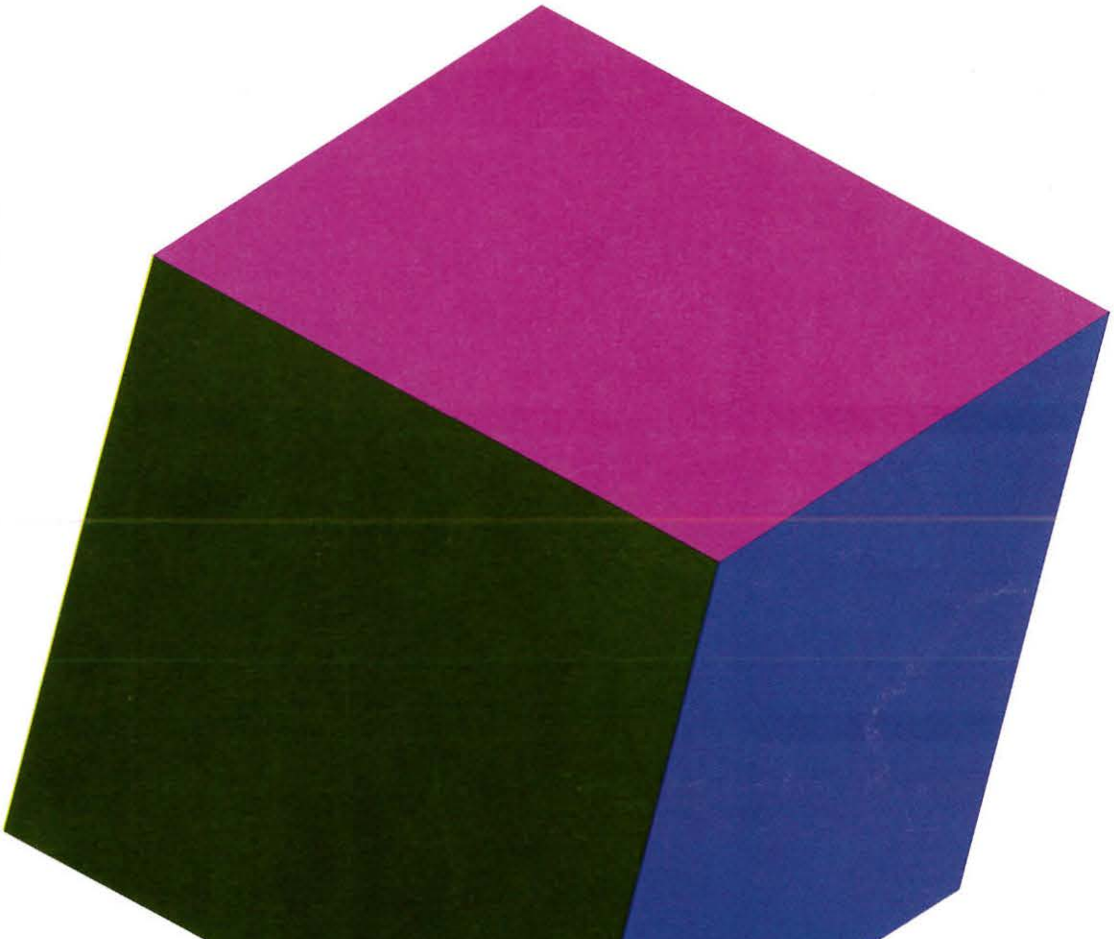
THE OFFICIAL JOURNAL OF THE SOCIETY FOR INFORMATION DISPLAY

INFORMATION DISPLAY

DECEMBER 1985



FUTURE OF FLAT-PANEL DISPLAYS

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NATIONAL

JANUARY 16-20: ICIA '86 COMM-TEX INTL., Las Vegas, NV. Sponsored by the International Communications Industries Association (ICIA). Contact: Bobbie Hunt, International Communications Industries Association, 3150 Spring St., Fairfax, VA 22031-2399 (703/273-7200)

JANUARY 19-24: O-E/LASE '86, Optoelectronics, Laser Applications in Science and Engineering, Los Angeles Marriott & Airport Hilton Hotels, Los Angeles, CA. Sponsored by The International Society for Optical Engineering (SPIE) in cooperation with Center for Laser Studies/Univ. of Southern California, Georgia Institute of Technology, Institute of Optics/Univ. of Rochester, and Optical Sciences Center/Univ. of Arizona. Contact: O-E/LASE '86, SPIE, PO Box 10, Bellingham, WA 98227-0010. (206/676-3290)

JANUARY 21-23: Office Automation Conference, Washington, DC. Contact: AFIPS, 1899 Preston White Dr., Reston, VA, 22091 (703/620-8900)

JANUARY 23-25: 1986 SCS Multiconference, Bahia Hotel, San Diego, CA. Sponsored by Society for Computer Simulation (SCS). Contact: SCS, PO Box 17900, San Diego, CA 92117-7900 (619/277-3888)

FEBRUARY 3-7: ACM Computer Science Conference (CSC '86), Cincinnati, OH. Sponsored by Association for Computing Machinery (ACM). Contact: Lawrence A. Jehn, Computer Science Dept., Univ. of Dayton, Dayton, OH 45469 (513/229-3831)

FEBRUARY 6-8: Workshop on the Foundations of Artificial Intelligence, Las Cruces, NM. Co-sponsored by American Association for Artificial Intelligence and the Computing Research Laboratory of New Mexico State University. Contact: Derek Partridge, Computing Research Laboratory, New Mexico State Univ., Las Cruces, NM 88003.

FEBRUARY 8-15: IEEE 1986 Aerospace Applications Conference, Steamboat, CO. Contact: Dr. Russell A. Gaspari, 6656 West 87th Place, Los Angeles, CA 90045. (213/648-1325)

FEBRUARY 10-14: Short Course—Fundamentals & Applications of Lasers, Greenville, SC. Contact: Laser Institute of America, Education Dir., 5151 Monroe St., Suite 102W, Toledo, OH 43623. (419/882-8706)

FEBRUARY 17-19: Short Course—Modern Radiometric and Photometric Measurements, Orlando, FL. Contact: Laser Institute of America, Education Dir., 5151 Monroe St., Suite 102 W, Toledo, OH 43623. (419/882-8706)

FEBRUARY 24-26: Conference on Optical Fiber Communication (CFC '86), Atlanta Marriott Marquis Hotel, Atlanta, GA. Contact: OSA Meeting Dept. 1816 Jefferson Place NW, Washington, DC 20036. (202/223-8130)

FEBRUARY 24-28: Short Course—Flat-Panel and CRT Display Technologies, UCLA Extension, Dept. of Engineering and Science, Los Angeles, CA. 10995 La Conte Ave., Los Angeles, CA 90024. (213/825-3344 or 825-1295)

FEBRUARY 26-28: 5th Annual Phoenix Conference on Computers and Communications, Phoenix, AZ; Sponsored by IEEE Computer Society (IEEE/CS). Contact: IEEE Computer Society, 1730 Massachusetts Ave., NW, Washington, DC 20036. (202/371-0101)

INTERNATIONAL

JANUARY 16-20: Third Asian Aerospace Exhibition and Conference, Singapore. Contact: Kerry Gumas, CEG, 1 Maritime Square, #72-03, World Trade Center, Singapore 0409. (271-1013)

FEBRUARY 19-21: AUTOMATION TAIWAN '86, CEIDC Exhibition Complex, Sung Shan Airport, Taipei. Sponsored by the China Economic News. Contact: David Wolstenholme, American Communications Group, 8300 Greensboro Dr., Suite 690, McLean, VA 22102. (703/893-4545)

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

MARCH 17-18: Conference on Sensors—Technology and Applications, Bad Nauheim, Federal Republic of Germany. Contact: German Section of IEEE, The Secretary, Dr. Ing. F. Coers, Stresemannallee 15, VDE Haus, D-6000, Frankfurt 70, Federal Republic of Germany. (069/6308-221)

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DECEMBER 1985 VOL. 1 NO. 12

Cover: *Graphic image, originally developed on a Spectragraphics workstation and printed on a Seiko video printer, represents 150 dots/inch saturated color copy available with thermal transfer printing technology.*

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.

Call for Papers

Computer Vision

Submitted and invited papers are now being accepted for the International Conference on Computer Vision and Pattern Recognition, to be held at the Fontainebleau Hotel, Miami Beach, FL, June 22-26, 1986. Invited papers will provide an overview of research in particular areas. Submitted papers may be long, short, or poster presentations. Long papers are reserved for finished high quality work. Short papers are for continuing work with partial results. Poster presentations are for timely presentation of current research where there may be few results at the submitted deadline. All accepted papers will be published in the conference proceedings. Conference topics include, but are not limited to: 3-D vision, image understanding systems, geometrical reasoning systems, robot vision, vision hardware, and pattern analysis, among others.

