

Bryston BDP-2/BDA-2

Bryston's latest BDP-2 digital music player has improved functionality over its earlier BDP-1 model. And its new matching DAC now features a hi-res compatible USB input
 Review: **John Bamford** Lab: **Paul Miller**

Where the term 'digital music' once referred to CDs and home recordings on DATs and MiniDiscs, today it represents music contained in myriad file formats, stored on all manner of media – from hard disk drives (HDDs) to flash memory sticks and cards the size of postage stamps.

Enter digital music players. At first they were portable devices but soon became embedded in home AV components designed for the masses. More recently, specialist audio firms have been paying attention to digital music sources, most noticeably in the form of outboard DACs equipped with USB inputs for easy connection to computers. How could they not? After all, the dream of having access to the record companies' high-resolution master recordings is no longer a fantasy thanks to the availability of downloads from music labels dedicated to recording at the highest fidelity.

A PURIST ROUTE

Canadian audio manufacturer Bryston adopted a purist approach when setting about designing its first computer audio product, the BDP-1 'digital player' which we reviewed soon after it came to market alongside the company's BDA-1 standalone DAC [*HFN* Apr '11]. Rather than produce a streaming network player as many hi-fi companies have done, it made an ultra-minimalist computer – designed for straightforward plug-and-play operation – with four USB sockets into which you simply plug memory sticks or connect external HDDs, and play music files using control buttons just as you would the transport keys on a CD player's front panel.

An enhanced model, the BDP-2 featured here, joined Bryston's component line-up at the beginning of this year along with a new BDA-2 digital-to-analogue converter which,

unlike the cheaper BDA-1 (£2350) that sports a 'convenience feature' adaptive USB input, now includes a 24-bit/192kHz-capable asynchronous USB input. This uses proprietary firmware running on the XMOS USB audio micro-controller platform that many other specialist manufacturers employ in their DACs today.

Bryston supplies accompanying Thesycon drivers on a key-shaped USB memory stick along with the BDA-2 DAC's instruction manual in the box. As is usually the case, these are only required for Windows PC users; Macintosh OS10.6.4 and above natively supports USB Audio Class 2.0 with most (although not all) connected devices. Meanwhile, whereas the cheaper BDA-1 utilises a pair of time-tested 24-bit Cirrus Logic CS4398 DACs in dual-differential configuration, the BDA-2 employs newer 32-bit AKM AK4399 DACs.

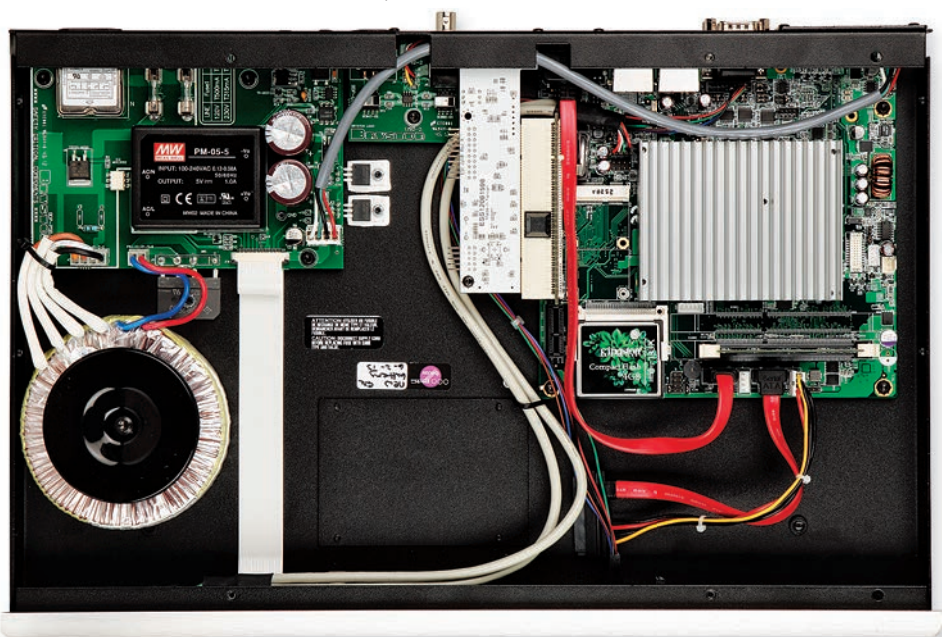
Otherwise the feature set remains the same. Since there are no fewer than eight digital inputs – six S/PDIF (two Toslink, two RCA, two BNC), a balanced AES/EBU (XLR) and the aforementioned USB input – it's hard to imagine any system rig that can't be wholly accommodated. A handy S/PDIF

