

Advance Program

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: 109th Conference — Elaine Itzkowitz, (212) 867-5410; Program Chairman Frank P. Clark, Association of Motion Picture and Television Producers, Inc., Research Center, 8480 Beverly Blvd., Hollywood, CA 90048, (213) 653-2200 ex. 243; or Symposium Chairmen John H. Donlon, TV Div., Technicolor Inc., 6311 Romaine St., Hollywood, CA 90038, (213) 462-6111; and Eliot Bliss, Quality Control and Research and Development, CBS Television Network, 4024 Radford Ave., N. Hollywood, CA 91604, (213) 763-8411. The Final Program, listing titles of papers, will be available ten days before the Conference from Society Headquarters. The synopses booklet will be available at the Conference.

SUNDAY — APRIL 25

12:00-6:00 REGISTRATION

8:00 PRE-RELEASE SHOWING OF
"THE ANDROMEDA STRAIN"

MONDAY MORNING — APRIL 26

8:00 REGISTRATION

CONCURRENT SESSIONS

9:30 LABORATORY PRACTICES I

Application of Solid-State Electronics and Stepping Motors to Optical Printer Drive Systems

Harold A. Scheib, Research Products, Inc., Hollywood
Electronics techniques are now being used to modernize and update optical printer drive systems. The requirements of an optical printer are that two or more heads be driven simultaneously in interlock at coordinated speed and with identical exposure relationships on all heads. In addition, the heads must be able to operate independently of each other with the same high degree of exposure and speed control. Vibration of the components must be held to an essential minimum to maintain definition of the film image. A new design substitutes for the cumbersome central motor of traditional mechanical drive systems a direct drive to each of the three heads, utilizing three individual 72-pole stepping motors. From the convenient operator panel, the operator can program any function merely by setting the appropriate switches, which are labeled for easy identification. Setting the switches activates the electronic circuitry within the compact drive module, all controlled by four solid-state printed circuit cards. Electronic controls and stepping motors have also been applied to a new dissolve mechanism on the camera which provides both linear and logarithmic dissolves, and also to the improved stop-motion/skip-frame programer, which are described.

Continuous Operation of a Step Printing Process for Making Color Reversal Internegatives

Harold A. Mayer, Technicolor Inc., Hollywood
A system of continuously operating a step printer is described and illustrated. This system was originally designed and installed for the purpose of printing matrices, which play a very important role in the Technicolor imbibition process. With the advent of color reversal internegative material, it was a relatively simple matter to modify the system for printing this new material by installing an additive-color lamp source and proper orientation of the negative and positive apertures. Negatives are changed and rawstock continuously fed into the system without ever stopping the printing process. Fades, dissolves and light changes are made during a single pass of the negative and rawstock through the system. Continuous feeding of the rawstock into the system is accomplished through the use of a "walk-in" printer magazine.

A Photometric Probe for Measuring Exposure Level and Uniformity in Continuous Color Printers

Richard A. Walker, Photo Research Div. of Kollmorgen Corp., Burbank, Calif.

The Spectra® Film Gate Photometer consists of a readout unit and a series of probes which are inserted in the film gate of color printers; one of these probes is described in great detail. The probe is designed to monitor and help maintain optimum performance (color balance, density and uniformity) of continuous printers. It measures the average irradiance (exposure) as "seen" by the film, through red, green and blue filters, and also makes an unfiltered "white-light" reading for overall exposure level. The same probe also measures the illumination uniformity in ten small increments across the width of the 35mm aperture. The illumination uniformity may be checked with white-light or through any of the colored filters in order to isolate "color wedging." The ability to check both illumination uniformity and average exposure level in a single device is made possible by use of a unique electrooptical design which utilizes a segmented photodetector in conjunction with electronic scanning. In addition, the probe contains a set of red, green and blue glass filters which precisely modifies the spectral sensitivity of the photometer to match that of the film stocks being used in the printer.

A New Automatic Sensitometer

Manfred G. Michelson and *Fred J. Scobey*, DeLuxe General Inc., Hollywood

The ever increasing demand for higher technical quality of motion-picture films has forced the film laboratories into ever more rigid process control and monitoring. One phase of monitoring film stock and processing machines consists of processing film strips exposed to known light levels. In a large laboratory several of these sensitized strips are processed in one day. Since these strips will be a standard for the entire lab, the accuracy with which they are produced is of ultimate importance. Secondly, when a large number of strips are used, the means of producing these strips should be fairly automatic. Design specifications and manufacture of a type 1 B sensitometer which is capable of producing such strips are described.

Continuous Optical Reduction Printing and the Standards of Picture Sizes

Wolf Grau, Deutscher Normenausschuss, Berlin

The professional use of 8mm and super-8 film has made it economical to mass produce high quality prints in a short time, an essential requirement. High-speed continuous optical reduction printers can meet the conditions necessary for reduction from 16mm to 8mm or super 8. The academy aperture with its large frame line does not make continuous reduction printing feasible for 35mm, due to the reduction ratios of picture size and perforation pitch differences. A new 35mm camera aperture is recommended for equal reduction ratio of picture size and perforation pitch, to make continuous reduction printing from 35mm to 16mm or 8mm or super 8 possible.

Shutter Calibration of Optical Soundheads

R. L. Estes and R. A. Morris, Research Laboratories, Eastman Kodak Co., Rochester, N.Y.

CONCURRENT SESSION

9:30 SPIE SECTION I, SESSION I

MONDAY AFTERNOON

12:00 GET-TOGETHER LUNCHEON

Guest Speaker: to be announced

CONCURRENT SESSIONS

2:45 SMALL FORMAT FILMS

The 8mm Personal Projectors

Charles Palmer, Parthenon Pictures, Los Angeles

"Personal projectors," which can be loaded with cartridges, are cordless, provide viewing in room light and are low in cost, have the advantage of not needing "audience" viewing, and make the powers of the visual-audio medium available to individuals for self-study at the student's own pace. A new one-to-one learning system recognizes that one teaching medium should be dominant: print, with the visual-audio element feeding into the printed text in short bits, as required to illustrate a point. These visuals would be single frames, silent filmstrip, sound/slide sequences and chunks of sound movies — as though it were printed on a textbook page, and running only the few seconds or a minute or two needed to clarify the particular point. The varied visuals are cartridge on a single reel, naturally arranged in the progression where they are cued by the printed text, so that the appropriate visual is always available at the flip of the switch. New applications beyond the public-school field are covered.

Super 8 in the Teaching of Film Production

Garry Margolis, Rick Holmes and Ramsey Gwynne, UCLA Theater Arts Dept., Los Angeles

Beginning students must produce a double-system sound film using super 8. For convenience in editing and interlocking with 16mm magnetic film, a projection rate of 24 frames/s has been made standard. In the Fall of 1970, a new super 8/16mm mixing system was installed which used a single-phase 117-V sync-interlock drive. All films are screened in a 280-seat theater; it was necessary to provide projection equipment which would give image size and brightness adequate for viewing in a theatrical situation. There are a number of specialized design considerations which had to be implemented in a system to be operated by nontechnically oriented students.

Network Utilization of Super-8 Newsfilm

Sheldon Nemeier, National Broadcasting Co., New York
Since the first network newsfilm use of super-8 film in November 1965, NBC has tested and evaluated the system. A completely viable double-system sound camera, processing, editing and TV projection system was installed for further testing and evaluation. Single-system has also been evaluated. Results through April 1971 are reported.

Image Unsteadiness in 16mm Film for Television

C. B. Wood, J. R. Sanders and D. T. Wright, British Broadcasting Corp. Research Dept., Surrey, England.

The increasing use of 16mm color film for television necessitates a close examination of its technical performance. An investigation into the image unsteadiness encountered in typical 16mm films and the contributory causes of this defect are described. Tests have been made to determine the degree of steadiness necessary to give satisfactory television presentation and the subjective loss of picture quality caused by various magnitudes and types of unsteadiness.

