

## Engineering Technology Committees Meeting During the 127th SMPTE Conference

"New Directions in Technology — Difficult Decisions," the theme for the 127th SMPTE Technical Conference, was apparent throughout the week, and attested to by the meetings of the committees on engineering technologies, their working groups, subcommittees, and study groups, held at the Los Angeles Convention Center October 27-- November 1, 1985. Synopses of the meetings, showing the progress being made by the committees, are presented herein, with additional information available from Alex E. Alden, Manager of Engineering, or Barry C. Detwiler, Staff Television Engineer.

### **Working Group on Digital Video Standards**

The meeting was conducted by Merrill Weiss in the absence of the group's chairman, Stan Baron.

The group is nearing completion of its work on a standard for the serial interconnection of component digital equipment. It was noted that during the next several meetings, the group will be making final decisions on a number of issues and will finalize the document.

Reports were received from the joint study groups which report to this working group, regarding component studio implementation and filtering requirements. A written report was also received from the chairman of the recent meetings of the EBU group handling digital video.

Discussions in the meeting centered around the appropriate means to make available the spaces between active picture areas for use by and for ancillary signals. Several schemes for packetizing ancillary data and for addressing it were presented. Included were fixed-length packets, run-length coded packets, and a form of token passing.

Other discussions included the possible requirement for additional data space to carry a key signal along with the luminance and color difference signals. Such a signal would have to be included in the multiplex, since it would have to maintain its time relationship with other signals, so as not to place a heavy storage burden on devices making use of the key signal.

The working group conducted a joint demonstration of component video together with the Working Group on Component Analog Video Standards on

Wednesday and Thursday of the technical conference.

### **Joint Ad Hoc Group to Study Filtering Requirements**

This group reports to both the Working Group on Component Analog Video Standards and the Working Group on Digital Video Standards. Filtering issues are seen as being nearly identical for both analog and digital component systems, so that results for one also apply to the other.

In the absence of the chairman, Bill Hogan, the meeting was conducted by Merrill Weiss. The group's agenda covered three main areas: review of tests performed at Grass Valley in July 1985, and of the test bed used; decisions concerning the test bed to be used for the next series of tests; and determination of the tests to be performed in the next series.

Results of the Grass Valley tests indicated the likely workability of the EBU template for filter characteristics, but multiple-generation tests have not been performed as yet. A higher quality test bed and the ability to adequately store the images is required for the next series of tests.

The test bed to be used the next time was defined. The tests will make use of a facility available at Bell Communications Research Center in New Jersey, and are scheduled to be held in January 1986.

The January tests will cover two aspects: first, multiple passes through two different implementations of EBU template filters will be made and stored; second, the characteristics of appropriate viewing filters will be examined. The results will be reported to the working groups in February 1986.

### **Working Group on Component Analog Video Standards**

The chairman, Merrill Weiss, conducted the meeting in rather unusual surroundings. Work was ongoing for the set-up of a joint demonstration of component video together with the Working Group on Digital Video Standards. The meeting was held in the middle of the demonstration facility as the work continued. The participants thus got to keep both their heads and hands busy.

Reports were received from the four subgroups which report to this working

group: those on camera/recorder interface, system design, component studio implementation, and filtering requirements. (Reports from the groups are included elsewhere in this issue.) One change to the camera/recorder document was agreed upon pending testing. In the last few months, the working group voted on three draft standards, which are now undergoing cleanups before being forwarded to the parent committee on Television Video Technology.

Discussions at the meeting centered on the proposed component reference signal (CRS), which had not been discussed at any of the related meetings due to time constraints. The purpose of the signal is to provide a plant timing reference which will work equally well for both analog and digital portions of a component facility, and which will interface easily with existing composite reference systems.

The three proposals considered to date were described in detail along with the analysis undertaken, which has led to the selection of one as a strawman. Comments received with respect to possible modifications of the strawman were received and found to be outside of the philosophical basis established for the CRS. They will be reviewed again at the next meeting, at which a testing schedule for the CRS will be established.

The demonstration of component video was held on Wednesday and Thursday of the technical conference.

### **Subgroup on System Design of WCAVS (Working Group on Component Analog Video Standards)**

The group, under the chairmanship of Birney Dayton, conducted its meeting the Sunday before the technical conference. This group handles the initial design work required by the Working Group on Component Analog Video Standards in developing systems for standardization.

