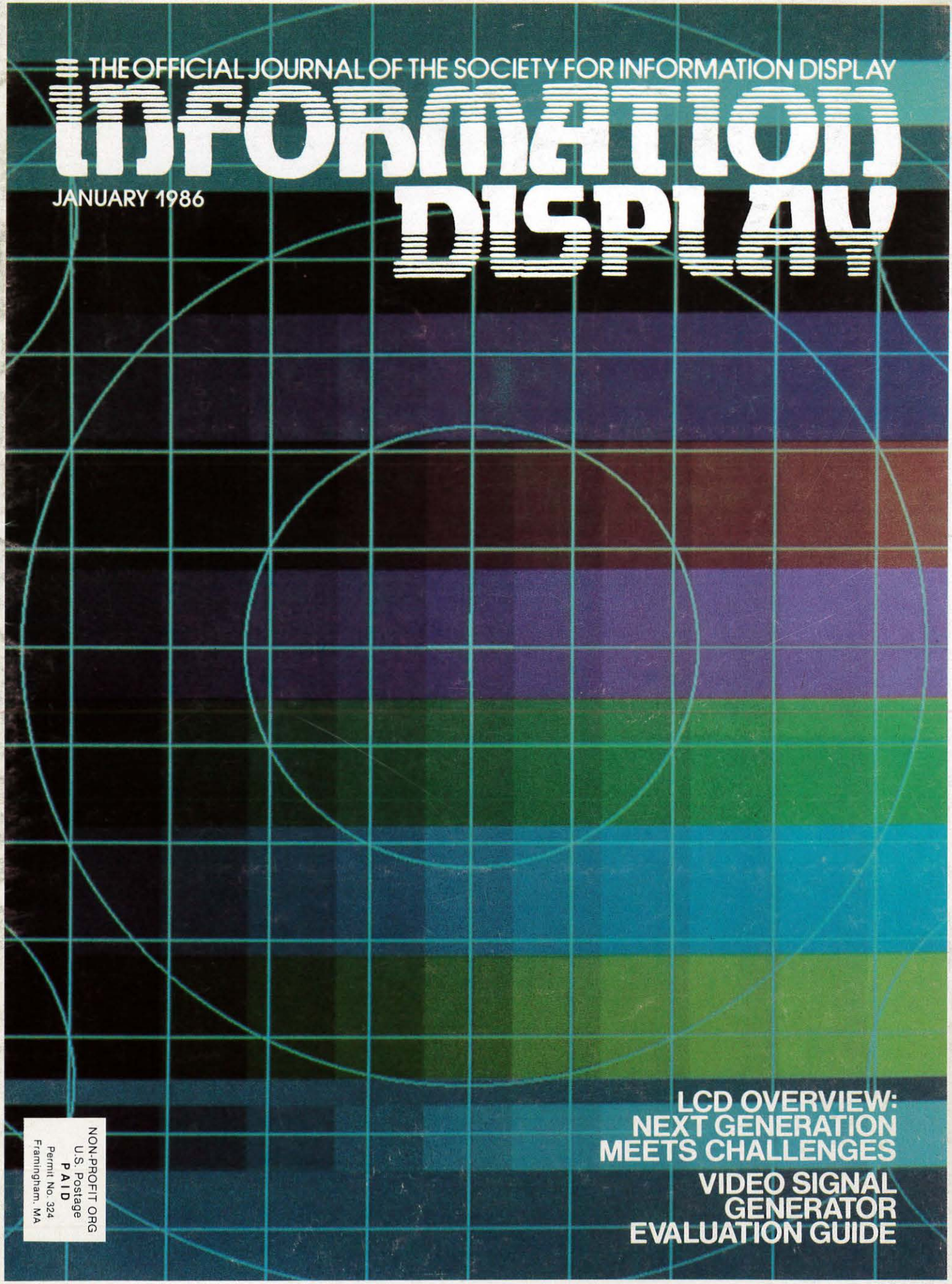
THE OFFICIAL JOURNAL OF THE SOCIETY FOR INFORMATION DISPLAY

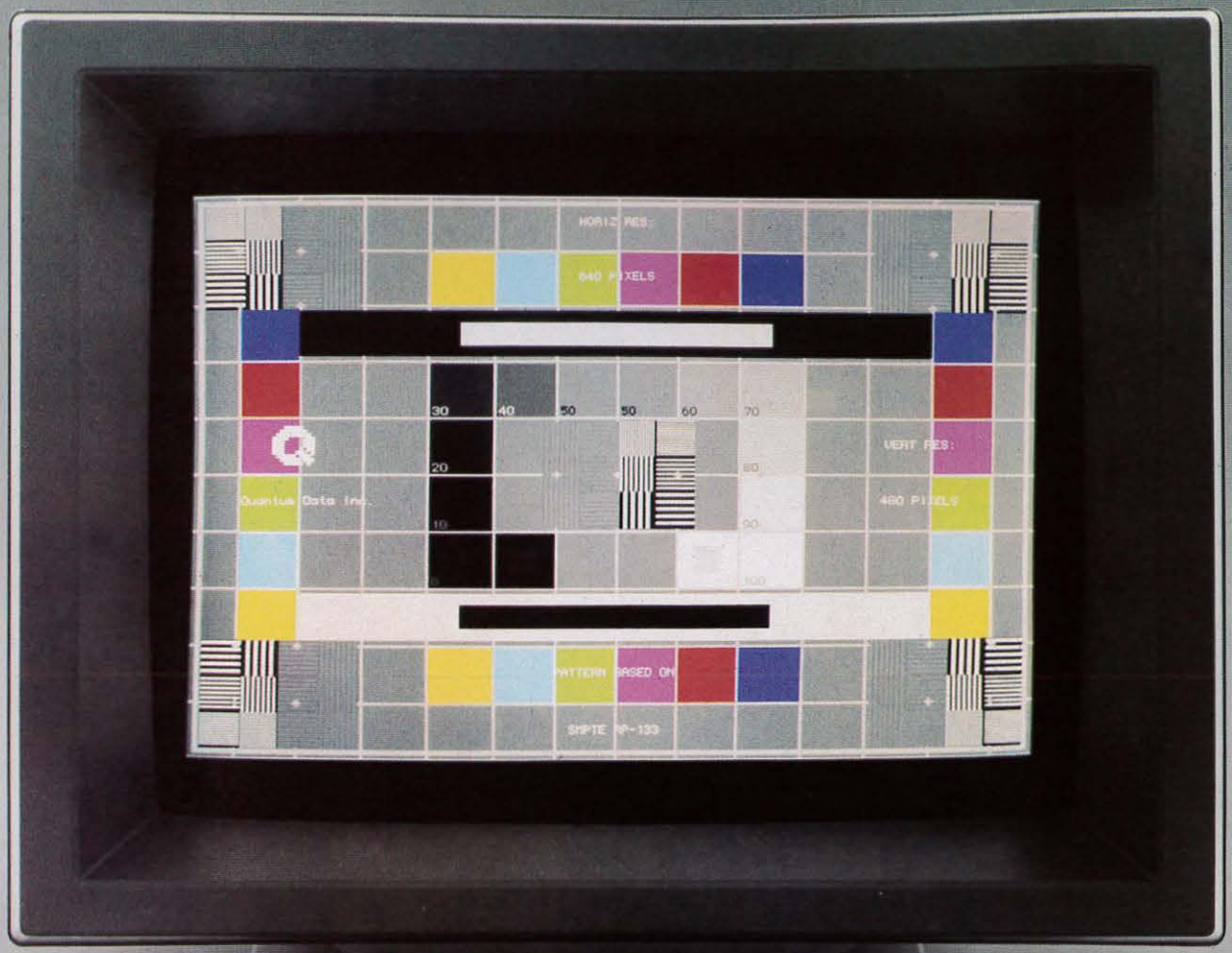
INFORMATION DISPLAY

JANUARY 1986

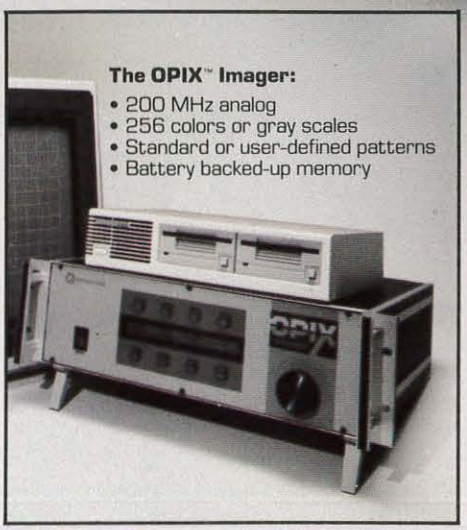


LCD OVERVIEW: NEXT GENERATION MEETS CHALLENGES

VIDEO SIGNAL GENERATOR EVALUATION GUIDE



SOON THIS PATTERN WILL HELP SAVE LIVES.



This test pattern* was developed to assist in the design and evaluation of video monitors in medical diagnostic applications. It accurately differentiates the minute changes in gray tones that indicate potential life and death problems in CAT-scan images, for example.

The test is one of many available on disk for use on the OPIX™ Imager—an extraordinary microprocessor-based video signal generator.

This pattern will self-scale to any monitor size and signal timing to provide you with an exacting standard for correlation.

With OPIX you can make certain that every display you use in your end-products will ship out with precisely the performance you designed in.

Whether you're involved in the design, evaluation or testing of life-saving displays, or video applications where high-resolution and precision analog requirements are equally critical, the OPIX Imager offers results no ordinary signal generator can approach.

Ask for an OPIX brochure. Contact: Quantum Data, 455 E. Kehoe, Carol Stream, IL 60188 Telephone: (312) 668-3301; Telex: 206725

*Based on the recommended practice of the Society of Motion Picture and Television Engineers [SMPTE RP133].

QUANTUM DATA®

For information circle Reader-Service # 1

MINOLTA INDUSTRIAL METERS

REMARKABLE VERSATILITY COMBINED WITH SUPERB ACCURACY– MINOLTA METERS CONFORM TO CIE SPECTRAL RESPONSE STANDARDS.

MINOLTA TV COLOR ANALYZER II

- Enables objective white-balance measurement and adjustment of color monitors.
- Clear, accurate digital and analog displays simplify adjustment of monitors on production lines.
- The analyzer has four memory channels for white standard plus four CRT memory channels. This enables measurement and adjustment of different models of CRT's.

LUMINANCE METERS

- The Luminance Meter ft-1°, nt-1°, or nt-⅓° is the perfect choice for readings of light source or surface brightness. The single-lens-reflex viewing system provides a bright, magnified circular view with a clearly marked 1° or ⅓° center spot to measure the light with no influence from surrounding areas.
- The meter instantly displays foot-lamberts (or cd/m²) on the viewfinder's LED digital display.
- The ability to read flickering sources makes the Luminance Meter ideal for measuring TV and movie screens, cathode-ray tubes, etc.

ILLUMINANCE METERS

- Accurate light measuring capabilities in a versatile, hand-held meter.
- A custom-designed liquid crystal display indicates illuminance in either foot-candles or lux.
- Measuring range of .001 fcd to 9,990 fcd enables measurements in virtually any situation.
- Stores a single reading for simplified comparison with other sources or monitoring of single source illumination.

