



## OUTBOARD USB DAC

DSD-compatible USB DAC  
Made by: Hegel Music System AS, Oslo, Norway  
Supplied by: Hegel Music System AS  
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Web: [www.hegel.com](http://www.hegel.com)  
Price: £3200

AUDIO  
FILE

# Hegel HD30

This is the first time a product from the Norwegian Hegel brand has appeared in these pages: it makes its début with a DAC that proves the importance of silence...

Review: **Andrew Everard** Lab: **Paul Miller**

The boom in the availability of high-end digital-to-analogue converters has raised an interesting possibility for the system-builder using solely digital sources: given that so many of these products have a variable-level analogue output, it's possible to connect them straight into a power amp or even a pair of active speakers, bypassing the need for a conventional line-level preamplifier. The £3200 Hegel HD30, the flagship DAC from this Norwegian company, is one such 'digital control centre'.

The HD30 offers not just an array of conventional digital inputs, including asynchronous, DSD-compatible USB, but also the ability to function as a DLNA/UPnP network client supporting the likes of Apple AirPlay. Yes, the network capability is somewhat limited – this is a client to which music needs to be 'pushed' using a third-party app – but it's still a function well worth having, and makes the Hegel an interesting alternative to more conventional network music players.

### SO WHO IS HEGEL?

So, before we get ahead of ourselves, who exactly is Hegel? While the company may not be familiar to many readers, its roots go back the late 1980s, and a thesis on amplifier transistor design by student Bent Holter, then studying at the Technical University of Trondheim. Based on his research into harmonic distortion in amplifiers, he developed what is now called 'SoundEngine' technology, initially for use in amps for his band, The Hegel Band, with help from telecoms company Telenor.

As well as amplifiers, Hegel added DACs and CD players, with the first converter in 1994 followed by a player in 1996. Over the subsequent couple of decades the company has refined and developed its range, and now has distribution in 32

countries. It handles its UK distribution from its Oslo HQ, and has a small number of dealers here, with a range now encompassing both integrated and pre/power amplification, CD players and DACs, and a headphone amplifier.

As is often the way with products from Scandinavian or Nordic companies, its products are distinguished by solid but simple design and construction, giving clean lines and fuss-free operation along with a 'hewn from solid' feel, as is the case with the HD30 here.

There's not much on show beside a large, clear blue-on-black display (of input source and sampling rate/output level) and two controls, for source and volume, but the whole thing exudes a feeling of cool quality – as you might hope for this kind of money. And yes, that front panel is milled from a solid piece of aluminium.

The HD30 uses a pair of 32-bit DACs in a dual-mono implementation for optimal stereo separation, and a system it calls 'SynchroDAC' in place of the more common 44.1kHz to 176.4kHz and 48kHz to 192kHz upsampling processes

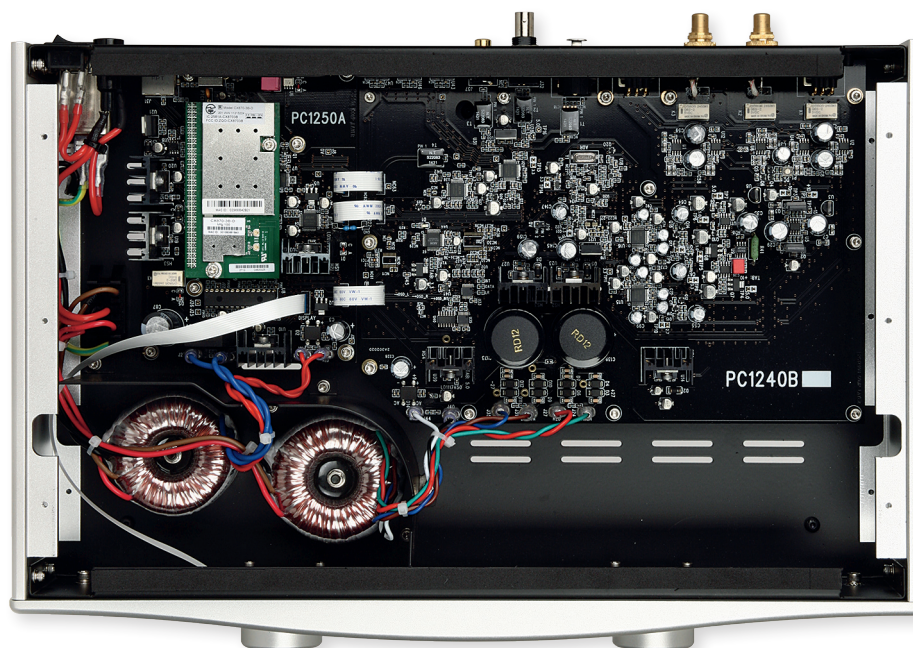
employed elsewhere [see PM's boxout]. The combination of SynchroDAC and the balanced topology reduces odd-order distortions and improves the achievable dynamic range but the final frequency response is limited to about 50kHz.

