

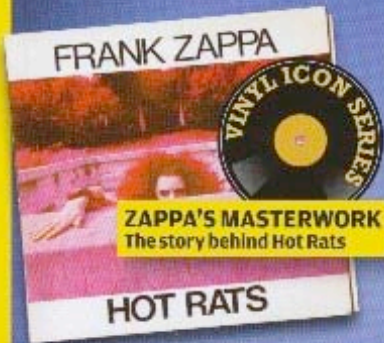
hi-fi news

THE HOME OF REAL HI-FI

& Record Review

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AUGUST 2009



CD & HI-RES MUSIC UNITE

Is this the future of stereo?



**“We couldn’t
destroy this tape
recorder with a
sledgehammer”**
Ken Ishiwata, see p110

UNISON RESEARCH
Giro Turntable

AUDIA FLIGHT
MM/MC phono amp



- **PLUS** 11 pages of music • **VINYL RELEASE** Thin Lizzy *Live & Dangerous* on 180g LP
- **AUDIO MILESTONES** Krell KSA-100 amplifier • **INVESTIGATION** Digital Radio
- **HI-FI @ HOME** State of the art sounds from Sweden • **VINTAGE** Howes' Quad II

UK £4.00 US \$9.50 Aus \$9.95



PS Audio PerfectWave (£2899 ea)

The PerfectWave was conceived as a seamless bridge between a traditional CD player and vehicle to replay hi-res downloads. We bring you the story to date, exclusively...

Review: Keith Howard Lab: Paul Miller

All too real fissure is developing within the specialist audio industry between those who embrace the emerging paradigm of hi-res music downloads and those who view the whole development, and the role of computer audio in general, with suspicion.

Well, here's a product that bridges the divide. The PS Audio PerfectWave Transport and DAC can – or rather, soon will – meld optical disc replay with the streaming of audio files in a way that will quickly seem natural to anyone familiar with conventional audio components. Actually, each is a stand-alone unit that can be used without the other, but only when they are combined are all their features exploitable.

THE TRANSPORT

Let's begin with the Transport. It has a conventional disc loading drawer but its CD-ROM drive allows a novel combination of disc options. It will, of course, play CD or the CD layer of a hybrid SACD. It will not play DVD-V, DVD-A or the DSD layer of SACDs but it will play hi-res PCM files – up to 32/192 format – from WAV, AIFF or (soon) losslessly compressed FLAC files on CD-R, DVD-R, DVD-RW, DVD+R or DVD+RW. Front panel control is via a colour touchscreen to the right of the fascia. This displays disc controls, track number, PCM format (sampling rate and bit depth) and, along the bottom, a progress bar showing current position through the track.

To the right is a square area that in default mode shows a PS Audio logo. But connect the Transport to an ADSL modem via its ethernet port and something more alluring happens. Via PS's GlobalNet server, the disc is identified, track names are downloaded for display and the logo is replaced by a picture of the disc cover, thereby endowing the PWT with computer

media player-like functionality. All this supplementary information is stored on an SD card in the back of the unit so that it is instantly available the next time the disc is played, and the SD slot also provides a route whereby player software updates can be installed.

MINIATURE ARTWORK

Track titles and cover art from data discs will be displayed too. PS Audio is very proud of this capability but there is one significant downside. The display is quite small and will often be placed such that it is out of the listener's line of sight and/or too far away to be legible. But no video output for an external monitor is provided to circumvent this.

From a hard-nosed audiophile perspective the most noteworthy aspects of the PWT are a feature that PS calls the Digital Lens and the provision of an I²S output interface alongside familiar S/PDIF, Toslink and AES/EBU connections. The Digital Lens is a 64MB solid-state buffer

memory to which disc contents are read before being asynchronously clocked to the outputs. So large is this buffer that the disc can be ejected and playback will continue for some time, unless stopped, until the memory is emptied.

Carried via HDMI connectors, the I²S interface is PS's method of avoiding the embedded clock of S/PDIF and AES/EBU, as other manufacturers have done previously using separate data and clock interfaces

'The PerfectWave will meld optical disc replay with the streaming of hi-res audio files'

between transport and DAC. HDMI is used in this non-compliant way because the HDMI interface offers wide bandwidth capability and allows signal data and clock signals to be carried separately.

