

This Program is the scheduling of papers within the sessions. It is as accurate and complete as possible. Before the Conference, however, papers may be removed or rearranged into other sessions. The sessions are firm. Questions about specific papers or sessions should be addressed to Society Headquarters, Att: 106th Conference—Elaine Itzkowitz, (212) 867-5410; Program Chairman Dr. Roderick T. Ryan, Eastman Kodak Co., Los Angeles, (213) 464-6131; or 8mm Symposium Chairman Dr. Richard J. Goldberg, Houston Fearless Corp., Los Angeles, (213) 272-4331. The Final Program booklet will be available ten days before the Conference from Society Headquarters, and during Conference week at the Century Plaza Hotel.

SUNDAY—SEPTEMBER 28

10:30-3:30 REGISTRATION

3:30 VISIT TO MARINELAND AND BUFFET DINNER

MONDAY MORNING—SEPTEMBER 29

8:00 REGISTRATION

CONCURRENT SESSIONS

9:30 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY

Computer-Generated Color Motion Pictures of Nuclear Fuel-Element Temperature Distribution

W. C. MACE and H. P. FOOTE, Batelle-Northwest, Richland, WA

The image on a color monitor simulating the temperature distribution of a nuclear fuel pin typical of a liquid metal cooled fast breeder reactor was produced by a hybrid computer. A motion-picture camera was positioned in front of a color TV monitor. An animation motor used to drive the camera was activated by a pulse from the computer. The shutter was set in the open position so that an exposure would be made until the motor was pulsed to cycle. In the cycle sequence the shutter is open, then pulsed, closed, film advanced, and the shutter returned to the open position. The TV monitor had everything disconnected from the picture tube except the power supply so that the three color guns and the sweep could be controlled by the computer. About 800 lines across the diameter of the circle made the solid color. The spiral sweep rotated 200 times per second and required two seconds to grow to full diameter. A PDP-7 digital computer was programmed to calculate temperatures and advance the camera. The program consisted of 1500 equally spaced points along the length of a fuel element.

Visual Recording of Random Vibration Occurrences Through Fiber Optics

H. P. DART and H. KIRKWOOD, Autonetics Div., North, American Rockwell Corp., Anaheim, CA

To synchronize a recording camera to photograph random vibration tests, an optical system with coherent fiber optics has been designed to transfer to the camera the image of the part under test. The distal end of the fiber optics is rigidly affixed to the test fixture, with the proximal end attached to the camera. In this way, the lens vibrates with the part and provides the opportunity to record in real time. The entire random sequence test is photographically documented for engineering evaluation.

Applications of Slow-Scan Television Systems to Planetary Exploration

M. I. SMOKLER and P. M. SALOMON, Jet Propulsion Laboratory, Pasadena

The design of a spacecraft television system must be selected from many parameters while seeking to optimize performance and reliability with respect to weight and complexity, within the constraints of existing technology. The slow-scan television system employing a vidicon photosensor uses a mechanical shutter which allows the vidicon to effectively store the scene image and perform the readout sequence at a much reduced rate. Digital encoding of the analog video signal prior to recording preserves the high signal-to-noise ratio and eliminates signal degradation in the Earth-spacecraft downlink. Sampled vidicon operation simplifies video-channel design, and allows low-noise amplification to be performed on the vidicon output signal. Spacecraft digital tape recorders will offer increased storage capabilities coupled with significantly higher recording rates. Intensifier-coupled vidicons of the return-beam and FPS type offer improved sensitivity, spectral response and resolution. Image intensifiers allow electronic shuttering and image motion compensation to be performed with large-format sensors. Future trends are described which involve improvements in sensors, data encoding and storage. Various types of television systems considered for future planetary missions are discussed.

Theory of Operation and Performance of High-Resolution Return-Beam Vidicon Cameras: A Comparison With High-Resolution Photography

OTTO H. SCHADE, SR., RCA Corp., Harrison, NJ

The development of high-resolution electron optics for 50×50 mm image formats and of electron guns providing a small diameter electron source has improved the modulation-transfer function of return-beam vidicons to a level competitive with high-definition aerial films. Limitations are imposed when the polarization time is restricted by operational considerations in the single-exposure read prepare mode of a slow-scan system. Injection of a control potential permits discrimination against the large "haze" component from low contrast scenes to optimize the current of the reading beam and the signal-to-noise ratio in the video signal output of the electron multiplier. Comparison at a spatial frequency of 100 cycles/mm shows that the high-resolution television camera has a detection efficiency equal to or better than SO-243 high-resolution aerial film, particularly at low contrasts, and can potentially exceed it by an order of magnitude with further development.

The Electroluminescent Panel as a Binary Light Source

L. RALPH BAKER, University of Arizona, Tucson

To expose very small areas on film as required for experiments in image processing, the most readily available and least expensive device was found to be the electroluminescent panel (EP), which has several characteristics that are highly advantageous to use in replacing a tungsten light source and a shutter. The EP luminance output is a func-

tion of both the ac driving voltage and frequency, and can be turned on and off very rapidly. The EP is available in different spectral emission ranges, allowing flexibility in its use; also the spectral emission can be shifted by driving the EP for a specific application. The spectral output and how it is affected by driving voltage and frequency is discussed and the spectral match between the film and the EP is shown. The results of the EP binary light source and how it has been used in image processing is shown in detail using actual photographs.

Holographic Motion Pictures of Small-Scale Events

ROBERT E. BROOKS and CAMERON KNOX, TRW Systems Group, Redondo Beach, CA

Holographic motion pictures provide a means for recording dynamic, microscopic events occurring unpredictably throughout a large volume of space without the depth-of-field and angular field limitations of conventional photography. Extremely short repetitive pulses of monochromatic green light from an argon laser were used to produce holographic movies of living marine plankton organisms by recording a series of in-line holograms at 70 frames/s on 35mm film.

CONCURRENT SESSION

9:30 LABORATORY PRACTICES I

Cue Analog, A Nonphysical Negative Cuing System

RALPH D. WHITMORE, JR., and MICHAEL V. CHEWEY, MGM Laboratories, Inc., Culver City, CA

Cue Analog is a system whose purpose is to eliminate notching, tape application, gratings and the handling of negative material during cuing. Foot and frame information is punched into the same tape containing additive light information, and is read consecutively. A photoelectric transducer mounted on the printer feeds frame information to a counter. When the counter matches the punched tape foot and frame data for a scene change, the system gates a signal to the additive light system for a modulator or valve change. Also described is the bidirectional cue analog on a new panel printer, a unidirectional system on a new high-speed step-reduction printer, and the programer for the new tapes.