CONCURRENT SESSION

2:45 SPIE SECTION I, SESSION II

5:00 EXHIBIT OPEN HOUSE

TUESDAY MORNING — APRIL 27

CONCURRENT SESSIONS

9:30 LABORATORY PRACTICES II

Electronic Tools for the Optical Printing Laboratory

J. Arthur Widmer, Universal City Studios, Universal City, Calif.

Simple electronic devices such as the oscilloscope, the laser, the X-Y recorder, the photocell and the linear variable differential transformer can be used to good advantage in the optical printing laboratory to learn more about the capabilities and the limitations of optical printers and allied equipment. They are particularly useful in trouble shooting and in optimizing optical, electrical and mechanical lineup or adjustment. In most cases these tools enable the job to be done more accurately and more quickly than by using conventional methods. Some examples of their uses in solving problems encountered in optical and mechanical operations of optical printers are presented.

A Survey of Super-16 Format

Jerry More, Hollywood

A survey of various super-16 formats designed primarily for photographing subjects intended for enlargement to 35mm is given. The essence of all of the proposed formats is to provide not only a greater usable image area but also a dimensional proportion that more closely resembles a 1.85:1 aspect ratio commonly used in theater projection. The various systems are described and compared.

A Super-16 System to Maximize Benefits for Several Formats

Eric M. Berndt, Cinestar International Inc., Studio City, Calif.

From lens to screen a combination of materials, techniques and equipment are closing perceptible gaps between the quality of release prints from 35mm negative and 16mm reversal camera originals. Generally recognized are 16mm's advantages in size, weight and ease in handling when compared to 35mm cameras. Substantially more shots can be taken within normal shooting schedules. The best way to improve screen quality when blowing up from 16mm to 35mm is to enlarge the area of the original (as it was done in the super 8 development). Super 16 appeared to be a logical development. With super-8 perforations (one row) with a frame two perforations high, super 16 provided a substantial increase in image area for blowup to all flat wide-screen formats plus more area for blowup to squeezed 2.35:1 aspect ratio. Area available for unsqueezed blowup was approximately 100% larger than the traditional cropped image area for regular 16. 35mm prints in the 1.33:1 aspect ratio could be improved in blowup for network film-chain originations. Reduction prints to regular 16 and super 8 should be somewhat sharper when made from a super-16 original. Most of the super-8 editing hardware can be easily modified to work with the super-16 system. A new super-16 camera has been built and an optical printer and projection capability for screening work prints are under development. Prime consideration has been given toward utilizing all the picture area possible.

Tone Reproduction — The Key to Film Quality

L. H. Holmes, Canadian Broadcasting Corp., Ottawa

There is an attempt to bridge the gap between much of the theory of objective tone reproduction and its application to practice by presenting some new methods of relating gray-scale input-output data that can readily be applied in a practical way to help define the elements of film quality. The basic technique first involves the filming of a series of known reflectances under actual scene conditions. Selected values of reflectance, approximately 5 x 7 in in size, are mounted on an octagonal drum which is placed at the center of interest of the scene and then rotated as soon as the camera comes up to speed. Thus a "running" gray scale is produced at the head of the film, recording diffuse reflectances of 100%, 50%, 25%, 12%, 6%, 3% and 1.5%. When the film gray-scale densities are plotted against the reflection density

values of the subject scale, a "scene-derived" tone reproduction curve is produced. This curve is not unlike the conventional D log E curve of reversal material, also derived from a direct input-output comparison. The method works well with all film systems. Excellent correlations between the "scene-derived" curve and the "sensitometer-derived" curve can be achieved. A new plotting technique enables subject gray-scale input to be related directly to IEEE values on the telecine wave-form monitor.

Processed Film Lubrication: Measurement by Paper Clip Friction Test and Improvement of Projection Life

T. Anvelt, J. F. Carroll, Jr., and L. J. Sugden, Manufacturing Experiments Div., Eastman Kodak Co., Rochester, N.Y.

It has been well-recognized for years that lubrication of processed motion-picture film is extremely important for projection performance. The advent of sprocketless projectors in the amateur movie market has greatly intensified this need. Nevertheless, experience has shown that some processed films had not been effectively lubricated. Therefore, there is a need for a simple and reliable test for lubrication. A simple and rapid instrument has been devised to determine the presence of lubricant. It is basically an inclined plane friction test in which a special slider takes the place of the usual sled. The rounded end of the paper clip, bearing on the test film, furnishes the only support for the slider. The paper clip is balanced in a vertical position, since the entire slider's center of gravity is well below the bearing point. In this study, the paper clip friction and projector performance of two different super-8 films are evaluated at several levels of lubrication.

A Comparison of Silver Recovery Methods

A. C. Cooley, Photographic Technology Div., Eastman Kodak Co., Rochester, N.Y.

The Regeneration of Ferricyanide Bleach Using Ozone

T. J. Dagon and T. W. Bober, Photographic Technology Div., Eastman Kodak Co., Rochester, N.Y.

CONCURRENT SESSION

SPIE SECTION II, SESSION I

TUESDAY AFTERNOON

CONCURRENT SESSIONS

2:00 MOTION-PICTURE SYSTEMS

The Front-Projection Process of Composite Photography *Petro Vlahos, Association of Motion Picture & Television Producers Inc., Hollywood*

The results of an in-depth study are documented to identify the many parameters associated with the front-projection process, and their effect on the composite picture. Useful working information given includes a listing of minimum practical subject-to-camera distances as a function of screen distance and lens aperture, alignment procedures and grain limitations.

A New 35mm Self-Blimped Shoulder Camera

J. Gerb, Arnold & Richter KG, Munich

Economical and artistic changes in the film industry demand lighter and more mobile motion-picture cameras for synchronous sound filming. The design of the new Arriflex 35 BL, which is the first self-blimped 35mm shoulder camera, is described. The noise-generating members of the camera and the magazine are mounted on two interlocking skeletons. The acoustical isolation of the skeletons towards the camera and magazine housings ensure maximum noise attenuation. In the interest of low noise operation the drive train uses toothed belts extensively. A new movement designed for this camera features low-mass dual-forked pulldown claws and dual registration pins tapered to accommodate film pitch variations and to avoid noise formation. The printed circuit dc motor control circuitry allows stopping with shutter in closed position, constant and variable speed operation, crystal control and ac interlock.

Development History of a Precision Intermittent Film-Transport Mechanism Built Into the Aperture Plate of a 16mm Camera

John T. Greenslade, Mitchell Camera Corp., Glendale, Calif.

A major design and development program was undertaken to evolve a substantially new configuration 16mm handheld camera. This camera was designed to comply with present military requirements for a lightweight, self-powered camera for use by combat cinematographers. With performance specifications comparable to existing professional studio equipment, the magazine-loaded camera was to feature a crystal-controlled motor and a pin-registered film-transport mechanism. Early in the development phases of the program, several unusual features were "frozen" into the design, which had a significant effect on the internal configuration of the camera. These features included a combined motor and shutter, in which the rotor of the hysteresis synchronous motor is a cobalt annulus laminated to the periphery of the shutter "wheel." The claw-type film-transport mechanism design criteria are defined and evaluated.

Recommended Standards for Nomenclature Used With Current and Future Anamorphic Camera Lenses

Richard H. Vetter, Todd-AO Corp., Hollywood

Some confusion and misunderstanding have resulted due to the use of different methods of describing focal lengths and relative apertures of existing anamorphic camera lenses as well as those proposed for future design and manufacture. It is recommended that standard nomenclature based on appropriate rationale be adopted by the industry. It is submitted that functional terminology be employed which describes true exposures, fields of view and subject perspective to users of anamorphic lenses.

Recent Trends and Developments of Zoom Lenses

Gordon H. Cook, Rank Precision Industries, Ltd., Leicester, England

Report of the Xenon Hazards Meeting

John Degenkolb, Association of Motion Picture and Television Producers Inc., Hollywood

Color Temperature, Facts and Fiction

Roger S. Estey, ESM Associates, Encino, Calif.

Color temperature is the identification of a blackbody type of color by the temperature of the color-matching blackbody. The quantity discussed is a "color," that is, a phenomenon which involves both the physics of radiant energy and the psychology of human perception. Practical sources and surface colors are discussed in terms of useful similarities and approximations. In the engineering world of color, visual observation is our standard of reference, but the engineering sensors of color are photographic emulsions or photoelectric detectors. A serious communication gap exists between eyeball-based experience and physics-based technology. The color-temperature concept is so useful that every manufacturer of filters provides photometric filters which are designed to raise or lower the color temperature of a source. These filters are designed to transform one blackbody distribution to another, effectively over the visible spectrum. Due to limitations in the colored materials available, the photometric filters depart appreciably from the ideal, particularly at both ends of the visible spectrum. Consequently, the use of the ratio of red-to-blue energy as a measure of color temperature may be subject to error when strong photometric filters are used or when the radiation from the source which is being described differs appreciably from the blackbody type of spectrum.

