

Primare DAC30

What do you get if you take the bespoke engineering from Primare's Oppo-based BD32 universal disc player? Something very much like this new DAC30 converter
 Review: **John Bamford** Lab: **Paul Miller**

Given Primare's near-30 year history, and its wide-ranging product portfolio, it's surprising to discover that this new DAC30 is the Swedish firm's first standalone D-to-A converter. Any new DAC had better be capable of accepting data up to 24-bit/192kHz, preferably via the convenience of a USB input to avoid the extra expense of a separate USB-to-S/PDIF (or USB-to-AES/EBU) converter and additional digital interconnect cable. And at £2000, Primare's DAC30 is clearly aimed at quality-conscious audio enthusiasts rather than casual buyers, so naturally it does include 'Full HD' 24/192 compatibility.

The DAC30 is housed in Primare's familiar heavyweight steel chassis with three chunky isolation feet (used for all its 30 Series components), with the minimalist brushed aluminium fascia immaculately finished with chrome-capped operation buttons. There are five digital inputs at the rear, a row of green LEDs on the front panel numbered 1-5 indicating which is selected. Inputs 1, 2 and 3 are S/PDIF with both Toslink optical and RCA coaxial sockets provided, input 4 is AES/EBU (XLR), and input 5 is a USB-B input socket. There is also an S/PDIF digital output.

A FAMILAR ENGINE

At the heart of the DAC30 is part of the processing 'engine' from the company's BD32 universal Blu-ray disc player [HFN Feb '12] which, as with most universal BD players, is based on an Oppo core with Primare's bespoke power supplies and audio output section. Consequently the DAC30 employs Crystal's CS4398 Delta-Sigma DAC, and a Burr-Brown SRC4392 digital interface receiver/sample-rate converter operating at 192kHz.

It's a fully balanced design, the DAC30's analogue output stage employing Burr-

Brown OPA2134 op-amps, WIMA and EPCOS polypropylene filter capacitors and MELF resistors. Single-ended (RCA) analogue outputs are of course included in addition to balanced XLRs, the single-ended analogue stage utilising MOSFET transistors fed by an active current source rather than passive resistors.

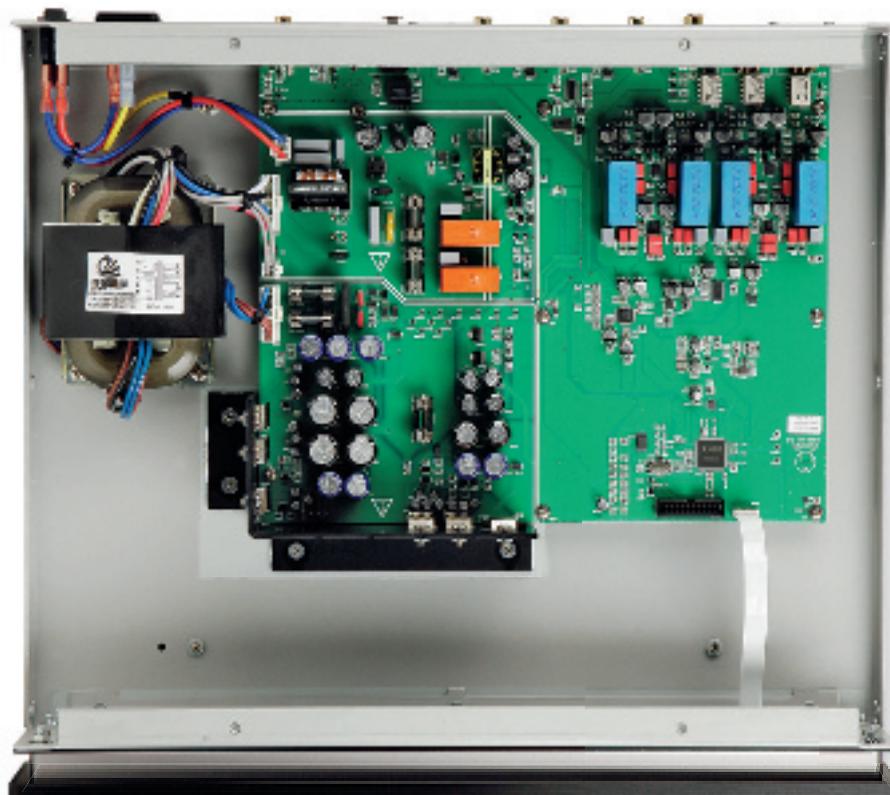
The linear power supply uses a R-core transformer with separate windings for analogue and digital power supply circuits, with extensive regulation in both the analogue and digital supplies. Primare chooses to use banks of small supply capacitors for lower equivalent series resistance (ESR), the company says.

