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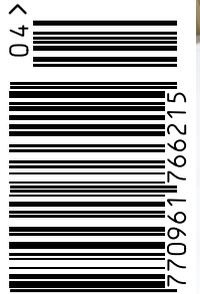
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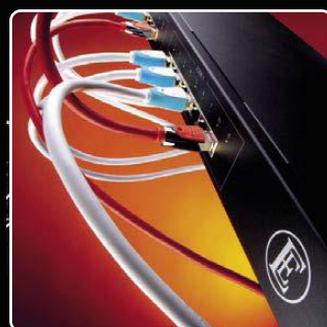


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verdicts

●●●●●	OUTSTANDING	amongst the best
●●●●	EXCELLENT	extremely capable
●●●	GOOD	worth auditioning
●●	MEDIOCRE	unremarkable
●	POOR	flawed
£	VALUE	keenly priced

ELECTRONIC MAGAZINE

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Last month I could not help but talk about Tannoy Westminster loudspeakers, large horns you could live in they were so big. This month we have another unusual design, an isobaric – used by NEAT in their Majistra stand mounter. It's not as big as a Westminster for sure, only room for mice inside, but it is different and – perhaps – better as a result.

Not many manufacturers use this bass loading principle. It's costly and you can't see it, so no visual kudos in the showroom. Internally the cabinet is complex and not suited to automated build techniques. Going some way to explain price, since this is no budget box. NEAT also include a ribbon tweeter, known for excellent treble sound quality. You can read about this unusual loudspeaker on p10.

Rega recently announced System One, a system in a box for vinyl beginners. With the market moving into a revival frenzy that has never been seen before, it is perfect timing. This frenzy is also going on elsewhere, notably Japan, where they have a long history with the LP (unlike China for example). So there's competition. Just how well will Rega negotiate this situation – in the UK and overseas? Find out on p66 where we take a close look at System One.

Many readers were driven to comment on our coverage of the Lenco LS-55 turntable in February 2022 issue, especially its use of a budget ceramic cartridge. On p73 we look at two budget moving magnet cartridges that offer better results at very low cost. You don't have to spend a fortune for good vinyl sound quality, nor grind the grooves with a cheap Chinese ceramic.

And it goes on...Triangle (France) introduce a budget all-in-one system entitled AIO that optionally comes with a turntable. This is a wi-fi connected loudspeaker that streams from 'net sources like Spotify and is app controlled. See what we think of these active loudspeakers on p38 and the turntable package on p42.

Vinyl won't let go. It's like an audio octopus. I hope you enjoy this issue where its tentacles spread wide!

Noel Keywood
Editor



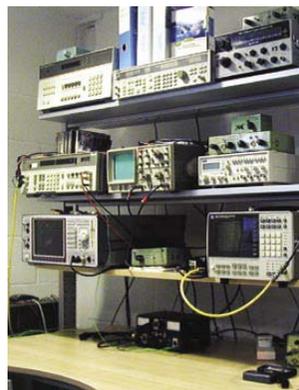
testing (see www.hi-fiworld.co.uk for full explanations of all our tests)

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.



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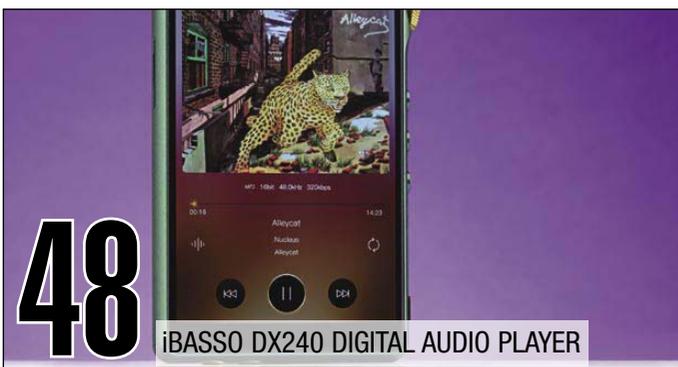
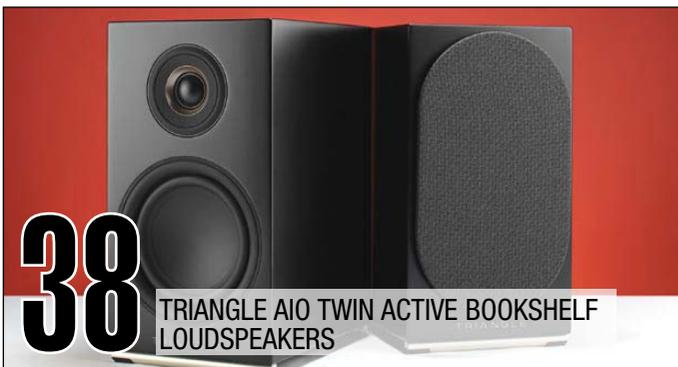
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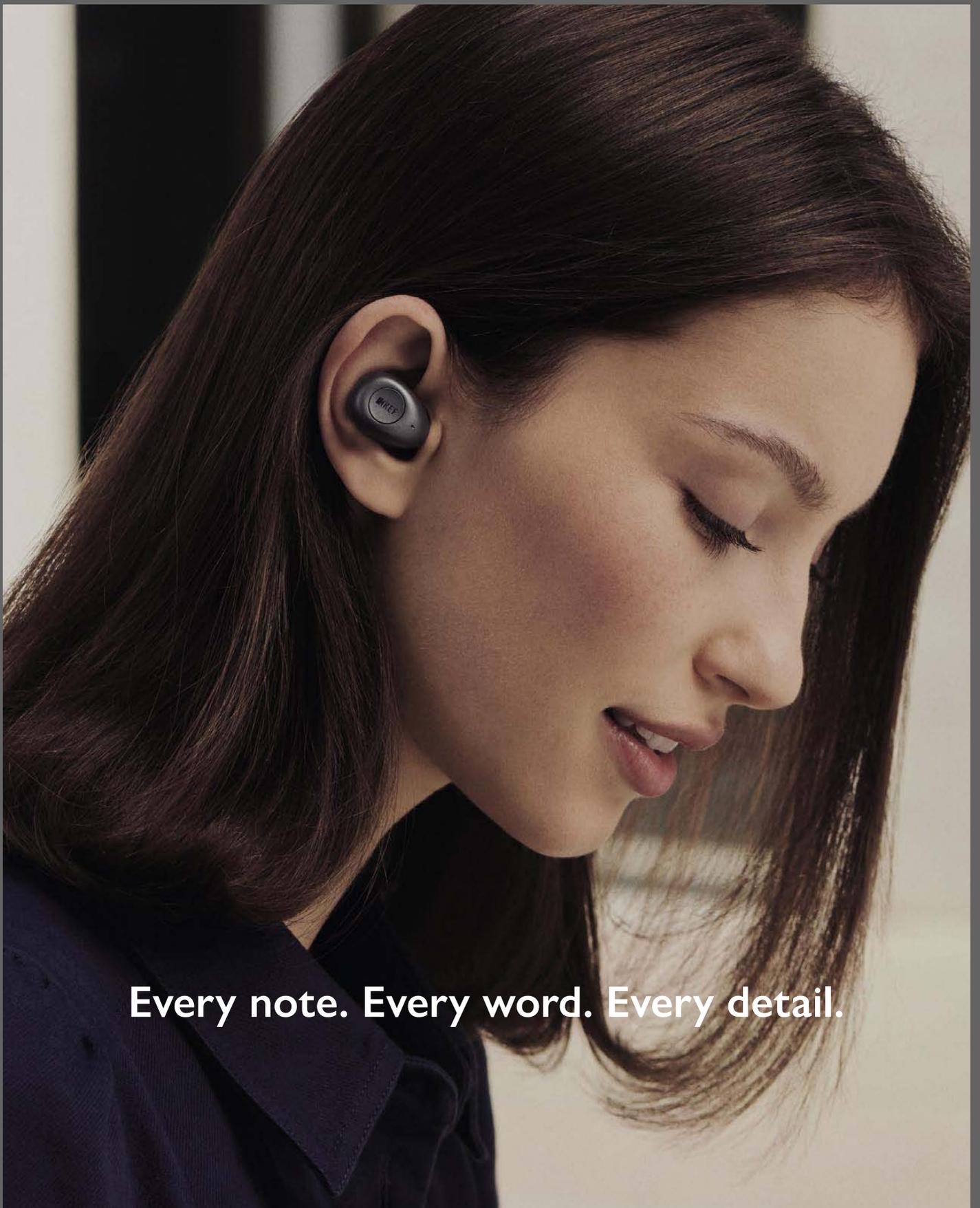
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Every note. Every word. Every detail.



Mu3 noise cancelling true wireless earphones
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We are purists at heart, at KEF, we believe in natural, accurate sound. The Mu3 earphones are the next evolution in that quest. Designed by Ross Lovegrove – pioneer in design and ongoing KEF collaborator - sculptural beauty and engineering excellence come together for audio that's brimming with life in all its astonishing complexity. Old favourites, new tunes, underrated or overplayed, this is music as it was meant to be heard.

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AUTOMATIC CHOICE?

Pro-Ject has been busy! First of all, we got wind of a new CD player from the Austrian firm. The £349 CD Box S3, which introduces the S3 line, is said to be “1:1 bit-accurate” on account of its slot-loading drive mechanism. Clad in aluminium casework, the CD Box S3 features 1.5in. screen, remote control, S/PDIF connectivity and – via a 32bit/384kHz DAC – analogue outputs.

Next is a Bluetoothed version of the Phono Box E entry-level MM phono stage. At the flick of a switch, this £89 device can transmit to external devices via BT too. Line outputs allow the Phono Box E BT to be used as a regular wired phono stage.

Truest to Pro-Ject’s origins though is a new turntable. The belt-driven £369 A1, made by Alfred Fehrenbacher in Germany, is the firm’s first fully-automatic design. Spearheading Pro-Ject’s Automat series, the A1 is designed with “ultimate ease of use in mind...but with the standard of performance expected”. It’s two-speed and features a 8.3in. aluminium tonearm pre-fitted with an elliptically-tipped Ortofon OM 10 cartridge.

Further details: bit.ly/3oEzXR2 (Pro-Ject); bit.ly/3Bf1GhW (Henley Systems, UK distributor)



POWER GAMES

Intended to replace the established (and similar-looking) M-900u, Luxman’s \$20k M-10x flagship power amplifier will presumably continue in production until at least 2025 – as the centenary of the Japanese firm, founded in 1925, is specifically-mentioned. Years in the making, the M-10x is nominally-rated at 2x150W (8 Ohms) but can peak at 1.2kW as demand dictates. This sort of output needs a beefy power supply; no wonder the M-10x weighs nearly 50kg! The circuitry, developed over many years, includes a refined version of Luxman’s trademark ODNF (‘Only Distortion Negative Feedback’) technology as well as a ‘LIFES1.0 Integrated Feedback Engine System’ to strike a balance between distortion and musicality. Everything’s on an impressive scale, from the backlit VU meters to heavy-duty speaker terminals that seem to have been borrowed from a power station! Specially-selected audiophile-grade components are used in the M-10x, the two channels of which can be ‘bridged’ to form a high-powered mono amp. Both balanced and unbalanced inputs are provided.

Further details: bit.ly/3LsDGLx (Luxman US); bit.ly/3BakAfa (Luxman Japan)

RINGS ROUND SATURN-R?

Designed to match the forthcoming Elicit MK5 integrated amplifier, Rega’s £2,000 Saturn MK3 CD/DAC will replace the existing Saturn-R model. Rega points out that the Essex-made Saturn MK3’s functionality and internal circuitry are identical to that of the outgoing model. The Saturn MK3 CD/DAC player is billed as offering “complete flexibility and integration in any audio system”, and not just those built around the new Elicit. Essentially two products in one, the Saturn MK3 combines a high specification top-loading CD transport with a Wolfson WM8742-based hi-res DAC circuit that can also be fed from external inputs – two optical, two co-axial and one (fully-asynchronous) USB. Other features include optical/coaxial digital CD outputs, unbalanced analogue connectivity, enhanced digital power-supply and analogue-signal circuitry, a Solaris remote handset and a ‘lifetime warranty against manufacture defects’. The XMOS USB driver, needed for 24/192 support, can be downloaded from Rega’s website.

Further details: bit.ly/3oGVEQz



AUDIOJUMBLE POSTPONED

The organisers of the Tonbridge Audiojumble have, owing to concerns with the Omicron variant of Covid 19, reluctantly decided to reschedule the next event from the end of February to Sunday May 29th. The popular and friendly enthusiast-driven show, appreciated for its music and second-hand hi-fi bargains, will – as ever – be held at the Angel Centre. For the benefit those who can’t attend, we’ll be covering the Kent show in these pages.

Further details: www.audiojumble.co.uk

HAVE A CARY

Joining North Carolina-based Cary Audio's existing DMS 700 are two new models – the DMS-650 and DMS-800PV (Professional Version).

The \$5,995 DMS-650 marries AKM AK4497EQ DACs (“switched resistor architecture, with current output”) to Cary’s digital front-end and analogue circuitry.

The \$14,995 DMS-800PV is essentially a “dual-mono, dual-differential” version of their DMS-700. Inside are a pair of AK4497EQs, two sets of DSP stages and ‘doubled up’ digital and analogue power supplies. This enables the left and right channels to be “completely separated”. Other DMS-800PV refinements include a larger 5in. display and Crystek clock. Like the DMS-700, the duo are Roon Ready and support TIDAL, Qobuz, Spotify/Spotify Connect, vTuner and USB/SD as well as locally-networked media. DSD512, PCM 32/768 and 16x MQA content can be handled, in addition to more widespread compressed formats like MP3, M4A and FLAC. Digital inputs enable the DACs to be fed from external sources, and there are also inbuilt MIMO Wi-Fi, Bluetooth with aptX HD, PCM upsampling and DSD conversion, volume control for driving power amps directly and balanced/unbalanced analogue outputs.

Further details: bit.ly/3rGCqwg (DMS-650); bit.ly/33jdSjK (DMS-800PV)



SHOPPING CART

Lenco, once revered for Swiss-made idler-driven turntables with massive platters, is responsible for Chinese-made mass-market hardware nowadays. Of these, the latest is the 400 series. Two-speed belt-driven record players (as each has four built-in speakers, they're not strictly-speaking 'turntables') they will, we're informed, “stand out in any décor setting” with their fabric, imitation leather or walnut finishes. They are however a cut (or should that be ‘cart’?) above competing Crosley Cruiser-type decks, because Lenco has specified better-quality arms able to accommodate pre-fitted Audio-Technica MM cartridges. Like the more upmarket Cambridge Alva decks featured elsewhere in this section, the 400 series features Bluetooth 5.0 – in this case, to play music from smart devices – and a USB port for digitising vinyl onto memory sticks. Other features include 3.5mm aux input, analogue outputs for amps, a claimed 40W of amplification and – depending on model – pitch control. Prices range from £220 (for the walnut-finished LS-410) to £250 (for the fabric-covered LS-440).

Further details: bit.ly/3swCduV



A ROSE BY ANY OTHER NAME

Hailing from Italy are Care Orchestra's Celestial Rose Evo two-way bass-reflex loudspeakers, which share their heritage with the existing Celestial Breath Evo models. A stand-mountable 16kg 'bookshelf' design in a 195x270x235mm cabinet, it features a 15cm woofer and dome tweeter for a frequency response of 58Hz - 21kHz (+/- 3dB). High-grade speaker terminals are fitted on the rear panel, although bi-wiring isn't supported. Sensitivity is claimed to be 87.5dB, while nominal impedance is 8 Ohms. Care Orchestra is flexible with styling, enabling these speakers to be personalised. As well as the 'standard' glossy finishes in black and white RAL Lacquer, the €1,950 Celestial Rose Evo is available in custom colours and lacquers. The leather covering the transducers can also be specified, in addition to “fabrics and exotic woods”.

Further details: bit.ly/33cRwq

STOOD UP!

If you're set on McIntosh amplification, but aren't sure how or where to place it for best results, your quandary now ends! Those New York (amplifier) giants have launched a pair of amplifier stands – the £3,495 AS125, which at 452x103x457mm will suit most Mc' monoblocks old and new, and the £3,995 AS901. The latter is longer (452x103x757mm) and specifically designed to partner the dual-mono MC901. Both are made from sustainably-sourced solid white ash using a “face-glued construction technique” and feature an edge-grain top for “strength, durability and stability”. McIntosh specifically chose white ash, on account of its resistance to scratches and dents. Both stands have a 76.2mm-thick wood slab, made by Symbol Audio, to firmly hold the gear. Base-mounted protective pads protect floors and minimise vibrations, and – perhaps not surprisingly – each features a faceplate with a McIntosh logo that can be illuminated via the amps' rear-mounted Power Control ports.

Further details: bit.ly/366T5Rp (AS125); bit.ly/3oETlgG (AS901); www.finesounds.uk (distributor)



HYBRID THEORY

Weighing in at a hardly-insignificant £2,999 is NAD's Masters 'Hybrid Digital' M23. Physically, though, it's a mere 9.7kg on account of its alloy metalwork, switch-mode power supply and efficient class-D output stages. The latter, 'Eigentakt' amplifier modules manufactured under licence from Denmark-based Purifi Audio, are nevertheless definite powerhouses. Continuous power output is specified at 2x200W (8 Ohms; 2x380W into 4ohms), with a dynamic output as high as 2x520W (4 Ohms). Like the M-10X, the M23 is capable of operating in bridged mode; NAD claims this will deliver a staggering mono output of 700W, into 8ohms. NAD plumped for Eigentakt, because it has a "load-invariant frequency response" and virtually-eliminates harmonic and intermodulation distortion...while rendering noise "inaudible...for a completely-black background and exquisite micro-detail". The M23 can be fed by balanced (XLR) or single-ended (RCA) sources, a three-position gain control being provided for level-matching purposes, and can be awoken via a 12V trigger input.

Further details: bit.ly/3oEeurs



IT'S ALL IN THE MIX!

Take the iFi ZEN DAC V2's conversion stages, add a soupçon of USB and S/PDIF (both optical and coaxial) connectivity, stir in the ZEN Blue V2's long-range Bluetooth 5.1 technology and garnish with Signature-grade circuit enhancements. Congratulations – you've just cooked up a ZEN One Signature 'universal DAC'! It will probably be cheaper (certainly easier!) to buy a ready-made one for £349, though, and feast instead on the music. There's no headphone amp or volume control, the compact aluminium-clad ZEN One Signature being designed as a 'home audio hub' to feed your amp and 'speakers via balanced or unbalanced means. Features include iFi's favourite Burr-Brown DAC chipset, iFi's latest low-jitter GMT (Global Master Timing) clock circuitry, various power options (including USB), support for all current Bluetooth codecs, 'true-differential' balanced analogue circuitry made with audiophile ingredients and hi-res compatibility (up to 32/384kHz PCM, DSD256 or 2x DXD, plus MQA). Sounds like a tasty dish.

Further details: bit.ly/34RCalj



Further details: bit.ly/34RCalj

A SHURE THING

Shure cartridges once graced many a tonearm, playing music that may have originally been captured by Shure microphones. These days, the American transducer firm is more active in the 'pro-audio' market. The latest versions of the SRH840 and SRH440 closed-back circumaural headphones are affordable, both intended for professional and home use, with padded headbands for long-term comfort. Styling has been revised, while distortion and frequency response have received attention. Included are detachable cables terminated with 3.5mm plugs, 6.3mm adaptors and carrying pouches. Priced at £89, the SRH440A is aimed at home recordists. Its 40mm neodymium dynamic drivers are claimed to be accurate, making the SRH440A "ideal for capturing talent in a podcast or mixing session". Similar drivers are used in the £135 SRH840A, but they're more closely matched. Distinguishable from its brother by gold detailing, the SRH840A is "optimised for critical listening and studio monitoring".

Further details: bit.ly/3rJJAA6 (SRH440A); bit.ly/3uEhp7h (SRH840A)



NUTHIN' BUT AN 'M' THANG

Remember the '80s and early '90s, when big and beautiful ghetto blasters rocked the joint? Some were referenced by rap stars like LL Cool J, while JVC (maker of the iconic RC-M90 model) lent its name to one old-skool crew. Monster is keen to revive such memories with the distinctive £300 Blaster 3.0, which is described as a 'boombox for the 21st century'.

With styling clearly influenced by the classics of old, the Blaster 3.0 could probably win a soundclash with one - thanks to its seven drivers and integral subwoofer, powered by 120W in total of amplification. No cassettes here, the Blaster 3.0 instead being fed via Bluetooth, and in place of those expensive 'D' cells is an internal rechargeable battery offering up to 12 hours of continuous use. Other features include Environment EQ sound optimisation, IPX4-rated water-resistance, app control and a 'powerbank' mode to charge your devices. Looks fun!

Further details: bit.ly/34PjYIY



EDISON MEDICINE

Three years ago Cambridge Audio launched its neat Alva TT direct-drive turntable, presumably named after phonograph inventor Thomas Alva Edison. It was billed as the world's first deck capable of sending audio from your treasured analogue discs to audio equipment via a digital aptX HD Bluetooth link. Purists may have scoffed (the two-speed £1,500 deck, pre-fitted with a high-output MC cartridge, did however have conventional analogue outputs) but others appreciated the wireless convenience. Now we have the Alva TT's replacement, the £1,700 AlvaTT V2, which benefits from a new tonearm with removable headshell; in other respects, though, new and old are similar. Cambridge has also introduced the more affordable (£850) Alva ST, which specifies belt-drive and a pre-installed MM cart. As with the AlvaTT V2, there's an analogue output – switchable between line level and 'cartridge straight' signals – as an alternative to the 24/48-capable aptX HD Bluetooth.

Further details: bit.ly/3oHlvXw (AlvaTT V2); bit.ly/3LtGkjq (Alva ST)





Top Story

Fitted with a ribbon tweeter for top treble quality, NEAT's new Majistra loudspeaker engages Noel Keywood.



NEAT's Majistra had me puzzled. The ribbon tweeter produced excessive treble under measurement, something I usually find

aurally unacceptable. Review fear set in: I'd rather not sit there gritting my teeth. But in this case the sonic picture wasn't as expected – for much of the time the Majistras not only sounded balanced but also impressive, for reasons I'll come to explain. So here is a curious review, one that is both good and bad: the £3495 Majistra turned out to be 'fun' in more ways than one. A top device in more ways than one.

The Majistra is a large stand-mounter, one that's heavy at 11kg. It will go on a shelf but this is not ideal as the speaker generates a lot of bass and would likely induce room boom in rooms under 16ft long. With dimensions of 380mm high, 220mm wide and 290mm (11.5in) deep it will sit on a stand

easily enough and this way can be manoeuvred for best results. Cabinet finishes are black oak, satin white, natural oak and American walnut, our review samples being a visually light natural oak. Beneath the removable grilles, held by magnetic catches, lie two drive units, a 170mm treated paper cone bass unit and – playing a star role – a 60mm long ribbon tweeter that NEAT call “a true ribbon” by which I guess they mean not a folded ribbon. Here comes my first aside.

Long ago (late '80s) I heard and took to the Tonigen ribbon tweeter used in the Heybrook Sextet, a favourite loudspeaker of mine at the time. So I used it in World Audio Design's first loudspeaker, KLSI. Integrating a ribbon isn't so easy, technically because they don't run low and subjectively because an aluminium ribbon doesn't sound like much else, leading to chameleon character. The Sextet suffered this but the benefit of a ribbon tweeter outweighed this disadvantage. What you get is super clean and precision fast treble that leaves domes standing – or so you might think.

After years in front of an electrostatic I now find ribbons have their own colour, sounding

tinselly, but this gives a good impression. Designers like to emphasise it by lifting output to ensure their contribution is obvious. No point in using an expensive drive unit if no one notices. Making them sonically more conspicuous than domes – especially in the Majistra.

Ribbon tweeters have progressed since the Tonigen. It reached down to 5kHz but Neat's makes it down to 2kHz so it contributes more to the sound. Ribbons have become popular in Germany where companies like Quadral and Mundorf are associated with them. But Quadral loudspeakers, that I know well and greatly admire, follow a different design ethic to that of NEAT: they measure flat.

The Majistra differs in other ways. It uses Isobaric loading of the bass unit to minimise pressure changes in the chamber behind.

A second bass unit sits behind the main one, working into a vented rear chamber, with vent (port) sited on the rear panel. It's quite a lot to squeeze into a small cabinet, but delivers “surprisingly deep and controlled bass” NEAT say, something our measurements confirmed. Such loading raises cabinet and drive unit cost and, with two bass units to drive, lowers impedance and sensitivity. The Majistras need an amplifier with a bit of oomph as a result: think 60+ Watts.



Fitted with a single pair of terminals, bi-wiring is not possible, nor external adjustment of tweeter level.

A large port tuned to 40Hz loads the internal isobaric bass unit.



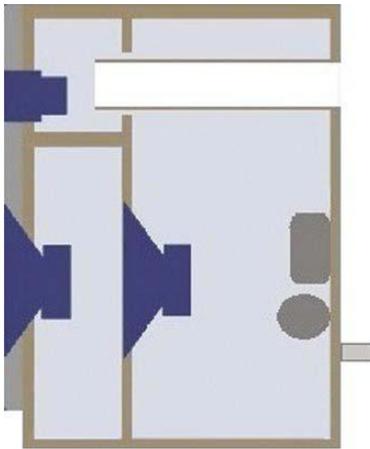
The Majistra is solidly built and heavy, made so by an internal isobaric chamber carrying a second 170mm bass unit. At top, the ribbon tweeter, with soft surround to absorb surface waves.

SOUND QUALITY

Initially, I drove the Majistras from our Creek i20 amplifier (100W) believing its easy going sound would be most suitable. Not so. It works well with acoustically well damped loudspeakers where, like our Icon Audio Stereo 30 SE, bass is enhanced, but the Majistras have strong bass and need a grippy amplifier like our PrimaLuna EVO300 Hybrid with its 100W MOSFET output stage. Differences were large, the PrimaLuna exerting better bass control.

Acting as a source was our Oppo UDP-205D silver disc player spinning CD and acting as an ES9038Pro equipped DAC to feed hi-res from a MacBook Pro, including DSD, from an Audirvana+ software player. For LP I used our Timestep Evo modified Technics SL-1210 MkII with SME309 arm and Audio Technica VM750 SH MM cartridge, feeding a Pro-Ject Phono Box RS2.

