

HI-FI WORLD

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2015 AWARDS ISSUE

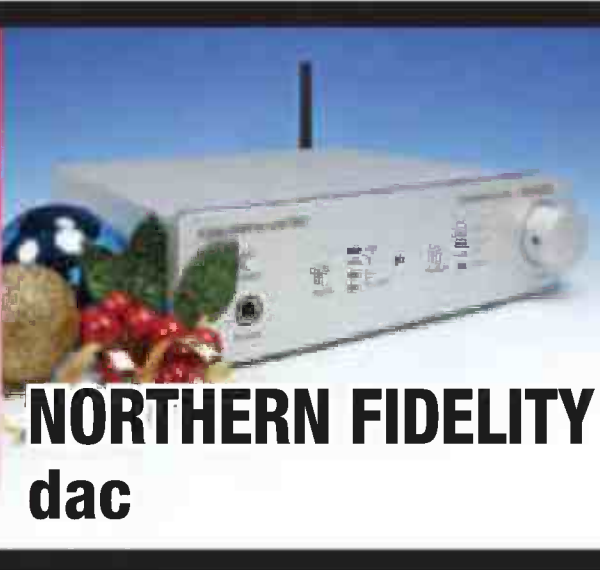
OUR TOP PRODUCTS OF 2015



...AND ALSO REVIEWED IN THIS ISSUE



QUAD ARTERA
cd player/amplifier



NORTHERN FIDELITY
dac



SPENDOR A5R
loudspeaker



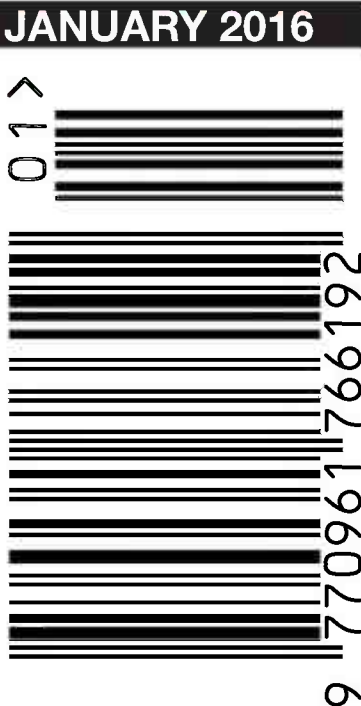
CHORD MOJO
dac

ROHDE & SCHWARZ
MEASUREMENT



ROKSAN K3 Di CD PLAYER * DALI ZENSOR 3 LOUDSPEAKERS
* CHRISTMAS CROSSWORD * CHRISTMAS QUIZ

7 PAGES OF LETTERS - THE BEST WINS A PAIR OF KEF Q100 LOUDSPEAKERS! (UK ONLY)





Signature Tuned ARAY

"I felt I was listening to a more lifelike rendition of the music...good vocal projection combined with tight timing and a natural tonality make this cable extra special"

**Hi-Fi World
Nov 2014**

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welcome

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Rafael Todes, Mark Osborn



We encounter a lot of admirable products every year, ones that have not a peep wrong with them and do everything expected well. And so they get a hearty recommendation from us, with our advice that you should check them out. I'll quote the FiiO X3 high-resolution portable player straight away: small, inexpensive at just £150 and just about perfectly honed. But it wasn't an Astell&Kern in sound quality, nor a Lotoo PAW Gold either, and now Chord have released Mojo the whole market is going to have to look to its transistors.

My point being that in a constantly moving market there is the honourable mainstream – but there are some stand-out products.

Stand-outs are the subject of this month's issue, revealed in the Awards we bestow upon those products we felt were exceptional. You can find our summaries starting p11 and read the original reviews from p23 onward. I hope you enjoy this great round-up, it's eternally popular and we came across some fine products over 2015.

Just missing out on our awards discussion and compilation process because it came a tad too late was the new Mojo DAC from Chord Electronics you'll find reviewed in this issue on p76. Perhaps it will make it next year. In the meantime, after lengthy measurement and use, we were nothing other than amazed by just how good it is. I hope you enjoy our coverage.

New digital products are being released fast and Quad's Artera DAC/CD player with current-dumping power amplifier is a great combo, reviewed by Martin Pipe on p90.

And finally an apology and an explanation that you may find interesting. Last month we featured a lovely Clearaudio turntable on p96, Next Issue contents page, but it is not in this issue. The turntable had been measured and worked superbly but the fascinating new in-arm Absolute phono stage – a second sample – was a tad odd in behaviour. In the end measurement pinned down the problem: it only suits Clearaudio MC cartridges they admitted. That's why our top Ortofon A95 didn't sound quite right! Hopefully, whilst we await a matching Clearaudio MC cartridge and re-measure the unit, all will go well and we will be able to look at this unusual phono stage in our February 2016 issue.

Meanwhile, I hope you find what we did manage to bring you in this issue – Awards as well as a quiz and crossword – keep you happy over Christmas. And remember – do not use brandy as a stylus cleaner. Drink it instead – and have a happy Christmas!

Noel Keywood

Editor



hi-fi world

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verdicts

● ● ● ● ● **OUTSTANDING**
● ● ● ● ● **EXCELLENT**
● ● ● ● ● **GOOD**
● ● ● ● ● **MEDIOCRE**
● ● ● ● ● **POOR**
£ **VALUE**

amongst the best
extremely capable
worth auditioning
unremarkable
flawed
keenly priced

ELECTRONIC MAGAZINE

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testing (see www.hi-fiworld.co.uk for full explanations of all our tests)

To ensure the upmost accuracy in our product reviews, *Hi-Fi World* has extremely comprehensive in-house test facilities, and our test equipment - from big names like Rohde & Schwarz and Hewlett Packard - is amongst the most advanced in the world.

Loudspeakers are measured using a calibrated Bruel & Kjaer microphone feeding a Clio-based computer

analyser, using pulsed and gated sinewaves, in a large room to eliminate the room's influence. Pickup arm vibration is measured with a Bruel & Kjaer accelerometer.

No other UK hi-fi magazine has in-house testing, and none has access to such advanced tests across all types of equipment. That's why you can depend on *Hi-Fi World* reviews.



Distributed by Seymour Distribution Ltd 86 Newman Street London, W1T 3EX Tel: +44 (0) 20 7396 8000 Printed by Precision Colour Printing Tel: +44 (0) 1952 585585
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Hi-Fi World measurement

Two products in this month's issue,
under test.

The products we review are tested first to ensure they work properly and meet their manufacturer's specification. Our measurements also look at factors that affect sound quality, like frequency response, distortion and dynamic range, as well as those that affect compatibility, such as output level, output power etc. Many of these tests are complex and can only be made using an advanced audio analyser, calibrated to international ISO standards to ensure accuracy. Hi-Fi World uses the world's most advanced analyser, a Rohde&Schwarz UPV, shown here.



Nothorn Fidelity DAC from Lead Audio, undergoing digital tests. Here an S/PDIF digital signal is being injected via optical cable (top left) to check the upper sample rate limit of the TOSLINK input. Output from the DAC is fed into the analyser's balanced XLR input through a blue XLR cable.

Chord Mojo DAC undergoing digital tests. Here an S/PDIF digital signal is being fed into the Mojo's OPT input (at right). Analogue output is taken from one of the two headphone outputs, 3.5mm jacks, through an adaptor cable to the analyser's balanced XLR input through a red cable.



email:news@hi-fiworld.co.uk

news

PRO-JECT RPMs

The new RPM 10 Carbon turntable employs 'high mass' principles with resin-coated steel pellets packed inside the CNC-machined MDF structure. The whole plinth is then subjected to a complex heat treatment and carbon fibre surface coating to ensure minimal resonance travels through the turntable. The plinth is finished with magnetic feet.



The RPM 10 Carbon's platter is the same as that found on the Xtension 10 record player. The polished aluminium exterior is internally lined with TPE (thermoplastic elastomer) damping material and topped with vinyl. The whole platter sits on top of a stainless steel spindle with inverted ceramic main bearing.

The RPM 10 Carbon's perimeter drive belt mechanism is driven by a completely decoupled heavyweight motor. The 10CC Evolution Tonearm is pre-installed. Price is £2,300.

The Pro-Ject RPM 9 Carbon follows a similar construction path in terms of the plinth and platter and belt drive. The motor has an automatic speed change switch built into the top panel for changing between 33 and 45rpm. The motor also benefits from a built-in AC power generator PCB. The RPM 9 Carbon is supplied with the 9CC Evolution Tonearm, pre-installed. Price is £1,500.

For more information call 01235 511166 or go to www.henleydesigns.co.uk

MIYAJIMA MADAKE

Madake is the Japanese term for a particular species of bamboo, Giant Timber Bamboo, often used in various types of traditional Japanese craftsmanship but now quite rare. The cantilever for Miyajima's new cartridge, rather than being made from the usual metal (e.g. aluminium, boron) or crystalline solid (e.g. ruby, sapphire or diamond), is fashioned from this specific bamboo. It's light in weight but rigid. Unlike metals and stones which contain small inherent resonances, bamboo has excellent natural damping properties. The Madake's cantilever is not 100% bamboo, though, it's fitted with a short aluminium shaft, to which is attached the Shibata stylus.

Like all Miyajima stereo cartridges, the Madake's generator system features a patented Miyajima cross-ring design in which the cantilever fulcrum and coils are exactly positioned in the centre of the magnetic field. All of which is housed in an African Blackwood body. Price is £3,750.

For more information, call 01803 833 366 or visit www.miyajima-lab.co.uk



CHORD CLEARWAY DIGITAL

The Chord Company has launched Clearway Digital – a digital coaxial cable. Standard terminations include Chord's silver-plated VEE 3 RCA plugs as well as silver-plated BNC plugs. The Chord Company has also recognised the increasing importance of portable DACs and is offering Clearway Digital terminated with a 3.5mm mono jack. Clearway Digital uses an oxygen-free copper conductor combined with gas-foamed polyethylene insulation and woven copper shield.

Prices for the Clearway Digital are: 1m RCA to RCA, £100; 1m RCA to 3.5mm mini-jack £100; 1m RCA to BNC £105; 1m BNC to BNC £110. Custom lengths are available in all terminations.

For more information, call 01980 625700 or click on www.chord.co.uk

UNISON RESEARCH UNICO 150

The Unico range of hybrid electronics from Unison Research has added the Unico 150 dual-mono integrated amplifier to the range, an integrated amplifier designed to accommodate a variety of sources via its three RCA and two XLR pair inputs, as well as bi-wirable speaker terminals. It boasts a new three-plate front fascia that can be controlled via the supplied RC2 system remote.

The Unico 150 uses a three-stage circuit controlled by Class A tube stages. The input stage uses two ECC83 triodes in totem-pole configuration while the driver stage uses two 6H30 triodes, also in totem-pole configuration.

The whole pre-amplifier section is directly coupled to each channel's MOSFET power stage. Price is £4,000

For more information call 01235 511166 or go to www.henleydesigns.co.uk



THEY'RE BAAAAACK!

Brace yourself, headphone fans. For two reasons. Firstly, Sennheiser has announced that it will be releasing the Orpheus headphones for sale again. The high-end headphones, which will be hand-crafted in Germany from next year onwards will cost €50,000.



The new launch is the second in the Orpheus series, bringing new technology that, says the company, surpasses the original design created in 1990/1991.

The theatrical Orpheus experience begins when you switch on as the control elements slowly extend from the marble housing, before the vacuum tubes enclosed in quartz glass bulbs rise from the base and start to glow.

Sennheiser also uses exclusive components such as gold-vaporised ceramic electrodes and platinum-vaporised diaphragms, plus marble that Michelangelo used to create his sculptures. To learn more visit www.sennheiser-reshapingexcellence.com.

NOBLE 3D

Noble Audio has launched a range of 3D-printed IEMs. The construction process helps to reduce waiting times for bespoke-fit monitors, using the very latest Stereolithography (SLA) 3D printing technology. There are five custom-fit models available, covering a range of performance and price points: Noble 4SLA (£399); Noble 5SLA (£499); Noble 6SLA (£599); the new Savant SLA (£699) and flagship 10-driver Kaiser 10SLA (£820).

Each model features a hypoallergenic, FDA-approved lacquer and is available in four colours: black; smoke; red and blue.

To learn more, click www.nobleaudio.com



CABASSE SURF SPEAKERS

Cabasse is launching the compact Surf loudspeakers for use with its Stream AMP, creating a complete audio system. The 29cm high Surf is designed for a performance in rooms up to 25m². The DEAP (Digital Enhancement of Acoustic Performance) DSP capability of Stream AMP allows the user to specify which Cabasse speakers are being used when setting up Stream AMP with the Cabasse Stream Control app. Inputting the model and telling the system whether they are placed in corners, against the wall or in free space the DSP helps the sound remains consistent.

The tweeter diaphragm utilised in Surf was created by Cabasse for the latest version of the 3-way co-axial TC23, which is fitted to the flagship La Sphère and L'Océan. The 13cm driver unit contains a high excursion woofer, the voice coil is mounted on Kapton.

Available in glossy black or white, the Surf speaker is sure to fit in any environment at a price of £379.

To learn more go to www.cabasse.com



FLYING VINYL

With the increase in vinyl popularity, maybe it's no surprise that a new vinyl club has been announced.

If you sign up, every month, you will receive a box of exclusive 7" records from new artists in the UK. All Flying Vinyl releases are exclusive 7" releases that won't be pressed in that format again. You'll never receive less than five pieces of vinyl in a box and there'll be plenty of free merchandise from artists too, such as art prints and lyric sheets.

Sign up now and you won't be billed for your first box until two weeks before it ships. If you're not based in the UK you can of course still join the club and they ship worldwide for just £5.

Membership is £20 per month and you can cancel at anytime. If you are joining from outside of the UK an additional £5 per month will be added for that shipping. The price for yearly membership is £216 per year with free UK postage and packing. To learn more visit flyingvinyl.co.uk



TEAC'S DACS WITH KNOBS ON

Teac has released two DAC units, each with added features.

The follow-up to 2014's UD-501 model, the UD-503 is a USB DAC/headphone amplifier that retains its predecessor's dual-mono architecture and incorporates a headphone amplifier with balanced/unbalanced outputs.

Featuring a pair of AKM VERITA AK4490 digital to analogue converters, these DACs support 11.2MHz DSD and 384kHz/32-bit PCM audio signals.

The unit is supported by an asynchronous USB that allows the UD-503 to control and sync incoming PCM and DSD audio signals using its built-in 44.1kHz and 48kHz clocks. You have the option to later add an external 10MHz master clock, if you wish.

The NT-503DAB is a USB DAC/Network Player. DLNA 1.5 compatibility means that formats such as DSD (5.6MHz) and 192kHz/24-bit WAV/FLAC can be replayed from PC or Mac. It also supports streaming from Android smartphones and tablets.

Housed in the same A4-sized enclosure as the UD-501, the NT-503DAB also features a USB input that's capable of receiving hi-res audio (5.6MHz) and a DSD input. Price for the UD-503 DAC/Headphone Amplifier is £299. For more information go to www.teac-audio.eu.



Arcam flies Solo again

Hitting stores in time for Christmas are Arcam's latest Solo 'all-in-ones'. The £1500 'Music' includes 2x 80W of the finest Class-G amplification, SACD/CD playback, DLNA audio, FM/DAB tuner, HDMI 1.4b support (unusual for audio-only gear!), apt-X Bluetooth, uPnP streaming and a control app. The £2000 'Movie' brother adds to this healthy spec DVD/Blu-ray compatibility, five 60W Class-G channels, DLNA video and 4k upscaling. Product manager Andy Moore told HFV that they were designed to "sound great with music - excellent movie reproduction then follows!" Both can be partnered with active subwoofers, and your choice of main speakers. The Solos, he claimed, can drive "pretty much anything". And to be audibly-superior to 'mass-market' integrated systems, they have "bigger bass/mid drivers" and "more rounded" enclosure.



PHILIPS IZZY

Gibson Innovations has announced the Philips BM5, the first product on the new Izzy multi-room platform that offers Bluetooth connections with the push of a single button. Just connect to one speaker via Bluetooth and Izzylink will do the rest, finding and connecting to all Izzy products in the home.

The first product on the new platform is the Philips BM5, a multi-room speaker. The compact BM5 is available in two different colours and is equipped with two 2.5" full-range drivers. Each individual speaker can be used either alone or paired with up to four other Izzy speakers by pressing the 'Group' button. No apps and no passwords are needed, so the BM5s can be used straight out of the box. Further products featuring the Izzylink technology will follow including the BM50 CD+ flat micro allowing consumers to stream radio and CD through their other Izzy speakers. Price is £100.

For more information go to www.gibsoninnovations.com/news.



DEATH STAR SPEAKER-ISH

Listen to music on the new Star Wars-inspired ElectriQ iQ Gravity Speaker levitating 4W Bluetooth speaker that hovers off its base plate. The floating orb boasts up to five hours of continuous playback on one charge. Price is £30.

For more information visit www.laptopsdirect.co.uk



VINYL UNLOCKED

Vinyl Unlocked, based in Hampshire UK, has launched a specialist service to transfer treasured analogue recordings on vinyl and cassette to digital media. High quality recordings are on offer, up to 24/192 PCM or as DSD, in both DSD64 and DSD128 flavours. These can be further processed to any popular lossless format including FLAC. The service is highly customised; including multiple format support and sophisticated tagging of the resulting digital files.

Visit www.vinylunlocked.com or phone 07871 157091 for further information.

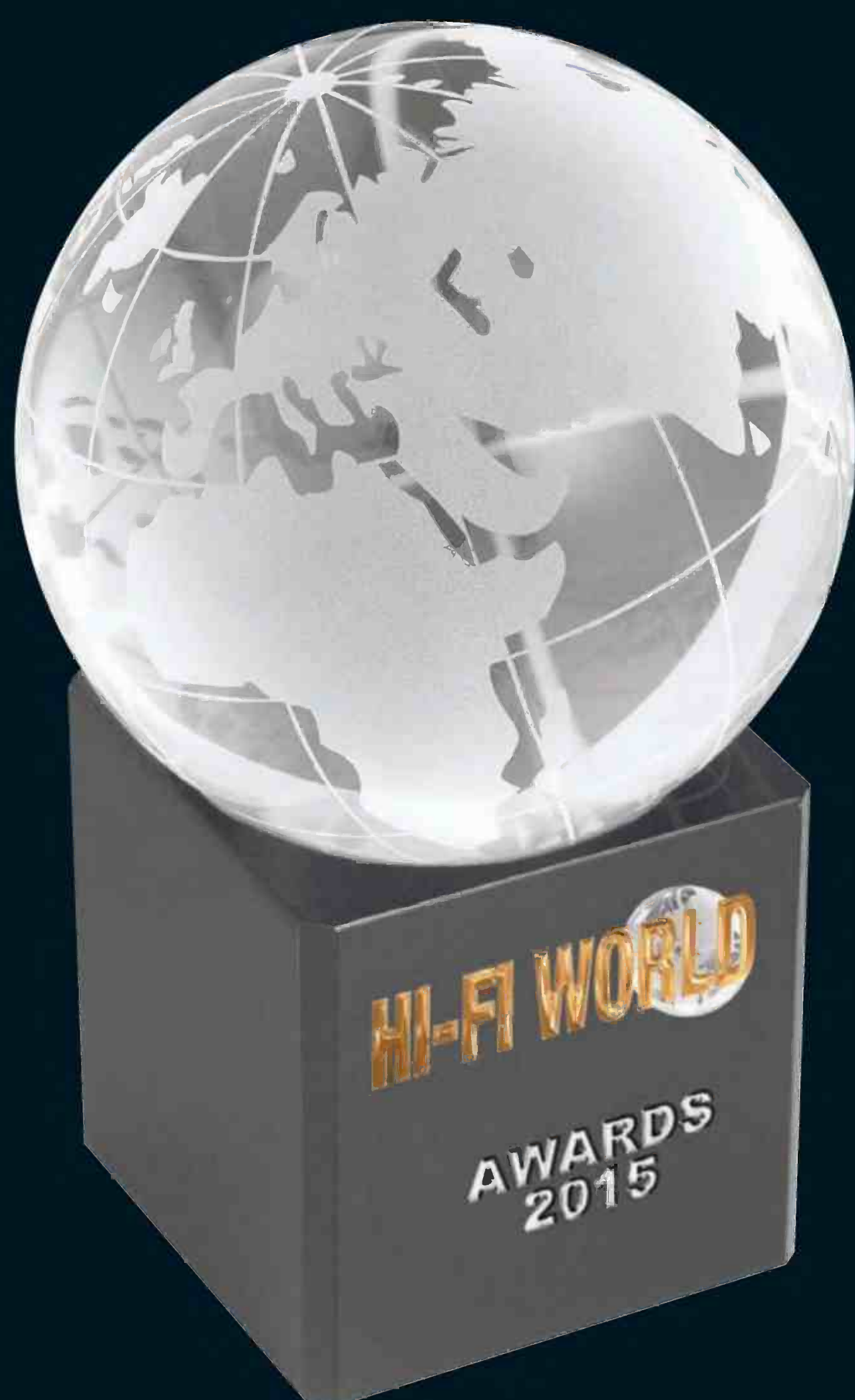
The new 800 Series Diamond
didn't get better by chance.
It got better by change.
868 changes to be precise.

Bowers & Wilkins

bowers-wilkins.com



★ HI-FI WORLD AWARDS 2015



Welcome to Hi-Fi World's 2015 Awards. Every year our expert review team tests a wide range of products to bring you the best from the world of hi-fi. Some always impress us more than others – be it for sheer sound quality, innovation or great value for money.

So here is our pick of the most outstanding products to have passed through our listening rooms over the past 12 months...

AWARDS 2015	WINNER
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BEST AMPLIFIER

McIntosh MC152

Reviewed: October 2015 issue

If you ever fancied a slice of the legendary McIntosh sound but were put off by the price, then the iconic American brand had the solution this year in the shape of the MC152.

Described as its entry-level power amplifier, you still get 150 Watts per channel worth of power into 2, 4 or 8 Ohms thanks to the company's proprietary Autoformers. What's more, it sounds superb. It's not just a cut-down version of McIntosh's bigger power amplifiers but a superb performer in its own right. "It can be subtle and fleet of foot when needed – yet is just at home pounding out deep bass lines, crashing guitar chords or orchestral crescendos" we said. It also throws out a big, wide soundstage that makes listening a truly immersive experience. Add in those distinctive big, blue power meters on the front, plus famous McIntosh build quality and you have one of the best power amplifiers you are ever likely to hear at this price. Definitely a deserved winner of our Amplifier Of The Year Award.

* For our original full review, see page 24.



★ BEST VALVE AMPLIFIER

Icon Audio MB81

Reviewed: March 2015 issue

If ever there was a distinctive-looking amplifier, then it's the MB81 mono-blocks. Built around massive Russian GU81 transmitter valves (each one 260mm tall, 100mm in diameter and weighing in at 1kg), Icon Audio founder Dave Shaw said the aim was to build a triode amplifier that could drive modern low-efficiency loudspeakers to "realistic levels".

Consequently each MB81 can deliver 200 Watts into 8 Ohms – without losing any of that triode magic. The valve complement is completed by a first stage 6SL7 and 6SN7 followed by EL34 output drivers. The GU81s are simple to calibrate using Icon Audio's EasyBias meters.

The result is a stunning sound which combines fine resolution with enthralling musicality. "They sound vastly powerful because of their unrestrained dynamics, yet are easy-going and gentle up top" we said.

This could be just about the most exciting and powerful push-pull triode amplifier you can buy.

* For our original full review see page 30.



BEST LOUDSPEAKER

Tannoy Definition DC10Ti

Reviewed: April 2015 issue

Tannoy's DC10Ti is the flagship model in its Definition range. Featuring a 76 litre, rear-ported cabinet constructed from the finest birch plywood and standing over three-and-a-half feet tall the DC10Ti is an imposing model built for large rooms.

It features the latest version of Tannoy's proprietary Dual Concentric driver – that places a 25mm titanium dome tweeter inside the throat of a 250mm mid/bass driver. Complementing these is a 250mm bass driver to add extra authority. And, with a massive 92dB sensitivity, they need little power to go loud. The result is a loudspeaker with outstanding yet controlled bass and a smooth yet expansive frequency range.

Noel Keywood said "These are amongst the best loudspeakers I have ever heard. They are wonderfully powerful, delivering this power with thunderous ease. They also play a bass tune like no other and sound as big as you'd hope – and as big as they look".
* For our original full review see page 34.



★ BEST PORTABLE HI-RES PLAYER

LOTOO PAW GOLD

Reviewed: October 2015 issue

The Lotoo PAW Gold is the nearest thing you can get to carrying your home hi-fi in your pocket.

Not only does it boast a full-blown hi-fi DAC in the shape of the Texas Instruments PCM1792 but it also has a LME49600 headphone drive chip and a powerful ADI Blackfin 541 signal processor for almost instant start-up. It is able to play almost any high-resolution digital file available as well as DSD. But more importantly it is a spectacular sounding player.

Playing Fleetwood Mac's *Dreams* the opening drum roll had both speed and punch and there was tremendous grip on pace. "Not only is there dynamic power aplenty but cymbals and percussion were rhythmically rock steady" we found.

With a fixed line output of 2V the Lotoo can also be connected to the CD input of an amplifier to deliver high-resolution files to your hi-fi. Add to that bomb-proof build quality with a machined aluminium case and a sapphire glass screen and the Lotoo PAW Gold sets the standard for portable players.

* For our original full review see page 40.



★ BEST DAC

Chord 2Qute

Reviewed: October 2015 issue

While most companies use off-the-shelf digital decoding circuits for their DACs, Chord famously designs its own programmable chips. The 2Qute is built around the latest version of the company's DAC, with 26,368 digital taps, built into a Field Programmable Gate Array, with the aim of producing better detail retrieval and musical transparency.

On the rear, BNC coaxial and USB type-B inputs can accept high-resolution files all the way up to 32-bit/384kHz while an optical input operates up to 24-bit/192kHz. All three will also play DSD64 files while DSD128 can be played via the USB and coaxial.

In use the 2Qute is clean, accurate and tremendously detailed. This is a DAC that goes about its business with almost forensic precision. But there's also a natural dynamism to the sound – down to the fact that the Chord manages to start and stop notes on a sixpence. A massively detailed DAC with the ability to get to the heart of any music.

* For our full original review see page. 44.



★ BEST NETWORK PLAYER

Entotem Plato

Reviewed: November 2015 issue

If ever a product covered all the bases then it's the Plato from new Derby-based company Entotem. In short, it's a music server that incorporates 2TB of hard disk storage alongside networking capability, an MM/MC phono stage, recording function, 24bit/192kHz DAC and a 45 Watts per channel amplifier – all in a box measuring just 370mm x 130mm x 300mm (W/H/D). So you can stream to it, record your LPs to the hard disk and connect a CD player or other digital components.

It also turns in a brilliant performance. Fed Led Zeppelin's 'Black Dog' we found the sound was both detailed and vibrant. "The Plato grabbed hold of the track and pushed it along with verve, without sounding congested or forced" we said. "The DAC section is extremely composed and free from any digital harshness, meaning various instruments are easy to follow, even in the densest of mixes".

Indeed, the Entotem Plato was probably the most innovative and fully-featured product we came across all year.

* For our original full review see page 46.



★ BEST TURNTABLE

Pro-Ject Essential II Digital

Reviewed: October 2015 issue

If a turntable with arm, cartridge, built-in phono stage and both line-level and 24bit/96kHz digital output for a shade over £300 sounds like a bit of a bargain, you'd be right. It is. But that's the magic of Pro-Ject Essential II Digital.

Based on the multi-award winning Essential II deck with a factory-fitted arm and Ortofon OM5e cartridge the additional features allow it to be connected to any existing hi-fi system or even to be used to record your vinyl collection to a computer.

Noel Keywood commented, "You get turntable, cartridge, phono stage and digital convertor, which in separate units could easily cost double, or much more. The sound was big bodied, fluid and dynamic. It was larger chested than most budget turntables in fact, giving me a big expansive sound stage with plenty of apparent depth and real power. The Pro-Ject Essential II Digital is quite an amazing package. It gave great results, having lush sound quality from its analogue output that I found thoroughly enjoyable and entirely in keeping with expectations from LP".

* For our original full review see page 50.



★ BEST CARTRIDGE

Ortofon A95

Reviewed: September 2015 issue

With a super rigid, laser-welded titanium body, boron cantilever and finely honed diamond stylus of Replicant geometry, Ortofon's new flagship Moving Coil cartridge is a feat of micro-miniature engineering, we said.

The A95 has a vestigial body frame that cradles a miniature electrical generator at its furthestmost tip. From this emerges the fine boron cantilever that traces the LP groove. The generator uses a powerful but light Neodymium magnet and the signal coils are wound from gold-plated oxygen free copper.

All this engineering produces a sound that is dry, fast, extremely detailed and almost concussive. As Noel Keywood commented, "The A95 is a highly-tuned mechanical statement. It is not lush, warm or cuddly, but rather a machine of insight and deep analysis".

"It is a cartridge that makes the LP sound better all-round than I have ever heard it. Almost frightening! It is sort of CD like in its qualities – only much, much better".

* For our original full review see page 56.



BEST DIGITAL SOURCE

Naim UnitiLite

Reviewed: April 2015 issue

The little brother of the original groundbreaking Uniti, Naim's UnitiLite is a talented box of tricks that gets on with the task of playing music, with refreshing verve and assurance.

Comprising a CD player, high-resolution streamer (up to 32bit/192kHz), DAB/FM radio and a 50 Watts per channel amplifier, the UnitiLite also now packs support for the Spotify music streaming service and Bluetooth capability. In short it has all the digital bases covered.

And the sound is just what you'd expect from Salisbury's finest – rhythmically assured and boasting a solidity and pace that brings music alive, with powerful bass and a smooth, uncluttered midband.

Whether via CD, streamed high-resolution files or Bluetooth replay the Naim never sounds clinical but allows music to flow naturally and with real verve and realism that makes listening a joy.

In short, the UnitiLite is an exceptional one-box, do it all digital source.

* For our full original review see page 60.



★ BEST LOUDSPEAKER CABLE

TelluriumQ Silver
Diamond

Reviewed: October 2015 issue

Tellurium Q are renowned for the secrecy surrounding the construction of their cables. But when your products are this good, that's completely understandable.

And the Silver Diamonds are undoubtedly their best loudspeaker cable yet. They are totally uncoloured – instead acting as a wide open channel between amplifier and 'speakers and so letting more of the music flow through to let you know exactly what the rest of the system is doing.

"They allow the entire frequency range to be heard in full resolution without any harshness – unless it happens to be on the record in the first place" we said. "On Jean Francaix's 'Petit Quatuor Pour Saxophones', for example, there's an incredibly expansive acoustic and lifelike presentation, with the tonal differences of the soprano, alto, tenor and baritone saxophones perfectly differentiated".

In fact the new Silver Diamonds can easily stand comparison with cables costing up to three times as much.

* For our original full review see page 62.



★ BEST HEADPHONES

Noble K10

Reviewed: September 2015 issue

Noble Audio's flagship K10 custom in-ear monitors are a feat of miniature audio engineering par excellence. First an audiologist takes an impression of your ears, then the company uses that to shape the earpieces so they exactly match the unique contours of your ear canals for a perfect fit.

The result is a sound that can be compared to listening to a set of the best full-range loudspeakers. Much of that is down to the fact that Noble packs 10 drivers into each earpiece – a pair of bass drivers, a pair of mid-frequency drivers, a pair of mid-/high-frequency drivers, two high-frequency drivers and also two super-high-frequency drivers.

This results in a beautifully coherent and extended sonic signature that combines detail with excellent tempo. The custom fit also means extraneous noise is almost completely eliminated, giving a totally immersive experience. Beautifully crafted and exquisitely engineered, they are among the best in-ear monitors you can buy.

* For our original full review see page 64.

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Blue Cheer

McIntosh has introduced a new entry-level solid-state power amplifier in the shape of the MC152 – but it still packs 150 Watts per channel and sounds sublime, says Jon Myles.

One of the undeniable joys of reviewing hi-fi equipment is that every so often a component comes along that literally blows your socks off.

It doesn't happen every month – but when it does it's enough to have you sitting on the sofa with a big, fat grin on your face and rifling through your music collection as you play track after track long into the wee small hours (preferably with a glass of nicely-matured Scotch in your hand – but that's not strictly a necessity).

So it was with me (well, apart from the Scotch) when the mighty McIntosh MA8000 integrated amplifier arrived at Hi-Fi World last year. Here was a beast of a product – weighing over 100lbs and capable of delivering some 300 Watts per channel of power yet possessed of

such subtlety, finesse and outright coherency that it put most of its rivals to shame. The very definition of an iron fist in a velvet glove.

It's only drawback was the small matter of a £10,000 asking price. Not that it wasn't worth it – but let's be honest, not all of us are fortunate enough to be able to spend that sort of money on a single piece of equipment.

But don't fret. Because if you fancy a slice of the McIntosh sound at a rather more wallet-friendly price then the company has just introduced its new entry-level solid-state MC152 power amplifier.

Being McIntosh (perhaps the very epitome of big and beefy in the amplifier world) entry-level still translates to a weight of 75lbs and a rated power output of 150 Watts per channel – which is highly conser-

vative as we measured a massive 235 Watts into 8 Ohms (see Measured Performance for full details).

Much of that weight is down to McIntosh's use of transformers in the output stage to ensure consistent power delivery regardless of the connected loudspeaker's impedance (see Noel Keywood's piece for a complete explanation).

The MC152 is, though, rather svelte compared to some of the brand's other power amplifiers – being a slim 6in in height with a depth of 21in and width of 17.5in. One word of caution, however; users of three-legged racks will find the power socket at the back of the MC152 falls just where the rear support stands making the use of chunky specialist mains leads a little tricky.

Once in situ, there's no mistaking



this is a McIntosh amplifier – entry level or not. The front panel is dominated by the traditional two big, blue illuminated power meters and the green company logo. A switch allows you to dim the power meter display if you wish while the only other control is the on/off button. Those power meters and big green love them or hate them; I unashamedly love 'em.

On the rear are sturdy binding posts with taps for 2, 4 and 8 Ohm 'speakers, as well as XLR balanced and unbalanced inputs. There's also a power save slider control which when activated automatically turns the MC152 off if it doesn't receive a signal for 30 minutes.

SOUND QUALITY

The MC152 may not have quite the prodigious arc-welding power of some of its bigger brethren but it still has the traditional McIntosh strength of exercising a firm grip over virtually any loudspeaker you care to pair it with.

Hooked up to our reference Tannoy Definition DC10Ti floorstanders (via the 4 Ohm 'speaker taps) and fed a variety of files from CD to 24bit/192kHz high-resolution via the impressive Chord

2Qute DAC (see review elsewhere this issue) and the MC152 impressed from the off with its big, spacious sound.

On King Tubby's 'Dub Fever' collection the MC152 proved capable of generating earth-shaking levels of bass yet without losing the sense of air and atmosphere that pervades these tracks and makes them work so well.

Electronic beeps and chopped, distorted guitar effects emerged from seemingly nowhere – swelling into the mix and then disappearing in the blink of an eye.

Just as importantly the McIntosh threw a big, wide soundstage into the room which made the listening a truly immersive experience.

Importantly, though, the MC152 can also tread gently when needed. The mid-band has a slightly lush and generous quality to it which is more akin to a good valve amplifier than a 150 Watt solid-stater.

On a 24/96 rip of Eleanor McEvoy's delicately recorded 'Non Smoking Single Female' the

McIntosh imbued the walking bass part with real timbre while vocals were wonderfully rich and romantic. The track simply flowed in a natural, organic manner.

Yet this isn't done at the expense of essential detail. The MC152 has the

The MC152's output stage uses transformer coupling (under the left and right screened casings at the front of the unit).





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ROT E L . C O M



ability to catch the leading edge of notes and subsequent decay without the artificial haze some transistor amplifiers impart. This made it sound wonderfully lifelike.

Moving onto something a little fiercer in the shape of The Sex Pistols' 'Never Mind The Bollocks...' and I could hear why McIntosh has long been a favourite with rock fans. The marching boots at the start of 'Holidays In The Sun' had me thinking an invading army was streaming across the room while Steve Jones's opening guitar chord wasn't just big, it was positively gargantuan. And when the pile-driver drums and bass kicked in I could thoroughly understand why one reviewer famously described this album as a big, bad beautiful sound. The McIntosh MC152 made it sound all of those things – and in all the right ways.

Overall, it was the combination of power, control and overall coherence that made the McIntosh work so well with seemingly all musical genres. I'd never mistake Stanislaw Skrowaczewski and the Minnesota Orchestra's rendition of Ravel's glorious 'Rapsodie Espagnole' for the Sex Pistols, but it was just as thrilling via the MC152.

Individual instruments were located firmly in place within the stereo image, with good height and depth, while the dynamic contrasts between the various movements were handled with pinpoint precision.

The work ends with an exuberant burst of orchestral colour in the fourth movement and the McIntosh captured all the joie de vivre of the finale without ever letting it spiral out of control or congeal into an indistinct cacophony – even with the volume pushed well higher than usual.

If I'm going to level any criticism then I have to say that the same piece played through the mighty MA8000 did have slightly more air and space to its delivery than on the MC152 – giving it a little more overall grandeur and impact. But if you'd never heard the former it's not something you'd ever be worried about.

That's because this new McIntosh power amplifier is a very impressive piece of equipment in its own right. It may be the smallest of the company's range of power amplifiers (both in terms of physical size and power output) but it still packs a significant punch – combining a big, punchy sound with a liquid, thoroughly



Both balanced XLR and unbalanced RCA inputs are provided, as well as taps for 2, 6 and 8 Ohm loudspeakers.

musical midband and a detailed delivery. I can well see it recruiting a lot more hi-fi lovers into the ranks of McIntosh converts.

CONCLUSION

McIntosh's new MC152 combines plentiful power output with a sonic signature that brings the best out of all genres of music. It can be subtle and fleet-of-foot when needed – yet is just at home pounding out deep bass lines, crashing guitar chords or orchestral crescendos. Not just a cut-down version of McIntosh's bigger power amplifiers but a great performer in its own right.

NOEL SAYS -

The absence of distortion in big auto-transformer coupled McIntosh amps is eerie and I suspect the output stages swing more voltage and less current than is common, because as you reduce current you minimize both distortion and thermal modulation at the output transistor junction. This eases the job of the output transistors, protects them and also makes 2 Ohm electrostatic loads no problem.

Feedback is taken from the output devices direct, and from the transformer, via a summing network – neat design.

The MC152 is also fully balanced all through, currently a rare topology but one that will become more popular as sound quality benefits are better understood and appreciated.

MEASURED PERFORMANCE

The MC152 produced 253 Watts into an 8 Ohm load and slightly less, 225 Watts, into a 4 Ohm load. Unlike most transistor amplifiers the use of output transformers means it is effectively load matched, rather than being a 'constant-voltage source' so maximum power is the same into any load. However, McIntosh also use voltage limiting as protection and

the output was prevented from going into serious overload. The MC152 is very powerful all the same and its 2 Ohm output is meant for electrostatic loads.

Distortion was very low at all frequencies, measuring 0.005% in the midband and 0.02%, mostly noise, at 10kHz, 1 Watts output. Our spectrum analysis shows an absence of crossover distortion harmonics and this was maintained right up to full power out at 10kHz, an impressive performance. Low frequencies had no impact on the transformers either, distortion at 40Hz, full output measuring 0.007%.

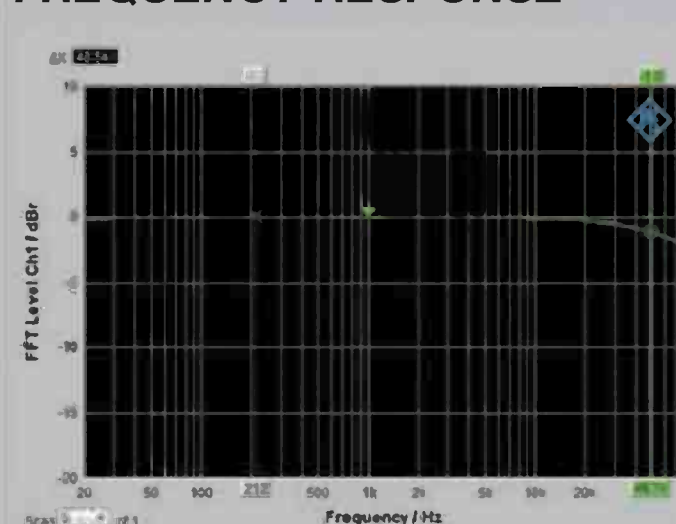
Frequency response rolls off slowly above 20kHz, and below 10Hz, but the amplifier measured flat across the audio band into 8 Ohm and 4 Ohm loads.

Input sensitivity was low at 1.6V through the phono inputs for full output, and no less than 3.2V through the balanced XLR inputs.

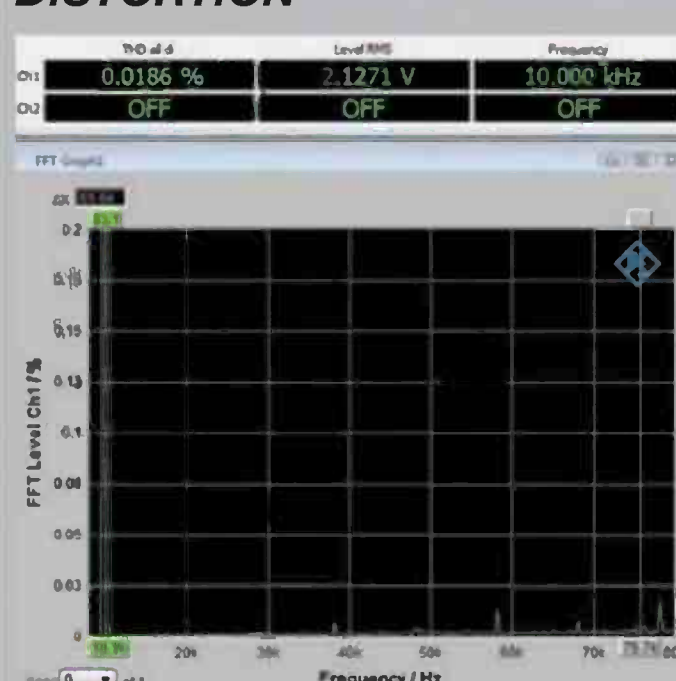
The MC152 is powerful and measures exceptionally well all round. It has very low distortion and can drive any load. Impressive. **NK**

Power	250Watts
Frequency response	5Hz-50kHz
Separation	110dB
Noise	-121dB
Distortion (1W, 10kHz)	0.02%
Sensitivity	1.6V

FREQUENCY RESPONSE



DISTORTION



MCINTOSH MC152 £4995



OUTSTANDING - amongst the best.

VALUE - keenly priced

VERDICT

Iconic looks matched with a big, expansive and detailed sound make the MC152 one of the best power amplifiers you'll hear at its price. Highly recommended.

FOR

- smooth and musical
- controlled, deep bass
- slim case
- price

AGAINST

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Icon Audio's MB81 power amplifiers lit up our listening room – and that's the point. Here are amplifiers no one can miss, Noel Keywood finds.

Light Power

As we gingerly pushed an MB81 amplifier down the business centre corridors, people gawped in surprise. Everyone was awestruck, even if they didn't fully know why. Women stared quizzically whilst men stopped and were eager to ask about it.

And that's why you may want to own an Icon Audio MB81 200 Watt valve amplifier. It stands out, catching everyone's attention. Although not 'styled' as such, its appearance powerfully speaks to people – and you can't say that about much hi-fi these days.

Functionality? Yes, every part of this extraordinary beast has a job to do, some parts explaining why most hi-fi companies shy away from building an amplifier based on Russian industrial transmitter valves. The spectacular glow from their heaters is achieved at a price: they need a large, dedicated filament transformer that adds significantly to weight (55kgs) – and cost.

And then there's the price: £10,000 a pair. OK it isn't so big by hi-fi standards and it's less than many modern hi-fi items. – but it isn't cheap.

And finally, Icon Audio's new

babies are not really intended for general use. Designer and founder David Shaw wanted to build this amplifier for his own use, but he felt others may be interested too. Trouble is, those white top caps on the GR81 valves have lots of volts on them and are potentially dangerous. To avoid a fry up, David says he will only sell this amplifier to buyers he has met and vetted first. An amplifier like this must be easily serviceable to keep it safe, so the owner has to be in contact with the factory, in the way that any transmitter would be serviced by trained engineers, not those using it.

It may all seem extreme, but in

the world of valve amplifiers there is a trend toward such 'boutique' products. Audio Research of the USA started the trend back in 1975 with the D-150 tube power amplifier that weighed 60kgs, no less. Tim De Paravicini kicked off EAR in the UK in 1976 with the 100 Watt EAR509, while Japan can perhaps claim to be first into the tube fashion contest with disco amplifiers that use the rare Western Electric 212E. Icon Audio took to the big 845 valve some years ago within their MB845 monoblock amplifiers. The new MB81 continues this trend but uses the Russian GU-81 ruggedised military transmitting pentode that is still available and not too expensive at around £60.

There's a stonking great 12V heater in the GU81 that draws 10A, meaning it's equivalent to a 120W light bulb – and that's why it glows so bright. With two GU-81s working in push-pull this means 20A for the filaments so the MB81 has an independent heater transformer inside one of those big, black screening cans at the rear of the chassis. The other cans house transformer, output transfo chokes.

David Shaw told me he not run the GU-81s at any the 1500 Volts they'd see n but at around half this. So t not sizzling monsters waiti the nearest living organism. on wasn't accompanied by from the transformers, but – as expected – a thrum fr loudspeakers until the circi settled, within seconds.

The GU-81s emitted a and intense glow when I sv on; they light up like a light The mains switch is at the the chassis, so there's no need to get within striking distance of the top caps either!

For maximum power output fixed bias is used, meaning occasional bias adjustment is necessary – hence the front panel meters. They monitor current, in conjunction with another front panel switch that selects between them, or in its Off position shows power output.

There are also 'hum buckers', small potentiometers that adjust for minimum hum from each amplifier. A user must occasionally adjust for minimum hum from the loudspeaker, but it is at a very low level and only audible when close to the speaker.

Life can get a little technical

when trying to explain the Sensitivity switch on this amplifier, but I'll keep it simple. It's a three-position toggle switch, selecting H, O or L - meaning High / Off / Low sensitivity. Icon suggest L (i.e. low sensitivity) is used. This gives best measured performance and tightest bass by applying maximum feedback, so lowering output impedance and increasing damping factor. It makes the MB81 insensitive, needing 2.7V from a preamplifier for full power output. Most can manage this easily, but if they have a gain of x3, or perhaps no gain, then only silver disc players will drive these power amps to full volume. The argument is a tad academic because full volume is 220 Watts and most users won't get near to needing all that power. All Icon Audio preamplifiers can drive the MB81s easily and I used an Oppo BDP-105D Blu-ray player and Icon Audio PS3 phono stage without difficulty.

Switching sensitivity to High gives the MB81 a normal input sensitivity and better matches low



The rear panel carries 8 Ohm and 4 Ohm loudspeaker terminals, a Sensitivity switch that alters feedback levels and an IEC mains input socket.

loudspeakers with lean bass suddenly sound better balanced I find from my own World Audio Design 300B amplifier, with feedback switched off. So what you hear in use depends upon your loudspeaker, to some extent your room – and what setting



Another five transformers/chokes lurk underneath, plus hard wired audiophile components.

the O, or Off position. It doesn't mean sensitivity off, so much as feedback off. Switching feedback off further increases gain and therefore sensitivity. However, distortion goes up too and bandwidth decreases, although the amplifier remains flat to 10kHz before a slow treble roll off.

