

Portable headphone preamplifier/USB DAC
Made by: Chord Electronics Ltd, Kent
Supplied by: Chord Electronics Ltd
Telephone: 02890 279839
Web: www.chordelectronics.co.uk
Price: £1800

AUDIO
FILE

HEADPHONE AMP/DAC

Chord Hugo 2

It can sometimes seem tricky to keep pace with the changes in the Chord Electronics range, but its Hugo 2 claims technical and spec advances over the original DAC/amp
Review: **Andrew Everard** Lab: **Paul Miller**

For a relatively small specialist audio brand – well, by the standards of some of the huge companies the industry seems determined to keep constructing these days – Chord Electronics has its bases covered in fairly spectacular fashion, from tiny pocket devices to hugely powerful amplification. What's more, there's little evidence of resting on laurels going on here. The company just keeps on adding new models to its range, from the Mojo/Poly portable DAC/amp/player/streamer combo to the newly announced Etude amplifier, said to use its 'first fundamentally new topology' since the company was founded some 30 years ago.

DRAMATIC REDESIGN

And it constantly reinvents its products, to the extent that it has been easy to get lost in all the variants of Qutes, Qutests, 2Qutes and QuteHDs, for example. However, the £1800 Hugo 2 reviewed here is a relatively simple prospect – it's the updated version of the company's first portable DAC/amp, launched back in 2014. The company says it has been 'dramatically redesigned', and features 'flexible new features, plus next-generation technical and sonic performance', with 'all-new casework' in black or silver anodised aluminium.

So what's going on, not least to justify the Moore's-law-defying 50% increase in price over the original Hugo – so-named, with its onboard battery power, to provide music wherever 'you go'? Well, for a start the Hugo 2 looks different, its casework adorned with four extra illuminated 'control spheres' of the kind familiar from the little Mojo [HFN Jan '16] and other more recent Chord products. The main volume control sphere of the original Hugo has been retained (albeit in a larger form), as has the transparent panel giving a view of the internal circuitry. Once again, the

RIGHT: Rechargeable batteries are fixed atop the PCB that carries the Xilinx Artix-7 FPGA chip, loaded with the custom code to execute the WTA digital filter and DAC. Illuminated volume 'bulb' and indicator LEDs are also clearly visible

illumination changes colour to indicate the incoming sample rate, but now the product quite literally has more balls: they control power, input, filtering and crossfeed functions.

These control devices are top-mounted to allow scope for adding expansion modules to the USB 'input end' of the casework. Perhaps that hints at the future availability of a Poly-style player/streamer device? The micro USB input supports (driverless) portable devices, and there's full HD compatibility with PCM-based formats up to 768kHz/32-bit as well as DSD512. A driver is offered for Windows OS(s). The original Hugo did 384kHz and DSD128 but the Hugo 2's optical and coaxial digital ins are still capped-out at 192kHz and 384kHz, as before. A separate micro USB input is provided for charging.

There's also an improved Bluetooth implementation, now with aptX capability

and claiming extended range, while the outputs are on standard RCA phonos, plus 3.5mm and 6.35mm headphone sockets. The input and output labelling is now laser-ablated for greater clarity and durability.

DESKTOP EMPHASIS

The original Hugo had a rounded style, emphasising its pocketability, so if the more squared-off looks of the Hugo 2

'Clean and precise it also swings, rocks and motors'

suggest a greater emphasis on desktop audio applications as much as for 'wherever you go', that's no coincidence.

Yes, there's still that fast-charging internal battery, said to be good for 14 hours' use, but the new

model also comes with a comprehensive remote control handset. It's more likely to be used in a static implementation, as your main means of controlling things, with the control spheres relegated for use only when on the move.



LEFT: One of the two micro USB ports is purely for charging, the other for audio, from driverless tablet/phone connection for HD audio up to 768kHz/DSD512. Meanwhile new spherical controls cover power, input selection, four filter and four crossfeed options (including off/none)

Hugo 2 on the end of my iPhone 8 Plus, and also with an Android tablet, my stripped-out Mac mini computer and Roon-equipped Intel NUC, as well as via coaxial digital from my Naim NDS. Headphones included the B&W P9 Signature [HFN Mar '17], Focal Spirit Pro [HFN Dec '15] and Oppo PM-1 [HFN Jul '14]. The Hugo 2 was also connected at line level into my main system.

And from the off the Hugo 2 impressed with its neutrality and clarity, combined with excellent extension and definition in both the bass and treble, as was made clear with the multiple layers of Queen's 'The Millionaire Waltz' from *A Day At The Races* [Island Japan UIGY-15015; DSD64], a seemingly simple track made challenging by Brian May's guitar orchestrations and the switching of tempo from retro ballad to driving rock. The tone of the layered guitars is striking via the Hugo 2, as is the slam it can deliver when required, whether through headphones or as a line source.

CHARGING RHYTHMS

I spent some time experimenting with the four-step digital filter selector – Filter 01 is described as 'Incisive Neutral', 02 adds some HF roll-off, 03 is warmer and 04 again adds HF roll-off to 03 – but to little avail: yes, Filter 03 is handy to add some richness to brittle recordings, but in general I stuck to the Filter 01 setting for most of my listening [see PM's Lab Report, p67].