The Majistras proved a bit Jekyll and Hyde, as expected. For the most part they came across as full bodied with surprisingly powerful deep bass in relation to cabinet size. This was more apparent with LP than the drier balance of CD, where the bass line in Ride Across the River (Brothers



NEAT's diagram of the Majistra, showing the principle of isobaric loading where a rear bass unit unloads the front unit. The rear unit itself is loaded by a reflex chamber. It's a complex cabinet.

In Arms, Mobile Fidelity 45rpm re-master) was large and muscular making it very apparent in the mix. Lows were very low, sending rumbling sounds out at me.

As this track faded and The Man's Too Strong got into its stride Mark Knopfler's aggressive chord strikes flew at my ears in supercharged fashion. Meanwhile his vocals and all else were smoothly and evenly presented. It was only at specific moments when the music deviated from 'normal' that the Majistras suddenly jumped at me, both at the bass end and up top. In this sense they are dramatic that's for sure, but I had reservations about such emphasis, where the balance I know suddenly became very different.

Spinning Alison Goldfrapp's Supernature LP massive lows came from the synthesiser and suitably breathy vocals from the lady, laced with sibilance from lines like "switch me on, turn me up" (Ooh La La) where 's' and 't' shot out like needles. At times like this, the extreme treble of the tweeter was very apparent. Otherwise the album came over well enough, sounding big bodied and powerful.

The same sort of switch from one state to another occurred with Nigel Kennedy playing Vivaldi's Spring (CD) where the orchestra was clear and very detailed, and so was Nigel's Stradivarius for the most part – until he got strenuous with the higher strings – then his violin was

pushed hard at me and took on a sheeny edge. The tweeter gives superb quality and deep insight, making this a dramatic experience that seemingly shades all else – because it does shade all else! But I found the drama artificial, making for a presentation quite different to that I know. It's very

detail. Bass was strong and ran low, the overall character of the loudspeaker being fulsome. There were times when I heard more from a song than ever before. However, there was a sense of bass and treble being emphasised as if a loudness control was in play.

"Spinning Alison Goldfrapp's Supernature LP massive lows came from the synthesiser"

easy in a situation like this to elect for drama and excitement, which the Majistras have in buckets, but the longer I listened the more my reservations built.

Running through a swathe of CDs and LPs the Majistras were, on balance, nothing other than a great experience. They deliver wonderfully clear vocals that have both body and depth, with a sense of insight that betters most else; the ribbons were mining deep

CONCLUSION

With most recordings and music genres the Majistra comes across as big bodied and colour free. As NEAT claim they deliver bass with depth and weight. The ribbon tweeter for the most part sounds finely detailed and fast, but at times its rising output was very obvious. Making this an idiosyncratic loudspeaker, worth hearing if strong bass and high treble are an attraction.

MEASURED PERFORMANCE

Our frequency response analysis shows a dominant feature of the NEAT Majistra is rising output from the ribbon tweeter, from where it comes into play at 2kHz all the way up to 20kHz where output is +8dB above the 1kHz datum – a very large rise not seen in other loudspeakers. This result is with grille on and 25 degrees off-axis. Ribbon tweeters have wide dispersion so measuring on/off axis made little difference, and the grille was transparent so had no affect either.

Below 4kHz output is even down to 400Hz after which there is low frequency lift of +4dB down to 90Hz before output starts to fall away. Deep bass below 100Hz is aided by a well damped port (red trace).

Emphasis to the lower midband suggests a full bodied sound balance. Extension down to 30Hz means very low bass 'subsonics' will be audible. In all then strong low bass and a full bodied sound are shown here.

Sensitivity was low at 84dB sound pressure level (SPL) from one nominal Watt (2.8V) of input, meaning 60W+ amplifiers will be needed. NEAT quote 88dB – not a figure we could repeat.

The two bass units combined come in at 3.5 Ohms d.c.r. overall and impedance stays close to this value up to 200Hz our impedance trace shows. The near flat nature of the trace

means the loudspeaker is well damped acoustically, reflecting back into being an almost resistive load. The port is tuned to 40Hz, its dip shows. Overall, impedance measured with pink noise was a normal enough 6.5 Ohms due solely to the midband peak caused by voice coil and crossover inductances.

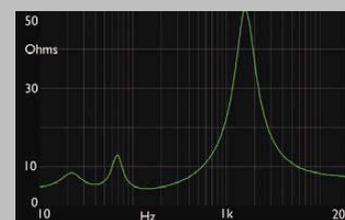
The Majistra has a reasonably flat response up to 4kHz but above that the strong treble rise will be audible. Bass runs very low and is strong. NK

FREQUENCY RESPONSE

Green - driver output
Red - port output



IMPEDANCE



NEAT MAJISTRA £3495



EXCELLENT - extremely capable.

VERDICT
A dramatic if inaccurate sound.

FOR
- very insightful
- strong deep bass
- big bodied demeanour

AGAINST
- upper bass heavy
- excessive high treble
- no bi-wiring

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Here's a chance for three winners – one prize per winner – to win a Chord C-ScreenX loudspeaker cable, reviewed in the June 2021 issue. Read the review excerpt below and answer the questions related to its content.

"The 'X' in C-ScreenX refers to Chord's use of XLPE (Cross Linked PolyEthylene) insulation, which replaces the FEP (Fluorinated Ethylene Propylene) material used in the previous C-Screen version – at £5 retail per metre, a popular line for Chord Company. According

to the Wiltshire firm, the choice of insulation has a "profound effect" on a speaker cable – get it wrong, and enjoyment of your music can be impaired by traces of colouration.

Of course, the signal-carrying conductors insulated by Chord Company's new wonder material are also important. Specified for the C-screenX are 16 AWG's worth of multi-stranded oxygen-free copper conductors, two bunches of which are arranged in a twisted-pair configuration. Over this XLPE-covered wiring is wrapped a twin-foil shield. Another of Chord's speaker-cable

specialities, this design feature helps to keep external interference at bay. Doing so, it's claimed, helps to convey subtlety while aiding coherence and timing. Try finding that attention to detail in the cheap stuff masquerading as 'speaker wire' at DIY stores!

The cable is then enclosed in a overall PVC jacket, which reduces 'mechanical noise' as well as spacing those all-important conductors correctly. Such construction is remarkably-complex"

There are three prizes this month, one prize per winner. Just answer the four easy questions at right for a chance to win.

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QUESTIONS

[1] X refers to –
[a] X rated graphics
[b] XLPE insulation
[c] Xtra dielectric
[d] extra Ohms

[2] Insulation has a –
[a] warming influence
[b] waterproof effect
[c] "profound effect"
[d] cosmetic purpose

[3] The copper is free of –
[a] lichen
[b] verdigris
[c] phosphates
[d] oxygen

[4] The shield keeps at bay –
[a] external interference
[b] mice
[c] gamma rays
[d] strong light

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**JANUARY 2022 WINNER: MARTIN LOGAN 15i LOUDSPEAKERS
Mr. Tom Millichamp of Bridgenorth, Shropshire**

Hearing Aid

Martin Pipe tries some interesting Bluetooth headphones that bring technology to personal listening.



Canadian firm PSB – named after Paul and Sue Barton, its husband-and-wife founders – has been making transducers of one form or another since the early 1970s. Some of their loudspeakers were developed with the help of government-owned anechoic chambers in Ottawa. PSB is now part of the Ontario-based Lenbrook group, which also owns NAD and Bluesound. We favourably reviewed a pair of PSB speakers not so long ago, but this month will be examining the latest (MKII) version of the firm's flagship M4U 8 wireless noise-cancelling headphones.

Your £300-odd pays for neatly-foldable closed-back circumaural headphones that will connect to your audio source via Bluetooth aptX HD or a detachable 3.5mm cable – which, at 2m, is possibly a little too long for mobile use. PSB also throws in a widget that allows said cable to interface with airline audio systems, a more conventional 6.3mm adaptor and a neat carrying case.

Fully-charged, via a base-mounted USB-C port, the M4U 8 MKII is capable of up to 25 hours of use (18 if the four-microphone active noise-cancellation system is engaged). When turned off, or if the batteries are drained, passive operation is possible when fed via the cable.

Plugging the 'phones into the USB port of my Windows 10 PC, as I accidentally discovered, turns 'em into an alternative to the



A generous package from PSB. As well as the M4U 8 MK2 'phones, you get a neat carrying case and all necessary paraphernalia – USB charging and 2m 3.5mm audio cables, plus 6.3mm and airplane adaptors.

existing soundcard – worth bearing in mind, if you spend a lot of time sitting at a computer.

On which subject, the M4U 8 MKII is packed with techno wizardry that I suspect would impress the likes of Bill Gates. For a start, NFC is offered as a wireless alternative to Bluetooth. Then there's the latest version of PSB's proprietary 'RoomFeel'

technology, which emulates loudspeakers operating in a room to deliver the "clear, natural sound of a live performance". Even more interesting, though, is the M4U 8 MKII's ability to tailor its sound to the individual wearer.

"Personal Sound by AudioDo" is configured via 'PSB Headphones', a free Android or iOS download from the relevant app store. Basically, it's a hearing test. You're asked if you can hear a series of tones at different levels, first through the left channel and then the right. AudioDo then applies correction to the audio, in order to achieve a flatter response. These 'customized sound profiles' are however for over-18s only.

I wonder if this is in any way related to Lenbrook's data-collection policy? Any personal info collected during the creation of these profiles, claimed to be non-identifiable, is granted to Lenbrook on a "non-exclusive, worldwide, transferable, perpetual, irrevocable right to use, modify, distribute, display and perform" basis. Lenbrook may however also provide access to third-party content providers via the "Lenbrook Product, from time



Unusually, PSB has fitted a 3.5mm socket to each earcup. If you're using a 'wired' device, you no longer have to worry quite so much about where it's positioned. There is however only one USB-C socket, which is needed to charge the M4U 8 MK2 for of up to 25 hours of continuous use.



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to time". Before running the app you must however accept that Lenbrook is "not responsible" for evaluating "such third-party services, technologies or related materials".

Using a Sony Nexperia 10 mobile phone, Bluetooth pairing using the app didn't work ('not found'). However, I was able to successfully-pair the phone to the headphones via the phone's own Bluetooth settings. I was thereafter able to use the headphones with my phone, and configure them with the app.

Such sophisticated digital trickery is all well and good, but PSB has thankfully got the more 'analogue' aspects right. For a start, the 342gm M4U 8 MKII is comfortable to wear, and the intimate fit of the replaceable 'ergonomic gyro-action' leatherette earpads helps to reject outside noise. How pleased I was to note PSB's insistence on 'genuine' hardware controls for everyday operations. In other words, there's no need to remember just how many times you should touch the back of an earcup to engage a specific function.

There are side-mounted slide-switches to raise or lower volume, turn on or engage the

operate independently of the Bluetooth-driven paired-device 'takeover', as it still works if your player is connected via the 3.5mm lead.

Plugging the cable into the recessed socket on either earcup disables Bluetooth, which also means the app 'loses control'.

I'm particularly impressed with this 'active wired' functionality, as it can give a useful volume boost to players with inadequate headphone amps. I tried the headphones with a Mahdi M200 MP3 player, picked up for a couple of quid at a charity shop (I was more interested in the memory card still inside!). Its bland and lifeless sound was transformed into something far more acceptable. Even without

the signal processing, i.e. fed via the 3.5mm socket in 'passive' mode, the 40mm 32 Ohm moving-coil drivers of the M4U 8 MKII are capable of a clear and detailed presentation,

of the bell's attack and decay emerged intact, as did its overall tonal character. Strings suffered from a slight glare, though, and that previously-noted warmth was still present.

I found that personalised 'Audioto tuning' added a brightness that tended to reveal tape hiss while bringing percussion elements to the front of the mix; this does help to make the presentation more exciting. Processing can however be turned off with the app, and so the choice is yours. It's just as well that the M4U 8 MKII is fundamentally a well-designed and good-sounding pair of headphones; anything else is just cake-icing!

CONCLUSION

PSB has dared to be different with the Mark 2 version of its M4U 8, and the risk has paid off. Its ability to tune sound to your ears makes a definite difference (and can be disabled). With Audioto processing engaged, the sound was more exciting and revealing. I suspect that the older you are, the more obvious the change will be as the system is compensating for age-related high-frequency losses. Maybe that's why you have to be 18 or over to use the app; most young people simply don't need it!



Sensibly, all M4U8 MK2 controls are positive-action physical switches – as opposed to accidentally-operable touchpads. Equally sensibly, the inner earpads clearly-identify the channels they'll be reproducing.

"the sense of scale given to the fifth movement of Berlioz's Symphony Fantastique (Berliner Philharmoniker/von Karajan) was entirely appropriate"

not-ineffective noise-cancellation system and – if you're using Bluetooth – pause playback, or select the next or previous track. The latter control also answers calls.

PSB has provided only one button to invoke the Bluetooth 'discovery' mode in which your playback device (e.g. mobile phone) looks for compatible hardware to pair with. Since PSB has avoided the use of trendy touch-sensitive earcups, you won't inadvertently change tracks (or whatever) by accidentally-brushing your hands against them!

The volume control can

although I noted a distinct (but not unpleasant) warmth to the bass. With PSB's processing turned on, the sound became livelier and more engaging. Purists will hate the idea of all that extra digital manipulation sitting between the music and their ears, but it does work very well indeed!

The 'rasp' of the sax in Black Country, New Road's Track X was imparted with accuracy and vitality, while the sense of scale given to the well-known fifth movement of Berlioz's Symphony Fantastique (Berliner Philharmoniker/von Karajan) was entirely appropriate. The subtleties

PSB M4U 8 MKII
£299



OUTSTANDING - amongst the best.

VALUE - keenly priced.

VERDICT

Minimalists might scoff, but there's something in PSB's high-tech approach to headphone listening.

FOR

- flexible connection arrangements
- psychoacoustic enhancements make an audible difference
- immersive and engaging

AGAINST

- tendency towards brightness
- occasional Bluetooth dropouts

PSB
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Gained In Translation

Martin Pipe goes from digital to analogue with Earmen's full metal-jacketed Tradutto DAC.

The Earmen Tradutto is a miniature (150x30x150mm) 'wall-wart' powered hi-res DAC that covers all bases with a USB port for computer audio, conventional coaxial/

optical inputs and HD Bluetooth capabilities. Its stereo output is available on phono sockets and, should balanced connectivity be required, a 4.4mm TRRS (Tip/Ring/Ring/Ring/Sleeve) 5-pole jack, likely a Pentacon. No headphone

amplifier is built in, and as the outputs are 'fixed' in level – no volume control here – the unit should be used as a source with conventional gear.

Build quality is excellent, and the Tradutto's machined enclosure





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contributes to a reassuringly heaviness – 550g, in all – that belies its size. Earmen tells us that the electronics inside is fully-balanced and mounted on a gold-plated PCB.

The Tradutto is designed around an ES9038Q2M Sabre32 DAC, a low power version of ESS's flagship 9038 device, and a 16-core XMOS XU216 chip that looks after hardware decoding and the USB interface.

Given that its manufacturer seems to be based in Chicago, I found it unusual that the Tradutto – derived from the Italian for 'translator', if you didn't know – bears a 'made in Europe' notice on its rear panel. So too does the accompanying remote, a tiny aluminium-encased device that's charged via USB-C (you don't get a charger or cable, so use your mobile's). Neat, and clever.

It turns out that 'Earmen, LLC' is a DAC-focused US offshoot of Serbian operation Auris Audio, an esoteric tonearm and valve-amp specialist founded by Milomir Trosic. It therefore wouldn't surprise me if the physical location of the European factory responsible for Earmen products is closer to Serbia than Italy. This truly is a hi-fi world!

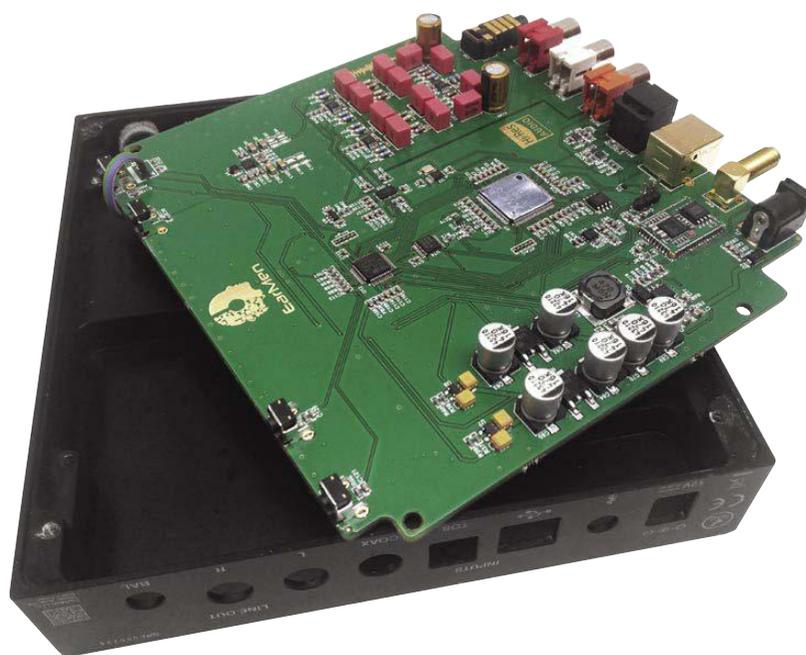
Dominating the Tradutto's front panel is an OLED display that indicates the source selected by a pair of buttons to its right, and the status of Bluetooth pairing. If you're listening to a USB source, then information about the incoming signal – PCM resolution and sampling-rate, for example – is displayed. Such information isn't also available for the other inputs, which is a pity because it can aid troubleshooting.

Unless it's unplugged, the Tradutto will remember the last used input (it defaults to USB). Furthermore the inputs are not cyclically selected, and so it's perhaps just as well there are only four of them! The remaining two buttons on the front panel (duplicated, with the others, on the remote) invoke Bluetooth pairing and standby mode. Customisable digital-filter characteristics are supported by the ES9038Q2M, but Earmen makes no use of them here.

It's also disappointing that the manual does not cover computer-based USB setup in anywhere near the depth required. All it

does is point out that Windows users must install a driver for best results. This XMOS driver is essential for hi-res PCM (as high as 384kHz/32-bit), DSD (up to DSD512 is supported) and MQA, which – thanks to the processing power inside that XMOS chip – the Tradutto will also decode. Good news for Tidal subscribers! Without such software, though, it's 48kHz PCM only. A driver download and support information should be added to the relevant Earmen web page (bit.ly/3HMSv9f) as soon as possible; it is, however, buried at the bottom of another

iCan support balanced inputs, but unfortunately the 4.4mm-to-XLR cable I ordered didn't arrive in time for this review and so I had to stick with the RCAs. Other sources included a Humax digital TV set-top box with optical output, an old Sony DVD player (used here as a CD transport), a Sony Nexperia 10 smartphone and a cheap Mahdi MP3 player. The latter two devices, both of which suffer from terrible analogue outputs, connected to the Tradutto wirelessly via Bluetooth. Their worst sonic limitations were bypassed, although the sub-£50 Mahdi still sounded rather thin and



Internally, the Tradutto is neatly constructed on a gold-plated PCB. The XMOS chip – heatsinked by the machined case – can clearly be seen. Barely visible though is the tiny ES9038Q2M Sabre32 DAC chip.

Earmen site (bit.ly/3rOTfW6) that is ranked lower on Google! Furthermore, Earmen is advised to append a meaningful USB configuration section to the manual and publish suitable instructions on its website(s). I chanced on the driver (EarMen_Win-1.rar) via a Thai review website, rather than Earmen's own, but users shouldn't have to go to so much trouble. I alerted the Tradutto's UK distributor (SCV) to my findings.

I used the Tradutto with a selection of equipment. This included an iFi Pro iCan Signature driving Focal Utopia headphones, and a Cambridge Edge NQ/W combo coupled to Quadral Aurum Wotan VIII speakers. The NQ and

uninvolving.

In contrast, the Sony was considerably fuller and more musical in character. I suspect this was due in at least part to a Bluetooth connection that the phone's Android operating



No need to worry about popping out for fresh batteries here – this remote has 'em built in! They're charged via a USB-C cable (not included) or phone charger.

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June 2019



February
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system revealed to be aptX HD. I don't know the specifics of how the Mahdi player communicated with the Tradutto, demonstrating just how useful a more communicative front-panel display would be! TV sound was also transformed via the Tradutto, BBC Four music programmes and Radio 3 benefitting in particular.

And so to albums, played with the Sony optical transport or Windows PC. Coming across particularly well was the plaintive pedal steel guitar of Mojave 3's dreamy alt-country Starlite #1. With the theramin and understated vocal, this cannot help but draw you into the piece's intimate melancholy. With the Tradutto I found that the BBC session version, aired now and again on 6 Music, is definitely clearer and more open than the recording on the 'Spoon and Rafter' album.

More uptempo electronic percussion, piano and analogue synths – Caribou's Never Come Back (from 2020's Suddenly) – gave a good account of itself in terms of pacing, although I perceived a definite 'edge' to upper percussion, relative to DACs I'm familiar with – Prism's Callia, for example. As a result, there's a 'forward' presentation; overall, though, the Tradutto is tonally-neutral. I'm also impressed with the levels of detail that the Tradutto can communicate without being over-analytical (a definite trait of the aforementioned Callia). It was able to, for example, resolve the complex (and hyper-fast!) layers of jungle/drum-and-bass percussion that dominates Pearl's Girl, which you'll find on Underworld's Second Toughest in the Infants album. And despite the heavy electronic



Earmen has built the simple remote - which duplicates the front panel's source selection, Bluetooth and standby buttons - into a solid aluminium case.



The Tradutto, powered by a 12V DC 'wall-wart', has unbalanced phono and balanced 4.4mm analogue outputs. As well as coaxial and optical inputs, you get a USB port and Bluetooth. The latter requires an externally-mounted aerial, due to the casework's screening properties.

processing of the vocal, every word of Karl Hyde's stream-of-consciousness lyrics is intelligible.

CONCLUSION

On the whole, the Earmen Tradutto is a likeable little DAC and is well worth considering if you're short of space. Coming across as more musical than

analytical, it nevertheless doesn't fall short in terms of resolution. It's a pity that Earmen didn't make more use of the front-panel display, and we hope that a firmware update can fix this. Something that Earmen should do straight away, though, is help computer-reliant users to unlock the full potential of the USB interface.

MEASURED PERFORMANCE

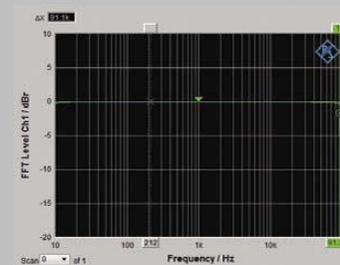
With 192kHz sample rate PCM frequency response extended ruler flat to 91kHz (-1dB) our analysis shows, before plunging in brick-wall fashion to the 96kHz upper theoretical limit. This is a very fast, multi-tap high order filter – unlike most that roll-off slowly above 30kHz or so. The time domain impulse response will be different and this may well give a slightly harder, faster character to the musical presentation.

Distortion measured 0.029% at -60dB our analysis shows, due mainly to a little phase noise rather than discrete distortion harmonics. With values of 0.02% or so being achieved by top DACs from ESS, AKM and Chord Electronics in other devices, this is a result up with the best. Output at 0dB was 2V, as per Philips original Red Book CD Standard.

Low noise and distortion contributed to a high EIAJ Dynamic Range value of 117dB as our analysis shows (57dB+60dB), fully enough to make the most of hi-res music files, if not up to the 120+dB figures being reached in other DACs, mostly those with an output swing of 3V or more to keep signal above the noise floor of the output amplifiers.

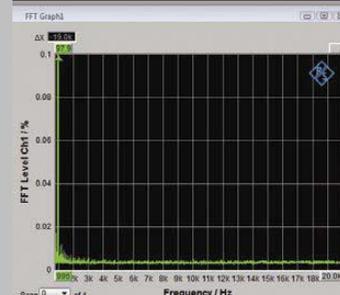
The Tradutto measured well all round and had some unusual characteristics. **NK**

FREQUENCY RESPONSE



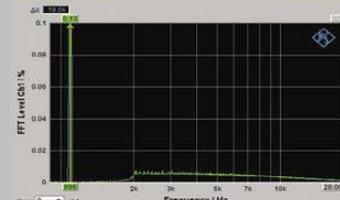
DISTORTION

THD @ 0dB	Level RMS	Frequency
0.0290 %	2.1941 mV	997.00 Hz
OFF	OFF	OFF



DYNAMIC RANGE

THD @ 0dB	Level RMS	Frequency
57.221 dB	57.258 dB	997.00 Hz
OFF	OFF	OFF



EARMEN TRADUTTO £799

EXCELLENT – extremely capable.

VERDICT

There's no headphone amplifier, but otherwise a flexible DAC that performs where it counts.

FOR

- detailed, musical and full-bodied sound
- compatible with USB, Bluetooth and S/PDIF digital sources
- supports DSD and MQA, as well as hi-res PCM

AGAINST

- under utilised front-panel display
- slight 'edge' occasionally noticeable
- no meaningful USB configuration information

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 WAYNE ALLEN, Letter of the Month winner in our March 2022 issue.**

Letter of the Month

A QUALITY CERAMIC

In the recent review of the Lenco LS55 you maintain that ceramic cartridges are not good, indeed not good at all. Definitely not hi-fi and to be honest in most cases I'll happily agree. In fact I agreed with nearly everything said in the review.

The turntable in question, I'm sure can be found on HMV with near identical offerings from ICON and Crossley and a host of others, facilitated by a sprinkling of badge engineering, all using the same cheap design.

It's basically a design I last saw on Saisho and Matsui (sorry Dixons and Currys) MIDI systems, used to prove to the masses that CD was better, in about 1987. A disheartening waste of a whole summers' wages and a lesson learned.

However, I can't dismiss ceramic cartridges with the same certainty, due to a chance encounter about 5 years ago with one I really like. I occasionally restored old turntables and had at the time put together a Garrard 4HF, using parts from a few basket cases, and realised that I did not have a cartridge that could put up with the massive weighty arm.

I was hoping it would give me



Garrard 4HF, 1957-1964. "I realised that I did not have a cartridge that could put up with the massive weighty arm" says David Gray. So he installed a ceramic.

that toe tapping immediacy that my father's old 1958 Regentone (BSR) portable record player did, when I first dug his rock and roll 78s and my mum's Everlys and Beatles records out of the loft, as a 7 year old. Stack 'em high and set it off and boogie, provided it didn't get too hot. The hum was quieter than the music, the smell of the thing was just as important: wax, dusty valves and

burnt transformer varnish.