As usual, with no feedback output overload becomes much more progressive, but as we are talking about 3% distortion caused by soft clipping at 250 Watts I don't think this is going to affect many users. Without feedback under-damped loudspeakers will start to sound loose in their bass, as well as boxy, but conversely well damped

part I used Lo when listening to the MB81s, since this gives just 0.1% distortion, best damping and is what David Shaw recommends.

SOUND QUALITY

Valve amplifiers need a good 30 minutes before they give their sonic best so I was careful to give the MB81s one hour warm up.

I ran the amplifiers with Tannoy Kensington Gold Reference loudspeakers. Sources were high-resolution digital from an Astell&Kern AK120 player, connected via optical digital link to an Oppo BDP-105D Blu-ray player, with its ESS Sabre32 DAC. This player also allowed me to

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play CD via the Sabre32, and since it has remote control of volume through the Sabre32's 32bit internal digital volume control I was able to drive the MB81s direct.

Even with the amps set to Lo sensitivity there was no trouble generating enormous volume from a setting of 70 on the Oppo's control. Playing taxing material like Angelique Kidjo's 'Aye' album (CD) with its powerful bass lines at very high volume the MB81s sounded relaxed and in control. They have strong bass, and plenty of clean low-end power. I was aware of the enormous bass push of these amplifiers and the laconic ease with which they deliver lows. I did start to realise I was playing everything super-loud, where I don't normally do this – Willy DeVille is singing 'Spanish Harlem' (24/96) at full nightclub level as I write this, his guttural voice having a big, solid forceful presence.

A little earlier I span Lady GaGa's 'Monster' (CD) at a ridiculous level to see how the MB81s would deliver the track's huge subsonics and it just shrugged the whole thing off; vast power is a non-issue. The huge dynamic contrasts of this amplifier were made very obvious with Safri Duo's 'Samb-Adagio' (CD) where the

explosive electronic percussion work was unrestrained in power.

Overall, the MB81s are well balanced and not especially characterful. They sound vastly powerful because of their unrestrained dynamics, yet at the same time they are easy-going and gentle up top. I set the Kensingtons to have a little treble lift yet even with this I noticed no treble character. Bass has a big, gently muscular quality. There's simply no hardness nor strain. It is like an encounter with a whale: not intrinsically threatening, yet at the same time there's a lot of heft there!

The MB81s have a lovely deep soundstage, roughly on-par with big 845s. I was aware of this with pieces like 'Marasa Elu', sung by The Creole Choir of Cuba (24/48) where the space in which the performance took place permeated our large listening room, seemingly turning it into a small church. The mournful lead vocal hovered in front of me, surrounded by the small choir – a lovely performance, made large by this amplifier's generous sound staging and lush delivery.

The Beatles sounded equally large and lifelike on 'This Boy' from the LP Mono Masters. There was a sense of John Lennon at the



microphone in front of me, sounding forceful and fluent in his delivery.

CONCLUSION

Not many people dream of running an amplifier like this. I know from a vast 211 amplifier we once built for a Hong Kong customer in 1994 that such amplifiers are a rich man's sport – one most appreciated in the Far East. And although the MB81 was designed in the UK, it is built in Icon Audio's Chinese factory. I say this to get the MB81 into context. It is a breathtaking sight to behold and equally impressive to hear. High Fidelity doesn't get more impressive than this.

MEASURED PERFORMANCE

With LO sensitivity switched in, meaning maximum feedback and flattest response, the MB81 measured flat across the audio band from its 8 Ohm winding, output rolling down to -1dB at a respectable 28kHz. With no feedback (0) response narrowed a little, the -1dB frequency reducing to 20kHz.

The 4 Ohm tap measured -1dB down at 3.4kHz and -3dB at 10kHz with max feedback, meaning the 4 Ohm tap will give a warm sound, as this degree of treble roll off is high. Reducing feedback to zero had little effect.

The easiest solution to this difficulty is to use a single 6 Ohm winding that feeds equal power to 4 and 8 Ohm loads, if less power than matched windings, or to use a feedback summing point; I suspect Icon will choose one or other in final samples to eliminate this problem.

As it stands the MB81 suits 8 Ohm loads, into which it delivered 220 Watts for just-visible distortion on an oscilloscope (2%). In practice overload is progressive even with maximum feedback (i.e. LO), distortion measuring 1% at 120 Watts, and 3% at 253 Watts - this is effectively the maximum usable

power. The 4 Ohm tap gave similar power figures.

With LO sensitivity selected, input sensitivity was very low, 2.7V being needed for full output. However, with the voltage gain available sensitivity won't seem low; the MB81 will go very loud from 1V in. Noise was low too and hum around 3mV, enough for hum to be just audible at the loudspeaker, if not at a distance, as with all directly heated triodes.

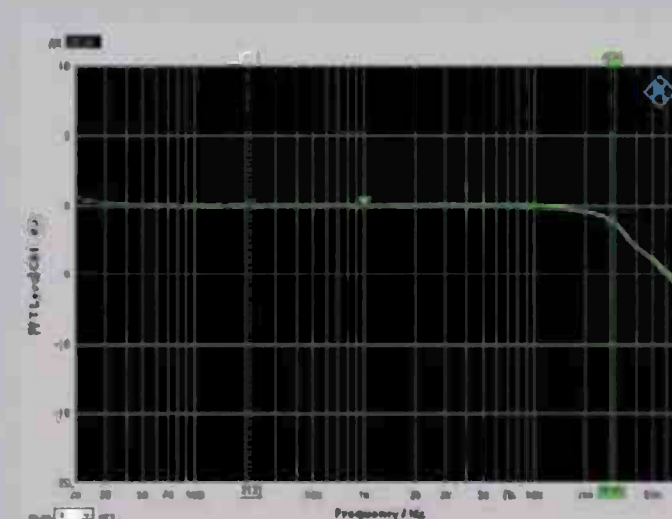
The highest damping factor measured 3 (maximum feedback) and the lowest was 0.4 with no feedback (8 ohm output).

The MB81 works well as an 8 Ohm amplifier but the 4 Ohm tap will give a warm sound as things stand. Icon Audio may well be able to cure this by altering the feedback arrangement in the final design. Massive power is available - 250 Watts no less - so its huge MB81 transmitting tubes do a good job and this is one impressive device, its one current but eradicable flaw notwithstanding. **NK**

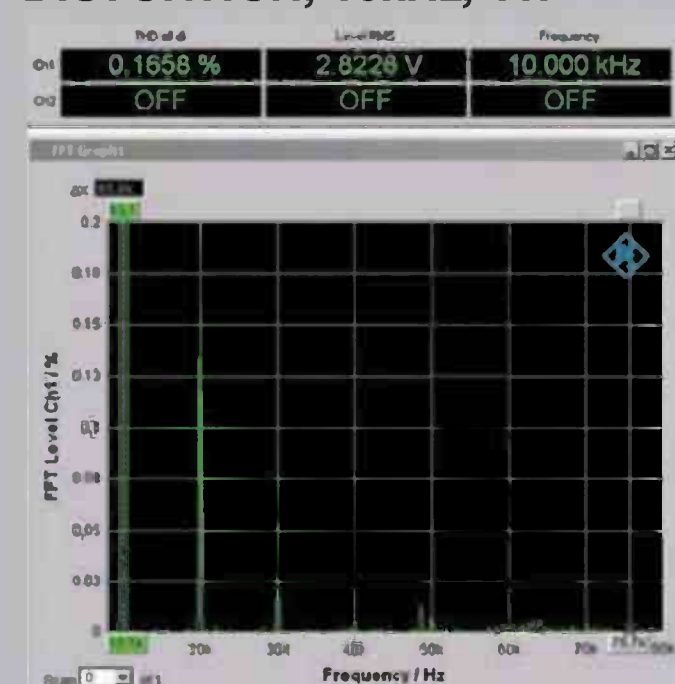
Power 220 Watts
Frequency response 12Hz-28kHz

Noise -100dB
Distortion 0.16%
Sensitivity 2.7V
Damping factor 3

FREQUENCY RESPONSE



DISTORTION, 10kHz, 1W



**ICON AUDIO MB81
POWER AMPLIFIER
£10,000 (PAIR)**



**OUTSTANDING - amongst
the best.**

VERDICT

A powerful and eye-catching amplifier that packs massive punch.

FOR

- smooth, easy sound
- big dynamics
- appearance

AGAINST

- heat
- weight
- 4 Ohm limitation

Icon Audio
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Tannoy Ti-me

Impeccable bass timing is a key feature of the new Tannoy Definition DC10 Ti. Noel Keywood admires its grip – and its power.

Big Tannoys are famous for their bass power and I've experienced this first hand on many occasions, most notably when reviewing the Yorkminsters, way back in our April 2006 issue. They shook our listening room in a way I had never heard – or felt – before. These very large 'speakers had the power and presence we all dream about – and everyone at Hi-Fi World was awestruck.

That was some time ago, in another day and another place. What hasn't changed is the ability of Tannoy's new Definition DC10 Tis



– reviewed here – to shake a room. But this is the loudspeaker Tannoy want us to be able to enjoy in our home, because it fits in, lacking the 1960s Tygan grille cloth and wardrobe proportions of the Yorkies.

Whilst the DC10 Ti is big, they hover below being visually overpowering, standing just over a metre – 1176mm – high. Like all modern floorstanders – and unlike models in Tannoy’s traditional Prestige range – their front baffle is relatively narrow at 434mm, so they don’t intrude in the home. This also has the benefit of giving more solid, concise stereo images due to a lessening of diffraction effects across the baffle’s surface.

To get the sort of bass power Tannoys are known for – and to come close to the mighty Yorkminster with its massive 12in Dual-Concentric driver, Tannoy have used two 10in drive units in the DC10 Ti, one above the other. This gives 40% more cone area than a 12in, I calculate, so although the DC10 Ti does not have huge cabinet volume, it still has prodigious cone area, only a little less than a big 15in. And this is where its bass power comes from. For big bass you just need to move air and Tannoy don’t flinch at this challenge in the DC10 Ti. But for those who find it – or its price – a tad too large, there is a more compact DC8 Ti.

The cabinets of our off-the-shelf samples were finished in a lovely Cherry, with deep gloss lacquer applied. There are no seams or joints on display at front and all edges have a small chamfer to soften the lines. As is common nowadays, the 320mm deep cabinet curves inward to the rear to remove hard, boxy lines and also to lessen internal resonances, we are told.

Further thought has gone into the base and this was a lovely piece of work. Tannoy use machined MDF to get smooth curves that flow into the cabinet above, adding a metal stabilising weight to provide extra mass; at 43kgs the DC10 Ti is heavy. The floor spikes within this plinth can be conveniently adjusted from above using a hex key. Our speakers came with base fitted, spikes and locking nuts, but no hex key or floor protection cups, or alternatively hard-faced protective feet; at the price they should be in the box.

Tannoy claim the heavy base improves bass articulation and it is likely so because I have found that adding weighty silver-sand to a loudspeaker’s cabinet chamber, when fitted, does obviously improve bass articulation as well as stereo image stability.



The rear carries two large ports and bi-wire connector panel, with earth terminal. We put a foam bung in the upper port for this shot.

Each ‘speaker’s rear connection panel carries sturdy bi-wire terminals, fitted with removable shorting links, and there is the usual Tannoy earth terminal to which I attach a conventional green earth wire that runs back to ground on an amplifier – meaning its casework, or ground terminal if there’s a phono input.

The top drive unit of the DC10 Ti is a Dual-Concentric, where the tweeter (high frequency unit) fires

out through the centre of the bass cone. This seamlessly integrates treble with midrange output from the bigger surrounding cone. It makes for a very consistent sound, wherever you are seated, or even if standing in a room. Our measurements show, as usual, that the Dual-Concentric is ever so slightly smoother off-axis than on-axis, so the DC10 Ti is best pointed straight down a room and not toed in toward listeners. They have been balanced for this alignment too, running flat to 20kHz off-axis, but peaking slightly by a few dB above 10kHz on-axis.

The big cones have a smooth, satin black finish and are of “multi-fibre” construction Tannoy say. At the base of the horn lies a titanium dome tweeter that reaches down to 2kHz our impedance measurement shows. High purity Oxygen Free Copper (OFC) wiring is used in the crossover and it is Deep Cryogenically Treated to relieve stresses and improve low-level resolution. The bottom drive unit handles bass alone.

Finally, a word about the all-important rear ports on this loudspeaker. In reflex loudspeakers it is the ports that radiate deep bass, not the bass unit, so what they do is important. Traditionally, ports have been seen as narrow-tuned, anti-resonant systems and given little thought. This is the source of the “bouncy” undamped bass quality people complain about with reflex loudspeakers.

It is possible to flat-tune a port so it doesn’t acoustically “bounce” by a variety of methods, and Tannoy have done this on the DC10 Ti, our port output measurement shows. You get a better bass tune, and less one-note bounce. However, subjectively, loudspeakers with flat-tuned ports have a drier sound, I find, with an apparently less enthusiastic dynamic. I can imagine some listeners may not hear this as a better thing – but it is!

That the loudspeaker is working better reflects back into the load the amplifier sees. So what is good for the loudspeaker is good for the driving amplifier too – and here the DC10 Ti excels. It will draw current (and power), that’s true, and this is where its earth-shaking bass comes from, but modern amplifiers are designed to cope and the bass that comes out is of better quality.

The two ports total a lot of area and here we are again looking



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at the same issue as cone area: the bigger the better for low distortion (smooth boundary air flow) and high acoustic power. Those two rear ports account for a lot on this 'speaker. But if they over-excite a room, causing it to boom, then foam bungs are supplied to lessen bass output.

I should say, however, that the DC10 Ti is purposed for large rooms that both need a lot of bass power and can handle it without booming. Small rooms are more resonant by nature, because of their lower air volume as well as higher frequency modes – and beware of this. I once tried Yorkminsters in my 17ft long lounge and their bass was lost; this combo just didn't work, even though my lounge is heavily bass damped by two settees plus armchair, and acoustically treated too; it still wasn't right.

The DC10 Tis will likely work best in rooms 18ft and longer. We ran them in a room 25ft long, 18ft wide with a 8ft-18ft sloping ceiling, of

AKI20's digital output.

Hoping the DC10 Tis could move our 25ft long room with body-shaking subsonics I span Safri Duo's 'Samb Adagio' (CD) and this showed just how far Tannoy have gone in achieving peerless bass. As the deep synth enters after an extended keyboard solo I felt the bass as much as hearing it; there was a deep

(24/96) and it had perfectly judged power, sounding neither resonantly large, nor constricted. But boy did it sound powerful; it punched at me, Mike Tyson fashion.

Although the DC10 Tis go low with laconic ease, in our room bass was not inflated; no one would accuse them of being bass heavy I believe – and measurement showed they are accurate rather than emphasised.

As measurement suggested, there was a slight sheen to the sound that added to detail and insight, also to speed, but I prefer total neutrality, even if it is less immediately engaging. I reviewed the DC10 Tis as standard, but I did at the end connect a 0.3 Ohm resistor in place of the bi-wiring link to the tweeter to pull level down a bit – an easy mod to make.

The Tannoys sounded perfectly consistent wherever I sat, or even stood, a strength of the Dual-Concentric drive unit. The big cones put a dark sound into silences, and the speakers maintained composure even with volume turned right up, so Christine McVie's vocals in 'The Chain' stood well apart and were unaffected by the power of Mick Fleetwood's drum kit behind her. I listened to the 'speakers loud for the most part because their clean but well damped dynamics demanded this – and yes I did attract complaint from others in our concrete office building as walls shook. On this I do not exaggerate! To run the DC10 Tis at shattering level – up to 110dB on peaks – I had to play at the weekend, and they handled absurdly high volume with ease.

With our reviewer Rafael Todes playing Beethoven's Quartet in C Minor, Opus 18, No4, on violin (CD) the Tannoys projected the sound of the strings forcefully and in great



The horn loaded tweeter, with pep-perpot waveguide, fires out through the centre of the bass/midrange cone.

"As the deep synth enters after an extended keyboard solo I felt the bass as much as hearing it; there was a deep presence in the room that came from below – and it shook me."

volume 4800 cu ft. This is big enough to develop very low bass, right down to 20Hz, providing a loudspeaker can input enough acoustic power. Most domestic speakers cannot; they are not designed to do so. The DC10 Ti can – and did! But the corollary is that it may be too much for a smaller space, hence the DC8 Ti. Room size dominates loudspeaker performance.

SOUND QUALITY

As always the speakers were run in with pink noise, then bass heavy music from Angelique Kidjo and finally a Monitor Audio De-tox disc. I used the Sugden Class A FBA-800 power amplifier reviewed in this issue, which was an ideal match; the Tannoys fully exploit low power, high-quality amplifiers.

Sources were an Oppo BDP-105D spinning CD, and processing high-res digital from an Astell&Kern

presence in the room that came from below – and it shook me. Until now, sitting on a settee close to the room's end wall has not bolstered the bass of speakers under review, but with the DC10 Tis it did. Our room's lowest mode is 23Hz and this the Tannoys energised, something few speakers can manage; bass this low you feel rather than hear. It was a deeply impressive performance.

Because the DC10 Tis are well damped, the articulation Tannoy claim for this loudspeaker was obvious. Rather than an amorphous "bass sound", I was aware that a synth was being played: notes started and stopped snappily at identifiable moments and they even had timbral qualities to them. This is bass articulation and, by the nature of the beast, rare – yet impressive when heard. I could hear the quality of Mick Fleetwood's kick drum in 'The Chain'



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detail. There was some slight sense of tubbiness to the violin's body that came from a small amount of cabinet whoomph but it didn't intrude and wasn't an issue I felt. There was a smidgen of hardness to the strings, but the detail was riveting. The Tannoys are forward and projective, of that there's no doubt, but that's also why they imaged so firmly.

CONCLUSION

After using the DC10 Tis for some time I felt they were well up amongst the best loudspeakers I have ever heard. They are not perfect, but there's no such thing as a perfect loudspeaker. They are wonderfully powerful, delivering this power with thunderous ease.

They also have fabulous bass of

JON MYLES SAYS:

The Tannoys are indeed big - and they sound it! But they are also an exceptional loudspeaker. Playing Lady GaGa's 'Monster' (24/96) at high volume and the bass literally hits you in the chest. It's not flabby or loose but simply solid - the way it should be.

That quality of low-end really does lay down a solid foundation for the higher frequencies and brings a real vividness to all types of music. Yes, they need a large room - but if you have the space there's very little to touch them in terms of outright musical enjoyment.

the best quality I have ever heard; they play a bass tune like no other. They sound as big as you'd hope - and as big as they look. They have a smooth yet expansive frequency range and they need little power; I never ran out with just 30 Watts from Sugden's FBA-800.

Couple all this with elegant appearance and great build quality

and there's little in the DC10 Ti not to like. This is a fabulous loudspeaker I would put it at the top of any audition list and both Jon Myles and I felt that it would be a good in-house reference loudspeaker for review purposes, because it is deadly accurate, deeply revealing and dynamically forceful, all of which is to say - fun.

MEASURED PERFORMANCE

Tannoy's Definition DC10 Tis run virtually flat from 20kHz down to 40Hz with no obvious response trends over this wide range. However, the treble horn takes over at 1.5kHz (our impedance analysis shows this by the frequency of its peak), and you can see that this unit is around +1dB up overall on the bass/midrange drive unit, so the DC10 Ti will not sound warm; detail will be quite obvious and projection strong; there may be treble sheen.

There was a small amount of treble

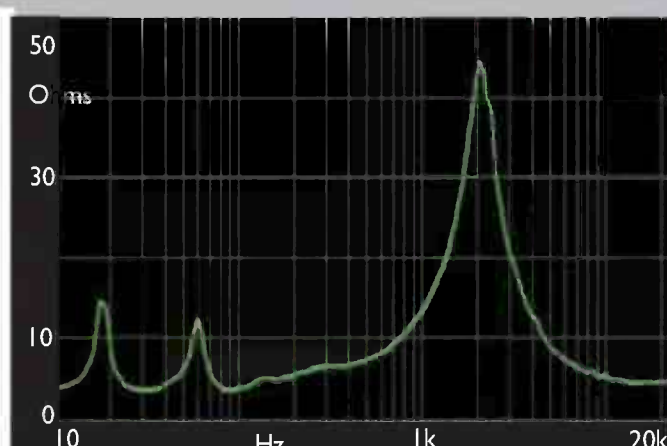
FREQUENCY RESPONSE

Green - driver output

Red - port output



IMPEDANCE



peaking - a few dB - when measuring on-axis, but symmetric drive units are best listened to asymmetrically, or off-axis, where phase cancellations/reinforcements are minimal, and our measurement is the off-axis result. The speakers should be pointed straight down a room for this result, not toed in to point directly at listeners. Differences were quite small however, the dual-concentric design giving consistent results over a wide forward angle - up and down, side to side. So the DC10 Ti will sound consistent in use, to listeners seated or standing. They will also sound smooth and tonally accurate.

Bass output from both drive units was plentiful below 100Hz and the twin ports, which together have a relatively large radiating area and were -3dB at 80Hz in SPL terms (not acoustic power), extend output down to 20Hz, our red trace of port output shows.

The ports measure flat, meaning they are relatively untuned and apply broad acoustic damping to the drive units. This is a quite deliberate design feature of the DC10 Tis and means they will have even, well damped bass, not "bouncy bass". It doesn't eliminate room modes but it does lessen the possibility of serious resonant interaction between port and room. The DC10 Tis will develop

powerful subsonics in rooms large enough, meaning longer than 18ft. To avoid over-energising smaller rooms foam bungs can be used in the ports to reduce bass power.

Sensitivity was a massive 92dB sound pressure level from one nominal Watt (2.8V) of input, helped by low overall impedance of 5.4 Ohms (measured using pink noise), plus plentiful bass output. As a result the DC10 Tis, in spite of their size, need little power to go very loud, 40-60 Watts being enough; even 20 Watt Single-Endeds would suit.

The impedance trace shows the 'speaker is effectively 4 Ohms below 200Hz and mainly resistive, due to broad damping around a port frequency of 32Hz. There is a lot of midband reactance at crossover, which isn't ideal and could be cured by Zobel's across the drivers.

A measurement of decay over 200mS shows low coloration across the midrange and treble. The cabinet has some hangover, but about what is expected when a lot of bass power is being produced.

The DC10 Tis measure very well. They have better damped bass than earlier models, but still produce a lot of bass power - like most Tannoys. In spite of this, little amplifier power is needed. **NK**

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Lotoo Winner

It's big, it's bulky and it's finished with gold – but Noel Keywood discovers this new portable music player from China's Lotoo offers class-leading high-resolution sound.

In the technological arms race of the portable player market, the Lotoo PAW Gold I'm reviewing here is firmly in the 'interesting' category. This high-resolution digital player is big and heavy like few others; it is also £1495 – quite a ticket. But that's because it uses top-quality hi-fi parts – and to hell with power consumption! Just make the battery larger. But you end up with a machine that is more luggable than pocketable. I could almost describe the PAW Gold as a portable hi-fi rather than a portable player.

That's the basic and somewhat fundamentalist approach Lotoo (China) have taken in conceptualising this player. Not only is there

a current guzzling, full-blown hi-fi digital-to-analogue convertor (DAC) on board – a Texas Instruments PCM1792 – but also an LME49600 headphone drive chip and a powerful ADI Blackfin 541 signal processor that brings almost instant start-up, as well as the ability to handle even the most demanding DSD playback. So sound quality has been pursued to the exclusion of most else in this machine; it's an extreme design.

Before I start to peer into the details let me just make clear what I am dealing with here. The PAW Gold is a portable audio player designed to drive either headphones or a hi-fi system. You can think of it as a CD player, one able to play just about any high-resolution digital file available – and it has been designed as such, because it runs from an independent 12V power supply not the 5V line within USB like most other players.

There is no digital output for an external DAC but I guess Lotoo see no need because with a full blown, mains powered DAC on-board it out-performs most external DACs in any case, our measurements showed. And I read the other day a comment from FiiO (also of China) that few people use the digital output of their players. Whether this is justifiable only listening can tell, more of which later.

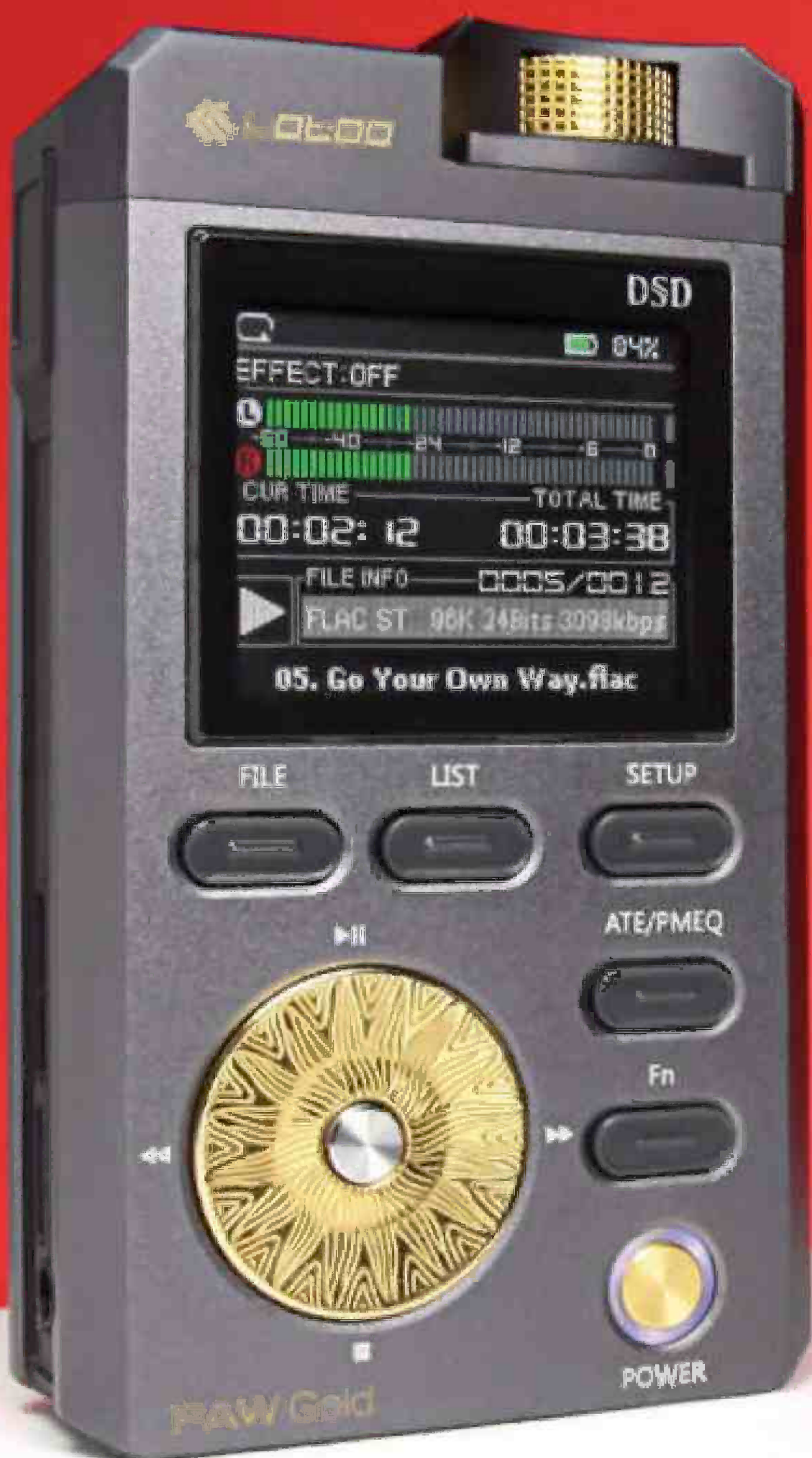
So what we have here then is a super high-fidelity player with masses of on-board lithium-ion battery power to sustain it on the move – 11 hours playing time no less – but with a well worked out architecture for delivering top quality as an analogue connected

'CD player' in the home, able to drive the hi-fi. This makes the PAW Gold a very interesting proposition to any audiophile, methinks – and a headbanger of a portable.

Lotoo are proud of the fact that the case is machined from a solid billet of aluminium that, they say, weighs 280gms – and it did on our scales. That's double the little 136gm FiiO X3 2nd gen I reviewed last month.

Like the FiiO, the Lotoo plays just about every music file format available, including SACD files, that are different in structure to DSD files, whilst using the same one-bit code. In addition you can play Flac, Wav, Alac, MP3 and DSD 64 and 128 in dff and dsf form. There's also less popular wma, Ape wavepack, Cue and m4a. But where is Apple's AiFF (their equivalent to Wav)? I thought this was a mistake but it isn't – the PAW Gold doesn't see them I found, so they must be converted with XLD or similar.

The PAW Gold feels brick-like in the hand – solid beyond expectation. It is very obviously machined with care and well finished too. Whether you like the gold finish of its parts is a matter of taste I think; I had slight reservations about the small and coarse 160x128 OLED colour screen, with its jagged-edged text – and in spite of price this is not a touch screen, as on Astell&Kern players. You have to click your way down through a cramped, grey on-screen music menu to select a track, using the central gold disc, that is a stationary selector, not a spin wheel as on FiiO's X3. None of this fitted too well with the price, but it did the job.





Computer connection is through a USB lead. Memory comprises a full size SD card.

The settings menus were similarly small, cramped and illegible. There is, however, some mitigation in an output level bar-graph display that covers 50dB dynamic range and gives some idea of the intrinsic recorded range of any music file; however, it is situated after the volume control

reduces this to a sensible 0.8V, about right for most else and not so far from European recommendations concerning limitation of hearing damage.

The Line output can be connected to the CD input of any amplifier, through a 3.5mm jack-to-

"Mick Fleetwood's opening drum roll of 'Dreams' (24/96) suddenly had both speed and punch and there was tremendous grip on pace; this player has chiselled timing"

to show output volume, rather than before it to show absolute recorded level. You can see recorded level by turning volume up to maximum – but only after removing the headphone plug because the PAW Gold goes fiercely loud!

On that subject I'll note that our measurements showed this player produces a massive 4.4V output from the headphone (Phone) socket with output set to High (H) – more than enough for insensitive planar magnetic phones (e.g. Audeze, HiFiMan, Oppo). The low setting (L)

phono plug adaptor lead, and it gives full CD output level. But whereas a CD player provides only low-res PCM digital of 1983 vintage, a hi-res player like this can send any exotic audio file to your hi-fi.

Since the player gave me a 'battery discharging' warning whilst connected via USB to my powered USB hub, power is not drawn from the 5V USB line at all, unlike most players. Instead the PAW Gold charges from its own 12V/1.5A, switch-mode, wall-wart power supply that connects to the usual



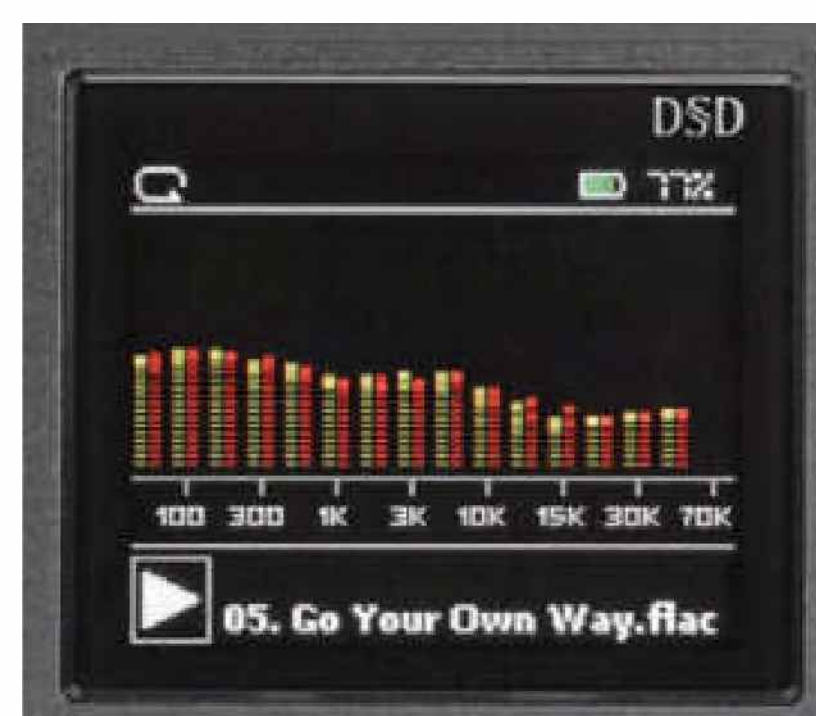
The top carries headphone and line (fixed volume) outputs, a Low/High switch and rotary volume control.

power input on the player, marked 12V/1A. Although it seems a little more cumbersome, this is the best way to deliver power: it gives higher supply volts to the DAC and output amplifiers – and that's why 4.4V output is available, because that's what you get from a 12V d.c. supply. It also means the PAW gold comes as an all-in-one, optionally mains powered player; an external USB supply is not needed to keep it up and running.

There is no internal memory, and just one slot for a full sized SD card – addressable at up to 2TB Lotoo say. But 128-256GB is the common maximum for an SD card and it will



The small screen conveys lots of info, including track format and music level.



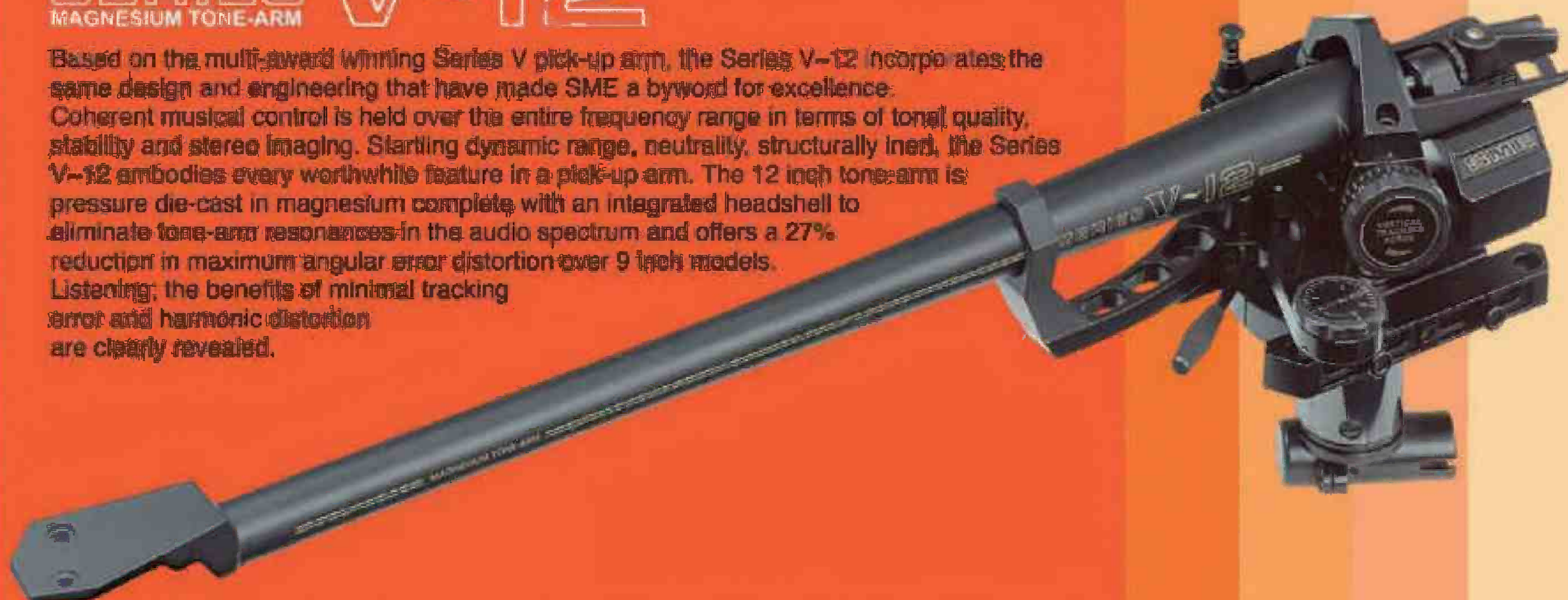
A multi-band equaliser is included.

store plenty of 400MB files if you feel you need to do this. The PAW Gold will play not just 192kHz sample-rate PCM, but even 384kHz, and these are of huge size. But I have yet to hear any difference between 96kHz and 192kHz sample rate files, let alone 384s like DXDs, so it is a non-issue for me for the time being – and I think a little off-the-planet as things currently stand.

OK, DSD files are large and they do sound exceptional, so DSD users may or may not feel 320 songs of 400MB on a 128GB card limiting, but the solution here is to have/carry multiple cards.

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Lotoo include a wide range of filters and equalisers to alter sound according to taste.

SOUND QUALITY

The last time I listened to a player and thought “wow” was with Astell&Kern’s original AK-100. It blew everything else away. Clamping Oppo PM1 planar magnetic phones onto my ears and setting the PAW Gold to play again had me thinking “wow”. This is a spectacular sounding player. It has vast dynamics, deep insight and is almost brutal in its delivery. Where a lovely player like FiiO’s X3 2nd gen came over as pure and delightful, the PAW Gold comes over as crushingly powerful in its sound. The Oppos usually sound a tad warm and slow against other phones, if deeply smooth rich and insightful. All this changed. The PAW Gold lit a fire underneath them; they picked up and ran, suddenly displaying speed and pace, driven hard by the player’s LME49600 output amplifier. Mick Fleetwood’s opening drum roll of ‘Dreams’ (24/96) suddenly had both speed and punch and there was tremendous grip on pace; this player has chiselled timing.

Not only is there dynamic power aplenty, but cymbals and percussion in this piece were rhythmically rock steady; it was almost eerie!

‘Go Your Own Way’ gave more of the same: Usain Bolt pace straight out of the blocks, every step perfectly timed; the PAW Gold is a breathtaking listen. My only surprise was that the Oppos were dried out a

little, sounding less bloomy and warm, tighter and under better control; the player exerts a lot of grip and this alters bass quality, but for the better.

There was plenty of low level atmosphere around close-miked vocals and this quality was very apparent with Benjamin Grosvenor’s rendition of Chopin’s ‘Nocturne No5, Opus 15 No2’ (24/96), where the piano stood in a sense of open space, each struck key having a well-hewn presence of his finger work under wonderful control.

Life and listening got better with a 352kHz sample rate DXD file running at prodigious 17Mbps bit rate of Mozart’s ‘Violin Concerto in D Major’, played by Marianne Thorsen and the Trondheim Solistene (soloists), that occupies a mere 1.2GBs of storage space. OK, so there’s tape hiss at the start – or is it the mic preamps that my Oppos detect? – but the violin and orchestra sounded crystal clear, upon a huge sound stage – and again I heard wonderfully precise timing. The PAW handled DSD 64 and 128 files in tests; it flinched at nothing except Aiff.

CONCLUSION

Lotoo’s PAW Gold is an impressive piece of dedicated engineering. It isn’t the sleekest player by a long mile, but its sound quality is quite extraordinary. If you want to carry your home hi-fi with you, this is the one. It has a lofty price tag as portables go but not as hi-fis go, nor high quality digital sources; a good CD player can cost more. Yet this machine far surpasses CD, playing all high-resolution digital music files with an ability that is astonishing. A superb player then, even if its user interface could be a little more attractive.

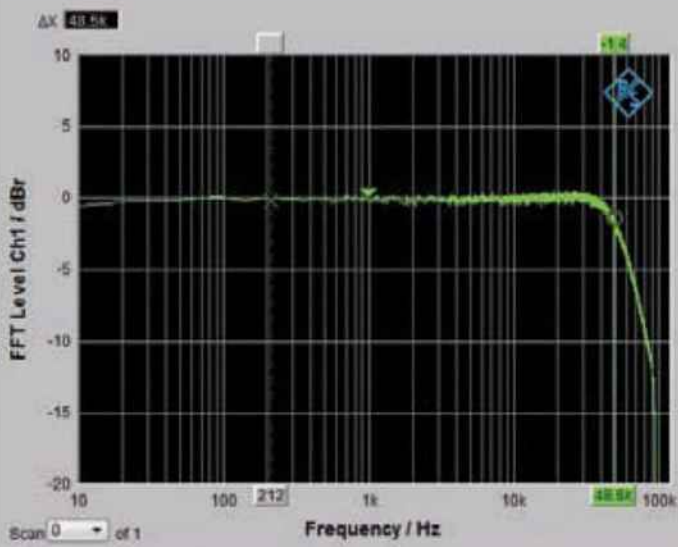


The screen is small and has low resolution, so text is jagged looking.

MEASURED PERFORMANCE

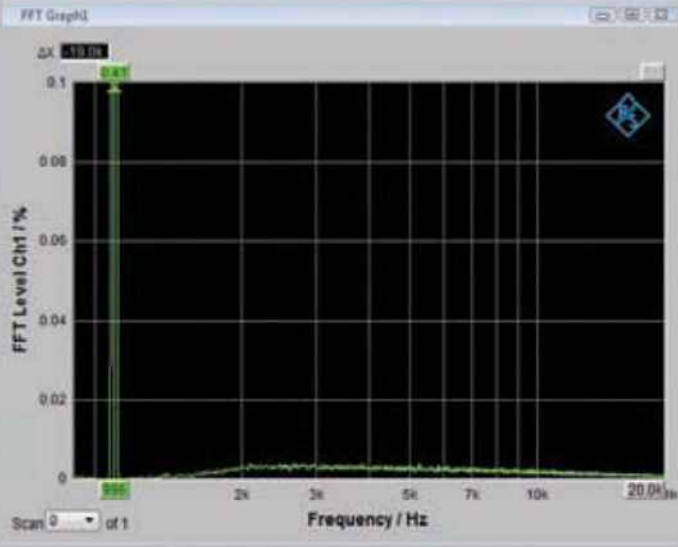
Frequency response through the headphone output, at maximum output (H), measured flat to 49kHz with 192kHz sample rate digital, our analysis shows, with a roll off above the frequency to the 96kHz upper limit – a good result that shows the PAW Gold exploits high

FREQUENCY RESPONSE



DYNAMIC RANGE (60+62)

THDall	Level RMS	Frequency
-62.078 dB	-51.256 dB	0.9970 kHz
OFF	OFF	OFF



sample rate digital. Results on low output (L) setting were the same and the Line output gave an identical result to headphone.

Distortion at full output (4.4V) measured a low 0.0003% and at -60dB a very low 0.05%, with 24bit resolution digital. We measured EIAJ Dynamic Range at a very high 122dB, exactly in line with Lotoo’s own result and that quoted by Texas Instruments. This is around 7dB more than rivals, that mostly come in around 115dB.

The fixed Line output delivers 2V, like a CD player, and its dynamic range was similar at 122dB.

The Lotoo PAW Gold measured very well in all areas. It’s massive 4.4V output will drive even the most insensitive headphones and dynamic range is that of top mains powered DACs. **NK**

Frequency response (-1dB)	
CD	4Hz-49kHz
Distortion (%)	
0dB	0.0003
-60dB	0.05
Separation (1kHz)	110dB
Noise (IEC A)	-120dB
Dynamic range	122dB
Output (headphone)	4.4V
Output (Line)	2V

LOTOO PAW GOLD £1495



OUTSTANDING - amongst the best

VERDICT

Fabulous sound quality from a technically superb portable that also serves as a hi-fi player able to deliver devastating digital into any audio system.

FOR

- sound quality
- great portable and stationary player
- plays all digital audio files
- solid build

AGAINST

- heavy
- low resolution screen
- needs menu refinement

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Quite Operator



Chord Electronic's new 2Quite DAC sounds even better than it looks, says Jon Myles.

A company has to have supreme confidence in its abilities when it allows one of its flagship products to share the same name as a popular TV comedy channel. But so it is with Chord – who earlier this year raised a few eyebrows by naming its state-of-the-art £8000 DAC Dave.

Mind you, the Kent-based outfit seems to have taken a particular delight recently in giving its products slightly off-the-wall names. At one time it was content with technical-sounding monikers such as QBD76HD or DSX1000 – but lately its DAC line-up has consisted of

products bearing titles such as Chordette, Hugo, Quite EX and the aforementioned Dave.

And now there's the Quite EX's successor in the shape of the 2Quite (see what they've done there again?).

To be fair, it's quite an apt epithet as the product in question is undeniably small, shapely and, well, cute. In typical Chord fashion the new standalone DAC is housed in a gorgeous machined aluminium chassis measuring 160mm x 70mm x 40mm (W/H/D) with curved edges and an illuminated round window on the top allows you to see a section of the neatly laid-out internal electronics as well as acting as an indicator of incoming sample rate (more of which later).

Inside the 2Quite employs technology derived from Chord's more expensive Hugo DAC. So instead of the off-the-shelf digital decoding circuits used by most other manufacturers you get the latest Spartan 6 version of the company's proprietary Field Programmable Gate Array technology with 26,368 digital taps – which the company claims

contributes to better detail retrieval and musical transparency.

On the rear, BNC coaxial and USB type-B inputs can accept high-resolution files all the way up to 32-bit/384kHz while an optical input operates up to 24-bit/192kHz. All three will also play DSD64 files while DSD128 can be played via the USB and coaxial. As usual the USB input is plug-and-play for Apple and Android devices while Windows users will need to install the supplied driver to get their machines running with the 2Quite.

A simple connector switch toggles between the three connections and a single pair of line-level RCA outputs provide connection to the hi-fi.

Incoming sample rate is indicated by the colour shown in the illuminated window on the top of the chassis. For example, on 44.1kHz files the window glows red while green indicates 96kHz, purple 192kHz and so on. It looks fantastic in use but you'll probably find yourself referring to the instruction manual on a regular basis at first until you memorise the various colour codes.

The round window on the Chord's fascia changes colour to show incoming sample rate. Green indicates a 24bit/96kHz rate.





On the rear of the 2Qute are coaxial, optical and USB type B digital connections as well as RCA analogue out sockets.

SOUND QUALITY

Clean, accurate and tremendously detailed were my first impressions when hooking up the 2Qute. This is a DAC that goes about its business with almost forensic precision.

Connected to the excellent Creek Evolution 100A integrated amplifier and fed Leftfield's 'Phat Planet' in plain 16-bit/44.1kHz it was immediately obvious the Chord has a crisp, robust sound with a talent for digging deep into the heart of the music.

This is a deceptively simple track on first listen but there's actually a lot going on throughout the piece. Through the Chord, though, it was easy to pick out the various samples and electronic trickery even when these elements were buried way back in the mix. Bass was firm and well-rounded with good depth while the Chord seems to have a slightly forward nature which emphasises the speed of the piece.

In fact, there was a natural dynamism to the overall sound – probably down to the fact that the 2Qute manages to start and stop notes on a sixpence, leading edges having pinpoint precision and timing.

Playing The Smiths' 'How Soon Is Now' (24/96) Johnny Marr's guitar work was laid out on a palette in all its studio-engineered glory. The Chord made it clear there were four amps being used on the rippling tremolo effect at the start of the song, where some other DACs can reduce the effect to more of a reverberation-soaked drone.

It's a level of clean, clear detail that makes the Chord the ideal DAC for those who really like to hear well into the detail of various pieces of music.

Switching to DSD via a MacBook Air connected into the USB input

that quality worked wonders with the San Francisco Symphony's 'Mahler No 2'. Here every element of the orchestra was spread

in front of me in an immense sound stage – yet every note, cymbal strike and string could be easily delineated.

This level of clarity does mean the 2Qute can sound a little harsh on poor recordings. Feed it some heavily-processed pop and you'll soon know about the production's shortcomings.

But switch to a decent recording such as Miles Davis's classic 'Kind Of Blue' and it has the ability to transport you to the studio with Davis's trumpet and Coltrane's saxophone ringing clean and true while the rhythm section possesses a natural, organic flow.

In fact, with high-definition recordings there's a sense that the 2Qute doesn't really have any character of its own at all but is merely letting the music flow through it completely unsullied.



