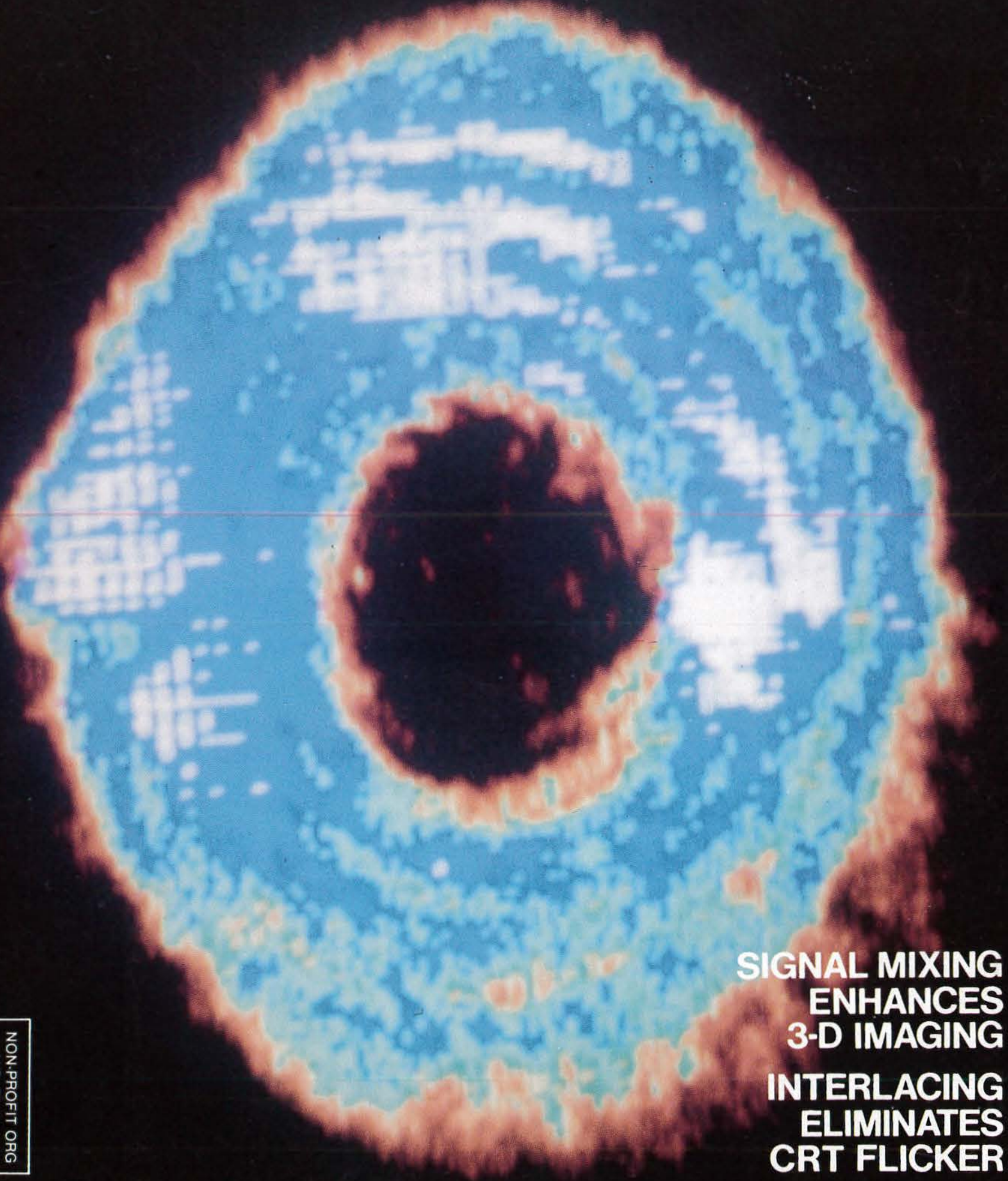
THE OFFICIAL JOURNAL OF THE SOCIETY FOR INFORMATION DISPLAY

INFORMATION DISPLAY

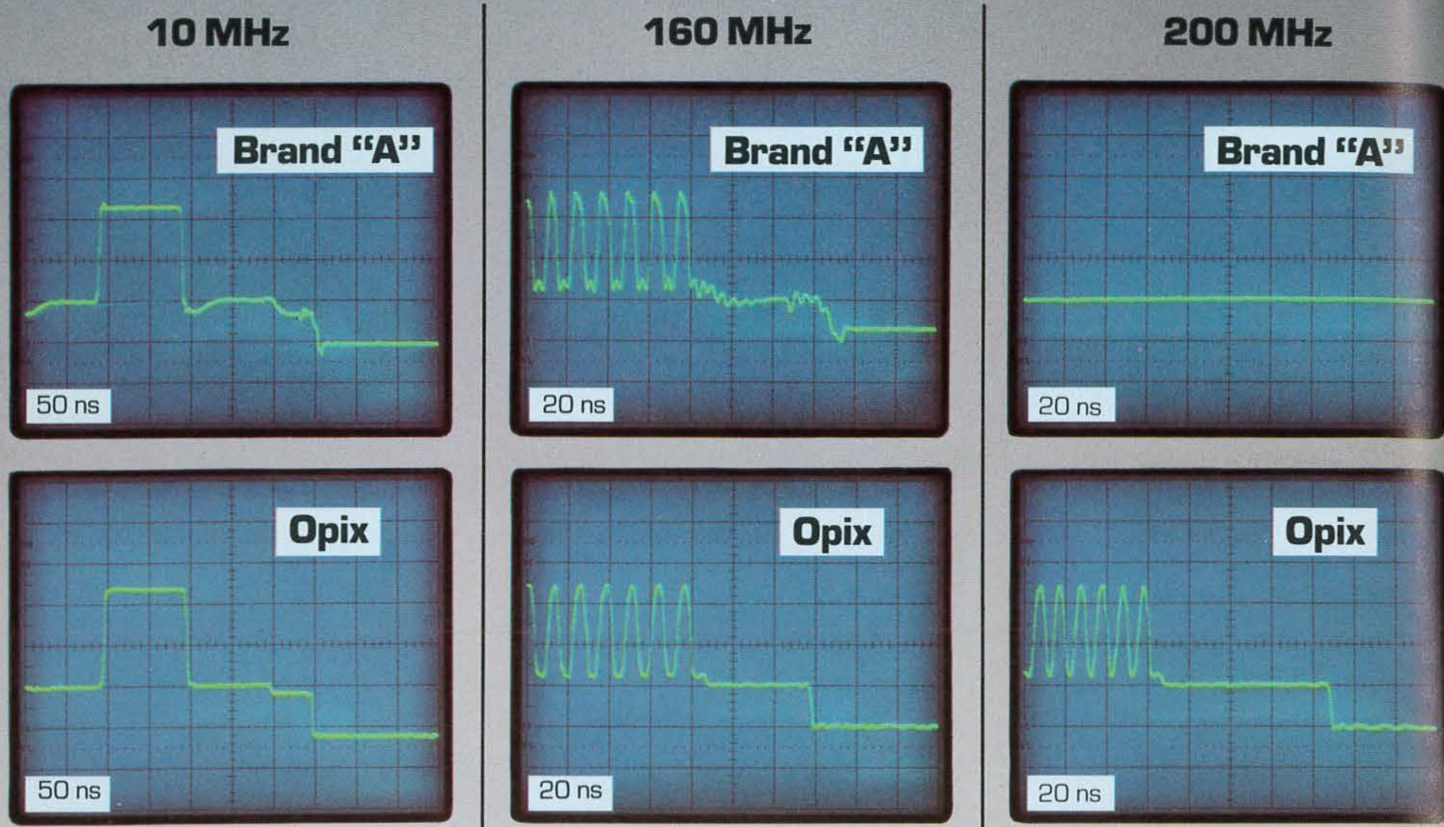
AUGUST 1986



SIGNAL MIXING ENHANCES 3-D IMAGING

INTERLACING ELIMINATES CRT FLICKER

NON-PROFIT ORG
U.S. Postage
PAID
Permit No. 324
Framingham, MA



All illustrations are unretouched photographs taken from a Tektronix Oscilloscope screen (Model 7854)

COMPARE SIGNALS AND YOU'LL SEE WHY THE OPIX VIDEO SIGNAL GENERATOR IS THE BEST THERE IS.

The OPIX™ Imager:

- 200 MHz analog
- 256 colors or gray scales
- Standard or user-defined patterns
- Battery backed-up memory

The test tool you choose for video correlation has to be better than the product you're testing. With signal generators, the proof of performance is the signal each produces.

In this oscilloscope comparison of two generators, the OPIX™ Imager on the bottom easily delivers cleaner, sharper waveforms at 10, 160 and 200 Megapixels per second—and everywhere in between. The Brand "A" generator doesn't even produce a signal at 200 MHz.

The slower rise time, ringing, poor step recovery, and overshoot you get with an inaccurate generator creates color bleeding and other correlation problems with your finished CRT products. That's why we designed OPIX to be an extremely accurate instrument, first and foremost. But, we didn't stop there.

OPIX carries built-in Instant-Expert™ test patterns that allow anyone to perform sophisticated video tests from day one. Or, you can easily design your own. Then save your best tests with battery backed-up internal memory or on disk. With disk, you can transfer test data around the plant, or around the world.

Why settle for less than the most accurate signal generation? Buy the OPIX Imager and bring your video testing to a point of performance you can trust.

For technical data, or a hands-on demonstration contact: Quantum Data, 455 E. Kehoe, Carol Stream, IL 60188. Telephone: 312-668-3301. TELEX 206725

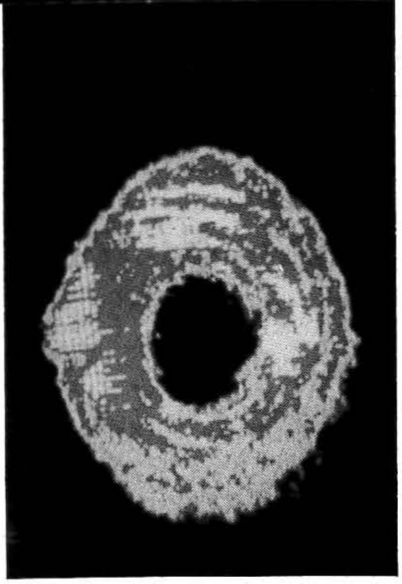
See us at SIGGRAPH '86 BOOTH #252

QUANTUM DATA®

THE OFFICIAL JOURNAL OF THE SOCIETY FOR INFORMATION DISPLAY

INFORMATION DISPLAY

AUGUST 1986 VOL. 2 NO. 8



Cover picture: Pseudocolor representation of the energy intensity distribution for a pulsed laser beam was generated by a commercial video graphics processing system coupled with a minicomputer and displayed on a color monitor in real time. The computer performs analytical measurements in 2-D on the beam shape and size, as well as on the pulse timing properties of the laser.—F.Martin and J.G. Willman, Western Div., GTE Government Systems, Mountain View, CA.

FEATURES

afips
American Federation of Information Processing Societies

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.

◄ Circle Reader Service #1

Events

NATIONAL

AUGUST 17-22: 30th Annual International Technical Symposium on Optical and Optoelectronic Engineering, Town and Country Hotel, San Diego, CA. Sponsored by The International Society for Optical Engineering (SPIE). Contact: SPIE, PO Box 10, Bellingham, WA 98227-0010 (206/676-3290)

AUGUST 18-22: ACM SIGGRAPH '86, Dallas, TX. Sponsored by Association for Computing Machinery/ Special Interest Group Graphics (ACM SIGGRAPH). Contact: ACM, 11 West 42nd Street, New York, NY 10036 (212/869-7440)

AUGUST 24-28: 3rd International Congress on Advances in Non-Impact Printing Technologies, The Fairmont Hotel, San Francisco, CA. Sponsored by Society of Photographic Scientists and Engineers and the Society for Imaging Science and Technology. Contact: Executive Director, SPSE, 7003 Kilworth Lane, Springfield, VA 22151 (703/642-9090)

SEPTEMBER 8-10: NCC Telecommunications, Philadelphia, PA. Contact: AFIPS, 1899 Preston White Drive, Reston, VA 22091 (703/620-8900)

SEPTEMBER 14-20: FIBER LASE '86—Technical Conference on Fiber Optics, Optoelectronics, and Laser Applications in Science and Engineering, Hyatt Regency Cambridge, Cambridge, MA. Contact: SPIE International Society for Optical Engineering, PO Box 10, Bellingham, WA 98227-0010 (206/676-3290)

SEPTEMBER 15-19: IEEE Computer Society Tutorial Week, Boston '86. Contact: Tutorial Week Boston '86, IEEE Computer Society, 1730 Massachusetts Avenue, NW, Washington, DC 20036-1903 (202/ 371-0101)

SEPTEMBER 15-19: Laser Safety—Inspection & Control, Cincinnati, OH. Short-course: Laser Institute of America. Fee: $900. Contact: Education Director, LIA, 5151 Monroe St.—Ste102W, Toledo, OH 43623. (419/882-8706)

SEPTEMBER 16-18: IEEE International Symposium on Electromagnetic Compatibility, Town and Country Hotel, San Diego, CA. Contact: H.K. Mertel, EMACO Inc., 7562 Trade Street, San Diego, CA 92121 (619/578-1480)

SEPTEMBER 23-24: Electronics and Aerospace Systems Conference—EASCON '86. Shoreham Hotel, Washington, DC. Contact: Dr. Arvid G. Larson, Vice President, Analytic Disciplines Inc., Suite 400, 2070 Chain Bridge Road, Vienna, VA 22180 (703/893-6140)

SEPTEMBER 23-24: NEPCON Southwest, Dallas, TX. Contact: Janet Schafer, Show Mgr., Cahners Exposition Group, Cahners Plaza, 1350 E. Touhy Avenue, PO Box 5060, Des Plaines, IL 60017-5060 (312/299-9311)

SEPTEMBER 28 - OCTOBER 2: ASIS '86, Chicago, IL. Contact : American Society for Information Science, 1010 Sixteenth Street, NW, Washington, DC 20036 (202/659-3644)

SEPTEMBER 28 - OCTOBER 2: 49th Annual Meeting of the American Society for Information Science, Chicago Hilton Hotel, Chicago, IL. contact: ASIS, 1424 16th St. NW, Washington, DC 20036. (202/462-1000)

SEPTEMBER 28 - OCTOBER 3: International Industrial Electronics Conference—IECON '86, Hyatt Regency Hotel, Milwaukee, WI. Contact: Dr. Richard C. Born, Rexnord Inc., 5101 West Beloit Road, Milwaukee, WI 53214 (414/543-2704)

SEPTEMBER 28 - OCTOBER 3: 1986 Applied Superconductivity Conference, Hyatt Regency—On the Harbor, Baltimore, MD. Contact: Lahni N. Blohm, Executive Administrator, ASC86, Code 6630C, Naval Research Laboratory, Washington, DC 20375 (202/767-3246)

SEPTEMBER 29 - OCTOBER 3: The 30th Annual Meeting of the Human Factors Society, Dayton Convention Center, Dayton, OH. Contact: HFS-86, PO Box 31190, Dayton, OH 45431-0190.

SEPTEMBER 29 - OCTOBER 3: Fundamentals & Applications of Lasers, Hilton Head, SC. Short-course: Laser Institute of America. Fee: $900. Contact: See above, LIA SEPTEMBER 15-19.

Westinghouse CRT's have the durability and dependability to explore outer space or inner earth.

Whatever your requirements for display or recording systems, Westinghouse can build a CRT to meet them. For more than 30 years, we've used our design expertise to build durable, dependable CRT's for a wide range of applications including:

- Heads-up display
- Energy exploration
- Air traffic control
- Military monitor displays
- Phototypesetting
- Large screen projection systems
- Microfilm systems
- Medical & X-Ray
- Color recording
- Multi-function heads-down display

For solving your CRT display or recording application problems, look to Westinghouse. Call or write Westinghouse, Industrial and Government Tube Division, Horseheads, NY 14845. (607) 796-3350.

You can be sure... if it's Westinghouse

Circle Reader Service #2

"When a thing ceases to be a subject of controversy, it ceases to be a subject of interest . . ."
—William Hazlitt

Live displays of the three-day-long extravaganza celebrating July 4 and the centennial of the Statue of Liberty on television screens around the world attested to this country's technological prowess in electronic imaging, communications and display.

