AUDIO FILE

Aurender N30SA

Aurender's flagship two-box network music library isn't the traditional PSU/player you might expect. Instead, the functionality is elegantly split between data in and data out
Review: **Paul Miller** & **Andrew Everard** Lab: **Paul Miller**

Look at any multi-box component and you can usually work out what's going on: CD transport and DAC, preamp and power amp(s), for example. But just as often those two boxes are an 'audio product' – phono preamp, headphone amp, DAC or even a digital audio transport – plus an outboard power supply. The rationale for these latter two-boxers is clear, for by isolating the electrically noisy parts of the system away from delicate audio signals, interference is minimised and signal purity maximised.

But take a look at the new Aurender N30SA, a £24,000 two-box network music library/player, and the division of duties between those beautifully machined alloy chassis is not so straightforward. This is not simply Aurender's flagship single-chassis W20SE [*HFN* Mar '23] player with its PSU stripped out into a separate enclosure.

DIVISION OF DUTIES

Instead, all the noise-generating components – the linear power supplies, Intel CPU, storage drives, USB host ports, LAN port, and IPS LCD screen circuitry – are located in the 'power' box [the top chassis in our pictures] while the digital audio boards, FPGA and USB plus S/PDIF digital outputs are separated into the lower 'audio' enclosure for maximum physical and electrical isolation. Two umbilicals connect the boxes, one providing DC, the other the data [see pic, p61]. These are also kept as far apart as possible to minimise any crosstalk or stray EMI occurring between the PSU and data channels.

The plain-fronted lower chassis has an external clock input and array of digital outputs, from optical, coaxial and AES/EBU through to USB-A, to allow the complete player to be connected to an external DAC. The two USB ports on the [top] player chassis are for external drives only – data

input, not output. So the N30SA really is not a 'two-box' W20SE, the latter with thicker alloy casework and an AMOLED display in place of the IPS LCD panel that graces the N30SA. Then again, the N30SA carries full-colour album artwork on its display while the W20SE does not.

There are other functional differences that exist too. While the N30SA has a single AES/EBU digital audio output, the W20SE has a pair capable of delivering DSD128 over DoP. Curiouser still, there's only a £1100 difference in price between the W20SE and costlier N30SA – marginal in the case of units at this level.

Otherwise, the N30SA and W20SE share a near-identical audio board, installed in its own aluminium chassis [see pic, p59]. There are numerous key components on here, not least the Xilinx Spartan 6 FPGA that handles Aurender's custom data signal conditioning. For example, DSD-to-LPCM conversion is included between 88.2kHz and 176.4kHz, gain is adjustable

by 1-6dB and a low-pass filter includes 24kHz, 30kHz, 40kHz and 50kHz settings. Upsampling across 44.1kHz- and 48kHz-centric rates is included in the W20SE/N30SA's FPGA, but for its OCXO-governed S/PDIF and AES/EBU digital outputs only.

CHAMBER MUSIC

Some may prefer the sound here over USB, although the latter always functions in 'bit perfect' mode, free of DSP, and is compatible with far higher 384kHz/32-bit and DSD512 data formats [see interview sidebar, p59]. The OCXO (Oven-Controlled Crystal Oscillator) employed for the S/PDIF outputs is superior to the TCXO clocks in more general use, because clock signal generators are typically highly sensitive to temperature changes. That's where the 'oven' comes in, for OCXOs are housed in their own temperature-controlled chamber.

Skipping back up to the top 'power' chassis, as well as hosting the computer mainboard, it also houses the network

