



ZEN DAC

Everyone uses headphones but only an enlightened few know how to get the best out of them. The ZEN DAC is a USB DAC/headphone amplifier that connects to PCs, Macs and smart devices via USB to take your audio experience to a higher plane.



This product guide provides information on the iFi audio ZEN DAC for purchasers, resellers and reviewers.

The introduction

Hot on the heels of our ZEN Blue hi-res Bluetooth streamer, at iFi we are expanding the ZEN family of desktop-sized audio products with the ZEN DAC – a USB DAC/headphone amp offering a level of specification and performance that belies its eminently affordable £129 price tag.

Designed for home use – on a desk, perhaps, or in the living room – the ZEN DAC connects to PCs and Macs, or smart devices such as tablets or phones, via USB. Its hi-res digital-to-analogue conversion technology processes all forms of digital audio to a super-high standard, while the integrated analogue headphone amplifier delivers superb sound with all headphone types, from in-ear monitors to larger on- and over-ear designs.

The retail cost of the ZEN DAC is US\$129 (ex tax) or €149/£129 (inc. VAT.)



ZEN DAC

The benefits

- Improve the sound quality of your music with the ZEN DAC quickly and easily.
- Connect the ZEN DAC via USB in between your PC, Mac or smart device – tablet or phone – and chill.
- Add the ZEN DAC to your home audio system and use it as a USB DAC, with or without the sound engaged.
- Whether you are hooking up headphones, an external amp or active speakers, you can choose between a single-ended or balanced connection – a remarkable facility at this price.
- The ZEN DAC delivers hi-res, 'bit perfect' PCM and DXD to 24-bit/384kHz, DSD256 and MQA.
- Tailor the sound of the ZEN DAC to your playback priorities with additional, exclusive iFi firmware.
- The analogue output stage of the ZEN DAC is a balanced design which means less interference and cross talk.
- Benefit from PowerMatch – switchable gain – to cater for headphone sensitivity.
- Turn on TrueBass to add missing base to open back headphones or IEMs.



Upgraded implementation



The DAC section is based around a Burr-Brown DAC chip that we use extensively at iFi, selected for its fluid, highly 'musical' sound quality and 'True Native' architecture.

This, together with the Xmos chip used for input processing, enables us to deliver excellent sound quality across all manner of digital audio formats including hi-res PCM, 'bit-perfect' DSD and MQA -- the hi-res streaming codec, as used by Tidal's 'Masters' tier. The ZEN DAC's digital audio credentials are highly impressive for a product in this price range.

The digital stage

The PCM logo, featuring the letters 'PCM' in a blue, pixelated font, with 'Pulse Code Modulation' written in a smaller font below it.The DSD logo, featuring the letters 'DSD' in a blue, sans-serif font, with 'Direct Stream Digital' written in a smaller font below it.The DXD logo, featuring the letters 'DXD' in a blue, sans-serif font, with 'Digital eXtreme Definition' written in a smaller font below it.

Double-DSD128 Quad-DSD256

5.6 MHz 6.2 MHz 11.2 MHz 12.4 MHz

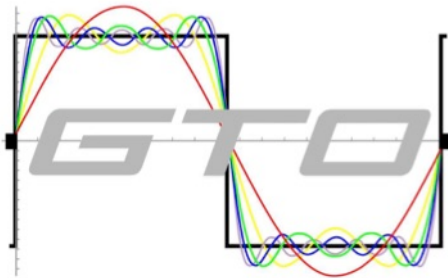
176.4 kHz 192 kHz 352.8 kHz 384 kHz

PCM and DXD audio data is supported up to 24-bit/384kHz, alongside DSD sampling rates from 2.8MHz to 12.4MHz (DSD256).

Thanks to the Burr-Brown chip's True Native design, PCM and DSD take separate pathways – this enables DSD to remain 'bit-perfect' in its native form, right through to analogue conversion. Many DACs that claim DSD compatibility accept DSD data but then convert it to PCM. We reckon that for DSD purists, the ZEN DAC is a fantastic affordable solution.

Extensive clock-locking is used throughout the digital stage to eradicate jitter, maintaining the integrity of the digital signal until conversion.

Bespoke firmware



Another circuit feature that we think separates this and other DACs made by iFi from competing designs is our in-house programming of the XMOS chip. While other manufacturers simply use the firmware that comes with the chip off-the-shelf, which is not typically optimised for audiophile-grade sound, we program our own bespoke firmware to boost audio processing power.

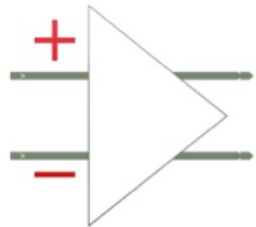
Our continuous software development allows features to be added or optimised via firmware updates, enabling the ZEN DAC to be tailored to your playback priorities and ensuring it stays cutting-edge over time. You can even download and install different versions of iFi firmware to experiment with different digital filters should you so desire.

