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CD/SACD player, USB & S/PDIF DAC Made by: T+A elektroakustik GmbH & Co. KG. Germany Supplied by: Dynaudio UK Telephone: 01353 721089 Web: www.taelektroakustik.de Price: £11,200

T+A PDP 3000 HV

A DAC with a built-in disc drive, T+A's new SACD player for its flagship HV Series contains individual PCM and DSD decoding engines – with separate analogue outputs! Review: John Bamford Lab: Paul Miller

ver since specialist record labels began offering downloads of their high resolution 'master' files the hi-fi market has witnessed a parade of new D-to-A converters and network music players boasting increasing capabilities. Such rapid progress affects manufacturers as well as we consumers.

Take Germany's T+A Elektroakustik for example. Its £7900 flagship MP 3000 HV media player [*HFN* June '13] is a hugely capable heavyweight source component by any stretch – CD player, FM tuner, network audio player (with internet radio) and hi-res-capable USB DAC all incorporated in its elaborate chassis.

For most listeners in the 'real world' that's everything one might need. But it was developed at a time when USB interfaces maxed out at 192kHz/24-bit PCM and couldn't accommodate DSD.

TICKING ALL THE BOXES

Enter T+A's latest 'HV' source component: the £11,200 PDP 3000 HV designed to tick all the boxes required by today's most demanding audiophiles. It's the company's latest 'statement' D-to-A converter, fitted with a programmable USB input module from Italy's Amanero Technologies which supports asynchronous data transfer of PCM up to 384kHz/32-bit and DSD64/ DSD128. Moreover with a supplied ASIO driver, PC users running Windows can also play back DSD256 and even DSD512!

And as it's fair to assume that many audiophiles will have a substantial number of SACDs nestled among their CD collections, T+A has built in an SACD rather than simply a CD drive. There are six additional digital inputs to accommodate all manner of sources: one AES/EBU (XLR) and five S/PDIF (two Toslink, one RCA, two BNC). The optical inputs are limited to 96kHz/24-bit; the others are 192kHz/ 24-bit-capable.

RIGHT: Top-loading SACD mechanism, which glides out like a tray-loader, is cocooned in an aluminium case machined from a solid block to shield it from the rest of the player

The construction of the PDP 3000 HV is nothing short of superb, built around a pure aluminium chassis and boasting complete symmetry and channel separation throughout. Substantial twin power supplies feed the PDP's analogue and digital sections separately, the design's no-compromise approach including two IEC connectors on the rear panel for individual AC power cables.

The player's SACD mechanism, shielded in a separate housing, is a bespoke design which glides out seductively like a trav-loader... but is in fact a top-loader incorporating an anti-resonance puck which you place on top of the disc. The disc carrier is mounted on just two closetolerance pushrods in order to divorce it from the heavy outer case, a high-torque synchronous motor moving the block by means of a decoupled spindle.

To reinforce the company's nocompromise design approach, DSD data fed into the PDP 3000 HV's USB input from a computer source is handled entirely separately from PCM data, thereby 'sticking up two fingers' to competing manufacturers who claim PCM and DSD compatibility in their DACs while employing delta-sigma DACs which - DSD evangelists might rightly maintain - do not replay DSD in a purist manner.

Says T+A's chief design engineer Lothar Wiemann: 'We do not do a DSD to low-bit PCM conversion. Rather than use an integrated converter chip we have built a real 1-bit converter using discrete parts, so that the DSD signal is preserved without any alterations. It's based on a "weighted sum of delayed samples" technology, with a structure similar to a FIR filter with a 1-bit delay line, the taps of this line



SOURCE Spyro Gyra East River Blue ٩ PDP 3000 HV T+A

driving signal switches. The output of the switches is summed via weighting resistors (representing the filter coefficients) and *voilà*, there's our analogue output signal together with [first stage] high frequency noise filtering. The structure is simple but the devil is in the detail. For example, it's vitally important to have literally a jitterfree clock for the switching stages.'

NO-COMPROMISE FILTERS

For conversion of PCM sources the PDP's DAC section is largely identical to that featured in the company's MP 3000 HV media player, except that here the DAC's analogue filter and output stages work with higher supply voltages. It employs eight of TI's Burr-Brown 32-bit/384kHz delta-sigma DACs in a 'double symmetrical' quadruple arrangement, with oversampling carried out by a 56-bit DSP and with four digital filter options that can be selected via remote control [see boxout].

