

## NAB Convention — 13-16 April 1980

NAB 80, the 58th annual convention of the National Association of Broadcasters was, as usual, an exciting event with a vast array of equipment displayed. Perhaps the most significant aspect of the convention was the great interest shown in the workshops, especially in the workshops on digital television, as well as the workshops on teletext and post production.

### Exhibits

Various systems based on the new technology were exhibited, among them:

- (1) Computer generated graphic systems;
- (2) Digital video effects systems which have continued to expand in scope and capability;
- (3) Color cameras all of which have new features providing better performance;
- (4) Switchers which included micro-processor control, event memories for auto sequencing, and digital interfacing for special effects;
- (5) Audio equipment, especially stereo, which gives better audio performance on VTRs via accessory processing;
- (6) One-inch helical VTRs which seem to be the major influence in the video recording field, especially, the Type "C" machines; and
- (7) New television services such as captioning for the hearing impaired via the PBS system, teletext transmission and receiving systems, fiber optic communication links, CCD cameras, self seeking microwave relays, and others.

Editing equipment has also evolved into a wider range of available hardware covering everything from a simple "off line" control track type electronic editor to very complex computer assisted systems that do auto assembly of master tapes in quad or one inch helical formats.

Satellite communication for both radio and TV is in full bloom. The Convention Center parking lot had more than 10 working earth stations picking up signals from various "birds." Many exhibitors now show a variety of receiving arrays, demodulators, multiplexed transmission systems (for two or more programs on one transponder) and ancillary signal capabilities.

Helicopters for ENG are the "in" thing this year and quite a few of them were parked on the exhibit floor or in the parking lots. With the helicopters there came a host of microwave gear, some with self seeking antennas that could follow the whirlybirds as they relayed back the images and sound of a fast-breaking news story.

### Color Cameras

As in earlier NAB conventions many color cameras were displayed, all of them making good to excellent color pictures. Most of the studio cameras have triax options, automated basic features, convertibility to EFP applications and other

desirable features. The middle range and ENG cameras also provide new levels of performance in compact and lightweight configurations.

### Videotape Recorders

The range of products and the scope of accessories for one-inch Type "C" helicals is so broad that almost all studio or field production needs can be accommodated. Editing, slow and stop motion, shuttle and jog, built-in memories and special effects, can all be accomplished with the basic machines or the accessories available from the prime suppliers or the accessories specialists.

### Switchers and Digital Video Effects

It would have been impossible to tour the NAB show without being attracted to the visual impact of digital video effects being demonstrated on all of the production switchers on display.

All the shows featured some live action manipulated in real time by digital dexterity or automated memories on the endless knobs, buttons and levers that made up the switching center at each booth.

Frame stores also do other things such as synchronizing remote feeds, buffering videodisks, VTRs and telecines, as well as other digital video manipulations.

### Telecines and Slide Scanners

Improved telecines of the standard type, and also flying spot and CCD telecines were shown. F.S.S. telecines have not been as popular in America as in Europe, perhaps because the film frame rate of 24 frames/s is so close to the European television frame rate of 25 images/s. In the U.S. the 30 frame television rate favored the use of projectors and television cameras for telecine operations. However, a number of European companies have made progress in adapting Flying Spot Scanners and CCD telecines to the U.S. requirements, especially via the use of frame stores as buffers. Good results could be seen at the various booths that displayed these systems.

American telecine manufacturers showed telecine islands with optical multiplexing with new features and improved performance.

Two improvements in telecine operations are worthy of note: first, the automated color correction available with most telecines, which permits scene by scene color balance preprogramming; and second, the integration of telecines into time code editing systems thus permitting the mixing of film and tape in a finished program.

### Editing Systems

Electronic editing systems were an important part of the NAB show, with equipment ranging from the simplest con-

trol track (pulse count) devices handling a pair of U-Matics in an ENG operation, to sophisticated computer assisted, multi-machine monsters that incorporate control of multiformat tape machines, telecines, switchers, character generators, videodisks, etc., in one large system.

### The Workshops

Three topics for workshops at the NAB 80 were of prime interest: digital television, teletext and post production.

