Outboard USB & S/PDIF DAC Made by: Auralic Ltd, Beijing, China Supplied by: Audio Emotion Ltd, Scotland Telephone: 01333 425999 Web: www.auralic.com/en/; www.audioemotion.co.uk Price: £2890



Auralic Vega

Behind the minimalist exterior of Auralic's Vega 'digital processor' lies a sophisticated DAC that can handle all the hi-res digital formats the 21st century has to offer Review: John Bamford Lab: Paul Miller

ou can count on your fingers and toes the number of DACs currently available worldwide that feature USB inputs capable of handling 'ultra HD' data beyond 24-bit/192kHz together with the playback of DSD audio files using the recently ratified DoP protocol. The svelte-looking Auralic Vega ticks *all* the boxes for audiophiles who want to explore the highest resolution audio that today's digital technology can offer.

Although founded five years ago, Auralic will be a new name to many readers. Only recently have the company's products become available in the UK. Headed up by electronics and recording engineer Xuanqian Wang and his business partner Yuan Wang, Auralic has its headquarters and manufacturing base in Beijing.

A DIGITAL PROCESSOR

In addition to the fully-featured Vega the company's product portfolio includes the Taurus PRE line stage preamp (£1790) and partnering Merak 400W monoblock power amps (£2090 each), Taurus Mkll headphone amp (£1490) and two new headphone 'docks' - Gemini 1000 and 2000 (UK prices to be announced) - that will surely be on headphone enthusiasts' wish-lists this year. Auralic has licensed from Klutz Design the form factor of the Swedish design firm's stylish CanCan headphone stand and integrated into the stand's base a USB DAC (based on the Vega) and a headphone amplifier, together with an SD Extended Capacity card reader that allows it to store up to 2TB of data on board. Talk about cool!

Auralic calls its Vega a 'digital processor'. You might call it a digital preamplifier, since it's a DAC with a (digital) volume control and a Class A preamplifier built in – not merely a high-current DAC output – so you can certainly connect it directly to a power

RIGHT: A linear PSU feeds a proprietary LPCM/DXD/DSD-compatible 'Sanctuary Audio Processor' with a claimed '32-bit/1.5MHz' upsampling while an equally bespoke 'Orfeo' Class A analogue stage drives the output amp or active loudspeakers if you live in an all-digital home. There are no analogue inputs. Neither are there any fixed-level line outputs, so to use it simply as a DAC, as I did, you'll connect its balanced (XLR) or single-ended (RCA) outputs to your amplifier and leave the volume control set to maximum output.

At the rear are five digital inputs. The AES/EBU (XLR) and three S/PDIF inputs (two electrical via RCA, one optical via Toslink) will handle LPCM up to 24-bit/192kHz, while its asynchronous USB input will accept incoming data all the way up to 32-bit/384kHz. Moreover, as well as being compatible with 1-bit/2.8224MHz DSD (DSD64) the USB input will also handle double-rate DSD with a 5.6448MHz sampling frequency (DSD128). Such a spec. represents the current state of the art in consumer audio gear, providing the ability to play all currently available hi-res file formats - no matter how rarefied available from audiophile record labels such as 2L, Channel Classics, Reference Recordings, Blue Coast Records, etc.

As with all the company's components, the Vega's chic-looking casework is made from an alloy of iron, nickel, silicon and rare-earth metals dubbed AFN402, coated internally with a damping material called Alire. Auralic claims this makes for a chassis that's excellent at protecting the internal electronics from vibration and electromagnetic interference. The minimalist alloy fascia, devoid of any controls other than a rotary knob on the right, is dominated by a large active-matrix organic LED display that's really gorgeous once the unit is powered up.

With yellowy-orange legends against a black background it's exceptionally easy to read from a distance, with a choice of three brightness levels that can be determined via the unit's setup menu. Pushing in and releasing the volume knob brings the DAC out of standby, while pressing it again enters its configuration menu where you select inputs and access the Vega's deeper settings – of which there are many. It can be fully operated via the supplied IR remote handset too.





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Under its bonnet the Vega has a 1000MIPS ARM-based digital signal processor called Sanctuary, developed in partnership with ASIC and software company Archwave of Switzerland, along with an ESS Sabre ES9018 DAC chipset. The Sanctuary DSP upsamples all incoming data to 32-bit/1.5MHz and also controls the Auralic's XMOS-based USB interface, buffering data to minimise jitter in a process that Auralic describes as 'Active USB Technology'. The DSP also provides myriad 'You would

digital filter options. **'FEMTO' CLOCK**

At the heart of the Vega is a very high precision crystal oscillator that Auralic calls its Femto

Master Clock (a femtosecond is equal to 1/1000th of a picosecond). When booted up from cold, the Vega operates in 'Auto' mode whereby it utilises the best internal clock precision it can, when locking on to incoming data. Via the menu this can be changed to 'Coarse' (higher input lock bandwidth) which allows the Vega to lock on to excessively jittery digital sources.

