

iFi Audio ZEN DAC

With its eye-catching looks, flexibility, solid engineering within and a remarkably grown-up sound, this entry-level DAC from iFi Audio is a conspicuous hi-fi bargain
Review: **Andrew Everard** Lab: **Paul Miller**

We've come a long way since iFi Audio was started as an offshoot of high-end brand Abbingdon Music Research, building its initial reputation with its 'Purifier' products, designed to clean up digital signals. And if anyone was labouring under the delusion that these were devices designed to tackle non-existent problems – you know, the old 'digits is digits' thing – the company has since expanded into making everything from complete systems to some of the most cost-effective DACs and headphone amps around. After all, its excellent xDSD [HFN Jul '18], was a 2018-19 EISA Award-winner, following on from the 2014-15 winning footsteps of the nano iDSD [HFN Dec '14].

Headquartered in Southport, Merseyside, and using a number of outside consultants as well as its own team to design and engineer its products in the UK, these days iFi Audio has expanded its catalogue, which now runs to some 30 components. It includes the striking-looking bamboo-clad, architect-inspired Aurora all-in-one network system alongside no fewer than eight DACs in the lineup. The most recent arrivals are the tiny pocket-sized hip-dac (£149), designed for music on the move, and the very affordable ZEN models, including the £129 ZEN DAC that we have here.

TRIPLE SURPRISE

Sitting at the 'even more affordable' end of the iFi Audio range, the compact ZENs show that building down to a budget doesn't mean the company cuts corners, whether on the engineering or industrial design. Built for desktop use, both the ZEN DAC and its Bluetooth counterpart, the ZEN Blue [see boxout, p67] have a striking look unlike anything else in the company's range. They're clad in high-quality aluminium casework that not only looks good but feels remarkably substantial for

RIGHT: Underside of the PCB reveals the XMOs USB input [top] and TI DSD1793 DAC [centre] with two crystal clocks [adjacent]. Headphone amplifier [lower left quadrant] is fully balanced

products so compact. Indeed, the ZEN DAC stands just 30mm tall.

Despite the toy-like dimensions, this is actually a potent and flexible digital device, both in its handling of data and its ability to fulfil its dual functions of DAC and headphone amplifier. Actually, make that triple functions as, due to its variable-level analogue outputs, it could even be used straight into a power amp or a pair of active loudspeakers, hilarious though the combination of this tiny unit and a hulking great power amp might seem. Indeed, iFi Audio's preferred analogue output is the tiniest connection here, a little

2.5mm socket on the rear panel that can be broken out into a pair of balanced XLRs via a suitable (third party) adapter cable.

Most users are more likely to use the ZEN DAC's entirely conventional unbalanced RCA outputs that can be set to fixed or variable, the latter under the control of the front panel knob. Also on

the front panel are the headphone outputs comprising a standard 6.35mm unbalanced connection or a 4.4mm 'Pentaconn' type for balanced headphones.

