Focusrite RedNet Modular Ethernet-Networked Interface Series

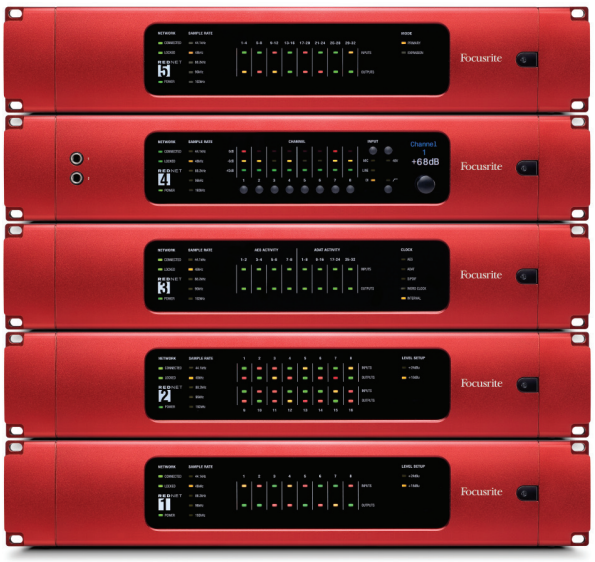
The efficiencies and workflows of networked audio systems have become expected necessities these days, so when a pro audio industry player like Focusrite enters the fray, I believe it's a big deal. Through RedNet, Focusrite has combined digital audio hardware interfaces, proprietary software control and "audio over IP" networking via Audinate's Dante protocol and Dante Controller software.

More than just a range of interfaces, the RedNet system is indeed just that—a complete audio "network" sans DAW. It is a modular network, scalable to fit specific needs, taking advantage of a user's computer's networking strengths to allow an extremely flexible, portable and high-fidelity digital audio system that is configured unlike anything your Grandpa could've envisioned.

Features

A RedNet system is made up of a number of seven hardware components, three software components and your DAW.

1. RedNet 1: An eight-channel, 24-bit, A-D and D-A converter with two DB25 multi-pair connectors for I/O and a single RJ45 Ethernet connection. There's not much to see on the front panel: single LED multi-color meters, a +18 or +24 dBu operation switch, some basic status LEDs and an eye-catching, polished aluminum faceplate. Specs are solid at -119 dB dynamic range, A-weighted, 20 Hz to 20 kHz bandwidth response within +/- 0.15 dB and THD at .001%. Priced at $2,000 street.
2. RedNet 2: A 16-channel version of the above, with four DB25 for I/O. Priced at $3,000 street.
3. RedNet 3: An all-digital interface with eight channels of AES/EBU I/O on a DB25; two channels of S/PDIF on RCA I/O; 32 channels of ADAT Optical via 16 TOSLINK (eight in and eight out with each connector carrying eight channels at 44 kHz or 48 kHz, four at 96 kHz S-MUX2, two at 192 kHz S-MUX4, and outputs 5–8 are redundant at low sample rates); word clock I/O via BNC; and the all-important Ethernet jack. Priced at $1,500 street.
4. RedNet 4: An eight-channel, remote controllable, electronically-balanced mic preamplifier featuring a high-pass filter (80 Hz, 12 dB/oct), eight to 63 dB of gain, polarity reverse, 48 VDC phantom and "step free and quiet" gain changes, per channel. Eight channels of line input (with a sensitivity range from -12 to +42 dB) on a DB25 are included as well as an Ethernet connection. This transformerless mic amp is not Focusrite's ISA2, nor from the Saffire or Scarlett line, but is also found in the Focusrite Forte interface (previously reviewed for *PAR* by Russ Long — *Ed.*). Priced at $2,500 street.
5. RedNet 5: A 32-channel RedNet to Pro Tools HDX bridge (six unit maximum), which achieves up to 192 channels at up to 96 kHz, or the Pro Tools maximum—up to 96 channels maximum at 192 kHz. This unit is compatible with Pro Tools Native, HD, and HD (TDM). Includes the mini-Digi-Link connector and expansion slot, Word Clock I/O, Slave Loop I/O and Ethernet. Priced at $1.500 street.
6. RedNet 6: A 64-channel, bi-directional MADI to RedNet bridge with an asynchronous sample rate converter on each input for interfacing network sources regardless of sample rate (e.g., live sound engineers often use MADI with 48 kHz as house clock, while CD players output 44.1 kHz). MADI is offered on both optical and co-axial (BNC) connectors, with word clock I/O and Ethernet. Priced at$2,000 street.
7. RedNet PCIe: This computer card with its single Ethernet con-