For full details on submission of papers;
Computer Vision and
Pattern Recognition
IEEE Computer Society
1730 Massachusetts Ave. NW
Washington, DC 20036-1903
(202/371-0101)
Deadline for submittal: January 7, 1986.

Information Communications

Authors are invited to submit papers for presentation at the 43rd Congress of the International Federation for Documentation (FID) to be held at the Queen Elizabeth Hotel, Montreal, Canada, September 14-18, 1986. English and French are the offical languages of the Congress and authors are requested to submit two copies of previously unpublished material in either language. Papers should be limited to 10 double-spaced pages. Topics include: Advances in Communications Technology, Electronic Publishing, Electronic Document Delivery Systems, Advances in Computer Systems, and Technology transfer.

Authors should submit papers to:
Mr. Elmer V. Smith, Director
Canada Institute for Scientific
and Technical Information
Ottawa (Ontario) Canada K1A OS2
Deadline for submittal: January 15, 1986.

Modeling and Simulation

Original papers, not previously published, are being solicated for the 7th Annual Pittsburgh Conference on Modeling and Simulation to be held at the School of Engineering, University of Pittsburgh, April 24-25, 1986. Special emphasis for the Conference will be on microprocessors, personal computer applications and software, artificial intelligence, expert systems, robotics and social, economic, regional science, and global modeling and simulation. Two copies of an abstract (50 words long) should be submitted.

Direct all correspondence to:
William G. Vogt or Marlin H. Mickle
Modeling and Simulation Conference
348 Benedum Engineering Hall
University of Pittsburgh
Pittsburgh, PA 15261
Deadline for submittal: January 31, 1986.

Computing in Research

Participation in ACM-IEEE Computer Society, 1986 Fall Joint Computer Conference, to be held at INFOMART, Dallas, TX, November 2-6, 1986 is open to professionals concerned with computing in research, development, and applications. Original technical papers or surveys; proposals for panel discussions, tutorials, seminars, and short workshops; and poster presentations are being solicited. Papers submitted should be complete and should include an abstract. Proposals should state the subject and purpose, and indicate expected participants.

For further conference information, contact:
Dr. Stanley Winkler
Conference Chair, FJCC'86
IEEE Computer Society
1730 Massachusetts Ave, NW
Washington, DC 20036-1903
(202/371-0101)
Deadline for submittal: March 15, 1986.

AFIPS to sponsor weekly TV computer series

The American Federation of Information Processing Societies (AFIPS) will be an underwriter this season for the popular weekly TV series on computer topics—"The Computer Chronicles." Hosted by computer authority Gary Kildall (designer of CP/M) and public television correspondent Stewart Cheifet, the series is broadcast on 125 public television stations throughout the nation and features discussions with leading computer innovators as well as hardware and software demonstrations. A news segment of the program includes important legislative issues relevant to the computer and information processing industry. Two half-hour shows are also planned for in-depth exploration of particular topics with leading legislators, information processing experts, corporate leaders and industry observers. AFIPS will provide "The Computer Chronicles" consultation on topics to be covered.
Contact: Katherine Jennings, AFIPS, 1899 Preston White Drive, Reston, VA 22091 (703/620-8911)

Penn and AT&T design $8-million computer network

The University of Pennsylvania will allocate about $8 million for AT&T to design and implement a campus-wide datacommunications network that would allow communication between any two computers. The project involves 10,000 computer work stations on a campus of 40,000 students, faculty and staff in 117 buildings. All campus computer work stations will be linked into a single optic-fiber network called PENNET. An additional $11 million will be spent to create internal networks within each building, linking individual offices and work stations together and into the building-to-building network.
Contact: Virgil Renzulli, University of Pennsylvania, 410 Logan Hall/CN, Philadelphia, PA 19104 (215/898-8721)

Transparent metrology concept for digital signals

The National Bureau of Standards has proposed a template method for measuring signal-power to noise-power ratios and distortion of digital signals that is transparent to the user. Measurements can be made without modifying or interfering with the signal and without degrading the usable channel capacity. The technique involves the use of selected patterns from the working digital data stream for analysis of performance parameters. Transparent Metrology of Signal to Noise Ratios of Noisy Band-Limited Digital Signals (TN 1077) discusses the concept. Stock No. 003-003-0Z658-1. Price: $1.25.
Contact: Dr. Donald Halford, Division 723.05, National Bureau of Standards, Boulder, CO 80303 (303/497-3246)

Booklet outlines fire protection for electronics

Facts About Protecting Electronic Equipment Against Fire, a 24-page

booklet published by Ansul Fire Protection, discusses the need for fire protection of delicate electronic equipment. Fire risks in electronic installations are analyzed, and viewpoints of the insurance industry and the National Fire Protection Association (NFPA) are examined. The booklet also includes details on the compatibility of Halon 1301 systems and water sprinkler systems, types of halon systems, fire detection and control, the testing of halon systems and the role of Underwriters Laboratories in the protection of electronics.
Contact: Sara M. Lambrecht, Ansul Fire Protection, One Stanton St., Marinette, WI 54143 (715/735-7411)

AFIPS document focuses on computers in education

The softcover edition of the Proceedings of the 4th World Conference on Computers in Education (WCCE), containing over 200 refereed papers and summaries of tutorials and panel presentations of the conference held in Norfolk, VA, July 29 to August 2, 1985, is now available from AFIPS. The reference document focuses on computers in college, secondary and elementary education, and is targeted for those who administer, design and implement computer education curricula as well as computer education researchers. It explains how schools plan for, select, implement and evaluate computing systems, courses, curricula and strategies, explores ethical issues and technologies, provides case studies of various computer education techniques and projects Two volumes; 1,038 pp. Price: $50.
Contact: AFIPS Press, 1899 Preston White Drive, Reston, VA 22091, (703/620-8937).

CAST sponsors Congress, supports INTERCOMM 86

The International Congress for Computers and Communications in Science and Technology will be held September 15-20, 1986, at the Beijing Exposition Center in China. Sponsored by the Chinese Association of Science and Technology (CAST)—a federation of 132 Chinese associations and societies—and the China Computer Society (CCS), the Congress will run concurrently with INTERCOMM 86—The International Communications Exposition & Conference for Science and Technology, supported by CAST.

INTERCOMM's conference will consist of technical seminars offered by exhibiting companies. CAST and CCS officials expect an attendance of 10,000 targeted end users at the exposition and about 500 at the Congress. INTERCOMM incorporates the ChinaComm exposition, which was produced in Beijing in 1982 and 1984.
Contact: Show Manager, INTERCOMM, Cahners Exposition Group, 7315 Wisconsin Avenue, P.O. Box 70007, Washington, D.C. 20088 (301/657-3090)

"The best-laid schemes o' mice an' men gang aft a-gley . . ."

—Robert Burns

For many business (trade) publications, December and July traditionally produce some of the smallest—pagewise—magazines of the year. Although ID is no exception to this rule, size of publication belies the quality of material we've included in this month's issue.

To begin with, SID member Elliott Schlam takes a look at some of the trends in flat-panel display technologies and the potential for their market growth . . . a subject that we'll explore in greater depth in various issues of your Journal during the coming year (see ID September 1985, p 5).

As Elliott points out, however, ". . . despite great strides in flat-panel display technologies (especially within the past few years), the single-wire addressing afforded by the horizontal/vertical deflection schemes used to address cathode tube displays still makes the CRT a unique and simple-to-drive display device. Although flat-panel technologies have various inherent complexities in addressing the x-y scheme, in time response and in other characteristics, Schlam projects that flat-panel displays will "infringe on CRTs at an increasing rate—in areas that don't require the unique capabilities offered by shadow-mask CRTs."

SID member Bernard Lechner, in another article, analyzes High-Definition Television (HDTV) potential for reaching the consumer market in the near future. His conclusion: while HDTV technology admittedly is ready, transmission capabilities have yet to catch up with the display technology.

In his article on magnetic shielding, SID member S.M. Kamens examines the effects of mishandling, or abusing, magnetic shields. His article explains an accurately controlled testing program to measure the effectiveness of five magnetic shields that were subjected to controlled repetitive drops from a uniform height and under similar conditions—both with and without annealing between drops. Evaluation of test results clearly shows an obvious reduction in shielding performance based on continuous misuse (or abuse) created by dropping. When samples were re-annealed, degraded shields apparently regained optimum magnetic shielding properties.

* * *

With the January issue of ID, we'll begin our regular monthly coverage of various flat-panel display technologies—starting with an overview of the next generation of LCDs by Allan R. Kmetz, in which he explores such problems as LCD addressing, new LCD effects, active substrates and other characteristics. And, in the same issue, we'll take a look at some applications of LCDs in business and scientific display systems.