RIGHT: This is the 'display' half of the N30SA with heavyweight PSUs [left], battery back-up [bottom], Intel Quad core-based mainboard [right], onboard 8TB SSD [top], SATA drive bay [bottom left] and 480GB SSD cache for playback
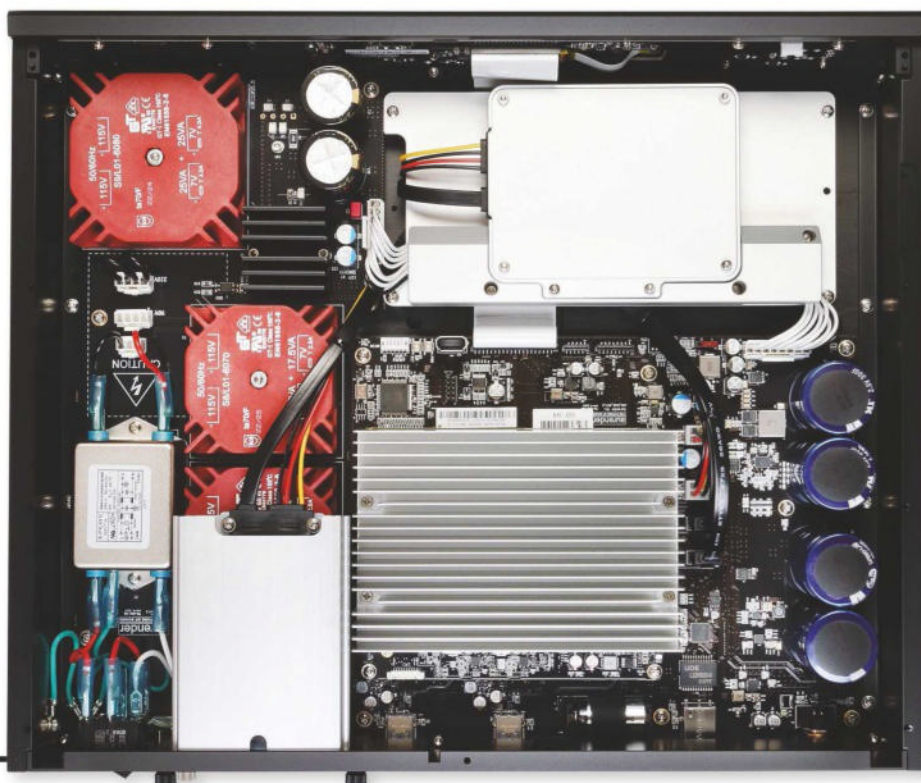
card, and an 8TB SSD drive to store music, with the option of adding a further 8TB drive if desired. This doesn't require any disassembly – a tray in the rear panel, held in place by two thumbscrews, allows you to slide a 2.5in SSD into position.

Aurender recommends Samsung QVO or EVO series internal SSD drives up to 8TB, or Western Digital or Seagate HDDs of up to 5TB. The SSD will cost you about £400, which isn't much in the grand scheme of a £24,000 device, and will typically offer faster, quieter operation. And with 16TB on board, the N30SA will have storage to compete with the most substantial external NAS set-ups. In addition to the bulk storage there's also

> ### 'Aurender's N30SA is not simply a "two-box" W20SE'

an onboard 480GB caching drive where music is temporarily stored before being summoned up for playback.

All this is under the control of the unit's main processor, a low-power Intel quad-core device with 8GB of system memory, protected against mains black-outs by a supercapacitor-based uninterruptible PSU. Meanwhile, the entire system is managed by the excellent Aurender Conductor app [see boxout, below]. It's also worth noting that the Ethernet port on the rear of the 'power'/data-input box is double-isolated, to prevent network-based interference getting into the system. In similar vein, the

ABOVE: While its Conductor app is still the go-to choice, it's also possible to navigate this luxuriously-appointed two box player via its colour 223mm/1920x480px IPS LC display

N30SA, like the W20SE, offers a 'critical listening' mode that defeats any non-essential background computing, all in a drive to deliver the cleanest data…

ANDREW AUDITIONS
As mentioned before with devices of this kind, the N30SA doesn't have a 'sound' of its own. Instead, it gives the connected DAC the best possible opportunity to shine by presenting it with a super-clean digital feed, and with as much interference as possible eliminated. That's immediately apparent when using a top-notch DAC ⟳

CONDUCTOR IN CONTROL

Aurender's Conductor app, currently in V3.3 form and available for iOS and Android tablets and phones, isn't just one of the slickest and most intelligent ways to play music – it also allows every detail of the company's devices to be set up from the listening seat. Quite apart from the speed with which it will re-index music added to internal or external storage [pictured left], and the ease with which streaming services including Tidal, Qobuz and Internet radio can be set up, it also enables the user to delve deep into the N30SA's configuration [pictured right]. Here you can 'tune' the output of the player to the capabilities of the DAC with which it's partnered.

