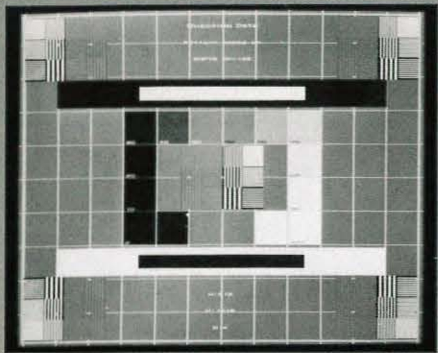
THE OFFICIAL JOURNAL OF THE SOCIETY FOR INFORMATION DISPLAY

INFORMATION DISPLAY

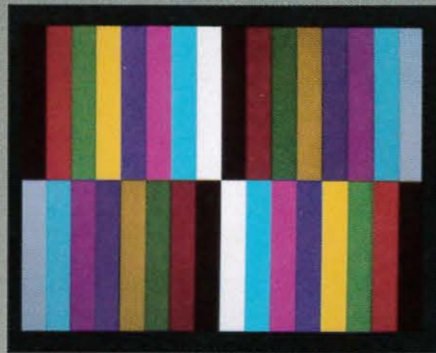
DECEMBER 1986

COLOR DEMAND SPURS VIDEO GENERATOR SPECS

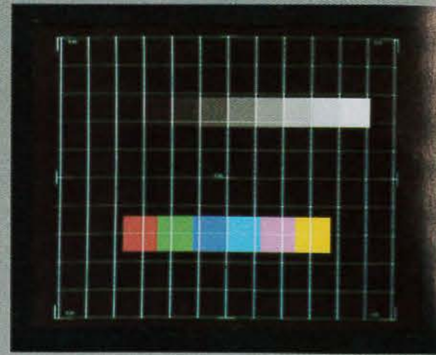
IMPROVING CRT BEAM-PROFILE MEASUREMENTS



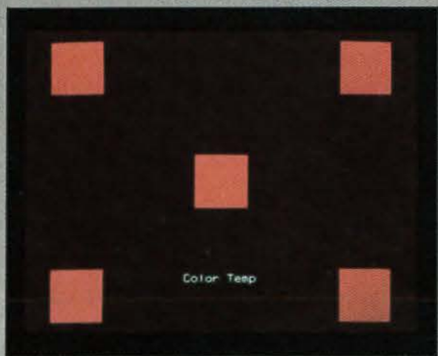
SMPTE RP-133



Color Bars

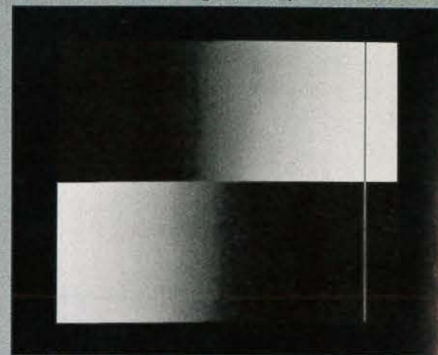


Signal Setup

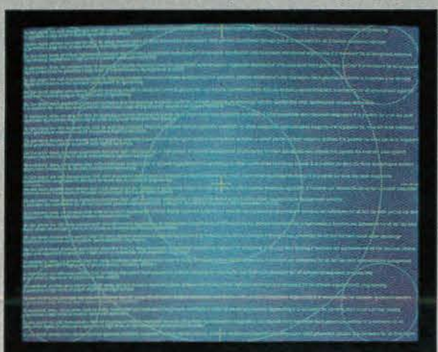


Color Temperature

Cross Talk

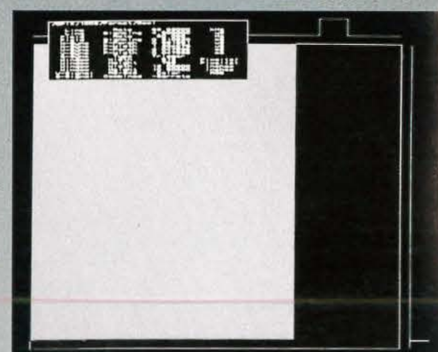


256 Level Gamma Pattern



Text with Circle

RGB Delay



Timing

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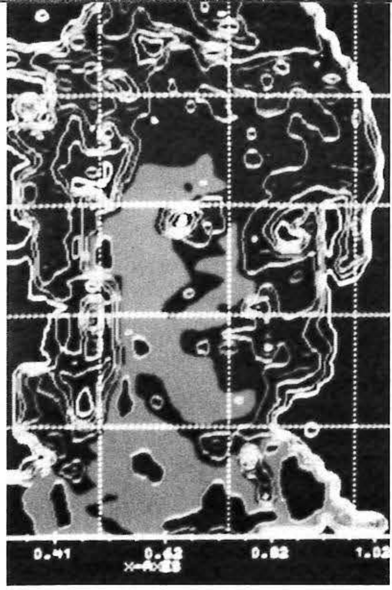

THE OFFICIAL JOURNAL OF THE SOCIETY FOR INFORMATION DISPLAY

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DECEMBER 1986 VOL 2 NO 12

Cover image: Thermal image of face was generated on a display using the GRAPHLIB-VMS software support under the MicroVAX for the DT2750 color raster graphics board. Package permits generation and display of mixed graphics and alphanumerics. —Data Translation, Marlboro, MA (617/481-3700)

FEATURES

DEPARTMENTS

afips
American Federation of Information Processing Societies

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.

Reader Feedback

Laser response

The positive response from (your) readers about (our) past continuing education listings indicates the valuable service you have provided. We appreciate your continued support.

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Marge Lee
Course Coordinator
Laser Institute of America
Toledo, OH

Spreading the word . . .

Enclosed you will find a completed membership application along with my personal check. Your records should indicate that previously I was a member of SID from approximately 1979 through 1985 . . .

In December 1985, I accepted the assignment of opening the Far East Branch Office in Taipei, Taiwan, for DISCOM-Display Components Inc. (Westford, MA). At the present time I am handling the sales of DISCOM products throughout the Far East, and sourcing materials for our manufacturing plant in the US. It is our intention, however, to transfer a portion of our manufacturing technology to Taiwan sometime in the near future to address the needs of the growing high resolution monochrome and color display manufacturers.

In discussions with many of the local firms in Taipei, I was surprised to learn that there is little or no knowledge about SID here. Additionally, there are no other technical organizations specifically for the display industry. Those I have spoken with have expressed interest in learning more about SID.

Therefore, I thought it worthwhile that I bring it to your attention . . . that the opportunity may exist here for SID to realize considerable local support. I'd like to offer my assistance to the Society should (the Board) be interested in evaluating the situation further. Please feel free to contact me here in Taipei at any time.

Michael Barry
Manager, Far East Operations
DISCOM - Dee Sih Kan, Ltd.
4F, No. 40, Alley 14, Lane 16
Chung Cheng Road, Section 1
Shih-Lin, Taipei, Taiwan, ROC

Change for the better . . .

I think that (ID) has improved enormously in the last year. I was sharply critical of the editorial content then, and I am happy to say that I think that it has changed a great deal for the better . . . I encourage you to continue this trend, since I think that it makes the magazine far more useful and far more credible.

You ran part of a press release we generated in September 1985. We are still getting reactions to that part-page article, and many of the reactions are of high quality: engineers or management types who have seen the piece and want more solid information that they can use in thinking about projects and products . . .

. . . Keep up the good work. People here at Lucitron are really pleased that the SID is getting a professional magazine at last.

Alan Sobel
Vice President, Operations
Lucitron Inc.,
Northbrook, IL

> *"Would you realize what Revolution is, call it Progress: and would you realize what Progress is, call it Tomorrow . . ."*
>
> *—Victor Hugo*

In his invited address to attendees at JAPAN '86—the Sixth International Display Research Conference—held in Tokyo (September 30 through October 2, 1986), Dr. Ifay Chang described what he labeled the "Information Revolution" that is unfolding throughout the economies of the technologically advanced countries, and that will inevitably alter the economies of the developing nations as well.

Dr. Chang (immediate past-president of the SID) traced the evolution to today's information era through the preceding revolutions that have irreversibly changed the world economy—agricultural, industrial, and electronic (computer)—citing mankind's never relenting quest for information and knowledge as the prime movers of this newest revolution.

As Dr. Chang pointed out (using the US as an example), ". . . with nearly one out of every two workers in the US working in offices; with 1 billion letters processed by the US postal service every day; and with over 400 billion documents per year now being handled by US businesses (and increasing at the rate of 72 billion per year) the Information Revolution is well under way."

He went on to say that the basic technologies exist to support this global demand for information and knowledge—the technologies of computer systems, telecommunications, input/output interfaces and software . . . With the possibilities for providing information and communication enhanced beyond ordinary imagination.