Gevachrome Original Films for a Sharp and Brilliant Television Image

R. A. EYNARD, Agfa-Gevaert Inc., Teterboro, NJ

The characteristics of two films, a normal speed film of ASA 50 and a high-speed film of ASA 125, fully meet the requirements of color television transmission. After short reversal processing they are ready for projection. Their low contrast insures pictures which are shown to full advantage on the TV screen. This low contrast also makes it possible to obtain excellent prints on Gevachrome print film Type 902 and on other color reversal print films. Spectral density curves, spectral sensitivity curves, MTF curves and other technical data are presented.

A New Eastman Ektachrome Commercial Film

P. H. GRIGSBY, Photographic Technology Div., F. KENT, Research Laboratories, J. M. McDONOUGH, Motion Picture Marketing Div., D. R. MILLER, Film Testing Div., and W. L. WOLF, Film Emulsion Div., Eastman Kodak Co., Rochester, NY

A new Eastman Ektachrome Commercial Film, designed to provide 16mm camera originals with improved sharpness, increased latitude and improved process stability is described. A new ECO-3 process and a means of obtaining additional film speed by a process modification is discussed. The new process will be compatible with existing processing equipment.

A Modular Additive Production Film Printer

S. R. KURTZWEIL, HENRY F. STEMKE and HANS CHR. WOHLRAB, Hollywood Film Co., Hollywood

This printer can be converted from one film size to another by only exchanging two rack-mounted plates. An additive color modulation system with a new self-checking light valve is used. Two standard speeds of 240 and 480 ft/min are provided. Any other two speeds up to 480 ft/min can be selected instead. The modular system makes the printer flexible to be used for picture and sound, A/B and sound, optical or magnetic sound, in the various standard film sizes. It is possible to insert superimposed title printing; there is an automatic pullback system for avoiding short ends of raw stock; and circuits allow for printing of negative sections.

Processing of Optical Soundtracks on Color Films with Emphasis on Silver Soundtracks on Improved Eastman Ektachrome R Print Film

G. L. BORTON and R. W. BAUER, Photographic Technology Div., Eastman Kodak Co., Rochester, NY

Obtaining a suitable optical soundtrack on color films has always created problems in processing. The needed techniques, required equipment and common problems encountered in processing of an optical track are discussed, covering the four main stages of soundtrack processing: preparation, application, reaction and wash-off. The specific system for obtaining a silver soundtrack on improved Eastman Ektachrome R Print Film 7389 is discussed in detail. Recommendations are given for printing the soundtrack on the new film, and for making suitable sound originals for this system. A picture and sound demonstration is presented.

An Electronic Technique for Analyzing Film-Transport Problems

RICHARD DULL, Bell & Howell Co., Chicago

One of the most accurate electromechanical position-sensing instruments available has been incorporated into a compact tension transducer in which the vagaries of film-handling equipment may be brought out into the open and carefully scrutinized. Due to the well planned mechanical construction of this transducer, its casual use as a hand-held instrument is amazingly free of the errors one might expect in angular relationships or random friction excesses ordinarily associated with such informality. This makes it a valuable adjunct as an aid to the engineer who is normally not afforded the cost or the time involved in special fixturing for making physical tests on transitory or small-run phases of engineering development. Nominal tensions may be instantly meter read and transient disturbances of a frequency bandwidth significant to most transport systems, with added instrumentation facilities, may be easily tabulated.

MONDAY AFTERNOON

12:30 GET-TOGETHER LUNCHEON

Guest Speaker: Barton Kreuzer, Vice President and General Manager, Commercial Electronic Systems Div. RCA Corp.

AWARDS PRESENTATION

CONCURRENT SESSIONS

3:00 LABORATORY PRACTICES II

A Laminar Air-Flow Clean Room

G. F. TANZA, AiResearch Manufacturing Co., Los Angeles

A full wall-to-wall laminar air-flow room, 40 × 80 × 8 ft, and an associated decontamination room, 20 × 30 × 8 ft, was designed and fabricated within one year. Conditioned air, 40 to 50% relative humidity at 72° ± 1°F, is supplied to the rooms through absolute filters, having a capability of removing particulate matter 0.3 μ and larger. Studies performed indicated that to achieve Class 100 particulate level per Federal Standard 209, the standard "bunny-suit" uniform is not required when working at bench level under laminar air-flow conditions. The room has been reviewed by both the military and industry and is considered capable of achieving and maintaining the low contamination levels desired.

Liquid Gate for Optical Printing

HOWARD F. OTT, Photographic Technology Div., Eastman Kodak Co., Rochester, NY

A 16mm liquid projection gate has been built for use in an optical printer. Thin liquid layers at the windows provide tight focal-position control in this total-immersion gate. The film rides between tensioned rails which contact the film only at the edges. One set of rails is compliant for passing splices; tension is reduced at pulldown. Fixed pins provide registration. Without adjustments to the liquid support system, printer speeds of from hold-frame to 640 frames/min are possible; normal operation has been at 320 frames/min. The gate operates well in either forward or reverse direction. The gate provides continuous cleaning by first vacuuming the film as it enters the gate area, then flushing its surfaces with liquid prior to projection. Liquid enters the gate near its windows and leaves through the vacuum slots at either end of the gate. The insweep of a ir at the gate ends also provides an effective squeegee for liquid removal from the film. The closed support system provides filtered, bubble-free liquid to the gate. Inhibited perchloroethylene has been used as the immersion liquid. The gate is easily loaded and used with little change in procedure from normal dry-gate operation.

Submerged Wet Negative Heads for Wet Printing

HAROLD A. MAYER, Technicolor Inc., Hollywood

A method of wet printing on an optical step printer is described, wherein the negative is completely submerged in the wetting liquid during the printing cycle. This technique overcomes the problems of non-wetting, streaking and splice interference, often encountered in the dip tank or felt application of the liquid to the surface of the film.

Counting Footage Electronically

WALTER A. MICHEL, Bell & Howell Co., Chicago

A footage counter is one source of billing customers; therefore it must be reliable and accurate. All moving parts (including switches and gears) can be removed in this system, from the counting system to increase reliability and at the same time reduce cost. This counter uses the latest solid-state and integrated-circuit techniques. The count is originated by an oscillator and then divided by a digital counter. The entire system is factory preset to exactly match the machine speed. The unit is contained in a small plug-in module which is easily accessible and removable. Some advantages of this approach are that expensive gearing is eliminated, inaccessible switches are not a replacement problem and adjustment can be made so that counting only occurs during the printing cycle rather than during the

entire running time of the printer. In addition, this new approach simplifies the problem of counting different speeds simultaneously such as in an optical-reduction printer where both the master and the raw stock must be counted.