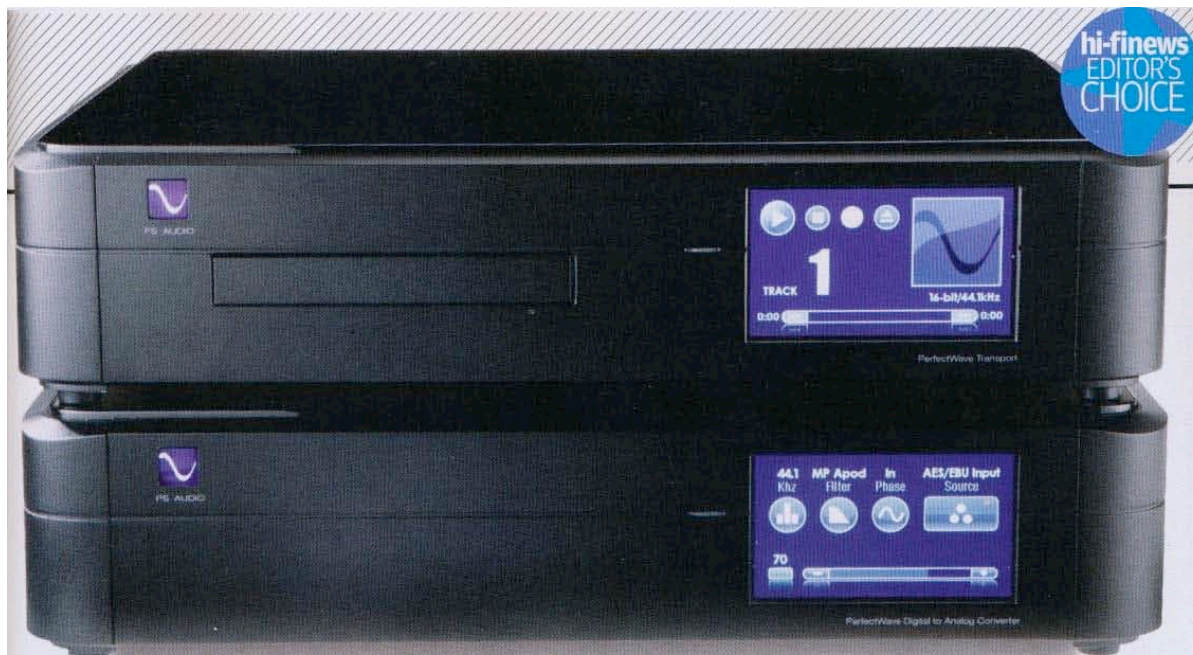
THE DAC

Of course, the DAC half of the partnership offers S/PDIF, Toslink, AES/EBU and I²S inputs

RIGHT: The PerfectWave transport will read 16-bit/44.1kHz data from CDs plus hi-res WAV, AIFF and, coming soon, losslessly compressed FLAC files burnt to CD-R, DVD-R, DVD-RW, DVD+R or DVD+RW media



hi-finews
EDITOR'S
CHOICE



to match the PWT. Also like the PWT, it has an SD slot on the back panel, in this case purely as a means of applying software updates. Analogue output is either unbalanced via phonos or balanced via XLRs. There is also a USB socket, so that the DAC can be used as an outboard converter for a computer-based hard-disk system, and a space on the back panel for adding an optional component PS calls 'The Bridge', which is due to become available in November. This will allow the DAC to interface with and stream audio files, via ethernet, from NAS (network attached storage) devices, making hard disk storage of many terabytes accessible.

Around the front there is just the small touch-screen. As well as providing for input selection and output volume control, this also incorporates controls for upsampling, digital filter type and polarity (absolute phase). Although the PWD can perform resampling to any standard sampling rate you wish, PS favours the use of Native mode, in which the incoming audio is reproduced at its original sampling rate. Five filter options are provided and an Auto mode is available for those content to use

PS's own favourites (Filter 3 at 44.1kHz, Filter 5 at all other sampling frequencies).

A MUSICAL ALLOY

This melding of traditional and computer audio technologies would count for little, of course, were the PerfectWave Transport and DAC's sound quality not up to snuff, but here the news is almost universally good. In order to experience the I²S connection at its best I borrowed a 0.5m Kimber HD20 HDMI cable from Russ Andrews and began my listening – with the PWT and DAC powered from a Power Plant Premier mains regenerator, of course. Comparison of the interface options was assisted by TAG McLaren Audio's defunct but excellent digital coax cable for the S/PDIF connection and Apogee Wyde Eye for the AES/EBU link. No question, the I²S option was best of the three, offering a dynamic alacrity and resolution of fine, musically telling detail that the other interfaces could not match, sounding somewhat clouded and diluted

by comparison. The difference isn't one to make your jaw drop, but then high-end hi-fi is often about accumulating incremental improvements.