CHROMA METER CL-100

- Ability to measure light source color and color difference between sources.
- Chromaticity and color difference are measured instantly and displayed as Yxy (CIE 1931), Yu'v' (CIE 1976), or △ (Yxy), △ (Yu'v'), or △ u'v'.
- The user can calibrate the meter to their own standard. Once input into memory, the user calibration value remains until changed. Several meters can be unified to eliminate any variations in their spectral response.
- Built-in terminals for remote operation or attachment to Minolta Data Processor DP-100.

For more information, write Minolta Corporation, Industrial Meter Division, 101 Williams Drive, Ramsey, N.J. 07446. Or, call (201) 825-4000.

ONLY FROM THE MIND OF MINOLTA

MINOLTA

For information circle Reader-Service # 2

Feedback

Calling all Apple orphans

I am the editor of THE///MAGAZINE, an international monthly publication for Apple /// owners—and I am writing to ask for a little help.

As you probably are aware, the Apple /// is now an "orphan" computer—owners and vendors of the Apple /// have been pretty much left to fend for themselves. We receive little or no assistance from either Apple Computer Inc., or the traditional computer publications. . .because we no longer represent a large enough share of the computer market. . .

. . .Many of us, though, invested tens of thousands of dollars in our machines and peripherals, and we did so because we were extremely impressed with the Apple /// as a user's computer. After reviewing hundreds of other machines amid the hoopla about IBMs, MacIntoshs, MS-DOS this and that, I still find our machines to be absolutely state-of-the-art.

At the request of several ///r friends, I started our publication about a year ago. We have strived to establish a reputation for fair reporting, for timely delivery, and for informative articles. Yet, while I am proud that we have grown to 2000 subscribers internationally this past year—merely on word-of-mouth—this number is but a small part of the estimated 60,000 Apple /// owners.

Perhaps you would be so kind as to let your readers know about the existence of THE /// MAGAZINE?

Frank W. Moore, Editor
THE ///MAGAZINE
Carmichael, CA
(916/485-6525

NEW! for SID Members —
. . . Especially international.

You may now authorize us to pay your dues via your MasterCard, charging fees and publications to your account in U.S. Dollars. This will help us expedite your order, and will save both time and money.

Just write your MasterCard number and expiration date on your invoice or order, and be sure to include your signature. We'll take it from there.

PAPERS ON DISPLAY

Information Display is soliciting original articles that cover all aspects of display technology and applications—display systems, sensing and imaging instrumentation, printing technologies, input/output devices, interactive graphics, storage media, and human factors engineering.

Articles may also be developed from technical papers originally prepared for: symposia, seminars, and workshops; professional and technical society meetings or journals; corporate in-house publications. NO ARTICLE previously published in a commercial magazine will be considered for publication in ID.

Notes for contributing authors and specifications for submitting manuscripts can be obtained from the Editor of ID. Address all inquiries and submit contributed articles to: The Editor, Information Display, 310 East 44th Street, #1124, New York, NY 10017.

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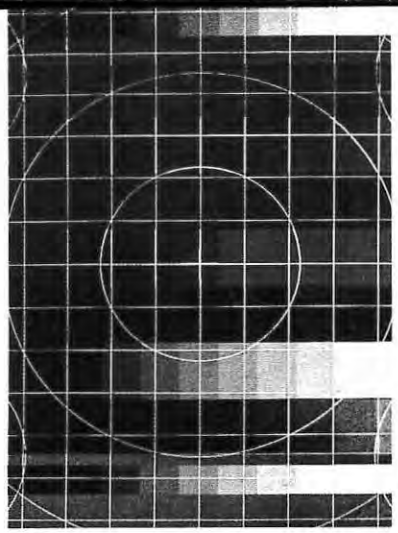

Cover: Complex color pattern produced on the Astro Design VG-807A, programmable video signal generator features 2048x 2048 dots for high resolution. System permits free selection of color combination, width and intensity; and up to 100 gray scale levels. — *Test & Measurement Systems Inc., Sunnyvale CA.*

FEATURES

PROFILE

afips
American Federation of Information Processing Societies

REVIEW

DEPARTMENTS

INFORMATION DISPLAY (The Official Journal of the Society for Information Display) is edited for corporate research and development management; and engineers, designers, scientists, and ergonomists responsible for design and development of input and output display systems used in various applications such as: computers and peripherals, instruments and controls, communications, transportation, navigation and guidance, commercial signage, and consumer electronics.

Editorial covers emerging technologies and state-of-the-art developments in electronic, electromechanical, and hardcopy display devices and equipment; memory; storage media and systems; materials and accessories.

Events

NATIONAL

MARCH 3-6: Compcon Spring 86, San Francisco, CA; Sponsored by IEEE Computer Society (IEEE/CS). Contact: IEEE Computer Society, 1730 Massachusetts Ave. NW, Washington, DC 20036. (202/371-0101)

MARCH 3-7: Short Course—HOLOGRAPHY, Orlando, FL. Contact: Laser Institute of America, Education Dir., 5151 Monroe St., Suite 102 W, Toledo, OH 43623. (419/882-8706)

MARCH 5-7: Seventh Annual Computer Graphics Conference, Diplomat Hotel, Hollywood, FL. Chairman: Carl Machover. Contact: Carol Every, Frost & Sullivan, Inc., 106 Fulton St., New York, NY 10038 (212/233-1080)

MARCH 5-7: Turning Info Systems into Competitive Weapons, Registry Resort, Scottsdale, AZ. Sponsor: Society for Information Management. Contact: Valerie Rohrbough, SIM Headquarters, 111 East Wacker Dr., Ste 600, Chicago, IL 60601 (312/644-6610)

MARCH 10-14: Eastern Simulation Conferences, Norfolk, VA. Sponsor: Society for Computer Simulation (SCS). Contact: Charles A. Pratt, SCS, PO Box 17900, San Diego, CA 92117. (619/277-3888)

MARCH 11-13: Automated Desig and Engineering for Electron ics West (ADEE WEST), San Francisco, CA. Contact: Show Manager, ADEE WEST, Cahners Exposition Group, 1350 Touhy Ave., PO Box 5060, Des Plaines, IL 60017-5060. (312/299-9311)

MARCH 11-13: SOUTHCON '86: Orange County Convention Center, Orlando, FL. Contact: Dave Litherland, Electronic Conventions Inc., 8110 Airport Blvd., Los Angeles, CA 90045. (213/772-2965)

MARCH 12-13: IEEE 1986 National Radar Conference (RADAR-86), Los Angeles, CA. Contact: Milton E. Radant, Hughes Aircraft Co., PO Box 92426, Bldg. R1. MS/D-425, Los Angeles, CA 90009. (213/647-0134)

MARCH 12-14: 19th Annual Simulation Symposium, Tampa, FL. Contact: Linda Holbrook, GTE Services Corp., One Stamford Forum, Stamford, CT 06904. (203/965-3661)

MARCH 17-21: Test Data Acquisition and Processing for Instrumentation Applications—Short Course. Sponsor: The Center for Continuing Engineering Education of the University of Wisconsin-Milwaukee. Contact: John T. Snedeker, Program Director, Center for Continuing Engineering Education, University of Wisconsin-Milwaukee, 929 N Sixth St. Milwaukee, WI 53205 (414/224-4195)

MARCH 24-26: Office Automation Conference, Houston, TX. Sponsor: American Federation of Information Processing Societies. Contact AFIPS Conference Department, 1899 Preston White Dr., Reston, VA 22091. (703/620-8900)

MARCH 24-27: SOUTHEASTCON '86, Holiday Inn—Downtown, Richmond, VA. Contact: V. Bodin, 7305 Longview Dr., Richmond VA 23225. (804/272-4735)

MARCH 24-28: Short Course—Far Infrared SMM/Physics, Houston, TX. Contact: Laser Institute of America, Education Dir., 5151 Monroe St., Suite 102W, Toledo, OH 43623. (419/882-8706)

MARCH 25-27: IMTC/86—IEEE Instrumentation and Measurement Technology Conference, University of Colorado Events Center, Hilton Harvest House, Boulder, CO. Contact: Robert Myers, Conf. Coord. 1700 Westwood Blvd., Suite 101, Los Angeles, CA 90024. (213/475-4571)

MARCH 26-28: 5th Annual Phoenix Conference on Computers and Communications, Sunburst Hotel, Scottsdale, AZ. Contact: Steve Paquette, Phoenix Metro Group, 34 W Monroe, Phoenix, AZ (602/254-5521)

MARCH 31 - APRIL 4: 3rd Annual Conference on Application of Artificial Intelligence, Orlando, FL. Sponsored by International Society for Optical Engineering (SPIE). Contact: Janet Huston, SPIE, PO Box 10, Bellingham, WA 98227. (206/676-3290)

MARCH 31 - APRIL 4: SPIE's 1986 Technical Symposium Southeast on Optics and Optoelectronics, Tutorial Education Program and Instrument Exhibit, Sheraton-Twin Towers, Orlando, FL. Contact: SPIE, PO Box 10, Bellingham, WA 98227. (206/676-3290)

APRIL 2-4: Conference on Management and Information Technologies, Chicago, IL. Cosponsored by Data Processing Management Assoc. (DPMA) and Assoc. for Computing Machinery (ACM). Contact: DPMA, 505 Busse Highway, Park Ridge, IL 60068. (312/825-8124)

INTERNATIONAL

FEBRUARY 22-MARCH 5: Television Technology in Japan—Study Mission. Contact: Hideaki Hashizume, Gen. Mgr., Technology Transfer Institute, One Penn Plaza, Ste 1411, 250 West 34th Street, New York, NY 10019 (212/947-8273)

MARCH 12-19: Hannover Fair—CeBIT '86—The World Center for Office Data and Communications Technology, Hannover Fairgrounds, Hannover, West Germany. Contact: Hannover Fairs USA, Inc., PO Box 7066, 103 Carnegie Center, Princeton, NJ 08540. (609/987-1202)

MARCH 11-13: 1986 International Zurich Seminar on Digital Communications, Swiss Federal Institute of Technology (ETHZ), Zurich, Switzerland. Co-sponsor: IEEE Computer Society. Contact: Secretariat '86 IZS, Dr. R. Hartmann, Zellweger Uster AG, CH-8634 Hombrechtikon, Switzerland (055-416111)

MARCH 17-19: Conference on Sensors—Technology and Applications, Bad Nauheim, Federal Republic of Germany. Co-sponsor: IEEE. Contact: German Section of IEEE, The Secretary, Dr. Ing. F. Coers, Stresemannallee 15, VDE Haus, D-6000, Frankfurt 70, Federal Republic of Germany. (069/6308-221)

MARCH 17-21: 2nd International Conference on the Application of Microcomputers in Information, Documentation and Libraries, Baden-Baden, Federal Republic of Germany. Co-sponsor: AFIPS. Contact: Secretariat Deutsche Gesellschaft fuer Dokumentation e.V., Westendstrasse 19, D-6000, Frankfurt am Main 1, Federal Republic of Germany (69-747751)

MARCH 25-27: INFO—European Information Technology and Office Automation Exhibition, Olympia London. Contact: Tony Webb, British Trade Development Office, 845 Third Ave., New York, NY 10022. (212/752-8400)

APRIL 9-16: Industrial Automation '86—Major exhibition sector of Hannover Fair '86, World Center for Industrial Technology, Hannover Fair Grounds, West Germany. Contact: Hannover Fairs USA Inc., PO Box 7066, 103 Carnegie Center, Princeton, NJ 08540. (609/987-1202)

Call for Papers: Japan Display

Original papers, previously unpublished, presenting new scientific or technical contributions, are being solicited for **Japan '86: Sixth International Display Research Conference** to be held in Tokyo, September 30-October 2, 1986. The program will cover all disciplines relating to electronic displays, with presentations scheduled for oral or poster sessions. Submit an original and two copies of an abstract and summary to Prof. Shunsuke Kobayashi, c/o Secretary of Japan Display '86, Japan Convention Services Inc., Nippon Press Center Bldg., 2-2-1 Uchisaiwai-cho, Chiyoda-ku, Tokyo 100, Japan.
Deadline for submittal: May 31, 1986.