Upsampling is configurable, or can be bypassed, and it's also possible to specify how DSD files are handled: in native form, or converted to PCM, and with a choice of low-pass filters to reduce HF spuriae. The 'Critical Listening Mode' mentioned in the main review can be invoked, for example with the display only lighting up when music isn't playing, then switching off again as the music starts. It's also possible to set the N30SA to fade tracks in and out to avoid clicks and pops between them, and even to set a few seconds' delay between tracks to allow certain DACs adequate settling time when switching between file types or sampling rates.
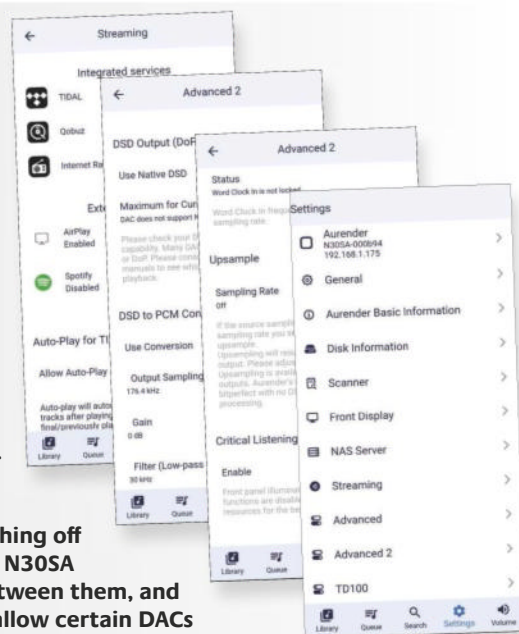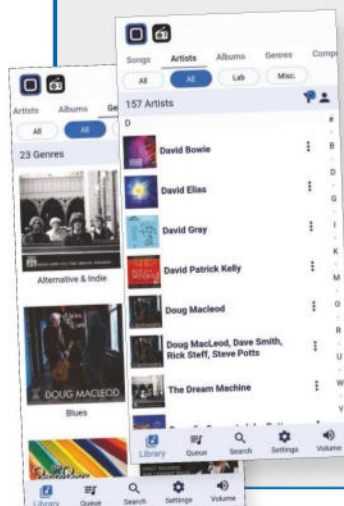
ABOVE: There's additional filtering [lower left] and choke-regulation of the incoming power supply [top] and galvanic isolation of the incoming data [lower right]. Within the screened 'audio board' there's an OCXO [centre], FPGA [top right] and custom USB audio module [lower left]

such as the dCS Vivaldi One APEX in PM's reference system – but also with less ambitious digital converters, from the iFi Audio NEO Stream [*HFN* Mar '23] or Chord Mojo 2 [*HFN* Apr '22] down to the likes of the little AudioQuest DragonFly 'DAC in a stick' [see PM's Lab Report, p61].

Returning to the dCS Vivaldi One APEX, the impact of Aurender's N30SA was evident when playing the Ensemble Allegria recording of Britten's *Variations On A Theme Of Frank Bridge* [Lawo LWC1241], with a remarkable sense of space and instrumental definition, and real impetus and drive in the Variation 2 'March'. The same was true with cellist Camille Thomas's *The Chopin Project: Complete*

'The album drew to a close with a late-night feel'

Chamber Music release [DG 4858596], with remarkable, intricate detail revealed in the Grand Duo for cello and piano. Everything here sounded just that bit more real, without any suspicion of things being over-processed or forced.

Those same qualities were clear even with the full-on mixes on Whitesnake's *Still... Good To Be Bad* remaster [Rhino 603497836918], the chugging drive of 'A Fool In Love' still not the cleanest of sounds despite the reworking, but having real power, fine instrumental clarity and a satisfying snarl.

GOOD TIMES
Strip things back to The Knack's 'My Sharona', from *Live At The House Of Blues* [Liberation Hall/Smile LIB-5077], and all that weight and drive is there, along with excellent ambience. Similarly, on the cover of The Monkees' 'Last Train To Clarksville' the detail really gets the listener into the good-time atmosphere.

Change pace to the lush sound and close harmonies of The King's Singers' *When You* ↪

LEFT: Also available in a silver finish, the N30SA has an IPS LCD panel in place of the AMOLED display used on the single-box W20SE model. It offers essential playback information, including album artwork

ARI MARGOLIS

While our tests focused on the N30SA's asynchronous USB output – a popular choice because of its compatibility with the highest LPCM and DSD data rates – there's a school of thought that suggests the older S/PDIF interconnect standard may be preferable for lower (up to 192kHz) sample rates. Ari Margolis, Aurender's US Sales & Business Development Director, tends to agree.

'The W20SE and N30SA share the same audio board which is run by an Oven Controlled Crystal Oscillator (OCXO) clock module which ensures precise and stable control of the S/PDIF and AES/EBU outputs. USB has become the *de facto* standard digital audio interconnect in 2023. Why? Because computers have USB ports. They don't have OCXO clock-controlled S/PDIF outputs. If they did, no one would be using USB.'

Ari continues, 'With asynchronous USB, all digital players (including the N30SA) are slaved to the DAC's clock. So our OCXO clock doesn't come into play for USB output, but if the connected DAC has a very precise clock to govern that USB input stage, then it can achieve very low levels of jitter. However, USB is prone to transferring noise from the source to the DAC. Even with the N30SA, where our engineering team has gone to great lengths to mitigate USB noise transference, the USB output is still noisier than S/PDIF or AES/EBU.

