

A Report on NAB '84

By Joseph Roizen and Barry Detwiler



Direct broadcast satellite (DBS) equipment displayed outside the Convention Center.

The world's largest display of broadcast equipment, the National Association of Broadcasters (NAB) 62nd Annual Convention, was held at Las Vegas, Nev., April 29 - May 2, 1984. The exhibit contained the products of more than 500 companies. SMPTE technical meetings were held both during and after the convention.

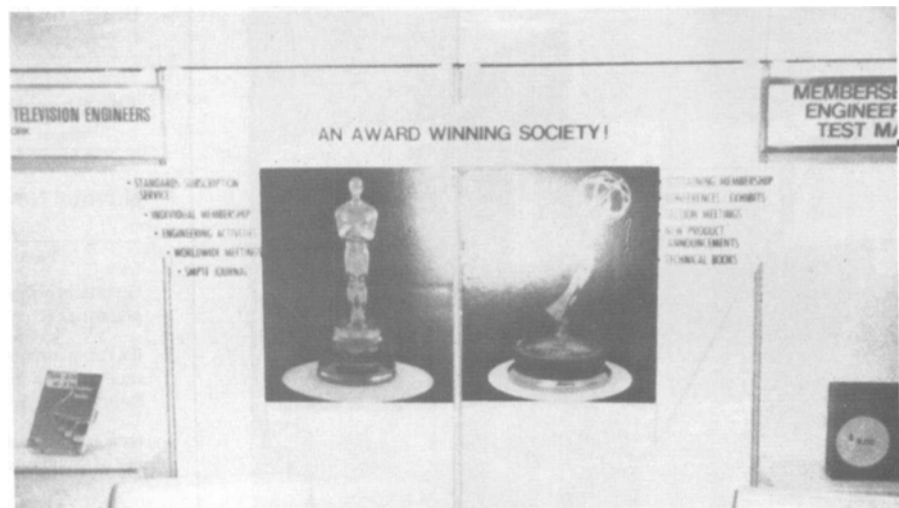
According to the NAB, attendance was estimated at 35,000. Approximately ten percent of the attendees came from outside of North America. The combination convention and broadcast engineering conference was opened April 29 at the Las Vegas Hilton and Convention Center. NAB President Edward Fritts delivered the keynote address, in keeping with the 1984 convention theme, "You've Got What It Takes." A multi-media presentation by TM Communications of Dallas followed, including a filmed address by President Reagan.

There is just one word that describes this year's NAB convention, and that is, "spectacular." From the sensational performance of the RCA CCD prototype at their technology suite in the Riviera Hotel, to the 15-screen spectacular TV show put on by Sony in their show-floor theater, and a dozen other equally spectacular advances in allied fields, it was a very successful convention.

Inside the East Hall of the Convention Center, one saw wall-to-wall delegates striving to absorb the technical details of new products from 640 exhibitors filling an exhibit space of 300,000 ft². The technical sessions were said to be a cut above normal, with good attendance for topics such as Multi-Channel TV Sound, Teletext, and HDTV. A 651-page *Proceedings* publication was needed to cover all of the technical papers given; and in the words of Tom Keller, senior vice-president of science and technology for the NAB, "The new ideas and

technology presented here are blueprints of our future; a how-to manual of success."

The SMPTE booth at NAB was well attended. Members from around the world visited the booth, which was hosted by Lynette Robinson, Executive Director; Alex Alden, Manager of Engineering; Peg Caggiano, International Standards Coordinator; and Barry Detwiler, Television Engineer. Dorothy Smith, Exhibits and Advertising Manager, met with current and future exhibitors and discussed the upcoming SMPTE Technical Confer-



The SMPTE booth featured blowups of the Oscar and Emmy awards won by the Society.

ence, to be held in New York, October 28-November 2, 1984. The SMPTE booth featured enlarged photographs of the Society's Oscar and Emmy Awards.

SMPTE introduced a new book at NAB entitled *Television Image Quality*, confirming the fact that television technology continues to grow and mature rapidly, with each year bringing forth new developments in image quality. Improved and enhanced NTSC, as well as compatible HDTV, are among the topics covered in the papers from the Montreal TV conference found in this book.