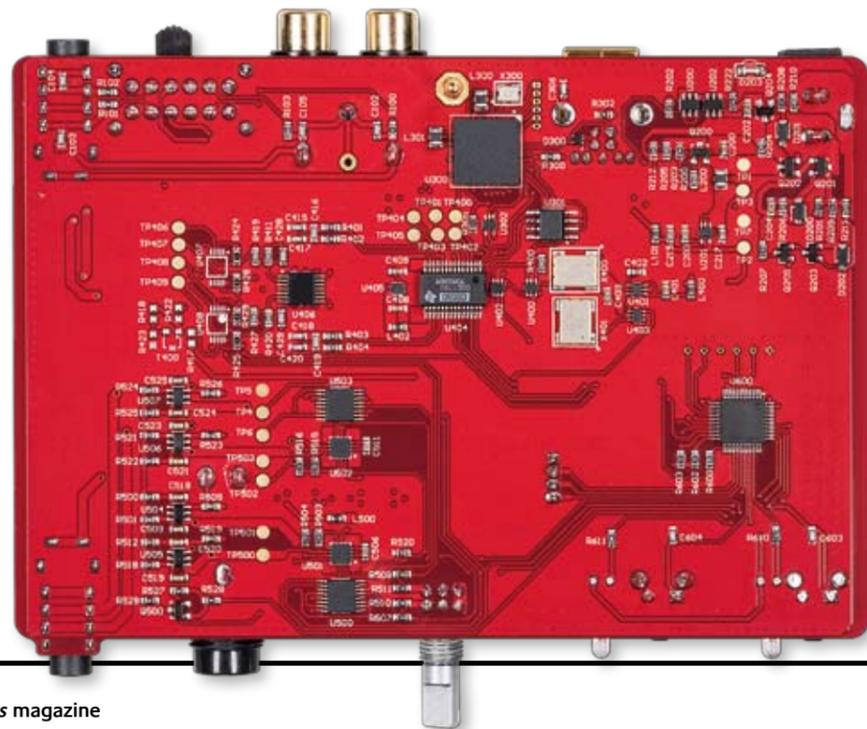
POWER MATTERS

The sole input here is a USB 3.0 Type-B socket, of the 'double-decker' kind rather than the smaller USB 2.0 square design more common on USB DACs, and a suitable A-to-B cable is included.

The USB connection also carries 5V power for the ZEN DAC but there's a separate DC input on the back of the unit should you wish to upgrade with an

aftermarket 5V/500mA supply. You could use a simple plug-top PSU (such as that provided with the ZEN Blue DAC), with such devices available online for around £10 or so, but iFi Audio also offers two upgrade power supplies, the iPower and iPower X, at £49 and £99 respectively. In practice the ZEN DAC's maximum (headphone)

'It's all rather wonderful, and totally involving'



power output [see PM's Lab Report, p69] can only be guaranteed with an external PSU because computer USB hub reserves can vary quite widely.

Within, the ZEN DAC certainly belies its budget pricing, and not simply by virtue of that balanced topology. Designed with substantial input from industry designer John Curl, who joined the company as a technical consultant last year, it employs Burr-Brown/TI's DSD1793 'True Native' DAC, downstream of a customised XMOS USB input, enabling it to handle LPCM at up to 384kHz/24-bit, as well as DSD256/1.2MHz 'quad DSD' in native form, and also MQA-encoded data.

FIRMWARE OPTIONS

A small LED next to the volume control changes colour to indicate the incoming file format. It glows green for LPCM up to 96kHz, yellow for 176.4-384kHz, cyan for DSD64/128, blue for DSD256, and magenta to indicate MQA. It's also possible

to download different firmware options from iFi Audio's website to optimise the DAC in various ways, and experiment with alternative digital filter settings.

Some of the filters originally used in the company's Pro iDSD [HFN Sep '18] can be downloaded as part of firmware 5.3C, and it's also possible to load v5.2 'Limoncello', which removes MQA capability, but makes it possible for the ZEN DAC to handle DSD512. Such firmware changes are carried out via the USB connection.

The ZEN DAC also offers two further adjustments, accessed via front-panel buttons. 'Power Match' switches the headphone amp's gain, boosting output for use with more demanding on-ear/over-ear headphones while the lower default setting should be used with in-ear monitors.

This is something of a broad-brush recommendation, especially given that the unit can deliver high basic levels – caution should be taken with the volume control when experimenting with this setting.

ABOVE: Elegant, formed alloy case is fronted by a bold volume dial. Balanced 'Pentaconn' (4.4mm) and single-ended (6.35mm) 'phone outs are joined by a bass boost (Truebass) and a high/low gain option (Power Match)

The same goes for iFi Audio's 'TrueBass' circuit, a development of the company's XBass system. Implemented in the analogue domain, this endeavours to enhance low frequencies without muddying the midband. While it's certainly effective with bass-light headphones being driven at low levels, in my experience it can still become a little overbearing at times [again, see PM's Lab Report], and was left off for most of my listening.

DRIVE ALL NIGHT

The term 'small wonder' rather undersells the ZEN DAC for this tiny unit is capable of a startling performance. While I wouldn't recommend it as the only digitally-equipped preamplifier you'll ever need – whether connected to power amps via its RCA outputs or rigged for balanced connection – that it puts up a more than respectable showing when so connected is testament to the engineering within.

