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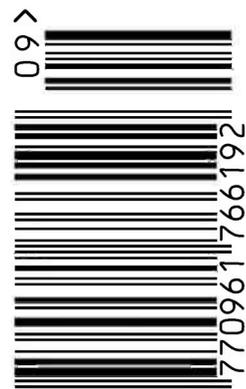
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# welcome

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Rafael Todes, Mark Osborn



Hmmm...streaming. It is the next big thing and taking off we are being told. Downloading is now yesterday; forget iTunes and all else, we are now talking Spotify, Tidal, Apple Music and Qobuz. Not everyone is happy in the music business because from this the artists make little, whilst the delivery company coins it, or so it is being said.

Funny that few in audio have realised that streaming is what the music business has long wanted, irrespective of this little spat, and it is what listeners

have long resisted. With streaming you don't 'own' the music, you pay to hear it – then it's gone. Music collection? A thing of the past, an anachronism. No shelves heaving with the weight of LPs or silver discs to use as beer mats. Nothing, Nada.

Physical media arrived around 1887 when Edison wound up his gramophone and is ending right now as the CD fades away.

Downloads were always a bit tenuous; you had 'em and you knew you had 'em, but where – and on which disc drive, memory stick or whatever? Like most people I suspect, I have vast picture, video and music libraries, but they are 'dispersed' shall I say! But at least I have 'em – somewhere.

Streaming 'frees us' of all this. Someone else stores the music for you and sends it upon request. You own nothing. It is how software vendors like Adobe see their future, except that Adobe have a rather more ambitious fee scale than most. This may be a lesson for us, a future reality.

I'm sort-of surprised by all this. The free model of Spotify has sneaked this new consumption model past the listening public without complaint and, for the time being at least streaming is tomorrow, downloading yesterday. Pay-per-listen is creeping up on us it seems and physical media may finally cease to exist. Will this really happen? Will artists benefit and music regain the value it was once accorded – a potential benefit? Or will music become like candy floss on Brighton pier, a trivial and fleeting experience?

Whatever happens, Onkyo's super value C-N7050 streamer is one way of entering this world, which is why Jon Myles was keen to include it in our budget system feature this month. So go to page 74 to learn more and how you can start streaming too.

**Noel Keywood**  
**Editor**



## hi-fi world

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## verdicts

●●●●●	<b>OUTSTANDING</b>
●●●●	<b>EXCELLENT</b>
●●●	<b>GOOD</b>
●●	<b>MEDIOCRE</b>
●	<b>POOR</b>
£	<b>VALUE</b>

amongst the best  
extremely capable  
worth auditioning  
unremarkable  
flawed  
keenly priced

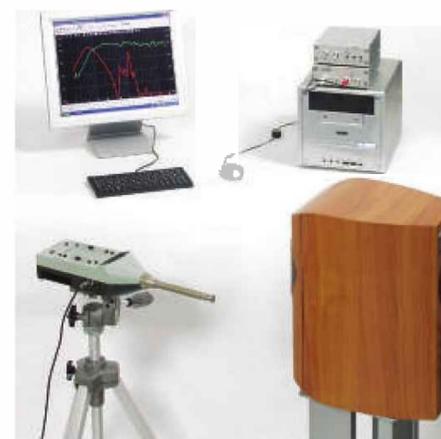
## testing (see [www.hifiworld.co.uk](http://www.hifiworld.co.uk) for full explanations of all our tests)

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.



## ELECTRONIC MAGAZINE

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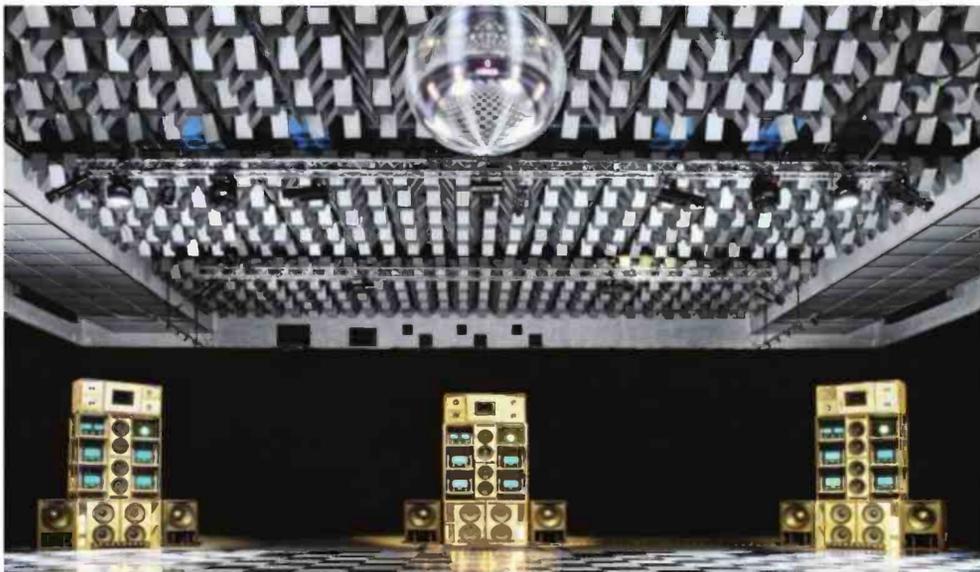
# news

## MCINTOSH'S 80,000W DESPACIO CLUB SYSTEM

McIntosh laboratory's Despacio, the sound system conceived by James Murphy (LCD Soundsystem) and Belgian artists TooManyDJs, is now touring. Personally designed by James Murphy and renowned recording engineer John Klett, with help from McIntosh Laboratory and Jordan Acoustics, this sound system can still be heard at the Electric Picnic (Ireland, 4- 6 September) festival. Despacio ('slowly' in Spanish) is a live vinyl-only event played using eight 3.35m McIntosh speaker/amplification towers.

The McIntosh-powered 'stacks' each house five amplifiers and a drive unit array in a custom cabinet, each stack providing 5,700 Watts with the entire system totaling 77,600 Watts.

Call 01202 911886 or go to [www.mcintoshlabs.com](http://www.mcintoshlabs.com) for more information.



## PRO-JECT ESSENTIAL II DIGITAL & SPOTIFY CONNECT

The Essential II DIGITAL aims to be the first hi-fi specified turntable that can be connected out-of-the-box to any modern home entertainment system. The brand new internal phono stage gives customers the option between an analogue Line Level output or a 24bit/96kHz digital optical output.

The analogue portion of the output stage uses a phono stage based upon Project's Phono Box design. The Line output allows for connection to any line-level (Auxiliary) input. The 24bit/96kHz optical output uses an analogue-to-digital converter (ADC) to send a signal to your digital hub. Price is just £309.

Project has also announced a firmware update enabling Spotify Connect on all Stream Box models. It is available as a free download. Additionally, a new control app version for Android and Apple will be released. The update allows Spotify Premium subscribers to stream over 30 million tracks from the Spotify smartphone and tablet application to their Stream Box.

Spotify Connect also allows users to make calls or use other apps without interrupting playback, since the technology is built into Stream Box components.

Call  
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or go to [www.henleydesigns.co.uk](http://www.henleydesigns.co.uk) for more information.



## SPENDOR A5R

The new Spendor A5R is a 2.5 way, floorstanding loudspeaker using its Dline technology to create a pair of Spendor drivers which are mechanically and electrically designed to work together in a single, sealed acoustic enclosure. Both drivers feature a cast magnesium alloy chassis and high efficiency motor, with optimised electro dynamic damping. A 15cm EP77 polymer coned bass/mid driver handles all the midrange frequencies and most of the low frequencies. As the low frequency content of the music increases, a two-part bonded Kevlar composite cone 15cm driver begins to handle more of the low frequencies. It does not require any form of tuned port or line.

High frequencies are handled by a 22mm wide surround tweeter with a polyamide textile diaphragm. Its acoustic output is phase and time aligned with the midbass driver.

The Spendor A5R is available in light oak, dark walnut, cherry, black ash veneer and satin white lacquer. The plinth is a complementary satin black lacquer.

Spendor A5R UK retail price is £1,995 per pair for veneer finishes and £2,195 for satin white lacquer finish.

See [www.spendoraudio.com](http://www.spendoraudio.com) or call 01323 843474 for more information.

## ONKYO A/V RECEIVERS & SPEAKER SYSTEM



Onkyo has announced two Dolby Atmos-enabled and DTS:X-ready 7.2-channel network A/V receivers: TX-RZ900 and TX-RZ800. The TX-RZ900 employs a hand-wound, high-current toroidal transformer (TX-RZ800 features a EI transformer) to power original three-stage, inverted Darlington amplifier circuitry.

Both products feature separate power amp and processing blocks, the latter featuring a Hi-Grade Asahi Kasei AK4458 32bit/384 kHz DAC and Onkyo's original VLSC technology. The THX Select 2 Plus-certified receivers include 4K/60Hz and 4:4:4-colour-space-ready HDMI inputs and two 4K/60Hz HDMI outputs for dual-zone video.

The Onkyo LS3200 Speaker System is a 2.1-channel audio package comprising a slim amplifier/control unit, two front speakers with mount stands and a wireless powered subwoofer. The system features a 20W digital amplifier, two pairs of 65mm, full-range drivers and a 50W down-firing subwoofer.

Prices? TX-RZ900 7.2 channel A/V receiver (5.1.2) is £1350; TX-RX800 7.2 channel A/V receiver (5.1.2) is £1050 and LS3200 2.1 channel speaker system is £350.

See [www.uk.onkyo.com](http://www.uk.onkyo.com) or call 08712 001996 for more information.



## ENTOTEM PLATO

A media server with 2TB capacity and run from Android, Plato is app controlled and able to rip vinyl, CDs and tapes. Vinyl can be played by connecting your existing deck to Plato, which records it to 24bit/192kHz files, the latter are integrated with Gracenote. Hence, your music can be accessed as the track/album artwork is displayed on the front screen either when a track is playing or during a search.

Plato can also store DVD/film formats (converted on a PC first and then transferred by USB to Plato) which can then be played through a TV using a direct HDMI connection.

Streaming over the internet is available (e.g. internet radio and Spotify) and you can also access YouTube music videos and view or listen through your TV, tablet or mobile.

Plato can also integrate with other systems, such as Sonos. Price is £3,600.

Go to [www.entotem.com](http://www.entotem.com) or call 01332 291972 for more information.



## GENEVA'S AEROSPHERE

From table-top or optional stand, the AeroSphère Large wireless active stereo speaker system features a domed cabinet, which measures 40cm across. It houses two 25mm tweeters, two 102mm woofers and an up-firing 152mm subwoofer, arranged within three separate acoustic chambers and powered by dedicated amplifiers.

Designed for shelf or an optional stand, AeroSphère Small is a wireless active mono speaker with DSP soundstage enhancement, which can be paired to operate in stereo through the AeroSphère App.

Having the form factor of its larger range-mate, but approximately half the size, AeroSphère Small comprises a 25mm tweeter and 102mm woofer individually chambered and driven by DSP controlled amplifiers. Both AeroSphère speakers offer a stereo mini-jack line input for local analogue audio sources.



An app for iPhone and Android is supported by an all-aluminium remote handset while LED indicators illuminate the Geneva logo on each AeroSphère speaker, changing its colour to indicate source and status.

Prices are: AeroSphère Small - £349, AeroSphère Large - £649, dedicated floor stands - £149. Click [www.genevalab.com](http://www.genevalab.com) or call 0843 5236344.



## MAGICO S7

Magico, has announced a new addition to the S-Series line - the S7. It's a full range, three-way floostanding loudspeaker that incorporates a new tweeter, midrange and bass driver designs which are derived from the M- Project loudspeaker.

The acoustic suspension enclosure of the S7 features curved aluminium side panels, machined in-house from half-inch thick aluminium extrusions which are 406mm in diameter.

The S7 houses three new 254mm bass drivers. The excursion rate of the voice coil is measured at 15mm linear movement. The midrange driver (152mm) cone material is formulated using Arkem a multi-wall carbon nanotube and XG Sciences C-750 Nanographene which combined is 20% lighter and 300% stiffer than previous cone material designs.

A new 25mm tweeter features a diamond-coated beryllium diaphragm with optimised geometry.

All five drivers in the S7 are acoustically integrated using Magico's Elliptical Symmetry Crossover topology that includes components from Mundorf of Germany.

Go to [www.magico.net](http://www.magico.net) for more information.

## NEW HIGH-END AVR FROM YAMAHA

The new RX-A550 sits below the RX-A850 in the AVENTAGE line-up but doesn't replace anything else within the AVR range. The RX-A550 includes the latest HDCP, 4k video support, Bluetooth and Wi-Fi on board and features a full aluminium housing. It also features 5-channel discrete amplification and a specific UK tuning to this model. The rest of the range will be updated to the RX-A850, RX-A1050, RX-A2050 and RX-A3050 - replacing their respective models from last year. All models from RX-A850 and above will include HDCP 2.2, Bluetooth and WiFi on board, support for the full 4k colour space of 4:4:4, Dolby Atmos, DTS:X and RS-232 for custom install integration and a new Subwoofer EQ.

The company is using ESS SABRE DACs in the RX-A1050 and above, with the ES9006 being used on the RX-A1050, two ES9006 DACs on the RX-A2050 and an ES9016 and ES9006 DAC on the RX-A3050. Combined with these is the new Polymer multi-layer capacitors, developed with Rohm technologies in association with Yamaha. There's a new jitter clock in AVENTAGE for 2015, specifically focusing on network, Bluetooth and USB playback. There's also a new volume IC built into the AV receiver range.

Go to [uk.yamaha.com](http://uk.yamaha.com) for more information



## QUADRAL CHROMIUM STYLE

A new speaker range from Quadral consists of four products: the Style 8 floorstander, Style 6 floorstander, Style 2 bookshelf and Style 1 centre speaker. This new range includes a ribbon tweeter with an aluminium membrane, neodymium magnets and a transducer with a sintered, high current ferrite core, 155mm woofer and a high gloss varnish of black or white.

The designs are finished off with gold plated stereo connection terminals and covers are held securely by magnets.

Prices for the Style 8 are £1,750 a pair, the Style 6 is £1,395, Style 2 is £795 plus £495 for the centre speaker. Go to [www.nunudistribution.co.uk](http://www.nunudistribution.co.uk) or call 0203 5442338 for more information.



## ROTH WELCOME MATTE

Roth Audio has announced two new finishes for its OLi POWA-5. The Bluetooth aptX-equipped powered stereo speaker system is now available in matte black and matte grey, complementing the existing black and white high-gloss options. Price is £249 per pair.

See [www.rothaudio.co.uk](http://www.rothaudio.co.uk) or call 01753 682782 for more information.



