HDTV – World Wide DVB Standard benefits North American HDTV efforts

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The extensive work completed by the international DVB standards organization in defining how MPEG and MPEG HD are to be mapped into standard telco and transport systems has enabled broadcasters to have a well defined interface for coders and decoders.

The DVB ASI (Asynchronous Serial Interface) has proven to be a reliable and stable standard that many manufacturers and broadcasters have adopted today. This standard provides inter-operability between vendors of HDTV and ATSC codecs, and defines the interface for carrying compressed MPEG-2 signals within a facility.

The DVB organization has also standardized another important aspect, and that is the method of carrying MPEG-2 signals of any type across terrestrial telecom networks between facilities. Devices that perform this function are usually referred to as "Video Telecom Adaptors".
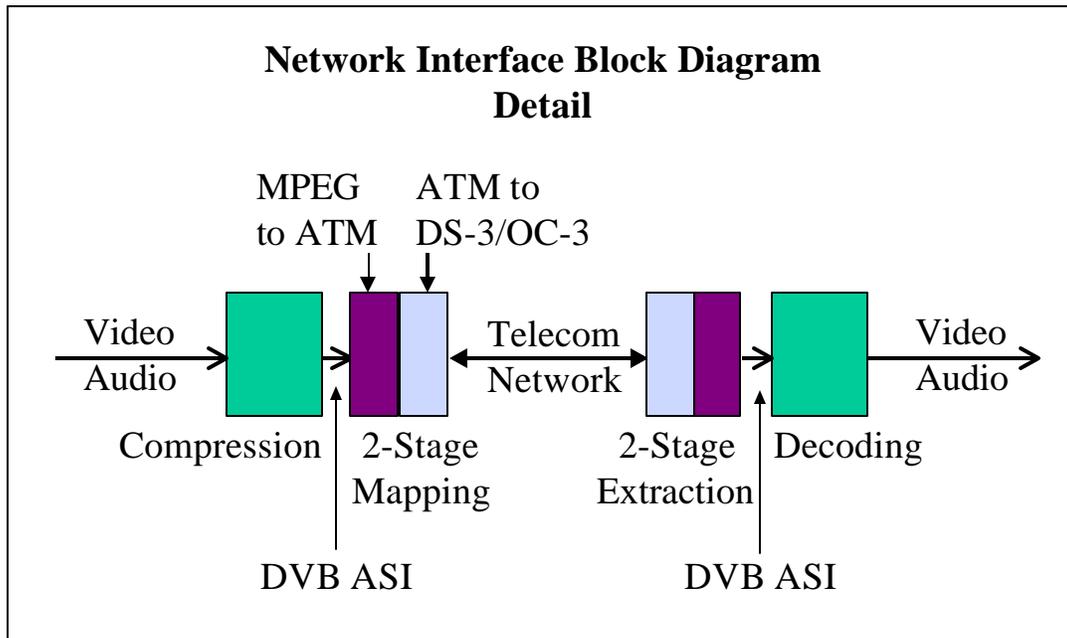
This standard is powerful in that it adopts existing standards and therefore enables cost-effective implementations and immediate interoperability between different telecom adaptors. Standard MPEG and MPEG HD into ATM mapping protocols are used to define how to take our TV programs and transport them over the Wide Area Network or on private broadband networks, while using already existing definitions of mapping ATM into E3/DS3, STM1 and OC-3, SONET and SDH and PDH networks.

It is instructive to look at how video and audio signals are put onto telephony systems. TV bitrates and standards do not exactly match up with the bitrates of telecommunications networks. Network standards include E-3 which is 34 Megabits per second (Mb/s), DS-3 at 45 Mb/s, and OC-3 / STM –1 which is 155 Mb/s. The first step is to adapt the video bit rate to telco bitrates, usually achieved through compression or bit-rate reduction, then a mapping or adaptation technique is required to put the resulting bitstream into the actual telecom interface.

Network Interface Block Diagram

| Video Audio → | Compression | Mapping | ← Telecom Network → | Extraction | Decoding | Video Audio → |
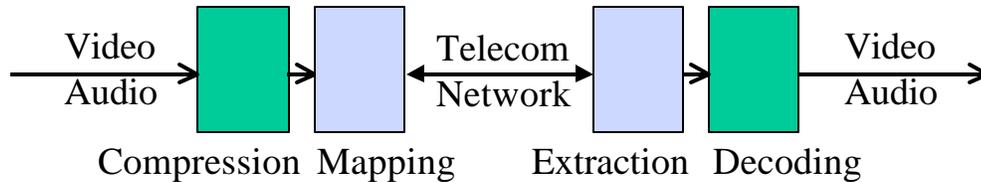
The defined standard for the compression of an HD signal comes from the work of MPEG (Motion Picture Expert Group) and the ATSC (Advanced Television Standards Committee). Mapping of MPEG-2 signals into telco standards was first standardized by the DVB, and later adopted by the ITU, ETSI and ANSI. The ITU and ATM Forum have standardized the process of mapping ATM into every Telco data standard, including T1, E1, E3, DS-3, STM 1/OC-3 and many more. The ITU has also standardized the method for adapting MPEG-2 signals to ATM. By combining those two standards, a world wide standard was defined. This simple approach to standards saves time. It also enhances the interoperability of equipment since a well defined standard will take shorter cycles to debug interoperability.

**Network Interface Block Diagram
Detail**

MPEG
to ATM

ATM to
DS-3/OC-3

Video
Audio

Telecom
Network

Video
Audio

Compression

2-Stage
Mapping

2-Stage
Extraction

Decoding

DVB ASI

DVB ASI

Broadcasters who have purchased equipment with built in network adaptation prior to this standardization work find themselves with incompatible equipment. It is not enough to take a DVB ASI MPEG-2 signal and put it in a DS-3 interface (also known as G.703). The method of mapping must comply to the DVB standard in order for it to be interoperable. Owners of those pieces of equipment which today provide a DVB ASI interface (such as encoders, MPEG servers, modulators) will find they can replace the proprietary network adapters with a standardized adapter based on ATM.

The ATM part of the DVB Telecom interface standard sometimes creates confusion. Broadcasters who look for a simple solution to carry MPEG-2 signals point-to-point across a leased DS-3 do not realize that this standard applies to them, and that ATM serves as a "middleman" even if you're not connected to an ATM network at all. However recent interoperability tests held between vendors and hosted by the Pro-MPEG Forum have helped clarify these issues. The remaining doubts may soon be dispersed when ANSI (in the T1A1 organization) formally adopts the ATM method for carrying MPEG-2 signals in DS-3 interfaces, with the support of SMPTE and the VSF.

Several manufactures today offer such DVB ASI to ATM network adapters, some even combine MPEG encoding with such adaptation. Today also you will find on the market products which combine all of these functions and others into a simplified single device. These integrated products lessen the complexity of controlling so many functions.

Check if your manufacturer or supplier of HD encoding equipment and telecom adaptation and interfacing equipment supports this world wide standard. If no mapping/adaptation method is mentioned or it does not say ATM AAL-1 and the standardized 128/124 FEC, ask for more details and for proof of interoperability.

Additional information on this subject may be found by contacting the following organizations.

DVB Digital Video Broadcasting -- www.dvb.org
SMPTE Society of Motion Picture and Television Engineers -- www.smpte.org
ATM Forum -- www.atmforum.com/
ITU International Telecommunication Union -- www.itu.int
VSF Video Services Forum -- www.vidtrans.org
ECI Telecom -- www.ecitele.com/Hi-TV/index.htm

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