

Motion Pictures Alan J. Masson Editorial Director, Motion Pictures

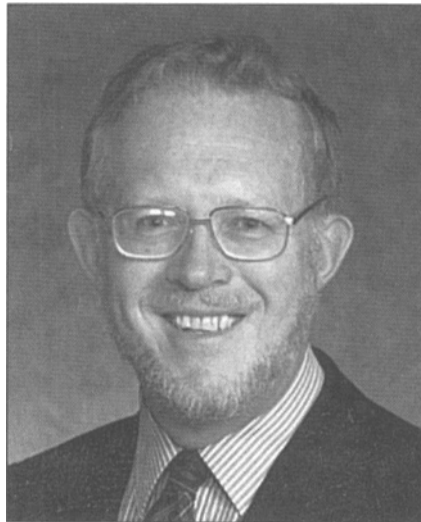
Already a mature technology, the motion picture industry continues to produce significant advances every year in cameras, film stocks, laboratory equipment, sound tracks, and associated electronic equipment. The year 1997 was no exception. The intimate relationship of film and video images today is evident from the introduction of more hybrid products and electronic innovations in film equipment.

Cameras and Accessories

Addressing the need for longer 16mm/Super-16 running times, Aaton Des Autres, Inc., introduced an 800-ft magazine for their XTR and XTRprod cameras, giving a running time of 22 min, close to that of video camcorders.

Arriflex Corp., announced a compact color video assist for full integration into the Arriflex 435 camera. The camera is flicker-free within a speed range of 5 and 150 frames/sec. The Arriflex Laptop Camera Controller (LCC), version 1.3.0, is configured for all new-generation Arriflex cameras: the Arriflex 435, 535B, 535, and 16SR 3. This is software for two-way communication between cameras and computers which runs on Macintosh PowerBook System 7.1 or later. The software controls all camera functions, maintains a database of camera status information, and is capable of printing automated camera reports. SL Cine announced the under-3-lb SL-435 Steadicam-style magazine for the Arriflex 435 camera.

The Millennium Panaflex Camera System from Panavision is designed to be the ultimate quiet studio camera, yet it is easily converted for



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Steadicam use, video finder, or video-only applications. The product has many new features including a computer-designed and optimized viewfinder system and new movement materials and advanced coatings for reduced lubrication requirements. The Millennium video assist is an integral part of the camera. It can be linked to the Panavision Take 1 Digital Video Assist, a hard-disk or fast video system providing easy-to-use film-style interface controlling multicamera recording, instant playback, cutting, and effects.

Panavision Mark II Primo Anamorphic Close Focus lenses are available in primes from 35mm to 180mm plus two zooms of 48-550mm and 270-840mm. Canon announced two zoom lenses for Super-16, a 7-63mm T:2.6 and an 11-165mm T:2.5, both with Aaton Arri BL and PL mounts. Century Precision Optics introduced the Angenieux 7-81mm HR T:2.4 zoom, also with Aaton Arri BL and PL mounts.

Widescreen Technology is An Active Area

Steadicam's use by IMAX was made possible by developments in lightweight camera design and was used to film *Everest* and *Special Effects*. SpaceCam Systems has introduced a gyro-stabilized helicopter mount suitable for 15-perf 65mm cameras. The use of 65mm to 35mm reduction dailies printing has increased with the use of the Cosharp Printer, developed by the Technology Council of the Motion Picture-Television Industry.

Iwerks is partnering with Cinema Products to produce new 3-D cameras. Iwerks has also introduced a 15/70 projector system. The number of 15/70 theaters has increased to 170 with another 40 projected for 1998.

A new organization, the Large Format Cinema Association (LFCA), has been formed. The organization supports all 65/70mm film formats and is complementary to the International Space Theater Consortium (ISTC).