What was not so evident in the viewing of the stately "tall ships" and spectacular fireworks displays, however, was the substantial worldwide market share lost by US manufacturers of electronic devices over the past five years or so—from 64% in 1980 to under 53% in 1985.

According to the recently released National Research Council Report*—Advanced Processing of Electronic Materials in the United States and Japan—"although the semiconductor market will continue to grow toward $50 billion by 1990, the downward trend in the US share is unlikely to be reversed any time soon."

While the report goes on to identify and describe seven key technologies in which the US already lags behind Japan, its main competitor, the principal message of the report is that the US electronics industry needs a new R&D philosophy. The traditional American R&D strategy that relies on the combined efforts of industrial laboratories to provide short-term product development, government laboratories to concentrate on mission-oriented projects, and university laboratories to examine phenomena that may have no immediate applications in either sphere is no longer practical for competitive survival.

Analyzing a series of successful multi-year R&D programs undertaken by Japanese companies guided by their government's Ministry of International Trade and Industry, the report urges the establishment of mechanisms to encourage the US electronics industry to make a long-term commitment to research and development; and to be intimately involved with the government laboratories.

The message is only too clear.

Industry, government, and academia must work together and find a way to fill the gap between short-term development and long-range research—if the current trend is ever to be reversed.

Joseph A. MacDonald
Editorial Director

*Available from The National Materials Advisory Board, 2101 Constitution Avenue NW, Washington, DC 20418

EDITORIAL STAFF

Joseph A. MacDonald
Editorial Director

William W. Jacobus, Jr.
Contributing Editor

Lee Harrison
Associate Editor

Stewart Scharf
Assistant Editor

Ted Lucas
Editorial Consultant

Dianne Zechman
Art Consultant

For editorial information call: 212/687-3836

EDITORIAL ADVISORY BOARD

Dr. Ifay F. Chang
Chairman
Director of Research
Institute of Systems Science
National University of Singapore

Dr. Frederick J. Kahn
Vice President
Greyhawk Systems Inc.

Koh-Ichi Miyaji
Professor
Shibaura Institute of Technology

Jan Rajchman
Consultant

Aron Vecht
Director
Phosphor Products Co.

For membership information call: 213/305-1502

INFORMATION DISPLAY (ISSN 0362-0972) is published monthly by MetaData Inc., 310 East 44 Street, New York, NY 10017, Telephone: 212/687-3836

Subscription: US & Canada - $36 one year, $64 two years, $90 three years; Elsewhere - $72 one year, $128 two years, $180 three years. Single copy: US & Canada - $3.00; Elsewhere - $6.00.

Permission is granted by the copyright owner for libraries and others registered with the Copyright Clearance Center (CCC) to photocopy any article herein for the flat fee of $2.00 per copy of each article. This permission to photocopy does not extend to any special reports or lists published in this magazine. Payment should be sent directly to the Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Copying done for other than personal or internal reference use—such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale—without the written permission of The Society for Information Display is prohibited. Requests for special permission or bulk orders should be addressed to The Society for Information Display, 8055 West Manchester Avenue, Suite 615, Playa Del Rey, CA 90293. Serial-free code: 0362-0972/85 $2.00 + $0.00.

Copyright © 1986 The Society for Information Display.

Events

SEPTEMBER 30 - OCTOBER 3: WESCON—Western Electronic Show & Convention, Los Angeles, CA. Contact: Dale Litherland, Electronics Conventions Inc., 8110 Airport Blvd., Los Angeles, CA 90045 (213/772-2965)

INTERNATIONAL

AUGUST 20-22: 1986 International Conference on Solid State Devices and Materials, Tokyo Prince Hotel, Tokyo, Japan. Contact: Prof. Takuo Sugano, Dept. of Electrical Engineering, University of Tokyo, Hongo, Bunkyo-ku, Tokyo, 113 Japan. (03/812-2111)

AUGUST 22-23: Human Factors in Motion Expo '86—XIX Annual Meeting of the Human Factors Association of Canada, Vancouver, Canada. Contact: Ulrika Wallersteiner, Ergo Systems Canada, 535 Robin Hood Drive, West Vancouver, BC, Canada V7S-1T1 (604/926-0166)

AUGUST 25-29: 11th International Conference on Computational Linguistics: COLING '86. Sponsored by Association for Computational Linguistics (ACL). Contact: Prof. Makoto Naga, Dept. of Electrical Engineering, Kyoto University, Sakyo-ko, Kyoto, 606, Japan.

AUGUST 27-29: 1986 IEEEC Workshop on Language for Automation, National University of Singapore, Singapore. Contact: Dr. S.E. Chang, Illinois Institute of Technology, Armour College of Engineering, Dept. of Electrical Engineering, Chicago, IL 60616.

SEPTEMBER 1-5: IFIP '86—10th World Computer Congress, Dublin, Ireland. Sponsored by International Federation of Information Processing. Contact: IFIP Congress '86, c/o AFIPS, 1899 Preston White Drive, Reston, VA 22091 (703/620-8900)

SEPTEMBER 7-10: 4th International Conference on Molecular Beam Epitaxy, University of York, England. Contact: B.A. Joyce, Philips Research Laboratories, Redhill, Surrey, England (0283/785544)

SEPTEMBER 8-10: 1986 ACM Conference on Research and Development in Information Retrieval Systems, Pisa, Italy. Sponsored by Consiglio Nationale delle Riceche. Contact: L. Rossi Bernardi, C.N.R. Piazza A. Moro 7, Roma, Italy.

SEPTEMBER 9-12: Second European Simulation Conference, Antwerp, Belgium. Sponsor: Dutch Benelux Simulation Society. Contact: Society for Computer Simulation, % Ghislain C. Vansteenkiste, Prof. of Engineering, University of Ghent, Coupure Links 653, B-9000 Ghent, Belgium. (91-236961 - ext. 400)

SEPTEMBER 10-16: International Congress of Photographic Science 1986 (ICPS), University of Cologne, Cologne, West Germany. Co-sponsored by SPSE and Deutsche Gesellschaft fur Photographie (DGPh). Contact: Executive Director, SPSE, 7003 Kilworth Lane, Springfield, VA 22151

SEPTEMBER 14-18: 43rd Conference and Congress of the International Federation for Documentation, Montreal, Quebec, Canada. Sponsored by the Canada Institute for Scientific and Technical Information of the National Research Council of Canada. Contact: 43rd FID Conference and Congress, C.P. 1144, Succursale Place Desjardins, Montreal, Quebec, Canada H5B 1B3.

SEPTEMBER 15-18: EURO MICRO '86—Twelfth Symposium on Microprocessing and Microprogramming, Venice, Italy, Contact: Fausto Distante, Deputy Conference Organizing Chairman, Politecnico di Milano, Instituto di Electronica, 1-20133 Milano, Italy (39/2-236-7241)

SEPTEMBER 15-20: INTERCOMM '86—The International Communications Exposition & Conference for Science and Technology, Beijing Exposition Center, Beijing, China. Sponsored by the Chinese Association of Science and Technology (CAST) and the China Computer Society (CCS). Contact: INTERCOMM, Cahners Exposition Group, 7315 Wisconsin Avenue, PO Box 70007, Washington, DC 20088 (301/657-3090)

SEPTEMBER 22-25: XII International Symposium on Discharges and Electrical Insulation in Vacuum, Hotel Shoresh, Shoresh, Israel. Contact: Prof. S.

Circle Reader Service #3

Goldsmith, Faculty of Exact Sciences, Tel-Aviv University, Tel-Aviv, Israel (03/420303)

SEPTEMBER 23-26: HCI '86—People and Computers: Designing for Usability, York, England. Sponsored by the British Computer Society. Contact: HCI '86, Conference Dept., The British Computer Society, 13 Mansfield St., London W1M OBP, UK.

SEPTEMBER 23-25: AI EUROPA—Artificial Intelligence and Advanced Computer Technology Conference/Exhibition, Rhein-Main Halle, Wiesbaden, West Germany. Sponsor: Computer Magazin, Expert System User, DM Data, International Directory of AI companies, Applied Artificial Intelligence Report and Society of Computer Simulation. Contact: Tower Conference Management Co., 331 W. Wesley St., Wheaton, IL 60187. (312/668-8100)

SEPTEMBER 30 - OCTOBER 2: Japan Display '86 - 6th International Display Research Conference, Keidanren Kaikan Hotel, Otemachi, Chiyoda-ku, Tokyo, Japan. Contact: Prof. Shunsuke Kobayashi, Dept. of Electronic Engineering, Faculty of Technology, Tokyo University of Agriculture & Technology, 24-16 Nakamachi 2 chome, Koganei City, Tokyo 184, Japan. (0423-81-4221)

OCTOBER 28-30: Electronic Displays, Kensington Exhibition Centre, London, UK. Contact: Tom Webb, British Trade Development Office, 845 Third Avenue, New York, NY 10022 (212/593-2258)

COMING IN OCTOBER

ELECTRONIC IMAGING SHOW ISSUE

Closing Date for Advertising

September 2, 1986

for Product Reviews and Feature Articles

August 18, 1986

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.

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.

NO. 9 IN A SERIES

Panasonic® THE Image Makers

CREATE GRAPHIC EXCELLENCE.

WITH 19" MONOCHROME TUBES

For CAD/CAM graphics applications, our 19" monochrome tube fills the bill with ultra high resolution plus a 2000 x 2000 dot capability. And there's more, including the features shown above.

From Panasonic...the Image Makers. For more information, contact: Panasonic Industrial Company, Computer Components Division, One Panasonic Way, Secaucus, NJ 07094. Mail Stop 4B5. (201) 348-5278.

Panasonic
Industrial Company

Circle Reader Service #4

Industry News

Master Index speeds database referencing

A single, comprehensive Master Index now contains information on over 250,000 products, including military, federal and industry specifications, standards, codes and testing methods. Available on-line and in hard-copy format, Master Index listings not only provide document film/fiche locations but also often suggest alternative products to research and give supportive documentation from other sources. All pertinent databases — Industry Standards, Vendor Selector, Defense Specifications, and Construction Regulations — are cross-referenced under both product name and document number.
INFORMATION MARKETING INTERNATIONAL, Oak Park, MI 48237 (800/821-8612)

Circle Reader Service #32

Standards permit moving information between systems

A recently approved Dept. of Commerce standard for the federal government promises to make it easier to interchange videotext and teletext information. The standard describes how to encode alphanumeric text and pictorial information for moving information between different processing and communications systems.

The National Bureau of Standards helped develop the voluntary industry standard used in both the US and Canada (American National Standard X3.110-1985/Canadian Standard T500-1983), and has also developed test methods that the industry can use to ensure the standard is being implemented correctly.

To order a copy of the standard, refer to Federal Information Processing Standard (FIPS) 121: Videotext/Teletext Presentation Level Protocol Syntax (North America PLPS). Contact: Jan Kosko (301/921-3181).
NATIONAL TECHNICAL INFORMATION SERVICE, Springfield, VA 22161.

Non-impact printer advances updated in quarterly report

A quarterly update on non-impact printer technologies covers advances in the field as reported in significant conference papers, technical articles, new patent issues, and new product introductions for various printers: ink-jet/ink-drop, thermal/thermal transfer, electrographic, electrophotographic, and magnetic.

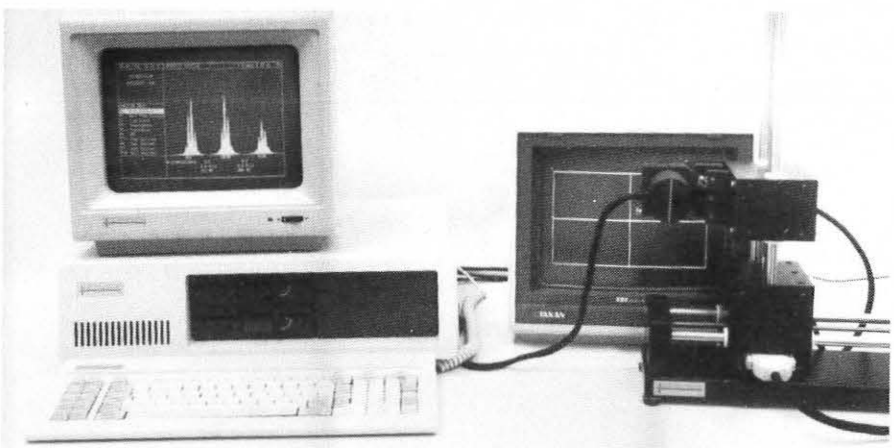
A European supplement to the Quarterly Update provides abstracts of New Patent Applications Published and New Patents Granted in the field of non-impact printers by the European Patent Office. *First Quarter 1986 Update on Non-Impact Printing.* Price: $650.
ADVANCED TECHNOLOGY RESOURCES CORP., El Dorado, CA (916/626-4104)

Research center established for fiber/electro-optics

Virginia Polytechnic Institute and State University received a $200,000 award from the Center of Innovative Technology (CIT) towards the establishment of a research "center for excellence" in fiber and electro optics.

The CIT award, which will be used to create an optical fiber fabrication facility on the campus, has led to some $2 million in total initial support pledged to the new center by the CIT, Virginia Tech, and industry firms with a stake in optical technology, according

"TOTAL CONCEPT"



Automatic, direct convergence measurements on CRTs are now possible with the SUPERSPOT 100. Line width, MTF and many more CRT measurements are made accurately and in real time with data logging, profile plotting, as well as real time adjustment of convergence and focus.

Designed specifically for the CRT industry—in both the laboratory and production environment—the SUPERSPOT 100 provides you, for the first time, with the tools needed to make creative measurements on color/monochrome CRTs.

To complete the package, MICROVISION has also introduced the SPOTSEEKER line of motor driven positioning systems. These allow the optic probe for the SUPERSPOT 100 to be positioned to any coordinate on a CRT via a joystick control, or under fully automatic computer control. Measurements such as pincushion, convergence, MTF or focus can now be made in a fully automatic mode at any position on the CRT. Call or write now for more information.

MICROVISION, 4855 Atherton Avenue, #201, San Jose, CA 95130, (408) 374-3158

Circle Reader Service #5

to *Optical Engineering Reports.* Industry support in future years, says the report, will be matched on a dollar-for-dollar basis up to $500,000 each year by the CIT.

According to Dr. Richard O. Claus, Virginia Tech professor of electrical engineering, the program will support "research development and instructional needs of fiber and electro-optics industries in a region from Roanoke to northern North Carolina." This region has been dubbed "Silica Valley," in reference to the material silica, used to manufacture glass, which is the main component of optical fibers.

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, VA (703/961-7203)

Fiber-optics, lasers topics of multi-conferences

Five multi-conference programs on fiber-optics, optoelectronics, and laser applications in science and engineering are scheduled for September 14-26, 1986, at the Hyatt Regency, in Cambridge, MA.

Sponsored by SPIE (The International Society for Optical Engineering), Fiber/LASE '86 is a two-week program that includes, in addition to the technical conference sessions, tutorial educational program, engineering update courses, and technical instrument exhibit. Twenty-five conferences are scheduled in the five programs:

- Sept. 14-20
  - Fibers and Lasers in Medicine (3)
  - Photonics and Optoelectronics (5)
  - Optoelectronics for Computers (3)
  - Lasers (3)
- Sept. 21-26
  - Fiber Optics (11)

SID member Elliott Schlam (US Army Electronics Research & Development Command) is chairman of the Computer Display Technology Conference.

SPIE, PO Box 10, Bellingham, WA 98227-0010 (206/676-3290)

VDT bibliography is international in scope

Visual Display Terminals: A Bibliography (Bildschirmarbeitsplaetze: Eine Bibliographie)
by Siegfried Grune
Saur, Munich, New York — 1985
456 pages, $30.00

A comprehensive bibliography on visual display terminals presents over 3,000 references (from 25 countries), including articles, monographs, and bibliographies listed alphabetically under the following subject headings:

- Basic ergonomic aspects with special reference to human-machine interaction
- Studies of the relationship between humans and computers
- Comprehensive descriptions of work with VDTs
- Technical aspects and design of the various parts of the hardware
- Microfiche and microfilm readers
- Ergonomic design of furniture and environments
- Medical and physiological aspects of work with VDTs
- Social aspects of work with VDTs, organization and content of VDT workstations
- Legal aspects of work with VDTs
- Norms, rules, and regulations for VDT workstations.