The search, mainly internet forum based, highlighted the Sonotone 9TA HC as a decent candidate, which I purchased, and which ploughed the records in a reasonably impressive way, it is reasonably hi-fi for about 75% of the audible spectrum and can be made quite useful if you use 2 acoustic guitar ceramic pickup preamps, guitar pickups cut off,

between it and a line level input, £7-£9 each, with 3 band tone controls, on eBay.

Not hi-fi really, but a much better presentation than the level my outlay would indicate, and a lot better than the bottom end of the range. Namely a USB enabled turntable. My 13 year old son has one that was used once before the cartridge bridge or stylus collapsed. It is still available today from a high street store, who will, if you make enquiries, send you to the Apple Shop or carphone warehouse to get a new stylus for it (I'm not joking).

I decided that I can't do this to my records...The Sonotone works, but the tracking force is worrying, records should not change colour, black to grey, when you play them. I joke but we have all added too many 2 pence pieces and blue tack at some point.

I eventually came across a few posts by a guy who calls himself AudioFlyer on a range of internet based hi-fi forums, who gave his view on a ceramic/electret cartridge, that his music teacher at school raved about. It is called a Philips Super 22 GP390. Plenty of posters boohooed, hissed and dismissed him. This is a cartridge from 1968 that uses a supposedly unique pair of ceramic elements, with a cantilever bonded to them, using some kind of organic adhesive. Lighter fluid is the solvent you use to facilitate a stylus change! Soften glue on the new stylus and insert it perfectly aligned, with the tool provided.

The cantilever is aluminium tube and it has a nude conical diamond bonded on. In the rear of the cartridge is a small circuit that converts the output to be magnetic phono input compatible. An impressively tiny circuit board is visible. This is potentially an idea borrowed from Sonotone who sold similar circuits hidden in some phono connectors with the 9T-HC in the US.

AudioFlyer was impressed, his internet friends were all impressed, especially when he blew their socks off with his GP390 equipped Thorens at a Hi-Fi Wigwam show. Well that's what I took from the internet postings. I was not there to witness this display.

I felt I needed to try one of these in my proper arm on a decent turntable, and that's where the problems started. Nobody in 1968 purchased a ceramic cartridge for their hi-fi. I'd guess that "trailing edge

technology for the mass market" had ruined the reputation of ceramic cartridges forever. Philips eventually realised this, I presume they had to pay to get it tested by the German standards institute to get it a HIFI DIN standard certification.

I'm sure in retail they cost a fortune as well. A new flagship model with, according to Philips, a new technology, that sounded on paper at least like old technology, and that diverged from the now accepted magnetic norm. Low sales equates to very few available second hand, and potentially a lot of land-fill when they were withdrawn and replaced with the moving magnet Super 22 GP400. I've got one it's not the same: it's good but it's no better than all of the other brands of similar vintage.

All in all it's very hard to find a GP390. Tracked one down 6 months later with an ex DJ in Oval south London. My wife was dispatched from



David Gray's Philips GP390 ceramic cartridge. "This is a cartridge from 1968 that uses a supposedly unique pair of ceramic elements" he explains.

her office in Vauxhall one lunch time (I work in Watford) to hand the man £20 for a brand new, never opened box. Inside you get a mini electric shaver box, containing a cartridge, stylus guard, instructions, leads and screws, all in a velvet flocked plastic base.

Wow....yes it is hi-fi, it says so on the front, and to me it sounds good. It works very well, tracking at 1.5 to 2 grams. I can't wax lyrical about the sound other than to say it's a fast, toe tapping experience. Drums, cymbals and strummed instruments sound correct to me, positioning is good, Esses are s with no ssshhh or

thhhh, and after about a month, to wake up something that is 50 years old, bass is tuneful and deep enough to cause family members to request a reduction in volume due to the thump, thump, thump of kick drums previously hidden.

Playing old 45s, discovered when I was 7, Ricky Nelson never sounded so good. Yes the excitement is there again, driven along at a pace. I found myself hovering around the strobe on my 401 to check the deck wasn't running fast. It wasn't needless to say. My Ortofon OM and Goldring 1000, both budget but competent, and with mid-price elliptical styli, have been in the box ever since.

Two months into my ceramic adventure I purchased the other four new old stock GP390s the guy had, and sent one to Expert Stylus Company to have a Paratrace fitted (followed Audioflyer's lead again, can't take any credit for the idea, goodness knows what ESS thought).

This one is now my best hi-fi bargain and has graced my turntable ever since. I really do like it.

The system is a Garrard 401 in skeletal plinth with Origin Live Rega 250, modified with a robust, bolt down steel adjustable mounting, and Michell stub and counterweight. WAD phono/pre ll/power. The power amp is a WAD 6500, speakers (recent) Mission LX4 Mk2, slight hum at high volume but I don't care.

Is this hi-fi? I don't know but I like it. It makes a 5th pressing Police or Blondie album sound like the first off the press, and modern Black Keys "El camino" is just thundering and subtle all in one. I spend hours listening for, and hearing the things I've not heard before.

The cartridge needs careful alignment due to physical constraints, it's a long cartridge so won't fit every arm. You can short out the pins by accident, and vertical tracking angle seems to make little difference, maybe a sweet spot for least or best surface noise, you can sure tell the difference between picture disk and pure black vinyl, handy for set up.

So I subscribe to the idea that not all ceramic cartridges are rubbish. This one is a forerunner of the technology used in every stage radio microphone in use today, and when Philips dropped the idea, presumably fed up with banging their head and their DIN certification against the wall, MicroAcoustics in the US picked it up and ran with it into the 80s,



Lenco's £135 LS-55 all-in-one 'record player' with ceramic cartridge (February 2022 issue) brought a response!

using boron cantilevers and better stylus shapes. They cost a lot more than £20 today – if you can find one that isn't broken.

Obviously, I may just be easily impressed. I have no experience with high end hi-fi, I just have "my" hi-fi. However, in my opinion there is something subtle and unique about the sound of a ceramic cartridge, or to put it the correct way, the sound of a record played with a ceramic cartridge, that was squarely aimed at, and marketed to hi-fi enthusiasts at a hi-fi price point. Rather than the sound of a throwaway ceramic pickup for jukeboxes and record changers or the latest budget offering, that doesn't work with my phono amp.

Some of the joy is evident (they sound fast) but I agree they are not hi-fi. Signal is not dependent on the velocity of magnet or iron or coils and I think that plays a part. The stylus is basically bonded to the transducer. Any movement fast or slow in one will be seen by the other and acted upon instantly even if an aluminium tube is there to get in the way. If DIN says it complies with a Hi-Fi standard, I'm happy to agree with the Germans. My current one, with a slightly smaller lighter diamond, with better groove wall contact should in theory be better still.

You can probably tell from my system that your magazine has had some influence. A regular buyer from

the 401 issue onwards, my 401 is from 1965 with 301 like bearing and facilities for the on/off strobe circumvented by the factory (little addendum in the manual) and I'm pleased to say no rumble. Apart from cleaning and lubricating once in a while, I have never needed any other work. As a direct consequence of your article years ago, I went for the earliest I could find. I'm very happy with it and have been for 15 years.

All the best.

**David Gray
Twickenham**

Hi David. Thanks for that fascinating information. I was unaware of the Philips GP390 but have found Art of Sound forum info that is quite detailed. It seems Philips based it on a newly developed piezo-electric generator and certainly the specs look very good. You have piqued my interest, that's for sure.

I was alluding to simpler past designs from Acos, Sonotone and others that lacked internal correction networks and, in their day, were common in record players like the legendary Dansette.

With all this in mind and the interest readers have shown in budget cartridges, we have taken a close look at Rega's Carbon cartridge this month that I hope you find interesting. **NK**

DECCA DERAM

"The ceramic cartridge is a nightmare from the past, that isn't hi-fi, so much as basic audio", announces Noel in the February 2022 issue.

Perhaps he is too young to remember the Decca Deram cartridge with its high compliance and low tracking force of 2.5 g? It was arguably the best ceramic cartridge ever produced and was claimed to be of transcription quality. I've even seen a suggestion that it was used at the BBC!

Ceramic cartridges are constant amplitude devices and when records with constant velocity recording are played with ceramic cartridges, no equalisation is required. This was the case for the Decca Deram – provided the recommended loading of 2 Megohm was adhered to.

If the Deram were to be connected to the lower impedance line/aux input of a modern amplifier, the result would be the same bass light sound that Noel encountered in his review of the Lenco LS-55.

Alan Scott



Decca Deram ceramic cartridge. "Arguably the best ceramic cartridge ever produced and claimed to be of transcription quality" says Alan Scott.

Hi Alan. As you say the ceramic cartridge is an amplitude sensitive device and RIAA gives – approximately – a constant amplitude cut, meaning the net result should be reasonably balanced sound. I have never measured a high quality ceramic to see just how good this match is though. I did measure the LS-55's Chinese ceramic cartridge



A third-octave analysis of pink noise from the LS-55's preamp output shows treble dominance. The cursor is at 8kHz.

by connecting up its preamplifier output to one of our analysers and you can see just how skewed it was.

Speculating, I suspect this ceramic cartridge feeds a simple transistor gain stage with low input impedance and, being a capacitive source, this curtails low frequencies.

Looks like we have to add the Decca Deram to Philips GP390 on a list of 'ceramics of merit'. **NK**

TURNTABLE TROUBLES

The February edition of Hi-Fi World highlights why I look forward to each edition. You don't always go for esoteric equipment reviews out of reach of 95% of the population, concentrating on an unbiased summary of what good quality hi-fi is available to the masses without necessarily costing a premium, although sometimes you come up with gems such as the Audio Research Reference Pre/Power Amplifiers: it is nice to dare to dream.

The Lenco LS-55 review certainly raised my eyebrows this month. I go back to the days of the late 70s where there was a plethora of mediocre items available. I for one was extremely gullible in this matter, getting a Strathearn STMA4. At least it had a Shure M75 cartridge and tracking adjustment, plus anti-skating.

Alternatives at the time of my visiting COMET back in the day was the Amstrad TP 12D which I dismissed even though it was aesthetically pleasing to look at – ah, the dangers of hi-fi. Eventually, I ended up getting a Griffin RHI back in 1980. Whatever happened to Griffin?

Anyhow, back to the Lenco, it looks like a good idea, especially the relatively straight forward way to digitise vinyl, but the small plastic platter and arm look straight out

of music and gramophone systems of the 60s/70s era. The use of a ceramic cartridge and lack of information for the intended user is shocking, unforgivable IMHO. They say on their website it uses a Moving Magnet (MMC).

On a positive note, I now feel I did not make possibly the worst purchase in the turntable category. How did it manage to get 2 globes? I thought that was very generous of you. It just goes to show, you can't cut corners and not cut quality.

Their LBT-188WA version looks more what is considered as being in the realms of hi-fi. I think the problem here is the features of the product would be very appealing but unknown to the user, the damage it would cause to the recording would be catastrophic. These days so many products get very good reviews: you rarely see one with so much criticism. I wonder what Lenco were thinking of?

Their product does seem to be selling well though and I have seen a review quote "If you are looking for a stand out stereo turntable, I think you would be hard pushed to find another classy model that packs a punch like this one does for style and features".

I would like to see the Bluetooth function extending to pairing with my Bose speakers down the line, but for the price you can't beat the functionality of this turntable.

Would a better alternative be in



"A mediocre item from the 1970s" Kevin Youde says of the Strathearn STMA4 he bought.



The Amstrad TP 12D Kevin Youde dismissed in favour of a Strathearn.

the second hand market if the purse strings are tight? I guess the problem here is getting a complete system for around the same price band, can you come up with an alternative? Would anyone interested in making such a purchase as a subscriber to a hi-fi magazine?

Vinyl is much in vogue these days;



Lenco's LBT-188WA is more in the realms of a hi-fi turntable thinks Kevin Youde.

album plugs on TV always show this medium. My disappointment with vinyl is the really good recordings are sold out before you have a chance. Bridge Over Troubled Water on 45 rpm was highly desirable as I am a big S&G fan but alas, not a chance. What is the best way to get hold of Mobile Fidelity Original Master recordings these days? This is the main reason I use either digital format or the endangered silver disc. I look forward to the next edition of HFW with anticipation.

Kevin Youde

Hi Kevin. Our review of the Lenco LS-55 turntable showed what lies behind these budget packages, that are everywhere on the 'net. All those features in a complete 'record player' for £135 comes with massive compromise, the worst being use of a ceramic cartridge without equalisation. Not only do you suffer very high tracking force (5gm) but poor tracking in any case, also lack of RIAA correction (or suitable correction even if not RIAA) that results in a sound balance that's all treble and no bass – meaning thin and scratchy. It would have been possible to correct this with one capacitor, but no one bothered.

Yet Lenco produce some very impressive turntables, such as the Direct Drive L-3808 (June 2017 issue), now priced at £260. As you suggest their LBT-188WA (£200) is a proper hi-fi design too. Highlighting that what appears to be a bargain is not, and that for a few dollars more it's easy to make a disproportionately big step up into true hi-fi. NK

ANGULAR MATTER

I was watching an Ortofon video on YouTube about setting up a phono cartridge and have a question. The chap at Ortofon went through, in quite some detail, on how to setup a cartridge on a turntable. It covered all the normal setups we need to do when setting up a cartridge but also covered the angle of the cartridge to the album. He said that the angle should be (for the cartridge he was installing) 23 degrees.

Now my question is: I always thought that the angle the cartridge needed to be to the album was set in the cartridge and that as long as the headshell was level the cartridge manufacturer had already set that angle by the way the cartridge was

constructed in the factory. Is this correct or should I be also raising/lowering the tone arm height to allow for this?

It just occurred to me that I could have been setting up my cartridges incorrectly for years and that I should check!!

Thanks

Andrew Burtchaell

Hi Andrew. You are correct. It is set in the design process by parameters such as disc clearance and cantilever length. The 23 degrees figure comes from an IEC Standard that is rarely met: around 30 degrees is common and it is impossible to move an arm enough to compensate for this apparent error. Also this would upset Stylus Rake Angle (SRA).

My advice is to keep the arm horizontal to (hopefully) ensure SRA is correct and forget the large VTA error.

It's impractical to adjust arm height for every LP played and, in any case, vertical modulation slant angle varies due to lacquer springback in the cutting process, making every LP different. See more on this next.

NK

should closely follow the cutting angle. When examined using a 200x USB microscope \$5k and \$10k cartridges were shown to have their stylus inserted at 87 degrees and at numbers way off ideal.

This is a manufacturing issue with the three factories in Japan that supply stylus already attached to cantilevers to cartridge producers. I know of only two companies that do the assembly themselves: Ortofon and Soundsmith.

At present here, serious audiophiles have to set up systems that can be purchased for optimum turntable set up analog magik and wally tools. They both take a different approach at present: wally tools has a great webinar on their site demonstrating their set up also analog magik has a series of short videos on their site. I hope you may find the time to compare the two approaches.

The zenith angle when viewed is also all over the place. I do not know how much attention is paid to these issues over in the UK with set up by reviewers of hi-fi magazines. Any feedback from you would be most welcome and thanks for informing me about lacquer spring-back in the past.

**Richard Fraser
Canada**

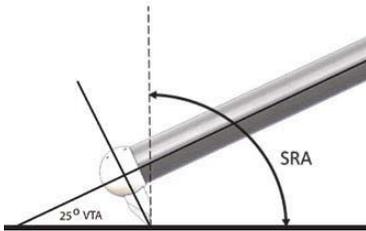


Ortofon explain stylus and cantilever geometries in their YouTube set-up video, by using giant model parts. "We want to have 23 degrees here" they say. "Should I be also raising/lowering the tone arm height to allow for this?" asks Andrew Burtchaell.

STYLUS RAKE

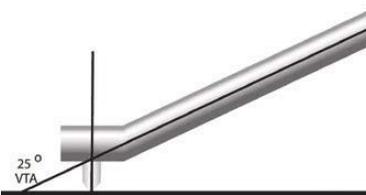
As a regular reader of your mag here in Canada and the resurgence of vinyl records I have a question. We are faced with info we did not have before CD. In an article written in 1981 in an audio magazine 92 degrees was decided by the researchers as the almost ideal stylus rake angle (SRA) for vinyl playback. A turntable happens to be a transcription device so playback tracing of the groove

Hi Richard. I looked at Analog Magik and Wally Tools and, like you, found them very interesting. Unfortunately, whilst I agree with most of what is said – and boy does it get complex – at the end of the day it's best to remember that vinyl is not a precision medium. The degree of variation in LPs themselves is very high, from disc to disc, according to the cutting lathe set-up and performance,



Ortofon's SRA diagram (SRA=92degrees). It shows the stylus shank is not upright, but the Replicant contact face is.

lacquer spring-back in the master and even material used in the master, Direct Metal Masters (DMM) for example having a distinctly metallic sheen to their sound.



Our diagram shows the most common situation where an alloy tube's crimped end is bent to suit upright stylus fixing.

Then there's the vinyl itself, noisy or otherwise. Add in the fact that there's little you can do about all this and my advice is to forget it, crack another beer and chill out.

To get a little bit more specific about some of the issues, SRA is important as the Wally Tools webinar shows with its USB microscope shots: the stylus should be upright.

Or should it? No, not according to Ortofon with their Replicant whose shank is right angles (90 degrees) to the cantilever, tilting it by 25 degrees (the VTA) from upright.

What is upright is the line-contact surface ground onto the diamond. It's necessary to get this upright (or 92 degrees it seems), but all those USB microscope shots show the diamond shank and its angle, not the tip grind angle. You need at least x2000 for this, preferably more.

Let's say you decide the shank needs to be upright (as many do) and you estimate the stylus is 5 degrees from upright when sitting on an LP, at the tracking force specified. Time to adjust the (220mm) arm, up or down, to

compensate. But by how much? A quick calculation shows that 1mm movement up or down at the arm pillar will alter SRA by 0.25 degrees. To compensate for a 5 degree error, the arm pillar must be moved by 20mm – far beyond what is possible and placing the arm at a crazy angle. You may be able to adjust upward by large amount, but not down – the rear of the cartridge will hit the disc.

I've been through all this and can assure you that compensating for VTA or SRA at the arm is unrealistic-to-impossible, especially as VTA error demands the arm pillar be lowered because VTA is always excessively large, typically 28 degrees where 23 degrees is the IEC standard, a 5 degree error that requires the arm pillar to be lowered 24mm – physically impossible.

And do you correct VTA or SRA? Which is most important? With VTA you are altering distortion, with SRA the ability to read short mechanical wavelengths – high frequencies and inner grooves. Altering one alters the other, making the trade off between them impossible to separate.

Now to the two LPs issued by Analog Magik and associated paraphernalia. I have no experience of these particular LPs (\$750) but don't hold out much hope. The reason being most test LPs are unusably inaccurate, I have found from comparing them to known references. CBS Labs and Shure (America), DIN of Germany and JVC (Japan) produced a range of professional test LPs in the past that make this clear.

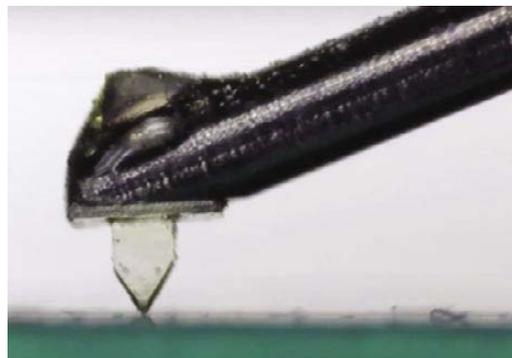
What Analog Magik have to say is sensible stuff but the issues behind getting the modulation axes aligned on LP, as explained by Roger Anderson at Shure, and the complexities of measuring VTA are missing, making me unconvinced. But again I come back to the issue: so what? There's little you can do about errors you may find, and you can't adjust VTA or SRA for every disc you play.

Another small illustration for you. I measure distortion from pickup cartridges with CBS STR-112 test disc. Levels of 0.5%, primarily second harmonic, are possible from this disc where 2%-3% appear from all others, due mostly to the cutting lathe/process I suspect, perhaps lacquer spring back too. Discs determine distortion, as much as cartridges. Most are unusably poor. Behind CBS discs lies the considerable knowledge of Benjamin Bauer who wrote at length about the LP, including the issue of lacquer spring back (look him up on Wikipedia).

On this theme, twisting a cartridge in the head shell by a small amount wrecks its groove alignment and drastically alters distortion. This is part of the variability of the replay process but it is never talked about. You can align the arm perfectly, but the slightest misalignment of cartridge body in headshell renders all other efforts worthless. Some cartridges don't even have parallel sides to facilitate alignment.

The two websites you quote are fascinating, and not wrong. But in the sea of information that they deliver you have to ask yourself whether you are able to gain any useful improvement from your turntable as a result – and I would suggest "no".

Stop worrying about SRA,



Wally tools picture an upright stylus in what appears to be a boron rod, adhesively bonded into place on a surface ground flat.

VTA, alignment of modulation axes and all else. LPs vary hugely, as my large collection of unusable test LPs demonstrate. You'll end up worried to death about things you can alter little or not at all. LP still offers the most wonderful sound available in spite of its complexities and variability. Relax and enjoy the music. **NK**



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New Classic?

JBL's L52 Classic loudspeaker, reviewed by Noel Keywood.

Classic values? It's difficult to know what expectations are here – a big warm sound, analogue smoothness, a genuine wood veneer? Is JBL's small L52 Classic (£999) I'm reviewing here capable of evok-

ing such old time strengths, whilst avoiding old-time weaknesses that – cough – commonly go unmentioned?

The L52 is a conventional ported two-way, with a 133mm (5.25in) bass/mid-range unit crossing over to a small 20mm

titanium dome tweeter (most are 25mm / 1in). The cream coloured Pure Pulp (paper) woofer is loaded by a front mounted port and – adding to front panel visual activity – there is a rotary 'HF level' (High Frequency level) control to increase or decrease output



from the tweeter, anchored by a 0dB reference position (which I'll explain later).

Topping off this complex looking mini there's a funky 1970s Quadrex foam grille that, I know from using them back then, collect dust. Prepare vacuum sweeper or possibly a blower of some sort if long term cleanliness is important to you. It may just be that a wash under the tap is best, but I didn't try it for fear of returning soggy speakers to Harman. Surprisingly, even though the foam is thick these grilles have no influence on treble,

it does sink to that as a minimum, but overall it is exactly 6 Ohms like most other speakers nowadays, so not an unusual load. Suitable amplifier power is quoted as 10-75W and this will do, but sensitivity isn't very high at 85dB and I'd suggest 40-100W.

The 'HF level' control I thought would raise treble for a bright sound, or lower it for a soft one. Well it does, but the maximum lift is small at +2dB, whilst maximum cut is drastic, the tweeter not working at all, so behaviour is asymmetric: you don't get a neat

"in Neils Lofgren's Keith Don't Go, there was a sense of diamond hard speed that JBL seem to prefer"

measurement showed, so can be used on or off.

The cabinets are solidly built, weighing 5kg (11lbs) each. JBL say they are finished with 'satin walnut furniture grade wood veneer' and – surprisingly – they come in mirror image pairs where it is usual to place tweeter on inside for sharpest stereo imaging. Some prefer the wider but more diffuse stage given by placing tweeter on outside. Looking at JBL's specs they say its impedance is 4 Ohms and

+/-5dB for example. Perhaps not a big deal but I think a bit more lift would have suited some listeners, if not me. In JBL's favour, the 0dB reference position gave an impressively flat and accurate response – a perfectly wrought starting position.

SOUND QUALITY

The 'speakers were initially driven by our PrimaLuna EVO 300 Hybrid amplifier, connected through Chord Company Signature Reference screened cables. Sources were an Oppo BDP-205D acting as CD player – used for its top ES9038 DAC chip and linear power supply – plus hi-res from a MacBook Pro running Audirvana+ software player to deliver in DSD (via DoP) over a USB link.

Running through our wide dynamic range review CDs I was a little surprised at the brisk modern sound balance of the L52s, rather than any hark back to the past. Set flat (0dB) there was a natural balance with no sense of warmth or body to the sound. The result pushed saxophone forward in the Pink Panther theme, whilst plucked bass was somewhere behind and lacked depth. When the orchestra came in there was some coarseness in the



JBL's Quadrex foam grille is reminiscent of times gone by. Although thicker than modern cloth grilles it was acoustically transparent, measurement showed.

brass section, with the hard quality expected from a titanium dome. The EVO300 Hybrid amplifier has fast, concise and brightly lit treble from its output FETs I know and this did not suit the L52s, so I swapped over to our Creek i20 Voyage amplifier for its softer, easier demeanour and this proved a more appropriate subjective match.

In themselves the L52s were clean and speedy, right on the nail timing wise. Their sense of clarity and resolution only filtered when I turned volume up with Safri Duo's Samb Adagio for example, where the pounding synth beat started to overwhelm the small bass unit and box boof became apparent from the front firing ports. This track also made clear bass was fast and snappy at normal volume, but it did not run deep – an over-damped balance best suited for use close to a wall in a small room, meaning 12ft long or less. The titanium dome tweeter could harden up with strong treble: Fleetwood Mac's Go Your Own Way (24/96), that has brightness in its transcription from analogue master tape, pushed it into this state and sounded a



At rear just one set of gold plated terminals, eliminating the ability to bi-wire. Bare wire, spade terminals or 4mm banana plugs are accepted.

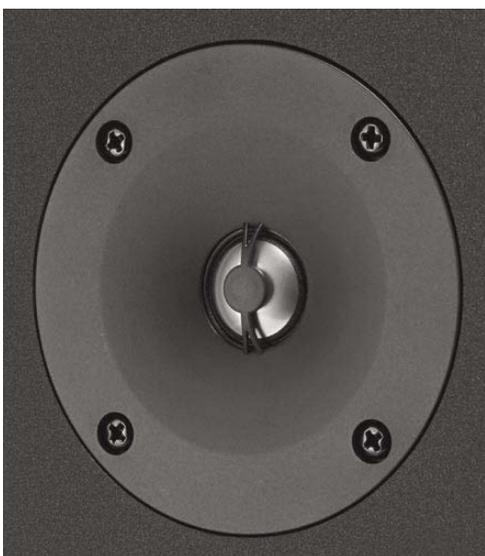


A unique feature of the L52 Classic is adjustable tweeter level. Set to 0dB the 'speaker measured flat. A few dBs of treble lift are possible, or a large range of treble cut.

bit remorseless. For most of the time though, with close miked guitar strings such as those in Neils Lofgren's Keith Don't Go, there was a sense of diamond hard speed that JBL seem to prefer.