CONCLUSION

The Chord 2Qute is a massively detailed DAC with the ability to get to the heart of any recording. It isn't dark, creamy or artificially rich in any of the frequency spectrum but instead majors on presenting your music files as accurately as possible. As such it demands good quality ancillaries and, ideally, high-quality recordings to give of its best. But supply it with those and the 2Qute will bring you as close to your music as it's possible to get in a £1000 DAC.

Here are the colours displayed through the 2Qute's glass window, and their related sample rates.

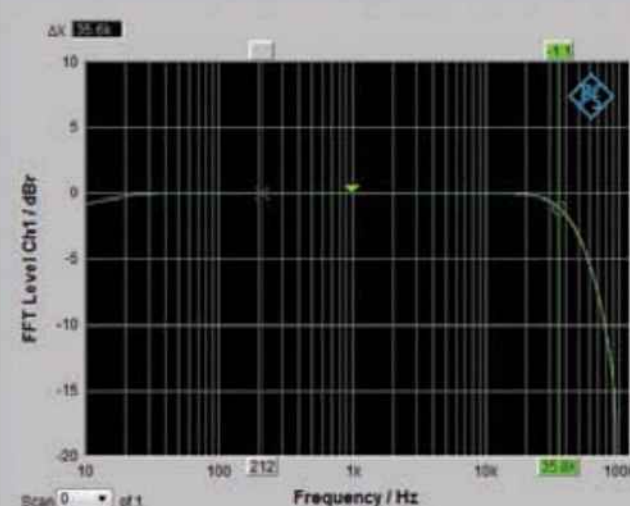


The Chord's window glows red to indicate a standard 16bit/44.1kHz incoming CD signal.

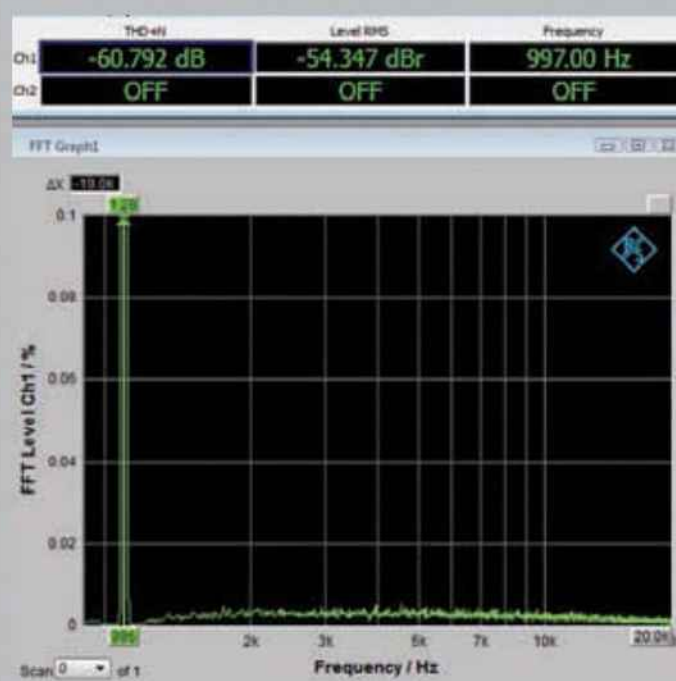
MEASURED PERFORMANCE

Frequency response measured flat to 36kHz with 192kHz sample rate digital via electrical S/PDIF input (BNC), our analysis shows, with a slow roll off in output to the 96kHz upper limit. The optical S/PDIF input (TOSLINK) worked to 192kHz too, with a good optical cable. So the Chord well exploits high sample

FREQUENCY RESPONSE



DISTORTION



rate digital.

Distortion at full output (3V) measured a very low 0.0003% and at -60dB a low 0.02% our analysis shows, with 24bit resolution digital. Partly as a result, the measured EIAJ Dynamic Range came out at a very high 121dB, which is up with the best DACs on the market; anything above 120dB is currently top tier.

The USB input works up to 384kHz sample rate and successfully passed a 384kHz test signal, although frequency response was no wider than that recorded for a 192kHz signal. Measured dynamic range was again a high 121dB so there is no degradation here and all other figures were identical to S/PDIF.

The Chord 2Qute DAC measured very well in all areas. It has a high 3V output and a high dynamic range value, suggesting exceptional sound quality. **NK**

Frequency response (-1dB)	
CD	4Hz-36kHz
Distortion (%)	
0dB	0.0003
-60dB	0.02
Separation (1kHz)	114dB
Noise (IEC A)	-120dB
Dynamic range (EIAJ)	121dB
Output	3V

CHORD 2QUTE
£995



OUTSTANDING - amongst the best

VALUE - keenly priced

VERDICT

Stunning-looking and built DAC that marries accuracy and forensic insight to great timing and drive. Really comes into its own with high-resolution material.

FOR

- detail and timing
- weighty sound
- great build quality

AGAINST

- doesn't flatter poor recordings

Chord Electronics
+44 (0)1622 721444
www.chordelectronics.co.uk

Box Clever

Vinyl replay and recording, high-resolution digital, streaming and amplification all converge in Entotem's new Plato. Jon Myles explains all.

There's never been more ways to listen to and store music at home. Once it was limited to vinyl or the radio. While those two mediums are still going strong they've now been joined by CD, Network Attached Storage (NAS) devices, iPods, high-resolution digital music players, internet radio, home computers, streaming services and...well, the list seems to grow ever longer each passing year.

And while that gives consumers a welcome degree of choice, it also means our music collections are becoming increasingly fractured between various different formats. Rare, nowadays, is the listener whose entire library is stored on just one physical format such as LP or CD.

The obvious downside to this is the increasing number of hi-fi components needed to play all these

different formats. My own system, for example, comprises a turntable, DAC, CD player, two NAS drives, streamer, amplifier and a couple of high-resolution portable digital music players. And, of course, all the associated cables to tie everything together.

So how convenient would it be if you could slim this down to a single box which not only looks good but sounds good as well? That's the thinking behind the new Plato from UK-based company Entotem.

In short, it's a music server that incorporates 2TB of hard disk storage alongside networking capability, an MM/MC phono stage, recording function, 24bit/192kHz DAC and a 45 Watts per channel amplifier – all in a box measuring just 370mm x 130mm x 300mm (W/H/D) and costing £3600 (there's also an alternative version which omits the

amplifier section available for £2700).

Added to this is a 5" TFT LCD touch-panel front screen and an Android-based app for phone/tablet devices (iOS to follow shortly, I'm told) which makes control of the unit relatively simple and allows regular software upgrades.

All these features, of course, would be pointless if the Plato wasn't, at its heart, a decent hi-fi component – which, I'm glad to say, it is.

Entotem is a relatively new company – formed just two years ago by four music-loving entrepreneurs to design and develop a multimedia home entertainment system which integrates both high-resolution audio playback and high-definition video (see box-out for more on the latter).

The company's vision was a system that combined the ability to convert, play and record vinyl alongside network streaming



capability, digital inputs and amplification to make a one-stop solution for music lovers.

If that makes the Plato sound a complex beast, well, it is – boasting a range of capabilities I've never come across in a single unit before. However, Entotem has obviously put significant work into the user interface as it is remarkably easy to operate, with an intuitive control structure that anyone familiar with an Android tablet will get to grips with within minutes.

From this you can access the various connections – optical and coaxial in/out, line level and MM/MC phono, HDMI, ethernet network and pre-outs – as well as control the volume. As it's DLNA-equipped the Plato will also look up other uPnP devices on your network so it can play their content – although it does need a wired connection.

The speaker sockets are of the plug-and-twist Neutrik variety which, while rare, do provide a secure fit. The pre-production unit we had for review came in a mustard colour but Entotem say the final version will ship in black with custom finishes a possibility in the future.

RECORDING

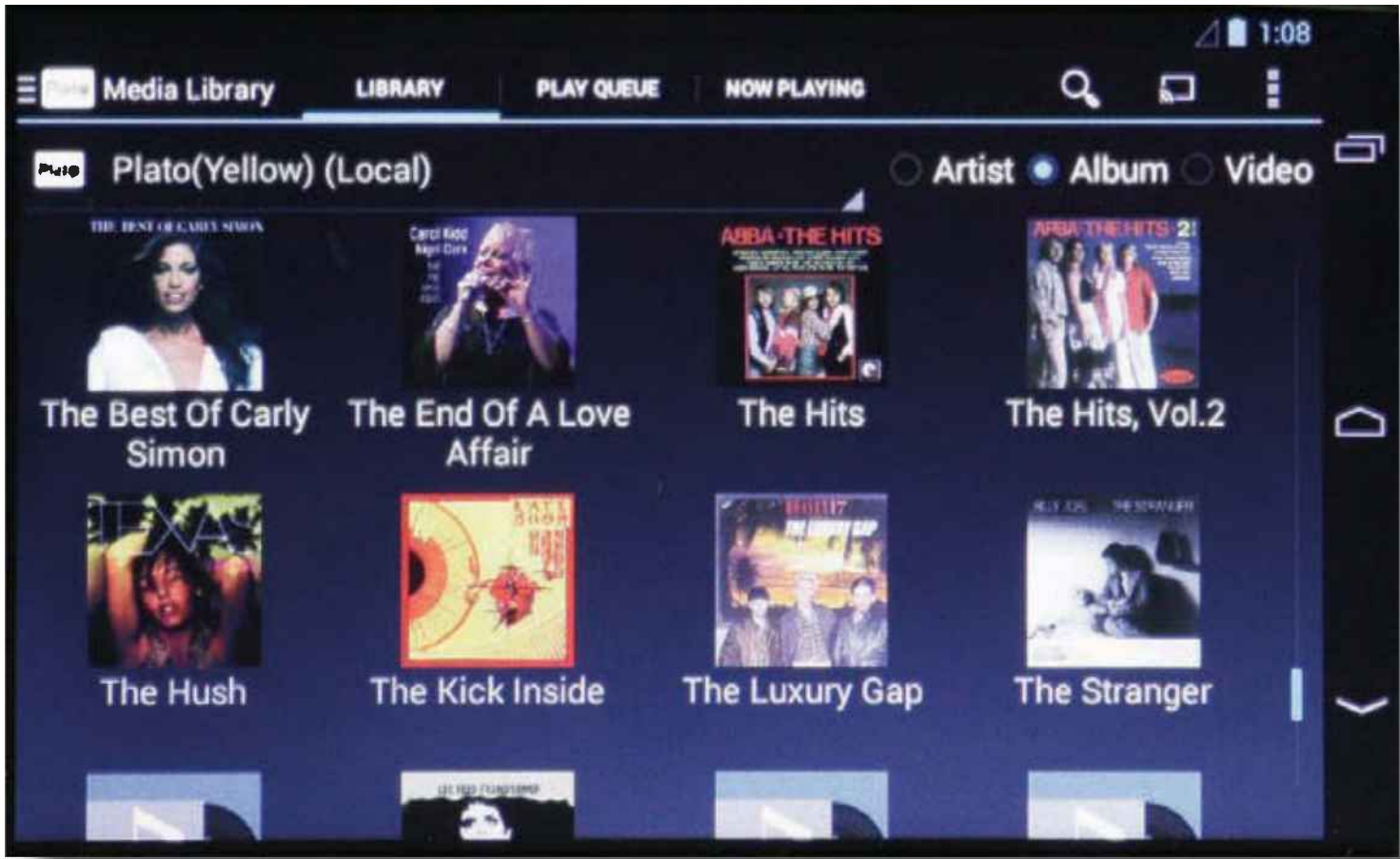
With the Plato connected to the network, the first task is to experiment with its stand-out feature – recording vinyl in high-resolution 24bit/192kHz resolution to the internal 2TB hard disk.

And this is where things get very clever. Plugging in Hi-Fi World's reference Timestep Evo turntable with SME309 arm and Ortofon A95 cartridge the Plato's control app let us select input impedance as well as gain and – if desired – bring in a rumble filter. Once the needle hits the groove initiating recording is simply a matter of pressing a red dot on the tablet's touchscreen.

As this happens the Plato automatically sends a sample of the track to the on-line Gracenote music database and – hey presto! – album details and artwork appear on the unit's front panel screen and the tablet. It really is that simple. What's more Gracenote is remarkably accurate – only failing on some of my most obscure selections.

The same process works for importing music from cassette or CD players, while files can also be saved to the disk from the front USB socket.

After that, all albums appear



The front panel touch-screen TFT display shows full album artwork and titles to make sorting through your music collection quick and easy...

under a Media Library section of the control application which is fully searchable by artist, genre, track name etc.

SOUND QUALITY

With the facilities on offer you'd be forgiven for thinking that sound quality might have taken a back seat. Fortunately, it hasn't.

Its amplifier section is conservatively rated (see Measured Performance for full details) yet has a big, clean and exuberant quality to it.

Playing back a 24bit/192kHz rip of Mark Knopfler's 'Kill To Get Crimson' the quality of the production on this album was more than evident. Here, the leading edges of guitar notes rang true while the subtle rhythm section was projected tightly between the loudspeakers.

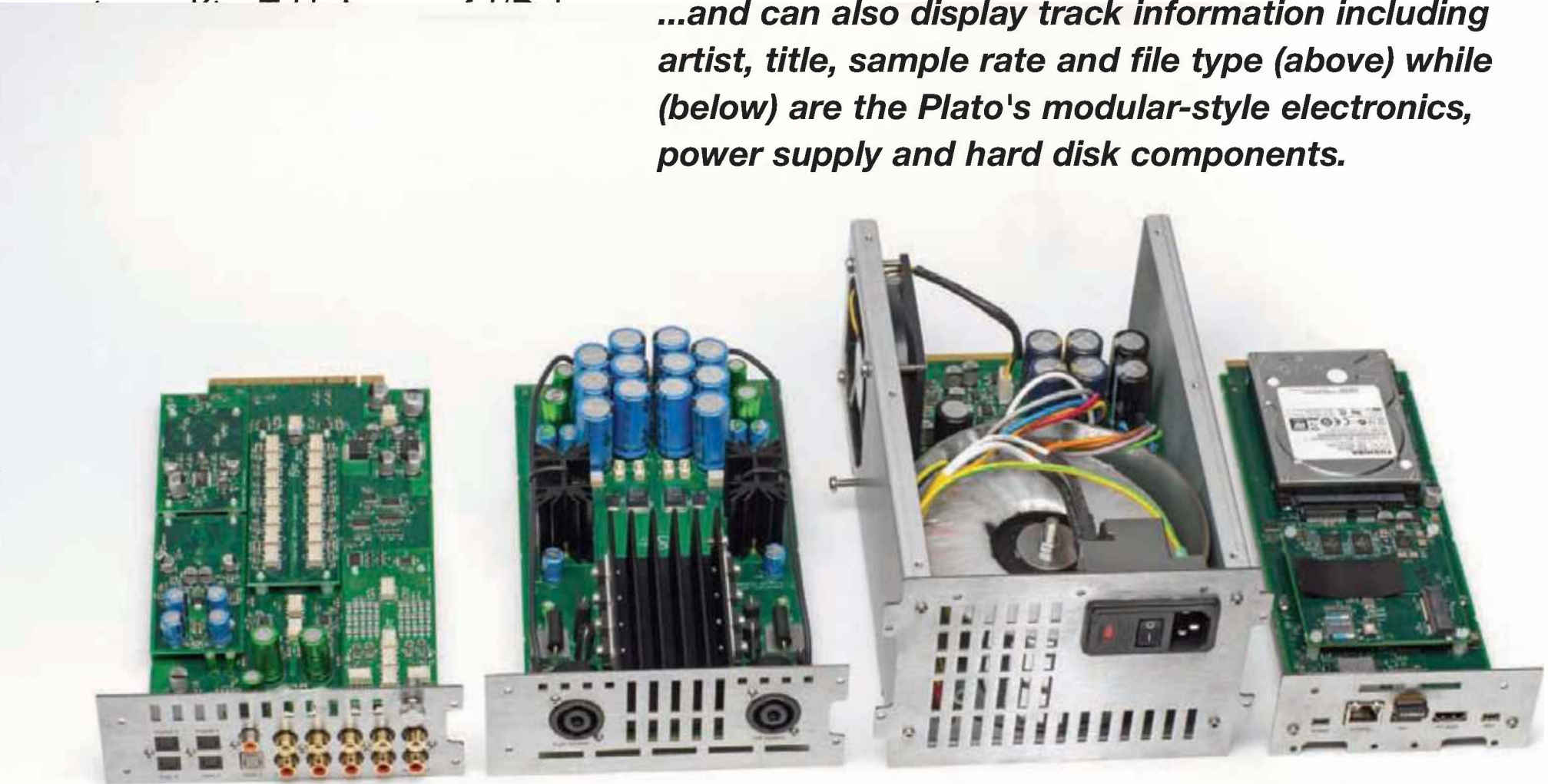
Moving onto something with more low-end power the Plato brought out decent bass from a pair of XTZ Master Series M2 standmounts (see review elsewhere this issue). If anything it tends a little towards the dry side – but that meant it gave a taut, tuneful presen-

sense of tempo on offer. Fed Led Zeppelin's 'Black Dog' through the digital out of an Oppo CD player the Plato grabbed hold of the track and pushed it along with verve, without sounding congested or forced. Indeed, the DAC section is extremely composed and free from any digital harshness, meaning various instruments are easy to follow, even in the densest of mixes.

If there's any criticism to be made it's that the software could be slightly glitchy at times – with an occasional lag between inputting instructions on the tablet and the



...and can also display track information including artist, title, sample rate and file type (above) while (below) are the Plato's modular-style electronics, power supply and hard disk components.



MUSIC PRODUCES A KIND OF PLEASURE WHICH
HUMAN NATURE CANNOT DO WITHOUT.

Confucius, from The Book of Rites

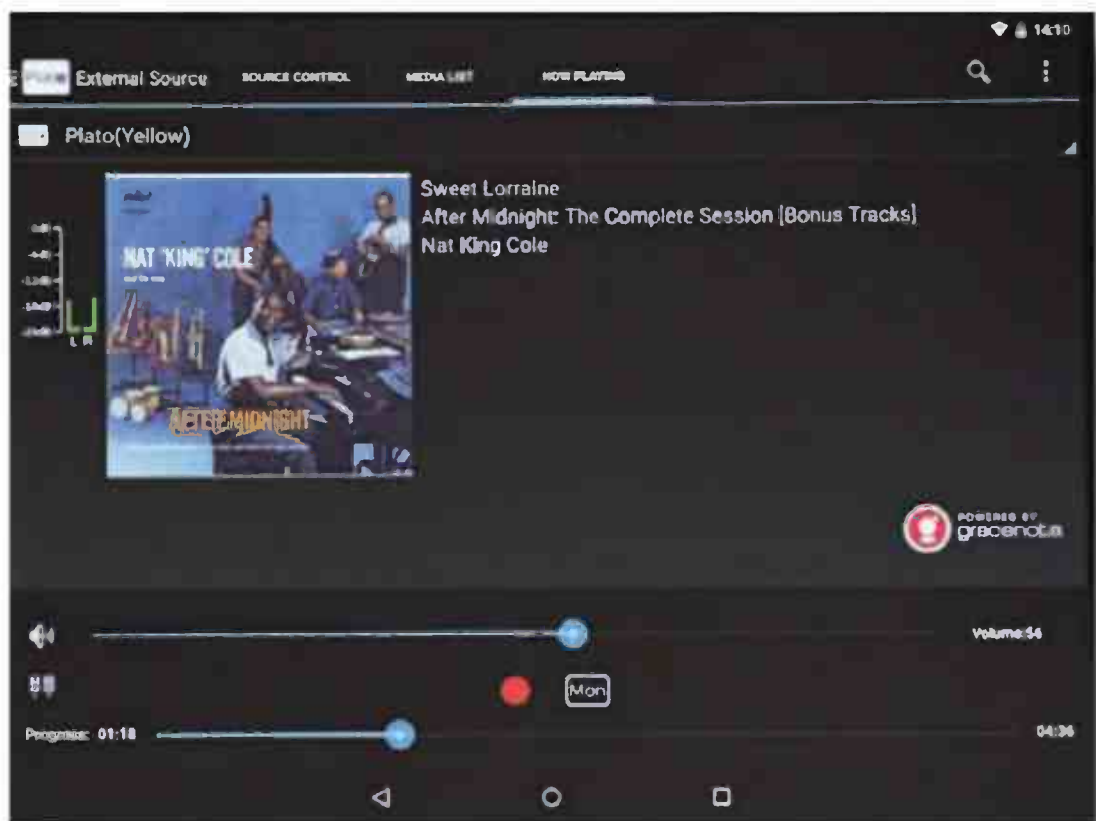


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The free Android app makes control of the Plato via a tablet a breeze. An iOS version is set to follow shortly.



A full complement of digital and analogue inputs on the rear panel are joined, unusually, by a pair of Neutrik-style loudspeaker connections.

player responding. Entotem do say, however, that this is a pre-production issue that will have been sorted by the time the first units reach the

stores. Apart from that, though, there's nothing not to like about the Plato. It'll record your vinyl in high-

resolution, play records, act as a music server and connect to your home network all in one package that is user-friendly and extremely easy to operate.

CONCLUSION

This could well be something of a landmark product in terms of flexibility and the combination of digital technology with legacy analogue capability. Add in an intuitive interface and the promise of regular software updates and Plato could just be one of the most exciting products of the year.

VIDEO PLAYBACK

While the sonic side of the Plato will be of greatest interest to hi-fi enthusiasts, the Plato does have some other interesting tricks up its sleeve. For not only will it store music – but also high-resolution video. That means your movie collection can also reside on the hard disk for playback via the HDMI output or streaming to a tablet or smart TV via wi-fi. Titles have to be loaded via the USB socket on the front of the unit: .mov, mpeg2, mpeg4 H263 and H264. Playback of a couple of episodes of Doctor Who proved extremely impressive, with pin-sharp images and smooth scrolling. It's not a feature I'd use much myself – but it could prove a clinching factor for partners or younger members of the family if you're considering purchasing. Also, as it connects to other DLNA-equipped kit, the Plato can communicate with the likes of Sonos to give different music in various rooms around the house, while internet radio and the likes of Spotify can also be played.

MEASURED PERFORMANCE

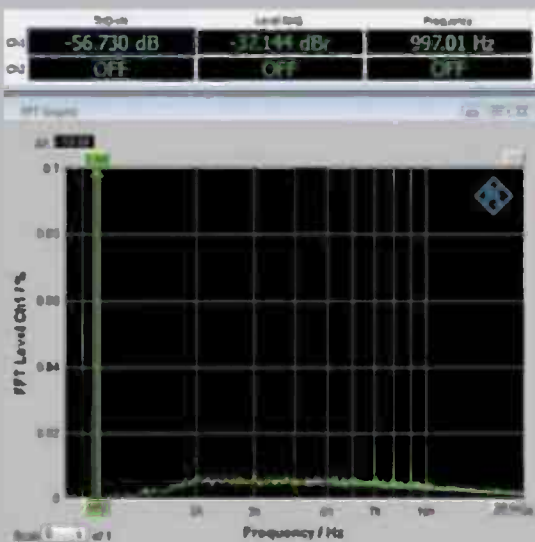
The Plato's power amplifier produced 66 Watts into an 8 Ohm load and 110 Watts into 4 Ohms, enough to drive most loudspeakers to very high volume in the average sized room. Distortion levels were very low in the midband and at high frequencies; there is little sign of crossover products in our distortion analysis, the sound will be clean and lacking any sign of harshness. The amplifier's output impedance was low too, resulting in a high damping factor figure of 40, so the amplifier will have relatively tight bass. Frequency response was very wide, stretching from below 2Hz up to 71kHz (-1dB). Phono stage equalisation was accurate, resulting in flat frequency response, the warp filter acting sharply below 20Hz. Input sensitivity was 5mV and 0.7mV max for MM/MC respectively – low values – and overload levels fairly limited at 2.6mV and 20mV respectively too; an Ortofon 2M red produces up to 35mV. The change from MM to MC sometimes didn't happen immediately either, so there are niggles here. Noise was very low. The S/PDIF digital inputs were inconsistent, with the electrical connection via phono socket working

to 96kHz sample rate maximum, whilst the optical input managed 176.4kHz maximum, neither working with a 192kHz sample rate signal. With 24/96 PCM digital, distortion measured a low 0.03% and EIAJ Dynamic Range was commensurately high at 116dB – a good value up with market norms, if not the 120+ dB nowadays possible from the best chips (ESS 9018, Texas Instruments PCM1795). With CD (16/44.1) however, EIAJ Dynamic Range was a high 103dB, so the Plato matches the best here. Frequency response at 176.4kHz sample rate extended to 42kHz before rolling away slowly, about as expected using slow, but well damped filtering. The Plato is a complex and ambitious product that worked well all round. Its phono stage in particular, with Gracenote ability to identify music and bring up artwork etc was especially comprehensive, if in need of a little buffing up of sensitivity and overload levels. **NK**

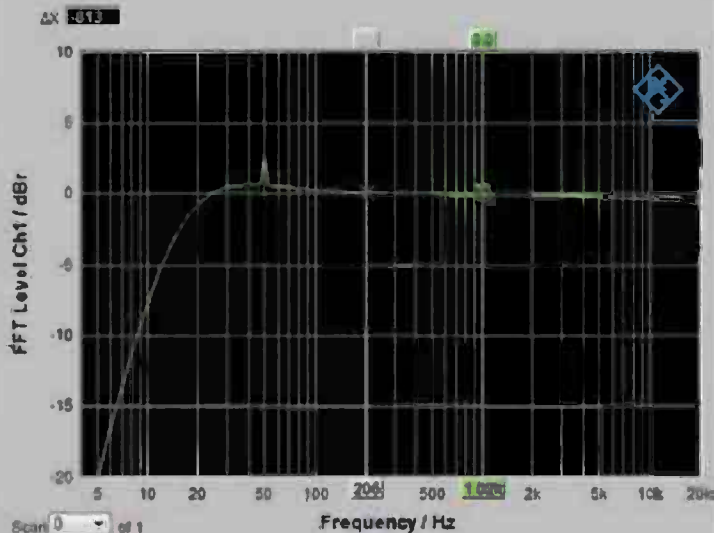
Power	66watts
CD/tuner/aux.	
Frequency response	2Hz-71kHz
Separation	95dB
Noise	-114dB

Distortion	0.04%
Sensitivity	600mV
Disc	
Frequency response	5Hz-20kHz
Separation	68dB
Noise (e.i.n.)	0.08/0.22µV
Distortion	0.05%
Sensitivity (MM/MC)	5/0.7mV
Overload (MM/MC)	2.6/20mV

FREQUENCY RESPONSE



DISTORTION



ENTOTEM PLATO
£3600 (WITH
AMPLIFIER
SECTION, £2700
WITHOUT)



OUTSTANDING - amongst
the best

VERDICT

A groundbreaking product from a new company that is ideal for those looking to combine digital and analogue replay.

FOR

- versatility
- vinyl playback/recording
- digital inputs
- DLNA

AGAINST

- minor software issues

Entotem
+44 (0)1332 291972
www.entotem.com

White light



A shiny white budget turntable that has an optical digital output, Pro-ject's new Essential II Digital intrigues Noel Keywood.

Here's the improbable idea of a digital turntable – an idea that may well make vinyl enthusiasts shudder. I thought initially “why would anyone want to do that?”, but after time spent with Pro-ject's new Essential II Digital turntable, I get it.

In a nutshell, the Essential II

Digital has both analogue and digital outputs, the latter being for recording purposes. It means you can digitally archive your vinyl and / or load it to a portable to make the commute easier to bear. Whilst everyone else is listening to shaky MP3s, you'll be enjoying the lush sounds of analogue.

It all starts to make sense – but generating decent digital isn't easy

and neither is recording it, so hang on, I have things to say about this.

The Essential II Digital is – I think – stunningly priced, costing just £309. I'm almost baffled by this because it actually has a lot of technology on-board and was quite challenging to test – so I don't find it easy to understand how the bill of materials equates to such a low price.

There haven't been any unacceptable compromises either: it didn't bulldoze the grooves of my LPs. Far from it, the budget Ortofon OM5E cartridge fitted tracked incredibly well under test, so there will be no groove damage from mis-tracking – something I think I need to assure you about straight away. There's no point in buying a budget techno-wonder if it's going to chew up the LP collection after all, and budget cartridges can do this. But onto a basic description...

The Essential II Digital is a two speed turntable, spinning at 33 and 45 rpm. It has a good, friction free arm that isn't the best finished you'll encounter; don't expect a Rega, let alone an SME. But I don't mind simple but effective design along well tried lines – and this is what the arm gives you.

The fitted Ortofon OM5E cartridge can be described likewise: it is a well honed lightweight Moving Magnet (MM) design with elliptical stylus that tracks at a recommended 1.75 gms. And in tests it never mis-tracked once, even on torture tracks. It does have a warm sound balance, but this is likely what people new to vinyl will expect. The arm could well take a better cartridge, right up to Ortofon's top MM, the 2M Black (£400) or a good Goldring or Audio Technica.

To change speed you move the belt manually from one motor pulley diameter to another, it's as simple as that. There is an on-off switch on the left side of the plinth, near the front – a convenient location. Pro-ject supply a thin felt mat that I would

The motor pulley has two diameters, for 33rpm and 45rpm. To change speed the belt must be moved manually. The 15V d.c. power supply input can be seen below.



Bias is applied by a simple weight-and-string system, our shot shows here. The counterweight turns forwards or backwards to set tracking force, a common method.

Below lies the optical digital output that makes this turntable so unusual and distinctive. The analogue output is for Line inputs, not Phono inputs/stages.

tend to change for something stickier, securing it with double-sided tape for speed stability tests; thin felt mats slip. The turntable is good enough in its performance our measurements showed, warranting a bit of extra investment in small tune-up items such as a better mat and/or disc clamp.

There's little sign of digital-ness in the physical appearance of this product, except in the logo on the nicely finished white plinth. Pro-ject have concealed the complexity of their digital wonder in a little box at the back, slung underneath the plinth. Inside lies a complete phono stage, no less, with RIAA equalisation, so you do not – and cannot – connect up to the phono stage of an accompanying amplifier; it plugs into line inputs. This means the Essential II Digital can drive just about any amplifier – even powered Bluetooth loudspeakers if they have a reasonably sensitive input.

The phono stage doesn't have an especially high output, so volume will have to be turned up on an accompanying amplifier that lacks sensitivity. Power is supplied by an external wall-wart delivering 15V d.c.

And now onto the digital bit! All Pro-ject fit is a single optical S/PDIF output, situated next to the phono sockets – and that's it; there are no lights, switches or an electrical S/PDIF output. The optical delivers 24/96 PCM, which



Unico Series

The Unico range of hybrid electronics from Unison Research combine the warmth of valves with the power and the accuracy of solid-state systems. All Unico products are recognised by their thick sandblasted aluminium fascias, which are accented by a wooden Unison Research logo.

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is higher digital quality than CD. So what to do with it?

There's seemingly little point in taking it to a DAC of any sort; you are better off using the analogue output to avoid conversion to digital and back again. However, you could conceivably do this in order to use a long optical digital cable across a lounge, to a distant DAC and amp. I ran this output through the top quality ESS Sabre32 DAC in our Oppo BDP-105D Blu-ray player and thence on to a Creek Evolution 100A feeding Castle Avon 5s to assess it – more of which later.

The most obvious use of a digital output is for recording purposes, as I mentioned earlier, but this is a tad more challenging than pressing the red Record button on a cassette deck – if you can remember them! You need a software music recording programme like Apple's Garage Band, or the free Audacity programme I use, available for Mac and PC. Then you need a device with an optical digital input, which could be a PC's sound card.

I used our trusty and very capable Furutech-ADL Esprit preamplifier, connecting its USB socket to a MacBook Pro – and this worked fine. It imposes an S/PDIF-to-USB digital conversion process, but these days there are no noise penalties; I was up and running immediately, making excellent 24/96 recordings.

What the Essential II Digital turntable has on-board that distinguishes it – and justifies the Digital moniker – is an Analogue-to-Digital Convertor, or ADC – and there are not so many of these about in hi-fi, because recording digital audio is



The turntable comes with an Ortofon OM5E moving magnet cartridge fitted. It tracked very well at 1.75gm downforce.

no simple process: check out the Audacity music editor online if you are interested.

I suspect Pro-ject will at some point fit a USB-B output instead of S/PDIF, because it is now a more common digital interface.

For measurement purposes I disconnected the cartridge, sent an analogue test signal in and took the turntable's optical digital output into our Rohde&Schwarz digital analyser – and got impressive results. Pro-ject have not skimped on all this, hoping no-one will notice. Quite the reverse in fact, their engineering is impressive.

Which is why I said earlier the £309 price is stunning – I don't know how they do this. You get turntable, cartridge, phono stage and digital convertor, which in separate units could easily cost double, or much more. Budget ADC chips can be

noisy and distorted but the one used by Pro-ject was neither, my ADC-DAC listening test showed.

SOUND QUALITY

With its analogue output connected into a Creek Evolution 100A amplifier driving Castle Avon 5s I review in this issue, I had a nice little vinyl set up. But a few issues popped up straight away. The Creek isn't sensitive so I had to crank volume right up, even to maximum at times to play very loud, because the Pro-ject has low gain.

At very high volume I detected a little motor noise coming through when playing an LP, a weak drone. Sitting 10ft back from the system I couldn't hear this. I heard the same with the silent groove of an Adjust+ test LP, by the way, a check to ensure the drone hadn't been recorded onto the disc being played.

There was absolutely no electrical hum or buzz even at full volume; the system was delightfully quiet, giving a very good impression in use.

Dropping the stylus into the groove to play Phil Collins I Don't Care Any More, from a 180gm pressing of Hello I Must Be Going, to see how well the system handled Mr Collins hitting his drum kit gave me a nice surprise. The sound was big bodied, fluid and dynamic. It was larger chested than most budget turntables in fact, giving me a big expansive sound stage with plenty of apparent depth and real power in the drums. Sounding smooth and quite dark in tone the Digital sounded gorgeously analogue and wouldn't



A wall-wart power supply provides 15V d.c. via a thin cable, so there is no hum producing a.c. anywhere near the hum sensitive cartridge and phono stage. An analogue signal cable is supplied, but not a digital optical cable. The earth must be connected, because there is no mains earth.

THE VINYL REVOLUTION



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Every Miyajima cartridge is handcrafted in-house by a dedicated full-time team of six based in Fukuoka. The cartridge bodies are individually precision-milled from rare and exotic hardwoods including ebony, rosewood and African blackwood (mpingo). These dense natural materials lend a vibrant and natural tonality to the sound.

**Clearaudio Goldfinger - Miyajima - Benz LPS - Denon DL103 - DL-102 mono - Audio Technica AT33
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disappoint anyone, especially those who bought it wondering what LP was all about. They'd get a shock if they'd been listening to the thin and shaky sound of MP3s!

"the Digital sounded gorgeously analogue and wouldn't disappoint anyone"

Sustained organ notes behind Phil Collins were satisfyingly steady, suggesting good speed stability, as measurement had suggested. Spinning Chopin's Nocturne, Op48, No1, confirmed this, the closing three sustained chords remaining reassuringly stable over their duration.

The big, full bodied sound suited classical and I don't think anyone could have easily criticised the lovely full tones of the English Chamber Orchestra playing Simple Symphony for Strings, from the pin sharp dynamics of plucked strings through to the strength and depth of the bassoons.

Spinning Jackie Leven's 'Some Ancient Misty Morning' from his LP 'Forbidden Songs of the Dying West' I was aware again that there was very strong projection of depth and atmosphere, to the extent that I wondered whether this little unit was benefitting in a rare manner from having the phono stage – and a good one at that – situated right at the base of the arm. There was a soothing sense of peaceful silence until the music started and Jackie's voice sprung out of the dark at me – lovely. I really liked this. The Digital sounded almost too good.

Connecting digitally via optical cable to our Oppo BDP-105D Blu-ray player showed that the analogue cable must also be in place – or an earth line – to avoid a slight mains buzz, but with this done the optical feed was silent.

Playing via the turntable's ADC into the Sabre32 DAC of the Oppo was an interesting experiment. In spite of the prodigious amount of processing involved in going to 24bit digital and back again, sound quality remained surprisingly good. It hardened up slightly, gaining a mechanical "tin can" coloration shall I say, but it was slight. I think a long optical line could well be used across a lounge to a DAC. because the

digital penalty is low.

Interestingly, when I cued up there was a slight time lag before the music stopped.

What this test tells me is that

the ADC does a pretty good job – and that's also what I heard with recordings to my MacBook Pro via Furutech's Esprit preamplifier. I got great quality with just the slightest added hardness, but absolutely no noise or muddle and the full glory of the Pro-ject Essential II Digital's

sound was preserved: impressive stuff.

CONCLUSION

The Pro-ject Essential II Digital is quite an amazing package. It gave great results, having lush sound quality from its analogue output that I found thoroughly enjoyable and entirely in keeping with expectations from LP. There was definitely no digital in this bit of the Digital!

I could almost say that of the digital output too. It sounded pretty darn good when played through the ESS Sabre32 DAC within Oppo's BDP-105D Blu-ray player.

This Digital turntable from Pro-ject isn't an idea that will make anyone shudder – quite the reverse. It is one impressive player, whichever way you look at it.

MEASURED PERFORMANCE

There was a lot to measure in this package: a turntable, arm, cartridge and – most unusually – a complete on-board phono stage with S/PDIF optical digital output, hence the name Pro-ject Essential II Digital.

The on-board analogue phono stage (with RIAA equalisation) had x52 gain, so a 5mV input delivered 260mV. This is low, enough for sensitive amplifier Line inputs (e.g. Aux, Tuner, etc) only; x100 gain is usual.

Frequency response was flat due to accurate equalisation. There is a low filter, to suppress warp signals below 20Hz. With low noise and distortion, plus high overload, Pro-ject have put design effort into this stage; it measured well.

Via the optical digital output peak

digital level (0dB) has been set at 35mV input from the cartridge, our Rohde&Schwarz UPV digital signal analyser showed, and this is correct, being the maximum output of a good Ortofon MM. Noise from the 24/96 ADC measured -96dB down – a low level – and frequency response was flat to 48kHz, so the digital side performed well. The Pro-ject's on-board ADC will outperform a typical computer ADC and will give good sound quality.

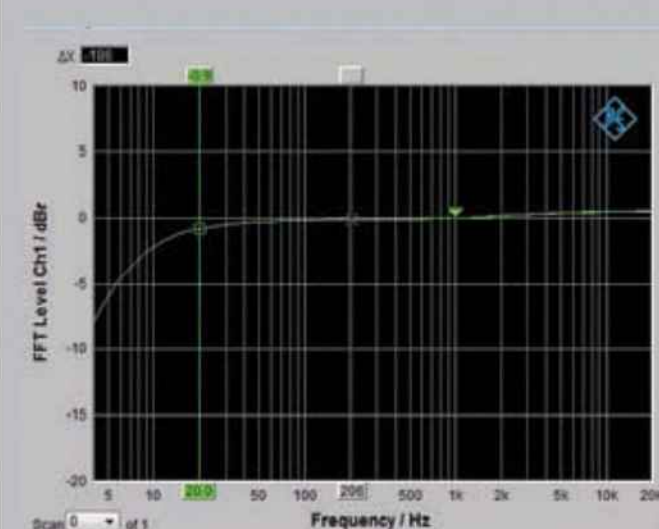
The Pro-ject Essential II Digital turntable ran at almost correct speed, its error of +0.1% being small. Speed varied little around its nominal of 3155Hz, suggesting a low wow figure. This promise was just-about delivered, basic rate wow at 0.55Hz (33rpm) being very low. However, there was some flutter to mar the picture, something our spectrum analysis of demodulated speed variation components clearly shows. All the same, for a budget turntable this is still a good performance; I was expecting wow in the 0.2-0.3% region, but the Essential II Digital managed around 0.15% most of the time.

The Ortofon OM5E cartridge fitted has falling treble measurement showed and will give a warm balance, but it tracked extremely well, clearing a top torture test track of 90µm lateral.

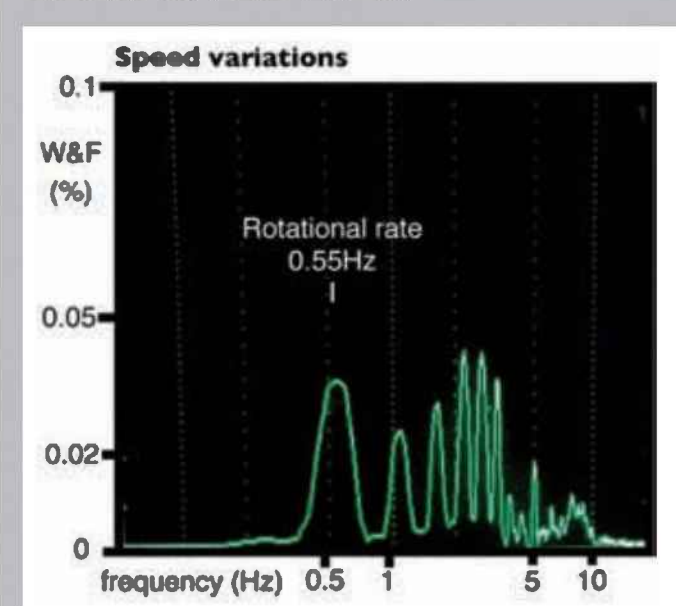
The Pro-ject Essential II Digital measured well all-round, even in difficult 'corners' such as ADC performance. It's impressive for the price. **NK**

Speed accuracy	+0.1%
Wow	0.15%
Flutter	0.05%
Total W&F weighted	0.09%

FREQUENCY RESPONSE



WOW & FLUTTER



PRO-JECT AUDIO ESSENTIAL II DIGITAL TURNTABLE £309



OUTSTANDING - amongst the best

VALUE - keenly priced

VERDICT

A great sounding budget turntable with fine on-board phono stage and useful digital output too. Impressive – a real bargain at the very low price.

FOR

- on-board phono stage
- hi-res digital output
- low price

AGAINST

- simple construction
- manual speed change
- no USB

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Art Of Sound

Noel Keywood hails Ortofon's new A95 state-of-the-art Moving Coil cartridge as one of the best he has ever heard.

With a super rigid, laser-welded titanium body, boron cantilever and finely honed diamond stylus of Replicant geometry, you can guess before I begin that Ortofon's new top Moving Coil (MC) cartridge I am reviewing here is a feat of micro-miniature engineering. You pay £3750 for the luxury of owning this fine and delicate device – a technology showcase.

I'm forever amazed at what can be teased out of the vinyl groove and just how far we can go – perhaps still have to go – to make the most of playing LP and the A95 is a great illustration of how modern materials and technologies are being used to advance this process.

You can see the A95 has a vestigial body frame that cradles a miniature electrical generator at its furthestmost tip. From this emerges the fine boron cantilever that traces the LP groove.

Visually, there's almost nothing in the A95 you may think. But all MC cartridges are built to this basic pattern. The generator, a tiny coil of wire in a magnetic field, has to be as small and light as possible, so everything is of Lilliput proportions.

One of the problems this raises, a cartridge manufacturer once told me, was that when you order in the basic materials your order is so small no one wants to fulfil it! Ortofon, like Nagaoka of Japan, actually have other businesses in micro-engineering, providing high precision parts, and this helps diversify and enlarge their business.

Bear in mind that the LP was all but dead and buried a decade ago and cartridge manufacturers appeared to be following candle stick



makers into oblivion; they would not have survived without other interests. The A95 now reminds us of what the vinyl revival is about. It's now an historic music source that is to be treasured – even revered. Think classic cars. And the revival of cartridge manufacturing as a high technology business, is sustained by these renewed sales.

The A95 enters this market not in virginal form; it was preceded by the A90. It is an update on a concept – to refine the structure by removing superfluous bodywork, whilst stabilising the generator in a rigid frame that doesn't move by any method, so not even the minutest signals are lost.

The traditional way of doing this is by using a solid machined block as the body, but that increases weight to 10gms or so – not ideal: most arms can cope, some cannot and it adds mass to the headshell that impairs warp riding.

By way of contrast the A95 is a slip of a thing that weighs 6gm

– about as light as most arms can handle without the counterweight reaching the end of its forward travel on the rear arm stub. So it might cost a lot but, physically, you get a flyweight device.

The body has tapped screw holes and screws are supplied, so fitment is easy enough. The signal pins are clearly colour coded too.

The generator uses a powerful but light Neodymium magnet, and the signal coils are wound from gold plated oxygen free copper. A low permanence armature and Field Stabilising Element help reduce magnetic distortion, Ortofon say.

To damp high frequency tip mass resonance, in order to achieve smooth treble, a 'wide range damping system' comprising a platinum disc and two rubber pads of differing properties are used – and our frequency response graph (see Measured Performance) does confirm this system works well, by the lack of peaking above 10kHz.

A small, specially ground nude

diamond stylus uses Ortofon's own Replicant geometry for long groove contact and it is mounted in a boron rod cantilever.

The tracking force range is quoted as 2gm-2.5gm, with 2.3gm recommended. In tracking tests I found moving from 2.3 to 2.5 made little difference so I used 2.3gm as recommended. It was mounted in our office steed, an SME309 arm attached to a Timestep Evo turntable.

SOUND QUALITY

We rejected two samples of the A95 before a problem identified by our measurements was cured by changes in production and this review refers to the improved update.

I ran the A95 into an Icon Audio PS3 valve phono stage with input transformers, so hiss wasn't a problem. The PS3 was connected directly to a Sjudgen Sapphire FBA-800 Class A power amplifier and thence via Tellurium Q cables to a pair of Tannoy DC10Ti loudspeakers. The stylus was left running for 24 hours in a locked groove test record to run it in.

Initially, before running in, the A95 sounded quite "bold", shall I say. With hard-etched and obvious treble it made a strong statement, throwing cymbals at me.

Yet I could hear some impressive underlying properties, a great sense of control and sharp timing being one of them as well as firm bass and masses of fine detail. After a 24 hour run-in, the slightly forward balance remained but the hard edge had gone and treble was starting to sound silky.

Generally though, the new A95 does not remind me of – say – the Cadenza Black, for example, and certainly not the Bronze I favour (although mine is wearing out and sounding gentler these days).

I mention all this to get the new A95 into context. It does not offer a warm or retiring performance; in fact the boron cantilever is, I suspect, responsible for its clinical delivery, one that is forensically clean.

And what you have to bear in mind with any cartridge is that they do soften out as they wear out: the balance changes over time.

Spinning Mark Knopfler's 'True Love Will Never Fade' on the quiet 200gm vinyl of 'Kill To Get Crimson' (a great cut), his vocals were forward on the soundstage with every intonation made very specific. The strumming of the metal strings was vividly outlined and fine

detail fairly shot from the big Tannoy loudspeakers. Treble energy was also strong.

The solid bass line behind this track was easy to follow and here – at low frequencies – the A95 showed it had grip and was fluid in its presentation.

Kate Bush's 'King of the Mountain' from 'Aerial' is another quality cut on quiet, flat vinyl and this too was forensically analysed by the A95. As the strong reggae bass line strode along, underpinning the track,

"The strumming of the metal strings was vividly outlined and fine detail fairly shot from the big Tannoy loudspeakers"

high cymbal crashes sprang out at me and fine detail formed a rich tapestry within the sound.

The overall presentation was a cool, but accurate one. I admit to being used to the lush tonality of Ortofon's Cadenza Bronze and by way of contrast the A95 is more controlled, more detailed and dry in its sound. But at the same time it offers greater grip and insight.

Upping the tempo and modulation velocity somewhat, I put on Carol Kenyon's 45rpm, 12in single 'Dance With Me'. These old 12 inchers were cut high and hard for 1980s disco use and they more strongly stress a cartridge than 33rpms. The A95 was rudely exposed!