An 80-page author and title index, plus an eight-page code register on the report literature, is included.

F.G. SAUR, 175 Fifth Ave., New York, NY 10010 (212/982-1302)

Enhanced LCDs to lead flat panel market growth

Spurred by the use of enhanced LCDs in new products and applications, the worldwide market for flat panel devices is expected to grow from $126 million in 1986 to $3.758 billion by 1992, according to a recent report by Stanford Resources Inc.

Enhanced LCDs use a thin-film semiconductor device at each element (pixel) in the display to overcome a number of current shortcomings with multiplexed LCDs. Major improvements have been demonstrated in readability and appearance, viewing angle, contrast ratio, display response time, and color capabilities. *Flat Panel Displays: The Impact of Enhanced-LCDs on the Market for High Information Content Displays.* Price: $2,450.

INTERNATIONAL PLANNING INFORMATION INC., Menlo Park, CA (415/364-9060)

Silicon Compilers Inc., San Jose, CA, has established its first authorized engineering center in Japan to design complete, custom, very large-scale integrated (VLSI) circuits using Silicon Compiler's Genesil silicon development system. Under the agreement, Soliton Systems K.K., Tokyo, will offer design-center services and user training.

YOUR MAGNETIC SHIELDING PROBLEMS END HERE

Save tooling costs—Ad-Vance already owns tooling for most standard shields. Our problem solving magnetic shielding specialists will adapt or custom design exactly what you need.


AD-MU foils cut, wrap easily, quickly

- Magnetic shields for 324 types of PM tubes
- AD-MU sheet stock
- AD-MU protective cases assure full fidelity of valuable taped data
- Helpful engineering & design service
- Painstaking in-house quality control.

Now—4 decades of magnetic shielding leadership. Your magnetic shielding problems end here at Ad-Vance.


Typical fabricated shields for components and systems




Completely modern mfg. facilities

Gives major designing/procuring guidelines, 2/3 of 84-page book contains valuable technical/engineering information about the entire magnetic shielding field; 1/3 is catalog data. Yours for the asking.

AD-VANCE MAGNETICS, INC.

AD-Vance Shielding: The "Nickel's" Worth
625 Monroe Street, Rochester, Indiana 46975
(219) 223-3158 TWX 810-290-0294

Circle Reader Service #6

Signal mixing enhances 3-D imaging procedure

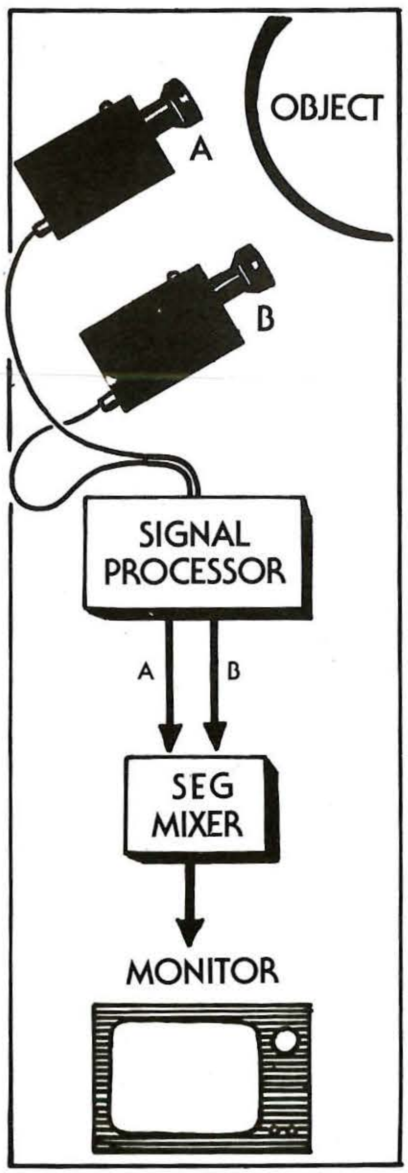
By combining parallax information from two vertically displaced cameras into a single video signal, researchers at the University of South Carolina (Columbia, SC) recently successfully produced 3-D presentations of video images and computer-generated graphics having enhanced depth. The images can be scaled accurately in all three dimensions and can be viewed directly without the use of special glasses or monitors.

The sequential, or time-displaced, views that result in the true 3-D quality of graphics produced by this method, however, create a slight rocking motion in the image that can be distracting to the viewer. The greater the angle between the perspective pairs, the more disturbing the rocking motion is to the viewer. But, by applying certain factors to the time-displaced procedure, the researchers found that it was possible to reduce the rocking motion significantly.

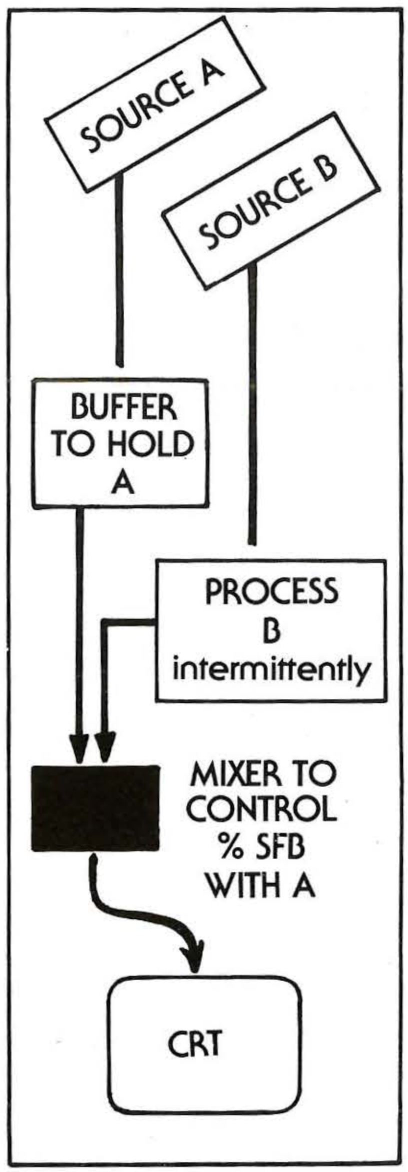
Basically, this image enhancement procedure consists of allowing the image from one source (signal A) to serve as a continuous reference, and to allow the second source (signal B) to be mixed with signal A at a constant rate. Thus, a portion of signal A is always present and signal B becomes intermittently added to A. The percentage of mix will determine the depth and the rocking of the resulting image. This effect works with both standard video imaging and computer-generated graphic displays.

Applying these factors may require software or hardware additions to a computer graphics system, depending upon the complexity and capability of the system in use.

For video, the problem is easily dealt



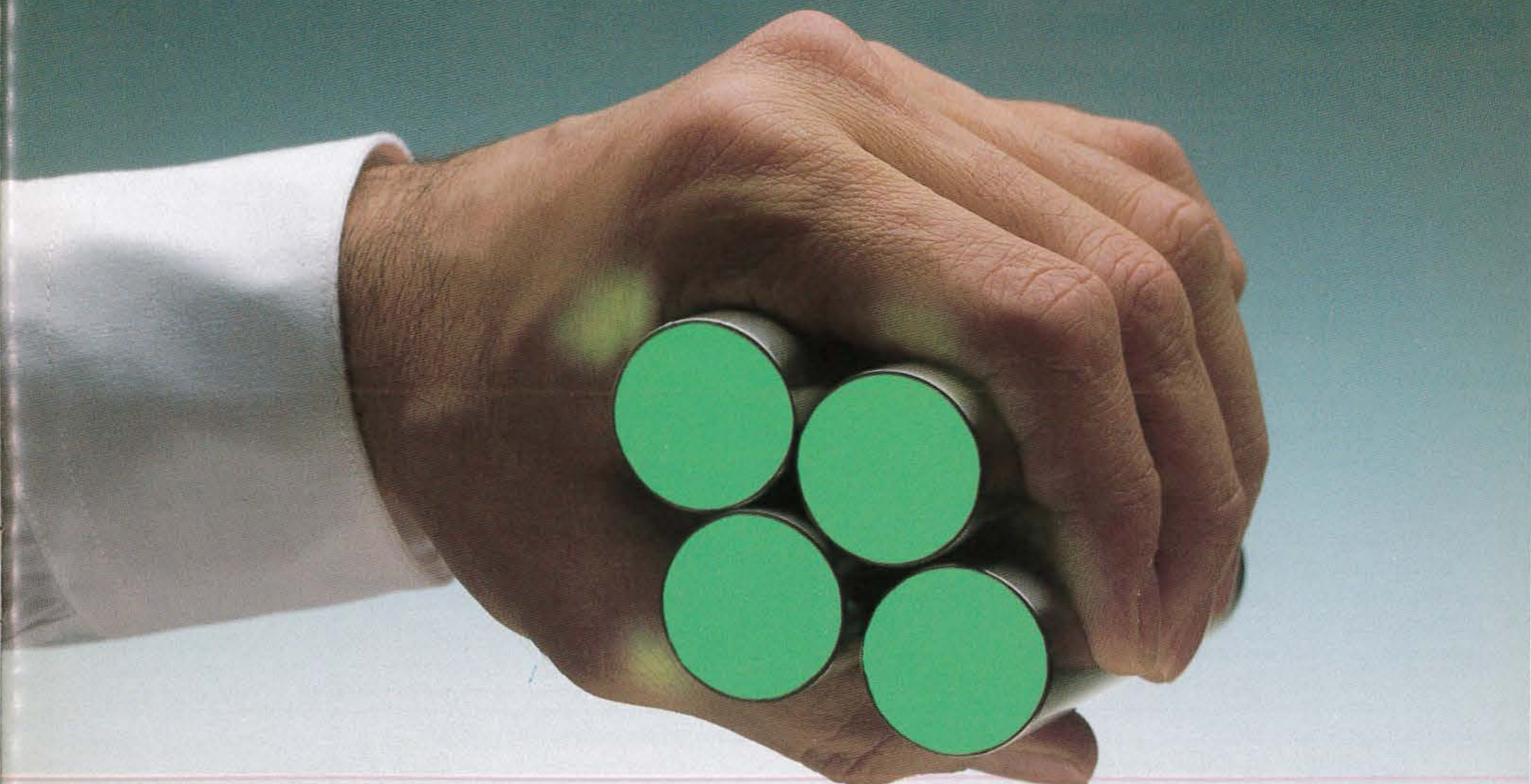
VIDEO SYSTEM



COMPUTER SYSTEM

Circle Reader Service #7

Our new CRTs are quite a handful.



Introducing Litton's 1" tube.

Now let's see. What could you use a miniature CRT for?

How about a helmet-mounted display.

A compact film recorder.

A hybrid typesetter.

Or a compact display inside a crowded tank.

Litton's L-4272 cathode ray tube is the newest sub-miniature on the market.

And one of the best.

It's made by the leader of high resolution, high precision CRT's. Litton's reliable CRT products have been used in everything from advanced reconnaissance systems to sophisticated photocomposition machines.

The L-4272 is ruggedized, so it'll survive inside a tank, an aircraft or any vehicle using forward-looking infrared systems.

And it's a high performer. Spot size is 0.0008 inch. Brightness is 100 footlamberts with standard 525 line TV raster at 30 Hz filling the useful screen.

You can buy it as a stand-alone item or with a small coil and magnetic shield.

To get the small picture, contact Litton Electron Devices Division, 1215 S. 52nd Street, Tempe, AZ 85283. Phone (602) 968-4471. TWX: 910-950-0149.

Litton

Electron Devices

with through the use of standard SEG and the two required sources. The signals can be mixed electronically to achieve a readily controllable depth illusion and reduction in rocking. In this instance, the operator has the ability to control the amount of depth and rocking, making the system user adjustable for both acceptability and personal desire. (Fig. 1)

Applying these techniques to computers should not add dramatically to the cost of hardware or software. The primary requirement is to develop a system that allows image A to be maintained on the screen while image B is mixed with A at either a pre-set proportion or an adjustable proportion at a rate of about ten times per second, with the on and off times being roughly equal. Much of this can be done outside the computer with peripheral hardware. (Fig. 2)

The peripherals required include a unit to hold image A constant and a mix-

Parallax Induction displays 3-D images

Visual Image Depth Enhancement by Parallax Induction (VISIDEP) is a procedure that sequentially displays on a two-dimensional screen alternating pairs of stereoscopic views of a scene or object.

The VISIDEP system creates images having enhanced depth by time-displacing binocularly related images and then displaying them in their proper time sequence. The rate at which these images must alternate depends on the time required for their synthesis in the viewer's temporary intermediate memory.

If the rate is too slow, the 3-D effect disappears and the perception becomes that of a sequence of flat images. If the rate is too fast, images appear to flatten out and the depth perception disappears.

The process generates a visual image that is immediately perceived with depth, whether viewed with two eyes or only one. Furthermore, if the head is tilted to one side or the other, the perception of depth remains undiminished. As long as parallax information is present in the image, the human brain can process the parallax information without regard to the direction of parallax—whether horizontal, vertical, diagonal, or anywhere in between.

Vertical parallax, however, tends to produce a more satisfactory perception than does horizontal parallax.

Depth sensation occurs at rates from about 4 to 30 frames per second (with best effects to date obtained at frequencies between 7 and 15 frames per second.)

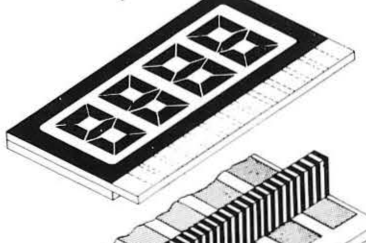
The enhanced depth is immediately perceived using this procedure and requires no conscious effort on the part of the viewer.

THERE ARE IMITATIONS

BUT, UNLESS IT'S FROM

TECKNIT® IT'S NOT REALLY A

ZEBRA® ELASTOMERIC CONNECTOR



Other elastomeric connectors may pretend to be. But the ZEBRA comes only from TECKNIT. In fact, we pioneered the original technology. Therefore, we have more design engineering experience than anyone else, more built-in reliability and on- time delivery. TECKNIT is the dependable domestic source.

The TECKNIT ZEBRA elastomeric connector is uniquely constructed of alternating layers of conductive and non-conductive silicone rubber, permitting high density interface connections as close as 0.010" centerline. This construction also provides non-abrasive contact plus superior shock and vibration protection. Connection is gas-tight, making the seal resistant to harsh and humid environments.

Application for the TECKNIT ZEBRA elastomeric connector is almost endless: appliances, field and test instruments, medical instruments, auto engine read-outs . . . where there's an LCD display, there's a TECKNIT ZEBRA elastomeric connector for the job.

TECKNIT®
INTERCONNECTION PRODUCTS
a TWP company

For more information, write TECKNIT
135 Bryant Avenue, Cranford, N.J. 07016,
Phone (201) 272-3850, TWX (701) 996-5951

Circle Reader Service #8

er that allows user control of the amount of signal B to be entered into the terminal display. Such hardware may not be necessary for some machines; each specific machine will require variations. The necessary elements are simple, and the amount of user control is arbitrary and left to the specific requirements in any given situation. What is required is the ability to generate in real-time images A and B and to achieve the proper mix.

Related to the rocking motion is depth of field, which also depends on the perspectives separation angle. Using videotape technology, the researchers determined that a perspective separation of 2 cm between dual video cameras produces a depth of field of approximately 20 ft.

For computer-generated (stationary) scenes, a perspective rotation of 1 to 2 deg produces acceptable depth in the image. Although increasing the rotational angle achieves greater depth of field, it also increases the image rocking motion.

Because the rocking motion of alternative-pair display is barely discernible to viewers of moving images (inherent in video scenes), methods to generate arbitrary or user-specified rotations of the alternating object at regular intervals can be used to introduce motion artificially into otherwise stationary scenes.

Beyond displaying the resulting 3-D image on a CRT monitor or video screen, the images may also be projected through any video-projection system and still retain the apparent depth illusion for the viewer. Once produced, the images can be recorded, edited, and replayed on standard equipment. Images can be viewed in full color or in black-and-white.

