operation, and switching and production problems resulting from technical limitations are well covered.

The chapters relating to lenses, mirrors and prisms, special effects, graphic materials, illusions and projection equipment are especially valuable to production personnel. The treatment is nontechnical and is easy to understand since excellent illustrations are utilized to supplement the text. The chapters on television scenery, makeup and lighting will be very useful to production and technical personnel. The chapters on audio and remote pickups provide good general information.

The reviewer believes that this book will be especially useful to all newcomers to television and a valuable reference source for those engaged in the art.—*R. A. Isberg* Television Consultant, 2001 Barbara Dr., Palo Alto, Calif.

New Products

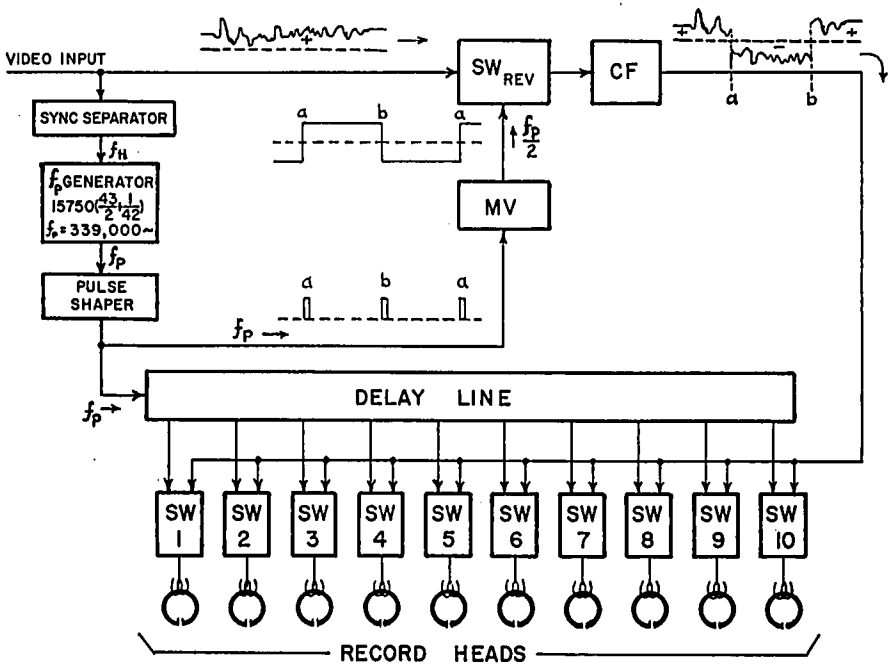
Further information about these items can be obtained direct from the addresses given. As in the case of technical papers, the Society is not responsible for manufacturers' statements, and publication of these items does not constitute endorsement of the products.

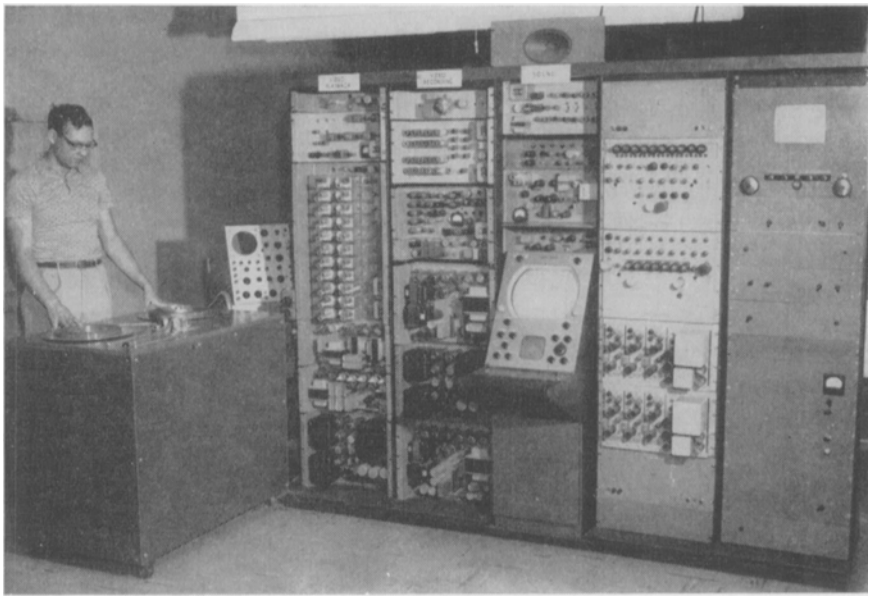
VTR (video tape recording), a new system of recording television signals on magnetic tape, has been announced by Bing Crosby Enterprises, Inc., Los Angeles. The new system is designed to conserve tape velocity and permit 15-min running time from reels of reasonable size. One-half in. or $\frac{3}{8}$-in. tape may be used, and the tape speed is 100 ips in either case.