Towards the end of the test I also tried the USB interface, replaying files from the new-model Mac mini that forms the heart of my own hard disk-based audio system. Good news here is that the USB connection is 24/96 capable (many are restricted to 16/48) but sound quality via this interface,

'Effortlessly detailed, it spits in the face of all who say that CD is inherently unmusical.'

while good, was not as outstanding as I achieved playing the same files from data disc via the PWT, or from the Mac mini via a RME Fireface 800 converter, which uses a FireWire link.

Via USB the PerfectWave DAC's sound quality loses some of its definition, with the result that music of all genres becomes less informative and less compelling. So PS still has some work to do to match the best here - which in my experience means dCS's USB interface.

APODISING DIGITAL FILTERS

Two of the five reconstruction filters offered by the PerfectWave DAC (filters 1 and 3) are apodising types, a relatively new development which stems from work carried out by Peter Craven for Meridian Audio.

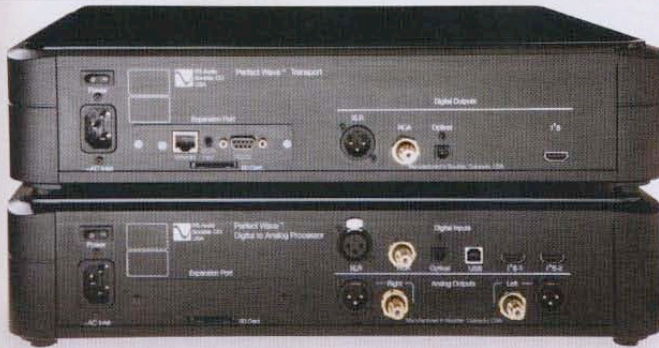
A response to concerns about 'energy smear' in anti-alias and reconstruction filters, apodising filters operate in such a way as to dominate the impulse response of the entire recording and replay process, allowing this to be controlled as desired. They do this by having a frequency response which is substantially attenuated before a conventional brick-wall filter begins to roll-off, so that by typically 90% of the Nyquist frequency (45% of the sampling frequency) their response is more than 100dB down. Apodising filters are best used with sampling rates of 88.2kHz or higher, but can be exploited with 48 or 44.1kHz if some sacrifice to in-band response is allowed.

GOING NATIVE

Comparing Native mode with the upsampling options, I came to the same conclusion as PS: that Native mode is superior. So superior, in fact, that I'm surprised the resampling option is included. Upsampled sound quality was a little softened, a little emasculated, like using the AES/EBU interface instead of I²S.

Perhaps PS felt that upsampling had to be offered for credibility, if only to allow buyers to hear for themselves that Native is better. (Note that these reactions were ☺)

CD/DAC COMBINATION



ABOVE: Digital data is communicated between transport and DAC via AES/EBU (XLR), S/PDIF (RCA and optical) or I²S (HDMI socket). The DAC offers USB support plus both single-ended and balanced analogue audio outputs

recorded mainly with 16/44.1 material, plus two 24/192 items – one of chamber music and another of a vocal ensemble. Had I known of the Lab Report findings I'd have been sure to listen to some high-rate material with more energetic treble and ultrasonic content, which may have diluted my enthusiasm for Native mode as realised in this early-status review unit.)

The DAC's filter options are worth experimenting with and you may, like me, come to different conclusions than PS as to which are best. I preferred Filter 1 (the minimum phase apodising filter) for CD replay, and Filter 2 (the minimum phase soft knee filter) for higher sampling rates. Differences between the five filters are not large, but they are perceptible – as subtle changes in image focus and dynamics – and allow the sound quality to be fine-tuned to taste. As I said before: incremental improvements.

OLD MUSIC, NEW LIFE

With all my favoured options enabled – I²S interface, Native mode, filters 1 or 2 – the PerfectWave combination proved to be one of the finest CD players I have heard. Effortlessly detailed and yet never cold or clinical, it spits in the face of all who say that CD is inherently unmusical. Ella Fitzgerald's entrancing *Reach For Tomorrow* [Verve 839 838-2] epitomised the directness of musical experience typical of fine older recordings, while the understated guitar and vocal panache of Bucky and John Pizzarelli's live performance of 'Route 66' [Challenge CHR 70025] had the

genuine frisson of live performance.