Motion Pictures in the USSR

Prof. M. Antipin, Director of the Leningrad Institute of Motion-Picture Engineers

Analog and Digital Computer Graphic Systems Applied to a New Motion-Picture Fine Art

John H. Whitney, Motion Graphics, Inc., Pacific Palisades, Calif.

Some distinctions are presented in order to point out the purpose of a study of the potential of computer graphic systems as a design tool for a new art of motion graphics. Motion graphics is defined as a new art that deals with visual periodic phenomena in much the same way that music deals with audio periodic phenomena. A film is presented to illustrate the motion design possibilities of an instrument based upon mechanical analog computer hardware. This machine is the forerunner of mechanisms used in *2001, A Space Odyssey*. A second film is an example of digital computer graphics. The computer and motion-picture techniques used in making this film are described.

The Protection of Special Effects Electro-Explosive Devices From Premature Firing

Petro Vlahos, Association of Motion Picture & Television Producers Inc., Hollywood

Explosives are used in motion pictures for a variety of effects ranging from simple bullet hits to battle scenes as called for by the script. Whether large or small the explosion is initiated by an electro-explosive device called a squib. The squib is fired by application of approximately 1/2 amp of current through one-ohm bridgewire. The firing power is thus in the order of 1/4 W. When connected to the firing leadwires the squib may be subjected to accidentally applied firing potentials originating from body static, RF pickup, induction from set-lighting cables, leakage from power cables through wet earth and by accidental contact with ac or dc power sources. A squib protector is described that prevents firing from these hazards.

TUESDAY AFTERNOON

CONCURRENT SESSIONS

2:00 TELEVISION SYSTEMS I

A History of Television Recording, Part II (1955 to 1971)

Albert Abramson, CBS Television, Hollywood

This continuation of a paper published in the Feb. 1955 *Journal of the SMPTE* brings up to date a complete historical survey of progress made in the field of television recording. The history begins with the kinescope recording era, both in monochrome and color; and continues with the introduction of the first commercial magnetic videotape recorder by Ampex in April 1956. It describes the first helical-scan video recorder introduced by Toshiba in Sept. 1959 and details progress made to improve videotape quality culminating in the adoption of new "high-band" standards of video recording and playback in 1964. The field of slow-motion, stop-motion and reverse-motion magnetic-disc and film recorders is surveyed. The several approaches to electronic editing including time and control codes are noted. The history describes progress made in thermoplastic and electron-beam recording in a vacuum; it narrates the resurgence of color kinescope recording as a means of producing "electronic motion pictures." The "cassette/cartridge" revolution started with the introduction of the CBS "EVR" system. Also covered is the Teldec system of video playback from a phonograph disc.

Electronic Editing With Videotape Recorders

G. R. Swelland and *R. E. Taylor*, Electronic Engineering Co. of Calif., Santa Ana

Videotape recorders have progressed from delay devices for network news to highly sophisticated television production tools. Early attempts to utilize videotape for editing were patterned after film-editing procedures; this approach had many problems. Early (manually controlled) electronic editing provided for the recording of edit pulses on the tape along with the video. By counting these pulses, it was possible to identify the location of individual video frames and thus provide for electronic splicing. A significant breakthrough to modern editing was the addition of a serial time code which was recorded on the audio cue track. With electronic (code-controlled) editing, it is possible to perform high-speed search of the recorded material. Tape location is easily logged; frame-by-frame control is provided and complete preview before edit is easily implemented.

Automatic VTR Program Editing System

Taichi Takesa, Tokyo Shibaura Electric Co., Ltd., Kawasaki, *Shigehiko Hori*, Victor Co. of Japan, Ltd., Yokohama, and *Yukihiko Harai*, Kansai Telecasting Corp., Osaka, Japan

The use of videotape editing has been increasing in the production of TV programs, and the original method of editing in which the tapes are cut and spliced is being replaced by an electronic editing method. The conventional videotape editing process can be divided into a preparatory stage, an editing point selecting stage and a splicing stage where the cuts are joined according to the editing points selected. Of these stages, only the editing point selecting stage requires human judgment; the others can be processed by mechanical means. An automatic VTR program editing system which uses an electronic computer can do the copying, editing and dubbing by which master tapes are produced from the original tapes recorded by use of a four-head VTR. The actual operation of the system for program editing showed a reduction of editing time by 80% on the average over the conventional editing method. The time in which four-head VTRs are used for editing purposes can be saved by about 60%.

Color Television Film Recording From a Shadow-Mask Picture Tube

K. G. Lisk and *C. H. Evans*, Research Laboratories, Eastman Kodak Co., Rochester, N.Y.

A great demand exists for transcribing to color motion-picture film material which was initially recorded on magnetic tape from color TV cameras. These transcriptions can be played back easily through any normal TV system and can also be projected directly without recourse to TV at all. Several different systems of transcription are in use; most of these could also be used for recording on film from the TV camera signals themselves without the intermediate use of tape. Of all the known methods for making tape-to-film transfers, one of the simplest and most widely used is direct photography on color film of a color TV picture played back from the tape and displayed on a shadow-mask tube, the same type of tube that is used in studio monitors and in home TV receivers. Although this method can give good results, many examples exist which fall far short of optimum. The chief problems and solutions are discussed. Of particular concern was the effect on overall quality of image sharpness, system noise (including film grain), picture gradation from highlights to shadows and color rendition.

Color Laser-Beam Recorder

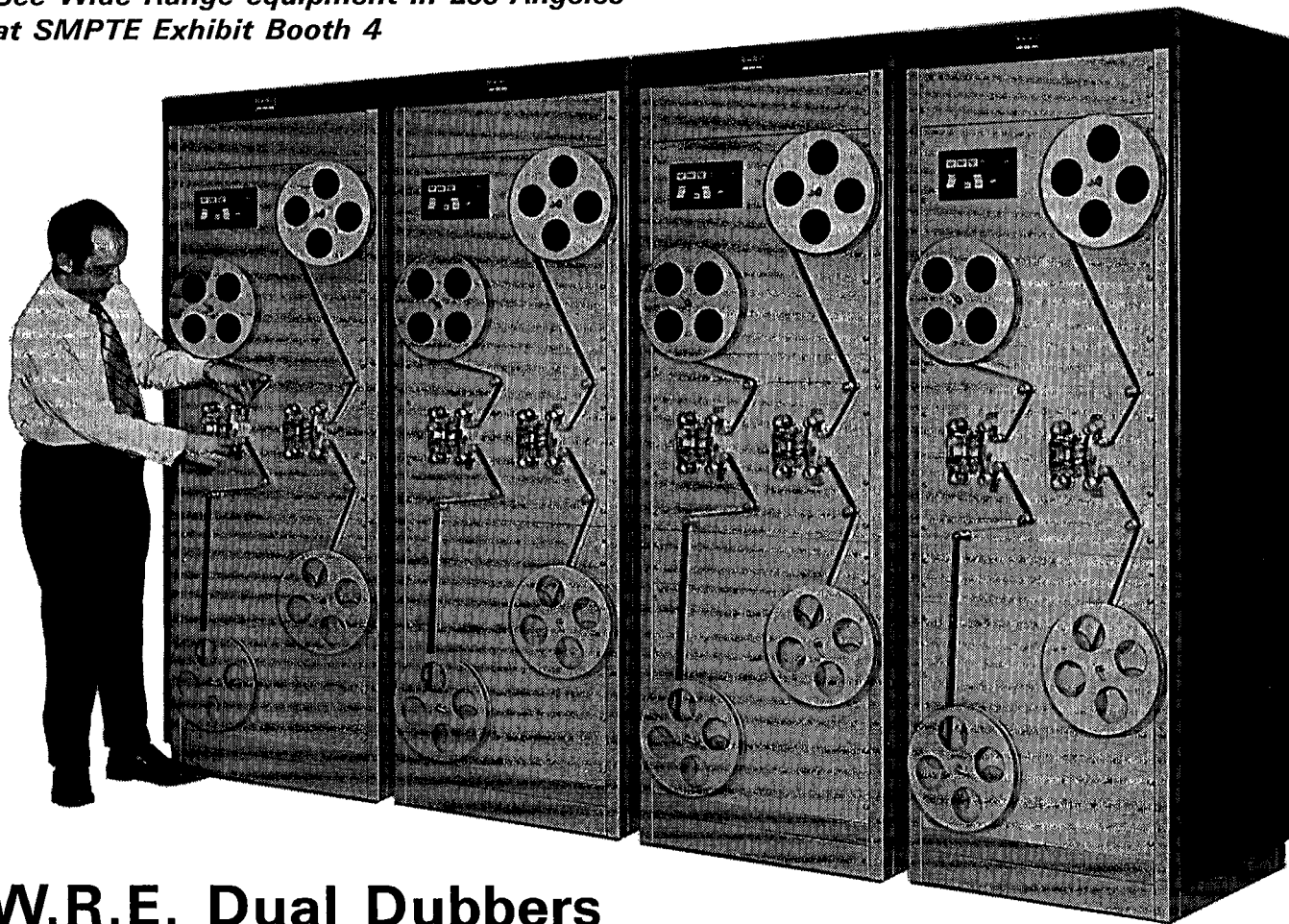
R. H. McMann, CBS Laboratories, Stamford, Conn.