## COWIN BLUETOOTH SPEAKER

Cowin has launched a two-piece Bluetooth speaker, combining a detachable mini soundbar and subwoofer base station. The dual parts can be connected into a single speaker unit using unique Magnatec technology or alternatively positioned separately while still working in unison. The compact and lightweight soundbar includes two speakers and two passive radiators, which can also be used independently as a standalone, portable speaker. With a battery life of up to eight hours and a range of up to twenty metres, it pairs with any Bluetooth device. Then to wirelessly recharge the lithium battery, place the speaker on the base unit.

The speaker will remember a mobile media device so they auto-connect when in range, while an initial pairing can be made with an NFC touch-and-pair feature. The base station also offers wireless charging for compatible devices. Available for £150 from [www.cowinmusic.com](http://www.cowinmusic.com).



## ETYMOTIC RESEARCH

Etymotic earphones are designed to be inserted inside the actual ear canal, creating an airtight seal.

The HF series include a Accu Driver delivering matched, balanced armature drivers. Price is £95 for the HF5 or £105 for the HF3 with an iPhone/iPad-friendly remote and mic support.

The ER4S earphones were designed to compensate for the, "high frequency emphasis in CD recordings" said the company. ER4S earphones can be used with a headphone amplifier when using low power portable devices.

The ER4PT earphones are intended for sound engineers and audiophiles in constant motion and come equipped with extra accessories and adapters. The ER4PT has 10dB greater output at high frequencies and 13dB greater output at low frequencies. Price for both models is £200 each.

Click on [www.etymoticdirect.co.uk](http://www.etymoticdirect.co.uk) or [www.just4ears.co.uk](http://www.just4ears.co.uk) for more information.



# Tasty Table

**EAT's new mid-priced C-Sharp turntable and C-Note arm offers a great-sounding, thoroughly well-designed vinyl disc spinner for not a lot of money, says Paul Rigby .**

**B**ased in Prague in the Czech Republic, EAT is in the fortunate position of owning and sharing a factory with turntable giant Pro-Ject (EAT boss Jozefina Lichtenegger, is married to Pro-Ject's founder Heinz Lichtenegger). All EAT turntable

are normally much more skilled".

The external power block trails a bell wire to a plug. Lichtenegger was unable to fully describe the nature of the power supply but it seems to be of a 'Never Connected' type. It

collectable was used though" quipped Lichtenegger. The platter sits on top of a belt-holding sub-platter and both are constructed from an aluminium/magnesium alloy sitting on a bronze bearing.



parts are made on site, which keeps costs down. Jozefina Lichtenegger was keen to emphasise, though, that EAT is a wholly separate company and, apart from a few screws, shares nothing with Pro-Ject. In fact, the sixth floor of the factory is wholly EAT which includes its own infrastructure, staff and designers.

Addressing the turntable, Lichtenegger first discussed the C-Note arm. "It's a hybrid Cardan/unipivot made from carbon fibre with copper internal cable" she said. "You can change the azimuth and VTA with adjustable locking nuts. It comes with a silicon damping liquid plus a lightweight, aluminium headshell".

The anti-skating compensator uses a nylon thread and must be passed around the back of the housing to hook onto a small peg on its outer side. This can be fiddly but Lichtenegger disagreed "It shouldn't be difficult unless you have big fingers! I'm a woman so I find it easy. You can maybe ask your wife to help for that part of the set-up. Women

holds the speed changer buttons (33.33rpm and 45rpm) plus a 'standby' button. The selected button's light flashes until the required speed is met whereupon the flashing light becomes a steady emitter.

The low-profile deck itself holds a large 340mm diameter platter which EAT sees as an alternative to thick, small diameter platters. "With our platter, more mass is actually moving while the actual weight of the turntable is kept low" said Lichtenegger.

On top of the platter is a fixed (recycled) vinyl mat. "Nothing

The motor is fixed in a lower plinth, separated from the tonearm and bearing by a suspended chassis. "They're constructed by a sandwich of carbon fibre

and MDF. The suspension features a series of seven conical thermo-plastic elastomer pieces to remove vibration" said Lichtenegger. "They are far superior to Sorbothane".

Produced by Ortofon, the elastomers were available in much wider, more customised densities. EAT also found that this elastomer was far more stable than Sorbothane, which changed its inherent properties over time.

So, let's put the C-Sharp into perspective. If EAT can produce a turntable at a cheaper cost because it owns the factory, how does that equate to a competing manufacturer who does not and must out-source more expensive parts? How much should this C-Sharp turntable

actually cost? "Probably around £4,000" said Lichtenegger. Which puts this

£2,500 turntable into some sort of perspective.

### SOUND QUALITY

I began the sound test without the use of the supplied clamp to judge the sound quality of the basic deck and then to see how the clamp altered the final sonic signature.

Spinning an instrumental piano rendition of 'You'll Never Walk Alone' from Nina Simone with a cello accompaniment and minor secondary cymbal percussion, this complex rendition is adorned with frills and rolls that threaten to bloom and invade the cello space.

Yet, from the first few bars of this music, I was impressed by the solidity and maturity of the EAT's output. This turntable is obviously the result of some considered design tenets because there is a focus here which breeds confidence in the listener.

Tonally, the piano was appealing and remained



*The C-Note arm is a hybrid Cardan/unipivot design.*

top of the scale during the musical climax. Despite a touch of midrange dryness, the cello remained rhythmic while the brief burst of treble via the cymbal was calm and rich in tone.

For a more up tempo contrast, I turned to David Bowie and his 'Always Crashing In The Same Car' from his 1977 album 'Low'. Again, I was impressed with the low noise output on this track. It certainly benefitted the overall

presentation. Despite a touch of midrange dryness again that slightly restricted the air and dynamic extension, there was plenty of detail revealed by the

low

noise

rendition

such as the

shy rhythmic guitar

that sat underneath

the Bowie vocal. The EAT

easily targeted this instrument,

allowing my ear to make out the

often hidden performance. The lead

guitar, which has a tendency towards

stridency in more uncontrolled

turntables, not only exhibited tight

control but offered no hint of being

shouty or forward on the EAT. At

all times the guitar was incisive and

exacting. Percussion was also focused,

although it was not the meatiest that

I've ever heard. There was plenty of

zip and vibrancy, though.

Finally, the soundstage was both

full and wide, giving the music a real

epic nature while detail could be

heard at each extremity, doubtless

the result of the excellent arm

performance, as confirmed by our

so as Simone upped her game and became more energetic in her performance. The rise to the final crescendo excited many piano resonances. At this point, the entire performance could easily have become uncontrollable yet the EAT's low noise output helped to not only allow the ear to peek inbetween each note but also prevented the ultimate upper midrange hardening at the



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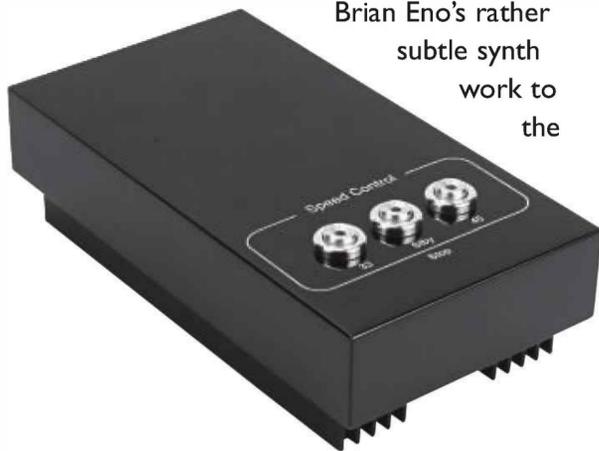
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technical tests.

It was at this stage that I decided to add the included clamp which I tightened onto the screw-threaded spindle.

Replaying the Bowie track, I noticed an immediate change in the upper midrange. The dry aspect was gone. It now offered a more open and airy nature, confirming that the clamp was a necessary part of the deck's design make-up. This allowed the vocal to sound breathy which enhanced the emotions during his delivery. It also pushed

Brian Eno's rather subtle synth work to the



The power supply also features the speed selector switches.

fore, giving it a little more prominence while the high-pitched percussive effects had a rounded tone that enhanced their character. There was a downside, though. Those same spacious upper mids also sounded slightly out of control, which ruined the previously admirable soundstage focus.

I confronted EAT boss Lichtenegger with this issue and she confirmed that the clamp was only to be tightened on the screw-threaded spindle during installation. During play, she instructed, the clamp was to be left sitting loosely on the record spindle. The advertised 'clamp', in use, is actually a stabiliser, therefore. In this configuration, the sound quality immediately improved. Focus was enhanced in the upper mids with a concurrent lowering of blurring. Yet, I felt that the C-Sharp was capable of more, so I removed the EAT clamp from the turntable.

I returned to Lichtenegger with my conclusions and she was refreshingly open about the EAT clamp/stabiliser's properties. "Yes, there are much better clamps on the market. We like to listen to you and our customers. This is how we progress".

This why I reached for the Oyaide STB-MS (£225) stabiliser instead. This design proved far superior, as it not only removed the

bloom and blurring but extended, further, air and space while keeping the focus intact. I highly recommend this unit if you intend to purchase an EAT C-Sharp as an immediate upgrade to replace the supplied EAT clamp/stabiliser.

With the Oyaide stabiliser in place I then moved to Ananda Shankar (son of Ravi) and his early seventies, self-titled production with a cover of the Rolling Stones' 'Jumpin' Jack Flash' on sitar!

I was impressed with the EAT's soundstage structure on this track which was layered in a 3D fashion around the central stereo image with extensions to the left and right. This pressing can be dangerously strident if not carefully controlled. I found the EAT performed this feat with ease, grabbing the track by the throat and forcing the oft forward upper mid-sounding female backing singers to remain calm and collected while percussion was self-assured without being hefty.

Moving onto the next track on the LP, 'Snow Flower', it was quite startling to hear the wide soundstage again. Secondary percussion displayed admirable clarity while bass provided a characterful presentation that added a secure foundation to the entire track.



The belt-holding sub-platter is turned from an aluminium/magnesium alloy.

### CONCLUSION

The C-Sharp displays incredible value for money with its low noise output and controlled sonics that are both well-focused and mature in nature with an incisive and detailed presentation.

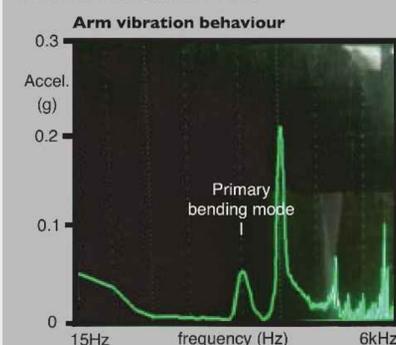
### REFERENCE SYSTEM

- Wilson Benesch Full Circle turntable
- 0.5 carbon fibre arm
- Oyaide STB-MS stabiliser
- Icon PS3 Phono amplifier
- Benz Glider cartridge
- Icon MB845 Mk.II monoblocks
- Aesthetix Calypso Pre-amp
- Quad ESL-57 One Thing modified speakers
- Tellurium Q speaker/phono cables
- Vertex AQ mains cables and power blocks

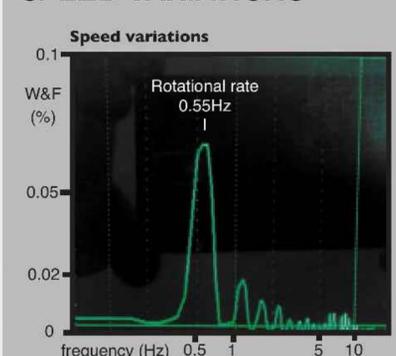
### MEASURED PERFORMANCE

The EAT C-Sharp ran at almost correct speed, its error of +0.1% being inconsequentially small. Speed varied little around nominal too, suggesting a low Wow figure. This promise wasn't quite delivered, basic rate Wow at 0.55Hz (33rpm) was still in there, measuring

#### ARM VIBRATION



#### SPEED VARIATIONS



0.13% – a well constrained level – as our Speed Variation analysis shows this. The C-Sharp will not sound rock steady, but it will sound stable and free of obvious time-domain slur. The DIN weighted Wow and Flutter figure was low at 0.09%.

The carbon fibre arm was unusually well damped, with no sign of a first order bending mode around 200Hz – unusual. It is also stiff, the first visible bending mode being at a high 500Hz.

Our accelerometer shows a spike at 1kHz but this is narrow and encompasses little energy. The head shell is also very quiet mechanically. The arm will give good stereo separation, especially across the lower midband on drums and larger percussion.

The C-Sharp turntable measures well and its arm looks superb: good sound quality is assured. **NK**

<b>Speed accuracy</b>	<b>+0.1%</b>
<b>Wow</b>	<b>0.13%</b>
<b>Flutter</b>	<b>0.05%</b>
<b>Total W&amp;F weighted</b>	<b>0.09%</b>

**EAT C-SHARP/C-NOTE £2,500**



**OUTSTANDING - amongst the best**

**VALUE - keenly priced**

#### VERDICT

Plenty of detail on offer which is enhanced by a broad and organised soundstage.

#### FOR

- clarity
- soundstage
- low noise
- arm performance

#### AGAINST

- fiddly anti-skating set-up
- 'clamp'

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# Special K

Jon Myles takes a listen to the new Epos K3 floorstander – and comes away more than happy.

**S**ome loudspeaker designers aim for absolute sonic accuracy in their products. Others look for extended treble or room-shaking bass. For Epos head man Luke Creek the aim of the company's new K series was simple: make them fun to listen to.

He certainly hit the mark with the K1 that I reviewed earlier this year – a loudspeaker I reckoned couldn't help but put a smile on your face.

But the K1 is a relatively small standmount with the accompanying limitations in outright bass extension and sound pressure levels. So what if you are looking for something a little heftier to drive a larger room? Enter the new K3 floorstander – the flagship of the range.



Despite being the largest of the K range it's still relatively modest in size – standing some 933mm high with a 212mm width and 300mm depth.

Mid and bass duties are handled by two 187mm polypropylene drivers above which sits a 25mm soft dome tweeter housed in a short-horn faceplate which is said to reduce refraction distortion and give a more even on-axis response. It's a two-and-a-half way design with the two main drivers acting together in the lower registers before the bottom unit rolls off at the mid-range.

Epos has also gone back to its roots by simplifying the crossover from the one used in their previous Epic and Elan series loudspeakers. As such the tweeter uses a first order crossover while the mid/bass has a second order filter which the company says makes it an easier load for amplifiers.

Beneath the drivers lies a long but narrow high-velocity slot port designed to give a smoother and less turbulent flow and so avoid the 'chuffing' of some cylinder ports.