Also, in the January issue of ID, we're launching a new section that each month will feature the profile of a newly elected Sustaining Member of your Society, along with a number of short sketches on long-standing Sustaining Members. Our ultimate goal is to provide ID readers with background information on every Sustaining Member of the Society, and then to package this information, for the display community at large, in an Annual Directory of SID Sustaining Members: Services & Products.

We sincerely hope each of you will respond favorably to our efforts.

Joseph A. MacDonald
Editorial Director

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Predoctoral fellowship and professional internship offered

Charles Babbage Institute, University of Minnesota, is accepting applications for a Predoctoral Fellowship and a Professional Internship. The fellowship, to be awarded for the 1986-87 academic year, is available to graduate students whose dissertation will address some aspect of the history of computers and information processing. Thesis topics must be chosen from, but are not limited to, the infrastructure of the information processing industry, and specific technological developments in the information sciences, including both hardware and software. The stipened will be $5,000 plus an amount up to $2,500 for tuition, fees, travel, and other research expenses. Fellows may reapply for up to two one-year continuations of the Fellowship.

Fellowship applications should include biographical data and a research plan, three letters of reference, certified transcripts of college credits and GRE scores (or their equivalents abroad) to be sent directly to the Institute. The Professional Internship, to be awarded for a period of three to nine months between June 1, 1986 and May 31, 1987, is available to professional people interested in an introduction to the history of information processing. Applicants may include historians and social scientists, or records managers and archivists. Residence at the Babbage Institute is required. The stipend for the internship is $1,000 per month.

Internship applications should include biographical data, a statement of interests, a proposal of dates during which the internship would be held, and the names, addresses and telephone numbers of three references.

No special application forms are required. Applicants should send their materials to the Charles Babbage Institute, University of Minnesota, 104 Walter Library, 117 Pleasant St. S.E., Minneapolis, MN 55455.

Deadline for filing applications is January 15, 1986.

Travel grants offered to IFIP's Computer Congress

The American Federation of Information Processing Societies (AFIPS) will offer travel grants to IFIP '86, 10th World Computer Congress on September 1-5, 1986, in Dublin, Ireland. The conference will focus on examining the legal, social, cultural and economic problems related to information applications. Partial travel support for about 75 participants in the Congress will be available under an NSF grant. Applications for these grants are now being accepted. Selection will be based on applicants' contributions to computer and information processing sciences.

Contact: AFIPS Communications Department, 1899 Preston White Drive, Reston, VA 22091, Attention: IFIP Congress '86 Travel Grants. (703/620-8914)

Deadline for submitting application is March 1, 1986.

Flat-panel displays poised to displace some CRT applications

Despite the great strides in flat-panel display technologies within recent years, the Cathode-Ray Tube continues to serve as the primary display mechanism for applications requiring more than a limited amount of alphanumeric characters . . . such as found in calculators and the like. Not only does the CRT maintain this status, but also its quality and breadth of application are growing.

Flat-panel constraints

Multi-element addressing or multiplexing flat-panel displays, in general, is not a simple task. The basic problem lies in implementing an x-y addressing scheme to select particular picture elements—with the limitations of selecting only one row or column at a time, to avoid redundancy. Complicating the problem are the system's time response, electrical/optical cross-coupling, voltage-current requirements, and voltage output characteristics of the various flat-panel technologies.

Each technology has certain specific requirements for satisfactory multiplexing, thus a number of different techniques have evolved. Plasma and electroluminescent technologies can use simple x-y schemes but require voltages in the 110V-200V range. Liquid crystals, on the other hand, work in a lower voltage range, but cover a much broader range of multiplexing difficulties, depending upon size, resolution and display characteristics required.

Plasma displays

The most advanced flat-panel display technologies are the dc, ac, and hybrid ac/dc plasma displays. One reason for this is the relatively straightforward multiplexing characteristics of such displays, with resolution being limited only by system construction.

Plasma displays have been developed that range in size from a single line of alpha-numeric characters to a 60x80-cm, 1200x1600-element panel. Display phenomenon consists of a discharge of light that occurs when a threshold voltage is exceeded in a specific gas mixture. Construction and electro-optical details of plasma displays are specific to the technology and dictate, to a certain degree, their cost and areas of application.

Liquid crystal displays

Liquid crystals completely dominate calculator-like applications; however, advances are now pushing the liquid crystal toward considerably more complex computer and imaging applications. One of the primary problems that has limited the use of liquid crystals in these advance applications has been extreme multiplexing difficulties due to undesirable response-time and electro-optical characteristics.

Advances in construction techniques in various liquid crystal technologies—including twisted nematic and phase-charge phenomena—as well as in intrinsically adding non-linear multiplexing elements such as metal-insulator-metal and thin-film-transistor devices have aided in improving system multiplexing. There are numerous tradeoffs in the operational mode and multiplexing mechanisms that impact producibility, cost, and operational characteristics—all of which have a direct effect on where and how liquid crystal displays will be used.

Electroluminescent displays

The ac-thin-film and dc-powder electroluminescent displays have progressed to the point where they can be used effectively in computer applications. Because they are lighter and less power-hungry than plasma displays, EL devices may fit into a broader range of mid-level computer requirements. The ease of showing live television with currently available integrated drivers adds to the EL's versatility.

In certain respects, the ac-electroluminescent device is a solid state analogue to the ac-plasma panel, although fabrication, multiplexing, and electro-optical characteristics are distinctly different.

Future prospects

Regardless of cogent arguments favoring CRTs, flat-panel displays can be expected to infringe on CRTs at an increasing pace, in areas that don't require the unique capabilities offered by shadow-mask CRTs.

It is reasonable to expect plasma displays to further grow in size, experience some cost reduction and ultimately add color capability. Further progress in multiplexing liquid crystal displays is expected, although the multitude of technological approaches and their impacts makes the ultimate future of liquid crystals somewhat cloudy.

The degree of expected price reductions and further reduction of power consumption in electroluminescent displays will determine how far-reaching their future impact will be.

by Elliott Schlam
US Army Electronics R&D Command
Ft. Monmouth, NJ

(Article developed from *Trends in Flat-Panel Display Technologies*, by Elliott Schlam, US Army Electronics Research & Development Command, Ft. Monmouth, NJ—presented at Electronic Imaging '85, Boston, MA, SPSE & IGC.)

Higher resolution, fewer artifacts, TV technology goals

Advances in all aspects of TV technology—from camera optics to kinescope phosphors—and the prospect of new TV transmission media, such as Direct Broadcast Satellites (DBS), have led to a number of proposals for enhancements to present TV systems as well as completely new systems employing more lines and wider band-width.

Although today's systems have served us well, the trend toward larger screen sizes begs for more resolution. At a viewing distance of 9 ft., typical for most home viewing, the limiting resolution of the eye corresponds to about 475 TVL/PH on a 25" diagonal screen and about 760 TVL/PH on a 40" diagonal screen. Also, with larger and brighter pictures, and improved transmission by CATV giving higher signal-to-noise ratio and fewer ghosts, the artifacts in the present systems are more visible and more annoying.

Besides an increase in resolution and elimination of the artifacts resulting from interlaced scan and in-band transmission of the color information, there is another desirable improvement to present television systems—an increase in the aspect ratio from the current 1.33:1 to something on the order of 1.75:1. When television was first introduced in the 1930s, the standard aspect ratio for motion pictures was 1.33:1 and thus it was logical to adopt the same standard for TV. Subsequent practice in motion pictures led to wider screens, partly in competition with TV, but also in recognition that a better match to the human visual system is achieved at the viewing distances of three to four times picture height that are typical in movie theaters.

Although many different aspect ratios have since been used for motion pictures, in the US today most movies are projected with an aspect ratio of 1.85:1; in Europe with an aspect ratio of 1.67:1. An aspect ratio of about 1.75:1, therefore, would represent a good compromise with current motion picture practice.

HDTV systems

In its broadest sense, HDTV means higher resolution and wider aspect ratio

by Bernard J. Lechner
Advanced Video Systems Research Lab
RCA Laboratories, Princeton, NJ

TV scan lines

Present NTSC systems employ 525 scan lines in two interlaced fields with a field rate of 59.94 fields per second and a luminance video bandwidth of 4.2 MHz. This results in a limiting resolution both horizontally and vertically of approximately 340 TV Lines/Picture Height (TVL/PH) for static images. The loss in vertical resolution results because the image is sampled in the vertical direction by scanning beams of specific size and shape. When there is motion in the scene, there is a further loss of vertical resolution due to interlace, since in each field there are only 242 active scan lines. The lag in present camera tubes also degrades the resolution both horizontally and vertically when there is motion in the scene.

The 625-line PAL and SECAM systems achieve a resolution of approximately 400 TVL/PH and use 5.0-5.5 MHz of luminance video bandwidth. In all of the present systems no additional bandwidth is required to transmit the color information. Although different encoding algorithms are used, NTSC, PAL, and SECAM all transmit the color information on a subcarrier that is within the luminance band.

