# Abstracts of Papers from Other Journals

**Spectral, Phase, and Transient Equalization for Audio Systems,** P. M. Clarkson, J. Mourjopoulos, and J. K. Hammond, *Journal of the Audio Engineering Society, 33:*127, March 1985.

A novel method for the equalization of loudspeakers and other audio system components is presented. The method is based upon digital prefiltering of the audio signals to compensate for distortions, with the filter designed in such a way as to give spectral, phase, and transient equalization. Results are presented for computer simulations and for a real-time implementation. Considerable improvements are demonstrated in both the time and frequency domains.

**Simple Simultaneous Carrier and Bit Synchronization System for Narrowband Data Transmission,** J. P. McGeehan and A. J. Bateman, *IEE Proceedings-F, 132:*69, April 1985.

The paper describes a simple technique for achieving bit synchronization with transparent tone-in-band (TTIB) systems. The composite system operates in such a way that carrier and bit synchronization with narrowband data communications are attained simultaneously in fading and nonfading environments. The technique has wide application including line, satellite, and mobile communications.

**On the Dynamic Range of Coefficients Generated in Transform Processing of Digitized Image Data,** R. J. Clarke, *IEE Proceedings-F, 132:*107, April 1985.

It is well known that the transform operation results in a large expansion of the numerical range of values encountered when input data is subjected to a one- or more dimensional transformation. It is usually assumed that the dynamic range expansion factor is $N^c$ where $N$ is the transform order and $c$ its dimension, but it is demonstrated here that this is true only under very restricted conditions, and that, in general, coefficient dynamic range expansion is not only transform dependent, but is often significantly greater than the above value. This effect may influence the transform processing operation in feature extraction and coding applications to a greater degree than has been realized previously.

**Evolution of the Solid-State Image Sensor,** Hsin-Fu Tseng, John Robert Ambrose, and Masoud Fattahi, *Journal of Imaging Science, 29:*1, January/February 1985.

To establish the state-of-the-art in design and fabrication in the field of solid-state image sensors, and to avoid repeating tests and observations documented years ago, extensive research has been made into the beginnings of the image sensor. This paper covers the three main disciplines: CCD, CID, and photodiodes, including early works, the refinements, and the present technology.

**Integration of the SPOT Panchromatic Channel into Its Multispectral Mode for Image Sharpness Enhancement,** G. Cliche, F. Bonn, and P. Teillet, *Photogrammetric Engineering & Remote Sensing, 51:*311, March 1985.

The SPOT (Système Probatoire d'Observation de la Terre) satellite system, scheduled for launch in France, will be equipped with two HRV pushbroom sensors that work either in a panchromatic mode with 10-m resolution, or in a multispectral mode in three channels with 20-m resolution. By integrating SPOT's panchromatic channel into its multiband channels, it is possible to produce a high-resolution image suitable for photo interpretation. Three integration algorithms were tested on simulated SPOT data to produce color composite images using SPOT's multispectral and panchromatic modes in combination. The algorithm that gave the best visual results used a different integration formula for the near-infrared channel than for the green and red channels, because the panchromatic is less correlated with the infrared than with the visible channels. The result looks similar to a color infrared air photo with high resolution and good spectral information quality.

**The Effects of Image Noise on Digital Correlation Probability,** Manfred Ehlers, *Photogrammetric Engineering & Remote Sensing, 51:*357, March 1985.

In remote sensing, digital correlation techniques are used to detect identical points in different images of the same area. Thus, digital correlation provides an automated technique for the determination of control points for image rectification. One disadvantage, especially in images with low SNR, is correlation failure. Five different objective functions for the correlation process are compared in a statistical test on identical images with added random noise of different magnitudes. An analytical formula for the correlation probability, depending on image SNR, is derived for each function. Methods for SNR estimation in images with unknown noise are presented. One result is that in low-SNR images, functions other than the normal correlation function should be applied. The phase-correlation method shows the highest correlation probability. With the derived relationship between correlation probability and SNR, an automatic choice of the appropriate objective function can be made.