A Precision Sliding Flange Roller

EVERETT L. HANSON, DeLuxe General, Inc., Hollywood

A combination roller has been devised with sliding flanges to accommodate both 16mm and 35/32mm film on the same printing machine. This roller is precisely built and the flanges can be moved to the required film width in a few seconds. The flanges will return to their proper positions within a tolerance of 0.001 of an inch. The roller lands always remain the same diameter and the flanges remain the same height. The commonly used drop-center combination roller does not have these advantages. The sliding flange roller is of great value on printing machines in film laboratories, particularly when large quantities of 16mm and 35/32mm film are to be printed. This roller has been in successful operation on several additive panel printers for over a year. The sliding flange roller can be used on any laboratory equipment where a combination roller is required.

CONCURRENT SESSION

3:00 APPLICATIONS AND TECHNOLOGY I

Subjective Color Created by Black-and-White Animation

JAMES F. BUTTERFIELD, Color-Tel Corp., Sherman Oaks, CA

Subjective color is produced by animation without the use of any special equipment. Color Coding Charts indicate the sequences (or codes) of black and white necessary to cause the entire scene or specific areas thereof to appear in the selected subjective colors. Animation cells are prepared so that the areas of the image to be colored are dark on one cell and then light on another cell. In the case of motion-picture film, the cells are shot in the desired sequence one frame at a time on a film animation stand. In the case of television, electronic editing equipment is used with a black-and-white TV camera to record the animation cells frame by frame on video tape. When the black-and-white motion-picture film is projected or the monochrome video tape is played back on a black-and-white TV receiver the image results in a flashing color picture on the screen.

A Modular Approach to Location Grip Equipment

ROSS LOWELL, Lowel-Light Photo Engineering, New York

The current tendency to work away from the studio presents problems in lighting. Tungsten-halogen light sources make it possible to reduce the size and weight of the luminaires, but until now, there has been a need for lightweight, compact, versatile lighting control equipment for location shooting. The system described substitutes a lightweight modular system for heavy single-purpose equipment; it consists of interlocking components which can be joined in countless combinations to form various types of equipment.

8mm Variable-Density Sound Recording Using a Silicon-Carbide Light-Emitting Diode

ALLAN S. MILLER and PAUL L. VITKUS, Norton Research Corp., Cambridge, MA

The electroluminescent diode provides a new means to optically record sound at very low power and in close quarters. It presents a challenge of its own to record in a variable density system with a source of unusual characteristics. The application of this work to 8mm color film is described along with the results obtained using the diode in its original and in a modified form. The results of a simple expression for predicting the frequency behavior are also given.

MONDAY EVENING

5:00 EXHIBIT OPEN HOUSE

TUESDAY MORNING—SEPTEMBER 30

CONCURRENT SESSIONS

9:30 LABORATORY PRACTICES III

Striping and Rerecording of Super 8 Prints in France ROBERT IVONNET, Eclair, Paris

The high price of 16mm prints has forced the audio-visual aids industry to look to 8mm sound film. Super 8 film was found to have good picture quality; the magnetic stripe, situated on the unperforated edge of the film, allowed good sound quality. Therefore the 35-S8-5R positive film was adopted and new equipment was manufactured for striping and rerecording the prints using this raw stock. The pre-striped film as delivered by the film manufacturers versus the striping realized on a Pyral machine on the finished 35mm-5R prints are compared. In the latter case, the film receives only five broad stripes, four of them providing both the sound and the balance track after slitting. The re-recording is made prior to splitting on a single pass on a four-magnetic-head console. In order to avoid an accumulation of manufacturing tolerances, the striping standards should not be measured from one edge of the film, but from the center row of perforations. Some problems that had to be solved in the slitting process are film guiding, cutter wear and quality control of the stripe's edge after slitting.

Dye Soundtracks for Duplicate Color Negatives and Internegatives

R. L. ESTES, M. J. FULLER and R. A. MORRIS, Film Testing Div., Eastman Kodak Co., Rochester, NY

Full-length black-and-white duplicate negatives containing both picture and soundtrack have proved useful where foreign release printing and dubbing are involved. Similarly, color duplicate negatives containing both picture and sound records would be useful. Recent improvements in color-duplicating films have generated interest in the sound quality attainable by combining picture and sound records as dye images on a duplicate negative or internegative, with the final print soundtrack processed to a conventional silver-dye track. Listening tests and cross-modulation data indicate that satisfactory sound can be realized at slight loss in quality and with possible cost savings.

A Year's Experience Processing Color Reversal Intermediate Film 5249

PAUL L. DEER and JOHN H. DONLON, Technicolor Inc., N. Hollywood

In March 1968, a new color reversal internegative stock was introduced to the industry. Technicolor was the first laboratory to install the CR-1 process. Since this installation, several million feet of 5249 and 7249 have been printed and processed, with steadily improving success. Some of the advantages of the system are given with direct comparisons with existing systems. Wet-gate reduction printing of 7249 reversal internegatives and its effect on television commercials, the quality of 5249 as a protection negative and the use of 5249 as cut negative for release printing are discussed.

Evaluating Motion-Picture Printing Sharpness Using Modulation Transfer Techniques

JOHN C. NORRIS, Photographic Technology Div., Eastman Kodak Co., Rochester, NY

The image sharpness of motion-picture release prints depends not only on the film products in the system, but also on the capability of motion-picture printers and projectors to transfer images. As sharper films become available, the need increases to know the transfer characteristics of other system components. Modulation transfer functions have been used to analyze the performance of various films and printers in some color systems. Use of MTF techniques permits one to assign transfer functions to various printing stages and conditions including step optical, continuous optical, and continuous contact types. The combination of film and printer transfer functions yields estimates of system sharpness. Predictions of 35mm, 16mm, and super 8 systems output compare reasonably well with actual system MTF data. Emphasis is placed on printing adjustment control; the investigation of the influence of the final projection stage on image sharpness is recommended. Another application of these MTF techniques is in the analysis of film sharpness requirements. By assuming theoretical MTF curves for films one can estimate their effect on observed printed-through quality.

Continuous 16 to 8mm Reduction Printing

HANS CHR. WOHLRAB, Hollywood Film Co., Hollywood

It has been shown that the best picture quality is obtained by reduction printing in the final stage of 8mm release printing. For high-speed production printing, therefore, continuous optical reduction printing is essential. Printers using this rather new technique are in operation in various laboratories. After reviewing the principles and designs for different modes of operation, e.g. regular and super 8, single, 1-3 and 1-4, quad 8 and other formats, performance data are given.