It now remains, according to Dr. Chang, to ". . . take advantage of the available hardware technologies, such as wideband communication, large capacity storage, advanced I/O devices, and powerful computers to build a system that allows a variety of information services with multilingual (programming and limited natural languages), multi-media (text, graphics, and images), and intelligent capabilities (in terms of both hardware and software).

One such program, currently in the research stage, is under way at the newly established Institute of Systems Science, National University of Singapore (under the direction of Dr. Chang). Its goal is to build a public information system having a common source of information (infoware) that can be shared by subscribers. The infoware would be a commodity available in offices, factories, schools, and homes simply by plugging in a PC, telephone, television, or other terminal device—with the amount of information available and its intelligent support dependent upon the devices that are connected to the system.

According to Dr. Chang, the realization of such a concept would result in ". . . the creation of a new information industry in which an integrated Intelligent Information System and related services would be available for everyone."

Joseph A. MacDonald
Editorial Director

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Events

NATIONAL

JANUARY 6-9: 20th Hawaii International Conference on System Sciences, Kona Surf Hotel, Kallua-Kona, Hawaii. Sponsor: IEEE Computer Society and Association for Computing Machinery. Contact: Ralph H. Sprague, University of Hawaii, College of Business Admin., R-303, Honolulu, HI 96822 (808/948-7430)

JANUARY 11-17: O-E/LASE '87, and concurrent symposium ELECTRO-OPTIC IMAGING SYSTEMS & DEVICES, Los Angeles Airport Marriott & Hilton Hotels, Los Angeles, CA. SPIE's Annual Symposium on Optoelectronics and Laser Applications. Contact: SPIE PO Box 10, Bellingham, WA 98227 (206/676-3290)

JANUARY 14-16: MULTI '87 — 1987 SCS Multiconference, Town & Country Hotel, San Diego, CA. Conferences: Modeling and Simulation on Microcomputers; Computer Simulation in Emergency Planning; MAPCON — Multiprocessor and Array Processor Conference; Simulation of Computer Integrated Manufacturing Systems and Robotics; AI and Simulation. Sponsor: The Society for Computer Simulation. Contact: SCS, PO Box 17900, San Diego, CA 92117 (619/277-3888)

JANUARY 19-22: 1987 Conference on Optical Fiber Communication, Reno, NV. Sponsors: IEEE-LEO, OSA. Contact: OSA Meetings Dept., 1816 Jefferson Place NW, Washington, DC 20036 (202/223-0926)

JANUARY 19-22: 1987 International Conference on Integrated Optics and Optical Fiber Communication, Reno, NV. Sponsors: IEEE-LEO, OSA. Contact: OSA Meetings Dept., 1816. Jefferson Place NW, Washington, DC 20036 (202/223-0926)

FEBRUARY 1-6: Medical Imaging, Newport Beach Marriott Hotel, Newport Beach, CA. Sponsor: SPIE - The International Society for Optical Engineering. Contact: SPIE, PO Box 10, Bellingham, WA 98227-0010 (206/676-3290)

FEBRUARY 1-6: International Symposium on Pattern Recognition and Acoustical Imaging, Newport Beach Marriott Hotel, Newport Beach, CA. Sponsors: SPIE - The International Society for Optical Engineering, The International Association for Pattern Recognition. Contact: SPIE, PO Box 10, Bellingham, WA 98227-0010 (206/676-3290)

FEBRUARY 7-14: IEEE 1987 Aerospace Applications Conference, Mountain Haus Hotel, Vail, CO. Contact: Warren A. Schwarzmann, 4 Aurora Drive, Rolling Hills, CA 90274 (213/973-1121)

FEBRUARY 9-13: Fundamentals & Applications of Lasers — Short Course, Orlando, FL. Contact: Laser Institute of America, 5151 Monroe Street, Toledo, OH 43623.

FEBRUARY 16-19: Electronic Imaging '87, International Electronic Imaging Exposition & Conference, Anaheim Marriott, Anaheim, CA. Co-sponsors: Digital Design, Diagnostic Imaging, and Electronic Printing and Publishing. Contact: Ed Martin, MG Expositions Group, 1050 Commonwealth Ave., Boston, MA 02115 (617/232-EXPO)

FEBRUARY 17-19: CSC '87 — 1987 ACM Computer Science Conference, Adams Mark and Clarion Hotels, St. Louis, MO. Sponsor: Association for Computing Machinery. Contact: ACM, CSC'87-PR, 11 West 42nd Street, New York, NY 10036 (212/869-7440)

FEBRUARY 23-27: Flat-Panel and CRT Display Technologies — Short Course, Los Angeles, CA. Sponsors: UCLA Extension and the Society for Information Display. Instructor: Larry E. Tannas, Jr. Contact: UCLA Extension, Short Course Program, 10995 Le Conte Ave., Los Angeles, CA 90024 (213/825-3344 or 825-1295)

MARCH 2-5: IEEE Computer Society COMPCON Spring '87, Cathedral Hill Hotel, San Francisco, CA. Sponsor: IEEE Computer Society. Contact: COMPCON Spring '87, 1730 Massachusetts Ave. NW, Washington, DC 20036-1903 (202/371-0101)

MARCH 9-11: Office Automation Conference, Dallas, TX. Sponsor: American Federation of Information Processing Societies. Contact: AFIPS, 1899 Preston White Drive, Reston, VA 22091 (703/620-8900)

MARCH 15-20: 1987 Technical Symposium Southeast on Op-

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tics, Electro-Optics, and Sensors, Sheraton-Twin Towers, Orlando, FL. Sponsor: SPIE - The International Society for Optical Engineering. Contact: SPIE, PO Box 10, Bellingham, WA 98227-0010.

MARCH 18-20: 20th Annual Simulation Symposium, Bay Harbor Inn, Tampa, FL. Sponsor: IEEE Computer Society. Contact: James V. Leonard, 255 Patterson Lane, Florissant, MO 63031 (314/925-6828)

MARCH 22-26: Computer Graphics '87, Conference and Exposition, Philadelphia Civic Center, Philadelphia, PA. Sponsor: National Computer Graphics Association. Contact: Computer Graphics '87, NCGA, 2722 Merrilee Drive, Suite 200, Fairfax, VA 22031 (800/225-NCGA)

MARCH 24-26: SOUTHCON '87, Georgia World Congress Center, Atlanta, GA. Sponsor: IEEE. Contact: Dale Litherland, Electronic Conventions Inc., 8110 Airport Blvd., Los Angeles, CA 90045 (213/772-2965)

MARCH 30-APRIL 2: 1987 International Conference on Robotics and Automation, Radisson Hotel, Raleigh, NC. Sponsor: IEEE-RA. Contact: Arthur C. Sanderson, Program Chairman, Carnegie Mellon University, Robotics Institute, Pittsburgh, PA 15213 (412/578-2590)

MARCH 30-APRIL 2: IEEE INFOCOM '87, Meridien Hotel, San Francisco, CA. Sponsors: IEEE Computer Society and COM. Contact: H. Freeman, Architecture Technology Corp., PO Box 24344, Minneapolis, MN 55424 (612/935-2035)

APRIL 5-9: CHI '87 + GI '87 — Human Factors in Computing Conference and Graphics Interface Conference, Toronto, Canada. Sponsors: CHI — ACM Special Interest Group on Computers and Human Interaction (SIGCHI); GI — Canadian Man-Computer Communications Society (CMCCS), Special Interest Group of the Canadian Information Processing Society (CIPS). Contact: ACM Conference Coordinator, 11 West 42nd Street, New York, NY 10036, (212/869-7440)

APRIL 6-9: ESC '87 — 1987 Eastern Simulation Conferences, Orlando Marriott Hotel, Orlando, FL. Conferences: Simulators; The Simulation Profession; Methodology and Validation; Tools for the Simulationist. Sponsor: The Society for Computer Simulation. Contact: SCS, PO Box 17900, San Diego, CA 92117 (619/277-3888)

APRIL 9-10: Satellite Communications Status '87 — Technology, Applications and Markets, Halloran House, New York, NY. Sponsor: Frost & Sullivan, New York, NY. Contact: Susan Smith, Industry Representative, Frost & Sullivan Inc., 106 Fulton St., New York, NY (212/233-1080)

APRIL 20-24: Fundamentals & Applications of Lasers — Short Course, Orlando, FL. Contact: Laser Institute of America, 5151 Monroe Street, Toledo, OH 43623.

APRIL 26-30: Robots 11/17th ISIR, Chicago, IL. Sponsor: Robotics International, Society of Manufacturing Engineers. Contact: Michael Tew, Technical Activities Dept., SME, One SME Drive, PO Box 930, Dearborn, MI 48121.

MAY 16-20: 22nd Annual Meeting of the Association for Advancement of Medical Instrumentation. Contact: AAMI, 1901 N Fort Myer Drive, Suite 602, Arlington, VA 22209-1699.