Industry News

PEOPLE

Harris Corp. (Melbourne, FL) announced that John T. Hartley has been named president and chief executive officer of the firm that produces state-of-the-art information processing, communications and microelectronic products. Hartley, previously president and chief operating officer, will succeed Dr. Joseph A. Boyd, who will remain chairman of the board.

AFIPS. The American Federation of Information Processing Societies, announced that Carl W. Malstrom has been named chairman of the National Computer Conference Board (NCCB) and AFIP's Conference Board. NCCB is the overall governing body for the National Computer Conference (NCC) and the new NCC-Telecommunications Conference. The latter will be held for the first time on September 8-10 in Philadelphia. NCC '86 is scheduled for June 16-19, in Las Vegas, NV. Malstrom is director of the North Carolina State University Computing Center.

Precontact Inc. (Langhorne, PA) announced the appointment of Yves Lepage to the position of president and chief executive officer. The appointment marks the first time the electronic interconnection manufacturer has had a resident president. Lepage came to Precontact in 1985 after spending three years with Curtis, Mallet, Prevost, Colt and Mosle, a New York law firm.

Computer Automation Inc. (Irvine, CA) has appointed Douglas L. Cutsforth president and chief operating officer. The company manufactures high performance automatic test equipment and OEM computers. Cutsforth, recently appointed to the board of directors, had been a vice president and general manager of the firm's Industrial Products Division.

Ricoh Corp. (West Caldwell, NJ) has appointed Hisashi Kubo chairman of the automated office equipment and electronics manufacturing company. Kubo, previously president, will be replaced by Hisao Yuasa, formerly executive vice president. Kubo will also be chairman of the Ricoh U.S. President's Conference.

ORGANIZATIONS

Sanders Associates Inc. (Nashua, NH) has received $21.6 million in funding from the U.S. Air Force to provide spare units for the AN/ALQ-137 electronic countermeasure systems for the Tactical Air Command's EF-111 advanced electronic warfare aircraft. The funding, provided by the Air Force Warner Robbins Air Logistics Center, GA, brings the total received for the EF-111/137 program to over $100 million. The AN/ALQ-137 provides self-protection against ground-based, shipboard or airborne radar controlled weapons.

Boeing Computer Services Co. (Bellevue, WA) has combined all governmental sales, marketing and systems activities into Government Information Services, directed by Senior Vice President Ben Wheat and General Manager Orv M. Langdahl. Commercial sales, marketing and systems activities will be combined into Commercial Information Services under Vice President Paul M. Sibalik. The purpose of the changes is to provide separate industry focus between government and non-government customers.

Sanders Associates Inc. (Nashua, NH) has received $22.5 million from the U.S. Air Force Aeronautical Systems Division, Wright Patterson Air Force Base, OH, for additional software, hard-

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"The desire of knowledge. . .increases ever with the acquisition of it. . ."

—Laurence Sterne

In this month's issue of Information Display we introduce our newest feature—PROFILES— consisting of a short background on one of our newer Sustaining Members, plus brief sketches of some "old timers." Our intent is to make all SID members more aware of the diversity of products and services available to them from fellow SIDers. . .with the ultimate goal of producing a year-end directory for the display industry.

* * *

While Chapter Notes should be of particular value to all SID members each month, they also should hold interest for non-members. . .providing an insider's look at Society functions and membership involvement. But, unless your local Chapter reports to us on upcoming activities or successful events they've sponsored, or commendations you've received from your peers we'll never be able to pass this important information along to our anxious readers. We need (as your President says in his column this month) an increased commitment on the part of Chapter Chairmen to improve this section of ID.

* * *

Among the many recommendations for amendment to the Society's By Laws (ID November 1985, p. 34) is Article 3—Membership—that would add a new grade "Affiliate Society Member," designated as an organization, other than a corporation or business, interested in furthering the purposes of SID.

This proposed action, on the part of your review committee, parallels our own efforts here at ID—to encourage a dialogue and greater cooperation among related societies whose published proceedings often contain papers covering certain aspects of your Journal's editorial endeavors. All too often, such material reaches only a handful of SID members, if they happen to be members of the particular society, and those few who have by chance attended the specific technical conference at which such presentations were delivered. Such papers are then consigned to the society's archives.

Precisely because your Society Journal's intent and purpose is to provide coverage of "emerging technologies and state-of-the-art developments" across the display spectrum—input/output devices, memory/storage media, display systems, distribution/transmission methods, materials and components, and the erogonmics of designing display systems—we attempt each month to include as many of the happenings of other allied societies as we are made aware of. To be truly comprehensive, though, we need your help. At present our list of resources includes:

AFIPS - National Computer & Office Automation Conferences
SPIE - Photo-optical Instrumentation
SPSE - Electronic Imaging Systems
HFS - Ergonomics (Human Factors Engineering)
SAE - Automotive & Aircraft Displays
IEEE (Computer Society) - Computer Systems
SIGGRAPH - Computer Graphics

We would appreciate hearing from our readers about other resources that we might approach for additional input for future articles in ID. Please drop me a line. Better yet, give me a call (212/687-3836).

Joseph A. MacDonald
Editor

ware, data items and spares for the AN/ALQ-189 electronic countermeasure system, a modified version of the AN/ALQ-137 ECM system. The ALQ-189 will be Sanders' entry in the F/FB/EF-111 self-protection ECM update program.

General Cable Co.'s Fiber Optics Div. (Edison, NJ) has formed a national organization to represent its fiber optics products for the data communications and Government/Military markets. Representative organizations include Eureka Technical Sales, Covina, CA; Technical Marketing Inc., Lakewood, CO; DalBrook Inc., Horsham, PA; Gramer & Co., Phoenix, AZ; Laser Sales, Plano, TX; Emtech, Chicago, IL; Lowell-Wendt, Livonia, MI; and Freeman Associates, Ft. Lauderdale, FL.

Dataproducts New England (Wallingford, CT) has received a $7 million USAF contract award for the production of TEMPEST multiplexers. The equipment, produced for the TAME (TEMPEST Advanced Multiplexer Equipment) program, will provide data circuits that support U.S. Air Force headquarters, Air Staff, and the Secretary of Defense at various locations in the continental United States, Alaska, Hawaii and the Republic of Germany. Dataproducts New England is the Government Products Div. of Dataproducts Corp., Woodland Hills, CA, a manufacturer of computer printers, datacommunications devices and aerospace electronics products.

Skantex Corp. (Warren, NJ) announced that its SK-1010 Automatic Digitizing Scanner received the annual IR-100 Award presented by *Research & Development* magazine to the most innovative and significant high technology product of the year. The digitizer scans engineering drawings at high speed, capturing data and converting it to digital format for entry into computer-aided design and CAD/CAE engineering systems, and computerized storage and retrieval systems.

Silicon Compilers Inc. (San Jose, CA) has signed a $1 million, three-year technical assistance agreement with General Dynamics Corp., St. Louis, MO, to assist in the application of silicon compilation to the design of very large-scale integrated (VLSI) semiconductors for its military and aerospace programs. In return, General Dynamics will assist Silicon Compilers in furthering its knowledge of the integrated-circuit design requirements of the Defense Dept. and defense contractors. The company's Genesil silicon compilation systems provide for the complete automation of VLSI circuit design.

Optical Devices Inc. (Camarillo, CA) is now manufacturing and marketing VU-TEX I, a contrast enhancement filter first introduced in the US in 1984 by American Hoechst Corp.'s Film Products Div. The circular polarized filter eliminates up to 99% of harmful computer screen glare. Dan Reiner, former Film Products Div. general manager, acquired the Hoechst subsidiary and formed Optical Devices to continue producing the Hoechst product.

For membership or subscription, use card in magazine.

Still-video system undergoes testing

Eastman Kodak Co. is testing in trade trials a still-video system it has developed that displays photographic images on TV sets and produces hard-copy instant prints. The system includes a 2x2-in. video floppy disk that holds up to 50 images, a film-to-disk transfer station, a still-video player/recorder, and a color video imager.

The film-to-disk transfer station is designed initially for use with 35-mm color negatives. During the transfer process, joystick and rotary controls are used to optimize color balance, contrast and brightness. The still-video player and a player/recorder are compatible with video output-equipped television sets in the US and other countries using the NTSC format.

Color LED displays indicate the mode (autoplay, record or playback) the unit is in. Image display is controlled from a panel on the face of the player; the panel can be removed and used as a wireless remote control device. In autoplay mode, the player will cycle through a disk at 5-sec intervals, and can be reset for intervals ranging from 0-99 sec. A wrap-around capability allows the player to advance from image 50-1. The device shuts off automatically after an hour of not being used.

Contact: Eastman Kodak Co., 343 State St., Rochester, NY 14650. (716/724-4241)

Scientists collaborate on optoelectronic research

Research projects, to be carried out jointly by ITT scientists and Yale faculty and graduate students, will investigate new materials to be used in developing advanced semiconductor circuits that handle both optical and electronic signals.

The research is part of a multilocation ITT undertaking—the Terabit Project—that aims to develop advanced optoelectronic systems, devices and materials capable of processing information at up to one trillion bits (roughly the equivalent of 500,000 typewritten pages of information) per second. This capability is necessary to take full advantage of the wide bandwidth of optical fiber, which has several thousand times the capacity of copper wire, as transmission medium for voice, data, and video signals.

The focus of the ITT/YALE will be on new materials based on gallium arsenide compounds. Using a technique called metal-organic chemical vapor deposition (MOCVD), very thin, single-crystal layers of semiconductor alloys are deposited on wafers of pure gallium arsenide and indium phosphide. Each resulting layer has specific electronic

and optical properties that permit the integration of high-speed electronic circuits, lasers and optical detectors in a single device or microchip.

Chief researchers are Dr. Richard C. Barker and Dr. Tso-Ping Ma, professors of electrical engineering at Yale; and Dr. Charles K. Kao, an ITT executive scientist based at the ITT Advanced Technology Center in Shelton, CT. Other groups participating in the Terabit Project are Standard Telecommunications Laboratories, Harlow, England; and ITT's Standard Elektrik Lorenz, Stuttgart, Germany. Five universities, including Yale, are affiliated with the project

Contact: Steven A. Erenburg, ITT Corp., 320 Park Ave., New York, NY 10022 (212/940-1255)

HDTV Standards proponents may be wasting time, money

The worldwide arguments over establishing a standard for high-definition television may be nothing more than an expensive irrelevancy, concludes a recently released 174-page report on large-screen displays.