A Pan-Scan System for Printing Motion Pictures for Television From Anamorphic Negatives

L. P. REITZ, JR., H. A. MAYER and J. W. SCHMIT, Technicolor, Inc., Hollywood

Up to a few years ago prints for TV from anamorphic negatives were made from scanned internegatives made from an interpositive. A printer has been developed to pan and scan directly to color positive from the original negative at the same time that other effects are put in. Later this equipment was to be used for making reversal internegatives. Because of the illumination optics used, and because the de-anamorphosing lens was quite long, it was thought desirable for the copy lens to be left on the optical axis of the printer bed and to move the receiving head back and forth to accomplish the scanning. Since the printing was to be done with a wet process, it was necessary to do the scanning "on the fly," that is, without stopping the printer. The 35mm film movement was swung within the positive head or camera, in order to accomplish the pan and scan. A single sprocket, located on the optical centerline, is employed to act as both the feed and takeup sprocket. The film movement is designed to shift a total of one inch (one-half inch each side of center). It is capable of assuming any one of seven scanning positions, or being moved linearly for panning the scene. Panning can be done from any one to any other of the seven positions in any number of feet from 1 to 100.

CONCURRENT SESSION

9:30 TELEVISION I

A New Color TV Film-Island Multiplexer With Solid-State Control

A. JACKSON and C. MANGIARACINA, Commercial Electronic Systems Div., RCA Corp., Camden, NJ

Optical multiplexing for TV film pickup is a long established practice. A new multiplexer has been designed to take advantage of new technology, particularly in the area of solid-state control. This multiplexer will integrate readily into existing film islands as well as provide operational and performance improvements when used as the heart of new film islands.

The Use of Integrated Circuits in Broadcast TV Film Equipment

W. F. FISHER, Broadcast Studio Engineering Div., RCA Corp., Camden, NJ

A three-input and two-output optical multiplexer and a high-capacity slide projector have recently been designed to incorporate ideas and requirements for film programming. The use of digital integrated circuits for the machine control of these broadcast equipments is discussed. The control requirements are outlined, the design decisions leading to the selection of the DTL family of digital logic are reviewed, and the interfacing between control logic and the machines is described.

New Type Television Broadcasting Transmitter

T. TAGUCHI, Fuji Telecasting Co., Ltd., T. OHSIMA and S. HIGASHI, Nippon Electric Co., Ltd., Tokyo

Color television requires highly-skilled maintenance engineering; therefore it must be capable of high performance and high reliability. Most conventional television transmitters, however, are characterized by the grid modulation method, thus requiring many vacuum tubes in their power amplifiers as well as prestages. This often results in instability of color characteristics and degradation of reliability, but these conditions can be corrected by using the solid-state exciter, fewer vacuum tubes, and by adding circulators between stages, which eliminates difficulties occurring in adjustment of the cascaded linear amplifier.

Video Edging

ROBERT J. BUTLER, National Broadcasting Co., New York

Many times when titles are added over a second background picture, visibility is poor. This is because the background scene conflicts in detail or in contrast with the title which is to be added. It has been found that the addition of an outline discretely surrounding each letter of the title improves visibility many fold, disregarding the information contained in the background.

A Practical Means of Quantitative Measurements of Magnetic Video-Tape Recorder Servo Performance

KOICHI SADASHIGE, Commercial Electronic Systems Div., RCA Corp., Camden, NJ

The quality of recording and the picture performance of the playback from a contemporary broadcast video-tape recorder depends greatly upon the dynamic behavior of its servo systems. The amplitude and phase characteristic of a high data sampling rate servo, such as the headwheel and capstan drive system of a quadruplex video-tape recorder, can be quantitatively measured with good accuracy by relatively simple instrumentation. The control command or the frequency and references for the servo system under test is time-modulated by the external disturbance. The tachometer output of the servo system is then synchronously detected with respect to the control command.

A Single Vidicon Color Television Camera System

LEWIS A. BRIEL, Design Engineering, RCA Corp., Burbank

The means of converting a scene to be televised to a color video signal usable in either CCTV or broadcast facilities is described. The optical system for both "live" and "film" reproduction is discussed including the striped filters, the objective lens and the field lens requirements. There are unusual requirements for the deflection and electrical potentials on the pickup tube; the need for and means of accomplishment of deflection linearity, uniformity of resolution and lack of size and centering change are discussed. The SNR of the system must be very good to provide satisfactory results. The output from the camera has luminance information as well as color information on sub-carriers, which must be handled in the normal video pass-band and processed to provide NTSC-compatible or NTSC signals. The option of providing internal sync signals to provide a completely self-contained system (except for power) is described.

TUESDAY AFTERNOON

CONCURRENT SESSIONS

2:00 TELEVISION II: VIDEO-TAPE EDITING

Neutral Color Balance of Films for Color Television

D. M. ZWICK and D. L. BROTHERS, Research Laboratories, Eastman Kodak Co., Rochester, NY

Proposals have been made to international standardizing groups that the color balance of films for television be defined as that balance which produces in the film a metameric match of a gray object in the scene. This criterion has been questioned on the basis that photographic experience leads to the conclusion that a color balance based on exact neutral reproduction does not result in the most pleasing picture. This assumption has been tested by an experiment in which observers determined the most pleasing color print of several scenes from a variety of prints of differing color balance using the paired-comparison viewing method. The neutral balance of each scene, determined from a separate but correlated picture, was compared with the color of the original neutral object. When the prints were viewed with 3200°K projection light, the neutral balance corresponding to the preferred print was colder (more cyan) than the original neutral object. However, when the prints were viewed at 5400°, with and without ambient light of the same color, the most pleasing picture was obtained when the picture neutral was a metameric match with the object neutral.

An Automated Video-Tape Editing System

KEITH CAMPBELL and MICHAEL L. PAULL, Advertel Productions, Toronto

A time code, found to be compatible with the present video-tape audio-cut system at all tape-handling speeds, is written once every second with a start pulse to identify every one second of information with a gated parity check. Once the signal has been decoded and channeled to the appropriate counter in forward or reverse, it may be read on the readout device. In the play mode the counter reads off the tape one second of information and preloads the counter before counting all following information from a division of the control track. The automatic search facility comprises the memory bank which is preloaded by a numeric keyboard. This shuttling is accomplished by an overload comparator which shuttles the machine past the point on the lower count side and puts the machine into play to run up to the selected spot. There is also a comparator to give a relay closure on an exact tapecount. This may be used to start another video-tape or audio-tape machine.