Video Pan-Scan System

Alan M. Gundelfinger, *Carl Hanseman*, *Richard R. Pyles* and *L. P. Reitz, Jr.*, Technicolor, Inc., Hollywood

Cinemascope, when "unsqueezed" (and it must be for final display on the motion-picture screen), has an aspect ratio of 2.35:1. The TV system utilizes an aspect ratio of 1.33:1. To display the entire width of an unsqueezed Cinemascope film on a TV system would result in large black areas on the TV kinescope above and below the transmitted picture. On the other hand, if the kinescope display face is filled with the center portion of an unsqueezed Cinemascope film, a considerable amount of both sides of the film frame is lost. The problem placed a serious deterrent on producers who were contemplating the use of this format in the photographing of motion pictures that would eventually be released to television. For a number of years we have been engaged in the anamorphic printing process, either unsqueezing Cinemascope to so-called "flat" versions, or squeezing flat versions to the Cinemascope format. The next logical step was to devise a film printing technique for unsqueezing Cinemascope and simultaneously selecting from the unsqueezed optical image a 1.33:1 aspect-ratio area within which the action occurred. This system is known as Pan-Scan. A system in which Pan and Scan is accomplished during the transfer of a 35mm Cinemascope print directly to videotape in a telecine chain is described.

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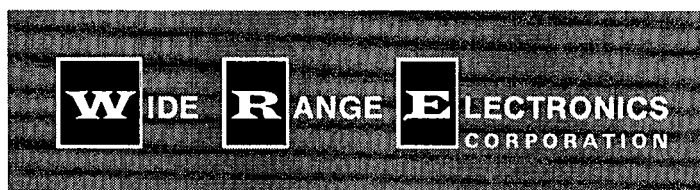
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Recording Mirror-Image Videotape for High-Speed Duplication

Robert Nelson, IBM Corp. Advanced Systems Development Div., Los Gatos, Calif.

A method is needed for recording mirror-image tapes on standard quadruplex VTRs, without making any mechanical modifications to the standard transport. It is proposed to accomplish this with a relatively simple electrical modification, activated by a push-button on the control panel, to reverse the direction of rotation of the head wheel motor. The tachometer pulses must be delayed accordingly. Use of high coercivity tape requires an increase in the drive to the erase and record heads. This reversal of the head wheel motor provides a master recording that is a mirror-image of the video only. The audio and control track can then be transposed and dubbed on the copy device.

The Automation of Small Television Stations

George Young and M. W. S. Barlow, Canadian Broadcasting Corp., Montreal

The introduction of automation into TV station transmitter control booths offers advantages in staff utilization that have become more apparent as equipment has become more sophisticated. The CBC has been using semiautomatic aids such as pegboard-controlled sequential switchers since 1963. It was apparent that if the data could be kept fed into the store as it was used up on air, all-day unattended operation would be possible. But there is no advantage to installing expensive equipment unless station efficiency is increased by reducing the cost of the on-air operation. With only one man in the operating area, monitoring requirements can be drastically cut, only four monitors being necessary in the whole area. Alternative forms of data entry are possible, depending on the use of data processing in other parts of the station.

CONCURRENT SESSION

SPIE SECTION II, SESSION II

TUESDAY EVENING

8:00-10:00 History of Wide-Screen Projection
Film clips of historic motion pictures are shown.

WEDNESDAY MORNING — APRIL 28

9:30 EQUIPMENT PAPERS AND DEMONSTRATIONS

WEDNESDAY AFTERNOON

CONCURRENT SESSIONS

2:00 TELEVISION SYSTEMS II

Television in the USSR

V. Trusko, Chief Engineer, Dovzhenko Film Studio, Kiev

A Systems Approach to Linear Integrated Circuits for Color Television Facilities

Hiroshi Naitoh and Yutaka Itoh, Tokyo Broadcasting System, Inc., Tokyo, Japan

The value of integrated circuits is well recognized because of their high reliability, small size, light weight, mass production capability and economy. However, practical applications of ICs in color TV facilities are very limited due to high design cost and severe performance required. Using a systems-approach technique to overcome these difficulties, we have attempted to standardize basic circuits in order to resolve cost problems, and also tried to establish practical performance specifications within limit not to cause deterioration of picture quality. Using unit ICs and block ICs, typical video equipments such as TV cameras, VTRs and other studio equipments can be integrated. These ordinary equipments designed with different circuitries now will be reconstructed with the same basic circuit of several different varieties. This will reduce design costs and make operation and maintenance much simpler and trouble free. A theoretical analysis, deriving from the standpoint of the system reliability, has been achieved to evaluate the limit of specifications of each unit IC.

CBS Television City Single-Line Pulse Distribution System

D. Horowitz, CBS Television Network, New York

When it was decided to replace TV City's old tube-type pulse system, one of the questions to be answered was that of using a conventional multi-signal system versus a newer single-line approach. In conventional systems up to six lines are used to distribute horizontal drive, vertical drive, blanking, sync, burst gate, and subcarrier. In a single-line system, instead of routing the primary sync generator pulses and subcarrier to each "subscriber" (studio, telecine chain or videotape machine), the pulses and subcarrier are used to generate a timing signal. The timing signal is then distributed to each subscriber where a decoder or secondary sync generator locks to the signal and reestablishes individual pulses and subcarrier in their proper relationships. The reasons for choosing the single-line approach, the choice of equipment and implementation of the system with special attention to timing are discussed.

Subjective Effects of Differential Gain and Differential Phase Distortions in NTSC Color Television Pictures

John R. Cavanaugh and Anthony M. Lessman, Bell Telephone Laboratories, Holmdel, N.J.

Differential gain (DG) and differential phase (DP) are measures of the variation in the amplitude and phase respectively of the chrominance signal with changes in the amplitude of the luminance signal. The effect of DG and DP distortions are to change the color saturations and hue of the transmitted color in an NTSC TV signal. Subjective evaluations of the impairing effects of DG and DP are necessary in order to establish acceptable limits on TV transmission. Subjective tests were designed to obtain the subjective evaluations of different types and magnitudes of DG and DP distortions. The results of these tests indicate that the mean levels of DP which are rated "just perceptible" or better range from approximately 7° to over 18° depending on the type of DP distortion tested. Similarly, the mean levels of DG which were rated "just perceptible" or better range from approximately 2.4 dB to 3.7 dB depending on the type of DG distortion tested.

Subjective Effects of Delay Difference Between Luminance and Chrominance Information of the NTSC Color Television Signal

Anthony M. Lessman, Bell Telephone Laboratories, Holmdel, N.J.

