Information Display

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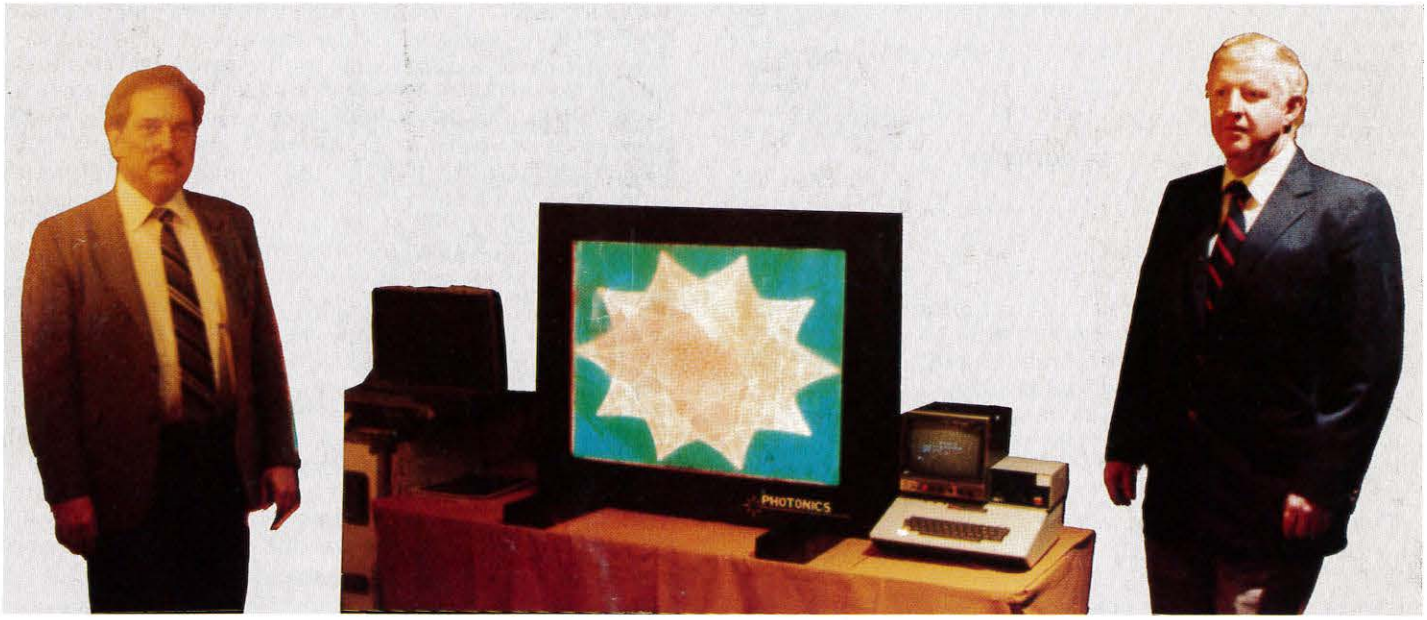

One-meter Diagonal Plasma display has been developed as a joint venture by Magnavox Electronic Systems Company, Fort Wayne, IN, and Photonics Technology, Luckey, OH. Shown here with the display are SID Members Donald R. Willis, manager, Advanced Tactical Systems at Magnavox, and SID-LA Chapter Chairman Kevin Kilcoyne, MTS, Rockwell International Research Center, Thousand Oaks, CA.

When your editor saw this display on January 20 and enjoyed the demonstration and dinner as a member of the Los Angeles Chapter, I was impressed. It took four strong men to carry the display in its packing case into the dining room at the Proud Bird. In addition to Willis, they were Mel Snyder, Magnavox engineer; Don Fern, marketing manager, and Jeff Plautner, engineer, Photonics. Don Willis told me that he and his tour associates from Magnavox and Photonics were a traveling road show. Talk about the chicken-dinner circuit — but the plasma displays, large and small, were well worth seeing.

Brief specifications of the large display in the center of this picture are as follows. It features 0.5 mm line spacing over its 60 cm by 80 cm active display area. A built-in processor and the associated drive electronics are encased in a "window-frame" design, preserving display transparency and allowing the use of either rear projection or standard paper maps as visible reference backgrounds to a dynamic electronic overlay.

Graphics composition and editing, frame storage and recall, and two-way digital communication via serial or parallel interfaces make the Tactical Display System (TDS) ideally suited to military command and control applications.

This "world's largest plasma display" was operated by a suitably programmed Apple II computer, shown at right. On the left of the big display is a small plasma display, completely contained with electronics, in a standard attache case. This letter-size display is used by the U.S. Navy in P3C Orion aircraft to show plots of submarine positions derived from sonobuoy signals.

Although present versions of these plasma displays present data in only a single color — orange data on a green background is favored — Willis says that Magnavox and Photonics hope to have full color displays by next October, in time for the 1982 AUSA (Army) Annual Meeting in Washington, D.C. More details appear on pages 3 through 6 of this issue.

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 April 10 for the May issue. If you miss that, try for the June issue. NOTE: We also welcome feature articles on interesting projects.

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Tactical Plasma Display System

by Donald R. Willis, Manager, Advanced Tactical Systems, Magnavox Electronic Systems Company, Fort Wayne, IN

Background

The AC gas discharge (plasma) flat display panel was developed in 1964 at the Coordinated Science Laboratory, University of Illinois, Urbana, Illinois by Professors D.L. Bitzer, H.G. Slottow, and others. Dr. Roger L. Johnson fabricated the earliest display prototypes. All the work at the University of Illinois was funded as part of the PLATO project by the U.S. Government, which holds basic patent and data rights.

In 1968 development work continued at Bell Labs, Control Data Corporation, IBM, Fujitsu, Owens-Illinois, and elsewhere. The developments at Control Data and Owens-Illinois were done with support funds from the U.S. Government. From 1970 to 1978 Owens-Illinois manufactured over 5000 small gas discharge panels ranging in size up to 21.5 centimeters by 21.5 centimeters and containing up to 512 pixels. Owens discontinued its manufacture in 1978.

AC gas discharge is the only present technology capable of providing large area flat display panels. Other technologies, suitable for small displays, have recognized technical limitations which prevent extrapolation to larger sizes. For example, capacitance, crosstalk, scanning, refresh, and line resistance are problems for large area electroluminescent (EL) displays. The upper limit for EL is approximately page size. The advantages of EL are more in the area of light weight and low power. Large area light-emitting diode (LED) displays have high power requirements and a higher cost per pixel.

The reliability and performance of AC gas discharge has been well established. The standard 512 panel has a resolution of 558 pixels per square centimeter. During the 1970's, thousands of these 512 panels were manufactured and are currently in operation. The failure rate for these panels is less than 0.04%. Many panels have operated almost continuously for over 7 years with a projected life of over 20 years. The operating voltages for AC gas discharge are 75 to 100 volts, substantially less than CRT. Our experience and results indicate that the quality and performance of large area gas discharge panels is fully equal to the quality and performance of smaller gas discharge panels.

A multiplicity of technologies is available for small area displays below 400 square centimeters and resolutions below 300 light emitting pixels per square centimeter. These include cathode ray tube (CRT), electroluminescence (EL), light emitting diodes (LED), liquid crystal displays (LCD), and both AC and DC gas discharge. However, only a few technologies are suitable for either large area or high resolution displays. Tables I and II show that AC gas discharge is the most suitable technology for a display requiring both large area and high resolution with the added advantage of transparency.

Table I. Non-Projected Displays (By Area)

DISPLAY AREA	TECHNOLOGIES
400 cm^2 and below	CRT, EL, LED, AC and DC gas discharge
400 cm^2 to 2500 cm^2	CRT, AC gas discharge
3600 cm^2 and above	AC gas discharge