The PCM DAC and DSD decoder employ individually-tailored output sections. Lothar Wiemann again: 'We wanted filters that precisely match the requirements

FILTER FEST

Although the PDP 3000 HV has an entirely separate D/A chain for DSD replay, right through to individual RCA/XLR outs. T+A's 1-bit DAC only operates with USB inputs of DSD64/2.8MHz or higher. In practice, and regardless of whether the output configuration is set to DSD+PCM or DSD/PCM, DSD64 (SACD) bitstreams are downsampled to 88.2kHz. With LPCM inputs, T+A's custom filters come in two flavours – FIR 1 and 2 being 'traditional' linear-phase FIR (Finite Impulse Response) types while BEZ 1 and 2 are minimum-phase filters based on Bezier polynomials. FIR 1 is a default filter with equal pre/post ringing and a brickwall roll-off. Phase distortion is low and rejection of aliasing images superb but the ringing is not ideal. FIR 2 is a shorter filter, trading less pre-ringing for poorer rejection of out-of-band images. BEZ 1, an interpolation filter, has almost no pre-ringing but neither does it suppress ultrasonic images. This filter serves 96/192kHz inputs best as 48kHz data is left with a treble peak and increased phase distortion. BEZ 2, an IIR (Infinite Impulse Response) type, offers almost perfect time domain behaviour - no ringing - but with a gentle HF response. PM





of each format. The output stages differ in their analogue filter response – filter order, slope, cut-off frequency, etc. A "combination filter" would have been too big a compromise and a filter with switched characteristics would have meant additional circuit parts – switches, etc – adding noise and distortion. So to avoid deteriorating the performance we've included separate and independent filter

ABOVE: Rotary source selector and menu/ media navigation controls flank the unit's large VFD which incorporates touch-sensitive controls for standby on/off and disc drawer open/close

commoned (to the DSD-labelled sockets) via the PDP's comprehensive setup menu. You can also configure all manner of default playback options and custom-name each digital input to personal preference.

source with a price tag balanced (XLR) and singleended (RCA) analogue outputs are provided on

and output sections.'

exceeding £10k, both

the rear panel. But as

if to reinforce the fact

As befits a high-end

'The bass served up by the organ's largest pipes was seismic'

It's important to note that for SACD playback (and 'standardrate' DSD64/2.8MHz DFF and DSF files) the PDP 3000 HV routes DSD signals through the Burr-Brown DAC stage by default in

order to minimise the high frequency 'hash' endemic in DSD and avoid stressing your amplifier and your monitors' tweeters.

For playback of audio files via USB this default can be overridden by selecting 'True DSD for DSD64' in the setup menu. Four further DAC Mode settings determine how DSD data is handled depending on a recording's native sampling rate. You will need to study the manual!

🗇 IT SOUNDS JUST RIGHT... As with any disc player or D-to-A converter with myriad filter options, you'll have endless hours of fun experimenting with the PDP 3000 HV's different settings while you explore your digital music collection. I could write a book about how each setting subtly affects the subjective sound quality of this disc, or that CD-quality or hi-res file... but as well as reading like an Excel spreadsheet it would only conclude with the inevitable statement: 'Whichever you prefer will be determined by the character of your system and the recording itself ... '

Describing the PDP's sound quality in broad brush strokes, however – whether \ominus

that the PDP treats PCM and DSD signal sources individually both the XLRs and RCAs are doubled up: one set labelled 'DSD', the other 'PCM'. Since you might not have two vacant line inputs on your (pre) amplifier, or are baulking at the expense of another set of high-end interconnects, the two analogue outputs can, however, be





ABOVE: Seven digital inputs cover all flavours, RI45s facilitate home automation, there's an S/PDIF output, and separate analogue outs for the DSD and PCM sections

playing a CD or pushing data into its USB input – it just sounds 'right'. There's no dramatic colouring or augmentation to musical events, rather it sounds 'pristine' and squeaky-clean.

Familiar high resolution downloads of audiophile-quality recordings, for example from 2L (352.8kHz/24-bit PCM – aka 'DXD') and Channel Classics (native DSD64 recordings), sounded as holographic and breathtakingly realistic as I've ever experienced in my home, the sound so obviously unsullied I found it impossible to determine that the unit has any 'character' whatsoever.

SIMPLY MORE LIFELIKE

I re-visited Channel Classics' beautiful recording of Haydn's String Quartet in D-minor performed by the Dutch Ragazze Quartet, which I recall describing as sounding bold and richly-coloured when I played it via the USB input of T+A's MP 3000 HV media player all those months ago. But, of course, back then I would have been listening to a 192kHz/24-bit file of the recording, not the native DSD64 DFF file (which the media player couldn't handle).

I listened to both files via the new PDP's USB input and was transfixed by the manner in which it portrayed the players' instruments with such vivid three-dimensional body and precise image focus – especially when playing the native file with the PDP's playback mode set to 'DSD 4' and 'True DSD for DSD64' enabled.

And I'd swear this player sounds less 'colourful' (in a positive sense), with each instrument's rich timbre more natural and lifelike. I thought this when playing the 192kHz PCM file as well, although it appeals to my audiophile sensibility to play recordings unsullied in their native form rather than format-converted.