On a bit of a vintage trip, I loaded up some – now deeply unfashionable – Genesis, in the form of 1972's *Foxtrot*, in both CD and DSD64 versions [Virgin CASCDX 1058/Charisma 50999 519522 9], and greatly enjoyed the way the Hugo 2 charged out the rhythms of 'Watcher Of The Skies' and the twists and turns of the behemoth that is 'Supper's Ready'. Interestingly, listening through headphones – and in particular the Oppo PM-1s, which the little DAC/amp drove with ease – I found the crossfeed filter, which uses the DSP to 'leak' some sound between the channels, did a fine job in creating a more spatial, three-dimensional image, also

The remote even has a dimmer button, which may be handy for late night listening or simply when the exuberant illumination becomes just a bit too eye-catching. The IR sensor is in that 'viewing window' on the top of the Hugo 2, and if you want to take the device even further on from the 'desktop audio' idea, you can also switch its outputs to a fixed 3V line level, allowing it to be used as pure source into a conventional preamp or integrated amp.

The Hugo 2 has also gained some weight, up 50g to 450g, and the way the company describes it is interesting; the original Hugo was pitched as portable, but this one is 'transportable'. Mind you, should you feel the need to 'transport it', there's a leather case available for the Hugo 2, though it'll cost you another £125.

Editor PM goes into detail about the WTA DAC technology used inside the Hugo 2 [see boxout below], but suffice it to say

here that it's a more advanced version of the Rob Watts-designed upsampling/filtering and conversion deployed in the original Hugo. The development of this bespoke DAC technology is an ongoing process at Chord: already the forthcoming Hugo TT2 – the latest iteration of the 'Table Top' non-portable Hugo derivative [HFN Dec '15] and due on sale later this year at just under £4000 – boasts more than double the processing power of the Hugo 2. The Hugo 2, meanwhile, offers twice the DSP horsepower of the original model and that was double that offered by the original QuteHD DAC [HFN Sep '12], although Chord's flagship DAVE DAC [HFN Apr '16] still remains the 'reference'.

CLARITY WITH SLAM

A product with capabilities as wide-ranging as this required extensive testing in a variety of set-ups. I found myself using the

THE WTA FILTER

Under the Hugo 2's bonnet, Robert Watts' WTA (Watts Transient Aligned) high-rate digital filter, which has no fewer than 49,152 taps (coefficients), runs on a single Xilinx Artix-7 processor alongside a ten-element version of his proprietary Pulse Array bitstream DAC. These ten elements (per channel) are visible as the cluster of chip components in the centre of the 'inside shot' on p64. There are no off-the-shelf upsampling/DAC chips in here...

Watts' Pulse Array solution first appeared in Chord's DAC64 model some 18 years ago and has been instrumental in driving the success of Chord's digital products ever since. This iteration features a two-stage filter (16x followed by 256x, with 7th-order noise-shaping) in addition to a user-selectable HF filter acting above 40kHz. Intriguingly, Watts maintains that it's not the extended response provided by high sampling rates that improves sound quality, rather the improved timing of transients. Watts' DAC is able to handle DSD data natively, without conversion to PCM, although the proprietary nature of the WTA filter means it will never be adapted to accommodate the likes of MQA. PM

HEADPHONE AMP/DAC



ABOVE: Conventional digital ins and analogue outs are all grouped on one end of the Hugo 2, with new high-quality labelling: both 3.5mm and 6.35mm headphone outs are provided, plus line audio on RCAs and optical/coaxial digital inputs

offering a more ‘out of the head’ listening experience.

Yes, one can go too far with this, the crossfeed allowing minimal, medium and maximum settings – the last of these gets a bit too close to two-channel mono at times, but ‘min’ and ‘med’ are worth trying, especially if you find some music sounds a little too ‘left and right’ through headphones.

THRILLING LIVE EFFECT

The same applies when listening to highly atmospheric recordings such as Boston Baroque’s recently released set of Heinrich Biber’s *15 Mystery Sonatas* [Linn CKD 501], where minimal use of the crossfeed can give a more enveloping effect through headphones without robbing the sound of any of its definition. That said, this 192kHz/24-bit recording does also sound magnificent when the Hugo 2 is used as ‘just a DAC’, with a wonderfully crisp string tone and having suitable reediness in the organ accompaniment.

But for real live ambience I switched to the recently released Esbjörn Svensson Trio *e.s.t. Live In London* album [ACT Music ACT 9042-2], where the resolution of the instruments is set against the ongoing presence of the audience to thrilling effect. This isn’t just great trio jazz with a bit of clapping at the end of each track, but has a real sense of an event about it, and that shines through via the Hugo 2, whether fed from a computer or via its coaxial input, and whether using headphones or employing the unit as a line source.

The spiky rhythms of ‘When God Created The Coffeebreak’ are well suited to the clean, pacey sound of the Chord Hugo 2. Svensson’s piano is given realistic weight and the tightly locked rhythm section

of Dan Berglund on bass and the always wonderful Magnus Öström, Svensson’s childhood friend, on drums is at turns subtle and punchy, the skins pattering and Öström’s barrage of Zildjian cymbals crashing and shimmering as the track gains pace and attack.