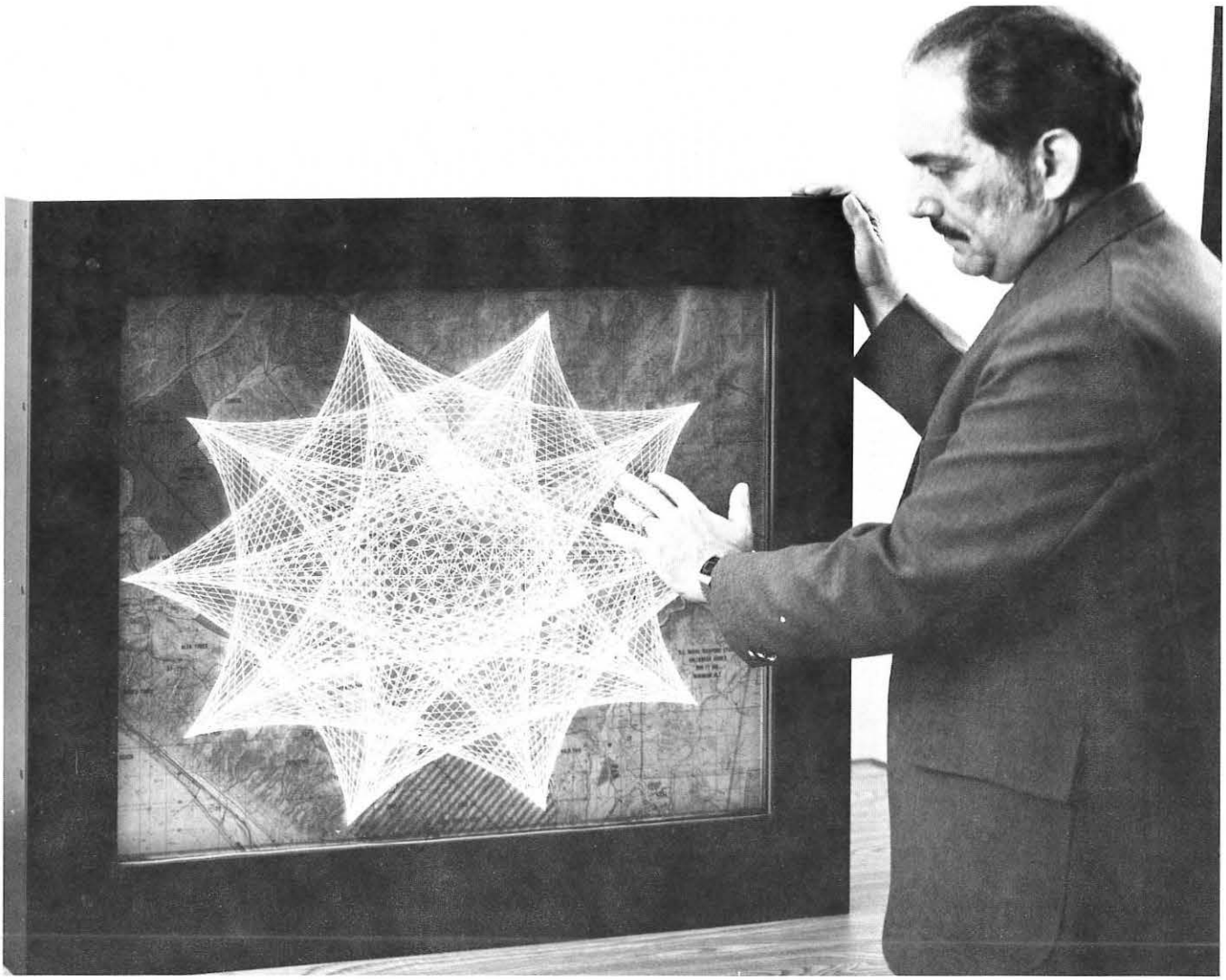
Table II. Non-Projected Display (By Resolution)

RESOLUTION	TECHNOLOGIES
Up to 300 pixels per cm^2	CRT, EL, LED, AC and DC gas discharge
At least 750 pixels per cm^2	CRT, EL, AC gas discharge
At least 1500 pixels per cm^2	CRT, AC gas discharge

Initial Developments

In the early 1970's the U.S. Government (Navy, Air Force) funded Owens-Illinois and Science Applications in the development and fabrication of the first 1024 x 1024 AC gas discharge display panel and electronics. Roger E. Ernsthausen was manager of the group responsible for the engineering, design and fabrication of the 1024 panels. This early work, limited to a few low quality prototypes, was subsequently stopped because of low process yields and lack of funding.

Photonics Technology, Inc. was founded by Mr. Ernsthausen and others to manufacture displays for the military market. The firm began operations in 1978 with the fabrication of high quality 1024 displays at resolutions of 23.62, 28.74, and 32.68 pixels per linear centimeter. Early prototypes were delivered for the EDM phase of the MIFASS program.



The 1024 glass panel displays have been delivered without drive electronics (glass panels only) and with drive electronics (display head) including power supply.

Two types of drive electronics have been developed and demonstrated. One is of the conventional discrete type design offered in both a militarized and non-militarized package. The other type is a more recently developed integrated circuit design using Texas Instruments' 32-line driver chips. A third type of drive electronics, using more advanced concepts, is presently under development.

All the 1024 panels manufactured by Photonics have been of military quality. For example, one typical 1024 display recently delivered to the U.S. Government had an operating window in excess of 10 volts. The 512 panels manufactured over the past decade had operating windows of about 1 to 6 volts.

By the use of proprietary process innovations and techniques, Photonics has increased the overall process yields for 1024 displays to above 60%. By comparison, the conventional manufacturing process for 512 panels has a typical overall process yield below 50%.

Meter Size Program

In the mid 1970's the U.S. Army (Fort Monmouth) funded the development of a meter-size plasma display panel. After the expenditure of several millions of dollars, it was falsely concluded that large area AC gas discharge panels could not be fabricated. Simultaneously the U.S. Army funded the development of a segmented meter-size light-emitting diode (LED) panel. This program has also not produced a practical large area display.

During 1980 super large area meter-size AC gas discharge display panels were successfully produced as part of a joint venture arrangement between Magnavox and Photonics.

These preliminary large area panels have a diagonal of one meter, a perimeter of 80 centimeters by 60 centimeters, a resolution of over 400 light-emitting pixels per square centimeter, and a total of about 2,000,000 pixels. This is the world's largest high resolution, transparent, flat panel display.

Photonics is presently working on the manufacture of large area panels up to 2 meters by 2 meters with resolutions approaching 2,000 pixels per square centimeter. Work is also being done on multicolor displays. Spacerless panels are being delivered (to Magnavox) for the U.S. Navy's DIFAR program and have been introduced for the U.S. Army's DIVAD and SST programs.

The manufacture of large area high resolution AC gas discharge panels is a complex sequence of over 25 sophisticated metallurgical and dielectric processes involving both thin film and thick film technologies. The total overall continuous process time for a meter-size panel is 3 weeks. Most of the process equipment is not commercially available and must be custom designed and fabricated.

The manufacturing processes for large area displays are proprietary and distinct from the manufacture of the

smaller 512 panels. Obvious differences and problems arise out of the increased panel area. For example, the problem of particle contamination increases as surface area increases. Special clean room techniques are required. Class 100 clean rooms with laminar air flow are typical. The large area panels also require substantially longer inspection times, which may range up to 300 hours per meter-size panel. The increased panel weight and bulk are also a problem with very special handling techniques being required merely to move a panel part from one process operation to another. The prevention of micro scratches is critical.

There are also substantial technological differences relating to process temperatures, cycle times, film deposition rates, and dielectric composition. Although rare gas mixtures are still used, the bake out cycle and gas pressures have been altered. New techniques have been invented to maintain the surface flatness and internal spacing to within 0.1 mil over the entire display area.

The panel design has also been changed. Specifically the electrode geometry has been altered. In the fabrication of displays with long electrode length, the electrode is designed to minimize breaks and maximize transparency. Electrical requirements including line resistance and cell capacitance must also be considered. One novel approach is to use electrodes of varying width and thickness.

The ultimate product to be delivered for the military market will be a high resolution, multicolor, spacerless, large area display.

Applications

The military has been seeking display devices since the conception of Command and Control Systems. Early display devices for presentation of status and situation information were first manual and then mechanical plotters. Although inadequate and non-responsive, the mechanical plotter did provide a readout media for situation display on maps. The desire for situation display in a more dynamic media is evidenced by the many attempts to develop various means of interactive computer displays. Although these programs were largely unsuccessful, the desire for situation displays has both continued and grown.

One development approach concentrated on a concept of flat panel segments utilizing LED matrices. This technology may very well supply small scale displays, but large scale display panels require large amounts of power to present sophisticated displays. Panel segments also introduce severe connectoring complexities.

A West German Company is developing a laser display which will permit a projected dynamic display as large as 3 meters square. The laser display requires significant packaging size in addition to being more fragile and a high power user. Laser hardware is not likely to be a successful contender for mobile front line or mechanized display requirements.

Even though these and other major technologies are continuing at each one of their respective industries, the only viable display technology for making large-scale militarized displays is that of the AC gas discharge panel. This technology will be a requirement for the new Command and Control systems.

The overall system concept of the automated battlefield includes devices which vary in size from hand-held to wall-mounted. These display based devices will be used at all levels of the arena from the forward-most edge of the battlefield to division and corps level command centers. These display devices must be mobile and present dynamic, near real time data. The systems currently under development at Magnavox permit the encompassing of this battle scenario with display technology and hardware. The small hand-held portable device under development at Magnavox utilizes electroluminescent display panels. This device will place graphics in the hands of the most forward area personnel.

Tactical terminals utilizing 512 x 512 AC gas discharge panels have been delivered to W. Germany and are anticipated as the baseline type hardware for the United States C^2 programs. These terminals are for use at mid-level tactical operating centers and furnish dynamic graphic map overlays. The terminals may be augmented with higher line count display heads as peripheral units. This type of equipment group will be used at battalion level operating centers and in clusters at higher echelon tactical operating centers. The extension of this display technology to larger displays was the main thrust of the Magnavox and Photonics joint development.