Film Emulsions Continue to Improve

Eastman Kodak introduced two new medium-speed color negative films in their Vision family. They are the tungsten-balanced Kodak Vision 200T film 5274 (35mm) and 7274 (16mm), and the daylight-balanced Kodak Vision 250D film 5246 (35mm) and 7246 (16mm). Both these films have finer grain and higher sharpness than their predecessors. Using similar technology, an improved version of Kodak primetime teleproduction film was announced. This is designated 5620 film in 35mm and was introduced for the first time in 16mm as 7620 film. Primetime film

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is specially designed for cost-sensitive episodic television shows and movies of the week. It has a low-contrast emulsion which permits easy lighting setup in the studio and has specially-designed telecine transfer characteristics, for fast and easy setup and transfers.

Choosing an aspect ratio for shooting a motion picture is an artistic decision made by the cinematographer. Over the years, many aspect ratios have been used. Currently in the U.S., the 1.85:1 flat and 2.39:1 CinemaScope (anamorphic) aspect ratios are common for theatrical use, and 1.33:1 for programming intended for current television systems. Telecine colorists have long been faced with the many problems of pan-scanning and letter-boxing to fit the film image to the television format. The imminent arrival of wide-screen digital television with an aspect ratio of 16:9 (1.78:1) has resulted in a proposal to the International Standards Organization (ISO) for a recommendation that all film for theatrical and television use be produced with an aspect ratio of 16:9 or CinemaScope. This will potentially simplify the telecine transfer of film and retain the original format in most cases. A Recommended Practice will be debated in the coming year.

Digital Sound

Digital sound continues to gain popularity, with the three competing systems increasing their numbers of converted screens. The SMPTE A12.68 Audio Ad Hoc Group reported in October that digital companies were claiming the following numbers: Dolby SR.D: 11,459 screens worldwide with 4,753 in North America; Digital Theater Systems (DTS): 11,789 screens worldwide, 6,586 in North America; Sony SDDS: 4,785 screens worldwide, 4,010 in North America.

The problem of possible multiple inventories of release prints has been overcome by the introduction of a sound recording film by Eastman Kodak, capable of transferring all sound-track formats including Dolby SR.D digital track (green exposure); DTS time code track (green expo-

sure); Sony SDDS digital tracks on both edges of the film (red exposure); and analog track (white light exposure). Kodak panchromatic sound recording film 2374 (Estar base) can be used in Westrex cameras retro-fitted with the LED exposing devices for these digital tracks. In order to avoid interference with the SDDS track along the edges of the film, the manufacturer's identification information is printed down the middle of the film. It has also been necessary to change the color of the manufacturer's edge-printed information on color print film from black to magenta to avoid interference with the cyan image of the Sony SDDS digital track.

Changes are Also Coming in Analog Sound Tracks

At last it seems possible that redevelopment of silver analog tracks on release prints may be eliminated in a few years. A pure cyan dye track, reproduced using the red LED readers which are already being introduced in new projectors and retro-fitted to existing projectors, would be welcomed by the laboratories due to the resulting elimination of messy and waste-producing redeveloper application procedure. The cyan dye track would also be accepted by theaters where the red LED readers will last much longer than traditional sound heads employing tungsten lamps and infrared photocells. However, the conversion to red readers requires an interim compatible track format to provide time for the theaters to install the red readers.

Dolby Laboratories, Technicolor, and Eastman Kodak are working on the technology for an interim track format, compatible with both infrared and red readers, to be used for a few years while the theaters install the red readers. Laboratories will switch to cyan dye tracks without redeveloped silver when the market conversion is complete.

Release Prints Have Undergone a Quiet Revolution

The majority of release prints are now being printed on polyester stock rather than cellulose triacetate, bring-

ing benefits of more environmental, reliable, and cleaner prints to laboratories and theaters. All three manufacturers are offering non-remjet color print stocks, eliminating the need for the prebath and backing-removal stages in the process, and significantly reducing the chemical and water discharges from the process. Eastman Kodak's SO-886 non-remjet color print film on Estar base has a process-surviving anti-static layer on the base side, providing a high degree of protection against static cling problems on platter transports. Fuji Photo Film Co. introduced its next generation of 35mm polyester base, color release print stock (3519). Notable improvements include better color reproduction and softer flesh tones. The product does not have a black remjet backing and contains properties that resolve the previous bromide issue during laboratory processing.