With Vivaldi's Concerto in D Minor, Opus 4 No8 (DSD) the orchestra was accurately balanced across the frequency range but I was – after lengthy listening – beginning to realise that a certain slight boxy quality was coming

from the front firing ports, the reason that ports are best (and most commonly) placed on the rear. It may well be that front port and Quadrex foam grille are the Classic bits in JBL's description, because otherwise this is a



The titanium dome tweeter has a frontal phase plate to flatten its frequency response by suppressing cavitation at the dome's apex. It sits in a shallow horn that directs energy forward.

loudspeaker of thoroughly modern sound balance.

CONCLUSION

Our JBL reviews consistently pick out the fact that this large U.S. loudspeaker manufacturer engineer their products for accuracy – and that's what I found with the L52. But its titanium dome tweeter had a somewhat hard quality and was conspicuous in its output even when set flat at the HF Level control. It could be dialled back a bit to ameliorate this.

There was little low bass, but in a small, resonant room, with placement against a rear wall, this may well be balanced out by 'room gain' and not be apparent. Under such conditions the L52 would indeed give a speedy modern sound from what appears to be a retro design. At the price it has plenty of competition, from Wharfedale, Q Acoustics, KEF and others, all of whom offer similar accuracy coupled to greater sophistication. None offer adjustability though, where highs can be dialled back – a feature that makes the L52 stand out.

MEASURED PERFORMANCE

With the 'HF Level' control (tweeter level) set to its 0dB position the L52 Classic measured close to flat from 55Hz to 20kHz our analysis shows, with front grille removed. Although the foam grille is thick it made no difference to this result. Rotating the control up to Max gave a small lift of +2dB above 3kHz, enough to add just a slight sheen. Rotating the control down to 12 o'clock gave similar cut, any further introducing strong cut until the tweeter stopped working.

For cabinet size bass extension was fair, the small front port tuned to 60Hz – see impedance trace dip – contributing to output down to 40Hz. Small ports provide little acoustic power however, so deep bass will not be apparent but the L52 Classic has plenty of upper bass around 60Hz that will be obvious, especially in a small-ish room 12ft long or less.

Sensitivity was on the low side at 85dB sound pressure level (SPL) from one nominal Watt (2.8V) of input but this is sufficient to go loud with 60W+ amplifiers. JBL unsurprisingly use a 4 Ohm bass unit for best voltage sensitivity, resulting in a measured impedance (with pink noise) of 6 Ohms, which is right on market target. Our

impedance curve shows the load is mostly resistive, with just small residual (reactive) peaks around port resonance at 60Hz.

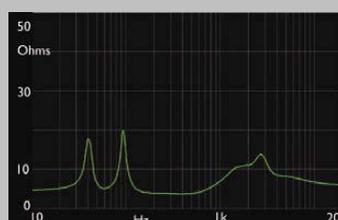
The JBL L52 Classic is surprisingly accurate, its titanium tweeter with corrective phase plate running smooth and flat to 20kHz. Bass extension is good too. A carefully engineered loudspeaker that is accurate and adjustable. **NK**

FREQUENCY RESPONSE

Green - driver output
Red - port output



IMPEDANCE



JBL L52 CLASSIC

£999

GOOD - worth auditioning

VERDICT

An updated retro design that's accurate and adjustable. Fast but bass light.

FOR

- tonally accurate
- small
- adjustable treble level

AGAINST

- bass light
- prominent midrange
- hard treble quality

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Three Point Turn

An All-In-One streaming system from Triangle with vinyl replay ability – disguised as a simple pair of loudspeakers. John Pickford dives in.

Active loudspeakers have been the industry standard in recording studios for a good couple of decades. Hi-fi enthusiasts have been slower to catch on, preferring to keep their boxes of electronics separate from their traditional passive speakers.

While studio monitors usually feature onboard power amplifiers only, Triangle's AIO (All In One) Twin system takes the active approach further still, by incorporating both line-level and moving magnet (MM) phono preamplification.

But that's just the analogue side of things. The AIO Twin is also

Bluetooth 5.0 aptX compatible and can stream hi-res audio up to 192kHz/24 bit. This is done via an app you have to download (App Store for iOS or Google Play for Android), then the app will allow you to play music from your chosen service, using your mobile device (phone, iPad etc)





On the back panel are all the analogue and digital inputs, volume control and an output for a subwoofer.

as a remote control. I use Qobuz for hi-res streaming, usually via my Leema Stream IV, and this worked faultlessly through the AIO Twin system.

You also get comprehensive connectivity for other analogue and digital sources, with an Auxiliary input (3.5mm mini-jack), Optical input (for TVs) and USB/charge input. There's also a RJ45 socket should you wish to connect to your router via an ethernet cable, rather than use on-board wi-fi.

All of this is located on the rear panel of the active unit along with a volume/source selection control, subwoofer output and AC inlet with its accompanying power switch.

I should explain that unlike active studio monitors, that have power amps inside each unit, the AIO Twin contains all of its electronics within one speaker cabinet. The output terminals then connect to the second passive speaker, just as if a separate amplifier was providing power; a bespoke 3m cable is provided for this. Forgetting all the electronic and streaming functions for a second, the loudspeakers themselves are a conventional two-way, bookshelf, bass-reflex design featuring a 130mm woofer and 25mm tweeter.

The woofer features a concave, treated paper membrane with no dust cap. This is said to increase rigidity and efficiency and allows the whole of the surface to be used to produce sound. The silk



All important wi-fi information on an app screen.

dome tweeter has been designed for smoothness, with none of the hard, ringing artefacts that often afflict metal dome types, while the shape of the front plate aims to reduce unwanted reflections.

At the base of each speaker is a pair of aluminium feet with rubber pads at each end to provide some isolation between the cabinet and whatever it's placed upon, however the pads slot into the feet rather insecurely and can easily

work loose to be potentially lost.

The system comes with a remote control, which, along with a variety of other functions, allows for treble and bass adjustment, which I found useful. Switching between sources using the control alters the colour of the LED on the front panel of the active unit.

I encountered no problems or glitches setting-up the system for streaming playback and, following the manufacturer's easy-to-follow instructions, was up and running inside 10 minutes. You only need to go through this process on initial set-up then you're good to go indefinitely.

With my Qobuz library accessible, I began by playing You've Got A Habit Of Leaving (96/24) from David Bowie's recently released Toy album. This album was originally recorded in 2000 and features his then touring band (with the brilliant Earl Slick on guitar) revisiting some of Bowie's earliest songs from the 60s. The track features a solid rock sound and the AIO Twin delivered it with more punch than I was expecting. There's not much in the way of deep bass on the track, yet the AIO Twin didn't flinch at revealing both the attack and mid-bass thump of the kick drum and the underpinning bass guitar line.

The broad midrange, where Bowie's effect-laden vocal competes for space with over-



The remote control enables adjustment of treble and bass and an EQ reset to restore Triangle's 'flat' response.



The 25mm silk dome tweeter features a surround designed to minimise unwanted reflections from the front baffle.



“ This was by far the best analogue upgrade I’ve made in the last decade.”

- AV Audio Editor July 2021
ENTERPRISE REVIEW

You might be sceptical that a tonearm could transform your system, but the editor of Av Audio found that the Enterprise Mk4 tonearm made more difference to his system than anything else. More difference than many other outstanding analogue products, including a world renowned £17,000 phono stage and £8000 cartridge.

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Editors Choice Award
– The Absolute Sound

Product of the Year Award
– HI FI+

“One of the truly special products I have reviewed in the last 18 years”
– Stereophile (USA)

ILLUSTRIOUS TONEARM

Best Analogue Product Award
– Fedeltà Del Suono” (Italy)

“The value of this arm is off the scale”
– John Stratton (Owner)

ENTERPRISE TONEARM

“The ultimate real world tonearm”
– HI FI World

SILVER TONEARM

Most Wanted Component Award
“So far ahead of the pack... looks about to lap them... first choice for those looking for ultra musical LP performance.”
– Stereo Times

Best of Year Award

“The Origin Live Silver tonearm is phenomenal and makes me realize what a bargain it truly is at its asking price.”
– 6 Moons

“Design of the decade.”
– HI FI World

CONQUEROR TONEARM

Tonearm of the Year Award
– HI FI World

Most wanted component award
– Stereo Times (USA)

Best sound at the show award
– Klangbilder (Vienna)

Perfect 10 award
“The most addictive product I’ve heard”
– Audio 10 (USA)

“For me Origin Live in the analogue sector is the discovery of the year.”
– Image HI FI (Germany)

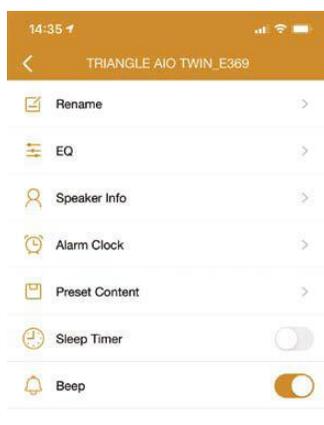


driven guitars, piano and lush backing vocals, displayed great depth of image to give a sonic presentation that was at once both forceful yet relaxed; there was no tendency to shout. I didn't miss the deep bass larger loudspeakers give, however dyed-in-the-wool

"gently shimmering chimes and sweeping strings added to the icy atmosphere"

bass-heads might want to consider Triangle's matching Tales 340 subwoofer, which connects to the active Twin via a mini-jack connector.

Another recent historic release



The Settings menu gives access to an array of functions.

by a legendary artist – Neil Young: Carnegie Hall 1970 (192/24) – features a solo performance in this large hall. During Cinnamon Girl, my attention was drawn to both the ambience of the hall and the leading edge of plectrum against guitar string. Treble detailing and atmospherics were more obvious than when I play the track through my Rogers LS3/5a monitors and here I made use of the treble control to ever-so-slightly tame the reverb and make ol' Neil sound a little less ghostly.

A more contemporary studio recording – Alexandra by Laura Marling (96/24) – also benefitted from a little treble cut, which helped sit the close-mic'd lead vocal more naturally into the mix, creating a more even presentation from top to bottom.

Led Zeppelin's Kashmir, from their 1975 opus Physical Graffiti

(96/24) is a dense production of epic proportions and in this instance, the AIO Twin's default EQ setting helped to define the massed horns, strings and mellotrons for a more lively rendition of what can be a dirge on dull or overly warm systems. John Bonham's kick drum

had enough impact and although I wouldn't have expected to hear the thunderous low-end I hear through big Tannoys, for example, texture and timing was excellent from the compact system.

Switching to vinyl via my Goldring Lenco GL75, I played John Coltrane's A Love Supreme (Impulse 1965) and was impressed with the quality of the onboard phono stage, which enabled replay with all the musicians' intense dynamics and emotion intact. Switching back to Qobuz, the Coltrane track streaming at 96/24 gained an extra degree of verve and revealed the AIO Twin's excellent, naturally delineated tonal properties.

On a wet and windy afternoon listening to Scott Walker, I just had to play It's Raining Today from Scott 3 (96/24). The generous studio reverb was highlighted by this system, while the gently shimmering chimes and sweeping strings added to the icy atmosphere; it was a delicious detailing of the recording.



Treble and Bass controls with a useful Reset switch for quick A/B comparison.

was extremely impressed with this feature packed system from Triangle. Sound quality is superb for the price and it may well



A 3m cable is provided to link the passive speaker to the main active unit.

prove a more synergistic option than finding a match made in heaven with separate amp and loudspeakers. It won't win over those who prize their multi-box amplification systems, with attendant power supplies and mains conditioners, but that's not really the target audience. For those wishing to enjoy all of their music collection, regardless of format, with excellent sound quality from an uncluttered system, the AIO Twin is an exceedingly elegant solution.

MEASURED PERFORMANCE

With the Treble and Bass level controls set to their default (reset) 12 o'clock position on the app, frequency response of Triangle's AIO (All In One) active loudspeakers, as shown, ran reasonably evenly from 90Hz up to 5kHz, after which output from the tweeter rises by +3dB or so, enough to make the sound balance obviously bright. However, the Treble control dialled back a little to 11 o'clock cured this, so there is room to adjust output to a reasonable degree of tonal accuracy. Maximum lift on both controls was a massive +10dB and there was equivalent cut so plenty of room for adjustment is available. With a small port tuned to 60Hz giving little acoustic

power and a steep roll-off below 90Hz from the forward driver deep bass will be minimal. Turning up the bass control raised upper bass rather than low bass. **NK**

FREQUENCY RESPONSE

Green - driver output
Red - port output



TRIANGLE AIO TWIN £699



OUTSTANDING - amongst the best.

VALUE - keenly priced.

VERDICT

Hi-res streaming and good-quality vinyl replay with superb sound at an attractive price.

FOR

- lively and punchy sound
- useful tone control
- supports all digital up to 192/24
- phono input for vinyl

AGAINST

- limited deep bass

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REVIEW

Project Management

Triangle team up with Pro-Ject for their first vinyl spinner. John Pickford reports.



I knew in advance that Triangle's first foray into vinyl replay was in collaboration with a highly respected turntable specialist, however I was surprised when it turned up in a box bearing the Pro-Ject logo.

Unboxed, the turntable looked smart enough with a traditional minimalist design and the Triangle logo in the bottom right-hand corner. But hang on, what's this? Bang in the middle of the dust cover was another logo, only this time it was the same as the one on the box: Pro-Ject.

The deck came with tonearm ready-mounted and its headshell equipped with an Ortofon OM-10E cartridge. It's not quite plug and play though as you still have to mount the platter and attach the drive belt. Of course, it's sensible not to ship a turntable with its platter in place, pressing down onto the bearing, however, fitting

side of the plinth, which does at least preserve the minimalist yet stylish look of the unit. Despite this, the basic design and uninspiring tonearm ultimately made the turntable feel like – if you'll forgive the pun – an unfinished project.

Following an enjoyable experience streaming hi-res audio into Triangle's Twin AIO loudspeakers, I hooked-up the turntable and played Scott Walker's It's Raining Today from Scott 3



The tonearm comes equipped with an Ortofon OM-10E cartridge.

"With the tonearm I noticed the lack of bias compensation"

the drive belt was a bit of a faff. This wasn't helped by the fact that the platter does not have a groove in its periphery. I've plenty of experience attaching drive belts yet this one took several attempts before it was in place; a vinyl-loving novice would have a real struggle with this, I thought.

With my attention turning to the tonearm, I noticed the lack of bias compensation and was a little surprised to see the counterweight almost dangling off the end; I would have thought it better designed to be closer to the pivot.

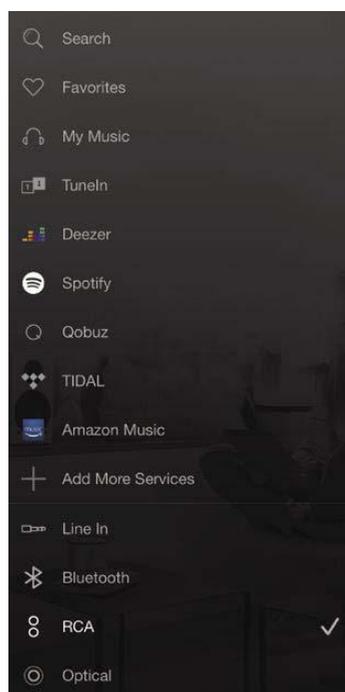
Although the arm is made of aluminium, in use it felt on the flimsy side of things and there was unacceptable flex in the armrest.

Looking on the bright side, the phono cable is Pro-Ject's Connect it E, which is far more substantial than the thin, red and white plastic phono-equipped cables I might have expected to see attached to a tonearm like this. And it features gold-plated RCA connectors. No exotic material is used for the platter though, just MDF with a standard black felt mat.

There's no switch for selecting 33 or 45 rpm – you have to manually adjust the drive belt – and the power switch is located on the

(Philips 1969) as it was the last track streamed through the AIO system.

I have to admit my expectations weren't exactly sky high for the turntable's sonic abilities, however I was still underwhelmed. Scott's reverb-soaked vocals were robbed of atmosphere while the strings and hand-held chimes lost their sparkle:



The turntable is identified as RCA in the app, denoted by a pair of phono sockets. The Line input is via a 3.5mm stereo jack plug.

a disappointing result.

At the price, Triangle's Turntable does not represent particularly good value for money and you can do far better elsewhere. Pro-Ject's Essential III A is a similar looking design and comes in a classy high-gloss finish. The tonearm is more solid looking and features bias compensation; and the OM 10-E equipped deck can be yours for well under £300.

Audition the Triangle Turntable with the Twin AIO system if all your components must display the same company logo. But be aware, it still says Pro-Ject on the lid.

MEASURED PERFORMANCE

The Pro-Ject turntable was remarkably speed stable, Wow&Flutter measuring 0.12% (DIN wtd). There was a peculiar flutter peak at 5Hz under analysis but very little basic speed wander, so no subjective 'drunkenness' or vagueness of pitch. Speed was accurate too at +0.2% fast. Overall a surprisingly good result, since speed wander is common in budget belt drives, generating impulsive wow especially.

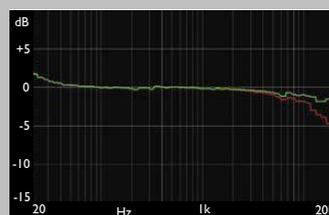
The OM10 cartridge fitted was set to track at 1.8gms, right at top of Ortofon's recommended 1.25-1.75gm range. Its tracking was so poor as to need this, and absence of bias correction in the arm did not help. Ortofon claim 70µm tracking, but we measured 45µm (CBS STR-112 test disc), with obvious mistracking at 60µm. In the midband (1kHz) results were even worse, just 10cms/sec being cleared on B&K QR-

2011 test disc. The suggestion here is that the OM10 – an old design – will mistrack on vocals.

Frequency response falls slowly toward high frequencies so it will have a soft sound. This can be brightened slightly by increasing load capacitance to 400pF.

This cartridge is past its sell-by date: modern budget designs like Ortofon's 2M Red or Audio Technica's AT-3600L (also in this issue) manage far better. **NK**

FREQUENCY RESPONSE



TRIANGLE TURNTABLE £369



GOOD - worth auditioning

VERDICT

A stylish, cartridge equipped turntable let down by below par sound quality

FOR

- elegant, minimalist style
- excellent speed stability
- cartridge included

AGAINST

- uninspiring veiled sound

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DAP's the way to do it!

Martin Pipe remembers the DAP Jukebox from Creative Labs, the world's first personal music player with hard-drive storage.

A few years back, I featured one of the earliest solid-state personal music players – the PMP300, from computer technology firm Diamond Multimedia. It had a mere 32MB of internal storage, meaning that the application of lossy audio compression (here, MP3) was essential. Using the common 128kbps encoding rate, that 32GB gave you approximately ten songs of three-or-so minutes duration. Unless users were prepared to splash out on expensive SmartMedia memory cards to augment the PMP300's meagre capacity, they had to murder their music with lower rates (like 80 or 96kbps) if a full album was to be accommodated. The PMP300 needed a computer and clumsy proprietary software to get software into its memory.

Launched in 1998, when the far more flexible (and better-sounding!) Minidisc was on the ascendency, the PMP300 nevertheless gave listeners – despite its obvious limitations – a foretaste of what was to come. Who would after all have believed back then that MP3 would, through the Napster MP3 file-sharing service, vigorously shake up the music industry? 'Big tech' firms might dominate music today, but we shouldn't forget that Apple was merely a struggling computer company when the PMP300 was launched.

With this in mind, it was surprising that another technology company – rather than a consumer-electronics giant or



recording-industry titan – would be responsible for the next personal-audio milestone. Creative Labs, a Singapore-based operation founded in the early 1980s, was around this time a market leader in IBM-compatible personal-computer audio systems. 'Unaided' PC sound was pretty hopeless, with nothing more exciting than a tiny onboard speaker primarily-intended to report fault conditions, but Creative designed internally-fitting plug-in expansion boards – 'Soundblaster' soundcards – that would help to revolutionise the PC

industry.

Creative's early-1990s Soundblasters featured simple FM music synthesisers, various interfaces (notably MIDI and joysticks) and could even record and play digital audio. Such talents were harnessed by the games designers of the time; the PC was rapidly being transformed from an item of office equipment into something with genuine home-entertainment appeal! By the middle of that decade, Creative offered a Soundblaster that was capable of CD-quality digital audio



The DAP Jukebox's headphone jack is fed by an amplifier rated at "100mW per channel", which struggled to drive the higher-quality transducers then available. This is a pity, as the headphones bundled with the player are mediocre. I can however remember achieving reasonable results from a pair of Koss PortaPro 'lightweights'. I'm sure that most users would have preferred better headphone amps and second jack to the two gimmicky stereo line outputs.

(i.e. 16-bit stereo, with 44.1kHz sampling rate). It also had an interface for a then-exciting CD-ROM drive.

Now PC owners could record and edit sound to near-audiophile standards – until this point, such functionality was exclusive to the expensive digital-audio workstations found in broadcasting and recording studios. And when affordable CD 'burners' came a few years later, such efforts could be written to discs that could be played on hi-fi systems.

Cutting-edge Soundblaster Live models, and subsequently the Audigy range, increased still further the sophistication and performance potential. They introduced hi-res audio, allowed external audio equipment to be connected digitally and offered more powerful wavetable-based music synthesisers. Desktop music production, without expensive purpose-designed hardware, was now possible.

These soundcards were also capable of discrete multi-channel audio – great for 'quaddies', gamers...and PC-based DVD playback, if your PC happened to be equipped with the appropriate optical drive. Indeed, Creative sold

home-entertainment 'packs' containing a soundcard, DVD-ROM drives and sometimes even active 5.1 speakers. PC audio had come a long way since those pathetic 'bleeps'!

In 2000, sandwiched roughly between its launches of the aforementioned Live and Audigy Soundblaster lines, Creative Labs confounded many by announcing a radically new portable audio device – the first to exploit the storage potential of hard disk drives. This was the Digital Audio Player ('DAP') Jukebox, which would later be rebranded the 'Nomad'. Launched over here that summer, the DAP Jukebox had an initial pricetag of £350. It resembled a portable CD player – albeit a somewhat heavy one, at 400 grams – but contained a laptop-style 6GB 2.5in. IDE hard drive instead of an optical pickup system. Six gigs doesn't seem much by today's standards, when you can buy a 16GB microSD card in a supermarket for a fiver. In 2000, though, MP3 players measured their capacities in the tens (or, if you were lucky, hundreds) of megabytes! The DAP Jukebox's capacity was therefore in a different league. 6GB, Creative was keen to point out, equated to approximately 100 hours of MP3 audio – i.e. 150 40-minute albums – provided it was encoded at 128kbps. As with lesser devices, more music could be crammed into Creative's little box by squeezing bit rates at the expense of sound quality; Microsoft's lossy WMA codec was also supported. Carrying around most, if not all, of your music collection in a pocket (albeit a large one!) seemed incredible at the turn of the millenium.

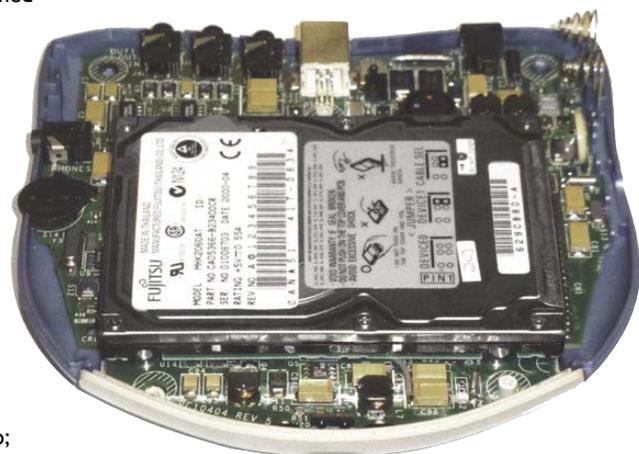
At the other end of the quality scale, the DAP Jukebox could play uncompressed (WAV) audio; lossless audio compression systems (like FLAC) were yet to be finalised. 6GB equated to approximately 15 of those 40-minute albums in WAV form, and so hardly surprisingly most users stuck with MP3 (all common bit rates, up to 320kbps, were supported).

One of the lesser-known features of the DAP Jukebox was its ability to record from a line-

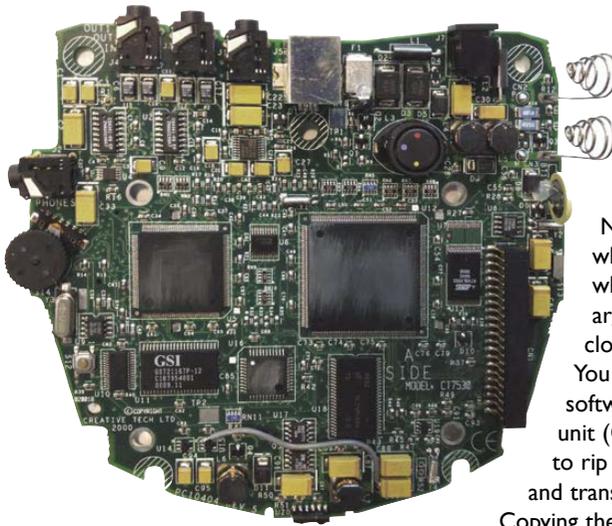


It's perhaps just as well that the DAP Jukebox's controls could be 'locked out', to prevent the player from being accidentally turned on while in a pocket. Users were nevertheless advised to pack a pair of spare batteries...

level source. Connect this to a tape machine or phono stage, and you could take analogue faves out on the road with you! I suspect that some bootleggers also saw value in the DAP Jukebox. The resultant recording was a 16-bit WAV file – with a choice of 44.1 or 48kHz sampling rates; the unit's ARM-powered hardware simply wasn't powerful enough to encode MP3 in 'real time'. If you wanted an MP3, the uncompressed file had to be transferred to your PC, processed with the supplied software and then copied back to the player. Indeed, a computer was essential if you wanted to make the most of the DAP Jukebox – unless you



Contributing significantly to the DAP Jukebox's power-consumption and 400gm weight is this laptop-style 6GB 2.5in. IDE hard drive (Apple adopted the much smaller 1-inch 'Microdrive', made by IBM/Hitachi, for its iPod). The DAP Jukebox could store 100 hours of 128kbps-encoded MP3 audio – 150 40-minute albums.