In fact, what I heard was fascinating: the opening synth drum beat was

faster – and also kick-ass hard; the A95 has enormous punch. A solo hand drum floated at left, its position perfectly outlined. Carol Kenyon's delivery was clearer than I have ever heard it; the A95 puts focus into every image: it pulled Kenyon's richly modulated vocal out of an-at-times dense mix. What I got was a machine gun delivery – great stuff!

Spinning a far newer LP, from 2L of Norway, made from a DXD 352kHz sample rate/24bit digital recording onto a Direct Metal

Master, stamped onto 180gm flat vinyl of Marianne Thorsen playing 'Mozart's Violin Concerto No4' again highlighted the A95's sense of massive analysis and control.

Thorsen's violin was rendered so clearly it fairly floated in front of the loudspeakers; isn't it wonderful how vinyl images! By any standards this is a great recording and a lovely LP and I was mesmerised by the sheer clarity of the whole performance.

I will note a few things at this point. Low output from the A95 was not an issue through the silent input transformers of our Icon Audio PS3 phono stage; even at high volume there was neither hiss nor hum in our system.

However, potential owners will have to pay attention to this issue because output from the A95 cartridge is very low, too low for

Clear colour-coded pins along with tapped screw holes makes fitting the A95 a relatively easy operation.



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many solid-state MC inputs.

Also, the A95 stylus is quiet in itself, but especially on modern low noise vinyl such as that of the 2L LP, where I heard no groove noise either. But to appreciate all this Ortofon's new cartridge does need especially good matching equipment.

Punching the 45rpm button on our Timestep Evo upgraded Technical SL-1210 Mk2 turntable, I again heard the grip and punch of this cartridge as Amy Winehouse's 'Tears Dry on Their Own' opened – another 45rpm 12in single. More synth bass admittedly but it was strong and yet delivered with enormous grip on time-domain progress; I was aware of every small note change, every little noodle.

I only hand cue – can't stand lift/lower platforms! – and the A95 was superb for this. Ortofon have chamfered the front face to reveal the fine boron cantilever so it can be dropped precisely into the groove; beats a CD skip button any time.

There was no problem with end-of-side groove reading, as expected from measurement. Modern stylus geometries read the short wavelengths of inner grooves without

difficulty, so when I span 'This Boy' from 'Mono Masters' within 'The Beatles in Mono' box set, John Lennon's every intonation at the microphone was conveyed with vivid clarity and sharp analysis.

Again, there was no groove noise either, these LPs being cut onto very quiet vinyl.

CONCLUSION

Dry, fast, extremely detailed and almost concussive, the A95 is a highly tuned mechanical statement. It is not lush, warm or cuddly, but rather a machine of insight and deep analysis.

Massively capable, the A95 is a cartridge that makes the LP sound better all-round than I have ever heard it. Almost frightening! It is sort of CD like in its qualities – only better.



The unusually-shaped cartridge has had all superfluous body-work stripped away to drop weight down to a low 6gm while stabilising the generator in a rigid frame.

MEASURED PERFORMANCE

Our analysis of frequency response shows the A95 has a smooth response to 20kHz, with +1dB of lift on outer grooves – just enough to ensure treble is not dull and to provide tonal balance across the disc surface because on inner grooves treble loss from tracing error reduces the small lift to flatness – a very good overall result.

This is an accurate and smooth cartridge with a good nude Ortofon Replicant stylus that traces the shorter mechanical wavelength of inner grooves with little loss.

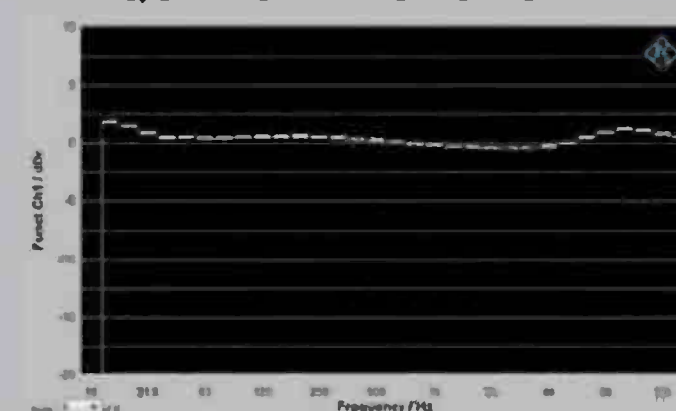
Frequency response analysis comes from JVC TRS-1007 test disc, equalised digitally in our Rohde&Schwarz UPV analyser.

Tracking force range is quoted as 2gm-2.5gm, with 2.3gm as optimum. At 2.3gms, in an SME309 arm, the A95 managed all tracking level test tracks on CBS STR-112 test disc, the highest torture level of 90µm peak amplitude at 300Hz just being cleared. Full lateral level of 45µm was cleared easily. Also, full level lateral at 1kHz of 25cms/sec rms velocity on B&K 2010 test disc was

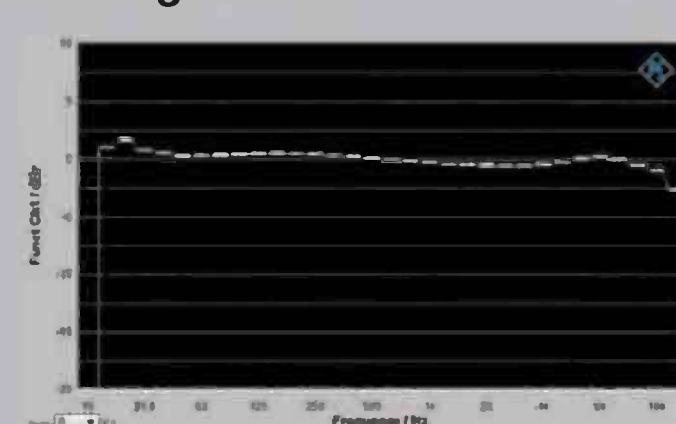
also cleared, so the A95 tracks very well, clearing all test tracks.

Lateral distortion was much as expected, measuring 0.9% second harmonic, this being a common result. Distortion on vertical modulation was 4% second harmonic, caused mainly by a Vertical Tracking Angle of 28 degrees, a little above the optimum of 22 degrees,

FREQUENCY RESPONSE



Outer grooves



Inner grooves

but this is not uncommon since achieving the correct VTA makes a cartridge ride very low and ground on warps.

Output was very low, a miniscule 0.17mV at 3.54 cms/sec rms, Left & Right channel (45 degrees). This amounts to 0.24mV at 5cms/sec rms velocity – extremely low. The A95 needs a very quiet preamplifier if hiss is to be avoided, input transformers usually being the best bet, although low noise transistor pairs like MAT12 can manage better.

The A95 measures very well in every area but it has low output and needs a very quiet MC phono stage. **NK**

Tracking force	2.3gms
Weight	6gms
Vertical tracking angle	28degrees
Frequency response	20Hz - 20kHz
Channel separation	24dB
Tracking ability (300Hz)	
lateral	90µm
vertical	45µm
lateral (1kHz)	25cms/sec.
Distortion (45µm)	
lateral	0.9%
vertical	4%
Output (5cms/sec rms)	0.24mV

ORTOFON A95 £3,750



OUTSTANDING - amongst the best.

VERDICT

An advanced-technology MC cartridge that digs deep and reveals all. Forensic ability and fast, dynamic sound.

FOR

- fast, punchy sound
- easy to fit
- easy to use

AGAINST

- needs super quiet preamp
- cool character

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Lite Fantastic!



Naim's UnitiLite has added Bluetooth and Spotify to its list of talents – making it even more of a bargain, says Jon Myles.

It's fair to say that Naim's original Uniti was a groundbreaking product for them – introducing a whole new set of customers to the company's distinctive products. The one-box system featured high-resolution UPnP streaming, a CD player, internet, FM and DAB radio plus USB input, a 50 Watts per channel amplifier, headphone socket and connections for an iPod – all for less than £2000 at the time of launch.



Little wonder it proved a runaway success and was soon copied by rival hi-fi manufacturers with their own versions of the all-in-one system.

Since then, there have been a number of revisions and software upgrades and – inevitably – price increases, which mean the current Uniti 2 model now costs nearer to £3000 and boasts a beefier 70 Watts per channel amplifier.

But if that price is too steep for you, fear not – for Naim has an entry level model called UnitiLite with

much of the same functionality as its bigger brother, but costing a more wallet-friendly £1995.

And, as part of a recent upgrade, the UnitiLite now comes with built-in support for Spotify's streaming music service, as well as Bluetooth for sending music from portable devices or computers.

Unbox the Lite and it's noticeably slimmer than the original Uniti or the Uniti 2 but still comes in Naim's trademark black powder-coated metallic casework.

The space saving comes from Naim abandoning the use of its famous swing-out CD drawer for a more traditional slide-loading tray.

Much of the front panel is taken up by the large display panel, alongside nine control buttons that give access to the unit's basic functions. Beneath the CD draw sits the USB input, together with headphone and combined line-in/optical digital input sockets.

The rear panel is also tightly-packed, featuring a wired network input and a connection for the supplied wi-fi antenna, two optical and two electrical digital inputs, two analogue ins, and an F-type screw connection for an FM/DAB aerial.

There's also one of Naim's

favourite four-pin DIN sockets for preamp-level output should you want to connect an external power amplifier, alongside 4mm loudspeaker terminals.

Inside the box is a 50 Watts per channel amplifier with a sturdy linear power supply – and as well as CD playback, radio and the new Bluetooth and Spotify capability, the UnitiLite will stream music files of up to 32bit/192kHz.

Naim recommends a wired Ethernet connection for best performance – but I had no trouble streaming high-resolution files from a WD NAS drive situated in the same room.

A remote control is also provided, but I'd recommend downloading Naim's free dedicated control app for Apple iOS or Android devices. The app has been gradually polished and improved since it launched and is now one of the best out there. It selects inputs – allowing the creation and saving of playlists, storing radio presets and other features, such as the display of album artwork – and it also gives access to the on-line Rovi music database for album reviews, information on artists and suggestions for other music you may be interested in, based on what



Two aerials, no less, for Wi-fi and Bluetooth, attest to the UnitiLite's comms. skills. There is a network RJ45 socket, S/PDIF inputs, loudspeaker outputs and more, underscoring just how capable this Naim is.

you are playing at the time. It makes operating the UnitiLite extremely easy and intuitive, despite the range of features on offer.

SOUND QUALITY

It may be dubbed 'Lite' but there's nothing inconsequential about the Naim's sound. In typical Naim fashion it has a solidity and pace that brings music alive, with powerful bass and a smooth, cluttered midband. Playing The Pixies 'Wave Of Mutilation' best of CD collection, there was real snap and crackle to the music. Joey Santiago's guitar lines have a crisp leading edge, while Kim Deal's bass is firm and distinct. There's good separation between the instruments too – but the Naim never sounds clinical, instead staying

true to the rough spirit of the music. The UnitiLite, though, really shines when streaming hi-res music – the extra detail on the likes of The Clash's 'Jimmy Jazz' 24/96 shining through with terrific air and atmosphere to the track. There's perhaps not quite the overall detail of the more expensive Uniti 2 – a slight feeling the UnitiLite isn't exploring both ends of the frequency spectrum to the fullest extent, but it doesn't alter the verve it brings to the music. Both Spotify and Bluetooth also worked seamlessly. Yes, the former's lower bit-rate is noticeable but not to the extent that the music becomes mere background noise. On the contrary, the UnitiLite is adept at grabbing hold of a song and bringing the best out of it. I had great fun

rifling through the service's millions of tracks – unearthing some long-forgotten gems while also discovering new favourites. Bluetooth via an Apple iPhone 6 Plus was also crisp and clear. Yes, you'll notice some reduction in quality compared to high-resolution, but it's a convenient and useful addition for when you just want to turn on some music instantly.

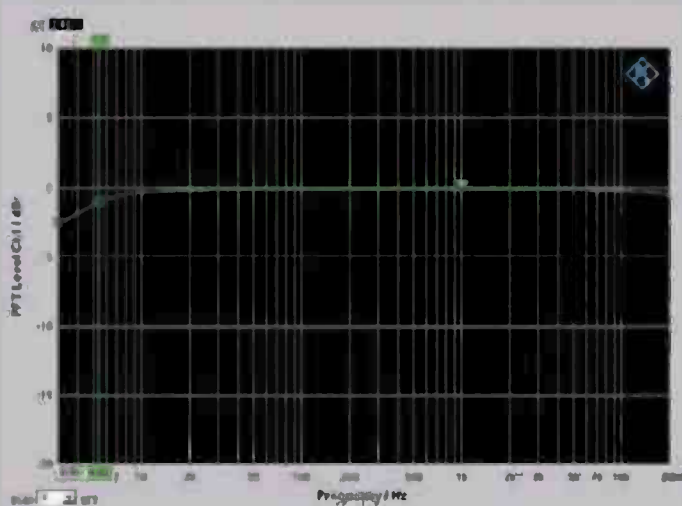
CONCLUSION

The UnitiLite is a talented box of tricks that gets on with the task of playing music with a refreshing verve and assurance – whether it be CD, high-resolution streaming or radio. Add in new Bluetooth and Spotify capability and it looks even more of a bargain. Connect up a decent pair of loudspeakers and away you go.

MEASURED PERFORMANCE

The UnitiLite amplifier produced a healthy 50 Watts into 8 Ohms under measurement, and 90 Watts into 4 Ohms, so it will go loud enough for most

FREQUENCY RESPONSE



DISTORTION



listeners. Frequency response was wide, with an upper -1dB limit of 30kHz. There was a small amount of crossover distortion, measuring 0.15%, with distortion rising at powers lower than 1 Watt - not ideal. Analogue input sensitivity was extremely high at 140mV, so just about any input can be handled. The S/PDIF digital audio electrical input (phono socket) accepted up to 24/192 PCM code, giving a flat audio response out to 20kHz – good. The S/PDIF optical input worked up to 192kHz sample rate too - useful because it avoids a no-sound scenario with hi-res – very good. Playback from memory stick exhibited the same mediocre dynamic range of 106dB as S/PDIF and also the same frequency response, as expected, reading up to 192kHz sample rate files. The UnitiLite's digital dynamic range isn't impressive. The VHF/FM tuner measured flat to 10kHz and rolled away smoothly to a pilot tone notch at 19kHz. Noise was that of a typical budget VHF/FM tuner, measuring

-60dB at full quieting, achieved at 0.7mV or more from the aerial, a good result. The IHF stereo sensitivity value measured 60µV, another normal value. It's a good VHF/FM section. The UnitiLite measured well. It doesn't excel: digital dynamic range was limited at 106dB from 24bit, little better than CD's 102dB – a disappointment. Otherwise, the figures are very respectable and in keeping with the price point of a product with so much packed in. NK

Power	55 Watts
Frequency response (-1dB)	5Hz-30kHz
Separation	95dB
Noise	-92dB
Distortion (1W, 10kHz)	0.15%
Input sensitivity	140mV
Digital S/PDIF	
Frequency response (-1dB)	24/192
	5Hz-20kHz
Distortion (16/24bit)	
0dB	0.001/0.001
-60dB	0.29/0.17
Separation (1kHz)	110dB
Noise (IEC A)	-119dB
Dynamic range (24bit)	106dB

NAIM UNITILITE £1995



OUTSTANDING - amongst the best

VALUE - keenly priced

VERDICT

CD, streaming and radio together with a great amplifier, Bluetooth and Spotify make the UnitiLite an ideal one-box music solution. Highly recommended.

FOR

- high-resolution streaming
- Bluetooth and Spotify
- good amplifier section
- slim design

Against

- nothing at the price

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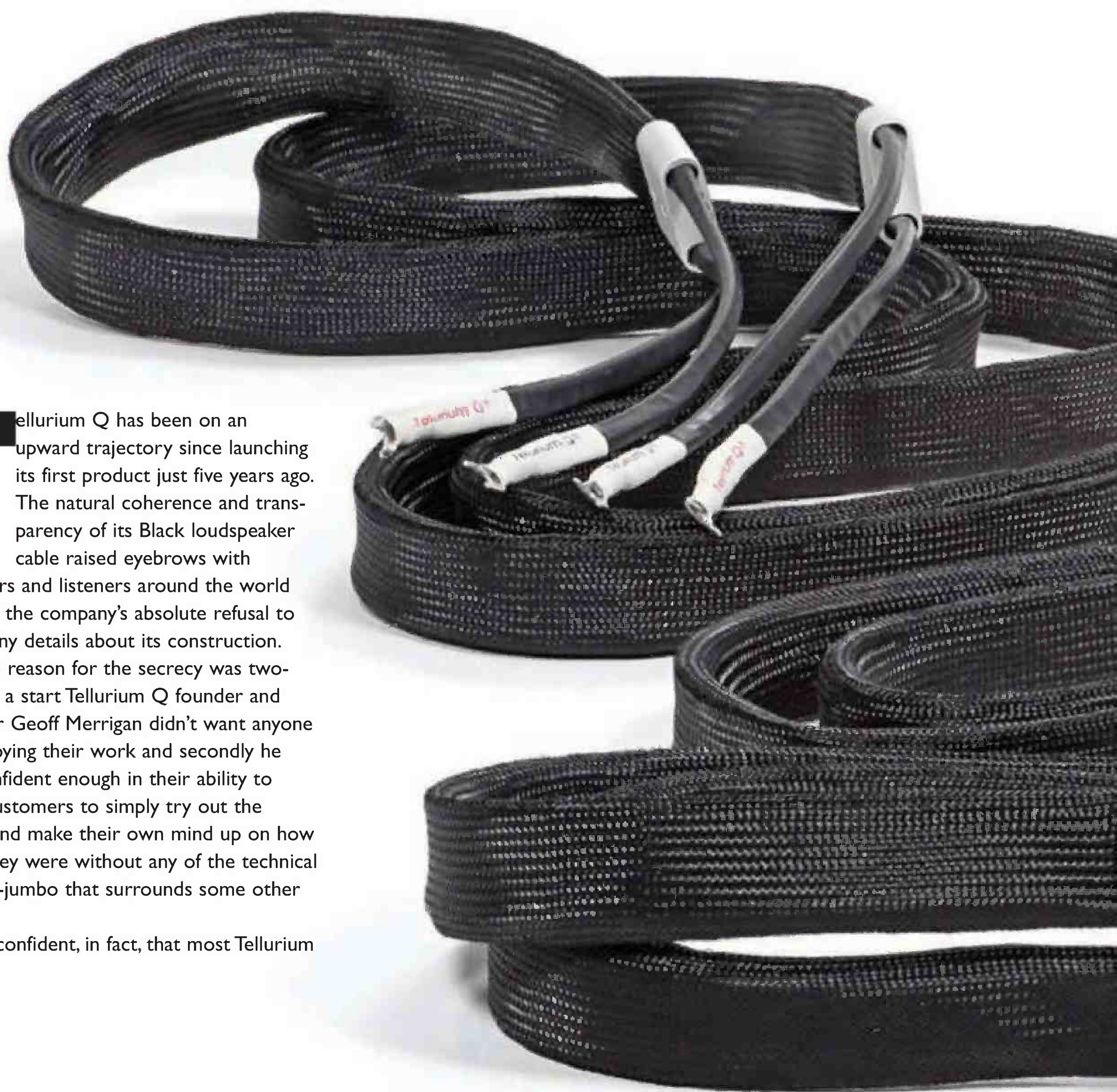
Precious Diamond

Tellurium Q's latest loudspeaker cable takes their range to another level, says Jon Myles.

Tellurium Q has been on an upward trajectory since launching its first product just five years ago. The natural coherence and transparency of its Black loudspeaker cable raised eyebrows with reviewers and listeners around the world – as did the company's absolute refusal to reveal any details about its construction.

The reason for the secrecy was two-fold; for a start Tellurium Q founder and designer Geoff Merrigan didn't want anyone else copying their work and secondly he was confident enough in their ability to allow customers to simply try out the cables and make their own mind up on how good they were without any of the technical mumbo-jumbo that surrounds some other cables.

So confident, in fact, that most Tellurium



Q dealers offer a money-back guarantee to any customers who are not completely satisfied. Not that this happens very often – which doesn't surprise me, having been blown away by their latest Ultra Silver cables earlier this year (Five Globe review, Hi-Fi World June 2015).

But now Geoff and his team have upped the ante with their latest creation – the Tellurium Q Silver Diamond which costs a not inconsiderable £804 per metre (but more of that later).

In looks it's very much like the Ultra Silver, comprising a sturdy, flat ribbon design with the conductors sheathed in a mesh braid and terminated with spades or banana plugs.

As ever, there's no indication of internal cable geometry or the materials used in the construction. Going by the name you'd probably guess there's at least some silver and probably tellurium involved. But then again, maybe not.

Whatever it is we'll never know – but as Tellurium Q say, it's ultimately the sound that matters.

SOUND QUALITY

Different cables can do different things to hi-fi systems; darken the sound, smooth out or accentuate the treble, bring subjectively heavier bass etc. The Silver Diamonds don't do any of this. To my ears they instead

act as a wide open channel between the amplifier and loudspeakers – essentially letting more of the musical information flow through.

On Jean Francaix's 'Petit Quatour Pour Saxophones', for example, there's an incredibly expansive acoustic and lifelike presentation, with the tonal differences of the soprano, alto, tenor and baritone saxophones perfectly differentiated. The transparency and resolution of the tiniest details – even down to the intake of breath of one of the players – raised the hairs on the back of my neck. Similarly the Jesus And Mary Chain's feedback-drenched 'Psychocandy' – where the whole soundstage seemed to open up before me.

I could hear the various layers of the sound, from the booming bass drum to the highest guitar note – and everything in-between – locked absolutely correctly in its own space. Not only that, the Silver Diamonds also seem possessed of tremendous energy, transmitting all the drive of the group in full flow.

They throw a holographic soundstage. With Kraftwerk's 'Minimum-Maximum' I could place a particular synth line from 'Neon Lights' exactly one foot to the side and two feet in front of the speakers.

The more I listened, the more convinced I became that the Silver Diamonds were actually showing up many of the deficiencies in other cables by acting transparently as a conduit for the signal. As such they

allow the entire frequency spectrum to be heard in full resolution without any harshness – unless it happens to be there on the recording in the first place.

Admittedly, £800-a-metre may seem a lot to spend on a set of loudspeaker cables. But I'd say that the Silver Diamonds actually stand comparison with rivals costing significantly more, such as Nordost's Frey 2 (£1800 per metre) which – while excellent – to my ears lack some of the unforced naturalness of the Silver Diamonds.

You don't need to own the highest of high-end systems to hear the difference these cables make. During the course of the review I used them with equipment ranging from the relatively budget end of the market to components costing many thousands of pounds. Never once did they fail to improve the sound.

In fact in each case the overall effect was akin to switching from listening to a track on CD to hearing it in its full 24bit/192kHz high-resolution glory – more detail, more depth, more resolution.

CONCLUSION

Tellurium Q have surpassed themselves here. It's often said all cables colour the sound of a system to some extent, but the Silver Diamonds do it to a lesser extent than any other product I've heard so far. As such they provide an open window onto your loudspeakers, amplifier and sources. Recommended without reservation.



TELLURIUM Q SILVER DIAMOND £804 PER METRE



OUTSTANDING - amongst the best.

VERDICT

One of the most open, natural and transparent loudspeaker cables you can buy. Brings extra detail, extension and coherence to any system.

FOR

- transparency
- timing
- frequency extension
- coherence

AGAINST

- price

Tellurium Q
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Noble Aspirations

After being measured for a pair of Noble Audio's Kaiser 10 Custom Fit earphones last month, Jon Myles puts them through their paces – with impressive results.

The humble earphone has undergone quite a transformation over the past few years. Once seen by many audiophiles as the poor cousin of full-size headphones – fit primarily for music-on-the-go and little else – an increasing number of high-end models are now hitting the market with sound quality comparable to their larger cousins.

Some of this is down to the influence of the professional music industry. After all, if bands, musicians and sound engineers find in-ear monitors good enough to use during live performances or recording, then why shouldn't the rest of us while listening at home or when out and about?

Which is why some manufacturers have been pushing the boundaries of just what can be

achieved – with US-based Noble Audio one of the leading innovators.

The brand was founded by renowned audiologist and hi-fi enthusiast Dr John Moulton, who was certain he could design a better in-ear monitor than some of those offered by the major manufacturers.

So at the top of the company's range sits the Kaiser 10 Custom-Fit model – featuring no less than 10 drivers per side. No, that's not a misprint; each housing contains two bass drivers, two mid drivers, two mid/high drivers, two high frequency drivers and two super high frequency drivers. And, as the name implies, they are also custom moulded to fit the individual shape of your ears.

The latter process involves the work of Noble's UK audiologist Gisele Flower at aid2hearing who takes a cast of your ear before

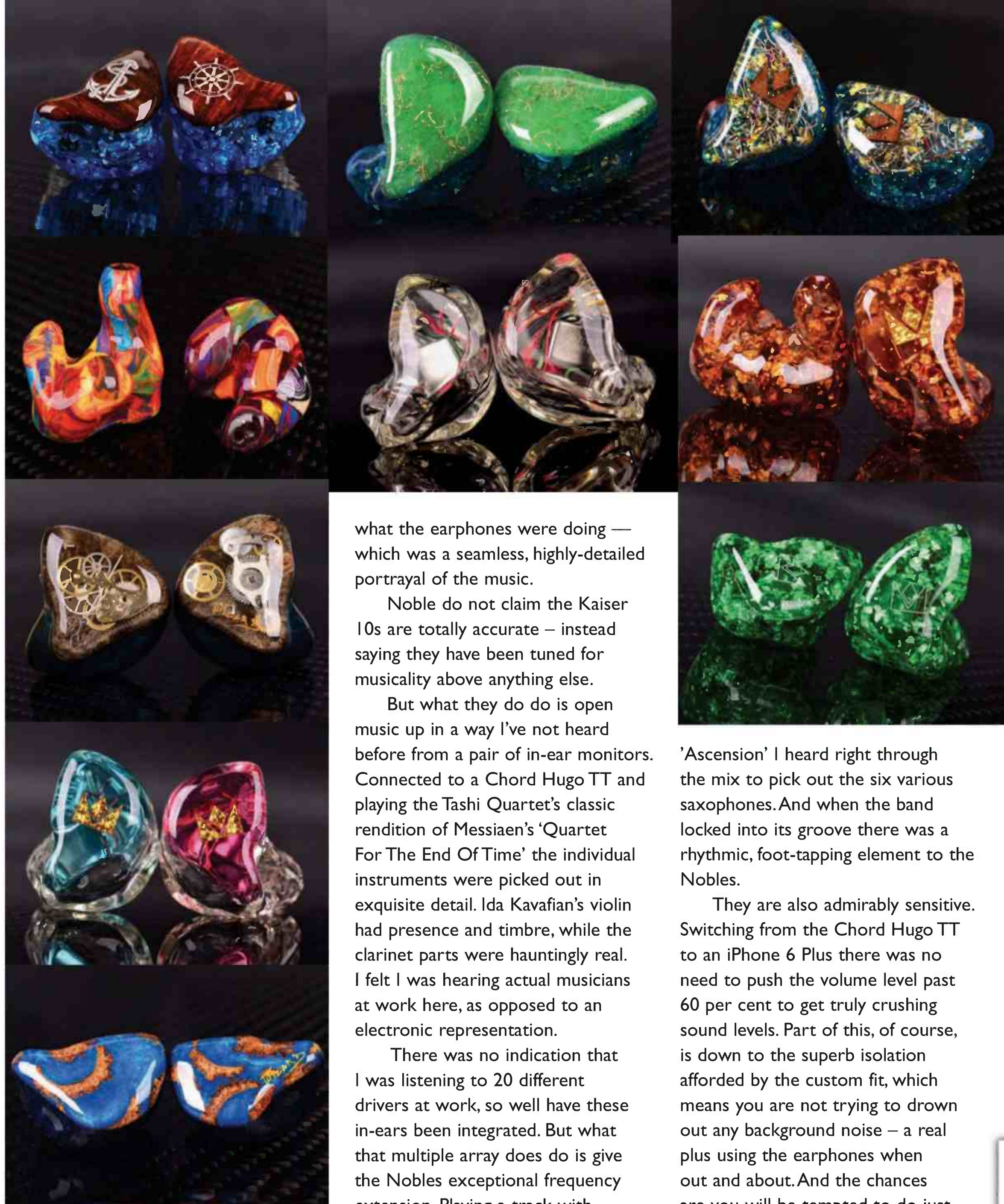
sending it off to Noble's California workshop to have the bespoke models handcrafted (see our Custom Fit feature in August's Hi-Fi World for more details).

Noble also offers a dazzling array of different finishes and will even tailor them to your own design if required. In short, not only will the Kaiser 10s be shaped perfectly for your ears they can also be made to look like no-one else's!

Of course, this level of craftsmanship takes a deal of work – with the standard build time being between six to eight weeks from Noble receiving your ear impressions to the product shipping.

It arrives in a sturdy, padded hard-shell case with the owner's name etched on the faceplate. The earphones themselves use a detachable woven cable employing





Noble's range of customised shells give an almost endless range of options to help you get a unique set of in-ear monitors. Our particular favourite features parts from a mechanical watch movement encased in a clear casing (third down on the left).

what the earphones were doing — which was a seamless, highly-detailed portrayal of the music.

Noble do not claim the Kaiser 10s are totally accurate — instead saying they have been tuned for musicality above anything else.

But what they do do is open music up in a way I've not heard before from a pair of in-ear monitors. Connected to a Chord Hugo TT and playing the Tashi Quartet's classic rendition of Messiaen's 'Quartet For The End Of Time' the individual instruments were picked out in exquisite detail. Ida Kavafian's violin had presence and timbre, while the clarinet parts were hauntingly real. I felt I was hearing actual musicians at work here, as opposed to an electronic representation.

There was no indication that I was listening to 20 different drivers at work, so well have these in-ears been integrated. But what that multiple array does do is give the Nobles exceptional frequency extension. Playing a track with real low frequencies, such as Jah Wobble and Evan Parker's 'Passage To Hades', the bass had a physical presence in my ear canal. But it was so well-judged and natural it never threatened to overwhelm Parker's saxophone improvisations higher up the scale.

Those who like the artificially pumped-up lower frequencies of some other in-ear 'phones may find that a little disconcerting at first — but spend time with the Nobles and you'll realise you are getting a much better and cleaner presentation of the music. It also means they sound exceptionally fast, with no bass overhang. Playing anything up-tempo, the music barrelled forward.

It was the overall clarity that impressed me most — something often missing with in-ear 'phones where subtle musical details can be lost. Listening to John Coltrane's dense (and at times difficult)

'Ascension' I heard right through the mix to pick out the six various saxophones. And when the band locked into its groove there was a rhythmic, foot-tapping element to the Nobles.

They are also admirably sensitive. Switching from the Chord Hugo TT to an iPhone 6 Plus there was no need to push the volume level past 60 per cent to get truly crushing sound levels. Part of this, of course, is down to the superb isolation afforded by the custom fit, which means you are not trying to drown out any background noise — a real plus using the earphones when out and about. And the chances are you will be tempted to do just that, because the Kaiser 10 Custom Fits are so thoroughly engaging it's extremely hard to go back to other headphones once you've given them a try.

CONCLUSION

Beautifully-crafted and exquisitely engineered the Noble Kaiser 10 Custom Fits are undoubtedly one of the best in-ear monitors you can buy. The 10 drivers in each housing integrate seamlessly to give a rich, vibrant sound that is both smooth yet extremely detailed, with a frequency extension that would shame some full-size loudspeakers. The custom fit option means music becomes both tonally richer and airier than on universal models, while also providing complete sound insulation.

Add to that the almost limitless range of finishes and the Nobles are an exceptional product. In short, they are highly recommended.

industry-standard two-pin connectors while the packaging also includes a cleaning tool, owner registration card as well as a small carrying bag and two rubber straps for attaching portable amplifiers/DACs to smartphones or portable music players.

All in all it's a smart package and the fit and finish of the Kaiser 10s is a world away from off-the-shelf earphones. But, of course, that counts for little if the sonic abilities aren't up to scratch...

SOUND QUALITY

The first thing I noticed when I slid the Kaiser 10 Custom Fits into my ears was their astounding sound isolation. Unlike the various ear-tips supplied with most universal 'phones, the Kaisers sealed my ear completely with no fuss, effectively blocking out all extraneous noise.

That meant I could hear exactly

**NOBLE KAISER 10
CUSTOM FIT
FROM £1079
(depending on finish)
Plus £200 for
aid2hearing's custom
service**



**OUTSTANDING - amongst
the best**

VERDICT

One of the best custom in-ear monitors available with great bass, refined high frequencies and a natural musicality.

FOR

- natural sound
- powerful bass
- finishes

AGAINST

- build time

Noble Audio
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mail



Visit our website at www.hi-fiworld.co.uk or send your emails to letters@hi-fiworld.co.uk. Letter of the month wins a pair of KEF Q100 loudspeakers.

LETTER OF THE MONTH PRIZE



KEF Q100 LOUDSPEAKERS

Answers by: **NK** - Noel Keywood; **JM** - Jon Myles; **PR** - Paul Rigby; **MP** - Martin Pipe; **RT** - Rafael Todes.

For more advice see Letters from earlier issues at www.hi-fiworld.co.uk/letters

A pair of KEF Q100 loudspeakers are on their way to **DAVID OSBORNE**, Letter of the Month winner in our December 2015 issue.

Letter of the Month

NOT SO HEAVY

I am enthusiastic about vinyl and it's great that it has been enjoying such a revival. I always buy it first, if available. But there is a creeping sense that some record labels are over-using or exaggerating the terms of quality we vinyl lovers like to hear. Terms like Audiophile, 100% virgin vinyl, Superior Quality pressing and, last but not least, 200gram or 180gram.

My most recent vinyl purchases were: Jimi Hendrix Experience – Freedom – the Atlanta Pop Festival, on Sony Legacy (i.e. the Authorised Hendrix Family edition releases' current outlet); 180gram vinyl King Crimson – USA – 40th Anniversary Edition re-master on Panegyric; 200gram vinyl Taste – What's Going On – Live at the Isle of Wight, on Eagle Records (under Universal Music), 180gram vinyl.

Now, as these all arrived at the same time, it didn't take a weighing scale to quickly spot that the Hendrix pressing was in no way as heavy as the Taste LPs. Weighing did reveal that each of the two discs weighs slightly less than 150gram. The Taste LPs weigh 180gram. The King Crimson disc weighs what it says – and I wouldn't expect anything less of the excellent and consistent quality of that Panegyric series overseen by Robert Fripp.

Checking back on previous Hendrix releases I found that People, Hell and Angels also suffers from overstated weight of the vinyl. Yet another release



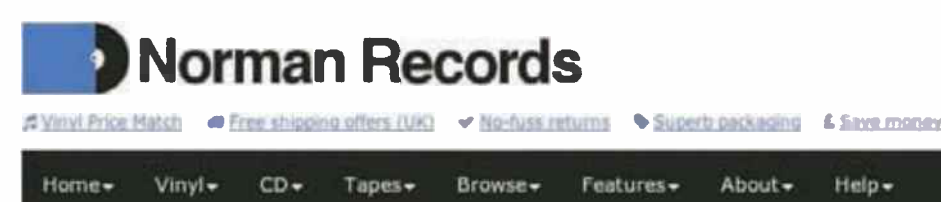
Sony Legacy Freedom Hendrix albums – their weight is overstated, says James Douglas.

from the same stable (i.e. Authorised Edition on Sony Legacy etc, etc) – the Miami Pop Festival – does bear-up to what it says on the label.

So, my point is pretty obvious: how are we letting major labels like Sony get away with this duping of collectors that have surely spent considerable sums of money on such music over the years? I mean it's not as if they need to see this sector of their target market as transient: vinyl buyers who pitch-up, buy a few bits of the black stuff and then revert to downloading or swapping digitals, is it? I have probably spent well over £1,000 on Hendrix material over the last 20 years. Most likely the type of consumer willing to spend £20 on another

Hendrix vinyl release is similar to me. So, why do these record labels need to try and fleece us as if we haven't paid our dues to the legacy of classic music already?

I might well take a look at other vinyl from a range of newer artists I have bought in the last few years and check where the vinyl weight and



King Crimson Islands

Vinyl LP DGM



Vinyl LP £16.50 + shipping
200g vinyl reissue LP on DGM / Panegyric (KCLP4)
Available to buy, but we need to order it in first.

DGM / Panegyric albums are of excellent and consistent quality, says James Douglas.

quality is not as it says on the sleeve (or should I say the shrink-wrap or ever Amazon shopping page from where I ordered it). Artists such as Temples, Syd Arthur, Mogwai, Royal Blood, The Charlatans, Paul Weller etc.

There is probably some pattern of where the record pressing plant is, versus which label is allocating its pressing runs at a given time. I'll let you know if I am OCD enough to identify the pattern.

But I'll bet that all Hendrix fans in the US get a genuine 200gram pressing (no, not 180gram – 200gram) of the albums I mentioned above. And I'll bet that it's with artists of this long standing stature, who are now released through major corporate labels, the issue lies most.

I have sent a mail to the Experience Hendrix site on the basis it's their brand which is dented as much as the record label's – and because it was easier to find a contact point to write to. I await a reply...

Thanks.

**James Douglas
Northwood
Middx.**

Thanks James. That is a very interesting observation. As a deep Hendrix fan with all historic albums, bootlegs etc, plus modern re-mastered box sets (see our headshot) I was intrigued by this.

I'm uncertain about your belief that the USA will get the cream and the UK the cack. Perhaps one of our US readers would like to get out their scales and let us know the weight of US albums. The UK did, after all, take to Hendrix before the US; he was an unknown backing man there.

I would suspect a UK LP was identical to that from the US, coming from the same pressing plant, wherever that might be located. But the fact that Hendrix albums are sub-par and not as advertised is concerning. **NK**

SOUNDING HARSH

I have been travelling to various hi-fi dealers and having fantastic listening sessions with John at Doug Brady Hi-Fi, Hughie at Emporium HiFi, Trevor at Guildford Audio and Mik at Unique Audio – and a very big thank you to all of them for a series of great days out and some fantastic sounding kit to think about.

I also visited the North West audio show (you can check out a collection of



Lector CDP-707 CD player with valve output "really made me sit up" says Roland Cook.

short clips on my son's YouTube account - <https://www.youtube.com/watch?v=5PIHupTT8NA>). Superb!

The result so far has been to order a Michell Orbe from Doug Brady (with SME 4 c/w fluid damping).

But now then, what about cartridge? Ortofon 2M Black? Dynavector DV20? Something else? Any advice gratefully received on this.

I've also auditioned a Lector 707 CD player featuring a valve output stage that really made me sit up and pay attention. I have a lot of CDs and

DAC has 26000 taps in its digital filter he told me, against 20 or so in a typical commercial DAC chip. He claims distortion and dynamic range figures better than all else and a smooth sound free from harshness. Available for £399 in Chord's Mojo, reviewed elsewhere in this issue, it has now also become affordable to all. So you may want to hang fire until you have heard one at the dealers you mention. It will not give you the spaciousness of valves, but it will give better basic source quality

p



Icon Audio's CD X2 has a valve output stage.

the harshness of the medium without recourse to a valve amplifier. Are there any other CD players with valve output stages out there worth a listen?

Regards,

Rowland Cook

Hi Rowland. I'm tempted to say you should buy what you like – and valve output CD players usually offer a lovely, atmospheric sound free from the harshness you (and I) dislike.

But this subject came up yet again recently with digital expert Rob Watts, at a Chord Mojo DAC press conference, and he insists harshness can be eliminated by better DAC design. His view is that the big companies producing DAC chips work to a price, not a principle; they don't even conduct listening tests. The result is DACs incapable of suppressing repetitive digital noise patterns and other subtle degradations that produce harshness, and degrade sound staging, timing etc.

Rob's latest version of his WTA

afterwards, or perhaps valve power amps; Mojo has a volume control so it can drive power amps direct.

Alternatively, consider an Icon Audio CD X2 with valve output stage. **NK**

MAINS POWER

Today I have a couple of systems – one my wife can operate and my hodgepodge of old but good hi-fi – a Trio amp and tuner from the late 70s, a Luxman turntable, Sony SACD player and Spendor speakers. All of which to my ears sound very acceptable. Cable by Nordost obtained at John Howes audio jumble at a sensible price.

Recently, after a small amount of work in my house the builder advised me to have the electrical circuits checked and modified to modern standards. This was completed with new upgraded earths and a new R.C.D. box.

Result? My wife asked me what had I done to the hi-fi as it sounded so good. To be honest the sound is improved by more than I would have thought possible. Is Russ Andrews

correct? No mains improvement cables I have tried have had the dramatic improvement that upgrading the switch box and earths have made. It reminded me when I changed from box to Martin Logan 'speakers. But that was a long time ago and when I received bonuses!

Pat Rickwood.

Hmmm... very interesting Pat. There's much scepticism about this but readers consistently report that improving the mains supply, by any method, usually results in better sound quality. Many say it is more effective than upgrading by any other method, which seems to be your experience. **NK**

WESTMINSTERS AND TRANSISTORS

Many thanks for your excellent review of the Tannoy Westminster Royal GR loudspeakers. It made a very good read. One interesting point you made is that it is very difficult to compare the Westminster Royals to other speakers. I have used the Westminster Royal HEs for 10 years now and I still find it incredibly difficult to compare what I hear at home to the same records played through more conventional loudspeakers. The modern trend seems to be that speakers are voiced to produce pin sharp midrange and treble, that in turn gives an illusion of detail. This is the antithesis of the performance of the big Tannoys, that make instruments sound more life size, rounded and less sharp and to some ears perhaps a little vague.

You could be forgiven for thinking that this was actually an absence of detail in the Westminster Royals performance, but actually in terms of realism and spacial and dynamic presentation they produce more information than more conventional counterparts. For me, I have not come across a loudspeaker that gives a greater sense of being there.

One of your comments is, however, in my view questionable – notably that one should only consider using the Westminster Royals with valve amplifiers. I think this is unhelpful and misleading for potential future users.

Can the Westminster Royals work wonderfully well with valves? The answer is unequivocally “yes”. Should solid state amplification be dismissed out of hand? The answer is in my view and that of many others unequivocally “no”. I have had many valve amplifiers in my music room over the years, including the Quad II-eightys and many models from Icon Audio, Unison Research and from Howes



Tannoy Westminster Royal HE loudspeakers in David King's listening room. "I still find it incredibly difficult to compare what I hear at home to the same records played through more conventional loudspeakers" says David.

Acoustics – and have enjoyed some superb results from them. My preference would be for the beefier push-pull amplifiers such as the Quad II-eightys used in your review, as I find that these are better able to exploit the scale and power which are the trademark characteristics of the big Tannoys' sound. This may be influenced in part by my preference for classical and jazz genres and for early stereo recordings from the golden age of vinyl.

I am, however, much less dismissive regarding the use of solid-state amplification with the Westminsterers. I have had some fabulous sounds from solid state amplification, currently Quad Elite QMP monoblock power amplifiers which push out a very healthy 250 Watts per channel. I have also used Sugden Masterclass Class A solid-state amplifiers producing a more modest 70 Watts per channel, to really good effect.

The presentation of solid-state amplifiers is quite different. They produce a more powerful but highly detailed sound with a smoother treble, bigger soundstage and deeper bass. The Quad Elite QMPs work beautifully with the Tannoy Westminster Royals, perhaps because they use small Class A amplifiers to control the speakers, augmented by high power but lower quality amplifiers to provide grunt.

My system currently consists of the following equipment: SME Model 20/3 record deck with Series V tonearm and Denon DL S1 MC Cartridge; Quad Elite CDP CD player; Music First Audio Classic step-up transformer; Music First Audio Classic 632 phono stage; Music First Audio Baby Reference V2 preamp; Quad Elite QMP Monoblock power amps or Yaqin MB 100B amplifier (as power amp); Tannoy Westminster Royal HE Loudspeakers



Quad Elite QMP monoblock power amplifiers drive Tannoys well, David King feels.

(single wired); DNM signal cables throughout (all WBT terminated).

Obviously, there is a strong element of personal preference here. Some audio fans are resolutely valve supporters and others equally firmly committed to solid state. My own stance is pragmatic. I am also a huge fan of valves, but not exclusively. If it works I am happy to use it. In this instance I think that to promote valves as the one true path to Westminster sonic heaven is unhelpful.

It might be interesting to do some further listening work on this topic and perhaps this could provide a useful follow-up to your review of the Westminster Royal GRs. With that in mind I would like to issue you with a personal challenge. You are hereby cordially invited to venture north to the Rose of the Shires for a friendly duel of the amplifiers. Who knows, you might just be persuaded to change or modify your view. Alternatively I might end up with egg on my face or "oeuf sur le visage" as the French might say! Either way I think there should be some fun to be had.

Clearly for a duel to be fair one must have seconds to ensure that the niceties are observed. If you would like to pick up the gauntlet I would suggest that John Howes of Audio Jumble and Lowther Voight Museum fame, and Jonathan Billington, transformer guru and boss of Music First Audio be approached to act in this capacity.

John, like yourself, suffers from an incurable affliction with valves. In spite of many attempts to rid him of this scourge he has proved completely unresponsive. In addition to his coat holding duties, he has also agreed to bring along some interesting valve kit for the contest. Jonathan on the other hand leans slightly towards solid-state sound and would bring along a fine pair of ears, having already provided the backbone of my system! Both gentlemen are highly skilled in the application of First Aid.

In addition to providing the venue I would be pleased to furnish refreshments for survivors. In anticipation of a positive response to this challenge I have already asked my wife to turf the geraniums out of my old tin hat. I look forward to hearing from you. Kind regards

David King
Northampton.

Hi David. I am glad to hear you experience the Westminsters as I did: a loudspeaker like no other and difficult to compare. They move air and the room, making music a

viscerally exciting event, more than an academically correct one.