In addition to having limited resolution, pictures produced by present TV systems contain certain artifacts, which arise from two sources: interlaced scanning and in-band transmission of the color information. Interlace scanning produces two artifacts: Loss of vertical resolution with motion (already discussed) and interline flicker.

Whenever there is a horizontal edge in a picture that creates a large amplitude vertical luminance transition, information at the edge is being updated at 29.97 Hz (25 Hz for PAL and SECAM) and the flicker is visible. For this reason, interlaced scan is never used in computer terminal displays.

Artifacts due to in-band transmission of the color signal are crosstalk effects, which result from less than perfect separation of the luminance and chrominance signals. It produces false color in areas of high-frequency luminance (such as an umpire's shirt) and crawling dots on vertical edges that have a chrominance transition (such as titles).

television pictures without artifacts. It is implicit that for HDTV the pictures be large, bright and free from noise and ghosts. Many proposals have been made over the past few years for improvements to our present television systems—variously labelled: improved NTSC, enhanced NTSC, enhanced definition TV, extended definition TV, and HDTV.

The following four examples compare the parameters of the two true HDTV systems proposals with NTSC and PAL.

• *Improved NTSC*—The key word in improved NTSC is compatibility, specifically backward compatibility—meaning either that no change is made in the transmitted signal, or that if any changes are made they will not affect the performance of the installed base of NTSC receivers. The majority of the effort on improved NTSC is based on no change to the transmitted signal, only improvements in the receiver.

These improvements can be considered part of the on-going evolution of TV receiver design and will occur in all parts of the TV receiver from the antenna terminals to the kinescope. A particularly important step in the process will be the introduction of digital baseband video processing to replace the analog signal processing currently used. The simple replacement of analog processing with digital processing will, in a theoretical sense, accomplish no performance improvement; but practically, it will lead to significant improvements. With digital processing, performance will be determined solely by the design of the system, not by the specific implementation or precise factory setup.

The first truly significant improvement will come when field- and frame-store memories are introduced into TV receivers. There are three important uses for a frame store in a TV receiver: first, a frame comb filter can be used to separate the luminance and chrominance signals; second, a frame store can be used to convert the interlaced NTSC signal to progressive scan for display; and third, a frame store can be used as a recursive filter to improve the signal-to-noise ratio.

Improvements are dramatic in all three cases, but there is a problem when there is motion in the scene. Because the pixel values will differ from frame to frame when there is motion, the frame processing fails and artifacts, such as double images, are introduced. It is, therefore, necessary to make the processing adaptive to motion in the scene and revert to intra-frame processing where there is motion. This can be done on a pixel-by-pixel basis. Future receivers will achieve perfect separation of luminance and chrominance and complete elimination of raster artifacts for static portions of images and performance at least as good as we have at present for the portions of the image that move.

Additional improvements to NTSC are possible if the signal is preprocessed before transmission. Currently, researchers are developing techniques for adding additional horizontal or vertical resolution, or both, to the transmitted signal without increasing the bandwidth required for transmission and without affecting compatibility with existing receivers.

PARAMETER	SYSTEM			
	NTSC	PAL	NHK	RCA/NBC
Aspect Ratio	4.3	4.3	5.33:3	5.33:3
Total Scan Lines	525	625	1125	750
Active Scan Lines	484	576	1035	726
Scanning Format	2:1 Interlace	2:1 Interlace	2:1 Interlace	2:1 Progressive
Temporal Rate	59.94 Hz	50 Hz	60 Hz	60 Hz
Luminance Video Bandwidth	4.2 MHz	5.0 MHz	27 MHz	29 MHz
Luminance Horizontal Resolution	340 TVL/PH	400 TVL/PH	785 TVL/PH	580 TVL/PH
Luminance Vertical Resolution*	340 TVL/PH	400 TVL/PH	725 TVL/PH	508 TVL/PH
Color Difference Format	I and Q Simultaneous	U and V Simultaneous	C_R and C_B Simultaneous	C_R and C_B Line Sequential
Color Difference Bandwidth	.5 and 1.5 MHz	1.5 MHz	13.5 MHz	14.5 MHz
Total Studio Bandwidth	6.2 MHz	8.0 MHz	54 MHz	43.5 MHz

**Kell factor of 0.7 is assumed.*
For NTSC and PAL, it is assumed that the signals are not encoded.

Table compares parameters of the two true HDTV system proposals with NTSC and PAL.

• *Multiplexed Analog Components*—A non-compatible signal format, called Multiplexed Analog Components (MAC), has been proposed to eliminate the problem of separating luminance and chrominance. Instead of using a subcarrier to transmit the color information, the luminance signal is time-compressed on a line-by-line basis, making some time available on each line to transmit the chrominance signal, which is also compressed.

With this approach, the luminance signal is compressed to occupy ⅔ of the active line time and the remaining ⅓ is used for the chrominance signal. Each of the two color-difference signals is transmitted alternately line-by-line. The resulting chrominance bandwidth is one-half of the luminance bandwidth, both horizontally and vertically. Total signal bandwidth, however, has been increased by the factor 3/2.

Thus, for NTSC luminance bandwidth of 4.2 MHz, the resulting MAC signal will have a baseband-width of 6.3 MHz; for 5-MHz PAL the resulting MAC bandwidth is 7.5 MHz. These bandwidths can be easily accommodated by DBS transponders—and it is primarily for this service that MAC has been proposed.

Although the MAC format eliminates the artifacts due to crosstalk between luminance and chrominance and only requires line stores—rather than frame stores—for receiver processing, it does not provide improved resolution or elimination of raster artifacts. It has been proposed that some additional horizontal resolution can be provided by increasing the luminance bandwidth to 5.3 MHz resulting in a MAC bandwidth of 8 MHz that will fit in a DBS transponder.

Another proposal would use two DBS transponders to provide an HDTV service. The first transponder would provide a basic MAC signal (as previously described), while the second transponder would contain additional horizontal and vertical information as well as the side panels to provide a wide aspect ratio picture.

• *NHK system*—The Japanese Broadcasting Co. (NHK) has developed a system that essentially achieves all of the requirements for HDTV except the elimination of raster artifacts. The system is based on 1125 lines, 60 interlaced fields, an aspect ratio of 5:3 and 20-MHz luminance bandwidth. The resulting resolution is about 620 TVL/PH horizontally and 725 TVL/PH vertically. The NHK system proposes two-color difference signals C_W and C_N having bandwidths of 7.5 MHz and 5 MHz respectively, resulting in a total bandwidth of 32.5 MHz. Substantial hardware for this system has been developed by a number of Japanese manufacturers and the system has been extensively demonstrated worldwide.

To fit the NHK signal into a transmission channel such as DBS requires bandwidth compression—and NHK has proposed a multiple sub-Nyquist encoding system called MUSE that achieves a 4:1 bandwidth reduction to 8 MHz. The encoding system requires multiple frame stores in the receiver and, although full resolution is achieved for static images, there is degradation with motion in the scene. A motion vector is computed before transmission and sent with the signal to help the receiver decoder adapt to unidirectional motion such as camera panning.

Recently, a modified version of the NHK system has been proposed for studio use. It has a slightly wider aspect ratio of 5.33:3 and increased luminance and chrominance bandwidths of 27 MHz and 13.5 MHz respectively, resulting in a total studio bandwidth of 54 MHz. The luminance horizontal resolution is increased to 785 TVL/PH.

• *Progressively-scanned system*—Increased interest in using progressive scan in TV receivers has also increased interest in using progressive scan in the production process. This led RCA and NBC to propose a production system based on progressive scan.

The system uses 750 lines (726 active lines), 60 pictures/second, an aspect ratio of 5.33:3, and requires 29 MHz of luminance bandwidth. The resulting resolution is 580 TVL/PH horizontally and 508 TVL/PH vertically. Two color-difference signals of 14.5-MHz bandwidth are proposed with line-alternate color encoding, resulting in a total studio bandwidth of 43.5 MHz.

Although the system requires slightly more luminance bandwidth than the modified NHK system and has somewhat less resolution, it requires less total studio bandwidth and it has significantly improved temporal resolution that is believed to be important with future CCD cameras. Despite the static vertical resolution in such a system being about 30% less than that of the NHK system, the vertical resolution is not degraded with motion in the scene—and under these conditions is actually about 40% greater than that of the NHK system.

Another advantage of progressive scan in a production system is that pixels adjacent in space are also adjacent in time. This makes the image processing and manipulation required for special effects easier to accomplish without degradation. It also aids in frame-rate conversion as required for program exchange with 50-MHz countries and for producing 24-frame-per-second motion picture film.