Delay difference between the luminance and chrominance information of the NTSC color television signal causes colors to shift to the left or right of objects in the viewed color picture. This delay difference can occur during the processing or transmission of the color signal resulting in two basic delay difference types. Flat delay is the type of delay difference that can occur when the luminance and chrominance signals are separated, as frequently happens during signal processing, and is a function of the absolute delays of the separate luminance and chrominance signal paths. Shaped delay can occur during the transmission of the composite color signal and is a function of the delay characteristic of the transmission system. A series of subjective tests were designed to evaluate the effects of both flat and shaped delay on color TV pictures. Expert observers used a seven-point comment scale ranging from "not perceptible" to "extremely objectionable," to rate picture impairments resulting from various magnitudes of delay difference.

World-Wide Television

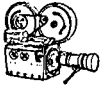
Georges Hansen and Eric Griffiths, European Broadcasting Union, Brussels, Belgium

Live television exchanges have increased considerably during the last 20 years, in spite of problems caused by the different television standards and the different ways in which the communications systems are organized in the world. The development of international television is reviewed and the methods used by the European Broadcasting Union for the organization of international television transmissions are described.

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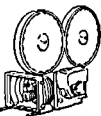
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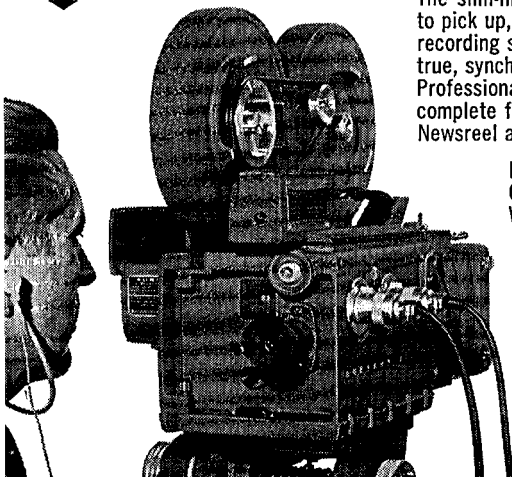
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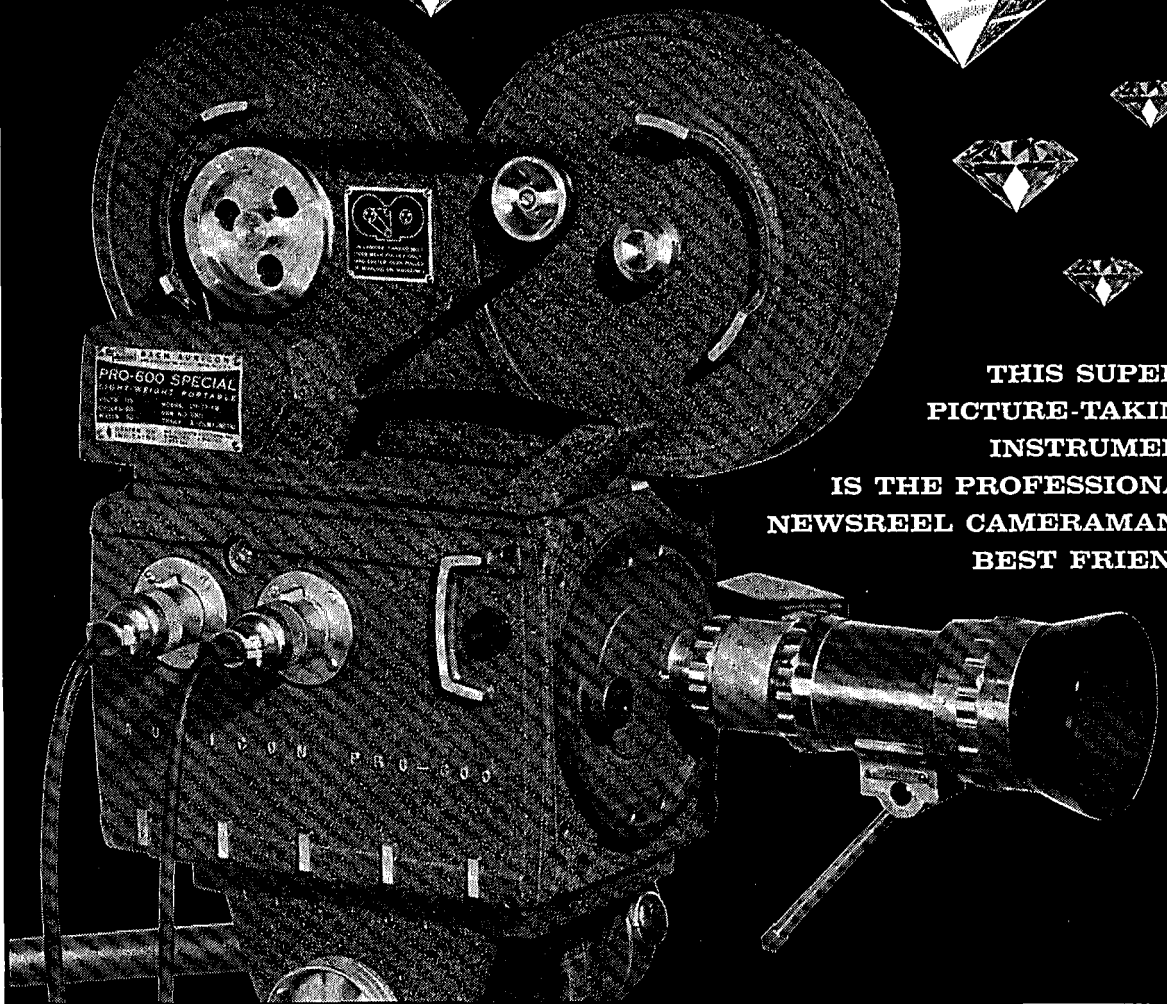
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The great majority of Newsreel Cameramen prefer the Auricon "Pro-600 Special" for the production of 16mm Newsreels and Documentary films. This superb picture-taking instrument, with all of its many built-in professional features, weighs only 24 pounds "ready to travel," yet gives you a choice of 400 or 600 feet of film, with ultimate portability!

The slim-lined "Pro-600 Special" is Self-Blimped for completely quiet operation, so there is no noise for the microphone to pick up, and no need for the heavy, bulky, sound-proof enclosure "blimp" required by all other 16mm cameras when recording sound. The "Pro-600 Special" records Optical or "Filmagnetic" Single-System sound. Because it is driven by a true, synchronous motor, it is also ideal for Double-System sound recording, as well. All of the many Auricon Professional accessories can be added when needed, for field or studio filming, without the use of tools... giving complete flexibility! The Auricon "Pro-600 Special" is the perfect answer for large film-capacity Newsreel and Documentary filming... with light-weight portability!

More than any other camera ever built, the "Pro-600 Special" has become firmly established as the Newsreel Cameraman's "best friend," because of its jewel-like Quality and proven high Reliability. Write for free, illustrated Auricon Catalog fully describing this "jewel among jewels."

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AURICON... THE PROFESSIONAL CAMERA • STANDARD OF THE 16MM SOUND INDUSTRY SINCE 1931

A Telecine Facility for Film Systems Evaluation

Richard E. Bartow, Robert C. Lovick and John C. Norris,
Photographic Technology Div., Eastman Kodak Co.,
Rochester, N.Y.

A substantial market for sensitized material exists in broadcast TV programming. If all the benefits and inherent quality of modern film systems are to be realized, their performance on representative telecine equipment must be continually evaluated. It is essential that film images intended for telecasting consistently be of the highest quality obtainable and that the film itself and ancillary equipment that together comprise the "system" be reliable and easily used. A facility has been equipped to evaluate the performance of color films and film systems on representative color-telecine equipment: the facility also evaluates areas in the film and telecine systems where improvements would appear desirable. Commercially available TV equipment is incorporated and a specially designed viewing room is included that enables controlled, repeatable viewing conditions for critical comparison of color-image displays.

A "Total" Communications System

Donald G. Chandler, Electronic Industrial Engineering, Inc.,
N. Hollywood

A revolution taking place in the communications field involves a "total" communications system utilizing a broadband coaxial cable communications network. This concept will provide many additional services, such as transmission of high-speed data, video information (including facsimile); it will be the consumer and commercial vehicle to provide both burglar and fire security information, information retrieval, interactive education, audience opinion polling, TV channel monitoring, subscription TV, credit card verification and many more. This system utilizes a time division multiplex scheme, and is capable of interrogating up to 30,000 subscribers in less than 30 s, and receiving up to 128 bits of data from each subscriber (total of 3,840,000 bits of information).