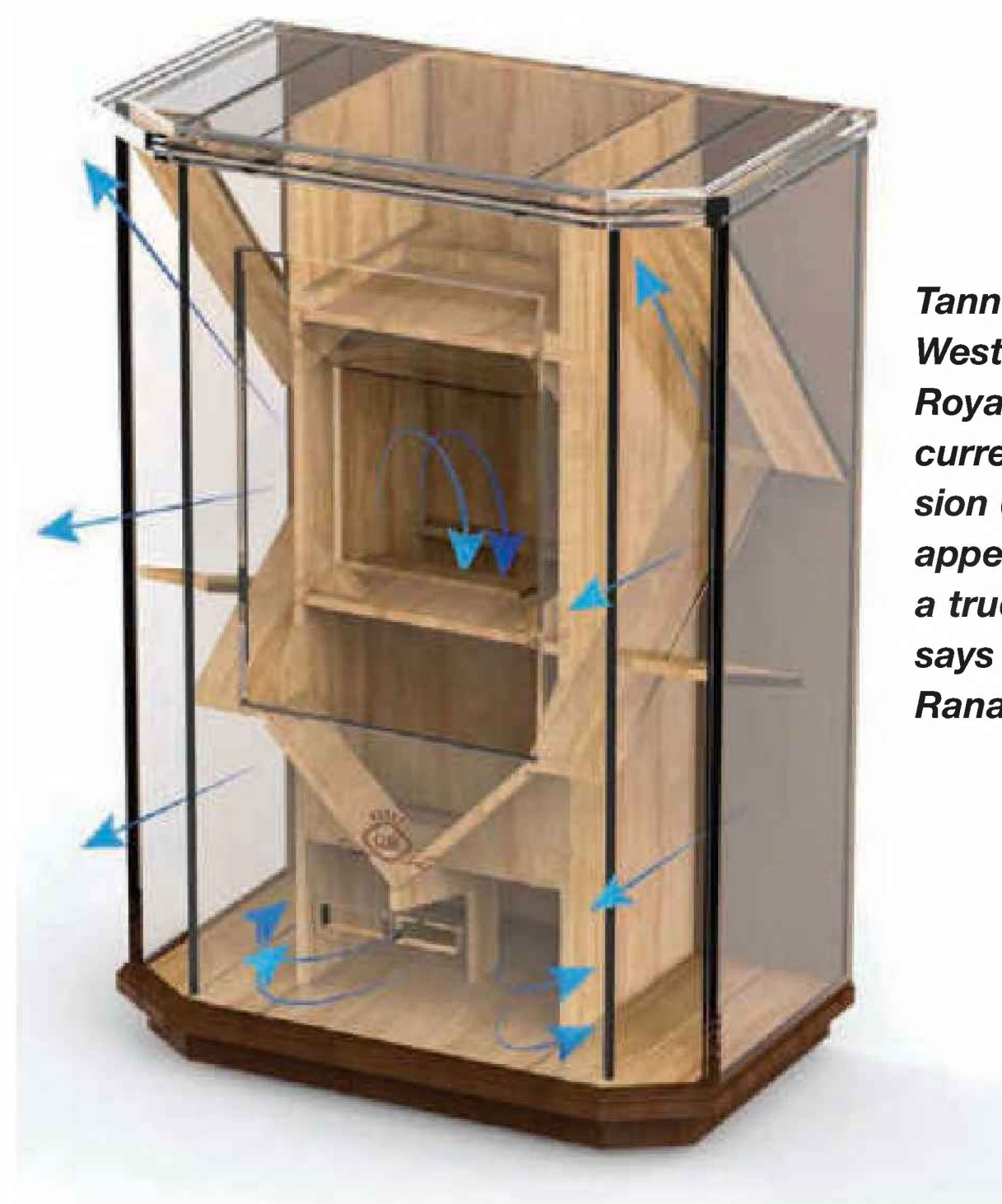
If you like transistor amplifiers in the driving role – and I did try Quad's lovely Elite QMP monoblocks – then that is good enough. Music is to be enjoyed, not argued over, and ultimately I keep away from anything more than expressing an informed opinion. However, I did today again connect up Quad Elite QMPs and don't agree with you! Westminsterers conspicuously work best with valve amplifiers, emphasising their sense of spaciousness and dynamic contrast, so we can agree to disagree here.

Within the Westminster itself is the situation that a product easily criticised in conventional engineering terms can still deliver an impressive and enjoyable musical experience – and that I will always support. It is why I have always had a place for valves and vinyl; at their best they

Your geraniums are therefore safe in their tin hat. **NK**

WESTMINSTER WORRIES

Reading Noel Keywood's Opinion article in the November issue of Hi-Fi World evoked many fond memories for me from time I spent in Singapore more than 15 years ago. Like much of Asia, Singapore has a highly-developed and burgeoning hi-fi culture with more local manufacturers entering the industry. One such manufacturer was Loth-X, established by an expat German Lothar Sander with local backing. Their raison d'être was full-range, back-loaded horn-speakers with drivers entirely of their own design using Lowther (PM4) sourced alnico magnets. The first time I heard one their initial offerings was late one night in a very large photographic studio with 10m+ high ceilings. The rear loaded rear firing Polaris horns were driven by a Brooks type 2A3 SET amp



Tannoy Westminster Royal GR "the current version doesn't appear to be a true horn" says Manoja Ranawake.

deliver a wonderful experience, irrespective of obvious weaknesses. I'm happy that others around the world share this view: valve amplifiers are popular in America, Germany, Japan, Italy and elsewhere. No point in kicking against this David, or trying to convert these illiterate masses – and me!

And you may be amused to know that I am working on a fully-balanced, discrete FET phono stage right now – it sits on the bench behind me as I type – so I am, as an engineer, technologically agnostic.

and the sound to someone who had owned Klipsch Belles in the past was still completely shocking. I can't remember the source or the piece of music, but the beginning of the first track had a train coming towards the listener, and even with 3 watts and 100dB+ efficiency you could feel the sound pressure that the train generated in the studio.

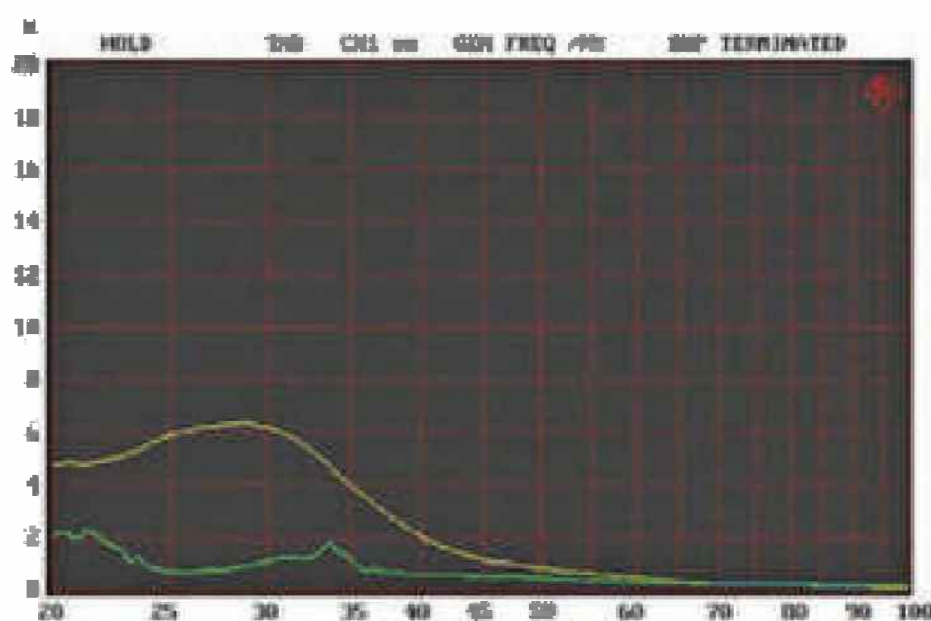
Later, with further development of their horns culminating in the Bard (A & B) and driven by battery-powered 300B SET amps developed by Silbatone in Korea and a more fitting front end, including a Loth-X turntable and a CEC

TL0 CD transport, they were able to fully realise their product goals.

I believe I experienced something similar to what you did with the Westminster. When the longer wavelengths of the lower frequencies are allowed to fully decouple into the listening space, you really understand what true bass and horns are all about – no other speaker type comes close. Similar to what you noticed, even when I was standing some 25m away from the speakers, you could still feel the sound pressure they were generating, albeit to a lesser degree than what you would feel 5m away.

I was also interested to read your comments regarding the bigger drive units that produce less distortion or unwanted noise. I would have thought these would be more difficult to control and maintain their rigidity, the bigger the driver became. Indeed the designer of the Loth-X speakers and drive units, Stefan Stamm thought that smaller cones were better, with the ideal being around 8in, especially for horns: the drivers were barely moving visibly, but generating huge levels of sound pressure.

Unlike the older corner horn Westminster, the current (review) version doesn't appear to be a true horn, but



Epos Encore loudspeaker distortion plot (green) shows low distortion from a big drive unit. Port distortion is shown by the yellow trace.

more of a transmission line. Not having heard them I don't have any impressions of how they sound. I have heard some large earlier designs, but never quite appreciated the virtues others saw in them. The centre (fixed) tweeter, which couples with the cone of the main driver will distort the sound as it propagates, resulting in disjointed upper frequencies to these ears. They have improved it in subsequent generations, but ultimately it is a design flaw that cannot be fully eliminated (unless the waveguide for the tweeter extends beyond the main cone).

Sadly, the Achilles heel of rear-loaded horns is the delay between the horn mouth and the front output of the drive unit. Some of the frontal

output from the drive unit could be heard with a slight delay from the horn mouth. This ultimately proved unacceptable for me and I have since moved on to (try) other designs.

Loth-X also closed its doors after only a handful of years in operation, due to a variety of reasons. Lothar mentioned that Peter Qvortrup (Audio Note) had visited him one day and apparently said nothing is perfect, but this is the best I have heard. I would wholeheartedly concur. I still miss them. Still searching. Kind Regards,

**Manoja Ranawake,
Harrogate,
North Yorkshire**

Hi Manoja. I too wondered whether Tannoy's horn was optimised in its flare, like a Tractrix or Exponential for example. But it is difficult to say from simple visual inspection.

A transmission line notionally seeks to lose rear energy down a long tapered line and is the inverse of a horn; the Westminster is not that.

Small cones work further up the frequency band but distort (bass-double) more than big ones. Our distortion measurements clearly show big cones are way better here, but distortion measurement of loudspeakers is difficult and consequently rare, so much of what is said about this is speculation.

Firing treble out through a cone has problems, and violinist/reviewer Rafael Todes who writes for us and pops in regularly to listen, does not like the megaphone effect this produces. It does not worry me, however.

You have two options here: fire forward like a Tannoy and get great focus and dynamics in front of the loudspeaker, or fire all-round from dome tweeters and shallow-cone bass/mids and get a big, open spacious sound (the norm), but weakened forward dynamics and more diffuse imaging at a distance as the room comes to dominate.

It's whatever floats your boat in the end – and it so happens I rather like Tannoys because they give a Rock performance. That's why people like Pete Townshend and other Rock luminaries love old Tannoys: you get to Rock with these things; forget the technical arguments!



The Rock business likes Tannoys. These are Kensingtons, used by various music biz luminaries.

Time delay is a new objection to me. Low frequency time delays must be long to be audible and at 200Hz cabinet delay would be in the order of one phase rotation (360 degrees) which I doubt you would detect. I wonder here whether you were hearing this phenomenon, or delayed energy (i.e. an echo) from the cabinet of the earlier design you heard.

In all though, as I hope I made clear in the review, Westminsterers are not the ultimate in accuracy and neutrality and they do have obvious weaknesses, but you'll go mad trying to find a loudspeaker without weaknesses – I have suffered this delusion! Best to enjoy what you hear, and if you don't, walk away – just as you say. **NK**

PROMS PROBLEMS

Thank you to Martin Pipe for your comprehensive and helpful reply in the December issue to my letter about the Proms broadcasts. It will be interesting to see if anyone else sparks on this subject now that my letter and your response have been published.

Yes, I do use Wi-Fi as the means of connecting to the Internet, and I can see it is certainly possible that if my wife goes on-line while I am tuned in to R3 it could be causing the drop-outs I'm experiencing. In future when I'm listening to R3 HD I shall get her to tell me when she is using her computer in an attempt to nail this as the source of my problems in this regard. Otherwise I shall consider a better internet connection, since fibre-optic broadband has just arrived in my neck of the woods.

The set-up I have for listening to R3 HD consists of an Acer laptop PC



David Lord hears Radio 3 drop-outs when listening with Quad ESL 2905 electrostatic loudspeakers.

running Windows 7, with the sound being extracted via a Halide Bridge USB-to-SPDIF asynchronous converter. This feeds into my dCS Purcell which up-samples the incoming 44.1/16 stream to 192/24. The up-sampled output from the Purcell then goes to my dCS Elgar Plus DAC. The pre-amp is a Music First passive, feeding a pair of Quad II-eighty valve power amplifiers and Quad ESL2905 electrostatic loudspeakers. So I think you can see I do try to get the very best out of R3.

I was intrigued by Huw Robinson's comments, and I am grateful to you for reverting to him with my queries. The BBC has long experience of broadcasting the Proms and great technical expertise, so it seems strange to me that the sound quality varies to the extent that I find it does. Hence my wondering if the differences I hear are caused more by the system downstream of the mixing desk, rather than the approach taken

by the balance engineer. Certainly, the fact that the same individual mixed the two concerts which I cited in my letter could be seen as an indicator that the problem perhaps lies more with the system.

I was also interested to have confirmation that – as I rather suspected – the person doing the mixing doesn't listen to the actual broadcasts in any shape or form, even if the reasons for this are perfectly understandable given the multiplicity of platforms.

Best regards,

David Lord

SAME PROBLEM

I was most interested in David Lord's letter (Dec 15). His experience listening to Radio 3's internet stream closely match my own. 'Radio 3 HD' may be the best way to access its wonderful live concerts, as it avoids (I think) the dreaded Optimod dynamic compression of FM, but it is not without problems. At best, the quality is most acceptable, but, like David, I also experience irritating 'dropouts'. These are quite regular (usually, it seems, when the music has reached an interesting juncture!) and vary from a few seconds to over a minute. The broadband speed in our area approaches 30Mb/sec, so this is not a factor. Also, during the more extended breaks, I have accessed other 'radio' streams, including Radio 2 and German stations without problems. The dropouts are more common, it appears to me, with live broadcasts in the evening.

There is another problem with the BBC internet stream which has caught out dedicated Radio 3 listeners. Some months ago, the BBC, without forewarning to its customers or discussion with equipment manufacturers, changed the way its data is encoded. The stream may be '320 kbps AAC' (though there is some doubt about this) but the change caused some streamers to default to MP3, whilst others were unable to access the data at all.

I have a Musical Fidelity MI Clic 'Universal Music Controller', and very nice it is too, but MF are unable to tell me whether I am listening to AAC or MP3, through their machine. The only advice the dealer would give was, "your streamer is out of date and would I like to buy a nice new shiny one?" However, they were unable to assure me that any were compatible with the latest BBC Radio 3 AAC bitstream, nor could anyone tell me how long the BBC would continue with this service.

It seems impossible to get sensible

advice about any of this, which leaves your average music lover, not overly competent in computer technology, more than a little frustrated. It's (almost) enough to make me go back to my Leak Troughline and accept the severe compression of FM. Any thoughts?

Thanks,

Roger Simmonds

We have asked the BBC about this, but it will take time to get a reply. Hopefully, it will appear in our next issue. **NK**

HEADPHONE CHOICE

Thanks to reviews in Hi-Fi World over the years, I have a reasonable system. It is a Yamaha CD-S300 (now used as a transport outputting via a £40 optical cable/pipe), an Audiolab Q-DAC, a Fiio X3 2nd Gen player and Sennheiser HD-449 headphones – plugged into the Q-DAC. A Marantz PM4001 and B&O speakers from a B&O 7000 music centre (I think they're S55s), from nearly 40 years ago provide more casual (while working/reading) listening fare from the same sources.

I suspect it's the HD-449s that are the weak link for serious listening. I got them to replace a pair of Sennheiser HD-575, which I loved for their sumptuous sound (unfortunately they just got old and a drive unit became



New Philips Fidelio X2s are impressive – and affordable.

detached in one chamber). I now prefer a more neutral sound – especially now that I've got used to the HD-449s – and want accurate bass, not one that sounds like the Loudness button has been pushed.

Music? Rock, Prog, pop, some classical, a bit of reggae, and quite a lot of synth/electronic – Kraftwerk, Tangerine Dream etc.

The X3 is used mainly as a super CD jukebox with microSD cards – all 16-bit FLAC rips (the price of hi-res albums shocks me – why pay so much



"It's (almost) enough to make me go back to my Leak Troughline" says Roger Simmonds.

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Oppo BDP-105D universal player "is just an astonishing machine for the money" says Gordon Robinson.

for an album I already have?) - along with a few DVD-A rips (some 24/96, some 24/48). This may seem a waste of a good source, but until hi-res albums drop in price that's the way it'll stay!

I have in mind the Oppo PM-3s, the B&W P7s, the Philips X2 Fidelios, and even maybe the Sennheiser Momentum 2.0s (no objections to saving a few quid). Anything else you can think of around this price – about £350 max?

My only complaint about all this new digital technology is the smallness/hassle of loading the microSD slot in the X3 (peyonggg! Now where's that ever-so-tiny card gone now?) and, basically, all the blasted long cables everywhere (headphones, coaxial-to-DAC, power cable for X3 etc), but that's the price we pay these days for audio bliss...

Yours sincerely

John Malcolm

The new Philips Fidelio X2s are a great choice John. Go for it! **NK**

VINYL GOES DIGITAL

I've started to dip a toe into the murky and religious world of digital music. Although I work with IT I have a deep distrust of technology, mostly because I know how wrong things can go! My main front-end is vinyl and I have a sneaking suspicion I'll always stick with the lowest form of technology that really works.

Having said that, I recognise convenience and I recently bought an Oppo BDP-105 which is just an astonishing machine for the money. I've now decided I'd like to truly exploit its capabilities. I'm about to buy a NAS and I'd like to transcribe some of my vinyl to 24/192 rips. This much I know (ish) how

to do, via Audacity and an external USB-connected sound card for my laptop. This is where I've run into some difficulty.

I have a very old and wheezing HP laptop on which I've put an Ubuntu 14.04 distro. It works remarkably well with everything, apart from being able to recognise my sound card as a recording device.

I've managed to make the card work on a Windows 7 machine pretty well, with the exception of the fact that I have to keep the input almost to zero on Audacity to prevent the signal swamping the recording capability of my machine. However, transcriptions so far sound good to my ears. I'm not sure about the veracity of them being 24/192 because my Arcam AVR-600 plays those files back via the Oppo without complaint. Arcam reckon that the highest resolution available through that amp is 24/48.

This leads me to a number of questions.

- 1) Can you give me any advice about how I make my Ubuntu-equipped laptop recognise the sound card as a recording device?
- 2) I'm a complete newbie to Linux in general, and feel somewhat clueless when it comes to trying to do tweaky stuff!
- 3) How do I stop the card's output swamping a Windows machine? I may be able to get access to a slightly more modern laptop soon, which will run Windows 10 (or Windows 7) but I want more control over input levels.
- 4) How do I know a file is really encoded at 24/192? I did read your article about a piece of software that analysed digital music, but unfortunately that magazine has hit the recycling bin!

Is it possible that my Arcam is really decoding a 24/192 file? The Oppo is connected to the Arcam via HDMI. It's set to Bitstream via HDMI, so what is going on there?

I recorded Pink Floyd's "The Wall" via the sound card, an old QED Discsaver (circa late 1990s) and my Windows machine at 24/192 to Audacity, and all seemed to go well. When I was exporting the file to a transportable format, I tried MP3 and Audacity said MP3 couldn't do the format as the maximum it could handle was 24/48. Is MP3 really so limited?

I then exported as a FLAC, which appeared to go well. However the total file size was 1.4Gb. As a 16/44 CD is (give or take) 750Mb, can this be correct? Have I exported a 24/192 file? The Wall is a double-vinyl album, so one standard 40-ish minute album appears to be only 750Mb FLAC-encoded at 24/192. I'm aware that FLAC is a lossless compression format but this seems like a lot of compression given the extra data involved.

I realise that these questions may sound pretty naive, but I'm sure that others are in the same place as me. Frankly, if any of this doesn't work, it's no great loss. But being able to jump around to disco, metal, house and opera would make life a lot easier! Suspended floors and pogoing do not a happy couple make.

Hope you can help.

Kind regards,

Gordon Robinson

Hi Gordon. Best to get advice from forum users about your computer problems. We do not deal with computer hardware, nor operating systems. As you imply, it all goes tits up very quickly.

Recording 24/192 for 40 mins gives a 2.76GB file, that compressed 50% by FLAC then amounts to 1.4GB, so your file is 24/192.

If you want high quality sound then use FLAC, like most other people. MP3 is a lossy system that offers 10:1 compression and degrades sound quality.

If you feel you have to use MP3 for its small file sizes, use XLD to down-sample 192 to 48kHz sample rate before compression to MP3, and choose the highest available data rate for MP3; usually 320kbps is available.

However, I think the best compromise is to use 24/96 FLAC – not 24/192 – because it halves the file size, but with imperceivable loss of quality. I hope this helps.

NK



SUEDE

**Dog Man Star: 20th Anniversary
Live At The Royal Albert Hall
Edsel**

Suede's dark, self-indulgent yet paranoid and excellent second album, originally released in October 1994. Its creation brought about the end of the band's original line-up. Then Suede decided to stay together following their 'one-off' 2010 concert for Teenage Cancer Trust. When asked by the charity to perform again at the Royal Albert Hall in March 2014, the band took the opportunity to play 'Dog Man Star' in its entirety, accompanied by a string section.

This beautifully presented edition spans four LPs with a thirty-two page booklet included in a book-type folder.

In terms of the sound quality, you're looking at a live recording here and live recordings are notorious for being imperfect as they are away from the controlled studio environment.

More than that, in some respects I wish that this particular

concert had not been recorded in the Albert Hall. The venue is notorious for producing very bad quality Rock concerts. Cream didn't do too well back in 1968, Frank Zappa had sonic issues in 1969 and, more up to date, I don't think that The Who were well served when they were recorded there in 2004.

This Suede gig suffers from the same issues experienced by The Who. There is a certain muddy sound presentation that sits on the dynamics and prevents the upper mids from taking off.

That said, Edsel have done the best with what they could find and should be congratulated in not panicking and shooting the compression into excessive peak limiting areas to find artificial dynamism. As it stands, the cut is relatively quiet and so you can, to some extent, allow your hi-fi to take the strain by boosting the performance with gain from your system: a much more preferable option.

AUDIOPHILE VINYL



PETER GABRIEL

**1/2/3/4
Realworld**

Peter Gabriel's first four self-titled albums '1' (1977), '2' (1978), '3' (1980) and '4' (1982)

are now available on half-speed remastered double vinyl to be run at 45rpm.

Matt Colton at Alchemy Mastering has cut the vinyl with Tony Cousins at Metropolis responsible for the mastering.

Each album comes in a gatefold sleeve while download cards are also included with a choice of 24bit/96kHz or 16bit/44.1kHz.

To test these 45rpm, half speed cuts, I compared them directly with the original pressings. All discs were compared but let's concentrate upon the debut album and the hit single 'Solsbury Hill'.

The difference was stark and immediate. Everything: vocals, strings, you name it, was opened up providing a host of extra detail. Just about every aspect of the presentation offered more detail while the

track itself increased in amplitude, forcing me to lower the volume just a touch.

The acoustic guitar strings now featured far more space and air around each finger pluck, adding tiny amounts of reverb around each string to provide a more natural tonality to proceedings. In general, there were more delicate strings floating around the soundstage as a whole, while the percussion was a touch more isolated in the mix, providing a characterful presentation. There was added heft and weight in the lower frequency extremes too.

The vocals also offered a natural and seemingly relaxed delivery. Now Gabriel seemed to be enjoying his time at the microphone. He enunciated his words with greater confidence and with extra emotion. Even if you have the originals, as an audiophile, you need to check out these new super editions.

From a live Glasgow gig in 2014, set within a beautifully presented forty-page hardback book package, this LP is joined by a 10" vinyl of key singles and fan favourites, plus a CD of the entire performance, plus interviews. The entire set is very easy on the eye and an attractive package for fans.

From the first few percussive strikes, you can hear that this live gig doesn't suffer from the same veiled midrange issues as heard in the Suede set reviewed on these pages.

Here, there is far more air and space surrounding the soundstage, giving the performance a more dynamic and insightful presentation. Lead guitar has a clarity that gives this instrument a sense of energy. It's alive and direct with a sense of danger in its approach.

Of course, this is still a live gig so the studio enhancements and control are not present. This can

be heard, to some extent in the slightly staid vocal which is a little subdued.

Drums and bass guitar are both lifted from the soundstage floor which gives the band a level of motion and tempo that provides impetus to the distorted rhythms employed by the group, but what the percussion and bass guitar do not give you is much power, heft or impact in terms of the lower frequencies.

Whether this is an issue with the recording or a conscious choice from the mastering engineer of the vinyl is unclear.

If it's the latter then it could be down to clarity issues. Added bass may have combined poorly with the signature feedback that the band liked to wallow in, to mask much of the user midrange.

If that is the case then the choice, in terms of clarity, was a good one because detail is generally open and easy to discern.



THE JESUS AND MARY CHAIN

Live At Barrowlands
Edsel

AUDIOPHILE VINYL

I make no apologies for including three Edsel box sets in this issue: such are the magnificence of each, I had to tell you about all of them in detail! Besides, each are ideal Christmas presents. This set includes 'Pretenders' (1980), 'Pretenders II' (1981), 'Learning To Crawl' (1984), 'Get Close' (1986), 'Packed!' (1990), 'Last Of The Independents' (1994), 'The Isle Of View' (1995; 2LP) and 'Viva El Amor!' (1999). The latter two albums appear on vinyl for the first time and all are contained in a sturdy slip-case cover. Order from the official website to grab a signed print too.

I played a selection of tracks during the test but the hit single from the album 'Learning to Crawl', 'Back On the Chain Gang', was symptomatic of the box set as a whole. The mastering has received a welcome, relatively quiet cut which means that it's unaffected

from nasty compression or excessive peak limiting. There's no ear splitting upper mids on this box set to contribute to even a suspicion of listening fatigue. This means that you can allow your hi-fi to do the talking. I was able to increase the volume and allow the inherent detail within the upper mids to flow freely.

If I was going to be picky, I could say that the upper mids could have been a touch more open and spacious. Sometimes you yearned to have a jangly guitar soar in terms of dynamics or secondary percussion tambourines to really shimmer. That never really happened which is why I really like this box set but won't jump up and down for joy. That, as I say, is being picky.

As it stands, though, this set is very enjoyable. It's music is presented well, its clear and noise free with a warm, comforting demeanour. **PR**



PRETENDERS

The Vinyl Collection 1979-1999
Edsel

Mojo working

Chord get their Mojo working with a new portable DAC/headphone amplifier. Noel Keywood boogies...

Is Chord's new Mojo DAC a market changer? I think so. What you get here is a high-end digital-to-analogue convertor (DAC) that Chord have purposed for use with mobile phones. The phone sends music digitally to Mojo, that turns it to analogue for headphones; there are two headphone sockets. If I hear you say to yourself "but I don't use headphones" – hang on! Mojo can be used in a hi-fi, hooked up to a CD player for example, to give digital quality that Chord claim is better than all else. Yet Mojo costs just £399. Now read on!

Here's a hi-fi DAC that undermines all others it seems. Chord claim a massive 125dB dynamic range for Mojo – more than most other DACs on the market, irrespective of price. Since Chord also have more expensive DACs for

domestic use – Hugo, 2Qute and Dave – Mojo looks like a cat amongst the pigeons.

Chord use a bullet proof machined alloy case. It has been given a sombre dark brown/grey finish, concealing the potential for a more eye catching bare alloy finish, as seen in 2Qute and Hugo, or even an anodised finish for added bling. I sense future boutique versions!

Our scales registered 173gms with Mojo on board, making it as heavy as some portable digital audio players. But then it houses a mass of electronics, plus a Li-polymer battery with a life of 8-10 hours playing time, and a 4 hour charge time. All edges are smoothly rounded to slip easily into trouser pockets. With a depth of 21mm, Mojo is a tad oversize for a shirt pocket, but height and width dimensions of 61mm and 83mm make it an easy fit in most other

garments, bags and what have you.

Usually, a stout rubber band is supplied with portables so they can be clamped to phone or player, but Mojo's buttons don't have space between them for this, so there are notches at either end for narrow bands. There's no CD-quality Bluetooth link, to headphones or source, as used by Astell&Kern to link their portables to the hi-fi for example.

With USB (micro-USB connector), plus S/PDIF digital inputs (optical and electrical), Mojo will connect to most phones and digital audio players, and it will connect to CD players too – those with a digital output of course. There is no analogue input: Mojo is strictly a high fidelity DAC intended to process high-resolution digital. Chord fit two 3.5mm stereo headphone-jack output sockets, able to run 4-800 Ohm



headphones they say – meaning Mojo can power loudspeakers direct, so I hooked ours to Tannoy Westminster Royal GRs as part of the review and they worked together well – see the picture! Mojo has a volume control and can drive power amplifiers too, acting as a digital preamp in effect.

There's little to say about the controls because there aren't any. Well, not many because Chord have given Mojo automatic input sensing, data conversion etc. It has an on/off button and volume Up / Down buttons – that is all. They light up in different and varying colours according to operating conditions. The On/off button indicates sample rate by colour, starting out at red for 44.1kHz digital from CD, all the way up to white for DSD. You'll need a good memory to remember all the variants and I could barely discern the colour difference between 192kHz and 768kHz sample rate (phew!) playing over USB from a MacBook Pro. Below 192kHz however, colour differences are obvious.

The volume buttons change colour according to level, both buttons showing green to indicate a typical usable volume (0.4mV). Turning volume up to loud took them to light-blue and 1V out, measurement showed. Dark blue was extremely loud (1.5V) and all else was shatteringly loud, light pink warning of output overload.

To enable mains power drive, Chord have given Mojo an independent power input, a micro-USB socket that connects to a 5V phone charger via micro-USB-to-USB A cable. A tiny led beneath this socket changes colour from green (discharge) to blue (charge) when power is applied. So to use Mojo in a hi-fi you need a £20 phone charging unit and a cable, preferably one with smoothing to lower noise; I used a smoothed 5V supply from Maplins.

Mojo senses an active input and switches to it. It also senses the format of the incoming data: PCM or DSD, as well as sample rate. It accommodates all digital formats, PCM up to 32bit and 786kHz sample rate, as well as normal DSD (64) and quad rate DSD 256 that demands vast data rate.

One small issue was inability to read 192kHz sample rate data via Chord's supplied short optical adaptor cable, from my Astell&Kern AK120's optical output; Mojo simply fell silent. There was no problem with

lower sample rates.

But Mojo did work with 192kHz sample rate test signals from our Rohde&Schwarz analyser, fed via optical. Low optical transmitter power in the AK120 may be contributory to this situation, but optical links are commonly marginal at 192kHz, TOSLINK being an old 1980s technology.

It isn't only the DAC that matters in a portable driving headphones. The headphone amplifier is crucial too. Chord make an issue of this, promising more output and lower output impedance (this is a big issue on 'net forums) than all rivals. Measurement showed Mojo meets their claims: it delivers a massive 4.3V, putting it a nose ahead of all others. I suspect Mojo pushes ahead sonically because of this aspect of its design;



COAX electrical and OPTical S/PDIF plus USB digital inputs. There's a battery charger input with tiny LED too.

and more vivid than usual; they commonly sound a little dull up top and lacklustre with small portable players, if not with mains powered headphone amps. like the Audiolab M-DAC I often use to drive them. Mojo cranked the PMIs up to the livelier nature of Philips XIs, yet at the same time it suppressed the slightly fulsome bass of the XIs, pulling them into line too. Mojo had a calming and civilising influence on my headphones!

With representative Rock tracks



Mojo can be used with a portable digital audio player like the Astell&Kern AK100 seen here, or a mobile phone.

after all Rob Watts used to design DPA (Deltec Precision Audio) power amplifiers, so he knows a thing or three about audio output stages.

As Chord claim, the Mojo user experience is slick. It powers on silently. It selects input automatically and, unusually, the big illuminated buttons stay alight at all times; there is no time-out to save battery power.

SOUND QUALITY

I used Oppo PMI Planar Magnetic and Philips Fidelio XI headphones – and immediately with Mojo I noticed the Oppos sounded brighter

from Fleetwood Mac's Rumours album (24/96), musicians were placed in a big, open space that seemingly extended beyond the ear pieces of my Philips Fidelio XIs. There was air and space around instruments and Mojo has powerful bass, that also runs very deep. It came over as three-dimensionally larger than my Astell&Kern AK120 portable player that in itself is punchy and fast in its sound, if with a more mechanical delivery and less 3-D.

Mojo's treble was both strong and obvious, yet very sweet in Go Your Own Way, whilst rendition of

detail was superb – beyond that from all players I've used to date. Cymbals on Mick Fleetwood's drum kit rang sonorously and I could hear the quality of the skins on his drums. Strummed guitar sounded fine and delicate in the gentle yet vivacious way its strings were delineated, one from another. A synth line floated away on its own, whilst Stevie Nick's vocals hovered in front of me. Sudden drum strikes and cymbal crashes had great dynamic impact but perfect timing too; there was no slur – or seen the other way around Mojo gets time domain definition from digital right whilst all others sound hazy by way of contrast – as Rob Watts claims. I felt I was getting an education here.

Mick Fleetwood's kick drum put shuddering bass through my Oppo PM1 headphones on Go Your Own Way, imposing a grip at low frequencies that was extraordinary. Mojo has massive bass power (working from battery alone) that re-defines what a portable can do. This is down to the headphone amps, that Chord have engineered to conspicuous perfection it seems. The PM1s occasionally went subterranean with Pink Floyd's Time.

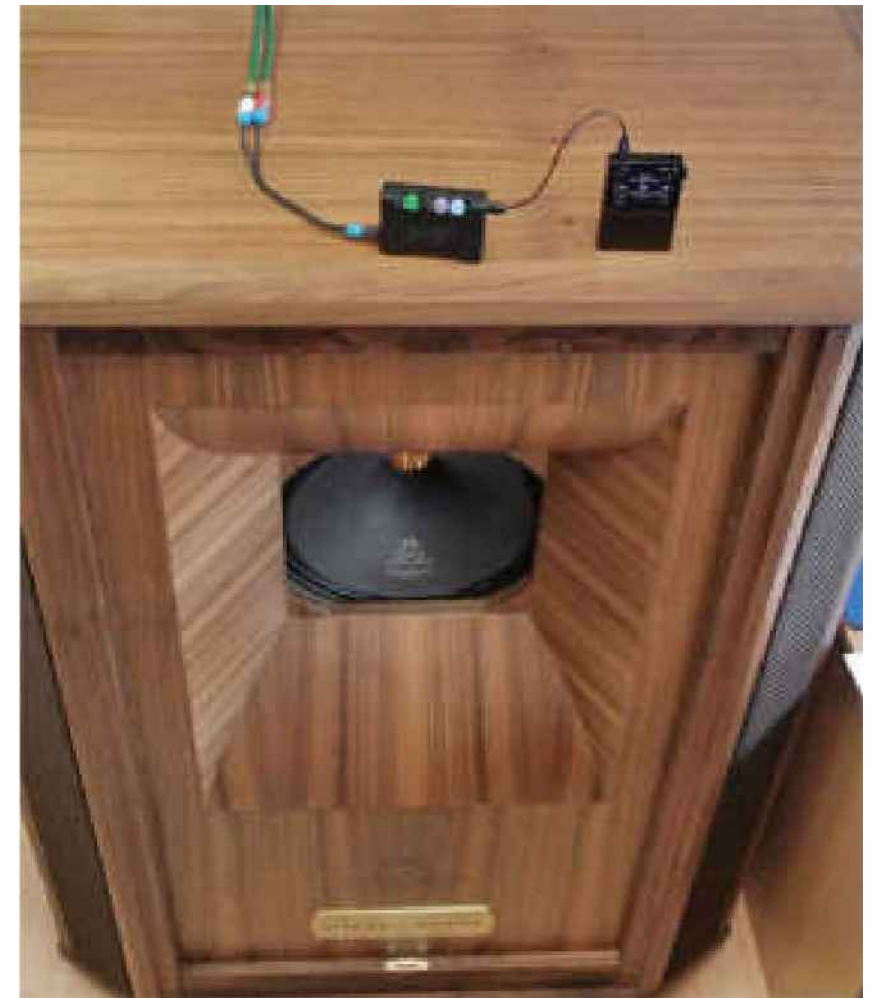
Interestingly, a rip from CD of The Eagles 'Too Busy Being Fabulous' sounded a trifle rough and dynamically flat, where this has been a track I use as a Rock demonstrator, if one that is obviously over-processed and dynamically compressed upward to sound loud.

Mojo made these properties very obvious. Similarly, Dave's True Story 'Misery' demo track suddenly had obvious flaws – I was taken aback. Mojo mines detail and has deep insight. As a result not all digital sounded good, I found as I worked through all my basic test tracks.

Slotted into a hi-fi as a hi-res digital source, fed by an Astell&Kern AK100 portable and feeding Quad Elite QMP monoblock power amplifiers and various loudspeakers under review, Mojo had some treble prominence. If anything it sounded lean, but analytically detailed. It is balanced for headphones, especially those with strong bass like my Oppo PM-1s. Against our mains powered Oppo BDP-105D universal hi-res player, however, treble was more obvious. Brightly balanced loudspeakers or headphones may not suit Mojo; I'm afraid you'll need Dave and deeper pockets!

To act as a CD player upgrade DAC, volume Up/Down buttons must be pressed simultaneously at switch on, to set output to 2V (dark blue).

Mojo can be used in a hi-fi then, and Chord have taken this into account. Just bear in mind that as good as Mojo is, it still lacks a sturdy on-board linear power supply, as you find in Oppo's BDP-105D for example. For this Chord have the yet-to-be-released Dave. You knew there was a snag!



Chord claim Mojo can drive loudspeakers so that's what we did, using Tannoy Westminster Royal GRs!

CONCLUSION

Technologically, Mojo is all but untouchable. Whilst there are other DACs with better figures, they are all mains powered and cost around ten times more. Most portable audio DACs are a whole step down in quality.

With fabulous sound quality – big, open and powerful – plus the ability to control and drive even the most difficult Planar Magnetic headphones, Mojo is a DAC that sits apart. And you can use it in your hi-fi system too, or even drive Tannoy Westminster Royal GR loudspeakers with it – as we did! Unmissable.

On The Road

Jon Myles takes the Mojo out and about with a mobile phone to discover whether it really can transform your Android or Apple device into a true high-resolution digital player.

One of the main aims of Mojo is to turn your mobile 'phone into a high-resolution music player – a state-of-the-art DAC and headphone amplifier that can be attached to your mobile without adding too much bulk.

But you have to make sure your device is compatible first. Android 'phones need to be USB On-The-Go (OTG) compatible. On iPhone only those with Lightning connectors will work – which basically means iPhone

5 and above.

After that the required cable is needed to connect your mobile to the Mojo. For Android it's a USB OTG connector (micro B to micro B) which are available from around £6. With iPhones you'll need the Apple Camera Connector Kit (£25) which plugs into the 'phone's Lightning socket and provides a USB connection that can be used with Chord's supplied cable.

Then, simply strap the Mojo to the back of your 'phone (handily, there are grooves in the Mojo's

casework to facilitate this) and turn on.

Which is exactly what I did – using the iPhone and Mojo together with a set of Noble K10 in-ear monitors on a daily commute.

And from the start it's rather special. The first piano notes on Jacques Brel's 'Ne Me Quitte Pas' had resonance and realism – the like of which I've never heard from the combination of a mobile 'phone and DAC before. Forwarding the track selection to Brel's live performance of 'Amsterdam' took me aback.

The background accordion was no longer an indistinct tone but a real instrument – one which came forward, receded and then came back again to become part of the whole song instead of just being part of the background.

On The Clash's 'London Calling' (24/96) I was hearing a clearer and different presentation than I was used to through the Noble K10s. Paul Simonon's bass sounded more rounded and forceful than usual while Mick Jones's guitar lines were laid out in detail and Joe Strummer's vocals hung in the air. The Mojo seemed to be picking apart every element of the track and laying it bare for me.

There was also a tremendous sense of rhythm and timing to the sound. The Mojo's inherent clarity means the leading edges of notes are clean and clear, which helps push music forward.

It also brings astonishing insights into even familiar pieces. On the ECM recording of Arvo Part's 'Tabula Rasa' (24/96) I could distinctly tell there were two violins playing, whereas some lesser DACs tend to blend them together.

Moving forward to the likes of DSD and there was even more to be had. The San Francisco Symphony's

rendition of Mahler's 'Symphony No 2' was not just good – it was simply stunning. The crescendos had power but were utterly convincing. It's hard to believe the level of dynamism and detail that was being delivered from an iPhone.

Switching from the Nobles to a pair of Focal Sphear in-ears priced at £100 reveals that Mojo can also shine with mid-priced 'phones. On Patti Smith's 'People Have The Power' the drums come in with tremendous force – with greater depth and thrust than I've heard through the Focals before. There was no doubt the Mojo's amp section was exerting a steely grip on the earphones.

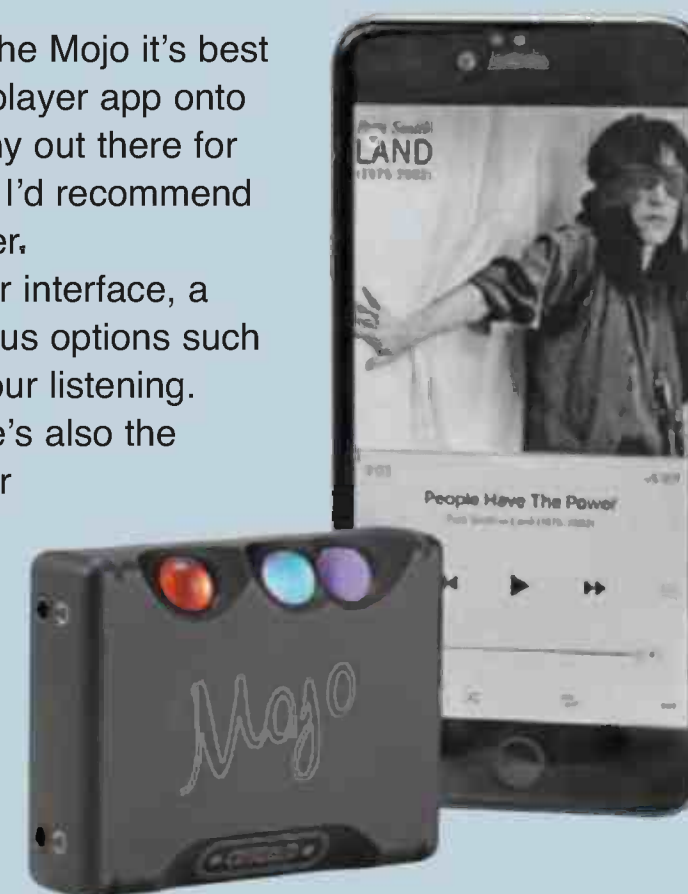
All this insight, though, means the Mojo doesn't flatter poor recordings. Play some heavily processed pop or rock and you'll soon know about

MUSIC PLAYER

To exploit all the power of the Mojo it's best to load a dedicated music player app onto your phone. There are many out there for both iOS and Android – but I'd recommend Onkyo's excellent HF Player.

It has an excellent user interface, a graphic equaliser and various options such as playlists to customise your listening.

For iPhone users there's also the option to add the HD Player pack for £7.99 that allows FLAC and DSD files to be loaded and played back.



Chord's Mojo has the power to turn the likes of an iPhone 6 Plus into a high-resolution music player – but a dedicated music app such as Onkyo's HF Player will help you get the best from it.

it. But that's the price you pay for the obvious benefits Mojo brings to everything else.

In the final analysis, Mojo redefines just how good music on the move can be. And, yes, it can turn your iOS or Android mobile into a high-resolution player that can better many of the dedicated players from the likes of Astell&Kern and FiiO. Now there's a thought.

MEASURED PERFORMANCE

With volume set to give full output, whilst avoiding overload from a full level digital signal (0dB) via S/PDIF, Dynamic Range (EIAJ) measured a high 124dB, and with one small step up in volume of 1dB it hit Chord's claimed 125dB. USB gave an identical result. So Chord's figure is achievable without overload being obvious.

Interestingly, turning volume up to maximum with the low level -60dB test signal gave 143dB Dynamic Range and this shows the potential of Chord's DAC. These are impressive figures: most hi-fi DACs achieve 120dB, a few expensive ones costing thousands 130dB. Portable DACs and DAPs usually measure around 115dB.

Distortion was minimal, measuring a very low 0.014% as shown in our analysis. Again, this was with volume set to avoid output overload with a full level (0dB) digital signal. No distortion components are visible in our analysis, so 'distortion' here is noise, even though a narrow band harmonic-only analysis was used.

Turning volume up to maximum to lift

DAC output above subsequent amplifier noise returned 0.0017%, showing the potential of Mojo in this area.

Frequency response measured flat to 31kHz (-1dB) via the analogue headphone socket, output falling away steadily above this frequency to the upper theoretical limit of 96kHz from the 192kHz sample rate test signal, as shown in our analysis.

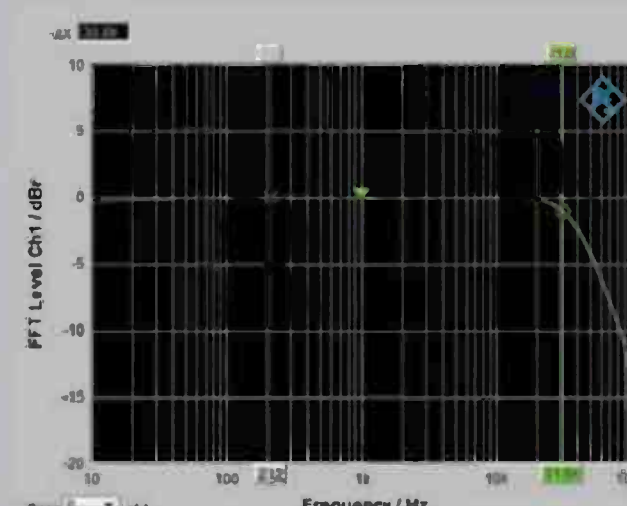
Mojo produced a massive 4.3V from its headphone outputs at full volume – more than enough to drive insensitive headphones, or power amplifiers direct. It can even drive loudspeakers. Chord quote 4 Ohm - 800 Ohm loads as being compatible, and output impedance 0.045 Ohms.

Mojo delivered better performance figures under test than mains powered hi-fi DACs costing considerably more. It possesses outstanding measured performance. **NK**

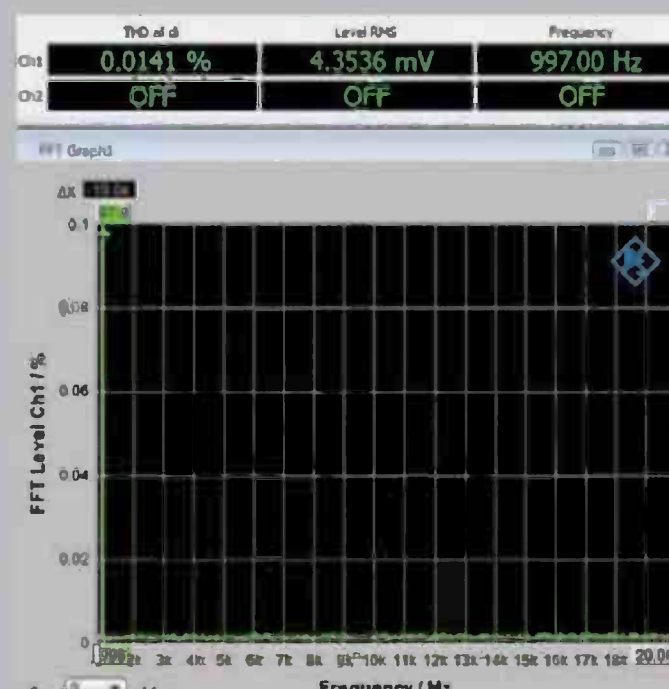
Frequency response (-1dB) 4Hz-31kHz
Distortion (%) 24bit
0dB 0.003
-60dB 0.014
Separation (1kHz) 110dB
Noise (IEC A) -124dB

Dynamic range 125dB
Output (Phono/XLR) 4.3V

FREQUENCY RESPONSE



DISTORTION



CHORD MOJO DAC £399



OUTSTANDING - amongst the best.

VALUE - keenly priced

VERDICT

Fabulous sound, great build quality and big illuminated buttons that change colour make Mojo unmissable – as does its low price of £399.

FOR

- sound quality
- portability
- fully automatic
- quad-DSD replay
- up to 32/786kHz PCM digital
- works from mains power supply

AGAINST

- heavy
- too big for shirt pocket
- no Bluetooth
- sombre appearance

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Hertfordshire, HP23 5EF



Dali's new budget standmount sounds a lot bigger than it looks, says Jon Myles.

Zen Thinking

The budget loudspeaker category is probably the most hotly contested sector of the hi-fi market. Look round any dealer's showroom or website and you'll see a plethora of loudspeakers costing £500 and under – the majority of them from some major names.

So a manufacturer must do something special to stand out. Which is what Denmark's Dali hope it has done with its new Zensor series of standmounts and floorstanders. They incorporate

technology derived from their more expensive 'speakers, Dali say.