pass-through output (RCA) is provided too. Inputs can be selected directly via front-panel switches or Bryston's BR2 system remote controller (a pricey option at £500) which also enables you to toggle the BDA-2's upsampling function from the listening seat rather than via the button on its front panel. This synchronously upsamples input data to either 176.4kHz (for 44.1kHz and 88.2kHz media) or to 192kHz (for 48kHz and 96kHz media).

IMPROVED CONNECTIVITY

Front-panel LEDs display the input sample rate: an essential feature in my book since it's the only way of confirming that your digital source is delivering what you expected – especially if you're pushing data from a computer. As with all its audio components, Bryston places great store in its proprietary discrete Class A analogue output circuitry, eschewing off-the-shelf IC op-amps, with both single-ended and balanced outputs provided.

For those who didn't see our review of the BDP-1, Bryston's digital player is a small computer running a Linux operating system, designed solely for replaying audio



RIGHT: At the core of the BDP-2 player is a passively-cooled Intel Atom-based micro PC board with Linux OS loaded via a 4GB compact flash. Digital output is via the (white) PC soundcard mounted on a PCI edge-connector



from file storage media connected to its USB sockets. It employs a linear power supply and a modified sound card with S/PDIF (BNC) and AES/EBU (XLR) digital outputs for connecting to any DAC of choice. A diamond pattern of four push buttons on the fascia allows navigation of folders and files, with conventional 'transport' keys provided for previous, next, stop, pause and play. A version of the open source Music Player Daemon (MPD) music player server provides decoder, queue and control functions.

Bryston doesn't claim any sonic enhancements for its new BDP-2 digital player, just significantly improved connectivity and functionality. The front panel looks identical to the BDP-1, with two USB 2.0 ports intended for thumb drives and a two-line, 23-character dot-matrix display that shows commands, player status or the current selection played.

The differences to the BDP-1 can be seen on the rear panel. There are two (rather than one) RS232 and Ethernet ports, four (rather than two) USB 2.0 ports, and an additional eSATA HDD connector. Under the bonnet is a new Intel Atom

powered motherboard offering three times the processing speed, an eight-fold increase in system memory, and a more robust power supply. Consequently the BDP-2 is a much more viable proposition for music lovers with enormous libraries, the faster processing and added system memory helping to load albums and metadata faster.

Upgradability to USB 3.0 connectivity is also promised for the future; furthermore a 2.5 inch SATA drive can be fitted internally if you really wish. You supply the drive, which must be fitted by a Bryston dealer otherwise you'll be voiding the product's warranty.

Connect the Bryston BDP-2 via Ethernet cable to a wireless router and several remote control options become available in addition to the BR2 IR handset. Embedded PC/Mac programs (Bryston-MAX for computers and tablets and Bryston-MINI for small-screened smartphones and the iPod touch) enable control via a web browser. You can also use the Minion music player plug-in for Mozilla's Firefox web browser. I drove the BDP-2 without any difficulty via an iPhone using the free MPoD

'Sharp transients and searing dynamic power were preserved'

ABOVE: It's no looker, but this DAC (bottom) is nevertheless functional. A bank of LEDs shows sampling frequency, and this is set between the on/off switch and a eight-way input selector

Music Player Daemon controller app. MPoD is also available for Android devices.

ENGAGINGLY DYNAMIC

The jury remains out deciding whether or not to use the DAC's upsampling function. Listening to the BDA-2 in my resident system, using the Mac mini running JRiver Media Center v18 player under Windows, showed in a matter of minutes that it's a terrific sounding DAC. In typical Bryston style, one could say, it sounds full-bodied, 'clean' and engagingly dynamic, with a grain-free and smooth treble quality.

When playing the classic 1970s audiophile recording *The King James Version* by Harry James & His Big Band [Sheffield Lab LAB-3] the DAC delivered the sound of the lead trumpet without any hint of strain while faithfully preserving the instrument's sharp transients and searing dynamic power. The sense of three-dimensionality was excellent too.