With the hard drive removed, you can get some idea of the DAP Jukebox's internal complexity. Creative Labs, presumably worried that its design would be copied, has scratched the identifications from two key components. The larger one is a Cirrus EP7212 'system on a chip', based around a British-designed ARM 7 microprocessor, while the smaller device on its left is a Texas Instruments DSP.

were happy with the collection of classical music (encoded at 128kbps!) that, if my experience was anything to go by, Creative had preinstalled on the unit's hard drive.

It's easy to transfer music to a modern digital audio player. Plug such hardware into a USB port, and it appears as an external

drive – music folders can be dragged and dropped into these (or copied from your player to another computer, naughty naughty!).

Not so the DAP Jukebox, which was launched when the music industry arguably had a lot more clout than it does today. You had to use proprietary software supplied with the unit (Creative PlayCenter) to rip CDs, compress them and transfer them to the player. Copying the other way wasn't allowed, the device being fettered by its need to comply with Secure

database, thereby sparing users from having to laboriously type in the names of albums and tracks. The software also enabled you to use some of that 6GB capacity to store non-music files, which could be handy for data backup purposes, or deal with line-in recordings. Creative didn't provide a Mac version of PlayCenter, but the DAP Jukebox CD was supplied, perhaps ironically, with a copy of Apple's iTunes - then just a music player and 'library', as the iPod was at the time being developed by secrecy-sworn engineers in California. Third-party software eventually allowed users to access the DAP Jukebox's hard drive directly via Windows Explorer, just as you can



DSP wizardry inside the DAP Jukebox facilitated surround decoding, the two stereo line outputs feeding front and rear channels to external amplification. Equally-unusual is the line input, which allowed the unit to be used as a CD-quality hard-disk recorder.

Digital Music Initiative (SDMI) restrictions – among them, DRM.

PlayCenter allowed you to manage the contents of your player, and organise music collections in a manner that best suited you. It interrogated the online CDDB

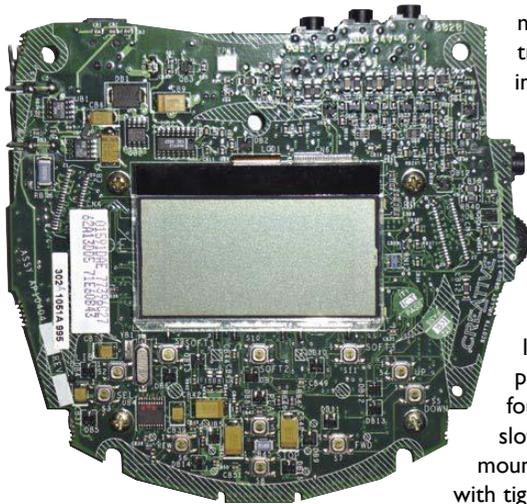
with modern players.

The most significant problem with Creative's approach was its time-consuming nature. It took a long time to rip and compress MP3 files with the PCs of the day, and – thanks to the DAP Jukebox's USB 1.1 interface – transfers between player and computer were slow. By modern standards, the player's user interface was rather klutzy too. No touch-screens or scroll wheels here – just a backlit 132x64 pixel monochrome LCD panel, with a busy collection of buttons underneath. You could choose music from the DAP Jukebox's library on the basis of album, artist or genre – playlists and searches were supported too. Tracks could be skipped forwards and backwards, and a 'seek' mode allowed you to quickly-move through long tracks – like your own line-in recordings.

Unusually, the onboard DSP allowed you to slow down or speed up tracks without changing pitch. Great for transcribing



Only four hours of continuous listening was possible on a full charge of the supplied NiMH cells, which live under a tricky-to-detach cover. Thankfully, the unit could also be powered from an external 12V DC supply – such as a car cigarette-lighter cable, or the supplied mains unit.



Dominating the top of the DAP Jukebox's single circuit board is this backlit 132x64 pixel monochrome LCD panel. You can also see the switches that correspond to the upper casework's control buttons.

interviews! Other DSP effects included 'spatialization' and the home cinema-style emulation of various acoustic environments (among them ballrooms, concert halls...and caves!). Indeed, the DAP Jukebox was capable of surround, its two stereo line outputs feeding front and rear channels to external amplification.

I'm however sure that most users would have instead preferred a second headphone jack! The unit had only one, rated at "100mW per channel". Creative bundled headphones with the player, but they sounded mediocre. Sadly, the DAP Jukebox struggled to drive the higher-quality transducers of the day – in 2000, there was little of the choice we have today (and big circumaural headphones, which helped to prevent external noise from contaminating your listening, were unfashionable to wear outdoors back then!). I can remember achieving reasonable results from a pair of Koss PortaPro 'lightweights'.

In terms of overall sound quality and musical satisfaction, the DAP Jukebox fell behind a good MiniDisc portable. It was however more resistant to skipping than a personal CD player, and a 8MB internal buffer ensured a steady and reliable flow of data from drive to decoding circuitry. The only glitches I remember related to tiny 'gaps' between tracks. These weren't noticeable with most

music, but albums with tracks that segued into each other (mix CDs, for example) suffered. The only solution was to 'rip' such CDs as continuous tracks.

Rather more concerning was the lousy battery life. The unit was powered by a set of four AA cells, which slotted into a base-mounted compartment with tight-fitting cover. Only four hours of continuous listening was possible on a full charge of the supplied NiMH cells, and so it's perhaps just as well that the controls could be 'locked out' to prevent the player from being turned on accidentally while in a pocket. Creative specifically advised against the use of non-rechargeable (e.g. alkaline) cells as they would be 'drained away much faster'... with expected playback times less than an hour. To its credit, the firm supplied two sets of rechargeables with some players – one could be charged, while the other was in use. The DAP Jukebox was supplied with a 12V DC power supply and has charging circuitry built in. An external charger was however needed to fully-exploit such continuous-use potential.

Reliability of the DAP Jukebox left much to be desired – and this wasn't just down to hard drives being damaged through rough handling. Take a look on eBay, and most (if not all) specimens – even ones in excellent physical condition, or 'new old stock' – are 'dead', and offered for 'spares or repair'.

Such fate has affected my own unit, which was definitely working when last used fifteen years ago. I contacted Creative (refer to my column) for technical information, but the company's support team refused to help on the basis that it's commercially sensitive. They did however offer me a 10% discount on new Creative products, which is good going considering that the DAP Jukebox is more than 20 years old. I dismantled my unit, in an attempt to discover the cause of failure, and was impressed the excellent standard of internal construction. I noted a small lithium battery on the circuit board and suspect that, after it died, data

crucial to the operation of the player was lost from the memory it once backed up.

This particular DAP Jukebox had only gone 'into storage' because I had switched to an iPod – pioneering though Creative's efforts were, Apple had by 2006 become the dominant player. Like other users, I found the iPod much more responsive and easier to drive. Creative continued to compete in the digital audio player marketplace, though. The 6GB DAP Jukebox was quickly followed by a 20GB version. Then came models with extra features – including faster USB (2.0) or Firewire ports (as featured on higher-end Soundblaster cards), and digital inputs for recording from CD transports and DAT machines. Creative then moved from fragile hard drives to solid-state media, which was becoming more attractive in capacity terms while plummeting in price. One particular Creative model, the Nomad Jukebox 3 with 20GB hard

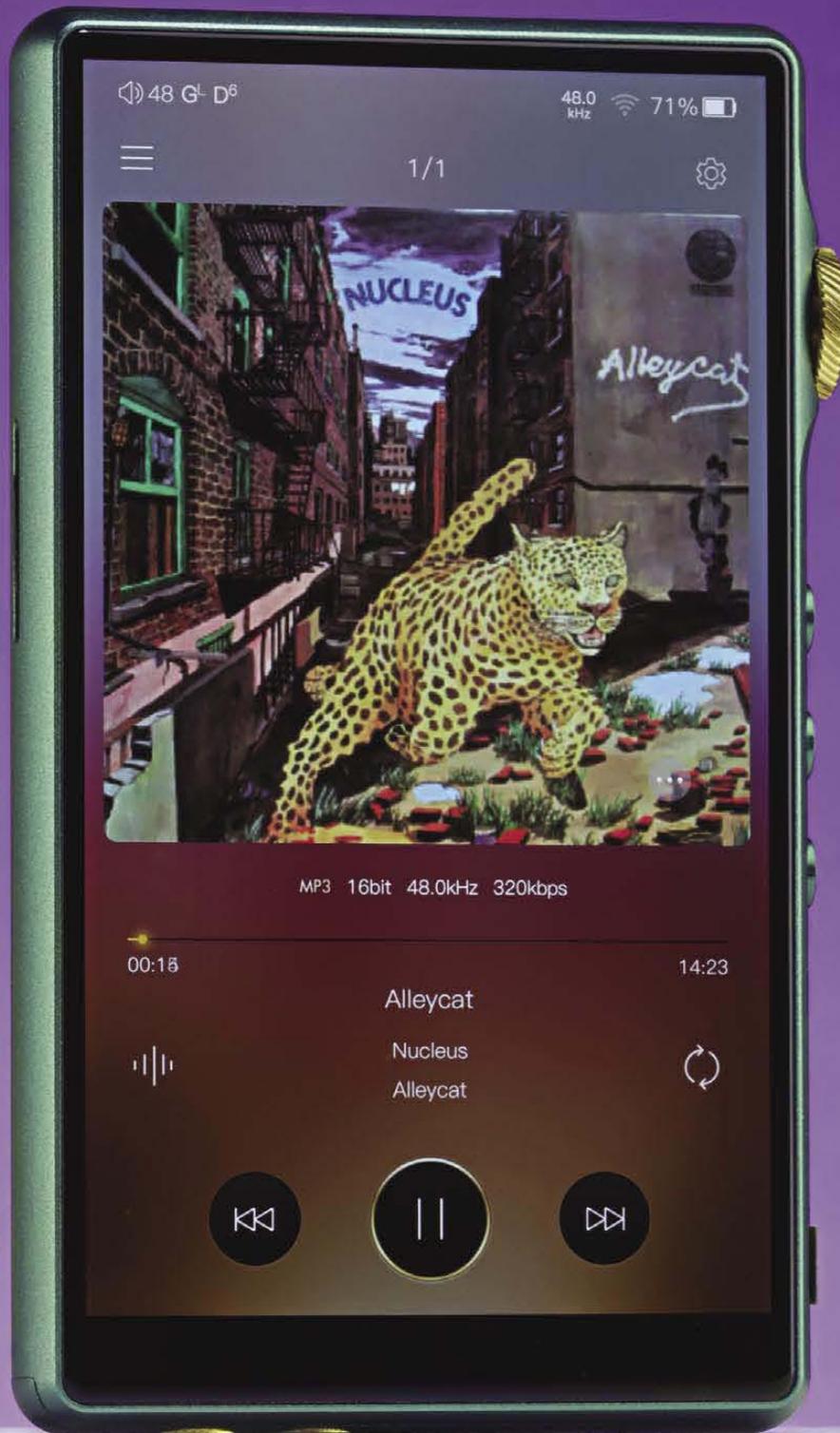


The DAP Jukebox was controlled via this intimidating collection of controls, which include three function-dependent 'smart buttons' under the screen. Unfortunately, the user interface was rather clumsy and unresponsive. Apple was to change the game a year after the DAP Jukebox's launch, with the user-friendlier iPod.

drive, inexplicably-continues to fetch premium prices on eBay. At the time of writing, two are being offered on eBay...for £200 each! As for the original, it's unlikely you'll pay more than £30 for one that's faulty – as most are. Your money buys you an interesting museum piece, of no practical use whatsoever. For all its limitations, though, the DAP Jukebox was a revelation in that bygone era when the likes of Outkast and Eminem ruled the charts!

Portable Pro

iBasso put an ESS ES9038Pro in a portable player. Noel Keywood is impressed.



You have to take notice when a portable digital audio player (DAP) claims to use an ESS ES9038Pro DAC chip. This is the best from ESS (California) by worldwide consensus and the chip I fall back to as my preference for its smooth, deep sound. iBasso (China) use this now-famed chip inside their range topping DX240 they say, so before going any further this means a hefty price (£850), a sizeable battery to feed it as the 'Pro chews current, and – hopefully – ability to use it as a mains powered hi-fi DAC. So let's see.

First I'll cover the DX240 as a portable player. Its well machined alloy case weighs 206gm and feels solid. With dimensions of 75mm wide, 125mm high and 20mm deep it fits neatly in the hand and will slide into most pockets, but not a shirt pocket unless you are a lumberjack. Inside lies a 4400mAh battery that provides up to 12 hours claimed play time and it will charge in a few hours from a fast charger: I used a USB-C-to-USB-C cable connected to a fast-charge hub to verify this, but a USB-C-to-USB Type A (blue USB 3 compatible) is supplied for broadest compatibility with computers and chargers. Exact playing time depends upon screen usage as always, and charge time depends upon the charger; it will charge from any 5V charger that can supply 1A or more, or accept QC3.0 or PD3.0 quick charge.

Once fully charged (it charges whilst switched off) I pressed the gold volume control and waited...for 35 seconds before the Qualcomm Snapdragon 660 processor running Android 9 brought up the home

screen. This was garish and can be changed – there are 13 wallpaper options but they're all garish too! I could not find a wallpaper folder in the Operating System (OS) to add my own (plain) background.

The OS carries various apps, most important being iBasso's own Mango music player that occupies a prominent position on the screen. Also provided are a Google web browser, clock, calculator and Gallery for browsing photos etc. Not a simple player then software wise, but one with a general purpose Graphical User Interface (GUI) and a specific music player GUI. This resulted in duplication as I'll shortly explain – a not uncommon problem.

(44.1k sample rate). This is likely because pre-set filter options in the ESS chip are being used – and they're always weak – rather than custom design alternatives, such as the filters used by Audiolab, designed by John Westlake. There are play modes (repeat, shuffle etc) L/R balance and – notably – both graphic and parametric equalisers that can perform extensive filtering, with stored settings. This is one for the geeks – read about it all in the DX240 handbook online.

Important in the Mango settings menu is Advanced, as it is here that use as a Bluetooth receiver or USB DAC are hidden. This is the section for inputs in effect and all worked sort-of



Two 3.5mm stereo jacks (gold) sit at the bottom of the case, with a tiny 2.5mm balanced outlet (black) alongside. The microSD card pops into a spring loaded slot.



A large rotary volume control worked smoothly. At top is a USB-C socket for charging/computer connection, as well as an electrical S/PDIF 3.5mm digital output jack.

There's wi-fi onboard for internet connection, to stream music from commercial web servers (Spotify, Amazon etc). My interest always turns to the gearwheel icon (Settings) of the basic OS and its audio bits. Here I found three gain settings, a maximum output slider, seven filter options, all of which are duplicated in the Mango player. This is a source of unnecessary confusion.

Which brings me to the Mango player. Tap the screen icon and it starts immediately – and again it's time to look at the player's gearwheel icon to see what's on the menu here. There are the same three gain settings, plus the same seven digital filters, but here marked as D1-D7, with better description of function than provided in the OS. I'll tell you straightaway measurement showed the DX240's digital filters affect frequency/phase little, with both hi-res (192k sample rate) or CD

well as a USB DAC. Connected to a Mac running Mojave DX240 identified itself as 'Playback inactive' – peculiar. It was active. iBasso could usefully fix this peculiar name declaration. Audirvana+, Audacity etc saw it and worked with it. Audirvana+ was happy to send DSD over USB via DoP.

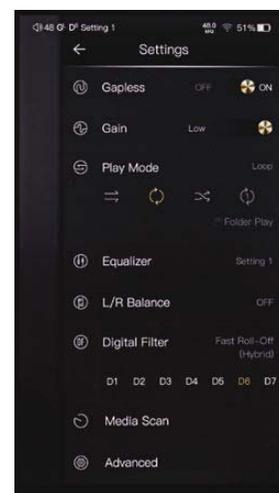
Also the little green Android man popped up assuredly so music files etc could be loaded to 64GB of internal memory, although I used a microSD card full of test files and music. A PC more slickly interfaces with Android based players – no green men – but a driver is needed for hi-res files.

My iPhone 11X Pro saw the DX240 as a Bluetooth receiver ('DAC') and sent over music files from its Onkyo HF player, including DSD. However, actual quality of iPhone audio through Bluetooth 5 on the iBasso measured out as CD level (see Measured Performance). Exactly what you get depends upon

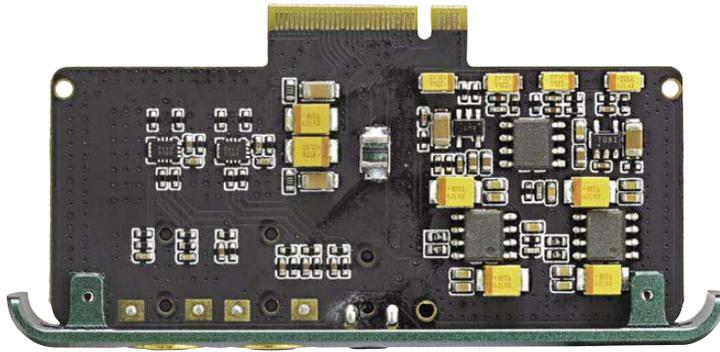
your phone and any Bluetooth compression system; on an iPhone there's no aptX or aptX-HD from Qualcomm, nor LDAC from Sony – heaven forbid that Apple would use anyone else's technology. But the 11X Pro runs later Bluetooth 5.1 with LCE codec that supports 24bit depth and can achieve 115dB dynamic range, but not here I found. Since the DX240 is compatible with aptX, aptX-HD and LDAC BT codecs, other phones so fitted may work better.

There's also outgoing Bluetooth, accessed from a swipe down menu: holding down the BT button reveals a pairing menu. It picked up our Creek i20 amplifier successfully and transmitted to it, but in use this link would most likely send music out to Bluetooth headphones.

iBasso also fit an S/PDIF digital output (now electrical only) for connection to an external DAC.



Settings available in the Mango player app with (at right) the list of seven digital filters together with a time domain graph of impulse behaviour.



The AMP1 Mk3 output amplifier uses surface-mount mini components, including three chip op-amps at right.



One of the background wallpapers provided, that obscures the Mango player icon (bottom left).

However, there is no S/PDIF digital input so it cannot be used as an ESS upgrade for an old CD player.

As you might expect the player handles all PCM (32/768) and DSD (512) files anyone is likely to encounter – and it will handle

DSD128 via DoP sent over USB from a computer. The single card slot accepts a microSD card up to 2TB, so plenty of space for huge DSD files here.

What I have not mentioned so far is the analogue amplifier used and the headphone outlets. Our sample came with standard AMPI



The AMP module slides out from below, after two miniature Torx T5 screws are removed. Other modules are available, AMP8 proving a better balanced output.

Mk3 analogue output card, but will accept all cards up to AMP8 iBasso say. There's no explanation of how to change cards in the

manual so I presume this is meant to be a dealer mod. In practice two tiny TORX T5 screws have to be removed and the card slid out – not difficult. Unfortunately, the AMP1 Mk3 card has a 2.5mm four-pole balanced output which I dislike, the tiny plug being all but unwireable and it snaps easily. iBasso offer an AMP8 Mk2 card (£200) with a more serious 4.4mm Pentaconn (five-pole) balanced output.

In addition to its balanced output AMP1 Mk3 on our player has two standard 3.5mm stereo outputs (three-pole), one marked Headphone, the other Line. Curiously, Line was identical to headphone and not Line in usual form, with fixed output of 2V to mimic a CD player. The 3.5mm unbalanced outputs deliver 3V maximum, the balanced output 6V maximum. Since 1V is shatteringly

loud with conventional phones this is plenty enough, but low sensitivity planar-magnetics – now becoming popular and rightly so – need 2V or thereabouts.



Three leads are supplied – USB-C to Type A, S/PDIF digital out (3.5mm to phono) and a peculiar balanced output burn-in lead.

SOUND QUALITY

Right on the nail: that's what I thought with this player. It quite obviously has the big, silky smooth sound of an ES9038Pro chip but also its sense of easy depth. ESS chips have always burnished the sound of digital; this player did likewise by making a 24/96 transcription of Fleetwood Mac's Dreams sound amenable, removing what is some sort of glare in the recording/transcription. As a result volume went up and I got to hear how hard Mick Fleetwood was

working his drums, because this is also a player with solid, pacey bass. Not quite the depth of my Audiolab mains powered M-DAC reference, with ES9018 chip, but close and certainly with the essence intact. Portables are commonly vague in bass timing and also don't hold left and right images firmly as current gets drained from the battery and the d.c. boost convertors start to wilt, but this player has a wide sound stage with strong, stable, extreme left and right images.

There were times I wondered whether the ESS warmth was too pronounced, with Misery from Dave's True Story (24/96) for example, where most players impose sharper definition, yet the DX240 gave atmospheric depth and fulsome dynamics. Diana Krall's Narrow Daylight (DSD) was under pinned by a firm acoustic bass line that was fluid and expressive. The lady's vocals were suitably breathy centre stage, with plenty of push into my Oppo PMI planar magnetic headphones.

All these characteristics of the ES9038Pro suited classical music perfectly, giving a generously large Minnesota Orchestra stretched out wide, strong at left and right, stable in imagery and with big strikes from kettle drum in Dance of the Tumblers from Korsakov's Snow Maiden (24/96).

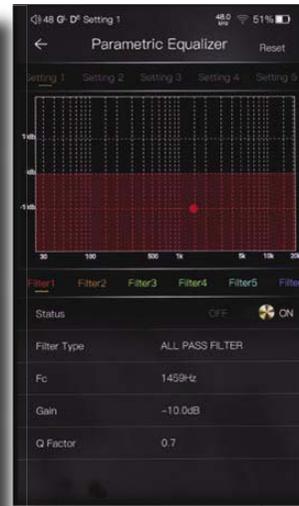
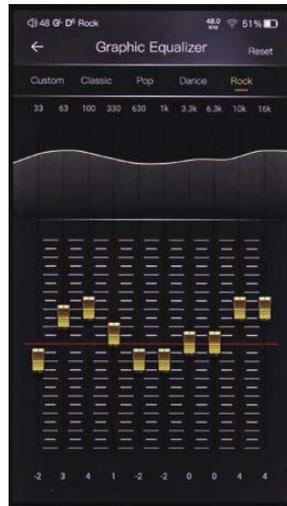
CONCLUSION

The electronics iBasso wrap around the ES9038Pro DAC in this player make the most of its



The Advanced menu in Mango player gives access to USB DAC and Bluetooth DAC modes.

capabilities. It offers a big, smooth sound that's analogue-like, with strong tuneful bass too – a rarity in battery-driven portables. Not all parts were perfect: the balanced output could be better and the purpose of AMP8 module is likely to address this issue. The Bluetooth receiver could have been better too, but its CD quality was still decent enough. At its technological heart and in sound



A Graphic Equaliser and a Parametric Equaliser provide massive ability to tailor the sound balance.

quality this is a top notch player from iBasso, well designed for top sound quality.

MEASURED PERFORMANCE

iBasso's DX240 portable player delivered 3V maximum from its 3.5mm stereo headphone jack and double that (6V) from its 2.5mm balanced headphone jack, the player set at Max Gain. The Line output was identical to headphone output, 3V max altered by volume control, where Line outs are usually 2V fixed to resemble a CD player. This is enough even for most planar magnetics.

When used as a USB DAC the unit is not isolated and needs to feed headphones in this role, not an earth connected hi-fi system unless the balanced output is used, to avoid ground

noise and distortion that occur due to a loop through a computer source.

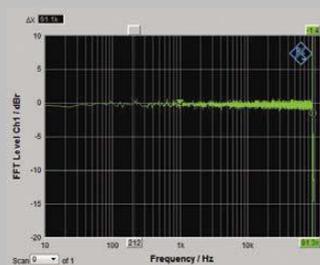
EIAJ Dynamic Range measured a very high 123dB and distortion was extremely low 0.014% at -60dB (24bit) and 0.0004% at 0dB, via the unbalanced outputs. The balanced output gave a worse result, 97dB dynamic range and 0.3% distortion due to the presence of noise. Likely AMP8 would give a better result from its balanced output; AMP1 provides high balanced output, but at CD quality.

Frequency response measured flat to a very high 91kHz (-1dB) with the fast D1 filter our analysis shows. The remaining six options made little difference, at 192kHz or 44.1kHz (CD) sample rates; their affect will be minimal subjectively.

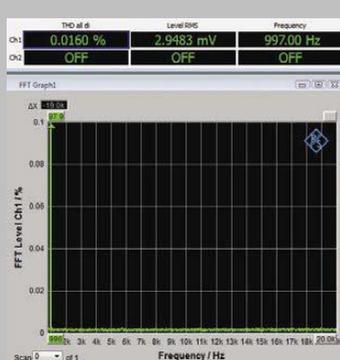
With Bluetooth distortion rose to 0.26%, dynamic range deteriorating to 98dB, where better is now possible from Bluetooth 5.1 (transmitting 24bit from an iPhone 11X Pro, using Onkyo HF player). It's satisfactory all the same, similar to CD.

From its 3.5mm stereo headphone outputs the DX240 gives class leading results. NK

FREQUENCY RESPONSE



DISTORTION



Frequency response (-1dB)	4Hz-91kHz
Distortion (24bit)	0dB
	0.0004%
	-60dB
	0.014%
Separation (1kHz)	110dB
Noise (IEC A)	-120dB
Dynamic range (EIAJ)	123dB
Output	3V/6V

iBASSO DX240
£840



OUTSTANDING - amongst the best

VERDICT

A top player with great sound quality, well worth hearing.

FOR

- build quality
- generous deep sound
- range of ability

AGAINST

- slightly warm ESS sound
- mediocre Bluetooth
- mediocre balanced output

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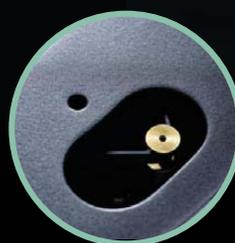
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Pre-Adjusted Ortofon OM10 Cartridge

"the extraordinary idea that the pickup cartridge is located in the counterweight!"



Noel Keywood

If you are a super-geek like me, YouTube is the place to go. It was made for people with weird and exotic interests, often eye-popping ones like Landrover Sophie washing down and painting her new, galvanised Land Rover chassis out in the garden. Or Bald & Bankrupt speaking Russian to babushkas in the snow, in distant regions of Russia no one knows about. Meanwhile, people like Sabine Hossenfelder or Dr Roger Penrose underline how little I know about anything worth knowing about. Then there are endless videos about capacitors, inductors, electricity and all else, so many I will never get through them all in my remaining lifetime.