In the middle of the range lies the Zensor 3 standmount on review here – retailing at just £299. Of course, making a loudspeaker for so little money involves a number of trade-offs to keep costs down. Cabinets, for example, are usually the most expensive element, so the Zensor 3 is fairly compact measuring just 205mm x 351mm x 293mm (W/H/D) and weighing 6.3kg each. A two-way design, due to the size almost the entire front of the gloss-finished

baffle is taken up by the drive units.

Here Dali uses its own proprietary 178mm mid/bass cone constructed of fine-grained paper pulp reinforced with wood fibres that is said to provide the ideal combination of stiffness and lightness, allied to a 25mm soft dome tweeter housed in its own short waveguide to maximise dispersion.

On the rear are a single pair of decent quality 'speaker posts (so bi-wiring is out), along with a reflex port that helps boost bass extension down to 40Hz (see Measured



The rear of the Dali Zensor 3 features a single pair of 'speaker binding posts plus a bass reflex port.

Performance for full details).

Despite the low price, cabinet construction is good, the Dalis feeling pretty sturdy. That black gloss finish on the baffle also adds a little distinction. They also come with a detachable grille – left off for listening tests.

SOUND QUALITY

Small and affordable they may be, but the Zensor 3s sound remarkably sophisticated for their price. Placed on a pair of sturdy stands (they respond well to good support) and driven by a Creek Evolution 100A integrated amplifier, the little Dalis showed a remarkable ability to dig out detail from well-recorded material.

Playing Medeski, Martin and Wood's 'Hey Joe', Chris Wood's subtle snare and cymbal work was bright and well-textured. Indeed, there was real bite to the treble with John Coltrane's saxophone having a real metallic ring on 'Africa Brass'. This doesn't flatter edgy recordings, 'Definitely, Maybe' by Oasis sounding a little searing at times, for example.

Pointing the 'speakers straight down the room helped ameliorate this somewhat, but there's no doubt the tweeter is slightly forward in nature. This does, though, help give the Dali's a very detailed presentation and it never tips over into unpleasantness.

Further down the spectrum the midband was smooth and open. The piano parts on Daft Punk's 'Random Access Memories' were rich and full, while the dynamic contrasts on the album never fazed the Zensors.

Bass was also surprisingly big

and punchy. Playing King Tubby's 'Dub Fever' album I never got any feeling of losing the low-end. Okay, the Dali's will never reproduce the lowest octaves like a big floorstander but the bass is fast and punchy with a nice, rounded quality.

There was an excellent soundstage, music pushing well into the room both to the left and right. On the classical/modern fusion of David Chesky's 'Area 31' the timpani parts had presence and drama, rolling into the room with real force; it was easy for me to believe I was listening to a speaker much bigger.

Which is one of the Dali's biggest plus points; they sound bigger than they look but also a lot more expensive. It means they are adept at handling all sorts of music, where some standmounts at this price have the feeling they are aimed firmly at a rock or pop audience.

But with the Zensors there is the scale to render classical music believable, the nuance to bring the detail and musicianship from acoustic jazz and also the sure-footed tempo to reveal the drive of something like Led Zeppelin or New Order.

Admittedly, push them really hard and they will start to sound compressed with the music starting to collapse in on itself. But in an

ordinary-sized room and on the end of a good amplifier they are a much better loudspeaker than they have any right to be at this price.

CONCLUSION

It may be a fiercely-fought sector of the market but the Dali Zensor 3s are capable enough to stand out from the crowd. They have a sophisticated, detailed sound with good bass and a smooth midband. Definitely worth investigating if you are in the market for a 'speaker at this price or even some way above.



The 25mm soft dome tweeter has a shallow wave guide to aid dispersion.

MEASURED PERFORMANCE

Our third-octave frequency response analysis of Dali's Zensor stand-mount loudspeaker shows a flat and smooth characteristic across the audio band, from 100Hz up to 5kHz, suggesting even and accurate tonal balance, good detail retrieval through absence of a crossover dip, and low coloration shown by lack of perturbation. This is a good result.

Above 5kHz treble rises substantially, our off-axis (30 degrees) response shows and this will add audible brightness to the sound. There was a little more treble on-axis so the speakers are best aimed down a room and not at listeners.

Bass output extends down to 40Hz, the port contributing substantially to this, our red trace of port output shows. The port also exerts good bass damping, shown by its spectral width and this is also reflected in the broad dip around 50Hz in the impedance curve. The Zensor is well designed in terms of bass output and control.

Sensitivity measured a very high 89dB from one nominal Watt of input, so this speaker needs little power, around

40 Watts will be sufficient for most situations. Overall impedance measured 7 Ohms, our impedance curve showing a smooth resistive characteristic.

The Zensor is well engineered all round, to have good bass and plenty of detail, plus tonal accuracy. It needs little power, but it will have a bright sound.

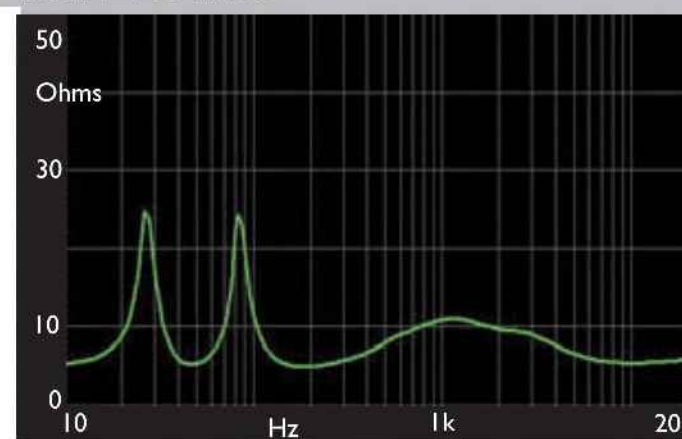
FREQUENCY RESPONSE

Green - driver output

Red - port output



IMPEDANCE



DALI ZENSOR 3

£299

OUTSTANDING - amongst the best.

VALUE - keenly priced.

VERDICT

A budget loudspeaker that punches well above its weight. Could show a thing or two to some rivals costing significantly more.

FOR

- detailed
- smooth midband
- good bass for its size
- excellent soundstage

AGAINST

- slightly forward treble

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Christmas Wishes

NAME: Paul Rigby

STATUS: Hi-Fi World's own Mr Vinyl

Attempting to keep a distance between himself and his wallet, Paul Rigby sends Santa his Top 5 Christmas desires.



Missing Link Dust Buster £21

There is, in the life of any vinyl user, a small but essential toolkit of items that greases the wheels, as it were, making vinyl listening that much more pleasurable. Right at the top of list in the toolkit is the Dust Buster. Just flip open the tin lid, gently rest and lift your stylus onto and from the sticky surface and all dust, muck and grime is pulled off. Much easier, kinder and safer than stylus brushes and liquids.

L'art Du Son Cleaning Fluid £30

If you have a record cleaning machine of some sort then you are spoilt for choice in terms of available cleaning liquids. My advice? Stay away from anything based upon alcohol. Initially, the results from the latter sound great but the harm it does to the vinyl, in the end, makes vinyl sound brittle and the damage is irreparable. Grab this gentle but effective treatment. I've tested several non-aggressive liquids - this one sounds the best to me.

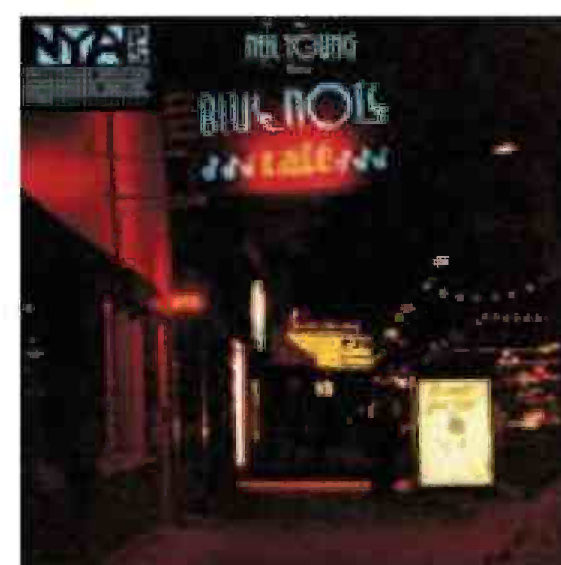


Spin Care Inner Sleeves £12 Per 50

The moment I open up either a new or, indeed, second-hand vinyl outer sleeve I check to see what sort of inner sleeve it contains. Even in these enlightened times, it's startling just how often an abrasive basic paper inner is the only means of protection for the precious vinyl recorded. These Spin Care inners are useful because they are gentle on your records and, because they are rounded, better fit into those awkward second hand sleeves that sometimes offer little or no room for square inners.

Neil Young £40

"What Young, the man?", you ask? "No, Young on vinyl," says I. Neil Young is one of the (very) few ageing, classic-era, musicians who still produce innovative, boundary-pushing music. Most of the rest have too much money, too much luxury and are too darned comfortable to really care. Maybe Neil wears a hair-shirt or something. Only problem with Neil's vinyl output is, firstly, it's very expensive and, two, it's far too limited with, in some cases, woefully few repressings.



Harmonia £100

A rather nice slice of limited edition Krautrock history featuring the complete works of the band plus rarities in a swish box set that includes five pieces of vinyl, poster, book plus a pop-up card...thing. It's a bit arty, let's say that. Created from members of Neu! and Cluster (Hans-Joachim Roedelius and Dieter Moebius of Cluster and Michael Rother of Neu!), this brilliant pioneering instrumental outfit also features appearance by Brian Eno.

Christmas Wishes

NAME: Martin Pipe

STATUS: Head-in-case expert

Martin Pipe, extreme Olde Worlde quadraphonic enthusiast and expert with a hot soldering iron too, gives us his wants for Christmas.



Involve Surround Master, \$AUS499 (approx. £240)

There are two versions of the Australian-made Surround Master., one for SQ, the other for other matrix formats, including Sansui's QS, in addition to stereo enhancement and two-channel virtual-surround. The Surround Master harnesses precision analogue electronics and no fewer than two powerful DSP chips to achieve a near-discrete performance that trounces 70s-era decoders.

Queen LP box set £300

I was brought up with Queen – frequently-imitated, never bettered! From the operatic leanings of the instantly-recognisable 'Bohemian Rhapsody', through the rock 'n' roll of 'Crazy Little Thing Called Love'. So its good to see that Universal have released this re-mastered 15-album vinyl box-set, cut at half-speed, which spans debut 'Queen' to 1995's swansong 'Made in Heaven'.



The Chord Company C-line 0.5m Stereo Interconnect £35

Decent cabling need not be expensive. A half-metre pair of Chord C-lines could interface, for example, a CD player to your amplifier. It may be entry-level, but you get high-grade audio cable with Chord's proprietary ARAY geometry and dense shielding, quality gold-plated phono plugs and a standard of performance that belies the modest price. If I get a new source for Christmas, I'm hoping that someone else in my good books drops me a C-line to get it 'plugged in'.

Audio Technica AT440MLb cartridge £130

In my recent Olde Worlde series on quadraphonics, I covered CD-4 LPs. JVC's CD-4 used clever jiggery-pokery based around a 30kHz subcarrier to encode discrete rear channels. Few present day carts can reach these 'highs', except Audio Technica's 440MLb. Its 'microline' stylus seems to do as good a job with CD-4 as the 'official' Shibata profile specified by JVC, with no roughness or dropouts. As an MM design, it should work with all of the CD-4 demodulators that were produced, including the JVC 4DD5.



Goldring/Milty Super Exstatic Disc Cleaner £15

An ideal 'stocking-filler' for vinyl lovers, this is a fine carbon-fibre brush and velvet pad designed to displace surface dust from a record. Static, and the grot that it attracts, will alas always be with us. The cleaner is gently-swept across the playing surface of a record. I actually had one of these simple but effective devices for a while – it was alas lost in a house move! And I'd love to be reacquainted with it.



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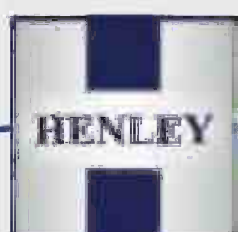
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Christmas Wishes

NAME: Jon Myles

STATUS: High-resolution Digital Expert

Resident high-resolution digital expert and fan of all things mobile, Jon Myles chooses his Christmas desires.



FiiO X3 2nd Generation £150

Listening to high-resolution music on the go has never been easier - or available at such a reasonable price. The FiiO X3 2nd Gen mobile digital player epitomises this. It's 24bit/192kHz capable, has a healthily good headphone output and is slim enough to slip into your pocket. Loading music onto it is also a breeze. Soundwise, it knocks spots off anything you'll get from the likes of an iPhone or Android device and is much sweeter sounding than even the iPod Classic. And at just £150 it really is an absolute bargain. The only thing you'll need to add is a microSD card for loading music - but you can now get 64Gb ones from as low as £17 on Amazon. So add that on and you have a great present for an audiophile for less than £180.

QED Reference Optical Quartz digital interconnect £80

Optical cables have their advantages but can be troublesome at times - especially when handling 24bit/192kHz files where I've found some simply do not work. Enter the QED Reference. It's one of the few of its kind actually constructed from multiple bundles of glass optical fibres to increase bandwidth and help eliminate timing errors. With a bandwidth of more than 150MHz the QED has no problem passing high-definition signals and so is ideal for making a safe, secure connection between components.

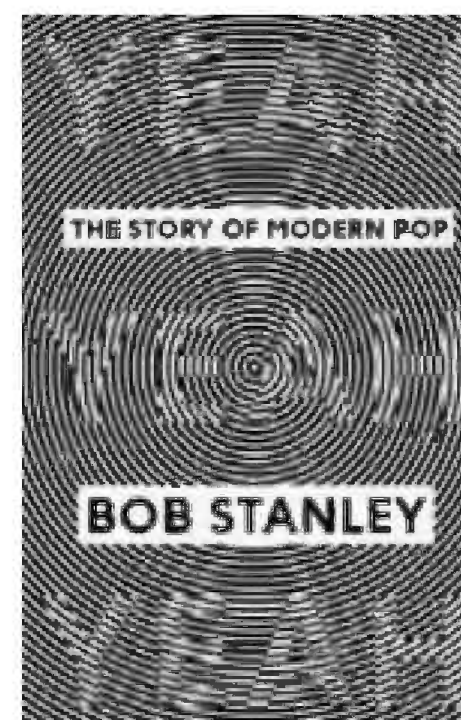


Focal Sphear in-ear headphones £99

This is one box from Santa anyone would love to open. The new Focal ear—phones took me aback when I first heard them. Accurate, enjoyable and without any unnecessary over-emphasised bass or searing treble. Just the sort of headphones which anyone would enjoy. They are also extremely comfortable to wear - which isn't something you can say about all in-ear 'phones. Oh, and they come in a lovely box so whoever you buy them for will be even happier!

Yeah, Yeah, Yeah - The Story Of Modern Pop by Bob Stanley £8

The ideal present for anyone with a passion for pop music. The Saint Etienne mainstay tells the story of the music from its beginnings in the 1950s to the present day with such zest, love for his subject and knowledge that every single page is a delight. It'll have you rummaging through your music collection to dig out long-forgotten gems or rushing to the shops to purchase some of the classics you never knew you didn't own. It reminds you why you fell in love with music in the first place.



Pure Evoke D2 digital radio £85

Whatever you think of the merits of DAB, it's an amazingly easy way to listen to music and speech radio and Pure make some of the best sets. The Evoke D2 comes in at less than £100, looks smart with its veneered wood finish and has a rich, warm midband that works wonders with voices. Its size also makes it ideal for the bedroom cabinet. So just the thing to listen to while getting over that Christmas hangover in bed.

High Five!

Spendor's new A5R floorstanders take an already special loudspeaker to a new level, says Jon Myles.



Replacing a classic loudspeaker is never easy. How do you improve on something people already love and, perhaps more importantly, is it worth it?

Which is exactly the problem Spendor faced when they looked at bringing in a replacement for their best-selling A5.

Could it be bettered for the price and how exactly would you go about it? According to Spendor's main man Phil Swift the project involved looking at every element of the A5 and seeing how gains could be made without losing the basic sonic signature that made the original such a success.

So in came a new cabinet. At first look it doesn't seem that much different, measuring 830mm x 165mm x 250mm (HxWxD). That's just 4cm taller than its predecessor but allows some important other improvements.

First off, and most importantly, the new A5R is now an infinite baffle design – Spendor being firmly of the opinion that this produces an inherently better and more coherent sound than the reflex-port used in the original A5. Then, Spendor added drive units derived from the company's excellent and more expensive D7 loudspeakers.

So, you get the latest 150mm iteration of Spendor's proprietary EP77 polymer mid/bass unit augmented by a similarly-sized Kevlar composite low-frequency unit while the tweeter is Spendor's tried and trusted 22mm Ferro-fluid cooled high-frequency driver.

The cabinet itself also features asymmetric bracing as well as Spendor's dynamic damping which uses polymer at critical internal points to convert energy

into heat instead of allowing it to transmit resonances to the structure.

So, it's an A5 – except actually a completely new loudspeaker in many ways and one which has a rather high reputation to live up to.

SOUND QUALITY

The remarkable quality of the original A5 was always its ability to sound a whole lot larger than it looked.

It was one of those loudspeakers ideally suited to small(ish) living spaces – being able to produce true quality and dynamics while not being overly fussy about placement.

The new A5R possesses the same qualities but is an obvious improvement in many ways. Most obviously the new EP77 mid/bass unit has a rich and smooth character that has warmth, but not at the expense of detail. Instead, it is extremely well balanced.

Playing Holly Cole's 'Train Song' the walking bass line had a firm foundation without being overly forward, while the rim-shots on the drums cracked and disappeared just as you'd like, while the slide guitar glimmered subtly in the background.

Here the A5Rs were putting the performance together just as it should sound. It's an atmospheric, shimmering track and the Spondors did it justice.

It's helped by the fact that there seems to be a slight treble lift from the tweeter – nothing too obvious but just enough to highlight detail. So play something a little more raucous such as 'Rock 'N' Roll Star' by Oasis and you will hear the edge in Noel Gallagher's guitar lines – but brother Liam's gruff vocals come over with a remarkable clarity.

Those drive units also interact remarkably well. The A5R is a two-and-half-way design so the lower Kevlar cone adds heft to the bass – and is remarkably effective considering its size.

On Aaron Copeland's 'Fanfare For The Common Man' played by the San Francisco Symphony Orchestra (24/96) the bass drum struck with a force and impact that belied the size of the 'speakers. Here was believable size and scale – not quite the force you'd get from a 12" driver but more than enough to create a believable soundstage.

There was also air and atmosphere. The Spondors seem able to open up a recording so you can hear subtle nuances within the music.

For more evidence I turned to

James Blake's 'Limit To Your Love'. This is a torture track for many loudspeakers, having room-shaking sub-sonics yet remarkably delicate vocals and a subtle electronic backing track. In short, it's a combination that can really let you know just how good a loudspeaker is.

Here the Spondors didn't shrink. Admittedly, I did not get quite the shattering force of the low-end bigger 'speakers can give – but nor did it feel as though anything was missing in the overall sound. Blake's voice was tinged with emotion and when the deep bass came in there was a shudder in the room. I've heard larger and more expensive loudspeakers that can't handle this as



well. All the while the detail of the synthesiser work was relayed with precision and firmly fixed in place between the 'speakers.

To my ears it seemed a significant improvement on the original A5, that was a rather special loudspeaker in its own right already.

All of which means that if you are looking for a domestically-friendly loudspeaker that combines a broad soundstage with dynamics, detail and a rather sweet tonality then the new A5R could be just the thing for you.

CONCLUSION

The Spondor A5 was always a great-sounding loudspeaker. The new A5R takes it to another level. It's extremely open and appealing, has exceptional bass for its size and sounds both rich and detailed. Highly recommended.

MEASURED PERFORMANCE

Frequency response of the Spondor A5R seen in our analysis shows some treble lift from the tweeter with a peak at 4kHz, enough to emphasise detail and add a little brightness into the sound. This is an off-axis response and the A5R is best pointed straight down a room for this result, which was smoother than on-axis.

There is a little bass lift to give the small cabinet a sense of warmth and heft to its sound. Low bass is supported by the bottom drive unit of the array, which is powered, even though it looks like an unpowered ABR. Its near-field output is shown in our red trace. There is no port; this speaker is an IB, an 'infinite baffle' sealed enclosure. Bass extends down to 50Hz, an adequate lower limit.

Sensitivity was a good 87dB from one nominal Watt of input (2.8V), so the A5R needs around 60 Watts or so to go loud. With a 4 Ohm d.c.r. bass unit the impedance curve dips to this value, our impedance analysis shows. There is a single bass unit resonant peak at 60Hz, but acoustic output does not rise at

this frequency; there is no sign of bass resonance here.

The A5R offers a good set of results all round. It has both low end emphasis to add warmth and a little upper-mid and treble lift to ensure strong detailing. **NK**

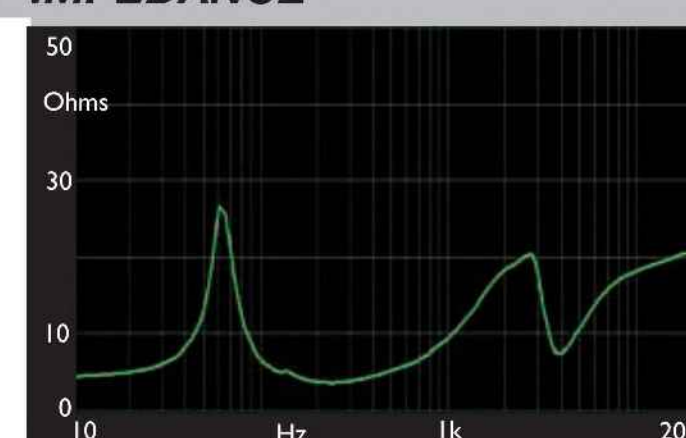
FREQUENCY RESPONSE

Green - driver output

Red - port output



IMPEDANCE



SPENDOR A5R £1995



OUTSTANDING - amongst the best.

VALUE - keenly priced.

VERDICT

An outstanding loudspeaker that majors on musicality, coherence and a broad soundstage.

FOR

- clarity
- solid bass
- detail

AGAINST

- nothing at the price

Spondor Audio
+44 (0) 1323 843474
www.spondoraudio.com

Atera era



Quad's Artera Play and Stereo combine old and new to good effect, reckons Martin Pipe.

Quad's new Artera range represents something of a departure from the rounded styling of past designs, having sleek lines, textured-aluminium frontages, glass platforms and the bare minimum of controls. The idea is to make something that looks good and is easy to use – a far cry from the intimidating 'technical' look of the past. Thankfully, the substantial construction associated with Quad products is still evident.

First up here is the Artera Play. This is a combined slot-loading disc transport with jitter-reduction processing DAC and – to lapse into vintage Quad-speak – 'control unit'. It has only four controls – eject, standby, play and a cyclic source-select. Disc apart, you get two optical, two coaxial, USB and two analogue inputs. The digital inputs will, by the way, accept up to 192kHz/24bit.

Of the aforementioned controls, the latter two are touchpads ranged above and below a circular screen

that displays source, sample rate, elapsed time and other mode-dependent functions.

Unfortunately, Quad hasn't provided companion touchpads on the left and right for convenient front-panel control over volume. If you want to change level without the supplied remote, you have to hold down the 'source' touchpad; you can then use both touchpads to raise and lower volume. Similar methodology underpins, for example, changing the digital-filter characteristics. The

remote is needed for this – as well as features like programmed track playback and repeat. But you'll get used to the Artera's way of doing things.

The Play will cope with DSD – up to DSD256, in fact – but only through USB. I tried my SACD of Elton John's 'Goodbye Yellow Brick Road' and all I got was the CD layer. CD-ROMs containing MP3 and FLAC tracks are ignored, and there's no 'direct' USB playback facility; the (asynchronous) USB interface is provided solely for use with a computer.

To this end, a Windows-driver CD-ROM is supplied. Follow the instructions, and you'll be able to stream DSD and PCM (up to 32-bit/384kHz!) tracks across the link. Quad has built the Play around the ESS9018 Sabre32 'wonder DAC', giving high hopes for performance.

And so to the matching Artera Stereo amplifier which links to the Play via balanced XLRs (recommended by Quad) or unbalanced phonos. A 'trigger' function allows the amp to be turned on and off by the Play if desired. The Stereo is a heavy beast that employs Quad's proprietary 'current-dumping' circuit topology. First met in the classic 405 power amp it's an ingenious alternative to the Class A/B push-pull approach. The latter dominated the design of high-power transistor amplifiers in the mid-1970s, when the 405 was launched.

In Quad's current-dumping design, a driver stage (built around an op-amp) powers your speakers via a small Class-A stage at quieter listening levels – with all of the associated purity. As demands increase, though, a bridge circuit-derived 'error' signal instantaneously turns on the amplifier's high-power transistors – known in Quad circles as 'current-dumpers', hence the name. Efficient muscle is thus available as and when it's needed.

In other words, you essentially get two amplifiers in one! Other manufacturers tried (with Quad's patents in mind) to implement this 'feed-forward' idea, but none were as successful. And current-dumping definitely works; amps like the 405 and Artera Stereo will happily power notoriously-difficult electrostatic speakers – including Quad's own! The original 405 was a masterpiece of 1970s industrial design, with its finned front panel. Tastes change, though, and the Stereo is far more elegant,

as befits a piece of equipment that's destined for the home, rather than the lab.

SOUND QUALITY

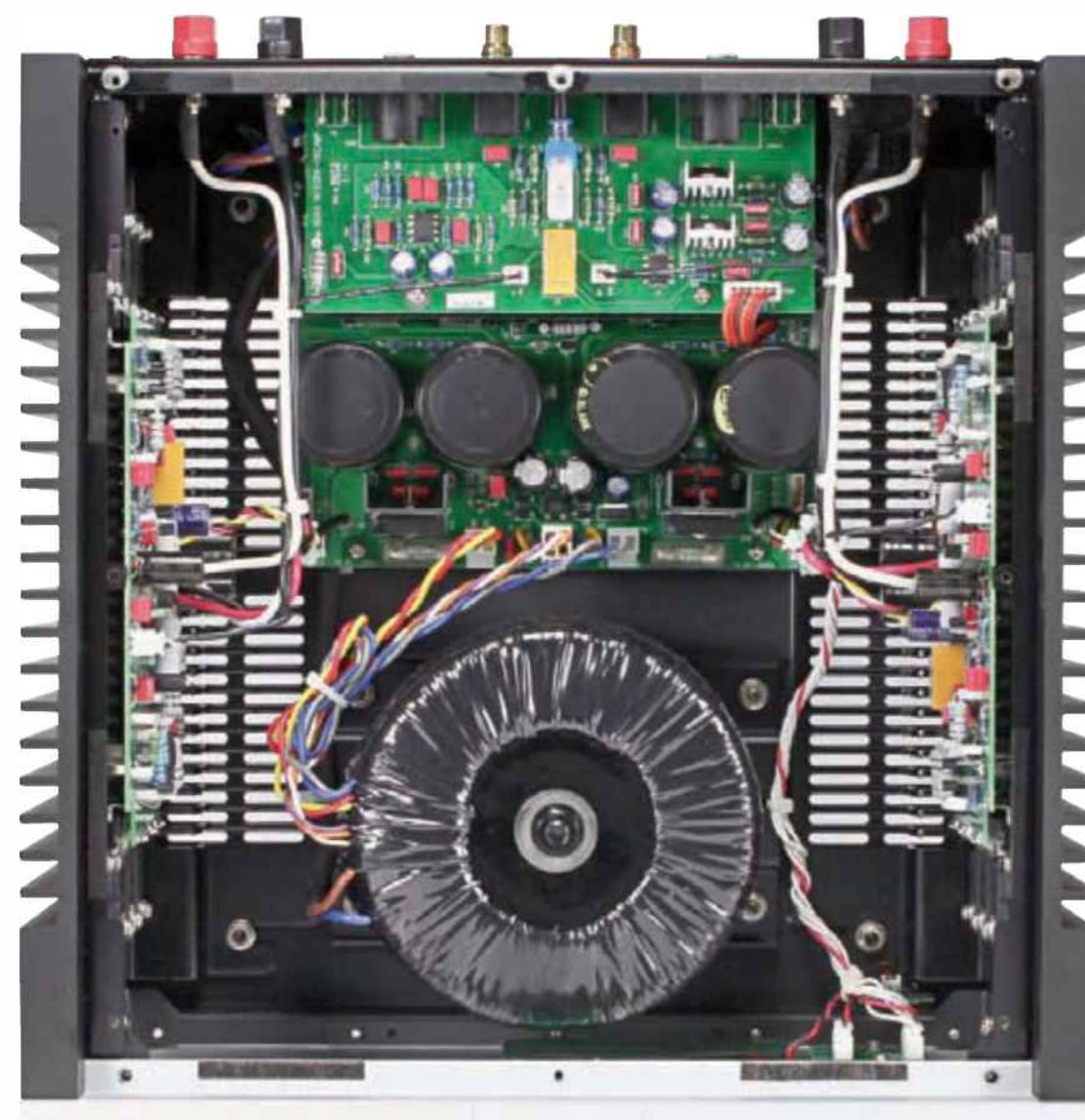
I used this pair of Quads with a set of Quadral Aurum Wotan VIII speakers that incorporate their wonderfully-revealing ribbon tweeters. I tried the USB port with a new-ish Acer Revo PC running Windows 8.1, following the instructions to a tee. All seemed to be working well, DSD being flagged up on the display when such content was loaded into the player software (Foobar2000, with all of the relevant plug-ins installed).

So far so good. However, during playback I heard occasional 'blips' and 'squeaks' – like a badly computer-ripped CD of yesteryear. I've never had this problem before with other DACs, even using the same music, software and computer. I tried system resets, different USB ports and cables – but to no avail.

Foobar2000 was outlined in the driver CD-ROM's configuration. Yet I was subsequently told that Quad "doesn't recommend" Foobar. Apparently, "it's not up to the job" – although it has worked fine with all the other DSD-capable USB DACs I've tried. Peter Comeau, from Quad's parent company IAG, recommends the "DSD High Res" compatible JRiver Media Center software. Peter explained that "most software players have only just upgraded to native DSD, so some are just not going to work right".

The system can definitely do hi-res PCM well; a random selection of 24-bit classical and jazz tracks selected with a A. C. Ryan network multimedia player, connected optically to the Play, were distinguished by finesse, space and depth. But most of my listening was sourced from CDs. First up was the sadly-neglected 'Warp' from electro-pop act New Musik.

This system does justice to the album's 'clean' sound and distinctly-1980s effects-driven atmosphere. The track 'Hunting' has a plunging synth bass that is carried here with depth



Internally, the Artera Stereo power amplifier consists of two identical mono modules, each with their own power supply fed by different windings on that massive toroidal mains transformer.



Internal appearance of the Artera Play is as neat as that of the exterior. Note the use of a linear power supply built around a toroidal-core transformer. High quality op-amps and capacitors are used in the audio stages.

and control. No flabbiness here. Warp contains a synth-pop reinterpretation of The Beatles' 'All You Need Is Love', inspiring me to try next the 2009 remaster of 'Abbey Road'. And here the Arteras excelled; I haven't heard this classic album sound so good for a long time.

Paul McCartney's bass is tight and well-articulated in tracks like 'Come Together', as is Ringo's kick-drum. The album's guitar work is exquisitely-detailed, while the Moog synthesiser parts you'll hear in tracks like 'Maxwell's Silver Hammer' are

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Nakamichi CR7e, B&W service 2013 excellent	used	1199				NAIM Naxo 2-4	used	199			
Nakamichi BX2, excellent	used	149				NAIM Hicap DR excellent boxed	used	899			
Nakamichi 580, near mint boxed	used	249				NAIM HiCap, various Olive/Chrome	used	Call			
Nakamichi ST7e, rare tuner	used	199				Nordost Blue Heaven 0.6m boxed	used	49			
Pure 701ES DAB Tuner	used	89				ProAudio Bono Reference Platform	dem	399			
Revox PR99, crated	used	799				Quadraspire racks various	used	Call			
Revox H2, just serviced, great condition	used	499				Stax, closed back 'phones & energiser, rare due in	used	Call			
Sony TC-K611S, 3 head,											

warm and organically-rich in texture.

Time to try the Play's digital-filter settings. They make a difference that's more perceptible than others I've come across. I found that 'Abbey Road' sounded cleaner and less 'up front' (i.e. more natural) in the 'smooth' setting. This setting also worked best for a 1987 Classics For Pleasure collection of Strauss waltzes. It 'tamed' a brightness that was noticeable in, for example, the 'wide' filter mode. Triangles and percussion seemed too forward here.

These works – and, for that matter a Naxos recording of Mozart's Jupiter Symphony (Capella Instropolitana/ Wordsworth) – demonstrated the Artera's ability to create an accurately-steered image in which the location of performers is unambiguous.

The 'fast' mode is particularly-suited to some types of electronic music like

Kraftwerk's 'Tour De France Sound tracks'.

It gave, I found, the rhythms urgency, edge and speed. Other forms of electronic music, for example Boards of Canada, benefitted from the 'wide' setting. As ever, I would recommend experimenting with filters and discovering which ones complement your musical tastes and ancillary equipment.

CONCLUSION

Quad's Artera components, on the whole, succeed through a combination of future-proofing practicality (the numerous inputs, for example), the intelligent use of technology and a sound that is marked by finesse and detail, yet can be gutsy if the demand is there. They also look great, thanks to the work of Rodney Mead – funnily enough, the man responsible for the look of the 405. Times change – and Quad has here proved its ability to change with them.



Connections include four digital inputs, two digital outputs, asynchronous USB and two analogue stereo inputs. The latter are line-level, and so vinyl junkies will need an external phono stage. Quad recommend the use of balanced (XLR) connections between Play and amplifier. Phonos are catered for, though.

MEASURED PERFORMANCE

The Artera CD/DAC managed a high 118dB Dynamic Range (EIAJ) from a 24bit digital input, via both its analogue balanced XLR output, and the unbalanced Phono output – a high figure. High dynamic range is a good indicator of well suppressed noise patterns, as well as low distortion, suggestive of good sound quality. USB introduced no extra noise.

Quad have provided an optional 'slow', well damped filter for minimum ringing and this rolls off frequency response slowly but smoothly above 20kHz to the upper (analogue) limit of 96kHz with 192kHz sample rate PCM, as our analysis shows. This filter also influences CD (i.e. 44.1kHz sample rate), rolling down treble early to give an upper response limit (-1dB) of just 13kHz; it will optionally make this player sound less sharp and hard than most. Otherwise, CD measured normally with 103dB Dynamic Range and 0.2% distortion at -60dB.

The USB input/output gave a different result again, measuring flat to 21kHz from the internal CD player, but rolling off fast above 10kHz from a 192kHz sample rate file from a USB input (MacBook Pro injecting white noise test signal). So external USB inputs will sound warm, but CD played via USB out – uncommon usage perhaps – normally

balanced and so brighter than the analogue outputs.

The preamplifier has no gain from phono input to phono output (i.e. unbalanced), acting as a volume control stage only. However, the XLR output has double the output of phono so a gain of x2 is available from phono in to XLR out.

Frequency response measured flat to 80kHz, distortion was low at 0.003% (1V out) and noise very low at -119dB.

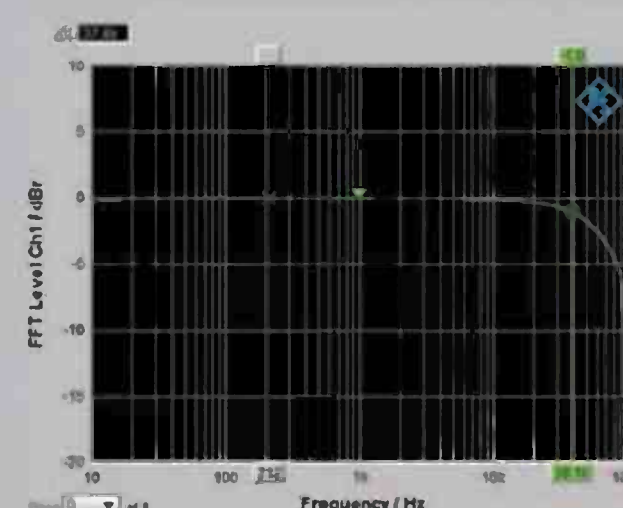
The matching Artera power amplifier has switchable Phono/XLR inputs, both of 1V input sensitivity. Since the Artera CD gives x2 output via XLR this means you get double the gain through XLR connection: the system will play 6dB louder through XLR – an unusual arrangement but no problem in itself.

Power was high at 150 Watts into 8 Ohms and 225 Watts into 4 Ohms, and distortion low at all frequencies and outputs, measuring 0.04% maximum. Output impedance was very low, giving an unusually high damping factor value of 88, suggesting tight bass control.

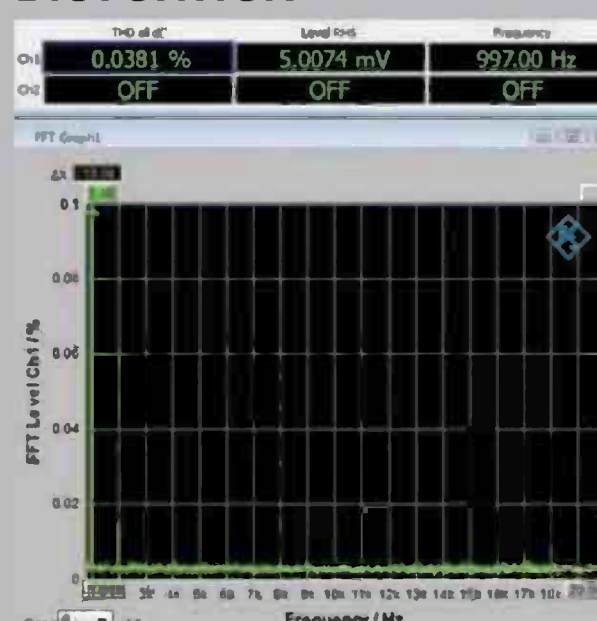
The Artera CD player/DAC/amplifier combination measured very well. It has an optional Audiolab style slow (Optimal transient) filter to achieve what would be considered a typical Quad presentation of smooth yet clean sound from digital. **NK**

Frequency response (-1dB)	4Hz-38kHz
CD	24bit
Distortion (%)	0.003
0dB	0.04
-60dB	112dB
Separation (1kHz)	-117dB
Noise (IEC A)	118dB
Dynamic range	2.5/5V
Output (Phono/XLR)	

FREQUENCY RESPONSE



DISTORTION



**ARTERA PLAY
TRANSPORT/DAC/
PREAMP (£1400)
ARTERA STEREO
AMPLIFIER (£1500)**



OUTSTANDING - amongst the best.

VERDICT

In terms of accessibility, sound, features and looks, what we have here are Quad in the present day.

FOR

- clean, detailed, potent and musical
- visually-stunning
- very well-connected in input terms

AGAINST

- problems with USB port during review
- no headphone socket or Bluetooth
- user interface may take some getting used to

Quad
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Northern Lights



The new Northern Fidelity DAC from Denmark combines great sound with superb flexibility, says Jon Myles.

Danish company Lead Audio caused a bit of a stir in the hi-fi community back in 2010 with the launch of its first stand-alone DAC/headphone amplifier – the LA-100.

It immediately won favour with critics and customers alike for its winning combination of great sound at a relatively low price.

This being all of five years ago, however, the LA-100 was limited to 24bit/48kHz replay as the high-resolution revolution was only just beginning to gather momentum.

Fast forward to the present day and the LA-100 has been supplanted in the Lead Audio range by a series of better-specified models – and now by a new flagship in the shape of the Northern Fidelity DAC-384 which, as its name suggests, will accept files of up to 32bit/384kHz over USB (if you happen to possess any).

Pull it out of its handsome presentation box and the DAC-384 immediately impresses with a sturdy feel that belies its £650 price tag.

It's a half-width unit with a curved, brushed-aluminium fascia that gives it a distinctive look. The front panel controls, while small, are well laid out and easy to operate; one row of buttons selects the output (fixed and variable RCAs, balanced XLR and headphone) and another the input that, as well as USB, optical and coaxial digital, also includes Bluetooth. The latter is a useful option allowing wireless music streaming from a mobile phone, tablet or PC and adds to value.

A rotary volume control and headphone socket complete the front, while power is provided by a wall-wart plug; Lead Audio says there is extensive on-board voltage regulation inside the DAC-384 itself.

A nice touch is the subtle blue light that surrounds the volume control to indicate level. Okay, it may not give all that much information but it does look nice!

Inside the unit digital conversion duties are handled by an ESS Sabre DAC (the ES9018K2M) that is rapidly becoming something of a standard

in high-end audio due to its class-leading specification (see Measured Performance for full details).

Taken as a whole, the Northern Fidelity is a nice-looking, easy to use product with, on paper, an excellent specification. But, of course, it's the sound that matters...

SOUND QUALITY

Eager to get started – and because it was there – I started out with the Bluetooth input, streaming Patti Smith's 'Land' collection from an iPhone 6 Plus.

Here, it was immediately evident the DAC-384's overall character is one of neutrality. It has a lovely, open air about it that brings great instrumental separation. Playing through a pair of Quad QMP monoblocks driving Spendor S5R loudspeakers (see review elsewhere this issue), drums, bass and guitar on 'Because The Night' were detailed and all in proportion, while Smith's vocals were distinct and placed at just the right level in front of the band. In fact it's a fine example of just how good

Bluetooth can be.

Moving on to some high-resolution material and that open and natural nature was even more evident. On The Dave Brubeck Quartet's 'Take Five' (24/96) the DAC-384 handled complicated time sequences with a light, delicate touch, making the music really swing. There was also a wide soundstage with instruments stretching beyond the edges of the 'speaker cabinets.

Being critical, there was a slight lack of impact on Joe Morello's drum parts here – a feeling his kick drum was not hitting me in the chest with all the power it should. Switching to the balanced outputs into a Music First preamplifier (by-passing the Northern Fidelity's volume control) helped here, imparting a little more power to the low-end.

But there's still not the slam or drive you will get from something like a Naim DAC or Resonance Invicta Mirus, for example. Instead the DAC-384 seems more content to take a step back and simply let the music flow through it.

That's not a bad thing though – especially if detail and atmosphere are important to your listening pleasure. Playing Ann-Sophie Mutter and the Berliner Philharmoniker I could hear the ambience of the concert hall, while violin tones were rich and resonant.

Moving on to Sinead O'Connor's rendition of the classic Irish ballad 'Peggy Gordon' the Northern Fidelity really showed what it could do. O'Connor's voice was pure velvet and the catch in her voice as she begins a new line had a spine-tingling effect. This is where you can really hear just how much information and resolution the Northern Fidelity is extracting from your files.

Switching from loudspeakers to headphones, again the Northern Fidelity showed its qualities. With a pair of my reference Noble K10 custom in-ear monitors upper registers were clean and clear with no hint of edge or sharpness while the midband had a lovely creamy quality.

Again, the low-end isn't the most powerful but it's more than made up for by the quality and detail of the rest of the presentation.

On Leftfield's 'Dusted', for example, Roots Manuva's voice was wonderfully gruff while the electronic backing seemed to gallop along. Lesser DACs can sometimes lose the pace of this track, but not the



At left is a Bluetooth aerial, then Variable and Fixed phono socket outputs, balanced XLRs and digital inputs – electrical and optical S/PDIF, then USB.

Northern Fidelity which seems to revel in the pace of the song.

CONCLUSION

Make no mistake, the Northern Fidelity DAC-384 is a highly-impressive performer with a sound that will appeal to many listeners. It may lack

that last element of punch down below but what it does give you is an extremely clear, open and detailed sound that few DACs at this price – or even some costing a great deal more – can match. Add in its Bluetooth capability and headphone output and it's something of a bargain at £650.

MEASURED PERFORMANCE

The Northern Fidelity DAC measured a very high 122dB EIAJ Dynamic Range from its balanced XLR output (4.5V) and 120dB from unbalanced Phono output.

The variable output inserts extra circuitry into the unbalanced line output and this introduced a little bit of noise, degrading Dynamic Range to a still-respectable 117dB. The Sabre32 has a digital volume control, but it appears Lead Audio do not use it.

Frequency response extended to 56kHz (-1dB) our analysis shows, rolling away slowly to the theoretical

upper limit of 96kHz for a 192kHz sampling frequency. There are no filter options to alter this. The optical input worked to 96kHz sample rate securely, 176.4kHz intermittently and 192kHz not at all, common enough behaviour for optical due to cable/TOSLINK-receiver limitations.

Distortion levels were low, 24bit resolution PCM giving 0.02% distortion at -60dB, an excellent if not quite class-leading (0.01%) result.

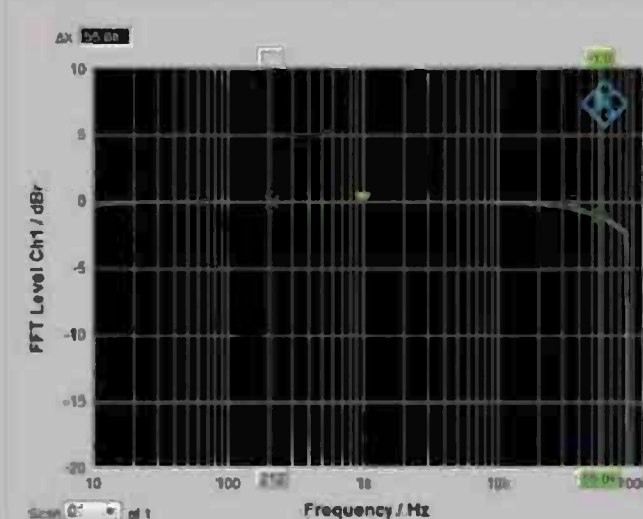
Used as a CD player DAC, the Northern Fidelity gave normal results, flat response to 21kHz, distortion of 0.21% and an EIAJ Dynamic Range of 101dB.

The USB input works up to 384kHz sample rate, which a Mac can supply, and Dynamic Range was a full 122dB. All other performance figures were identical to S/PDIF.

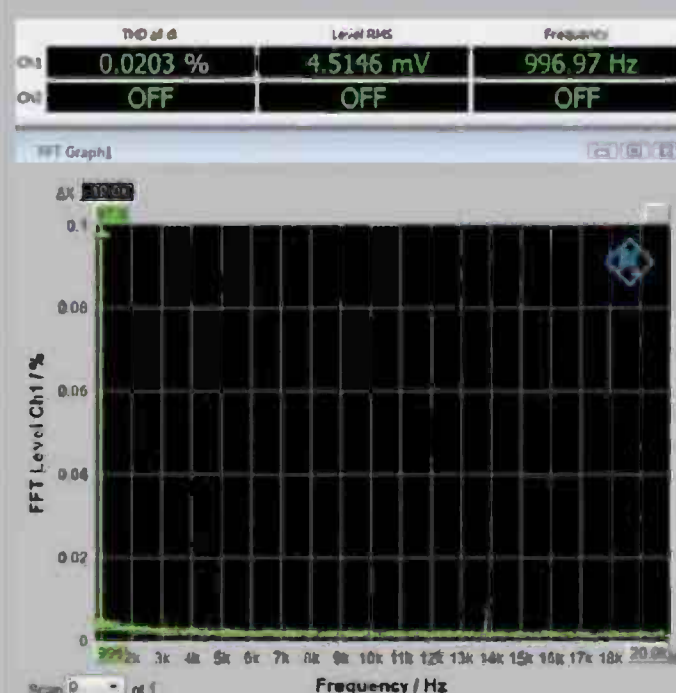
The headphone socket gave a high 3.4V output maximum, but dynamic range here was a disappointing 99dB, -23dB down on the XLR output.