Although HDTV in the near future will be used for production, delivering it to the home is another matter. Until fiber optic networks are in place, it is difficult to find enough spectrum space to accommodate the needs of HDTV. Thus, we are likely to see compromises including both bandwidth-reduced HDTV and extended-definition NTSC and PAL, possibly in MAC format, transmitted through channels of 8- to 10-MHz

The one thing that can be said with certainty is that improved NTSC and PAL will occur. The large installed base of receivers provides an opportunity to introduce improvements to all parts of the system as advances in technology make such improvements technically and economically feasible.

(Developed from *High Definition TV*, by Bernard J. Lechner, Advanced Video Systems Research Laboratory, RCA Laboratories, Princeton, NJ—Keynote Address, SID '85, Orlando, FL.)

HDTV requirements

The key parameter of HDTV is bandwidth—every improvement made increases the required signal bandwidth. Doubling the resolution, for example, increases bandwidth by a factor of 4; increasing the aspect ratio to 1.75 increases bandwidth by a factor of 1.75/1.33 = 1.32; eliminating the artifacts due to interlaced scan, by using progressive scan, leads to another factor of 2; and eliminating the crosstalk between luminance and chrominance, by keeping the signals separate spectrally, increases bandwidth by a factor of 1.5*. To achieve all of these improvements for NTSC would require a total bandwidth of 4.2 (4 x 1.32 x 2 x 1.5) = 66.5 MHz. The luminance bandwidth requirement is 44.4 MHz.

**(The ability of the eye to resolve detail in color is less than half of that in luminance. Hence, it is not necessary to reproduce chrominance with the same resolution as luminance. Present TV systems limit chrominance bandwidth to less than one-third that of luminance.)*

Drop tests show annealing restores "abused" mag shields

How much does dropping affect a Magnetic Shield: Its permeability? Its attenuation factor? Its workability? Its shielding effectiveness?

Estimated percentages, educated guesses, and theories abound. But there have been no conclusive answers available—based on statistics developed from results of an accurately controlled testing program, that is,—until now.

Engineers at Amuneal Mfg. Corp. (Philadelphia, PA) recently ran a series of "drop" tests on five magnetic shield cylinders—from a uniform height and under uniform conditions. Control parameters limited the sampling to one material thickness, one diameter, one length, and three drop heights. Cylinders were 2.4" ID, 10" long, 0.020" thick, and 80% nickel-iron alloy with the following chemical composition:

C	MN	SI	P	S	NI	MO
.018	.52	.32	.002	.001	80.1	4.33

Permeability potentials, resulting from ring test samples from induced current (ASTM Test #A-753), provided the following:

B	PERMEABILITY
40	95,000

Attenuation tests performed immediately after fabrication (ASTM Test 698-74, the Helmoltz method) produced these results:

Shield	#1	#2	#3	#4	#5
Attenuation	$\frac{14}{1}$	$\frac{13}{1}$	$\frac{14}{1}$	$\frac{14}{1}$	$\frac{13}{1}$

This was followed by a full hydrogen anneal in a furnace. Annealing consists of first soaking the cylinders in anhydrous ammonia (cracked at 1750F to make pure dry hydrogen at a dew point of minus 60F) for three hours at 2150F, then cooling them at an average rate of 370F per hour.

Test results (ASTM Test 698-74-2, Ostered field 60 Hertz) provided the following attenuation ratios:

Shield	#1	#2	#3	#4	#5
Attenuation	$\frac{526}{1}$	$\frac{500}{1}$	$\frac{500}{1}$	$\frac{487}{1}$	$\frac{500}{1}$

To provide uniform height and drop conditions, a simple fixture was assembled that allowed controlled, repetitive horizontal drops—so cylinder sides would receive the impact of the drop.

During the test, each cylinder was first dropped from a 1-ft height to a linoleum covered wooden floor, and the resultant attenuation was read and recorded. The procedure was repeated three times: dropping, then measuring (ASTM), and recording attenuation readings. Table #1 provides the results.

Shield	#1	#2	#3	#4	#5
After H_2 Anneal	$\frac{526}{1}$	$\frac{500}{1}$	$\frac{500}{1}$	$\frac{487}{1}$	$\frac{500}{1}$
After 1st drop	$\frac{400}{1}$	$\frac{393}{1}$	$\frac{400}{1}$	$\frac{444}{1}$	$\frac{476}{1}$
After 2nd drop	$\frac{363}{1}$	$\frac{370}{1}$	$\frac{357}{1}$	$\frac{370}{1}$	$\frac{350}{1}$
After 3rd drop	$\frac{357}{1}$	$\frac{303}{1}$	$\frac{333}{1}$	$\frac{303}{1}$	$\frac{338}{1}$

TABLE 1: 1-ft "Drop"

At this point in the test, a preliminary evaluation clearly shows an obvious reduction in shielding performance based on the continuous "misuse", or "abuse", created by dropping the cylinders.

Because shield #5 had the highest attenuation after the first drop, but subsequently the lowest after the second drop, it was assumed that possibly multiple bounces of this cylinder or maximum distortion of the material occurred.

by S.M. Kamens, President
Amuneal Mfg. Corp.
Philadelphia, PA

Those results made it impossible to determine degradation of shield #5 after misuse.

Upon completion of the first set of tests, the cylinders were rerolled and sized, returning them to their original shapes. They were then annealed again in the same furnace, same heat, same H_2 flow, same cooling rate, and tested in the original manner.

Shield	**#1**	**#2**	**#3**	**#4**	**#5**
Attenuation	625/1	625/1	714/1	625/1	625/1

Test results indicated higher attenuation was achieved on the second anneal. It was assumed that starting with an attenuation of 14/1 the initial H_2 anneal would increase permeability. But after three drops, with a resultant attenuation of 333/1, a second H_2 annealing not only increased permeability, but also provided a higher attenuation.

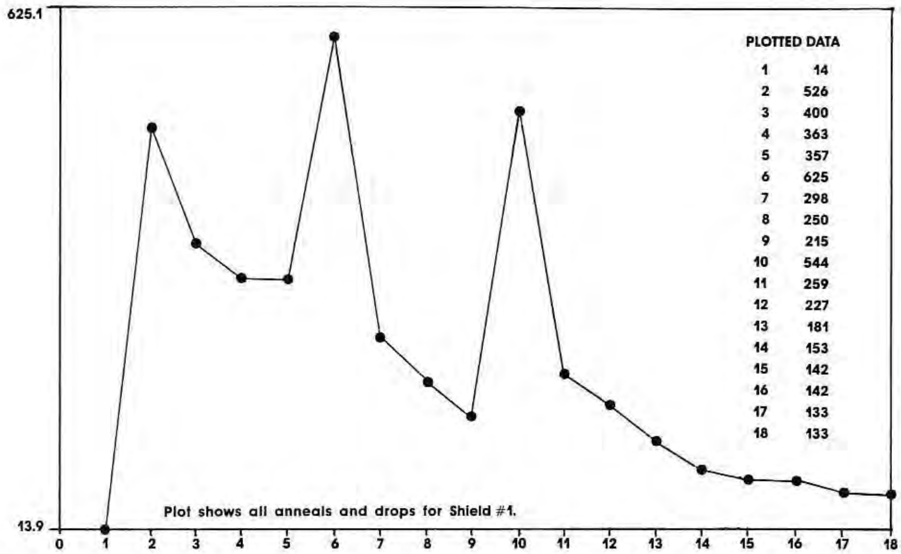
After the second anneal, cylinders were then subjected to three additional "drop" tests, at a new drop height of 2 ft—but in the same location as the first drop. Table #2 lists the results.

Shield	**#1**	**#2**	**#3**	**#4**	**#5**
After Re-Anneal	625/1	625/1	714/1	625/1	625/1
After 1st drop	298/1	322/1	333/1	377/1	350/1
After 2nd drop	250/1	265/1	285/1	277/1	277/1
After 3rd drop	215/1	215/1	229/1	222/1	232/1

TABLE 2: 2-ft "Drop"

Once again, upon completion of the tests the cylinders were rerolled and sized, returning them to their original shape, and again annealed for optimum shielding effectiveness. Testing (ASTM 698-74 Test) was again performed yielding the following results:

Shield	**#1**	**#2**	**#3**	**#4**	**#5**
Attenuation	544/1	588/1	588/1	625/1	645/1



The results clearly indicate that after three 1-ft drops, rolling, sizing and annealing, followed by three additional 2-ft drops, attenuation is higher than provided by the first annealing. At this stage of the tests, it is evident that dropping and, naturally, continued dropping will reduce the permeability.

Continuing the drop test, this time from a 3-ft height provided the data in Table #3. At this point, it also becomes obvious that the greater the height of the drop, the greater will be the deterioration of permeability.