For example, pop to our website and download firmware version 5.3C to unlock the now infamous 'GTO' filter originally found in our flagship DAC, the Pro iDSD.

More on iFi firmware at <https://ifi-audio.com/downloads/>

The analogue stage

Balanced



The ZEN DAC's analogue stage is a balanced design – highly unusual in a DAC/headphone amp anywhere near this price point. It incorporates a range of high-quality circuit components, carefully selected for their performance in an audio context, including C0G capacitors from TDK and a high-quality analogue volume pot.

The headphone amp stage has switchable gain, which we call PowerMatch. This matches the level of drive to the load presented by the headphones, by adjusting input sensitivity and thereby signal strength. With high-sensitivity headphone types such as in-ear monitors, leave PowerMatch at its lower setting for ultra-low-noise performance. But if your headphones require more drive – most on/over-ear types, for example – press the PowerMatch button on the front panel to increase gain.

The analogue stage



TrueBass is another user-selectable feature. An evolution of our established XBass circuit, TrueBass is a sophisticated form of 'bass boost' that subtly enhances low frequencies without muddying the midrange – particularly useful with earphones and open-back headphones that may lack deep bass.

It operates entirely in the analogue domain rather than messing with the digital signal via DSP and may be switched in or out via another button on the front panel.



Well connected



The ZEN DAC sports 4.4mm balanced outputs, both front and back – this is a relatively new interface type, designed to enable balanced signal transfer between compact products that cannot accommodate traditional XLR connections. The front-mounted 4.4mm output sits alongside a standard, single-ended 6.3mm headphone socket – thus, the benefits of balanced headphone designs are fully utilised, whilst also accommodating every type of headphone, both balanced and single-ended.

The 4.4mm output to the rear enables connection to amps and active speakers equipped with a balanced input – either a 4.4mm input, or XLR inputs via a 4.4mm-to-XLR cable. Single-ended RCA outputs are also provided.

These line-level outputs – both balanced and single-ended – can be switched between ‘variable’ and ‘fixed’, enhancing the ZEN DAC’s versatility. The variable setting applies volume control to the audio signal, enabling the ZEN DAC to perform as a preamp feeding a power amp or active speakers. The fixed option bypasses the volume control, fixing the output at 4.2V (balanced) or 2.1V (single-ended) for connection to an external preamp or integrated amp.

The ZEN DAC’s asynchronous USB Type B input supports the ‘SuperSpeed’ USB 3.0 standard and is also compatible with USB 2.0.