CONCURRENT SESSION

2:00 THEATER PRESENTATION AND PROJECTION

Presentation of Motion Pictures in Theaters

Louis M. Wutke, Pembrex Theatre Supply Co., Las Vegas
Motion-picture presentation in any situation requires the cooperation of many facets of the industry. The relationship of the exhibition of the print as projected is discussed. Suggestions for improvement and remedies are spelled out. Detailed case histories are explained and visually shown. The reasons for the suggested modifications in the standard release print as now composed are given. The many facets involved in film-print damage and detailed suggestions for remedies are given, which are practical and easily within budget requirements.

Flicker Perception in Motion-Picture Projection

F. J. Kolb, Jr., and P. N. Preo, Manufacturing Experiments
Div., Eastman Kodak Co., Rochester, N.Y.

Report of the Xenon Hazards Meeting

John Degenkolb, Association of Motion Picture and Television Producers Inc., Hollywood

Acoustical Response and Its Measurement — Theaters and Dubbing Rooms

Eric Rasmussen, Filmfoundation, Copenhagen, and *Lennart Ljungherg,* Svenska Elektronik-Apparater AB, Stockholm, Sweden

Panel: Film Damage in Theaters

CONCURRENT SESSION

2:00 SOUND RECORDING AND REPRODUCTION

A Phase Comparison Cross-Modulation Test Instrument

Petro Vlahos, Association of Motion Picture & Television Producers Inc., Hollywood

A new cross-modulation test instrument measures the cross modulation present in a photographic soundtrack. The test signal may be any of the presently used cross-modulation frequency pairs. The length of the test signal need not exceed one inch. The instrument measures the dB level of the cross-modulation products and indicates whether the cross modulation is due to over or under density of the print. A secondary calibration indicates the required change in print density to achieve minimum cross modulation.

A Wireless System for Synchronizing Sound and Camera

Hal Landaker, Columbia Pictures, Hollywood

Syntrol, a compact, completely mobile unit, has cableless synchronized camera-sound operation with any camera capable of producing a sync signal, remote starting and stopping of the recorder by the camera and automatic start marking of the camera and soundtrack, thereby eliminating the need for clappersticks. Basically the system consists of two parts: a very small control unit with the necessary circuits to operate the fogging lights in the camera, plus the transmitter to send these signals and the synchronizing signal to the recorder. The transmitter contains its own battery and operates independently from any source of supply from the camera other than the sync signal. The receiver of the system is designed for attachment externally on any battery-operated recorder. With Syntrol either crystal-controlled or constant-speed motors may be used to drive the camera.

A Review of Cordless Camera Drives

Edmund M. Digiulio, Cinema Product Development Co.,
Los Angeles

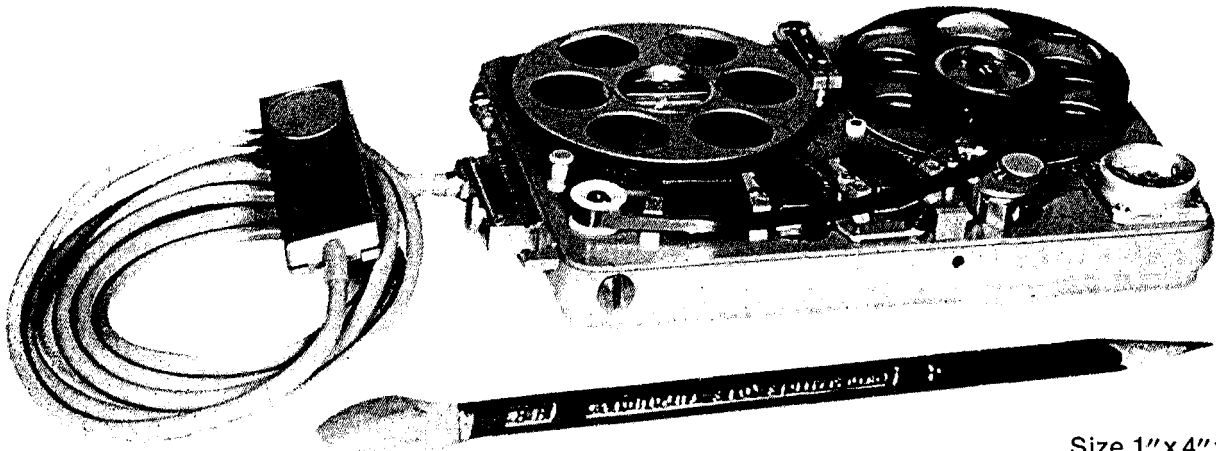
The past few years have seen a host of new developments in cordless camera drives resulting from the introduction of sound recorders with built-in or plug-in crystal oscillators that could provide a highly accurate sync track. A broad survey of developments to date describes the various techniques employed, citing the features inherent in the various systems, as well as additional features incorporated by the particular manufacturer, and compares the advantages and disadvantages of the different approaches. Work has progressed along two general lines, the first being a relatively brute force approach where crystal-controlled, solid-state inverters are used to operate standard pre-existing synchronous motors. As our technology has become more refined there has been increasing emphasis on the second approach, the use of specially designed dc motors with ac tachometers capable of phase-lock operation from a dc source. Crystal-controlled motors are now available or in design for virtually every commonly used professional 35 and 16mm camera.

Computerized Control Equipment for Looping

Jack V. Leahy, Film Recording Div., RCA Corp., Burbank,
Calif.

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One lb. and One oz.



Size 1" x 4" x 5 3/4"

- New Automatic Level Control or Manual Mixing
- Includes erase and record heads plus reproduce monitor
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- Inputs: Kudelski Lavelier Condenser Microphone or any professional low impedance, high-quality microphone or 600 ohm line input

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- 150 mil tape, type used in cassettes
- 27 minutes of recording time per reel at 3 3/4 ips
- Battery enclosed, life—7 1/2 hours

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**SYMPOSIUM: MOTION-PICTURE AND
VIDEOTAPE PRODUCTION TECHNIQUES**

THURSDAY MORNING — APRIL 29

9:30 SESSION I

The Changing Scene in Production and Release
Neal Keehn, DeLuxe General Inc., Hollywood

The Synchronvision System
Bruce Hill, Bruce Hill Productions, Hollywood

Mobile Production Techniques
Fouad Said, Cinemobile, Los Angeles

THURSDAY AFTERNOON

2:00 SESSION II

Production Management for Film
Leon Chooluck, American Broadcasting Co., Hollywood

Production Management for Tape
S. Bryan Hickox III, Ampex Corp., Glendale, Calif.

New Developments in Lighting Equipment

Experience With a Computerized Lighting Control System
Adrian B. Ettlinger and Salvatore J. Bonsignore, CBS Television Network, New York

The application of computer techniques to stage lighting control began a few years ago, and a variety of approaches have been tried. The data-storage function in lighting control requires memorizing a series of cues, each cue consisting of a pattern of number values specifying the voltages to be fed to an array of dimmer control channels. Digital data-storage techniques can readily perform this task, but the man-machine problem, requiring that the operator have easy manual access to alter the dimmer settings, has proven difficult to resolve satisfactorily. It was also felt that the inability to read the status of every dimmer at every point in time was an inherent limitation which had to be overcome before memory lighting cue storage could meet the particular demands of network TV show production. The new system, which overcomes most disadvantages, is based on the use of an alphanumeric display with a light pen as the controlling instrument. By programing the computer to respond to operator requests in a closely interactive manner, problems of status display and the dynamic relationship between functional options and systems status can be dealt with at a very effective level.

FRIDAY MORNING — APRIL 30

9:30 SESSION III

Color Production Problems — Film and Tape
Robert Brower, Universal City Studios, Universal City, Calif.

Electronic Production Techniques
Joseph Bluth, Vidtronics Div., Technicolor Inc., N. Hollywood, Calif.