Shield	**#1**	**#2**	**#3**	**#4**	**#5**
After Re-Anneal	544/1	588/1	588/1	625/1	645/1
After 1st drop	259/1	277/1	277/1	270/1	277/1
After 2nd drop	227/1	212/1	215/1	202/1	238/1
After 3rd drop	181/1	181/1	142/1	181/1	166/1

TABLE 3: 3-ft "Drop"

If Shield #1 is examined, the 1-ft-drop reduced original attenuation of 526 to 400; the 2-ft-drop reduced it from 625 to 298; and the 3-ft-drop reduced a 544 initial attenuation to 259. From this, it can be concluded that the higher a magnetic shield is dropped, the more degradation that shield will show; and a reduction of approximately 50% can be observed as the result of any significant drop.

Upon conclusion of the 3-ft drop test, cylinders were not annealed, but instead were dropped from a 3-ft height an additional five times. Attenuation was monitored after each drop as shown in Table #4.

Shield	**#1**	**#2**	**#3**	**#4**	**#5**
After 1st drop	153/1	153/1	133/1	142/1	166/1
After 2nd drop	142/1	133/1	125/1	142/1	133/1
After 3rd drop	142/1	133/1	117/1	133/1	133/1
After 4th drop	133/1	133/1	117/1	133/1	117/1
After 5th drop	133/1	133/1	111/1	125/1	117/1

TABLE 4: Cumulative results

The results of these accurately controlled tests allows the following assumptions:

- Dropping a magnetic shield degrades the permeability and lowers the shielding effectiveness.
- Once a shield is degraded, it can be reannealed to achieve optimum magnetic shielding properties.
- Full hydrogen anneal is mandatory for maximum attenuation.
- Shields should always be handled with care.

Color display growth spurs development of thermal color copiers

Increased use of color information systems has created a demand for color hard-copy to supplement and implement color computer applications. To meet this growing demand, a number of color printing technologies have emerged within recent years—among them the thermal transfer*— process.

Unlike direct thermal printing methods (first introduced in the mid 1950s) that required specially coated thermal sensitive papers, today's thermal transfer systems use lower cost plain paper and produce hard copy images having longer shelf life. Additionally, thermal transfer processes permit half-tone and color printing, as well as the application of saturated colors in copies.

When configured with local intelligence, such printing systems can offload CRT image information in fractions of a second—without need for special software to create the hard-copy. And, when a video frame store is added, the system can freeze an image during the copy cycle, thus allowing the operator to continue working with the display terminal without interruption to generate hard-copy. Without a frame store, the only requirement is that the display image remain static long enough to prevent blurring during copy time.

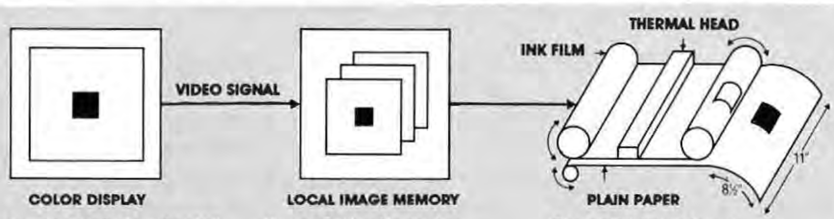
Video printers

Among a handful of such systems introduced within the past year or so is the Seiko D-Scan CH 5201B, which can generate prints having up to eight saturated colors at a resolution of 150 dots per inch. Once a file is captured by this system, repeat copies (up to 99) can be produced without further interaction with the terminal or the system.

Color for image transfer in the Seiko printer is contained on an ink sheet in three consecutive page-sized bands of yellow, magenta, or cyan. This color pigment can be transferred to plain paper or polyester film to produce color hard-copy.

Sensors built into the copier monitor critical copy parameters such as paper skew, thermal head temperature, and ink sheet conditions. The information derived is then used by a built-in microprocessor to dynamically adjust writing parameters, thereby assuring optimum copy quality.

Structurally, the Seiko unit is divided into two command sections: one to control critical ink, sheet, and paper movements—using stepper motors; and the other to manage such electronic duties as control of input, formatting, storage, and output of graphic data to the thermal printing head. The system interfaces with either video or digital data, accepting most current RGB video signals.



Video image is down-loaded to color display copier.

Image is stored in display copier's local memory, freezing the terminal for continued operation while hard-copy is being generated.

Thermal ink is transferred to plain paper or polyester film to produce copies of images stored in local memory.

Thermal transfer process

The principle behind thermal transfer color printing technology is relatively simple. Color reproduction is accomplished by thermally transferring color ink from a plastic ribbon, or sheet, onto plain paper.

A thin film of solid ink is painted on the plastic medium in three zones—yellow, magenta, and cyan—with the size of each zone and the paper size nearly equal to each other. The plain paper and color ink media are inserted between a platen and the thermal head, with heat then applied by the head to the back of the inked medium fusing color onto the paper in varying dot patterns.

After the first color, yellow, is fixed, the paper is returned precisely to its original position and the process is repeated laying down the second color, magenta, which overlays the first. Finally, a third pass transfers the cyan in similar manner.

*(*Thermal Transfer Printing, Session IX, SID'85 International Symposium Digest of Technical Papers. For information circle Reader Service #35.)*

Illuminance meter
Illuminance meter features a sensitive silicon photo cell, sophisticated microprocessor, and easy-to-read liquid crystal display. The hand-held meter calculates integrated illuminance over a period of time, measures illuminance deviation between sources, and checks the deviation of single source illumination at different meter positions. The LCD automatically signals when calibration is needed and when the operation is completed. The meter weighs 7¾ oz.; measures 1-5/16 x 13/16 x 6-11/16 in. Price: $495
MINOLTA CORP., Ramsey, N.J. (201/825-4000)
For information circle Reader Service # 51

Copyboard
The Oki copyboard, consisting of a white writing surface connected electronically to a thermal printer, combines a blackboard with a photocopier. The copyboard is 58-in. wide, 75-in. high and weighs 172 pounds. The printer produces 8½x11-in. copies of whatever appears on the board. The board's writing surface scrolls to four separate 51x36-in. sections, all of which can be copied. While reproducing a section, the copyboard can be erased. A memory unit enables additional copies to be made even if the original printing is interrupted. A smaller board 34-in. by 25-in. is also available.
OKIDATA, Mt. Laurel, N.J. (609/235-2600)
For information circle Reader Service # 53

High temperature elastomer
CONSIL-R (HT), a silicone based elastomer filled with pure-silver particles, is designed to meet high temperature requirements of military and aerospace applications. The conductive device is available in sheets, die-cut flat gaskets and cross-sectional strips.
TECKNIT, Cranford, NJ (201/272-5500)
For information circle Reader Service # 69

Channel intensifier tube
Proximity focused channel intensifier tube features a 75-mm diaperture, provides a brightness intensification of low level input signals of 1.5×10^4 fL/fc, and utilizes a 25-m bore size microchannel plate for a limiting highlight resolution of 18 line pairs/mm, constant across the entire aperture. Model F4156 achieves less than 10% variation in output uniformity and equivalent background levels of less than 2×10^{-11} lm/cm^2. The device can be supplied with bi-alkali, tri-alkali or UV responsive photocathodes. The encapsulated tube has a 114 mm dia, is 25 mm long and can be customized for observation and amplification of fast events, in which case it would be gated on within 100 nanoseconds after application of the gate pulse.
ITT CORP., Fort Wayne, IN (219/423-4341)
For information circle Reader Service # 72

Arsenide emitters
Series of Gallium Aluminium Arsenide (GaAlAs) infrared-emitting diodes emit 880 nm peak emission, non-coherent infrared radiant energy when forward biased. Power output is three times greater than GaAs emitters at the same drive current. Models are OD-880W-Flat window, OD-880L-Lens Cap and OD-880F-Narrow Beam. Price: $4.50 each (1-99).
OPTO DIODE CORP., Newbury Park, CA (805/499-0335)
For information circle Reader Service # 70

Pocket inspection microscope
Self-illuminated pocket microscope weighs

4-½ oz and provides 30-power magnification (Spirig-30); or 100-power magnification (Spirig-100). Price: $19.50; $34.50)
SOLDER ABSORBING TECHNOLOGY INC., Springfield, MA (800/628-8862)

For information circle Reader Service # 71

Multi-user PC

PC/IT Personal Computer, utilizing the Intel 80286 processor and the IBM PC/AT 16-bit open architecture standard, operates as a stand-alone, supporting up to nine users, or links to Sperry or IBM mainframes. MS-DOS and XENIX-compatible software applications and hardware add-ons are available.

The system has a basic 512-kB memory that can be expanded to 1 MB without using expansion slots. Adding two boards increases memory to 5 MB. Additionally, the system can be configured with two 44.6-MB non-removable hard disk drives for a total mass storage capacity of 89.2 MB. A backup 60-MB tape storage device can be added.

