



# Word perfect



Audiolab's much heralded M-DAC digital convertor is finally here. **Richard Black** finds its performance adds up to something special...

**A**mong the names to conjure with in digital audio over recent years, John Westlake's has come to figure very highly. He has been behind many of the Audiolab products we've waxed lyrical about in past issues of *Hi-Fi Choice*, and before that was involved in some justifiably celebrated products from Cambridge Audio (the original DacMagic) and Pink Triangle (the Da Capo, one of the most sought-after of the first wave of audiophile DACs, back in the 1990s). His latest magnum opus is this, the M-DAC.

There are a number of things interesting about this product, but surely the most noteworthy is its wide range of filter options (many of which we've encountered already in the excellent Audiolab 8200CD). This makes it one of the most sonically tweakable DACs on the market.

A brief digression on the subject of filters, if you'll indulge me. Digitally encoding audio inevitably requires some filtering, which simply means limiting of bandwidth. If you don't do this, all sorts of bizarre and unpleasant distortions arise. There is such a thing as a filterless DAC

## DETAILS

**PRODUCT:** Audiolab M-DAC  
**ORIGIN:** UK/China  
**TYPE:** DAC  
**WEIGHT:** 1.5kg  
**DIMENSIONS:** (WxHxD) 250x59x252mm  
**FEATURES:**  
 • balanced (XLR) and unbalanced (phono) analogue outputs  
 • electrical and optical digital outputs  
 • 2 each electrical and optical digital inputs (max 24-bit/192kHz)  
 • USB digital input (max. 24-bit/96kHz)  
 • can control media player on PC/Mac via USB  
 • digital gain control  
**DISTRIBUTOR:** IAG  
**TELEPHONE:** 01480 447700  
**WEBSITE:** audiolab.co.uk

(Audio Note, for instance, makes them) but this simply means that the filtering is in effect carried out by the loudspeakers, the air and your ears instead! The vast majority of DACs use digital filtering to present an undistorted analogue signal to the world, but there are various ways to do this. And by far the commonest way of doing this is – surprise, surprise! – a compromise, achieving okay performance from relatively simple hardware of very well-documented design.

With the huge advances in designing and manufacturing digital integrated circuits, requirements for simple hardware have receded and the option now exists for audio designers to implement more sophisticated filters. Trouble is, there's no consensus on what the best filter type actually is. Options include filters with near-perfect amplitude response but lots of ringing, or no ringing but poor amplitude response, or good amplitude response from a filter with no pre-ringing, but plenty of post-ringing, and more. Audiolab is not the only manufacturer to have seized on this divergence of opinion



directly observable at the analogue output using conventional test methods and equipment. On the other hand, specialist audio cables suffer from the same issue and there's no shortage of people prepared to put their hand on their wallet and swear they make plenty of difference! These options are available in 'Optimal Transient' mode, as XD and DD versions.

Selectable filtering isn't the only handy thing the M-DAC does. It's got a volume control which can be taken out of service if you prefer to use your preamp, but with five digital inputs on the M-DAC itself you may not actually need a separate preamp – this is it! There's a balance control too, like the volume control calibrated in accurate dB steps. If you wish, you can set the display to indicate signal level for each channel, and it can display either nominal or exact incoming sample rate, possibly useful for fault-finding. The display can even indicate track and time information from a CD; who knew that information came down the S/PDIF digital link? No, I didn't either!

With computer audio such a common source these days, more and more manufacturers are including details of how to ensure bit-perfect replay, and Audiolab does this in its instruction. It goes one further in making a 'bitperfect' test available, which is very clever and simple, relying on a file which you download from the Audiolab website. It's very comforting to know that you are playing back an uncorrupted file. If you're using Windows XP, which has a habit of altering the least significant bit (LSB) of the audio data, you can use the 'LSB restoration' feature of the M-DAC to correct the damage done.

Finally, and it gives me great pleasure to report this, practically all this stuff can be controlled remotely. It's remarkably rare to find a remote control included with any DAC, but Audiolab has done it and I for one

am grateful. The remote's nothing fancy, but who cares? It does a valuable job.

Electronically, the M-DAC is based around a high performance DAC chip from ESS, which converts to a very high technical standard. It's followed by op-amp chips, as is the case in most converters, but the M-DAC also includes discrete transistor circuitry, an extremely rare detail at this kind of price. The headphone output is also driven by discrete circuits. There's copious power supply filtering all over the place and heavy-duty jitter attenuation to ensure that jittery sources are still optimally converted.