All the drivers are flush mounted to the fascia with no obvious fittings, giving the K3 a smooth, uncluttered look. In fact, it's so uncluttered there's not even a logo on show!

Round the back, however, things look a little more – well, prosaic. That's because in contrast to the smooth lines of the front the two rear panels are clamped on by a number of recessed screws. It seems strange at first but there's logic at work.

Firstly, Epos says making the top half of the rear baffle a separate element of the cabinet helps reduce energy absorption and so reduces colouration and undue resonance.

Secondly, the K3 (in common with all of the series) is designed to be upgradeable. Coming soon is an amplifier unit from Epos's sister company Creek Audio which will turn the K3s into active loudspeakers, as well as adding a DAC, USB input and Bluetooth receiver. So, unbolt the lower panel, fit the new module and suddenly the K3s become the heart of your hi-fi system – needing just a source.

It's a clever idea which means any buyer of the K3s has a clearly defined upgrade path if they want it.

## SOUND QUALITY

All the ingredients that made the K1s so enjoyable are present in the



*The forthcoming Active-K module will allow users to upgrade their K3s, turning them into active loudspeakers by unbolting the bottom panel and slotting in an amplifier. It will come from Epos's sister company Creek Audio, and a DAC, USB input and Bluetooth receiver will be available too. Users will then be able to play any source through the K3s. Expect to see the new Active-K upgrade later this year – prices are to be announced.*

"there was soundstage aplenty; images hung in the air left and right of the loudspeakers and there was a strong sense of depth to the music"

K3s – but with added authority. They are fast, rhythmic and tremendously communicative, but have more depth and assurance about them.

The polypropylene mid/bass drivers and soft dome tweeter combine to give a sound that isn't hard-edged and bright but slightly warm yet not without detail and attack.

When I put on 'This Is The One' by The Stone Roses the K3s tracked

it brilliantly. There was no sibilance from Ian Brown's vocals, the leading edge of John Squire's guitar was clear cut and when things moved up apace at the end of the track, the K3s pushed it out with all the power it deserved.

Crucially, they don't over-egg anything. The bass isn't inflated, the treble isn't over-extended and the mid-band is smooth without being bland.

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"There is a bounce and vibrancy about them that does, undoubtedly, come back to the design ethos of making music fun"

There is also a bounce and vibrancy about them that does, undoubtedly, come back to the design ethos of making music fun.

On Echo And The Bunnyman's 'With A Hip' the K3s locked onto the rhythm with an innate sense of timing. They pushed it forward slightly in terms of tempo but not at the expense of losing any of the darkness of the track. That's not always an easy balance to pull off and many other loudspeakers at this price don't manage it.

The K3s do not, however, have quite the treble bite that a metal-domed tweeter or ribbon equipped loudspeaker will give you. Point them straight down the room and the treble is very smooth. Toe them in a little and they sound a bit sharper – but, as ever, experimentation in your own room and to your own tastes is the key.

Nor do they dig excessively deep into the lower registers. Yes, they'll go down to around 30Hz but they won't

give you wall-shaking sub-sonics (see Measured Performance for full details).

Instead they are treading the middle ground between the two and doing it with considerable aplomb.

For evidence, I plugged the K3s into a McIntosh MC152 power amplifier which, at £4995, wouldn't usually get matched with such loudspeakers and settled upon 'Fanfare For The Common Man' as a real test of their abilities. From the first kettle drum strike, to the final trumpet fanfare and then the fade I was totally captivated. The K3s didn't just relay the music they took hold of it and made it resonate.

Here there was soundstage aplenty; images hung in the air left and right of the loudspeakers and there was a strong sense of depth to the music. So much so that it became



**The 25mm soft dome tweeter is housed in its own short-horn faceplate which is said to reduce refraction distortion and give a more even on-axis response.**

completely immersive – I closed my eyes and loved listening; the K3s are lively and engaging.

## CONCLUSION

Epos have hit the mark with this loudspeaker. It is tuneful, rhythmic and totally captivating. What it lacks in pure frequency extension – which isn't that much at its price – it makes up for in sheer verve and the ability to draw you into the music. Add to that the fact that there's an upgrade path coming shortly to enable active operation and you are looking at one of the best £1400 loudspeakers on the market at present.

## MEASURED PERFORMANCE

Our frequency response analysis of the K3 shows a basically flat characteristic, albeit with a +2dB plateau lift of output below 500Hz, enough to give the sound an obvious sense of body.

Treble extends smoothly to 16kHz before rolling away, with a valuable absence of peaking, suggesting very smooth treble quality. On-axis treble peaks up a little; our response is off-axis (30 degrees) and shows the K3 becomes flat when directed straight down a room, rather than being toed in toward listeners.

Below 100Hz bass level is well maintained right down to 40Hz, the port contributing to extend this down to 30Hz (red trace). Bass will be strong and will run deep, but sub-sonics are absent. This will keep the K3 sounding quite fast.

The narrow slow port imposes good acoustic damping, over a broad band

from 80Hz down to 30Hz, suggesting well damped bass. The impedance curve makes clear the port is tuned to 42Hz and covers a broad area, keeping the residual peaks either side low. With a d.c.r of 4 Ohms and an impedance of this value that extends to 600Hz the K3 draws current, but the plus side of this is that it is voltage-sensitive, producing a very loud 90.5dB from one nominal Watt (2.8V) of input. Amplifiers of 40W-60W will drive the K3 very loud easily and they do not need more power than this. Valve amps with a 4 Ohm tap and 40 Watts output will suit.

The K3 is a good all-rounder. It has strong deep bass, an extended response with peak-free treble. There's no crossover dip to soften detail, so detailing will be strong. Acoustic damping is good and power requirement low. **NK**

### FREQUENCY RESPONSE



**Green - driver output  
Red - port output**

### IMPEDANCE



### EPOS K3 £1399



**OUTSTANDING - amongst the best**

**VALUE - keenly priced**

#### VERDICT

A totally enjoyable loudspeaker which will suit any system. Portrays music with a real sense of fun.

#### FOR

- vibrancy
- nicely balanced
- smooth
- upgrade option

#### AGAINST

- not the most explicit treble

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# Box clever



**The new CD transport and DAC combination from Pro-Ject is quirky but musically-proficient, says Martin Pipe.**



**Annoyingly, separate remotes are supplied for the DAC and transport.**

**P**ro-Ject made its name with turntables - starting with the Czech-made Pro-Ject I, which shook up entry-level vinyl playback during the era when CD ruled the roost. Naturally, Pro-Ject was well-placed to take advantage of the format's revival. CD nevertheless represents the bulk of music listening for most people. And courtesy of its 'Box Design' operation the Austrian firm brings its values, style and engineering to a growing series of small but perfectly-formed components that also embrace digital audio.

Currently topping the extensive crop of Box Design gear is the RS ('Reference Series') range. CD

playback on this rung is taken care of by a distinctive two-box CD player that couples the separately-available CD Box RS (transport) and DAC Box RS (converter). Together, they'll cost you around £1700; Pro-Ject clearly wants its CD reference to be a relatively-affordable proposition. There's also a version of the DAC Box RS with on-board headphone amp (the Pre Box RS Digital); thanks to its volume control, this can drive power amps and active speakers directly.

Key features of the substantial (2kg) transport include the ability to play CD-ROMs containing 16/24-bit FLAC, WMA and MP3 tracks, Blue Tiger CD-100 internal signal-processing and an excellent

full-colour screen that will display CD-Text or MP3 tags. It's a top-loader, a precisely-fitting 'cooking-pot' lid being removed to gain access to the disc compartment. A CD is held in place by a detachable magnetic clamp. Yes, the CD Box RS has more quirky charm than a contemporary 'tray-loader'. Mislaid either the lid - which forms part of a safety interlock - or the clamp, though, and your disc transport becomes an expensive paperweight. There's no USB port for playing compatible files stored on memory sticks...

Sadly, the aforementioned screen lacks a 'touch' capability. The CD Box RS is instead controlled via the toggle-switches that are a Box Design's 'trademark', or the

diminutive handset – which won't drive the DAC! An even-smaller remote is needed for the latter, which boasts no fewer than eight inputs (among them AES/EBU, two coaxial, four optical and an XMOS-chipsetted asynchronous USB port with DSD-over-PCM capability), 24-bit/192kHz capability, a pair of venerable Burr-Brown PCM1792 DACs (one per channel, operating in differential mode), two switchable digital filters and a choice between valve and Class-A FET output stage. The (fixed) analogue output is available on phono sockets, and in balanced form on XLRs.

The presence of two valves – Russian-made Electro-Harmonix 6922 double-triodes – in a relatively-small box means that the DAC Box RS gets rather warm in use, certainly when compared to the transport.

Both transport and DAC follow the now-familiar Box Design 'house styling'. Place them side by side, and the result occupies roughly the same real-estate as a 'standard' CD player. The two are linked together with a proprietary 'Sonic2' connection – this is the DAC's second input. Sonic2 is Pro-Ject's proprietary take on the standard I2S 'data-and-clock' interface, intended to reduce jitter. In practical terms it consists of a BNC-terminated coaxial cable that carries the clock from the DAC to the transport, and a separate RJ45 lead that returns precisely-timed digital audio (in noise-rejecting differential form) from your disc. Behind the scenes, Sonic2 employs a technique called 'sonic scrambling', which is claimed to improve linearity and reduce distortion at low signal levels.

The CD Box RS does however give you a coaxial S/PDIF output, and for that matter an AES/EBU feed. Good news for anyone who might also want to simultaneously-feed their CD collection to an AV receiver, or another DAC. But Sonic2, which also upsamples CD audio by a factor of 4 to 176.4kHz, should give you the best results. Coupled with the overall design, you should thus be able to combine the flexibility of a separate



**Plenty of connectivity - including the DAC's provision for USB, AES-EBU and six consumer-standard digital sources. On top of this is Pro-Ject's proprietary link, with separate cabling for clock and digital audio.**

transport/DAC with (if you're prepared to overlook the handset issue) the integration of a single-box player. A 2x (88.2kHz) upsampling mode is available for the 'standard' digital outputs. These digital output modes are selected with a dedicated button on the remote. If you're using the Sonic2 link, but haven't selected the right setting you'll hear weak and phasey sound backed by an unpleasant rasping buzz. And if you lose the handset, you're stuck with whatever mode you've 'preset' the DAC to use!

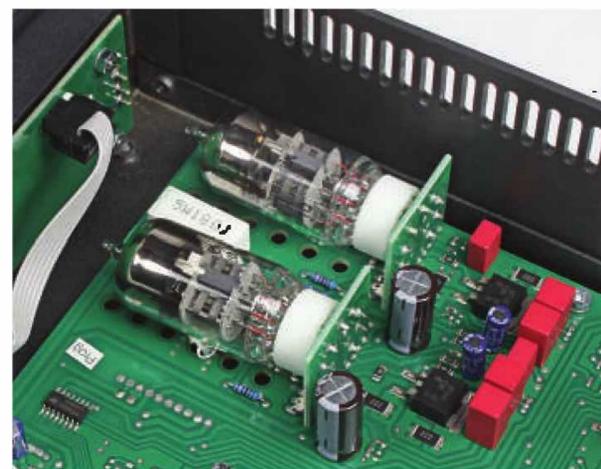
### SOUND QUALITY

The transport and DAC were interlinked with the supplied Sonic2 cabling, although a coaxial connection was employed for comparative purposes. The DAC's line output fed an Arcam FMJ-A49 integrated amp and Quadral Aurum Wotan VIII speakers. To try the DAC with DSD files (64 and 128 variants are supported, thanks in part to the PCM1792's ability to accept such streams) I pressed into service an Acer Revo One mini-PC running Windows 8.1. Pro-Ject's recommendation is to use the free Foobar 2000 player.

Let's start with CDs; Talking Heads' 'Remain in Light' was first into the 'pot'. 'Born Under Punches (The Heat Goes On)' is dominated by Chris Frantz's African-influenced complex polyrhythms and Tina Weymouth's basswork. And this

player was well up to the challenge; the former is bestowed with deftly-timed propulsion while the latter gets tautness and depth. The two positions of the digital filter made little difference here, but switching between tubes and solid state made noticeable changes.

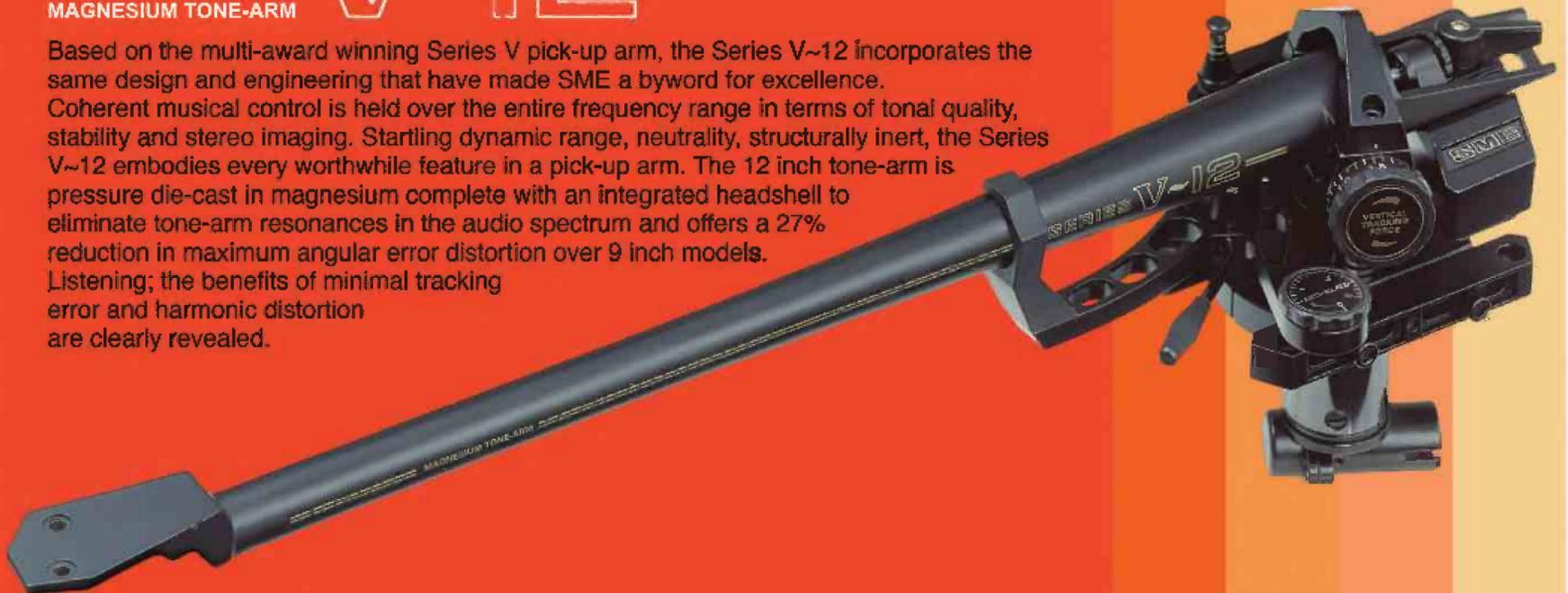
With FETs in the signal path, the character is noticeably more forward – the drumkit's snares, for example, become prominent. Switching to valves, and the bassline is bestowed with an extra degree of smoothness and warmth. I found that these differences enable the combo to be 'matched' to different music and recordings. The Beatles' 'Sergeant Pepper' and Black Sabbath's 'Paranoid' albums, for example, were made that little bit more enjoyable when heard through valves. On the other hand, the icy top-end percussion of



**Here's what gives the DAC Box RS its 'valve sound' – a pair of Russian-made Electro-Harmonix 6922 double-triodes.**

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contemporary electronic and dance music was better-suited to the solid-state setting.