It’s delicious stuff, wonderfully recorded at The Barbican hall back in 2005 and only just released, and a fitting tribute to the great pianist just ten years after his death in a scuba diving accident.

That’s the beauty of the Hugo 2: clean and precise it may be, but it also swings, rocks and motors, with never any sense of being overly analytical or the slightest hint of technical soullessness, making just about any style of music you choose to play through it sound both rewarding and captivating.

Yes, the revisions have brought with them a higher price, but they’ve also delivered a more flexible product with excellent futureproofing, a more logical operation and performance to delight, whether you choose to use it ‘on the go’, on the desktop or on your main equipment rack. ☺

HI-FI NEWS VERDICT

With so many models on offer in its range, working out which Chord Electronics product is best for your needs might seem a little tricky. The Hugo 2 is a pretty simple answer to the question, performing as well as a portable headphone amp as it does as a main-system DAC. The redesign has added extra facilities to improve the listening experience, making it both a technological achievement and a sonic one.

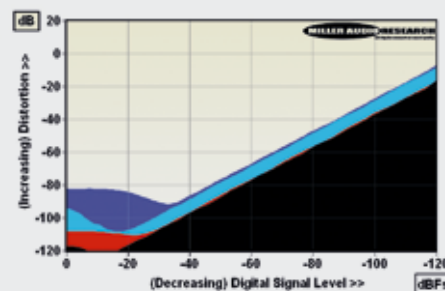
Sound Quality: 86%



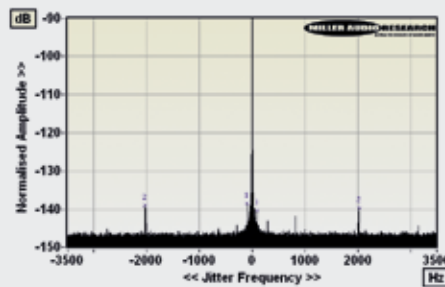
CHORD HUGO 2

Maximum output via the Hugo 2’s variable line or headphone sockets is close to 5.2V but the signal is clipped at this point and so the next (lowest) value via its stepwise volume is 4.57V at which point distortion is just 0.0002%/1kHz and 0.0025%/20kHz. Power output is 825mW/25ohm at this volume position, with distortion increased to 0.09% – a figure in line with Chord’s claimed 740mW/33ohm. A sub-1ohm output impedance is key to the Hugo 2 being able to drive low, variable impedance headphones/earbuds without further modification of the overall frequency response. The Hugo 2’s response is influenced by your choice of its four digital/analogue filter combinations and is most evident at higher sample rates. So with 96kHz/24-bit inputs the response varies from 0.0dB/20kHz to –1.25dB/45kHz (Filter 01; 256x WTA), –0.0dB/20kHz to –1.35dB/45kHz (Filter 03; 16x WTA), –0.85dB/20kHz to –4.7dB/45kHz (Filter 02; 256x WTA plus HF filter), and –0.85dB/20kHz to –4.8dB/45kHz (Filter 04; 16x WTA plus HF filter).

Meanwhile, under headphone loading, there’s a very mild increase in distortion, the Hugo 2’s vanishingly low 0.00006-0.0009% THD (20Hz-20kHz at –10dBfs) increasing to 0.005% through bass and midrange to 0.011% at 20kHz into 25ohm [see Graph 1, below]. But digital jitter at just 5-8psec [see Graph 2, below] is as low as we’ve seen from a portable USB DAC – beating the Questyle QP2R [HFN Feb ’18], the Oppo HA-2SE [HFN Dec ’16] and Chord’s own Mojo [HFN Jan ’16]. Noise too is fabulously low and contributes to another standard-setting figure for S/N of 104dB (re. 10mW/25ohm). Relative to its full line-level output, the A-wtd S/N is a massive 116.1dB. PM



ABOVE: THD vs. digital signal level at 1kHz (black, 600ohm; red, 25ohm; 0dBfs = 825mW and –29dBfs = 1mW) and 20kHz (cyan, 600ohm; blue, 25ohm)



ABOVE: High resolution 48kHz/24-bit jitter spectrum (unchanged between line and headphone outputs)

HI-FI NEWS SPECIFICATIONS

Maximum output (re. 0dBfs into 47kohm)	4.58V (line out)
Max. power output (re. 0dBfs into 25ohm)	825mW (headphone out)
Output Impedance (20Hz-20kHz)	<100mohm
A-wtd S/N ratio (0dBfs; re. 2V/10mW)	110.1dB / 103.5dB
Distortion (20Hz-20kHz, re. 10mW)	0.0003–0.009%
Freq. resp. (20Hz-20kHz/45kHz/90kHz)	+0.0 to –0.0dB/–1.5dB/–7.3dB
Digital jitter (into 25ohm / 600ohm)	<10psec / <10psec
Power consumption	2x2600mA/3.7V batteries
Dimensions (WHD) / Weight	100x130x21mm / 450g