Frame Numbering of Television Tape Recording

E. S. BUSBY, Ampex Corp., Redwood City, CA

A phase-modulated data signal for recording TV frame numbers on the cue audio track is described. Each frame period includes a series of binary-coded decimal numbers arranged in hours, minutes, seconds and frames, and an additional data period for logging information. A synchronizing interval is included which marks the end of each frame, from which tape speed and direction are sensed. Preamplifier requirements for wide-speed range playback are discussed.

A Proposed Standard Time and Control Code for Video-Tape Editing

R. B. BONNEY, ROBERT PARGEE and TED KLOBA, Electronic Engineering Co. of California, Santa Ana

A new proposal for an industry standard code for video-tape editing and control is needed to replace the various codes now used, none of which are compatible with each other. The code must contain sufficient information to unambiguously locate any desired video frame within a reel of tape, and should be self-contained on a single audio track. The method used is a bi-phase space modulation using sixteen bits of control data in each code frame. These control bits can be used as a single sixteen-bit binary number, as two ASCII standard alphanumeric characters, four binary-coded decimal numbers or other arbitrary code combinations. Since each code form is uniquely identified, the control information can be compound-coded using successive frames. The effect of changing to a standardized code and feasibility of code conversion equipment are discussed.

A Versatile System for the Automation of Television Post-Production

KENNETH P. DAVIES, Central Dynamics Ltd., Pointe Claire, Que.

The development of magnetic recording for television applications has provided the production house with a simple, flexible means for the recording of program material that has considerable advantage over film in terms of technical quality, immediacy and simplicity of handling. The use of magnetic recording for this purpose, however, has serious problems in the post-production area due to the necessity of having the magnetic tape running at synchronous speed before any picture output is produced. The system described has the capability of assembling complete program segments automatically from a random selection of program material segments such as frequently occur when program material is recorded on a single camera on a shot-by-shot basis, as is the normal motion-picture practice. The system incorporates automatic frame-location circuitry, automatic editing point-location circuitry, completely automatic circuitry for edit print control — both audio and video, automatic dissolving facilities with frame accuracy over a very wide range of dissolve rates, and the capability for synchronizing audio with video. The system also incorporates facilities for machine-language input and machine-language logging of system operations with printout of a hand-copy log. The system may be completely preprogrammed, leaving the operator free to tend to quality-control monitoring.

PANEL DISCUSSION: Video-Tape Editing

FREDERICK M. REMLEY, JR., University of Michigan, Ann Arbor, Moderator. Panelists: KEITH CAMPBELL, Ad-vertel Productions, Toronto, E. S. BUSBY, Ampex Corp., Redwood City, CA, R. B. BONNEY, Electronic Engineering Co. of California, Santa Ana, and KENNETH P. DAVIES, Central Dynamics Ltd., Pointe Claire, Que.

This is an opportunity for the audience to ask questions of four men who represent the major manufacturers of video-tape editing equipment.

CONCURRENT SESSION

2:00 THEATER PRESENTATION AND PROJECTION

A 50-Hz Subaudible Picture-Change Method With Battery-Operated Filmstrip Projector

JOHN LORD and ROBERT LARSON, DuKane Corp., St. Charles, IL

There is a need for a simple approach around which automatic portable sound filmstrip equipment can be designed. A small lightweight tape transport using the 0.150 type tape cassette, solid-state circuitry and low power-drain drive components can be combined with a specially designed high-torque, fast-acting picture advance mechanism and a highly efficient optical projection system to produce an automatic sound filmstrip projector of the portable battery-operated type that will yield the maximum picture and sound power for the greatest period of time from a battery pack consistent

in size and weight with similar equipment. The advantages of the 50-Hz monaural superimposed pulse system for automatic picture change is discussed in detail. A new approach to the design of a stalled motor device for picture-advance mechanisms using small, high-torque dc motors is shown. Design of an optical projection system that uses no mirrors and produces a bright, sharp rear-projected picture with a minimum power requirement is described.

A Report on Listening Characteristics in 25 Danish Cinemas

ERIK RASMUSSEN, Danish Government Filmfoundation, Copenhagen

A 35mm optical test film was produced with octave-filtered random noise. Played back five times with five different microphone positions in the auditorium, the average sound pressure level was calculated for each center frequency; mean and range values are given for 25 theaters and some specific samples are analyzed. Applying the ISO Draft Proposal (May 1969, Moscow), six theaters were within the boundaries, nine needed small modifications and ten were out on a large scale.

A Three-Element Condensing System

CHAN STREET, Street Laboratory and Industries, El Segundo, CA

The efficiency of an optical condensing system is difficult to achieve since it must encompass a high aperture at the source and an enlarged image of the source at the entrance pupil of the projection lens. The system outlined here is basically three elements and a series of supplementary lenses to accommodate a range of projection lenses from 35mm to 300mm. In addition to the need that it should have a high initial aperture at the source, two other goals were set: to correct for the cosine fall-off at the source and to maintain its efficiency for all projection lenses of some specified f -number. Both of these later requirements were achieved with a field flatness of 10% and a lens of $f/2.5$ receiving 90% of the flux at its entrance pupil. These conditions are based on a 50° acceptance angle at the filament of a 1200-W incandescent projection lamp.

Operational Requirements of High-Wattage Xenon Lamps

KENNETH S. SQUIER, Macbeth Corp., Newburgh, NY

New Concepts in Motion-Picture Projector Design

LLOYD M. ADAMS, Geotel, Inc. Flight Research Div., Santa Ana, CA

Automated systems now perform nearly all the functions of the presentation including lighting, curtains, sound, background music and projection. It is easily conceivable that multiple theaters could be operated automatically and efficiently from a single remote-control center. The motion-picture projector plays a vital role in these applications. This, combined with extensive use of the projector in other fields, requires an entirely new look at its design from reel to reel. The characteristics necessary to achieve a high degree of automation and operational flexibility are discussed, with an explanation of some methods successfully employed to achieve these goals in equipment of recent design. Since the heart of any motion-picture projector is the intermittent film-transport mechanism, considerable emphasis has been placed on the role of this device in the projection system.

Automated Projection for Cinemas, Auditoriums and Industry

ALBERT Z. JEKSTE, Atlantic Films & Electronics, Ltd., Montreal

Projection automation for 70mm, 35mm and 16mm projectors and slide projectors are described. Specially designed projection systems aimed at improving projection quality by relieving projectionists from tasks other than looking after sound and picture quality and saving operational costs are discussed. Included are projection systems at the Paris Grand Opera and the National Arts Center in Ottawa which were specially designed to assist in the creation of stage productions through video effects produced by direct single or

multi-screen projection, and special single and multi-screen presentations used by industry for training, information and promotion and special projection for exhibitions. The design, manufacture and installation of automated 16mm theater in New York, especially the projection systems for the new 70/35mm Ziegfeld Theatre in New York, as well as special projection systems designed and installed at Expo 67 are covered.