Random-Access Video Editing System
Kenneth I. Taylor, CMX Systems, Sunnyvale, Calif.
Present-day video-editing systems are limited by the sequential access character and limited slow-motion and still-frame capability of videotape recorders. An editing system is described which applies computer technology to video editing. The use of a newly developed video disc pack recorder operating under computer control makes possible random-access to program material on the order of one hour in length, variable speed and still frame conditions during the decision-making process. The disc pack system allows immediate rehearsal and modification of splices individually or in complete sequences. A light pen-software control system with all bookkeeping handled by the computer is used to enhance the human interface. Assembly is accomplished automatically under computer control in a separate process using a decision list generated by the off-line editing system.

FRIDAY AFTERNOON

2:00 SESSION IV

Sound Recording Techniques
Joseph Kelly, Glen Glenn Sound Co., Hollywood

New Techniques for Producing Visual Effects
Douglas Trumbull, Douglas Trumbull Productions, Hollywood

Transfer Techniques
Robert Ringer, Vidtronics Div., Technicolor Inc., N. Hollywood, Calif.

Formats and Standards in Broadcast Television
Rodger J. Ross, Canadian Broadcasting Corp., Toronto

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ARRIFLEX 35BL

silent, hand-held production camera

ARRIVOX-TANDBERG

professional 1/4" tape recorder

SONOREX

double sixteen interlock projector

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Los Angeles, Calif.

April 26-29, 1971

during the SMPTE convention

and

New York Hilton Hotel

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May 5, 1971 3 pm to 9 pm

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the long-awaited silent,

ARRIFLEX has achieved a major technological breakthrough in motion picture camera design with its new hand-held, lightweight, silent ARRIFLEX 35BL. An all purpose production camera designed to facilitate modern trends in theatrical and commercial film production, the new 35BL gives the filmmaker all the mobility, speed and creative freedom heretofore limited to 16mm equipment.

Here are some of the new ARRIFLEX 35BL's exciting features:

Low operating noise level for on-location sync sound shooting.

Lightweight and compact design.

Excellent weight distribution and low silhouette for shoulder rested operation.

Four-pin pulldown, two-pin film registration and fixed gap film channel.

Bright mirror-shutter reflex viewing through rotatable viewfinder with correcting device to keep image right side up throughout arc of 120°.

Full aperture viewing area with overview area.

Ground glass image magnified 6.5X for critical focusing and viewing.

Easily interchangeable ground glasses and film gates for all common aspect ratios.

New printed circuit type universal motor with 24 fps. crystal control plus variable speed for operation off 12 volt DC and 117 volt AC.

Quick change, double compartment coaxial 400 ft. and 1000 ft. magazines.

Camera speeds from 10 fps. to 90 fps., forward and reverse.

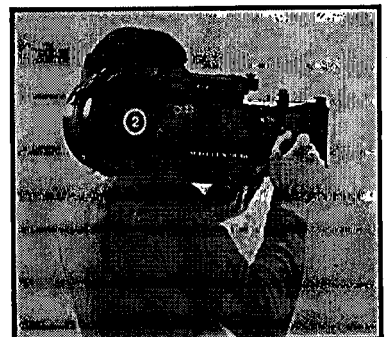
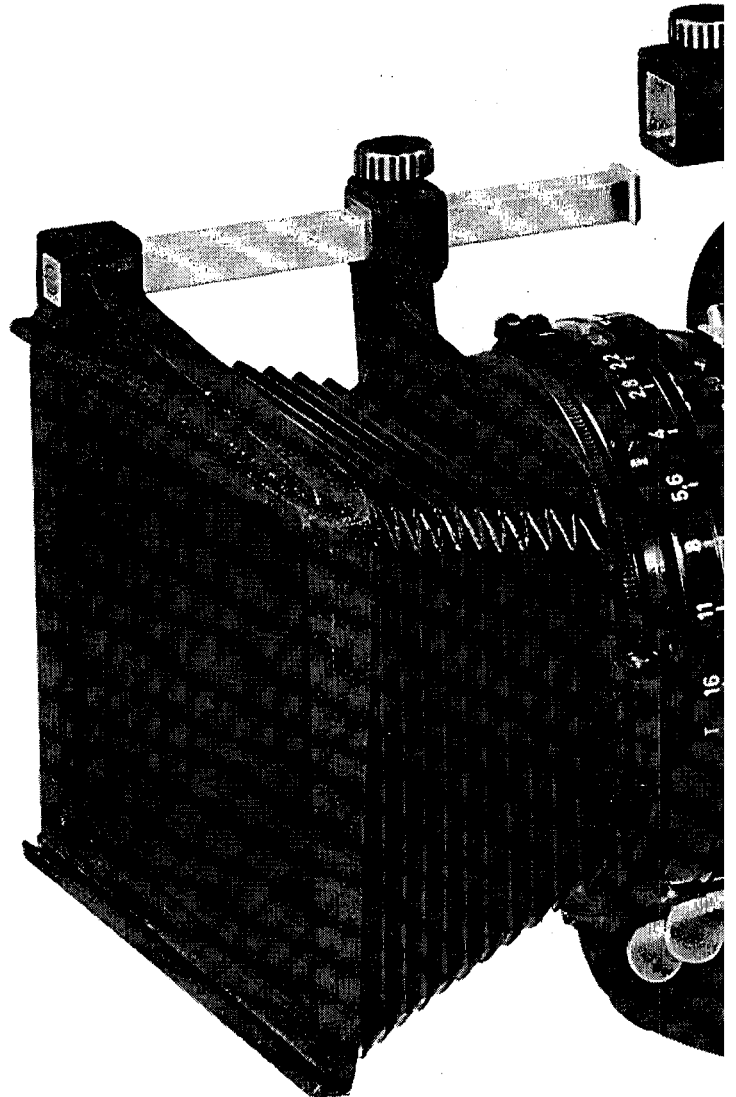
Large, easy to read tachometer and geared footage counter.

Ready for sync sound shooting, with automatic start marking and pilotone generators built-in.

Standard Arri steel bayonet lens mount, accepting all Arriflex lenses.

The ARRIFLEX 35BL will be the professional filmmaker's tool for the 70's, revolutionizing the industry as the standard Arriflex 35 did thirty years ago.

(Specifications subject to change without notice)

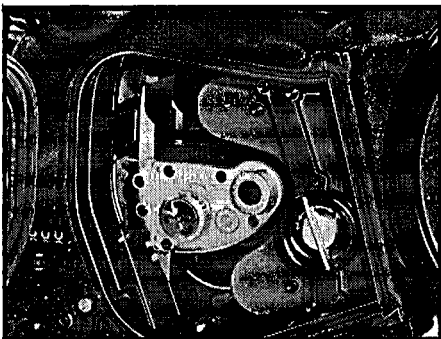


Slim, streamlined design made possible by new flat, printed circuit universal motor.

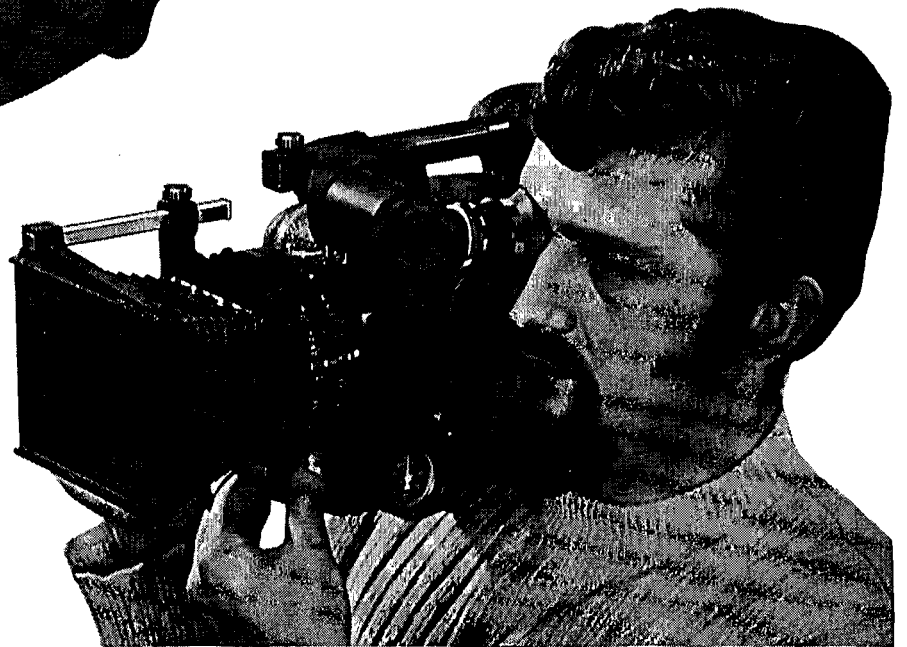
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New transport movement with double-pin registration and four-pin pulldown, retracts for quick loading and cleaning.