In developing its asynchronous USB interface – used both in this DAC30 and the company's MM30 multimedia add-on module for its I32 integrated amplifier – Primare collaborated with Syncore Technologies AB, an embedded

systems specialist based in Linköping. For Windows OS, USB Audio Class 2.0 drivers from Bristol-based XMOS are provided via Primare's website. Says Primare's managing director Lars Pedersen: 'For reliable 24/192 operation there were few choices available. We chose XMOS because it offered an integrated communication hub hosting the microcontroller, and the company was very helpful in developing our specific application. We were able to fine-tune its firmware for optimal performance with our hardware platform.'

UP AND RUNNING

Installation of the driver was certainly straightforward. I had the DAC30 hooked into my system and music flowing from my computer into the DAC30's USB input in a matter of minutes, the row of LEDs on the fascia confirming that all sampling rates were being correctly received. One



RIGHT: Primare's linear power supply, with its R-core transformer and extensive regulation, and its choice of DAC and balanced analogue output stage are all inspired by the BD32 universal player [see HFN Feb '12]



of Primare's C23 multi-function system remote controllers is supplied with the DAC30, its numbered keys providing direct input selection as well as the up/down keys allowing scrolling through inputs. The Dim button, which adjusts the brightness levels of the display in many Primare components, turns the DAC30's indicator LEDs off/on. The power button operates the DAC too – but other than this there's nothing else to control, as there are no digital filter options or up-sampling modes from which to choose.

Criticisms? As with many DACs that employ relay-controlled mute circuits, you'll often miss the first second or so of music when you play consecutive music tracks that have *different* sampling rates, necessitating restarting the track. Frankly, I can live with this – I've become accustomed to it as a common issue. Also, the DAC30 doesn't remember the last input selected when powered down.

'Marsalis' sax wailed clearly above dense keyboard layers'

When you bring it out of standby it always defaults to Input 1. This I *did* find mildly irritating and I'd like to see Primare address this in a future revision.

COMPOSURE RETAINED

I can imagine the DAC30 sounding wonderful in unison with one of Primare's crisp and super-vivid UFPD Class D amplifiers, as it has a richly-coloured warm tone with delicate treble and really 'bally' bass. I was struck from the outset by its bold and powerful depiction of bass dynamics and descriptive detailing of bass textures

when playing Sting's 'Children's Crusade' from *The Dream Of The Blue Turtles* [A&M 393 750-2], while doing my utmost to ignore the unnecessary electronic treatments in the recording (Sting's voice swimming in cavernous artificial reverb).

The DAC30 allows you to hear all the way into a recording's noise floor, pulling

ABOVE: Available in black or titanium finish, the Primare's aluminium fascia sports on/off and input selector buttons, with LEDs indicating active input and incoming sampling frequency

out delicious detail from a beautifully dark background. During the rather difficult middle section of Sting's anthem – difficult, that is, for a hi-fi system to deliver it without seemingly collapsing into a wall of noise – as the level increases and Branford Marsalis's parping saxophone joins in the mix, the DAC30 retained its composure admirably. The ride and crash cymbals had natural 'ring' while the saxophone wailed clearly above the increasingly dense layers of keyboards, the Primare serving up a coherent image throughout the piece.

Later in the album, during 'We Work The Black Seam' with its Police-esque 'white reggae' beat, the DAC's excellent resolving ability allowed transparent differentiation between kick drum and plucked bass notes, and the clarity of the hypnotic keyboard patterns in the background helped make the song engagingly rhythmic.

