

three basic types of AO devices, deflectors (Bragg cells), modulators, and tunable filters, are presented. Comparison of physical properties of the various AO materials shows that trade-offs are required to suit specific applications. As an example of how to search for new materials, the potential of a chalcopyrite compound ($ZnGeP_2$) for AO device applications is discussed. Tables that list the properties of selected AO materials are included.

Multiplex Holography: Some New Methods, E. N. Leith and P. Voulgaris, *Optical Engineering*, 24:171, January/February 1985.

Afocal cylindrical lens systems and their prismatic equivalents are used in the formation of multiplex holograms. They introduce the desired, controlled astigmatism, and they assist the low f number final cylindrical lens in the formation of a strip hologram. In addition, a line source and a broad source fringe system applied to the hologram-making process can result in improved signal-to-noise ratios.

Configurations for High-Speed Gallium Arsenide Charge-Coupled Device Imagers, P. B. Kosel, M. R. Wilson, J. T. Boyd, and L. A. King, *Optical Engineering*, 24:176, January/February, 1985.

Several configurations of charge-coupled device (CCD) imagers formed on gallium arsenide are considered. A process

was investigated for the fabrication of overlapping charge transfer electrode structures in CCDs on GaAs with ion-implanted active channels. The electrode metal was aluminum and the inter-electrode isolation medium was anodically formed aluminum oxide. The use of aluminum electrodes and ion-implanted active channels makes this fabrication process compatible with that used for fabricating high-speed integrated circuits on GaAs. Support circuitry can thus readily be integrated with the CCD imager.

A computer model that simulates charge transfer through an implanted channel beneath an array of electrodes with a finite gap between each pair of electrodes is presented. The use of this model in designing the overlapping electrode structure and channel profile is demonstrated. The impetus of the device design is to maximize charge transfer efficiency and minimize channel noise.

Electronic Imaging with CCDs, G. W. Hughes, *RCA Engineer*, 29:4, November/December 1984.

CCD imagers for TV are now becoming available in large quantities. Several solid-state cameras have been announced that are the first generation of high-performance, low-cost cameras that will change the way in which video is used and perceived. This paper reviews the characteristics of various solid-state imager sensor types and compares representative

imagers in use today. Present applications of CCD image sensors and the future direction of imager and camera development are discussed.

A Countour Deformation Model of Capacitance VideoDisc Signal Pickup, P. D. Southgate, *RCA Review*, 45:397, September 1984.

A method of calculating the videodisc pickup signal is described that includes the elastic deformation of the disk by the stylus. The stylus shoe is idealized to a flat, rectangular shape, and small vertical displacements are assumed. Disc-stylus capacitance is calculated using a two-dimensional geometry and an approximation to the field configuration that allows fast computation. Typical results are described for the wavelength and tracking-force dependence of pickup. There is agreement between most general features of calculated and measured pickup.

The mechanism of soundbeat is investigated and shown, within the terms of this model, to depend primarily on the elastic deformation of the signal contour. The calculated magnitude and the wavelength dependence of soundbeat agrees well with the measurement; for "flat-top" signal, drop of soundbeat and change of wavelength of the type observed are predicted. Calculations usually deviate from measurements only by a magnitude similar to the mutual deviation of measurements made under varying conditions.

BOOKS, BOOKLETS, BROCHURES

Extraction of Information from Remotely Sensed Images, ed., Paul F. Hopkins. The book (170 pages) contains the proceedings of a conference sponsored by the Society of Photographic Scientists and Engineers and the American Society of Photogrammetry. It contains articles on digital enhancement of data, thermal infrared data, analysis of multi-spectral images, and recent developments in data acquisition from satellites. The book is available from the American Society of Photogrammetry, 210 Little Falls St., Falls Church, VA 22046, at a price of \$25 (\$18 for members).

Modern Antenna Design, by Thomas A. Milligan, provides comprehensive coverage of antenna types. The book (408 pages, illustrated) is available from McGraw-Hill Book Co., 1221 Ave. of the Americas, New York, NY 10020, at a price of \$44.50. The book is intended to enable the reader to determine the approximate size and type of antenna he might need for a specific project. Thoroughly practical in approach, the book concentrates on design methods through-

out and includes only enough theory to describe the basic concepts involved. The author stresses the limitations and summarizes the characteristics of various antennas.

Silver Recovery from Waste Photographic Solutions by Metallic Displacement is a 25-page report available from National Silver Equities, 2 Gassib Ct., Mahwah, NJ 07430, at a price of \$19.95 (plus \$1.50 postage and handling). The illustrated report notes that the ion-exchange method of silver recovery is easy and cost effective. No electricity is required and precipitant alternatives are widely available. In principle, the report states, one ion of silver exchanges with one ion of precipitant just by contact.

The report examines the effectiveness of various precipitants (window screen, mesh, nails, etc.) under laboratory testing. Critical retention-time data are analyzed. Detailed procedures on flow rate and silver concentration are presented in text and chart formats. How to estimate potential recoverable silver in used fixer is explained. Diagrams of working cells that

can be built easily and inexpensively for both large and small operations are included, as are instructions on marketing and smelting the recovered silver.