If there is any doubt concerning the validity of the requirement for dynamic tactical displays, one need only consider the operation of an international airport utilizing only text messages received from printers, or in some cases, verbal and hand-written. Such a situation would bring staggering delays and errors into airport operation causing chaos and non-operation. The military commander must be able to see (not read) the situation in order to make current, real-time command decisions. The products coming from large area display developments will span the battlefield with dynamic tactical display systems.

Army requirements represent only a small part of the applications for large size displays. Another example is CIC room displays for Navy combat vessels. Investigation work is also being accomplished relating to the use of large scale displays as carrier aircraft tracking displays. These units would give, in several locations on an aircraft carrier, a dynamic real time display of the location of each aircraft presently on board.

The extension of the gas discharge display technology to the higher resolutions will also permit displays suitable for FAA and other radar-related applications.

Table III. Standard Functions

- Tactical Situation Display
- Electronic Overlay for Standard Paper Maps
- Electronic Overlay for Rear Projection
- Electronic Map Registration (Orientation and Scale)
- Frame Compose/Edit
- Frame Store/Recall
- "Stand-Alone" Planning Mode

Hardware Description

The package design utilized in all currently developed large size panel systems is identical except for linear dimensions. This package approach yields standardized unit constructions for all panel sizes. Systems will basically reflect the length and width of the active area of the glass and appear to be a picture frame around the active area. The thickness of all display systems will be approximately 12 centimeters or less. The package design allows rear projection as well as electronic map overlay operation. The driver designs are segmented to permit the connection together of sufficient driver boards to account for the X and Y line count of each display. The package also contains the dual 8086 controller and memory for on-board processing. The power supply for all display head electrical requirements is also contained in the display head package and the system operates from standard military 24 Vdc power sources.

Table IV. General Description

- TGT Display Peripheral
- Replaces 512 x 512 Line Displays
- 1212 x 1596 Line Displays
- 60cm x 80cm active area
- Scale Factor
  1:50,000 25 meters per dot
  1:100,000 50 meters per dot
- Multiple Frame Local Memory
- Built-in Processor
- Serial & Parallel Interfaces
- Power 295 Watts (AC or DC)
- Volume 3 ft^3 (.085 m^3)
- Weight 220 lbs (99.89 Kg)

Figure 1 shows the meter diagonal display panel and its package. Figure 2 is the block diagram at the display subsystem. The block diagrams and functions of all the different size display subsystems are common except for the display line count.

The main functional performance of the display subsystem is given in Table III. The general physical description is given in Table IV.

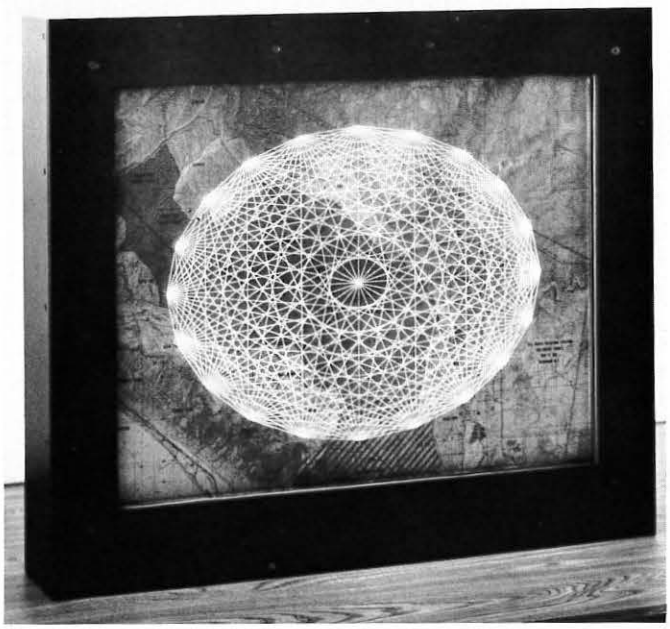


Figure 1. Meter Diagonal Plasma Display System

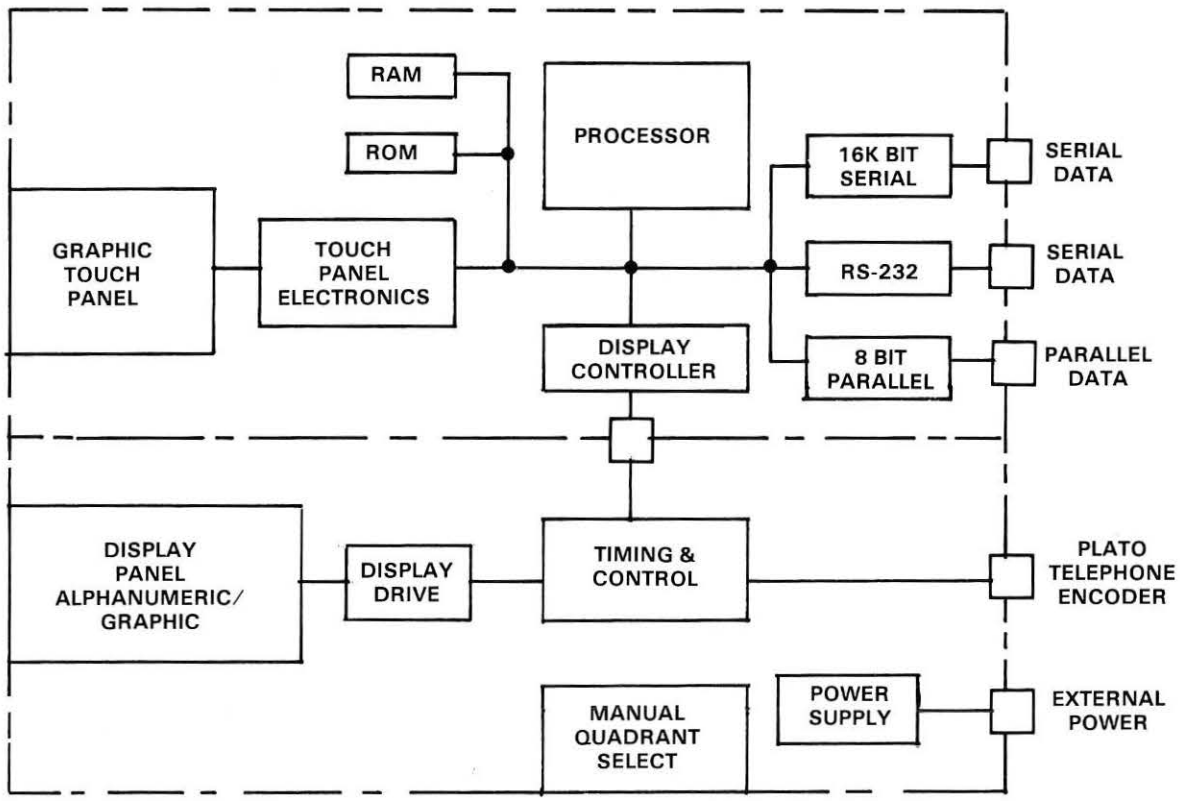
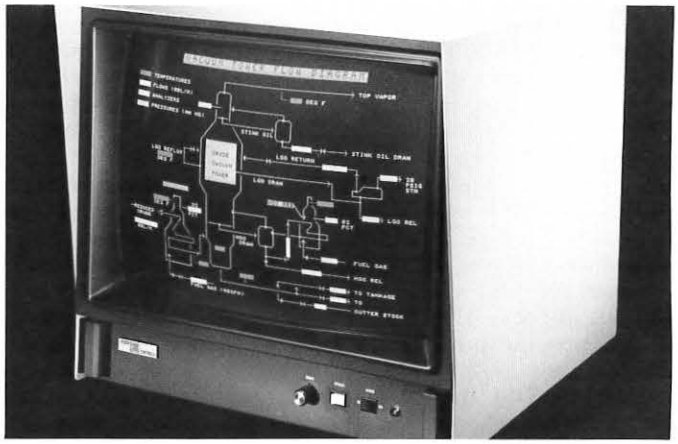


Figure 2. Display System Block Diagram

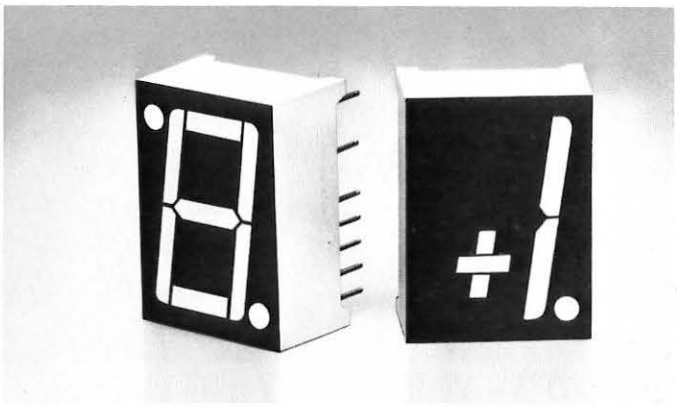


Aydin Controls' In-Line Gun Monitors

Aydin Controls, Fort Washington, PA, a leader in high resolution color monitors, recently announced the expansion of its existing monitor product line with the addition of its own manufactured in-line gun Patriot™ series monitors. The 13-inch Model 8810 and the 19-inch Model 8830 supplement Aydin's family of delta and in-line gun models, according to Don Lippy, CRT product manager.

