

JOHN ATKINSON

Aurender N10

MUSIC SERVER



When I reviewed the Antipodes DX Reference in October 2015,¹ that \$7500 media server made musical mincemeat of my regular computer audio setup: a headless 2.7GHz i7 Mac mini fitted with 8GB of RAM and Pure Music and Audirvana apps. Coincident with the publication of that review, Aurender launched its N10 music server (\$7999) at the 2015 Rocky Mountain Audio Fest. I had been impressed with Aurender's Flow USB headphone amplifier when I reviewed it in June 2015,² so I asked for an N10.

On the Outside

Designed in California and manufactured in South Korea, Aurender's N10 is a smart-looking if hefty component, 16¾" wide and weighing 26 lbs, with a large Active Matrix Organic LED (AMOLED) screen in the center of its front panel. This screen has two individual "windows" that can be switched between displays of the metadata of a selected file being played and the identity of the USB-connected DAC being used, and a pair of VU-type meters, illuminated

Tidal streams can be mixed with local files in the playlist window.

in beige or pale blue, using either the Aurender Conductor app (see later) or one of the four buttons to the screen's right. The other three buttons are the usual Play/Pause and Track

Forward and Back functions.

The sides resemble black-finished heatsinks, while the rear panel offers, from left to right: an AES/EBU digital output on an XLR jack; coaxial S/PDIF digital outputs on RCA and BNC jacks; a TosLink optical output; a Class 2 USB Type A jack for outputting data to a USB DAC; a stack of two USB Type A jacks for connecting external drives; a Gigabit Ethernet port; and the AC outlet and On/Off switch. (There is a Sleep/Wake button to the left of the front-panel display.)

The N10 is a good-looking, solidly finished piece of kit.

1 See www.stereophile.com/content/antipodes-dx-reference-music-server.

2 See www.stereophile.com/content/aurender-flow-da-headphone-amplifier.

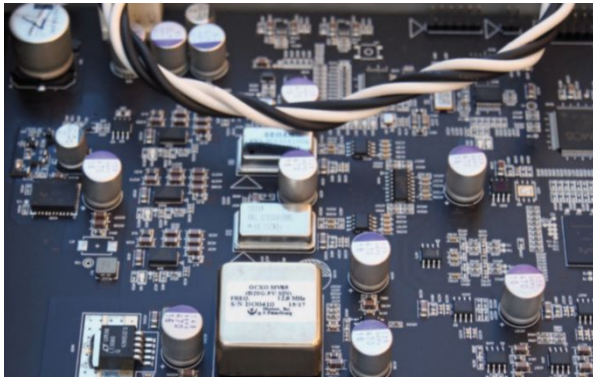
SPECIFICATIONS

Description Media Server running Linux. Formats supported: WAV, AIFF, FLAC, ALAC, AAC, M4A, MP3, APE, DSF, DFF. Internal storage: 4TB (two 2TB hard disks) plus 240GB solid-state cache drive. Resolution and sample rates supported: PCM up to 32-bit/384kHz,

DSD64, DSD128. Inputs: Ethernet, two USB Type A. Outputs: USB Class 2.0 (Type A jack), AES/EBU (XLR), S/PDIF (coaxial RCA and BNC), TosLink optical. **Dimensions** 16.77" (430mm) W by 3.24" (83mm) H by 13.77" (353mm) D. Weight: approximately 26 lbs (11kg).

Finishes Silver, black. **Serial number of unit reviewed** N10-003a27 (N10); v.4.3.155 (N10 system software); v.2.2.13 (Aurender Conductor app). **Price** \$7999. Approximate number of dealers: 60 (US), 12 (Canada). **Manufacturer** Aurender Co.

Ltd, Dongan-gu, Anyang-si Beolmal-ro 126 OBIZ Tower 12th. (1211-1213) Gyungi-Do, South Korea 14057. US: Aurender America Inc., 2519 W. Woodland Drive, Anaheim, CA 92801. Web: www.aurender.com.



On the Inside

Like the Antipodes server, the Aurender N10 is actually a single-purpose computer. Running a modified version of the open-source Linux operating system, it's dedicated to retrieving audio files—from an external NAS drive, or a drive plugged into one of its Type A USB ports, or its internal storage—and, with the highest precision, sending the data to its Class 2 USB Type B output port or to one of its serial digital audio ports.

Looking first at the hardware, three 2x9V, 25VA toroidal transformers behind the front panel form the basis of a hefty power supply. Internal storage comprises two 2TB Western Digital Green hard drives, along with a 240GB solid-state disk (SSD) that's used to cache files before playback. These drives, too, are mounted behind the front panel, in a small card frame. When a selected song or album is cached on the SSD, the hard drive storing the original files remains asleep, prolonging the drive's life. Playing cached files from the SSD also eliminates electrical and acoustic noise from spinning disks and moving heads.

