

The Definition of Digital TV

NAB '98 is all about digital television. You don't have to be an industry insider to know this is a very complex and absolutely critical issue.

On the one hand, there is no doubt that digital is the way forward. On the other hand, several different, apparently incompatible digital television standards are emerging from different regions of the world.

With different digital television standards from Europe, Japan and America, has a vital opportunity to forge a single global standard been missed?

A new "standards gulf"

Broadcasters are all familiar with the "standards gulf" from the last thirty or forty years of NTSC, PAL and SECAM analogue television.

It should come as no surprise therefore that the US has chosen a system developed in America, and that Europe has adopted an essentially European system, developed by the international DVB Project.

The good news is the standards gulf no longer has anything to do with the pictures. Now, there is a single global standard for compressing digital TV pictures prior to transmission. It is MPEG-2, developed by the Moving Pictures Experts Group (MPEG).

The bad news is, the standards gulf continues in the sound coding systems, and most importantly, in the RF modulation of the MPEG-2 bitstream.

Picture Format - MPEG-2

Digital Broadcasting offers the potential for having more channels, and/or for improving the resolution of TV pictures. The MPEG-2 standard used by both the US and DVB standards supports a number of different picture formats.

MPEG-2 digital compression is used by all proposed digital TV systems to achieve an adequate throughput of the vast amounts of data required by High Definition (HDTV) or multi-channel Standard Definition (SDTV).

Beyond the pictures, the US and DVB systems use different systems for coding audio. Both audio systems offer a range of sound qualities from CD-quality stereo to full surround sound.

While current digital television plans in Europe are geared towards SDTV, and in the States towards HDTV, the important point to keep in mind is that the question of HDTV or SDTV has nothing whatsoever to do with the RF modulation, or transmission of the MPEG-2 bitstream.

There are no obstacles for broadcasters who wish to use DVB-T to carry HDTV. All of the MPEG-2 compliant formats in the US HDTV standard can be delivered by DVB.

Modulation and Transmission

Sending the signals is easy, it is receiving them which can be difficult. Broadcasting does not happen until you have both modulation and demodulation taking place, relatively error-free.

The difference between the American and DVB standards exists largely in their RF modulation technique.

The US system uses the single-carrier, 8-VSB modulation scheme.

DVB uses multiple-carrier "COFDM" modulation to provide the most rugged and flexible delivery mechanism for information available today.

The reception of digital TV signals can be difficult in dense city environments, or areas with steep hills or bodies of water.

COFDM is particularly suited to environments with co-channel interference and multiple reflections. Having multiple carriers means that when your signal encounters obstacles there is considerable "insurance" against loss of picture.

Even in the US, there is considerable interest in COFDM, especially among broadcasters who wish to deliver services to inexpensive reception equipment in dense urban areas.

When the chips are down...

The emergence of two partly compatible digital TV standards is very good news for one group within the manufacturing community - the MPEG-2 chip-makers.

The same chip-sets now becoming available for HDTV receivers in the US are equally valid for DVB. Remove the MPEG-2 SDTV decoder chips from a DVB receiver, replace them with MPEG-2 HDTV decoder chips and you have DVB HDTV.

More DVB-T-compliant COFDM chips from more manufacturers are available than for any other digital terrestrial standard, and consumer-type DVB-T receivers have already arrived on the world market.

In Europe, audiences in several countries will be enjoying digital terrestrial television before the end of the year.

And *that* says it all.

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