Plus Power

Audiolab's new M-DAC+ brings better quality to CD and high resolution digital, Noel Keywood says.

For those in the market for a top quality DAC, Audiolab's M-DAC has been the go-to product for many years. Unlovely in appearance, it was lovely in sound quality – and affordable. The new M-DAC+ is even less lovely in appearance, but it addresses weak points in the original M-DAC, to give even better sound. And it remains affordable, carrying a price tag of just £850.

Otherwise much remains the same, since you don't want to change a successful formula for the sake of it – and in any case there wasn't much leeway to change anything; Audiolab got it mostly right in the first place.

The original M-DAC scored by using the best DAC (Digital-to-Analogue Convertor) chip available at the time, the ESS ES9018 from their Sabre32 series, put into a box with a set of unique digital filters – no less than seven of them.

DAC chips are technologically very complex devices, and also require large investment to manufacture. So the DAC that lies at the heart of all digital players (e.g. CD players) and external hi-fi DACs like the M-DAC comes from an outside specialist supplier: think Texas Instruments (USA), Wolfson (UK), Asahi Kasei (Japan). Choice is limited and chip manufacturers seek to leapfrog each other in order to corner the global market.

In 2008 ESS of Milpitas, California, introduced the Sabre32 series DAC chips that have an astonishing performance, way beyond all else: people soon took notice. One of those people was UK designer John Westlake, who isn't averse to complexity, and he based the Audiolab M-DAC around ESS's top quality ES9018, Sabre32 series DAC chip, adding those filters I mentioned in the process.

And that explains how and why the first M-DAC was different to most others. It was one of the first to use what proved to be one of the best sounding (and measuring) DAC chips on the market at the time – and ever since, with the single exception of Chord Electronics unique rival DAC, from designer Rob Watts.

I hope this gives you some idea of where top-quality hi-fi DACs come from, how they are designed and what – inevitably – are the limitations of choice seen by hi-fi manufacturers. It sets the stage for the M-DAC+ here, shining light into the commercial background from whence it came. And from where all others – Chord Electronics excluded – come.

These days, rivals using the ES9018 chip are popping up all over the place, including price rivals such as the Northern Fidelity DAC-384 at £650 we reviewed in the January 2016 issue – competition is getting fierce.

The big physical difference between M-DAC and M-DAC+ is that the latter has its power supply built in, so comes as a single unit. M-DAC relied upon an external switch-mode power unit connected by cable terminated in a multi-pin DIN style plug. The advantage was no hum – and switch mode power supplies are more numerous than ducks in China, where this DAC is made, meaning they are cheap. After repeated and fairly heavy use at our hands though, the pins in the power cable plug started to bend and I have had to apply corrective surgery, using snipe-nosed pliers and magnifying glass. Our usage doesn't mirror that of the outside world since we constantly plug and unplug equipment – causing weak connectors to fail. But it does suggest where M-DAC had weakness.

And then there is the poor reputation of switch-mode supplies with regard to sound quality, not to mention the intervention of a cable and connectors between supply and DAC to degrade sound quality. Japanese audio companies commonly play up the superior sonic results of conventional linear power supplies – and along came Oppo with their BDP-105D Blu-ray player with ES9018 DAC chip and internal linear supplies to underline the message: go linear if you want good sound.

So this is what Audiolab have now done. M-DAC+ has a high quality on-board linear power supply, mains power being applied through the usual IEC mains plug.

Another new feature of the M-DAC+ is the ability to process DSD digital code, in addition to normal PCM. All modern DAC chips can process DSD because it is simple to do so but enabling this provision hasn't been so common because DSD files are rare and difficult to transmit over a USB computer connection. No point in adding complexity and cost when no one will use it, the thinking goes.

Yet DSD, as originally used in SACD (Super Audio Compact Disc), sounds more fluid and natural than standard digital (PCM) and has gained wide respect for this alone. As a result DSD recordings have moved out of being an interesting rarity and into the mainstream - helped by continued support from Sony who developed DSD long ago as an archiving medium. Labels like Blue Coast Records (California) promote DSD and have a DSD Guide on-line if you are interested in knowing more. They are supported directly by Sony I found, when visiting them at the California Audio Show, so there's no lack of activity here and the new M-DAC+ can now handle DSD recordings, up to quad-DSD (DSD 256).

That's new M-DAC+ described in outline, and what the + moniker means. Audiolab thankfully haven't stripped out any of the original features that made the unit so flexible. It still has a high-resolution digital volume control that can be switched out if desired, this being intrinsic to the 9018 DAC chip. What it means is the unit can drive power amplifiers direct – no preamp needed. The small remote control has volume Up and Down buttons, as well as Mute, so volume can be adjusted from the settee; the main unit has a rotary volume control should you prefer it (or lose the remote).