In the digital television category there were at least three separate meetings, the first being an SMPTE-sponsored workshop with a panel of experts, the second a meeting of William Connolly's (CBS) digital VTR committee, and third a meeting of the digital television technology group chaired by Robert Hopkins (RCA) and Kenneth Davies (CBC).

Digital television standards are currently undergoing scrutiny by working groups on both sides of the Atlantic. In fact, the EBU Digital Standards Committee was meeting in London during NAB, which accounted for the absence of a few familiar faces in Las Vegas.

### SMPTE-Sponsored Workshop

The SMPTE-sponsored workshop was opened by Robert Smith, SMPTE President, and chaired by Blair Benson, SMPTE Editorial Vice-President.

Roland Zavada, SMPTE Engineering Vice-President, explained the purpose and procedures of the Digital Standards Committee. He also explained the liaison role of the SMPTE with the EBU and other international standardization groups.

Hopkins then reported on the current status of component vs. composite coding for digital television and on the desire for a standard interface "black box" for all digital devices to be used in television. He said that an SMPTE task force headed by Frank Davidoff was in London doing demonstrations for the EBU committee in an effort to agree on a world standard for a digital coding method.

Davies gave more details on the component vs. composite dilemma. The present equipment is mostly composite because it is the simplest, most economical way in a world of analog equipment. The disadvantages of the composite technique are a limited luminance bandwidth and difficulty in properly handling the color subcarrier, Davies said.

On the plus side for component coding were the following: (1) good for VTR signal systems; (2) easy handling by VLSI circuits; (3) no subcarrier related problems; (4) no color framing problems; (5) interface with digitally generated images; (6) could have improved TV standard; and (7) no "chroma/luma" crosstalk problem.

Davies emphasized that component coding was really the only way to achieve an international digital TV standard.

After reviewing a few of the disadvantages of component coding, like the high sampling rate and the problem of interfacing with existing systems, Davies then described a binary related coding scheme that would do for television what the 16, 35, and 70-mm formats do for the film world, namely provide three quality levels of images to suit the application needs. The three levels of television image quality would be first, a highest quality production standard for program origination; second, a normal broadcast standard for on-air transmission; and third, an EFP/ENG standard for location or news work.

The new system would employ combinations of 768 or 384 samples per TV line in luminance and chrominance with easy convertibility upward or downward because of the mathematical relationships. As an example, the broadcast version, which would be of a higher quality than the current NTSC, would use 768 luminance and 384 chrominance samples per line, and ENG standard would use only 768 samples on an RGB basis.

Connolly reported on the Digital VTR Committee activities and the responses to a questionnaire recently circulated to gauge user opinions and needs in this field.

Connolly cautioned against too rapid a selection of digital VTR parameters and showed a few charts of how the packing density of experimental VTRs has increased in the last few years. In 1974, the BBC showed a digital VTR using longitudinal techniques which had a packing density of 0.88 megabits/in<sup>2</sup>.

By 1980, several experimental VTRs, were operating at 50 megabits/in<sup>2</sup> and an extrapolation of this trend showed the possibility of even greater potential in this direction. Connolly explained that even a current Betamax machine can achieve a 64.516 megabit/in<sup>2</sup> performance at an SNR ratio of 20 dB, a level adequate for digital signal recovery.

In view of all this, Connolly said that digital VTRs of the future should wait for a full assessment of user needs and a standard format that would satisfy these.

Mike Negri (NBC) gave a status report on the 1500 digital VTR questionnaires that had been circulated in the broadcast industry and said the committee was pleased with the high rate of response (21%) to date. They expected many more to come back, and had not yet analyzed the available data. He did indicate that the proposals for a digital VTR seem to lean toward an all feature ultimate machine with everything on it.

Mike Fisher of ABC discussed the problem of controlling broadcast hardware with digital equipment and the need for a uniform code in this area. He expressed the hope for a new era of system engineering where any two digital black boxes can "talk" to each other. He also expects that

fiber optics will be a major means of sending digital video signals, and he suggested that manufacturers of such equipment should deliver the original signal distortions faithfully and not add any new ones.