The Northern Fidelity DAC is well engineered, with a fine measured performance, but the headphone output could be better. **NK**

FREQUENCY RESPONSE



DISTORTION



Frequency response	4Hz-56kHz
Distortion (%)	24bit
0dB	0.001
-60dB	0.02
Separation (1kHz)	110dB
Noise (IEC A)	-119dB
Dynamic range	122dB
Output (Phono/XLR)	2.2 / 4.5 V

LEAD AUDIO NORTHERN FIDELITY DAC-384



OUTSTANDING - amongst the best.

VALUE - keenly priced

VERDICT

Superbly-specified, open-sounding DAC with Bluetooth – at a great price.

FOR

- detailed
- open
- Bluetooth
- price

AGAINST

- slight lack of drive

Divine Audio
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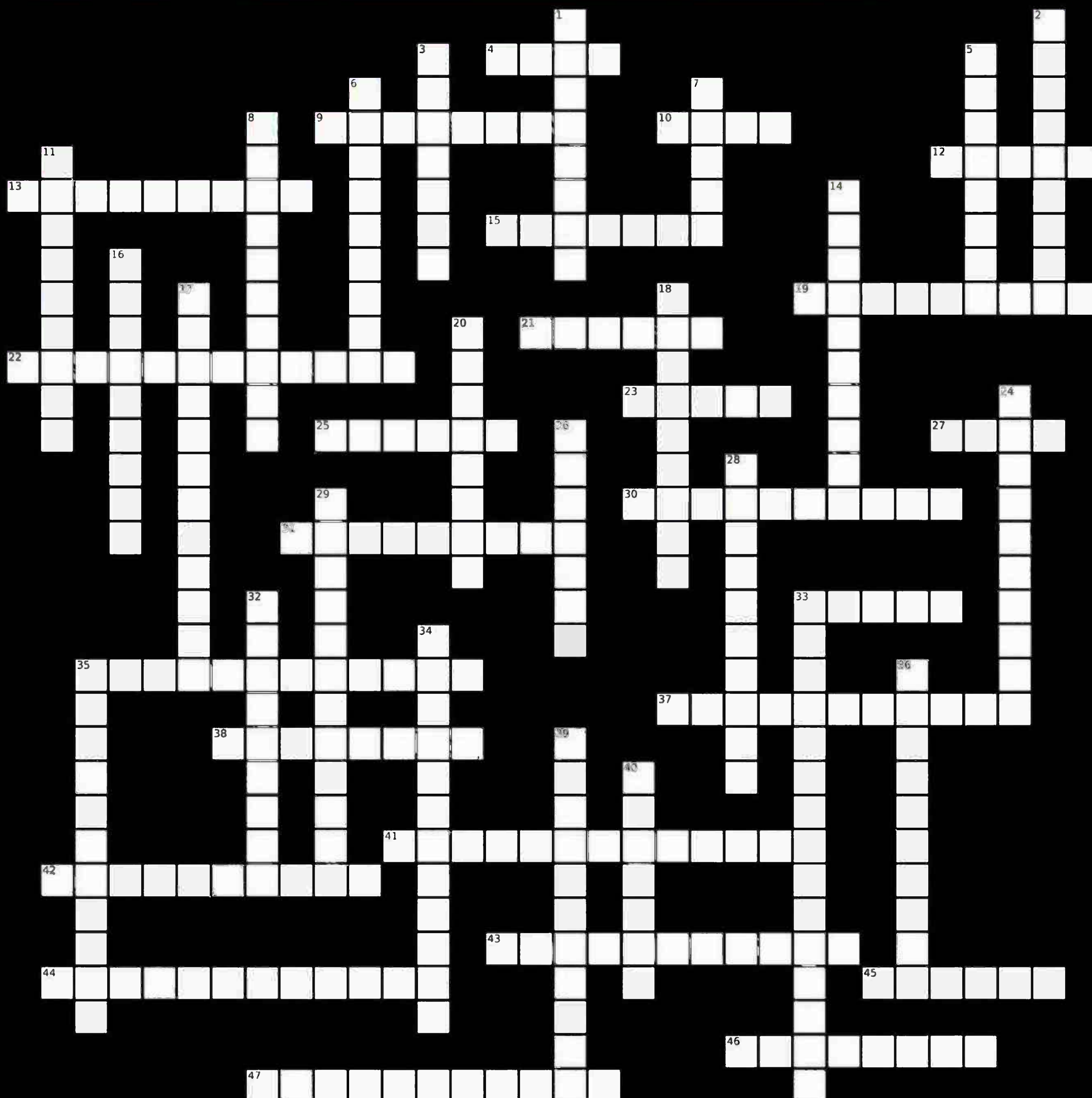


Turntables
Best turntable £800+
Clearaudio Concept



Christmas Crossword

FEATURE



ACROSS

4. A type of bike - and a legendary British hi-fi brand (4)
9. High-end Swiss amplifier manufacturer (8)
10. U2's lead singer (4)
12. An amplifier's output power is measured in... (5)
13. Johnny Rotten's real name (4,5)
15. German loudspeaker manufacturer (7)
19. Separates high and low frequencies in a loudspeaker (9)
21. Designer of the Android operating system (6)
22. Some Guys Have All The Luck singer (6,6)
23. Founded by Lee Taylor and Mallory Nicholls (5)
25. Original name of Joy Division (6)
27. Creek's loudspeaker arm (4)
30. You'll always find him in the kitchen at parties! (5,5)
31. Japanese maker of tape decks (9)
33. Cambridge-based hi-fi manufacturer (5)
35. Founder of Glastonbury (7,5)
37. American electrostatic 'speaker manufacturer (6,5)
38. Sound measurements (8)
41. Founded Naim (6,7)
42. Home city of New Order and Happy Mondays (10)
43. She sang Cry Me A River (5,7)
44. Beatles manager (5,7)
45. Single ended... (6)
46. Author of The Rest Is Noise (4,4)
47. They're not valves (11)

DOWN

1. Grand Funk... (8)
2. Another name for a record player (9)
3. Maker of the Cadenza Black cartridge (7)
5. Canadian manufacturer behind the Moon range (8)
6. My Bloody...(9)
7. Partner of Naim (5)
8. Ian Dury and the...(10)
11. McIntosh supplied amplification for this famous festival (9)
14. Founded by Gilbert Briggs (10)
16. Echo And The Bunnymen hail from here (6)
17. Surname of Devo founder and writer of music for The Lego Movie (12)
18. Wireless transmission standard (9)
20. An ocean...and a famous record label (7)
24. Founder of Factory Records (4,6)
26. Direct Stream... (7)
28. Frontman of Talking Heads (5,5)
29. French town and British pop band (5,7)
32. Founder of Apple (5,4)
33. Former tenant of Boleskine House - once owned by Jimmy Page (8,7)
34. One half of the KLF (4,8)
35. Blues singer who's Mojo was always working (5,6)
36. Guitarist in The Smiths (6,4)
39. Planar magnetic loudspeakers from the US (11)
40. High-frequency driver (7)

Answers

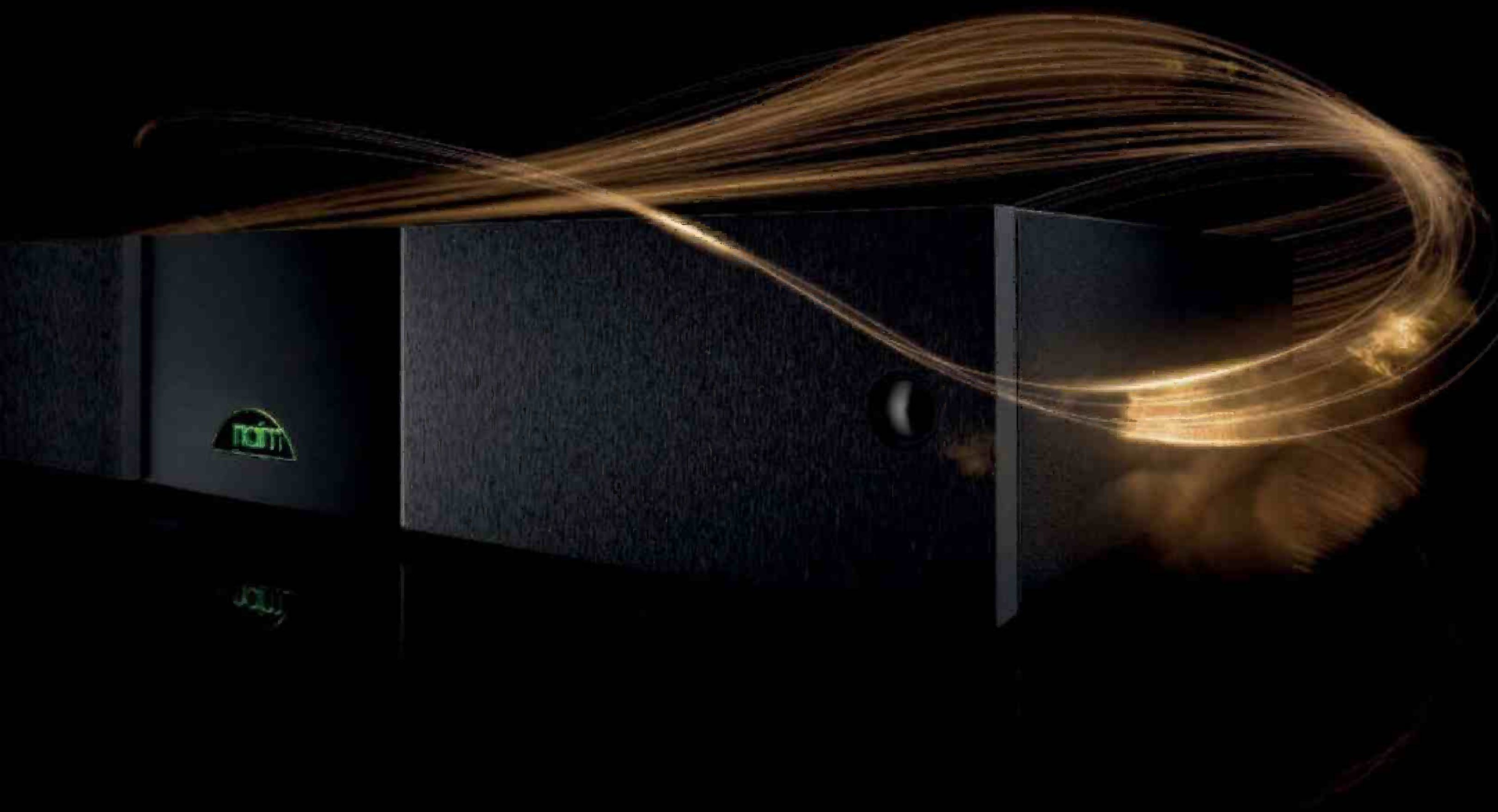
Across

4) Quad 9) Dartzeel 10) Bono 12) Watts 13) John Lydon 15) Quadral 19) Crossover
21) Google 22) Robert Palmer 23) Leema 25) Warsaw 27) Epos 30) Jonah Lewie 31)
Nakamichi 33) Arcam 35) Michael Eavis 37) Martin Logan 38) Decibels 41) Julian Vereker
42) Manchester 43) Julie London 44) Brian Epstein 45) Triode 46) Alex Ross 47) Transistors

Down:

1) Railroad 2) Turntable 3) Ortofon 5) Simaudio 6) Valentine 7) Focal 8) Blockheads 11)
Woodstock 14) Wharfedale 16) Liverpool 17) Mothersbaugh 18) Bluetooth 20) Atlantic
24) Tony Wilson 26) Digital 28) David Byrne 29) Saint Etienne 32) Steve Jobs 33) Aleister
Crowley 34) Bill Drummond 35) Muddy Waters 36) Johnny Marr 39) Magneplanar 40)
Tweeter

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Go Deeper



"Products can and should do their job easily and reliably"



Noel Keywood

What is a hipster? This new phrase keeps drifting past me when I read the daily news. As I pad the streets of London I have come to think there's a connection with lavishly crafted flat caps, beards of a certain casual nature and – most catching to my eye – vintage motor-cycles. Or ones that look that way at least. And in this new sensibility I suspect a thirst for vinyl lies.

Which is OK by me. For the time being I'm not going to buy a flat cap because there are better ways to keep the water off and the heat in. Hipsters can keep 'em. I like the style, it's easy on the eye – all those soft browns and autumnal yellows – but mock retro is more than a little faux, even if it is kind of nice in a quaint way. Turntables are more authentic.

But perhaps I am missing the point and I should know better! Rather than brush off the flat cap I should try one on. After all, they were loved by Londoners in 1850 and 60 years later in 1910, I see from early photos of London's streets from the Getty collection, published on the Daily Telegraph's website recently. Fascinating. There must be something in there I am missing (ignoring poverty).

It's the same with vinyl methinks. I could rattle on all day about its technical merits but perhaps that isn't the point for so many, especially hipsters. The LP and the turntable are contraptions we can all understand and use, without need for a 150 page, densely-worded manual of the sort that, these days, accompanies AV receivers and digital cameras, to take just two good, by which I mean terrible, examples.

I wrestle with both and despair. Fed up with the bulk, weight and complexity of a Nikon D600 for example, too much for hi-fi shows

and press receptions when you have to conduct a conversation whilst avoiding show visitors whilst trying to take a picture in Stygian gloom, I bought a simple, pocketable Fujifilm X-T10 the other day. Unfortunately, the manual is anything but simple; accessibility to this device approaches zero for anyone not a photographic expert – and masochist too.

A record deck, by way of contrast, is gloriously easy to use. It isn't that it lacks complexity, so much as that complexity doesn't challenge you, even fight you it seems, in daily usage, as a modern camera does, or an AV receiver. You don't approach a turntable wrapped in trepidation about whether it will spin or not; it performs its function in a simple yet reliable way.

The hi-fi business, as I'll call it for the sake of my argument here, moves into similar territory with AV receivers. These things are truly barking. I know because I have to study every word in their manuals and understand every facility – and I use one at home too, in a TV system. Yes, they work, and they work well.

But a lot of what they do is unnecessary and effectively unusable in any case because access is so difficult. When the cat sits on the remote control all hell breaks loose, and every six months an internal processor re-set is needed, plus subsequent re-programming, to avoid erratic behaviour, due to software corruption. In this discussion I'll not mention the "intelligent TV" (hah!) and the keyboard needed to operate it. The world has gone mad.

All this stuff has a strict shelf-life. If the mechanical bits, such as switches and relays, don't break, new models and changing conditions will still compromise the product's effectiveness and ultimately send it to the scrapheap, to be replaced by a shiny new model.

And that is what is supposed to happen of course; if it didn't the industry that built it would collapse. Well, it wouldn't but it would have to scale right back.

Yet ironically, that is precisely what is happening to AV and domestic desktop computers. Consumers are fast losing interest in this stuff: it isn't easily accessible to them, it is too complex for their needs or doesn't meet them, like my camera, it isn't reliable and it will be made obsolete within three years or so, forcing us involuntarily onto a treadmill of expenditure.

All of which brings me back to the humble turntable and cloth caps. I get it! Hipsters seem to get it too.

Products can and should do their job easily and reliably. They must fulfil their basic function in a way that is obvious to the user, without recourse to anything except the simplest user manual, of one page, not one hundred pages.

The product should be serviceable too, so it does not have to be scrapped and replaced when a simple failure occurs.

We then slowly move away from obscene consumerism, where perfectly good devices made prematurely redundant must be thrown away.

I may have my doubts about Victorian flat caps but I don't about moderating throw-away consumer culture.

I like the idea of products that are important to us being made to do their job without having to be regularly replaced. And the hi-fi turntable is a great example of this.

I think I can see why hipsters take to this sort of product from yesteryear – and the cloth cap. I suppose I just now have to get in the spirit of things and dress appropriately whilst using my trusty Garrard 401. ●

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"The Keef Hartley Band is one of those outfits that deserve more attention"



Paul Rigby

I don't intend to patronise but I do feel sorry for Keef Hartley and his band. "Keef, who?" you ask. Well, exactly. The Rolling Stones' Mr Richards is not the only 'Keef' that dazzled the rock firmament.

Doing the job I do, I'm in an ideal position to pursue my interests as an amateur music historian. One of my interests is the Woodstock Music Festival.

The seminal music festival that took place in the USA in 1969 stood for a lot of things within 60s art culture, not least for being the beacon to the so-called Summer of Love (a media creation, it really wasn't).

Anyone who wants to know more about the festival and what really happened behind the scenes should immediately seek out the book 'The Road to Woodstock', written by the man whose idea it was and one of the principle organisers of the whole affair, Michael Lang.

Woodstock itself never made a dime, partly because the poor security arrangements turned the potential money-spinner into a free festival. The one part of the occasion that did make money was the film of the festival which played to cinemas world-wide and made major stars of just about everyone who appeared within it.

There has also been, over the years, a series of CD packages offering an audio version of events and there's even been outtake DVDs and expanded versions of the concert including extra footage that could not be included in the main film.

It's also been a self-imposed task of my own to collect audio of every artist who performed during that time and every song that they sang to boot. 'Boot' is the operative

word too because you have to peer into some grubby Internet corners to find this stuff. But find it I have and one of the main finds was one of the very few Brit bands that appeared at the time. Not The Who, not Joe Cocker, not even Ten Years After. Some say that the lost artist of Woodstock was Bert Sommer (he sang nine songs and never received a moment's coverage) but I'd add to that the only other UK artist(s) of the festival, one Keef Hartley.

Stuck in between John Sebastian and The Incredible String Band, the four songs plus four-song medley from Hartley et al sank without trace (blame the manager who refused to sign the movie-rights paperwork) and it's a crying shame because our Keef was a highly talented guy, while his band was a nursery for a string of talented individuals.

As a band, Keef Hartley merged jazz and rock to present a progressive rock vibe. If you know Colosseum then you're sure to like Keef, although Keef had more blues infusions in his work. Hartley himself was a veteran in the music scene. In fact, when Ringo Starr left his old group Rory Storm & The Hurricanes it was Keef who took the drummer's stool.

Later, Keef would become a member of The Artwoods (seen as a prototype for the heavy metal band Deep Purple) and then later attached himself to John Mayall's Bluesbreakers.

After their Woodstock stint, the Keef Hartley Band really got going in 1969 as a studio outfit with the release of the album 'Halfbreed' which highlighted Hartley's interests in Native American Indian studies. Arguably his most famous album, it features the laid-back, yet forcefully sung 'Born To Die' plus 'Sacked' whose introduction has Hartley

'playfully' sacking John Mayall over the phone!

'The Battle of North West Six' album was released in 1970 and saw a slight dip in quality but included the addition of a brass section and moved towards R&B and away from the languid blues style of the band's debut while the brass section added a jazz flavour.

'The Time is Near...', also released in 1970, was the best LP of the lot to date, taking a more esoteric direction mixing jazz, soul, R&B with a splash of harder rock.

The LP is packed with strong melodies and hooks a-plenty, with those promised prog flavours to add interest. As you can tell from the above, though, the recipe sourced a wide-ranging array of ingredients to produce something uniquely Keef.

The band's next release, 'Overdog' from 1971, changes the picture again, moving away from any promises of complexity by wiping out the prog elements and returning to a simple, rocking presentation with a gritty, harder rock.

This album is full on and in your face with added wah-wah flavours and a pieces of funk just to spice up the music.

Released in the same year was 'Little Big Band' recorded at the Marquee Club in 1971 then 'Seventy Second Brave' (1972): Genesis men, Phil Collins and Peter Gabriel feature as uncredited vocal backing performances.

All of the above can be bought via the Esoteric label, incidentally, often with new liner notes from Hartley himself and each are well mastered.

The Keef Hartley Band is one of those 'lost' sixties and seventies outfits that deserve more attention that they get – and if it hadn't have been for their manager, they might have had some! ●



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“Most of the major record companies have shown little interest in pushing high-resolution material”



Jon Myles

DAC manufacturers (of whom there seem to be more every month) appear to be involved in their own version of a technological arms race at the moment.

This issue I've reviewed the new Northern Fidelity DAC-384 from Danish digital specialists Lead Audio – that, as its name suggests, can handle audio files of up to 32bit/384kHz. It is quite a leap in quality when you consider that when the company launched its first DAC just five short years ago its resolution extended to just 24bit/48kHz.

Then there's the latest device from Chord named Mojo that Editor Noel Keywood has the comprehensive rundown on. No bigger than a cigarette packet and designed for mobile use, it can process anything up to an astonishing 768kHz.

As if this were not enough, there are ever more DACs able to playback DSD of different flavours (yes, Mojo can do that too).

Most DAC manufacturers use chips from digital technology firms such as America's ESS who are always looking to push the boundaries of their products in the hope of better sales.

So, if a chip will process 32bit/384kHz or DSD then why not use it? Chord, by contrast, develop their own DACs but they, too, are always looking for advances in the digital domain.

It's all well and good and great news for us consumers but there is one obvious caveat; where's the music to make the most out of all this technological ability?

For while DAC manufacturers are pushing the boundaries of what can be done, the content providers are lagging behind to a massive extent.

It seems to be the exact

opposite of the glory days of vinyl and CD. Then, it took ages for manufacturers to build replay equipment that could actually get the best out of the music contained on vinyl and silver discs. The first CD players, in particular, were crude sounding and it's only been in the past 10 years that we have seen the equipment really extract the best from the medium.

Now it's the other way around. We have massively accomplished and technologically advanced equipment that, in relative terms, is supremely affordable yet most people don't have the content to actually take advantage of it. The majority of people I know – even those who are committed audiophiles – have few digital files above 24bit/192kHz with the vast majority of their collection in 24bit/96kHz or plain standard CD quality.

The reason is that there's so little to actually buy – and even when it is available it is often prohibitively expensive. Most of the major record companies have shown little interest in pushing high-resolution material even as sales of traditional mass-market mediums like CD have declined.

And with some of those same companies now making as much as an estimated 30 to 40 per cent of their revenues from low-quality streaming services they probably see little reason to do so.

Even Apple – who helped create the download revolution to a great extent – has shown no interest in high-resolution downloads through iTunes. It probably won't do any time in the future either, now that it has its Music streaming (at a crippled 256kbps) and analysts estimate that the bulk of the iTunes revenue is now coming from films and TV series.

There are honourable exceptions such as the websites HD Tracks,

Blue Coast and 2L who have all championed high-resolution downloads – but there's no guarantee they'll have anything by your favourite artists or something that tempts you to listen to something new.

So I cannot help but think some of the biggest artists and bands are missing an obvious trick. Many of these, like the Rolling Stones, Madness, The Stone Roses and even more recent ones such as Madonna and Taylor Swift make the bulk of their money from concerts instead of music sales nowadays.

So why not take advantage of their packed touring schedules to release live material from the dates in high-resolution. I could easily envisage a 32bit/384kHz recording of a Rolling Stones date selling in the thousands to those of their fans who now have the capability to play it back.

It could even open up a whole new market with high-resolution downloads of certain concerts being made available for a limited time only or being released just 24 hours after the event itself. Imagine; 10,000 fans see the Stones one night and then have the opportunity to listen in high-resolution on their Mojo just the day after.

The technology is there to do it so it's high time the music industry started taking advantage of it if high-resolution downloads are ever going to make a significant impact and become something more than simply an audiophile sideline.

What's more, when devices like the Mojo start showing people just how good high-resolution files can sound on reasonably-priced equipment they may start investing in hi-fi equipment for their homes as well. Which would be much better than the future being dominated by low-quality streaming from the likes of Spotify and Apple. ●



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"One of the best resources I've come across is the superb americanradiohistory.com"



Martin Pipe

Information is almost as important to hi-fi as the music you play on it. From the catalogues and advertisements that draw your attention to it, through the reviews that independently assess it, to the instruction books that tell you how to use it. And then there are the service manuals that tell the electronically-inclined how to repair it.

It's fascinating to go through old magazines and brochures, as they are time capsules in their own right; a record of recent history, forged through commerce. They are often lovingly-used to illustrate *Old Worlde* articles.

Hi-fi shows were big business in the seventies, with hundreds of exhibitors, thousands of punters and likely tens of thousands of aspirational brochures and glossy catalogues stuffed into (free) carrier bags, never to be read. Until, that is, they're discovered 40 years later while clearing out dearly-departed Dad's loft. Then they end up for sale on eBay – or, if we're lucky, scanned and uploaded to an Internet site.

At today's audiojumble-type events of the sort that take place twice a year in Kent, for example, you can often find and buy old magazines containing ads like these.

What strikes me about these magazines is their technical content and emphasis on objective lab-testing over subjective listening. And DIY projects – from John Linsley-Hood's respected amplifier designs, through quad decoders, to dynamic range-expanders – were more common back then. The expense of ready-built hi-fi did however give readers an incentive to 'home-construct'.

Our esteemed competitor *Hi-Fi News* (and *Record Review*) is mercifully still with us, but during the hi-fi boom years of the 1970s there was a much wider choice of

reading. Competing with *Hi-Fi News* for space on British news-stands were *What Hi-Fi*, *Hi-Fi Answers*, *Popular Hi-Fi*, *Hi-Fi Sound*, *Practical Hi-Fi* and – I kid ye not – *Hi-Fi Weekly*. Most are long-gone. Oh and *Hi-Fi Choice*, now a stablemate of *Hi-Fi News*, existed too, but as a 'paperback book' containing enormous group-tests of specific products – amplifiers, cassette decks, turntables, etc.

The highbrow Gramophone had a hi-fi section and the BBC's Radio London broadcast a hi-fi programme called 'Sounds Good' – does anyone have any recordings?

All of this happened long before *Hi-Fi World* arrived in 1991, although founder/editor Noel Keywood was contributing to magazines at this time. Indeed, at one time, back in the early 1970s, he edited *Hi-Fi Answers*.

Surprisingly, few of these early hi-fi magazines have been scanned, converted into PDF form and published on the internet by enthusiasts. I haven't found any of the iconic *Hi-Fi Yearbooks* that were issued annually from the mid-1950s to the early 1980s.

But that's not to say there's nothing out there. One of the best resources I've come across is the superb americanradiohistory.com. This site is arranged into sections listing different subjects, and the collections of documents that cover them. Although the emphasis is, as the site's name suggests, American broadcasting (itself fascinating), you'll find PDF copies of *Tape Recording* (a UK magazine, from the then-publisher of *Hi-Fi News*, that morphed into the equally-readable *Studio Sound*).

There's also an interesting American mag of the same age, and the excellent US consumer publication *High Fidelity* – most, if not all, issues from 1951 to 1970.

Look around, and you'll find copies of *Wireless World*, *Broadcast Engineering*, *Practical Television*, *dB Magazine*, *Audio Engineering*, *Radio Age*, *RCA Broadcast News*, *FM Atlas*, *Radio Constructor*, *Byte*...

On top of this are numerous handbooks, industry reports, logbooks, coverage maps and literature published by radio stations. You could lose yourself for ages! I wonder how much time it took the people behind the site just to scan all of this wonderful material. And incredibly, it's all for free. Compare this with the numerous sites that take copyrighted material – most notably, poor-quality scans of instruction books and service manuals – and charge you to access them.

But there are free alternatives – worth bearing in mind, if your hi-fi equipment needs attention. Elektrotanya.com, eserviceinfo.com and nostatech.nl are all worth a visit.

But for the hi-fi enthusiast, two sites stand out above all others. Hifiengine.com and vinylengine.com, frequently-referenced in *Old Worlde*, contain enormous repositories of scanned instruction books, service data and brochures – all organised by manufacturer.

Both of these related sites also feature a comments/requests feature, equipment database and 'Readers' Hi-Fi' photo gallery. You have to register to download, but no money changes hands. hifiengine.com alone boasts nearly half a million registered users, and encourages the conversion and uploading of information that's not already on the site. Thanks to this, a bewildering variety of documents are available. Even if your gear is obscure, take a look. You might find it documented here! Information on hi-fi can be as fascinating as the products themselves. ●

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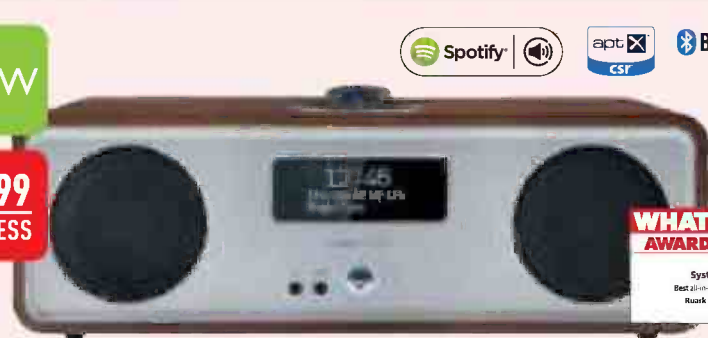
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S O U N D & V I S I O N

K-Class!



Take Roksan's K3 CD and add a pair of digital inputs. That, discovers Martin Pipe, increases the versatility of a strongly-performing CD player.

A short while back, we extolled the virtues of Roksan's K3 CD – a substantially-built but rather basic CD player. But the machine fulfilled its single purpose exceptionally well, with an unfatiguing and finely-etched sound that complemented a wide range of musical genres. The K3 CD's Burr-Brown PCM1798 DAC may be able to handle 24-bit, 192kHz signals but alas has to make do with the 16-bit, 44.1kHz of CD, no intermediate upsampling tricks being applied in the player's bowels.

Roksan obviously considered this to be a wasted opportunity, so we now have the K3 CD Di – basically a K3 CD with added DAC potential (the 'Di' presumably standing for 'digital input'). The newer model exists side by side with the K3, rather than replacing it. They look identical, are supplied with the same remote and have equal disc-playing ability.

But now, the K3 CD's sonic virtues can be experienced on external digital sources – optical or coaxial; there's alas no USB for

computer audio here. A look inside reveals the usual high standard of Roksan engineering apart from the fact that the K3 CD Di's circuit board is different to that of the K3 CD. Although much is shared – the PCM1798 DAC and NEC CD 'jungle chip', for example – the board's layout is different.

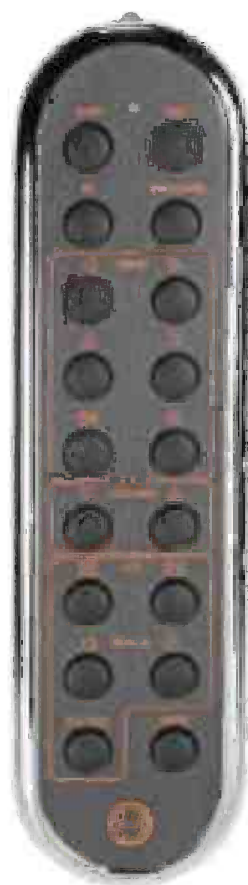
This is because it has to accommodate the TI/Burr-Brown DIR9001 – a chip that performs digital input interface duties – and the associated circuitry. Roksan didn't just leave components or modules off a K3 CD Di board for K3 CD production runs, instead preferring to optimise layouts for each player. Upgrading a K3 CD to 'Di' spec is thus not really practical, so make sure you buy the right model from the outset!

A three-way switch on the base of the K3 CD Di toggles the source between CD playback or one of the digital inputs. If you're using optical, the base glows blue. If the coaxial feed is selected, a white light confirms the fact. There's no illumination if you're playing a CD; in this scenario, then, the K3 CD Di is to all intents and purposes a K3 CD. That means the same CD-playback basics

– previous/next track, play/pause, stop, repeat, shuffle and a lack of 'extras' like MP3/WMA CD-ROM compatibility.

What a pity that electronic switching isn't provided! You cannot, as a result, switch between CD and DAC modes with the remote. I have read claims that the K3 CD Di's inputs will accept signals going all the way to 192kHz/24-bit – odd, considering that the datasheet of the Burr-Brown interface chip states a maximum 96kHz. Interestingly, the upper sampling-rate limit we measured during our lab. tests was 176.4kHz – i.e. the DIR9001 is performing beyond spec.

But let's examine this from a practical perspective. There's not an awful lot of musical material available with a sample rate of 192kHz, which is perhaps hardly surprising as it's absurdly high for audio purposes – a waste of data capacity! After all, how many instruments (even harmonically) and, for that matter, the microphones that capture them reach the lofty heights of 96kHz – thereby making such an exercise worthwhile? I'm certainly amused to find 192/24 Blu-ray audio discs remastered from analogue tape.



That 96kHz upper frequency is, by the way, around five times the upper limit of human hearing... But I digress! Even 96kHz (with its theoretical 48kHz upper-limit) is arguably wasteful; however, the K3 CD Di can – if my own tests are to be believed – accept such material at the 24-bit resolution that can make an audible difference. Naturally, 24-bit (and 16-bit) material sampled at 44.1kHz and 48kHz are playable here.

SOUND QUALITY

I have for several months been putting the K3 CD Di to regular use with a Benchmark DAC2 HGC DAC/preamp/headphone amp, AHB2 power amp and SMSI speakers; I also tried an Arcam FMJ-A49 integrated amp and Aurum Wotan VIII speakers. My external digital source was an A. C. Ryan PlayOn HD2, pulling losslessly-compressed (FLAC) tracks from a QNAP NAS box via a network and connected to the K3 CD Di optically.

Hardly surprisingly, considering the common heritage of the electronics inside, the K3 CD Di is similar to its smaller brother in presentation terms.

That means a forward and detailed sound; the rhythmic propulsion and perceptible ‘edginess’ I sensed on the percussion of Joy Division’s ‘She’s Lost Control’ (Unknown Pleasures, CD) was very much as I remember it from the K3 CD. Meanwhile, the dry electronic hi-hats, snares and samples that underpin the various tracks of Spanish techno artist Oscar Mulero’s ‘Muscle And Mind’ album (FLAC conversion) were dealt out with deftly-timed precision.

Then, shifting in taste again, we come to the harmonica played by Ray Davies on the bluesy ‘Last of the Steam-Powered Trains’ (The Kinks Are the Village Green Preservation Society, CD rip – FLAC). This was conveyed with the necessary bite, but not to the extent that it dominates the mix. The sound of the track is fuller and richer than Howlin’ Wolf’s ‘Smokestack Lightning’, recorded more than a decade beforehand and a track that so obviously inspired The Kinks composition.

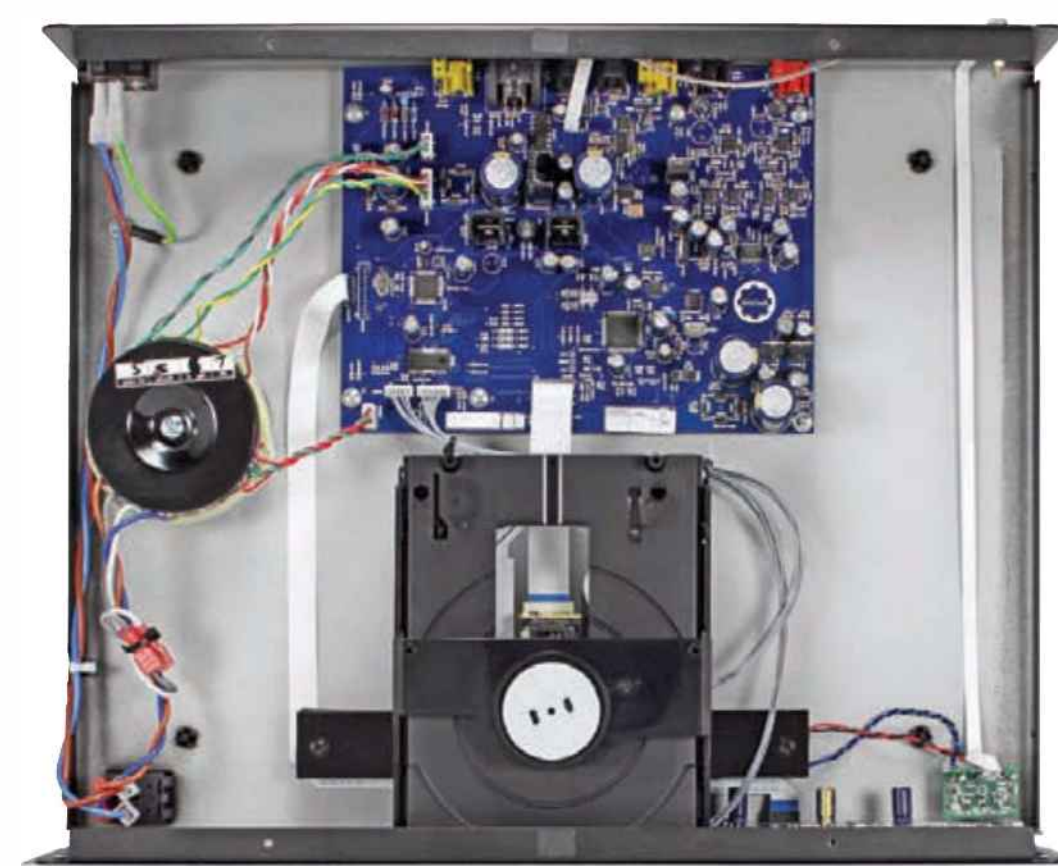
This difference in atmosphere is certainly apparent here; the comparative simplicity of that wonderful old Chess recording (disc two of ‘The Complete RPM & Chess Singles As & Bs: 1951-62’) ensured that its own harmonica contribution

was easier to pick out.

And what of the other end of the spectrum? ‘...Village Green Preservation Society’ is a 1968 recording, albeit remastered in 2004 as part of the 3-disc Sanctuary Records special edition. The K3 CD Di gives you that ‘60s bass sound as you expect to hear it - smooth, warm and almost as nostalgic as the album’s quaint subject matter.

Move forward over forty years, though, and there’s a different sort of bass in town. This player has at its disposal the scale, depth and sheer weight to complement tracks from that dark and brooding Oscar Mulero album. For articulation, though, what better than Tchaikovsky’s ‘Fourth Symphony’ – specifically, the third movement (as performed by his countryman Svetlanov conducting the USSR Symphony Orchestra, back in 1967).

The bass drums and lower strings have impact, yet never lose control. More delicate elements of the work, for example the triangle and pizzicato strings, are treated with due delicacy. All of these elements form part of a believable soundstage that develops across the two speakers.



The neat interior is very similar to that of the K3 CD. Once again, much of the functionality is contained within a single NEC semiconductor device and the DAC is a Burr-Brown PCM1798.

CONCLUSION

I’m pleased that Roksan has increased the potential of its fine-sounding K3 CD with digital inputs, but it’s a pity that such connectivity has stopped short of a USB port. Bluetooth we can live without, not least because some of Roksan’s matching integrated amps offer this facility.

But the added functionality as provided is welcome, as it means you can enjoy the musicality of the K3 CD with other digital sources.

MEASURED PERFORMANCE

The K3 DAC accepted up to 176.4kHz sample rate but wouldn’t recognise 192kHz through either optical or electrical inputs. Analogue frequency response reached 30kHz before rolling

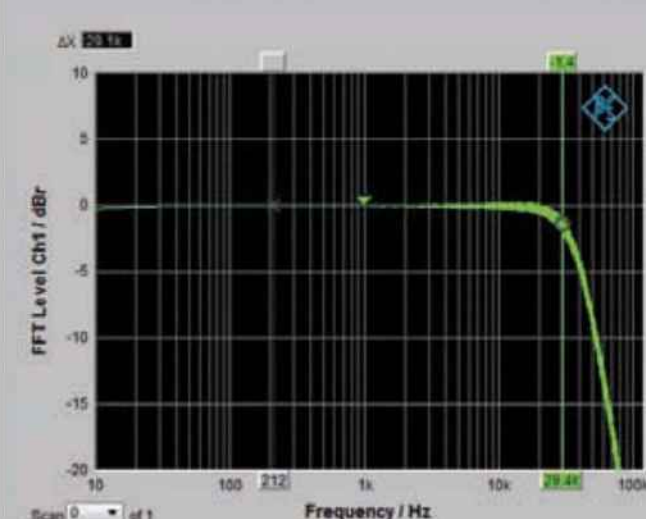
away to the upper half sample frequency limit of 88.4kHz our analysis shows.

There were spurious products – seen as spikes – in the distortion analysis that should not be there. The EIAJ Dynamic Range measurement picks up all unwanted signals: distortion, noise, quantisation noise etc and accordingly returned a low-ish 110dB dynamic range value with 24bit PCM. This is better than CD (102dB) but below the current market norm of 115dB, and much below the best at 120dB and above, to put the DAC into context.

Output measured 2.2V and was fixed; the remote volume control had no effect.

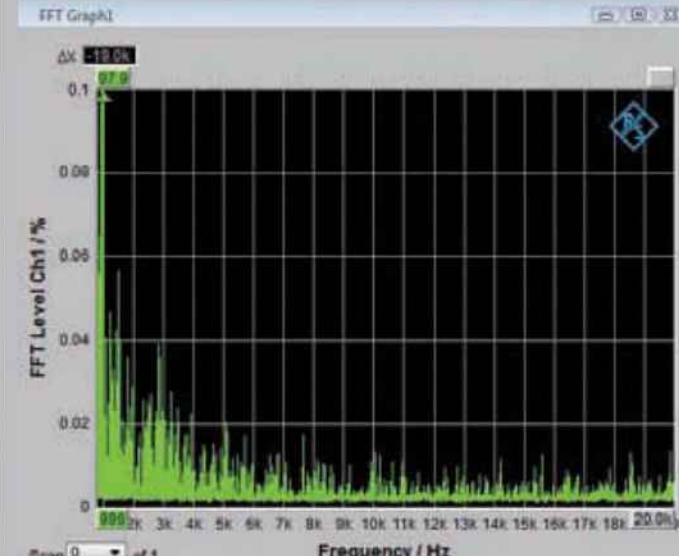
The K3’s DAC measured averagely well. It is no disgrace but the figures could have been better; they were below market norms. **NK**

FREQUENCY RESPONSE



DISTORTION

THD all	Level RMS	Frequency
CH1 0.0417 %	2.2653 mV	997.02 Hz
CH2 OFF	OFF	OFF



Frequency response (-1dB)	3Hz-30kHz
CD	24bit
Distortion	0.003%
0dB	0.04%
-60dB	110dB
Separation (1kHz)	110dB
Noise (IEC A)	-111dB
Dynamic range	110dB
Output	2.2V

K3 CD DI CD PLAYER/DAC £1300



EXCELLENT - extremely capable.

VERDICT

A solid performance and user-friendliness’. This player’s DAC functionality can transform the sound of sources like streaming media players and digital TV set-top boxes

FOR

- detailed, well-imaged and carefully-timed sound
- substantially-built
- ease of use

AGAINST

- no USB port
- can err on the bright side
- cannot switch between digital sources and CD playback via remote

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vinyl section

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JANUARY 2016

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CLEARAUDIO TRACKABILITY TEST RECORD

117

Noel Keywood tries out a new trackability test record to ensure your cartridge is correctly set-up.

news



RARENOISE DUO

Two from Rarennoise (www.rarennoiserecords.com) and new from Italian bassist and composer Lorenzo Felicity plus ex-Japan drummer Steve Jansen and King Crimson percussionist Pat Mastelloto is 'KOL', exhibiting ambience, prog, jazz constructions and atmospheres that seem to have escaped from the ECM studio.

Also look out for Metallic Taste of Blood's 'Doctoring the Dead' featuring art-punk rock, supercharged dub, fuzzed-out metal and ethereal sound-shaping. Porcupine Tree fans note that Colin Edwin occupies bass guitar.

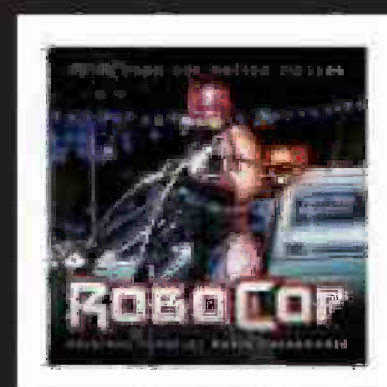
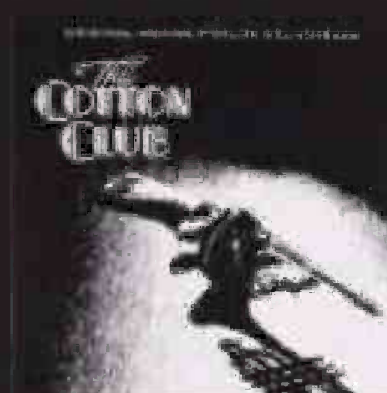
SOUNDTRACK SOUNDS

Soundtracks are everywhere this month and mostly from Music On Vinyl's imprint At The Movies. All limited edition, numbered and on coloured vinyl, they include 'Poltergeist' (2015) via Marc

Streitenfeld that features an insert; 'The Godfather Part II' (1974) via Nino Rota and Carmine Coppola; Federico Fellini's 'Otto E Mezzo' (1963) via Nino Rota; 'The Big Chill' (1983) featuring classic songs from the likes of Marvin Gaye and Procol Harum; 'The Cotton Club' (1984) featuring the work of John Barry; 'Southpaw' (2015) via James Horner, who sadly died recently, plus the work of Brian Tyler with 'Furious 7' (2015). The latter including a booklet and poster.

From Milan Music (www.milanmusic.fr) comes 'Robocop' (1987) and the music of Basil Poledouris (that's a double album in a single sleeve) plus 'Mustang' (2015) including the music of Warren Ellis.

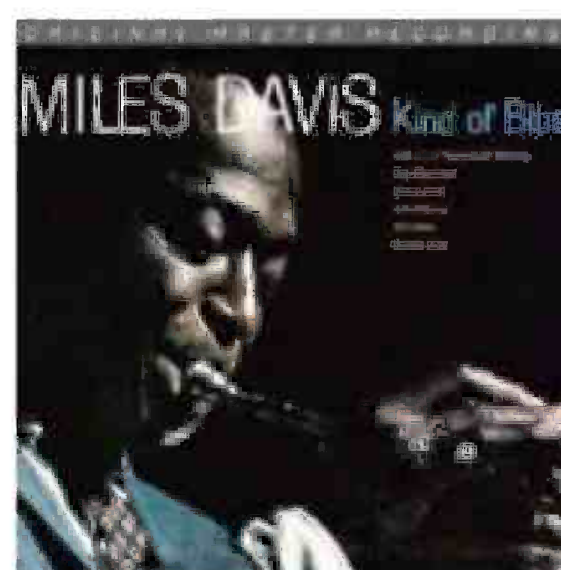
Finally, from UK outfit, Silva Screen (www.silvascreenmusic.com) comes the 40th Anniversary edition of the original motion picture soundtrack of 'Blazing Saddles' (1974) plus TV works from the BBC's Radiophonic Workshop and Delia Derbyshire in particular with 'The Delian Mode' (1968 at 33.33rpm) and 'Blue Veils and Golden Sands' (1967 at 45rpm) as a 7" gatefold edition.



MILES AND MILES

Two significant Miles Davis releases from Mobile Fidelity (www.mofi.com) features a two disc box set of the legendary 'Kind of Blue' (1959) which anticipated modal jazz and gave his band's improvisers room to manoeuvre – a total and complete masterpiece.

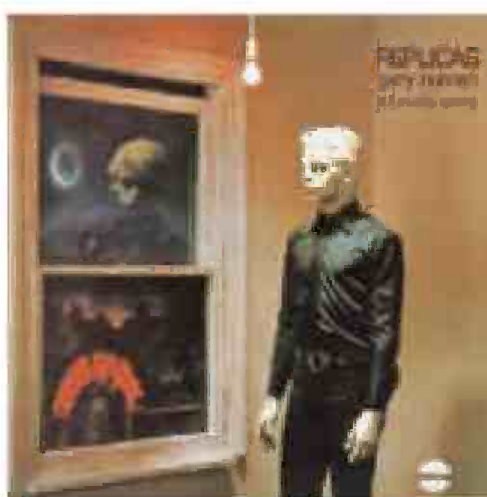
Also look out for 'Filles de Kilimanjaro' (1968). A superb release that features the launch into jazz-rock and the break from his second, classic quintet. Just ignore the pretentious French titling.