Similarly Diana Krall's sultry 'I've Got You Under My Skin' from *When I Look In Your Eyes* [Verve IMPD 304] was rendered with a richly saturated palette of tonal colours, the balance creamy and luscious, yet sharply focused, without the slowed-down feeling of 'laziness' that an overly-thick tonality can sometimes create.

With both these recordings I decided I preferred to hear them at their native sampling rate rather than upsampled, but only after switching back-and-forth many times. The effect was subtle, but I sensed that the upsampling removed some of the recordings' vibrancy and dynamism, smoothing the performances just a little bit *too* much.

Further experimenting highlighted that the effects of upsampling are entirely dependent on the recording being auditioned – so you might find a real need for Bryston's IR handset unless you sit ⇨

STAYING OFF THE GRID

When you consider the lengths designers of high-end gear go to in order to ensure short signal paths and shielding of audio circuits from internal and external disturbances, it's not surprising that the audiophile validity of computer audio is a topic that gets many hi-fi purists hot under the collar. Specialist music player software and utilities obviate shortcomings in Mac OS Core Audio and Windows kernel mixer, ensuring that audio is routed to an external DAC at native bit-depth and sampling frequency. Hobbyists seeking perfection furthermore shut down all unnecessary services in their computers to minimise CPU workload, disable wireless connectivity to avoid potential interference, and resolutely keep their music computers off the internet. Since Bryston's BDPs are ultra-minimalist computers designed to do nothing other than play music files, it's no wonder they sound excellent. Of course, knowledgeable computer geeks will holler that it's possible to build your own simple set-up for a fraction of the price. Nevertheless they could be precisely what you want if you don't have the necessary skills yet are keen to enjoy today's world of hi-res 'studio master' files.

MUSIC PLAYER/DAC

LAB REPORT

BRYSTON BDP-2/BDA-2

In practice Bryston's balanced analogue output stage has as much impact on performance as its choice of AKM's '32-bit' AK4399 DACs. Compared with the inaugural BDA-1 [*HFN* Apr '11], the BDA-2 offers a slightly lower maximum output level (3.9V versus 4.7V, balanced) and a correspondingly reduced S/N ratio (113.8dB vs. 115.3dB) although the identical 70ohm source impedance, rising to 76ohm at 20Hz, plus $-0.05\text{dB}/20\text{kHz}$ (48kFs) and $-1.5\text{dB}/45\text{kHz}$ (96kFs) responses all suggest the analogue stage's topology is essentially unchanged. With upsampling turned *off*, the response is flatter out to 43kHz (-0.7dB) before dropping more sharply to 45kHz (-2.5dB) though, naturally, there's no change in the $-7.3\text{dB}/90\text{kHz}$ response with native 192kHz media. Distortion is also essentially unchanged at 0.00012% (0dBfs/1kHz), rising to 0.0015% at 20kHz but lower-level performance is slightly better in the BDA-2 with THD holding to 0.0002% at -30dBfs [see Graph 1, below]. Correlated jitter remains vanishingly low at 10-12psec, all sample rates, but the new BDA-2 DAC exhibits a reduced low-rate uncorrelated jitter [meaning the signal peak shows less broadening near its base – see Graph 2].

Bryston's new BDA-2 DAC also supports asynchronous USB 2.0 and the performance here is right up with S/PDIF and AES/EBU with a wide 113.8dB S/N ratio, reference-class jitter suppression [10-16psec, all sample rates – see Graph 2] and low-level resolution good to $\pm 0.3\text{dB}$ over a 100dB dynamic range. Readers are invited to view comprehensive QC Suite test reports for the Bryston (BDP-2) and BDA-2's S/PDIF and USB inputs by navigating to www.hifinews.co.uk and clicking on the red 'download' button. PM



ABOVE: BDP-2 [top] has a connector for an eSATA drive and six USB sockets, plus Ethernet, RS232, 12V trigger and S/PDIF (BNC) and AES/EBU (XLR) digital outputs

adjacent to your system rack. For example, Eric Clapton's 'I Shot The Sheriff' and 'Motherless Children' from *461 Ocean Boulevard* [Polydor 811 697-2] sounded typically compressed and overly processed, yet when upsampled the sizzling, over-driven guitars appeared less peaky and better defined. But, as I said, the differences were subtle.

