

Audio Considerations for HDTV Migration

by David Turner

Audio Warrants Careful Consideration in your HDTV Migration Strategy

Most broadcasters are transmitting in HD or preparing to transmit in HD. The networks are providing an ever increasing inventory of HD programming and sales of HDTV sets are skyrocketing (albeit a little slower than early predictions). The HD transition implications for broadcasters and producers are significant and range from set construction and lighting details to new high definition, wide-format cameras and lenses, HD capable production and edit tools, and signal distribution as well. The scope of this video conversion is so vast that it often causes another essential part of the transition scenario to be overlooked: the audio portion of HDTV programming.

Multi-channel audio: A different workflow requires a different process

The HDTV specification includes 5.1 surround sound for audio. This finally allows the broadcast community to catch up in providing the enriched viewing experience available from home viewed DVD movies that include robust surround sound, designed for today's home theater systems. Pre-recorded programming and movies are often produced in surround sound and the broadcaster needs only to be able to distribute the content within their environment. Technologies like Dolby Laboratories' Dolby E® enable broadcasters to utilize existing stereo infrastructures to support the distribution and transmission of multi-channel audio.

However, multi-channel audio is also finding acceptance in more than pre-recorded productions. Live productions, sports coverage and even local programs are exploring use of full multi-channel audio. Sports producers are learning that creative placement of microphones and the audio mix for sports venues bring viewers right into the action. This adoption of multi-channel audio for all aspects of programming is driving the need for a new and improved audio process.

Clearly, producers or broadcasters can opt to provide traditional mono or stereo audio for many components of the broadcast stream such as station identification, effects and promos. However, broadcasters are learning that a mix of multi-channel programs with audio delivered only in mono or stereo can leave the undesirable impression of a flat or disjointed program. It is similar to the effect of jumping between widescreen program content and "banded" standard definition commercials and station announcements. As more commercial and announcement inventory moves to widescreen or HD to avoid this, audio must be given consideration also.

Some producers are not only considering microphone placement for their live productions but are also re-mixing stereo and mono components on the fly to produce a continuous multi-channel audio program. Combined with dynamic visual effects introduced with computer graphics, the days of simple static presentation of stats and scores are gone. Everything is moving—including audio. The audio for HD programming is no longer just along for the ride. It is an important and integral part of presentation.

The process to support HDTV audio need not be costly nor labor intensive, but it is different. Building a process analogous to old tape based record and playout systems (even when emulated with hard disc based systems) does not provide the flexibility and speed necessary to manage live multi-channel events.

A Robust "data-driven" architecture needed

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A Computer based systems approach is required to address these emerging issues. In fact this process was pioneered for use in radio over 15 years ago by ENCO Systems with their Digital Audio Delivery or DAD system. The radio broadcaster needed computer tools to manage multiple audio program streams, commercial inserts, voice-overs, promo announcements and jingles, often for multiple stations simultaneously. Audio elements became essentially data files in a dynamically changing playlist available across the studio network.

Similarly, efficient television production with multi-channel audio requires instant availability of audio elements in realtime from any location without time consuming special handling or conversion. Production engineers must be able to simply "drag and drop" native multi-channel audio sequences to their edit suite timeline, or load multi-channel effects to a console or other device without delay.

Rundowns or logs need to be automatically assembled into sequential playlists that are immediately available to the audio operator, but still easily modified right up until air time from any network location. Producing HDTV programming with consistent multi-channel sound means more is happening to audio during preparation for air and the old process, which was established in the days of tape, is just not fast or flexible enough. In live variety show formats it is not unusual to have band mixes, library music and sound effects being pulled across the network from several locations and mixed for both stereo and 5.1 just in time for air.

Along with the improved workflows required, it is also becoming essential for broadcasters to log every element played to air. Incorporating a powerful database driven audio backbone automates the task of generating tracking reports or ASCAP/BMI rights reporting without added overhead. Some broadcasters are implementing systems for this reason alone.

Cost, space and flexibility

The move to a data driven IT infrastructure for audio essentially separates the audio delivery, playout and management functionality, implemented in software, from device hardware, and removes dependencies on proprietary data structures or hardware components. This allows the broadcaster to realize the cost/performance benefits of the general IT marketplace. A typical master control or field production unit replacing up to 8 legacy proprietary "CART" emulating devices can be implemented in a single 1RU standard processor saving valuable rack space. And, utilization of standard PC configurations means sources are abundant and costs are low and continue to drop. The audio functionality, implemented in software, need only be purchased one time. It will only improve over time, and is not tied to specific hardware components which may be replaced independently when necessary. The separation of application functionality from proprietary components has brought staggering cost reduction to the general IT marketplace for over two decades. It is now just beginning to impact some of the special needs in broadcast. A further benefit is an open architecture that simplifies integration into and with other broadcast studio equipment such as audio consoles, video production switchers, edit controllers and other devices. And, the breadth of operator interface options available in general hardware can accommodate any special need from the control room to the edit suite.

Moving away from legacy systems mimicking a 40 year old process and into a modern data driven architecture will yield impressive benefits today and protect studio investments well into the future. The use of multi-channel surround sound is an aesthetic and technical journey that is only just beginning.