JUNE 15-18: National Computer Conference, Chicago, IL. Sponsor: American Federation of Information Processing Societies. Contact: AFIPS, 1899 Preston White Drive, Reston, VA 22091 (703/620-8900)

INTERNATIONAL

MARCH 3-5: 1987 Electromagnetic Compatibility Symposium and Technical Exhibition, Federal Institute of Technology, Switzerland. Contact: Dr. T. Dvorak, ETH Sentrum-KT, 8082 Zurich, Switzerland.

Government approves data interchange standard

A Federal Information Processing Standard, developed by NBS for use by the federal government and approved by the Secretary of Commerce, defines a common way to represent data so that it can be exchanged easily between incompatible computer systems. *Data Description File for Information Interchange* (FIPS 123) adopts a voluntary industry standard that was developed with NBS assistancce (ANSI/ISO 8211-1986, *Specification for a Data Descriptive File for Information Interchange).*

NATIONAL TECHNICAL INFORMATION SERVICE, Springfield, VA (703/487-4650)

Performance measurements outlined for multiprocessor computers

Evaluating and comparing performance of multiple processor computers have proved difficult because of the great variety of these designs. Now, however, the NBS Institute for Computer Science and Technology has come up with some suggestions on how to make and use performance measurements to "tune" current multiprocessor computer designs or improve the designs of future machines. The report, *Performance Measurement Techniques for Multiprocessor Computers* (NBSIR 85-3296) looks at various aspects of computer performance that can be measured. Price: $11.95 prepaid. Order PB # 86-186855/AS.

NATIONAL TECHNICAL INFORMATION SERVICE, Springfield, VA (703/487-4650)

Chemical journals database available on new network

The American Chemical Society Journals Online database (CFTX) is now available on STN International (Scientific and Technical Information Network); and will become an integral part of STN's new full-text database service, CHEMICAL JOURNALS ONLINE (CJO).

Users of the new system will now have access to a completely revised version of the ACS Journals Online file (CJACS) that has been designed for flexibility and precision in searching; and access to other publishers' journals.

New search software has been designed specifically for full-text retrieval with such features as easy cross-over between the Chemical Abstracts (CA) and CJACS files, and improved search capability with both left- and right-hand truncation.

AMERICAN CHEMICAL SOCIETY, Washington, DC (202/872-4457)

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SIGGRAPH '86 highlights available on video tape

A 90-minute video program of the five-day SIGGRAPH '86 provides conference evaluation specifically for experienced professionals among computer graphics researchers, end-users, systems integrators and manufacturers. The video report is organized as follows: Introduction to SIGGRAPH '86, an assessment of the show with a comparison to previous SIGGRAPHs and highlights of technical, product, and industry trends; a guided tour of the exhibition featuring brief presentations of more than 40 products; and in-depth presentations, classified by product, of an additional 20, including product demonstrations; a summary of on-site oral product descriptions and specification/pricing information. The video program is

also available in a Japanese language version. Price: $395.
FROST & SULLLIVAN, New York, NY (212/233-1080)

Circle Reader Service #104

Computer standards groups described in directory

More than 400 organizations that develop standards for computers, information processing, and telecommunications are listed in a directory prepared by the NBS Institute for Computer Sciences and Technology. The directory identifies international, regional, and national organizations, professional and trade associations, and user groups, and describes their standards-related activities. Organizations that would like to be included in the directory should contact: Josephine Walkowicz, A265 Technology Building, NATIONAL BUREAU OF STANDARDS, Gaithersburg, MD 20899 (301/921-3491)

DACs provide sharper, more colorful TV pictures

High-speed digital-to-analog converters (DACs), currently being used to enhance contrast and vividness of high-resolution CRT displays in medical electronics and computer-aided design applications, promise to boost color quality in commercial TV displays and maintain that quality even in large displays.

The DACs convert a computer's digital commands into analog signals, which in turn control the red, blue, and green electron guns in a color tube. They reach speeds in excess of 200 MHz, which enable DACs to create displays up to 1,500 by 1,800 pixels and still refresh each pixel 60 times/second.

Three DAcs recently introduced by Honeywell's Signal Processing Technologies (SPT) unit, include two monolithic (a single integrated circuit) triple, 4-bit devices; and a monolithic 8-bit converter. Instead of using separate DACs for each electron gun, SPT's triple 4-bit DAC controls all three guns and can display 4,096 colors. The 8-bit DAC creates more than 16 million colors and helps generate images that look like 3-D photographs.

Complex DACs previously were made with several silicon chips connected by fine gold wires. Honeywell's new monolithic converters were built using advanced integrated circuit technologies.
HONEYWELL INC., Honeywell Plaza, Minneapolis, MN 55408 (612/870-2207)

Invisible bifocals preferred by VDT workers

According to a study published in the September Journal of the American Optometric Association, invisible bifocals may be a better choice than conventional multifocals and reading glasses for older workers using video display terminals (VDTs).

The study compared different fitting designs of progressive addition lenses, a type of multifocals that differ from conventional ones in that they provide gradual, invisible change in lens power from top to bottom, rather than a sharp jump from one prescription band to another.

Conducted by researchers at The Ohio State University College of Optometry and the University of Alabama at Birmingham School of Optometry, the study showed that a design with a prescription for an intermediate seeing distance on top and a near-vision prescription on the bottom was the one preferred by an overwhelming majority of the participants. The design having a nonprescription segment on top, with a near-vision prescription beneath it, proved to be not acceptable.

AMERICAN OPTOMETRIC ASSOCIATION, St. Louis, MO (314/991-4100)

Circle Reader Service #102

Electro-optical inspection systems facing explosive growth

The need for higher speed industrial inspection methods—and in many cases the requirement for 100% inspection—has created a huge and growing US market for electro-optical inspection systems that is expected to hit $3.7 billion by 1990 (up from $990 million in 1984), according to a recent Frost & Sullivan study.

While the lower cost of electro-optical components, introduction of low-cost lasers and laser systems, and development of advanced microprocessors and microcomputers have contributed immensely to this 25% annual growth rate, the rapidly growing robotic/intelligent vision systems market segment has proved to be the catalyst for such growth. Robotics/vision will show a 50% growth over the forecast period, rising from $130 million in 1984 to $1.5 billion in 1990.

The study, *Electro-Optical Instrumentation Market for Quality and Production Control* (#1557), looks at eight product categories for electro-optical instruments used in production and quality control: image digital coordinate measuring machines; laser-based systems for imaging, alignment, and other inspection functions; solid-state imaging camera sytems; fiber-optic-based inspection systems; spectrophotometers; photomask alignment instrumentation; scanning electron microscopes; and robotic/intelligent vision systems. The 244-page report includes information on the major competitors in each market segment; and discussions of current and future technology as well as market share information and projections through 1990. Price: $1,575.

FROST & SULLIVAN, New York, NY (212/233-1080)

Circle Reader Service #107

Carroll Touch Inc. (Round Rock, TX) has acquired the product lines of Touch Technology Inc. (TTI), an Annapolis, MD-based manufacturer of resistive overlay touch systems. Carroll Touch, a leading manufacturer of infrared touch systems has, incorporated resistive overlay touch systems into its existing Add-Touch and Total-Touch product lines. The Add-Touch products are standard add-on units for a variety of CRTs and flat panel displays. Total-Touch products are integrated packages consisting of a monitor and touch system that are ready to plug into a computer.

Lucitron Inc. (Northbrook, IL) has been awarded a $50,000 grant from the National Institute of Health for work on a new kind of very large, flat, video dislay panel to be used for medical purposes. The Small Business Innovation Research (SBIR) grant will further Lucitron's work on thin, direct-view, large-screen display panels. Lucitron's first 35-in.-diagonal FLATSCREEN panel, delivered to a US Navy laboratory earlier this year, is four square feet in area, only 5 in. thick, and window-glass flat. The unit shows off-the-air TV as well as computer-generated pictures.

Today's technology: Tomorrow's products

The range of the Sixth International Display Research Conference (IDRC)—JAPAN DISPLAY 86—held in Tokyo, September 30 through October 2, 1986, was broadened this year to encompass the expanded frontier of the science and technology of Information Displays ... in response to the accelerated demand for a wide range of display systems, including small to large screens and hardcopy devices.

More than 140 technical papers presented at this year's conference described a broad range of innovative technologies and advanced systems that included CRTs, LCDs, ELDs, VFDs, PDPs, hardcopy printers and a number of other display devices.

Significant among the many excellent papers presented during the three-day conference were the following technological achievements that hold promise for widespread commercial application in the near future.

CRT

• A 3-in. diagonal, flat CRT having a vertical resolution of 300 lines or more and a brightness of 70 fL at a beam current of 70 μA, and applied anode voltage of 1.2 kV. The display has 192 vertically deflected beams that provide the advantage of vertical deflection scanning and horizontal matrix addressing. Power consumption by the device's heater and anode are 0.18 W and 0.08 W respectively.—E. Miyazaki and Y. Sakamoto, Kanazawa Institute of Technology, Nonoichi, Ishikawa.