Hi-res FLACs (up to 24/96) of vinyl rips stored on CD-Rs fared well too. It's great to have such a function for occasions like parties. My 24/96 FLAC 'rip' of Miles Davis' 'Kind of Blue' was heard with a presence and depth that was hard to distinguish from the original Columbia vinyl LP. There was no discernible change in balance or presentation when the same file was played out via the computer.

However, the PC route allows you to audition the DSD files that are another route into the wonderful world of hi-res audio. A good thing, as the transport ignores any such content on CD-Rs (only compatible files can be selected for playback). Try to play a SACD, and all you'll hear is the 'compatible' CD (i.e. 16-bit/44.1kHz 'Red Book') layer. Thanks to the wonders of DSD-over-PCM I was able to listen to my DSD64 files of the AUN J Classic Orchestra's 'Hachi-nin no Hibiki (Eight People's Sounds)', a collection of pieces composed, and played on traditional Japanese instruments.

The subtle tonal characters of instruments here were individually-conveyed with precision, insight and finely-etched detail. Yet these definable elements all also came



**The DAC Box RS' neat internals, revealing its 'motherboard/daughterboard' construction. The USB interface and the PCM1792 DACs account for two of these daughterboards.**

together as a cohesive and beautiful musical whole.

### CONCLUSION

The idea of a disc transport and DAC might sound rather anachronistic these days, but the CD Box RS and DAC Box RS enable you to maximise enjoyment of your existing

CD collection while providing a route to hi-res audio via disc or computer. You even get the chance to add a hint of the 'tube sound' to an otherwise solid-state playback chain! There are some minor flaws – but they don't detract from the music making of this combo, making it an extremely tempting proposition I feel.

## MEASURED PERFORMANCE

The DAC Box RS accepts up to 192kHz sample rate through its electrical S/PDIF inputs, both phono socket and AES/EBU balanced XLR, but the optical input worked to 96kHz maximum, an unfortunate limitation usually imposed by the optical receiver used. USB worked to 384kHz sample rate. All the same, analogue frequency response is curtailed hard at 20kHz our frequency response analysis shows. The rate of roll off is steep, a function of deliberate filtering and selecting Filter 1 or 2 made no difference – a bit surprising. Nor did the Transistor/Tube option have any affect; the filtering lies ahead of the output stages, in the digital section. This will ensure the DAC Box RS has a uniformly 'easy' sound, irrespective of switched selections, but absence of an extended response option does deny this unit any possible benefit of wide analogue bandwidth.

Distortion and noise were low through the Transistor output, resulting in

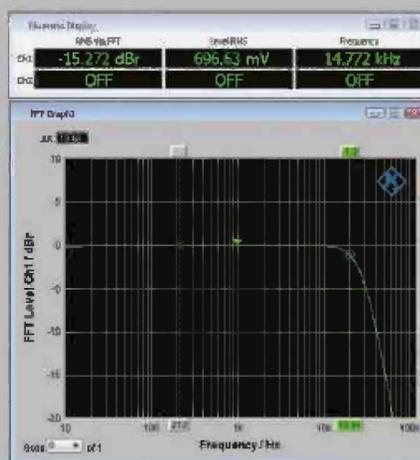
an EIAJ Dynamic Range value of 115dB – relatively high, if not up with the best that manage over 120dB nowadays. Noise from the tubes lowered this to 102dB through the tube output stage, but this is still as good as top CD players.

Output measured 4V and 2V from XLR and phono outputs.

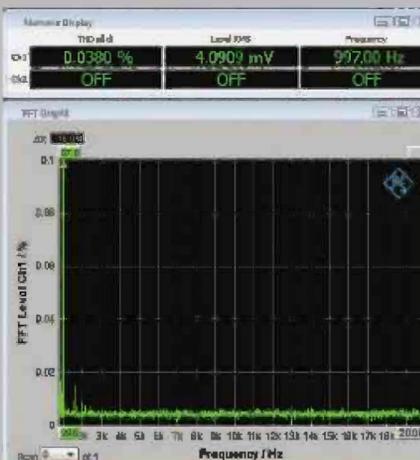
The Project DAC Box RS worked well all round, if with some small performance limitations. Curtailed audio response suggests it has been designed to give a warmer and smoother sound than usual, so it is aimed at specific tastes. **NK**

<b>Frequency response (-1dB)</b>	
<b>CD</b>	<b>4Hz-20kHz</b>
<b>Distortion 24bit (%)</b>	
<b>0dB</b>	<b>0.003</b>
<b>-60dB</b>	<b>0.04</b>
<b>Separation (1kHz)</b>	<b>97dB</b>
<b>Noise (IEC A)</b>	<b>-114dB</b>
<b>Dynamic range</b>	<b>115dB</b>
<b>Output (phono/XLR)</b>	<b>2/4V</b>

### FREQUENCY RESPONSE



### DISTORTION



## PRO-JECT CD BOX RS (£900), DAC BOX RS (£800)



**EXCELLENT - extremely capable**

### VERDICT

A two-box solution that gives CD as well as high-resolution playback and the ability to switch between valve and solid state. Clever and versatile.

### FOR

- flexible in terms of connectivity, format support and settings
- proprietary data link and buffering all but eliminate jitter
- detail, focus and a natural balance

### AGAINST

- no USB socket on the transport for file playback
- two remote handsets necessary
- compatibility with DVD-type media would have furthered flexibility

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## K3 INTEGRATED AMPLIFIER & CD PLAYER

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# Noble Aspirations

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

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

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

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

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

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

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

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

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

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

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

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





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VERDICT 





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

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

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

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

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

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

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

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

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

### CONCLUSION

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

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

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

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

### SOUND QUALITY

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

That meant I could hear exactly

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### VERDICT

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

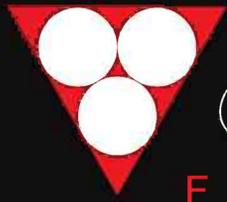
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- natural sound
- powerful bass
- finishes

### AGAINST

- build time

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# New Generation

If you want to play high-resolution digital on the move or through your hi-fi, the new FiiO X3 2nd generation is a great way to do so, says Noel Keywood.

**Y**ou'll like this: it is a high-resolution, portable digital music player costing just £150 that can blow the headphones on your head, off your head – or act as a high-resolution 'CD player' feeding the hi-fi. In a now-massive market for headphones and portables, the newly updated FiiO X3 looks potent as a

portable – but to hi-fi enthusiasts it's attractive as a high-resolution source too.

I reviewed the original X3 player in our January 2014 issue – and was impressed. Its controls and screen were unattractive but it did the job and readers have since written in saying they were delighted with the first X3. In the new X3 '2nd

gen' FiiO (China) have come back with a greatly improved user interface, and they have improved build quality and finish too. The original Wolfson DAC has been updated to a Cirrus Logic CS4398 for better sound – yet the price has not gone up one jot. By way of contrast, market-leading Astell&Kern (Korea) players have soared in price to become rarefied items; their AK100 entered the market at £400 and now costs a massive £800, for example.

In latest form the X3 will play normal digital files (PCM) up to 24/192 resolution, as well as FLAC losslessly compressed files, Apple's equivalents AIFF and ALAC, plus APE and even DSD 64 and 128 (.dsf & .dff). Lower quality compressed files like

MP3 etc are all handled too, as you might expect. I tried all these files – including the DSDs –

and they all played without problem.

Music files are loaded from a computer, PC or Mac, via a USB A-to-microUSB cable and the player can charge through this link, using its 5V line, or from a dedicated USB charger, which is usually faster. Charge time from a supply able to provide 2A, is quoted as 3 hours, but note that computers usually deliver 0.5-1A maximum. USB hubs or mobile phone chargers are the best bet for fast charging.

FiiO continue to equip the X3 with a simple but effective set of interfaces to the outside world. There is one 3.5mm stereo headphone socket and nearby on the top face lies a second such socket that can be switched, in software, to offer either an analogue line output to a hi-fi amplifier or, perhaps more importantly, an S/PDIF digital output through a short 3.5mm plug-to-phono socket adaptor lead. Being an electrical link this will always work up to 192kHz sample rate, unlike optical links where the input receivers commonly reach no higher than 96kHz sample rate. So although my Astell&Kern AK120's optical output delivers 192kHz, a lot of DACs fall silent if I play a 192kHz file – more than a little irritating; FiiO's electrical link avoids this issue.

Why bother with an external DAC? No matter how good the internal one is of a hi-res portable, a top mains powered external DAC, like the Audiolab M-DAC/Q-DAC and Oppo BDP-105D Blu-ray player with digital input, will always deliver best sound quality; they have sturdier power supplies and greater dynamic range. Connect up the FiiO X3 like this and it acts as a CD transport in effect, playing hi-res digital files via its line output (set to 'Coax') – and even DSD64 files play via S/PDIF, being



converted to 24/88.2 PCM. However, DSD128 will not play; the files flag up as 'unsupported' I found, because the processor has insufficient grunt to handle this task (headphones must be removed, since the sockets are logically linked).

The only remaining issue is that of power: to act as a hassle free hires player, a portable must work from an external supply whilst playing, not its internal batteries – and this the FiiO can do too, via USB (there is no independent power input). I powered it from an Apple iPhone charger whilst plugged into an Audiolab M-DAC driving headphones and there were no glitches; everything worked fine.

The X3 in its new form still lacks a touch screen, something all the Astell&Kerns have. But the old jog buttons have gone and a jog dial is fitted instead; you spin it with a finger over various screen symbols and press the centre button to select. The 2in TFT screen isn't so large and its graphics are small and not so pretty either but it's respectable having a 320x240 pixel resolution. FiiO have improved processing speed and control logic to produce a user experience hard to seriously criticise.

Cold start was painfully slow at 60 seconds but start after sleep was just a few seconds – and there is good control over screen timeouts etc. Volume buttons control a 0-120 range – good resolution – for either normal output, our measurements showed of 1.4V (Gain: L), or very high output of 2.66V (Gain: H) for insensitive headphones like planar magnetics such as the Oppo PM-1s I use. The control logic was simple and most menus one layer deep; there were few sub-menus, or obscure trails of linked menus. It was one of the easiest players I have used to date. You can read a complete list

**The top face carries two 3.5mm headphone jack sockets, logically linked so the player knows which is in use. One is for headphones only, the other a dual-role output, internally switchable, carrying a fixed level analogue signal, or S/PDIF digital.**



**A range of play options are available, including favourites, genres, play list etc. At top, battery level and card capacity are shown in small icons.**

of features and download a User Manual here - <http://www.fii.net/en/supports/33>.

There are a few funnies. To keep price down, I suspect, the X3 has no on-board memory: it uses a single 128GB microSD card (or smaller) to store music files – and this is not supplied; add £60 for one of these. There is also an OTG (On The Go) SSD storage drive mode about which FiiO say nothing in the User Manual, that would not see music files on my PQL drive, although it did see storage was attached (FW1.1). A comment on FiiO's website describes OTG support as "not very excellent"!

The X3 remains easily pocketable, measuring 97mm high, 57mm wide and 16mm deep. It weighed 136gms on our scales, which is relatively light, yet FiiO claim a

useful 11 hrs battery life between charges.

The X3 can be used as an external DAC too, via its USB link. Just don't expect an easy ride trying to get DSD through this link: go to the FiiO website for more info.

## SOUND QUALITY

The original X3 sounded good for the price, if lacking the focus and clarity of an AK100 that costs considerably more. But it didn't matter when connected to our Audiolab M-DAC, because then an ESS Sabre32 took over from the internal Wolfson DAC, giving super high-fidelity. It was great value, if not best suited to high quality headphones.

FiiO have stuck their head under the bonnet ("hood" if you're in the 'States!) and got chip-changing in the 2nd gen. The new X3 even has a 'power output' chip, an LMH6643 able to swing 75mA, which is what would be drawn by 40 Ohm phones



**The main menu has five options arranged in a semi-circle, scrolled by the black rotating thumb wheel. Selection is made with the centre button.**

at full volume (2.66V) – but this would be way above what the ear could take in volume, so this chip has drive current to spare.

I mention this because the underpowered and noisy (cheap) headphone chips in lots of portables are a significant limiting factor in sound quality. Within a portable playing high-resolution digital into ultra-revealing headphones, every atom of design detail counts and

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the headphone drive amp is crucial, especially since our measurements show modern 'phones are down to 30 Ohm impedance and need a lot of drive volts to go loud. That means the tiny player's batteries have to deliver quite a lot of current if the sound is to have slam and not sound anaemic.

So does the X3 2nd gen have slam? It has scale, rather than outright slam. Overall, I first felt the new X3 obviously tidied up all-round over the first model; the sense of haziness and indeterminacy has gone. It is now clean and well defined, has an easy going nature and powerful bass. As you might expect, with both Philips Fidelio X1s or Oppo PM1 headphones connected to our Audiolab M-DAC replay quality was superb and here the sound did have slam, especially with Mick Fleetwood's drumming at the start of 'Go Your Own Way' (24/96). Transferring back to the X3's headphone output it still did an impressive job: clean and clear with meaty bass. 'Go Your Own Way' sounded suitably powerful.

With the Trondheim Soloists (2L of Norway) playing 'Divertimenti' the quality of DSD128 came through well: the space around the orchestra was generously open and the string instruments well separated; DSD has a more organic nature and flow than PCM and the X3 2nd gen made this clear through Oppo's PM-I planar magnetic headphones.