"The Patriot series offers state-of-the-art features plus all of the advantages of American technology and manufacturing," says Lippy. "These monitors provide high video bandwidth, wide horizontal line rates, fixed convergence, high voltage regulation, modular construction, and analog or TTL inputs."

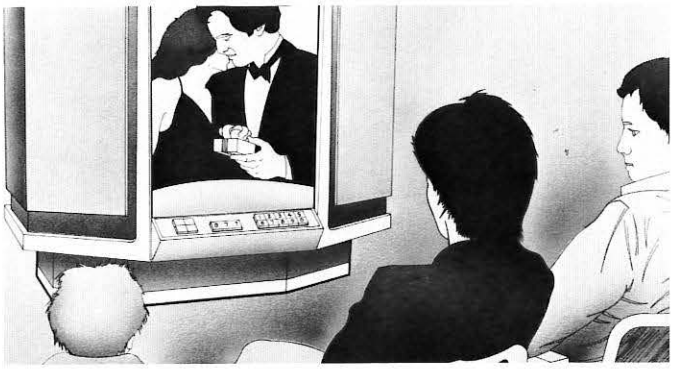
Options include long persistence phosphor tubes and neutral density filters. The monitors are available with or without cabinets and optional rack mounting.



Hercules 0.8" Hi-Efficiency Red Displays

The Component Products Division of Industrial Electronic Engineers, Inc. (IEE), Van Nuys, CA, a leading manufacturer of displays in diverse technologies, has announced the addition of a complete line of 0.8" hi-efficiency red, seven segment LED displays. The LR8900R Series is said to combine high brightness and large size with good aesthetics, and is designed to be used where accurate readable displays need to be viewed over a distance.

"All models use right hand decimals and are available in both common anode and common cathode configurations," says Lou Hronek, product manager, LED products, "Each unit incorporates the use of red segments on a red-faced background and features a typical viewing distance of 33 feet. Thus these displays prove to be a good choice in point-of-sale terminals, digital clocks, instrument panels, TV and radio applications."



3-D TV Without Glasses Using Standard TV Bandwidth

U.S. and foreign patents have been applied for on a new 3-D television system that uses existing single channel TV bandwidth, maintains compatibility with 2-D TV receivers and provides "Holographic like" 3-D without the need for observers to wear glasses and is so realistic that observers can "look around" spatial images, it is claimed.

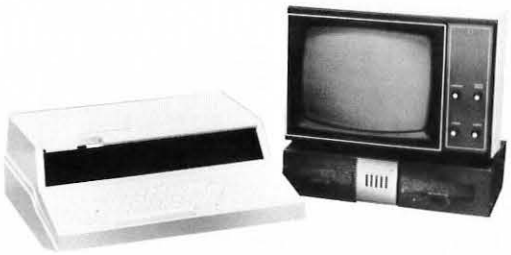
Longtime SID Member, Robert Collender, president of 3-D Vision, Inc., says that venture capital is being acquired for development of both 3-D television and 3-D motion pictures. J. Ward Mattox is vice president of this new firm located at 12295 E. Bates Circle, Aurora, CO 80014 (near Denver).

The 3-D Vision approach to 3-D television is based on two generic methods. The first method requires absolutely no changes to the existing studio equipment and works with existing television signals on a specially designed 3-D TV receiver. Existing 2-D TV receivers, whether color or black and white, would be compatible with the 3-D TV transmission but the picture would be viewed in 2-D. In the first method, relative left or right scene/camera motion is required to put the scene into realistic 3-D. The second method does not require this relative motion but only requires a slight studio equipment modification. Scenes from two standard cameras are combined on a single standard TV channel by a process known as STRAP ("Simultaneous Transmission and Recovery of Alternating Pictures"). STRAP was originally developed at CBS and subsequently licensed to Thompson—CSF under the name "Vidiplex". In Vidiplex, the odd field from one picture and the even field from the other picture are combined into a standard single channel transmission. At the receiver the fields are separated and missing field lines for both fields are inserted by linear interpolation to form two independent frames. In the second method, the 3-D Vision system synthesizes additional prespectives in real time to provide the necessary parallax for audience random seating locations. Although the second method as described does not maintain compatibility for 2-D viewers, this can be achieved by placing one view on VHF and the other on UHF. The penalty here, of course, is double bandwidth. The artist's concept shows one form that the receiving equipment will take. A brief description of each method is given below.

The first method works on the principle that there must be relative lateral motion between the TV camera and scene in order to have unaided 3-D. Without this motion, the TV picture looks flat (like standard TV). The system can sense the direction of scene/camera relative motion electronically and provide the correct scroll sequence direction for 3-D from either right or left motion. The successive TV frames are scrolled across small specially designed picture surfaces that simultaneously receive whole fields and frames rather than the conventional serial element at a time. The picture surface array can be either reflective, transmissive or active and will utilize both Charge Couple Device (CCD) and Liquid Crystal properties. The TV frames are read into the LED memories and then transferred in parallel to Liquid Crystal Light Valve (LCLV) readout image array. The TV image exponentially fade after transfer due to LC time constant, but is scanned just following the transfer interval to assure a strong signal. Each of the successively formed images are scanned by a simple optical scanner which is synced to the TV signal and which directs the light from a single and central projection lamp successively over the image surfaces. In the use of active arrays, the lamp would not be required. The high brightness picture surfaces are selectively picked off by scanner projection optics and projected onto a relatively large and special semispecular cylindrically concaved screen. A vertical aerial (not real) exit slit rapidly moves linearly across a viewing window (making one cycle during a conventional TV field). Observers are forced to look through this moving spatial exit slit of high intensity focused light. There are no physical obstructions between the observer's eyes and the screen and observers can reach out and pass their hands through the spatial image illusion which recedes back to infinity. The system has potential for full color and for recording and replay of programs. The system can freeze action and when prerecorded data is available, it can reverse action.

The second method for unaided stereoscopic television utilizes most of the aforementioned receiving equipment but eliminates the storage requirement for TV frames and replaces some logic. This system also operates on existing single channel bandwidth while providing "Hologram like" horizontal continuous parallax without the need for glasses. This system allows a stationary scene to camera relationship and correct lip sync for all viewing positions. The system uses two physical cameras separated by approximately the width of a TV receiver screen. These two cameras are placed on the ends of an imaginary extended array of TV cameras where the missing "in-between" cameras are synthesized at the receiver in near real time. The dual channel bandwidth is reduced to single channel by the use of "STRAP/Vidiplex". The two TV cameras have parallel axes and are synchronized and aligned so that any given scan line of one camera is in a common line with the same line in the other camera. Because of this alignment, any point in the volume of the scene in front of the two cameras will appear on a common scan line for both cameras. When a given scan line is received from both left and right cameras, they are placed in memory. The stored cells from the line in one camera are successively analyzed and matched up to the same line from the other camera using various encoding techniques. This action results in the correlation of common spatial scene elements. A linear transformation is made to calculate the element position for the same common TV line for other imaginary camera positions. The processing for all imaginary camera positions is done in parallel in the receiver and the resultant element emplacements are stored in random access memory. After a delay of one line time, all common TV lines are ready for display. Since the audio signal is synchronized with the picture for the two end views, lip sync will be maintained for the other imaginary camera positions.

3-D Vision has developed a working model of a similar system using a 16mm motion picture film to prove the principle. A full color one-half hour 3-D movie is shown in which no special glasses are required by anyone in the audience.



Dynatem Inc. DIS 1 microcomputer development/industrial control system, which combines in an enclosure an AIM 65 microcomputer, CRT and floppy disk controller modules, 65K dynamic memory, PROM programmer and power supply, plus two floppy disk drives and a 12-inch CRT monitor.

Dynatem DIS-1 Industrial Microcomputer and Development System at Low Price

A complete microcomputer system for industrial applications, which also functions as a development system, with floppy disks, CRT monitor, wide expansion options, software and multi-languages, has just been announced by Dynatem, Inc., El Toro, CA.

The DIS-1 system combines in one enclosure a 6502-based AIM 65 microcomputer with full keyboard, printer and display, 64K dynamic memory, CRT and floppy disk controller modules, a PROM programmer and power supply, plus two double-density floppy disk drives and a 12-inch CRT monitor. All required software, including BASIC or FORTH language, is also included in the integrated hardware/software system.

With the Dynatem disk operating system, the PROM programmer and the various language options, the DIS-1 is said to be a complete development system for software or actual hardware for a planned product. With its many additional options, it also can serve as a learning tool for use with microcomputers.

As an industrial microcomputer system, the DIS-1 can be customized for specific applications with any of hundreds of off-the shelf modules available from many manufacturers. Dynatem, for instance, offers A to D and D to A modules from Gordos, plus custom system designs.