As a very good little headphone amp it has much to commend it, despite using a lower-powered output stage than the £399 xDSD, as PM notes in his Lab Report, and as one might expect given the huge price differential. That it's also usable as a line-out DAC for use into a conventional amp or system also does its value for money proposition no damage whatsoever. In fact, during testing I used

ZEN BLUE

There's a second string to the ZEN bow, in the form of the ZEN Blue [pictured, below], aimed squarely at those who prefer their music streamed wirelessly from a smartphone or tablet rather than played from a computer via USB. The price is the same, and so is the attention-grabbing casework, and indeed the ZEN Blue has both balanced and unbalanced line outputs, as well as optical and coaxial digital outs, with a switch to select between these analogue and digital modes.

Powered from an offboard plugtop supply (we don't have wireless power over Bluetooth yet!), it uses the latest Qualcomm QCC5100 Bluetooth chip to support standard aptX as well as the Low Latency, Adaptive and HD variants. It also supports Sony's LDAC and Huawei's HWA Bluetooth audio coding regimes along with AAC and basic Bluetooth SBC, though Qualcomm's integrated DAC is replaced in the Blue by a tried-and-tested ESS Sabre converter. The result is a Bluetooth solution with not only wide flexibility but also a persuasive sound: wireless transmission still leaves something to be desired, but the ZEN Blue makes the most of what's delivered, both in terms of weight and scale and the detail on offer.



USB DAC/HEADPHONE AMP



ABOVE: USB-hub powered (or via an external 5V PSU), the ZEN includes a USB-B digital in with both fixed/variable single-ended (RCA) and balanced (2.5mm) outs

it as a convenient 'computer DAC', connected into both my desktop and main systems, as much as I did to power a range of headphones.

Using earphones including a long-running pair of Phonak Audeos, some inexpensive SoundMagics and a decidedly superior model from Astell & Kern and headphones ranging from B&W P5 to the P9 Signature [HFN Mar '17], Focal Clear [HFN Mar '18] and – to test the balanced output – Oppo's PM-1 [HFN Jul '14], the ZEN DAC proved its worth by driving everything I threw at it. I didn't have to use the 'Power Match' boost, and only with the least expensive models did 'TrueBass' come in useful, and then only at very low levels.

FRANKLY AMAZING

Playing Sam Amidon's often chaotic-sounding *The Following Mountain* set [Nonesuch 7559793801; 44.1kHz/24-bit], the ZEN DAC does a great job of bringing out the studio atmosphere, complete with its inter-track noise, buzzes and chatter. It all adds to the improvised feel here, from 'Gendel In 5' with its multi-layering to the jam of 'April' closing the set, which just has that vibrancy of free association and interplay. This kind of ambience and immediacy would be impressive in a high-end DAC; that iFi Audio's ZEN manages it for less than many would pay for a digital cable is frankly amazing.

Up the scale of recording to Sa Chen's dramatic, sweeping reading of Rachmaninov's Piano Concerto No 2 with the Orquestra Gulbenkian conducted by Lawrence Foster [Pentatone PTC5186444; DSD64], and the ability of this little DAC/headphone amp to deliver both the scale of the orchestra and the detail of the solo instrument is never in any doubt, whether the music is played through headphones or into an amplifier in DAC mode.

And if you want any more demonstration of its speed, definition and ability with timbral textures, look no further than harpist Claudia Lucia Lamanna's performance of Mchedelov's 'Variations on a theme of Paganini' [from Linn CKD646; 192kHz/24-bit]. Here the sound is appropriately crisp and tight, yet with a wonderful sense of the strings in motion and notes decaying into the acoustic.

Meanwhile, playing the first scene of Mascagni's *Cavalleria Rusticana* [Dresden Philharmonic/Janowski; Pentatone PTC5186722, DXD live recording] shows the effortless way in which the ZEN DAC makes music, from the subtle chimes to the rhythm of orchestra and chorus, not to mention a spot of percussive thunder. It's all rather wonderful, and totally involving.

Mind you, the same goes for 'Unbroken Chain' from The Grateful Dead's *From The Mars Hotel* set [DSD64 from MFSL UDSACD 2196], in which every instrument is allowed to shine without impeding the goodtime flow of the whole piece – but then I could say the same for the way the Zen DAC plays the whole set. What a bargain! ☺

HI-FI NEWS VERDICT

Yes – a startlingly high sound quality score, but then the ZEN DAC is a remarkably capable, fine-sounding piece of equipment and something very special for just £129. It goes to show that desktop audio doesn't have to be the poor relation of 'proper' hi-fi, and that there are still giantkillers out there. Buy this to boost the sound of your computer, and you may well find you're listening to it most of the time.

