Get Ready for Next-Gen Audio

The term "sea change" has been used to describe a major transformational change, a shift from the way we've always done something before. "Sea change" then is a perfect term to describe what's happening with audio system design today.

Audio systems are being required to handle many more channels than 5.1 plus stereo. In the consumer world, Blu-ray with Dolby Atmos can support multiple channels for an immersive audio listening experience. For those who can't afford more loudspeakers to their listening room, solutions such as Yamaha Sound Bar can provide a 5.1-like sound field without the bulk. And major MSO Comcast will be supporting Dolby Atmos in its Xfinity X1 platform starting in 2016.

At the broadcast, production or origination end of the spectrum, we'll need to rethink our audio systems to accommodate the growing requirements of next-generation audio, an umbrella term Tim Carroll, Linear Acoustic founder and Telos Alliance CTO, prefers to use. This covers object-oriented audio, which can provide immersive audio, personalized audio, visual descriptions, multiple languages, headphone rendering and more.

One of the big changes is the multitude of audio channels that will be required. Instead of BNC or XLR connections, multiple channels of audio will be carried on an RJ45 connector and interconnected through an AES67-based network using computer network switches. This will obviate the need for another audio system mainstay, the crosspoint-based routing switcher. No more determining matrix configurations or what sources need to be available to what destinations. And maybe even more radical, now that most of us have gotten used to SDI where audio is carried along with the video, audio and video will need to once again go their separate—although synchronized—ways.

If you're thinking of upgrading your plant or creating new build in an AES67 network, Carroll said, "No matter what happens with audio, an [AES67 network] will be able to handle it. It will be more expensive to go SDI and SDI will probably not be able to handle it."

The audio network shouldn't be the same as that used for business computers and devices like printers, Carroll advised, but digital telephony could be carried on an audio network, and can have some advantages in tying in phone calls to an audio production system or server.

 Certain off-the-shelf network switches can be used. Carroll said that Telos has tested and certified switches that they stand behind for broadcast-grade networks. The list can be found on the Telos Alliance website.

Reliability for an audio network is key. It must run 24/7 with no signal delays. This may not be something a business IT department is used to, and must be considered when determining who will maintain and monitor the system. Education on all sides can help the transition.

The audio network will need to be synchronized with video and other technical networks, but that has been made easier with the passage of two recent SMPTE standards, ST 2059-1 "Generation and Alignment of Interface Signals to the SMPTE Epoch," and SMPTE ST 2059-2 "SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications."

These standards are based on the IEEE 1588-2008 standard for Precision Time Protocol (PTP) and written to address sync requirements for professional audio and
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video systems.

Manufacturers of master sync generators are starting to make PTP available. An example is the Evertz 5601MSG, where PTP is an option.

While it looks like over-the-air broadcast of next-gen audio will need to wait until ATSC 3.0 is completed, streaming is an option today. Broadcasters don’t necessarily have to wait before upgrading their audio systems.

“AES67 can handle multiple audio channels in a single RJ45 connection using network cable,” said Ken Tankel, platform manager, TV Processing at Linear Acoustic.

“This is much easier, more space-efficient and likely less expensive than placing multiple BNC connectors on the rear panel of a device. A user should consider what AES67 can offer. This includes audio contribution, audio monitoring, metering and the ability to control source/destination connections anywhere an IP network can reach. All of these things can be done without needing a dedicated hardware audio router. We think that there are many places to start.”

“Sea change” is a perfect term to describe what’s happening with audio system design today.

One of them is the on-air chain. For example: “Linear Acoustic has the SDI x-Node that interfaces two HD/SDI SDI I/O to 16 pairs of AES/EBU I/O. We also have separate audio processing and loudness control with AES67 I/O,” Tankel said.

Fig. 1 shows an example of how AES67 networked equipment can be incorporated in an on-air signal chain.

Production is a big area that can take advantage of AES67, not only for a simple control room/studio complex, but especially across multiple studios and control rooms, as different control surfaces, stage boxes, IP servers and audio processing can all be easily linked, as well as the on-air devices. The same could be said of mobile trucks.

While audio over IP has been in use in radio facilities for over a decade, now that AES67 has been standardized, it should see more use for audio for TV or video. Production audio console systems from such manufacturers as Lawo, Studer, and Wheatstone offer AES67 capability, and Calrec has announced AES67 support with products out in the future.

“It is an ideal time to look at the equipment and manufacturers that you want to use and find out if AES67 interfaces are all ready available or planned for,” Tankel said. “The industry is in a transition and designing with AES67 in mind will become easier, and more common, as more manufacturers choose to include it in their products. Audio consoles, intercom, audio DAUs, video editors, telephone, ISDN and IP-based audio transport, audio processors, loudness controllers and playout systems are just a few of the places that AES67 can find immediate application in the television facility.”

There could be an argument to wait a bit until AES67 becomes a feature in equipment you are interested in. And there are some things in flux. Still to be standardized are such functions as audio naming conventions, advertising and discovery, as well as carrying GPIO control, and there is ongoing work in that direction.

No matter what one chooses to do now, it’s important to start becoming familiar with AES67 and networks in general.

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