The meeting was devoted to the further development of a pair of timing and amplitude (T&A) control signals to be included in the vertical interval of component analog signals. The signals are intended to pass unimpaired through both forms of analog component environments, both forms of digital component environments, and the composite environment.

The signals will be used to permit construction of adjustment-free facilities in the analog domain. Because of the complementary nature of the various component forms, signals which are unimpaired in one will not be impaired in any other, so the only real area of concern is passage through composite. In addition, it is desired to develop signals which will work equally as well in 625-line as in 525-line systems.

The group split into two separate meetings much of the time, with one concentrating on the time and control signal and the other on the amplitude control signal. The effort was directed to converting the concepts which have been under discussion for a number of months into waveforms which could be disseminated for comments. That goal was achieved. The waveforms were drawn up and circulated with other documents distributed at the demonstration of component video held as part of the technical conference.

### **Joint Ad Hoc Group to Study Component Studio Implementation**

This group reports to both the Working Group on Component Analog Video Standards and the Working Group on Digital Video Standards on issues of interest to

up and component signals with no setup was investigated. The errors resulting in the component signals from such transformation from NTSC were found to be less when combined with other component signals than would normally be the case between NTSC signals.

The group reached a preliminary conclusion that a fixed transformation could be recommended, with any improvements in accuracy required by users placed in the NTSC environment, since that is where the errors originated. Such improvements can be obtained in either of two ways — maintaining tighter tolerances on the setup levels used, or applying corrections to the setup and amplitude of the NTSC signals prior to decoding.

### **Committee on Theatrical Projection Practices**

This committee, chaired by John Pytlak, endeavors to assist theaters in achieving optimum presentation quality by setting standards for projection equipment and projected image quality, while advancing the state of the art. Aside from the annual SMPTE Technical and Exhibit Conference, the group met at the theater owners convention, ShoWest '85, to encourage participation from all areas of industry.

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both regarding implementation of component studios. Its chairman is Birney Dayton, who conducted the meeting held on Sunday, October 27.

The group concentrated its effort at this meeting on one area of urgent concern to both parent committees — the problem of how to handle setup on NTSC systems which are connected to component systems. The meeting heard a thorough presentation on the mathematics of setup and on the focal point of the problem, the large tolerance allowed on the setup level. An analysis was conducted of the locations within the NTSC portion of a facility in which setup might be applied or not applied. It was determined that there were a number of ways in which an existing facility could be logically migrated to the use of no setup in NTSC, thereby easing problems of maintaining the relationship between the NTSC and component signals.

Finally, the possibility of using a fixed transformation between NTSC with set-

Committee discussions indicated that there is a continuing concern that most theaters do not meet the standard for screen luminance (PH22.196, Screen Luminance and Viewing Conditions for Indoor Theater Projection of Motion-Picture Prints). To gain better understanding of the document, it was suggested that tutorial materials be published to help theater personnel.

The committee, having undertaken the task of modifying the 35mm projector alignment test film (RP 40), reported that a new target master is being made, and improved production techniques should produce a better quality and more widely used test film. Other subjects discussed included screen gain determination/installation of gain screens; 35mm projector illuminance; projection manual; projection contrast test film; high-definition film projection; and 3-D projection.

A new project, the use/need of 35mm CinemaScope (CS) perforations, having

been investigated by the committee, is valid, and will be embraced by the group. They will explore the ramifications of sprocket-tooth design on film wear and tear as well as image steadiness, and new applications (digital sound) for CS-perforated print film.

Some of the avenues to be explored by the committee include: the use of polyester film for 35 and 70mm prints, and the development of a Recommended Practice on the maximum radiant energy on film.

### **Working Group on High Definition Electronic Production**

Convened by the chairman, Richard Stumpf, this very active group was informed that HDTV technology demonstrations were to take place on the October 30 and 31 at the Los Angeles Convention Center. The demonstrations allowed the various manufacturers to interface their equipment and setup systems. It included tape-to-film and film-to-tape transfers, blue-screen compositing equipment, cameras, recorders, a paint-box system, switchers, test-signal generators, projection and CRT displays, and a telecine.

A draft recommendation of a high-definition television studio standard from the Asia/Pacific Broadcasting Union, specifying the 1125-line, 60-field interlaced system with a 16:9 aspect ratio was presented by Dr. Masao Sugimoto.