Nevertheless the DAC has immense resolving capability whatever and however you feed it a digital signal. Putting Musical Fidelity's V-LINK₁₉₂ USB-to-S/PDIF converter into my system rig's replay chain in order to test the DAC's S/PDIF inputs with a selection of high-sampling-rate files revealed a perceptible flattening of the sound image and marginal dulling of vitality compared with direct connection between computer and the BDA-2's USB input. (What I heard might well have been due to the introduction of an additional digital interconnect cable in the chain.)

BDP-2 AS THE SOURCE

After transferring various FLAC and WAV files to a pen drive I set about listening to the BDA-2 using the BDP-2 digital player as a source. Would it blow my computer set-up away? I'm somewhat gratified to say that it didn't, as I'd be lost without the rich functionality and flexibility provided by a fully-featured media player such as JRiver Media Center, the more so since I control it via a touch-screen monitor sited on the coffee table in front of my sofa. But the BDP-2 *did* sound marginally more precise and transparent.

Listen to standard resolution rock and pop recordings and I'd defy anyone to *reliably* identify which was which in a blind listening test; but with top-drawer audiophile recordings the Bryston digital player delineated instrumental lines

with greater ease, and allowed music to flow and breathe with a compellingly engaging naturalness.

Returning to the Harry James recording brought to light the BDP-2's adeptness at preserving the spatial cues that can transform a high-end listening experience. The Bryston better preserved the full scale of the band's well-recorded performances, with tangible three-dimensional instrumental body and natural reverberant decay into the air of the recording venue.

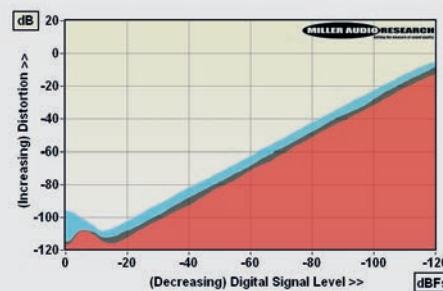
Of particular note was the player's imperturbable dynamic stability. Even during energetic crescendos the BDP-2 maintained a consistent perspective with instruments fore and aft in the sound field anchored to their positions. Played out from my computer the performance exhibited minor sonic artefacts during high-energy peaks, adding glare and projecting the sound slightly forward.

Bryston's BDP-2 might not rip, store or organise your music, but it certainly plays music to a very high technical standard. Even audiophiles who have thus far resisted computer audio would be impressed. ☺

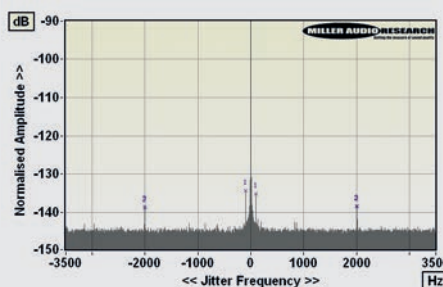
HI-FI NEWS VERDICT

If you owned the BDP-2 and BDA-2 you might find the latter's USB input superfluous, as the sound of hi-res files played by the BDP-2 is likely to be noticeably superior to that from a standard laptop or desktop computer. And some might welcome the simplicity and limited functionality. It's a persuasive, if expensive, endorsement of the validity of computer audio in today's audiophile world.

Sound Quality: 82%



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 res. jitter spectrum from 24-bit/48kHz data over USB (S/PDIF input is directly comparable)

HI-FI NEWS SPECIFICATIONS

Maximum output level (Balanced)	3.94Vrms at 70-75ohm
A-wtd S/N ratio (S/PDIF / USB)	113.8dB / 113.6dB
Distortion (1kHz, 0dBfs/-30dBfs)	0.00012% / 0.00025%
Dist. & Noise (20kHz, 0dBfs/-30dBfs)	0.0015% / 0.00035%
Freq. resp. (20Hz-20kHz/45kHz/90kHz)	+0.0dB to $-0.05\text{dB}/-1.2\text{dB}/-7.3\text{dB}$
Digital jitter (48kHz/96kHz/USB)	12psec / 11psec / 13psec
Resolution @ -100dB (S/PDIF / USB)	$\pm 0.2\text{dB}$ / $\pm 0.3\text{dB}$
Power consumption (BDP-2/BDA-2)	22W / 9W (2W standby)
Dimensions (WHD)	432x70x282mm (each)