

the commonality of equipment and operations is the ability to achieve a significant improvement in the quality of the television picture suitable for future developments in display technology. Component coding allows the concept of a family of extensible digital codes to become a reality. The appropriate code can be selected to suit the application. To realize all of these

advantages and benefits, it is necessary to select a digital standard wisely and carefully, since this standard will determine the future of television broadcasting for the next 20 to 30 years.

#### References

1. Frank Davidoff, "Digital Video Recording for

Television Broadcasting," *SMPTE J.*, 82: 525-555, July 1975.

2. Joseph A. Flaherty, "New Horizons in TV Program Production, Post-Production and Continuity," *SMPTE J.*, 86: 642-645, Sept. 1977.

3. Frank Davidoff, "An Update of Digital Television Fundamentals," in *Digital Video*, SMPTE, Scarsdale, N.Y., 1977, pp. 5-11.

4. Leonard Golding, "Quality Assessment of Digital TV Signals," *SMPTE J.*, 87: 153-157, Mar. 1978.

## Report of the Committee on New Technology

By ROBERT S. HOPKINS, Jr.

Given the theme of the 14th Television Conference as "The Digital Decade" it is appropriate to present here a report from the Committee on New Technology. The Committee on New Technology has been intimately involved in digital television throughout its life. The committee came into being in July 1976, when the SMPTE Board of Governors approved a new engineering committee organization. Eight new committees were formed at that time with a general scope which applied to every committee.

### Original Organization of the Committee

The supplementary scope of the Committee on New Technology was given as "The application of the general scope as it pertains to the study of new or advanced technology which would benefit from the concentrated effort of specific study groups or subcommittees." The committee was to begin working through five study groups:

1. A Study Group on Digital Television
2. A Study Group on Digital Audio
3. A Study Group on Time Codes and Codification of Motion-Picture Films
4. A Study Group on Video Disc Systems
5. A Study Group on High-Definition Television.

The Committee on New Technology held its first meeting during October 1976 and was chaired by Fred Remley.

In this report I will be discussing only the digital television activities of the committee. I will be relating to you historical information as well as current information on the activities occurring within this committee's structure. I will attempt to give some insight on how the committee's operation is meeting the challenge of the digital decade.

### Study Group on Digital Television

The Study Group on Digital Television was formed in 1974 by the Television Technology Committee. The Study Group, chaired by Charles Ginsburg, was to monitor and evaluate the progress of worldwide research and development efforts relating to the digitizing of television signals, both picture and sound, and the handling of the signal in this form. The primary function of the Study Group was to prepare tutorial material which could, eventually, be used by a Standards Committee as a basis for recommending standards. The Study Group was not to prepare standards.

Early in the deliberations of the Study Group, a decision was made by the members that they would not be discussing digital audio. It was felt that the expertise of the members was far stronger in the area of video than audio and that another specialist group would be required to properly discuss digital audio. The Committee on New Technology was in the process of forming such a group

when the Audio Engineering Society formed a Digital Audio Standards Committee. Rather than duplicate their efforts, a decision was made for the SMPTE to participate in the AES activity with five members selected from various disciplines of our Society. The AES work has progressed slowly because of legal difficulties encountered through questions raised in regard to the AES Committee procedures. As a result digital audio standards were deferred, and our Society is now in the process of reevaluating the role we should take in this field.

The Study Group on Digital Television has held 12 meetings; the first meeting was in March 1975. Subjects discussed during the last two meetings have been: (1) digital components proposed for 625-line systems in Europe; (2) transmission of digital television by common carriers; (3) digital composite vs. digital component encoding in NTSC; (4) digital component systems for NTSC; (5) differences in considerations for component or composite encoding in NTSC compared with 625-line PAL; (6) "footprints" left by certain techniques in coding for transmission.

From this listing of subjects, the rising importance of component systems is obvious.

Various reports have been given by Mr. Ginsburg during conferences and published in the *Journal* and are available for anyone interested in securing more detailed information.