Sound quality from data DVDs, like Reference Recordings' HRx discs, is very fine too – although no better, I feel, than can be achieved by the best existing HDD playback. Again I used the Mac mini and RME Fireface 800 for this comparison, which I thought pretty much matched the PerfectWave pairing, or even bettered it somewhat – being a little cleaner and more dynamic.

The ability to play PCM and FLAC files from data DVD is a boon, though, and goes some way to allaying the disappointment of not being able to replay DVD-Vs or DVD-As. Later this year, PS plans to offer Windows and Mac freeware programs that will compile data DVDs for the PWT from audio files on computer. How you get these files on to hard disk from DVD-V and DVD-A is your own business – but there are programs available that will rip both. ☺

HI-FI NEWS VERDICT

PS Audio has stuck its neck out a long way to produce this novel crossover product, combining state-of-the-art CD replay, playback of hi-res files off DVD, and the streaming of audio from network hard disk storage. Although still a work in progress, the PerfectWave Transport and DAC together represent a bold and largely successful attempt to build a bridge between old and new audio paradigms.

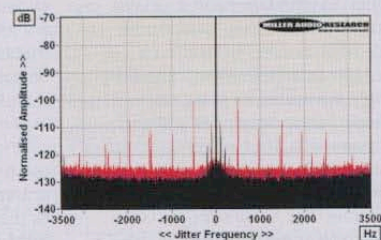
Sound Quality: 80%

LAB REPORT

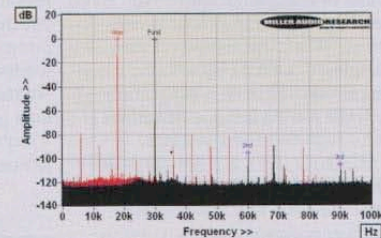
PS AUDIO PERFECTWAVE (£2899 ea)

Truth be told, this is not the first sample of PS Audio's PerfectWave that I've tested, each sample supplanted by another through a seemingly tortuous evolution of its software and firmware. This final sample should have been 'good to go'. The basic performance is intact – a maximum 5.5V balanced output, healthy 113dB A-wtd S/N ratio and distortion, slightly raised at 0.002% at 0dBfs but reduced to 0.0007% at –10dBfs through bass, mid and treble. Relative to filter '1', filters 2 through to 5 offer responses that are –0.2dB, –0.0dB, –3.8dB and –3.6dB down at 20kHz with all modes offering >109dB rejection of stopband images. Responses with 24-bit/48kHz media are broadly similar although both 96kHz and 192kHz recordings are rolled-off earlier than expected at –6dB/32kHz and –6dB/49kHz, respectively. Jitter is <100psec in all symmetrically upsampled modes (ie. 48kHz to 96kHz/192kHz) but increases very slightly to a (perfectly acceptable) worse-case of 320psec with 96kHz data received by the PerfectWave DAC in 'Native' mode [see graph 1, below].

At the time of writing, PS Audio's 'Native' mode is not quite de-bugged, but I am confident of its resolution. Currently, 96kHz and 192kHz inputs are subject to some anomalous 48kHz resampling that yields an in-band alias [see red trace, graph 2 below]. With a 30kHz tone, as illustrated, there's also an 18kHz 'image'. This only occurs in 'Native' mode but its subjective impact will depend upon the ultrasonic content of the hi-res music selection. Readers may view QC Suite test reports for PS Audio's PerfectWave CD player/DAC by navigating to www.hifinews.co.uk and clicking on the red 'download' button. PM



ABOVE: High resolution jitter spectrum comparing 24-bit/96kHz data converted with 96kHz/96kHz upsampling (black) versus 'Native' mode (red)



ABOVE: Distortion from 30kHz signal at 24-bit/96kHz (black spectrum – 2nd/3rd harmonics marked) plus digital alias at 18kHz in 'Native' mode (red spectrum)

HI-FI NEWS SPECIFICATIONS

| | |
|------------------------------------|-----------------------------|
| Maximum Output Level (Balanced) | 5.5Vrms |
| A-wtd S/N Ratio | 112.8dB |
| Distortion (1kHz, 0dBfs) –30dBfs) | 0.0017% / 0.0037% |
| Distortion & Noise (20kHz, 0dBfs) | 0.0033% |
| Frequency resp. (CD/96kHz) | –0.00dB to +0.05dB / <–30dB |
| Digital jitter (CD/Native) | 250psec / 300psec |
| Resolution @ –100dB (24-bit/48kHz) | ±0.1dB |
| Power consumption | 25W combined |
| Dimensions (WHD) | 432x96x356mm |