Meanwhile the 1976-vintage analogue recording of 'Julsång' from the Proprius label's *Cantate Domino* [88.2kHz/24-bit download, HDtracks] similarly appeared exquisitely 'open' and unvarnished, the massed voices in the chorus remaining clear and unforced even during the loudest climaxes. And the powerful bass served up by the organ's largest pipes was utterly seismic.

As well as listening to the PDP 3000 HV feeding my succulentsounding vintage Mark Levinson No383 100W integrated, I was able to audition it with T+A's flagship 'HV' pre/power combo, complete with additional PS 3000 HV power supply bolstering the A 3000 HV's power stages [HFN Sept '14]. What was clearly apparent, even when listening to run-of-the-mill CD-resolution recordings, was that the player/DAC's unadorned deadpan delivery is precisely what the amplifier components require to give of their very best.

Hearing the three bass guitarists, Stanley Clarke, Marcus Miller, and Victor Wooten, resolved with such poise and startling clarity on SMV's 2008 album *Thunder* [Dreyfus Jazz FDM 46050 369212] was a revelation as the trio pumped out the riffs in the medley 'Lopsy Lu – Silly Putty'. The PDP 3000 HV just tells it how it is. (b)

HI-FI NEWS VERDICT

Expensive? Well, yes... but as with all of T+A's HV Series components build quality is fabulous and meticulous attention to design details second-to-none. Weighing the PDP's top-notch sound, along with the fact you're getting *three* high-end components – an SACD/CD disc transport, DSD and PCM DAC – for less than many boutique brands' standalone DACs, it's unquestionably an audiophile bargain.

Sound Quality: 89%

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LAB REPORT

T+A PDP 3000 HV

The PDP 3000 HV's (LPCM) DAC and analogue stages are clearly derived from T+A's MP 3000 HV media player [*HFN* Jun '13]. The 4.6V maximum (balanced) output is joined by a wide 114-5dB A-wtd S/N ratio, the 45ohm output impedance confers broad compatibility and low-level linearity is good to ±0.1dB over a huge 100dB dynamic range. As before, the response of all sample rates at or below 96kHz is determined by choice of digital filter [see boxout, p37]. With CD or 48kHz digital inputs this varies from -0.33dB/20kHz to -4.6dB/20kHz while 192kHz/ 24-bit inputs via S/PDIF or USB are fixed at -7.2dB/90kHz regardless of filter. T+A's SACD DAC Mode 1 and 2 options offer silght differences in extreme HF (-1.5dB/20kHz in Mode 2).

Regardless of input (incl. SACD), correlated jitter varies from just 10 to 35psec – a fabulous result [see Graph 2, below]. Furthermore, distortion is very low at 0.0008% at its peak 4.6V (balanced output) falling to 0.0005% at –10dBFs and 0.0004% at –30dBFs [red trace, Graph 1 below] and only fractionally higher via USB 2.0 [black trace] although our sample showed a uniformly higher THD via the left channel through bass and low midrange. We saw exactly the same pattern with the MP 3000 HV. There's also an increase in odd-order THD at higher frequencies (0.0009% at 1kHz to 0.015% at 20kHz/–30dBFs) as illustrated by the blue (USB)/green (CD) traces in Graph 1. For more detail, readers may download full QC Suite reports for the T+A PDP 3000 HV's CD/SACD, S/PDIF and USB performance (including filter options) by navigating to *www.hifinews.co.uk* and clicking on the red 'download' button. **PM**



ABOVE: THD vs digital level – 1kHz at 24-bit/48kHz over S/PDIF (red) and USB (black); 20kHz via USB (blue) and 20kHz at 16-bit/44.1kHz via CD (green)



ABOVE: High res. jitter plots using 24-bit/48kHz data (S/PDIF, red; USB, black; SACD, green with markers)

HI-FI NEWS SPECIFICATIONS

Maximum output level (Balanced)	4.60Vrms at 44-50ohm
A-wtd S/N Ratio (SACD / S/PDIF in / USB in)	114.9dB/114.1dB/114.5dB
Distortion (1kHz, 0dBFs/-30dBFs)	0.0008% / 0.00045%
Distortion & Noise (20kHz, 0dBFs/-30dBFs)	0.00085% / 0.015%
Freq. resp. (20Hz-20kHz/45kHz/90kHz)	+0.0dB to -0.37/-0.5/-7.2dB
Digital jitter (SACD / S/PDIF in / USB in)	33psec / 10psec / 12psec
Resolution @ -100dB (SACD / S/PDIF input)	±0.1dB / ±0.2dB
Power consumption (Digital/Analogue)	10W / 15W
Dimensions (WHD) / Weight	460x170x460mm / 26kg