablet and either additional display list memory or a hard copy output device.

"Like their predecessor WHIZZARD 6250 workstation, both of the new terminals are designed specifically to provide the same high technology graphics features found in our larger WHIZZARD 7250 raster system but in a smaller unit and at less than half the cost," says Peter J. Shaw, Megatek vice president.

"We expect the availability of such a low cost, high performance family of graphics terminals to spur tremendous growth in the CAD/CAM marketplace because they give users more capability than is available with traditional storage tube devices, yet they are priced about the same as these older and less versatile forms of graphics terminals," Shaw declares.

CAM/CAM graphics systems generally are used for automating design, drafting, engineering and manufacturing tasks. The benefits of using such systems include both savings in time and significant improvements in productivity. "This results in better new product development lead times, savings resulting from engineering analysis performed in simulation not in trial-and-error manufacture, better quality of designs due to improved dimensional accuracy and better utilization of materials," Shaw explains.

In the past, the most common graphics display used in CAD/CAM systems was the storage tube, primarily because of its low cost. "But a tradeoff had to be made for that low cost because storage tube terminals did not offer multiple colors, they were slow in drawing screen images and, perhaps most important, they offered little dynamic interaction between the operator and the terminal for on-line design and analysis tasks," Shaw says. "The WHIZZARD 6200 family eliminates that tradeoff."

The new 6245 and 6255 models both incorporate the same high speed digital vector generator of the 6250 and the 7250, updating and manipulating complex pictures at rates from 30 to 60 times per second. The new color 1024x1024 monitor uses long persistence phosphors to virtually eliminate screen flicker.

Because the graphics processor used in the new workstations is the same as that used in other Megatek systems, the new models offer the same 4096x4096 virtual vector space which provides a high level of detail in real-time steps from 1024x1024 through 2048x2048 and 4096x4096. This provides the capability of displaying the

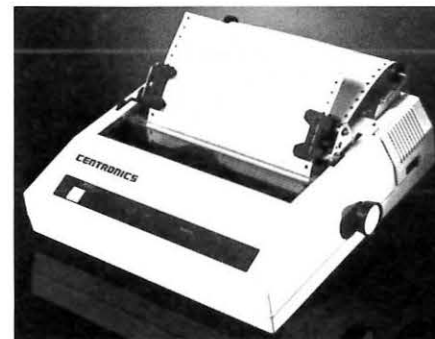


Both of the new WHIZZARD 5200 graphics workstation family members offer high resolution 1024x1024 raster display screens for use in critical CAD/CAM applications. The WHIZZARD 6245 has a 20-inch black and white monitor and the WHIZZARD 6255 has a 19-inch color monitor, according to Megatek Corporation, San Diego.

entire 4096x4096 area on the screen or of zooming in on any smaller viewport. Users may also do a real-time continuous pan throughout the virtual vector space to look at any portion of the total vector space in greater detail.

Write protection of individual bit planes is provided so that real-time data can be displayed simultaneously with static overlays. The double-buffered bit planes of the 6245 and 6255 also permit erasure of overlapping or intersecting lines in a drawing without causing breaks in the lines that remain in other planes on the screen.

Centronics Introduces New 150 CPS Desk-Top Printer



Centronics Data Computer Corp., Hudson, NH, recently introduced its Model 150 cps desk-top printer designed for business and communications applications. The Model 150 is available for immediate volume delivery to qualified original equipment manufacturers.

This new product family is the latest addition to Centronics' full line of printers and offers versatility, convenience, and high-speed printing capabilities for the end user, it is claimed.

The Model 150 standard features include 3-way paper handling, top of form, compressed print, adjustable snap-on tractors and a roll paper holder. Additional features include 150 cps print speed, bi-directional logic — seeking printing, "clean hands" ribbon cassette, forward tear bar, self-test, and a visual paper empty indicator.

According to Neil Kleinfeld, vice-president of marketing and planning, "The Model 150 is designed for heavy-duty, 100% duty cycle business applications in microcomputer and communications systems. With the Model 150, we are offering a printer with the features and pricing needed to fulfill the demanding requirements of today's OEM manufacturers."

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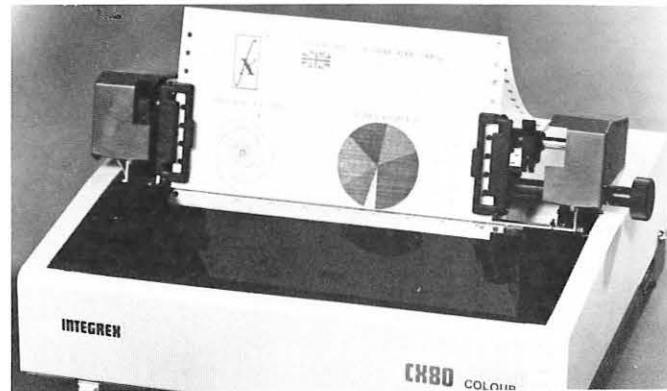


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Low-Cost Color Matrix Printer

A new color matrix printer from Integrex Ltd., Burton-on-Trent, Britain, requires no special absorbency paper. It is expected to sell for about \$2,000.

Said to be a highly cost-effective solution for color printout, the Integrex CX 80 can print text, graphs, histograms, and color VDU dumps in seven different colors, with no restriction on mixing characters, do-addressed areas and color changes on the same line. Colors are selected by 1 of 7 color control codes. Stripes from the tricolor ribbon are selected to produce the required colors, which simplifies the host program requirements.

Unlike ink-jet printers which require high absorbency paper, the printer uses plain white-edge perforated paper (4-10" wide). The unit is fully dot addressable in all 7 colors; the character ROM contains 96 ASCII and 64 graphics characters. The 7-wire head produces a character format 5 x 7 plus graphics format 6 x 7.

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