

## Television

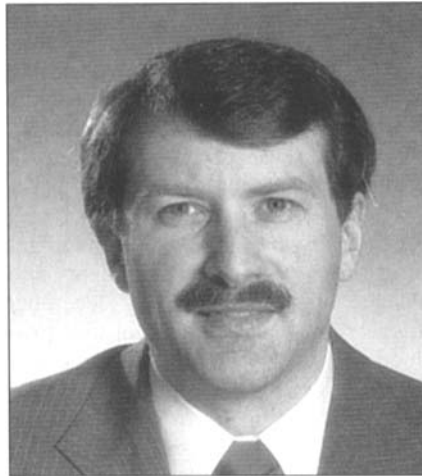
### Robert P. Seidel

#### Editorial Director, Television

Nineteen hundred ninety-eight was a milestone year for the television broadcast, and production community as it began the transition to DTV. The Consumer Electronics show kicked off the year with prototype receivers being displayed by almost every manufacturer. Temporary broadcast facilities were set up by ABC, CBS, and PBS to provide receiver manufacturers with actual HDTV broadcast signals. Many observers indicated that they were disappointed that the manufacturing community had not progressed further in DTV receiver development. However, the manufacturers assured their detractors they would have product available for the 1998 holiday season.

By February, the International Broadcast Center in Nagano, Japan, was in full swing. The 525-line section of the center had been designed as a complete 601 component digital system. The host broadcaster, NHK, took on the monumental task of broadcasting the entire Nagano games in HDTV. They employed well over 300 HD cameras in covering the event and were able to overcome fiber and microwave conductivity hurdles that would have seemed Olympian the year before. CBS utilized 45 Mbit/sec 4:2:2 compression to backhaul the NTSC signal to the U.S. where it was decompressed to baseband audio and video for commercial integration.

No sooner was the Olympics over than everyone was focused on NAB 1998. One did not have to walk far in the exhibit area to realize that HDTV had transitioned from the wings to center stage. Almost every manufacturer was displaying some form of HD-related equipment. The 1.5 Gbit/sec SMPTE 292 routers, that were considered to be cost-prohibitive and technologically impractical, pro-



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liferated on the scene. The NVision 1.5 Gbit/sec, 128 x 128 router took the prize for the largest matrix in the least amount of space. Snell and Wilcox, Grass Valley, Artel/Utah Scientific, Panasonic, ProBell, and Sony exhibited the new generation of HDTV master control switchers. Most of these products were designed to meet the modest start-up requirements of a local HDTV station or transfer facility. However, Sony exhibited their HD-7000 production switcher that includes 3 mix effects buses, 30 inputs, and 2 DVE channels. The feature set of the switcher matches most of our present-day equipment requirements and is more than adequate for a first class HD production. The price and availability of these "relatively" low-cost routers and switchers seemed to end many of the discussions regarding mezzanine compression formats for internal plant routing and distribution.

In general, equipment manufacturers have responded to the needs of the broadcast industry for DTV equipment with comprehensive product offerings including encoders, cameras, recorders, switchers, DVE character generators, logo inserters, frame synchronizers, upconverters, downcon-

verters, transmitters, antennas, STL/TSL links, and a wide variety of "glue" products. Thus, most of the building blocks needed for construction of practical DTV systems are now available from multiple sources. Although quantities are limited and there is still a premium on equipment prices relative to SDTV, the situation is improving rapidly as manufacturers increase production and more suppliers come into the market.

With the advent of DTV, a great deal of attention has been focused on "future proofing" investments in plant and equipment for eventual conversion to HDTV. In this regard some of the router manufacturers have provided a migration path for the router from SDTV to HDTV by simple component replacement for portions of the router.

In early spring, many stations began tower modification and construction projects for DTV. The predicted shortage of available tower crews proved inaccurate, as many stations were able to complete the necessary strengthening and tower erection process by the voluntary airdate of November 1, 1998.

During the summer, the ATTC completed their measurements on the "Evaluation of DTV taboo channel interference into NTSC under strong signal conditions." In general, this report, based on laboratory simulations, predicts that existing NTSC receivers may overload in cases where relatively low-power DTV stations increase their power to 1 MW and employ beam tilt to minimize interference and maximize inner city receivability. This result is in direct conflict with the FCC's Report and Order regarding beam tilt to control interference. Stay tuned for further developments on this issue.

In voluntary compliance with FCC requirements, the CBS network commenced broadcasting of the Content Advisory Signal in early summer and

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was followed by the ABC network shortly thereafter. This system enables home viewers to block display of programs in accordance with rating codes embedded in the EIA-608 data on line 21, field 2. Some receiver manufacturers have introduced new TV sets that support this functionality. However, at least two companies, Parental Guide and V-gis, have built standalone units for use with existing receivers to implement the blocking function. Local stations, other broadcast networks, cable, and direct broadcast satellite services are also instituting this public service.

