

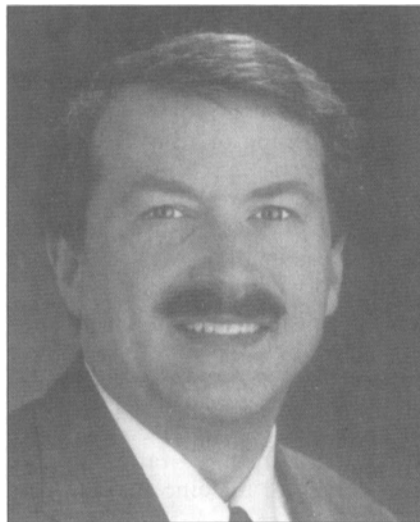
## Television — A New Era

### Robert P. Seidel

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The beginning of a new era in television broadcasting dawned on December 24, 1996, when the FCC issued the technical standard for digital television and high-definition television (HDTV) after a waiting period of over nine years. The FCC rules mandate the 8-VSB modulation, up to six channels of AC-3 surround sound audio, and the data transport protocol. However, the video display will remain a private sector standard. While not mandated, the 18 formats recommended to the FCC by its own advisory group, the ASTC, are being implemented by all major receiver manufacturers. Though the receivers will decode all 18 formats, many will transcode in memory to their native display format of 1080 lines (interlaced) by 1920 pixels per line to avoid the costly expense of a multiscan monitor.

The starting gun was heard for the DTV conversion when the FCC issued the final table of channel assignments on April 3, 1997. The overarching goal of the FCC was to insure the continuation of free over-the-air television for the general public. In order to speed up the transition, the FCC mandated that the four major networks (ABC, NBC, CBS, and FOX) have their top ten markets on the air with DTV no later than May 1, 1999. Six months later, the 11th through 30th markets of the same four networks must be on the air. A number of broadcasters pledged voluntarily to be on the air by November 1, 1998, seven months ahead of the FCC schedule. The end date for the NTSC service, 2006, is viewed by many as a political expedient with little hope of reaching the 85% penetration levels necessary for the government to reclaim the



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NTSC spectrum. While this may at first seem beyond the realm of reason, the rate of technological change is accelerating. One out of every five Americans replace their TV receiver each year, and who could have predicted that in just three short years after the introduction of the CD the record industry would stop pressing vinyl.

#### 1997 Industry Marks

The year was punctuated by a number of milestones. CBS announced that it would use 1080 x 1920 for its HDTV broadcasts at its affiliates' meeting in January. This was followed by WCBS-HD becoming the first station in New York City to broadcast DTV. The CBS HDTV97 open house at the New York Broadcast Center featured live over-the-air transmissions from the Empire State Building on Channel 33.

The first HDTV transmission of a major league baseball game occurred on September 16, 1997, at the

Baltimore Orioles vs. Cleveland Indians game at Camden Yards. The contest, sponsored by Harris Corp., was broadcast on WHD, the model station, and WETA, and viewed at the Washington Press Club. This demonstration was noteworthy because it combined a number of digital HD systems including ENG, SNG, mobile production units, satellite systems, studios, master control, and transmitters.

The American television industry also took its new digital television system on the road with live over-the-air transmissions from Montreux, Switzerland; Mexico City; Beijing, China; Sydney, Australia; and Las Vegas, for the 1997 NAB. The NAB transmission from KLAS-HD was viewed on a 16 x 9 ft screen with six channels of Dolby AC-3 surround sound. When the picture and sound were not fully occupying the channel, opportunistic data was being multiplexed into the data stream.

#### Cable Network News

The cable industry also made significant announcements of its own. HBO reported that it would be initiating an HDTV east and west coast service by mid-1998. This was followed by service announcements by The Discovery Channel, The Rainbow Network, and MSG. Ted Tuner proclaimed that the cable industry was going HDTV to prevent broadcasters from mounting a multichannel service, thereby forcing the broadcast industry into HDTV in order to remain competitive.

When ABC and Sinclair Communications suggested their companies would be doing multichannel SDTV broadcasting, they found themselves facing a congressional hearing on why they were not going to use their newly assigned channel for HDTV. The senators made it perfectly clear that

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unless the broadcasters transmitted HDTV, they could expect to pay huge user fees for the DTV channels that would be equivalent in value to what the channels would have brought at auction. To paraphrase Carl Sagan, this could mean "billions and billions of dollars" of additional expense to the broadcaster, dwarfing the capital conversion costs.