The system's high-resolution monitor displays 16 different colors at one time from a total palette of 256 colors in either 640x200 or 640x400-dot resolution. Two built-in RS-232-C communications ports integrate into Sperry and IBM central processors. Price: $4,340.
SPERRY CORP., Blue Bell, PA. (215/542-4213)

For information circle Reader Service # 50

Cartridge drive

HCD-134 data cartridge drive, a quarter-inch device in a 5¼-in. form factor, provides 134 MB data storage and has an average file access time of 14 sec. Random track access and bi-directional search is used with the drive providing data transfer at more than four megabytes per minute (70kB/sec). Streaming and random file/block access, operating modes and continuous or start/stop tape motion are featured. Price: Less than $1,000 (OEM quantities).
3M, St. Paul, MN (612/736-2355)

For information circle Reader Service # 57

Laser printer

Facit's Opus 1 laser printer, for word processing and correspondence printing applications, prints up to 12 pages per minute. The laser combines the print quality of a typewheel with the high speed of a dot matrix printer. Other time-saving features include an ability to duplicate the text at copier speed, and a print resolution of 300x300 dots per in².

In the set-up mode, Opus 1 can create customized fonts by changing the height, width or slant on one of four basic fonts stored inside. In type mode, any one of four stored forms can be recalled. The draw mode offers graphics and line-drawing capability. Price: $9,500.
FACIT INC., Merrimack, NH (617/894-3100)

For information circle Reader Service # 55

Xerox laser printer

A line of low-cost, desktop printers, 4045 Laser CP, can be shared by four personal computers and stores up to 128 different type fonts in various sizes and styles with text, graphics and data printed at 10 pages per minute. The printer can also be used as a copier. Standard interfaces available include Centronics, Dataproducts parallel ports or an RS232C serial port for asynchronous communications. The printer's memory capacity is 128 kB with optional memory expansion of 384 kB. Laser CP includes two resident standard fonts for horizontal and vertical character positioning. Also offered are four optional plug-in Read-Only-Memory cartridges that allow up to 36 different fonts to be loaded and accessed. Up to 90 fonts can be sent from the host computer and stored in the CP memory. Price: $4,995.
XEROX CORP., Stamford, CT (203/329-8711)

For information circle Reader Service # 56

AC coupler

IL250 is designed for applications that require AC or bi-directional optocouplers with very high current transfer ratios. The coupler has a minimum CTR rating of 50% at $I_F = 10$ mA and a typical CTR at 150%. IL250 consists of two inverse parallel GaAs infrared emitters coupled to an NPN phototransistor. Back-to-back input diodes detect signals of polarity and AC monitoring. Price: $1.55 (Quantities of 1K).
SIEMENS, Iselin, NJ (201/321-4842)

For information circle Reader Service # 58

Test pattern generators

The 2500-Series, video test pattern generators designed for evaluation of all types of video displays is completely programmable and provides test capability at virtually any scan rate. Models 2501A, 2502A and 2503A, feature memory for 69 rasters, including different scan rates. Keypad code entries store, recall, edit or delete rates. A16 segment alpha-numeric display indicates timing and parameters. Software "lockout" prevents unauthorized editing without proper password. Model 2501A includes

test pattern functions of bars, dots, flat field, window, V Stripe, color bars, resolution, character Cx, gray scale, video and combination. Model 2502A is virtually identical, and Model 2503A is configured for monochrome medical imaging systems. Its gray scale pattern includes 5% and 95% reference contrast flags. Price: $4,950.
VII, Xenia, Ohio (513/376-4361)

For information circle Reader Service # 75

Sealed bezels

Atlas 2, a line of pre-assembled sealed bezel/filter systems designed for most vacuum fluorescent displays, can be used for prototypes or full-scale production runs. Optionally correct color filter material is bonded to the bezel to improve the contrast ratio and reduce glare. Fourteen color filters are available. Price: $12.15 to $20.30 (100 piece quantities).
INDUSTRIAL ELECTRONIC ENGINEERS (IEE), Van Nuys, CA (818/787-0311)

For information circle Reader Service # 61

Design environment

Plessey MEGACELL design environment enables engineers with little or no semiconductor experience to create complete digital systems in silicon. Previously, system designers had to rely on a vendor's integrated circuit experts to interpret their ideas.

The original designer can create, lay out, test, and approve VLSI circuits from a video display terminal. The Plessey concept enables the user to tailor the size of such devices as RAM's and ROM's and create proprietary "standard" cells. The software, which can be applied to circuits of up to 100,000 transistors, constructs a model of the user-defined components for simulation and verification of design rules. It also creates test patterns and routing of the interconnects between cells. The software runs on Digital Equipment Corporation VAX systems.
PLESSEY, Irvine, CA (714/951-4212)

For information circle Reader Service # 54

Surge suppressor

SMOOTHLINE CP-220 AC surge suppressor protects peripheral equipment from power fluctuations. The four-outlet device includes an exterior, glowing switch to indicate operation. CP-220 features include a clamping time of less than one nanosecond after surge detection of up to six kilovolts, a noise suppression filter network to protect against data corruption and equipment malfunction due to electromagnetic interference or radio frequency interference, and a 15-A circuit breaker. Price: $69.95.
GTE, Teterboro, NJ (201/288-9487)

For information circle Reader Service # 62

Plasma display tube

Line of Bar Graph Plasma Display Tubes indicates the analog value of a measured parameter by the length of a bright orange neon-discharge column. The tubes are made of a flat glass panel construction, less than 0.250-in. thick and operate on DC voltage. A segmented cathode structure for high resolution is automatically scanned with a multiphase driver. A 100-segment tube gives basically 1% resolution; 200- and 300-segment tubes are also available. MB-202-3P is a two-bar, 200-segments-per-bar display in a 4.75-x1.365-x0.210-in.-thick tube format.
MITSUBISHI INTERNATIONAL CORP., New York, NY (212/605-2607)

For information circle Reader Service # 73

For information circle Reader Service #10

For information circle Reader Service #11

President's Message

This past year has proved to be one of the best for your Society—in terms of membership growth, conference attendance, and chapter participation.

More than 230 attendees at SID'85 last May signed up as new members. Another 150 have used the cards in ID to become members. At present, total SID membership stands at 2300 + —the highest enrollment in our Society's history.

But, the success of this recruitment effort can only be measured by the results of our current membership *RENEWAL* drive. You've already received a notice from our national office manager, Bettye Burdett, requesting prompt payment of dues. It's the best bargain you can get this year, or any year, for just $25:

- Membership in *THE* professional society in your field of interest,
- *FREE* subscription to 12 issues of ID, the professional journal of the information display industry,
- Copies of the official Society Proceedings,
- Invitations to both annual Society conferences—SID'86 in San Diego, and IDRC'86 in Tokyo, Japan.
- Participation in local Chapter meetings,

. . and, of course, exposure to new ideas, new contacts, new friends in the Information Display community.

* * *

There were more than 1000 attendees registered at SID'85, with over 60 vendors presenting demonstrations of their newest products . . . in both cases, the largest number yet to participate in an SID conference. We anticipate 1200 next Spring at SID'86 in San Diego.

Likewise, the 505 participants in IDRC'85 this past Fall, in San Diego, also set an attendance record.

* * *

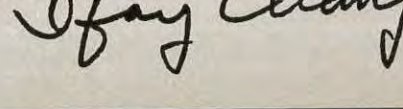
Some 80 + Chapter meetings throughout the US, Japan, and the UK drew an estimated 4000 members and guests during the year to hear specialists in display technologies discuss the newest developments and advances in the industry. The increasing number of meetings over previous years is also a welcome sign of a vigorous and healthy organization.

* * *

And finally, the growth of our Society's new Journal from a 9 times frequency to 12 times a year; from 141.25 pages of editorial material to 242 pages; from 44 advertisers to 72; from 2000 member-subscribers to more than 10,000 circulation at last count—further substantiates the preeminent position SID enjoys in the professional community.

Subscription cards in ID to date have added more than 1000 request subscribers to our circulation; while the combined distribution of ID at SID'85 and EI'85 (the Electronic Imaging Show in Boston) spread our word to some 3,000 new interested readers. Next year, we anticipate expanding this direct contact with potential new members through distribution at two additional national industry shows: NCC and Siggraph.

From my vantage point, 1985 was a good year for the Society. Let's maintain the momentum and make 1986 even more successful.



SOCIETY FOR INFORMATION DISPLAY
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Chapter Notes

UK & Ireland: November 25, 1985
Program: General Meeting
Topic: Display Applications
Speakers: Charles Cooke, Plessey (Plasma Displays in Rugged Environments); Alan Knapp, Philips (Consumer Displays of the Future); Richard Davis, EFD (Getting the Most from Limited Display Capability); Ian Andrew, IBM (Don't Forget Human Factors).

