

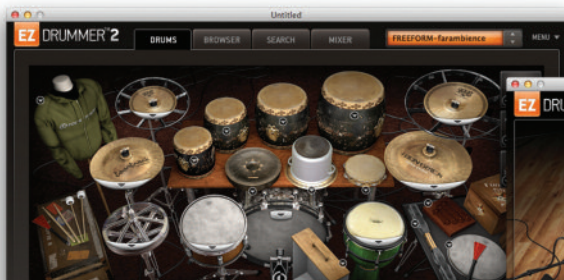
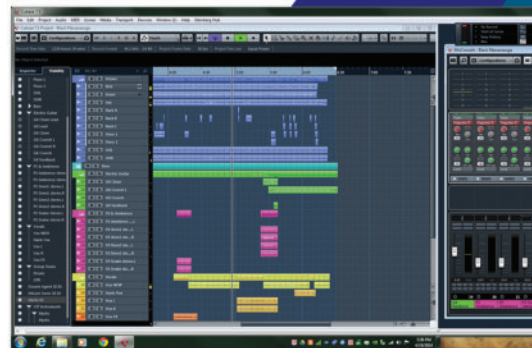
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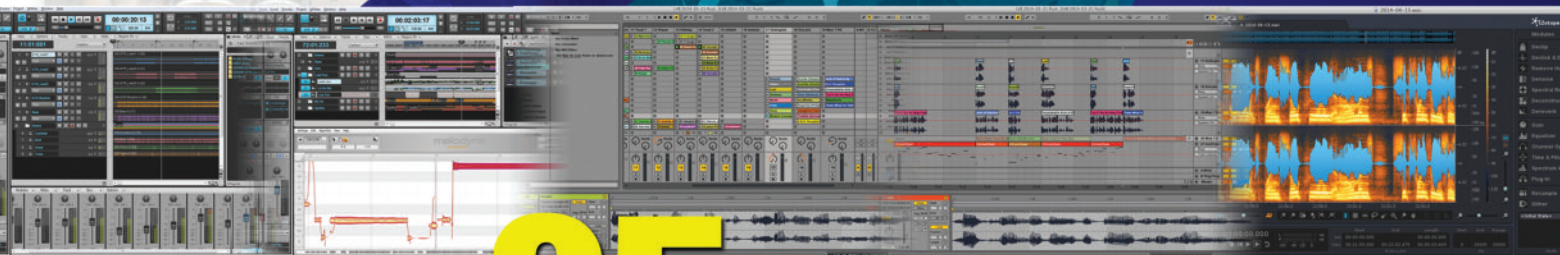
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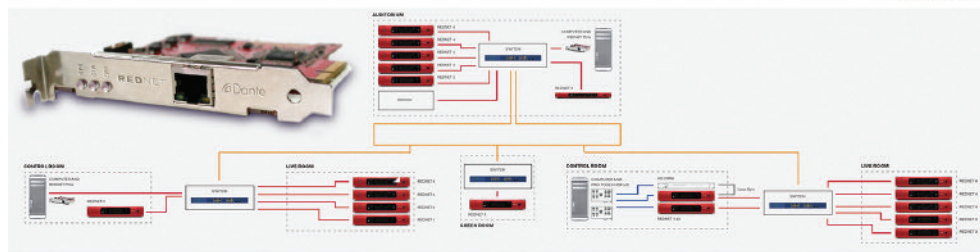
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Dante For Beginners

An introduction to a popular network standard that may be in your studio's future

By Ray Legnini



Most of us now find recording and mixing digitally a common occurrence compared to 10–15 years ago. Digital technology brings with it the promise of better connectivity and interactivity amongst pieces of gear, computers, and software. A natural extension of that idea is networking—numerous devices all communicating about their capabilities, eliminating some of the restrictions posed by the point-to-point wiring we're all accustomed to when using analog. Just as with setting up a computer network for an office, where multiple devices can share hardware like printers and servers, a network of audio devices should be able to share its resources. Ah, but that's easier to say than do.

With a computer network, there's a set of industry standards that allow devices to communicate; there's rules for Mac users and PC users. Follow the rules and it works (most of the time—you can tell I'm not an IT guy, right?); you find all the printers, you share files, etc..

But audio is a bit different. What works for your typical printer will not work for your mic preamp, digital audio workstation (DAW), mixing console, digital snake, etc.. Your typical Ethernet-based computer network has far too much timing unpredictability and latency to be practical in a live performance or recording environment where timing is everything. It's totally unacceptable to have the drummer's timing and feel expanding and contracting by even a couple of milliseconds. For these reasons, many audio guys have found networking to be confusing and frustrating.

As a result, manufacturers have been coming up with proprietary protocols for distributing digital audio to their products for years now, and it's for a simple reason—there really isn't one good way to network products together that's available to everyone. Audio devices in a professional environment require precise synchronization and sample-accurate clocking. So Manufacturer A's products cannot necessarily connect to and communicate with products from Manufacturer B, and so on.