Low silhouette, lightweight and excellent balance for snug, comfortable shoulder-rested hand-held shooting.

new ARRIVOX-TANDBERG professional tape-recorder

DELUXE SOUND AT A BUDGET PRICE... that, in short, is what the new Arrivox-Tandberg recorder is all about.

Arriflex and Tandberg pooled their know-how and experience for the design of this new 1/4" professional tape-recorder which satisfies the highest demands for quality and performance at a price every filmmaker can afford. The Arrivox-Tandberg recorder offers features and performance found only in professional tape-recorders costing up to twice as much. Some of its standard built-in features are costly accessories on other machines.

Built into a sturdy lightweight magnesium casting, the Arrivox-Tandberg utilizes state-of-the-art, plug-in electronic boards for reliable, low service operation. A close loop servo-drive motor assures highest speed accuracy. All front panel controls and straight line tape threading provide convenient and easy operation. For tape to film synchronization, the Arrivox-Tandberg is fully equipped for the standard pilotone system. Some of the Arrivox-Tandberg exclusives are: built-in pre-amplifiers for dynamic microphones; built-in power supplies for condenser microphones, switchable from the control panel; completely encased and protected tape-drive and head assembly; and a forward/reverse footage counter. Optional accessories such as a plug-in resolver module, studio synchronizer, AC converter and remote control cable, further enhance its versatility.

The Arrivox-Tandberg is a non-compromising, professional 1/4" tape-recorder designed especially for the motion picture industry. It provides filmmakers with the ideal sound package in quality, compactness and lightweight, at a low price.

SPECIFICATIONS:

Measurements: 13" x 4" x 10" **Weight** (less batteries): 10.5 lbs. **Reel Diameter:** 5" reels with cover closed 7" reels with cover open **Tape speeds:** 7 1/2 ips and 3 3/4 ips **Wow and flutter:** .1% for 7 1/2 ips; .2% for 3 3/4 ips **Temperature range:** -4°F to +140°F (-2°C to +60°C) **Inputs:** Two balanced microphone inputs for dynamic microphone, 50 to 200 Ohm impedance, switchable to built-in power supplies for condenser microphones. One line input with control range from .775 to 7.5 V. Each input has separate gain controls and individual, switchable automatic limiters.

(Detailed technical specifications are available upon request. All specifications subject to change without notice)

deluxe sound
at a budget
price!



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new SONOREX double 16 interlock projector

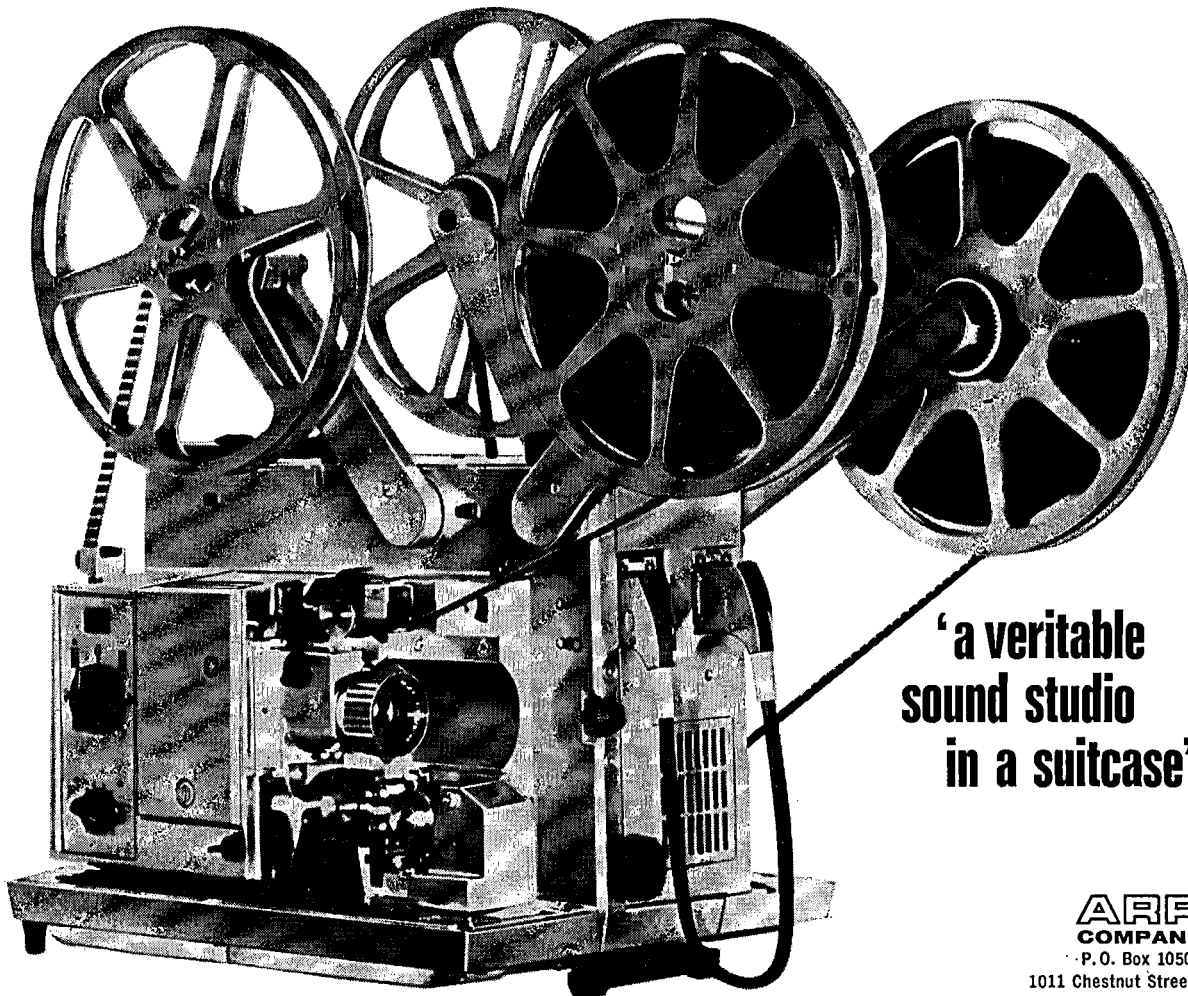
Meet the second generation of one of the most versatile and useful production machines ever built—the Sonorex Double 16 Interlock Projector.

Designed as successor to the Siemens 16/16 projector which we pioneered in the USA, the Sonorex has all the capabilities of the Siemens plus many new important features developed as a result of our years of experience in this field.

As a professional 16mm sound projector, the new Sonorex is the finest you can get. Picture steadiness of better than 1/1000 of picture height is obtained with its cam-driven transport mechanism and low wear film gate assembly. A low voltage, long-life halogen projection lamp system, guarantees a bright evenly illuminated image even on large preview screens.

But the Sonorex is much more than just a high quality sound projector. Equipped with a heavy-duty mechanically interlocked magnetic film deck, it lets you run both 16mm picture film and full coat 16mm magnetic film in perfect sync, or transfer sound from single system magnetic or optical to full coat stock while previewing camera footage. With all of its capabilities in recording, transferring, mixing, and playback, applications for the Sonorex in general film production work are virtually unlimited and expand money-saving in-house capabilities for every filmmaker.

The new Sonorex Double 16 Interlock Projector is specifically designed for all these applications and not a "converted" sound projector. It meets professional standards in every way. If making films is your business, the new Sonorex can save you time and money. Compact and portable, the Sonorex goes where you go—a veritable studio in a 'suitcase'. Write for complete literature. (All specifications subject to change without notice)



**'a veritable
sound studio
in a suitcase'**

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