• A 4V flat beam index, color TV tube having a screen size of 3.15" x 2.36", a thickness of only 1.20", and a total length of 8.57". This flat tube has a reflective type phosphor screen, inclined at an angle of about 20 deg to the electron gun axis. The screen has 180 triplets of phosphor stripes. Brightness is 200 (Cd/m^2); power consumption, only 6.5 W.—F. Inoue (and others), Consumer Products Research Center, Hitachi Ltd., Yokohama, Kanagawa.

• A 17-in. diagonal full square, superhigh-resolution CRT displaying 1280 x 1024 pixels with an 0.3 mm maximum convergence error. The CRT has 64 Hz horizontal scanning and is intended for use in high resolution, compact display applications.—K. Kobayashi (and others), Toshiba Corp., Fukaya, Saitama.

• A 43-in. diagonal direct-view, color CRT having a 4:3 aspect ratio, and 110-deg deflection angle to keep the tube as short, and therefore as lightweight, as possible. The overall display is just 24.3 in. deep; screen size is 35.4" x 28".—S. Ashizaki (and others), Matsushita Electronics Corp., Takatsuki, Osaka.

LCD

• An 8.5-in. diagonal full color, high resolution LCD having 960 x 200 pixels, driven by simple multiplexing (32-driver ICs on glass substrate). Overall dimensions of the display are 9" x 6.5" x 1". High brightness is achieved by backlighting with cool white spectrum consisting of a diffuser and a lighting curtain, two hot-cathode fluorescent lamps, and a reflector.—H. Arai (and others), Product Devel. Lab., Mitsubishi Electric Corp., Amagasaki, Hyogo.

• A 6-in. diagonal, active matrix addressed LCD having 320 x 250 pixels resolution and 8 gray levels or saturated colors. Display area is 5" x 4". Developed for the French MINITEL system—a telephone information service—the LCD panel is intended to replace the 9-in. CRT screen currently used in the system.—M. Bonnel (and others), Centre National d'Etudes des Telecommunications, Lannion Cedex, France.

• A 13-in. diagonal, multicolor LCD having 639 x 400 pixel resolution and RGB mosaic color filters driven by a simple multiplexing method. The device's high multiplexing capacity is based on the bistability of the device's ferroelectric LC material.—H. Hatoh (and others), Electron Device Engineering Laboratory, Toshiba Corp., Yokohama, Kanagawa.

• A flat panel color LCD in which the 128 x 128 pixel color pattern is displayed by opening and closing a ferroelectric LC matrix shutter placed in front of a backlighted panel. The panel consists of LEDs capable of emitting red and green colors uniformly. A full-color version of the display, under RGB LEDs, is presently under development.—T.

Tanaka (and others), Tokyo University of Agriculture & Technology, Koganei, Tokyo.

• A matrix-addressed LCD with high information content and high contrast ratio using non-linear elements (at each pixel) that consist of a simple structure of back-to-back diodes. The two-terminal switching elements can be manufactured in one photolithographic process; the two sequential thin film depositions, with one aperture mask. The 128 x 128 dot matrix, LCD panel has high contrast rating—greater than 20:1 under a duty ratio less than 1/900.—S. Fujita, Wireless Research Laboratory, Matsushita Electric Industrial Co., Ltd., Kadoma, Osaka.

PDP

• A 512 x 512 pixel, plasma display panel (PDP) that uses an independent sustain and address technology. The panel's advanced addressing technique requires only 512 circuit drivers instead of the conventional 1024. Drivers use the simple open-drain n-channel MOSFET output structure, which can be manufactured at a lower cost than the popular totem pole drivers. This design incorporates an energy recovery sustain circuit that uses inductors to recover 90% of the energy normally lost in charging and discharging the capacitance of the plasma panel.—L.F. Weber and K.W. Warren, Computer-based Education Research Laboratory, University of Illinois at Urbana-Champaign, Urbana, IL

• A 5-in. diagonal, planar pulse discharge panel with 160 x 127 display cells providing 256 gray levels for a color TV display. The panel consists of only two parts: a front plate with display and auxiliary anodes and three-color phosphor dots; and a rear plate with cathode and banks. A priming path, between the display and auxiliary cells, is provided on the rear plate to obtain large memory margins.—H. Murakami (and others), NHK Science and Technical Research Laboratories, Tokyo.

ELD

• A high contrast EL unit having 16 x 16 pixels and providing a contrast ratio of 5:1 at 10,000 lx ambient illumination. Units are 2" x 2" x 3/8" and can be arranged to provide a large screen graphic display with a constant pixel pitch. Color is amber; brightness is 50 fL (at 200 Hz, 200 Vp).—T. Shyoji (and others), R&D Ise Electronics Corp., Ise, Mie.

VFD

• A 320 × 320 pixel color graphic front luminous vacuum fluorescent display (FL VFD) having a bright image that is observed from the phosphor-coated side. Display area is 7" x 48". RGB trios pitch is 0.56mm. By controlling light emitting time per dot, halftone images can be generated on the display.—K. Morimoto and E. Imaizumi, Futaba Corp., Mobara, Chiba.

HARDCOPY

• High quality, full-color direct printing based on selective exposures and employing a single gun, white light laser that oscillates three primary colors simultaneously. The white light laser beam is split into three color beams, then each beam is individually modulated by input data signal and recombined. This colored beam scans color photograhic material to produce a full color picture.—M. Takashima (and others), Shaken Information Media Laboratory, Shaken Co. Ltd., Wako, Saitama.

• An ink-transfer, thermal printer using a digital/analog method to reproduce half-tone images. The device utilizes heat interference among the printed dots—that is, the dotted area consisting of multiple dots is gradually varied in size by the feeding print energy. Halftones reproduced on the printer feature high image quality; more than 4 pixel/mm spatial resolution; and less image noise. The system has over 1.5 ms/line print speed without deterioration of image quality. An A4 size, full gray scale image can be printed within 7 seconds, even when using a 16-dot/mm printer.—T. Kanai (and others), Toshiba R&D Center, Toshiba Corp., Kawasaki, Kanagawa.

• A conference copyboard 36" x 51" from which letters and figures drawn on the board can be copied in a reduced hardcopy size for distribution. Writing or drawing is done on a large white sheet that moves across the copyboard surface into its interior where the letters or figures are converted into digital signals for transmission to a stand-alone thermal-head printer.—J. Tadokoro, Applied Facsimile Engineering Section, OKI Electric Industry Co., Ltd., Tokyo.

• A double-sided, white enameled copyboard 35.5" x 71" using a scanning principle to read information written or drawn on the board for transmittal to a stand-alone printer to produce hardcopies. The self-moving scanner—similar to that used for a stationary document-type facsimile—consists of a contact image sensor, a Selfoc lens array, a fluorescent lamp, and a driving unit (to move the scanner across the board). The device rides on a guide rail on top of the board. An A4-size thermal printer interfaces with the copyboard to produce copies of information directly off the copyboard.—T. Yamashita (and others), Matsushita Graphic Communication Systems Inc., Okayama Factory, Okayama.

3-D

• A 3-D display that generates images in space permitting a viewer to see the other side of the image by moving around it. The method uses a gas laser and a moving screen, and operates on the same principle as the varifocal mirror method—with the laser projecting sequentially cross-sectional images on the moving screen. When the screen's moving speed and the laser's scanning speed are fast enough and synchronized to each other, the 3-D image can be seen in space—due to the afterimage effect of the eyes.—H. Yamata, Shibaura Institute of Technology, Tokyo.