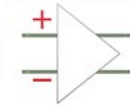


Precision Audio-Grade Oscillators



Precision low-noise power supply

Balanced



Balanced output stage



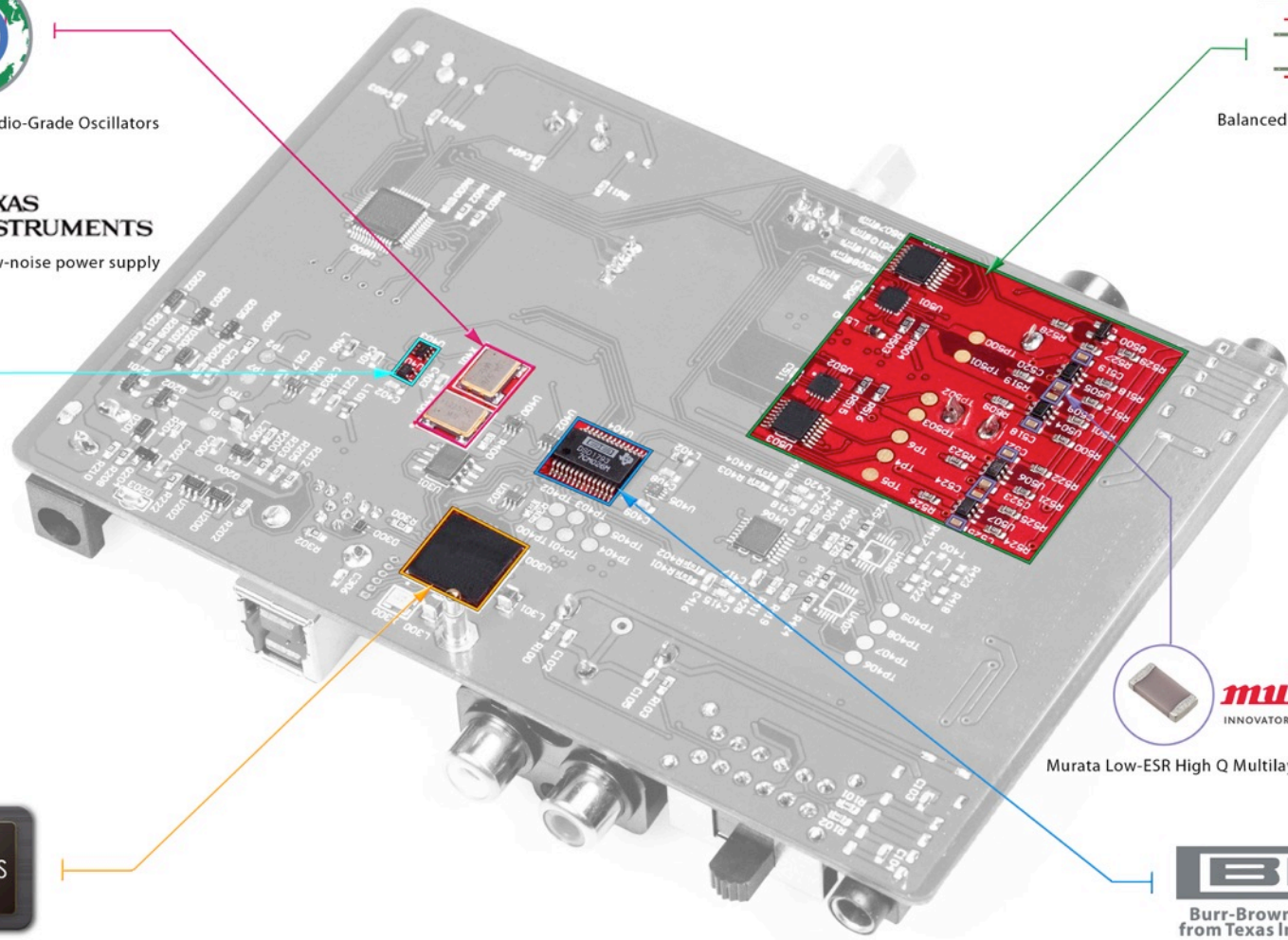
XMOS USB Controller with iFi Optimised Firmware



Murata Low-ESR High Q Multilayer Capacitor



Burr-Brown Products from Texas Instruments
Burr-Brown Native DSD DAC



Specifications

Input: USB3.0 B socket (USB2.0 compatible)
 Formats: 44.1/48/88.2/96/176.4/192/384kHz PCM
 2.8/3.1/5.6/6.2/11.2/12.4MHz DSD
 353/384KHz DXD
 DAC: Bit-Perfect DSD & DXD DAC by Burr Brown

Line Section:

Output:	Audio RCA (UnBAL)	2.1V fixed	1V / 3.3V max. (variable)
	4.4mm (BAL)	4.2V fixed	2V / 6.2V max. (variable)
Zout:	<= 100 Ohm (UnBAL)	<= 200 Ohm (BAL)	
SNR:	< -116dB(A) @ 0dBFS (UnBAL/BAL)		
DNR:	> 116dB(A) @ -60dBFS (UnBAL/BAL)		
THD + N	< 0.0015% @ 0dBFS (UnBAL/BAL)		

Headphone Section:

Output:	6.3mm (UnBAL)	1V / 3.3V max. (variable)	12 Ohm - 300 Ohm Headphone
	4.4mm (BAL)	2V / 6.2V max. (variable)	12 Ohm - 600 Ohm Headphone
Output Power:	UnBAL: > 280mW @ 32R, > 36mW @ 300R	BAL: > 380mW @ 50R, > 70mW @ 60R	
Output impedance:	< 1 Ω (UnBAL/BAL)		
THD & N:	< 0.005% (125mW @ 32R)		
SNR:	> 113dBA (3.3V UnBAL / 6.2V BAL)		
Power Consumption:	<1.5W		
Dimensions:	117(l) x 100 (w) x 30 (h) mm		
Weight:	491g (1.08 lbs)		





About us

iFi was born in 2012 with one goal in mind: to produce 'ultra-fidelity' audio products that push the sonic envelope - whilst still priced within the mainstream.

iFi audio is under our parent company, AMR, Abbingdon Music Research, which designs and produces top-end luxurious audio products. AMR saw in 2010 that customer demand for wireless and portable headphones was expanding as the whole audio dynamic was changing. Thus, iFi was launched.

iFi offers small but prodigious personal audio products thanks to the superior knowledge of AMR's technology. Today, we are proud of our British (and international) roots. We continue to design and manufacture over 35 different products. We are headquartered in Southport, UK with distribution including retailers such as B&H and etailz with production overseas.

We source parts from around the world from manufacturers including AMOS (UK), GE Valves (USA), WIMA (Germany) and TDK (Japan).

High-resolution photos & official logos: <https://media.ifi-audio.com/portfolio/zen-blue/>

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