Not that I necessarily need to because many videographers are confused about their chosen subject or just unable to explain it in any useful manner, other than to regurgitate what they've learned elsewhere.

Then there are ones that are just plain wrong for unfathomable reasons – something I find amusing but also slightly worrying. What if people watch and believe this stuff? For example, I watched one the other day entitled *The Truth About Vinyl*, from Real Engineering, with 4 million views (big).

Rarely do I watch any YouTube video about hi-fi subjects 'cos there's a 99% chance they'll induce apoplexy, but I dared click on this one and got a shock. It is very well produced – professionally produced in fact – with lots of nice images and graphics, a fast pace, structured script and good verbal delivery without excruciating "ums" and "ars", circumlocutions and diversions.

I didn't get a shock from the opening shot of a head shell, gripped between two fingers, being dropped onto the LP. Never seen this done

before and I winced: unsettling for a 'knowledgeable' look at turntables. But worse was to come. I was drawn in by spinning platters and all the loveliness of a good quality record deck doing its thing. But it didn't take long before I had to hit the pause button. "What?"

At 4min and 31 seconds comes the extraordinary idea that the pickup cartridge is located in the counterweight! The headshell was equipped with a vast stylus that shook the arm and the counterweight, where magnet and coils produced a signal. Who thought this up?

At 6.27 we are told that analogue and 44kHz digital "should sound the same". Eh? No talk about bit depth and dynamic range here. Only sample rate gets a look in, yet it is bit depth that affects sound quality. So no, 16bit will not sound the same as "analogue" (vinyl?) because of audible distortion and quantisation noise.

At 7.41 we are told there is a volume and time constraint on vinyl that does not apply to digital. Wrong. Digital has strict upper and lower limits, as well as file size limits. This crucially determined CD's original design specs. where they had to cram 650MB onto a disc.

The video reaches a conclusion that is inconclusive. At 12.12 it suggests that any preference for vinyl is just that – a preference, one likely based on familiarity and nothing else.

Not so. There are clear and audible differences between digital on CD (which they appear to be talking about) and analogue on LP. Specifically, the distortion patterns are entirely different, LP distorting most at high level and least at low level, whilst CD is the opposite. At ordinary music levels I measure less than 0.5% correlated second harmonic from LP where CD is producing 5% of

uncorrelated distortion with an extended harmonic structure the ear can easily detect. It would be surprising if people could not hear a difference between the two and form a preference.

Only with 24bit PCM or DSD does digital consummately outperform LP in all technical aspects. And still it does not necessarily sound better because that ignores the problem of distortion and noise generated in the analogue-to-digital conversion process (i.e. in the ADC). This is digital's hidden horror, one few know about.

When you put this little lot together you soon find that the sound you get from modern high quality all-analogue LPs (*Chasing the Dragon* etc) and from grotty old CDs is a world apart, for quite specific technical reasons that are measurable.

This video talks about the shortcomings of vinyl, ignoring the shortcomings of CD, as if it were "perfect" as originally claimed by Philips back in 1982. How old assertions linger. And lack of understanding about digital leads to simple beliefs that blind.

There's even a blushing suggestion that dynamic range compression could explain CD's perceived 'problem' and that – by inference – CD is not the culprit because it is digital.

CD sound was – and still is – dominated by the analogue-to-digital (ADC) conversion process and only recently has this difficult yet crucial technology reached audiophile standards. It was early ADCs that made CD sound so bad.

Once you prod the assumptions lying behind CD's notional 'perfection' the reason for its poor sound becomes obvious. That's why LP still sounds better than CD – providing the cartridge sits in the headshell and not the counterweight of course! ●

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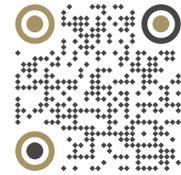
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"I dislike vinyl and valves being described as 'warm'"



Paul Rigby

The thing I've noticed about writing for both hi-fi and music magazines is this: they arrive with their own hamper of oft repeated cliches. Some are fun, some are annoying.

Because of our human frailties, some of them cling to a particular writer/reviewer like lint grips onto a woollen jumper but others seemingly attach themselves to the hi-fi media industry as a whole, in a broad blanket fashion.

What I was wondering was this – what are your favourites? And also this, which of these well used words and sayings irritate the hell out of you? Also, do any of them actually prove useful to you in terms of understanding the editorial? Do any of them serve your final buying decisions? Cliches can be of use to distill a longer phrase or explanation into a single thought or mood. That is, a cliché is often useful in covering a thousand words of exposition.

So, during a hi-fi review, the word 'bright' (a word I use) tells me that the upper midrange and treble is out of control, possibly full of high-frequency noise. A harsh noise that makes you wince when you hear it. It actually makes your ears hurt. There, in this case, the word 'bright' has just distilled about thirty words of gratuitous explanation.

Ideal for editors who are on a budget and have a bus to catch. Terrible for journalists who are paid by the word.

Other words I use include the likes of 'boomy' for poor bass performance or 'pinched' for poor treble performance. Now, I know, you can't actually pinch treble. If you tried to pinch a tweeter you'd probably ruin your speakers. What I and other hi-fi writers are trying

to do is convert a sound into an idea or an image to you, the reader. 'Pinched' hopefully provides a suitable image.

As I say, some words tend to be attached to people. For example, one ex-editor of this very magazine used to love the word 'fettle'. He would 'fettle' this and 'fettle' that. Hi-Fi never sounded any good to him until it had been 'fettled'. When I joined Hi-Fi World and saw the use of the word fettle, I was a little taken aback. It was a rather unusual term but it seemed to fit our editor down to a tee.

Problem was, because he used it indiscriminately, he owned it, in my eyes at least. I wouldn't have dreamed including it in my work. I still won't. To me, 'fettle' is almost under his trademark. Owned – if not legally – then certainly in spirit by that esteemed individual.

'Lucid' is another odd word. One that you see more in hi-fi magazines than just about anywhere else and one that is still used now in this magazine. It's a word used when you're fed up saying that these speakers or that turntable exhibit impressive 'clarity'. It's a thesaurus word that prevents a reviewer from grinding repetition.

There are clichés that irritate me and I do avoid. And if any of these are subsequently found in my archives then I apologise now but at least I've since seen the light.

For example, "like a veil being lifted" is just lazy. What do you mean by that exactly? And if an explanation is then offered, then why use the 'veil' term at all then?

'Punches above its weight' is another one I avoid.

I dislike vinyl and valves being described as 'warm'. To me, if valves and vinyl are 'warm' then there's something either wrong with the hi-fi or the technology

in and of itself has been voiced in that manner. It's not the valves or vinyl inherently filtering the sound. I've heard plenty of aggressively sounding vinyl and valves that would make a late-80s CD pressing blush, for example.

I love the words 'organic' and 'transparent' yet I know some who despise those terms. To me, the former means natural sounding, realistic. The sound doesn't sound manufactured. There's nothing false about it. The latter term means – to me at least – that your ear can travel through the mix and can easily hear individual sounds emanating from the rear.

Another dislike? When a reviewer tells the audience that "It's like the musicians are playing in my room". Well no. It's not. If they were, the sound would probably be a lot worse. Different, at the very least. I'm being pedantically literal here but saying something like that offers no help to the reader. As for music reviews?

• 'Sophomore' when referring to an artist's second album release. It's such an elitist, superior and smug offering.

• A top guitar player being described as a 'bass-meister', for example. Or anything 'Meister' makes the writer sound like he's twelve years old.

• 'Highly anticipated' By who? The artist and their manager?

• 'Long player' Semantically picky, I know but it's an album or more succinctly, LP.

• 'Took time out of their busy schedule to...' Condescending nonsense.

• 'Uber' Should be reserved for German philosophers or taxi drivers not musicians.

Contributions are welcome on this one please. ●

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"Exchange and Mart, Loot and boot sales helped me build a decent hi-fi system"



Martin Pipe

You've probably heard of the burgeoning 'Right to Repair' movement and, at a time of severe economic squeeze and environmental awareness, it's never been more relevant. Many people want to keep 'old stuff' going, not only to stave off replacement they can ill-afford, but to downsize the frankly-shameful piles of white and brown goods building up within the gated confines of rubbish tips. E-bikes and cars are also within their sights.

Originating in the USA, the movement was built around the premise that manufacturers should design their goods so they can be repaired with ordinary tools. Furthermore, everyone should – in the words of its EU/UK equivalent 'repair.eu' – "be able to access spare parts and repair manuals for the entire lifetime of a product". RtR is now enshrined in UK law (bit.ly/3L7v0tA), a goal being reduction of "the 1.5m tonnes of electrical waste generated each year".

Through complex supply chains, worldwide sales and globalised large-scale manufacture, the price of goods has been tumbling in real terms for years. Many of today's internally-sophisticated products are designed for automated assembly, little thought is given to repair. Any opportunity to squeeze costs, such as cases that are glued together, is mercilessly-seized. The absence of obvious screws can, as with smartphones and tablets, give a product a sleeker appearance. Would consumers sacrifice this, so they could replace failing battery packs and upgrade storage capacity with greater ease?

Many discarded items have simple faults. They're mendable by

independent workshops (once a common sight around the country) and repair cafes, if their owners don't feel safe having a go.

Circuit boards inside modern electronic products often use densely-packed surface-mount components, and are built by robots. Fault-finding and repair is difficult-to-impossible. However, self-diagnostics systems could determine which subsystem is faulty. A user/repairer could deal with that by unplugging and replacing it with a spare. Modular design helps, but even if the entire electronics is on a single board the manufacturer could offer an exchange service.

Another problem concerns technical information – or rather the lack of it. In the 'good old days', manufacturers would produce service manuals with circuit descriptions, parts lists, schematics and exploded views. It's difficult to get hold of them now, such information being either retained internally or offered exclusively to 'authorised repair centres'. In the US, it's perhaps telling that firms lobbying against Right to Repair legislation were 'Big Tech'. Safety was often cited as a reason. Some of them, notably Apple and Microsoft, have thankfully bowed to pressure; President Biden seems to be taking the credit for this!

They have some way to go; in Apple's most recent Macbooks, RAM and SSDs are soldered to the motherboard and therefore cannot easily be replaced or upgraded.

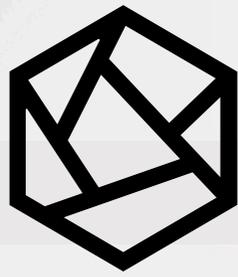
There are still plenty of companies that don't support RtR. One of the reasons I'm having to rely on dusty memories for this month's Olde Worlde is because the featured unit, a Creative Labs DAP Jukebox, is faulty. It may be

20 years old, and no longer of any commercial relevance, but I was told by a member of its support team that "circuit diagrams are internal and sensitive information... property of our company...which we can not share with customers". Without such maps of the internal workings, anything bar the most obvious fault cannot be tackled. If Creative Labs isn't prepared to help out with an ancient product, spare a thought for those who own its more recent wares!

Back in the 1980s, my town hosted numerous second-hand shops. Alongside Exchange and Mart, Loot and boot sales, they helped me to build a decent hi-fi system when money was scarce. I was lucky to chance on the occasional 'real' hi-fi bargain, typically-sourced from house-clearance operations. Relative to buying new, huge savings were possible. Great for students, the low-paid and those setting up home for the first time.

Then came globalisation. As the price gap between 'new' and 'used' began to narrow, second-hand shops dwindled in number. eBay isn't quite the same experience as a local 'bricks-and-mortar shop', to which faulty merchandise can be quickly returned, and with those boot sales it's very much caveat emptor.

If RtR does make things more expensive to buy initially, is that necessarily a bad thing? Users will be encouraged to look after them, and repair would be realistic. Furthermore, that 'used' market would become viable again. I'd love to see a resurgence of the second-hand shops – and independent repair workshops – that I remember from my boyhood. Better for consumers...and better for the planet! ●



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"there's really only one way to go: back to mono"



John Pickford

The passing of Ronnie Spector at the beginning of the year saddened me far more than that of her former husband and record producer; Phil Spector was not known for being a nice guy. The Ronettes' *Be My Baby* is the ultimate expression of Spector's trademark Wall Of Sound and resides in the 'as good as it gets' pile of classic 45s from the 1960s. Some consider it to be the greatest record of all time. Brian Wilson certainly thought so. The record stopped him in his tracks upon hearing it for the first time and he spent his career trying to equal it. Despite creating ground breaking records such as *Good Vibrations* and the *Pet Sounds* album, the chief Beach Boy felt he never matched Spector's masterpiece.

All of those fantastic records have something in common; they were recorded in mono. Single channel audio is a hard sell in the surround sound world of today, which is why many classic records originally produced with monophonic reproduction in mind are now, sadly, only available with their inferior stereo mixes. While stereo is the preferred presentation of classical enthusiasts, stereo pop albums in the 60s were usually produced as an afterthought. Singles were always mono until the end of the decade.

In recent years, Giles Martin, son of the late Sir George, has been creating new stereo mixes of The Beatles albums, starting with *Sgt. Pepper's Lonely Hearts Club Band* in 2017. His intention is to correct the dodgy stereo separation of those 1960s recordings to make them sound more like the original mono

mixes... but in stereo.

Sgt. Pepper was recorded on 4-track tape machines, yet the complex arrangements required so many overdubs that sub-mixes were created by bouncing between two machines, freeing up tracks for further recording. This meant that each of the four tracks of the completed recording contained many pre-mixed elements, the balance of which could not be subsequently altered. Also, the stereo panning on those old EMI mixing consoles was only available via a 3-way switch, so you had the choice of hard left, centre or hard right in respect of stereo positioning. All of this meant that the final stereo mix might end up with almost all of the instrumental backing on one channel, with vocals panned to the other - a headphone listener's nightmare.

Fortunately, EMI had the foresight to keep all of the Beatles' session tapes, so Giles Martin is able to go back to the initial tracking tapes and unravel the mix to isolate instruments and voices for his new stereo remixes. At times Martin goes a little too far in modernising the sound for my tastes, but I'll always defend his work for improving on those skewed 60s mixes that would otherwise be the default option. But the mono mix is still king around these parts and The Beatles certainly thought so at the time. All the mono mixing sessions were attended by the group, with approved mixes completed as soon as the tracks were completed; the stereo mixes were rushed through by engineers at the end of the album sessions without a Beatle in sight.

Mono still has a place in modern recording practice even

when stereo masters are created. When a good balance is achieved in mono, the subsequent stereo panning produces a more robust sound. It's easy to make individual sounds distinct by simply shoving them off to one side or the other, however if the stereo mix works in mono, it won't fall apart when heard on a mono radio, for example. I've lost count of the times I've listened to *Radio 2's Sounds of the 60s* on my Roberts radio and heard stereo recordings suffer phase problems when collapsed into mono.

Thankfully, lovers of monophonic recordings are well catered for in hi-fi these days, with dedicated mono cartridges available and many phono amps incorporating a mono switch, which reduces extraneous groove noise enormously. But one aspect of mono listening is often overlooked, even by those who engage their mono switch and use a mono cartridge. You really should listen through a single speaker; stereo speakers produce a phantom central image. By using a solitary speaker, you get a much firmer and punchier sound with a solidly focused central image. I use a single Quad ESL 57 for serious mono listening because it's a wonderful sounding loudspeaker yet I get so frustrated with a stereo pair as you daren't move an inch from the sweet spot if you want the image to remain stable.

Sometimes, I create a mono stack with one LS3/5a inverted atop the other if I fancy a session with my old 45s. Grooving to the early Stones, Who, Aretha, Otis, Tamla Motown and other swinging sixties sounds there's really only one way to go: back to mono. ●



NUCLEUS

Live at the BBC
Repertoire

The British jazz rock band, Nucleus was formed in 1969 by trumpeter, Ian Carr. Their debut LP, 'Elastic Rock', emerged on Vertigo in 1970 with Chris Spedding on guitar and John Marshall on drums. Unlike other groups of that time and genre, Nucleus retained a heap of jazz within its jazz rock framework and never leant towards the rock ethos too much. Later members would primarily be drawn from the jazz milieu. Some would go onto other, significant products. Both Marshall and Karl Jenkins would later join Soft Machine, for example.

Many albums would follow 'Elastic Rock' and under a rotating series of line ups but with Carr as the constant pivot for the Nucleus movement.

This box set crams in fourteen hours of music over thirteen CDs and spans the very early days from 1970 (four hours of this box output features the founding line

up) to more recent recordings in 1991. Programmes featured include Jazz In Britain, Sounds of Jazz, Jazz Club, Jazz Parade, Jazz Today, Top Gear and Sounds of the 70s. One of the discs here is reserved for improvised works, never before released on CD. Many of the tracks include the original spoken presentations from the likes of John Peel, Charles Fox and Peter Clayton.

A 35-page booklet, packed with essays, track listings, photographs and concert poster scans is also present within the sturdy slip case.

As for the mastering, this is a compilation covering numerous programmes, time periods and sources so the tracks move between silence and hiss, edgy mids to dull presentation to good renditions over a wide soundstage.

In the end, none of that matters, what does matter is the music and its broad-based content plus those essential rarities. A top quality box set.

AUDIOPHILE CD



SEX PISTOLS

"76-77": The Complete Demos & Outtakes
Collection 1976-1977
UMC

This 4CD, eighty track collection in a pizza-style box features the band's work before the release of the album 'Never Mind The Bollocks, Here's The Sex Pistols' and includes eight previously unreleased versions and thirty tracks available for the first time, digitally.

The included booklet is packed with nostalgic tabloid newspaper snippets. The Pistols and the tabloids were joined at the hip. "Punk group get £75,000 for doing nothing at all" they cried, producing as much invective spittle as the band's fans during a typical concert.

The Pistols entered the studio at the Majestic in London on 15 May 1976 with producer, Chris Spedding. Then, two months later, the Decibel and Riverside with Dave Goodman on the dials. After that, Lansdowne and Wessex.

This set takes you on a guided, evolutionary tour of that music. The Manchester Square studio

sessions occurred after the band signed with EMI.

Eden Studios followed that infamous TV appearance with the unfortunate TV presenter, Bill Grundy.

The Spunk LP bootleg is here too, an arguably more primitive version of the final album.

It's interesting to hear the musical changes in direction and experiments. 'Anarchy in the UK', for example, veered wildly from an articulate, rhythm-based song to a shocking wall of sound, full of sneering violence - and that was just the electric guitar.

Mastering, on the whole, is commendably 'flat'. There's no edge in the mids. There's not much bass to be truthful but at least these demos are not bright and shrill.

This is a diary of a legend - and a time and a place. A time when music could still move entire generations. A time when music was still worth fighting for...and against.

The album – nicely mastered – is promoted as the first Jethro Tull album in 18 years but really, it isn't, is it? It's a rebadged solo album. It's not as if band leader, Ian Anderson returns to any sort of older core band when he picks up the Tull banner because there's no-one to go back to. Everyone's gone - in one form or another. The current, post-Millennium backing band has appeared on a range of recently released Anderson solo projects. This album is a marketing exercise designed to drum up a prog frenzy from the Tull faithful.

It is also a 12-track, song-based album. That is, Anderson pops in, gives you the message and gets out. Of the twelve tracks here, nine time in under four minutes each. There's no complex prog work out here. This is an album from a singer songwriter.

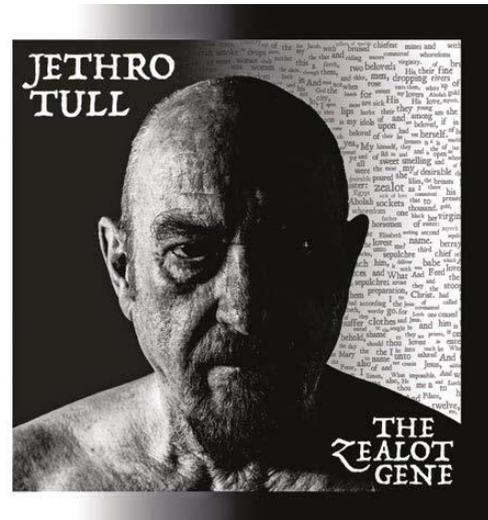
Anderson rails against the world and its dark corners

including. Everything from Donald Trump and "hate and prejudice", to drunken teenage revellers.

The album's core is religion. Specifically, the Bible. The Bible is all over this release. Literally. Many of the tracks feature chapter and verse references to specific passages of the Bible.

Mastering is good, although not great for a modern presentation. Mids are pushed to the edge while bass is hardly organic in tone.

I like Anderson's focus on themes. I appreciate that he has targets. He's got a lot to get off his chest. I like the fact that he's not spending an hour saying 'Ooo Baby'. I'm impressed with all of the performances on this album, including his own. The album is professional, skillfully executed and artfully discharged but I never felt energised, excited or elevated. To Anderson on this album, the message seemed more important than the songs.



JETHRO TULL

The Zealot Gene
Inside Out

AUDIOPHILE CD

Volume 1 of this impressive archival series followed the story of Mitchell The Younger, getting to grips with her talent, creating demos, building confidence within live scenarios and the like. Creating an artistic foundation, in other words, finding her boundaries, discovering her capabilities.

This box set moves the story into a more hectic and demanding existence.

From the 1968 debut 'Song to a Seagull' that includes home demos and a major live outing of twenty-three tracks at the Le Hibou Coffee House (1968) plus outtakes from the album.

Then we're straight into 'Clouds' combining home-based demos, TV-based demos (the Dick Cavett Show in 1969 is one of those) and the 1 February 1969 Carnegie Hall concert (22 tracks).

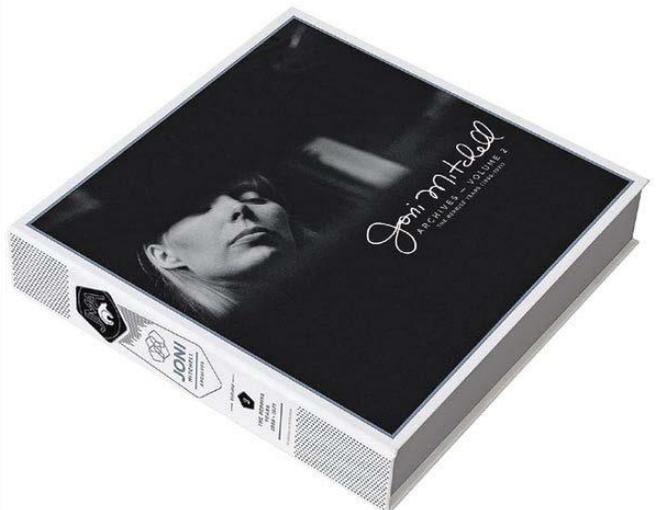
There's a fascinating sense of evolution that derives from

combining the familiar with the rough and ready, that are sometimes dependent on location. So demos at friend's houses tend to be more 'kick-back-and-relax' affairs. The creation process is also illustrated as some songs feature wordless singing while the right words are still to be found.

What is impressive is the speed of this evolution. That Carnegie appearance contrasts, sometimes starkly, with some of the early versions of the same song just a year earlier.

'Ladies of the Canyon' (1970) is explored via a range of 1969 demos while the masterful 'Blue' (1971) is addressed during a BBC 'In Concert' rendition of twenty-three tracks and more.

Mastering is varied, as you might expect from a compilation – yet Rhino has done a good job. Nevertheless, the point of this set is that it exists in the first place. Essential for Mitchell fans.



JONI MITCHELL

Archives - Volume 2: The Reprise
Years (1968-1971)
Rhino

Up The Tubes

Martin Pipe 'hears double' with the bi-wired version of QED's XT25 speaker cable.



For many years, I used QED XT400 speaker cables in my reference hi-fi and home-cinema systems. They were of transparent and natural character, their neutrality being important as said systems were being used to review other equipment. The XT400s made use of QED's proprietary X-Tube construction, a product of the same intensive research programme that led to QED publishing its 'Genesis Report' on the design and performance of audio cables. In X-Tube cables, the signal-carrying conductor strands are braided around a central polyethylene (PE) dielectric instead of being – as with other cables – 'bunched' together into one aggregate mass. This 'polycore' is covered by a conductive copper foil before the braid is applied.

Their need to accommodate those inner polycores – hollow

plastic tubes, hence the name – explains why QED X-Tube speaker cables are of larger diameter than competing designs with similar copper content. In both cases, the conductors are covered by an insulating jacket – a "specially-formulated" low-density polyethylene (LDPE), in the case of QED's products – with an intermediate polytetrafluoroethylene (PTFE) wrap.

So why go to so much trouble? According to QED, both types of cable behave similarly at lower frequencies. At higher ones, though, current flow is said to concentrate around the outer periphery of the conductors. Current density, says QED, progressively-reduces towards the centre of the conductors meaning that their potential is not being fully realised. "The cross-sectional area of the cable at 15kHz", states QED, is "less than

75% of that at low frequencies".

X-Tube neatly sidesteps the problem, by avoiding the centre! Frequencies, high and low alike, are carried around the periphery. Apparently responsible for this phenomenon is the 'skin effect', a self-inductance property. Skin effect only becomes an issue at extremely-high (GHz magnitude) frequencies, which is why radio engineers working with such signals (radar, satellite earth-stations and so on) use 'waveguides' – hollow pipes, basically – to carry them with minimal losses. Ironically, QED – in its Genesis Report (bit.ly/3rMgCzg) – concedes that the skin effect "is not an issue...at audio frequencies". So there must be other reasons for the performance of X-Tube cables. For its part, QED steers us towards the more recent (2017) 'Sound of Science' report (bit.ly/3rMCSsQ) for its "latest understanding" of what

it “thinks is going on with the skin effect”.

And the X-Tubes have certainly been successful, over the near-twenty years since their introduction. One particular product, 2017’s ‘Performance XT25’, was praised by reviewers and has sold very well indeed. The still-available XT25, a terminated 3m pair of which can be yours for £80, features 2.5mm² of oxygen-free copper conductors arranged in the concentric X-Tube pattern. It has now been joined by a ‘bi-wireable’ version, the XT25 Bi-

intended for its HF inputs. Shorting plugs or plates must be removed from the speaker terminals first, of course. One of bi-wiring’s traditional advantages is that you can use runs of different cable optimised for carrying treble/upper-midrange and lower-midrange/bass; what’s best for one frequency band is not necessarily good for the other. Some cable manufacturers (Atlas, for example) do indeed use different types of conductor for the LF and HF pairs.

QED has in contrast opted to use the same XT25 for both, citing as a benefit that “separating high- and low-frequency currents... minimises intermodulation distortion”.