Similarly, the crystal clock is located hard up against the DAC section of the PCB to minimise jitter, while the analogue output stage draws on Hegel's SoundEngine technology, employing 'adaptive feed-forward' compensation, rather than global feedback, to manage distortion.

### CHRISTMASSY HANDBOOK

The analogue output is available on both RCA phonos and balanced XLRs, with the level controlled by the right hand knob on the fascia and via the remote control handset supplied, which is another cool metal device. Setting the level to its fixed maximum, at which point the display will show '101', gives a suitable output for use directly into a conventional integrated amplifier or preamplifier.

The main digital inputs, selected by the left knob or the remote handset, are pretty



**RIGHT:** The HD30 features separate linear PSUs for its balanced analogue output and digital circuits, the latter also benefiting from discrete clocks and Asahi Kasei Electronics Corporation's premium 32-bit audio chipset



conventional, encompassing S/PDIF coaxial (on RCA phono and BNC), three optical and an AES/EBU input, but the HD30 also has both a Type-B USB input for connection to a computer, and an Ethernet port. The USB has a dip-switch beside it to select either A or B: the former gives 'plug and play' operation with computers, but is limited to files of up to 96kHz/24-bit, while the latter extends compatibility to 192kHz/24-bit and DSD64/128 (using DSD over PCM frames), but requires the use of downloadable drivers for Windows, and (for DSD) Mac OSX.

Strangely, the purpose of the A/B switch isn't explained anywhere in the manual (which comes complete with a Nordic forest scene on the cover, making it look more like a Christmas card than an instruction book) – I had to turn to the 'read me' notes supplied with the driver download for my Mac computers.

However, as Anders Ertzeid, Hegel's VP Sales & Marketing, acknowledged during our research for this review, 'the sound [in A and B modes] is exactly the same'. Hegel says the HD30 is best used with Audirvana as a computer music player, and

the software and DAC worked together as smoothly as any such combination I have tried. However, the unusual streaming solution will take a bit more familiarisation for anyone more used to all-in-one network player devices.

The usual UPnP control points, including PlugPlayer and the Kinsky open-source software distributed by Linn, work well

with a NAS full of music and the Hegel, though they do require learning the concept of adding tracks or albums to a playlist before they can be output through the HD30. It's not quite as intuitive as a player able

to 'pull' music from the server for itself, but you soon get used to the 'push' method.

### OUT OF THE SILENCE...

The most immediately apparent aspect of the sound of the Hegel is what isn't there, as this must be one of the quietest hi-fi components I have ever auditioned. No, I'm not talking about level here – with a healthy 2.5V fixed output there's no shortage of that – but rather the complete absence of noise, throwing the music being played into a sharp relief as soon

*'It's characterful in all the right ways, sounding subtly nuanced'*

## ORGANIC SOUND

Hegel's design philosophy is embodied in what it loosely describes as 'Organic Sound' where 'all parts of a dynamic recording are reproduced exactly like the original'. With no more specific detail provided on its website, Hegel leaves me wondering if this ethos was partially inspired by its choice of audio chip supplier Asahi Kasei and the 'Velvet Sound' promoted in its literature [see [www.akm.com/akm/en/product/featured/velvetsound](http://www.akm.com/akm/en/product/featured/velvetsound)]. The sophisticated 32-bit architecture of this premium chip range is clearly aimed at high-end hi-fi brands requiring support for 768kHz LPCM and 11.2MHz DSD, offering 'a balance between information and intensity... focusing on the original sound to achieve rich musicality and high performance'. Hegel has adopted a pair of these Velvet Sound AK4490 DACs with a matching AK4137 sample-rate converter for its HD30, although in practice, and evidenced by Hegel's response specification of '50kHz', all inputs are resampled to a frequency close to 96kHz. We've seen DACs from MBL and Métronome that downsample to precisely 96kHz, but Hegel's HD30 brings its own, unique, twist [see Opinion, p103 and Lab Report, p51]. PM

**ABOVE:** Front panel has no more than controls for input selection and output level while the central display shows input selected to the left and sampling rate/output level to the right

as you start playing anything. It's actually rather startling at first, leading to some suspicion that everything's going to sound rather hyper-realistic – or perhaps just hyped-up – but after only a short period of acquaintance with the HD30 it soon becomes clear that this is not only going to be a thrilling ride, but also a highly enjoyable musical experience.