According to the report—Large-Screen Display Market (#679)—the US is backing the Japanese NHK standard, while European countries express doubts about the proposed standard, because its 60-Hz field rate may make conversion to the European PAL and SECAM standards difficult.

Negotiators, for some time now, have been trying to come to grips with adoption of a single worldwide standard for HDTV—in an effort to avoid repeating the mistake of 30 years ago when failure to coordinate efforts internationally produced the three standards currently in use.

The report points out, though, that the present arguments may be academic, since technological advances have already overtaken the original goals. Television receivers are being produced today in West Germany that can decode a variety of signals—PAL, SECAM, or NTSC. When receivers are produced that can decode a multitude of signals, a single standard would be unnecessary. A trade-off for this flexibility would be a measure of image degradation at the receiver.

Contact: Susan Bores, International Resource Development Inc., 6 Prowitt St., Norwalk, CT 06855 (203/866-7800)

Guide to high-voltage, resistance calibrations

Industrial and government laboratories that have devices calibrated as standards for measuring high, direct-current (DC) voltages and resistances should find a new NBS report useful.

Authored by bureau researcher Martin Misakian, the report is a guide to the NBS calibration service for determining

dc voltage ratios and total resistance of voltage dividers and resistors. Misakian's report contains diagrams and photographs of the bureau's calibration apparatus, including descriptions of the Wheatstone bridge circuit and standard resistors that form the heart of the calibration system.

Also discussed are the operating procedures NBS uses to maintain the apparatus and to perform the calibrations. The report is available from the Superintendent of Documents; $1.25 (prepaid); Stock No. 003-003-0267247.
Contact: Superintendent of Documents, US Government Printing Office, Washington, DC (John Henkel, 301/921-3181)

IBM to study magnetic recordings coatings

IBM has established a research associate program at NBS to study the bonding of metal oxide coatings on polymer materials. The first applications of this research will be to increase storage capacity of hard computer disks by improving their magnetic coatings.

Dr. George Hadziicannou, from IBM's Research Center, San Jose, CA, will use a small angle neutron scattering (SANS) technique at the NBS research reactor to measure polymers that may be applied over metallic coatings on magnetic recordings. With SANS, a specimen is placed in a neutron beam from the reactor where it is exposed to relatively low-energy neutrons that are used as probes to measure internal structure of a material on a scale from approximately 1 to 100 nanometers.

The NBS Research Associate Program provides an opportunity for engineers and scientists from industry, technical societies, and other organizations to conduct cooperative research at NBS on projects of mutual interest, with salaries paid by the sponsor.
Contact: Roger Rensberger, NBS (301/921-3181)

Planning process paper wins top information prize

The Society for Information Management awarded first place prize of $5,000 to the paper *Implementation of a Planning Process at GTE*, co-authored by Nick Rackoff of GTE Data Services, Inc.; Walter Ullrich of GTE; and Charles Wiseman of Competitive Applications.

Two papers tied for second place: *The Application Profile* by John Batiste of A.O. Smith Data Systems; and *User-Generated Subsystem Models: An Innovative Information System Development Approach*, co-authored by John Mahlum of 3M Co., and Kenneth Kozar of Indiana University.

How Syntronic helps you meet the design challenges of high-frequency, high-resolution CRT displays.

The demands for higher frequencies and higher resolution in CRT displays are more evident today than ever before.

Syntronic recognized this demand years ago. We began —and still are—responding with improvements in CRT deflection component designs for modern high-frequency scan circuitry.

Syntronic offers technical assistance for product development supporting commercial, industrial, and military systems.

High Frequency

At high scan frequencies, ordinary deflection yokes lose efficiency or may even melt, as in raster-type systems.

Syntronic has developed yoke designs incorporating low-loss cores, multi-stranded (Litz) wire, and high-grade molded housings utilizing a flow-through venting system to dissipate heat without forced cooling.

High Resolution

To maintain high resolution from corner-to-corner (with high-speed, low-inductance yoke designs), Syntronic utilizes precision stator-type cores, contour matched to the CRT neck profile.

The coil distribution characteristics are then optimized for the application.

Syntronic stator-core designs allow production repeatability and low spot-growth that is mandatory for modern wide-angle, high brightness displays.

This repeatability, or consistency, assures the user the same product from prototype through production.

Learn More in Syntronic AP Notes

Syntronic publishes a series of Application Notes that detail these and other deflection yoke considerations.

Send for your copy of these AP Notes to learn more about Syntronic and its efforts in high-frequency, high-resolution CRT displays.

syntronic

Syntronic Instruments, Inc.
Department 6A
100 Industrial Road
Addison, IL 60101
Phone (312) 543-6444

For information circle Reader-Service # 10

From shields to fire pumps, firm traces electronics growth

From the knitting of wire mesh for industrial gaskets to the manufacturing of fire pump controllers, TECKNIT engineers and scientists have gained worldwide recognition for innovative research and development of high technology products.

The Cranford, NJ firm (a company of Technical Wire Products Inc.) since its founding in 1958 has focused on the development of improved materials and components used in shielding electronic systems from adverse effects of Electromagnetic Interference (EMI). Within a few years from its startup, the firm's initial activities with wire mesh shielding devices, however, expanded into areas of other conductive products . . . rubber, paints, adhesives, lubricants, caulks, and textiles. Thus is was, with the development of conductive rubber products, that TECKNIT was firmly launched into a then newly-evolving discipline in the electronics industry—solderless connectors.

Electronic connections

The elastomeric connector—ZEBRA—that the company introduced to the industry in the mid-1970s revolutionized the method of interconnecting electronic components. Consisting of alternating layers of carbon-filled silicone rubber and plain silicone rubber acting as a dielectric, the new connector permitted contact (for the first time) between a Liquid Crystal Display and its printed circuit board—without need for soldering or clips. The immediate result of this development was the explosive growth in digital watch manufacturing.

Other applications for the connector soon followed . . . field instrumentation, medical devices, and consumer products. And, through further research, the TECKNIT team then produced a conductive elastomer that met the rigid and demanding requirements for such high-technology applications as gas plasma panels, electro-luminescent displays, and printed circuit board to printed circuit board connectors.

TECKNIT President: *William L. Rose, formerly Chief Executive Officer of Rose International Inc., a Miami processing and controls manufacturer, which he founded, has had extensive experience in the electronics field—in the missile/space systems and data transmission segments of the electronics industry.*

Product expansion

TECKNIT's growth into other product fields began in 1966 with the acquisition of RFI Corp. in Santa Barbara, CA—and the establishment of a West coast headquarters there. In 1970, the firm further expanded its operation by acquiring the Premer and Rayseal Corps., and assigning the new products to its Santa Barbara facilities.

Then in 1983, a new dimension in the evolution of Technical Wire Products Inc. emerged with the acquisition of Metron Instruments Inc., which moved the company into an industry discipline quite removed from electronic materials and components. The Denver-based firm had been a leader for 20 years in the manufacture of fire pump controllers—equipment used to start large stationary diesel engines or electric motors that drive the pumps that supply sprinkler systems in multi-storied buildings.

With its eye on the future of electronic connection technology, TECKNIT management in 1984 established InterConnection Products as a separate business entity—and opened a new manufacturing facility in Cranford, dedicated exclusively to the development of new connector products.

In addition to its US-based operations, TECKNIT in 1981 established TECKNIT-Apacom in Hong Kong to manufacture and market its elastomeric connector products in the Far East; and in 1984, opened new facilities in England to manufacture and market EMI shielding and InterConnection products to the European electronic community.

TECKNIT, Cranford, NJ (201/272-5500)

Hartman Systems

A Div. of Figge International Inc., the Long Island firm traces its beginning to 1933 with the founding of Waldorf Mechanical Laboratories—designers and builders of special automatic machinery and precision mechanical devices for both commercial and military applications. By 1951, the company had formed an electronics group to develop industrial instruments, and within eight years its manufacturing emphasis was in electronic systems, navigational computers, instruments, and display systems. After going through several name changes (resulting from a succession of companies having acquired the group), the firm in 1969 became known as Hartman Systems. During this period, Hartman had gained worldwide recognition for its design of complex computerized navigational systems—including data conversion systems, flight indicators, data display systems, support equipment, and mechanical control systems. Today, the company's display products line has grown to represent nearly half of its business.

HARTMAN SYSTEMS, Huntington Station, NY (516/427-7500)

Amuneal Mfg. Corp.

A recognized leader in the field of magnetic shielding since 1965, this Philadelphia-based company is particularly well known for its work in the design and manufacture of CRT shields, both custom-made and standard units. In addition, the company produces magnetic bubble memory shields, image storage shields, vidicon shields, tiny recording shields for computer disk drives, and computer terminal shields.

AMUNEAL MFG. CORP., Philadelphia, PA (215/535-3000)

Next generation LCDs evolve to meet changing applications

Regardless of how one calculates generations in the evolution of liquid-crystal display technology, it is evident that LCDs are now entering a new era.

LCDs emerged in the mid-1970s, taking over the field of electronic digital wristwatches and easily displacing LEDs, whose relatively high power consumption required two-hand pushbutton operation to tell time. As the price of those early, hermetically-sealed LCDs plummeted, Japanese manufacturers moved into the market with a new product based on non-hermetic LCD technology, which was amenable to larger display sizes and matrix addressing.

Thus was ushered in the era of the slender pocket calculator, with its liquid-crystal display driven by a single VLSI circuit, and powered by miniature button cells—later by solar panels.

The presure to find new, profitable LCD markets fueled an explosive development that today finds LCDs not in another specialized market niche but rather in every area of display application.

LCD addressing

In those early watches, every segment in every digit of a liquid-crystal display was individually connected to its own dedicated driver. Direct accessing persists today, not only in simple displays with just a few addressable memories, but also in applications where its cost is contrast can be obtained by driving unselected elements at slightly above threshold. Thus, some manufacturers are offering fluorescent or electroluminescent backlighting to compensate for the rather dark LCD background. Critical tuning of the liquid-crystal layer thickness also can bring improvements, but at the cost of extremely tight manufacturing tolerances.

At the same time, progress is being made in the synthesis of liquid-crystal materials with inherently sharper threshold curves. And, VLSI chip sets, implemented in custom CMOS for 20-25V, are beginning to appear to meet the needs of new materials and still higher levels of multiplexing.

New LCD effects

An entirely new approach to controlling the shape for the electro-optic characteristic was discovered by D.W. Berreman in the combination of high-tilt surface alignment and a chiral dopant (SID'82 Symposium Digest p. 242). Although the competition between boundary conditions and inherent tendency to twist can introduce a snap action, by using a full 360-deg twist instead of the ordinary 90-deg, Berreman showed that the characteristic becomes bistable with sufficient hysterisis for an LCD with memory.

In another approach, T.J. Scheffer and J. Nehring performed rigorous computer simulations of what they term the supertwisted birefringence effect in a cell with 270-deg twist, to optimize the performance of a refreshed display with conventional addressing (SID'85 Symposium Digest p. 120).

Their 2000-character prototype LCD display appears strikingly superior to state-of-the-art conventional LCDs. Speedy commercialization, however, is hampered by the need for an order of magnitude improvement in manufacturing tolerance on cell thickness.

