ABSTRACTS OF PAPERS FROM OTHER JOURNALS

Digital Videotape Recorders for Component Coded Signals, G. M. Drury, *IBA Technical Review*, 43-56, March 1982.

The videotape recorder has become a vital element in modern television program production. It has evolved to fulfill various roles reflecting numerous aspects of the production process. The prospect that digital technology might, perhaps within the near future, begin to dominate broadcasting, naturally brings into question the practical feasibility of digital videotape recorders.

This paper reviews the work done during the past few years to investigate digital video recording. This supports other work on digital coding standards to assist in identifying the constraints set by recording technology on future digital studio systems. This work is not yet complete, but considerable headway has been made in clarifying key design parameters, and in developing certain necessary techniques. These signal processing techniques and the problems which they solve are discussed, together with some of the theoretical factors of digital recorder design.

A New Method of Extracting Time and Control Code Information for Videotape Editing, Takuji Sekiguchi, *NHK Laboratories Note*, January 1983.

A time and control code for videotape recordings was standardized in 1972 as an IEC recommendation based on the American National Standard.

Editing systems have made great progress, but the accuracy and reliability of editing depend on the stability of time-code decoding. The time code, in the "Bi-Phase Mark" modulation method, has a transition at the beginning of every bit-period known as "clock" transition. A "zero" bit consists of the clock transition only, whereas a "one" bit has a second transition, half a bit-period after the start. Bit information can be discriminated and decoded by detecting these transitions.

In the editing of VTR pictures, variable speed reproduction may be required, such as high-speed reproduction for search and slow-speed reproduction for the confirmation of cuts. Using 1-in. Type-C helical-scan VTR, a variation of tape-speed from one-sixteenth of normal to 60 times normal causes about a thousand-fold change in the reproduced clock interval. Therefore, an important problem is how to extract clock information from transition pulses with variable intervals with stability and security.

Both analog and digital methods can be used to extract clock pulses of variable intervals. However, the analog method cannot extract clock pulses with large interval variations, and the digital method uses an extremely complicated circuit, and it is difficult to apply LSI cheaply to either method.

A new simplified method of extracting time-code clock information has been found to be practicable. It can be used for clock pulses with widely varying intervals, and LSI can easily be applied because of its relatively simple circuit configuration. This paper explains the principle of a fixed-rate delay circuit used in this system and the method of extracting the clock information.

The Digital VTR, Paul Scorer, *International Broadcast Engineer, 14:* 58-59, July 1983.

VTRs are now essential equipment in all studios; it is hardly possible to even conceive of a production environment without them. Developments in VTRs are resulting in continuous improvements, both in technical specifications and user convenience, and interchange standards have been agreed upon. It is against this evolving background that the digital VTR must compete.

Design and Testing of Lenses for Optical Disk Technology, P. Kuttner, *Optical Engineering, 22:* 473-478, July/August 1983.

Optical disk technology today finds widespread application in laser vision, compact disk, and data storage equipment. The required specifications of lenses which meet these requirements are discussed. Their image quality is given by root mean square (RMS) of wave aberration, by point spread function, by encircled energy, or by modulation transfer function (MTF). Due to the automatic servo focusing technique, a certain amount of field curvature can be tolerated. Measured results of image quality are compared with theoretical values.

Optical Data Storage: Step-by-Step to Market, David H. Davies, *Photonics Spectra, 17:* 89-94, May 1983.

Optical techniques offer the potential of increasing the data capacity of storage media by several orders of magnitude. The evolution of this technology is reaching the stage of across-the-board commercialization. The question of its speed, or acceptance, and ultimate success, will depend on the market acceptability of both the media and the drives designed to be used with them.

The ABCs of LANs, Michael H. Coden and Frederick W. Scholl, *Photonics Spectra, 17:* 47-50, August 1983.

The local-area network (LAN) is starting to look like the most significant development in data processing in two decades. Optical LANs, both fiber optic and line-of-sight, offer greater performance at lower cost, because their high bandwidth and low attenuation allow them to transmit data at higher data rates over greater distances and areas.

Fiber-Optic Technology and Applications, Ronald Ohlhaber and David Watson, *Electronic Imaging*, 28-35, August 1983.

To use fiber-optic cables, they must be connected as part of a system for a specific application. Either analog or digital optical signals can be transmitted in much the same way as conventional electronic cables. This paper reports that in most cases the optical source or emitter can be considered a transducer which converts an electrical voltage or current into the proportional optical level. A similar reverse conversion of optical power to current or voltage occurs at the detector. Further electrical amplification then generates the original signal levels.