Quite simply, the Hegel is almost the exemplar of 'I was hearing things on recordings I never knew were there'. However, this is not purely a show of hi-fi ability to the point of distraction from the music, but rather all about startling the listener with its dynamics, its power, and the depth, focus and detailing of the sonic picture it creates.

It's characterful in all the right ways, not imposing anything of itself on the music but rather bringing out the subtlest nuances of the sound of voices or instruments, and giving excellent insight into technique and performance, all the while developing an unfettered sound that might even have one thinking a heftier power amplifier had been transplanted into the system. And we're not just talking about the very latest super-whizzo audiophile recordings here.

With the eponymous first album from Dire Straits, here in DSD64 [Vertigo UIGY-9634], I was immediately taken aback by the sheer impact of the instruments on the slow-burning 'Six Blade Knife', from the sharp, crisp guitar stabs to the fine detail of the patter of the percussion, and the laconic character of Mark Knopfler's voice.

In the same way, the Hegel dug deep into the layers of David Gilmour's *Rattle That Lock* set [96kHz/24-bit download, Columbia 88875123262]. OK, so that does make it sound even more Floyd-like for good or bad, but there's no shortage of punch yet at the same time allowing the



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**ABOVE:** Three optical and two coaxial (BNC and RCA) S/PDIF ins are joined by AES/EBU and USB with an Ethernet port supporting Apple AirPlay and UPnP streaming. Variable (and fixed at volume '101') outputs are available on RCAs and balanced XLRs

listener a fine impression of how well it's been pieced together.

One of the very good things about the Hegel is that it seems almost completely input-agnostic, such that one can't say it's best with USB or network or whatever, and switching back down to tried and tested CD quality revealed it's also able to do a very fine job when playing the formats likely to make up the majority of potential buyers' music collections.

With the recent Duran Duran outing *Paper Gods* [Warner Bros 9362-49264-2] the Hegel gets its teeth into the driving bass-line of 'Pressure Off', while giving full rein to the guest guitar of co-producer Nile Rodgers and the vocals of Janelle Monáe, making this not only a return to form but a complete Duran Duran classic: big, multi-layered and so classy.

### CAPTIVATED BY LIVE MUSIC

I even gave it a workout with some vintage overproduction, in the form of 'America' from *The Nice's Autumn '67 - Spring '68* [DSD64, Virgin UIGY-9696], and while the age of the recording and its relative simplicity is inescapable, the Hegel brings out all the scale of the music and the beginnings of Keith Emerson's career in keyboard abuse to exciting effect, as the notes can be heard clicking and banging away high in the mix.

With Béla Fleck and Chick Corea's *Two live set* [Concord Jazz CJA-37992-02], the Hegel does a beautiful job of keeping the unusual combination of banjo and piano crystal-clear while evoking an almost uncanny sense of the

presence of the audience, and not just in the end-of-number applause! With the 2014 *Martha Argerich And Friends Live From Lugano* box [44.1kHz/24-bit, Warner Classics 0825646134601], the sheer detail of instruments and performance ensures a thrilling sound and total involvement too.

Oh, and it definitely handles DSD audio in an utterly compelling way. The 1-bit sampler compilation *8 Ensembles* [DSD64, JL002] – a typically detailed recording by Channel Classics/NativeDSD-founder Jared Sacks – takes in everything from vocal ensembles to violin and piano. Via the HD30, it's hard not to be awestruck by the sheer realism of the textures on offer, especially in the pizzicato attack of the Ravel sonata for violin and cello, where I swear you can almost hear the vibration of every string!