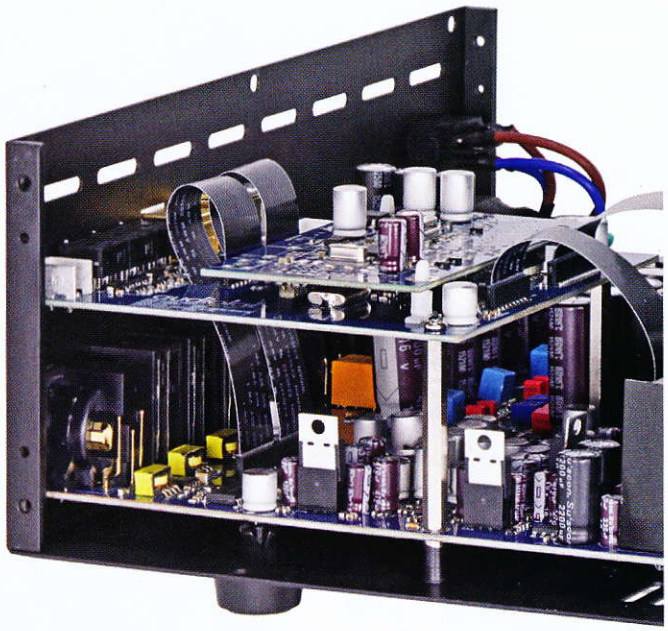
The optical S/PDIF digital input now handles 192kHz sample rate PCM so it will accept output from an Astell&Kern portable hi-res player and not fall silent when a 192 file is played, something I suffered

The small remote control unit provides all functions, including volume, mute and filter selection.

continually and found irritating on the original M-DAC!

There is also an AES/EBU balanced S/PDIF digital input, that gives slightly better results than optical or electrical inputs – where an AES/EBU balanced source is available; they are rare.

And then there's a USB B 'uni-directional' input for connection to a computer. It will accept up to 384kHz sample rate PCM, the limit of the ES9018. You can set a Mac to output at this sample rate if you wish, but



Multiple layers of circuit boards in the newer, high-profile case of M-DAC+ reveal how complex it has become with on-board power supply and DSD processing.

it won't improve sound quality; PCs must have driver software installed. Audiolab include an 8cm mini-CD with necessary software, so you don't have to download it. There's now also an iPhone/iPad USB A input.

As before, M-DAC+ has both unbalanced phono socket audio outputs and balanced XLR outputs. Measurement showed the XLRs run direct from the DAC (which has balanced output only), giving the 9018's full 125dB dynamic range, but the unbalanced has been buffered and has 7dB lower dynamic range due to noise in the buffer. To get this into perspective, at 117dB it's still has the dynamic range of most high quality DACs but it is a significant shortfall on what is available from the balanced XLR outputs, so obviously M-DAC+ is best connected via XLR.

As before, M-DAC+ has a full sized (1/4 in) headphone output on the front panel so it can be used to drive phones from a computer via USB.

To play DSD use Foobar 2000 for PC Audiolab suggest, Audirvana Plus for DSD from Mac (£58) or Pure Music Player for Mac that works in conjunction with iTunes.

The seven filters Audiolab have designed around the Sabre32 DAC chip are impressively effective. They can impose quite large changes upon the sound quality of CD but their impact is less obvious at higher

sampling rates where the filter characteristic effectively moves up in frequency.

In essence, three filters are 'fast' – Sharp roll off, Optimal Spectrum and Minimum phase. Three are 'slow' – Optimal transient, Optimal transient XD and Optimal transient DD. Then there's the seventh odd-man-out that is a compromise between fast and slow, being called Slow.

The three fast filters are what you get in most digital devices, whilst the three slow filters are most certainly not. That's because they roll off high frequencies quite strongly and don't offer the best performance figures, being drastic enough to make CD sound obviously warm. However, they eliminate pre and post ringing in the time domain, giving superior transient performance and, in my experience, after a while I find I prefer them, offering an easier and more relaxed sound.

For those who want this well-damped time domain response but also some high treble sparkle from CD there is the Slow filter that is a compromise – and a very good one under measurement, if not obviously so when listening, but it does depend upon programme material I find.

Filter selection is achieved by pushing in the Select knob, rotating it to the filter wanted and pushing again – simple.

DSD filters are included in the ES9018 chip and implemented in the M-DAC+, so you also get three filters here, but they are simple analogue filters to reduce the supersonic noise one-bit DSD produces and little affect sound quality.