Ten tracks are used simultaneously for video information; an eleventh track records vertical and horizontal synchronizing signals; and a twelfth carries the sound channel.

For recording, horizontal sync from the incoming video signal is transformed into a pulse which in turn operates a polarity-reversing switch affecting the signal at the pulse rate. The signal, alternating at 169 kc, is then applied to a series of ten switch units in parallel, and the pulse meantime applied to a delay line containing nine equally spaced taps. During the pulse period each switch in turn samples the video signal and passes a burst of current to its associated recording head. At the end of this sequence, the polarity of the input video signal reverses and each recording head is excited in the reverse manner.

An alternating signal is thus recorded on each





track, with both positive and negative halves representing bits of picture information up to 1.69 mc for the whole group of ten heads.

In playback, the sampling pulse is 0.15 μsec in duration but the highest sampling rate of the video signal is 0.34 μsec, giving 0.19 μsec of dead time between samples. By shifting the time of sampling of the entire system so that it is alternately delayed between zero and 0.19 μsec at a 15-cycle rate the field of the picture may be made up of twice as many samples, resulting in a high-definition picture containing detail well beyond that of a 3.39-mc image. Units which read only the peak value of successive samples are applied at the output of the video bus, thereby bringing the picture to an average energy level, the same as that of a customary signal. This "box-carring," or dot-connecting, device, when used with the 15-cycle shift, results in a picture having a fairly indeterminate high-frequency cutoff, lying between 1.69 and 3.39 mc.

Employment Service

These notices are published for the service of the membership and the field. They are inserted for three months, at no charge to the member. The Society's address cannot be used for replies.

Positions Wanted

By a Motion-Picture Industrial Engineer: 8 yrs planning plant expansion and improvement projects of film laboratories, including equipment procurement, contracting, expediting, bill-of-materials control, machine design, material handling, floor-plan layout, utilities. Familiar with cinematography, sensitometry, color principles, printing problems, mfg. processes. MIT-trained in mech., elec., indus. engineering. Esp. interested in Service Dept., producer liaison, or TV applications. Phone or write: F. L. Bray, DuArt Film Laboratories, 245 W. 55 St., New York City, PLaza 7-4580.

Motion-Picture Television Technician: 10 yr intensive skill and know-how related to 16-35mm cinematography, animation, recording (optical, tape, disk), editing, laboratory processing practice (black-and-white, color); also kinescope recording techniques; self-reliant; inventive; relocate if required; write: CMC, c/o Penning, 435 E. 74th St., New York 21, N.Y.

Electronics Engineer: B.S.E.E., 3 yrs chemical engineering, 2 yrs graduate work in physics. Currently working on Masters Degree. Engaged in gaseous electronics research, experienced in design and development of electronic instrumentation, installation and operation of automatic recording temperature control systems, vacuum system technique, maintenance and repair of all types of electronic equipment. 4 yrs retail business experience. Possess ability to write clear, concise reports. Interested in the motion picture, both artistically and technically. Desire position with organization in Los Angeles area preferably engaged in motion-picture production. Expect to be in Los Angeles area in late summer this year. Request inter-