Testing of Sharpness of a Motion-Picture System

GLENN M. BERGGREN, Wil-Kin Inc., Atlanta

In a motion-picture theater, there are certain specific and well-accepted tests and standards, including film-frame dimensions and screen luminance. Total quality of the picture reproduced currently has no accepted standard and a proposal is in order. Before a new reel of professional motion-picture film is used in a theater projection machine, that machine, lens, lamp and screen have some maximum level of operating performance relative to reproduced sharpness. The use of a resolution test film is the first step in the analysis of the screen image. Some of the factors in image appearance in the earlier resolution films and more particularly in the use of the prototype films now being prepared for SMPTE distribution are discussed. This subcommittee report reviews some of the use factors and visual indicators within the test film pattern, which are also shown in slides; e.g., color fringing, loss of sharpness, obvious film flutter and the effects of defocusing. Pictorial description indicates the desire of the eye to expect sharpness in an image; due to this need, a proposal is made for the consideration of minimum, average and superior levels of motion-picture operation. All tests shall be made in actual theaters, with photographs of the screen image taken with a newly designed camera, and referring primarily to the 35mm anamorphic film format.

TUESDAY EVENING

8:00 INTERNATIONAL TEST FILMS FOR TELEVISION

New Soviet Test Film for Color Television

FYODOR F. PROVOROV, Mosfilm, Moscow

Discussion of SMPTE Color Television Subjective Test Films and Slides

FRANK P. BRACKETT, Chairman, SMPTE Color Committee, Technicolor Corp., Hollywood

Discussion of Film Recommendations for Use on German Television

KARL-ERIK GONDESON, Institut für Rundfunktechnik GmbH, Munich

WEDNESDAY MORNING—OCTOBER 1

9:30 EQUIPMENT PAPERS AND DEMONSTRATIONS

Bell & Howell/DePue: 16 to S8 (1-3) Step Reduction Printer Design 6628 (Paper)

RICHARD C. BAUM, Bell & Howell Co., Chicago

A Light Valve Monitor for the Bell & Howell Additive Light System (Paper)

WALTER A. MICHEL, Bell & Howell Co., Chicago

Gelatran (Paper)

Mini-Pro; Soft-Lite (Demonstration)

GERALD R. BARUCH, Berkey-ColorTran, Inc., Burbank, Calif.

Xenon Projection (Paper)

Xenon Projectors (Demonstration)

M. ACKERMAN, Christie Electric Corp., Los Angeles

A Recorder/Pulsar for Creating 50-Hz Automatic Sound Cassettes (Paper)

JOHN LORD, DuKane Corp., St. Charles, Ill.

New Single System Sound Capability — Eclair NPR (Demonstration)

KEN NELSON, Eclair Corp. of America, Los Angeles

Steenbeck ST 6000 Combination 16/35mm Editor and the ST 16 4 Picture Editor and Print Inspection Table (Paper)

WILLIAM A. ENGSTLER, General Enterprises, Inc., Kensington, Md.

The KEM Universal — A Revolution in Editing Techniques (Paper)

ROBERT ROWEN, Intercraft Corp., New York

Portable Dimming System (Demonstration)

PATRICK S. BYRNE, Kliegl Bros. Western Corp., Los Angeles

A New Air Knife Cooling System Permitting Operator to Stop 16mm M.P. Projector for Still Picture Viewing without Film Damage or Focus Drift with 1000-W Lamp (Demonstration)

R. H. LAWRENCE, L-W Photo, Inc., Van Nuys, Calif.

The New NAGRA IV ¼-in Tape Synchronous Sound Recorder (Demonstration)

LOREN L. RYDER, Nagra Magnetic Recorders, Inc., Hollywood

Kelly Zoom Control Pod; Auricon Conversion with Transistorized dc Governor Controlled Motor (Demonstration)

ROY R. LOW, Jack Pill's Camera Equipment, Hollywood

Automatic Freeze Frame on Takita Reduction Printer; Acmade Pic/Sync Synchronizers (Paper)

DOM CAPANO, S.O.S. Photo-Cine-Optics, Inc., New York

Some Examples of Special Effects Inserts for TV Commercials made with Unilux System 500 Flash Lighting (Paper)

RICHARD SEQUERRA, Unilux, Inc., Woodside, NY

WEDNESDAY AFTERNOON

CONCURRENT SESSIONS

2:00 TELEVISION III

A Single Weighting Characteristic for Random Noise in Monochrome and NTSC Color Television

JOHN R. CAVANAUGH, Bell Telephone Laboratories, Inc., Holmdel, NJ

Previously there were specifications of separate noise-weighting characteristics for monochrome and color TV. A single noise-weighting characteristic has been found which satisfactorily weights broadband system noise shapes typical of those found in various TV transmission systems for both monochrome and color. A series of subjective tests was designed to study the effects of broadband random noise on 525-line monochrome and NTSC color TV. The broad bands of random noise used in these tests had noise shapes (power density vs. frequency) typical of those found in various TV transmission systems. Both color and monochrome pictures were generated from slides and viewed on 21-in studio monitors at a viewing distance of four times picture height. A seven-point comment scale which ranges from not perceptible to extremely objectionable was used to obtain the observer responses. The distributions made from the data describe the spread of observer opinion as a function of noise level for each of the classes.

Exchange of Temporal and Spatial Resolution in Television Coding

J. O. LIMB and R. F. W. PEASE, Bell Telephone Laboratories, Inc., Holmdel, NJ

Satisfactory encoding of TV signals usually demands that full spatial resolution be provided in areas of high detail and that full temporal resolution be provided in areas of rapid movement. Human vision appears to be able to tolerate a loss of spatial resolution in moving areas. A simple coding technique is described which can reduce the channel capacity required for the transmission of TV signals. The output of the TV camera is stored for one frame interval. The TV camera outputs from successive frames are compared to determine which areas of the picture contain moving parts and can tolerate reduced spatial resolution. At the receiver the signal from the previous frame interval is available (in a digital memory) and is displayed for those picture elements not represented in the received signal. Experimental results are shown.