After it's been powered up for around one hour, after which the temperature controlled clock has stabilised, two further

DSD CONTROVERSY

settings appear in the configuration menu: 'Fine' and 'Exact'. The user manual warns that these modes will only work with low jitter sources and that when pushing data into the Vega's USB input one might experience drop-outs (especially with high data rate audio) unless the computer has been 'optimised for music playback'.

Further menu settings include: a sleep function (whereby when putting the Vega into standby it only shuts down some of

> its circuits and keeps the clock active so that its Fine and Exact modes are available immediately it's powered up); balance and absolute phase; and choice of digital filters. For PCM sources there are four filter 'modes'.

Mode 1 is a traditional digital filter offering a flat frequency response and good stopband attention, but with pre- and post ringing and poor group delay. Modes 2-4 are in fact groups of filters that provide varying passband, stopband and group delay characteristics optimised for different sampling rates [see Lab Report, p57].

Auralic calls this its Flexible Filter

Mode technology, saying: 'We developed our filters using subjective auditory and objective data models, designing them Many audiophiles claim that DSD recordings, played either via SACD media or via

computer playback with appropriate software players and DSD-capable DACs, sound 'more analogue' and closer to the original source (the music) than PCM recordings. But not everyone thinks DSD is the most accurate encoding system. Cookie Marenco, proprietor of Blue Coast Records, and Andreas Koch of Playback Designs are both DSD evangelists - Koch having headed up the development of the Sonoma DSD recording system for Sony. But other engineers maintain that DSD colours the sound. Says Morten Lindberg of Norway's 2L label: 'We find DSD somewhat different in colour to PCM. In some mysterious way DSD is softer and more beautiful but slightly less detailed. I personally prefer extremely high resolution PCM over DSD and would claim that DSD is not transparent. Similarly Reference Recordings' president Marcia Martin has been quoted as preferring 24-bit/176.4kHz PCM. When discussing the great SACD vs DVD-Audio debate in 2008 she said: 'As for SACD, our mastering engineer Paul Stubblebine felt the conversion to DSD changed the sound of our masters in a way we didn't like.'

ABOVE: AMOLED display shows selected input, volume setting and sampling frequency of incoming data. Rotary multi-function control knob is used to access the Vega's setup menu

to optimise the listening experience for different types of music and hi-resolution formats.' Two further filters (Modes 5 and 6) are 18dB/octave IIR low pass filters designed to suppress the ultrasonic noise inherent in DSD, with respective -3dB cut-off frequencies at 70kHz and 50kHz.

WARMTH AND OPULENCE

Living with the Vega for more than a few weeks, I found its sound quality enchanting and immersive. Rather than aim for a 'get a load of this' detail and 'grab these visceral dynamics' type of presentation, its designers appear to have erred towards a slightly 'warm' and opulent sound character that allows for extended listening without fatigue. Certainly the Vega delivers detail a-plenty, but rarely does it throw it in your face seemingly to grab attention.

I was gratified to find that my rig worked seamlessly with the Vega's clock setting in Exact mode, experiencing only very occasional drop-outs when switching between tracks that had different sampling rates. On the rare occasion this occurred it was easily remedied by simply stopping the track and starting it again. Set to Auto mode the DAC worked seamlessly throughout the extended review period.

I could fill a book describing the subtle variations in presentation offered by the Vega's digital filter options, since my preferences varied depending on source recording and its sampling frequency. Listening through my system I generally found the DAC's Mode 2 setting preferable when playing CD quality files, especially with well-balanced recordings - perhaps because its group of filters offers the flattest frequency response. With harderedged recordings the Mode 4 setting tended to be my favourite.

As ever, it's easy to tie yourself in knots as so much depends on the character of the recording you're playing – and, of \ominus

OUTBOARD USB DAC



ABOVE: The Vega has five digital inputs: USB, AES/EBU (XLR) and three S/PDIF (two RCA, one Toslink). It has single-ended (RCA) and balanced (XLR) analogue outputs

course, the sound of your system and personal preferences.

Listening to the album Hidden Colours by the David Rees-Williams Trio, recorded for the BBC's shortlived Late Junction label and reissued by DePaean Records in 2010 [DPNCD 006], revealed how smooth and creamy the Vega can sound. The best track on the album, in which pianist Rees-Williams brings a jazz trio approach to a selection of 'popular' classics in the manner of Jacques Loussier, is the sublime 'When I Am Laid In Earth' from Purcell's Dido and Aeneas. The acoustic bass sounded rich and full-bodied, with good transient attack to the plucked notes without appeared over-etched. The piano which can all-to-easily sound quite 'clanky' in this recording – remained bold and powerful throughout.