NAB Engineering Program

Engineering programs included two sessions on multichannel and stereo TV sound. Earlier this year, the FCC endorsed a transmission system developed jointly by Zenith and dbx, Inc., which was selected by the Electronics Industries Association (EIA) task force after having tested several other stereo TV systems. Excerpts from the multichannel sound committee report of the EIA were presented by Thomas B. Keller, senior vice-president of technology for the NAB broadcasting group. Leslie Tyler of dbx, Inc., and Carl Eilers, manager of electronics research and development for Zenith, explained the technology of the recently approved system.

SMPTE Engineering Meetings

SMPTE engineering meetings held at the Las Vegas Hilton and Convention Center included the following:

Working Group on Digital TV Standards, chaired by Stan Baron; Ad Hoc Group on VTR Control Messages, Ted Staros; Ad Hoc Group on ATR Control Messages, Karl Trissl; Subcommittee on Digital Control, Tom Meyer; Working Group on Digital TV Tape Recording, Frederick Remley; Study Group on Station Automation, John Schultz; Study Group on Camera/Recording Interface, John Streets; Working Group on Component Analog Video Standards, Merrill Weiss; Subgroup on Edit Procedures, Robert Lund; Joint Working Groups on Digital TV and Component Analog Video Standards, and Working Group on Component Analog Video Standards, Stan Baron and Merrill Weiss.

Equipment Exhibit

This year's equipment exhibit was the largest so far. It covered seven

acres of exhibit space, including the parking lot of the Las Vegas Convention Center and expanding into meeting rooms of the adjacent Hilton Hotel. NAB is considered the world's largest television equipment exhibit, with many booths occupied by Japanese, British, German, and French manufacturers.

Progress in HDTV was described in papers presented by Dr. Sugimoto of NHK and J.B. Seweter of Britain's Independent Broadcast Authority (IBA). Peter Rainger, of the British Broadcasting Corp. (BBC), summarized recent studies in HDTV from the European Broadcast Union (EBU).

New Technology

What was most significant about this year's NAB meeting was not so much the parade of new technology, as much of it had been seen before in prototype form, but in the availability of this equipment for practical image origination or image processing use. RCA, Sony, and Philips had suites to display the new CCD camera, the 19mm digital VTR, and the Extended MAC system, respectively. In each case, the new equipment may greatly alter the way TV programs are produced and handled on the air. This should result in improved ease of operation and picture quality.

While NAB is primarily a domestic show, there was no shortage of prominent international visitors from the major networks abroad. Delegations from national TV services in Britain, France, Holland, Belgium, South Africa, and many other PAL and SECAM countries, were anxious to learn how the new emerging NTSC technologies would be applied to their color TV standard, and most important, how soon. Many expressed hope that 625 line/50 field versions of the new equipment on display would be shown at the IBC show in Brighton next September.

Picture Origination

The show-floor demonstration of the CCD-1 consisted of a pair of cameras mounted together, one being the CCD-1 and the other a Sony ENG unit with Saticon™ tubes. The demonstration graphically illustrated the superior low light sensitivity and the incredible high light immunity of the CCD-1. Overall camera performance

was very good, but the complete absence of comet-tailing, field-to-field residuals, specular overshoots, or low light level noise, made this the obvious choice ENG camera of the future. The CCD-1 weighs 6 lb less than the Hawkeye camera, but is about the same physical size, and can be coupled with a VTR to form a CamCorder.

If the CCD-1 performance was spectacular, the prototype EFP version RCA showed at the Riviera Hotel was even more so. Disguised in a rather "boxy" enclosure that gave the camera an early developmental look, this camera did something that every TV sports fan would drool over. It literally removed all image blur from fast-moving objects on a field-to-field basis.

