DSD USB DAC/headphone amplifier
Made by: Audiobyte, Romania
Supplied by: BD-Audio Ltd, Malvern, Worcs
Telephone: 01684 560853
Web: http://audiobyte.net; www.bd-audio.co.uk
Price: £1200

Audiobyte Black Dragon

While the brand is new outside of central Europe, Audiobyte brings a longstanding heritage to this all-singing DAC/preamp which offers both PCM and DSD functionality

Review: **Andrew Simpson** Lab: **Paul Miller**

Thanks to the continuing success of computer audio and the growing demand for high-res music, the standalone DAC market has expanded significantly in recent years. The choice of music recording and file formats has also evolved to encompass both DSD and LPCM types, up to DSD256 and 384kHz sample rates respectively.

Each 'flavour' has its adherents and Romanian-based Audiobyte clearly recognises the appetites of both camps, so its £1200 Black Dragon has been created to cater for both formats across a wealth of sample rates, bit-depths and inputs. It serves as either a standalone DAC or dedicated headphone amplifier, making it equally at home as part of a desktop system or larger separates rig.

SIMPLE FASCIA CONTROLS

The Black Dragon is part of Audiobyte's three-strong digital audio product range and joins the Hydra Z USB Audio Bridge (£640), which converts USB audio for DSD, DXD and PCM formats, and its Hydra ZPM PSU upgrade (£450). At the heart of the Black Dragon sits an FPGA that's carried over from the Hydra Z, and this is actually borrowed from Audiobyte's sister brand Rockna and its Wavedream DAC [see boxout]. This chip is custom-programmed to act as the digital receiver and clock manager, and to offer PCM/DSD formatting for single-rate (DSD64) and double-rate (DSD128) DSD, alongside PCM up to 384kHz/32-bit. A pair of 192kHz/24-bit AKM AK4396 DACs operate in balanced mode at the output.

Lifting the Black Dragon's lid reveals separate PCBs for its analogue and digital circuits, with each being fed by its own PSU. The discrete analogue output stage is also fully balanced, as illustrated by the rear panel XLR sockets. Quality casework contributes to the unit's 4.5kg heft while the 1cm-thick black alloy faceplate has nicely chamfered edges. Although the black hex-bolts holding it in place are visible, they're recessed to make them 'blend in', rather than stand out.

The front panel furniture comprises just four buttons, an IR remote control sensor, 6.35mm headphone socket and a centrally positioned display screen. The largest of the four buttons is the power switch, which is joined by three silver domed pushbuttons – the first marked 'M' for menu and the remaining pair marked '+' and '–' to facilitate its navigation.

Pressing the power button brings the screen to life, which defaults to show the active input and incoming sample rate ('USB/44K', for example) on its red, dot-matrix screen. While this type of display window may seem a bit dated when seen alongside the slick OLED screens of some rival DACs, its bright and bold text does have the advantage of being highly legible from a good distance away.

Within the menu you can select from USB, I²S (HDMI), S/PDIF (coaxial or Toslink) and AES/EBU (XLR) inputs. Pressing 'M' a second time displays the DAC's optional filter labelled 'FIR' (Finite Impulse Response), which can be set to on or off. Despite the label, this filter is actually an apodising type, specifically designed to counteract pre-ringing [see PM's Lab Report p63].

Finally, a longer hold on the 'M' button takes you back to your chosen input, with the +/– buttons now changing the output level. Volume control is performed inside the DAC chips, and to use the Black Dragon in fixed output mode – for example when feeding a separate preamplifier – you need to crank the output up to its maximum level. The volume level is stored at power-down, so care needs to be exercised if it's been left at max…

The rear panel sockets are top quality and sensibly spaced to cater for even the most heavy-duty cables and connectors. And while many high-end users will perhaps favour the balanced (XLR) outputs, the gold-plated WBT line-level RCAs are no mere afterthought.

RIGHT: PCB for digital circuits (uppermost) hosts a Spartan FPGA and twin AKM DAC chips; the (lower) PCB carries the analogue circuits. Each is fed by its own toroidal transformer

LEFT: Minimalist front panel includes an IR sensor and 6.35mm headphone socket. Menu 'M' and ± buttons offer volume and input selection. Retro red dot-matrix screen is highly legible

The whole unit sits on four disc-shaped feet with furniture-friendly rubber pads at their bases, which serve to aid vibration damping. The Audiobyte-branded universal remote control is arguably less than tailor-made for this product, as it does sport lots of redundant buttons.

Windows users will need to install a dedicated USB driver from Audiobyte's website [*www.audiobyte.net/products/black-dragon*] and then follow a few simple steps laid out as screen grabs in the product manual. If you are running iOS or Linux-based operating systems then the Black Dragon will play straight out of the box, without any need for extra drivers.