### Sound quality

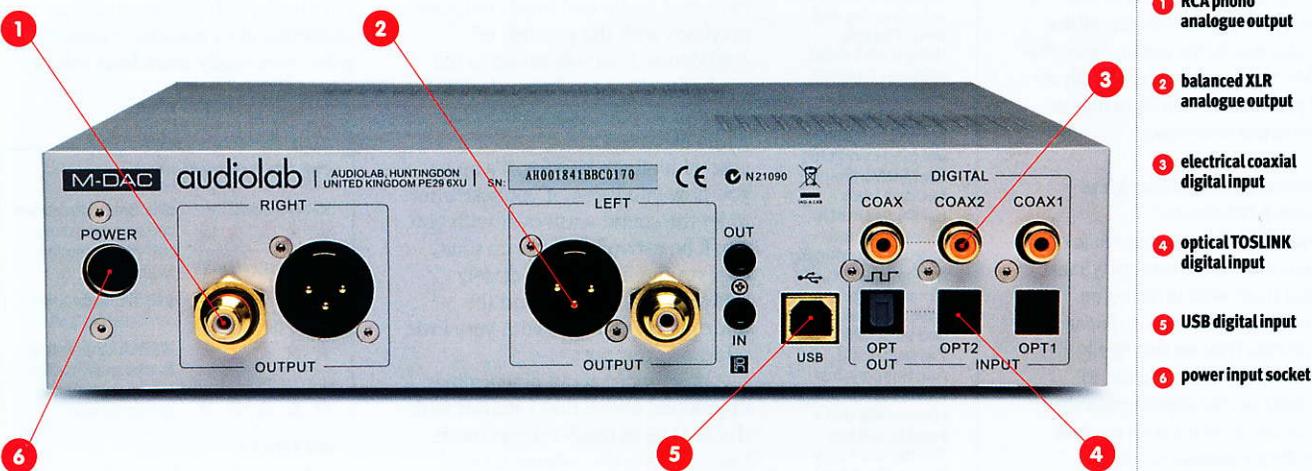
With all the options available, it's hard to know where to start the listening, so I plumped for the 'sharp roll-off' digital filter (much the same as most CD players) with a budget CD player as the source connected via an electrical S/PDIF link, and output volume fixed. Very much the plain vanilla setting in other words, but probably the simplest way of assessing basic performance. And as I'd rather expected, performance is in fact anything *but* basic...

There's near-faultless extension at frequency extremes. Bass is beautifully extended but never in any danger of exaggeration or overhang, while treble is sweet and open. It's treble that most obviously reacts to changing the digital filtering settings, seeming to gain a little in extension when one switches to 'Optimal Transient' but, as it seems to us, gaining in transparency in 'Optimal Spectrum' mode. This is a hard one to call as some recordings just don't show up the difference, but with the clearest recordings, including some I'd had a hand in making, I definitely felt that Optimal Spectrum had the edge all round over the longer term, though Optimal Transient can sometimes be more immediately ear-catching.

as an opportunity to offer selectable filters so that you can tune the sound to your taste.

John Westlake however has taken things a stage further. Within some (not all) of the filter types, he has made available options related to how the DAC processes the data internally. This is pretty subtle stuff and Audiolab makes no claim that the results are

### CONNECTIONS



## Q&A

RICHARD BLACK TALKS TO AUDIOLAB DESIGNER JOHN WESTLAKE...



**RB: How did the M-DAC come about?**

**JW:** It had its origins in work that Dominik Peklo and I did before joining International Audio Group (Audiolab), but it also grew through our work on the 8200CD, CDQ and DQ.

**What's the thinking behind XD and DD processing?**

XD and DD filters are variations of the original Optimal Transient filter. The XD filter results in a mathematically identical output as the Optimal Transient filter, but the results are achieved via computationally different processing, altering second-order effects such as internal PSU modulation. The Optimal Transient DD filter takes this further by using corrective processing to null these effects.

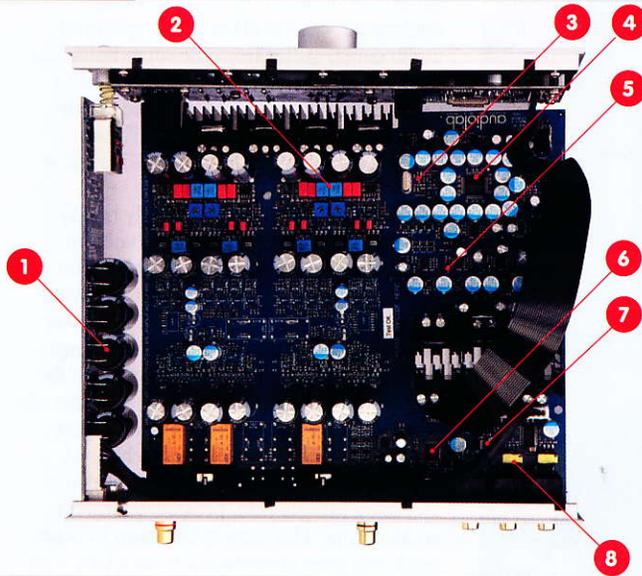
**Can the M-DAC really restore bit-perfect audio after Windows has fiddled with the LSB?**