The higher degree of order found in the layered structure that characterizes "smectic" liquid crystal offers yet another path to an improved full-page LCD. Once written, the smectic LCDs tend to remember without refreshing, so the duty ratio constraints on matrix size are obviated.

One technique, developd by STL/ITT Courier and similar to the old dynamic-scattering texture-change displays, employs electrohydrodynamic stirring of a smectic "A" material by low-frequency current. This then produces a strongly scattering texture that can be cleared by a high-frequency electric field (SID'85 Symposium Digest p. 124). Their full-page demonstration, with a strong uniform backlight, rivals a CRT in brightness and resolution. But, its ±150V drive requirement and justified by stringent performance requirements.

For example, automobile dashboard displays must switch in less than a second, even at -30C where liquid crystal viscosities are high. This specification, at present, can be met only by driving selected elements "on" hard with the full available voltage, and by removing all voltage for rapid relaxation of the "off" state.

Similarly, wall-sized displays in which LCD elements control the passage of light from fluorescent lamps through colored filters rely on direct addressing to attain high contrast over a wide field of view, with gray scale and fast re-

by Allan R. Kmetz
AT&T Bell Laboratories
Murray Hill, NJ

Magnetic Shield Manufacturing

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Eagle Magnetic Benchmark Quality is our manufacturing standard. We believe value added quality is a **design-in** feature not an inspect-in incident. Skillful management of committed individuals operating state-of-the-art CAD/CAE/CAM equipment increase **design-in** value added quality with each process.

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317-297-1030

For information circle Reader-Service # 11

sponse. The high cost of this brute-force approach is justified by the large audience served with information at such installations.

For the majority of applications, however, cost is a principal consideration so matrix addressing is used instead. By constructing the picture elements at the intersection of "N" rows and "M" columns, "N" x "M" elements can be addressed by a total of only "N" + "M" drivers. Selected elements are turned on by the coincidence of signals on the appropriate rows and columns, signals that unfortunately also produce a smaller, but non-zero, voltage on unselected elements.

A single, inexpensive IC has enough I/O pins for the display and keyboard needs of an electronic calculator. For a full-page computer screen with a quarter of a million elements, however, the cost of interconnections and electronics to drive 1000 leads would exceed the cost of the LCD itself. Without matrix addressing, the task would be unthinkable. A large matrix, however, requires an LCD with a steeper threshold and more voltage to drive it.

Capacity vs performance

The number of rows in a matrix that can be satisfactorily addressed has doubled about every 18 months for more than a decade now, reflecting a steady evolution in LCD technology. At present, state-of-the-art is about N = 100. Putting two such matrixes into a single package is sufficient to meet the *de facto* standard set by the 640x200 display of the IBM-PC.

Drive requirements are just within the 15-18V capability of conventional CMOS, with ICs much less expensive than those for plasma or electroluminescent displays. LCDs are by far the lowest cost flat-panel displays on the market today.

Unfortunately, current performance is only marginally acceptable. Contrast, poorer than a newspaper, is obtained over a narrow range of angles that does not include normal incidence. The best 840-ms frame time are obvious disadvantages.

Still, another approach employs a class of liquid crystals that are ferroelectric. W.A. Clark and S.T. Lagerwall proposed that fast switching memory displays could be made from very thin layers of ferroelectric smectic "C" material. This concept was realized in a prototype (having a 2 μm-layer thickness) from Seiko Instruments, but contrast and uniformity were poor (SID'85 Symposium Digest p. 131).

AT&T Bell Labs used an ac-bias technique to permit a conventional layer thickness in a smaller display with higher contrast (SID'85 Symposium Digest p. 128).

It remains to be seen whether the promise of a microsecond switching can be achieved at room temperature with matrix addressing.

Active substrates

Rather than trying to improve the LCD for matrix addressing, another school of thought accepts the LCD and attacks instead the problem of integrating drive electronics into the display to implement direct addressing.

An "active" substrate places an electronic component in series with every liquid crystal picture element to act as a switch. During the brief line selection interval, the switch must pass enough current to charge up the liquid-crystal capacitance; then it must open with low enough leakage to hold most of the charge until refreshed by the next scan. Good performance of a direct-drive LCD is thus obtained at the cost of fabricating perhaps 100,000 components across the display substrate.

Several candidates are available for the switch.

- MOS transistors suffer from the opacity and limited size of silicon wafers.
- Amorphous silicon TFTs benefit from the experience in low-temperature deposition of uniform, large-area thin-films for solar cells—but field effect mobility is low, so devices with high width/length ratios are needed.
- Polysilicon has higher mobility and the double-gate structure from SUWA Siekosha achieves adequate on/off ratio—but high temperature deposition

(Continued on p 29 . . .)

Guidelines for selecting a video signal generator

The color monitor used in present day CAD/CAE systems is, along with keyboard or mouse, the main user interface. As a result the whole system may be judged—rightly or wrongly—on a video monitor costing just a few thousand dollars.

Systems manufacturers are demanding more and more resolution from their monitor suppliers. If the right selection is to be made, sound evaluation of the many different types of monitors available is of the utmost importance.

A number of test equipment companies today offer sophisticated video signal generators to make this task easier. There are, however, a number of parameters to consider when choosing the right video generator:

SCAN RATES: Although most present day monitors run at 64kHz scan rate, the trend is definitely upwards. Check that the generator can go well beyond the scan rates you currently use—200kHz should see you through the next few years.

DOT CLOCK FREQUENCY: Again the trend is higher, faster, more dots. The typical monitor in a CAD/CAE system runs around 110 MHz, but you can be sure that there will be a need to go higher. Look for a generator with the highest possible dot clock frequency, providing it does not compromise other features just to give you "blazing speed".

PATTERNS: The purpose of a video signal generator is not to produce pretty pictures or graphics for trade shows, but to provide the user with some real tests of monitor performance. It should be able to produce cross hatch, dots, circles and characters to provide a full evaluation of the monitor's capabilities. Look for the maximum amount of flexibility in generating these patterns. Are you deciding what pattern to generate or is the machine giving you limited choice?

- *CROSS HATCHES*—Test for linearity in both planes simultaneously and also clearly show both barrel and pin-cushion distortion. The CROSS HATCH also provides an excellent test of monitor high frequency performance. Horizontal and vertical lines should be of exactly the same brightness at the monitor's rated dot clock frequency. Poor high frequency response will be indicated if the vertical line is dimmer than the horizontal. You should be able to adjust the dot clock frequency independently of the horizontal scan rate to get the most value out of this test. The generator should, of course, allow complete control over the spacing between the vertical and horizontal lines.
- *DOT PATTERNS*—Test for linearity over the whole screen as well as color purity and high frequency response. Any fringing around the dots shows poor convergence, and increasing the dot clock frequency beyond the "spec" number until the dots start to fade will tell you how fast the monitor can be pushed. The spacing between the dots should be fully controllable in both the horizontal and vertical directions.
- *CIRCLES*—Test for linearity over the whole display area. Look for a wide variety of circle patterns to test both the center and the corners.
- *CHARACTER GENERATION*—Helps you to see what an end-user will be staring at when operating the monitor. CHARACTERS also provide an excellent test for focus and definition over the entire active display area of the monitor. Look for a generator that also allows you to program your own special characters and store them in a non-volatile memory.

All patterns should be completely variable and capable of being superimposed on top of each other.

WINDOWS: The generator should be capable of producing a number of window test options. For example, a white window in a black field, with vertical lines superimposed on it, makes an excellent test for high-voltage power supply regulation. First, set the pattern on the screen then invert the color every half second or so. This switches the current from low to high and back again at a fast rate. A poorly regulated supply will cause the picture to jump around and the vertical lines will move horizontally.

COLOR BARS: A monitor is supposed to show all its colors at 110MHz. Make sure the generator you select can give ALL its colors at any dot clock frequency. Size, level and sequence of the COLOR BARS should be fully controllable.

GRAY SCALES: Thirty-two shades of gray should be considered the minimum requirement. Look for the maximum number of steps from Black to White and also full control of size, step and level. Also check to see if the COLOR BAR and GRAY SCALE patterns can be superimposed. This will provide you with many subtle shades of your basic colors.

VIDEO OUTPUTS: The best generators have video outputs for ANALOG, TTL and ECL signals along with all the usual horizontal, vertical syncs, drive pulses etc... TTL and ECL signals should provide half tones and there should be complementary ECL outputs too. Read the specs carefully.

Be sure to check rise times. When you get a generator in for demonstration, or evaluation, hook it up to a 300MHz oscilloscope. Too much overshoot can be a way of getting high frequency perfor-

by Bill Nicklin
Test and Measurement Systems, Inc.
Sunnyvale, CA

mance at the expense of a true fast rise time.

Check to see if the analog output levels are programmable. Not all monitors require the "standard" voltages for analog video and sync. Choosing a generator that only gives 0.7 volts output may be fine for today but not the next project.

For repetitive testing, an output from the video generator to a PROM programmer provides an easy way to "burn" your own special patterns and timings. The PROM programming should be an integral part of the generator's operation and be as straightforward as possible. PROM control of the generator is usually less "goof-proof" than keeping all your timing and pattern information in non-volatile memory. It takes a lot more effort to wipe out a PROM.

TIMING PARAMETER SETTING: Many of the older video generators were programmed in terms of numbers of dots and characters. Current generators are usually set in actual timing values for horizontal parameters and number of lines for the vertical. This is far more logical and the operation becomes easier. Also it makes for independent adjustment of dot clock frequency within the horizontal period. Setting the timing using dots and characters means that you have to recalculate everything if you want to change dot clock frequency.

EASE OF USE: This factor is the most subjective. One person's easy-to-use instrument may drive someone else completely "buggy". There are, however, some features to look for in making your final decision:

- *BUILT-IN PROM*—This enables recalling programs without the use of an external controller, and is especially useful in a manufacturing environment where full access to the front panel is not required or even desirable. The operator only uses the patterns and timings you decide on to make the tests.
- *ERROR MESSAGES*—These should tell you on the display screen if, and where, you made a mistake in entering the monitor's parameters. Just beeping at you and locking up is not too much help.
- FRONT PANEL—This should be clear and laid out logically. Can you find your way around it without reams of instructions? Watch how the salesperson demonstrates the instrument. If he or she has trouble, chances are you will too. LCD displays are becoming very popular for their low power consumption and size. They do however suffer from lack of readability in poor light and a narrow viewing angle. If you test monitors in a darkened room, you may not be able to read the generator's settings.

TRY IT YOURSELF: Get a demonstration of the generators you are considering. See if you can borrow one for a few days and let others try it too. Only then will you be happy with your choice.

Display monitors

A series of cost-effective, high performance 11- to 19-in. color display monitors and CRTs can be tailored to a customer's specification requirements. XC-1412C, a 14-in. unit compatible with the IBM/AT/XT, or compatibles having the IBM professional graphics controller (PGA). It features 30.488 kHz horizontal scanning frequency and analog RGB input, 640 dots x 480 lines in the high function graphics mode, and in-line self-convergence design. The 11-, 13- and 15-inch HF series models, having the option of adding logic boards or additional power, are available with 0.31, 0.25 or 0.21 mm pitch analog RGB, and accept digital input. Precision in-line gun/shadow mask CRTs are offered, and the chassis can be tilted at 2.5, 5, 7.5 and 10 degrees. The 19-inch C-6921 (full front controls, no cabinet) and the C-6922, are high resolution CRTs with 0.31-mm dot pitch, self-convergence in-line gun. Both monitors display up to 5,000 characters and offer 1,000 lines interlaced. Price: $520 (approx.)