Regular readers will be familiar with my listening room and resident amplifier/speaker rig [go to www.hifinews.co.uk and click on 'Meet the Team']. Currently I'm using a Mac Mini (2.2GHz/8Gb RAM) running JRiver Media Center v.17 playback software under Windows 7, driven from a recently acquired Dell ST2220T touchscreen monitor. I've spent the last four years gradually transferring my entire CD collection to a 2TB HDD, and with my selection of hi-res recordings added to the library, playing out from computer has inexorably become the predominant listening source both for pleasure and critical audio component analysis.

With Primare's DAC30 in the replay chain, using its asynchronous USB input, I was utterly blown away by the playback

PRIMARE'S PAST

Primare's history dates back to the mid-1980s, its iconic 900 Series components causing design-conscious audiophiles to go weak at the knees. It was the work of Scandinavian designer Bo Christensen, one of the most creative and inspirational industrial designers the world of audio has ever seen. Lars Pedersen, managing director and owner of Primare Systems, has been at the helm since 1996. As a young entrepreneur he was the Scandinavian importer of British-made Target loudspeaker stands, and by the 1990s had a business (Xena Audio) that owned Primare, Copland and QLN before he chose to focus on Primare. What was a niche ultra-high-end marque has grown into a successful brand that today covers multi-channel AV electronics as well as specialist two-channel analogue and digital audio components. Manufacturing is mostly in the Far East, Primare's chief electronics designer Bent Neilsen and co-product development engineer Bjørn Holmqvist juggling their time between supervising suppliers in Taiwan and China and at the company's design and testing headquarters in Växjö, Sweden where final assembly and soak testing is undertaken.

OUTBOARD DAC



ABOVE: Balanced (XLR) and single-ended (RCA) analogue outs are joined by AES/EBU (XLR) and USB digital inputs alongside three Toslink optical and three coaxial S/PDIF

of a 24-bit/96kHz file of a recording of Norwegian pianist Helge Lien. I was listening to 'Diverted Dance' by the Helge Lien Trio, from *Hello Troll* Germany's Ozella Music imprint [24/96 FLAC download from highresaudio.com]. The transient attack of the keyboard notes was startlingly real, the natural decay of reverb creating a palpable image of a piano at the end of my room as my monitors seemed to 'disappear'.

The sharp tinkle of Indian bells that first marks the introduction of drum kit and bass accompaniment leapt forward in holographic fashion – and once the trio got into its stride I was treated to swathes of rich, creamy and abundant bass alongside the drummer's sizzling cymbals and Lien's modal piano workout.

TEMPERED BY CIVILITY

Coupled with the Primare DAC's subjectively bold and powerful disposition through the bass and midband is a hint of gentleness in its reproduction of high frequencies. I wouldn't describe it as soft, but it is smooth and 'sweet', sounding refined both via its USB and S/PDIF inputs. Whether you'll consider it an upgrade to your CD player will depend entirely on the performance of your player of course. Certainly it added verve and gravitas to the performance of an ageing Stable Platter Mechanism-equipped Pioneer PD-S06 CD player I had, that itself has a polished and refined sound.

Using the player as a disc transport, adrenalin-fuelled rock music and large-scale orchestral works gained muscularity and dynamic potency – with better resolution of fine detail as well. Rarely were recordings delivered in a raucous, up-front manner. Most



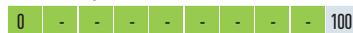
of the time the DAC30's smooth treble ensured that its authoritative energy was tempered with a degree of civility, encouraging long listening sessions. Nevertheless the Primare can't make *everything* 'the voice' Knight's rousing 'Come As You Are' from 2006's *The Best Of...* retrospective [Parlophone 0946 354566 2 2] was shown to be quite horrible (more's the pity), dynamically squashed and bandwidth limited.

Her premier-league vocals, double-tracked extensively in the song, might just as well have been recorded down a couple of telephone mouthpieces. The engineer responsible might learn from listening to a recording of Scott Walker from more than three decades earlier. I was playing *Boy Child: The Best of Scott Walker 1967-1970* [Fontana 842 832-2], admiring 'The War Is Over (Sleepers)' taken from his 1970 long player *'Til The Band Comes In*. The slightly distant, shut-in quality of the string arrangement betrayed the recording's vintage sure enough, but the clarity of Walker's voice was sublime. Some might say: 'It must have been the tubes...' ☺

HI-FI NEWS VERDICT

This is a great sounding D-to-A converter that can be strongly recommended to audiophiles looking for a straightforward-in-use DAC for a high resolution computer audio system setup. It's perhaps a little expensive given its limited feature set, but that classy casework doesn't come cheap – and you can certainly fit it and forget it. Its tremendous sound quality will prove highly rewarding in top-flight systems.