M-DAC may not look lovely, at least in the black finish we had, but it is sturdily built. Measuring 247mm wide, 114mm high and 292mm deep, the unit will slot into most spaces. It's a neat bit of packaging in fact because linear power supplies are big and they radiate hum unless you use a heavily screened toroidal transformer. Audiolab say there are no fewer than eight different supply lines and digital and analogue are kept separate.

Running M-DAC+ on my computer desk as a headphone amplifier, fed from a Mac via USB, all worked well. Until, that is, I decided to load test files from the same computer onto my iPhone via USB cable: iTunes would not see the phone. I had to physically disconnect M-DAC+ before the phone icon appeared in iTunes.

With test files loaded, the iPhone played via M-DAC+'s USB A input, then all of a sudden it stopped doing so and would not see the phone - even though all else worked properly and so did the phone. M-DAC+ needed a re-boot to clear this, meaning switch-off of mains power and removal of IEC plug. Happily this did not happen often.

"a sense of order and clarity were imposed on the track and it sounded quite different to the way I know it."

I've come across obscure Apple problems like this before and they're usually linked to the constant changes being made by Apple in their software; heavens I've loaded Mavericks, Yosemite and El Capitan months apart.

The little remote was superb I thought; easy to hold, no spurious buttons and yet able to do it all, including change filters.

SOUND QUALITY

I started listening to M-DAC+ as a headphone amplifier, to check its USB behaviour and iPhone compatibility. With Oppo PM1 and Philips Fidelio X1 headphones the overriding quality was a sense of massive low end power, delivered with supple ease. The Darkness 'Growing on Me' (a CD rip) fairly blew the Philips Fidelio headphones off my head, the huge rhythmic lead line stretched out wide and solid, underpinned by enormous heft. There was a sense of warmth to the sound that didn't suit the Oppos, that in themselves are a tad laid back up top, so I gravitated to the X1s. The message here being that the smooth, easy sound of this DAC suits normal to bright headphones but less so those that veer the other way.

'Time' from the Pink Floyd (24/96) came over as rich and smooth, with a sense of deep separation between instruments across a wide soundstage - and again power behind drums and the laconic bass line.

Headphone listening apart, I used M-DAC+ fed by a digitally linked Astell&Kern AK120 portable player driving a Naim NAP 200DR power amplifier direct, hooked up to huge Spendor SP 200 loudspeakers (two 12in bass units no less!).

These 'speakers have bass resolution big style and this made it absolutely clear to me that M-DAC+ has an altogether larger, more muscular sound than the original. M-DAC+ is very, very un-CD like - more so than the original model.

With The Eagles 'Too Busy Being Fabulous' (CD rip) which usually sounds somewhat messy and harshly bright, M-DAC+ discarded the muddle and focussed on the instruments instead, putting definition into the bass line, setting the drums into their own space whilst clearing the air around Don Henley's vocals. A sense of order and clarity were

The rear panel carries phono and balanced XLR analogue audio outputs. At right is an XLR socket for balanced (AES/EBU) digital input, alongside electrical and optical digital S/PDIF inputs. There is also a USB B input for computer connection, and USB A for iPhone connection.

imposed on the track and it sounded quite different to the way I know it, being a classic Rock test track used often. Just be aware that M-DAC+ comes over as creamy smooth with the sort of warmth associated with analogue LP rather than anything digital, so it changes what is going on.

With well recorded and balanced Rock tracks like Fleetwood Mac's 'Go Your Own Way' (24/96) there was strong dynamic punch to Mick Fleetwood's drums, the SP200s driving our room with gusto. Cymbals rang with strength here, with the XD filter giving a well solidified image.

With the Minnesota Orchestra playing Rimsky Korsakov's 'Dance of the Tumblers' (24/96) bowed stings were lusciously smooth, forming a caressing backdrop to the solo flute, whilst kettle drum strikes shook our listening room with confident ease. With classical in general, orchestras had massive presence and power; I was inevitably pummelled by the LSO playing 'Mars' from the Planets (24/48), the aggressive closing orchestral sequences having both forward thrust and sharp timing.

Then I moved to another system entirely for a different view – and specifically to use the M-DAC's balanced output, which offers a step up in performance over unbalanced (i.e. phono socket) output. A Creek Evolution 100A amplifier was switched to straight-through (i.e. no volume control) from its balanced input, and connected to revealing Quadral Auram Megan VIII loudspeakers. This system sounded extraordinary, even with CD. A sense of immaculate grip and razor sharp timing became apparent, transients from Terry Evan's steel stringed guitar coming across with lacerative power, in Get Your Lies Straight. His gruff grumbling about his woman, and background rumbling picked up by the microphone in this blues piece all had electric presence. In fact, I was so taken aback by this performance and all others that followed, I would declare it is the best I have ever heard from CD. The basic output of the ES9018 Sabre32 DAC is balanced (as it is with most DAC chips), not unbalanced – and what I was hearing here was the chip at its best in Audiolab's excellent support environment, now with linear power supply. I preferred the Audiolab's Optimum Impulse XD filter, by the way; with CD its impact is quite noticeable, smoothing the sound and adding body to mid-range instruments. Extraordinary clarity, enormous dynamic swings and a deeply smooth, quiet background greeted me from the balanced output of the new M-DAC+: it was beyond impressive, the best I have heard digital yet.