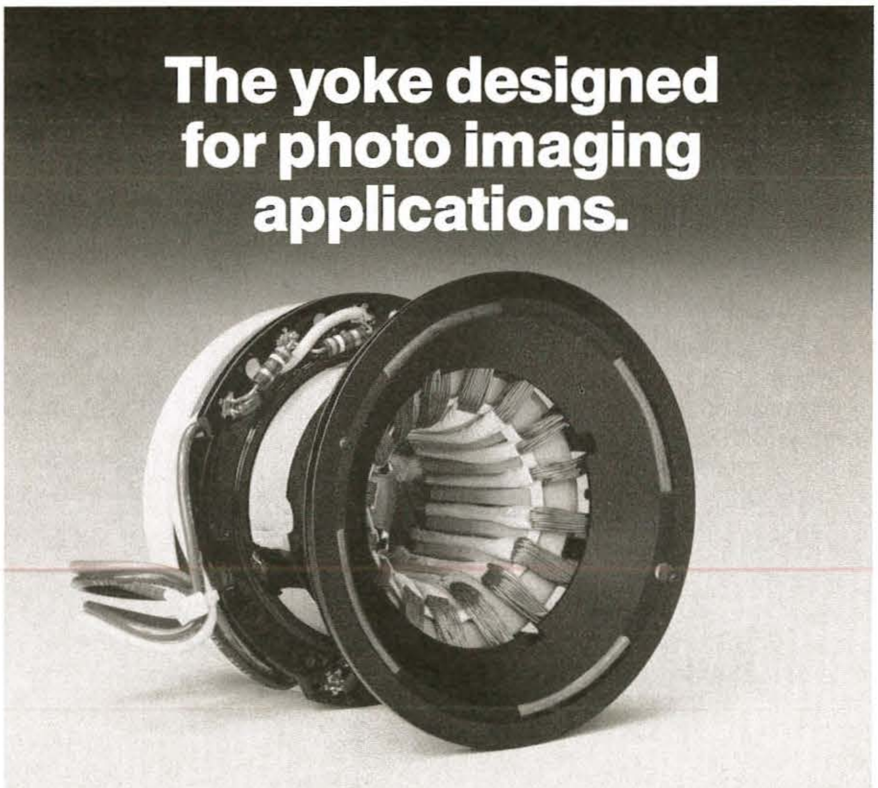
(Developed from *Improvements in Alternating-Pair Technology for Three-Dimensional Imaging,* by A.P. McLaurin, E.R. Jones, and LeConte Cathey, University of South Carolina, Columbia, SC.)

Circle Reader Service #102

EDITORIAL CALL **DEADLINE: August 18, 1986**

Special ELECTRONIC IMAGING issue
October Information Display
needs your Editorial & Products input

- Technical papers on imaging technology, systems, applications, products
- New Products/Literature news releases



Syntronic's C14550 type stator core yoke supplies optimum resolution and geometry correction, with no additional trimming needed—plus low cost.
Its proprietary "compensating" coil distribution works with a calibrated, permanent magnet configuration that results in optimum resolution from corner-to-corner, plus excellent geometry control.
This computer engineered design means you simply clamp the C14550 yoke to the CRT neck. Only minor adjustments are needed to align and set the convenient beam-centering magnet rings. And our in-house molding and machining facilities ensure repeatability and performance from prototype to production. The C14550 type deflection yoke is designed around modern flat-face photo-imaging CRT's, such as the Clinton CE 599/789 tube. However, Syntronic can quickly customize both electrical parameters and geometry correction for your specific application.

Syntronic manufactures a complete line of photo-imaging deflection yokes, with performance commensurate with your requirements—all at competitive prices. Contact us today and find out more. **Syntronic Instruments, Inc.**
100 Industrial Road
Addison, IL 60101
Phone (312) 543-6444

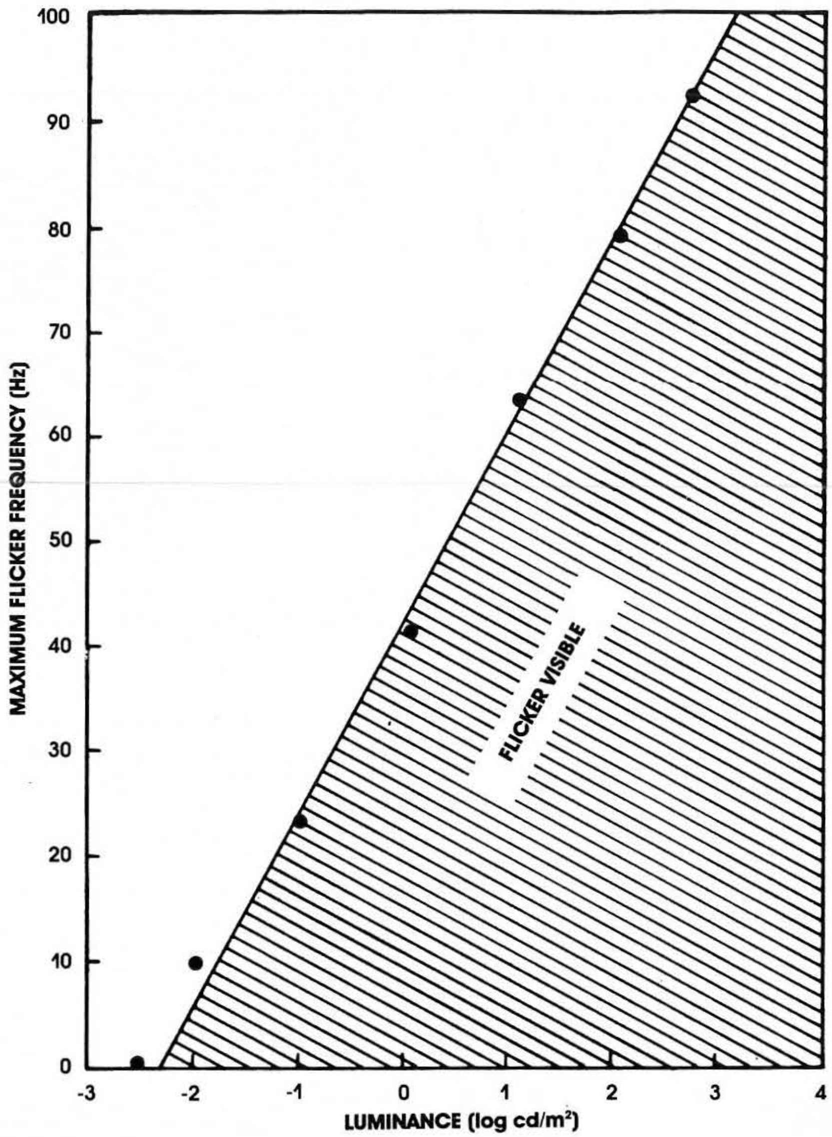
syntronic

Interlacing eliminates CRT perceptible flicker

Recent experiments by researchers at Smith-Kettlewell Institute for Visual Sciences (San Francisco, CA) have shown that perceptible flicker in advanced video displays—especially those employing black-on-white images—can be completely eliminated by applying conventional frame interlacing. By splitting the standard 60 Hz video frame rate first into odd and even lines, then presenting all the odd lines in one frame and all the even in the next, the researchers effectively increased the frame rate immediately to 120 Hz—while the total number of lines remained at the 60 Hz rate.

Because the information rate remains at 60 Hz, this approach to solving the flicker problem provides ready compatibility with current video and television technology. Since some experimental systems already have 120 Hz interlace, it also provides full compatibility with probable future video frame rates. Additionally, implementation of the interlacing method in the display technology is simple, since the bandwidth of the video amplifier only has to be increased by a factor of 2.

Tests to date indicate, however, that a 120 Hz frame rate may be susceptible to frequency beating with the 120 Hz flicker rate of fluorescent illumination. According to the researchers, this can be minimized by adopting either a true 120 Hz synchronized to the electrical line frequency, or by doubling the present video frame rate of 59.94 Hz. This would result in 119.88 Hz, which would beat at only 0.12 Hz with the fluorescent illumination. Such a low beat frequency should be scarcely perceptible unless the incident illumination were a large proportion of the display illuminant. Further empirical studies are needed, say the researchers, to choose between these options.



Visual sensitivity

Perceptible flicker and eye-movement distortions in video displays are significant problems when displays are used for intensive information processing work. Both conditions are known to give rise to headaches and muscle tension in susceptible operators—thus reducing operator efficiency and willingness to work with the machine.

(Continued on page 18 . . .)

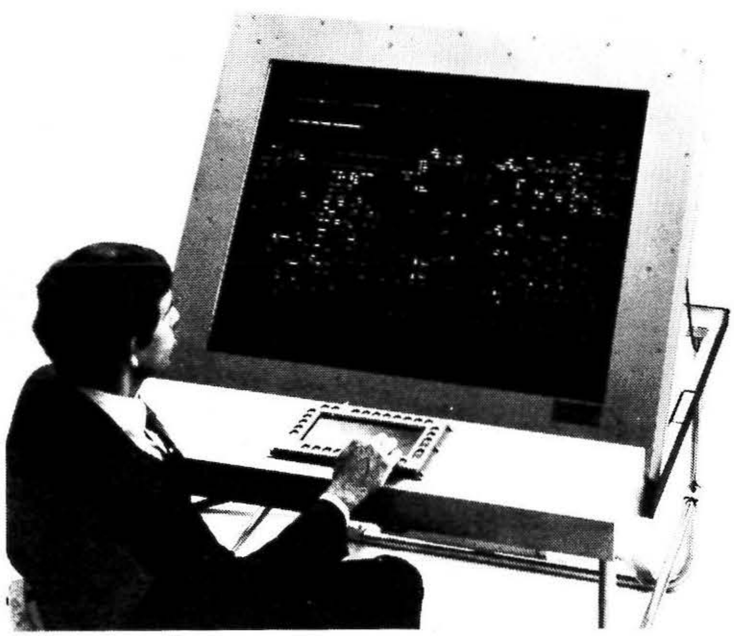
PHOTONICS TECHNOLOGY, INC.

PIONEERS AND LEADERS IN THE Design, Development, and Production of AC Gas Discharge Displays

PHOTONICS TECHNOLOGY PRESENTS

THE WORLD'S FIRST METER-SIZE, HIGH RESOLUTION FLAT DISPLAY TERMINAL

DEVELOPED FOR MILITARY PROGRAMS INCLUDING U.S.ARMY AFATDS



This is the world's first large area, high resolution, non-projected, flat display terminal. Utilizing AC gas discharge plasma display technology, the terminal has an active display matrix of 1600 by 1200 pixels measuring over 39 inches (one meter) diagonally with 5.3 square feet of viewing area and a resolution of 2500 pixels per square inch. All drive electronics are mounted in a 4 inch thick picture frame package around the perimeter of the transparent, thin (0.5 inch) display screen allowing for rear-projected and see-through applications.

Jointly developed by Photonics Technology, Inc., Luckey, Ohio and Magnavox Electronic Systems Co., Ft. Wayne, Indiana.

Photonics and Magnavox are presently completing the development of AC gas discharge flat panel displays ranging in size up to 3 meters with active display matrices up to 4096 by 4096 pixels. Multicolor displays are also being developed.

Photonics is the world's leading developer and manufacturer of sophisticated, high technology AC gas discharge displays. We are able to design and manufacture flat display panels, monitors, and/or terminals in a variety of sizes at relatively low costs. Our flat displays range in size from a few centimeters up to one meter. Some of our standard and custom displays include the following:

Panel Size, Pixels	Resolution, Pixels Per Linear Inch
128 x 256	40, 60
128 x 512	60
256 x 256	60
256 x 512	64
512 x 512	60, 64, 73, 83
512 x 1024	60
1024 x 1024	60, 73, 83
1200 x 1600	50.8, 101

Our standard display resolution ranges from 30 to 100 pixels per linear inch (900 to 10,000 pixels per square inch). Display resolutions up to 200 pixels per linear inch are available.

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.

Circle Reader Service #10

THE FURTHER WE GO, THE FURTHER YOU GO.

The sharpest image devices in the world.

Thomson-CSF is your winning partner for professional display tubes and devices. Whether your applications are in radar, avionics, defense, industry or medicine, you can be sure of our technology for reliability and performance, even under the most adverse conditions.

Our vast CRT range incorporates the latest models for video projection, short head-up and head-down displays, helmet-mounted displays, ground/airborne monochrome and color radars, photographic data recording, instrumentation, etc.

And our proven AC plasma panels offer the ultimate in readability and ruggedness for medium and high density graphics display, in all environments.

With manufacturing plants in Europe and the US, we are at hand to let you benefit from our quality products with the best customer care. Just as we did for major programs worldwide.

In radio and television, telecommunications, military and civil aviation as well as in a wide range of scientific and medical applications, Thomson-CSF knowhow gets your systems moving. Fast.

THOMSON-CSF
ELECTRON TUBES

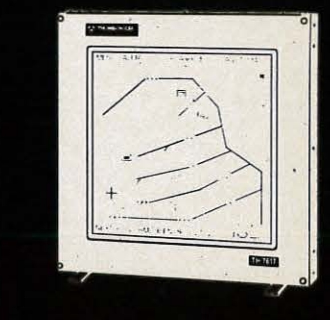
THOMSON ELECTRON TUBES AND DEVICES CORPORATION
550 Mount Pleasant Avenue
DOVER, NEW JERSEY 07801.
Tel.: (201) 328-1400. TWX: 710987 7901.

Very high definition CRTs
Linewidth as small as 20 µm
Flat optical glass screens of up to 205 mm dia.

Very high brightness projection CRTs
Up to 175,000 cdl/m²
Dipenser cathodes

Special monitor CRTs including ruggedized color radar and helmet mounted displays

Ac ruggedized display panels
Tireless, flicker-free display
Up to 1,024 x 1,024 dots



POLARIS

Belgique: BRUXELLES
Tel. (32-2) 648 64 85
Tx 23 113 THBXL B

Brazil: SAO PAULO
Tel. (55-11) 542 47 22
Tx (011) 24 226 TCSF BR

Canada: MONTREAL-QUEBEC
Tel. (1-514) 288 41 48
Tx 5 560 248 TESAFI MTL

Deutschland: MÜNCHEN
Tel. (49-89) 78 79-0
Tx 522 916 CSF D

España: MADRID
Tel. (34-1) 405 16 15
Tx 46 033 TCCE E

France: BOULOGNE-BILLANCOURT
Tel. (33-1) 46 04 81 75
Tx THOMTUB 200 772 F

Italia: ROMA
Tel. (39-6) 639 02 48
Tx 620 683 THOMTE I

Japan: TOKYO
Tel. (81-3) 264 63 46
Tx 2 324 241 THCSF J

Sverige: TYRESÖ
Tel. (46-8) 742 80 10

United-Kingdom: BASINGSTOKE
Tel. (44-256) 29 155
Tx 858 865 TESAFI G

U.S.A.: DOVER
Tel. (1-201) 328 1400
TWX 710987 7901

Circle Reader Service #11

5583

(. . .continued from page 14)

The Smith-Kettlewell studies indicate that by using short, unadapted flicker presentations that approximate everyday viewing conditions the human flicker frequency limit approaches 100 Hz for a typical display condition of a 30-deg viewing field with a luminance of 400 cd/m². (Earlier studies by D.H. Kelly indicated the maximum frequency was about 70 Hz for display conditions of 100 cd/m²—using a prolonged psychological adjustment method to obtain the limit, which allows the visual system to adapt to the flicker while setting the threshold, and thus results in a lower reading).

In any peripheral region (beyond about 5 deg eccentricity from central fixation), the newer studies show that the maximum detectable frequency increases with a linear function of log luminance with a slope of close to 20 Hz per log unit of luminance. For a large field, this gives flicker limits from about 20 Hz at 0.1 cd/m² to about 100 Hz at 1000 cd/m². (Fig.)

These data show that for a large, high luminance display to be completely free of perceptible flicker it should have a frame rate of at least 100 Hz. The slope of the sensitivity curve is very steep near the flicker limit, such that if the display flicker rate is 20 Hz below the limiting frequency the flicker must be reduced to 10% modulation to be below threshold and 100% modulation would appear as pronounced flicker.

