

DIGITAL FILM SOUND

by a malfunctioning synchronization device, or simply with the sound for reel 5AB being played with reel 6AB!

The anticipated leap to digital reproduction in motion picture theaters has brought the single/double system controversy to the fore again. The obvious places for the soundtrack — magnetic stripes on 35mm or 70mm prints, and an optical track on 35mm print — do not appear to have sufficient bandwidth to handle multi-channel digital audio soundtracks with professional standards of 16-bit resolution and a 48-kHz sampling frequency.

The best-known single-system idea is that proposed by Peter Custer in his Digital Fluorescentsound process. Eight, 16-bit/48-kHz channels of digital audio are “recorded as colorless and transparent, brightly fluorescent high-density data image, multiplexed over the picture across the entire photographic image space.”

While the process currently exists only in the form of patents, Custer hopes to obtain financing within the industry to create a prototype system. He anticipates that the Fluorescentsound cinema processors will be leased to theaters, both to sidestep the high cost outlay by the theater owners, and also to assure proper maintenance.

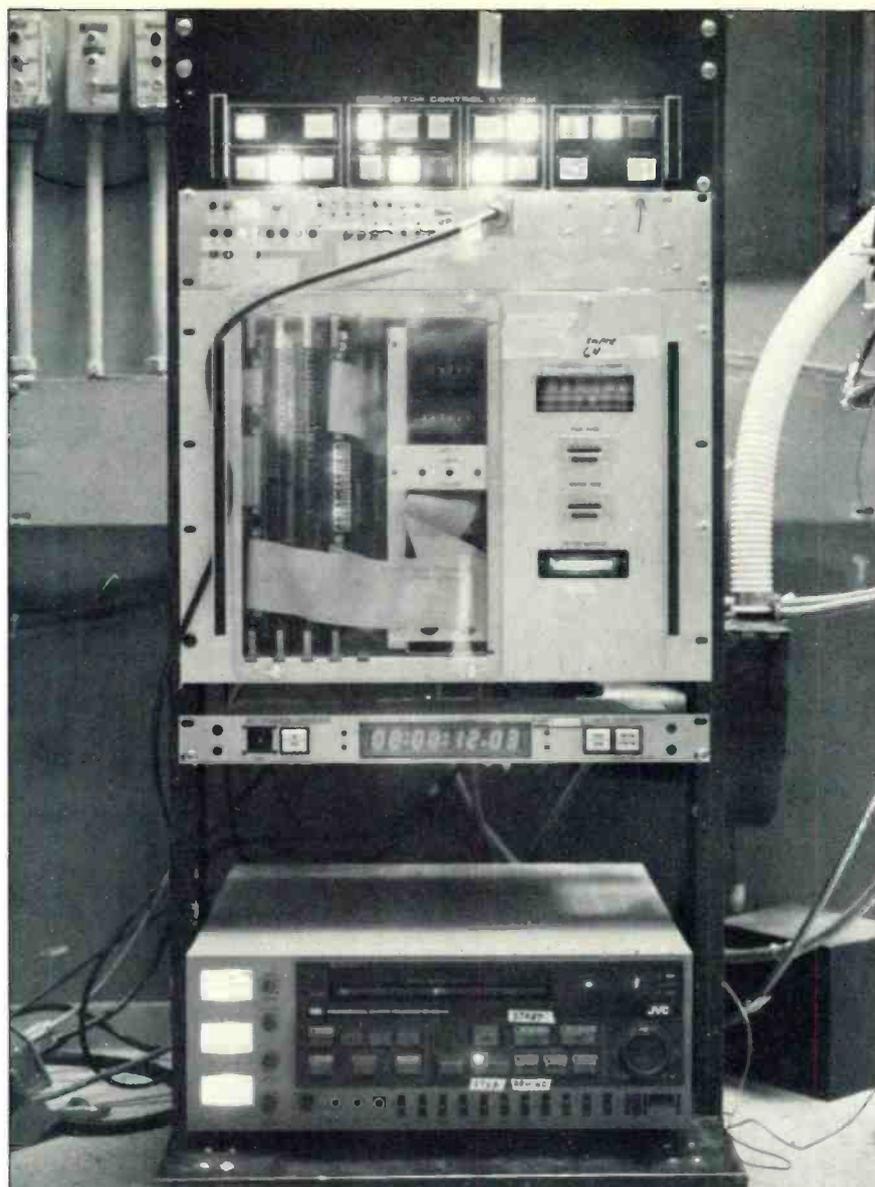
Because the Digital Fluorescentsound “soundtrack” is invisible, standard Dolby Stereo optical soundtracks will provide compatibility with unconverted theaters. Another important benefit of the system is that it would provide top quality sound without the cost and trouble of preparing 70mm prints (approximately \$12,000 each) which, in turn, costs the major studios millions of dollars each year.

Double-System Digital Projection

If someone attempts to sell a double-system digital interlock format to the industry, the first question people ask is something like “Can it be operated reliably and without worry in the Spearfish, South Dakota Cinema XIV?”

Discussed below are two custom interlock systems that have been used to showcase the ways in which all-digital soundtracks can benefit from digital presentation; neither system is being proposed for adoption by the industry.

Early this year, Walt Disney Productions once again scored a first with *Fantasia*, this time with the first public presentation of that landmark stereo film’s digital re-issue in digital interlock. Special equipment was



A custom Disney projector controller unit used to provide digital interlock with an Audio+Design/Calrec-modified Sony PCM-710 processor for double-system presentations of the classic movie *Fantasia*.

installed at the Plitt’s Century Plaza Theater II in Los Angeles, beginning February 8, 1985. The digital Lt-Rt master was transferred in a continuous segment onto a Sony PCM-F1-encoded one-inch videotape which, in turn, was copied onto a F1-encoded half-inch VHS cassette to provide the necessary two-hour running time. The same digital program has since been presented at the Avalon Theater in Washington D.C., and the Ziegfeld Theater in New York City.

The system utilized a proprietary projector drive system with stepping motors developed for use in the EPCOT Center film shows to interlock projectors with analog multi-tracks; all film shows at Disney theme parks utilize double-system projection. The PCM-encoded tape was played through with an Audio+Design-modified Sony 701ES processor, with SMPTE timecode on linear tracks of

the videocassette loaded in the JVC-BR-8600 industrial VCR.

The projector drive system always knows “where” the 35mm print of *Fantasia* was, since it is aligned at the 12-foot Academy Picture Start frame. The 24-frame drop-frame timecode on the videocassette was recorded separately from the recording of the PCM-encoded digital audio, with the timecode starting approximately two minutes before the first frame of picture, and the numbers bearing no particular relationship to the picture.

At the Century Plaza, it was determined that the projector motor had to be started 64 seconds after the cassette. Any variance caused by starting the projector sooner or later is compensated by the projector-drive mechanism, which regards the 64-second start mark as the nominal sound start mark, and knows the correct picture frame that has to be in the