Tech Page: Easy Does It

Jun 1, 2009 12:00 PM, By Scott Wilkinson

DIGITAL AUDIO NETWORKING MADE SIMPLE

As all electronic musicians know by now, digital audio has transformed nearly all aspects of modern music production. But one area remains largely analog: signal distribution within recording studios and live-performance venues. Audio distribution systems are prone to all the analog bugaboos, such as signal degradation over long cable runs, electromagnetic interference (EMI), and ground loops.

Several companies have developed various solutions to this problem based on the concept of digital audio networking. However, these systems suffer from several limitations of their own. For example, setting up the network is often quite complicated. In addition, most of these systems can support only one sample rate and bit depth, and clock errors lead to loose timing between networked devices.

An Australian company called Audinate has thrown its hat into the ring. In 2006, the company was spun off from the National Information and Communication Technology Australia (NICTA) research institute to commercialize a digital audio networking system called Dante.

FIG. 1: Audinate's controller software provides matrix routing of all audio signals on the network.
Photo: Courtesy Audinate

The Audinate system uses standard IP (Internet Protocol) messaging on 100 Mbps and 1 Gbps switched Ethernet networks and offers much more flexibility and ease of use than earlier systems. Audio and control data can easily coexist on the same network, along with traffic such as email, Web browsing, and other office data, allowing it to be implemented using an existing network infrastructure. In addition, PC and Mac applications can be connected to the audio network using the computer's built-in Ethernet port.

Multiple sample rates and bit depths can share the same network, and all clocks on the system are synchronized to a master clock independently of the audio data, allowing sample-accurate playback from different devices on the network. Latency can be as low as 82 μs, and it can be fixed or variable for different devices and pathways. For example, an audio channel might travel over a gigabit switch to a monitor speaker with sub-millisecond latency while also being sent from the stage over a 100 Mbps venue-distribution network with a latency of 4 ms.

Perhaps most important, Dante is truly a plug-and-play system. Thanks to Audinate's Zen technology, all Dante-enabled devices on the network automatically discover each other and configure themselves. Also, each audio channel can be labeled with a logical, descriptive name instead of an incomprehensible number, and the assigned names are stored in each device and retained even if the power is turned off.

With no other traffic on a 100 Mbps network, Dante can carry up to 32 channels of 96 kHz/24-bit audio or 96 channels of 44.1 kHz/16-bit audio with a latency of 1 ms; a gigabit link can carry at least ten times as many channels. A switched Ethernet environment with a gigabit backbone can accommodate even more channels, especially when the data is unicast from one device to many. To be fair, real-world networks require at least 30 percent of the available bandwidth to allow some headroom and support a reasonable amount of control traffic, reducing the number of channels that can be practically conveyed.

Currently, there are more than 25 licensees of Dante technology, including PreSonus, Dolby, Peavey, Symetrix, and Whirlwind. In addition, Audinate offers a software implementation called Virtual Soundcard for Windows or Mac, which lets you use software tools such as DAWs with no additional hardware required. All Dante products also come with controller software to route signals as needed (see **Fig. 1**).

Dante clearly points the way toward a future in which digital audio can be easily sent wherever it needs to go without the hassles of nonstandard networking systems or the pitfalls of analog distribution. I look forward to watching it grow as companies introduce products that avoid the flames of networking hell.

Find this article at:
http://www.emusician.com/futuretech/tech-page-easy-does/index.html