(Complete papers are published in the *Proceedings of the 6th International Display Research Conference—JAPAN DISPLAY '86*, The Society for Information Display, 8055 W. Manchester Avenue, Suite 615, Playa del Rey, CA 90293)

Circle Reader Service #106

Knife-edge technique improves measurement of CRT beam profiles

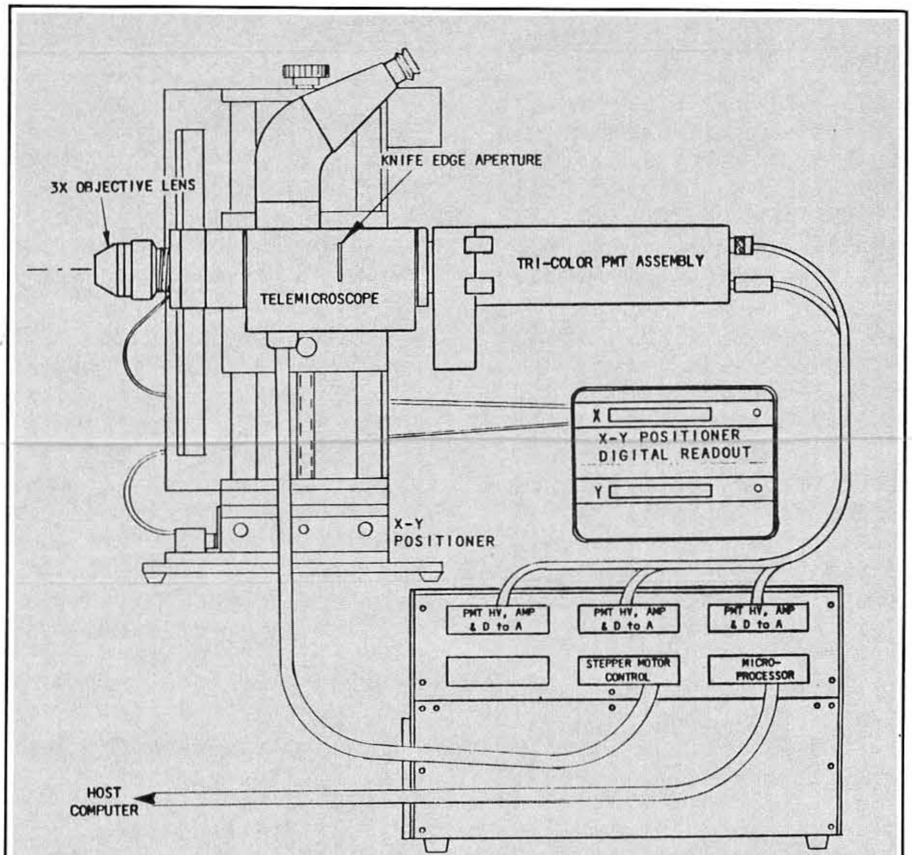
Engineers at EG&G Gamma Scientific have developed an improved technique for measuring spatial profiles of color CRT beams — from which line width, peak luminance, color, and convergence measurements may be derived.

The technique (patent pending) uses a knife edge for scanning the beams and a three-detector assembly for developing the profiles of the Red, Green, and Blue beams — for all practical purposes, simultaneously. During the scan, an incremental profile of the incremental radiance is developed. When this function is differentiated, the spatial beam profile is produced.

Basic advantages of this technique, according to the engineers, are:

- Improves signal to noise ratio
- Eliminates the effects of slit width on spatial profiles (normal CRT line width measurement methods use slit apertures)
- Simplifies profile centroid calculation (essential for convergence and beam deflection linearity measurement)
- Includes the effects of beam interactions in measurement (as compared to measuring each beam's profile with the other two beams turned off)
- Eliminates the effects of intensity of spatial beam drift, or both (as compared to measuring each beam's profile with the other two beams turned off)
- Eliminates any problems of measurement aperture width vs grille or shadow mask pitch or structure.

In addition, the new measuring system features periodic controlled sampling, which significantly reduces the effects of jitter due to power supply, frame, and horizontal line ripple on the measurement values.



The system also has a channel crosstalk deconvolution routine that is used during set-up and, in any one channel, removes any spectral energy from the other two channels. This is accomplished by making three scans; one with each beam on and the other two turned off.

Then, by analyzing the output of each detector channel for each scan and solving the resultant simultaneous equations, crosstalk factors for each detector channel relative to the other two channels can be developed and used to remove the effects of crosstalk. In the process, any crosstalk between the spectral overlapping of detector channels is also eliminated.

In operation, the telemicroscope used in the system is focused on the

(Continued on p 18 . . .)

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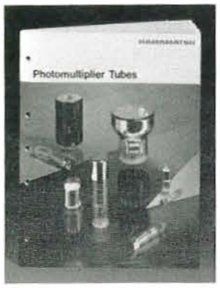
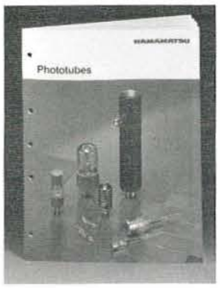
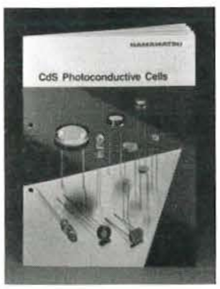


PHOTOMULTIPLIER TUBES FOR EVERY NEED This 68-page catalog details 18 PMT characteristics including spectral response, luminous sensitivity, ground polarity, dark current and hysteresis for the most complete line of head-on and side-on types, ⅜"-20 inch diameter. Selection guide with specifications and dimensional outlines help you make the best choice.

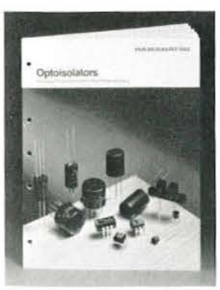


PHOTOTUBES — This 18-page catalog includes a selection guide, spectral response charts, dimensional outlines and specification charts for more than 40 head-on and side-on phototubes, UV detectors, vacuum phototubes, gas-filled and biplanar phototubes.

PHOTODIODES — Silicon, PIN Silicon, GaAsP, GaP, Avalanche This 44-page catalog provides spectral range, response time, temperature characteristics, linearity and specifications for UV to IR silicon, visible to IR silicon, GaAsP and GaP photodiodes.

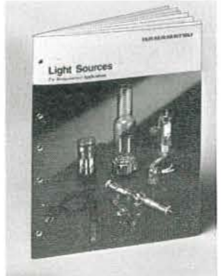


PHOTOCONDUCTIVE CELLS CdS, CdSe This 16-page catalog describes performance characteristics and specifications of various photoconductive cells used in exposure meters, auto dimmers, musical instruments, flame monitors, street light controls and other applications.



OPTOISOLATORS Single and multi-element LED-CdS optoisolators, LED phototransistors, Lamp CdS and opto-interrupters are described. Photos and diagrams illustrating physical characteristics and complete specifications are provided in this 18-page catalog.

Call or write to receive one or all ten catalogs.

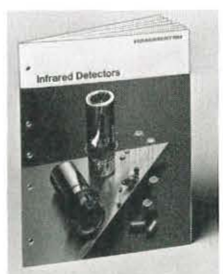


LIGHT SOURCES — Deuterium, Xenon, Mercury-Xenon, Hollow Cathode, etc. This 24-page catalog provides information about the most complete line of light sources for scientific instruments. Specifications are provided which define the high stability and dependability. Super-quiet xenon lamps are among the special light sources described.

PHOTOMULTIPLIER TUBES FOR SCINTILLATION COUNTING AND HIGH ENERGY PHYSICS This 30-page catalog provides a quick reference of PMTs with special performance characteristics. Energy resolution, pulse linearity, response time and application information are included.

VIDICONS — Visible, IR, UV, X-Ray This 24-page catalog provides a cross-reference of vidicon types and typical applications in addition to dimensional outlines, application photos and complete specifications.

SPECIALTY IMAGING TUBES — This 25-page catalog contains a number of new types of photonic devices for capturing static and transit images. An ideal source of ideas for new types of instrumentation.



INFRARED DETECTORS — PbS, PbSe Cells; Ge, InAs, InSb Cells; Photon Drag Detector; Pyroelectric Detectors & More This 36-page catalog describes IR detectors with various elements and configurations. Extensive diagrams, characteristic graphs and glossary accompany performance specifications.

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Circle Reader Service #10

CRT BEAM PROFILE MEASUREMENTS

(. . . continued from p 14)

monitor's phosphor screen. A video signal generator generates a thin white line grid on the face of the monitor. The scanning system of the telemicroscope moves the knife edge aperture across the image plane of the telemicroscope — in increments as small as 10 microns in the image plane. With a 3X objective, this corresponds to 3.3 microns in the phosphor (object) plane. Its motion is under software control of a desktop computer.

Different power objectives may be used, either higher or lower, for CRTs with different resolutions or screen sizes, or both.

To make measurements on either horizontal or vertical lines, the telemicroscope is rotated about its optical axis 90 deg. To measure profiles at different locations on the CRT screen, the telemicroscope is mounted on an X-Y mechanism large enough to move it anywhere within the display field.

For production measurements, this technique can be added to the GS-1000 Automatic CRT Measurement System. Using this combination of technologies, spatial profiles can be measured anywhere specified in the whole display field, without the need of rotating, refocusing, or moving the telemicroscope from one location to another.

Regardless of the method or model chosen for analysis, the discrete spatial data — as measured by this knife edge process — contains all the information necessary to determine color CRT beam characteristics.

(Developed from A Unique Technique for Measuring Spatial Profiles of Color CRT beams — EG&G Gamma Scientific Inc., San Diego, CA)

Circle Reader Service #101

High-res color monitors drive development of sophisticated generators

Rapidly growing demands from industry for higher-resolution color monitors (HRMs) in such areas as CAD/CAE, military and commercial avionics (trainers/simulators) and the graphic arts, are stressing the capabilities of present HRMs. Indeed, the currently accepted specifications that define the minimum for hi-res color monitors are almost obsolescent.