'So S/PDIF and AES/EBU are less noisy than USB, but they are historically prone to jitter. That's why the source's clock is so important and why with Aurender's OCXO-slaved S/PDIF or AES/EBU outs, we achieve low noise *and* low jitter.' PM
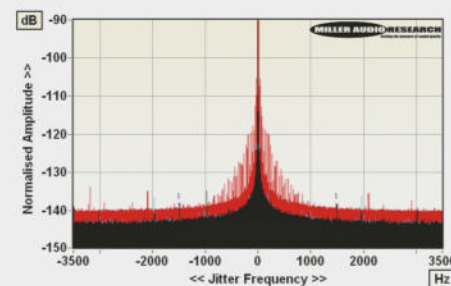
ABOVE: Two USB-A 3.0 hubs for outboard drives, a bay for a 2.5in SATA drive and a double-isolated Gigabit Ethernet port service the input/display chassis [top] which sends a PSU feed and digital data to the 'audio' chassis [bottom] with its outputs on USB-A 2.0 (384kHz/32-bit; DSD512) and AES/coaxial/optical (192kHz/24-bit)

Wish Upon A Star album of music from Disney films [Warner Classics 5419736740], and that ability of the Aurender/dCS combination to dig deep and let you hear what each voice is doing greatly enhances the appreciation of the musical skill playing out before you. This was especially true of tracks including 'The Second Star From The Right', while also ensuring Joyce DiDonato's voice soared out of the arrangement of 'Colours Of The Wind'.

IN THE MOOG

With Taj Mahal's *Savoy* album [Stony Plain Records SPCD1470], the N30SA lends its clarity not just to the appropriately chilly version of 'Baby It's Cold Outside', with lovely guest vocals by Maria Muldaur, but also to the standout covers of many jazz and blue standards, culminating in a big, rich 'One For My Baby…', ending the album with a real late-night feel.

That ability to delve deep into a mix without the artificial impression of disassembling the music was especially clear when playing Thierry Maillard's *The Moog Project* album [Ilona Records LIR 9302396]. This draws heavily on the Supertramp back catalogue, treating familiar songs to funked-up jazz arrangements understandably heavy on electronic instruments, from the synths of the title to syndrums and analogue electric pianos. The album benefits from the absolute clarity of the bass and percussion, both in the recording and the way the N30SA enables a DAC to handle it.

What's more, the keyboards are set front and centre, and have the same kind of period character one might identify in an 'authentic instruments' classical recording, or one of an historic fortepiano. As with the other recordings sampled, the N30SA's contribution was clear whatever DAC was hosted, but the subtlety of the sound, its black silences and micro-dynamics were even more transparent with the highest quality converters.

Then, just when you think you're getting all the system has to give, switch the N30SA into 'critical listening mode' – and it summons just a little more information to delight, whether that's the bite of a bow on the strings of a cello, or the tell-tale switching of (relatively) ancient electronic keyboards.

And this set-up loves voices, as is obvious with the Rias Kammerchor/Akademie Für Alte Musik Berlin/Justin Doyle recording of Handel's *Coronation Anthems* [Harmonia Mundi HMM902708]. Released just before King Charles III's crowning, it's a set of thrilling instrumental and vocal performances, especially if you swerve the obvious 'Zadok The Priest' and delve deeper into the other three anthems, where the precision and richness of 'The King Shall Rejoice' is especially rewarding.

It all goes to show that while the quality of the DAC and analogue components in a system are of paramount importance, what happens *before* the music is converted from digital data has a major role to play. ⏻

HI-FI NEWS VERDICT

For all the protestations of the 'bits is bits' absolutists, the proof that 'digital done right' has a crucial role to play is in the listening, as demonstrated by Aurender's N30SA. Provided the rest of your playback chain is optimised, its cossetting of data coming from network or onboard storage can enhance both musical communication and involvement. Yes, it's a luxury, but it's one that's well worth having.

Sound Quality: 90%

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ABOVE: 48kHz/24-bit jitter spectra from iFi Audio's NEO iDSD DAC (via Aurender N30SA, black; Aurender W20SE [*HFN* Mar '23], blue; and PC, red)
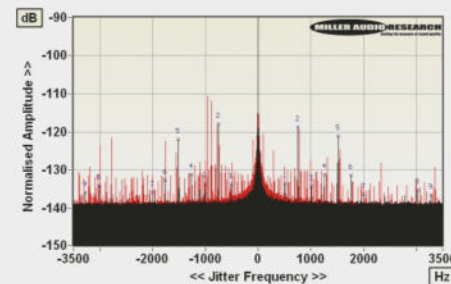
ABOVE: 48kHz/24-bit jitter spectra from AudioQuest's DragonFly (via Aurender N30SA, black; via PC, red)