**A New Densitometer,** R. J. Hercock, *Journal of Photographic Science, 33:*7, January/February 1985.

A new densitometer is described which could be used as a standard for density measurement or serve as the basis for an automatic densitometer. The instrument employs no servo mechanisms and has a minimum of moving parts. In principle, it is an analog computer that solves the equation: density = $\log_{10} I_0/I$ where $I_0$ is the incident intensity and $I$, the transmitted intensity. The incident and transmitted intensities are measured in sequence by a photo-multiplier and the difference between their logarithms taken by a sample-and-hold circuit. Either an analog or a binary-coded decimal output is available. The instrument's precision is better than 0.5% or 0.002 density, whichever is greater. Its accuracy, as with all densitometers, depends upon the efficiency of the collection of light, its spectral response, and the definition of density. It is calibrated by reference to an electrical standard that can be readily established and maintained.

**A Laser Flashover Test Method for Cathode-Ray Tube Displays,** A. J. Bateman, *Radio and Electronic Engineer, 54:*439, November/December 1984.

Large-scale-integration parts are easily damaged by the transient currents that result from extra-high-tension flashover in a CRT. Therefore, adequate circuit protection must be included in the design and tested to ensure that flashover-induced failures will not occur during normal operation. The purpose of this work was to evolve a test method that could achieve universal acceptance, so that it could be applied to both monochrome and color units containing hard or soft-flash CRTs. The method chosen uses $Q$-switched laser pulses to initiate flashover discharges to the focus electrode, and then employs the focus-to-final-anode gap as a surrogate spark gap to transfer flashover energy to the remaining CRT connections.

**Transmission of Broadcast Services over a 140 Mbit/s Digital Bearer: A Joint BBC/BT Pilot Scheme,** A. R. Lewis, D. W. Osborne, P. V. Gooch, and B. N. Kearsey, *Radio and Electronic Engineer, 54:*445, November/December 1984.

This paper describes a joint BBC/BT pilot scheme involving the transmission of

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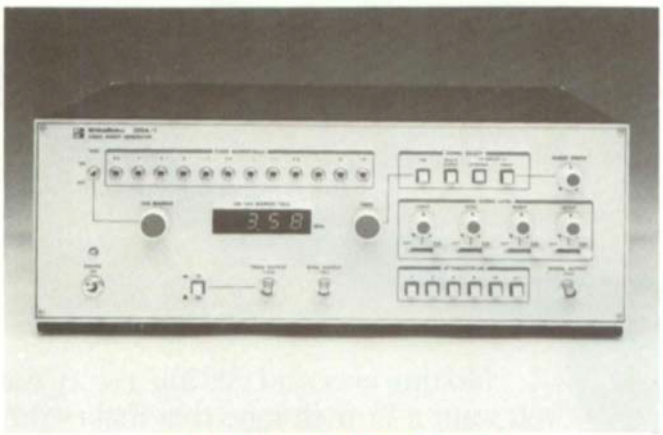

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**The RCA Communications Satellite Networks,** W. H. Braun and J. E. Keigler, *RCA Engineer, 30:*15, January/February 1985.

Channel demands on the RCA Americom domestic satellite communications system have continued to increase rapidly since the first launch in 1975. After deploying four of the first-generation 24-channel spacecraft, Americom introduced an advanced, all-solid-state design in 1982, which has more than twice the capacity of the original series. To supplement the operational network of six C-band satellites, K-band satellites will be introduced in 1985 to serve the small master antenna TV market.

**The NASA Advanced Communications Technology Satellite (ACTS),** G. A. Beck, *RCA Engineer, 30:*29, January/February 1985.

The NASA Lewis Research Center's Advanced Communications Technology Satellite (ACTS) system will provide a flight demonstration of new technologies for reliable, efficient, point-to-point communications. ACTS will also demonstrate satellite-switched time-division multiple access (TDMA) communications using fixed narrow spot beams and baseband-switched TDMA communications using scanning spot beams. Demand access is provided for both types of TDMA systems.

**New Simulation Techniques for Video Provide Powerful Investigative Tools,** R. J. Klensch and H. Waldman, *RCA Engineer, 30:*38, January/February 1985.

Satellite simulations in the laboratory can predict system performance before field implementation. Both hardware and software approaches may be used to achieve this goal.

**Advances in the Design of Solid-State Power Amplifiers for Satellite Communications,** Brian Dornan, Michael Cummings, and Frank McGinty, *RCA Review, 45:*619, December 1984.