As a result, existing HRM pixel resolutions of 1024H x 1024V that display non-interlaced frames at a horizontal frequency of 64 kHz (a dot-clock frequency of about 100 MHz), are rapidly being pushed toward 2048H x 2048V with clock frequencies in excess of 360 MHz.

To meet the parallel growing concern of HRM designers, manufacturers, and end-users on how to measure electrical and visual characteristics of higher-resolution HRMs, manufacturers of video (signal) generators (VGs) are also pushing the limits of their testing tools toward faster speeds and higher resolutions.

Although a particular existing commercial generator may not appear to offer enough performance to exercise a specific HRM, considerable information may be gleaned in a development laboratory by using the VG as a raster generator and an external pulse generator, slaved to the VG, to generate smaller pixels than the VG can generate alone.

by Edward S. Jacklitch
Marketing Consultant
TEAM Systems
Santa Clara, CA

Specification	Quantum OPIX Imager	Team Astro VG-811	Team Astro VG-807A
Dot Clock			
Frequency range — MHz	1.6 to 200	5 to 120	5 to 160
Simultaneous display states* per frame			
Frequency — MHz			
Up to 25	256	114	702
Up to 50	16	114	702
Up to 100	4	114	702
Up to 200	2	114 (to 120 MHz)	702 (to 160 MHz)
Sync adjustment resolution — n-sec	40 to 80	50	20
Analog Outputs			
Volts across 75 ohm load			
Video signal	0.714	0.5 to 1.27	0.5 to 2
Sync	0.286	0 to 0.7	0 to 0.5
Set up	—	0 to 0.2	0 to 0.25
Circle pattern	1	1	6
Burst patterns	0	4 (variable)	3
Windows	1	1	16 prgrmable
Price, dollars	12,500	10,950	15,800

** Each color bar, gray scale step, and graphics and background plane constitute one state. This is a measure of the versatility of the VG in a test situation.*

Generator selection

Before selecting a VG, it is necessary to consider certain key parameters, then carefully weigh the alternative systems available.

Scan rates — Even though most present VGs operate at 64 kHz, selecting a VG that has horizontal scan rates to 200 kHz or so will enable the testing of new higher-resolution monitors that are already reaching the market. Pick the model with the finest selection of a sweep time at, or very close to, the actual operating requirement of the HRM. When timing can be precisely selected, it minimizes visual distortion on the display.

Dot clock frequency — Make sure the VG selected has the highest dot clock frequency at which all features and capabilities are operating — such as the number of display features that can be utilized at maximum dot clock frequency.

Patterns — Cross hatches, dots, circles, characters, color bars, and gray scales are important evaluation patterns. The VG being considered should be able to mix and match these patterns at full rated dot clock frequency so that it is possible to develop a screen full of various patterns for evaluating several parameters at the same time.

Video outputs — The more signal outputs available, or optional on a specific VG, the more versatile it will be in use. Most HRMs require at least one of the following kinds of signal inputs:

- One bit (on-off ECL/TTL for each of Red, Green, and Blue signals
- Two bit ECL/TTL, where the most significant bit gives 70% brightness on the CRT, and the second bit is used for the final 30%. This technique is used to produce halftones
- Composite video, RGB with sync signals coming down the same wire, or available separately
- Eight bit parallel word, giving up to 256 levels of shading.

The parallel output, besides being able to exercise HRMs having integral DACs, is also helpful in exercising DACs themselves. Some VGs do not output all eight bits at full rated speed. Make sure the VG being considered has enough performance to test the devices required.

And finally, in the selection process make sure to measure the analog video pulse output risetime at the end of a convenient length of coaxial cable, properly terminated; sometimes the vendor specifies the pulse risetime at the rear panel connector, rather than at the end of a cable. The extra capacitance of the cable can distort the pixels, and mask the apparent performance of a given HRM.

Standardized testing

Today's highly sophisticated, low cost commercially available VGs offer a broad range of capabilities to fit specific needs on any given application. These high performance tools provide a convenient and versatile source of complex video signals that allows designer, manufacturer, and end-user alike to apply similar standardized testing to HRMs.

Circle Reader Service #108

Information system ties computers, WPs, printers to telecommunications

Multi-function, multi-user NetExpress 2100 Global Office combines office automation functions with electronic transmittal and receipt of documents and information ... permitting a network of operators and executives in locations around the world to perform a variety of operations on a given document.

The system consists of a Canon laser printer/copier, an IBM Personal Computer AT, and a controller that serves to interface the two components and provide for multiple applications and uses in today's business and scientific environments. The integrated software/hardware system creates, stores, retrieves, edits, prints, duplicates, transmits, and receives graphic material, photographs, and text. It supports up to 15 local terminals and exchanges information among as many as 32 multiple destinations using a single command.

Utilizing a high resolution digital scanner to convert visual material (graphics, photographs, and text) into a digital format, the NetExpress 2100 transmits documents or images around the world quickly and accurately—over telephone lines, via satellite, or on dedicated data networks, depending upon destination. Documents are printed on plain paper or company letterhead (or both) at each receiving location.

The system's high-speed, digital laser printer can print, copy, enlarge, reduce, or modify documents in near-typeset quality (400 × 400 dpi) and can reproduce photographs in up to 64 gradations of tone. Operating also as a copier, the system performs a wide range of sophisticated copying and editing functions including positive/negative reversals, two-page separation, blocking, framing, enlarging/reducing (50%-200%), and more. Copies can be reproduced at speeds up to 24 per minute. Price: $40,000.

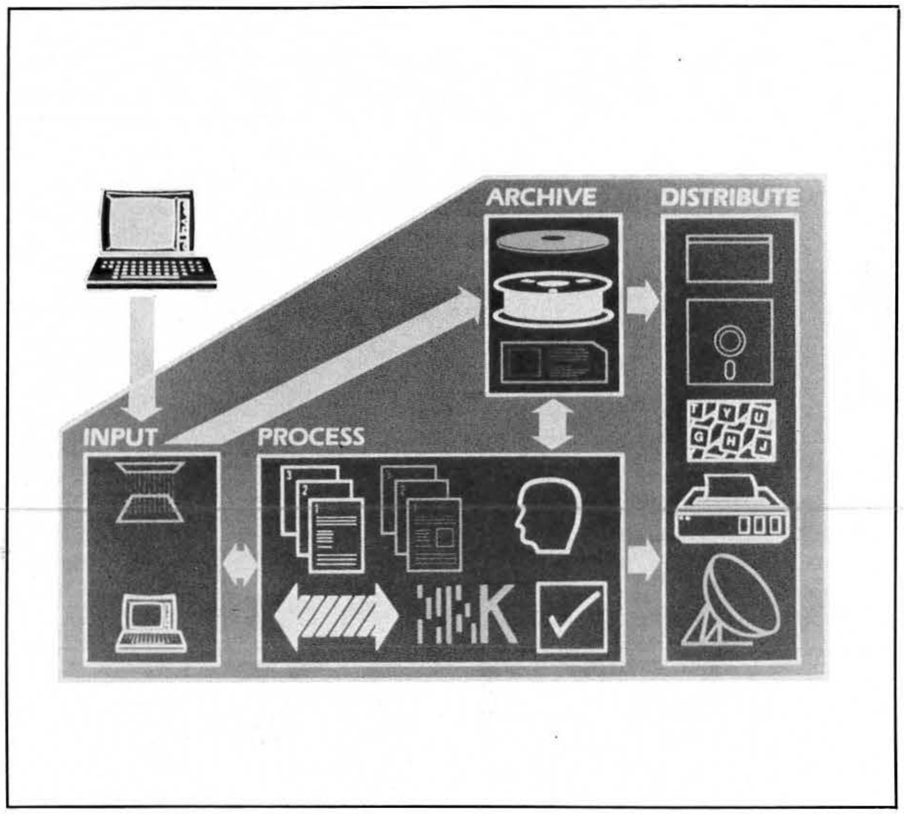
NETEXPRESS SYSTEMS INC., San Mateo, CA (415/341-1370)

Circle Reader Service #109

Documentation system automatically plans, supervises work flow

Overseeing the complex matrix of tasks involved in engineering documentation for manufacturing operations—from design concept drawings through working details to information archiving—frequently requires considerable manual effort and often takes many weeks for valuable information to reach the user.

To overcome these problems and streamline the work-flow, engineers in Kodak's Advanced Systems Group have developed a system that automates the many documentation management functions and eliminates manual routing and distribution of drawings. Using artificial intelligence tools, process mapping, queuing theory, and a systems integration approach, the documentation management system shortens product cycles, increases both throughput and productivity, and reduces costs—while assuring improved accuracy of the finished product, according to the engineers.



Based on the Kodak Cerebral Manager software, which is custom-configured for each user, the system functions as supervisor (or job manager) in requesting, collecting, processing, and conveying information among the various design/manufacturing environments. It internalizes PERT charts to control workflow and time lines; provides necessary checks to insure that the required approvals and tasks are carried out; and serves as an interface between dissimilar pieces of equipment, so information may be exchanged among them.