And then you switch to the DSD128 version of the same album – its bandwidth fitting within the HD30's 50kHz 'window' – and everything snaps into even sharper focus, and we're discovering even more from the recordings. It's totally addictive stuff. ☺

### HI-FI NEWS VERDICT

Regardless, or perhaps *because* of its downsampling of very high rate media, Hegel's HD30 begs to be auditioned by all serious digiphiles. By tweaking the sample rate of the DAC chips and using the low-noise technology developed for its amps, the Norwegian designers have come up with a product delivering a sound with remarkable presence, impact, subtlety and detail. It's a wholly captivating listen.

Sound Quality: 88%

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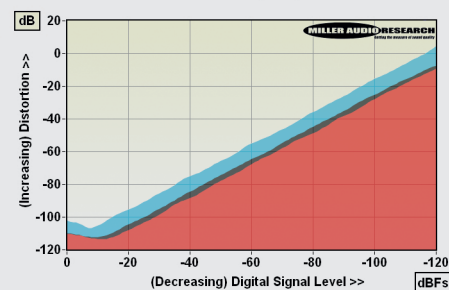
## LAB REPORT

### HEGEL HD30

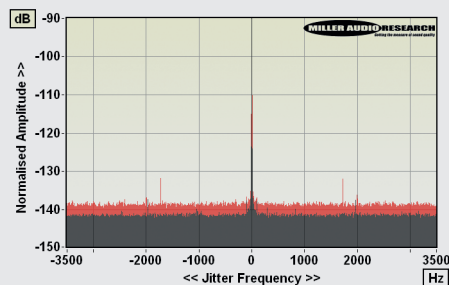
In practice, Hegel asynchronously resamples *all* S/PDIF and USB inputs to realise an analogue frequency response that's  $-0.06\text{dB}/20\text{kHz}$  (44.1/48kHz inputs) and  $-0.31\text{dB}/45\text{kHz}$  (or  $-3\text{dB}/47\text{kHz}$  with any incoming rate above 96kHz, including DSD128). Within this bandwidth, both USB and S/PDIF inputs yield the same excellent performance, with 110.2dB/110.7dB A-wtd S/N ratios, respectively, from a maximum 2545mV output and 22ohm source impedance (balanced XLR outs). Stereo separation stretches out to 130dB through the midrange while its L/R channel balance is good to  $\pm 0.04\text{dB}$  over the top 80 steps of its digitally-governed volume.

Distortion is also very low indeed, and as much a function of the analogue output/filter stage as the pair of AK4490 DACs. THD drops as low as 0.0002% from 20Hz-20kHz at  $-10\text{dBFS}$  [see Graph 1, below] with a peak level maximum of just 0.00055% at 20kHz regardless of 48kHz, 96kHz or 192kHz input sample rate (many DACs show a change in high frequency distortion behaviour depending on the native sample rate – the HD30 does not). Low-level resolution is good to  $\pm 0.1\text{dB}$  over a full 100dB dynamic range and stopband rejection, from Hegel's choice of AK's 'Traditional' sharp roll-off filter, is  $>124\text{dB}$ .

Most impressive of all are the 'clean' jitter spectra from both S/PDIF and USB inputs [see Graph 2, below], the mere 5-15psec achieved through a combination of Hegel's discrete low phase noise clocks and the proprietary jitter reduction technology at the core of Asahi Kasei's AK4137/4490 chipset. Readers may download full QC Suite reports that detail the Hegel HD30's S/PDIF and USB performance by navigating to [www.hifinews.co.uk](http://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 (red = 1kHz, S/PDIF; black = 1kHz, USB; blue = 20kHz, USB)



**ABOVE:** High resolution jitter plots with 24-bit/48kHz data comparing S/PDIF (black) with USB (red)

### HI-FI NEWS SPECIFICATIONS

Max. output level / Imp. (Balanced)	2.54Vrms / 22ohm
A-wtd S/N ratio (S/PDIF / USB)	110.7dB / 110.2dB
Distortion (1kHz, 0dBFS/-30dBFS)	0.00035% / 0.00016%
Dist. & Noise (20kHz, 0dBFS/-30dBFS)	0.00054% / 0.00053%
Freq. resp. (20Hz-20kHz/45kHz)	+0.0 to -0.06dB/-0.31dB
Digital jitter (48kHz/96kHz / USB)	5psec / 7psec / 15psec
Resolution @ -100dB (S/PDIF / USB)	$\pm 0.1\text{dB}$ / $\pm 0.2\text{dB}$
Power consumption	19W (1W standby)
Dimensions (WHD) / Weight	430x100x310mm / 6.5kg