**The sound balance can be tailored by a graphic equaliser, that comes with a variety of pre-set states but can be set manually, and the settings stored.**



**In the base lies a microUSB port for charging, file loading or connection to a computer as a high quality DAC. A single microSD card acts as memory, held in the side slot.**

Playing The Eagles 'New Kid in Town' (DSD64) the X3 laid out a lovely, wide soundstage and the strong bass line was well supported, even if it didn't have the grip and push of the M-DAC. Tracks like this showed how good the X3 2nd gen really is now though; to be able to match an M-DAC with its mains supply and Sabre32 DAC is quite a feat for any portable, let alone one at this price; I was more than impressed.

### CONCLUSION

The new FiiO X3 2nd gen is a frighteningly good player for £150. Almost unbelievable in fact!

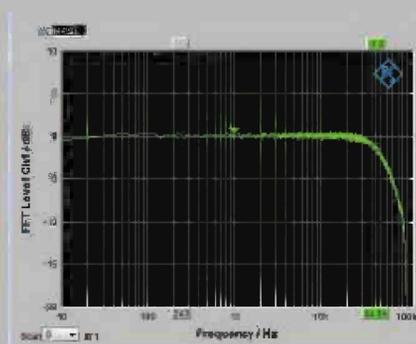
It delivers massive headphone drive, suitable for the most advanced and insensitive phones going, and superb quality into phones.

It acts as a hi-resolution CD player, as it were, and can play all files including DSD. It's a great player, well worth having.

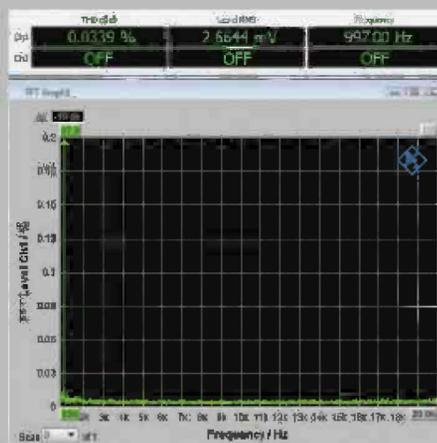
### MEASURED PERFORMANCE

Frequency response through the headphone output, at maximum output (H), measured flat to 45kHz with 192kHz sample rate digital, our analysis shows, with a slow roll off to the 96kHz upper limit – the FiiO well exploits high sample rate digital. Results on low output (L) setting and Line output were identical.

#### FREQUENCY RESPONSE



#### DISTORTION



Distortion at full output (2.66V) measured a low 0.003% and at -60dB a very low 0.03%, with 24bit resolution digital. As a result EIAJ Dynamic Range measured a high 115dB, another fine result. Together with very high output of 2.66V the FiiO X3 had plenty of headphone drive ability and should have a good feeling of cleanliness and punch. Output can be set to low (L) to avoid excessive headphone volume, measuring 1.4V at this setting.

The Line output delivers a fixed 1.5V, for connect to a hi-fi amplifier much like any CD player (2V).

As a USB DAC the X3 worked to 192kHz sample rate from a MacBook Pro and performance was identical to that from test files on the player, the crucial EIAJ Dynamic Range value being 115dB again.

The FiiO X3 measured well in all areas. It will drive even the most insensitive headphones. **NK**

Frequency response (-1dB) CD	4Hz-45kHz
Distortion (%) 0dB	0.003
-60dB	0.03
Separation (1kHz)	88dB
Noise (IEC A)	-114dB
Dynamic range (EIAJ)	115dB
Output	2.66V

**FiiO X3 2nd gen**  
**£150**



**OUTSTANDING - amongst the best**

**VALUE - keenly priced**

#### VERDICT

A top quality hi-resolution portable player with great sound quality – at a fantastic price. Well worth having.

#### FOR

- sound quality
- small and light
- plays all files inc DSD

#### AGAINST

- small screen text
- slow cold start
- poor OTG support

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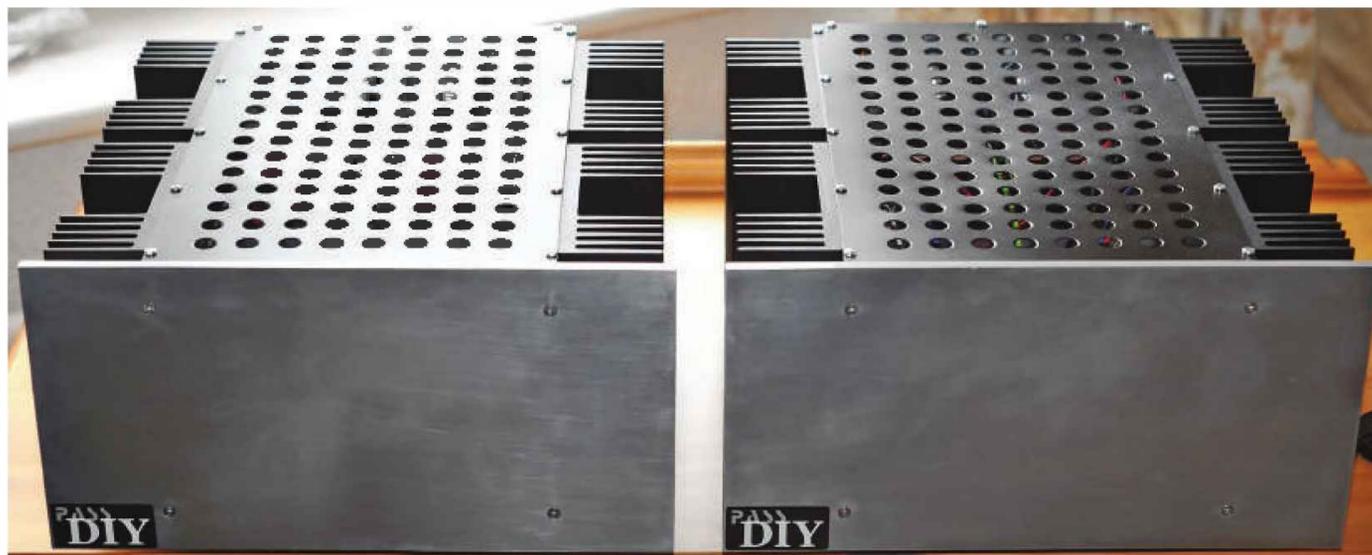
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Answers by: **NK** - Noel Keywood; **JM** - Jon Myles; **PR** - Paul Rigby; **MP** - Martin Pipe; **RT** - Rafael Todes.

For more advice see Letters from earlier issues at [www.hi-fiworld.co.uk/letters](http://www.hi-fiworld.co.uk/letters)

A pair of KEF Q100 loudspeakers are on their way to **DEAN MARSHALL** Letter of the Month winner in our August 2015 issue.

## Letter of the Month



A pair of impressive looking Pass Labs Class A monoblock power amplifiers built by Jeremy Dunn. "The sound is epic – simply stunning" he says.

### CLASS A DIY

I really enjoyed reading about the balanced phono preamp in the July issue; it's great to see a DIY project again in a hi-fi mag with actual schematics that can actually be built by an electronics enthusiast or hobbyist. I fondly remember the days when Hi-Fi World came with a DIY Supplement!

Anyway, the article has prompted me to write and tell you about a recent hi-fi project of my own in which I built a pair of class A monoblock power amps. They are called the A40s and were designed by Nelson Pass. They are rated at 40 Watts per channel and a full article detailing the design (but not the

metalwork) is available for download on the Pass Labs website. This design dates back to 1978 but after much browsing of transistor data sheets I was able to find modern equivalent devices which work fine. The original Darlington TO3 output devices were still available from Farnell which was great news, otherwise I would not have given it a go. Each channel contains a 500VA PSU toroid with 44000uF of smoothing! So how do they sound?

The sound is epic – simply stunning. Huge soundstage, super sweet treble and pile-driver bass (when bass is present) with superb grip and control (no doubt aided by the use of a 500VA

toroid with 44,000uF per channel). Stereo imaging is fantastic and the amount of extra detail in the music is nothing short of astounding; I can hear extra instruments and incidental sounds so clearly that it beggars belief that they were totally inaudible with my previous amp.

If anything these amplifiers are a perfect lesson in how power ratings can be misleading; the power amp they replace is rated at 100 Watts per channel (an Audiolab 8000P which is very nearly 28 years old and purchased when I was 24) and these monoblocks just blow it into the weeds.

I was wondering, when I was

building them, if there would be enough power for my KEF Q7s! I have not been able to drive the amps to clipping because the Q7s sound like they might burst – and also my ears wouldn't stand any more volume.

What is also amazing is how effortless and relaxed the sound remains at this volume.

Another plus point is that the sound is every bit as good at very low volumes too. All in all, I am absolutely gobsmacked by the magnitude of the improvement over my old amp (the KEFs sound amazing when driven properly with a quality signal).

After all the usual wiring checks and rechecks, I said a short prayer and hit the on switches. No smoke and nothing on the PCB seeming to be getting too hot. I then checked for DC offset on the speaker terminals and measured 6.5mV on one channel and 2.5mV on the other.

Brilliant, they seem to work so I left them powered up for nearly two hours and re-checked the offsets and they measured 6mV and 2mV. After confirming that my preamp (8000C) had no DC on its outputs (the A40s are direct coupled) I connected it; DC offsets remained the same and so I connected the speakers. No hum, no hiss (unless I put the tweeters in my ear) so I played a CD.

This was at approximately 7.00pm one Saturday evening and I can't remember the last time I felt so pleased with myself. One bottle of red later and it is 2.00am Sunday and I realise I have listened to music for seven hours solid without the slightest hint of fatigue.

I forgot to mention that when I switched to vinyl LP via Ortofon

MC25FL and a buffered shunt feedback phono stage (John Linsley Hood discrete component design with ultra-quiet shunt regulated PSU, both also home built) I thought I had gone to heaven. The only way I can describe the sound from vinyl now is to say multiply the aforementioned improvements by a factor of ten! It really is that good.

Wanting to ditch the 8000C preamp and realising that my phono stage and CD player (8000CD) could drive the A40s with no additional gain required, I have since built a unity gain buffer preamp (bipolar-FET symmetrical compound source follower - Linsley Hood design from 1984 - with internal series and shunt voltage regulators and external DC PSU) and the system now has real transparency to it and such musicality that it is a pure joy to listen to.

My vinyl set-up is LP12 with Cirkus, Ekos MK1 and the first Lingo PSU and I would like to replace the MC25FL with a better moving coil, but I'm unsure which one to go for or, rather, which ones will work well in the Ekos. I rather like the look of the AT33EV but would tend to steer clear of the OC9 in case it sounds too bright. I realise that it will be difficult to make an absolute recommendation as you don't know



**Big 44,000µF power supply capacitors and sturdy 500VA toroidal mains transformer help provide "pile-driver bass with superb grip and control".**

the sound of my amps, but I would be grateful for any suggestions. Maybe I should be looking at higher end Ortofon?

Thanks for a truly great magazine!

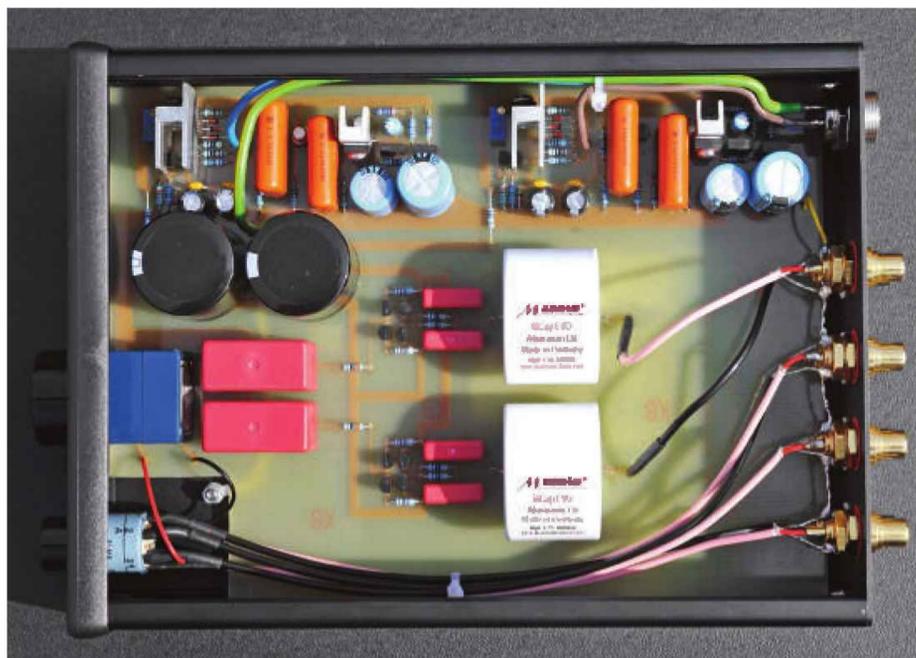
PS - I forgot to mention that the power amps cost just under £400 to build them both and an awful amount of hole drilling and tapping! (I've attached a few photos). The buffer preamp and external raw +/- 27VDC supply, including two Hammond instrument cases, cost around £120.

Also, special attention must be drawn to the excellent DIY audio forum at [www.diyaudio.com](http://www.diyaudio.com) for the wealth of information, tips etc from fellow DIY enthusiasts including Nelson Pass as well.

Kind regards,

**Jeremy Dunn.**

Hi Jeremy. That's wonderful – I know the fear at first switch on of a DIY project and the elation when it works! Or – as is sometimes the case – the bang when it does not. Oh shoot. So congratulations on getting a sophisticated solid-state amp up and running perfectly first time: this is quite a feat. The AT33EV is good but the OC9 MLII is more neutral than it once was and I have always liked it very much. Notable features are tight, punchy bass and very finely delineated treble with lots of filigree detail. It is great value. When buying an MC, don't be too stingy, it rather defeats the purpose. I suspect your phono preamp, being a discrete design, will be somewhat better than the mass of cheap-chip preamps out there. **NK**



**An internal view of Jeremy Dunn's unity gain FET pre-amplifier, with Alps Blue potentiometer at left.**



**An Auralex diffusion tile, from Studio Spares. Will this help improve Mark Wilkinson's conservatory sound?**

#### IN THE GLASS HOUSE

I'm writing to you for advice on a subject area that I think a number of other audiophiles may have similar issues with, namely the listening room. First of all the system, as a child of the 80s my system is all about CD, I never got the hang of them big black plastic discs that you have to get up to turn over halfway through the recording and I have neither the nose nor the desire to explore computer audio which is infiltrating the way we listen to music,

As I say, I'm a product of the 80s, I love the way the disc glitters when you take them out of its be-jewelled case, however I digress.

My tastes vary from AC/DC to ABC, with just about anything and everything in-between (my only real prejudice when it comes to music is Opera; I don't understand it and it gives me a banging headache trying to follow it).

The system consists of Mastersound Compact 845 Single Ended Triode integrated valve amplifier (what a belter of an amp it is too, it literally oozes Italian charm).