The system software is in reality a "skeleton" that requires a set of rules—the equivalent of only a few hundred lines of code, instead of the hundreds of thousands of lines of code conventionally used to produce a dedicated application. A model of the user's existing system, including personnel and equipment resources, is created that parallels the processes involved in preparing technical documentation within the user's organization.

No attempt is made within the programming to impose preconceived ideas of how activities should be carried out. Rules established for the software to use in making its decisions are based on the customer's own working methods. The system "knows" what information is needed and obtains it in the most efficient way—asking questions, if necessary. The software automatically prepares a tailored PERT chart and then proceeds to shepherd the job from start to finish, planning the schedule and monitoring the process. The system uses an open architecture approach to handle interfacing various electronic systems so that the CAD equipment, photo-typesetting, or other devices can communicate.

The Kodak system does not require specific equipment configuration, other than the symbolics host computer that runs the software. The user's existing equipment can be used, with any changes or additions implemented when necessary to improve operations.

EASTMAN KODAK CO., Advanced Systems Group, Government Systems Div., Rochester, NY (716/724-1336)

Circle Reader Service #105

LED indicator block

An eight-in-one LED indicator block, consisting of eight individual rectangular light-emitting diodes within a single integrated assembly, enables the user to install eight LEDs at one time with uniform height and perfect alignment; and to use wave soldering, rather than hand soldering of individual LEDs. The indicators also have the correct polarity and cannot be installed in reverse. Additionally, the package provides accurate location on a printed-circuit board behind the panel so that the LEDs line up behind transparent openings in an overlay.
INDUSTRIAL DEVICES INC., Edgewater, NJ (201/224-4700)

Circle Reader Service #41

EL graphics display modules

Two electro-luminescent (EL) graphics display modules incorporate touch screen input devices, offering a maximum resolution of 32 x 16 touch points. Model M2EL 512 x 256 P-9 uses an infra-red beam touch panel; Model M2EL 512 x 256 P-10, a transparent resistive membrane overlay. The number, size, and location of touch points activated is programmable. Each module has an RS-232C port for connection to the touch panel, thereby eliminating the need for a separate host serial port to accommodate the touch device. The IR panel is 11.75" x 7.85" x 1.0", making the overall depth of the display panel a maximum of 3.0 in. Because the resistive membrane touch screen is affixed directly to the display screen face, no depth is added to the display except for the interface card. Overall dimensions of the display module are 10.278" x 5.708" x 2.50".
DIGITAL ELECTRONICS CORP., Hayward, CA (415/786-0520)

Circle Reader Service #42

Graphics desktop printer

Model 4696 Color Ink-Jet printer is a low-cost, desktop personal printer that produces a color print in approximately 2.5 min — on paper or transparency. Two systems configurations are available. The 46964 Color Graphics Output System features 120 dots per inch resolution and a palette of 130,000 colors, is host-based and performs as a shared "plotting" resource off ASCII-based computers, such as those produced by DEC. The CX46965 version was developed for use in the IBM 3270 host environment. Prices: 4696 - $1,795; 4696S - $6,995; CX4696S - $8,995.
TEKTRONIX, Beaverton, OR (503/644-0161)

Circle Reader Service #44

Raster-scan film recorders

Ultra high line rate (60Hz non-interlaced) CompactColor Model 635 and MultiColor Model 638 film recorders offer direct screen compatibility with such graphics workstations as: Apollo, Chromatics, DEC, IBM 5080, Ramtek, Raster Technologies, Seiko, Silicon Graphics IRIS series, Sun Microsystems, Tektronix and others. The addition of the CompactColor Model 635 brings raster-scan CINE capability to the 64kHz environment. Single 16 mm frame and 35 mm pin-registered film heads are available with this unit. The film recorder features 35mm, 4x5, SX-70, CB-33, and 8x10 film backs for slides, instant prints, and transparencies. Price: $18,950 (starting).
DUNN INSTRUMENTS, San Francisco, CA (415/957-1600)

Circle Reader Service #43

Projection camera

Polykon 6300H Projection Step and Repeat Camera is a large area display system used for photo tooling of multi-layer circuit boards, and projection printing of high resolution substrates used in flat panel displays. The unit is completely computerized, and can step and overlay previously generated patterns. It comes complete with a 1000-

watt mercury light source (G lines) with field coverage up to 10" x 10" with resolution of 5 microns. Options include laser interferometer positioning, automatic reticle to wafer alignment using image processing, and automatic reticle changing. Table travel is 24" x 30", with a maximum step field of 24" x 30" plus one image size. Repeatability is ±2 micron (standard); ±1 micron (optional).
ELECTROGRAFICS INTERNATIONAL CORP., Warminster, PA (215/443-5190)

Circle Reader Service #46

Input system controller chips

Implemented in Cmos for ultra-low power consumption, the L2001BK Instrument Panel Input system controller chips include a complete auto-ranging A/D subsystem, switch encoding. Each chip provides outputs for both standard RS232C serial and 5-v ttl serial communications. Up to three panel potentiometers and up to 15 switches can be connected to the chip to provide a complete system ready to communicate with the instrument central controller over a three-wire harness. Software is available for IBM PC compatible instrumentation. The L2001BK supports 32 baud rates from 150 to 76,000 baud; and odd, even, or no parity conditions. Controller parts incorporate a special auto-center technique that eliminates adjustment and centering of potentiometers. The chip will support up to 100% range differences between potentiometers. Price: $25.00 (single piece with discounts up to 50% in large quantities).
LIGHTGATE, Oakland, CA (415/653-8500)

Circle Reader Service #47

Digitizing service

Automatic digitizing service provides fast turnaround for inputting existing drawings or blueprints into CAD and graphic systems. Standard output to IGES as well as direct interfaces to major CAD suppliers are available. Additional CAD services, such as editing, revising, and plotting are also available.
CADSCAN, Scotch Plains, NJ (201/322-9595)

Circle Reader Service #50

EL display systems

Family of sunlight-readable, high-bright electro-luminescent (EL) display systems, which vary in size from 4" x 4" (256 by 256 pixels) to 8" x 8" (512 by 512 pixels), use a split column electrode configuration glass, and an advanced interconnect system that allows the screen refresh rate to be more than doubled — resulting in a bright display in direct sunlight applications. With brightness levels to 125 ft-L (unfiltered), and 120-degree viewing angles, the EL56 Series displays permit wide flexibility in installation. The systems come completely integrated in full-case enclosures, with standard CRT interfaces, or optional Parallel or Serial interfaces to provide either alphanumeric or graphics controllers. Flexible power requirements for the systems allow use of either 24 v or 28 v dc (unregulated 17 v to 32 v), or 15 v dc regulated. Power consumption ranges from 25 to 40 watts, depending on the model.
INFODEX INC., Waterbury, CT (203/757-9291)

Circle Reader Service #45

Intelligent sensor systems

Fluxgate Heading Sensor is a complete subsystem that can be used as a smart peripheral device to provide heading input to another system. Models vary in size and

Circle Reader Service #20

complexity, ranging from a simple toroidal sensor coil with internal gimbaling, to a high-precision sensor system with a built-in microprocessor. The more advanced model has digitally variable damping, automatic deviation correction, a range of selectable outputs, and can drive remote LCD readouts directly.

KVH INDUSTRIES, Middletown, RI (401/847-3327)

Circle Reader Service #51

Video digitizing system

Slow-scan video digitizer, COMPUTER-EYES/2 for the Apple II series of personal computers, connects to any standard video source (video tape recorder, video camera, videodisk, and so forth). The system features: single plug-in board; capture time of less than 6 sec for any mode and any number of gray levels; software controlled video switching that provides preview of the video input directly on the monitor; automatic calibration of brightness and contrast, and Appleworks-like menu-driven software. The digitizer acquires both standard and double hi-res images, as well as true gray-scale images on Apple IIe's equipped with Video-7 Enhancer or Legend 'E Card. Price: $129.95.

DIGITAL VISION INC., Needham, MA (617/444-9040)

Circle Reader Service #52

Touch input system

Scanning infra-red beam input system for the Textronix terminals includes a 13-in. Smart-Frame and a custom insert that fits inside the existing bezel; and a Smart-Y, serial splice controller that reformats 7-bit ASCII compatible protocol into 8-bit bytes for communication with Smart-Frame. In addition, Smart-Y allows data from the computer terminal and the Smart-Frame to share a single EIA-232-C host link. Price: $1,000.

CARROLL TOUCH, Round Rock, TX (512/244-3500)

Circle Reader Service #53

Half-height hard disk

Model 3540 Winchester disk drive is a half-height 3.5-in. unit that features a 40 MB formatted capacity, and a 40 millisecond average access time. The drive has a low power requirement of only 12 watts. Recording density is 13,171 bits-per-in.; track density is 1019 tracks-per-in. Price: $1,000.