MITSUBISHI ELECTRONICS AMERICA, Torrance, CA (213/515-3993)

For information circle Reader Service # 59

Sign module

VARACTER module, added to family of reflective electromagnetic display modules, is 11.4 in.; measures 11.42x8.09x1.50 in. (290x205.5x38 mm) overall with a display area of 11.42x7.87 in. (290x200 mm). Modules can be stacked either horizontally or vertically. Features include a 5x7 dot matrix to display upper and lower case letters, punctuation, user-defined special characters and graphics.

Reflective pixels are fluorescent yellow on a black background. Pixels contain four magnetically controlled rollers that are switched between the darkened and colored states by driving its electromagnet with a 24DC pulse; the core's magnetic field holds it in place until the next sequence. Price: $215 each (quantity of 100)

IEE, Van Nuys, CA (818/787-0311)

For information circle Reader Service # 65

Data capture systems

Scan-Graphics Turnkey Systems link the Micro VAX II with scanners and software, providing a cost-effective, high-quality solution to automated data capture problems. Turnkey systems are configured to include any of five Scan-Graphics scanners, RAVE, IGMS, raster display graphic workstation and the Micro VAX II. The standard DEC Micro VAX II systems consist of 5 MB memory, floating point, 70 MB disk drive and controller, cartridge and 1600 BPI tape drives, four-port serial line interface, and LA-120 console printer.

Model GDC-1000 consists of D500 scanner/digitizer with hardware and software interface and driver, raster display graphic workstation, DEC Micro VAX II, RAVE and IGMS. Options include IDS format conversion to IGES, ISIF and CV, plotters, plotter output software and optional workstations. Price: $149,910.

SCAN-GRAPHICS INC., Broomall, PA (215/328-1040)

For information circle Reader Service # 63

Push switches

Line of push-button switches range from 3/16 to 3/4 in. high, with short-stroke tactile or longer travel actuation available. Switches can be mounted either perpendicular or parallel to a circuit board. One-row and two-row brackets eliminate switch-to-switch alignment problems. Fourteen switches can be combined into a single bracket with several options of switch spacing (pitch). Combinations of momentary and self-locking (push-on-push-off) switches within these brackets, and interlocking between switches are also available. Circuit configurations range from single-pole-single-throw (SPST) to 4-circuit, 2-position (4C2P). Operating life of up to 100,000 cycles is specified for some switches.

NOBLE USA INC., Grove Village, IL (312/364-6038)

For information circle Reader Service # 68

Spectral scanner

Rapid spectral scanning system Model 6230 consists of a scanning monochromator (spinning grating) and a control unit that is built into a microcomputer. With appropriate grating and detector selection, the spectral range from 200 to 4500 nm can be measured.

Data into the computer is processed and can be displayed as tabular data, a spectral distribution curve, and colorimetric information on a C.I.E. color diagram on the system's 9-in. monitor. Microcomputer main memory is 64K and comes standard with two 3½-in. 160K (each) micro floppy disk drives.

EG&G GAMMA SCIENTIFIC, San Diego, CA (619/279-8034)

For information, circle Reader Service #55

Products

Industrial RF heating tube

RS 3060-C, a coaxial metal-ceramic triode, is available in two versions: forced-air cooled (RS 3060-CL) and water-cooled (RS 3060-CJ) tube with integrally welded cooling jacket.

The tube is ideally suited for applications that require generating frequencies up to 100 MHz and a maximum output power up to 120 kW, such as dielectric heating, induction heating, welding and switching and controlling of high voltages.

The water-cooled version utilizes a closed loop water system filled with deionized water to protect the system against mineral deposits. Maximum ratings for the tube are: anode voltage, 14kV; peak cathode current, 70 A; and anode dissipation, 40 kW. Operating efficiency is 76% at 110kW; operating frequency is 30 MHz. Price: $2,500.

Siemens Components Inc., Special Products Div., 186 Wood Ave. S, Iselin, NJ 08830 (201/321-4842)

For information circle Reader Service #69

Backlight displays

Illuminated Crystal Display (ICD), a 1x16 character dot-matrix panel, includes LED backlights and 5x7 dot-matrix format. LM16152 series incorporates LSI driver/controller to interface with either a 4- or 8-bit bus to generate the appropriate alphanumeric character. Backlights provide contrast ratio and wider viewing angle, and panels operate off a 5V supply with temperature compensation circuits to insure stable displays. Available in yellow-green (LM16152E), red (LM16152D) and yellow (LM16152H) backlight colors. Price: $27.

SHARP ELECTRONICS CORP., Paramus, NJ (800/223-2121)

For information circle Reader Service # 67

U-V photo exposure systems

Two ultra-violet photo exposure systems for the fabrication of flat panel displays feature highly collimated optics to minimize divergence, resulting from fine line resolution and near zero declination for soft contact or off-contact proximity printing.

Model OB/1600-12 is a semi-automatic U-V exposure system designed for research and development, or low-volume production applications. The unit features a 1600 W mercury xenon short-arc lamp for producing a highly collimated light source. Beam size allows single-sided top exposures of 12 in. × 12 in.

Models OB6000 EL and OB6000 EL Auto are designed for the fabrication of large area single-sided flat panel displays. The semi-automatic model is designed for an 18-in. × 24-in. exposure image area; the fully automatic model, for an 18-in. × 20-in. image area and is capable of processing more than 200 panels per hour.

OPTICAL RADIATION CORP, Azusa, CA (818/969-3344)

For information circle Reader Service #53

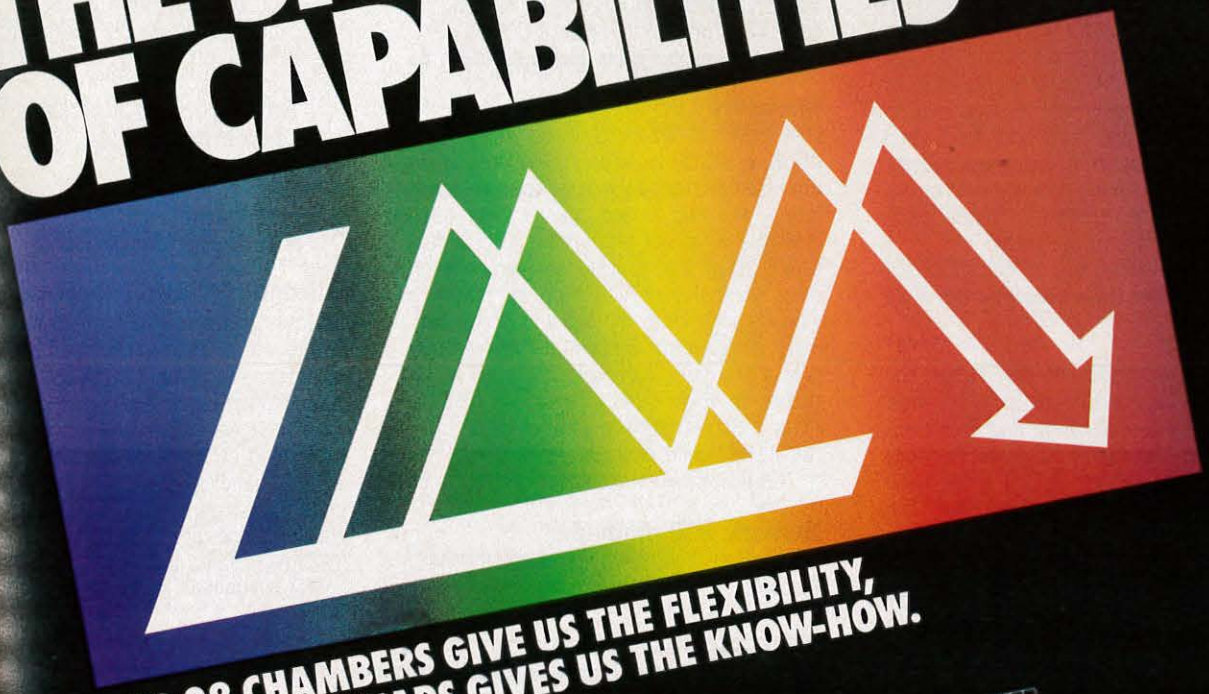
Bus display/keyboard card

STD bus display/keyboard card features a 16-character alphanumeric display, 20 programmable keys and an on-board beeper. The board may be installed directly into a card cage or mounted in a control panel and connected to the bus via a ribbon cable.

TYTRONICS INC., Watertown, MA (617/926-2756)

For information circle Reader Service # 70

THE SPECTRUM OF CAPABILITIES



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Products

Telecommunications printer

Microline 182 TTY, high resolution dot-matrix printer delivers utility mode printing, bit image graphics, and other advanced features at 120 CPS in the utility mode and 60 CPS in the enhanced mode. It offers selectable intelligence levels that allow just one printer to handle many applications. In TTY mode, the printer will respond only to carriage return, line feed and form feed commands, preventing extraneous commands from corrupting received data or delaying the printer. In the CRT mode, page formatting commands are added.

OKIDATA, Mt. Laurel, N.J. (609/235-2600)

For information circle Reader Service # 52

Avionic CRT

Family of Avionic Cathode Ray Tubes, for Head-Up Displays and Head-Down Displays, withstands severe vibration and shock encountered in airborne applications. Random vibration levels as high as 0.1 g^2/Hz have been applied to these tubes over the 300-1000 frequency range. High voltage electrostatic focus allows a resolution/brightness of 0.005-in. line width at 13,000-fl, 15 hV operation with P53 phosphor. For Head-Down use, red-yellow-green voltage penetration phosphor is available. Diameters range from 2 in. to 3 in. with deflection angles from 45-deg to 70-deg.

EEV, Elmsford, NY (914/592-6050)

For information circle Reader Service # 64

Miniature LED array

Low cost miniature 5-diode array, LDR 4555, is a 0.09-in. wide, 0.5-in. long, gallium arsenide (red) solid state lamp encapsulated in a red tinted plastic lens (also available in yellow and green). Lamps feature 0.20-in. lead spacing, an average luminous intensity of 0.8 mcd at 10mA, a viewing angle of ± 40-deg and IC compatibility, designed for applications where space is at a premium. Lamps can be stacked together to form lines of multiple lengths. Price: 85¢ per piece (quantities of 5K)

SIEMENS, Iselin, N.J. (201/321-4842)

For information circle Reader Service # 66

Numeric LCD modules

Line of LCD numeric display modules feature:

— 0.7-in. high characters,
— Four and six digit modules,
— Multiplexed interface via 14 conductor ribbon cable,
— Industrial temperature range,
— Single power supply operation,
— CMOS circuitry for low power consumption,
— Battery powered applications, and
— Optional backlighting.

Price: $93 (100 pieces).

OMEGA DIGITAL INC., Valparaiso, FL (904/678-9591)

For information circle Reader Service # 60

Silicone-carbon compound

A low-resistivity, silicone-carbon compound—SC-CONSIL—offers a 2.0 ohm-Cm resistivity for molded parts and 6 ohm-Cm for extruded parts. The compound provides electromagnetic shielding and environmental sealing effectiveness. It offers excellent voltage handling capability for grounding, static discharge, and corona applications, according to results of factory tests.