NEW NUMAN

Three classic LPs from Gary Numan (Beggars' Banquet). 'Replicas' (1979) saw Numan become defector leader of Tubeway Army. A perfect piece of paranoid, electro-punk. 'The Pleasure Principle' (1979) is even better; there isn't a weak moment on it with some wonderful ensemble playing. An ideal introduction into the man's musical canon.

Also look out for 'Telekon' (1980), another good album but a slight dip in quality compared to the first two releases.



MUSIC ON VINYL

New from Music On Vinyl (www.musiconvinyl.com) is a varied selection including Kevin Ayers And The Whole World's 'Shooting At The Moon' including a British supergroup of Mike Oldfield, Lol Coxhill, David Bedford and Mick Fincher. It's a 1970 LP that's full of possibilities but with nothing fully realised.

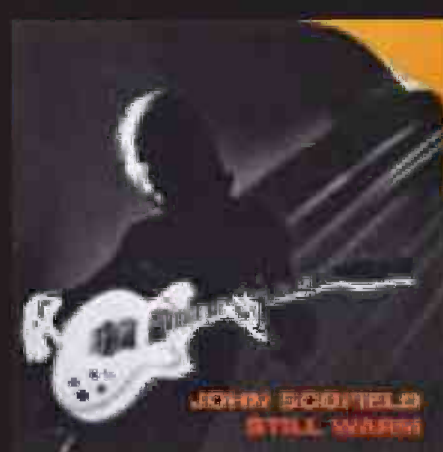
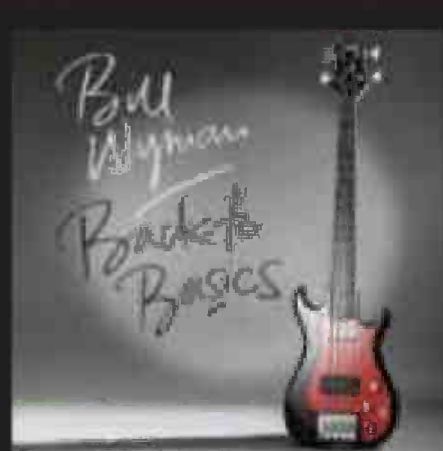
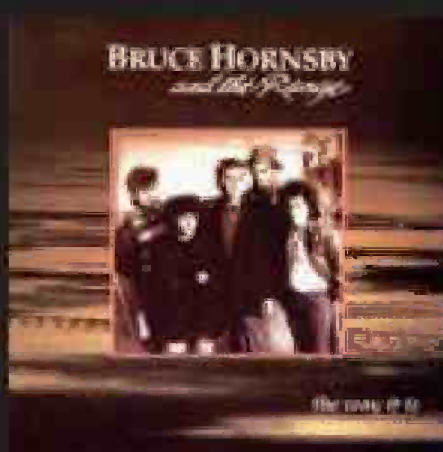
Much better is jazz-based sax man, Eddie Harris' 'Silver Cycles' (1968), a real eclectic album that mixes Latin funk with avant-garde electronics and everything in between!

Shuggie Otis' superb debut, 'Here Comes...' (1970) was co-written by him and his father Johnny Otis (a R&B legend in his own right). A top-quality series of blues rock guitar originals, Shuggie displays superb skill and talent.

Another superb release was Bruce Honsby and the Range's 'The Way It Is' (1986) featuring the hit of the same name. There's nothing raw about this debut, though, while the rest of the songs rival the hit single in terms of quality and poetic lyrics.

Over to Chaka Khan and 'What Cha' Gonna Do For Me' and a successful partnership with Arif Mardin. Khan displays superb vocals while the songs themselves (not always up to the same standard on past LPs) are, thankfully, of a similarly high quality.

Also look out for Bill Wyman's latest LP release 'Back To Basics'; Mobb Deep's superb 1995 release 'The Infamous', a masterpiece of foreboding, convincing hardcore rap, jazz guitar man John Scofield and 'Still Warm' (1986) with six original funky, genre boundary crossing compositions. Not the most important music he's ever produced, though; after 'JT' came 'Flag' from James Taylor which takes a dip in quality with so-so covers, remakes of his own compositions and substandard originals and Sarah McLachlan's 'Surfacing' (1997) which is not her strongest release. Good...but not great.



...AND FINALLY

A rather lovely 7" box set from Vampi Soul, 'R&B Hipshakers Vol.4: Bossna Nova And Grits' from the King and Federal archives with a host of unreleased fare from the likes of The Lamplighters and Little Esther.



From The Dead Weather is 'Dodge And Burn' (Third Man; thirdmanrecords.com), the best yet from this Jack White-formed supergroup (including members of Queens of the Stone Age and the Kills). It's a dangerous romp.

From Kurt Vile, 'B'lieve I'm Goin Down...' (*Matador*; www.matadorrecords.com) is a direct, simple, introspective LP with a deep melancholia running throughout.

Two from Mapache (mapacherecords.com) includes the sunshine folk pop of Mike Fiems' 'I Would Dream' (1974). A gentle, sincere, innocent, some might say naive album of hope and beauty. Also look out for Joe & Bing's 'Daybreak' offering West Coast, hippie-like folk vibes. This soft pop harmony-rich LP features lush strings via Deodato.



Artera

“Lush, gorgeous – choose whatever adjectives you like: The Artera duet respects the music.”

Ken Kessler, Hi-Fi News (November 2015)



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Combining the assurance of tradition with the buzz of innovation, QUAD Artera is the lifeblood of high-performance audio entertainment for modern music lovers. Visit QUAD's new website at quad-hifi.co.uk to find out more.

QUAD Artera Play and Stereo pictured with QUAD S2 speakers





WIN

TELLURIUM Q'S SUPERB ULTRA SILVER 2M LOUDSPEAKER CABLE WORTH £2,000 IN THIS MONTH'S GREAT GIVEAWAY!

Here's your chance to win Tellurium Q's Ultra Silver loudspeaker cables, 2metres long, reviewed in our June 2015 issue. Read the review excerpt below and answer the questions.

"Tellurium Q's latest Ultra Silver 'speaker cables have the company's trademark ribbon design with the conductors enclosed in a thick mesh braid and terminated with sturdy Z plugs (spade termination is also available).

While this makes for a hefty construction it is conversely extremely flexible so easy to route around furniture or other

obstructions.

Of the few things Tellurium Q will reveal about their cables is the fact that they are all engineered to combat the effects of phase distortion – an effect that can smear the sound and lead to errors in timing and accuracy.

That holds true across the entire range – but the difference with the Ultra Silver is that it has been voiced for greater detail and top end air and extension from, say, the Tellurium Q Black.

Did I say detail and extension? That's probably selling the Tellurium Qs a little short.

Plugged into a Sugden Sapphire FBA 800 amplifier the Ultra Silvers brought a level of clarity and

resolution that was something of a revelation.

Listening to the Cuban jazz of Robert Fonseca's 'Clandestino', the speed, control and timing of this busy track was impeccable. There was no muddying of the sound – instead a simple, pinpoint accuracy.

Fonseca's piano covers the full range and I heard it with all its rich, timbral weight; the soprano saxophone positively soared. The soundstage and focus was unerringly exact with no part of the sonic spectrum taking undue prominence over another. The only caveat is that at £500 a metre the Ultra Silvers are not cheap".

For a chance to win this great prize, just answer the four easy questions at right. Send your entries on a postcard only, by Jan 8th 2016, to:

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QUESTIONS

[1] Is the trademark design –

- [a] polyester
- [b] PVC coated
- [c] ribbon
- [d] pebble dash

[2] What connector is used –

- [a] Z plugs
- [b] screw terminals
- [c] solder tags
- [d] crimp

[3] They combat –

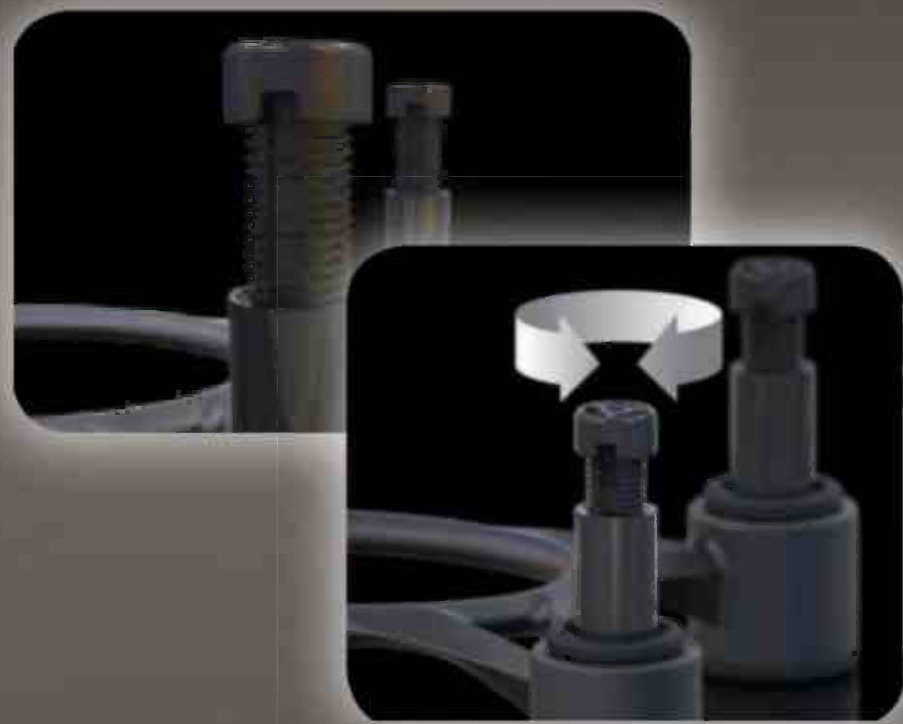
- [a] excess current
- [b] boll weevils
- [c] phase distortion
- [d] EMP

[4] Fonseca's piano had –

- [a] shaky legs
- [b] loose strings
- [c] woodworm
- [d] timbral weight

entries will be accepted on a postcard only

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Neville Roberts,
Hi-Fi Choice,
September 2014

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offer improved clarity and transparency to the sound. The
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Neville Roberts,
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Testing Times

Noel Keywood puts the needle into the groove as he tries out Clearaudio's new Trackability Test Record.

It's been a long time since I've seen a 'trackability' test record: Shure produced a whole series of them back in the 1970s when LP was king. Luckily, I have the lot – a treasured possession! – as well as classic CBS trackability test discs I still use today. Against these I inevitably compared Clearaudio's Trackability test disc, LPT-83063. Happily, LP technology has moved on and today's test LPs are in some areas better than their predecessors. And because in Germany the LP is popular and high engineering standards are pursued, I was expecting much from this test LP – and I was not disappointed.

What is trackability? It is the ability of the cartridge to stay in the groove when the music gets loud. If the stylus loses contact with the groove, it 'mis-tracks' and distortion is produced – an occasional buzzing sound. Worse, the groove side wall is damaged, imprinting the distortion into the groove permanently, to be

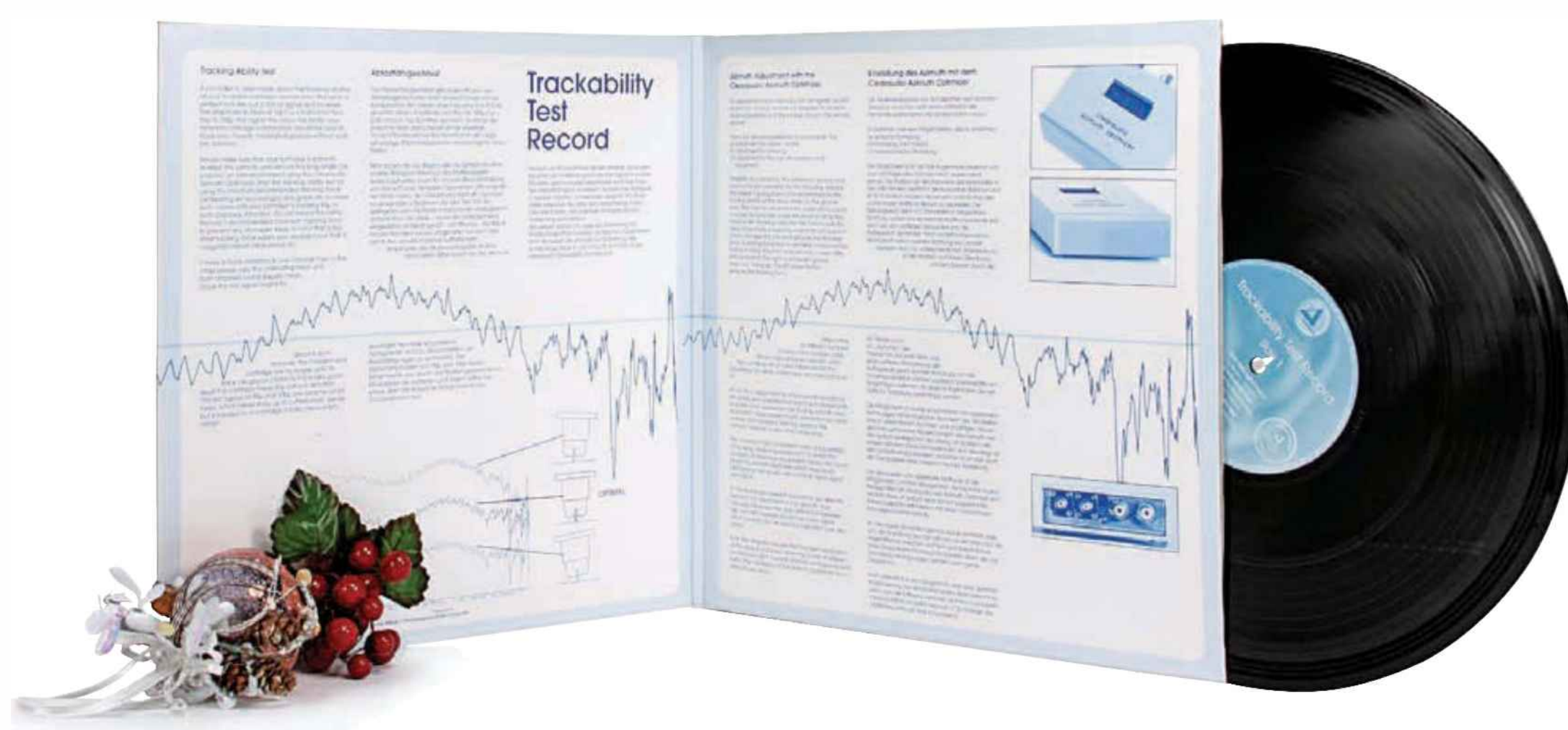
heard for evermore no matter what cartridge is subsequently used for playback.

Which brings me to tracking force and the need for a trackability test disc. Cartridge manufacturers quote a tracking force range and it is better to aim for a tracking force higher up the range to ensure good tracking, so avoiding groove damage, than one low down to minimise contact pressure. Lacquer plasticity and springback accommodate a high-ish force, meaning around 2gms for most modern stylus shapes, and you'll find Goldring state an optimum of 1.8gms for their cartridges, for example.

Clearaudio state that 80 μ (μ m peak amplitude) is the highest cut

on their test disc a cartridge needs to track – and I agree with this. Tracking down force should be set to get through this track, providing the recommended maximum is not exceeded. If it is, then you'll just have to accept you have a cartridge that's a little limited in this respect.

There are two higher values – 90 μ m and 100 μ m. These are torture tracks. Some high quality modern cartridges can play 90 μ m I find during testing; I have no 100 μ m track, this is very high.



A big 180gm (quoted) LP that sits flat on the turntable so that its modulation axes are properly aligned. This ensures correct azimuth alignment.

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MISCELLANEOUS

Akai GX635D open reel top of the range £1195
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Nakamichi 550 portable cassette deck £495
Various Nakamichi cassette deck phone for details
Schit LYR headphone amplifier £245
Little Dot MKIII SE £245
Musical Fidelity V-Link £75



"...the Bespoke sang more sweetly, more colorfully, and, above all, more forcefully."

Art Dudley - Stereophile, October 2015

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To summarise then, it's best to use a test disc such as this to see whether your cartridge is staying in the groove – and adjust accordingly. You don't need test equipment: just listen for buzzing sounds from the 'speakers or – better – headphones.

CONTENTS

What does this test disc have on it? Side 1 carries two sets of identical trackability test tracks, something I haven't seen before – on outside grooves and inside grooves. Groove velocity changes, becoming lower in inner grooves; you get to check tracking across the disc. I would prefer to see a low frequency tracking test and a high frequency test (1kHz-3kHz) as Bruel&Kjaer managed on B&K2010, as such tracks test two different cartridge properties, hinge compliance and tip mass, and can give quite different results.

Clearaudio also state the disc can be used to measure channel balance and adjust cartridge azimuth. As Shure pointed out long ago, with their TTR109 disc, this means the cutting lathe stylus must be set perfectly upright. Clearaudio suggest use of their Azimuth Optimizer. Or you could use the Fozgometer I reviewed in our September 2015 issue.

Just to warn though that if your cartridge does not have perfectly aligned generator coils you can find severe misalignments needed to achieve so called 'correct azimuth', with the headshell leaning wildly one way or the other. Then the stylus will be misaligned relative to the groove wall, which is unwanted. I have seen this many times when cartridge testing and you will also see complaints on Forums about this issue.

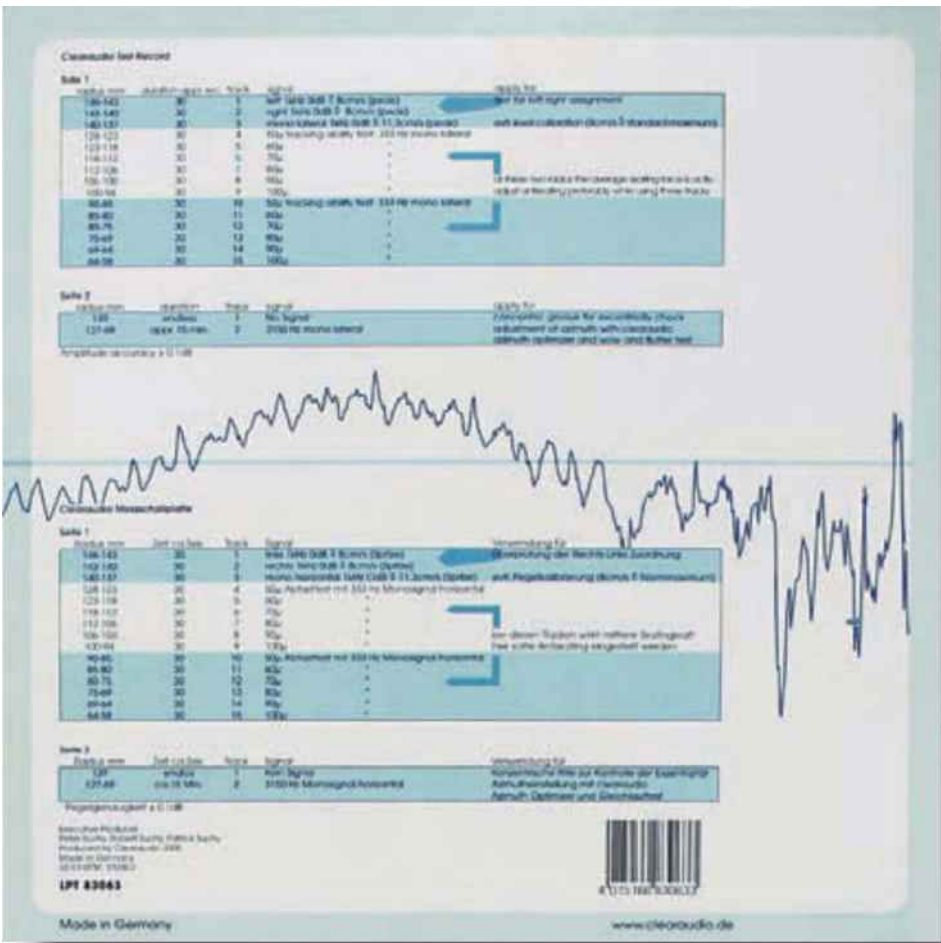
So be prepared to be perplexed! It isn't as straightforward an issue as Clearaudio or Fozgometer would make out and I avoid severe azimuth alignment/misalignment.

Unlike other test discs there are no vertical cuts, only lateral cuts, but vertical modulation amplitude is limited in any case, so I note this more than criticise it.

Side 2 of the disc is very interesting to people like me, and Clearaudio who make turntables, because it is for turntable speed accuracy and variation (wow & flutter) measurement. It's of little general use, however, although you can sit and listen to the 15 minute duration 3150Hz tone to see whether you hear it warbling and slurring – both of which it should not do. I'll just warn you that choosing to listen to a high frequency tone like this for any length of time is like volunteering to be tortured.

The tone is meant for a Wow & Flutter meter, but you cannot buy them new any more (£300 or so second-hand). You could conceivably use a hand-held multimeter (circa £80) to read frequency, which should be 3150Hz, to see whether your turntable is running fast or slow, especially if speed is adjustable, but a stroboscope is cheaper if a little less precise.

Is LPT-83063 accurate and usable? Importantly, it is pressed into 180gm vinyl and the disc is flat, with no outside safety lip, just a slightly tapered edge. Our sample weighed 202gms, so it was well above the 180gm weight claimed (traditionally, LPs weighed around 135gms) and ours also sat perfectly flat; there was no sign of dishing caused by differential cooling on the press, caused when the LP is removed too early during this stage of manufacture.



Instructions come in English and German.

So the disc comes across as very well made, in the hand or under inspection.

Trackability levels are 50, 60, 70, 80, 90, 100µm peak amplitude, a suitable range of high values finely spaced to well resolve actual mis-track amplitude. As Clearaudio say 80µm is a common maximum and a very good level of trackability; many cartridges start to mistrack slightly from 60µm upward I find, looking at the waveform on an oscilloscope, starting to let go at 80µm. By the way, nowadays your computer/laptop can act as an oscilloscope – Google 'software oscilloscope'. Your ears are good enough however.

CONCLUSION

This is a very well cut and pressed test LP. It is made from high quality vinyl, is heavy, sits flat on the turntable platter and its modulation axes and levels are all accurate I found from tests. It is useful to know about trackability and this LP is a fine way to do so. I thoroughly recommend it and will definitely be 'retaining' my sample for future cartridge review work!

Amplitude accuracy ± 0,1 dB

Side 1

radius mm	duration appr.sec	Track	Signal	apply for
146-143	30	1	Left 1kHz 0dB = 8cm/s (peak)	test for left-right assignment
143-140	30	2	right 1kHz 0dB = 8cm/s (peak)	
140-137	30	3	mono lateral 1kHz 0dB = 11,3cm/s (peak)	
128-123	30	4	50µ tracking ability test: 333 Hz mono lateral	evtl. Level calibration (8cm/s = standard maximum)
123-118	30	5	60µ	
119-112	30	6	70µ	
112-106	30	7	80µ	
106-100	30	8	90µ	
100-94	30	9	100µ	
90-85	30	10	50µ tracking ability test: 333 Hz mono lateral	
85-80	30	11	60µ	
80-75	30	12	70µ	
75-69	30	13	80µ	these two radius the average skating force is active adjust antiskating preferably while using these tracks
69-64	30	14	90µ	
64-58	30	15	100µ	

Side 2

radius mm	duration appr.sec	Track	signal	apply for
139	Endless	1	No Signal	concentric groove for excentricity check adjustment of azimuth with clearaudio azimuth optimizer and wow and flutter test
127-69	Appr. 15 min.	2	3150 Hz mono lateral	

Clearaudio give a comprehensive track listing with track radius (i.e. its position on the disc) from 148mm to 68mm, duration in seconds (30 secs, all tracks), track number and finally peak amplitude in µm. There are reference levels on outside grooves. Clearaudio recommend the 70µm tracks are used for anti-skating force adjustment.

CLEARAUDIO
TRACKABILITY
TEST RECORD
LPT-83063 £50



OUTSTANDING - amongst the best

VALUE - keenly priced

VERDICT
A very well made trackability test disc, well worth owning.

FOR
- heavy and flat
- accurately cut
- usefully wide range of tracking tests

AGAINST
- Side 2 is for W&F only
- azimuth alignment needs test equipment
- W&F needs test equipment

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Festive Quiz

Here's your chance to test your knowledge of all things hi-fi with our special Christmas Quiz. Answers are below - but no peeking!

1) In what English town are Naim based?

- a) Salisbury
- b) Shaftesbury
- c) Greatley
- d) Warwick

2) To which famous actress and comedienne was New Order bassist Peter Hook once married?

- a) Julie Walters
- b) Dawn French
- c) Caroline Aherne
- d) Jennifer Saunders

3) The Primitives later turned into which legendary band?

- a) The Clash
- b) The Beatles
- c) U2
- d) The Velvet Underground

4) KR Audio's T1610 valves are said to be the biggest in hi-fi. How high do they stand?

- a) Two foot
- b) 30cm
- c) 40cm
- d) 50cm

5) Noble Audio are famous for what?

- a) Loudspeakers
- b) Amplifiers
- c) Supplying the Queen's hi-fi
- d) In-ear headphones

6) Jimi Hendrix allegedly borrowed a refrain from which British TV show on Third Stone From The Sun?

- a) Panorama
- b) Coronation Street
- c) Z Cars
- d) Benny Hill

7) Meridian makes in-car sound systems for which manufacturer?

- a) Bentley
- b) Rolls Royce
- c) Land Rover
- d) Ford

8) Which Japanese company invented DSD with Philips?

- a) Nissan
- b) Panasonic
- c) Nintendo
- d) Sony

9) And what does DSD stand for?

- a) Direct Stream Digital
- b) Digitally Superior Disc
- c) Double Stream Decoding
- d) Nothing

10) The Clash's Train In Vain was originally destined to be what?

- a) An America-only single
- b) A Mick Jones solo single
- c) A free flexi-disc in the NME
- d) The theme tune to a TV show

11) Yeah, Yeah, Yeah - The Story Of Modern Pop is a book by a member of which band?

- a) The Stone Roses
- b) Saint Etienne
- c) The Charlatans
- d) Coldplay

12) Marconi sent the first wireless transmission across the Atlantic from where?

- a) Cornwall
- b) Newfoundland
- c) New York
- d) Ireland

13) Rod Stewart has a passion for what hobby?

- a) Kite flying
- b) Model trains
- c) Origami
- d) Tropical fish

14) Which company supplied amplification at the famous Woodstock festival?

- a) Naim
- b) Quad
- c) Audio Research
- d) McIntosh

15) How many records has Taylor Swift sold worldwide?

- a) Too many
- b) More than 40 million
- c) Not enough for her liking
- d) 70 million

16) Gilbert Briggs founded which loudspeaker company?

- a) Martin Logan
- b) KEF
- c) Wharfedale
- d) JBL

17) Which was the first band to appear on Top Of The Pops?

- a) The Beatles
- b) Manfred Mann
- c) The Hollies
- d) The Rolling Stones

18) Which fictional detective was a big fan of Jackie Leven?

- a) Rebus
- b) Taggart
- c) Morse
- d) Mrs Marple

19) Streaming service Spotify has approximately how many active users?

- a) More than 75 million
- b) Under 40 million
- c) Too many to count
- d) 1 billion

20) How many channels were there in Quadraphonic?

- a) five
- b) 2.5
- c) four
- d) six

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Less than 10 points: You obviously haven't been paying attention to Hi-Fi World these past 12 months. Try reading a few back issues!

10-20 points: You are a well-balanced individual who knows their stuff but hasn't entered the anorak-wearing stage yet. Congrats!

20 points and above: Very impressive - you can claim two portions of Christmas pudding covered by three tots of brandy!

ANSWERS:

1) Salisbury 2) Caroline Aherne 3) The Velvet Underground 4) 30cm 5) In-ear headphones 6) Coronation Street 7) Land Rover 8) Sony 9) Direct Stream Digital 10) A free flexi-disc in the NME 11) Saint Etienne 12) Cornwall 13) Model trains 14) McIntosh 15) More than 40 million 16) Wharfedale 17) The Rolling Stones 18) Rebus 19) More than 75 million 20) Four

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Information

Developer

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Category

Entertainment

Updated

7 Dec, 2014

Version

1.0

Size

9 MB

Rating

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Family Sharing

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Compatibility

Requires iOS 5.0 or later. Compatible with iPhone, iPad, and iPod touch.

Languages

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More

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Complete Beatles

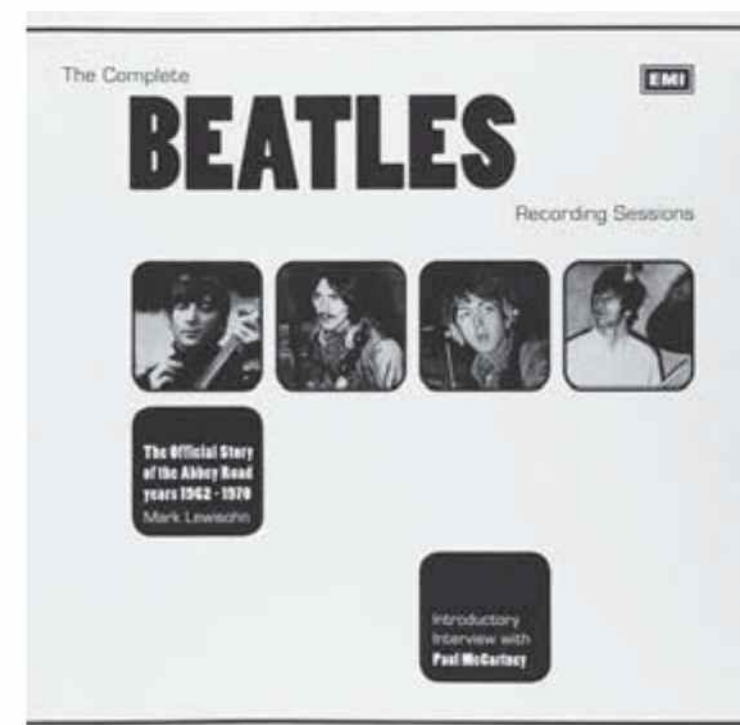
In the latest in our new series of music-related books Paul Rigby takes a look at two new works on The Beatles.

The Complete Beatles Recording Sessions & The Complete Beatles Chronicle

Author: Mark Lewisohn

Publisher: Hamlyn

Price: £25 [each]



It might only span 204 pages but the densely worded hardback that is 'Recording Sessions' might just be the most important book that you ever read on the works of The Beatles.

That's not because it's packed with information – there are plenty of other books out there that are similarly crammed – but because author Mark Lewisohn received the unique permission of running through all of the group's master tapes in Abbey Road. A task (joy?) that just about any other Beatles fan would kill for.

This book has enough detail squeezed in to comfortably span 400-500 pages of any normal tome, or so it seems. Most other publications would certainly provide more space for the included 350 photographs (some in colour) that include people pics. and images of recording sheets, tape boxes, memos, contracts, press releases and more.

Subtitled The Official Story of the Abbey Road Years 1962-1970 and including an extensive interview with Paul McCartney as an informative foreword, this large format book takes a day-by-day view of the recording career of the band.

For each and every entry, unless it's a live recording, you get a list of where the recording took place and at what time, the songs and takes, the producer and engineers present plus extra information such as early names of tracks.

For example 'This Bird Has Flown' was the early title for

'Norwegian Wood'.

There are plenty of insights into the music and the Beatles themselves. There is also an interesting array of unreleased material still in the locker – or in a locker somewhere. Not all of the tapes are in Abbey Road, apparently.

The Beatles often took them home to listen or work upon them at their leisure. The detail in Lewisohn's book effectively contradicts Paul McCartney's continual assertion that there is nothing left unreleased to come from The Beatles.

These unreleased songs include just two of many tracks that were recorded on 20 August 1968, for example. Both, ironically, recorded by McCartney. Both Etcetera ("A beautiful ballad," according to Alan Brown, engineer) and Wild Honey Pie, a 53-second, much over-dubbed one man effort (nothing to do with the song 'Honey Pie') were committed to tape.

It's also interesting to get an Abbey Road staff point of view of the increasing tensions between The Beatles, which were visible to the engineers during the recording of 'The Beatles' ('The White Album'). That same band tension would lead to established engineer Geoff Emerick quitting on the spot as he sat in the control room next to George Martin during those same sessions because he couldn't take the constant bickering, moods and tension.

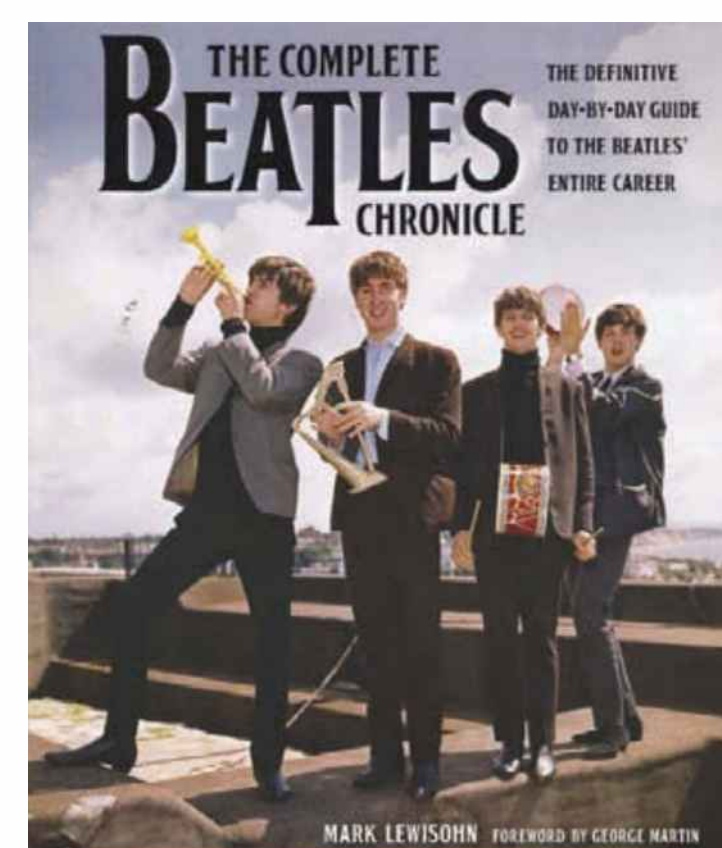
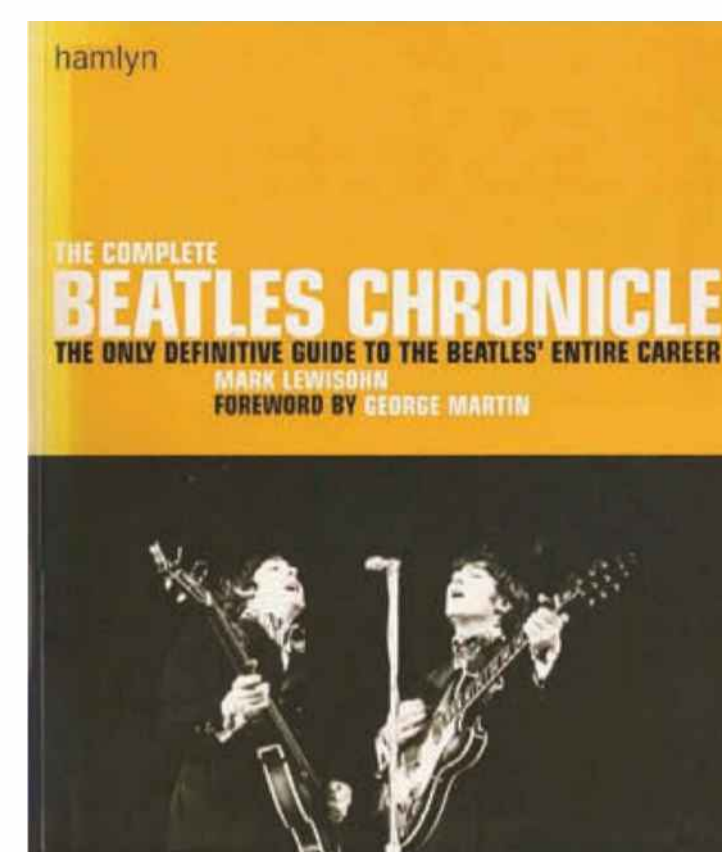
A fascinating piece of work that benefits from conscientious and diligent research and interpretation,

The Complete Beatles Recording Sessions is a 'must have' for any true Beatles fan.

For completists out there, also look out for Lewisohn's 'The Complete Beatles Chronicle', subtitled 'The Only Definitive Guide To The Beatles' Entire Career', with a forward from George Martin.

A perfect companion to 'Recording Sessions', this 368-page tome takes a day-by-day account of the Fab's activities including recording sessions, concerts, other appearances and significant happenings. The book provides a broader, more rounded account of the group's life and fills in many gaps.

There is a competing book of a similar size penned by Paul McCartney's friend Barry Miles on the market called 'The Beatles - A Diary' but, while the latter offers the odd insight and unique anecdote plus more and larger images, the Miles book has but a fraction of the essential information offered by Mark Lewisohn.



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Resolution Audio C50 integrated S/H	3500	1999			
Loudspeakers					
Avantgarde Duo G2.2 S/H	14000	5899			
Bonicke SLS xdemo	10000	5999			
Chario Constellation Cygnus xdemo	2499	1499			
Chario Constellation Delphinus xdemo	1599	899			

Cables and Accessories

Apollo 80cm single column Stands S/H 1	149	99
Cardas Golden ref balanced 1.5m xlr S/H	1595	579
Cardas Golden ref balanced 1m xlr S/H	1295	499
Cardas Golden ref power 1m IEC-UK S/H	995	299
Cardas Golden ref power 1m IEC-UK S/H	995	299
Cardas Golden ref speaker 3m pair S/H	2799	999
Cardas Golden ref power 1m 20amp IEC/UK S/H	995	299
Custom Design 4 pillar 60cm stands S/H	279	149
MIT shotgun online S3.3 S 12ft pair Speaker S/H	3100	999
MIT shotgun online S3.3IC 1m pair RCAS/H	1100	499
Revelation Audio Labs Prophecy Firewire 1m	499	279
Signal Projects Hydra mains cable 2m Shuko S/H	1199	450
Target Audio R4 50cm S/H	379	175
Target Audio R4 60cm S/H	425	199
Transparent Audio MLBU 1.5m XLR S/H	1529	599

Tuners & Tape decks, power supplies

Magnum Dynalab FTR remote/Etude S/H	395	129
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Midland Audio X-change are looking for All high end audio separates best prices paid for good examples.

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- SME
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- Well tempered lab
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Midland Audio X-change are looking for Audio Research, Krell , Mark Levinson , Naim Audio, SME, Wadia.

WANTED FAULTY or non working Quad 44 preamps.(later models preferred)Contact Mike 01758 613790. with price.

INTERCONNECTS:
CABLE Talk Reference 2, 1m pair £30. DNM Reson solid core, 1m pair £25. Email: jonathan.kempster@gmail.com

MARANTZ VINTAGE 'Champagne Gold' separates complete system. Immaculate looks and sound. Far too much to list, contact for full details, photos, etc. £750 or reasonable offer. Tel: 01291 627048, Email: richardj.lewis@tiscali.co.uk.

MICHELL TECHNOARM A, Silver, Boxed, £300 including RMSD within UK Mainland. Rogers LS3/5a, Bi-Wire, Walnut finish £850 including RM Delivery within UK, Email: kjholland@hotmail.co.uk, 01415508436

MUSICAL FIDELITY M6I amplifier plus KEF LS50 speakers, both less than 100 hours use, mint condition, smoke/pet free environment, with all packaging, rrp £3300 - £1700, will split, pictures upon request. Tel: 01902 884694 Email: jukey39@yahoo.co.uk

MUSICAL FIDELITY A308cr Dual Mono Preamplifier £590 British built, boxed and without blemish. Covered and kept clean since unboxing. Very carefully and lightly used. Looks good. Sounds good. Mike (Cheshire) Email: imeldayates@hotmail.com 07500804700

MUSICAL FIDELITY A308cr 24 Bit Upsampling CD Player £490 British built, boxed and without blemish. Covered and kept clean since unboxing. Very carefully and lightly used. Looks good. Sounds good. Mike (Cheshire) Email: imeldayates@hotmail.com 07500804700

MUSICAL FIDELITY A3.2 RDS Tuner £290 British built, boxed and without blemish. Covered and kept clean since unboxing. Very carefully and lightly used. Looks good. Sounds good. Mike (Cheshire) Email: imeldayates@hotmail.com 07500804700

SHANLING CD-T1000SE tube CD player. Excellent sounding player complete with remote control, excellent condition. £595. Elipson Planet L loudspeakers, red, £295. Tel: 01782 596 470

SENNHEISER HD600, unmarked, ultra pure cable, £100. Tel: 07572 865 525 (Suffolk)

QUAD ELITE pre-amp. Quad Elite stereo power amplifier. Both excellent condition. £800. Tel: 01903 506 479

MARTIN LOGAN Montis, ELS with 200w active woofer in dark cherry finish. Perfect condition, boxed up, very little use (60 hours and 9 months old) superb sound quality. Priced to sell 5500.00 (including delivery) Pictures available on request. Contact neilpage37@yahoo.com or call 00974 66312709 for more information

ATC SCM 40 loudspeakers (latest version), black ash finish, 12 months old, £2250 ono. Tel: 0151 677 3521 (Wirral)

MOTH VINYL MkII record cleaning machine. Original owner, in very good condition with cleaning chemical. Buyer collects. Tel: 01162 415 435 (Leicester)

NOTTINGHAM ANALOGUE Spacedeck, Rega 300 arm, Ortofon MC, needs new tip, granite plinth, £480. Marantz CD17 Signature MkII, excellent condition, remote (black), £250. Tel: Robin 07768 357 634

KHARMA CERAMIQUE CE1.2 high-end floorstanding speakers no-compromise design piano black superb condition 44"x16"x18" 3 drivers sensitivity 90dB Can demo Downsizing £4500 (originally £18000) 07415652983 michael@hispersonaladdress.co.uk

RADFORD STA15, 15+15 stereo valve amplifier complete with SC3 stereo control unit. Fully working £1850. Tel. Nigel 07796 591 818

WORLD AUDIO KLPI, revalved Sovtek 6922, no hum noise issues, very good condition, £275. Chord Odyssey speaker cable, 2.6m, factory banana connections, very good condition, £75. Tel: Steve 07709 075 613

NAIM SUPERLINE phono stage. Mint condition. Manual load plugs. £1150. Michell Gyrodec plus Tecnoarm and Unicovert, box, little used, excellent, £1250. Ortofon Rondo Blue moving coil, 150 hours, £200. Tel: 020 8866 3523

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NEXT MONTH FEBRUARY 2016 ISSUE

CLEARAUDIO INNOVATION TURNTABLE WITH UNIVERSAL ARM & ABSOLUTE PHONO STAGE

Next month we hope to bring you this unusual high-end turntable from Clearaudio, whose arm contains a micro-miniature phono head amplifier that feeds an external Absolute Phono stage – an interesting idea.

OK, we billed it for last month's issue but then found cartridge compatibility problems when measuring its transconductance head amp. You can read all about this, as well as the servo-locked platter with in-built speed sensor, in our next issue we hope. Fingers crossed!

Also, we hope to bring you –

ALACRITY AUDIO DUNDEE 5 LOUDSPEAKERS

LOTOO PAW 5000 DIGITAL MUSIC PLAYER

QUAD S2 STANDMOUNT LOUDSPEAKERS

FINAL AUDIO SONOROUS HEADPHONES

CAMBRIDGE AUDIO CXC CD PLAYER

HANA EH MC STEREO CARTRIDGE

LEEMA LIBRA PRECISION DAC

AUDIOLAB 8300A AMPLIFIER

..and much more.



This is a selection of what we hope to bring you, not a complete list. We regret that due to a wide range of issues, such as failure under review, we cannot guarantee that all products listed above will appear.

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MARCH 2016 - 7TH JANUARY

SIMPLE MINDS

REAL TO REAL CACOPHONY

VIRGIN



"Yes, there were failures and bumps along the road but the sequence as a whole was worthy"

The problem with Simple Minds, and a big issue with this band, is that most people know them – or think they know them – from albums such as 'New Gold Dream (81, 82, 83, 84)', released in 1982, 'Sparkle in the Rain' (1984) and 'Once Upon A Time' (1985) with hit singles such as 'Promised You A Miracle', 'Alive and Kicking' and 'Don't You (Forget About Me)'.

These albums are good, very good in fact but the real treasure is to be found within the band's earlier evolution. In fact, there are Simple Minds fans out there that refuse to acknowledge any Simple Minds album after the 1981 LP, 'Sister Feelings Call'.

Why the conflict? Why the emotional divergence and fractious behaviour? Possibly because Simple Minds evolved at such a tremendous rate. The journey towards the top selling LP releases of 'Gold Dream' and 'Sparkle' was remarkably rapid and creatively eventful.

It is arguable that the pre-fame period of the band was more interesting and diverse in terms of musical adventure, inspiration and artistry.

Yes, there were failures (but glorious failures) and bumps along the road (bumps that pushed their ambition up towards the stars without having the energy to really get there) but the sequence, as a whole was worthy.

The first in this sequence, 'Life In A Day' (1979), is the lesser of the pre-fame five albums mixing, as it does, Roxy Music with Magazine but the post-punk sounds still intrigue and are direct in nature.

Even so, lead singer Jim Kerr realised that this debut was a stutter. As Kerr succinctly put it, "I was like [he puts his head in his hands and groans]: 'We're the Boomtown Rats!'".

That 'Life' should spawn another LP in just seven months was remarkable in the early 80s. Hey, that was what bands used to do in the sixties! That the follow-up should be a largely unheralded masterpiece was something to blow the mind: simple or not.

"Going through these amazing landscapes my head was full of movies, books and characters" said Kerr.

"Being in a group is hyper-reality. You have to

invent myths. As the singer, that's your job. From first thing in the morning to last thing at night my head was full of it. We were speedy" said Kerr. "Loved it. Driving to Rockfield with 20 grams. We didn't like sleeping. Or eating. That changed! There were two or three heady years, but it wasn't a dark time. It was an innocent, young thing".

There were other things that fed into 'Real to Real'. Change, conflict and ructions. "By 1980, we'd been round Europe three or four times and our eyes were wide open. We'd visit the galleries and art exhibitions and parks but at the same time we'd be aware that someone had blown up the train station in Rome or the Paris synagogue where we'd just been, we'd be in Germany at the time of Baader-Meinhof or in Spain when the Basque separatists hit. Meanwhile, in Britain there were riots. There was something in the air, and those elements of danger and beauty came together in our music".

For those looking for a copy of 'Real To Real Cacophony' and for that matter 'Life In A Day' plus many more albums of the period, look no further than the new vinyl box set, out now via Virgin and called 'The Vinyl Collection (79,84)' which also arrives with more of those 'pre-fame' release such as 'Empires and Dance' (1980), 'Sons And Fascination' (1981), 'Sister Feelings Call' (1981) plus the break-out releases 'New Gold Dream (81, 82, 83, 84)' (1982) and 'Sparkle In The Rain' (1984). All of the albums have been remastered at Abbey Road.

It's great to revisit the last two titles, full of shiny production and hits a-plenty but for those who missed out on those early releases, this is a set to savour and on precious vinyl too.

But the jewel in this neat and tidy box set is 'Real to Real Cacophony'. To say that this album was imaginative and adventurous would surely be to understate.

Melodic? Oh yes, but on its own terms with differing time signatures, mixed with new sounds and fascinating textures.

This is an album, a finely honed magnum opus of post punk that stands up there with Wire's '154' and PiL's 'Metal Box'. It's that good. Some would say that it's even better. **PR**

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Audio Research has ever built'

- José Victor Henriques, Hi-Fi News & Record Review

GENIUS



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