A paper on the second-generation HDTV frame rate converter developed at the NHK (Nippon Hoso Kyokai Research Laboratories) was also presented by Dr. Sugimoto. It described a system which includes an 1125/60/2:1 (line number/field rate/interlace factor) to 625/60/1:1 converter, a 60-50 Hz frame converter, a non-interlace to interlace converter, and a PAL encoder. The converter was first demonstrated at the IWP 11/6 (HDTV) meeting in Tokyo, Japan, during January 1985. A report on the standards converter from the EBU: "European Broadcasting Union's Contribution to CCIR, IWP 11/6 and Study Group II, Further Analysis of Factors Affecting the Choice of HDTV Production Standards," was also given by Dr. Sugimoto.

A report entitled "Resolution Requirements for HDTV for Electronic Production Based Upon 35mm Motion-Picture Film," given by James Mandrala, was intended to clarify relationships between aspect ratio, bandwidth, resolution, and scanning lines.

The chairman reviewed the genesis of the colorimetry and gamma (or transfer characteristics) studies, which will be done by the group. Some of the organizational details concerning the colorimetry subgroup were clarified by Dr. Kerns Powers, who noted that a single joint subgroup, chaired by Leroy DeMarsh, operating under both the Working Group on

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High Definition Electronic Production and the Subcommittee on Colorimetry, chaired by Stan Quinn, under the Committee on Television Video Technology, has been formed. It is charged with the responsibility for developing the state of knowledge and alternate approaches to the camera primary specifications in terms of the coordinants on the CIE diagram, and also on the question of nonlinear dynamic range and dynamic contrast range.

Richard Stumpf concluded the meeting by calling attention to the newly formed group under Edmund DiGiulio, Engineering Director, Motion Pictures, of the SMPTE. The group will investigate the conversion of film to a 30-frame system from its historic 24-frame/sec standard, and suggested that those interested consider participating in the work of this group.

### Subcommittee on Digital Control of Television

Formed in 1978, the group is charged with making available to industry a control interface for videotape recorders, film chains, character generators, still stores, audio tape decks, audio consoles, video switchers, frame synchronizers, time-base correctors, noise reducers, digital effects, etc.

Two documents reflecting the basic specifications on control bus architecture were completed by the group and published: ANSI/SMPTE 207M, American National Standard for Television Digital Control Interface - Electrical and Mechanical Characteristics; and RP 113, Supervisory Protocol for Digital Control Interface.

Two other documents were published in the September 1985 *SMPTE Journal* for public review: RP 138, Control Message Architecture; and RP 139, Tributary Interconnection.

The chairman, Tom Meyer, reported that the EBU (European Broadcasting Union) has published equivalent specifications in their document EBU Tech. 3245, Specification for Remote Control of Television Equipment.

Agreement was reached by the group on the standard control messages applying to system service messages (control of the network); common machine messages (in use by all machines); and VTR control messages.

During June 1985, a joint EBU/SMPTE system test was held in Munich, Germany. The nine manufacturer/user groups agreed on the basic system architecture and the approach to the initial standard control messages. Tests were scheduled to take place on November 4-8, 1985, with participants from the EBU/SMPTE, in Redwood City, Calif. A proposal was made for demonstrations of the control systems, scheduled to be held at IBC (Independent Broadcast Confer-

ence), NAB (National Association of Broadcasters), SMPTE Australia, and the 128th SMPTE Technical Conference and Exhibit. In conjunction with the demonstrations, a tutorial paper is to be prepared and made available through the SMPTE.

Subcommittee assignments include documentation which will reflect the overview and guide to the control systems; ATR control messages; production switcher control messages; routing switcher control messages; telecine control messages; post-production and m/c audio control messages, MERPS control messages; and a report on station automation use of the system.

### Committee on New Technology

The committee convened on October 28, under the chairmanship of Kerns Powers. The original objective (the study of new or advanced technology or special consideration of contemporary technology, which would benefit from the concentrated effort of the specific study groups or subcommittees), and current status of the committee were reviewed. To work more effectively, two of the committee's working groups on digital television had been transferred to other technology committees (its senior study group on digital television had recently been dissolved). The committee is currently concerned primarily with many developing questions in the high-definition television field.

The Working Group on High Definition Electronic Production (WGHDEP), chaired by Richard Stumpf, and the Subgroup on High Definition Television Psychophysics, chaired by Irwin Abrahams, are not only extant, but are very active. The consensus of the committee is that new technology will continue to be a dynamic area and the original objectives are valid. Over the past year, the WGHDEP completed studies required by the Advanced Television Systems Committee for recommendations on the parameter values for electronic production of high-definition television material. The information provided by the committee was included in a paper prepared by the U.S. for presentation to the CCIR (International Radio Consultative Committee), regarding an international program exchange standard for high-definition television.