Other expansion modules, such as IEEE-488 controller, ACIA for RS232 applications, solid-state relay modules, clock and calendar, CMOS memory with battery back-up, are available through Dynatem or from their manufacturers, Rockwell International, Gordos, Burr-Brown, Motorola, and others.

DIS-1 systems can be configured to accept up to ten additional modules (six Eurocard and four EXORciser size). Final custom configurations are available from Dynatem or can be designed by the user.

Available languages include FORTH, BASIC, Assembler and PL/65. The DIS-1 enclosure will also allow use of Rockwell's AIM 65/40 microcomputer in place of the AIM 65.

New color terminal option to Litton DCS-500 EMS

New Color Terminal Option for Litton Energy Management System

A new color graphic terminal is now available as an option to the Litton DCS 5000 energy management system. According to Joe Perret, vice president of Litton Energy Control Systems, Chatsworth, CA. "This new option is integrated to the distributed control design of the DCS 5000 through a central console module, and supports discrete or analog values on the color graphics display screen."

The color graphics display live data via customer-specified formats which allow the user to visualize conditions in his facility. Each color screen shows a schematic display of equipment such as air supply systems, boilers, valves, etc., represented in standard industrial shapes. Flow directions of pump lines or supply lines are indicated by arrows.

System operators may add or delete displayed equipment as desired. This allows the user to bring idle equipment back on line, or to drop equipment from inventory. Displays are called up on the color terminal from a central command console menu in the DCS 5000. The operator merely touches a light pen to the screen to summon the graphics desired for status review. Each central console supports its own CRT graphics unit in this manner.

Alarm conditions are signaled on the screen by both a change of color of the equipment value and a blinking illumination of the data. After acknowledgement of the alarm by the operator, the color remains changed until a return to normal status. Changes to the display screen can be made by using an independent keyboard supplied with the color terminal. Litton training allows each customer to build his own graphics displays for future expansion of this color capability. The color terminal unit is delivered with an extension table which matches the design of the DCS 5000 Central Console. This extension places the color graphics at a 45 degree angle to the front of the Central Console, providing visual convenience and easy access for the operator of the Litton DCS 5000.

Emulog Introduces General Purpose CRT Terminal

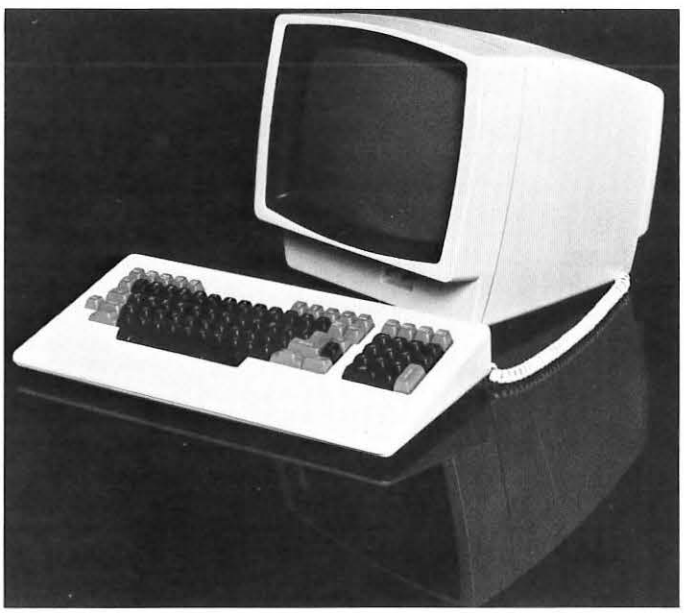
Emulog Inc., Fremont, CA, a manufacturer of emulating CRT terminals, has recently introduced the Alpha Star, a low cost general-purpose CRT terminal. The maker describes it as a user-friendly data input/output display terminal. "We've designed the terminal to make eight hours in front of it more pleasure than pain," said James Kurinsky, president of Emulog and Phasar, Emulog's subsidiary that markets the Alpha terminals.

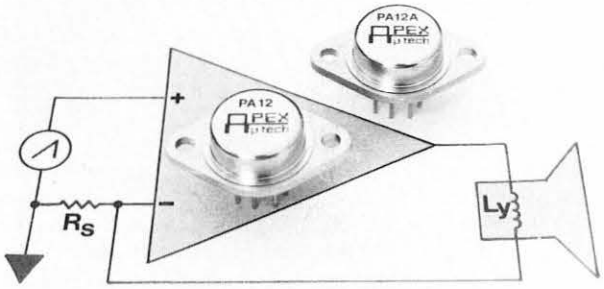
The Alpha Star's operator-oriented features include sculptured matte finish key caps, palm comfort areas on the keyboard, a green tilting screen with a diffusing non-reflective bezel and a thin detachable keyboard. Contrast and brightness controls are on the front of the terminal for easy access.

"By marketing the Alpha directly, we are able to put the dealer mark-up in the hands of the user," said Kurinsky. "Also, the low cost will enable companies to buy the Alpha as an expensed item rather than a piece of capital equipment."

Other features include an 80" x 24" green phosphor screen, upper and lower case characters, true descenders, reduced intensity, reverse video, foreground/background for forms, limited editing, a programmable printer port, EIA RS232C or 20 milliampere current loop, a built-in numeric pad and three programmable function keys. The Alpha Star weighs under 18 pounds.

Emulog produces emulating CRT display terminals for minicomputers and large scale computer manufacturers. The company makes CRT terminals compatible with those supplied by Data General and Burroughs.





Drive ±15A With TO-3 Power Op Amp

Said to be unprecedented for a device of this size, according to Bill Olschewski, Apex Microtechnology Corp., Tucson, AZ, the PA12 hybrid power op amp can provide an output current of ±15A at supply voltages up to ±50V. Translated into available power in real life applications in real life applications, this amounts to 440W for dc circuits such as programmable power supplies, heaters and power-LED's or 220W into ac loads such as transducers, synchros and motors.

"Furthermore, the PA12 is well suited to drive high current magnetic deflection coils for CRTs and other inductive loads," says Olschewski.

The PA12 has been designed, the maker claims, to satisfy applications that require more drive current than can be delivered by conventional TO-3 power operational amplifiers rated for up to 5A now available from Apex, Burr-Brown, Intersil, and National Semiconductor. To maximize its versatility, the positive and negative output current limits are seperately programmable from 10mA to ±15A. The PA12 also is said to exhibit low crossover distortion, even at 15A. This was accomplished with a class A/B output stage biased on by a compensating semiconductor junction which is fine tuned by two thermistors. Inductive kickback protection is provided by two internal flyback protection diodes across the output transistors. The specifications compare favorably with other power op amps and include: slew rate of 4V/μs; gain-bandwidth product = 4MHz; input offset voltage = ±2mV; input bias current = 12nA; common mode rejection = 100db; distortion at 120W into 8 ohms at 1KHz = 0.006%.

These hybrid integrated circuits are built on a high thermal conductance beryllia substrate. The conductor system is platinum-silver and the 0.2" x 0.2" power transistor dice are attached to it with a lead-indium solder. All interconnections are made ultrasonically with 1 and 10 MIL aluminum wire. The 8 Pin TO^3 package is hermetically sealed by resistance welding.

This microprocessor training lab, a portable self-contained microcomputer with a built-in keyboard and display, is designed to be used for real-time, hands-on experiments. The training unit is provided by Integrated Computer Systems, Santa Monica, CA.

New Panasonic Color Video R G B Monitor Designed for Computer Applications

Panasonic Video Systems Division has produced an advanced NTS and R G B color video monitor for use with a computer. The new monitor model CT-1350MG is also said to be ideal for industrial, professional, educational and cable TV operations.

Model CT-1350MG features selectable AFC constants for normal or VTR use and a pushbutton NTSC/R G B select switch. It provides BNC connectors for NTSC video in (loop through) with a 75 ohm termination on/off switch and an 8 pin connector for VTR/VCR playback or R G B input.

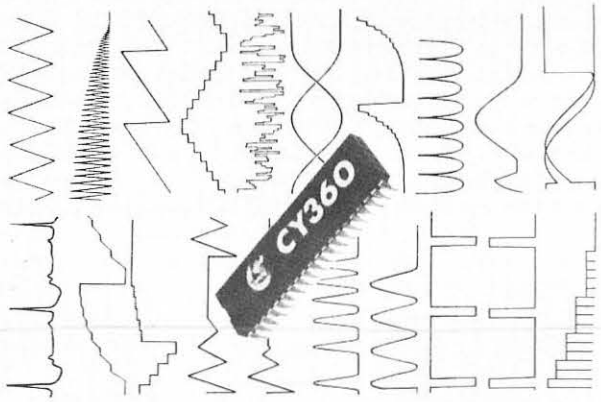
The new Panasonic monitor produces a sharp, clear picture with horizontal resolution of more than 400 lines from R G B signal. The 13" screen monitor utilizes the Quintrex II in-line picture tube with jet black background for excellent contrast, and its glass plate cover and light shade hood reduce light reflections, enhancing picture quality, the maker states.

