

individual harmonic curves, and the sound's waveform is automatically computed. The library facility (storage) keeps track of about two thousand sounds and musical sequences. Software comes on floppy disks. Hardware includes one or two music keyboards with live controls, a video-control console with lightpen, and the main cabinet.

After a coffee break, Akira Tomizawa presented a paper on Sony Beta HiFi. For the video signal, there is no difference from conventional recording, but the HiFi audio is FM-modulated (AFM) and recorded on the same video track, while standard monaural audio track is recorded for full compatibility with all other Betamax equipment. The modulated FM signals are located between a converted color subcarrier and the video FM band. Four independent carriers are used for both channels ($L_A L_B R_A R_B$) to avoid crosstalk between video tracks and to improve signal-to-noise ratio.

Dropouts in the FM carrier are compensated by a pre-hold type circuit. Frequency response of 20-20 kHz, harmonic distortion of less than 0.3%, and dynamic range better than 80 dB are obtained by the AFM system.

The presentations were followed by a demonstration and a number of questions from the audience. — Fung F. Lam (Secretary-Treasurer), Sony of Canada Ltd., 411 Gordon Baker Rd., Willowdale, Ont., Canada M2H 2S6.

OBITUARY

Frank G. Back

Frank G. Back, a scientist and inventor of the Zoomar lens, which revolutionized cinematographic techniques by allowing cameramen to change focus without changing lenses, died July 6, 1983, in San Diego, Calif., at the age of 80.

Born in Vienna, Austria, Dr. Back received the M.E. degree in 1925 and the Sc.D degree in 1931 from the University of Vienna. After graduation, he was a consulting engineer in Vienna and, later, in Paris. He came to the U.S. in 1939 and became a citizen in 1944. He was a long-term resident of Long Island, N.Y., where he established and was president of Zoomar, Inc., a research and development firm specializing in optics. Following his retirement in 1978, he moved to La Jolla, Calif., where, in 1981, he formed the Back Optics Manufacturing Corp. Dr. Back held more than 50 patents and was a prolific author of technical papers.

Among many honors and awards, he received the Gold Medal Annual Award of the Television Broadcasters Association in 1947, and the Friedrich v. Voigtlaender Gold Medal Award of the Photographic Society, Vienna, in 1960. He was made a Fellow of the Royal Photographic Society

in 1949, a Fellow of the Photographic Society of America in 1952, and he was President of the Society of Photographic Scientists and Engineers in 1958.

In 1961, he became a Fellow of the SMPTE. He was awarded the SMPTE Progress Medal in 1962.

In accepting the Progress Medal Award, Dr. Back said, "We always think of something spectacular when we talk of a breakthrough. Actually, a breakthrough can always be pinpointed to a very small but significant discovery, though it always radically changes the whole concept."

Beginning in 1945, Dr. Back authored seven papers, published in the *Journal of the SMPTE*, describing the problems he encountered during his development of the Zoomar lens and the solutions he arrived at. One of his "small but significant discoveries" was how to develop a zoom lens which, while changing its focal length would maintain its transmission value. "The simple solution," he said, "was to place the iris diaphragm behind all movable elements of the zoom lens."

Known in his lifetime as the "father" of the zoom lens, his more than 50 U.S. and foreign patents covered the field of vari-focal and catadioptric lens design.

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