OTDR Puts Fibers to the Test, Christopher Flatau, *Photonics Spectra, 17:* 47-50, March 1983.

Optical fiber quality can be specified in a number of ways, but for general-purpose measurements, optical time domain reflectometry (OTDR) is a key technique for testing optical systems for many of the needed qualities. Typically, an OTDR instrument consists of a laser source, a beamsplitter, and a photodetector. During OTDR measurement, a laser pulses an optical fiber, the reflections are directed to the photodetector, and the resulting backscatter waveform is displayed.

A New Technique for Minimizing Distortion, Douglas R. Frey, *Journal of the Audio Engineering Society, 31:* 320-325, May 1983.

Most amplifiers today are based on designs that exhibit low distortion. Feedforward and feedback schemes have been suggested to refine the circuit performance

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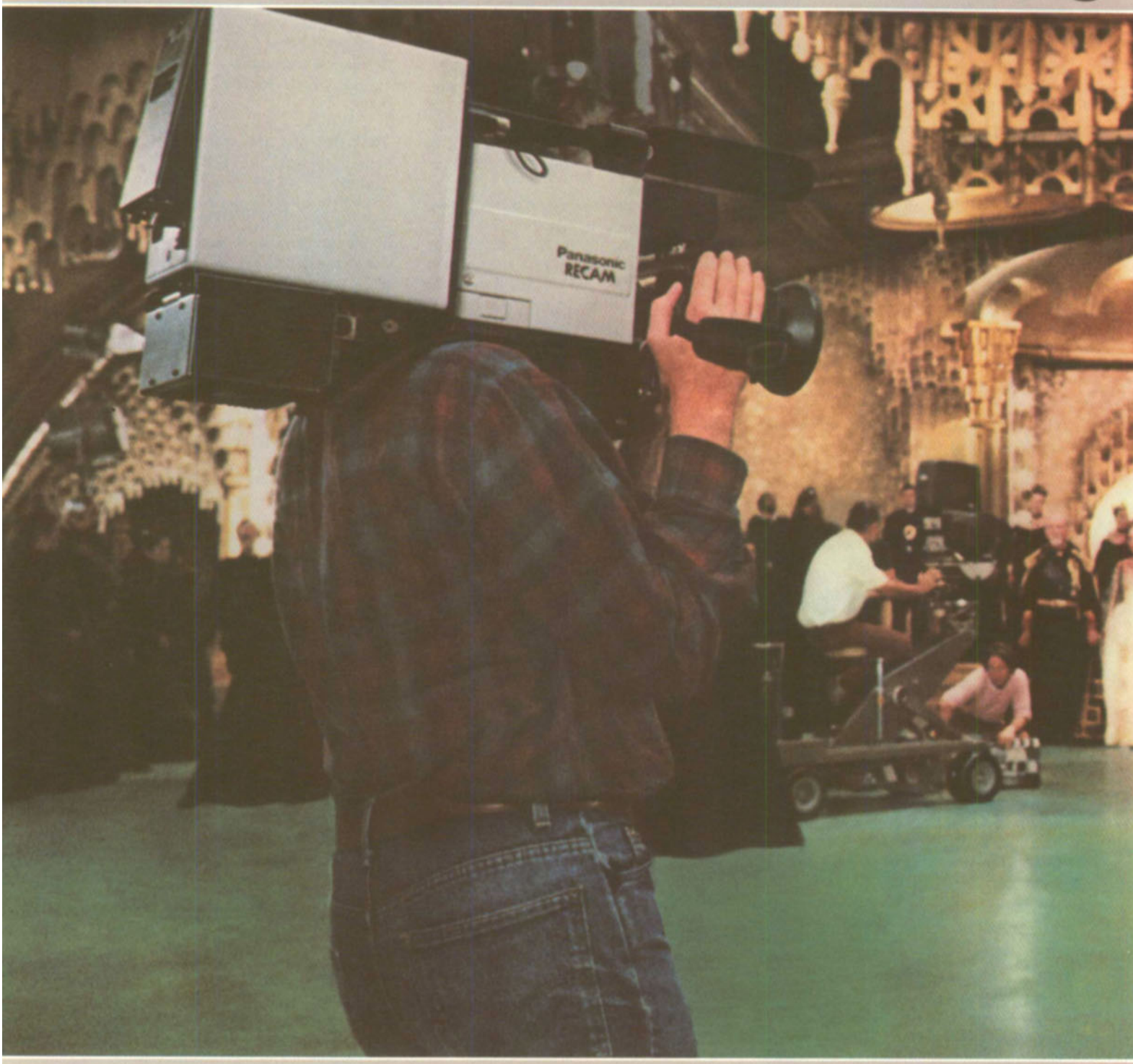

When Dino De Laurentiis and producer Raffaella De Laurentiis got together with director David Lynch to film Frank Herbert's classic science fiction novel, "Dune," they knew it wouldn't be easy. But it wasn't just the eight sound stages, desert locations, a cast of up to 20,000 people and a crew of 900. Perhaps Raffaella De Laurentiis said it best: "Dune is the most technical picture ever made."

