



FOURTH IN A SERIES:

More HDTV Source Material Information

After a review of last month's column I realized that, in my haste to finish, I had made a number of omissions. So I will correct those now.

The correct page numbers for the articles by Joseph Flaherty and William Schreiber were included, but the names of the articles were omitted. Flaherty's article is entitled *High Definition Television Production* (October 1988, *The Journal of the SMPTE*, pages 844-846). Schreiber's article is *Advanced Television Systems For The United States: Getting There From Here* (October 1988 *The Journal of the SMPTE*, pages 847-851).

In this column we continue our research into information available on HDTV, focusing on systems that seek to accommodate the various technical, financial and political considerations.

You will notice I use HDTV rather than HD imaging system. This is an attempt to try to define the many paths HD is taking as it evolves into an everyday tool. I say HDTV in this particular instance because the bulk of the material we will cover concerns what is conventionally known as broadcasting.

The first article we will look at — *HDTV And Today's Broadcasting World* — was written by Yozo Ono. (1)

In his article Ono says: "Video image quality is changing dramatically, and true high definition (HDTV) produces the highest quality picture possible." (1)

Ono describes the advancements and refinements that have been made to the HDTV picture to facilitate commercial applications (information and entertainment programs), something akin to the broadcasting we are familiar with but with the added virtue of the improved picture quality of HD and multi-channel digital sound.

Three Elements Of HD

In any discussion about the possibility of HD broadcasting you have to consider three distinct elements — production, transmission and display.

1. *Production* using an HD format is optimized to facilitate the best image quality through the multiple generations that most recorded material is subjected to in the post-production process.

2. *Transmission*. The standards currently being sought feature some form

of reduced transmission rate with a direct reconstitution of the signal at the receiver.

Until recently there hadn't been a widespread need for system compatibility, but that has changed. The U.S. FCC Tentative Decision (FCC 88-288) dated September 1, 1988 states that "existing service to viewers utilizing NTSC receivers must be continued irrespective of the actual manner in which ATV services are delivered; at least during a transition period. This can be accomplished either by transmitting ATV signals that can be received directly by an NTSC receiver or by simulcasting NTSC and incompatible ATV signals in separate channels." (2)

Towards this goal, and keeping with the FCC decision, the NAB and AMST (the Association of Maximum Service Telecasters) have asked NHK to conduct tests to arrive at a terrestrial broadcast system.

It should be noted that Direct Broadcast Satellite (DBS) was the transmission medium of choice when HD first became a reality because it would be free of the technical, political and other constraints plaguing present systems. The inventors of HD counted on the program originators being so desirous of a single, worldwide standard that they would forego any strictly nationalistic concerns.

They couldn't have been more wrong.

The reasons for this are clearly illustrated in Joseph Flaherty's article *High Definition Television Production*. The U.S. and other countries eventually came to the conclusion that accepting a worldwide standard generated offshore without domestic input could put their electronics industry at risk.

3. *Display*. At this time there are a number of ways of reconstituting an encoded signal at the receive site. The main goal of decoding at the receive site is to reconstruct the HD signal, audio as well as video, from its transmission format. This translated signal is then displayed on an HD display device in the appropriate screen size, 5x3 or 16x9. At present there are HD monitors and large format projector screens. Unfortunately, large format screens lack brightness and must be viewed in a darkened room. The eventual goal of manufacturers is to

develop a flat, large screen display, not unlike a motion picture screen.

In addition to describing the technical considerations, operating parameters and features of the systems under consideration by NHK, Ono touches upon the issues of NTSC spectrum compatibility. The systems he illustrates are Narrow MUSE, NTSC Compatible MUSE 6, and NTSC Compatible MUSE 9.

Also discussed is the viability of a new transmission standard — MUSE-E — developed by NHK that will be compatible with the 6 Mhz bandwidth of an NTSC RF channel. This will conform to the FCC's directive.

The article is lengthy and, at times, may be too technical for the casual reader. But it is thorough, precise and full of technical information on transmission standards currently undergoing testing. And a great deal of useful information in layman's terms is communicated in the conclusion.

In the June 1989 issue of the *Journal of the SMPTE* there are two companion articles that speak to the issue of HD studio production.

The first, written by Dominique Nasse and Jean Chatel, is entitled *Toward A World Studio Standard For High Definition Television*, pages 434-438. In it the writers discuss the broad range of performance parameters that would be desirable for a world standard for studio hardware and software. Their work reflects the cumulative research that has been done in HD to this date. Graphs and charts are presented to provide a sense of the current hierarchical family of signals that have been developed.

The two authors discuss the benefits and drawbacks of certain choices and the system artifacts that make one preferable to another. Picture origination, display and recording, mixing and switching, as well as studio interfaces, are discussed with the aim of arriving at a practical, transparent (for today and the future of) HD.

The article aims to lay a practical theoretical foundation for the design of system architecture for studio operation; one that would not be obsolesced by the rapid advances being made in the technology of HD.

The companion article was written by Richard J. Iredale. In *HD-PRO: A New Global High Definition Video*