The circuitry is carried on a large, multilayer printed-circuit board, with a hefty heatsink over the microprocessor

Above: In the center of the audio circuitry is a can containing the Oven-Controlled Crystal Oscillator. **Right:** three toroidal transformers are mounted behind the N10's front panel.



The Oven-Controlled Crystal Oscillator keeps the master clock at a constant temperature.

and the digital-audio-handling section shielded within a machined-aluminum subenclosure. Removing the engraved cover from the subenclosure reveals a neat layout, with a large can in the center marked "OCXO 12.8MHz." This Oven-Controlled Crystal Oscillator keeps the master clock at a constant temperature to eliminate any changes in its operating frequency due to temperature fluctuations. There are two other crystals on the board, along with large chips from XMOS and Xilinx. The Xilinx is a Spartan Field Programmable Gate Array (FPGA) that Aurender uses to implement a digital phase-locked loop system that they say "precisely times the digital data transmission, reducing jitter to near immeasurable levels."

Overall, the N10's full-size enclosure and the layout of its circuitry suggest that Aurender's designers have paid attention to detail regarding RFI isolation and shielding, as should be the case at a price of \$7999.

MEASUREMENTS

With a media server like the Aurender N10, there's not much that can be assessed on the test bench. However, I did look at the properties of the N10's AES/EBU output, using a 45'-long cable to

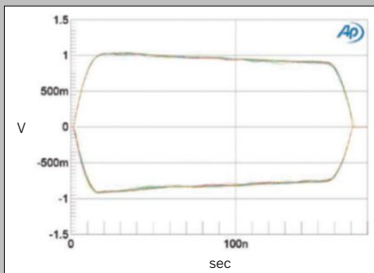


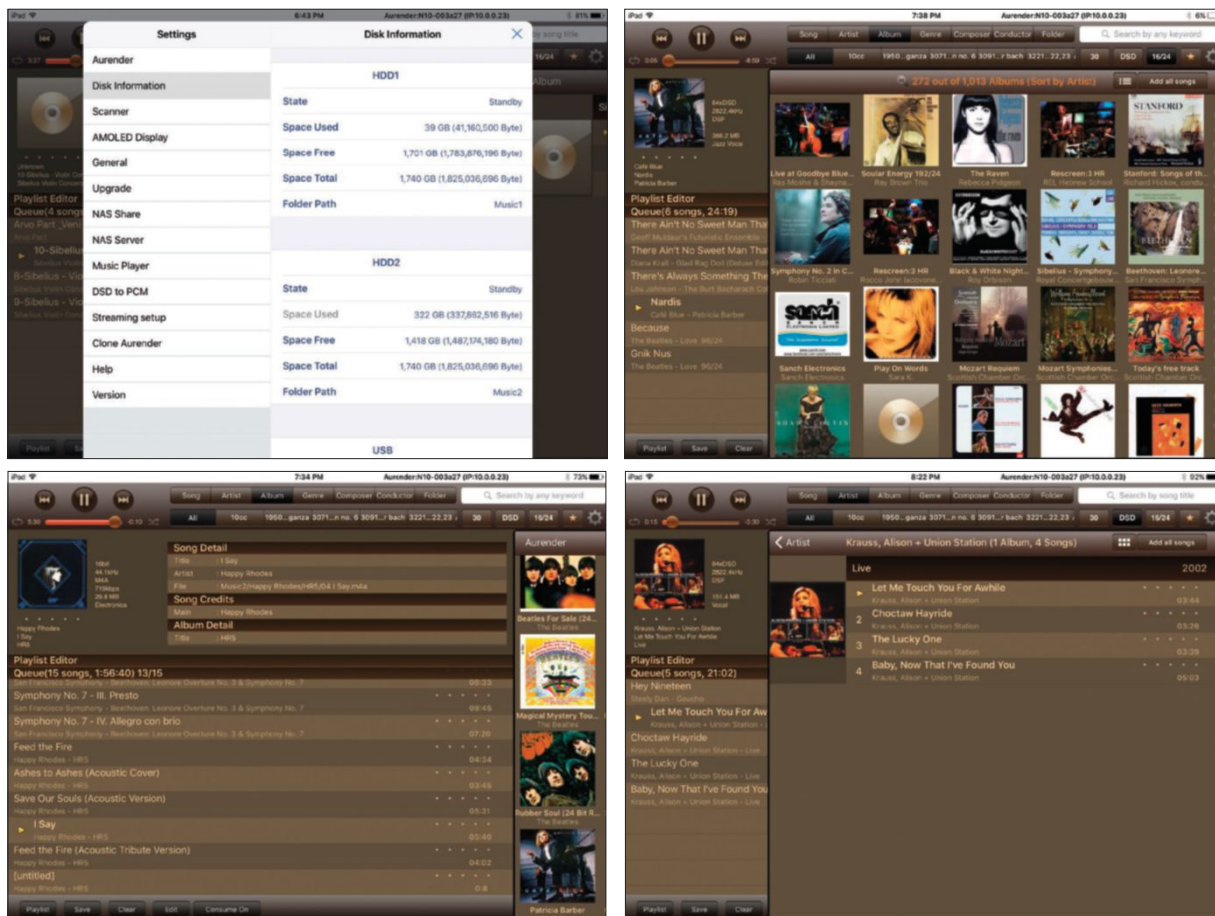
Fig.1 Aurender N10, AES/EBU output, eye pattern with 44.1kHz J-Test data. (50ns/horizontal div.).