In a well-prepared tutorial tape by Bob Hurst (manager, electronic recording equipment, broadcast systems), this phenomenal imaging improvement was succinctly explained. With a sensitivity 3.5 times that of a normal tube camera, the CCD camera could sacrifice exposure time for image sharpness. The Angenieux Co. had provided RCA with a special zoom lens that included a shuttering mechanism capable of yielding $\frac{1}{500}$ -sec exposure time. Since the CCD imaging elements have neither retentivity or lag, the image sharpness is proportional to the amount of actual movement during exposure time.

To prove the point, the RCA engineers demonstrating the system showed split-screen identical images taken with both a normal unshuttered camera and the CCD prototype. There was no comparison. A golf putt, where the golf club literally disappeared and the ball became a complete blur, came out sharp and clear on field-by-field instant replay. A running athlete crossing the finish line was indistinguishable on the normal camera instant replay, while his CCD-shuttered image allowed the insignia on his shirt to be read. A bouncing soccer ball that had become a defocused streak, clearly showed its hexagonal structural elements on the shuttered CCD camera.

The prototype CCD-camera demonstration did not stop at just showing the significant improvement of moving images. It also covered enhancements to normal images, including higher resolution produced by a half element physical offset principle in the green channel, and excellent chroma key performance for studio



View of the exhibit area.

applications. Dennis Woywood (vice-president, broadcast video systems) feels that RCA has an eight-month lead on the competition, and expects that the CCD-1 will become the target at which all other color camera manufacturers will begin to shoot, so as to emulate its astounding performance characteristics. RCA claimed in their floor show that a new era in color cameras was about to begin with the CCD-1.

Picture Handling

A major item in the picture handling area at NAB '84 was the Sony Betacart. There are, of course, other cart machines using VCR cassettes to do on-air commercial spots, but the Sony Betacart is said to integrate into a single machine the features that most broadcasters would like to have. It is about as physically compact as such a versatile device can be. Introduced with all of the "show biz" flair of a Hollywood opening, Sony used a wall of 15 large-screen color TV monitors, arranged in a 5:3 aspect ratio. A seemingly equal number of synchro-

nous 1-in. VTRs fed the 15 TV monitors with related or integrated images that flashed across the screens in a spectacular manner.

The BVC-10 Betacart machine combines computer and VTR technology to satisfy the basic needs of a TV studio in handling commercial messages and news programming. Using up to 40 Betacam cassettes in a random-access vertical holder, and four playback decks, it can be programmed to do back-to-back spots in rapid succession, or to sequence ENG program segments into a newscast.

An optical bar code, generated by a printer associated with the Betacart, identifies each cassette with all of the information needed to integrate it into the commercial break or news show. Local and remote computer terminals make it easy to set up sequences, change them at the last minute, and read out the program information for logging or billing purposes.

Four playback decks provide enough redundancy that the failure of one, or even two decks, will not put the system out of commission. In the com-

mercial-spot mode, one deck plays back the on-air spot, while the second deck is cued up for the next spot. In the ENG news mode, several decks can be playing simultaneously, with the possibility of switching and fading between decks.

Picture Editing

A whole new wave of video editing systems broke over the delegates at NAB '84. Although there were some signs of these imminent changes in a few preceding industry shows, the confluence of all of these new editing schemes at the NAB show left little doubt that video editing is taking a drastic new turn, making video editing equipment serve the same purpose as that for film.

The Montage system was, in the opinion of many, unique. It used 14 small monochrome screens, arranged in two strips of seven monitors each, to show digitized, low-resolution images derived from off-line Beta VCRs. If the manufacturer had painted sprocket holes between the monitor strips, it would appear that

film images were flitting by on the screens.

The operation of the system is understandable and eye-appealing. The images on the small screens can be sequential or selectively incremental, thus permitting fast skipping across lengthy scenes. The upper strip of seven small monitors can carry scene "A" while the lower strip carries scene "B." The large right- and left-hand controls can "slide" the two sets of images past each other until the adjacent edit point scenes are visually located. Since this is purely an off-line system, its output is a computerized readout of the edit decision list in SMPTE time-code format, or in a CMX-compatible floppy disk to drive the on-line CMX editing system.