It’s worth pointing out



Wire. Here, two lengths of XT25 – their four insulated conductors carefully-interwoven in a consistent ‘star-quad’ pattern, to prevent audible imbalance between channels caused by routing-dependent inductance and capacitance variations, and covered by an overall jacket – are joined together at the amplifier end.

The other end consists of four colour-coded plugs. I’d be happier if QED had labelled them too – make a mistake, and you could effectively short out your amp’s output stages! Half of the complement should be inserted into the ‘LF’ sockets of your speakers, the remainder being

that QED retailers can also supply an independently-wired bi-amped version, with four sets of plugs at either end, and a single wire version with the two runs of XT25 parallel-connected.

In all cases, QED – or its dealers – fit ‘Airloc’ 4mm banana plugs designed specifically for the unusual construction of X-Tube cable. Some dealers quote by-the-metre pricing for X-Tube cable, which is misleading as the cost of these connectors isn’t factored in. With the cold-welded (crimped) Airloc plugs fitted – two at the amp end, four at the speaker end – I can confirm that a 3m pair of XT25 Bi-Wire cables will set you back £150.60. This nudges them from budget into midrange territory.

The company told us that it takes “extreme care to ensure that the cable materials are as electrically-stable as possible” and guarantees that the “dielectric will

not deteriorate or change over the course of the cable’s lifetime”. As a result, its cables should deliver their best “from the moment you start using them”. “No significant changes in performance” are expected over time, but QED nevertheless admits to burning in review samples for 24 hours using a run-in rig fed with a pink-noise source (noise that has equal energy per octave). You can achieve something similar with a FM tuner tuned to the ‘static’ between stations, and your amp’s volume set to a low level. I carried out this procedure, as I do for all cables.

I didn’t have a pair of the original XT25s to compare the bi-wireable review samples with, and so they’re being judged here on their own merits. They linked the LF and HF sections of my Quadral Aurum Wotan VIII speakers to a Cambridge Edge W power amplifier, which was fed with music from the matching NQ streamer/preamp.

The Airloc plugs were a snug fit for good connectivity, but didn’t require brute force to remove.

On the subject of strength, what immediately stands out in listening terms is the solidity of bass lines. They’re not in any way exaggerated, retaining their scale, but the character of the instrument played – be it a kick drum, cello or synthesiser – is better-defined. Indeed, clarity is definitely one of the XT25 Bi-Wire’s strong points – across the audible spectrum. With orchestral material, there seems to be a greater sense of perspective relative to budget cables – and, for that matter, my vintage XT400s. The latter’s tonal neutrality are, however, inherited.

CONCLUSION

Although not cheap, these speaker cables don’t sell for silly money. Yet they do a great job, and represent a worthwhile upgrade over budget fare. If your speakers are bi-wireable, the XT25 Bi-Wires are definitely worth auditioning. Pay close attention as to which coloured plug goes where, though, if you want to avoid any possibility of amplifier damage. On account of the cable’s significant diameter – four individual X-Tube wires, enclosed within an jacket – some effort might be required to route (and indeed hide) them. Persist – the results are worth it.

QED XT25 BI-WIRE
£150.60
 (3M PAIR, AS TESTED;
 OTHER LENGTHS
 AVAILABLE)



OUTSTANDING - amongst the best.

VALUE - keenly priced.

VERDICT

A high-tech cable that delivers the goods at a sensible price.

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- fantastic sense of scale
 - high resolution

AGAINST

- make sure you don’t get your plugs mixed up!
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vinyl section

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A complete system optimised for LP, price £1199, from vinyl experts Rega. Is this the one to get? Noel Keywood checks it out.

REGA CARBON CARTRIDGE 73

A £33 moving magnet cartridge with amazing abilities, reviewed by Noel Keywood.

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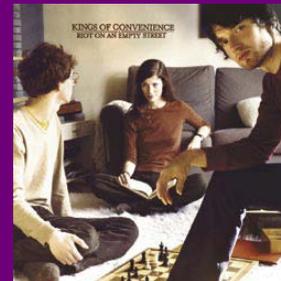
SPACE 1999: YEAR ONE & TWO

From UK outfit Silva Screen (www.silvascreen.com) comes these two-disc, gatefold releases devoted to Gerry Anderson's TV, SF series 1999. Bound by a paper band (there's no shrink wrap here) and pressed on 'lunar' white vinyl, the original television soundtracks, via Barry Gray (Year One) and Derek Wadsworth (Year Two), offer classic queues and vibes. The gatefold supplies valuable information and insight. Wonderful music and essential for Anderson, SF and TV fans.

news

KINGS OF CONVENIENCE

From 'Quiet is the New Loud' (2001) – the band's debut – and 'Riot on an Empty Street' (2004) (*Source; say-yes.eu/artist/kings-of-convenience*), this Norwegian indie duo offers low key acoustics, low noise vocals, low in energy and, come to think of it, the group reminds me of Low. Sparse, stripped, I like the pair of them...performers and albums.



PEPE DELUXÉ

Phantom Cabinet Vol. 1 (*Catskills; catskillsmusic.com*) sees the band's first release in nine years. Sometimes described as pop opera, I can hear that, sure. There's a wide diversification of music styles here: high-energy soul, big beats, psyche and a bit of Dr John's mysticism.

STEELY DAN

'Northern Corridor: Steely Dan Live!' (UMC) is the rather strident title of this single-sleeve double covering four venues: Mohegan Sun Arena; Orpheum Theatre, Beacon Theatre and the Met Philadelphia from 2019. Adding a sense of live edge to the mostly seventies classics, this is a professionally performed suite.



SPEAKERS CORNER

A couple of releases from German audiophile label, Speakers Corner (www.speakerscornerrecords.com) starts with Ornette Coleman's 'Free Jazz' (1961), an early release of the form that saw a lack of formal template but did utilise a sense of structure from band members like Don Cherry and Freddie Hubbard, meaning this challenging release was still accessible.

Formally educated by James Brown, Fred Wesley, the Horny Horns (1977) originally released their debut 'A Blow for me, A Toot for You' on Atlantic. At this point, the group were Parliament/Funkadelic's horn section. It's no surprise that this release is a P-funk outing with jazz sprinklings. George Clinton fans should seek it out.

BEAR FAMILY DUO

A pair of nicely produced 10" albums from the German audiophile outfit. 'Beal Street Beats Volume 2' is a ten track compilation covering R&B tracks from the likes of Charles James and The '5' Royales from 1960-1964.

The second, 'Please Don't Touch!'. From Johnny Kidd and The Pirates it's a twelve tracker including the seminal 'Shakin' All Over'.



THUNDERCAT

'The Golden Age Apocalypse' (*Brainfeeder*; www.brainfeedersite.com) is a 10th anniversary edition of Thundercat's adventurous soul/jazz fusion debut via translucent red vinyl, a shiny gold sleeve with a Thundercat logo hologram sticker.



SPACE JAM

"Music from and inspired by..." the film itself (1996; Warner) is a useful statement to ease the song title restraint on this gatefold double that includes artists such as Seal, Coolio, D'Angelo, Barry White and...Bugs Bunny. Oh yes. Limited to 6,000 copies, the vinyl is pressed on both red and black.

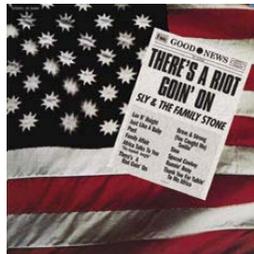


AND DID THOSE FEET

And Did Those Feet's 'Deo Volente' (*RnR*; www.rnrrecordsfl.com) is a limited-edition, numbered and signed ten-track album with an attached CD within. Featuring the folksy operetta of Eisteddfod blue-ribbon winning vocalist Ina Williams, it covers the band's output from 2001-2018.

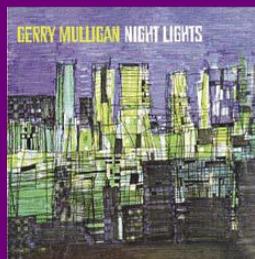
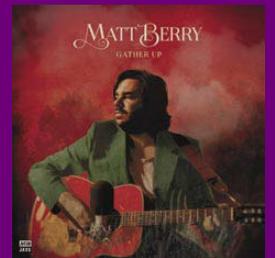
SLY & THE FAMILY STONE

A 50th anniversary release, 'There's a Riot Goin' On' (Sony) probably says more about the riot happening in Sly's spaced-out head and within his immediate social circle than any broader social commentary. This loose-leafed, straggly, unfinished collection of grooves and vocals attached with staples was, nevertheless, a major album in its day and influential ever since.



MATT BERRY

On Acid Jazz (www.acidjazz.co.uk), 'Gather Up' is a ten-year retrospective from the folksy/psychedelic singer-songwriter and TV entertainer.



GERRY MULLIGAN

Baritone sax legend Mulligan spent around four years fronting his Concert Jazz Band from 1960-1964. 'Night Lights' is an easy-going 1963 release (New Land; newlandrecords.co.uk) includes trumpet man Art Farmer, trombonist Bob Brookmeyer, guitarist Jim Hall, bassist Bill Crow and Dave Bailey on drums. No stretch, just ease.



THE WORLD TO COME

By Daniel Blumberg (*Mute*; mute.com) this is the Original Motion Picture Soundtrack to 'The World to Come'. Avant in direction, the music is slightly unstable, slightly unnerving and has a raw beauty that's hard to gaze upon.

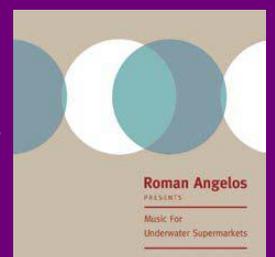
JOHANNES WAMBERG

'Tabloid' (tabloidcopenhagen.bandcamp.com/album/tabloid) offers a jazz excursion from Denmark. Johannes Wamberg (guitar), Jonathan Bremer (bass), Oilly Wallace (saxophone), Felix Ewert (drums) and Malthe Rostrup (keys) provide a real jazz/soul, seventies feel. There's a retro cloak over this one. It's groovy, it's finger-clicking, it's funky fun.



HAPPY, HAPPY ROBOTS

Roman Angelos' 'Music for Underwater Supermarkets' (*Happy Robots*; www.happyrobots.co.uk) from New York-based producer Rich Bennett offers a library music-type sleeve (oh how I smirked) but that's just how it plays. It's a compilation of sixties-tinged orchestral loungecore, synth noodling and MOR square. If you love library music, you should hear this one.



Not So Simple

A seemingly simple system to play LP – but not so simple inside, Noel Keywood explains.

Occasionally, when I'm walking down the road an anonymous black car will race by with sirens blaring and discrete blue lights flashing.

What are they? Dunno. But the large males huddled inside suggest disguised ability. And that's how I see this rather anonymous all-black system from Rega. It has dedicated primary function: to play LP well,

strengths little evident from anonymous appearance. Cost £1199.

I understand the idea behind "system in a box, complete with leads" but not so sure about who this might be aimed at. A teen





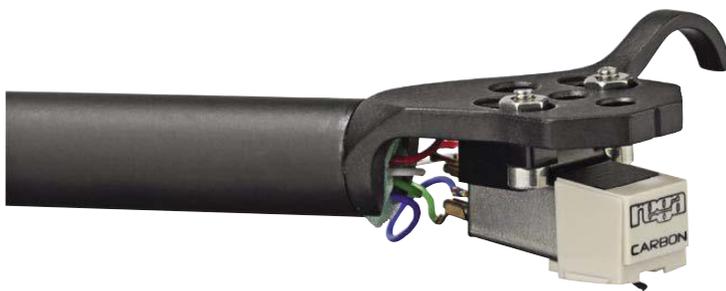
Rega's basic RB110 arm with conventional metal arm tube and fixed moulded (phenolic?) headshell, complete with usable curved finger lift.

getting into vinyl perhaps, like my son who has a decent collection but no way to play them – and little idea either! Don't ask because I don't understand. Or perhaps those who have LPs from long ago but no good way to play them, only an old record player perhaps.

Rega weren't around in the days of record players but have become Britain's acknowledged vinyl experts since, the business being founded on an exceptional tone arm. This system has something similar in the budget P1 turntable – plus amplifier and loudspeakers at a price that's about as low as it can get.

At this point you might protest. After all I reviewed a Lenco system recently (February 2022 issue) that cost just £135, and doubtless there are plenty more 'all-in-ones' in this world (well, China) able to spin LP for less than this system. But beware. This is a proper hi-fi, dressed down to the level of those black police cars, designed to do a strong job without standing out. It isn't a fake tarted up to look the part. As you will realise when I go into detail (and there's much to talk about).

In keeping with Rega's straight-



Rega's sturdy fixed headshell, with stainless steel cartridge fixing screws mounted upside down. The nuts fit the slots but don't look so good. A hex key is needed to remove the cartridge. The stylus carrier unclips downward for easy replacement.

with moving magnet (MM) cartridge fitted, and the leads necessary to get up and running. Except there's no stylus force gauge and one is needed. Or is it? Rega say not, a subject that needs a bit of coverage I'll provide shortly.

First I'll explain the three main items in sequence here, turntable through to speakers.

REGA P1 TURNTABLE

The P1 is a two speed (33/45rpm) all-manual belt drive. That means you have to change speed by removing platter and physically moving belt on the motor pulley;



Underneath the P1. Three solid rubber feet, an arm lead with no separate earth and a 24V a.c. synchronous motor fed by an external wall wart. The low voltage supply and non-metallic plinth remove a need to mains earth, avoiding a hum loop.

forward approach this system in a box arrives literally in a single cardboard box with all parts included. Inside are a pair of Kyte loudspeakers, an iO amplifier (yes 'iO' is lower case), a P1 turntable

also start/stop and all arm movement is manual; there are no auto-mechanisms. It's a pared down design, but at least with a hinged dust cover.

The outstanding feature of any Rega turntable is a Rega arm – it has big influence on sound quality. If you want a stable, wide sound stage and firm dynamics, the arm must be structurally rigid, but also non-resonant. Trouble is, one begets the other: a brass bell is rigid – but it rings. An aluminium arm tube is rigid and it also rings, typically around 180Hz in 9in form, which most arms are. In engineering terms they are a constrained beam with 'bending modes', something Garrard noted long ago and justification for their



Belt drive to a central hub of moulded Phenolic. To change speed (33rpm / 45rpm) the platter must be removed at the belt moved to a different pulley groove. It's set at 33rpm here.

Lab 80 arm wood/aluminium composite arm they once explained to me.

Unfortunately, Rega's classic tapered RB300 is not here nor its descendants, instead an RB110 with parallel sided tube, anchored by an RB250 style bearing hub with improved ultra-low friction bearings, they say. Outward bias force is fixed; it cannot be adjusted. Since most cartridge these days track around 2gms suitable fixed bias is acceptable.

I like the new arm clip which works well (these things are important) and there's a rigid fixed head shell with usable finger lift, another item I value, since I hand cue. Rega's damped lift/lower platform has always been effective and remains so here. Just be aware that changing a cartridge is a bit

of a caper, since the headshell does not unplug. As standard, Rega fit their Carbon MM cartridge, a modified Audio Technica AT-3600L with its unusual carbon fibre cantilever.

The platter is made from phenolic resin and simply lifts off the hub for speed changing. Drive comes from a 24V a.c. synchronous motor, speed being determined by stable frequency from the a.c. output wall-wart external supply module, badged by Rega. It's likely made in China, but to the company's specification, this not being the usual d.c. output wall wart.

As is now common, there is no mains earth so no possibility of a hum loop and hum from this most-common source. The cartridge green and blue 'earth' wires run to the cartridge only, they do not ground the arm, and the headshell is non-conductive phenolic so metal bodied MCs will need to have their body separately grounded. This means the RB110 is best fitted with MM cartridges, but there are plenty of high quality designs available nowadays.

The arm is plenty good enough for high quality MMs and this is an important consideration for anyone expecting to upgrade. Or, if you buy the system for a teen, let's say, then things like a cartridge upgrade or a stylus pressure gauge, not to mention LPs, make presents easy

to choose later on!

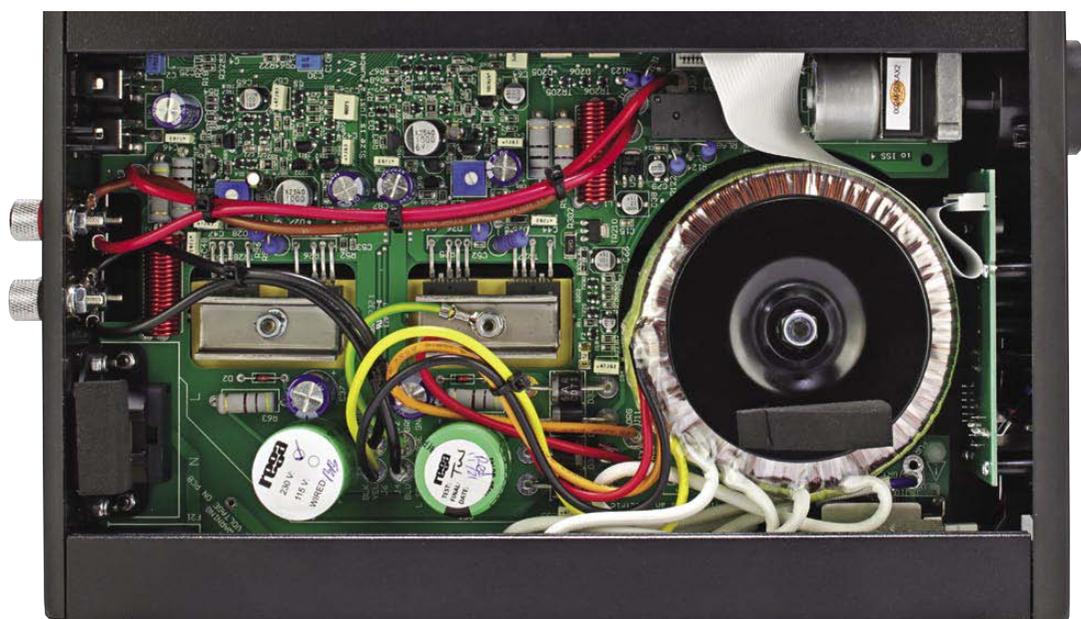
Weighing 4.2kgs the PI is not heavy by any means and needs a firm surface, isolated from floor bounce since there's no suspension system. It measures 450mm wide, 355mm deep and 120mm high lid closed; with lid open rear overhang increases depth to 430mm and height rises to 410mm (16in), the clearance needed between shelves for example. The lid will not partially open, lacking counter-balanced hinges, but it can be



The rear counterweight has no weight calibration dial, making stylus scales essential. Rega set VTF at 2gms but Audio Technica recommend 2.5gm minimum.

removed.

There's virtually no set-up involved, but here's where the PI gets awkward compared to rivals



Inside the io amplifier, a large toroidal transformer feeding a linear power supply. At top right is the motorised Alps volume control and at centre four power transistors bolted to the under-tray. Rega use two custom green-sleeved electrolytics in their power supply (bottom).

like the Audio Technica LP2X: its counterweight is uncalibrated, so a stylus gauge is needed. However, with the Carbon cartridge just push the weight on as far as it will go, the handbook explains. I did this and downforce measured 2gm – at the bottom of Rega's 2-3gm quoted force range. To go any higher weight must be added to the headshell, meaning the counterweight isn't well judged: it's too heavy.

And of course with any other cartridge a stylus force gauge will be necessary. I changed the cartridge for the purposes of measurement and this was a fiddle, since the hex head screws must be undone from below; it was so much easier to attach an Audio Technica AT95 SLC, with its captive nuts, since screws could simply be dropped in from above. But it wasn't so easy installing an Audio Technica VM750 SH, with its peculiarly awkward mounting scheme.

The Carbon cartridge has an unusual black carbon fibre cantilever that looks like a match stick compared to the usual aluminium tube, but in practice it measures better, the Carbon having superb tracking (2.5gms VTF). The conical stylus even reads inner grooves effectively. An even larger hidden strength though is sound quality: this is one of my favourites.

REGA IO AMPLIFIER

The little io amplifier most reminded me of those black (police?) cars that charge around: anonymous, but with a lot of punch inside. Coming from an analogue specialist, it thankfully has a linear power supply rather than a switch-mode and a traditional Class A/B amplifier, not Class D. So no digital here. Power is 50 Watts per channel our measurements showed (see Measured Performance) with very little distortion. As you can see from our internal shot it is a modern design full of robotically fitted surface-mount components, an Alps motorised volume control, low-level sealed relays, the strong alloy case being used as a heatsink (it gets warm). Inside is a prettier picture than outside methinks, but external simplicity makes for ease of use.

There's remote control of volume and input switching, plus a Mute function, but not of power



At rear the small io amplifier has just three phono socket inputs, two for Line and one (left) for a turntable. The two pin IEC mains input shows it is not earthed, allowable in IEC Standards if certain safety conditions are met.

on/off. Nor is there automatic power-down after a period of inactivity. Rega fit two Aux inputs and one MM phono input of high sensitivity that will work well with the low-ish output of 'high output MCs'. The io is a high quality amplifier at heart, that can be functionally enhanced by addition of an external streamer able to read a Flash drive, and perhaps a Bluetooth receiver.

With a weight of 2.9kgm and dimensions of 180mm wide, 68mm high and 290mm deep this is a unit that will slot in just about anywhere. Perhaps aware that young listeners to vinyl are also wedded to headphones (hello – are you there?) they draw attention to its 3.5mm front jack socket.



Kytes bass/midrange unit with fixed central phase plug to prevent cancellations across the apex of the cone.

REGA KYTE LOUSPEAKERS

I had to laugh at the anonymous (that word again) black plastic case of Rega's Kyte loudspeakers. The wooden case of a loudspeaker is expensive to manufacture: why not press it out in plastic? Hmmm...

Turns out there are not a lot of reasons. Asymmetry is easy to build in (unlike wood) to damp down internal resonances and plastic does not have a woody sound (natch!). Drop it, hit it etc and the case will remain unscathed: except the paint finish of one loudspeaker was peeling off in our review system.

What you do not get is anything that is visually attractive; the idea is to sound good at lowest possible price and here the Kyte's case makes a lot of sense. The rear carries a single pair of sockets suitable for 4mm banana plugs, spades or bare wire.

SOUND QUALITY

Set up wasn't as easy as it could have been for a beginner. The 'speaker leads are supplied unterminated so the bare copper multi-core wires had to be twisted and wrapped around both amplifier and loudspeaker terminals allowing for the possibility of a short. Lead length – 10ft / 3.3 metres each.

Rega's solution to setting cartridge tracking force without a gauge of any sort, even a cheap



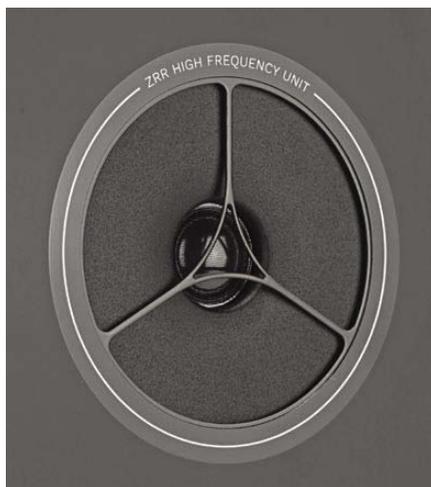
An easy-to-use remote control with input switching, volume, mute.

plastic one like that supplied by Ortofon with their cartridges, was awkward and approximate to say the least.

When set up, very high gain of the io's MM input resulted in some hum on one channel at full volume that appeared to be coming from the external alloy shield of the cartridge, connected to Right ground (green). At normal volume this hum was inaudible, but I suspect some may find it disconcerting.

"their unusually deep bass revealing all the potential of the P1 with Carbon cartridge and the superb little io amplifier"

Each item in a system like this makes its own contribution to the sound and it is best to separate them to understand the whole. To measure the Carbon cartridge it was installed in our Timestep Evo modified Technics SL-1210 MkII Direct Drive turntable with SME309 arm, so I initially auditioned it through io and our Martin Logan ESL-X hybrid electrostatic loudspeakers in this turntable.



The Kyte treble unit with a protective grid in front.

I have heard this cartridge before and it is a favourite of mine, the carbon fibre cantilever giving a seductively natural sound free from the lighter, more metallic quality of aluminium cantilevers (that most are). And that is what I again heard, a smooth, deep quality

to the sound that's expected from analogue LP. No sign of sharpness or glare, just the music. Plenty of bass too, Dire Straits Ride Along the River showed me.

With Carbon re-installed in P1 again its particular character and strengths were obvious, the P1 doing a good job of setting up a wide stereo stage, underpinned by dynamic contrasts that allowed our re-mastered Abbey Road to sound both subtle yet often punchy too, when "she came in through the

bathroom window" for example.

It was only when I connected up the Kytes that misgivings arose. Somewhat worse than measurement had predicted, there was little in the way of bass, robbing them of impact. Spinning Fleetwood Mac's Rumours, which I see is again a top selling LP (will it never die?) Mick Fleetwood had little presence, where – like Phil Collins – he was a guy who made sure drums featured strongly in the song and were obvious in the mix. The Kytes altered this, throwing emphasis on the mid-range and treble. Both were decent enough if not outstanding, having a brisk sharpness I found not especially engaging, plus a little boxiness due to echo. A pair of Mission QX2 MkIIs were connected up instead and restored the balance, their unusually deep bass revealing all the potential of the P1 with Carbon cartridge and the superb little io amplifier. There are plenty of small budget loudspeakers, from



At rear of the Kyte loudspeakers a plastic stabilising bracket keeps the curved cabinets stable. With a single pair of terminals bi-wiring is not possible At top a port tuned to 60Hz measurement showed.

Wharfedale to Q Acoustics, that better complement this system I feel.

CONCLUSION

Much like those black cars with sirens, System One from Rega did its job in focussed manner, with a great sense of purpose. At heart it is a finely optimised budget record playing system, with the exception of the loudspeakers that at the price can be bettered, so rather spoil the picture. That suggests a P1 with Carbon cartridge and an io amplifier are best bought separately and paired with better loudspeakers.



Simple 3.3m long loudspeaker cables with bare ends.

MEASURED PERFORMANCE

P1 TURNTABLE

The arm has a well damped first bending mode at 150Hz our analysis of vibration with a Bruel&Kjaer accelerometer on the head shell shows, but there was some third order flexure at 450Hz; overall however a creditable performance for a budget tubular arm.