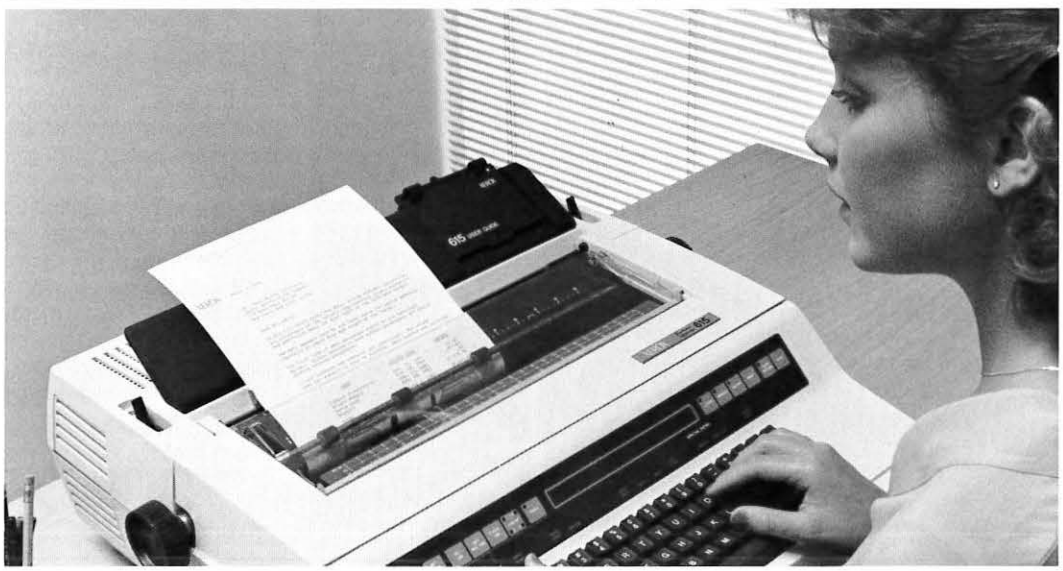
Monitor model CT-1350MG has a 3" round speaker, earphone jack and front mounted sliding volume control for audio usage. Its built-in carrying handle provides portability, and an optional rack mount adaptor, model CT-T3R, is also available.

World's First Intelligent Waveform Synthesizer on Single Chip Allows User Defined Functions

Said to be the world's first programmable waveform synthesizer capable of generating standard functions, such as sine, square, triangle, sawtooth, and non-standard such as haversine, linear approximation, pseudo-random outputs, and user defined functions, has been introduced by Cybernetic Micro Systems, Inc. The device functions as an intelligent interface between a computer and an 8- or 16-bit D/A converter to relieve the computer of the task of generating complex wave forms at low audio frequencies. Simple interfaces allow the CY360 to be driven from a parallel I/O port, RS232, or the IEEE-488 bus, according to Cybernetic Micro-Systems, Los Altos, CA.

The CY360 executes commands as received or stores them in an on-chip program buffer for later execution. Twenty four commands using single ASCII letters select functions, delays, count pulses, synchronize to external events, and provide branching capability.





Operator sets up jobs on Xerox Memorywriter typewriters by just touching a set of labeled, touch-sensitive squares above keyboard. Four models introduced range from low-cost model with half-page of memory to communicating version that stores 10 pages in memory and has built-in small display. All models use same keyboard, daisywheel printer and case, said to facilitate field upgrading and service.

Chapter News (continued from page 24)

MINNEAPOLIS/ST. PAUL CHAPTER had a good turnout despite cold weather at Computerland. Thanks to our most regular supplier of SID Chapter pictures for this photograph — none other than Vern Born, Central Area Director.

MIDWEST CHAPTER on January 28 enjoyed an excellent presentation by Richard Hockenbrock, Zenith Radio Corporation, on "Projection TV — Past, Present and Future."

In the last five years, projection TV has gone from a novelty item to a serious consumer product which is now being marketed by every major television manufacturer. What has caused this phenomenal rise in popularity, and where was projection TV in the preceding 30 years? How good are projection TVs today? What are the design tradeoffs of the major components that can be made in the future? These topics were covered.

The talk included details on glass and plastic lenses, the new Zenith tilted faceplate, phosphor characteristics, and graphic simulations of higher-resolution systems. A demonstration of the Zenith Fold-Away Projection Unit was also provided.

LOS ANGELES CHAPTER on February 25 viewed new graphic display technology, courtesy of Megatek and Digital Equipment Corporation (DEC).

SID members were given a special showing, with speakers from Megatek and DEC explaining in detail some of the state-of-the-art concepts — architectural, hardware and software — employed to implement high quality interactive graphic displays. The Megatek WHIZZARD 7250 color 1000-line graphic station was driven by a DEC VAX computer using some nifty CAD software (which exploits the 7250 hardware features) to demonstrate the capability for brightness and color shading of 3-D surfaces, and interactive, real-time manipulation of 3-D objects. The Megatek hardware features locally interfaced front end processing (LIFE) to off-load the host computer, thereby permitting a large number of highly interactive graphic workstations to be driven by a single host computer. The hardware graphic processor employs points, lines and polygons as primitives (as opposed to lines only, the standard approach) to connect user specified end points with the appropriate curves, and to generate the area-fill video to implement the surface shading feature. This was a highly informative session, according to Chapter Program Chairman Kevin Kilcoyne. And thanks, Kevin, for an excellent report!

SID CALENDAR

MARCH to OCTOBER 1982

1982		
March	5	Post-Deadline Papers for SID 1982 International Symposium
April	1	Proceedings, Volume 23, No. 1, 1982, Mailed
	12	National Ballot Return Deadline
	20	Quarterly Chapter Rebates Mailed
May	9	Executive Committee Meeting
	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
October	19-21	1982 International Display Research Conference, Cherry Hills, NJ

OTHER EVENTS

1982		
April	4-5	Office Systems Research Conference, San Francisco
	5-7	Office Automation Conference, San Francisco
	18-20	Inter-Society Color Council, Annual Meeting, Charlotte, NC
	22-25	New York Computer Show & Office Equipment Exposition, Nassau Coliseum, Uniondale, Long Island, NY
	27-29	INFO/Manufacturing, Chicago
June	2-4	ACM/SIGMOD International Conference on Management of Data, Orlando FL
	7-10	National Computer Conference, Houston, TX
	17	ACM/NBS Symposium: "Computing and Government", Gaithersburg, MD
July	26-30	SIGGRAPH '82, John B. Hynes Veterans Auditorium, Boston

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Datamedia Announces New Enclosure And Lower Price on Its Color Display

Datamedia Corporation, Pennsauken, NJ, has reduced the price of its VT-100-compatible, eight-color display terminal, the COLORSCAN 10, by about 16 percent. According to Frank Zelis, the company's vice president of marketing, "a new ergonomically designed display enclosure, plus higher than anticipated production volumes" permitted the price reduction.

Zelis points out that COLORSCAN 10 is receiving considerable attention from Fortune 500 companies interested in displaying financial data, sales charts, and performance graphs in full color. "Many OEM's are finding that COLORSCAN allows them to provide meaningful graphic and color display information to support their applications software," Zelis says.

"Most of the COLORSCAN terminals are installed in offices where appearance is just as important as functionality," Zelis continued. "Our new stylized enclosure has a movable keyboard and tilt screen that allows the operator to adjust the keyboard-position and angle of the screen for optimum comfort. By using a rugged injection molded enclosure for the unit we can also achieve certain economies during the COLORSCAN's manufacture. These economies plus our projected volumes have allowed us to lower our single unit price," says Zelis.

The first of a series of Datamedia's color display terminals, the COLORSCAN 10 features a 12-inch, high resolution in-line gun monitor that can display either 80 or 132 columns of data. One of eight colors can be individually selected for both background and foreground on a character-by-character basis. The COLORSCAN 10 also has a separate 128 character set of special graphic symbols that can be used in generating more complex business charts.

Super Chips — Hughes Aircraft Company technican Margaret Sanchez operates a photolithography machine that will be used to etch dense electronic circuits on chips the size of thumb tack, as part of a program designed to give military electronic systems a tenfold increase in data processing capability. Hughes is one of six firms involved in the tri-service program being conducted by the Department of Defense to develop "super chips," called Very High Speed Integrated Circuits (VHSICs). The lightweight, compact chips will be more reliable and require less power than the integrated circuits now used. The photolithography process will be used for circuit patterns in 1.25 micron dimensions. Hughes also will develop an electron beam lithography system that will focus beams of electrons to "write" circuit patterns in submicron — less than one millionth of a meter — dimensions. The company has received VHSIC Phase 1 contracts totaling $34.6 million from the U.S Army Electronics Research and Development Command.

Touch-Sensitive CRT Option Available For DEC's VT100 Video Display Terminal

Interaction Systems, Inc., Newtonville, MA, recently announced the availability of a custom-designed touch-sensitive CRT option for the DEC VT100 video display terminal.