### Working Group on Digital Video Standards

The Study Group recognized the need for standards for digital television and in their sixth meeting in April 1976 made a recommendation that a standards group be formed. This recommendation to the Committee on New Technology was accepted in January 1977, and the formation of the Working Group on Digital Video Standards was authorized. The word "video" in the name of the Working Group was selected after specifically deciding that the Working Group would not be addressing the subject of audio. I was asked to chair this new group, which had been given the following scope: "to draft standards for a digital video signal format for System M(NTSC) broadcast studios and plants and for input/output interfaces used with digital video equipment," and "to draft standards on other appropriate digital video subjects as directed by the Committee on New Technology and with the advice of the Study Group on Digital Television."

The Working Group was assembled rather quickly after its authorization and held its first meeting in March 1977. Since then, the Working Group has held 22 meetings. The primary thrust has gone through three phases. The first phase consisted of making basic decisions on details which should be included in a proposed standard. A subcommittee, chaired by Mr. Robert McAll, was formed during that phase to specify details for signal timing. The second phase began in May 1978, when the Working Group started writing a draft. The work of Mr. Stanley Baron as chairman of the draft subcommittee has been invaluable. The third and current phase began in March 1979, when the Working Group began discussions on test-

Presented on 1 February 1980 at the Society's 14th Television Conference in Toronto by Robert S. Hopkins, Jr., RCA Corporation, Building 10-2-1, Camden, NJ 08102. Copyright © 1980 by the Society of Motion Picture and Television Engineers, Inc.

ing the proposal specified in the draft. Mr. Richard Kupnicki, as Chairman of the Testing Subcommittee, will be playing a significant role in this phase of the Working Group.

Reports have been given to the membership by this Working Group during conferences and in the *Journal* and will not be repeated here. It is appropriate, however, to make some comments on the contents of the draft. The Working Group has been working on a parallel data system. The video sampling rate is four times the color subcarrier frequency, and the data represent a composite color signal. Separate signals would be used to carry timing information and the clock. The signal with the timing information has been called the reference timing signal. This draft is complete with the exception of any minor changes which may be found necessary after tests are completed.

#### **Study Group on Digital Television Tape Recording**

The Committee on New Technology has authorized the formation of another study group. The Steering Committee in March 1979 decided to form the Study Group on Digital Television Tape Recording. Recognizing the importance of the digital recorder, it was felt that a study group could serve a very important role in defining the needs and requirements of such a machine. This Study Group is chaired by William Connolly, with Marcel Auclair serving as the Vice-Chairman. The charter of the Study Group is to provide a forum for the exchange of information on user needs and on technological capabilities of digital television tape recorders. Written reports are to be submitted to the Committee on New Technology at least once a year. This Study Group has held four meetings; the first meeting was in October 1979. This group will not write standards. However, it is not unreasonable to expect that one of the results of

this Study Group will be to recommend that a standards committee be formed. A report on the activities of this Study Group was given by Mr. Connolly during the Papers Program.

#### **Recent Developments**

Within the last few months, a shift in the emphasis of digital television activity has been evident. Component coding has become extremely important. Since the Society's 121st Conference in Los Angeles, each of the groups of the Committee on New Technology has dedicated significant effort to this subject. Two days ago (on 30 January 1980) the Working Group on Digital Video Standards made a unanimous decision that a Task Force should immediately be assigned the responsibility of investigating the possibilities for a worldwide component digital television format. Comments made during that meeting indicated strong desires for achieving compatibility among digital television standards in different countries. Last night (31 January), in a special meeting, the Steering Committee of the Committee on New Technology acted upon this recommendation and formed such a Task Force. Other organizations involved in international standards are being informed of this decision and invited to participate.

In summary, the Committee on New Technology can be expected to continue placing high emphasis on digital television. At this time there are four different digital television groups: the original Study Group on Digital Television, the Working Group on Digital Video Standards, the Study Group on Digital Television Tape Recording, and the newly formed Task Force on Component Digital Coding. As the new Chairman of the Committee on New Technology, I have a personal interest in continuing the excellent work in this important field that was so wisely started by my predecessors.