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further, each possessing inherent advantages and drawbacks. A method is presented that provides an improvement in performance by modulating the loop gain of a feedback amplifier. Following a theoretical discussion, experimental results that test the theory are described.

Channel Codings for Digital Audio Recordings, Toshi T. Doi, *Journal of the Audio Engineering Society, 31:* 224-238, April 1983.

Channel coding is very important in obtaining both high-density recording and high reliability. Several new channel codes have been developed for improving digital audio recording. The parameters for evaluating channel codes are described, and several conventional codes are explained with application to current systems. New codes are discussed. One new code is applied to professional recorders; another one to compact disk systems.

Application of Magneto-Optic Readout to a Video Signal, Haruki Tokumaru and Tatsuo Nomura, *NHK Laboratories Note,* February 1983.

A magneto-optic recording and readout method has been studied for about 20 years because it has the following merits compared with conventional magnetic methods: (1) high recording-density, (2) high reliability (no contact), and (3) some laser functions (fast access, etc.).

In recent years, various optical components and devices, such as an optical videodisk and a laser diode, have been developed, and a magneto-optic recording and readout method has gradually become more practicable.

We have done research on a magneto-optic recording and readout system that used a CrO_2 magnetic sheet as a recording material and a magnetic thin film as a readout medium. Earlier, we had shown that a video signal could be recorded thermo-magnetically by a laser on CrO_2 magnetic tape and read out by a magnetic ring head, and it became clear that it is also possible to record the video signal on CrO_2 tape by means of an optical method.

An optical readout method that has recently been developed is presented. As a result of its application to a video signal, we have achieved a 45-dB signal-to-noise ratio and a horizontal resolution of 300 TV lines.

First, an experimental equipment for magneto-optic readout is described and explained. Second, the magnetic thin film used in the experiment as a readout medium is described, and the principle of readout (transfer process) is discussed. Finally, the recording and readout characteristics in the video band are given. In conclusion, we discuss certain problems that still must be solved.

Analysis of the Logarithmic Amplifier Bandwidth Requirements for a Scanning Densitometer, Peter G. Engledrum, *Journal of Applied Photographic Engineering, 9:* 104-108, June 1983.

A historical review of methods used to obtain direct reading densitometers is presented. Modern scanning densitometer design uses a logarithmic amplifier to "calculate" the density signal. The finite temporal bandwidth of the amplifier suggests that the measured density difference will not be exactly $-\log_{10}$ (reflectance). An analysis is conducted, assuming a simple resistor-capacitor filter in conjunction with a scanning slit aperture, which shows that the percent density error can be less than 5% with appropriate parameter selection. The key parameter, ρ, which is equal to the filter bandwidth times the frequency-slit width product, divided by the scanning velocity, should be greater than 2 to achieve these small errors.

Systems Engineering Consideration in the All-Digital Television Production and Transmission Center, M. S. Tooms, *IBA Technical Review:* 26-42, March 1982.

A design study has been undertaken for an all-digital television center. This was considered the most practical method of exploring: (a) whether system configurations alternative to those adopted for analog environments would be advantageous; (b) of evaluating what would be the consequences of these alternative configurations on the specifications of new digital equipment; (c) of determining how the phasing of the introduction of the digital system into a television operation could best be achieved; and (d) of assessing the suitability of a particular set of digital coding parameters for use in an overall system context.

This paper emphasizes those aspects of the study which pertain to the system configuration and the resulting desirable features of the digital equipment, particularly as they relate to the adoption of standards for multiplexing the video, the audio, and the pulses within the installation.

Digital Image Processing With Coherent Light: A Method and Some Applications, C. Draman, P. Meyrueis, and P. L. Wendel, *Optical Engineering, 22:* 330-333, May/June 1983.

This paper describes a method of hybrid processing of data and its applications in various spheres. The principle is to use an optical Fourier transform device coupled to a minicomputer via a mechanically driven diaphragmed monodiode scanning system. The principles and technologies are discussed.