The development of solid-state power amplifiers (SSPAs) to replace traveling-wave-tube amplifiers in satellite communications systems is described. The initial

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development work, which began in the mid-1970s, was made possible by the development of the GaAs FET device. This early development work resulted in a significantly improved communication system; to date, over 100 SSPAs have been included in operating geosynchronous satellites. Operational results for these transponders indicate a significant improvement in channel capacity, due largely to the linearity achievable with the SSPAs. In this paper, the design of several advanced SSPAs operating at higher output power (6, 10, and 12 W) is discussed.

**Communication Receivers for Satellites: A Review,** H. B. Goldberg and S. S. Dhillon, *RCA Review, 45:*631, December 1984.

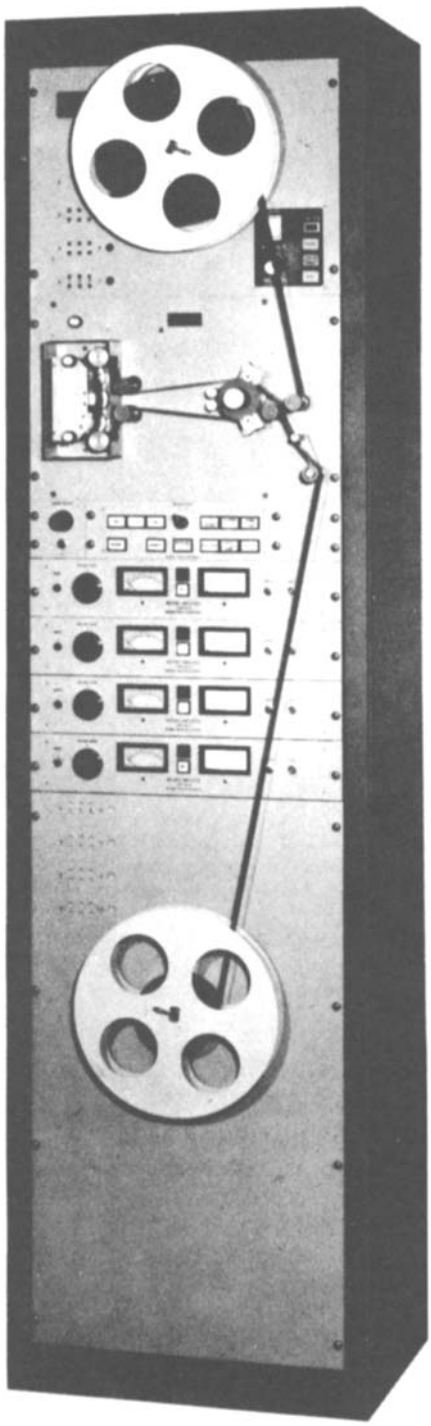
This paper reports the development of all solid-state low-noise wideband receivers for use in communication and direct-broadcast satellites operating in the 5.9 to 6.4-GHz, 14.0 to 14.5-GHz, and 17.3 to 17.8-GHz uplink frequency bands. The receivers provide low-noise and spurious-free down-conversion of the uplink frequency bands to the downlink frequency bands of 3.7 to 4.2, 11.7 to 12.2, and 12.2 to 12.7 GHz, respectively, with excellent frequency stability. The receivers incorporate state-of-the-art GaAs FET devices and microwave integrated-circuit technologies. Details of the design and measured performance of the receivers are given.

**20-GHz Lumped-Element GaAs FET Driver Amplifier,** S. S. Moochalla and D. E. Aubert, *RCA Review, 45:*670, December 1984.

A wideband lumped-element 20-GHz driver amplifier using GaAs FET chip devices for a 30/20-GHz communications satellite is described. Also described is a wideband 17 to 22-GHz low-loss waveguide-to-microstrip transition developed to provide the input and output connections to the microstrip amplifiers. An RF output power level of 17 dBm and 12-dB gain over the 17.7 to 20.2-GHz band was achieved using the two stages.

**Studying Magnetization Distribution on the Video Head Working Surface Using a Magnetic-Optical Method,** V. L. Gribkov, V. E. Zubov, G. S. Krinchik, V. A. Lyskov, S. G. Muchiev, and S. I. Nikanorov, *Tekhnika Kino i Televidenya,* p. 53, October 1984.

This paper presents the results of measuring the magnetization distribution functions of a video head working surface by means of a magneto-optical micromagnetometer. The longitudinal magnetization component is shown to be nonuniform. This results from the difference in the magnetic properties of individual grains. The mechanism of interference distortions is explained.



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