Eye movements

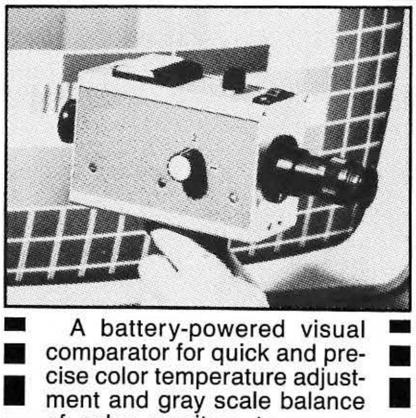
Typical eye movements of a person examining a display screen are rapid jerks of fixation known as saccades. For medium-sized eye movements up to 10 deg across the field, the duration of these saccadic jerks is only 20-30 msec, reaching a maximum velocity of about 500 deg/sec. If during this time the visual image is moving in space, it will produce a distorted image on the moving retina. Because the scan line of a video display is effectively moving at a rate of a full frame every 17 msec, or a velocity of 127 deg/sec for a 20-deg display, the retinal image of the display is substantially distorted during normal saccadic eye movements.

Even though there is some neural suppression of the shifted retinal image when a saccadic fixation shift is made, most video displays still show pronounced perceptible image distortion when the eyes are moved across them. This is particularly evident for fast phosphor displays designed for the rapid replacement of information on the screen. Although the limiting frame rate for elimination of the saccadic distortion effects are not known at present, it is evident that the faster the frame rate, the smaller the effect, according to the researchers.

(Developed from *The 120 Hz Interlace Option: A Flicker-Free Future for Video Displays*, by Christopher W. Tyler, Ph.D., Smith-Kettlewell Institute for Visual Sciences, San Francisco, CA)

Circle Reader Service # 101

CONSISTENT COLOR MONITOR DISPLAY
with IRT Visual Color Comparator



A battery-powered visual comparator for quick and precise color temperature adjustment and gray scale balance of color monitors to recommended world standard of D6500°K.
Over 12 years in service at TV networks and stations.

Bourbon Street Associates
Box 393, So. Salem, NY 105900393
914-763-8893 (In CA. 213-271-9570)

Reader Service #13

VIDEO TEST
The Catalog

The Vii Video Test Catalog made its debut at SID '86. It features a cast of the finest video test products in the industry today: Display Test Pattern Generators, Camera Calibration Instruments, Test Charts, and more. Don't miss it!

Get your copy - contact us at Vii; PO Box 33; Xenia, OH 45385-0033; Phone 513/376-4361.

Vii®

© Visual Information Institute, Inc., 1986

Circle Reader Service #21

CALL FOR PAPERS

SID '87—International Symposium, Seminar and Exhibition for Information Display

Hyatt Regency, New Orleans, LA - May 11-15, 1987

TOPICS

Areas of interest include, but are not restricted to:

- **Emissive flat panels:** Plasma, electroluminescent, vacuum fluorescent and other flat cathodoluminescent displays and materials, light-emitting diodes, backlights.
- **Non-emissive flat panels:** Liquid crystal, including active-matrix-addressed liquid crystal, electrochromic, electrophoretic, magneto-optic, electromechanical and ceramic displays and materials.
- **CRT displays:** CRTs and monitors for entertainment, computer display and specialized applications; flat and miniature CRTs; electron optics including gun and yoke design; CRT materials; high resolution, storage, beam index, high brightness and multibeam CRTs.
- **Hard-copy printers:** Ink jet, thermal, electro-graphic, electrostatic and impact systems; plotters; optical disc/video disk; videotape; electronic photography; facsimile.
- **Display systems and applications:** Computer graphics workstations, high-definition TV, digital TV, teleconferencing, military/avionics display systems, automated crew stations/workstations, image processing and analysis, displays in expert systems.
- **Automotive displays:** Display requirements, voice and command I/O for the driver, light control and day/night readability, head-up displays, environmental requirements, comparison of display technologies for automotive needs, use of TV systems for improved driver visibility.
- **Display addressing/packaging:** "Active" matrices including thin-film transistors and two-terminal devices, multiplexing techniques; ICs for display drivers and controllers; interconnection techniques; glass and plastic processing; ruggedized display fabrication.
- **Interactive I/O technologies:** Interactive displays, input/output devices including touch panel, keyboard, and voice-I/O software.
- **Human factors:** Display standards and legislation; display ergonomics, measurement and characterization; visual perception; choice of color, font.
- **Large-area displays:** Projection systems including projection CRTs, light valves, lasers, optics and screens; message boards and mosaic displays; simulator displays.

DEADLINES

Abstracts of original papers, not previously published or presented, and technical summaries are due **December 8, 1986.**

Authors will be notified of acceptance **January 30, 1987.**

All papers are due **March 16, 1987.**

A limited number of 20-min late-news papers reflecting important new developments, will be considered if an abstract and technical summary, with pertinent illustrations suitable for publication, are received NO LATER than **March 2, 1987.**

MAILING

All authors should send one reproducible copy of their abstract and technical summary to:

Ms. Hildegarde Hammond (SID)
Palisades Institute for Research Services Inc.
201 Varick Street, Room 1140
New York, NY 10014
212/620-3388

INFORMATION

Mark Goldfarb, Symposium Coordinator
Palisades Institute 212/620-3371

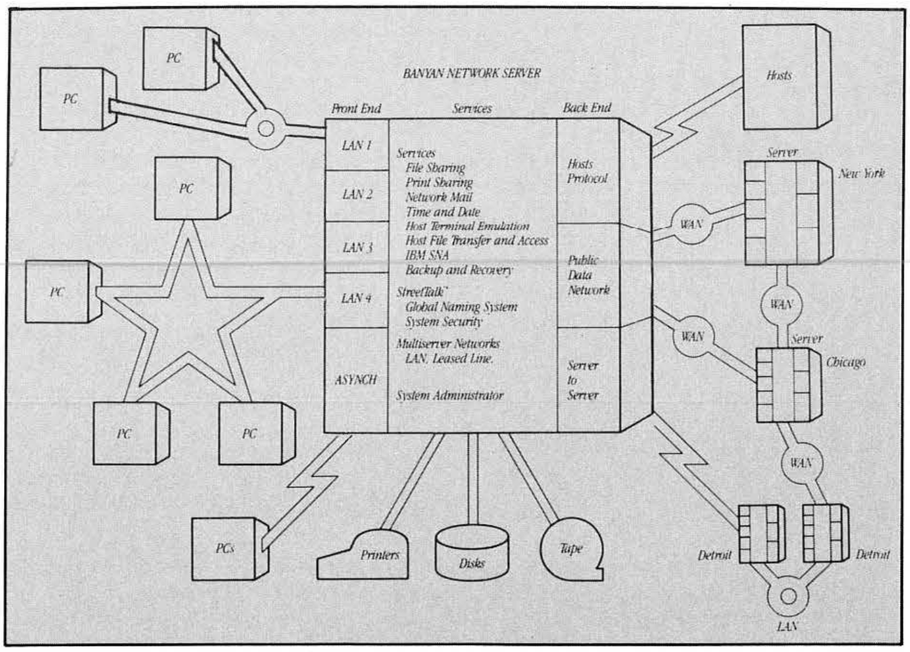
Jay Morreale, Exhibit Manager

Network links PCs to wide range of systems, devices

Small to moderate-sized PC clusters can now be economically integrated with minicom puters and mainframes into a comprehensive information network using a newly released virtual network system called **VINES/286**. For LAN-based PC clusters, **VINES** permits low-cost sharing of disks, printers, files, modems, back-up tapes, information and services (such as electronic mail, mainframe links, and network management.)

The six-disk software package converts a conventional IBM/AT (or compatible) into a multi-function file server that provides: file- and peripheral-sharing; protocols for communicating with minis, mainframes, and larger networks having additional servers; gateways between two similar/dissimilar LANs; a global naming mechanism for tracking all network resources; and diagnostics for all system hardware, network media, and serial communications.

VINES/286 includes 3270 emulation software for connecting to IBM mainframes over SNA/SDLC links, and offers VT100, VT52, IBM3101, and TTY emulation for communicating with asynchronous hosts. File transfer capability is available through the Kermit protocol.



Memory/storage

The dedicated PC file server requires a minimum of 512 Kbytes RAM, but can support as much memory and storage as can fit into an AT-compatible — up to 15 Mbytes. It supports AT-compatible hard-disk drives, currently offering users up to 240 Mbytes total internal storage, as well as tape drives on network PCs. An external disk and tape expansion unit can be added to store up to 60 Mbytes or to provide tape backup.

Peripherals

The network system supports standard IBM serial and parallel printer posts. Up to four additional printers can be added through an intelligent serial communications board. Data can be transmitted at speeds up to 9,600 baud.

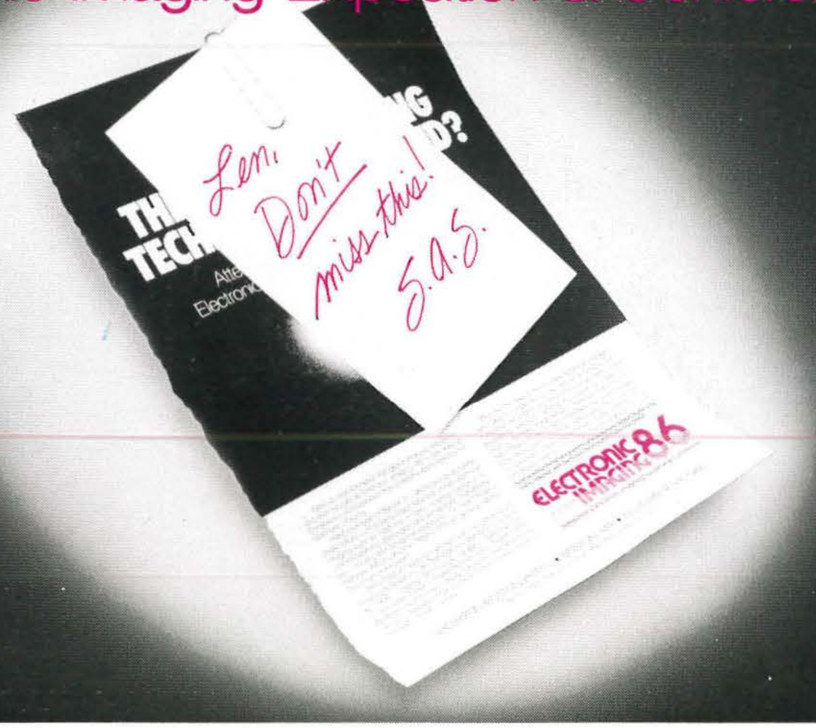
Communications

Large distributed networks can be built by connecting multiple services on the same network as the PCs; on a separate, high-speed backbone or corporate network; or over leased or dial-up lines using synchronous (HDLC) or asynchronous protocols. A four-port, intelligent 8088-based serial communications controller supports asynchronous and synchronous protocols for data transfer speeds up to 19,200 baud.

(Continued on page 25 . . .)

HOW DO YOU KEEP UP WITH THE FASTEST MOVING TECHNOLOGY AROUND?

Attend the 3rd Annual, International Electronic Imaging Exposition & Conference



Keep up with the rapid changes in imaging disciplines and technologies at Electronic Imaging '86 — the leading Conference and Exposition that covers the entire spectrum of electronic imaging.

Held once again in Boston, E.I. '86 is the original international forum uniting every major field that utilizes electronic imaging such as medicine, military, imaging components, communications, computers and peripherals, instrumentation, industry and consumer electronics. Dr. Albert Rose, a member of RCA Labs from 1935 to 1975, will serve as General Chairman of the event.

More than 80 leading manufacturers, including Gould Imaging & Graphics, 3M, Recognition Concepts, Cilas Alcatel, AT&T, Imaging Technology, Ikegami, Westinghouse, Chorus Data Systems, EG&G Reticon, Litton Systems, NEC America, International Imaging, Panasonic and Tektronix will display a vast array of products and technologies impacting the $30+ billion industry.

Plus four full days of minicourses, technical and application sessions organized by the Institute for Graphic Communication will explore current topics such as raster image processing, electronic printing and publishing, image processing hardware, image sensors, hard copy, machine vision technologies for automated manufacturing, consumer electronic photography, CD-ROM, optical data disc technologies for document image management, digital scanners, array processors, electronic imaging in medicine and much more!

Sponsored by the following technical publications: Digital Design, Diagnostic Imaging, and Electronic Printing and Publishing (EP&P).

ELECTRONIC IMAGING 86

International Electronic Imaging Exposition & Conference

Call 1-800-223-7126 or (617) 232-3976 for Registration Information

SHERATON-BOSTON HOTEL • BOSTON, MA • NOVEMBER 3-6, 1986

Send today for your Free Pre-Registration Form: EI '86 • 1050 Commonwealth Avenue, Boston, MA 02215

TECHNOLOGY *PLUS* ECONOMY

FOR DISPLAY MONITOR AND POWER SUPPLY VALUE, NO ONE ADDS UP TO IKEGAMI

Ikegami's full line of display monitors are engineered for high performance and high value, while our impressive list of features score high marks with computer people, industry-users, lab technicians and R&D personnel. These features include:

- ☐ 1280 x 1024 pixels with greater than 100mHz of video frequency response.
- ☐ Horizontal deflection frequencies available from 15 to 64kHz on monitors with medium to ultra high resolution.
- ☐ A variety of sizes from 9″ to 26″, analog and TTL, monochrome and color.
- ☐ Both precision in-line gun and delta gun configurations.
- ☐ Neatly packaged for ease of maintenance, with or without an enclosure.
- ☐ Exceeds safety and emissions requirements: UL, CSA, FCC, IEC and VDE
- ☐ Precise geometry, superior linearity and color stability assure reliable and repeatable images.

Ikegami's power supplies also combine technology and economy, and the following superior features:

- ☐ Designed for a variety of applications, including computer and communications systems.
- ☐ Output ratings from 120 to 1000 watts with 4 or 5 user specified power outputs.
- ☐ Dual range AC inputs, user selectable for worldwide system applications.
- ☐ Meet international EMI and safety requirements: FCC, UL, CSA, IEC and VDE Standards
- ☐ 100% tested and burned-in to insure quality.
- ☐ Soft start with overload and overvoltage protection standard.
- ☐ Offered in both open frame and enclosed designs.

Together, or alone, when you consider great technology, at economical prices, the name to watch is Ikegami.

Ikegami®

Ikegami Electronics (USA), Inc. 37 Brook Avenue Maywood, NJ 07607

Northeast: (617) 579-4992 East: (201) 368-9171 Northwest: (415) 449-1794 Southwest: (213) 534-0050

(. . . continued from page 20)

A VINES/286-equipped server can act as a gateway between similar or dissimilar LANs, supporting two LANs simultaneously. Support currently includes: IBM Token Ring Network, 3Com Ethernet, Corvus Omninet, Interlan Ethernet, SMC ARCNET, Proteon ProNET, Ungermann-Bass Net/One LAN, and Allen-Bradley VistaLAN.

Directory

A global database used for identifying, locating, and controlling access to users, services, and resources has a descriptive three-part name by which users can easily identify it. When a name is referenced, hierarchical directories are searched automatically. Because an item's name is independent of its location, the item can be relocated without requiring its name to be modified. User devices or file volumes can be moved around the network without the whole community being notified of the changes.

Network management

The system also provides a comprehensive administration and network management facility, which is the focal point for managing systems resources and security. Systems administration can add or remove users, set up user profiles, configure resources, and backup and restore files automatically on a pre-scheduled basis. Security restrictions can be set up so that only authorized users have access to network resources. Diagnostics for all system hardware, network media, and serial communications are included in the system. Network management, statistical monitoring, and diagnostics can be performed from any local or remote PC on the network. Price: $1,895; includes support for one LAN (available October 1986).

BANYAN SYSTEMS INC., Westboro, MA (617/366-6681)

Circle Reader Service # 70

Video image database

Interactive image database creates, files, transmits, and displays high-resolution full-color video pictures linked with graphics and text. Called V-base, the system allows television quality images to be accessed, modified, stored, printed or transmitted in virtually unlimited numbers. V-base stores up to 24,000 full-size image frames on a single eight-inch, write-once videodisc recorder/player. Up to 54,000 frames can be recorded on a 12-in. read-only videodisc. V-base works with IBM personal computers and IBM board-compatible PCs. The system can be configured in a variety of ways to meet specific needs and interface with existing computers and peripherals. Images may be stored on a hard disk, CD-ROM, videodisc or videotape. Pictures can be digitized from any video source: video camera, videodisc player, or videotape player.