connect the N10 in the listening room to my Audio Precision SYS2722 in the test lab. Even so, with the N10 playing 24-bit J-Test data sampled at 44.1kHz, the jitter in the AES/EBU datastream was very low, at 293.3 picoseconds (average value over a 700Hz-100kHz bandwidth). The eye pattern (fig.1) was wide open, as it should be.

All 24 bits were active in the digital outputs with 24-bit PCM files and transcoded DSD files. However, there was one peculiarity with DSD: The Aurender app offers the user the choice of transcoding DSD files either to 88.2kHz-sampled PCM or to 176.4kHz PCM, but no matter which I selected, I always got a 24-bit PCM stream sampled at 176.4kHz. — **John Atkinson**

Conducting

While audio files can be navigated with the N10's front-panel buttons, it is Aurender's Conductor app that mostly will be used to control the server. This runs on iPads (an Android version is under development), and manages both file playback and all the N10's settings and functions. I downloaded the app from the Apple App Store, installed it on my iPad mini, and logged on to the family's protected WiFi network. The N10 had already been connected to the router via Ethernet, and I'd copied both my iTunes library and a large number of high-resolution FLAC and DSD files to its internal storage over the network. As soon as I ran the app, it found the N10 and asked if I wanted to connect to it.



Indeed I did!

Once the app was running, I selected the Settings Menu, which lets you turn on DSD-to-PCM transcoding (this affects only the serial digital outputs, not the USB output), see how much space there is on the hard drives, set up the N10 to stream music from Tidal, connect to any NAS drive on the same network, and adjust the appearance of the front-panel display (see first iPad screenshot above). While I was doing this, the N10 was scanning and organizing the files it found in its storage and preparing them for playback.

Playing music with the N10 is a simple matter of selecting an album or individual songs, and adding them to a playlist in a window on the left of the screen with the transport controls at the top (see second screenshot). The library can be arranged by Artist, Album, Composer, Genre, Song, etc.—or by applying a filter, such as “just show DSD files” (see third screenshot).

Tidal streams can be mixed with local files in the playlist window; swiping the app’s library window to the right reveals the metadata for the song being played (see fourth screenshot). When you click on an album or artist and touch “Add all songs,” a button with a stylized “W” appears at the bottom left of the submenu. Clicking on that brings up a browser window with the appropriate entry from Wikipedia, and while this is not as extensive as the AllMusic Guide information accessible with the iPeng app used with the Antipodes server, it serves its purpose.

Setting up the N10 and the Conductor app was straightforward, but if the N10’s owner does run into a roadblock,

Clockwise from upper left: The Conductor app’s Settings screen; the D10’s music library can display files by Artist, Composer, Genre, Song, etc.—or by Album, as in this screenshot; when a DSD file is played, the N10’s AES/EBU and S/PDIF outputs can stream a transcoded PCM version; swiping the Conductor’s library window to the right reveals a song’s metadata.

pressing the Help button on the app’s Settings screen requests support, and allows an Aurender engineer to diagnose and fix the problems over the Internet.

Listening

Triggered by Larry Greenhill’s review of Tannoy’s TS2.12 subwoofer in February, where he mentioned using a performance of Beethoven’s Symphony 7 by Michael Tilson Thomas and the San Francisco Symphony, I downloaded the files from <http://sanfranciscosymphony.downloadsnow.net/>, and dragged’n’dropped them onto one of the N10’s internal drives. LG had auditioned the DSD64 files, but as the SFSO lists the provenance of the recording as being 24-bit PCM at 96kHz, that’s what I bought. (Why move a step further away from the original format?) From the opening declamatory chord through the glorious melodies in the first movement, the shuffling rhythm in the second movement, the joyous scherzo, to the triumphant horns in the final movement, the symphony that Richard Wagner called Beethoven’s “apotheosis of the dance,” sourced from the Aurender, had me glued to my seat, though with feet tapping.