DISTINCTLY ANALOGUE

I started my listening with a 96kHz/24-bit FLAC download of Eleanor McEvoy's 'Land In The Water' from *If You Leave* [Naim Label MOSCD4010], via the DAC's USB input and with its balanced outputs connected to my Musical Fidelity M6PRX power amplifier [*HFN* Nov '13], and this DAC's smooth sound was obvious from the outset.

Some DACs that I have heard at this price-point can shine almost too brightly and serve up music with the kind of detail that's overly dazzling. This certainly wasn't the case with the Black Dragon, which, while possessing a good sense of articulation, focused on delivering the music in a more controlled manner that encouraged you to settle in and enjoy each performance at your own pace.

> 'Activating the filter gave the music a grander sense of scale'

Through the Black Dragon, the Eleanor McEvoy track was presented with a richness which had a distinctly 'analogue' flavour to it. The slight reverberation on the Craic Squad's lead guitar's notes, for example, conveyed a genuine sense of warmth, making each chord sound pleasantly full-bodied in its sustained decay.

In a similar manner, the widely spaced bass guitar notes on this track came across as well-rounded and with good textures, letting me appreciate each string's resonant vibration.

A quick dip into Audiobyte's menu revealed that so far I'd been auditioning the Black Dragon in its default mode, with the optional filter switched on. And so playing Future Islands' 'Spirit' from their *Singles* album [CD-rip, 4AD CAD 3402CD] on repeat, with the filter first activated and then de-activated, gave insight into its influence on the sound.

With the (apodising) filter in play, the music sounded slightly bolder, and this was illustrated by how the track's synthesiser notes across the lower midband gained confidence in their attack. This brought a more dynamic edge to the performance by allowing its pacy percussion to punch more firmly through the air.

With the filter deactivated, all the detail in the track remained, but clearly it wasn't brought out to quite the same extent as before. Activating the filter also tended to let the DAC recreate sounds and instruments with a bit more air and space around them. This gave the music a grander sense of scale, even at lower listening levels, and so I left the filter on for the remainder of the reviewing.

FINE LEVEL ADJUSTMENTS

Another string to the Black Dragon's bow was the degree to which its output level can be finely adjusted in preamp mode. Thanks to a volume range extending from zero to 127 in very small increments, you get ample scope to find optimum music replay levels appropriate to your system and listening environment.

This point was illustrated perfectly by Massive Attack's 'Teardrop' from their *Collected* album from 2006 [CD rip, Virgin 0094636006826]. With this track, finding the right level to allow Elizabeth Fraser's gorgeous vocal performance to really fill my room, without the sound nudging

ROMANIAN HERITAGE

Founded by Nicolae Jitariu in Suceava, Romania, Audiobyte is the sister brand of Nicolae's high-end Rockna Audio company. Established in 1996, Rockna first entered the hi-fi market in 2000 with its Heart monoblock Class A power amps. The range soon grew to include a matching Heart preamp the following year, alongside a MOSFET-based integrated variant in 2004. Rockna's digital products began with the Heart CD player in 2002 which sported a tube output stage, followed by the RD-2 DAC. Next came Rockna's Wavequest DAC and matching transport at the end of the decade, which paved the way for its cutting-edge Wavedream DAC featuring custom code running on FPGAs. This subsequently led to the launch of the Audiobyte line-up which benefited from plenty of trickle-down tech. All Audiobyte/Rockna products are designed and built in the company's Romanian facility. Alongside designing his own products, over the last decade Nicolae also claims to have provided his R&D services to a number of high-end audio brands including Wadia, Goldmund, MSB and PS Audio.

ABOVE: High quality balanced (XLR) and single-ended (RCA) analogue outputs sit alongside digital inputs that are spread over S/PDIF (coaxial/Toslink), AES/EBU, I²S (via an HDMI socket) and USB type B connections

towards being too forward or overwhelming, can sometimes prove tricky, but with the Black Dragon I was able to find just the right level to bring her voice fully to life, without the setting either raising the roof or leaving her sounding too quiet and restrained.

AN OPEN WINDOW

Moving on to the 1999 SACD of Canadian singer-songwriter Carla Lother's 'Don't Look Back' from *Ephemera* [Chesky JD 183], streamed from my laptop at DSD64 using JRiver Media Centre software, allowed for deeper analysis of the Black Dragon's refined treble. Vocals and strings were rendered with impressive depth as they pushed back into the soundstage.

And the way their leading edges during the more powerfully sung choral parts were presented, without any sibilance, meant that I was able to really push my Dynaudio Focus 260 loudspeakers without fear of any harshness creeping into the mix at these extremes.

Instead, the Black Dragon gave an open window into this high-quality recording, allowing me to access and enjoy each musical layer, from the gentle taps of percussion deep within the mix to the slow-building strings as they extended 'outwards and upwards' across the soundstage.

While I've appreciated the bass drum's echo on this track many times, the way in which the Black Dragon revealed subtle changes in tone as each echo faded, highlighted this particular DAC's ability to get deep into the music, prompting me to eagerly re-explore the rest of the album.