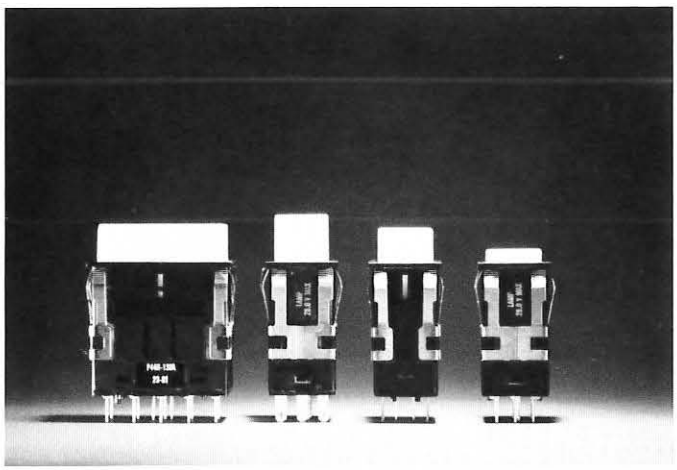
Designated the Model TK-2100, the touch-sensitive CRT option complements the double-height double-width character feature of the VT100, resulting in a display that is said to be ideal for menu selection applications.

"The touch-sensitive CRT option allows data to be inputted to a system by simply touching, with a fingertip, the area where appropriate information is displayed on the display screen of the VT100. This option allows persons who are not familiar with the use of computerized equipment to interact with online information without prior training," says Steven J. Puchkoff, vice president-marketing, Interaction Systems.

"The option consists of a touch-sensitive faceplate, an electronic touch control and interface board, interconnecting cables, mounting hardware, and easy installation instructions."

The TK-2100's touch-sensitive faceplate is mounted in front of the CRT monitor of the VT100. When the faceplate is touched by a user's finger, an electronic method under software and microcomputer control is used to identify and interpret the changes in capacitance which are detected. The touch-sensitive CRT option utilizes a continuous recalibration technique in order to compensate for temperature, humidity, or other environmental fluctuations or changes, resulting in error-free, touch-sense accuracy in virtually all operating environments, the maker claims.

Interaction Systems, Inc. also provides custom-designed touch-sensitive CRT options for Lear Siegler's ADM 32 and ADM 42 video display terminals and similar componentry for most other popular CRT terminals.



New Cherry Pushbutton Switches

"Until now the pushbutton switch field has been a hodge-podge of sparkling specials: no generally accepted family of standard sizes has existed. The new Cherry P4 line of switches changes all that," says Frank Amendola, Cherry Electrical Products Corp., Waukegan, IL.

"Cherry now offers a line of pushbutton switches and encoders that snap into industry-standard mounting holes from the front of the panel. The switches are available in alternate and momentary action and in two electrical ratings. Cherry's 1 x 2 rectangular encoder body offers up to 256 different 8-bit addresses from a single unit."

The P4 switches feature two terminal configurations, six contact actions and can be obtained with or without lamp socket. Three button styles are available.

Data Base Inquiry — during the most recent Space Shuttle mission. VDTs such as this were used by operators in five locations throughout the U.S. to provide the press with accreditation, mission news, and information on the Shuttle. The word processors — NBI System 3000s — store information on diskettes in the terminal to the right of the screen. The contents of these diskettes are fed into the NASA central computer in Houston, using high-speed phone lines. If a reporter needs a question answered, the operator can search the central computer, display the information on the screen, and print it out in hard copy. The network's debut occurred during the Shuttle's maiden voyage in April. NBI Inc. is in Boulder, CO, and supplied 18 word processors for this NASA application.

CRT Terminal Markets Continue Strong Growth

A report from Gnostic Concepts, Inc., Menlo Park, CA, covering CRT terminal applications and markets concludes that CRT terminals will continue to be among the fastest growing product lines through 1985, at which time the overall value of shipments from U.S. manufacturers will exceed $15.2 billion, as compared to $3.4 billion in 1980.

The growth of distributed processing and office automation will continue to create a strong demand for CRT based work stations of all kinds, but by mid-decade some alternative display technologies will begin to become significant. While terminals are commonly categorized into dumb, smart and intelligent, market and technological factors are compressing these into two new categories: user-programmable and non-user-programmable, with the user-programmable category growing at 34 percent annually, compared to 23 percent for the non-user-programmable category, according to Bob Katzive, program manager, Gnostic Concepts.

Altos Computer Systems Launches Its First Display Terminal

Altos Computer Systems, San Jose, CA, has recently introduced its first video display terminal, the Altos 1, a smart user-friendly detached-keyboard model with a tiltable rotating display, according to Ron Conway, vice president-marketing.

"The Altos 1 terminal is designed to increase operator productivity by virtue of its ease of use and its system performance. This product marks a significant step for Altos toward providing a complete data processing system for our current users and new customers as well," says Conway.

The Altos 1 features a low-profile detached typewriter-style keyboard with 105 keys. It is connected via a 6 foot cable to the rotating, tilting display, which is said to reduce operator eyestrain through a green-phosphor screen. Thus, the keyboard/display can be configured easily to meet the needs of any operator and any work station.

Keyboard format capabilities are 24 lines with 80 characters per row, with two additional lines for messages and function key identification. Eight program function keys plus a special function key provide up to 96 codes; 14 keys include the numbers 0 to 9; period, comma, minus and enter/tab.

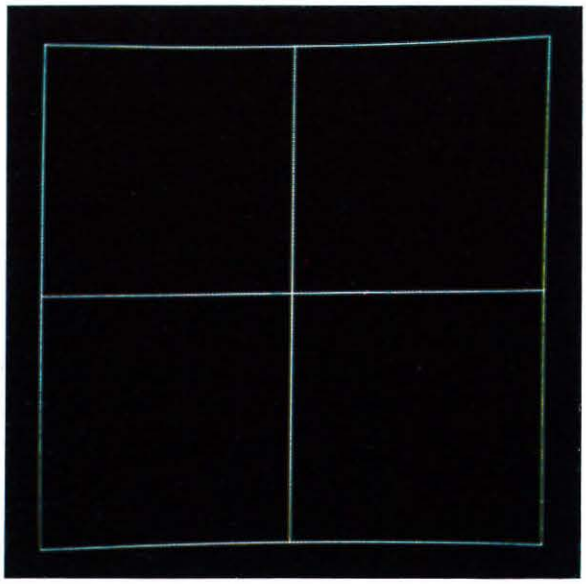
Functional command, editing and cursor keys allow full editing options as well as send and print. The display is capable of graphics line drawing and horizontal/vertical split screen with independent scrolling. The Altos 1 features 15 transmission baud rates from 50 to 9600 baud via a standard RS232C interface. The printer port allows data transfers at rates between 50 and 9600 baud.

According to Conway, Altos Computer Systems is one of the fastest-growing computer companies in the industry. It has shipped more than 15,000 of its ACS8000 8-bit systems in the five years of its existence and its sales are expanding at more than 12 percent per month.

This Altos 1 user-friendly "smart" terminal is said to increase operator productivity by enhancing system performance. It features rotatable-tiltable screen, easy-to-read phosphor display to reduce eyestrain, and detached keyboard with 6-foot cable.

Signal, size, flexibility, and cosmetics are improved by a custom-designed cable and connector. An electronic cable assembly with a unique right-angle connector has solved several design problems and improved the performance of an ultrasound machine in the medical field.
National Electric Cable, Portland, OR, first replaced the existing conductors with smaller diameter, lighter Teflon insulated ones, then covered them with a matt-finished polyurethane, non-squeak jacket. The result is said to be a tighter, lighter, quieter, cleaner cable with a smaller outside diameter.

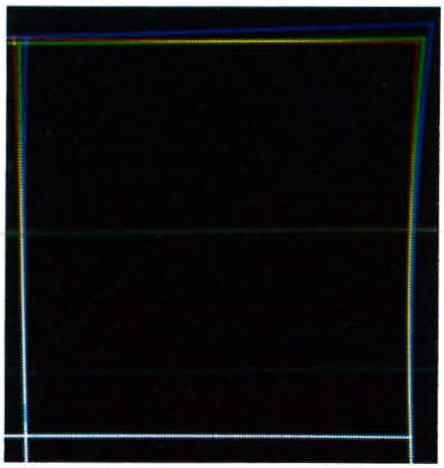
Masstor Systems Corporation, Sunnyvale, CA, now offers a tape cartridge-based system that gives users a data storage capacity of 55 billion bytes per unit. It gives users over five times the storage capacity of IBM's 3850 mass storage unit. Access to the tape cartridges is through an access panel in front of the unit.



Celco's in-line color Yoke for perfect black & white.

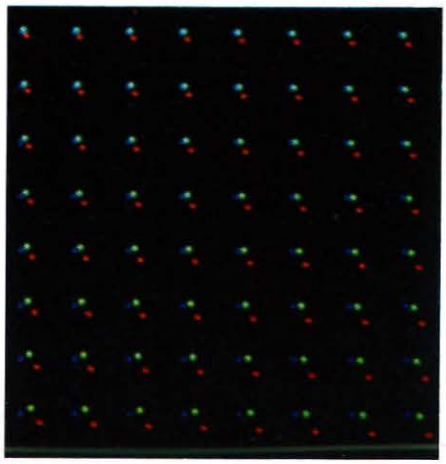
The CELCO Color Yoke Produces Perfect B&W

Engineers who design color displays requiring low inductance look for **perfect black and white** on their test patterns for best convergence. They do not **want** to see the beautiful colors illustrated in the error patterns — just black & white.