That's where a protocol such as Audinate's Dante comes in. Dante is an audio over IP (Internet Protocol) networking technology that becomes the backbone for the communication between

devices, regardless of who manufactured them. Dante communicates over simple, readily-available Cat-5 (Ethernet) cabling and has lower installation and transport costs, while at the same time eliminating some of the other nasty problems that plague analog systems: heavy and costly multi-core cables, RF interference and noise, cumbersome routing, and difficulties when attempting to split the sources for multiple users.

Of course, Dante is not the only audio networking technology out there that has been designed for the specific needs of audio (and video) professionals: DigiGrid, CobraNet, HiQNet, MADI, A-Net, and EtherSound have all been introduced to help solve some or all of the same set of problems. Audio Video Bridging (AVB) has been in development for about five years now, and it too promises to become that universal pipeline that finally does for audio gear what Ethernet does for computer gear. I'm focusing on Dante as an introduction to this technology because it's widespread, adopted by many companies that are not all part of the same larger corporation, and easy to understand; the basic principles will carry to other networking standards in many cases.

So how does it work?

Dante runs over standard, off-the-shelf 100 Mbps and 1 Gbps (Gigabit) networking gear and switches, using readily available Cat-5 and Cat-6 cabling, and does not require any special connectors. The protocol can flow through standard Mac OS X or Windows PC computers using the Ethernet ports they already have; no special sound cards or adapters are required. Dante allows devices and their individual channels to be labeled, and those labels flow throughout the network to all connected devices. That makes it easy to keep track of what you're doing as you route your audio signals. The protocol supports various sample rates from 44.1 kHz to 192 kHz and can support mixed sample rates in the same network.

Audinate also offers the inexpensive Dante Virtual Soundcard (DVS) software, a simple way to add your computer and favorite digital audio workstation to a Dante-based audio network. With Dante Virtual Soundcard activated, your computer and its

audio software see another source for input and output routing. Dante Virtual Soundcard can be configured in a variety of I/O sizes, depending on your needs: 8 x 8, 16 x 16, 32 x 32, and 64 x 64 channels are available (at a 48 kHz sample rate). Figure 1 shows the basic control panel for DVS.

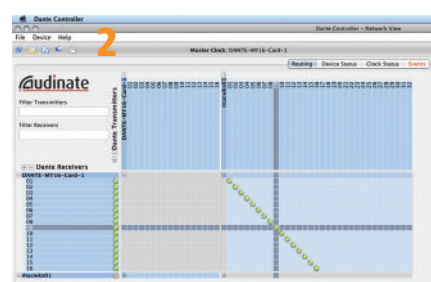


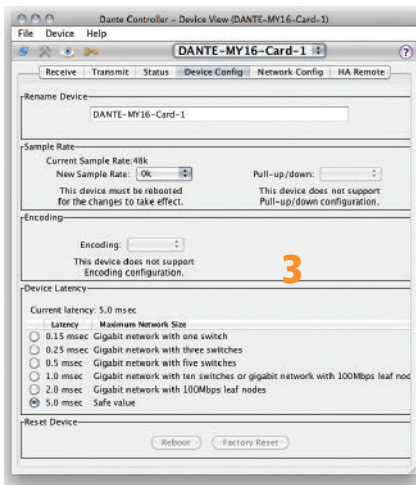
Setting up a Dante network

You need at least two Dante-enabled devices connected with Cat-5 cables to create a network. The devices discover each other as they're added to the network, so there is no need for individual device addressing. For routing channels from one device to another, you'll need the Dante Controller software, which is available free from the Audinate website (www.audinate.com). And, of course, you'll need a computer connected to run the Dante Controller software.

Dante Controller is used to set up the clocking, switched versus redundant modes, and names for devices and their channels. Once your routing is completed, the Dante Controller software and its computer can be removed; the devices will remember their routing assignments until they are changed. Of course, if you'll be using the computer as a Dante Virtual Soundcard, it should remain connected as part of the network.

Dante Controller is basically an X/Y table-style grid of inputs and outputs; devices with