ROYAL RECOVERY SYSTEMS INC., Plainfield, NJ(201/753-2835)

Circle Reader Service #53

Sperry in Albuquerque

Putting your talents on display

Sperry's defense systems operation in Albuquerque is offering you the opportunity to display your talents. Our digital map project gives you a chance to be involved with leading-edge display technology for use in military aircraft such as the AV-8B Harrier and F-18 Hornet. Career opportunities are available in the following areas:

CRT Display Development

Display Systems Engineering Section Head

This position requires a BSEE or MSEE degree plus eight or more years of experience in CRT display system development with cockpit operational problems. You should have particular knowledge of cockpit display systems and their interaction with on-board systems. You must also have experience in planning, scheduling, and directing a staff of eight to 12 engineers in the development of CRT display systems. Your duties will be 75 percent technical and 25 percent administrative. Appropriate skills in proposal writing and customer interface are also required.

Electronic Design

You'll need a BSEE degree and two or more year's experience in analog or digital design. Some experience with monochrome and/or color CRT systems including display processor or a closely related field is also preferred. Customer interface and proposal experience is also desired. Your experience will be used in the development of high speed digital processing, analog-to-digital converters, and raster/stroke CRT circuitry design.

Put your talents on display.

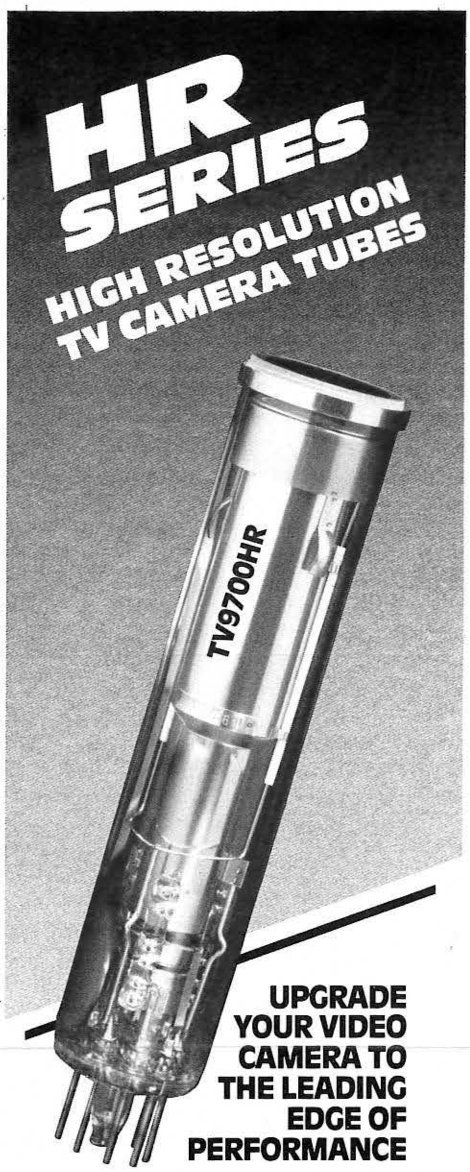
Sperry offers you a generous salary and benefits package. Send your resume and salary history, in confidence, to Brandon Harwood, (ID-E708), Sperry, P.O. Box 9200, Albuquerque, NM. 87119

SPERRY

Equal Employment Opportunity/Affirmative Action Employer
U.S. citizenship is required

Circle Reader Service #14

Products



- Precision Electron Gun
- 1400 + TV Lines Resolution
- Choice of Sb_2S_3, CdSe, SeAsTe Photoconductors
- Fits Standard 1" Cameras

Many Special Purpose TV Camera Tubes . . . Ruggedized, IR, UV, Fiber-Optic, etc.

teltron® INC.

Exclusively Marketed by:

MII

P.O. BOX 395
BIRDSBORO, PA 19508

1-800-835-8766
In PA call (215) 582-5361

Remote sensing system

Model 4000 high performance computer system for processing remotely sensed, large-scale geographic images is a bundled, total-solution system designed to meet the needs of high computation requirements and large data-base manipulation. System functions include image enhancement, multiple image correlation, image overlay, geometric correction, classification, video digitizing, and hardcopy capability. The system is compatible with LANDSAT and SPOT tape inputs. Price: $110,000.

GOULD IMAGING & GRAPHICS DIV., Fremont, CA (415/498-3284)

Circle Reader Service #50

Image processing

Family of display and image processing hardware and software, designed for processing and displaying high resolution large format images, comprises four LSI-11 Q-bus boards that are used to acquire, store, process, and display images ranging from 64 x 64 to 4096 x 4096 with either 8 or 16 bits per pixel.

IMAGE ANALYTICS CORP., Montchanin, DE (302/652-3386)

Circle Reader Service #51

Multibus memory board

The DS-541M, memory-mapped Multibus memory board, holds four 512 x 512 images and contains a memory array of 1024 x 1024 pixels, each with 9 bits of depth or resolution. On-board pan and scroll hardware allows any 512 x 512 window to be active for video input or output at any one time. The 512 squared image size is compatible with most machine vision systems. Model DS-542 is a registered-accessed version of the DS-541. Price: $3,495.

RECOGNITION TECHNOLOGY, Holliston, MA (617/429-7804)

Circle Reader Service #52

Gate arrays

Line of high-speed 1.5-micron gate arrays, with typical gate delays of 1.2 nanoseconds and clock rates up to 100 MHz, are used in next-generation supermini and mainframe computers. Designated MSM70V000 series, the gate arrays range in size from 700 to 10,008 gates. The number of I/Os range from 66 to 172, and are CMOS and TTL compatible. All arrays are offered in dual-in-line, plastic leaded chip carrier, pin grid array, and flatpack packages. Number of pins available on packages ranges from 24 to 208. The devices feature a cell library that consists of 38 macro blocks and 110 functional logic blocks.

OKI SEMICONDUCTOR, Sunnyvale, CA (408/720-1900)

Circle Reader Service #54

Image processing database

Picture Database Management System (PICDMS) operates on two or more dimensions on digitized photographs, maps, and drawings for image processing and model-building. As a fourth generation language, the system gives the user a flexible, easy-to-use way to define a wide variety of operations on picture data: detecting objects or edges in pictures, recognizing and classifying patterns, determining minimum and maximum values, calculating distances, and creating histograms and statistical analyses. Price: $5,000 for microcomputer; $8,000 for minicomputer (one-time license fee).

MIB CHOCK, Santa Monica, CA (213/828-4788)

Circle Reader Service #55

Digital imaging scanner

Menu-driven software interface enables AutoCAD drafting software to receive original drawings (up to 36" x 46") from EIKONIX automatic scanners. The menus include SET-UP, SCAN, and EDIT, all of which may be controlled by a keyboard or optional mouse. SET-UP allows the operator to specify drawing size and select exposure time. SCAN is used to initialize a scan and allows the user to specify a region of the drawing to be scanned. EDIT displays image directories and enables user to crop and zoom the image, and contains a raster editing function that permits the user to "clean up" undesired image data at the pixel level.

EIKONIX Corp., Bedford, MA (617/275-5070)

Circle Reader Service #56

Dedicated line modems

Three 9600 bits-per-second modems for dedicated line applications include the CLX96 (point-to-point), CLX96FP (multi-drop), and the CLX96M (multiport). Each complies with International Telegraph and Telephone Consultative Committee (CCITT) V.29 requirements for domestic and international 9600 bps synchronous data transmission and meets Federal Standard 1007 for government applications. Each model provides automatic adaptive equalization through a micro-processor-based equalizer that continually compensates for varied line conditions. The CLX Series also offers built-in diagnostics for fault isolation. Local analog and remote digital testing provides unattended loopbacks to isolate error conditions at key points within a network. Prices: $1,445 (CLX96), $1,995 (CLX96FP); $2,195 (CLX96M).

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

Circle Reader Service #57

Serial communications controllers

ProtoCol 1000, a multibus-based commu-

nications protocol controller, processes up to 16 channels of data communications at 64Kb/second and provides interfaces between a wide variety of protocols with an extensive protocol library. The controller has dual processor architecture and up to 512 Kbytes of triple-ported memory. V/SIO 3208, a serial communications controller with eight independent, full-duplex RS-232 channels on a single VMEbus board, provides four software programmable interrupts for each of its eight channels, for a total of 32 interrupts. The V/SIO 3208 offers programmable baud rates from 50 to 19.2K, modem control, asynchronous, synchronous, and SDLC bit-synchronous modes, local loop-back, and auto echo modes. It also offers the flexibility of 32-bit or 24-bit addressing. Prices: $2,750 (ProtoCol 1000); $795 (V/SIO 3208).
INTERPHASE CORP., Dallas, TX (214/350-9000)

Circle Reader Service #58

Fiber optic supertrunk

System 1301 is a supertrunk that uses advanced fiber optic technology to deliver high quality video, audio, and data signals. The system accepts baseband video and audio input of the originating equipment and FM modulates them in a frequency band ranging from 40 to 540 MHz. Modulator outputs are combined and used to drive the T1301 transmitter. RF signals are converted in the transmitter to an intensity modulated light signal at 1300 nm wavelength that is carried on one single node fiber to the R1301 receiver. At the receiver, the light signal is converted back to an RF signal, demodulated and presented as baseband video and audio output.
PIRELLI, Meriden, CT (203/238-9665)

Circle Reader Service #59

Personal computer network

The Knowledge Network, software-based network for IBM PCs and compatibles (with DOS 2.1, 3.1, or higher), allows the sharing of changing data and costly peripherals without regard to distance, technical communications obscurities, re-buying software, or learning new commands. The network consists of memory-resident PC-DOS/MS-DOS software and simple modular telephone cables to interconnect up to six computers through their RS-232C serial ports. Groups of computers can also be connected through modems or additional serial cards. The system has no prescribed network topology — users can connect in a bus, star, tree, ring or other configuration with no effect on the network operation.
KNOWLEDGE NETWORK GROUPS INC., Mountain View, CA (415/965-1300)

Circle Reader Service #60

Color plotter

Full color, 8-page brochure provides background on Versatec Spectrum, an 11-inch electrostatic color plotter/printer. The brochure is divided into three sections: printing, plotting and CRT hard copy. Spectrum's features such as mirror image, line enhancement, and raster data translator are explained, as is the multi-pass color process.
VERSATEC, Santa Clara, CA (408/988-2800)

Circle Reader Service #81

Circuit board indicator

Eight-page LED Circuit Board Indicator catalog lists extensive line of LEDs in various configurations. Red, yellow, and green LEDs in T-1¾, T-1 and T-¾ sizes are offered in a variety of package styles. This short form catalog includes dimensional drawings and specifications for the selection of an LED Circuit Board Indicator.
DIALIGHT, Brooklyn, NY (718/497-7600)

Circle Reader Service #82

ENVIRONMENTAL IMPACT!

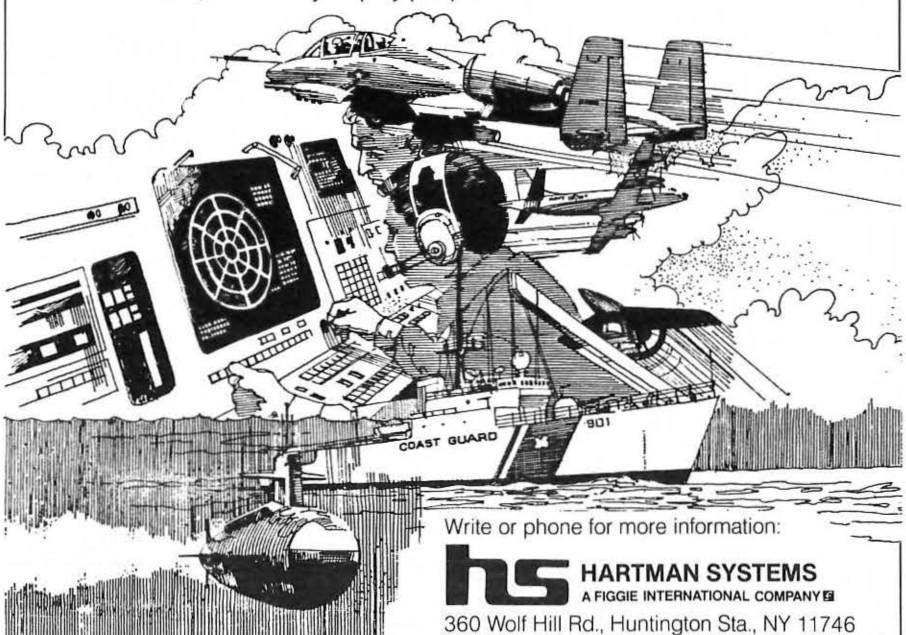
Air, Land, Sea, Space. Military systems must perform in the most demanding environments—under the most hostile conditions.

Mil-qualified displays and display subsystems from Hartman Systems can meet any environmental requirement. They can withstand the shock, vibration and temperature extremes of battle and still deliver the high-resolution graphics and alphanumerics needed to effectively integrate the man with the system.

Hartman displays are as advanced as they are rugged. We built the first Mil-Spec color displays, and we manufacture a complete line of color and monochrome units for integrated processing and display, machinery control, weapons control, threat assessment and intelligence applications.

In the air, on land, and at sea, displays from Hartman are on-station around the world—and off it, too, on board the Space Shuttle. Wherever the application, when your system requirements call for rugged, mil-qualified displays, Hartman has the answer.

Hartman, the military display people.



Write or phone for more information:

HARTMAN SYSTEMS
A FIGGIE INTERNATIONAL COMPANY
360 Wolf Hill Rd., Huntington Sta., NY 11746
516 427-7500, TWX: 510-226-6982

Circle Reader Service #16

President's Message

EXECUTIVE COMMITTEE

President: J.A. van Raalte
Vice President: L. Tannas, Jr.
Treasurer: W.L. Goede
Secretary: P. Pleshko
Past President: I.F. Chang

PRESIDENT'S ADVISORY COUNCIL

B. Lechner, Chairman
T.V. Curran, W. Good, A. Kmetz, P. Pleshko,
J. Simonds, H.G. Slottow

REGIONAL DIRECTORS

Minneapolis/St.Paul: R. Jamieson
Midwest: J. Markin
Delaware Valley: S. Filarsky
New England: T. Cheek
Mid-Atlantic: A. Lakatos
Bay Area: H. Sherman
Los Angeles: R.C. Knepper
San Diego: R.E. Thoman
Japan: M. Ashikawa
U.K./Ireland: A. Woodhead
European: C. J. Gerritsma

COMMITTEE CHAIRMEN

Academic: L. Weber, L. Todd, Jr.
Archives/Historian: R.C. Knepper
Bylaws: A. Silzars
Chapter Formation: A. Lakatos, C.J. Gerritsma
Conferences
IDRC—R. Durbeck
Symposium—T. Gredelle
Definitions & Standards: A. Kmetz
Honors & Awards: W. Howard
Intersociety: H.L. Funk
Memberships: R. Feigenblatt
Nominations: I.F. Chang, G. Carroll, T. DuPuis
Publications: P. Heyman
Proceedings Editor: S. Sheer
Information Display Editor: J.A. MacDonald
Publicity: J. Price
Special Technologies:
Workstations—P. Pleshko
Hardcopy—W. Lloyd

CHAPTER CHAIRMEN

Bay Area: G. Carroll
Canada: A. Moffat
Delaware Valley: J. Parker
Japan: S. Kobayashi
Los Angeles: P. Baron
Mid-Atlantic: J. Stapleton
Midwest: J. Markin
Minneapolis/St.Paul: V. Born
New England: M. Silverstein
San Diego: J. Lipscomb
UK & Ireland: M. Green

OFFICE ADMINISTRATION

National Office Mgr: Bettye Burdett

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

A distinct drawback with this means of communicating with members of SID and other readers of *INFORMATION DISPLAY* is the time lag between my writing of this column and your opportunity to read it. In these days of instant electronic communications and information display, it seems incongruous to accept a six-week delay for production and printing and post office. The day will surely come when all the contents of the Journal, including this column, will be transmitted via optical fibers, or satellites, or . . .or . . ., directly to all subscribers for instantaneous viewing on high-resolution, color, flat-panel displays in office or at home.