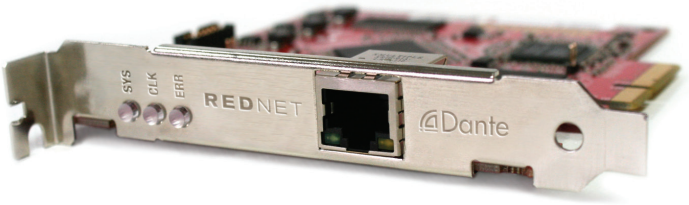


Rob Tavaglione has owned and operated Catalyst Recording in Charlotte NC since 1995. catalystrecording.com

nection interfaces the hardware world of RedNet to your DAW (128 channels at 96 kHz or 512 channels at 48 kHz). Using standard Cat 6 cabling, users connect the RedNet PCIe to a managed gigabit Ethernet switch, host computer to the managed gigabit Ethernet switch, and each RedNet component, then run Audinate's Dante Controller digital audio network software for a complete RedNet rig with only three milliseconds latency at 96 kHz (at a 64 sample buffer). Priced at $1,000 street.

8. Audinate Dante Controller: The brains of the RedNet system, Controller allows complete virtual patching of audio "transmitters" and "receivers" on the network via "audio over IP" (with its inherent low latency) along with the critical naming/storing/recalling of patching set-ups so crucial to network flexibility and ease of use. Controller is available via free license with hardware purchase.
9. Focusrite RedNet Control: This Mac (OS X 10.7 and 10.8) and Windows (7 and 8) software allows simple drag/drop automatic routing into Dante, remote control of the RedNet 4 preamp(s), some helpful diagnostic and routing tools and sample rate selection. Control is available via free download with hardware purchase.
10. Audinate Dante Virtual Sound Card (DVS): DVS is software allowing the Dante network audio to be recorded directly into Core Audio or Windows-compatible ASIO/WDM without a PCIe card, or you could employ a PCIe with an external Thunderbolt enclosure/PCI slot (when one becomes available). Such a system will not enjoy the RedNet PCIe's low latency and is limited to 128 channels at 48 or 96 kHz, but it does offer valuable utility for location recordists and the like.

If you consider the prevalence of Dante in today's marketplace (it's the leading audio networking format, having been adopted by over 100 manufacturers to date); the inherent logic behind "audio over IP"; the prevalence of Cat 6 runs throughout residential, institutional and business construction; and the relative ease of setting up small RedNet interfaces with not much more than AC and Cat 6 interconnect, you can see numerous possible applications—recording studios, broadcast studios, theme parks, theaters, location recordists, houses of worship and educational facilities. RedNet is designed for any place where high fidelity digital audio is split, processed, distributed and delivered.



In Use

Prior to testing RedNet in the comfy confines of my own trusted room, I had the privilege of visiting two RedNet installations in the LA area, just a bit off my beaten path.

Dean Martin Hovey owns and operates Soundwell (soundwell.tv), his sound design company with a wide palette of work from scoring film (David Lynch's *Lost Highway*), sound design and composition for over a thousand commercials (including those recognizable Nike/LeBron James spots), recording artists (The Martinis with Frank Black), audio branding, theme park sound design, interactive "audio furniture" for museums/galleries and even avant garde projects like creating surreal swirls of sound by running ball bearings through pneumatic metal tubes with air pressure to cleverly attract patrons to an outdoor park. Hovey is accomplished and versatile, to say the least.

Soundwell employs five RedNet 2 units featuring 64 channels of "dozens of synths/modules that are always patched and normalled to Pro Tools for spontaneous design and composition idea laying." A RedNet 4 is on hand for mic inputs and the occasional additional line ins. Two RedNet 5 units are racked for final delivery of stems/tracks to Pro Tools on film mixing stages; Hovey reports that last minute changes are the norm.