My CDs are played through one of two CD players. Firstly, I have an Icon Audio David Shaw Signature CDX1 and the second player is a Bryston BCD 1. Speakers are from the Spondor Classic range (SP3/1R2). Speaker cable is Russ Andrews Kimber Kable 12 TC with 8 TC Jumpers.

The system's units are powered through a Russ Andrews Power Block with a selection of Power Kord 300 leads and the interconnect is a Chord Indigo Plus.

I also have a headphone rig which consists of the Bryston BHA 1 headphone amp, two pairs of mid-price Grado headphones, a pair of Audio Technica ATH W5000 closed back phones and a pair of Sennheiser HD 800 open-back phones with aftermarket Cardas balanced leads. The units are connected with a balanced Chord Chorus 2 cable which makes the headphone rig fully balanced when listening through the Sennheisers.

I have spent a lot of money, time and effort getting the infrastructure right, but here comes the crux of my problem. Well it's two cruxes really: firstly the listening room and secondly and most importantly her who is to be obeyed, namely the wife. She fails to understand high-fidelity, has no interest in it whatsoever, thinks my system is ugly (that one really hurt as I think it looks rather beautiful, especially when those dirty great 845 tubes are lit up at night). The quarterly electric bill is always a bone of contention and she would turn into a raving lunatic if she found out how much I actually spend/have spent on my quest for high-fidelity nirvana.

I have been told upon pain of a thousand cuts and then divorce the hi-fi is not going in the living room. Unfortunately for me, the living room is

me having to have the system firing across instead of down the room. The room is oblong, 14 feet in length and 10 feet wide, I have the speakers approximately 1.5 feet from the rear window and 7 feet apart. My listening position is half way between the speakers and about 6 feet back from the rack (I hope that makes sense). The soundstage between the speakers is great from left to right but I tend to lose depth front to back and get very little out of the speakers; with poor recordings the sound tends to be flat, unemotional and one dimensional. Sometimes I could weep when I listen to a recording I have been particularly looking forward to getting a hold of.

So bar a lottery win and knocking down the cursed conservatory and building a dedicated listening room right across the back of the house I'm stuck. I even broached the subject of converting the garage into a listening room and got pretty much the same response as above, an emphatic no way, I see little of you as it is now and I would not see you at all if your boxes were in the garage. I even tried the well it won't be a garage it would be a listening room but just got the steely eyed glare.

I have tried to improve the situation by placing a large thick rug in front of



**Rhododendron bushes have thick, fleshy leaves that break up sound.**

the only room in the house that vaguely resembles a passable listening room. The back of the house consists of an open plan kitchen/diner which by the way it is laid out would not accommodate the equipment, let alone allow me to set it up to ring the last nuance of high-fidelity from my system.

So what I am left with is the conservatory, not just a conservatory but one with a tiled floor. The other big problem with the room is where the doors have been placed which leaves

the system and filled the furniture with loads and loads of cushions but I know I'm not hearing my system sing like it could/should and feel I am missing something fundamental from the many recordings I own. I have considered removing the blinds and replacing them with thick curtains, or even replacing the plastic roof with a solid tiled one (well I did once and if looks could kill the wife would now be doing time for manslaughter). Is there anything I can do to improve the quality of the sound

# HI-FI WORLD

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ON THE APP STORE

The screenshot shows the Apple App Store page for the Hi-Fi World app. The page is titled "Hi-Fi World" by "audio web publishing ltd". It features a "Get" button, a "Rating: 4+" badge, and a "LINKS" section with "Privacy Policy" and "© 2014 Hi-Fi World". The "Screenshots" section displays five preview images of the app's content, including magazine covers and articles. The "Description" section provides details about the app's content, including expert opinions, international standard measurements, and a large Mail section. The "Information" section lists the developer, category, updated date (5 Dec, 2014), version (1.0), size (9.0 MB), rating (Rated 4+), family sharing (Yes), compatibility (Requires iOS 3.0 or later), and language (English).

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that is a) wife friendly and b) doesn't involve outlaying vast quantities of money?

**Mark Wilkinson**  
**South Tyneside**

Hi Mark. The changes you made all make sense and are what I would recommend.

Damp the hard floor with a rug, break up side wall reflections from panes of glass with – believe it or not – bushes! Yes, they actually break up sound well; try thick leaved varieties. You may even be able to hide curtains behind bushes; it could look quite nice. Note that bushes diffuse sound, whilst curtains absorb it; they perform different roles and you will need to experiment to find which best suits subjectively. Please let us know which bush sounds best!

You need some reflected energy from the ceiling to get a sense of height to the stereo image; it is best if this reflected energy is randomised, which is why acoustic ceiling tiles have hard, random surfaces; they break sound up. Use such tiles if you can: go to StudioSpares on the 'net.

As you say, large cushions and foam filled settees etc also absorb sound well and help control a reflective environment. Don't forget that people commonly sell good furniture cheap just to be rid of it, allowing you to pick up some great second-hand bargains.

I wonder also whether the glass is selectively absorbing energy, perhaps at low frequencies. Panelled rooms are notorious for this and I have heard big loudspeakers sound bass light in such rooms, although your Spondor loudspeakers should be fine.

Sorry I cannot be too specific. You do have a difficult situation there, but I suspect that with enough experiment and a judicious choice of plants and furniture you'll get a decent sound and a happy wife. **NK**

### FREE MUSIC

*Isn't it amazing. Give something away for free and you cannot stop people thinking it is the best thing ever. Ask them to pay, even a small amount for something these days – and they do not want to know. Most Spotify users don't pay a thing. Now most NME readers will pay nothing as well, as it is to be given away for free. Whatever happened to the value in something? Whatever happened to people genuinely being interested in something enough to believe it worth paying for?*

*This country is full to bursting with people who will tell you that they love music. They neither buy music or the music magazines it seems, but yes of course, they love music. No they do not. They are simply an increasing number of non thinkers who have decided that the internet and all it contains, means that they no longer have to invest any real time or emotion or real interest in anything, but at the same time can carry millions of tracks around with them just in case they stop Tweeting long enough to actually decide they may like to listen to a track or two, properly, without interruption and without fiddling with something else while they are doing it.*

*I would much rather be back in the business times and times in general of the 60s, 70s and 80s and I believe everyone at Hi-Fi World would too. Charles Bukowski said, "it won't be long for any of us". The countdown is now seriously under way...*  
**Neil Porter.**

Hi Neil. I agree that music has a value and is worth paying for. Expecting music for free devalues it and we have seen a hollowing out of the music business as a result. Artists now expect to make their income from live performance but that hardly justifies their work being distributed for free by companies that are making money doing so. There is, after all, someone somewhere profiting from this 'trade'.

The NME may be better off financially for going free because its circulation increase exposes adverts to more people (whether they read them is another story) but it will

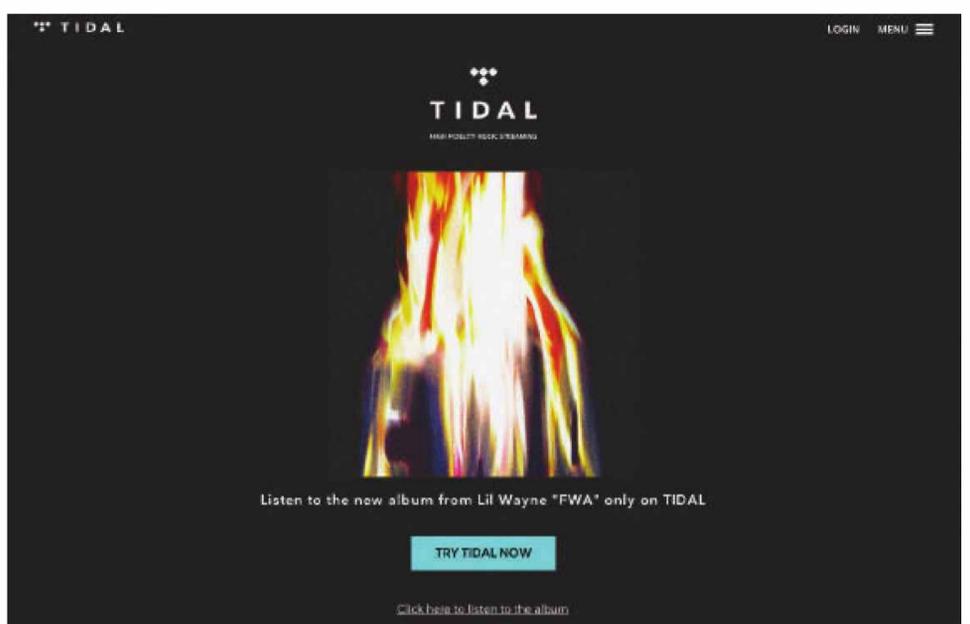


*The NME (New Musical Express), famously mentioned in 'Anarchy in the UK'. It is to go free, says Neil Porter.*

forever be debased. I have in the past read warnings that the 'free with ads' model devalues the product and have seen London's Evening Standard go down this route to what I view as its detriment. It was once a good read for 50p; now it is simply London street junk with content I find facile. But the old Evening Standard was loss making and the new operation is apparently successful: see Jon Myles comment below.

A problem with 'free' in the newspaper/magazine market however is that you lose access to the newsstand; shops will not stock free titles because they make nothing from them, so you have to find a new distribution path – not easy. Frees must be given away by street vendors or left in open bins.

Now, the habit of downloading,



*The Tidal streaming service offers CD quality. "If I find something I like then I go out and buy the CD or download a high-resolution file" says Jon Myles.*



**The Pro-ject RPM 3 Carbon uses belt drive from a speed controlled free standing rear motor, to the platter rim. It held speed well our measurements showed.**

made popular by Apple's iTunes, is being challenged by streaming and services like Spotify and artists like Taylor Swift have already been critical of this model. Music's glory days have long gone I suspect, with no sign of the old model returning. **NK**

I totally agree Neil, it is sad to see the NME going free - but it may well suit their business model as advertisers are more likely to come on board if they think their products are being exposed to a greater number of readers. Just look at the success of the Metro series of newspaper titles for evidence of this.

Unfortunately, it's often the case that whenever a publication goes down the giveaway route the content invariably becomes devalued – or is increasingly at the mercy of the

whims and demands of advertisers.

As for music, unfortunately it seems the days are long gone when people placed a value on new releases and were not only prepared to pay for them but genuinely excited about hearing the latest creations from their favourite artists. I have my reservations about streaming services – the major one being you never actually own the content but merely 'rent' it.

Having said that, for people who do actually love music they can be a fantastic way of discovering new artists so the concept is not all bad. As for myself, I do subscribe to Tidal and if I find something I like then go out and buy the CD or download a high-resolution file.

The fact is, whether we like it or not, streaming services seem

to be the future of mass music consumption so we will just have to live with it. **JM**

### GOOD VIBRATIONS

*In the Pro-ject RPM 3 turntable review in the August issue of Hi-Fi World , Vol.25 No.6, the SPEED VARIATIONS plot is published twice and the ARM VIBRATIONS plot is not published. Please publish this Arm Vibrations plot as it is for an S-shape arm with integral cartridge carrier and fingerlift all in a single piece, thus may be an interesting plot.*

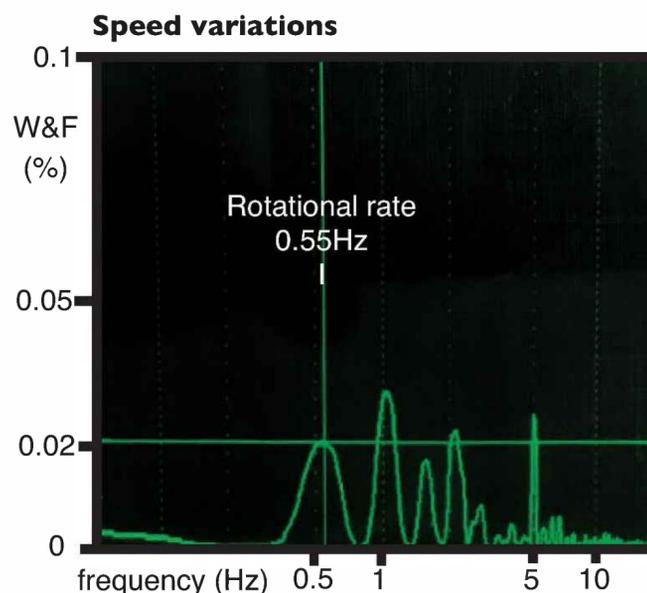
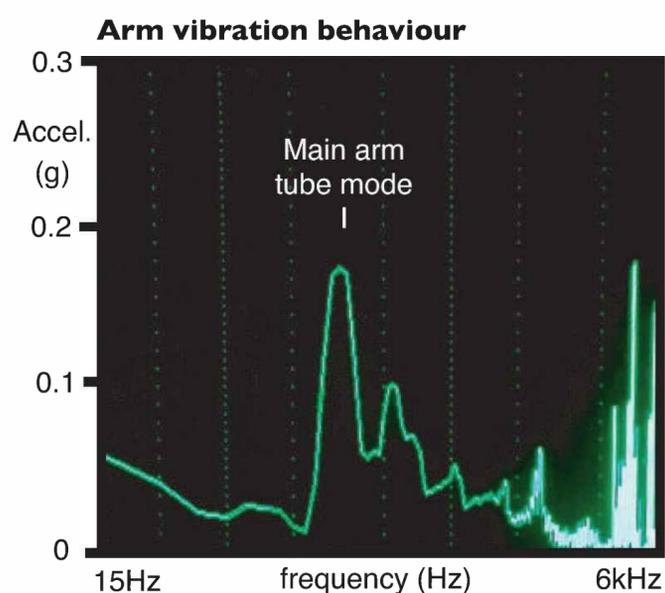
*Also, in the Speed Variations the 1.1 Hz and 2.2 Hz Harmonics and the 5 Hz anomaly are all of higher magnitude than the 0.55 Hz rotative frequency. That seems to be uncommon for good performance belt drive turntables, thus further discussion of this peculiarity would be interesting, particularly the 5 Hz anomaly.*

*Yours sincerely*

**Chris Taylor**

Oops! Sorry for that error Chris – and thanks for your keen eye in spotting it. The arm vibration plot, taken from an accelerometer attached to the arm's headshell, is published here. It shows a peak at 260Hz, which is quite high (around 200Hz is common for an alloy tube) and shows the carbon fibre arm tube is stiff. The peak is about the amplitude expected – neither high nor low – and it "is a tad lively in the lower midband". The headshell is well behaved, however, shown by the few narrow peaks at right.