Buying an Audio Console for Broadcast Video, an 8-page handbook offering practical information for buyers of audio consoles for broadcast video, is available from Rupert Neve Inc., Berkshire Industrial Park, Bethel, CT 06801. The handbook answers such questions as: Do you really need 24-track monitoring? What grouping and assign functions do you really need? Do you need a console that can be operated in multi-track stereo or mono configurations? The information presented is a general guide, and specific products are not mentioned.

Special Effects — Wire, Tape and Rubber Band Style, by L. B. Abbott, covers almost 50 years of special effects in motion pictures. The author, during his 46 years with 20th Century-Fox, has been instrumental in bringing the art and technique of special effects from the "wire, tape, and rub-

ber band" era to its present state of sophistication. The winner of both Oscars and Emmys for his work on well-known feature films, he provides authoritative information on the history and development of "cinematic magic." The book (241 pages, illustrated) is available from the American Society of Cinematographers, P.O. Box 2230, Hollywood, CA 90078, at a price of \$29.95.

The BBC 1985 Report and Handbook, replete with photographs, provides information on every aspect of the BBC. The first section deals with programs, broadcasting, engineering, and personnel, and presents the annual reports of the National Broadcasting Council for Scotland, Wales, and Northern Ireland, including a detailed financial report. The second part of the book presents the BBC constitution and lists dates of significance, beginning with its founding on October 18, 1922,

through January 16, 1984, when the BBC Elstree Center opened. The report contains 271 pages and is illustrated. It is available from British Broadcasting Corp., 35 Marylebone High St., London W1M 4AA, England, at a price of £6.50.

The 1985 edition of the Graphics Standards Handbook is available from CC Exchange, P.O. Box 125, Laguna Beach, CA 92652, at a price of \$170. The book describes a proposed three-dimensional extension to the GKS (graphics kernel system). Noted is the relationship between GKS-3D and PHIGS (programmer's hierarchical interactive graphics standard). GKS-3D retains the simplicity and primitive/segment organization of the basic GKS specification, while PHIGS creates a complex, multi-level hierarchy of graphic images that can easily be manipulated and changed each time the picture is recorded or displayed.

Low, medium, and high-frequency oscilloscopes are described and illustrated in color in a 4-page brochure available from Leader Instruments Corp., 380 Oser Ave., Hauppauge, NY 11788. Included are detailed descriptions of three new oscilloscopes, the 525L 50-MHz 2-channel dual-time-base oscilloscope, the LBO-516 100-MHz 3-channel dual-time-base oscilloscope, and the LBO-518 100-MHz oscilloscope with 4-channel capability.

The Motion Picture Equipment Master Sales Catalog, No. 20, is available from Alan Gordon Enterprises Inc., 1430 Cahuenga Blvd., Hollywood, CA 90078. The catalog contains listings and illustrations of motion-picture and video support equipment. Listings include 35 and 16mm cameras, lenses, filters, batteries, tripods, dollies, animation equipment, underwater cameras and housings, and more.

OBITUARIES



Hans Schmid

Hans Schmid, manager of ABC's Broadcast Operations and Engineering Technical Quality Control Dept., died January 21, 1985, at the age of 57.

Born in Frankfurt, Germany, he was graduated from the Polytechnikum Friedberg in 1949 with an Ingenieur Fuer Elektrotechnik (the equivalent of the BSEE degree). He began his career as a maintenance engineer in the Frankfurt studios of the Armed Forces Network, moving to radio station CKEY in Toronto as a maintenance engineer in 1952. Later that year, he joined the Canadian Radio Manufacturing Corp. (Philips) as an electronic engineer, where he designed specialized test

equipment used in the production of quartz crystals.

In 1953, Schmid joined McCurdy Radio Industries in Toronto as a development engineer, and somewhat later was appointed chief engineer. While with McCurdy, he designed broadcast audio and video equipment, including the McCurdy AU-300 audio amplifier, which is still being used in the industry.

Schmid left McCurdy Radio in 1957 to join the Canadian Broadcasting Corp. as an engineering assistant in the Network Operations Dept. In 1958, he joined Telechrome Manufacturing Co. in Amityville, N.Y., as a project engineer, and a year later was named engineering manager of the Electronics Div., where he established design standards and expanded Telechrome's line of commercial television equipment and military electronics.

Schmid joined the American Broadcasting Co. in 1961, then left to spend a year with Telemet (formerly Telechrome), rejoining ABC in 1962. His career at ABC spanned 23 years. He was first a video system engineer, then a senior equipment engineer (1968). In 1979, he was appointed to the post he held at the time of his death. During the time he was with ABC, he authored more than 20 technical papers on television signal measurement and control.

Schmid's work on synchronization of remote program sources for color TV broadcasting was first used in 1968 during ABC's televised coverage of the Olympic

Games from Mexico. Further work on this automatic color locking system earned him and ABC an Emmy Award in 1971 for outstanding achievement in engineering development.

Schmid joined the SMPTE in 1968 and was made a Fellow in 1972. He is survived by his wife, Maria.



Hans Schmid was presented with an Emmy in 1971 for his work on the automatic color locking system.