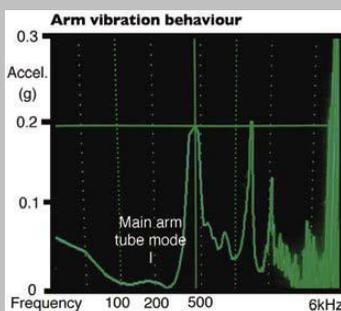
The 3150Hz test tone of a DIN 45-452 test disc varied from 3156-3162 on a Wow&Flutter meter, a small speed error and low variance about mean value; budget belt drives usually wander more. There were some sudden variations in speed but for the most part Wow&Flutter readings were low for a budget design. An analysis showed the main variation component was at 0.55Hz, or rotational speed.

The Rega Carbon cartridge (Audio Technica AT-3600L) with its unique carbon fibre cantilever is a gem. Tracks superbly at 300Hz due to hinge compliance and at 1kHz due to low tip mass – extraordinary at the price. Frequency response was flat to 20kHz, with a slight -1dB roll down to ensure smooth treble; the simple conical tip even worked well in inner grooves, where tracing loss was low. No weaknesses, in fact too good for the price (£33).

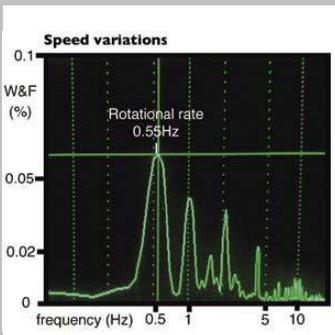
TURNTABLE

Speed error	+0.3%
Wow	0.15%
Flutter	0.07%
Wow & Flutter (DIN wtd.)	0.12%

ARM VIBRATION



WOW & FLUTTER



IO AMPLIFIER

The Rega io amplifier produced 40 Watts into 8 Ohms, increasing to 60 Watts into 4 Ohms, so this can be rated as a 50W amplifier into 6 Ohms, which is now what most loudspeakers measure. Although not a high power figure, in practice it is plenty enough to go loud in most situations.

Output impedance was very low at 0.06Ω giving a damping factor of 143, which will impose strong electrical damping of loudspeakers.

Frequency response measured flat from 10Hz to 23kHz (-1dB) via an Aux input, unaffected by load value or volume control position. In expected Rega fashion upper treble starts to roll down above 10kHz to ensure a smooth sound (Naim also do this).

Distortion levels were low at all frequencies and output levels, measuring a low 0.1% at 10kHz, 1W into 4 Ohms – a telling test of crossover distortion.

Also as expected, the Phono input has a strong warp filter, rolling down to -1dB at 27Hz and -17dB at 5Hz where warps are prevalent.

AMPLIFIER

Power (8Ω)	50W
Frequency response	10Hz-23kHz
Distortion (10kHz, 1W, 4Ω)	0.09%
Noise (IEC A)	-98dB
Sensitivity	200mV
Phono	
Frequency response	40Hz-21kHz
Distortion (-60dB, 24bit)	0.12%
Sensitivity	1.8mV
Overload	100mV

KYTE LOUDSPEAKER

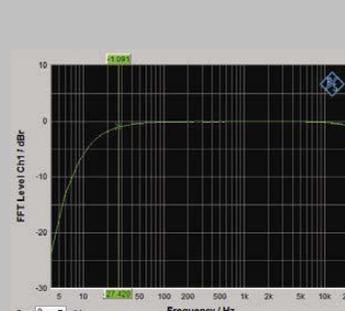
Not unexpectedly, Rega's small Kyte loudspeaker measured flat our third-octave analysis shows, tweeter level being slightly (1dB or so) lower than the bass/midrange to bring some warmth

and body to the sound. Most importantly through there is no treble emphasis and in fact treble is remarkably smooth, the phase plate in front of the tweeter doing a good job in this respect. Crossover is at 3kHz nearfield measurement showed.

The small cabinet and drive unit have limited bass output, rolling down below 200Hz to measure -3dB at 100Hz, the port tuned to 60Hz adding a little at this frequency. The Kyte will be bass light, but use close to a rear wall in a small room (10ft long or less) will help. There are small speakers that go lower (Mission QX-2 MkII) and have the same low-ish sensitivity of 85dB from one nominal Watt (2.8V) of input. Main reason being relatively high impedance of 12 Ohms, obvious by the height of our impedance trace, most of which lies above 10 Ohms. It's common to use a 4 Ohm d.c.r. bass unit and achieve 6 Ohm impedance, but the Kyte is far from this, meaning it does not exploit the power of the io amplifier.

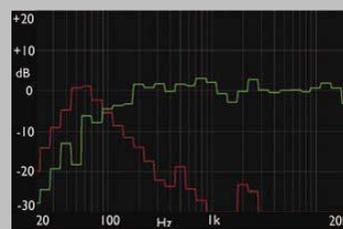
Overall the system measured well, Rega quite obviously engineering in an accurate tonal balance. Lack of bass from the Kyte loudspeakers was an obvious drawback however.

FREQUENCY RESPONSE LP



FREQUENCY RESPONSE

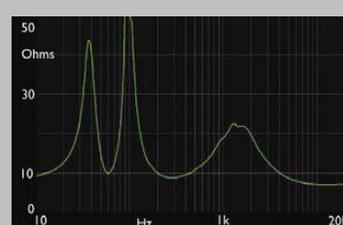
Green - driver output
Red - port output



DISTORTION



IMPEDANCE



REGA SYSTEM ONE £1199



EXCELLENT - extremely capable

VALUE - keenly priced

VERDICT

Good LP system let down by its loudspeakers.

FOR

- good turntable
- excellent amplifier
- reasonably easy set up

AGAINST

- mediocre loudspeakers
- lacklustre standard of finish
- unterminated cables
- no tracking force gauge

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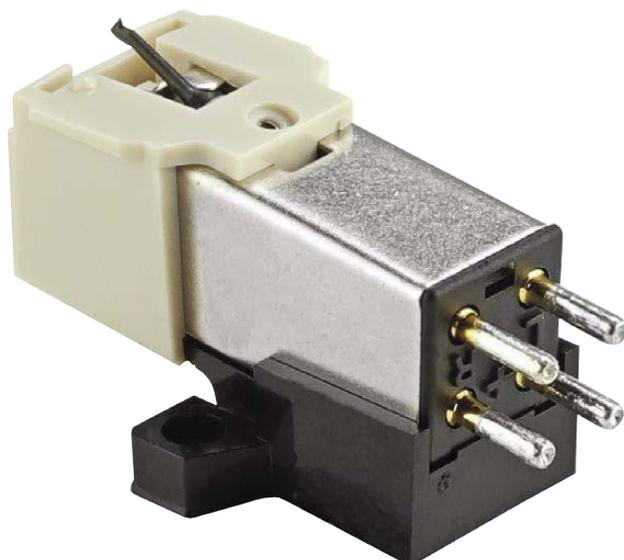
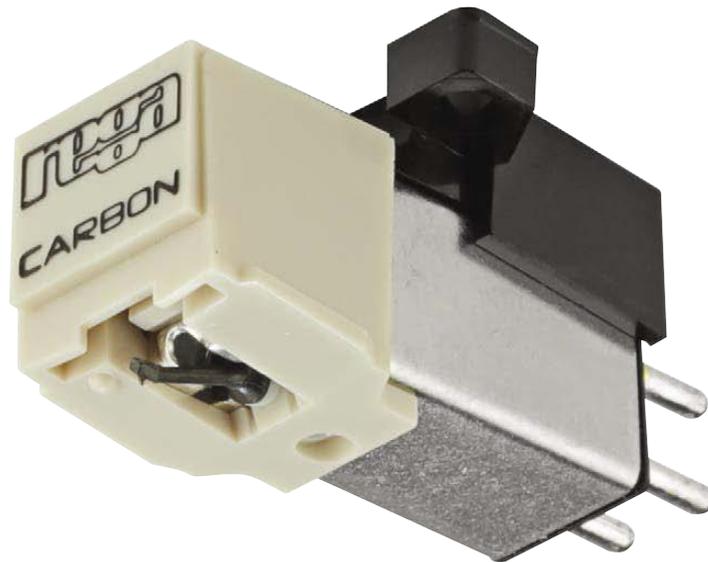
A black cantilever in a shiny white MM cartridge catches Noel Keywood's attention. Here's a close look at Rega's Carbon MM cartridge – price £33.

How can a £33 moving magnet cartridge be near-perfect, languishing as an ignorable cheapie? Rega's Carbon cartridge is a re-badged AT-3600L from Audio Technica, complete with black matchstick cantilever having a couple of mini-magnets glued on in V formation. Distinctive. It's a cartridge of choice in low cost turntable packages, reinforcing its budget status. I've come across many AT-3600Ls and they consistently perform unusually well, not just under measurement but also in listening. Confronted with Rega's Carbon version I decided to take a close look.

Why is it so good? I could ask Audio Technica but somehow think I'd receive a vague reply rather than candid insight. They publish no in-depth technical data to even hint at its abilities: the pauper gets no attention. It could be that its high level of ability together with low price brings large sales in a high volume market the company would prefer to keep quiet about. The

AT-3600L is an anonymous moving magnet cartridge easily passed by. A Honda 50 then: loved in the Far East where I've seen families on them, but laughable in the UK.

Let's talk matchsticks. When I first saw the matchstick sized cantilever, conspicuous by its black colour, I cringed. Reason being large cantilevers have high



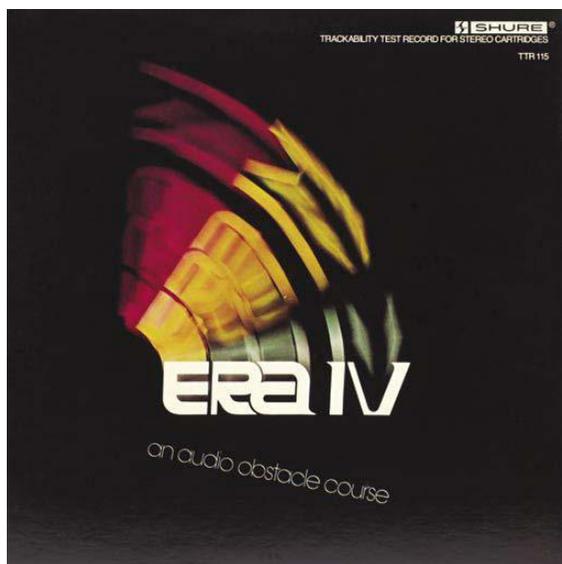
A removable stylus carrier clips into place from above. The screening can is earthed to Right ground (green) only, not to the body.



CBS STR-112, a professional test LP – one of the best.

mass and therefore poor tracking, explaining why cantilevers get finer and more fragile as performance rises. This one looked built to survive heavy use, potentially a groove grinder.

And why black? Used to shiny bright alloy cantilevers I wondered whether it had been sprayed to



Shure TTR 115 test LP, sold for consumer use. Still available on eBay.

look good. It must be an alloy cantilever after all?

My simple musings were wrong. Measurement of tracking ability showed that the large matchstick was the equal of smaller aluminium cantilevers. It's made from 'carbon fibre reinforced ABS' they say, something our pictures here make obvious. Larger than a fine walled alloy tube, but as light – and

What's the drawback? Here's a mystery. If it was heavy then it would not track high frequencies, like the sibilance in close-miked vocals that can be challenging, but in Shure's TTR 115 trackability test record it sailed through all five

this seems too good to be true, yet it is true. The cantilever may look like a matchstick, but it doesn't perform like one. More like a black swan.

We took high resolution pictures with a x1000 microscope that show it has a conical stylus ground on a cylindrical shank that's neatly bonded to a carbon fibre rod. Compare this to the crimped ends of alloy tube cantilevers and the cartridge looks well made; it's not a budget botch-up.

A conical stylus is the simplest profile available and the cheapest too, as you might expect. Known for being unable to resolve short mechanical groove wavelengths, they exhibit measurable tracing loss on inner grooves. As did the Rega Carbon – but our frequency response analysis using the

"it plays old, noisy LPs very well, the damped carbon fibre cantilever not accentuating ticks and pops"

levels of bells, flute and harp, plus all levels in combo on Side 2, playing Greensleeves. The Carbon managed just as well with 1kHz test tones on a Bruel&Kjaer QR2011 test LP that identifies cartridges with high tip mass. It also stayed in the groove at 90µm when tracking a 300Hz test tone (CBS STR-112 test disc) – better than most cartridges on the market. For a £33 budget cartridge

definitive JVC TRS-1007 test disc shows that inner groove tracing loss was just -1dB at 10kHz, which is tiny. Almost worryingly good – yet again. Top tips suffer this level of loss, unbelievably putting the Carbon up with the best!

What our frequency response analysis also shows is that the Carbon is basically accurate, unlike MMs of the past, but it has a small loss of output at 7kHz that



B&K QR2011, a professional test LP. Needs test equipment.

naturally black. It was designed to track at 2.5gm-4.5gm to actuate mechanical stop/lift auto-mechanisms in budget turntables, the L standing for Large. There is an AT-3600 with aluminium cantilever that tracks at lower downforce.



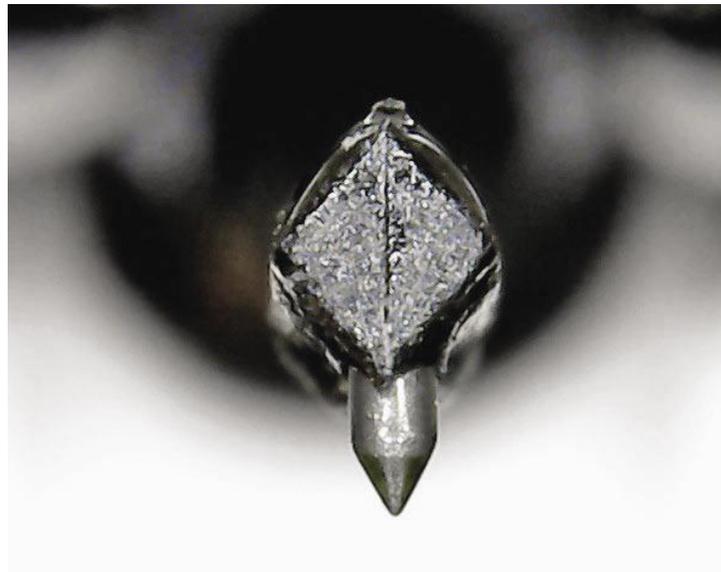
This picture shows the fibrous nature of the cantilever and what appears to be a ground-on flat to accept the stylus shank.

will slightly soften the sound. An absence of peaking means there'll be no hiss or spit, but the balance is one that will be both revealing yet easy on the ear – vinyl like. It's all so well judged I can't help suspecting this is a carefully tailored device. It's consistent too: I've measured many of these cartridges – in AT-3600L form – and they were all the same.



Inside the removable stylus assembly lie a pair of cylindrical magnets attached to the cantilever, ahead of the hinge. This is Audio Technica's V magnet arrangement.

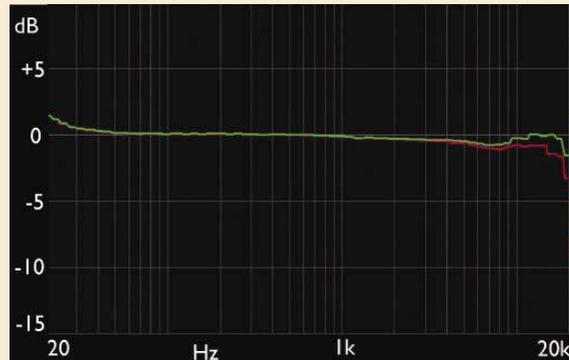
How does it sound? In a nutshell: lovely. The Carbon gives a deeply relaxing sound that's easy on the ear yet bass is strong so it comes over as weighty. What you don't get is the forward upper



This front view shows the cantilever is a moulded part. The conical stylus profile is also clear.

mid-band and apparent clarity of modern cartridges like Audio Technica's AT95 series, nor the light sonic patina of an aluminium cantilever. As you might expect the stylus doesn't mine detail and can sound a tad vague, but it plays old, noisy LPs very well, the damped carbon fibre cantilever not accentuating ticks and pops. I'd say this cartridge

FREQUENCY RESPONSE



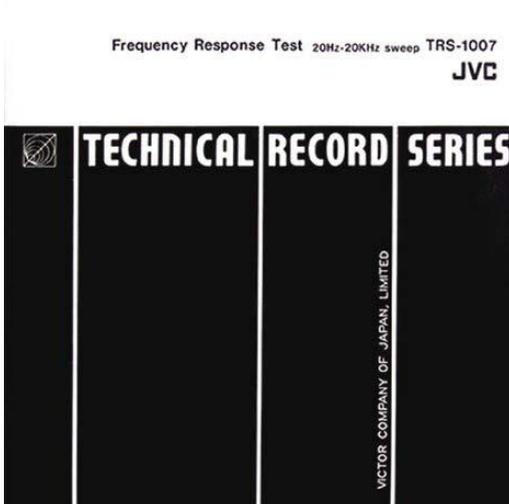
Our analysis shows near-flat frequency response to 18kHz, even on inner grooves (red trace). Variance is within a miniscule 1dB – up with the best. Test disc: JVC TRS-1007.

holds its own up to the AT95ML or SH (£180), both of which sound audibly more concise with the MicroLine / Shibata styli. You need to move up to their VM740/50/60 (VM750 SH is £260) with conical alloy cantilevers to lessen the patina of aluminium, giving a slightly more neutral balance.

But whatever cartridge is used as an upgrade,

it won't have a carbon fibre cantilever, nor the well damped colour-free sound it offers. Boron rod cantilevers are the sound of today and give fine results at a technical level but their sound is, for me, a little sterile. Fast no doubt, deep in detail too, but best with modern LPs: playing oldies becomes difficult. Suddenly they lose their romance.

For all those who want classic vinyl sound this is as close as you will get. It isn't as warm as those old Shures and what have you, but it is more revealing whilst remaining amenable – a well chosen balance. Excellent tracking at 2.5gm downforce preserves new vinyl and doesn't further damage oldies. Being an entirely conventional MM it works with any phono stage. Rega's Carbon and its AT-3600L equivalent are bargains.



JVC TRS-1007 test disc: half speed mastered for high accuracy; an industry standard. Very specialised.

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Table talk

This time, the music book sub-genre classic, the coffee table book. As Paul Rigby knows, like any book, the coffee-table release benefits from care and attention.

BRUCE SPRINGSTEEN

The fact that this book measures around 30 x 22cm, give or take, spans under 200 pages and includes the word 'illustrated' in its title tells you that it is a classic coffee-table book biography. One to be browsed rather than read in an assiduous fashion.

Don't think I'm dismissing it either. There are a host of valuable nuggets for those who would like a potted history of the man and all his works. The casual Springsteen fan might want to take a gander. Quality of the images included is high, with plenty of images of Bruce doing Bruce type things in a wholly Brucey manner: Bruce looking smouldering, Bruce doing mid-air splits, Bruce looking...towards a distance horizon and Bruce taking a few notes.

There are a few gems here, the odd photo during rehearsals to an upcoming concert, scanned posters for the same, Bruce's school report, an acetate of his first recording and the like.

Again, the text is not to be dismissed. It reads like a good magazine feature article with plenty of pulled quotes, including political and social issues.

Not for hardcore fans perhaps but a book that serves as a good artist introduction.

FLEETWOOD MAC

Another coffee-table effort, of a similar size and page count, this one moves from the band's roots in the early sixties to 2015 and so has a lot to pack in within its comparatively limited page count.

Again, it's a book that reads like an extended article. It touches on the history of the band and does so competently. The highlights are the large images, especially from the band's early history. The concert poster scans, Peter Green playing in a TV studio wearing a white robe so voluminous it could be used as a tent

at the next Glastonbury, and some fascinating 7" sleeve scans.

What I like about this book are the pull-out album reviews, written by guest writers and spanning a couple of pages, set within the time period of the book at that moment. Useful for the beginner.

Once more, ideal for the casual Mac fan or one looking for a bit of a crash course on the band.

BILLY F GIBBONS

Resplendent in a deep orange, in an embossed folio sleeve, this tome is split into three sections. The first is potted biography.

But look, that's not why we're really here. Not in this book because, of the 224 pages you will see here, only around sixty are devoted to the ZZ Top man's biography. Yet, this section is packed with fascinating information that says a lot in a short space. You'll also find images galore here showing historical images, action shots, poster and ticket stub scans and even an old contract scan.

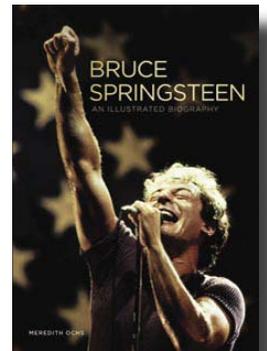
The point of the book follows soon after – the sections on the cars and the guitars. Both are Gibbons' passions.

The cars are all custom builds, pushing vintage designs to the extreme. Everything from a Cadillac '61, a '32 Highboy Roadstar and a V8-powered Mexican Blackbird. There's talk from the men behind the tech plus lots of brief car descriptions dripping with colloquial language of the era. Cars are "whacked to the max", paint is "squirted" onto the chassis while metalwork is "sliced and diced". The visual results are striking.

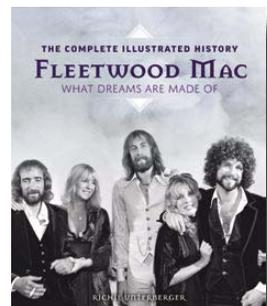
The guitars are no different: big, bold with lots of colourful images plus extended captions of equally impressive guitars.

Another coffee table release but this one dives deep into Gibbons' personal passions.

Title: Bruce Springsteen, An Illustrated Biography
Author: Meredith Ochs
Publisher: Chartwell
Price: £19.99
Pages: 184



Title: The Complete Illustrated History; Fleetwood Mac; What Dreams are Made Of
Author: Ritchie Unterberger
Publisher: Crestline
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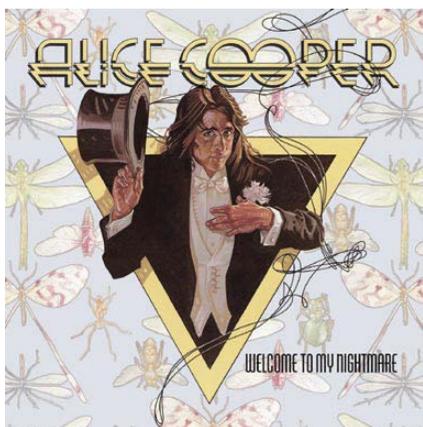
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ALICE COOPER

WELCOME TO MY NIGHTMARE ATLANTIC



"It used to be if I cut my head off on stage in 1970 there was nothing to compare that to"

Back in 1973, proto-punk glam band the New York Dolls appeared on the cult UK, music TV programme 'The Old Grey Whistle Test'. It appeared late at night, when no-one was watching, on the BBC's backstreet TV channel of the time, BBC2.

After their performance of the song 'Jet Boy' Whistle Test presenter Bob Harris reportedly dismissed the song, the performance and the band with the smiling two-word conclusion "Mock rock" (the band's love of women's clothes, surely should be tagged 'Frock Rock').

I didn't see Harris' label as a negative. I thought it summed up the New York Dolls very nicely. The group was satirical in many ways. They mocked society with glee. Others didn't see Harris' comment quite in that way.

Ranging from 1971 to, oddly enough, 1973 the band Alice Cooper had hit upon a music formula of their own that would also get them noticed and labelled. Unlike the New York Dolls, that didn't mean covering themselves in lady's clothes although make-up did play a part.

Alice Cooper found another way to create mayhem and trigger revulsion, outrage and offence from the general public. Apart from their very appearance and stage moves, there were the theatrics. The fake blood. The fake hangings. The electric chairs. The odd live reptile (I'm not talking about any of the band members here).

Cooper's view of Anita Pallenberg as the Great Tyrant in the 1968 film 'Barbarella' changed everything. She wore long black leather gloves with switchblade accessories. Cooper thought "Alice should look like that. That and a little bit of Emma Peel, in The Avengers".

Accompanying that lot was a dirt-laden hard rock smeared all over 1971's 'Killer' to 1973's 'Billion Dollar Babies'.

The fans loved the band, the music, the theatrics and the public reaction. The New York Dolls were Mock Rock. Alice Cooper was Shock Rock. An epithet well earned.

Nevertheless, Shock Rock became Tick Tick Rock because, in 1973, time became the enemy as the band became the man. The Alice Cooper band was rent asunder. The split meant that Vincent Furnier took the role of the reincarnated witch of the group's

legend. Sailing towards the horizon, not on a broomstick but on a Fender guitar.

Furnier's first solo outing was this, 'Welcome to my Nightmare', an eleven track outing. A concept piece of sorts, following the child who would become Steven the killer narrated, with the aid of producer Bob Ezrin, by the one and only Vincent Price.

Cooper lionised Bob Ezrin: "He hears things other people don't hear and seems to know exactly how to orchestrate things in a way you don't get with other producers" he said.

The album was recorded at Toronto's Soundstage and New York's Electric Lady and A&R Studios between 1974 and 1975. Although the eventual LP appeared on the Atlantic label in the USA, Canada and Mexico, it actually turned up in the UK, Europe and Australia on the Anchor label.

In many ways, the Jim Morrison-esque, breezy yet sinister introduction from the title track provides a contrast to the overall darker theme of the LP as a whole.

The track 'Only Women Bleed' is tremendously affecting. Maybe more now than when it was originally released. It's tale of domestic violence offering a disturbing contrast with the orchestral arrangement and melodicism. Sinister but less theatrical.

What was theatrical and wholly Alice is 'Cold Ethyl', a jolly tale of frozen necrophilia. "One thing, no lie/Ethyl's frigid as an Eskimo Pie/She's cool in bed/And she ought to be... 'cause Ethyl's dead".

Ahh, Alice. He's on scandalous form with this one. The slashing guitars and rasping vocals take Alice into his comfortable hard rock territory.

Cooper might not be 'shocking' his audiences in quite the same way these days. "It's impossible to shock an audience" said Cooper recently. "We stopped shocking audiences when CNN came out. It used to be if I cut my head off on stage in 1970 there was nothing to compare that to. Now you turn to CNN and someone's really getting his head cut off by a terrorist or somebody's really getting hung".

Mastering is excellent. Wide soundstage, lots of detail and clarity plus a vintage 70s sheen of tape hiss. Lovely.

You can relive that original nightmare via a newly released issue of the album, available on clear vinyl and out now. **PR**



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