The level of speed variation components was very low, around 0.03% maximum. These sum (rms)



**At left is our arm vibration analysis for the Pro-ject RPM 3 Carbon turntable, reviewed last month (August 2015 issue), and at right is a speed variation (wow & flutter) analysis. "The speed variations plot is published twice and the arm vibrations plot is not published", says Chris Taylor.**

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**Align azimuth using a pencil lead and sheet of paper, says Alasdair Beal.**

to produce the unweighted wow and flutter (W&F) value, but there's quite a lot of variance in belt drive, including between samples, so you have an approximation. The analysis is an average of samples but the 0.55Hz basic speed component rises and falls and the read value from the swinging meter needle of our Kenwood W&F meter is a DIN weighted maximum value. The marker lines show most of the peaks are harmonics of 0.55Hz, as is to be expected from a slightly random mechanical system, and the 5Hz value may be a ninth or tenth harmonic; it is difficult to say without tearing the whole thing apart, which is impractical. Overall though, such low level peaks don't have much impact on the sound. **NK**

### TOP TIPS

Here are two top tips for vinyl enthusiasts which solve tricky problems and cost next to nothing.

Setting cartridge azimuth.

Badly-set cartridge azimuth (stylus verticality) can make the sound spitty and distorted from a line contact stylus, so it is important to set it precisely – which can be tricky with a unipivot arm.

There is a simple solution that requires only a piece of paper and a pencil lead or matchstick. In order to align the top of the headshell exactly parallel to the record surface, first lower the stylus on to the record and place a thin pencil lead across the top of the headshell. Then take a small piece of folded paper, stand it on the record beside the cartridge and mark a line on it at the level of the pencil lead/matchstick (see photo). Finally move the piece of paper to the far side of the record and by eye check whether the pencil lead/matchstick still lines up with the line on the paper.

If it does not, then adjust the arm's lateral level and repeat the process until it lines up for both paper positions.

Using this simple, cheap process

it is easy to align the headshell and cartridge parallel to the record surface to an accuracy of +/- 0.25 degrees.

Of course this will not be the final answer if the stylus is misaligned relative to the cartridge body but in a well-constructed cartridge this simple technique is all that is needed for perfect alignment – and with a fussy line-contact stylus the sonic benefits are considerable.

### RECORD CLEANING

One of the most popular record cleaning tools is a carbon fibre brush. Unfortunately this tends to leave a line of dust across the disc. One solution is to use a Pixall sticky roller to lift the line of dust and the combination of the brush and sticky roller can be very effective. However the Pixall roller is sadly no longer available. What to do? A cheap, practical and effective alternative is a roll of low tack masking tape, which is available from shops which sell supplies for artists. Simply stick a length of tape down on the line of dust on the record and lift it off (see photo). The low

tack masking tape lifts the dust and leaves no sticky deposits on the vinyl – perfect!

**Alasdair Beal**

### TRACK CHOICE

Sorry to bother you again (last time for now – I promise). I've just spent a wondrous couple of hours on the internet undertaking a voyage of exploration into the unknown. I was so taken with the magazine I decided to deepen my understanding of the equipment reviews, to see if I could understand them better by listening to the musical tracks discussed in them. You can tell from the age of my current system I believe in getting my money's worth! So this system upgrade is probably the one they'll use to play me out of the door in my coffin and I hope to enjoy many hours of music from it before that happens. So this system has to be the one that I really love rather than the one that I bought just to upgrade, if you see what I mean.

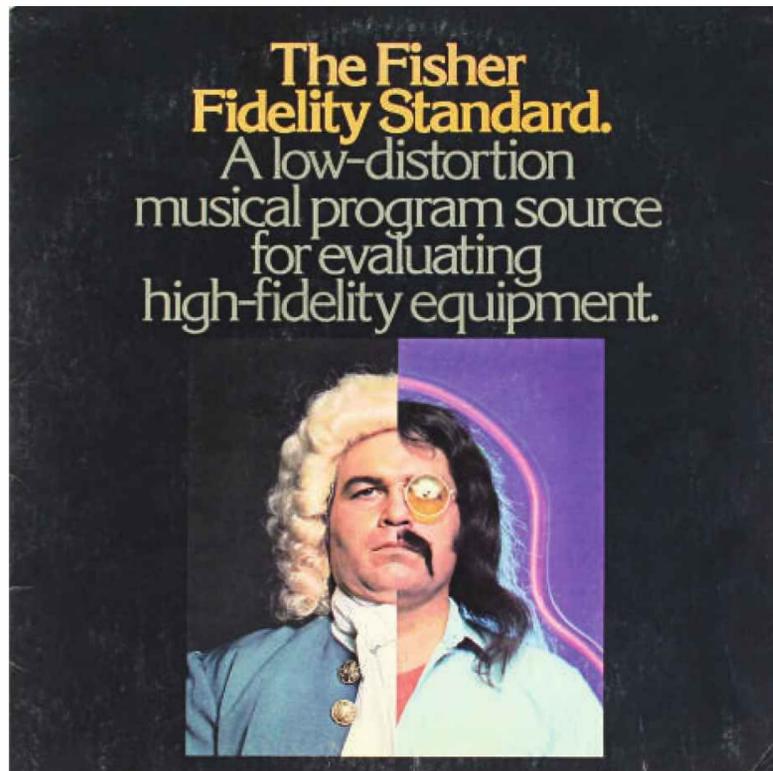
But there is so much equipment out there, the question is which ones to listen to, and in what combination? This is where your magazine and its fellow publications shoulder considerable responsibility, based on your reviews people will choose to audition some equipment and not others; and so it's vital your write-ups are accurate and relevant. The reviews all seem to follow the same format. The first half of the review is a discussion of the item and the second half is about how it sounds. Tracks of music are used to illustrate the key points. Lab measurements are used to provide objective analysis of performance.

It's the choice of tracks that



**Use a roll of low-tack masking tape to clear dust from a record, suggests Alasdair Beal.**

**An old U.S. test LP, the Fisher Fidelity Standard (named after Avery Fisher), that used Chopin's Opus 48 No1 to test for turntable speed variations (wow).**



fascinated me when I worked through them. Take the Prima Luna valve amp for example, here Jon Myles discussed music from Goldfrapp (not a great fan of this lady I'm afraid), Neil Cowley Trio (Jazz), Skunk Anansie (tortured soul music - desperate video) and New Order (80's synth & electronica).

But no classical...Bum! So how would it fare with Mahler's 2nd? How would it cope with the thundering full orchestra finale complete with choir and pipe organ? Or Carmina Burana? I would imagine a valve amp would see some classical music but it is not specifically covered in the review.

Same for the Roksan Xerxes, Goldfrapp again, Kate Bush and Scissor Sisters – again no classical, folk, or 60's pop and rock. I would have thought that most record collections would have some of that.

So it goes on as you work through the reviews, a wide and sometimes eclectic mix of music. However, if you take the playlists and look at the item of equipment and think what music it will probably be bought for, there are some surprising inclusions and omissions.

So, how do you choose what tracks to include in the review? I guess you must listen to much more music than you can possibly write about, but surely there's a case for covering the basic groups, classical, jazz, rock and pop, mood music and synth/electronica in each review?? Just a thought.

A couple of asides:

1. Charlie XCX 'Sucker' chorus is actually '[Beep!] -you sucker!' and the comments on YouTube were all along the lines of 'F\*\*k you censor - remove the beep!' but a way down the list one plaintive comment said 'The beep is on the original recording! - I've got the CD.

What's up with you people???

2. Listening to The Orb - Towers of Dub, I had the following conversation with my son. Son: 'What on earth is that you're listening to?' Me: 'I'm not sure this one is from earth son!' Son: 'It sounds like a man wearing a galvanised iron bucket banging his head against the wall in a room full of wind chimes whilst walking on old car hooters'. - that image, once placed in my mind, proved difficult to shift; though, to be fair to Orb, I don't think the TV monitor speakers were doing it justice. Anyway, thank you for a fascinating journey into a whole new musical landscape. I can't wait for the next edition.

regards

**Rowland Cook**

Hi Rowland. We choose music for its ability to reveal defining characteristics – and in general if rock is handled well, then so will classical, but they do each have different abilities to reveal faults..

Classical is needful of soundstaging, smoothness and a generous bottom-end for timpani etc, especially kettle drums. We listen for all these properties within rock and they are equally valuable with classical performance.

Interestingly though, classical is more critical of turntables and cassette decks (remember them?), where long sustained notes, found in pieces like Beethoven's Moonlight Sonata or Chopin's Nocturne Opus 48, No1, will brutally reveal the unsettling effect of speed variations (wow). And violin will always be furtwangled (changed in unknown and entirely random ways) by amplitude and phase discrepancies in

the crossover region between bass and midrange units of conventional loudspeakers.

If you want to hear this for yourself, phone a Martin Logan stockist and see if you can get a demo of Nigel Kennedy playing his Strad. through an ML electrostatic, that suffers no such problem, against any two-way speaker that rarely gets it right.

In general, however, we are fairly agnostic about music played: it has to be of good quality and/or revealing of performance across the board. And we often do play classical and don't list it. **NK**

### OPPO LOAD

Thanks Noel for your reply to my query about the 47k ohm load recommended by Oppo for their BDP-105EU Blu-ray player.

Curious about your hint that its output capacitor might be as low as 0.1 microF I decided to measure the output impedance of the player by seeing how it coped with a 10k ohm load resistor.

The output held up well with frequencies between 10 Hz and 1k Hz with the 10k ohm load, the slight voltage drop (constant at all frequencies) in the sine wave viewed on the scope being consistent with a Blu-ray player output impedance of 100 ohm.

I then went as far as reducing the load on the Oppo from 10k ohms to 2k ohms. Again the output reduction was small, consistent with a 100 ohm Oppo source impedance. The Oppo output signal level I chose was typical for a disc player so the Oppo is generous with its available current.

As the Oppo BDP-105 Blu-ray player has only digital inputs I digitised the sine wave output of the signal generator with the AU-D4 ADC Analogue to Digital Converter described and illustrated in April's Hi-Fi World.

The sine wave output from the Oppo appeared identical to that of the signal generator, suggesting low distortion from combined ADC and Blu-ray player. I didn't actually measure the overload voltage of the ADC, but suspect it's none-too-generous, so if used with, say, a phono stage with plenty of output, it may be important to turn down the gain.

Interestingly, a week later I replaced the wall wart supplied to power the AU-D4 ADC Analogue to Digital Converter with a third party dc supply, the Russ Andrews PowerPak II Power Supply. My impression is that the audio quality improved across the frequency range.

Regards

**Jim Thorpe**



# WIN

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2010 to specialise in wireless and Bluetooth 'speaker systems and now boasts an impressive range of products, the X40s being one of its top models coming in at £699.

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channel amplifier.

The right 'speaker acts as the master and is connected to its partner by a supplied cable. Apart from Bluetooth with aptX, the X40s

also feature a pair of standard RCA analogue inputs, a single optical digital input and also a sub(woofer) out for those wishing to add more bass. A simple but effective multi-function remote control completes the package.

Set-up is simplicity itself. Merely plug the attached wall wart-type power supply into the right 'speaker, connect it to the left loudspeaker via the supplied cable and then pair your Bluetooth device – be it mobile 'phone, tablet or laptop/desktop computer."

For a chance to win this great prize, just answer the four easy questions at right. Send your entries on a postcard only, by 10th September 2015 to:

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**H**ere's your chance to win the superb Blue Aura X40 loudspeakers we reviewed in the June 2015 issue. Read the review excerpt below and answer the questions.

"If you haven't heard the name before, Blue Aura was founded in

## QUESTIONS

**[1] When was Blue Aura founded?**

- [a] 2000
- [b] 1896
- [c] 2010
- [d] 2021

**[2] What Class is their amplifier?**

- [a] top Class
- [b] Class D
- [c] no Class
- [d] lower Class

**[3] How tall are the X40s?**

- [a] 865mm
- [b] 875in
- [c] 892mm
- [d] 88m

**[4] We described set up as -**

- [a] simplicity
- [b] confusing
- [c] shocking
- [d] piece of cake

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# A quad into a pint pot

**Martin Pipe discovers how four channels were squeezed into the grooves of a stereo vinyl record.**

**D**uring the 1970s, the stereo vinyl LP and single were the primary means of distributing music. Some musicians relished the creative possibilities of moving from two channel to four channel – and tape was the simplest way to do this. But no commercial concern was enamoured with the difficulties of adding a four-channel tape reel or eight-track cartridge to the many two channel music carriers that retailers were already offering – LPs, 8-tracks and in some cases cassettes too. And pre-recorded reel-to-reel tapes were particularly expensive to make.

Wouldn't it be great to sell one record that would give mono, stereo or quad depending on the equipment being used to play it on? A panacea for all thrills, in other words. The public was getting used to the fact that they could enjoy '45/45' stereo LPs on mono equipment like the bedroom Dansette, as well as that snazzy new music centre in



*The first quadrasonic releases were distributed on 'discrete' four-channel tape. This was prohibitively expensive, and so an effective means of getting four channels onto a vinyl disc became quad's Holy Grail. Unfortunately, it led to a proliferation of incompatible standards.*

the lounge, with no ill effect. This backwards-compatibility is one of the reasons why 45/45 – one of the great contributions of iconic British engineer Alan Blumlein to the world of audio - became the industry standard.

The '45', by the way, has nothing to do with the speed of the record. It refers instead to the 45-degree angles of the groove-walls relative to the record surface (the inner and outer groove-walls are thus at 90 degrees relative to each other). The inner groove-wall is modulated with the left-channel audio, while the

outer wall carries the right channel. The stylus of a mono cartridge moves only in the horizontal plane, and in doing so recovers the sum signal of both grooves (L+R, i.e. 'mono').

But the best you can expect from the unmodified 45/45 system is a maximum of two separate or discrete channels. Some means of encoding four channels into the available two (known as '4:2:4', i.e. four into two - and back again!) is thus needed if we're to have records that can be played by quad as well as mono and stereo gear.

An encoding system that uses an algebraic function known as a 'matrix', to embed the extra information within the stereo channels looked most promising. This idea was presented to the Audio Engineering Society in a 1969 paper by experimenter and musician Peter Scheiber. The matrix, the exact maths (or 'coefficients') of which differ from one specific quad format to another, adds the rear channels (and sometimes tiny proportions of the

*This Sherwood S-8900A from the early 1970s, is a 'straight stereo' receiver with a passive Dynaquad adaptor circuit.*



opposite front channel) at a lower level to the front channels, with some signal-inversion and/or phase-shifts applied. The result is an encoded two-channel signal. To recover the four channels, the decoding process reverses this signal manipulation.