CMX also jumped on the pictorial editing bandwagon by showing a clever prototype editor vastly different from the 3400+ it introduced at the last NAB. The new CMX editor, demonstrated by its major developer, Stan Becker, engineering manager, used an approach first shown by Asaca at Inter Bee in Tokyo in 1983.

A color monitor screen has two (or potentially more) strips of small color images, each strip representing sequential pictures from scene "A" and scene "B." The color monitor screen also has image handling commands (play, stop, preview, etc.) appearing along the edge of the monitor. Touching one of these commands initiates the action desired. The images come from a pair of Sony laser videodisk players, with instant random access to the recorded program material. Strip "A" is put into play mode and stopped at the edit point in the scene. The same is done with strip "B." Then a finger touch to the outgoing image on strip "A," and the ingoing image on strip "B" puts the scenes in sequence, and permits a full-color screen preview of that edit decision. A printer turns out the time-code edit decision list for on-line editing with the larger CMX equipment. According to Phil Arenson, president of CMX, it is simple, very understandable, easy to operate, and relatively inexpensive. It will be available before the next NAB.

Across the aisle from CMX was the Convergence booth with its latest development, the Editroid, an editing machine that combined the creative talents of Lucasfilm with Convergence. Demonstrated by Art Schneider, a veteran videotape editor

who dates back to the razor-blade era, the console looked like something out of *Star Wars*. Again, the emphasis is on film-style editing, with a large movie-type lever that shuttles the picture, and a separate computer-style screen on the right that displays pertinent editing information. In the center was a large projection-screen display of the TV image, and a smaller color monitor on the left carried the alternate image.

The "film strip" technique for video editing also showed up as a new approach to videotape editing at both the Ampex exhibit and the ISC booth, which are heavily involved in the editing of the 1984 Winter and Summer Olympics. Ampex went one step further and employed a modified videodisk player with two sets of readout optics, thus making it possible to pick up two separate image sequences from the same disk.

There were several clear messages about video editing in all of these devices on display in Las Vegas. The first is that editing by picture and sound, rather than by time-code numbers, is obviously on the upswing. The second is that off-line editing via a videodisk intermediary is becoming practical, especially since disk producers and replicators, like 3M, are offering one-day turnaround on disk delivery, at reasonable prices.

Ironically, the first video editing system, conceived and created more than a decade ago as a joint venture between CBS and Memorex (hence the CMX name), was a random-access multiple disk device using low-quality monochrome images called the CMX 600. It was said to be at least ten years ahead of its time, but the existing technology was not up to such a sophisticated approach to editing.

By contrast, present video and computer technology will easily accommodate a rapid random-access approach to computer-assisted editing, even if the human editor never deals with a time-code number directly, and makes all edit decisions on picture and sound. The sophisticated machinery in the background quietly does all of the complex editing functions quickly and cost-effectively, and turns out a finished, well-edited product.

Pictures from Computers

NAB 84 also showed an increasing trend toward digital videographics,

and a willingness on the part of both domestic and international broadcasters to invest in such systems, even at the high-entry prices they now command. Many observers agreed that these computer graphics systems looked better than ever. Coupled with companion digital still stores, they are more flexible and more useful than ever before.

When used for dedicated applications, such as weather forecasting or news stories, they are also becoming very cost-effective, and often visually spectacular. As an example of this last point, an Aurora 100 system at KPIX in San Francisco uses a pseudo 3-D topographical map of the Bay Area which changes from a sunlit daytime view to a nighttime scene, complete with flashing car lights crossing the Bay Bridge. Using two-plane animation, the daily temperature figures "grow" out of the map at the specific locations selected by the weather-caster.

In 1978, Ampex and CBS teamed up to let renowned sports artist Leroy Nieman create electronic images of the Super Bowl on the first Ampex Video Art system. At NAB '84, Ampex showed the AVA-3, a computerized graphics system that, when coupled to their Electronic Still Store, makes a viable combination for studio or post-production use.