Technicolor Inc., announced in 1997 that it was introducing a modern version of its dye transfer process for release prints discontinued in the 1970s. Color separation matrices are used to transfer yellow, cyan, and magenta dyes to a blank receiver film carrying a silver sound track. A small number of release prints were made in 1997 using a prototype dye transfer machine. They included a single print of the restored version of the 1957 classic, *Giant* (on the 40th anniversary of its original release), and two prints of the 1997 feature, *Batman and Robin*, which included many shots with high-color saturation and deep shadows well suited to the dye transfer process.

The Compact Distribution Print (CDP) is a development from Todd-AO Corp., and United Artists Theaters. Requiring projector conversion, at an estimated cost of \$2,500, the CDP is 37.5% shorter than a conventional print. A 111-min feature is only 6,250 ft long, compared to the normal 10,000 ft. Any feature release under 140 min can fit on a single extra length reel (ELR). A number of optical and equalization changes are necessary to optimize the analog sound track response at the slower transport speed, and changes would be necessary for Dolby SR.D and Sony SDDS digital tracks.

The new Westrex RA7035 projector is designed for screening, high-speed dubbing, and image/sound-track analysis. Features include high-speed 6x or optional 10x speed, forward or reverse through the gate, optional jog/shuttle at cine speeds of still-frame and flickerless 1 to 60 frames/sec, and high-speed cueing to any frame.

For Film Scanning....

Cintel International, Ltd., announced at NAB the development of the C-Reality flying-spot scanner. The scanner provides an uncompressed 2k per color data output at 6 frames/sec, as well as 525/625-line realtime standard-definition (SDTV) and high-definition television (HDTV), once formats are decided. The servo and film transport are microprocessor-controlled, providing a high degree of image stability and gentle film handling suitable for the transfer of valuable archive material. The CRT is mounted horizontally on the right, with the light beam passing through the gate to the detection system on the left. There are no mirrors in front of the beam-splitter.

Eastman Kodak introduced the Cineon Genesis Plus film scanner

with 10-bit logarithmic output matched to the logarithmic density characteristics of film; the enhanced Cineon effects (FX) and compositing software (version 3.5) with grain management systems; and the new Cineon Lightning II laser film recorder with a fiber-optic interface to workstations.

Philips BTS announced an upgrade to the Spirit Datacine, providing data output in DPX or TIFF files which can be configured to Cineon or Discrete Logic Flame systems. Cintel and Aaton announced Keylink software version 6.02C and InstaSync technology which provides automatic synchronization of film dailies, and reads Keycode and AatonCode on the film. The software burns these codes onto every video frame and stores all data on disk in a 100% frame-accurate manner for nonlinear editing.

The KeyLog Tracker graphical interface from Evertz Microsystems Ltd., has several new capabilities including reader heads and decoders for Keycode and Arri codes, dual-standard film and tape footage encoders, and telecine logging programs.

Celco introduced the eXtreme Nitro film recorder with EBX advanced CRT technology, the first CRT-based

recorder capable of recording onto Eastman color intermediate film 5244. Earlier, CRT recorders required the use of camera-speed film, usually Eastman EXR color negative film 5245. eXtreme Nitro can record to 35mm, 16mm, and 65mm film.

Sony is developing a CCD HD telecine for delivery in late 1998. It will employ 3 x 2 million pixel FIT HyperHAD CCD arrays. Quantization from the CCDs will be 12-bit log, and the processing quantization rate will be 16 bits linear R, G, B independent. Output formats announced to date are HDTV 1920 x 1080, 525/59.94 and 625/50, 10-bit R/G/B or Y/R-Y/B-Y in each case. The lamphouse will utilize a xenon source with separate R, G, B exposure controls using high-speed shutters. A unique image stabilizer system will employ capacitive 2-D multiple perforation sensing.

Conclusion

The quality of the film image continues to improve and will transfer well to the new medium of digital HDTV. The technology will help display images to theater audiences in more appealing ways, and present sound quality equal to that of compact discs.