The original target of November 1 was for 21 stations to voluntarily go on the air early in support of the receiver manufacturers' holiday selling season. I am happy to report that over 42 stations voluntarily went on the air by the end of the year. These numbers demonstrate the commitment of the broadcast community, which has met the DTV challenge and is wholeheartedly embracing it.

On December 17, 1993, years of exhaustive research culminated in a simple telegram stating, "Success. Four flights Thursday morning. Longest fifty-seven seconds. Inform press. Home Christmas." A similar milestone occurred on October 29, 1998, when the Harris Corp. sponsored the John Glenn Space Shuttle Launch that was carried live coast-to-coast on the CBS high-definition network consisting of eight early adopter stations. Numerous individual PBS, ABC, NBC, FOX, and WB stations also carried the broadcast, which coincided with the SMPTE Fall Conference and was viewed live and via videotape at the papers sessions. HDTV pioneer, WRAL-HD in Raleigh, N.C., provided many of the pre-production and editing facilities at Cape Canaveral.

The initial program offerings from the networks included: from CBS, four NFL football games, which were also carried on the Direct TV satellite, and an episode of "Chicago Hope," photographed with a Sony HDCAM in 1080I. ABC rolled out their 720P network HDTV facility utilizing the Panasonic D-5 machine, AJ-HD2700, that is capable of both 720P and 1080I playback. The facility was operational

in time for the origination of *101 Dalmatians* on November 1 to the ABC digital network. ABC also broadcast the following series/movies in HDTV: *The Wonderful World of Disney*, *Mission Impossible*, *The Birdcage*, *Home for the Holidays*, *Forest Gump*, and *Naked Gun 33-1/3*. PBS broadcast "Chihuly Over Venice" in HDTV, "Frank Lloyd Wright" in enhanced digital, and PBS Online's "digital TV website." PBS will broadcast "Jessye Norman—Home for the Holidays" in HDTV and will showcase at least one HDTV program in prime time each month.

How well are the receivers being accepted by the public? One manufacturer has reported that shipments and sales as of the beginning of December are at the 10,000 unit level and production is sold out for the remainder of the year. Demand for DTV receivers has been strong due to the promotional efforts of the receiver manufacturers. A wide variety of display choices in direct view and projection receivers are being offered. There are also set-top boxes, which can interface to current NTSC receivers. Major DTV product introductions and sales promotions have been coordinated with broadcasters to demonstrate the DTV system to the viewing public. In general, reaction to the new system by members of the press and the public has been extremely positive.

In the past, the television industry worldwide has wrestled with over 14 different television standards. Recent progress was made when the International Telecommunications Union re-affirmed ITU-R BT.709, "Parameter Values for Production and International Program Exchange," which specifies one common image for high-definition program exchange. Specifically, 1080 x 1920 interlace, 60 and 50 Hz.

Many negative press reports and consultants have predicted that the HDTV transition could be delayed for years if the "cable must carry issue" was not resolved. On December 8, CBS and Time Warner announced a model agreement for the retransmission of DTV on the Time Warner Systems. In essence, Time Warner will carry the entire CBS signal in its original form including HDTV at 1080 x 1920 I or P,

or an SDTV multiplex. Initially the 8-VSB signal will be placed directly on the Time Warner wide bandwidth cable systems and in the future will be re-modulated into a 256-QAM channel. Also noteworthy, Madison Square Garden has cabled its entire facility for HDTV and will be delivering all broadcasts of major sporting events in (1080I x 1920) HDTV.

As 1998 comes to a close, the upcoming Consumer Electronics Show has all the signs of being a tremendous success from the HDTV standpoint. Many manufacturers will have HDTV product in direct view CRT form, rear screen projection, front screen projection, and flat panel display available for purchase by the consumer. The 42 stations that signed on the air ahead of schedule have enabled over 26% of the American public to view HDTV. By next year at this time, well over 50% of the U.S. will have access to over-the-air HDTV broadcasts and 100% will have HDTV access through DirecTV's HBO offering utilizing the Thompson/RCA satellite receiver at a lower cost than the original NTSC version.

The television industry is at a historical crossroad, which is the culmination of years of intensive research and standardization. The industry is now in the process of transitioning from mature analog technology to a completely new digital paradigm. To successfully accomplish this task, broadcast technology is being reinvented with a new emphasis on digital data of all forms, e.g., video, audio, metadata, etc. The entire television industry including equipment manufacturers, networks, television stations, cable, production, post-production, and distribution is now caught up in the complex design challenges, format issues, marketing, and economic issues which need to be solved in order to successfully migrate to the new digital millenium.

By all accounts, 1998 has been a small step in the HDTV transition but a giant leap from analog to digital technology for the broadcast and entertainment industries. The December 1999 e-mail may well read, "HDTV is off and flying. Inform the press. Will be home for Christmas with an HDTV."