In summing up his attitude about digital video equipment, Fisher agreed that some distortion during picture manipulation was acceptable, and he gave three elements by which a digital system could be evaluated for applicability:

Will it change the look of the program in a positive way?

Will it increase reliability of the operation?

Will it be economically viable by reducing costs?

Henry Thedick (PBS) started his presentation by stating that bit rate reduction schemes can lead to more programs going through satellite transponders. His organization is investigating various forms of PCM to satisfy three different quality levels of program transmission. These three levels were categorized as top quality of entertainment programs, median quality for educational programs, and limited quality of teleconferencing.

He pointed out that a transponder handling 60 megabits can handle one video channel with excellent quality, at 30 megabits it can handle two programs, and by using alternate field transmissions and interpolated reconstruction at the receiving end, could handle four programs simultaneously.

The workshop also generated a healthy dialogue between the audience and the panelists. Davies responded to a question on the application of current vertical interval test signals to digital television operations by saying that they would have little value. He expects that a new set of test signals will be developed both for static and dynamic measurements. The BBC's current practice is to look for lost bits during maintenance testing, while picture quality is assessed subjectively.

Hopkins fielded a question on the time scale for digital VTRs with the cautious prediction that they were three to five years away and that digital cameras will come after the DVRs are established.

Blair Benson then gave some of the pros and cons relating to the desirability of a digital VTR. First, he felt that DVRs would have to be cost effective to compete with the current Type C machines, which, he said, are now very good down to many generations. He also noted some of the problems of studio maintenance of new and unfamiliar digital technology and wondered about the cost of that.

Hans Groll (Bosch Fernseh) questioned the advisability of a world digital standard by pointing out that there was no practical example of a common 50 and 60 Hz standard. With tongue in cheek, he suggested the world move to a 55 Hz power frequency. Groll stated that the Europeans had no choice but to go to a component coding digital TV system to accommodate

the French TV standards and create a common bridge between PAL and SECAM countries. He did not see this as mandatory for the NTSC standard.

Hopkins replied that the committee was looking for compatibility in digital standards, and that even agreeing on the same number of samples per line would help VTRs working on both standards. He felt that this compatibility would help in the manufacture of hardware that meets both needs.

Davies pointed out that there will be a transitional phase between analog and digital television which will require the mixing of component and composite coding, undesirable as that may be. Reality will dictate this in order to interface with the current composite world.

Fred Remley (University of Michigan) asked about the maintenance problems of digital equipment and Mike Fisher suggested that technicians trained in computer maintenance could be used, as they are familiar with this technology. Thedick added his comment that digital gear is generally easier to fix than analog, so that might not be such a problem.

Blair Benson closed the workshop with the hope that future digital gear will be more reliable, will provide a reduced operating cost and may even have a lower initial acquisition cost as that equipment goes the same direction that computers did.

#### *The Teletext Workshops*

Two separate workshops on teletext were held, the first relating to management's view of this subject and the second incorporating technical progress and a status report on EIA committee activity in the field of teletext standardization. The engineering session also included an update on multichannel television sound and closed captioning for the hearing-impaired, now being provided by PBS, ABC, and NBC.

The management workshop was chaired by Tom Miller of CBS and included presentations by William Putnam of Springfield Television Corp., William Loveless of KSL-TV and Hartford Gunn of KCET-TV.

Putnam opened the session with some general remarks after which Loveless described the teletext system in operation at his station in Salt Lake City. His major message was that teletext could be made into a revenue generating service by the commercial broadcaster who used it wisely.

Loveless also showed some comparison graphics of the various teletext systems now under study by the EIA teletext committee and gave some cost projections.

Miller then reviewed the extensive field trials that have been conducted at KMOX-TV in St. Louis including UHF transmitter tests and satellite transmissions of program and teletext combined signals. He said that his network was investigating problems

that might be encountered by teletext transmission. Gunn then gave a detailed update on the closed captioning work going on at PBS, ABC and NBC. He described the difference between open captions which are added to a television program and are seen by the entire audience and closed captions which are visible only to viewers with a line 21 decoder. The latter, according to Gunn, is preferable because it does not disturb those in the audience without a hearing impairment.