Single Gun Color TV Projector

WILLIAM E. GOOD and THOMAS T. TRUE, Visual Communication Products Dept., General Electric Co., Syracuse, NY

A new color television projection system has been developed which can produce high-quality pictures virtually unlimited in size. A novel light valve is used to control both color and intensity of light produced by an external source. Orthogonal phase diffraction gratings are written in the form of tiny grooves on a transparent control layer surface. A combination of optical and spatial filtering allows independent control of each of three primary colors by one of three corresponding diffraction gratings written within each picture element. Physical optics principles underlying the design are described. In previous light-valve color television projectors, the resulting color images had to be optically registered at the screen. The new system accomplishes the entire writing process by a single electron gun scanning a single raster, and is fully compatible with the NTSC color standards. The color diffraction gratings are written on the fluid surface with the electron beam. A sealed light valve utilizing these principles is described.

Design and Operation of a Minimum Delay Time Television Newsfilm Screening, Transfer and Sound Mix Facility

SHELDON NEMEYER, NBC News, New York

Television newsfilm screening, mixing and transfer space has been redesigned and equipment upgraded with a view toward improving quality and reducing time delay. The design and operation features of this special purpose television newsfilm area are discussed. Motion-picture film is one information storage medium in use: the basic raw stock is 16mm magnetic-striped color-reversal film. Short editing time is achieved by cutting film single system with a film viewer and a synchronizer with a magnetic playback head. Double-system editing allows greater flexibility and quality. Therefore, when time permits a single screening prior to editing, the film is simultaneously transferred to 16mm magnetic film permitting immediate double-system editing. When more time is available, striped film is transferred on transfer equipment at normal and double speed.

CONCURRENT SESSION

2:00 APPLICATIONS AND TECHNOLOGY II

Studio Tests of High-Wattage Tungsten-Halogen Lamps

T. M. LEMONS, Sylvania Electric Products, Inc., Danvers, MA

To evaluate the high-wattage tungsten-halogen lamps a studio test was sought to subject the lamps to the standard conditions found in a film or television studio and to insure that laboratory tests conducted on the lamps during their development were verified under studio conditions. During the tests various problems which were found in the lamps were corrected and the tests were continued. To document this test and the results obtained from it, a test film has been made.

Mission and Facilities of the Air Force Audio-Visual Center

RICHARD L. ALEXANDER, United States Air Force Audio-Visual Center, Norton AFB, CA

In 1964 plans were initiated for the AAVS Headquarters, Air Force Film Library Center, Air Force Film Depository and two major AAVS production units to be consolidated at Norton Air Force Base, which became operational in July, 1969. The consolidation led to more efficient and rapid response from one center, shorter production periods and close proximity to motion-picture talent in the area. The Center, which has 300,000 ft of floor space, houses a motion-picture processing laboratory, a still laboratory, a sound recording and dubbing system, projection rooms, two sound stages, a TV taping system, media depository, library and shipping areas, and offices and workrooms.

A Multicamera Network Utilizing Radio-Linked Double-System Sound Synchronization

STANLEY J. ANDREWS, JR., and GEORGE R. HENKES, Argonne National Laboratory, Argonne, IL

A system utilizing three cameras which allows continuous film recording of seminars, lectures or classes with practically no disturbance to the audience has been developed. The cameras are placed among the audience to provide the best possible photographic angles of the speakers. Each camera functions independently of the others. When a camera is started, a self-contained electronic unit flashes the camera's fogging lamp in a predetermined code while transmitting this same code to the film recorders. At the recorder, this coded signal is received and recorded on a center "control" track through one side of a special dual head; it in no way interferes with the audio program, which is recorded through the second head on a standard edge track. This function clearly identifies each camera during electronic slating without obliterating any portion of the audio program. Each camera, with its own identity code, can operate independently and will be coded, in sync, whenever it starts. Since at least one of the cameras is running at all times, the changing of magazines between "takes" affords continuous filming. The cameramen are in constant wireless radio communication with each other. By simply cutting from one camera to another and allowing some overlap, a wide variety of angles can be achieved to produce a good film.

Vibration-Free and Stable Motion Pictures—In Any Shooting Environment

J. D. LOWRY, John Lowry Productions Ltd., Toronto

To eliminate the vibration and stability problems inherent in shooting from helicopters, camera cars, boats, cranes, etc., a camera mounting and control system has been designed with the motion-picture camera built into a gyro-stabilized platform. The camera and servo-drive system package is housed in a spherical container that can be readily mounted on either side or under most helicopters, or on any device that will carry its 150 pounds. The camera operator remote controls the system using a TV monitor which shows him a picture of the ground-glass image in the film camera. The operator's controls consist of pan and tilt, zoom, focus, iris, camera start and stop, footage counter and tachometer. The console is connected to the camera and stabilizer by a single cable. Extra TV monitors and video-tape playback are available.

The Italian Influence on Technology in British Film and Television Studios

M. J. CHARLES, Rank Audio Visual Ltd., London

WEDNESDAY EVENING

7:45 COCKTAIL PARTY, BANQUET AND DANCE



THURSDAY MORNING—OCTOBER 2

9:30 SYMPOSIUM ON SUPER 8 PRODUCTION TECHNIQUES

Super 8: Whither Bound?

NORWOOD SIMMONS, Motion Picture and Education Markets Div., Eastman Kodak Co., Rochester, NY

A significant benefit of the super 8 system is that it now makes the motion-picture medium accessible for small-group and individual viewing. Implications of this breakthrough are discussed in terms of 8mm statistics and potential markets. Seven key attributes of super 8 are flexibility, accessibility, repeatability, controllability, "creatability," compatibility and profitability. Compatibility and performance factors influencing the choice of a super 8 sound system and a cartridge design are discussed in terms of the eventual potentialities of this new format in screen communication.

The Evolution of Quality in 8mm Prints

JOHN M. McDONOUGH and **RICHARD K. SCHAFER**, Motion Picture and Education Markets Div., Eastman Kodak Co., Rochester, NY

Until ten years ago no extensive professional use was made of 8mm as a release-print material. Although some progress was made during the early sixties, it was not until the introduction of the super 8 format that 8mm received consideration as a prime medium for education and instructional technology. Expanding the use of films to many new areas of information transmittal now becomes a definite possibility. To realize this potential, however, it was recognized not only that better hardware was needed but that the entire film system needed upgrading. In improving the films in the system, it was the aim to produce a screen image from super 8 that was comparable in quality to the then existing 16mm systems. The step-by-step progress that has been made over the last few years toward achieving this goal is traced and predictions are made. The presentation is accompanied by a series of films.