### **HDTV Equipment Already Available**

On the HDTV program supply side of the equation, the production process of acquiring primetime programs on 35mm film will require little modification. The technology needed to transfer all of the subtleties of film to HDTV tape is available today. The Philips Datacine, with its 2000 x 2000 pixel resolution, has taken the film transfer and post-production industry by storm since its introduction. However, the HDTV tape formats that can record the full 1.5 Gbit/sec SMPTE studio standard remains expensive and elusive. The Sony HDD-1000 is only available by special order, while the D-6 has not received wide market acceptance. This year saw the introduction of the Panasonic D-5 machine with an outboard HD processor that does 5:1 compression of the 1.5 Gbit/sec signal prior to recording on tape. This was followed by the Panasonic AJ-HD2000 with an integral HD processor. Sony introduced their HDCAM portable camcorder which records at 140 Mbytes/sec using 3:1:1 compression. It does not reproduce the full 30 MHz of the SMPTE studio standard, but it still achieves impressive results.

In an effort to bring clarity to the HDTV production and post-production requirements for primetime program delivery, CBS issued their HDTV program delivery specification. As a result of their CBS Studio Center HDTV/35mm/Super 16mm/16mm film tests, the specification recommended that to ensure HDTV syndication value, the original program should

be acquired on 35mm film and that D-5 tape was to be delivered to CBS for program playback.

For news acquisition, the 525 digital tape format selection process began to sort itself out with Panasonic DVCPRO being selected by NBC and CBS owned stations. Stations included Raycom Media, The Ackerly Group, Sinclair Communications, Ziff Davis, Tribune, Fox Sports, Time Warner Cable, Jefferson Pilot Communications, Benedek Broadcasting, Pappas Broadcasting, Shockley Communications, Televisa and TV Azteca (Mexico), CBC (Canada), and the BBC, ITN, and Reuters (U.K.). On the Sony side, SX was selected by CNN, Tribune, Gannett, and Belo. Both vendors claim that their format provides a migration path to HDTV. For example, the DVCPRO-HD studio VTR will playback all of the DVCPRO family of formats: DVCPRO and DVCPRO-50 (4:2:2 -50 Mbytes/sec).

This concept of a migration path to HDTV is extremely important if we expect to control the conversion costs during the transition. The cost premium for an HDTV studio camera is about 15 to 20% more than a standard digital 525 camera. However, don't be fooled by manufacturers' claims that by just changing the optical block and the CCD's sensors to widescreen (16:9) you can make your facility HDTV-ready. A component digital camera with a 601 output when recorded on tape with its 13.5-MHz sampling rate will produce only 37% the resolution of true 1080 x 1920 HDTV.

### **Conclusion**

As the year drew to a close, the race to re-invent our industry had just begun. At the January 1998 Consumer Electronics Show, no less than 12 manufacturers will be displaying digital HDTV receivers with direct view CRTs, rear screen projection, front screen projection, and 4-in. deep flat panel displays that you hang on your wall. Lucent/Mitsubishi announced

that their single-chip DTV solution (AV8100) that contains an 8-VSB demodulator, MPEG-2 video decoder that decodes all 18 formats, and AC-3 audio decoder will start commercial sampling early in 1998 with volume production starting in the second quarter of 1998.

Any technological revolution is always preceded by years of evolutionary steps. I applaud the SMPTE and ATSC committees that have worked so diligently to develop the production, distribution, and transmission standards that have made the DTV revolution in television technology possible. For the first time in the history of our industry, we will be able to bring the cinema experience into millions of homes. We have been described as the toolmakers of the entertainment industry. We need to be able to provide the same level of production flexibility and reliability as we do today with digital 525. It is time to re-double our efforts in the conversion to HDTV. Here is my wish list for next year — an affordable full bandwidth recorder, portable ENG camcorder, full bandwidth routers and production switcher, 1.5 Gbit/sec digital distribution amplifier (optical and electrical), optical to electrical converters, 1.5 Gbit/sec color correctors, frame sync, HDTV still store and character generator, and fiber optics patch bays. On the standards side, a satellite distribution standard, an in-plant captioning standard, an in-plant data standard for content advisory, and Local Station Identification Inserted Automatically, an in-plant (middle) and audio compression standard for routing six channels of audio.

Those in our industry who want to believe that program producers, commercial advertisers, and consumers will not demand the highest quality possible are taking a "bet the business" gamble. The meaning of "broadcast quality" and 35mm cinema are converging at last.