Gunn also pointed out that a teletext system could provide captioning and a lot more visual information for the general public, including the hearing impaired.

In the realm of what kind of service teletext should provide to viewers Gunn said that both KCET-TV in Los Angeles and WETA in Washington would be conducting experiments to determine consumer requirements.

The question and answer session explored the dilemma faced by broadcasters as to how much a teletext service might cost them and if it would compete with on-air commercial time.

Putnam pointed out that there may actually be two markets for data transmission by a TV station.

He defined these as a large market for a small amount of data and a small market for a large amount of data. As to who provides this information, it could be an outside Information Provider who buys access to a number of pages that cater to specific clients.

It was evident from the exchange between the audience and the panelists that broadcasters have a genuine concern as to how teletext might affect them, if a standard is adopted and a public service is implemented.

An Australian delegate, Darryl Drake of ATN-7 in Sydney, where teletext is in operation at present, gave a short report on the positive use of teletext at his station by sponsors who want to buy pages to support their regular advertising.

#### *Ancillary Signals Workshop*

The Engineering Workshop on Teletext and multichannel sound also had a good representative panel covering the television industry. These included Robert O'Connor (CBS) as chairman of the session and panel members Carl Eilers (Zenith), Tom Keller (WGBH), Kevin Hamburger (ABC), and Gregory Harper (consultant).

O'Connor led off with a detailed report on the EIA teletext committee, which he chaired. He covered the KMOX field trials, which he said proved teletext signals were reliable in primary and secondary service areas, and he described the KCET experiment on early vertical interval line visibility which involved the viewing public in Los Angeles.

O'Connor stated that all of the teletext systems under review by his committee had much in common, but there were basic differences that continue to exist and that the parent committee and its task forces were working diligently to provide the FCC with a set of recommendations.

Keller then reported on the multichannel Television Sound Committee which he heads. Although they have worked for 18 months on a report, there have been many delays.

Three systems are undergoing tests: the EIAJ proposal from Japan, the Telesonics and the Zenith system. The primary requirement for any system is compatibility with the present monophonic audio system on U.S. television.

Keller described each system showing the EIAJ approach using three subcarriers for separate sound channels, and the Telesonics as also planning three audio channels with Dolby Labs Type B noise reduction and a pilot carrier. The Zenith system proposes five audio channels with the extra ones used for remote control and ENG intercom purposes.

The tests of these systems are being conducted at WTTG in Chicago and the Quasar facility in that area. Tests are expected to be completed in the summer and a final report submitted to the FCC by November or December of 1980.

Kevin Hamburger of ABC reviewed the network's activities in the field of closed captioning. ABC started captioning experiments in 1971.

Greg Harper, a consultant in the teletext field, provided a review of the current status of teletext in England, France, Canada, and the U.S.

#### *Post Production Workshop*

Chaired by Chris Cookson, Director of Engineering for Golden West Broadcasters, this session had panelists from different segments of the television industry. From the networks, ABC had Mike Fisher and CBS had William Nicholls, for independent program producers there was Emery Cohen of Compact Video and from the manufacturers' side there was Joe Roizen of Telegen.

Each of the panelists gave a short review of his area of interest. Nicholls discussed CBS's recently developed off line editing system using modified Betamax VTRs. Cohen suggested that film or tape should be used where each fits the program needs best, and in many cases film is still the preferable medium.

Fisher talked about ABC's increasing use of digital effects, one-inch editing systems and fiber optic television links. He gave some examples of the coverage at the Lake Placid Winter Games and how some of the new equipment fitted in.

Roizen proposed that distributive processing was the efficient way to go in post production editing, and that the question of "off line" versus "on line" may need re-examination in light of the capabilities of the one-inch VTRs. He cited some examples of cost effective operations with new editing facilities where distributive processing techniques are employed.

It was evident by the end of the session that there are a number of different views about the future direction of post production and that only extensive use of various conceptual systems, and subsequent comparison of the productivity of each, will answer the question of which is the more efficient or more creative.

— Joseph Roizen