Directions in 8mm Cartridge/Cassette Use as Communications Media

LEE H. SCHANK, Fairchild Camera and Instrument Corp., Plainview, NY

Parameters for Super 8 Optical Sound

EDGAR A. SCHULLER, Cine Magnetics, Inc., Mamaroneck, NY, and **JOHN ARVONIO**, Photo Magnetic Sound Studios, New York

Commercially acceptable optical sound quality on Super 8 composite prints can be realized in film laboratories on a routine production basis with the present state of technology. In order to insure a high state of consistency in sound quality it is necessary to specify and control the parameters which circumscribe this extremely small format. The parameters which must be defined are in the three general areas of recording, duplication and reproduction; these are described in detail. The various formats now used to produce super 8 optical sound prints are described. Characteristics of the formats which effect production capability and quality are detailed. These films, useful for maintaining consistency of the system are described. A wide range of program material is demonstrated on various reproducers and compared to the original tape master.

THURSDAY AFTERNOON

2:00 SUPER 8 SYMPOSIUM II

16mm and Super 8: Noncompetitive Media

SIDNEY P. SOLOW, Consolidated Film Industries, Hollywood

The present large-scale utilization of 16mm in the field of educational, business and religious films seems to be un-

distributed by the growth of super 8. The smaller film has made feasible audio-visual techniques which have created new and expanding markets. Samples of technical subjects are shown to illustrate some of the areas in which motion pictures, because of super 8, are being used widely for the first time.

Lack of Standardization on Hardware in Super 8

G. CARLETON HUNT, DeLuxe General Inc., Hollywood

8mm Printing Systems

WILLIAM D. HEDDEN, Calvin Communications, Inc., Kansas City, MO

Most 8mm release prints are derived from productions originally photographed on either 16mm or 35mm materials. Several methods of printing involving reduction steps have been used commercially. Some of the printing systems used and some of the printing equipment that has been or is being used by different laboratories for the making of large quantities of 8mm release prints are described.

A New Method of Quad Rank Printing Super 8

RONALD R. BALOUSEK, Producers Color Service Inc., Detroit

A 35mm format is desirable for release printing super 8. The design of a quad rank super 8 printer and the steps taken for the preparation of preprint materials are discussed.

A Super 8 Projection Cartridge System for Automatic Loading and Operation

R. C. GEARHART, Motion Picture and Education Markets Div., and **M. E. BROWN**, Kodak Apparatus Div., Eastman Kodak Co., Rochester, NY

Super 8 films, cameras, projectors and auxiliary equipment may properly be described as comprising a system in which the common super 8 film format is intended to serve the widest possible variety of photographic display applications. Subsystem needs include a projection cartridge offering film loading, cleaning and editing simplicity in addition to operating reliability and handling convenience. A super 8 projector design utilizing a new film cartridge system is described. A number of features involved in the cartridge and projection system are covered in some detail. These features include the cartridge mounting, automatic film take-up assembly and automatic rewind and review.

FRIDAY MORNING—OCTOBER 3

9:30 SUPER 8 SYMPOSIUM III

The Future of Super 8 in the Department of Defense

COL. WILLIAM F. GALLOGLY, Office of Audio-Visual Activities, Office of Secretary of Defense, Washington, DC

The introduction of super 8 motion pictures in the Dept. of Defense (DoD) is an event of major proportion in the audio-visual field. Within the DoD the applications of this relatively new media is endless and will be used to serve a common purpose in indoctrination, education, training and orientation. The lightweight, simplified equipment with its accompanying lower cost has made it possible to use motion pictures in more places and in more ways. The key to the future use of super 8 is to be found in acceptance and agreement by industry, that a universal standard for the compatible cartridge is an absolute necessity. The economy in laboratory and print processing will open the gates to unlimited demand and large-scale inventories of super 8 film and equipment. The basic problem conflicting the DoD as it affects the future of super 8 is the attempt to inject proprietary cartridges and projectors into the system, thereby reducing or possibly permitting the lessening of the Armed Forces as a producer and supplier of training films. Prior to any standardization or commitment by the DoD all available products under development on the market will be examined.

Super 8: A Producer's Viewpoint

GEORGE A. HOWARD, Ealing Corp., Cambridge

The introduction and acceptance of super 8 has created completely new problems for the motion-picture industry, lying in all areas of production and in laboratories. In addition, completely new procedures have had to be established for handling and control of material being produced for release in 8mm and in the release prints themselves. All aspects of this film format are discussed, from the viewpoint of a producer-distributor, considering the laboratory area from a customer's standpoint.

The Standardization of the Super 8 System

ROLAND J. ZAVADA, Chairman, SMPTE 16mm and 8mm Motion-Pictures Committee, Eastman Kodak Co., Rochester, NY

The super 8 system was commercially introduced in 1965. Coincident with this introduction, proposals to standardize film and equipment were made to the SMPTE, followed by proposals for international recommendations. Commercial acceptance has traditionally been a guideline for national standardization to insure that through practical experience the dimensions and specifications are reasonably valid. To obtain equivalent reliability, the early standardization of the super 8 system required the prerequisite of an informed industry. National standards have been approved on more than half of the 29 subjects of the super 8 system originally considered as standard proposals. Most of the remaining subjects have received engineering committee consideration and are in the final stages of approval. There is considerable feeling in the industry that there is insufficient standardization, principally in the use of super 8 sound film in cassette or cartridge projection systems. The SMPTE is expected to guide the establishment of standards; however, the Society cannot become involved in the comparative rating of competitive items.

Educational Use of Super 8 Films

WALTER CAPPEL, Institut für Film und Bild, Munich

FRIDAY AFTERNOON

2:00 SUPER 8 SYMPOSIUM IV

Loop Projectors and Optical Sound—A Symposium

FRANK P. BRACKETT, DOUGLAS FLETCHER, ARMAND PAUL, PAUL GALANIS and WILLIAM NEWBURN, Technicolor Corp., Hollywood

In this symposium which is given by the five authors listed, the technical processing specifications for super 8 optical sound along with the characteristics of the sound system in the Technicolor loop-cartridge projector is described. The channels available for preparing super 8 from various types of negatives (65mm, 35mm, 16mm sizes and 133, 185 and other aspect ratios) are discussed in detail. The use of super 8 in education, the capability film has to increase visual literacy and reduce the signal-to-noise ratio in the process of transmission of learning sequences are outlined. The situation regarding optical or magnetic sound film standards by markets and equipment trends are reviewed. A live on-screen super 8 comparison to 16mm is presented.

PANEL DISCUSSION: Super 8 Production Techniques

All authors presenting papers during the entire Super 8 Symposium will take part in the panel discussion. The authors and the audience will discuss any questions or problems brought up in any of the papers presented, or in the general area of super 8.



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