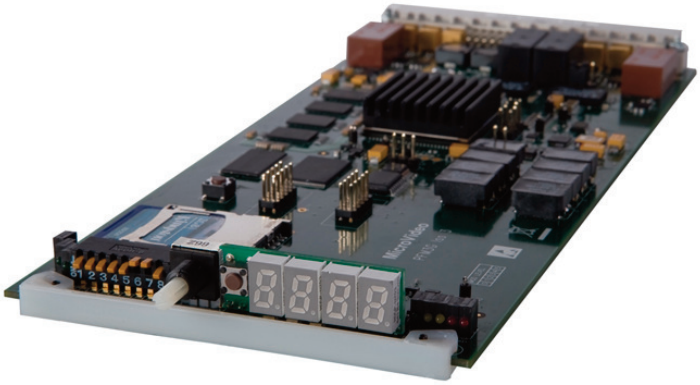
# Control Signalisation Across Continents

With the complexities and geographical spread of today's broadcast infrastructure, the need for using data in addition to transmitting video has increased exponentially.

By **Craig Lovell**
Microvideo



A simple demonstration of this is to list some of the applications where data is utilized: ad insertion, cues, subtitles or captions, WSS /AFDs (wide screen signaling or active format descriptors), V-Chip (parental controls), Teletext, Timecode, CNI codes, RS-232 data, audience monitoring signals, interactive 2nd screen services and a host of proprietary commands and information. Then there are the regional playout centres, which convert the video to their own specific format (Pal to NTSC, SD to HD, 720p to 1080i etc.) and want the captions converted to their regional format or they want to read (decode) the embedded control signals in real time and use them.

**DATA WORKFLOW**

So not only do all broadcasters use data in their everyday workflow, but as we move more and more towards centralised control rooms managing remote playout centres, so the need for managing data simply and efficiently increases. Microvideo is a recognized pioneer in this field with over 30 years of experience inserting, decoding, bridging and transcoding data for the Broadcast market.

For this article we are looking at the control signal element of this data.

**CONTROL SIGNALS**

Over the years, many control signalization methods have been employed; from the simple, ubiquitous GPI/O interface wired directly between equipment, to more complex and embedded control protocols present within baseband SDI and ASI transport streams.

How and what control protocol to use is generally down to the broadcaster. Some maintain variants of dedicated signalization; whether it be regular GPI/O interfacing or embedding such controls over existing IT networking infrastructure. Some broadcasters have now gone one step further by integrating complete facility-wide control of signalization over a 10Gb backbone.

**DIGITAL STRINGS**

A more common approach is to insert signalization or 'Cue Tones' into the SDI programme stream. Cue Tone is actually a legacy term used in analogue broadcasting where an analogue tone (the cue) is modulated into the programme feed (in the VBI space) and subsequently demodulated where required further downstream in the form of a tone. With digital broadcasting, the tone has of course been replaced by a digital data string that is inserted into a specified line in the video VANC space.

There are a number of digital transmission protocols for transmitting control information, these include Wide Screen Signalisation (WSS) user bits, Packet 31, Packet X31, SCTE104/35, plus other proprietary formats from various manufacturers. Packet 31 is a recognized SMPTE standard and takes the form of a teletext packet, so maintaining and not increasing video bandwidth.

**MULTIPLE PACKETS**

The maximum number of control signals available in the Packet 31 standard is 128 (HAM encoded with error correction), while with no error correction this can be extended to 256 control signals. In practice, most solutions offer a limited subset of control signals per packet – usually within the range of 6 to 8. However it is possible to insert multiple packets on different lines (up to four) within the VANC space if a greater number of control signals are required.

A recent example of such an application is with Viacom International Media Network [VIMN] in Singapore. Viacom has historically used analogue cue tones for commercial ad signaling applications, however with such equipment becoming obsolete they needed to look for new ad insertion technologies to meet their commercial ad detection requirements.

**X31 CONTROL**

Viacom implemented Packet X31 control signalisation as their solution for commercial ad detection. Multiple control signals for each territory are inserted into the programme material prior to being uplinked to various countries in the region. Microvideo supports and provided Viacom the solution with the HDB 300 to decode these control signals locally within each territory and hence control the regional ad signaling process.

When operating in the ASI domain, ad switching can be directly controlled by the receipt of SCTE35 commands. Control signals can be inserted by the HDB300 using the SCTE104 standard operating in the SDI domain. In addition to encoding the programme material from SDI to ASI, the downstream encoders also convert the embedded SCTE104 format to SCTE35 prior to transmission/uplink. At the receiving end, the SCTE35 commands the ad server to splice the ASI stream as required to switch between programme and ad.

The HBD 300 is capable of inserting and decoding multiple cues (simultaneously on the same card or across multiple cards) with a degree of intelligence and programmability being incorporated so that inputs and tallies can be programmed precisely to meet the various requirements of the equipment at either end (e.g., level detection, edge detection, pulse width or polarity).

**REMOTE ACCESS**

A significant number of broadcast organisations receive or send programme content from international/remote sources, whether from collaborative partners, overseas broadcast divisions or syndicated suppliers and each face the challenge of managing these remote locations without adding unnecessary costs or resource. In other words; remote transmission needs to be controlled in exactly the same way as you would if you were transmitting directly, via the same automation.

The HDB 300 puts remote transmission at your fingertips. It's like having the remote facility in the room with you.