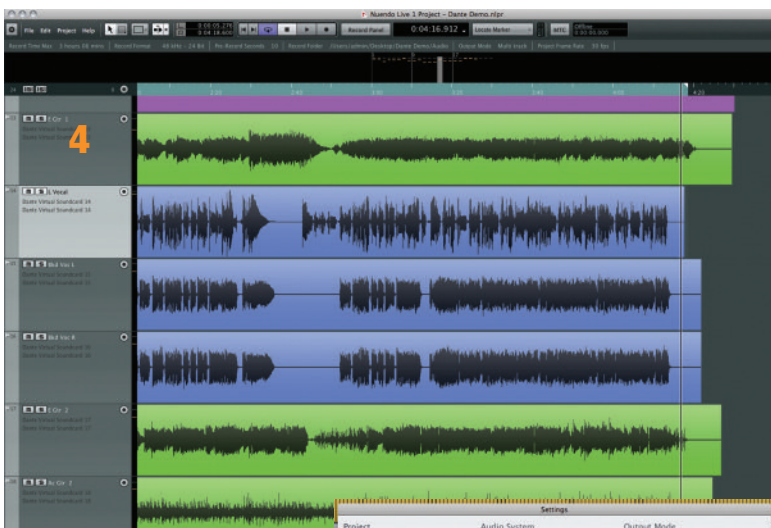
inputs appear across the top row of the grid while devices with outputs are on the side. To set up a routing, expand the view of each device to show the channel-level connections and then click the point in the grid you want to connect; you'll see a small green check mark appear in the grid once a valid connection is made and broadcast throughout the network. See Figure 2.

Dante Controller also provides configuration tools for the devices connected to the network. You can set sample rate, encoding (where applicable), latency, and so on. Figure 3 shows a simple example, an

optional add-on card for Yamaha digital consoles.

Record me

One of the coolest applications of Dante networking technology is through the Dante Virtual Soundcard. Anything that is active in your Dante network can be routed into and recorded by your favorite digital workstation software. That feature alone is worth the price of admission if you have any studio or live performance gear that speaks Dante. Figures 4 and 5 show I/O configurations and routing in Steinberg's Nuendo Live software, but pretty much any DAW can see Dante devices as ins and outs.



For live recording you can now capture the entire gig for editing back at the studio. This is especially easy if you use a Dante-based console such as the CL Series from Yamaha. All you have to do is assign each network channel you want to capture to an input of the DAW. Arm the channels for recording and that's it; it really couldn't be an easier to capture a live performance for later editing.

The future

Yes, it's just that easy. Boxes appear on the network, are told how to communicate, and do so. We have a ways to go before this sort of networking becomes common in small personal studios; right now it's mainly cost-effective for big studios that share a lot of different computers, or for live installations and PA systems. But it's coming. I predict more and cheaper devices using networking protocols like Dante with every passing year, and more and more studios making use of these elegant protocols. ➔

Ray Legnini (legnini@recordingmag.com) is a former astronaut, Olympic weight lifter, gourmet chef, congressman, and part-time psychic. He now spends most of his time playing guitar and working as a product design and marketing specialist at Aviom (aviominc.com).

Who's Using Dante?

The following companies offer Dante enabled products.

AEQ	www.aeqbroadcast.com
Allen & Heath	www.allen-heath.com
Ashly Audio	www.ashly.com
ASL	www.asl-control.co.uk
Attero Tech	www.atterotech.com
AuviTRAN	www.auvitran.com
Aviom	www.aviom.com
Bittner Audio	www.bittner-audio.com
Bosch	www.boschcommunications.com
Bose	global.bose.com
BSS	www.bss.co.uk
Cadac	www.cadac-sound.com
Crest Audio	www.crestaudio.com
Delec	www.delec.de
DHD	dhd-audio.de
Digico	www.digico.biz
Digital Audio Labs	www.digitalaudio.com
EAW	www.eaw.com
Electro Voice	www.electrovoice.com
ESS	www.essaudio.cn
Extron Electronics	www.extron.com
Focusrite	global.focusrite.com
Four Audio	www.fouraudio.com
GlenSound	www.glen-sound.co.uk
Harman	www.harman.com
Inter-M	www.inter-m.com
Jato	www.jato.co.jp
JoeCo	joeco.co.uk
Klark Teknik	www.klarkteknik.com
Lab.gruppen AB	labgruppen.com
Lake	lake.labgruppen.com
Lectrosonics	www.lectrosonics.com
Linea Research	www.linea-research.co.uk
Link SRL	www.linkusa-inc.com
Midas	www.midasconsoles.com
Nexo	nexo-sa.com
NTP	www.ntp.dk
Open Access	www.oa.com.au
Peavey	www.peaveycommercialaudio.com
Peavey MediaMatrix	mediamatrix.peavey.com
Powersoft	www.powersoft-audio.com
PreSonus	www.presonus.com
RTS	www.rtsintercoms.com/rts/line
Sierra Automated Systems	www.sasaudio.com
Shure	www.shure.com
Solid State Logic	www.solid-state-logic.com
Solidyne	www.solidynepro.com
Sound Devices	www.sounddevices.com
Soundcraft	www.soundcraft.com
StageTec	www.stage-tec.com
Stewart Audio	www.stewartaudio.com
Studio Technologies	www.studio-tech.com
Symetrix	www.symetrix.co
Televis Conference	www.televis-conference.com
Tendzone	www.tendzone.com
TEQSAS	www.teqsas.de
Xilica	xilica.com
Yamaha	www.yamahaproaudio.com