The Subgroup on High Definition Psychophysics has completed its documentation on the status of knowledge in psychophysical phenomena that can be exploited in the design of HDTV systems.

The Study Group on Application of DRAW (Direct Read After Write) Video Disc Technology has been reactivated under the chairmanship of Edward Efron. The group will review the increased use of DRAW disc technology in both motion picture and television post-production applications.

The committee took the opportunity to express its appreciation to Charles Ginsburg, who was instrumental in pioneering SMPTE's efforts in digital television, having chaired the Study Group on Digital Television since 1974.

### Committee on Audio Recording and Reproduction Technology

A well-attended committee meeting, chaired by Tomlinson Holman, took place the first day of the conference. Topics ranged from production through studio use of standards to television release.

In the area of production, current standards projects are under way on characterizing acoustic noise of cameras and on guidelines for setting levels on recordings. The committee's activity for time code is reflected in RP 135, Use of Binary User Groups in Motion-Picture Time and Control Codes; and RP 136, Time and Control Codes for 24, 25, or 30 Frame-per-Second Motion-Picture Systems, and is being considered internationally. The time code recorded on the balance stripe of "single" stripe film for editorial purposes is being considered nationally, which will call for standardization of dimensions of the balance stripe among manufacturers.

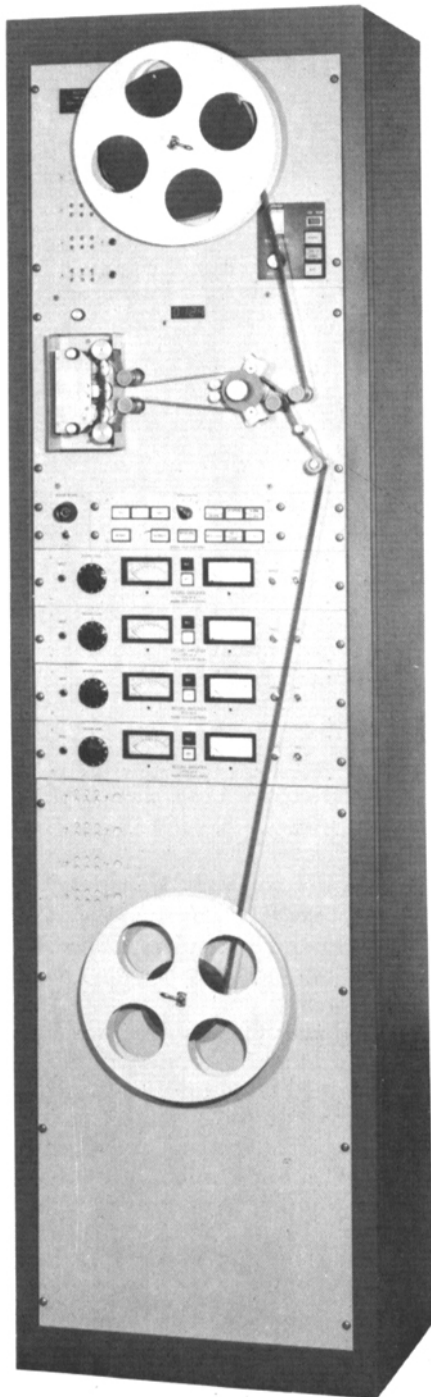
The chairman reported that the committee has been actively engaged in establishing, for studio use, standards, practices, and guidelines for flux levels on films interchanged among studios, and is continuing its work on specifying test films for these various formats.

New projects include the consolidation of existing standards for 3, 4, and 6-track studio formats into one document; a Recommended Practice for a magnetic buzz track test film, and a proposal for head leaders for film masters to be dubbed to video media. The committee is continuing its work on reverberation time and echoes; on isolation needed from noise sources outside of buildings and from adjacent auditoriums; in addition to a guideline on the amount of electrical power required to drive loudspeakers so that films can be played without excessive audible distortion.

The dedicated efforts of the committee to provide test films and documentation on the handling of magnetic materials in storage and shipping of materials will continue.

### Conclusion

Active participation on any SMPTE Engineering Technology Committee or subgroup is most welcome, and is encouraged for those interested in or affected by the standard under development. Pertinent information relating to the scope of each committee, enrollment as a member, and other details are readily available through the SMPTE Manager of Engineering, or Richard G. Streeter, SMPTE Engineering Vice-President.



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