On Fluorescent Photometry, Robert E. Levin, *Journal of the Illuminating Engineering Society, 12:* 218-225, July 1983.

Calibration for relative fluorescent luminaire goniophotometry is generally derived from the flux-to-intensity ratio for fluorescent lamps. Conventional photometric practice is to use a generic factor of 9.25, but the factor for a specific lamp is sometimes utilized.

Transformations of the Energy Sphere, Martin E. G. Willcocks, *Journal of the Audio Engineering Society, 31:* 29-36, January/February 1983.

The energy sphere has been widely used by many authors as a means for the representation of the amplitude ratio and phase difference between correlated signals of a stereophonic pair, often in connection with surround-sound encoding systems. By application of suitable matrices to a phase-amplitude surround reproduction system, the energy sphere may be rotated or boosted as desired. Practical applications of this technology are included.

A New Dimension to Digital Video Effects, *BME,* 56-62, January 1983.

ADO, Mirage, is a new system under development by Bosch. The latest generation of digital video effects processors incorporates Z-axis control for real-time, three-dimensional effects.

A New Look at Models of Visual Performance, Robert Clear and Samuel Berman, *Journal of the Illuminating Engineering Society, 12:* 242-250, July 1983.

In this paper, the authors argue that performance-visibility models are meaningless if "performance" is not strictly defined. The authors' argument implies that there are serious conceptual problems in the new CIE visual performance model (CIE 19/2). They analyzed (1) optimization of performance with respect to time; (2) the problem of multiple tasks; and (3) the significance of ambiguous targets. The performance-visibility fits presented in CIE 19/2 are not correctly based on a physical model, and therefore, in their present form should not be used as a basis for lighting recommendations.

Invasion of the Satellites, James A. Lippke and Robert Rivlin, *BME,* 41-50, July 1983.

Satellites are primarily a means of distribution, and the chief advantages of DBS will be to deliver high-quality signals into areas of the country where it is not economically feasible to lay down a cable TV system. Subscribers in these areas will still not have access to the multiple channels of a typical cable system, and thus DBS becomes more like a nationwide LPTV distribution system than it does a full-fledged broadcast service. Many in rural areas have already bought larger earth station systems in order to grab whatever is available on the satellites, including pay-TV services, such as HBO. Home Box Office has recently decided to scramble its satellite signals to avoid piracy, now that some 10,000 consumers are said to own their own TVROs.

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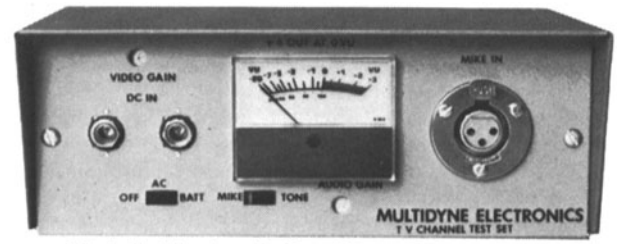

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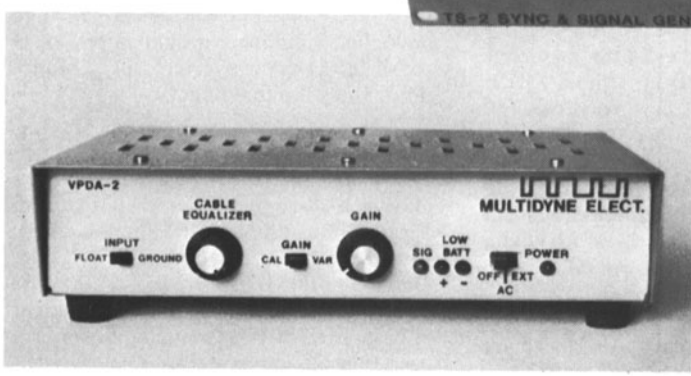

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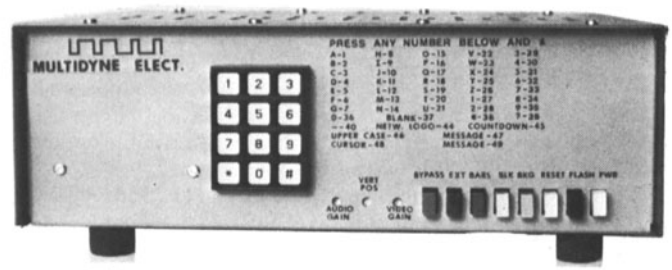

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