Hovey found a number of advantages with his RedNet system (working at 48 kHz and 96 kHz); the low latency aids in accurate timing and feel of parts, and Hovey offers that the RedNet converters are absent of harshness or shrillness, and that "clarity" is maintained even when all 64 channels are simultaneously recording. Hovey maintains that the individual tracks he records do not suffer when system throughput is maxed out, unlike the performance of his previous A-Ds.

Next, I visited John Jennings Boyd, who scores TV, film and commercials as an independent composer. Within his LA studio, Boyd runs two DAWs: a Mac running Logic as his compositional rig and a Mac running Pro Tools HD as his mixing rig. Boyd prefers the MIDI and composing features of Logic, but needs low latency for accurate composing in spite of routing through two DAWs. With a single RedNet 1 for eight channels of I/O and a RedNet PCIe card in both computers, Pro Tools sees Logic's audio via the RedNet 1 as just another 8-channel interface and routes audio data efficiently. Boyd reports only three milliseconds of latency roundtrip and that's mostly in Pro Tools. I played a few notes and felt no discernible delay (and, being a composing musician myself, I am intolerant of even minute amounts of latency).

Back in North Carolina, I put together a small RedNet system for trials at my home base, Catalyst Recording. Armed with a RedNet 2 converter, a RedNet 4 mic pre and a PCIe card, I got down to the brass tacks of networking digital audio. First of all, the RedNet PCIe installed as expected, no problem. RedNet Control and Dante Controller software installed easily as well. With four short pieces of Cat 6 and a managed gigabit Ethernet switch, I was impressed by the ease of set up and lack of bulk. Two DB25s of analog output ran to my console as the only reminder of the "old norms."

Within my MOTU Digital Performer DAW,

the RedNet PCIe showed up as an interface option with I/O available in mono or stereo pairs. Within DP, I'm comfortable with a "buffer size" of either 64 or 128 samples (tops) before I get frustrated, so I tested as such.

I started out with some simple mixing work at 44.1 kHz for a client (gutsy, right?) and I was comfortable within minutes. At first, the evenness of the bottom, its lack of bumps and ripples, its extension and solidity threw me for a loop—then, just minutes later, I was mixing without concern. These converters felt flat to me—reference grade with no hype and no color—so adjusting was easy.

Emboldened, I next tracked vocals and guitars for a client. I tried the RedNet4 and it worked just fine, but the mic pre was rather neutral—in my opinion, too neutral for male vox, wonderfully neutral on acoustic guitar, and nicely transparent on electric guitar. This was followed by "characterless" digital conversion, just like its RedNet 1 and 2 converter brothers (they do, after all, share the same Cirrus Logic chips for conversion). I found routing via Dante Controller is easy; remote mic amp control is an addictive luxury and the lack of latency makes clients happy. For what it's worth, if you slam gain into the converters, they distort with a reasonable fuzz, not a scratchy rasp.

Next I brought in engineer and trusted colleague Bill Weir for some "techy" testing. Weir is no stranger to designing and operating large audio networks, and he appreciated the ease, throughput and low cost interconnectivity of the RedNet/Dante system. He also appreciated the neutrality of the RedNet mic amps, not to mention the linearity and invisibility of the converters.

Our sample rate listening sessions were where we found real insight. Tracking with the RedNet 4 at 192 kHz, we found a sonic signature that was slightly lacking in high end, somewhat dark and thick. It was clean and dynamic, but missing top end while not hyping bottom end. At 44.1 kHz, all the top end was there, bottom end, too—maybe a little less dynamic, but the problem resided in the high frequencies. Weir called it "blurry and cloudy," and I called it "grainy and sandy"—it was flatter than 192 kHz, but sort of distorted in high-end detail. At 96 kHz, the porridge was just right, with a top end like Windexed glass (minus the glare), linear truth through the mids, and what is probably the most accurate bottom end I believe I've ever heard (maybe not my euphonic favorite, but truer and properly extended) with realistic dynamics and seemingly no phase shift. At 96 kHz, RedNet conversion is on par with other heavyweights I've reviewed and used (this Focusrite is actually more neutrally balanced than some products I've used from iZ, Apogee, Prism, Lavry and Mytek.