Serving the Black Dragon some music with a touch more fire in its belly, courtesy of Pink Floyd's 'Coming Back To Life' from their 1994 album *The Division Bell* [96kHz/24-bit download, Parlophone 7243 8 28984 2 9], I opted this time to test the unit's headphone output driving a pair of AKG 242 HD over-ear cans. Unsurprisingly, it showed it was also very capable when working in this mode.

While its bass didn't appear quite as strong via these headphones, channel separation was especially notable, resulting in a stereo image sounding open and focused.

The way that the lead guitar's solo (which kicks in around four minutes into the song) was placed centre stage had me sitting eyes-closed, lost in the moment and nodding along to David Gilmore's fretwork. It seemed to highlight how, above all, the Black Dragon 'DSD digital preamp' allows the music simply to speak for itself.

HI-FI NEWS VERDICT

With its good build quality, wide range of inputs and file types, and balanced outputs to boot, the Black Dragon offers a compelling investment for those in the market for a do-it-all DAC. With DSD and LPCM files it's a smooth mover that'll surely prove a welcome tonic for more lively systems – so if you like your digital files dished-up with an organic sound then add the Black Dragon to your audition list.

Sound Quality: 78%

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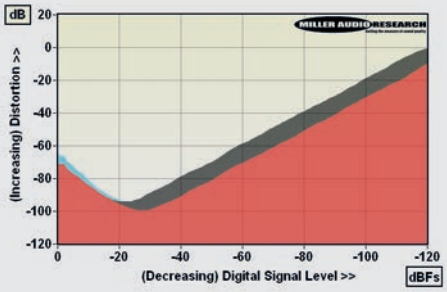
LAB REPORT

AUDIOBYTE BLACK DRAGON

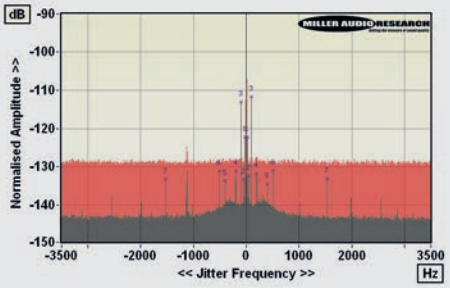
Described by Audiobyte as a 'DSD digital preamp' the Black Dragon DAC's Class A analogue output stage offers a full 3.6V (balanced) from an impressively low 2ohm source impedance. Furthermore, this stage offers sufficient current to support a maximum 109mW/25ohm via its 6.35mm headphone socket – adequate but still 10-100x lower than that offered by standalone (mains-powered) DAC/headphone amps from Simaudio, Oppo and Chord. However, the headphone out also has a low 2ohm source impedance, helping maintain response uniformity even with low and variable impedance 'phones.

The Black Dragon's native response is directed by filter setting but 'FIR off' actually yields an impulse response with strong pre/post ringing and a flat amplitude response (–0.1dB/20kHz, –0.5dB/45kHz and –1dB/90kHz with 48kHz, 96kHz and 192kHz media) that's entirely typical of a 'traditional' linear-phase FIR filter! By contrast 'FIR On' inserts an apodising-type filter with no pre-echo, stronger post-impulse ringing, better stopband rejection (>115dB vs. 50.6dB) and a response with a steep cut-off (–0.05dB/19kHz and –3.2dB/20kHz).

Distortion hovers around 0.03-0.05% from 20Hz-20kHz at peak (0dBFs) levels, reaching a minimum of 0.0002-0.0003% at –30dBFs. Its consistency with frequency is impressive [see Graph 1, below]. The 108dB A-wtd S/N is creditable via S/PDIF but less so via USB which achieves a 16-bit 96dB – an increase in noise clearly visible on the jitter plots [see Graph 2]. Readers are invited to view comprehensive QC Suite test reports for the USB, S/PDIF DAC and headphone output performance of the Audiobyte Black Dragon by navigating to *www.hifinews.co.uk* and clicking on the red 'download' button. **PM**



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



ABOVE: High res. jitter spectra with 48kHz/24-bit data over S/PDIF (black, with markers) and USB (red)

HI-FI NEWS SPECIFICATIONS

Maximum output (re. 1% THD into 47kohm)	3.61V (balanced XLRs)
Max. power output (re. 1% THD into 25ohm)	109mW
Output Impedance (20Hz-20kHz)	1.85-2.08ohm
A-wtd S/N ratio (re. 0dBV/ S/PDIF / USB)	91.0dB / 108.3dB / 95.8dB
Frequency response (20Hz-20kHz/25ohm)	+0.02dB to –0.09dB
Distortion (20Hz-20kHz, re. 10mW)	0.036-0.045%
Digital jitter (S/PDIF / USB)	137psec / 145psec
Power consumption	26W (1W standby)
Dimensions (WHD) / **Weight**	240x90x300mm / 4kg