One of the exciting events here on the East Coast of the USA was the recent July 4th celebration and the reopening to the public of the restored Statue of Liberty. The organization and scheduling of all the events presented a mind-boggling logistical problem (even for an electronics display engineer), with the news media using the latest in information gathering and display technologies to cover all the festivities, the speeches, the entertainment, the parade of tall ships, and the "best fireworks ever." One cannot help but be impressed by the international participation and cooperation in this celebration, even down to the restoration work on the Statue itself.

By the time this column appears in print, another international gathering—the International Display Research Conference, Japan Display '86—will be just two months away (Tokyo: September 30 - October 2). The program for Japan Display '86 is presently being finalized and will be mailed to all SID members within a few weeks. (Non SID members: circle #106 on the Reader-Service card).

The program includes: Keynote Address by T. Sasaki of Sharp on "Information Displays for the Age of New Media Technologies;" invited addresses by former SID President I.F. Chang of IBM, and C.J. Gerritsma of Philips Research Labs; and a number of invited talks on EL, color plasma display technologies, ferroelectric liquid crystals and others.

Judging by the last IDRC held in Japan—Japan Display '83—this conference will again be a huge success. The organization and planning have been outstanding. This conference provides all attendees with an opportunity to meet a large number of display scientists who have not attended previous symposia and IDRCs. And, we anticipate hearing about some of the most recent information display work in Japan.

A number of other display-related conferences that may be of interest to IDRC attendees will also be held about the same time ... Japan Electronics Show, Korea Electronics Show, Taiwan Electronics Show, Hong Kong Electronics Fair, and Canton Trade Fair. Various travel packages from the US and Canada, combining some of these events, are being offered by Commerce Tours International Inc., 870 Market Street, San Francisco CA 94102. (415/433-3072)

I urge all of you to make a special effort to attend Japan Display '86. See you in Tokyo.

1986 Frances Rice Darne Memorial Award

For pioneering and continuing contributions to liquid crystal display technology.

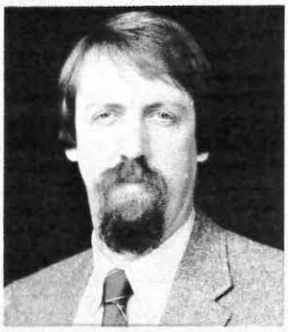
James L. Fergason
Consultant to Taliq Corp.
Mountain View, CA

Fergason began working on liquid crystals with Westinghouse in 1957. He founded International Liquid Crystal in 1970, where he invented the twisted nematic display, which accounts for 99% of all display systems using liquid crystals sold in the world.

To carry out custom development in liquid crystal applications, he then established American Liquid Xtal, where he developed several liquid crystal compositions for thermography, principally for use in non-destructive testing; a new method for controlling the recovery time of cholesteric temperature indicators; and new products for using liquid crystal as an electric-mechanical transducer. In 1981, Fergason invented the NCAP liquid crystal display system.

1986 Fellow Award

For contributions to the theory and application of ac gas discharge display technology.



Dr. Roger L. Johnson
Vice President, R & D and Director, Advanced Concept Group, SAID Technology Div., Science Application Intl Corp. (SAIC), San Diego, CA.

Dr. Johnson performed graduate research at the University of Illinois (1970s) in the early development of ac gas discharge devices and associated electronic drive circuitry. At the time, he was also a member of the design team involved in the development of the PLATO computer-based education system at the University of Illinois.

His work in this area resulted in the development of advanced computer workstation architecture and a patented IR touch input system for use with computer displays.

From 1970 - 1977 he was a member of the Electrical Engineering Staff at the University, and also consulted with various US and Japanese corporations involved in the development of ac gas discharge display products. He left the University in 1977 to join SAIC.

THE HUMAN FACTORS SOCIETY
30th Annual Meeting

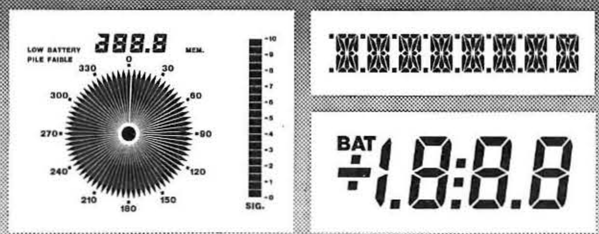
September 29 - October 3, 1986
Dayton Convention Center
Dayton, Ohio

- Communications
- Training
- Environmental Design
- Organizational Design and Management
- Product Design
- Test and Evaluation
- Computer Systems
- Forensics
- Education
- Ergonomics
- Visual Performance
- Aging
- System Development

For information, call or write:

Steve Marlin
HFS Meeting Planner
Prestige Accommodations International
2102 Business Center Drive
Irvine, CA 92715
(714) 752-7866

LCD
CUSTOM/STANDARD
BEST QUALITY/SERVICE
U. S. MANUFACTURING



- −40°C TO 95°C STORAGE/OPERATION TEMPERATURE
- LOW POWER/HIGH CONTRAST/WIDE VIEWING
- DICHROIC/PHASE CHANGE TYPES
- PLASTIC PROTOTYPE/GLASS PRODUCTION/DOT MATRIX
- COMMERCIAL/MILITARY STANDARDS
- CUSTOM MODULES
- 2 TO 4 WEEKS DELIVERY

POLYTRONIX, INC.
P. O. BOX 833024, RICHARDSON, TX 75083
(214) 238-7045
TM

SID '86 Awards

1986 Fellow Award
For leadership in the commercialization of liquid crystal displays.

Dr. Tomio Wada
Division General Manager of Display Div., Electronic Component Group, Sharp Corp.

Dr. Wada joined Central Research Laboratories of Sharp Corp. in 1960 and initially worked on thick-film electroluminescent displays. In 1969, he was named manager of Sharp's Non-Emissive Display Research Group, where he was engaged mainly in research and development on liquid crystal displays. In 1973, Wada developed the epoch-making LCD mounted on COS (Calculator on Substrate) Systems Electronic calculator. He also developed the double-layered LCD and the TFT-LCD.

1986 Fellow Award
For pioneering studies on the addressing of liquid crystal and electroluminescent displays.

Dr. Paul M. Alt
Manager of the Display Systems Group, IBM, T.J. Watson Research Center, Yorktown Heights, NY

Dr. Alt has been pursuing the study and characterization of various display devices since 1970, when he joined the IBM Research Center. His present work includes very high content CRT displays and new flat panel display systems and applications. In 1980, Dr. Alt received a special recognition award from the SID for his contributions in the area of multiplexed liquid crystal displays. He was appointed, in 1984, to the position of Associate Editor, IEEE Transactions on Electron Devices.

"America's Shielding Source"

- **Magnetic Shielding of all types**
- **Shielding grade alloys**
- **Total in-house design, testing and manufacturing capabilities.**
- **Send for our latest product literature.**

Magnetic RADIATION LABORATORIES, INC.

92-A North Lively Boulevard • Elk Grove Village, Illinois 60007
Phone: 1-312-437-5200 • TWX 910-222-0225

JAPAN DISPLAY '86

6th International Display Research Conference
September 30 to October 2, 1986
Tokyo, Japan

Sponsored by S.I.D., and ITE of Japan

Advance registration forms and hotel reservation forms are now available from Palisades Institute, 201 Varick Street, New York, NY 10014, and must be sent directly to the Japan Travel Bureau in Tokyo.

Plan to maximize your trip by attending one or more of the following exhibitions and conferences during the same period:

Japan Software Oct 1-3
Japan Electronics Oct 2-7
Japan Audio Fair Oct 2-7
Japan Optoelectronics Oct 6-9
Intl Optical Fiber Sensor Oct 7-9
Intl Semiconductor Laser Oct 14-17

Though hotel bookings must be made directly through the Japan Travel Bureau, Commerce Tours (San Francisco), the official travel agent for S.I.D., can arrange transportation and tours to help you coordinate and simplify your travel arrangements. Phone (415) 433-3072.

Circle Reader Service #12

Sustaining Members

Ad-Vance Magnetics Inc.
625 Monroe St.
Rochester, IN 46975
219/223-3158

AEG-Telefunken Corp.
Rt.22-Orr Dr.
Somerville, NJ 08876
201/722-9800

Amuneal Mfg. Corp.
4737 Darrah St.
Philadelphia, PA 19124
215/535-3000

Applied Films Lab Inc.
6797 Winchester Circle
Boulder, CO 80301
303/530-1411

Asea AB, Dept. YLKHM
S-72183
Vasteras, Sweden
021/10-0000

Audiotronics Corp.
7428 Bellaire Ave.
P.O. Box 3997
No.Hollywood, CA 91609
818/765-2645

Babcock Display Products
1051 S. East St.
Anaheim, CA 92805
714/491-5110

Ball Electronic Systems Div.
P.O. Box 589
Broomfield, CO 80020
303/469-5511

BDH Chemicals Ltd.
Broom Rd., Poole
Dorset BH12 4NN, UK
0202-745520

Bendix Corp.
Flight Systems Div.
Teterboro, NJ 07608
201/288-2000

Bidco Inc.
8 Commercial St.
Hicksville, NY 11801
516/433-0740

Canon, Inc.
7-1, Nishi-Shinjuku 2
Shinjuku-ku, Tokyo 160
Japan
714/556-1036 (California)

Cardion Electronics
Div. of General Signa lCorp.
Long Island Expressway
Woodbury, NY 11797
516/921-7300

CESCA
Sistemas Electronics S.A.
APD036, 189
Madrid, Spain
91/675-4300

CELCO
(Constantine Engrg. Labs Co.)
70 Constantine Dr.
Mahwah, NJ 07430
201/327-1123

Cherry Electrical Prod. Corp.
3600 Sunset Ave.
Waukegan, IL 60085
312/662-9200

Clifton Precision/
Special Devices
5100 State Rd.
Drexel Hill, PA 19026
215/622-1718

Clinton Electronics Corp.
6701 Clinton Rd.
Loves Park, IL 61111
815/633-1444

Conrac Corp.
3 Landmark Sq.
Stamford, CT 06901
203/348-2100

Control Interface Co. Ltd.
Optoelectronics Div.
21 Rt. 10
East Hanover, NJ 07936
201/887-3222

Corning Glass Works
Electronic Materials Dept.
MP21-3
Corning, NY 14830
607/974-7451

C.W. Cameron Ltd.
Burnfield Rd.
Giffnock
Glasgow, Scotland
UKG46-7TH

Dale Electronics
P.O. Box 609
Columbus, NE 68601
402/564-3131

Data Images
1283 Algoma Road
Ottawa, Ontario
Canada, K1B3W7

Display Components Inc.
334 Littleton Rd.
Westford, MA 01886
617/692-6000

Eagle Magnetic Co. Inc.
P.O. Box 24283
Indianapolis, IN 46224
317/297-1030

EG&G Gamma Scientific
3777 Ruffin Rd.
SanDiego, CA 92123
619/279-8034

Electro-Plasma Inc.
4400 Martin-Moline Rd.
Millbury, OH 43447
419/255-5197

EM Industries
Advanced Chem. Div.
5 Skyline Dr.
Hawthorne, NY 10532
914/592-4660

Endicott Research Grp. Inc.
2601 Wayne St.
Endicott, NY 13760
607/754-9187

Futaba Corp.
629 Oshiba
Mobara, Chiba 297,Japan
0475-24-1111

Garrett Mfg. Ltd.
255 Attwell Dr.
Rexdale, Ontario
Canada M9W 5B8
416/675-1411

GEC Avionics
(Affil. General Electric Co.
p.l.c. of England)
4500 N. Shallowford Rd.
Atlanta, GA 30338
404/394-7800

General Atronics Corp.
Sub. of Magnavox Govt. & Ind.
Electronics Co.
1200 E. Mermaid Lane
Philadelphia, PA 19118
215/233-4100

General Electric Co.
Aircraft Instrument Dept.
50 Fordham Rd.
Wilmington, MA 01887

George D. Harris Assoc. Inc.
The Plaza Building
Fairlawn, NJ 07410
201/796-5200

GML Information Services
594 Marrett Rd.
Lexington, MA 02173
617/861-0515

Grid Systems Corp.
2535 Garcia Ave.
Mt.View, CA 94043
415/961-4800

GTE
100 Endicott St.
Danvers, MA 01923
617/777-1900

Hartman Systems
A Figgie International Co.
360 Wolf Hill Rd.
HuntingtonStation, NY 11746
516/427-7500

Hazeltine Corp.
Cuba Hill Rd.
Greenlawn, NY 11740
516/261-7000

Hewlett-Packard Co.
Optoelectronics Div.
370 W Trimble Rd.
San Jose, CA 95131
408/263-7500 (x6450)

Hoya Optics Inc.
3400 Edison Way
Fremont, CA 94538-6138
415/490-1880

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

Hycom Inc.
16841 Armstrong Ave.
Irvine, CA 92714
714/261-6224

IBM Corp.
Armonk, NY 10504
914/765-1900

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

Industrial Electronic
Engineers Inc.
7740 Lemona Ave.
Van Nuys, CA 91405
818/787-0311

Infodex Inc.
395 W. Main St.
Waterbury, CT 06702
203/757-9291

Interstate Electronics Corp.
Display Product Operations
1001 E. Ball Rd.
Anaheim, CA 92803
714/635-7210

ISE Electronics Corp.
P.O. Box 46
Ise, Mie, Japan
0596/39-1111

K & R Engrg. Sales Corp.
354 Route 206
Flanders, N.J. 07836
201/584-5235

Litton Systems Canada Ltd.
25 Cityview Dr.
Rexdale, Ontario, Canada M9W 5A7

LXD Inc.
24500 Highpoint Rd.
Cleveland, OH 44122
216/292-3300

Magnavox Govt. &
Ind. Elec. Co.
1313 Production Rd.
Fort Wayne, IN 46808
219/429-5263

Magnetic Radiation Inc.
92 N. Lively Blvd.
Elk Grove Village, IL 60007
312/437-5200

Micro-Curl
Display Technology Inc.
61 Wilton Rd.
Westport, CT 06880
203/226-0222

Mitsubishi Electronics
America, Inc.
991 Knox St.
Torrance, CA 90502
213/515-3993

NEC Electronics Inc.
401 Ellis St., PO BOX 7241
Mountain View, CA 94039
415/960-6041

Nederlandse
Philips Bedrijven B.V.
PO Box 218
5600MD Eindhoven
The Netherlands
31-40-791111

Norden Division
United Technologies Corp.
100 Helen St.
Norwalk, CT 06856
203/852-4905

OKI Electric Industry Co., Ltd.
550-5 Higashiasakawa-cho
Hachioji-shi
Toyko, 193, Japan
0426/63-1111

Optical Coating Lab. Inc.
2789 North Point Pkwy.
Santa Rosa, CA 95407-7397
707/545-6440

Optical Radiation Corp.
1300 Optical Dr.
Azusa, CA 91702
818/969-3344

Orwin Associates Inc.
88 Seabro Ave.
Amityville, NY 11701
516/842-7177

Ovonic Display System Inc.
1896 Barrett St.
Troy, MI 48084
313/280-1900

Panelvision Corp.
265 Kappa Dr.
Pittsburgh, PA 15238
412/963-9635

Philips Electronics Ltd.
601 Milner Ave.
Scarborough, Ontario,
Canada M1B 1M8
416/292-5161Ext.2567

Phosphor Prod. Co. Ltd.
#1 Factory Rd.
Upton, Poole
Dorset BH16 5SJ UK
0202-632116

Photo Research Div.
Kollmorgen Corp.
3000 N. Hollywood Way
Burbank, CA 91505
818/843-6100

Photonics Technology
6967 Wales Rd.
Northwood, OH 43619
419/666-0033

Planar Systems Inc.
1400 NW Compton Drive
Beaverton, OR 97006
503/625-2006

Plessey Displays
Station Rd.
Addlestone, Weybridge
Surrey KT15 2PW, UK
0932-47282

Plessey Optoelectronics
and Microwave Ltd.
Wood Burcote Way
Towcester, Northhants,
England NN127JN
0327-51871

PTK
Div. Emerson Electric Co.
1173 Los Olivos Ave.
P.O. Box 6128
Los Osos, CA 93402
805/528-5858