Converter technology has made significant sonic strides in the last couple of years—as clarity and musicality have simultaneously advanced amongst numerous manufacturer's lines—but latency still remains a very important measure. I routed a mono 96 kHz track from DP to the RedNet 2 for D-A conversion, patched that analog signal back through a RedNet 2 input for A-D, and recorded that to a track for a "roundtrip" test of latency and fidelity. Fidelity was so good that I could not tell a difference between source/copy tracks and the roundtrip delay was only 15 samples: that's 15/96,000 of a second, folks, or 0.0001562, about a ten-thousandth of a second. Can you hear me now?

Summary

The RedNet system sounds great: full, flat, smooth and musical. Maybe the RedNet 4 preamp is too neutral for you, and maybe not—that's purely a matter of taste. These RedNet converters are world-class neutral at 96 kHz, even if I do not recommend them at 192 kHz (though, full disclosure, I've *never* preferred 192 kHz, not even in my recent RADAR 6 evaluation. To my ears, 192 kHz is simply too stark and clinical.)

I found only minor bugs in operation: for example, the occasional peak indicator not clearing and the need to reboot with sample-rate changes, though such issues are said to be addressable with software updates. I also believe that the RedNet line could use a few more hardware options, too (especially for temporary set-ups or small-scale users): two- or four-channel converters, or maybe even a mic pre or two and a headphone output (with selectable source).

Hopefully, my personal testing and the testimonial of my visited RedNet users illustrates that new levels of throughput and minimal latency can be expected as "the new normal." With such broad and important claims covered, let's get comparative:

A typical 24-channel RedNet system comes in at $10,000: a RedNet 1 and RedNet 2 for A-D and D-A; a RedNet 3 for Digi I/O; at least one RedNet 4 for "neutral capture" drums, acoustic instruments, and classical recording; and a PCIe card. While that's not a budget price, it is competitive: exceeded by some competitors, but in the "high end" of truly pro gear.

Beyond cost, RedNet value is in the eyes (and ears) of the beholder. Truthfully, RedNet is more powerful than most project studios currently require. For a multi-room recording facility, RedNet makes *perfect* sense: wire the entire facility with Cat 6 (bathrooms, hallways, offices, etc.), get several RedNet 2s and audio will run from and to anywhere. Get at least one RedNet 4 and a RedNet 1, and with Dante's ease of use (create a complicated patch, name it and save it, then recall it when needed), users can turn any room into an iso with

(continued on page 50)

"Focusrite has created a digital audio networking solution that far exceeds performance expectations from even the recent past."

Focusrite RedNet

(continued from page 39)

foldback and remote mic control.

For the broadcast facility, RedNet's scalability, lack of latency and Dante functionality are quite desirable. Divergent users like theaters, houses of worship and theme parks—all potentially troublesome with signal splits, zones, PAs and recorders—would be served quite well with RedNet. For location recordists, their jobs may now be possible without heavy multi-pair snakes; place RedNet4 on a catwalk with only an AC and a Cat 6 run, then remotely control mic amps from laptop with RedNet Control and DVS to go straight to Core Audio.

But here's my favorite application for RedNet: the modern educational facility. With campuses wired for Cat 6 from top to bottom, difficult jobs are now routine. Any venue on a campus can be a location—classrooms, performance rooms, gyms, theaters, labs, stadiums—as any area can get foldback and utilize remote control. Runs of a mile and a half are possible with acceptable latency, too. The RedNet system is expandable, reconfigurable and subject to improvements as software improves—right in line with normal educational upgrade paths.

Focusrite has created a digital audio networking solution that far exceeds performance expectations from even the recent past. As such, the future is now; these functionalities and applications actually create new opportunities and the only hesitancies to adoption I can identify are system cost and abandoning a legacy system.

The RedNet 5 and RedNet 6 units address interoperability issues for those who employ Pro Tools and MADI systems. To such sophisticated users, let me recommend an adoption of the entire RedNet concept and Dante networking; only full immersion will bring about a sublime simplicity, power and fidelity level unheard of, up to now.

Contact: Focusrite | focusrite.com