Several other companies also demonstrated their expertise in digital technology. Aurora Systems and Quantel each have many working systems around the television world, while Dubner, Thomson-CSF, Bosch Fernseh, and Chyron offer specialized systems tailored to alphanumeric manipulation and animation.

In almost all cases, add-on software is the key to expanding the capabilities of these systems, and many of the digital videographics systems at NAB '84 displayed software enhancements over last year's counterparts. As with other products, the most advanced digital videographic devices were being shown in hotel suites to selected visitors.

Aurora's president and founder, Dick Shoup, who was awarded an Emmy in 1983 for his pioneering work in computerized video (while with Xerox), spent much of his NAB time at Aurora's suite in the Flamingo Hilton showing new developments on the basic Aurora 100 System, while gathering user feedback on what a future system should offer. The new



An overall view of the exhibit floor.

features included perspective image positioning by the artist, achieved easily by the selection of a simple viewing angle on the menu monitor.

MCI/Quantel used its suite at the Hilton to show off their latest development, code-named "Henry." Henry is a mass memory that can store several minutes of real-time video, with quick access to individual frames or sequences. When Henry is coupled to their Paint Box art/graphics/animation, it becomes a means of creating short animated sequences. Quantel referred to this system as a prototype of an electronic animation stand, and solicited potential user suggestions on how to best configure it.

Picture Peripherals

NAB '84 will also be remembered as the first show at which teletext was being utilized by at least three networks (CBS, NBC, Westinghouse) and a few independents. While two competing teletext systems (NABTS and World Teletext) were on display in adjacent booths on the Concourse, the major interest shown by most broadcasters was in the EIA-recommended NABTS system.

NABTS was being fully demonstrated in two separate booths, and on Panasonic teletext receivers around the Convention Center. The VSA booth, which was part of the Thomson-CSF exhibit, had a frame-creation terminal alternately staffed by CBS and NBC graphic artists who produced NAB-oriented pages for on-

air transmission. Using the alpha-geometric level of NABTS, these teletext pages had high-resolution graphics, a wide array of colors, and well-defined sponsors' logos.

The main thrust of the NABTS demonstrations was the cross-compatibility of that transmission standard with both the videotex NAPLPS standard and with the widespread ASCII-II protocol used on microcomputers. A display at the Telediffusion de France (TDF) booth coupled signals from three different sources representing the three forms mentioned above. After insertion into a common VBI, and transmission on a single channel, the signals were then decoded into three separate display devices, an NABTS receiver, an Antiope receiver, and a micro terminal, each displaying the different data dedicated to them individually.

NABTS is currently being transmitted by both CBS and NBC over most of their networks, thus reaching hundreds of affiliates all across the country. Albert Crane, III, vice-president for teletext services at CBS, announced the addition of two more affiliates that are broadcasting both network and local Extravision teletext services in Charlotte, N.C., and Buffalo, N.Y. Barbara Watson, general manager, NBC Teletext, also stated at NAB, that her network had signed up the first commercial client for teletext ads, and that NBC affiliates interested in teletext services now had access to a wide variety of origination

equipment supplied by VSA, Norpak, AT&T, VG Electronics, and others. On the home receiver front, Quasar, Panasonic, Sony, and Hitachi have announced set-top or integrated decoders.

World Teletext, supported by Taft Broadcasting and operating in Cincinnati, announced that it has arranged with Metromedia in Los Angeles to provide a teletext service related to the Olympic Games. Zenith and Sanyo are producing World Teletext decoders to supply teletext sets for the Los Angeles operation, and Zenith has already provided set-top decoders for the Cincinnati service. The World Teletext booth also showed upgraded teletext services made possible by electronic enhancements of the basic system, i.e., higher resolution graphics, expanded character sets, etc. However, present World Teletext services are in alpha-mosaic, and produce coarser graphics.

Conclusion

Booth traffic at NAB was brisk, indicating that delegates obviously had high interest in the products shown. This situation is likely to continue until the next NAB convention.

In summation, it was a great NAB convention. Once inside the Convention Center or the technology suites, the delegates had access to an array of new hardware that will make future program production and on-air broadcasting better and easier.