Sound Quality: 84%

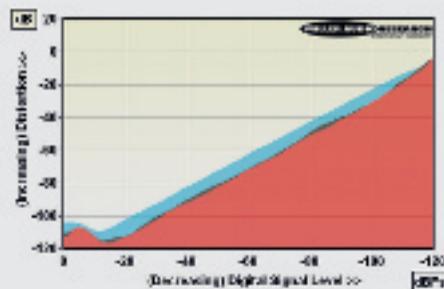


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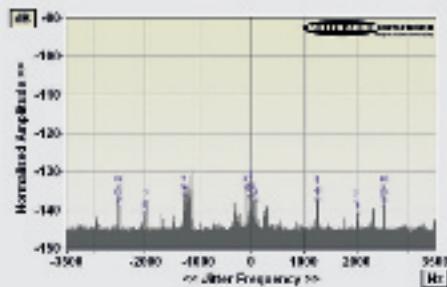
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When Primare says that the DAC30 'incorporates the supreme processing engine of the award-winning BD32 universal player' it might also mention that the two-channel CS4398 DAC-based analogue stage also looks to be lifted from this chassis [see *HFN* Feb '12]. The 4.3V output from its XLRs is the same, as is the 113.5dB A-wtd S/N ratio and, tellingly, the 97ohm source impedance. The output is also phase-inverting, so you might want to flip your speaker leads before doing any meaningful comparisons. The responses with 48kHz, 96kHz and 192kHz are also the same as we recorded for the BD32, and consistent between S/PDIF and USB inputs, at -0.1dB/20kHz, -1.4dB/45kHz and -5.2dB/90kHz, respectively.

Primare implements the CS4398's standard, FIR-type digital filter which offers a very uniform response but incurs both pre- and post-echoes in the time domain. Still, not having to trawl through numerous filters makes my job a little easier in the lab, for which it has my thanks! Otherwise, while the layout of the analogue stage looks broadly unchanged (stereo separation still deteriorates slightly at HF), there is an improvement in treble distortion, down from 0.0009% to 0.00065% at 20kHz/0dBfs and, more importantly, from 0.0016% to 0.0003% at 20kHz/-30dBfs [compare blue trace, Graph 1 below, with BD32]. The freedom from the BD32's necessary complexity also allows the DAC30 to escape its very mild PSU-related jitter. What remains is very low and clustered at ±1.3kHz/±2.6kHz and consistent through all inputs at ~20-30psec [see Graph 2, below]. Readers are invited to view comprehensive QC Suite test reports for the Primare DAC30's S/PDIF and USB inputs by navigating to www.hifinews.co.uk and clicking on the red 'download' button. PM



ABOVE: Distortion vs. 24-bit/48kHz digital signal level over a 120dB dynamic range. S/PDIF input (1kHz, red) and USB input (1kHz, black; 20kHz, blue)



ABOVE: High resolution jitter spectra from 24-bit/48kHz data over S/PDIF (USB is almost identical)

HI-FI NEWS SPECIFICATIONS

Maximum output level (Balanced)	4.31Vrms at 97ohm
A-wtd S/N ratio (S/PDIF / USB)	113.6dB / 113.5dB
Distortion (1kHz, 0dBfs/-30dBfs)	0.00005% / 0.0003%
Dist. & Noise (20kHz, 0dBfs/-30dBfs)	0.00065% / 0.0004%
Freq. resp. (20Hz-20kHz/45kHz/90kHz)	+0.0dB to -0.09dB/-1.4dB/-5.2dB
Digital jitter (48kHz/96kHz/USB)	30psec / 18psec / 40psec
Resolution @ -100dB	±0.1dB
Power consumption	25W
Dimensions (WHD)	430x95x370mm