Sound Quality: 87%

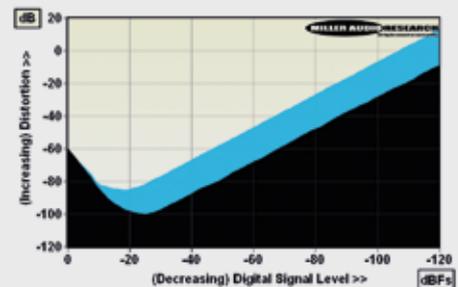


IFI AUDIO ZEN DAC

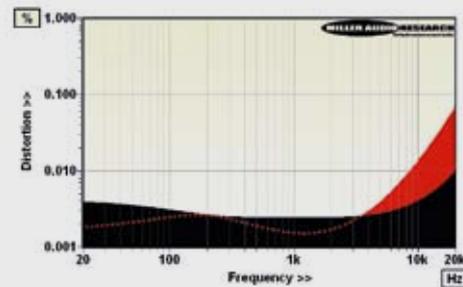
This high-value product employs the same TI (née Burr-Brown) DSD1793 DAC as iFi Audio's EISA Award-winning xDSD [HFN Jul '18], albeit with a lower-powered headphone amp in tow here. The DAC's default linear-phase digital filter offers a 53dB alias image rejection and excellent jitter suppression to <15psec (all sample rates). With a 0dBFS input, the RCA line outs are just clipped at 3.3V. The S/N is a wide 108.3dB and distortion falls to a minimum of 0.0011% over the top 30dB of its range [Graph 1].

There's much common ground between the DAC/line out and DAC/headphone out, including a response that's ruler flat to 20kHz ±0.02dB with CD/48kHz inputs, just –0.6dB down at 45kHz (96kHz files) and downsampled to a –6dB/48kHz bandwidth with higher rate files. Tested with the ZEN Blue's PSU, there's almost no change in response with loading (10mW/32ohm), partly due to the ZEN's impressively low 400mohm output impedance (the RCA outs are a higher 94ohm), but THD does increase with both loading and frequency [Graph 2, below]. Here, loaded or unloaded, the low 0.002% bass/midrange THD increases to 0.013%/10kHz and 0.075%/20kHz (10mW/32ohm).

Maximum output depends on iFi's 'Power Match' facility: switched on, this is 3.32V (18mW/600ohm) and achieving a single-ended 200mW/32ohm at 1% THD. Switched off there's a 10.1dB drop to 1.03V, or 1.8mW/600ohm, which is sensible for high impedance ear buds. Also from the standpoint of sensitive 'phones, levels of residual noise are very low at –98dBV (13µV), while the A-wtd S/N ratio is a wide 94dB (re. 10mW/32ohm). Take care with the 'TrueBass' feature, however, because this progressively boosts the ZEN's LF response from +1dB/235Hz, +3dB/120Hz, +6dB/60Hz and a whopping +10.6dB/20Hz. PM



ABOVE: Pre (RCA) distortion vs. 48kHz/24-bit digital level over 120dB range (1kHz, black; 20kHz, cyan)



ABOVE: Distortion versus frequency from 20Hz-20kHz (black, 1V into 600ohm; red, 10mW into 32ohm load)

HI-FI NEWS SPECIFICATIONS

Maximum output (<1% THD into 47kohm)	3310mV (RCAs)
Maximum power output (<1% THD)	200mW / 32ohm
Output Impedance (20Hz-20kHz)	0.4-0.5ohm (94ohm, RCAs)
A-wtd S/N ratio (re. 10mW/0dBV)	94.0dB / 108dB
Distortion (20Hz-20kHz, re. 10mW/0dBV)	0.002-0.075%/0.006-0.009%
Frequency resp. (20Hz-20kHz/45kHz)	+0.0dB to –0.02dB/–0.55dB
Digital jitter (48kHz / 96kHz)	13psec / 15psec
Power consumption	2W
Dimensions (WHD) / Weight	100x117x30mm / 800g