Quantum Data Inc.
455 E. Kehoe, Suite 104
Carol Stream, IL 60188
312/668-3301

Racal Microelectronic
Systems
Worton Grange Ind. Estate
Reading RG2 0SB, UK
0734-864611

Rank Electronic Tubes Ltd.
Sidcup-By-Pass
Sidcup Kent DA14 6LZ, UK
01/302-0271

Raytheon Co.
Ind. Components Operation
465 Center St.
Quincy, MA 02169
617/899-8400

RCA Laboratories
David Sarnoff Research Center
Princeton, NJ 08540
609/734-2000

SAI Technology Co.
4060 Sorrento Valley Blvd.
SanDiego, CA 92121
619/452-9150

Sanders Associates Inc.
MER15-1222
C.S. 2035
Nashua, NH 03061
603/885-3522

Sigmatron Nova Inc.
1901 Oak Terrace Lane
Thousand Oaks, CA 91320
805/498-4504

Singer-Librascope
Aerospace & Marine Systems Grp.
833 Sonora Ave.
Glendale, CA 91201
818/245-8711

Sony Corp.
7-35 Kitashinagawa 6-chome
Shinagawa-kuTokyo, 141 Japan
03/493-3406

Stanford Resources Inc.
P.O. Box 20324
San Jose, CA 95160
408/448-4440

Syntronic Instruments Inc.
100 Industrial Rd.
Addison, IL 60101
312/543-6444

Tecknit
129 Dermody St.
Cranford, NJ 07016
201/272-5500

Tektronix Inc.
Information Display Products
P.O. Box 500
Beaverton, OR 97007
503/644-0161

Texas Instruments Inc.
P.O. Box 225936, MS105
Dallas, TX 75265
214/238-4533

Thomas Electronics Inc.
100 Riverview Dr.
Wayne, NJ 07470
201/696-5200

Thomson-CSF Components
Dumont Div.
550 Mount Pleasant Ave.
Dover, NJ 07801
201/328-1400

Thorn-Emi Brimar Ltd.
Greenside Way Middleton,
Manchester M24 1SN UK
061/681-7072

UCE Liquid Crystal Displays
24 Fitch St.
Norwalk, CT 06855
203/838-7509

Venus Scientific Inc.
399 Smith St.
Farmingdale, NY 17735
516/293-4100

Visual Information Institute Inc.
P.O. Box 33
719 Lower Bellbrook Rd.
Xenia, OH 45385
513/376-4361

Westinghouse Electric Corp.
Industrial & Government Tube Div.
Westinghouse Circle,
Horseheads, NY 14845
607/796-3350

Zenith Electronics Corp.
1000 Milwaukee Ave.
Glenview, Il 60025
312/391-7657

**Litton Systems—Two Sustaining Memberships*

Advertisers Index

COMING IN OCTOBER

ID's ELECTRONIC IMAGING SHOW ISSUE

Bonus Distribution at

Electronic Imaging
Conference & Exhibition
Arlington, VA October 14 - 17

Electronic Imaging '86
Boston, MA November 3 - 6

BUSINESS STAFF

Eugenie L. Gray
Publishing Director

Leslie A. Saunders
Marketing Manager

Adrienne Madden
Circulation Assistant

Business Office: 212/687-3836

REGIONAL SALES OFFICES

New England
MetaData
310 East 44th Street
New York, NY 10017
212/687-3836
Eugenie Gray

New York, New Jersey
C. Lynn Coy & Associates
55 Forest Street
Stamford, CT 06902
203/327-4626
Ted Taylor

Mid Atlantic
C. Lynn Coy & Associates
288 Lancaster Avenue, Bldg. 3
Malvern, PA 19355
215/647-1611
Nancy Hunter

Southeast
MetaData
310 East 44th Street
New York, NY 10017
212/687-3836
Eugenie Gray

Midwest
C. Lynn Coy & Associates
482 N Milwaukee Avenue #5
Wheeling, IL 60090
312/520-0199
Al Riefenberg

West Coast
Ted Lucas
P.O. Box 852
Cedar Glen, CA 92321
714/337-8889

RECRUITMENT ADVERTISING

MetaData Inc.
310 East 44th Street
New York, NY 10017
212/687-3836
Leslie A. Saunders

EDITORIAL

Joseph A. MacDonald
Editorial Director

Circle Reader Service #19 ➤

WHEN THERE CAN'T BE A MARGIN FOR ERROR

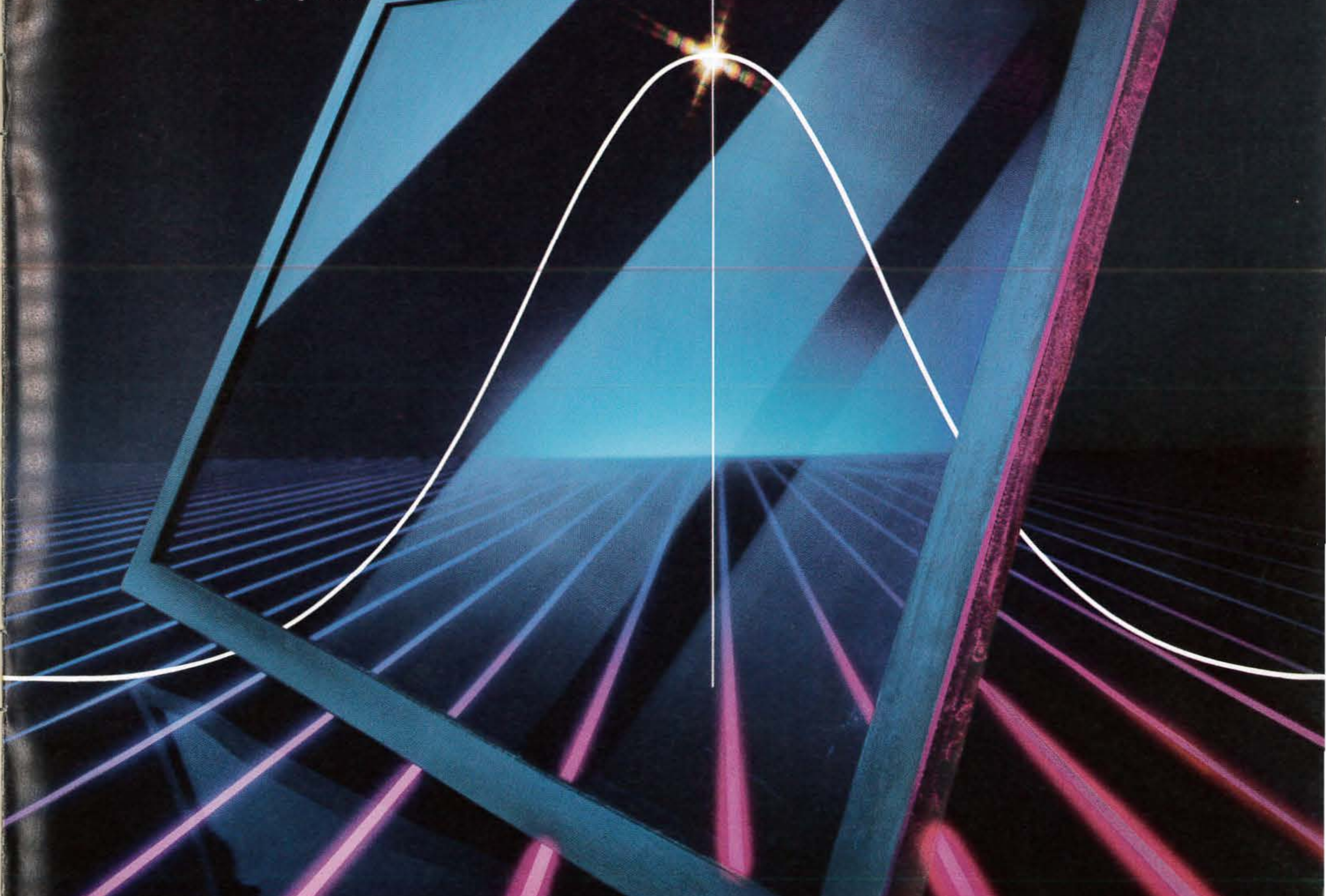
...rely on the EMI experts you always wanted on your staff.

Where performance must meet design, results can't be "almost as good." With over 25 years experience in the development and manufacture of EMI Shielding products, TECKNIT engineering understands your requirements and provides "center line" quality.

TECKNIT patented TECKSHIELD-F® high performance EMI shielding flat glass or acrylic windows were developed for TEMPEST Visual Display Unit (VDU) applications. Ruggedly constructed, TECKSHIELD-F® Windows provide protection against moisture intrusion or entrapment with its fully laminated design feature. Various design options for contrast enhancement including anti-reflection coatings permit flexibility in matching optical and shielding requirements to specific designs.

Write for your copy of the new TECKNIT Design Guidelines for EMI Shielding Windows.

TECKNIT® a TWP company
129 Dermody St., Cranford, NJ, 07016
320 N. Nopal St., Santa Barbara, CA, 93103



EAST COAST: 129 DERMODY ST., CRANFORD, NJ, 07016 (201) 272-5500 TWX (710) 996-5951; TELEX: WUI6853079 TCKNT. CABLE: TECKNIT, CRANFORD, NJ
WEST COAST: 320 N. NOPAL ST., SANTA BARBARA, CA, 93103 (805) 963-5811 TWX (910) 334-1186. FAX (805) 962-9475

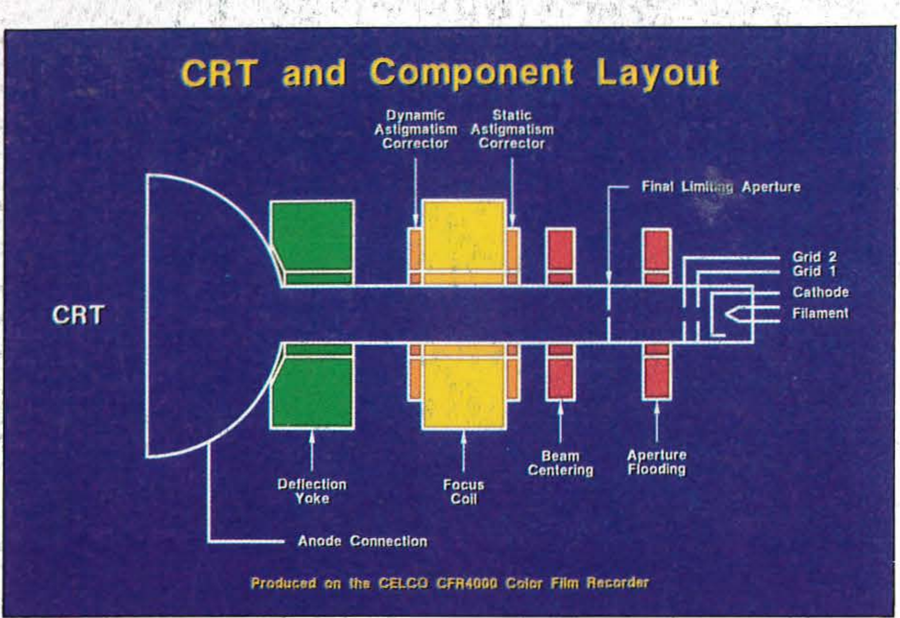


Figure 1 All graphics shown here are produced on The CELCO Machine (CFR4000 CRT Color Film Recording System) at CELCO in Mahwah, NJ.

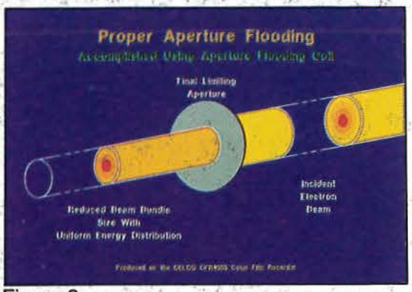


Figure 2

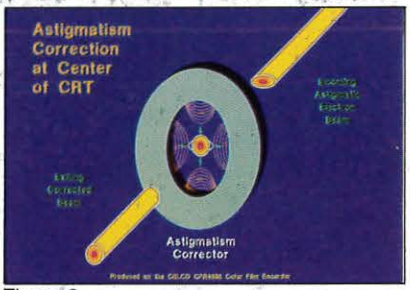


Figure 3

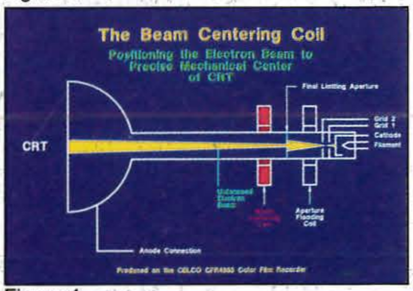


Figure 4

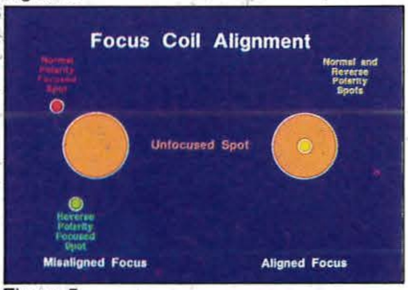


Figure 5

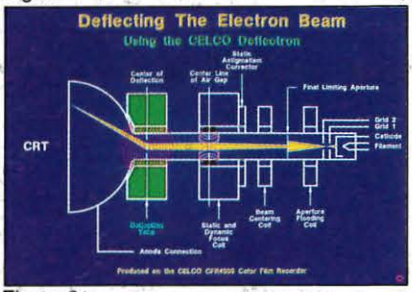


Figure 6

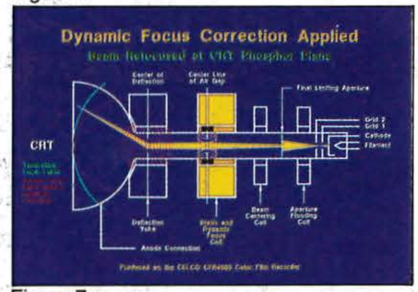


Figure 7

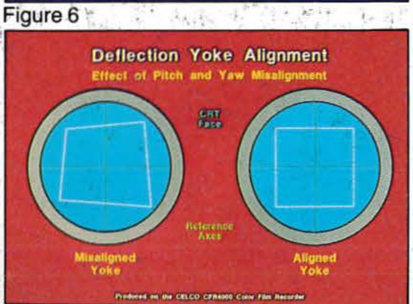


Figure 8

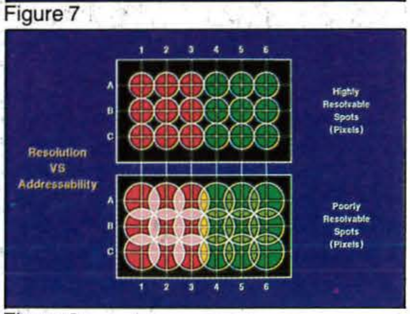


Figure 9

CELCO's Electron-optical techniques produce ultra-high-resolution CRT displays.

Absolute control over the size, shape and position of the scanning electron beam spot is necessary to produce an ultra-high-resolution CRT display. For example, the CELCO CFR4000 CRT Color Film Recording System yields over 7500 resolvable points across the CRT face with resulting image content in excess of 31 million picture elements per field. This system is presently providing theatre-quality imagery to the rapidly growing computer graphics industry for computer animation and other computer image generation techniques of recent development. Other applications include imagery for oil exploration and analysis and other geological interpretations and LANDSAT.

Proper selection and use of cathode-ray tube, deflection yoke, magnetic focus lens, astigmatism correction, centering and aperture flooding coils is the foundation of your high resolution CRT display.

Figure 1 indicates the proper position of the magnetic components on the CRT neck.

Figures 2-8 depict uniform aperture flooding, focusing of the divergent beam, astigmatism correction and deflection from center to the 63 million other positions of addressability (on the CELCO Machine) without distorting spot shape or size. Figure 9 illustrates the difference between resolution and addressability.

For a more detailed discussion, please circle reader service number below to reserve your free copy of "Electron-optical techniques for an ultra-high resolution color film recorder", (delivered before SPIE, January 1984) by John Constantine, Jr., CELCO Vice-President and Yoke Designer. Or call CELCO today with your display requirements: 201-327-1123. Ask for Doc Christaldi, Engineering Sales Manager.

Celco

70 Constantine Drive, Mahwah, NJ 07430 201-327-1123
1150 E. Eighth Street, Upland, CA 91786 714-985-9868

For information circle Reader Service #20