CONCLUSION

The new Audiolab M-DAC+ has been usefully buffed up to keep it ahead of the pack. If you want fabulous sound quality from CD, something the original M-DAC provided in buckets, the new model manages even better. It is deep, open and spacious – but now has even firmer bass and a more broad-shouldered sound. Use balanced output and it gets ever sharper timed, forensically clean and clear, with more dynamic contrast.

You also get superb hi-res of course and a DAC that has few rivals when hooked up to a computer through USB. And all for £850. Pay much more – as in the Resonessence Invicta Mirus – and you may well get just a little better, but you'll not get anything as well designed and effective under £1k by a long margin. The M-DAC+ remains the place to go in my view if you're looking for a super high quality DAC. It's great piece of design work and sounds wonderful too, even breathtaking.

MEASURED PERFORMANCE

The M-DAC+, at maximum volume on its display of +3dB, delivered 3.35V from its phono sockets, and double that at 6.7V from its balanced XLR sockets.

At full volume it was not in overload, so full volume is usable. What +3dB means is that output is above Philips Red Book standard of 2V – that's all.

The higher output of XLR lifts music further above noise and as a result gives improved dynamic range figures. The best dynamic range value from M-DAC+ was, surprisingly, from its USB computer connection that delivered an impressive 125dB via the balanced XLR outputs. This is higher than the original M-DAC by 2dB and reaches Chord's Mojo. Unfortunately, the unbalanced phono socketed output delivered 117dB dynamic range – quite a shortfall on balanced. Although this is a good result, it isn't exceptional.

All three digital S/PDIF inputs accepted 192kHz sample rate signals, including optical, but where optical and electrical gave 124dB dynamic range via XLR out, the balanced AES/EBU input was obviously quieter the analyser showed, giving 125dB.

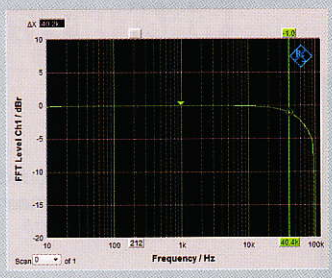
Maximum analogue bandwidth (68kHz, -1dB) was achieved with the Optimum Spectrum filter at 192kHz sample rate.

With CD the Slow filter becomes severe, rolling off treble sharply above 5kHz, whilst Optimum Transient rolls it off slowly above 5kHz, so both will have quite an obvious audible affect upon CD, but the other filters are more conventional in behaviour, Optimum Spectrum giving flat response to 21kHz for example.

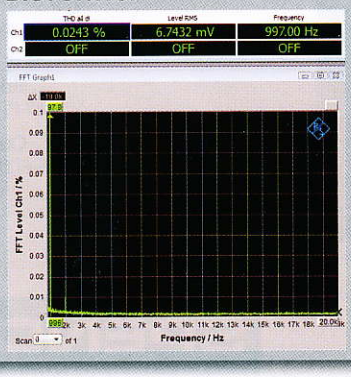
Overall, the seven filters give a wide range of differing results: three offer best impulse response with least pre/post time domain ringing, two offer widest frequency spectrum and one – Slow – offers a good compromise.

Now with high-quality internal linear power supply, as well as DSD capability, the M-DAC+ continues to offer fine results all round, the only caveat being unexceptional dynamic range from the phono socketed, unbalanced outputs that most people use. **NK**

FREQUENCY RESPONSE



DISTORTION



Frequency response (-1dB)	
CD	4Hz-68kHz
Distortion (24bit, -60dB)	%
0dB	0.002
-60dB	0.02
Separation (1kHz)	112dB
Noise (IEC A)	-124dB
Dynamic range	125dB
Output	3.4/6.7V

AUDIOLAB M-DAC+ £850

OUTSTANDING - amongst the best.

VERDICT

A DAC that offers the best performance today – and affordable too. The new M-DAC+ has it all for £850: best sound and the ability to do it all, almost.

FOR

- sound quality
- flexibility
- filter set

AGAINST

- appearance
- dull display
- phono dynamic range

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