TECKNIT, Santa Barbara, CA

For information, circle Reader Service #58

Optical coatings

Optically-coated components for Wide Field of View Head-Up Display systems (HUD) prevent solar energy or high-density skylight backgrounds, or both, from impinging on display instruments without inhibiting their visibility. Contrast is enhanced, thus providing better resolution to the observer.

These coatings are optically tuned to a specific wavelength with very narrow optical bandwidths while still providing high transmission over large viewing angles. Transmissions greater than 70% are available over viewing angles in excess of 15 deg. on or off axis, and greater than 50% over much larger angles. Mechanical configurations are usually rectangular or circular with sizes up to 8 in.

MICROCOATINGS INC., Westford, MA (617/692-8140)

For information circle Reader Service #56

Square cathode-ray tubes

Two square cathode-ray tubes designed for aircraft cockpit displays—a 4-in. and a 5-in. model—feature magnetic deflection and electrostatic focus. Both are magnetically shielded, fully potted assemblies, with a high-contrast filter on the faceplate, making them suited for high-contrast cockpit display of video information. Prices: $3,600—5-in. H-1399; and $3,000—4-in. H-1383.

HUGHES IMAGE COMPONENT PRODUCTS, Carlsbad, CA (619/931-3000)

For information, circle Reader Service #54.

Thermal array recorder

AR-14, a compact 50mm thermal array recorder, features three modes of operation, curve smoothing software, 8 × 32 dots per mm resolution, and an injection molded chassis. In the text mode there are 96 ASCII characters, which can be printed both horizontally and vertically. Waveform mode features curve smoothing software. Dot addressable graphics mode allows user to address each of the 384 dots which make up the 48mm width, generating any type of output. A DC input voltage of 22-38 volts is required, enabling the user to contact an unregulated power supply of nominally 30 V. Printer/recorder can operate at speeds from 25mm per hour to 50mm per second. Safety features include internally regulated head voltage, optical sensors, and an 8 dot low frequency. The device is housed in an injection molded, glass filled polycarbonate chassis. Price: $535.

GENERAL SCANNING INC., Watertown, MA (617/924-1010)

For information circle Reader Service # 71

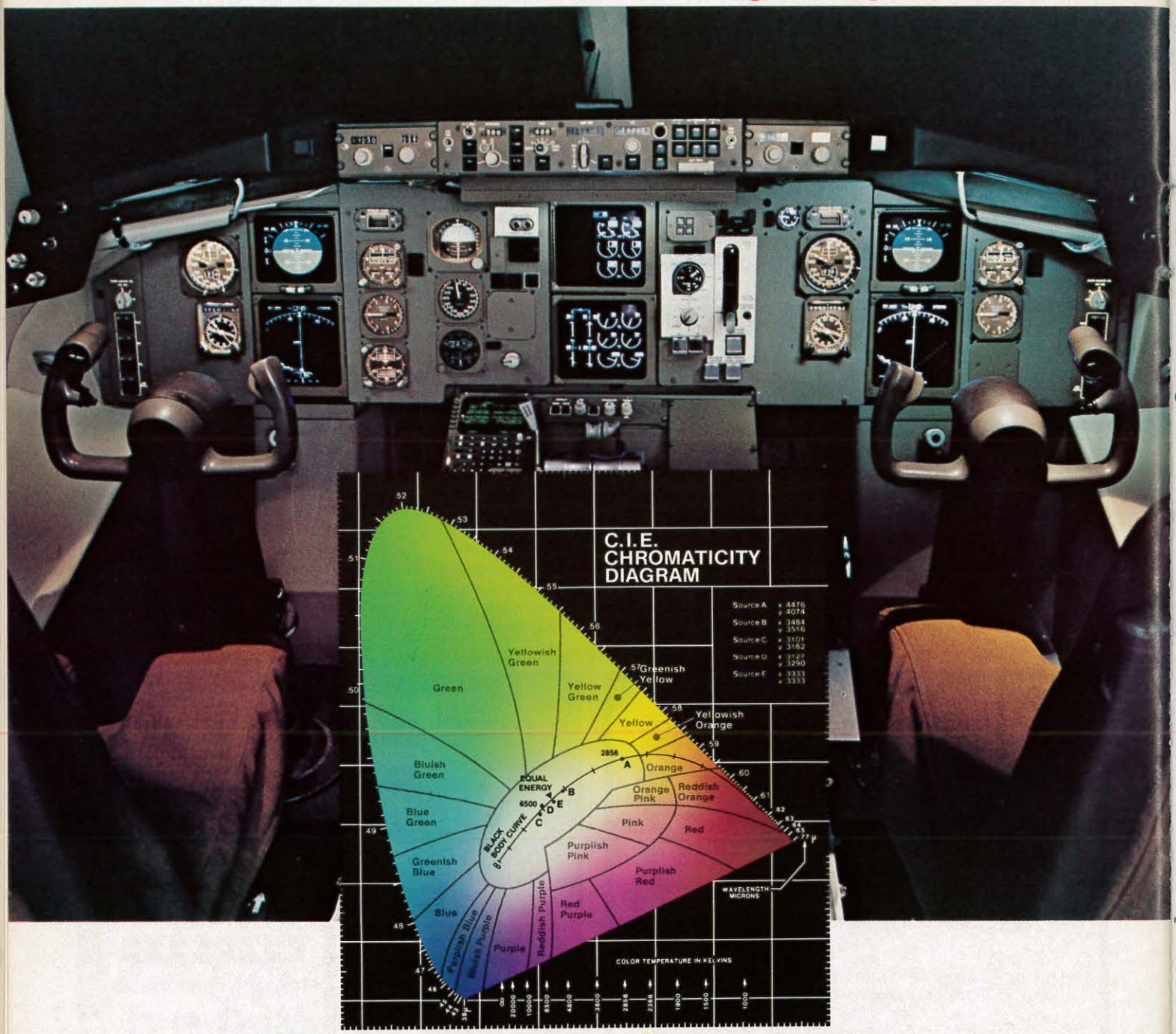
Color plotter

A 36-inch wide format model electrostatic color plotter, CE3236, plots at up to one inch per second (IPS) with a resolution of 200 points per inch (PPI) on paper or film. Features include multi-pass plotting technique, compact size ... 48-inch width, 30-inch depth, low weight (435 pounds), normal operating power of 300 watts, hardware character generator, and manual media cutter. Color plotting software provides for seven colors and 256 pre-defined area colors, with 256 additional area colors that may be defined by the user. Price: $72,200.

VERSATEC, Santa Clara, CA (408/988-2800)

For information circle Reader Service # 72

Do the instruments meet lighting specs?



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For information circle Reader Service #24

NEW LCDs

(. . . continued from p18)

requires a more expensive quartz or special glass substrate (SID'83 Symposium Digest p. 156).

- Panelvision, virtually the sole champion of cadmium selenide TFTs, recently showed a full-page prototype (SID'85 Symposium Digest p. 286).

As alternatives to TFTs, two-terminal threshold devices also are being considered, with expectation that employing a less complex device with no busbar crossovers will result in higher yield and lower cost. Threshold devices, however, demand close tolerances on uniformity as well as higher drive voltages.

Active substrate LCDs are finding their first application in the small screens of personal television receivers—with the Seiko/Epsom pocket color TV having 240x240 polysilicon TFTs spread over a 2.13-in. LCD, the bellwether (SID'83 Symposium Digest p. 156). Seiko has developed a similar smaller version, intended to be the viewfinder on a portable video camera. It incorporates redundant addressing shift register "on chip" in the same polysilicon TFT technology.

Computer displays are a harder target for active substrate LCDs, even though full color grayscale and animation are not immediate requirements. A full-page display, with quadruple the number of picture elements requires a lower defect density, especially because defects are more visible and less tolerable with processing equipment available for the IC industry.

And finally, there are already many competitors in this established market, including comparably priced plasma and electroluminescent displays, and less expensive multiplexed LCDs and CRTs.

(Developed from "The Next Generation of Liquid-Crystal Displays," by Allan R. Kmetz, AT&T Bell Laboratories, Murray Hill, New Jersey. SPSE & IGC - Electronic Imaging '85, International Electronic Imaging Exposition & Conference, October 7-10, 1985, Boston, MA.)

Display journal

Display and Imaging Technology (Vol.1 No. 1—September 1985) carries the subtitle *"An International journal devoted to the science and technology of electronic displays, imaging devices, and recording media."* Edited by G.W. Taylor and J.R. Burns, of Princeton Resources (US), this newest journal for the display industry is distinctly international in scope, containing papers from five nations—both East and West.

USA—In the first paper, an IBM team gives a technology overview of its newest 581 AC plasma display having 960 × 768 pixel capacity. The plasma display contains nearly half a mile of 71-micron thin-film metal electrode lines, the reliability of which can be influenced by a variety of glass-metal interactions. IBM found that these could be favorably affected mostly by reducing the processing temperature. This in turn led to the introduction of new low-temperature seal and dielectric glass materials. From display technology, the paper moves on to discuss such aspects as the effects of physical design parameters on the trade-offs required for good performance at acceptable cost.

CHINA—The second paper describes the basic physical reasons for luminance saturation of vacuum fluorescent displays. Author Ge Shi-chao, of Hangzhou University, China, shows that the main cause is thermal quenching—and applying this theory, has prepared a high luminescent device that saturates at 72,800 cd/m^2.

BULGARIA—A Bulgarian paper explores the role of carrier transport in the photoelectric and electrophotographic properties of CdS binder layers, concluding that it is trap limited. Workers from Moscow and East Berlin describe an electrophotographic process based on the pyroelectric and photovoltaic effects in the polymer polyvinylidene fluoride.

JAPAN—The next paper, from NEC, Japan, moves theory towards application in a discussion of the performance characteristics for an electrochromic display based on simulations and experiments. Cell performance was improved by optimizing parameters using relations derived from this work.

WEST GERMANY—In the final paper, a Freiburg University team discusses a class of materials with new possibilities for display application, liquid crystal side chain polymers. These combine polymer and LC properties enabling realization of the glassy state of polymers without losing the liquid crystalline structure. This allows orientation in the magnetic or electric field to be combined with durable storage of the LC structure by freezing-in the glassy state. The materials are easy to handle and can be produced in large sizes.

SID members are well represented on the Editorial Advisory Board. A quick glance through the lengthy list turned up Infante, Lakatos, Sherr, Pleshko, Schlam, and Tannas, of the US; Suntola, Schadt, and Martin, of Europe.

Finally, one might ponder at the chances a new displays journal might have for survival. Jan Rajchman, in his foreword, is clearly optimistic "the field is so important and so dynamic that a new forum for detailed original contributions and timely reviews will provide another useful perspective and may also bring to light otherwise ignored contributions." We wish the new venture every success.

For further details, contact: Gordon and Breach, Science Publishers Ltd., % STBS Ltd., One Bedford St., London WC2E 9PP.

(Derek Washington is Secretary of the newly formed SID UK & Ireland Chapter.)

by Derek Washington Principal Engineer Philips Research Labs Redhill, Surrey, UK

President's Message

SOCIETY FOR INFORMATION DISPLAY
8055 West Manchester Avenue-Suite 615
Playa Del Rey, CA 90293 - 213/305-1502

In reviewing the various Chapter activities that were listed in Chapter Notes during the past year, I was both impressed and disheartened: Impressed over the diversity and quality of subject matter presented by SID members and their invited guests; disheartened over the failure of some Chapters to share their experiences with us SIDers not fortunate enough to have been able to attend a particular Chapter meeting or function.