PCM PREFERRED

Moving on to some more adventurous jazz I listened to several tracks from the CD version of Carlos Franzetti's The Jazz Kamerata [Chesky Records JD283] featuring interpretations of compositions from the likes of Pat Metheny, Bill Evans, Wayne Shorter and Keith Jarrett, among others. This is a beautiful recording, with plenty of space around the jazz ensemble that allowed the Vega to paint wonderful images of the musicians working in harmony. Again, the sound was richly textured and the tone colours vibrant, the strings and woodwinds accompanying the piano, saxophone, bass and drums depicted exquisitely across the wide and deep soundstage.

If you wanted to employ the traditional cliché of describing



solid-state electronics as sounding 'fast', vivid, squeaky-clean but sometimes hard and edgy, where tube electronics sound pleasingly softer and lyrical, less forceful and more fleshed-out with sweeter high frequencies, then you'd swear the Vega had valves in its output stage! It doesn't paint razor-sharp images, rather they're *slightly* soft-focused. Only with 'brutal' recordings does its sound ever become incisive and hard. And it *does* sound tonally neutral, exceptionally 'tidy' and relaxed, its robust bass in particular always tuneful and controlled.

With the Vega I've spent countless hours listening to hi-res downloads from 2L and Channel Classics, including DXD (24-bit/352.8kHz PCM) master files and native DSD recordings. However, I have to say I was largely underwhelmed by the sound of DSD files delivered via DoP. Sure, there's a pleasing warmth and 'ease' to the sound, but to my ears high sampling-rate PCM appears simply more lifelike. Nevertheless, Auralic is to be applauded for enabling its Vega to handle all formats, ensuring it to be a future-proof investment for audiophile music lovers.

HI-FI NEWS VERDICT

The Vega sounds glorious: there's a natural ease to its music making with an effortless quality that makes listening pure pleasure. Yet it's not too smooth-sounding to rob the music of vitality, preserving dynamic swings and leading-edge transients with aplomb. Its feature set is also pretty much state of the art, making it an outstanding proposition for anyone looking for a top quality DAC.

Sound Quality: 87%



LAB REPORT

AURALIC VEGA

Tested via its balanced XLR output, capable of 4.1V through an astonishingly low 0.25ohm source impedance (this DAC will drive any length of cable), the Vega puts in a state-of-the-art performance. Thanks to its 'Sanctuary Audio Processor', ESS Sabre DAC and 'Orfeo' analogue output module, distortion is vanishingly low at 0.00004-0.0004% from 20Hz-20kHz over the top 30dB of its dynamic range [see Graph 1, below] while the A-wtd S/N ratio is a full 115.8dB. If JB's listening results are any guide, it shows that super low-THD solid-state stages can still sound silky smooth! The '32-bit' DAC performance is impressive, with low-level resolution good to ±0.1dB over a 100dB range and ±0.5dB over a 110dB range while jitter is so low it wasn't worth publishing the graphs here – just 8psec via S/PDIF at all (44.1kHz-192kHz) sample rates and 14psec via USB.

The Vega's core feature, however, is its 'Flexible Filter Mode'. Mode 1 is akin to a traditional FIR brickwall filter with familiar pre/post-event ripples in the time domain but excellent amplitude flatness [-0.3dB/40kHz; black traces, Graph 1 below]. Mode 2 is similar but with reduced group delay, better stopband attenuation (110dB versus 83dB re. 20kHz) but an earlier response roll-off (-15dB/40kHz with 96kHz media). Mode 3 offers minimal pre/post-echoes while Mode 4, a minimum phase filter, trades zero pre-echo for slightly higher post-echoes and an early high-treble roll-off [see red traces, Graph 2]. Modes 3 and 4 are best used with sample rates *above* 48kHz. Readers can view comprehensive QC Suite test reports for the Auralic Vega's S/PDIF and USB inputs and all its filter modes by navigating to *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. S/PDIF input (1kHz, red) and USB input (1kHz, black; 20kHz, blue)



ABOVE: Frequency (zoomed) and impulse responses at 24-bit/96kHz (Filter 1, black; Filter 4, red)

HI-FI NEWS SPECIFICATIONS

Maximum output level (Balanced)	4.10Vrms at 0.25ohm
A-wtd S/N ratio (S/PDIF / USB)	115.8dB / 115.3dB
Distortion (1kHz, 0dBFs/-30dBFs)	0.00004% / 0.00016%
Dist. & Noise (20kHz, 0dBFs/-30dBFs)	0.00035% / 0.00040%
Freq. resp. (20Hz-20kHz/45kHz/90kHz)	+0.0dB to -0.1dB/-0.7dB/-2.1dB
Digital jitter (48kHz/96kHz/USB)	8psec / 8psec / 14psec
Resolution @ -100dB (S/PDIF / USB)	±0.1dB / ±0.1dB
Power consumption	10W
Dimensions (WHD)	330x65x230mm