Minneapolis-St. Paul: October 25, 1985
Program: Annual election of Chapter officers—
Vern Born, Pres.
Charles Ring, VP
Russ Inveldsen, Treas.
George Huard, Sec.
Richard Jamieson, Dir.
Topic: Leitzscope Precision X/Y Positioning
Speaker: Bill Dubbel
BMC
St. Paul, MN

Bay Area: October 22, 1985
Program: General Meeting
Topic: The Processes and Challenges of Manufacturing Cathode-Ray Tubes for a Growing Military Market
Speaker: Ron Johnson
Exec. VP and
Chief Operating Officer
Rank Electronic Tubes

Delaware Valley: October 17, 1985
Program: General meeting, followed by a guided tour of the Combat Information Center (CIC) of Ticonderoga-class cruisers, US Navy CSED Site, RCA, Moorestown, NJ
Topic: Aegis Display System—An overview of the US Navy AEGIS Combat Display System, the world's most advanced shipboard decision-making instrument.
Speaker: Reid R. Benton
AEGIS/CIC Design Mgr.
RCA Corp.
Design manager for both AEGIS cruisers and destroyers, Benton is also RCA Display Manager for designs including the new Navy Standard AN/UYO-21. Reid joined RCA in 1978, having previously served 18 years as a US Naval Aviator. During his Navy career, he worked in Command & Control for the Pacific Fleet and became Computer Program Project Manager of the Fleet Combat Systems Support Activity, San Diego, CA.

Los Angeles: October 2, 1985
Program: 85/86 kick-off meeting at which new chapter officers were introduced—
Pete Baron, Pres.
Don McMichael, Treas.
Ken Miller, Co-program Chair
Leon Steven, Co-program Chair
John Kossey, Sec.
Topic: Night Vision Helmet Visor Display
Speaker: Dick Winner
Hughes Radar Systems Group
El Segundo
Dick described an IR system for helicopters that allows a pilot to navigate the night-time terrain almost as though it were daylight. The system features a pod-mounted IR sensor served to the pilot's line-of-sight; a helmet incorporating mechanical (soon to be magnetic) sensors for detecting head position; a high reslution 1" CRT; a diffraction optics visor that allows the pilot to simultaneously watch the visual and IR scene; and a signal processor that converts the very wide dynamic range IR sensor signal into a nicely grey scale-rendered image. After his talk, Dick showed a short video tape recording of the image displayed to the pilot and demonstrated an operational binocular helmet.

UK & Ireland: September 17, 1985
Program: Annual general meeting at which Chapter officers were elected—
Prof. Mino Green, Chair
Neil Bartlett, Vice Chair
Derek Washington, Sec.
Dr. Barbara Needham, Treas.
Topic: Liquid Crystal Displays—a one-day conference held at Standard Telecommunication Laboratories (STL), Harlow, Essex.
Speakers: Mike Clark, RSRE (Overview of Liquid Crystal Materials, Multiplexing, In-cell Addressing, and Bistable Electro-Optic Effects); Bill Crossland, STL (Smectic-A Panel Intended for Use As a Datagraphic CRT Replacement); Matthew Bone, STL (Ferroelectric LC Materials and Devices); P. Migliarato, GEC (Review of Active Matrix Addressing, Including State-of-the-Art Examples from Japan and the US).

Mid-Atlantic: Schedule of Meetings
January 8, 1986: High Content Display (4 Mpels)
Nate Caswell, IBM
February 11, 1986: Meeting at Thompson-CFS/Dumont, Dover, NJ
Andre Martin
March 13, 1986: Image Processing
A.N. Netravalli, ATT-BTL

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DECEMBER	Today's Techonology—Tomorrow's Systems (Annual Review & Forecast)	

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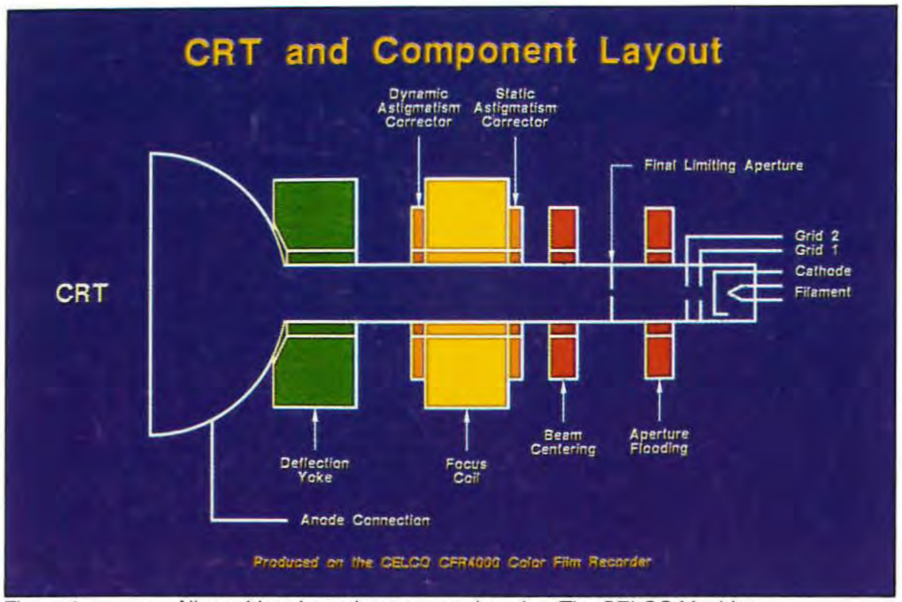

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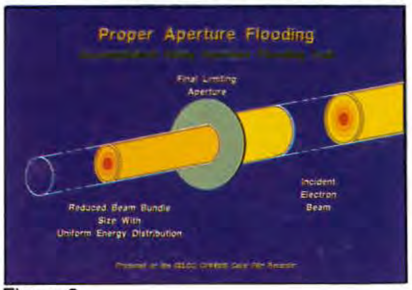

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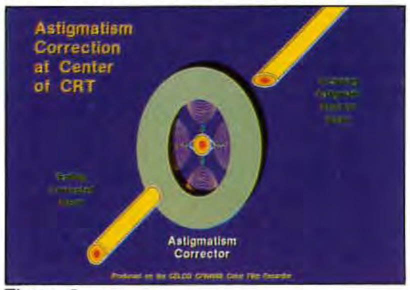

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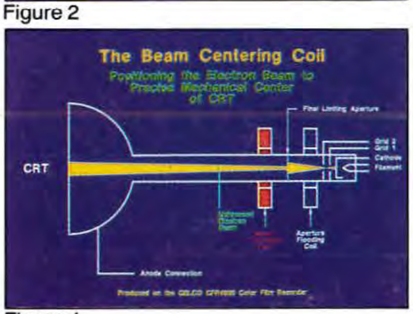

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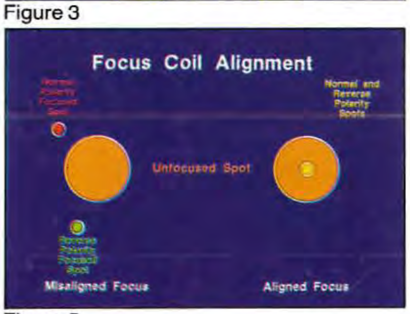

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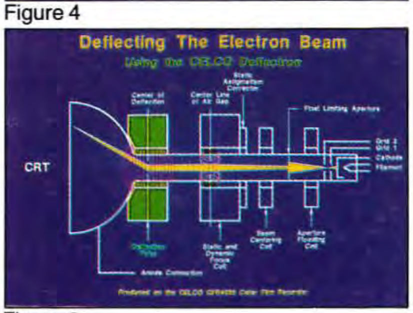

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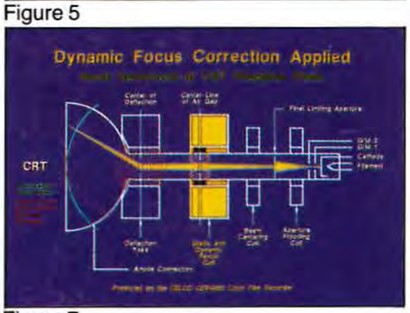

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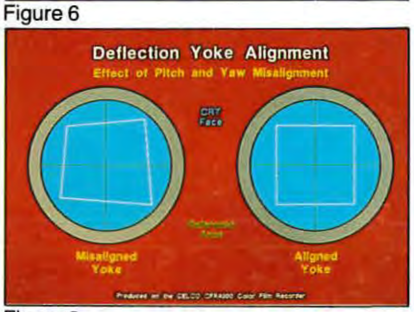

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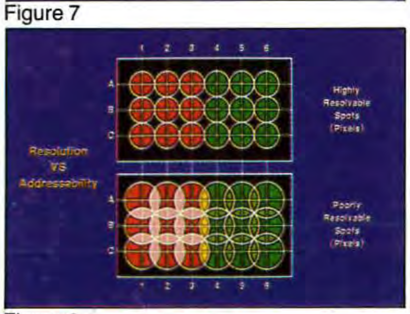

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