The tally for 1985 shows:

Chapters	Meetings listed in Chapter Notes
BA	Jan, Feb, Jun, Jul, Dec
DV	Feb, Apr, Dec
JA	Jan, Oct
LA	Jan, Feb, Mar, Apr, Nov, Dec
MA	Feb, Jun, Jul, Aug, Nov, Dec
MW	— — — — — —
MSP	Jan, Feb, Mar, Apr, Jun, Nov, Dec
NE	Jan,
SD	Feb, Jun
UKI	May, Jun, Jul, Aug, Oct, Dec

Regular Chapter meetings provide an opportunity for on-going dialogue among members at the local level that bridges the months between the Society's two annual events (SID Symposium and IDR Conference) at the national level. While listing your particular Chapter's functions in the Society Journal on a regular basis is in no way compulsory, it nevertheless should command high priority when it comes to scheduling Chapter activities.

During the coming year, I look forward to seeing the Chapter Notes section expand to two full pages in each issue of ID. This means that every Chapter will have to submit, at the very least, an announcement of upcoming events, or a review of a recently concluded activity—every issue. Additionally, announcements concerning individual SID member activities, their career advances or appointments, professional awards, presentation of papers, authorship of books, and so forth, should also be shared with other members through this section of your Journal.

Chapter Notes is YOUR forum for exchanging information about what you and your fellow SIDers are doing in the Information Display industry. Use it accordingly. . .and frequently.

And, in line with sharing such information with others in our Society, your guest speakers at these monthly encounters should be encouraged to submit papers, or at least notes, on their presentations for consideration as possible articles to be developed in future issues of ID.

To assure your information will be more timely when it is published, please send all material directly to the Editor, Information Display, 310 East 44th Street, New York, NY 10017. And, if it is an announcement of upcoming events, make sure you submit it at least three months before the scheduled date.

I-fay Chang

Los Angeles: December 4, 1985
Program: Technical meeting
Topic: Everything a Display Engineer Wants to Know About Satellite Television
Speakers: Erwin Ulbrich, President, CALSAT (California Satellite Television)

Ulbrich, Charter SID member, founder of the Journal and the SID Proceedings, President of SID in 1976, presented an enlightening discussion on satellites in orbit and their geometry, legality and coding, networks and superstations, projection and HDTV considerations, block down and image down conversion, terrestrial interference and filters, and capitalism and market trends. Erwin also explained to attendees how to put their own systems together, working with two portable systems he brought along for a hands-on demo. Erwin has agreed to give a repeat presentation sometime early in February for those of you who missed the first go-around.

Mid-Atlantic: November 14, 1985
Program: Technical meeting
Topic: IDRC Panel Critique
Moderator: A. Kmetz, AT&T
Panelists: W. Howard, IBM
P. Ngo, Bellcore
E. Schlam, US Army
P. Seats, Thomson CFS

Japan Chapter: *Chairman S. Kobayashi with Chapter officials and attendees at Chapter Technical Meeting, November 13, 1985. From left to right, back row: M. Fukushima, A. Araki, Y. Tohyama, F. Saito, M. Yoshiyama, H. Uchiike, K. Kurehashi, T. Kojima, T. Uchida, H. Hori (Treasurer); front row: C. Suzuki (Vice Chairman), K. Miyaji, S. Kobayashi (Chairman), S. Mikoshiba (Secretary).*

Japan: November 13, 1985
Program: Technical meeting
Topic: Display Researches in US
Speaker: T. Uchida, Tohoku University

Uchida reported on recent progress in display devices, as presented at the 1985 International Display Research Conference held in San Diego, CA, October 15-17. Included in his presentation was his evaluation of various display devices.

Topic: Impressions of Tsukuba Science Exposition
Speaker: T. Kojima, NHK

Mr. Kojima presented his impressions of Tsukuba Expo, among them that movie was still much better than existing large screen displays.

UK & Ireland Chapter: *SID President Dr. Ifay Chang with Chapter officials and speakers at the inaugural Chapter meeting in London, June 5, 1985. From left to right: Alfred Woodhead (Chapter Representative in Europe & Speaker), Cees Gerritsma (European Committee), Bill Crossland (Speaker), Harry Ellis (Newsletter Editor), Dr. Ifay Chang, Derek Washington (Secretary), Mino Green (Chairman), Aaron Vecht (Speaker), Barbara Needham (Treasurer & Membership Secretary), Cyril Hilsum (Keynote Speaker).*

Los Angeles: November 1985
Program: Technical meeting
Topic: Flat Panel Technology
Speakers: Paul Smith, Mgr., Babcock Dislay Products
Dick Ketchpel, Rockwell
Larry Tannas, Rockwell
Dr. Larry Weber, Univ. of IL

Smith gave an overview of vacuum fluorescent display products; Ketchpel reported on the state of the EL panel art; Tannas gave an informative (and awe-inspiring) report on the advances made by Japanese companies in active matrix liquid crystal flat panel displays; and Weber not only reviewed the state of plasma panel art, but also topped this with a world premiere presentation of a unique approach to plasma panel construction that promises to reduce substantially the number of drivers (and therefore the cost) of plasma panels. Even the die-hard CRT guys walked away impressed.

CHAPTER MEETINGS CALENDAR

FEBRUARY 11: Mid-Atlantic Chapter
Place: Thomson CFS/Dumont, Dover, NJ.
Speaker: Andre Martin

FEBRUARY (last week): UK & Ireland Chapter
Place: Thorn EMI
Program: Large-area displays

MARCH 13: Mid-Atlantic Chapter
Place: Crawdaddy Restaurant, New York City
Program: Image Processing
Speaker: A.N. Netravalli, ATT-BTL

APRIL 9: Mid-Atlantic Chapter
Place: Crawdaddy Restaurant, New York City
Program: Personal Computer Smectic LCD Viewgraphs
Speaker: Frank Astorino, ITT

(This quick-glance calendar is intended to help SIDers plan their business trips around local Chapter meetings—but to make it work it will require your input of advance notice for upcoming meetings.)

New SID Members

We extend a sincere welcome to these newest SID members:

Bay Area Chapter

Chao, Min-Hung
Sect. Mgr.
Kaiser Electronics

Friend, Thomas
Design Engineer
Spacelabs Inc.

Hu, George
Engineering Design Mgr.
ERSCO - ITRI Co.

Hylton, Thomas
Vancouver BC

Lee, Soo Y.
Material Scientist
Tektronix

Vye, Michael
Manager
A. Windsor Co.

Washington DC Chapter

Emmett, M. David
Div. President
SECOM Gen. Corp.
Potter Light Div.

McMichael, Allen E.
Sr. Scientist
Science Applications/
International Corp.

Delaware Valley Chapter

Catalano, Anthony
Sr. Mgr. Development
& Materials
SOLAREX

Europe Chapter

Case, David A.
Product Mgr.
NCR GmbH

Maltese, Paolo
Prof. Microelectronics
University of Rome

Japan Chapter

Kobayashi, Marato
Staff Engineer
Yokosuka Elec.
Comm. Lab, NIT

Munezawa, Takuro
Dept. Mgr.
Planning & Development
Ajinomoto Co. Inc.

Nishi, Dr. Shin-Ichi
Res. Assoc.
Tech. Machines Div.
Konishiroku Photo Ind.

Nozawa, Toshio
DEN-EI, Inc.

Toshimitsu, Konuma
Engineer
Semiconductor Energy
Lab Co., Inc.

Los Angeles Chapter

Bill, Lawrence W.
Sigmatron Nova

Brady, Walter H.
Dir. Operations
Babcock Display Prod.

da Silva, Timothy
President
Sigmatron Nova

Gangopadhya, Robin
Sigmatron Nova

Gurnufson, Morris
Engineer
EG&G Gamma Scientific

Heimanson, Dorian
Sigmatron Nova

Lessman, Gerhard
Sedona Inc.

Moffitt, Kirk W.
Sr. Scientist
Anacapa Sciences Inc.

Panicker, M.P.R.
Sigmatron Nova

Mid-Atlantic Chapter

Allan, Dr. Frank
EM Industries

Feiman, Stephen
EM Industries

Feiman, Jeanne
EM Industries

Kirchgaessner, H.P.
EM Industries

Nosker, Dr. Richard W.
Fellow Tech. Staff
RCA Laboratories

O'Toole, Austin

Samuels, James V.
Sr. Engineer
Princeton Graphic Systems

Sanders, Barbara
Student
NYU

Wilcox, Dr. C.R.P.
EM Industries

Midwest Chapter

Blazek, John H.
Mgr. Product Development
McDonnell Douglas
Electronics Co.

Berg, Robert H.
President
Particle Data Inc.

Holycross, Mark E.
Development Specialist
Mead Imaging

Pfisterer, Richard
Electronic Eng. Mgr.
Total Control Product

Rozploch, Robert A.
Elec. Engr. - R&D
The Standard Oil Co.

Stein, Richard A.
President
S&S Optical Co. Inc.

Southwest Chapter

Mosier, Dale M.
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512 x 512	60, 64, 73, 83
512 x 1024	60
1024 x 1024	60, 73, 83
1200 x 1600	50.8, 101

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For Further Information, Contact:

Donald K. Wedding Sr., VP Marketing Photonics Technology, Inc., P.O. Box 432, Luckey, Ohio 43443, 419-666-0033.
Research, Development, and Manufacturing facilities located at 6967 Wales Road, Northwood, Ohio 43619.

For information circle Reader-Service # 22

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San Jose, CA 95131
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Hoya Optics Inc.
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Fremont, CA 94538-6138
415/490-1880

Hughes Aircraft Co.
P.O. Box 1042
ElSegundo, CA 90245
818/391-0711

Hycom Inc.
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Irvine, CA 92714
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IBM Corp.
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914/765-1900

Imapro, Inc.
West Royalty Industrial Park
Charlottetown, Prince Edward Is.
Canada C1E 1B0
902/892-8594

Industrial Electronic
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818/787-0311

Interstate Electronics Corp.
Display Product Operations
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ISE Electronics Corp.
P.O. Box 46
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0596/39-1111

K & R Engrg. Sales Corp.
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219/429-5263

Magnetic Radiation Inc.
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312/437-5200

Micro-Curl
Display Technology Inc.
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Santa Rosa, CA 95407-7397
707/545-6440

Optical Radiation Corp.
1300 Optical Dr.
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Orwin Associates Inc.
88 Seabro Ave.
Amityville, NY 11701
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Ovonic Display System Inc.
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Planar Systems Inc.
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503/625-2006

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and Microwave Ltd.
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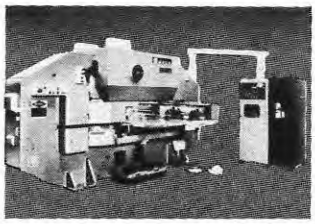

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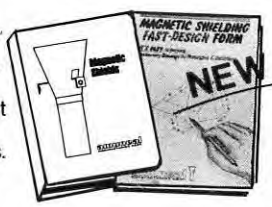

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