Yes it can, as can be verified using the M-DAC's built-in Bitperfect Test. The LSB restoration will work for files with original bit depth of up to 20 bits at sample rates up to 96kHz played on Windows XP through DirectSound or waveOut. In other words, you can now listen to a lossless CD or even HDCD music straight from iTunes or Windows Media Player with no feelings of guilt. Unfortunately, Vista and 7 both employ a limiter that's kicking in any time the music is hitting peaks, irreversibly changing all the samples nearby the peaks. Again, the M-DAC's real-time bit depth analyser and peak meter make it possible to observe this behaviour.

**What are the advantages of the discrete J-FET circuits?**

The M-DAC's fully discrete analogue circuits make up an extremely linear output stage without relying on overall global feedback, to linearise the design. They are also highly immune to RF demodulation. RF leakage from the digital conversion process is one of the main reasons we believe conventional digital designs have a tendency to sound 'hard' and 'bright'.

## IN SIGHT



- 1 1st stage PSU converts raw AC mains to DC
- 2 left channel balanced Class A output stages
- 3 5th overtone low jitter clock
- 4 ESS 32-bit Sabre DAC
- 5 cascaded asynchronous time domain isolator
- 6 asynchronous USB interface
- 7 1st stage jitter attenuation stage
- 8 transformer isolated coaxial inputs

## HOW IT COMPARES

**AMONG DACs** we've reviewed recently, the Rega DAC (HFC 357) is the closest in price to the M-DAC. It too offers user-selectable filters, though doesn't have the other processing options of the M-DAC. Nor does it have the informative display, a headphone output, a remote control or balanced outputs, so Audiolab can apparently justify the extra £100 easily enough.

Sonically the comparison is interesting. I found lots to like about the Rega, including a similarly effortless way with detail and very good extension in both treble and bass. The one thing it fell behind with was imaging, which seemed a touch distant. Now I haven't mentioned imaging as regards the M-DAC, simply because I was hardly aware of it. Going back and listening specifically for that, though, I found images were about as solid and believable as I've ever heard. And this certainly includes recordings I personally had a hand in making. The Rega is a very fine product, but I feel the M-DAC just edges past it.

One of the beauties of having all these filters available is that some music may seem more convincing via a different filter. A solo piano recording seemed to have just a shade more body to it using the 'Minimum Phase' filter, for instance. My investigation of the filters was certainly aided by the very high-quality headphone output, which drove all in my large collection of 'cans' very convincingly, and to very high levels when required. Interestingly though, my conclusions as to which filter was preferred for which music once or twice differed, depending on whether I listened through headphones or speakers.

That this DAC clearly offers some of the most detailed – and at the same time most musically bewitching – sounds I've heard from any digital source. It is, as it should be, largely immune to the differences between sources and gets the best from CD, streamed audio and local computer playback with the greatest of confidence. It simply revels in the kind of tricky multi-layered sound that can so often trip up modern audio electronics.

As with all the best kit, it's up to you how you listen; if you just want to let the sound wash over with you, you'll be carried away in no time, or if you prefer to listen closely and analytically you'll find the information you seek with very little effort on your part.

A quick word about practicalities. I mentioned above that I started with the M-DAC in fixed-volume mode, but engaging the volume control convinced me that this is also a perfectly sensible way to listen.

Performance as a digital preamplifier is excellent, and the gains to be made from eliminating a unit (i.e. the preamp) from the signal chain don't seem to have a price on them. And while it doesn't affect the sound, the unusually informative display and remote control combine to make this one of the nicest DACs to use that I've encountered at any price. I couldn't convince myself that I could hear any gains from the DD/XD processing, but everything else about the M-DAC is so easy to recommend that it comes out a clear winner.

## Conclusion

With excellent sonics across a wide range of sources, fine build, superlative ease of use and a vast feature count, it's very difficult *not* to rave about the new Audiolab M-DAC. It's a landmark product, just like John Westlake's original DacMagic was all those years ago. If you're looking for a digital-to-analogue convertor at or anywhere near this price, you surely must hear this. ●

## Hi-Fi Choice

### OUR VERDICT

- SOUND QUALITY** ★★★★★ **LIKE:** Beautifully clear and detailed sound; strong on rhythm; impressive feature set
- VALUE FOR MONEY** ★★★★★ **DISLIKE:** Fragile power connector; that's all!
- BUILD QUALITY** ★★★★★ **WE SAY:** Raises the bar for what an affordable – or in some ways any – DAC can achieve
- FEATURES** ★★★★★

### OVERALL