I switched to the Antipodes DX Reference playing the same FLAC files and was hard put to hear any change in the

sound. The Antipodes server's superbly palpable imaging was matched by the Aurender's. Both effortlessly connected me with the music of "I Say," from Happy Rhodes's 1993 EP, *HR*³ (16/44.1 ALAC, Aural Gratification). (A shout-out to Jon Iverson for turning me on to this idiosyncratic singer in his January review of the Apogee Groove headphone amplifier.³) Using all of her four-octave range, Rhodes has laid down multiple vocal lines over a haunting, chugging, gamelan-esque instrumental backing. As I'd connected the N10 to the PS Audio DirectStream DAC via both USB and S/PDIF coaxial links, I could play this hypnotic song over and over with the Aurender app, ostensibly to compare the sounds of the different outputs, but actually just to groove on the groove. I heard no meaningful differences.

I *did* hear a difference between a DSD file played natively via USB and transcoded in real time to 176.4kHz PCM via S/PDIF. When I played the "Moonlight," from Peter Takács's complete cycle of Beethoven's piano sonatas (DSD64 files, Cambria Master Recordings), the DSD version was louder. Checking with a DSD64 1kHz tone, I confirmed the level difference: a very audible 6.5dB. Peculiarly, with a DSD128 file, the difference was smaller, with a level reduction for the PCM version of just 0.72dB. (Perhaps the digital filter that transcodes DSD to PCM reduces the level to avoid the possibility of peak clipping, but why, then, the difference in level between DSD64 and DSD128 files?) Once I'd adjusted for the level difference with the Beethoven sonata, the difference between DSD and PCM was very difficult to hear—if at all.

Over the past year, I've been working my way through *The Decca Sound: The Analogue Years*—a boxed set of classic classical recordings from the English record company (50 CDs, Decca 001934702)⁴—ripping the CDs to ALAC files as I do so. An album from this collection that I keep returning to is Clifford Curzon's performance of Brahms's Piano Concerto 1 with the London Symphony conducted by George Szell, which is displacing in my affections Emil Gilels's 1972 version, with Eugen Jochum and the Berlin Philharmonic. Recorded in London's Kingsway Hall in 1962, by Decca's A team of producer John Culshaw and engineer Kenneth Wilkinson, this recording has a bold, upfront balance. Nevertheless, with the files played on the Aurender feeding

ASSOCIATED EQUIPMENT

Digital Sources Apple 2.7GHz i7 Mac mini running OS 10.10.3, iTunes 12, Pure Music 2.0, Audirvana Plus 1.5.10; Antipodes DX Reference music server; iPad mini running Aurender Conductor app for N10, iPad mini 8 for Antipodes DX; PS Audio PerfectWave DirectStream D/A processor; AudioQuest JitterBug USB noise filter; UpTone Audio USB Regen.

Preamplifier Ayre KX-R Twenty.

Power Amplifiers Vandersteen M7-HPA monoblocks.

Loudspeakers Vandersteen Model 7 Mk.II.

Cables Digital: AudioQuest Coffee (USB) & Vodka (Ethernet), Kimber Kable Orchid (AES/EBU), Esperanto Audio (S/PDIF). Interconnect (balanced): AudioQuest Wild. Speaker: AudioQuest/Vandersteen. AC: Kubala-Sosna ElationI, manufacturers' own.

Accessories Target TT-5 equipment racks; Ayre Acoustics Myrtle Blocks; ASC Tube Traps, RPG Abffusor panels; Shunyata Research Dark Field cable elevators; Audio Power Industries 116 Mk.II & PE-1 AC line conditioners (hard drive, computers). AC power comes from two dedicated 20A circuits, each just 6' from breaker box.—John Atkinson

USB data to the PS Audio DirectStream DAC, Curzon's arpeggiated musings in the slow movement still sounded magically mysterious. This server is a keeper.

Conclusion

Aurender's line of music servers contains models more and less expensive—they range from \$2499 to \$17,600—but at \$7999, the N10 hits the sweet spot where price, features, and functionality converge. Yes, apps like Roon offer much greater integration with metadata sources, but I very much enjoyed my time with the N10, especially given its sound quality and the usability of Aurender's Conductor app. Highly recommended. ■

3 See www.stereophile.com/content/apogee-electronics-groove-da-headphone-amplifier.

4 See www.stereophile.com/content/idecca-sound-analogue-years.