Typical Convergence Error Problem

CELCO color yokes provide complex magnetic fields to be compatible with your color CRT. The Yoke-CRT combination is optimized to achieve color purity and best convergence for your display applications. A precision color yoke is required to deflect the beam to the correct apertures in the shadow mask. These impinge on the proper phophors to produce the blue, green, and red patterns.



Typical Dot Pattern Error Problem

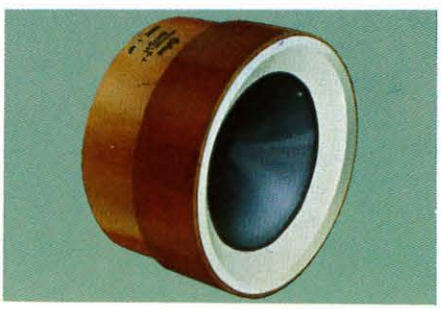
Over twenty years ago CELCO designed and built low-inductance color *Deflectrons® for delta gun CRTs for military color information displays. Today's new generation of cockpit, air traffic control, flight simulation, ground and ship based radar and graphic displays, require precision deflection of the three in-line electron beams to produce the required colors **anywhere** on the CRT face!

CELCO supplies color yokes with a wide range of inductances and specializes in **low**-inductance color yokes for high-speed, random positioning and vector displays.

*CELCO Low-Inductance Color Yokes may be used with your own amplifier designs. They are also compatible with CELCO High Speed X-Y Deflection Amplifiers for wide bandwidth, ultra-linearity, and high stability. CELCO Deflection Amplifiers are available in ranges from 20 to 75 volts with a change of 4 to 40 amps.

For every CRT face size and neck diameter for In-Line, Delta, or Color Penetration Yoke requirements call John Constantine, Jr. Yoke Designer or Dr. Sam Christaldi, Engineering Sales Manager, Mahwah, New Jersey at (201) 327-1123. (Or call Michael Constantine, President or Bud Reese, Manager, in Upland, California at (714) 985-9868.)

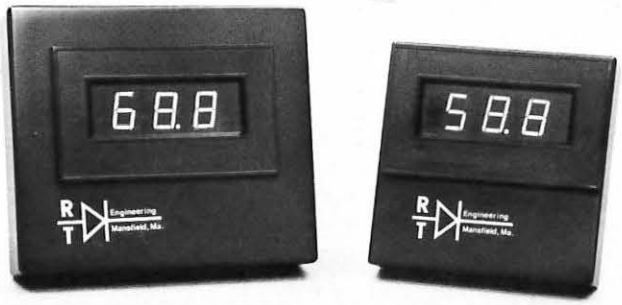
Typical CELCO Color Yoke Solution



*Deflectron® is our registered trademark for Delta-Gun Deflection Yokes in the 1950's.

Celco

Your plant is only hours away by CELCO Air Fleet piloted by CELCO design engineers.



New Digital Panel Meter Reads Pulse Inputs and Requires No Time Base Calculations

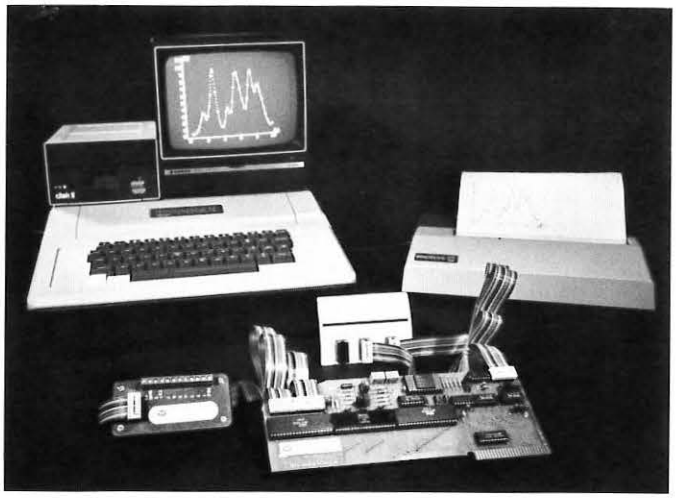
R.T. Engineering Service Inc., Mansfield, MA, has developed an all new DPM-31P Digital Panel Meter. Designed to accomodate digital pulse inputs from a standard magnetic pickup, or a certain type of slow speed (Hall Effect) magnetic pickup, the DPM-31P comes in a rugged metal case for durability and is easy to install and wire, according to Tom Crowell.

The DPM-31P can be easily calibrated to monitor rate-related engineering units (e.g. RPM, FPM, etc.) and requires no mathematical calculations. Its standard 4½" rectangular size (or 3½" for junior model) allows it to be installed in an existing analog meter cutout. The display is a high visibility ½" LED, with 3 active digits (0 to 999). The accuracy is 1% linear ±1 digit full scale. The meter can directly monitor the output frequency (up to 480 Vac) of a 6-step pulse width modulated (pwm) or current source inverter when equipped with the appropriate field modifiable interface kit.

Electrical specifications include a power supply of 115 Vac (±10V) 50/60Hz, 2 watts and an operating temperature of 5 to 50°C. A 5Vdc supply voltage is provided for the required excitation to a slow speed pickup. The sampling time is 0.25 seconds/reading update. The DPM-31P can be manufactured or field modified to accomodate the desired portion of its overall frequency range of 5pps to 5000pps. Calibration is accomplished by a 25 turn potentiometer.

Typical applications include monitoring machine rates, including slow-speed machines, where a gear or sprocket is available to display engineering units, such as a roll RPM on a non-woven felt line, and monitoring the output voltage of a variable frequency inverter drive that is connected to a positive displacement pump. The meter can be calibrated to display a flow rate such as gallons per minute.

Full microprocessor compatibility with PCI's new alphanumeric LCD dot matrix module for hand-held terminals and point-of-sales systems. Display is 16 characters in one line 5 x 7 format, with row 8 as a cursor, and is made by Printed Circuits International, Inc., Sunnyvale, CA.



Adalab™ Laboratory Interface For Apple® Computers

Interactive Microware, Inc., State College, PA, has just announced a new low-cost interface card designed for use with the APPLE II+ computer, to control or collect data from most scientific instruments, including chromatography systems, spectrophotometers, pH meters, strip chart recorders, temperature controllers, etc.

The ADALAB hardware interface features a 12-bit A/D and a 12-bit D/A converter, each having four jumper-selectable voltage ranges (±0.5, ±1, ±2, or ±4 V). The dual-slope integrating A/D converter smoothes out noisy signals at up to 20 voltage readings per second. True differential input and automatic zeroing enhance the A/D accuracy. The digital I/O subsystem features 8 bits each of input and output, versatile handshaking signals, interrupt circuitry, and TTL-compatible signal levels. A 32-bit real time clock displays time in hours, minutes, and seconds and permits timing of events to an accuracy of 0.1 second. Two 16-bit timers may be configured as an interval timer, pulse counter, pulse generator, square wave frequency generator, or shift register. All of these features are included on a single ADALAB™ interface card. The system may be expanded with up to three additional cards, according to John Kalasky.

A unique program, called QUICKI/O™, facilitates writing programs in BASIC to control scientific instruments. Manuals are provided to explain ADALAB hardware and software. A comprehensive demonstration program on disk and many examples in the manual are being provided to introduce the capabilities of ADALAB.

Versatec V-80 produces hard copy for Xerox 350 color slide system.

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Chapter News

Left to right at SID Board of Directors Meeting, January 22 in San Diego, are Treasurer Ifay Chang, President Tarricia Du Puis, Secretary John van Raalte, and Past President Bernard Lechner. There were 16 present for a productive meeting, including Gus Carroll, Vice President; Directors P. Pleshko, H. Sherman, L. Tannas, and D. Thoman; Committee Chairmen R.C. Knepper, T.V. Curran, and G. Kramer; B. Kagan, Editor, Proceedings and T. Lucas, Editor, SID Journal; June Friend, National Office Manager; and SID Member D. Pinsky. Walter Goede, Symposium Chairman for the forthcoming May 1982 SID Symposium, was hard at work at the scene, along with Lewis Winner, Symposium Consultant. The big event in San Diego promises to be the best SID Symposium ever.

BAY AREA CHAPTER on January 19 enjoyed a meeting at International Applied Systems, Mountain View, where Jack Davis, vice president, discussed his firm's high resolution color graphics control unit for on-line operation with IBM computers. The demonstration, watched by the SID group in this picture, included an IAS model 1010 control unit used with an IBM 4300 and Interactive CADAM graphics software. Tallest in the photograph is Tom Curran, SID Publications Chairman. Thanks to Mike Rehmus, Chapter Chairman, for this picture and report.

(Chapter News continued on page 13)

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