C. ITOH ELECTRONICS INC., Los Angeles, CA (213/306-6700)

Circle Reader Service #54

Color graphics workstation

The 32-bit microprocessor-based Model G5068 Color Graphics Workstation functions in either 2D or 3D, through easy keyboard commands; and is switchable to 16-bit mode. The workstation includes a VME bus chassis with dual 68020, 6881 4-decker pipeline and segment memory. It runs software under the UNIX System V operating system with a 4-MB main memory with C, Fortran 77 and LISP capability. A 171 MB Winchester hard disk drive and 1 MB, 3.5-in. floppy disk drive are included. A 19-in. display screen provides 1280 x 1024 pixels of viewable resolution and draws from 16 to 16.7 million colors simultaneously. High-speed bit-mapped raster graphics are placed on the screen in 24 layers.

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President's Message

SOCIETY FOR INFORMATION DISPLAY
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Over the years, displays and imaging have steadily improved and many of the far-out dreams of the science fiction world, from Dick Tracy watches to large, flat television screens, have become technological possibilities, if not commercial realities. Some of these dreams, however, seem to frustrate our most inventive minds.

Very early in my career, as a research scientist/display engineer, I became interested in 3-D displays. The reason for this interest is easy to explain: I worked for a company, RCA, that had been active in the early days of radio and had played a major role in the "addition of images to radio", namely B&W television, and had successfully pioneered and commercialized color TV. Obviously the research department should be concerned with the next major improvement, and 3-D TV seemed the logical next step.

I reviewed the previous history of stereoscopic images and movies ("anaglyphs") using either red/green or polarized images with glasses or a stereoscopic viewer; I found patents dating back to 1915. Unfortunately I belong to a significant number of people (mostly men) who do not "fuse," that is who do not use both eyes simultaneously to translate stereoscopic cues into 3-D images and therefore do not appreciate stereoscopy. I do have at least one fond memory of these early days, namely the time that a colleague and I went to see a newly-released, slightly blue, 3-D movie (I believe it was entitled "The Stewardesses") — for the sake of research, of course. It turned out that my colleague also didn't fuse and so the exaggerated 3-D bodies on the screen were somewhat lost on us; I also remember getting a stiff neck (you can't tilt your head for two hours without seeing two conflicting images). In any case this movie again failed to revive the public's interest in 3-D, probably because of the dislike for glasses and absence of parallax.

I had also made a few holograms in those days and produced realistic 3-D images that even I could appreciate, but it was immediately obvious from the resolution-requirements of the film we used that the bandwidth requirements to transmit true holographic images at 50-60 frames per second were astronomical. What was needed was a bandwidth compression scheme to provide 3-D images - with parallax - within reasonable bandwidths.

My attention then turned to "panoramagrams," the lenticular images that are still sometimes seen in postcards which provide parallax information in a "repeating" viewing angle. This type of display combines many views of a scene by recording strips from each view in the focal plane of cylindrical lenticular lenses; the basic idea for this arrangement goes back to 1692 and the French painter Bois-Clair! The lenticular printing technology which was introduced by Cowles Communications, Inc. in 1964 appeared attractive since it provides parallax information only over a limited (controllable) viewing angle horizontally (not-at-all vertically) thereby minimizing the information content, or bandwidth requirements. A distinct drawback, however, was that scenes with great depth of field were necessarily out of focus in the background.

I believe the real solution eluded me then as it appears to have eluded all of us to date. Just as color TV avoids transmitting three monochrome images — the requirements for color TV are compatible and barely larger than for monochrome — we must find a means of encoding 3-D images without significant penalty in bandwidth. The solution, I suspect, will not lie in transmitting limited-resolution difference signals, as is the case in audio for instance, but in clever image processing and encoding techniques, possibly borrowed or stolen from the world of computer graphics.

I just learned that yet another 3-D movie is being made jointly by the giants of Hollywood and moguls of Disneyworld, again using glasses of some kind. Since I will not be able to appreciate this new revival of an old technology I am sticking to my belief that we should go back to the laboratory and invent a better mouse trap. I would frankly love to see my favorite TV personality "step out of the boob tube, and into my living room."

While I return to my drawing board I would like to wish each and every one of you a joyous 3-D holiday season and happy, prosperous new year!

Bay Area: November 18, 1986
Program: Technical Meeting
Location: The Blue Pheasant, Cupertino, CA
Topic: Effects of Viewing Angle on Flicker Perception in Displays
Speaker: Dr. Christopher W. Tyler, Sr. Scientist, Smith-Kettlewell Institute of Visual Sciences, San Francisco, CA

Dr. Tyler's presentation explained why previous data on flicker limits are underestimates; and revealed the surprising results of his recent investigations. This was a rare opportunity for improving one's understanding of one of the more subjective and controversial aspects of modern display performance.

San Diego: October 28, 1986
Program: Technical Meeting
Location: Hughes Carlsbad Facility, Carlsbad, CA
Topic: Prototype Full Color Liquid Crystal Light Valve L.S. Project; High Resolution Probeye II Infrared Viewer; and OPTI III Automatic Optical Inspection System
Speakers: Hughes Engineers

Minneapolis-St. Paul: October 24, 1986
Program: Technical Meeting
Location: Tartan Park Auditorium, St. Paul, MN
Topic: Optical Recording Technologies
Speaker: Peter J. Vogelgesang, 3M Company, St. Paul, MN

This was a joint meeting with SPSE—the Society of Photographic Scientists and Engineers

Bay Area: October 21, 1986
Program: Technical Meeting
Location: Beverly Heritage Hotel, San Francisco, CA
Topic: Laser Displays

TWENTY-FIVE YEARS
SID
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Announcement to subscribers and advertisers

Starting with the January 1987 issue, *Information Display* will be published by Palisades Institute for Research Services, Inc., 201 Varick Street, New York, NY 10014.

All correspondence concerning the January issue and following issues should be directed to Jay Morreale, Publishing Director, Palisades Institute for Research Services, Inc. (telephone: 212/620-3371).

March editorial closing:	January 2
February ad closing:	January 2

Philip M. Heyman
SID Publications Chairman

Society for Information Display
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Playa del Rey, CA 90293.

NOMINATION FOR 1987 AWARDS

One of AFIPS' most important goals is to encourage excellence, achievement, and service to the information processing industry through the presentation of annual awards to individuals who have distinguished themselves in this field.

Nominations for the 1987 awards are now being solicited.

Harry Goode Memorial Award—Presented in memory of Harry H. Goode, a pioneer and leader in the field of systems engineering; and consists of a medal, certificate, and a $2,000 honorarium. The award honors either a single contribution of outstanding significance in theory, design, or technique in information processing, or the accumulation of contributions in theory or practice over an extended time period, the total of which represents an outstanding contribution.
Deadline for submitting nominations: **February 1, 1987.**

Education Award—Honors outstanding contributions to education in the information processing field; and consists of a certificate and a $1,000 honorarium. Selection of the recipient is based on contributions through publications, innovative teaching, curriculum development, or leadership (or combination of all three).
Deadline for submitting nominations: **February 1, 1987.**

Certificate of Recognition—Honors specific and outstanding contributions to AFIPS and its activities; and consists of a certificate and a pin.
Deadline for submitting nominations: **February 1, 1987.**

AFIPS-Fortune Magazine Product-of-the-Year Awards—Recognize outstanding products in the computer field. Established in 1985 by AFIPS, and sponsored by Fortune Magazine, one award (and up to two meritorious mentions) may be given in each of three categories: hardware, software, and systems. Nominated products must be innovative, have a potentially significant impact on the computer industry, and be commercially available within the US.
Deadline for submitting nominations: **March 15, 1987.**

Contact: AFIPS,
1899 Preston White Drive, Reston, VA
22091 (703/620-8911)

Speaker: Alfred Hildebrand, Vice President and Manager, Corporate Development, Spectra-Physics
Mr. Hildebrand discussed the growing list of display applications for which lasers are being adapted, pointing out the unique qualities laser displays offer that cannot be matched by other displays. He also pointed out the disadvantages of their use.

San Diego: September 25, 1986
Program: Technical Meeting
Location: San Diego Yacht Club, San Diego, CA
Topic: Close Encounters of the Star Kind
Speaker: A.B. Meinel and M.P. Meinel
Jet Propulsion Laboratory,
CalTech, Pasadena, CA
Joint meeting with the Optical Society of America.

Bay Area: September 16, 1986
Program: Technical Meeting
Location: Beverly Heritage Hotel, San Francisco, CA
Topic: Multibeam CRT
Speaker: Bill Fenley, President, and Dr. Roy Murphy, Vice President, R&D, Azuray Inc., Scotts Valley, CA
The speakers discussed the CRT, the monitor and dynamic correction circuitry of their company's 2048 × 2048 display. Also covered were the graphic controller, the memory architecture, and applications.

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