Let's take as an example what is considered to be the very first commercial matrix-quad system - Electro-Voice's Stereo-4 (also known as EV or EV-4), launched in 1970. The signal presented to the left channel of the record cutting-head consisted of the front-left channel at 'full-strength'



**This Electro-Voice ad dates back to 1972 - before the quad 'war' had begun in earnest!**

(100% or '1.0' proportion), the front-right channel at 30% level (0.3 proportion), the rear-left channel at 1.0 and the rear-right channel at 0.5 with phase-inversion (i.e. -0.5)

The signal presented to the cutting-head's right channel, meanwhile, was a mix of the front-left channel at 0.3, the front-right channel at 1.0, the rear-left channel at -0.5 and the rear-right channel at 0.1. A decode matrix was applied to the two-channel playback source at the playback end to recover the four channels. For the left front channel, this was 1.0 (left playback channel) and 0.2 (right channel). The others were 0.2L+1.0R (front right), -0.8R+1.0L (rear left) and -0.8L+1.0R (rear right).

It can be seen that cross-leakage was deliberately-introduced into the front and right channels; as a result, the front/stereo soundstage will be restricted. Vinyl can offer 25dB or so of stereo separation; Stereo-4 restricted this to 12dB. The separation between the front and rear channels was even lower,

at a mere 2dB, using the primitive analogue decoders of the day.

In other words, the quadraphonic image you heard was rather subtle and far from what a fully-discrete four channel (or '4:4:4') format like Q4 tape could deliver; matrix quadraphonics was thus a compromise between compatibility and performance.

The encoding matrix of an early alternative, Dynaco's Dynaquad (or DY), didn't carry out any blending between the front channels and so the stereo-playback soundstage wasn't compromised. The simple passive-matrix DY decoder (or 'Quadaptor') worked from a stereo amplifier's loudspeaker outputs using networks of wirewound resistors to derive the signals needed to power the rear speakers. It was built into at least one Dynaco amp; companies like Sherwood and Lafayette also sold Dynaquad-compatible gear.

A lot of stereo records gave a kind of 'surround image' with this type of decoder, thanks to the differences between the left and right channels; indeed, you'll hear this if you play a modern record or CD through one of the matrix surround-sound modes (such as Dolby Pro-Logic II Music or DTS Neo:6) of a modern AV receiver.

Such 'derived surround' systems are known as '2:2:4'. This effect was researched, and initially commercially exploited, by famous audio engineer



**One of only a few quadraphonic LPs to use the Electro-Voice matrix format, this is Arthur Lyman's 'Puka Shells'.**

(and Dynaco co-founder) David Hafler. Simple 'Hafler circuits' graced many budget audio systems of the era, and provided a cheap route into 'surround sound'. Indeed, the very first Dynaco surround decoder (circa 1969) was designed to specifically exploit the Hafler effect and 'synthesise' ambience from stereo records. In its most basic form, Hafler



**Made by US brand Lafayette, this passive Dynaquad adaptor connected to a stereo system's speaker outputs to recover 'ambience' from stereo material.**

was actually a 2:2:3 configuration as it consisted of a single rear ambience speaker connected across the amplifier's positive speaker terminals.

Not many records were released in the EV or DY formats, which enjoyed minimal success in the USA. Only a few records and decoders were imported into the UK.

Of the six known DY releases, one was a demo disc - and three of the others were Beach Boys albums ('Sunflower', 'Keeping The Summer Alive' and a few tracks on 'Surf's Up').

EV wasn't much more successful, even though it had the backing of the Radio Shack/Realistic concern. Among the ten or so albums were a Realistic demo, a number of early electronic-music releases (two Beaver and Krause LPs, and Keith Droste's 'Big Band Moog'), Arthur Lyman's Hawaiian lounge-music 'Puka Shells' and Morris Knight's brassy 'Three Quintets'.

In subjective playback terms, both standards were loosely interchangeable. However, the LPs play through modern matrix decoders far better than they ever did with the official 'lo-tech' decoders. Although enhancements were tried - Electrovoice even introduced an EVX4 decoder chip - EV and DY disappeared with the emergence of newer systems of higher performance potential and significant commercial backing.

**Next month, we'll discuss these matrix systems - and also a clever alternative that allowed four discrete channels to be crammed onto a two channel LP.**



**When quad hit the streets, many equipment manufacturers and record labels released 'demonstration albums' to show off the new technology.**



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# Mighty Atlas

Jon Myles finds the latest power cable from Atlas makes a worthwhile upgrade to any system.

**P**ower cables undoubtedly divide opinion. Some argue that there's no way a short connection between your power outlet and equipment can possibly make a difference to the overall sound of a hi-fi system.

Others say that with the increasing prevalence of RFI and EMI interference due to the growing number of Wi-fi networks, smart devices and switch-mode power supplies adding grunge to the general environment, they can be a weak link in the hi-fi chain.

Personally, I'm firmly in the latter camp. They are a wire which can pick up extraneous distortion and transmit it into the system – the deleterious effects may be subtle but they can also be crucial to musical enjoyment. And having used a number of specialist power cords in various systems ranging from the thoroughly budget to the seriously high-end I know they can make a significant difference.

Which brings us to the Atlas Eos 4DD – one of a range of power cables produced by the respected Scottish manufacturer.

It's a sturdy cable, but no so stiff that it makes installation awkward. Atlas says it is built to offer low resistance, high current handling and excellent screening from radio frequency interference.

Inside Atlas uses oxygen free copper wiring (OFC) with a Teflon dielectric, aided by a dual drain technology derived from its reference Mavros and Asimi cables as the mechanism of coupling to the primary screening – effectively dumping airborne and electro-magnetic disturbances to earth.

The IEC and mains plugs are Atlas's own design and feature



rhodium-plated pins for better connectivity. They are also nice and chunky and easy to grip, making plugging and unplugging the connections gratifyingly simple.

At £200 for a 1 metre length it's not the cheapest power cable on the market – but nor is it prohibitively expensive.

## SOUND QUALITY

Compared to a number of other power cables – from a standard freebie to after-market models costing up to £300 – the Eos consistently impressed me with the way it opened up the sound and seemed to extend the frequency range.

Although the effect was obvious on both source components and amplifiers, the greatest improvements came with the latter.

Plugged into a McIntosh MC152 power amplifier (see review next issue), Antonio Forcione's delicate guitar work on 'Meet Me In London' had greater definition and presence. The noise floor also seemed to be lower – as though a slight background hash had been removed. It's most noticeable when you remove the Eos and replace it with a different cable and realise there's a slight blurring of the sound.

On Frank Black's 'Hang On To Your Ego' there was more back-to-front depth to the music and timing appreciably improved – the track becoming more propulsive with

added drive to the low-end.

It's this quality that really sets the Atlas cable apart from some of its rivals. Bass and drums gain more definition with the system seeming to dig a little bit deeper, but without losing any rhythmic swing.

Switching to the cheaper Creek Evolution 100A integrated amplifier, again the Eos opened up the sound, managing to bring a little bit more out of what is already an excellent piece of equipment. Some might see spending £200 on a power cable for a £1500 amp is skewing the budget, but I'd argue it actually could be one of the most cost-effective upgrades you could make.

Which is one of the impressive attributes of the new Atlas power cable. It will bring obvious improvements to expensive equipment but also manages to give a boost to mid-price components as well.

Like any of these products, the degree of improvement may vary depending on the quality of your mains and the general RF environment in your listening room. But I'd definitely recommend giving the Atlas Eos at least an audition. The chances are you'll not want to take it out once it's plugged in.

**ATLAS EOS 4DD  
£200 1 METRE  
LENGTH**



**OUTSTANDING - amongst the best**

### VERDICT

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### FOR

- extended frequencies
- better definition
- construction

### AGAINST

- nothing

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# Grand Opera

**Italian style allied with a beguiling sound make the Opera Mezza a tempting proposition, says Jon Myles.**

It's a strange fact of life that some countries become synonymous with certain types of hi-fi. Mention America and the mind immediately conjures up pictures of muscle-bound amplifiers from the likes of McIntosh and Krell. Mention Japan and you'll think of exquisitely built and technologically advanced electronics.

And Italy? Well, that has to be luxurious loudspeakers boasting hand built wood and leather covered

cabinets looking like they been built by craftsman who learnt their trade at the local Bentley dealership.

Of course, the most famous exponent of that design ethos is Sonus Faber – but fellow Italian company Opera has been producing similarly well-regarded loudspeakers since 1989. The sister company of famed valve amp manufacturer Unison Research, Opera builds all its products at its factory in Treviso, just outside Venice, in the north of Italy.

The Mezza is the smallest model in Opera's Classica range, it's a two-way bass reflex standmount measuring 32cm x 20cm x 33cm (H/W/D).

As you might expect, the Mezzas simply ooze style when unboxed, with solid wooden side panels and a black leatherette finish on the front baffle, top and rear panel. That baffle is also sculpted around the drivers to aid sound dispersion, while the cabinet slopes in slightly to the rear

in an attempt to diminish internal standing waves.

For the drive units, Opera uses a 5in SEAS treated paper mid/bass unit allied to a 1in Scanspeak tweeter – the same as that used in models higher up the Classica range.

Round the back are a single pair of loudspeaker binding posts and a small reflex port to help augment bass.

Fit and finish are excellent and placed in situ on a sturdy pair of stands the Mezzas really do look a classy proposition – a world away from some of the other bland square boxes on offer at this price point.

## SOUND QUALITY

And the Opera Mezzas sounded just as good as they look, I found. Unlike some other small standmounts, they are admirably smooth and accurate with no attempt to artificially boost the bass or treble (see Measured Performance for more details).

Firing them up, clean and detailed treble made an immediate impression on me. Playing Sinead O'Connor's 'Sean Nos Nua' collection of traditional Irish songs, her voice was beguilingly sweet and possessed great intonation. It's O'Connor's phrasing that makes this album – and the Mezzas have the mid-range accuracy and timing to really bring this out. Backing instruments such as cymbals, piano, drums and accordion also had fine articulation. Leading edges were distinct, without being edgy or harsh.

Likewise, Barb Jungr's jazz

reworkings of Bob Dylan songs on 'Man In The Long Black Coat' had delicious atmosphere, with a palpable sense of the band being right there in front of me.

Moving to something a little heavier the Mezzas had a decent amount of bass for their size; the pounding intro on Massive Attack's 'Angel' was replayed with punch and power. Inevitably on a 'speaker this size you do miss the very lowest octaves – but what's there is solid and tuneful, so they don't rob the tune of any of its grunt. Room placement also helps here, with Opera's recommendation of about 30cm from a rear wall seeming about right to me. Any further into the room and they could start to sound a little light and bass-shy.

In the final analysis the Mezzas might not be quite the thing for die-hard dance and heavy dub lovers. But they aren't really 'speakers designed to send shockwaves through your stomach – more to relay music in a natural, unforced and accurate way.

Those qualities shone through on Saint Etienne's 'London Conversations' where the Mezzas managed to keep the music racing along while losing none of the subtle electronic effects and keyboard samples floating behind Sarah Cracknell's vocals. They also image extremely well, pushing sounds beyond the edges of the cabinets and well into the room.

All these attributes mean the Mezzas are also good at revealing

the differences between various amplifiers; they liked our Creek Evolution 100A.

If there's one word of caution it's that you do need to spend some time with the Mezzas to appreciate their qualities. Some other loudspeakers may initially sound more exciting due to a pumped-up bass or over-inflated treble.

Next to those the Mezzas may come over as a little reserved, even bland at first. Don't be fooled – they are anything but. Instead what they are is superb music makers which concentrate on accuracy and detail, as opposed to superficial excitement.

## CONCLUSION

The Opera Mezzas are beautifully built and have a sound to match – clean, uncluttered, with a pleasing lack of any obvious colouration. They are very well engineered, with a sound that very much complements the high standards reached by their Italian leather and veneer finish.



**The rear of the Opera Mezza have a single pair of speaker binding posts plus a small reflex port.**

## MEASURED PERFORMANCE

Our frequency response analysis shows the Opera Mezza measures almost flat across the audio band, on-axis and substantially off-axis too. As a result it will have accurate tonal balance and lack common problems, including an upper midband crossover dip that softens the sound and/or raised treble that adds brightness. The Mezza will instead come across as neutral but detailed, with clean, character free treble. The smooth nature of the response suggests low coloration too.

Bass rolls away slowly below 200Hz, potentially an over-damped response that suits near-wall placement. The width of the trough at 40Hz in our impedance trace suggests good acoustic damping, so bass should be well controlled and not flabby. The Mezza reaches down to 40Hz smoothly – good for a small cabinet – then cuts off hard below this frequency. It

will play low, but not produce subsonics. The port aids output around 40Hz, but only a little as its output wasn't great – about 6dB less than most speakers.

Sensitivity was good at 87dB Sound Pressure Level from one nominal Watt of input (2.8V), and this was into a load of nominally 6.3 Ohms measurement showed. The Mezza's DCR measured 3.7 Ohms and unsurprisingly the impedance curve bottoms out at this value, which amplifiers can handle. The load is largely resistive; only the residual port peaks are reactive, as is usually the case.

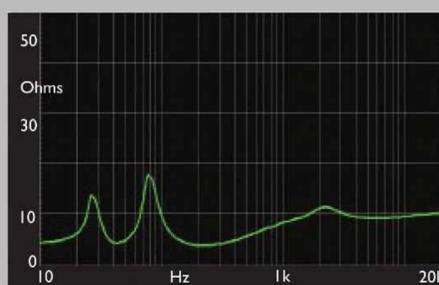
The Opera Mezza is well engineered and neatly balanced all-round, with no weaknesses or difficulties. Measurement shows it offers accuracy and a clean, neutral sound, when used close to a wall in a small to medium sized room. It may well come across as low on character, but high on neutrality. **NK**

### FREQUENCY RESPONSE

Green - driver output  
Red - port output



### IMPEDANCE



**OPERA MEZZA**  
£1100



**OUTSTANDING - amongst the best**

#### VERDICT

A stylish, great sounding 'speaker in a small package that does everything right. Highly recommended.

#### FOR

- natural, uncoloured sound
- good bass for its size
- looks
- detail

#### AGAINST

- nothing at the price

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# WORLD STANDARDS

Your guide to the best products we've heard that are currently on sale in the UK...

## TURNTABLES

**FUNK FIRM LITTLE SUPERDECK** 2013 £110  
Funk's entry-level turntable offers excellent value. Superb speed stability and an appealing sonic performance make it a true bargain.



**AVID INGENUUM** 2013 £800  
Great bass response and upper midrange detail allied to clarity and a fleet-footed delivery makes this a must-hear at its price-point.

**INSPIRE MONARCH** 2012 £3,970  
A startlingly musical performer with blistering speed and dynamics allied with smoothness, sophistication and purity of tone..



**PRO-JECT 2 XPERIENCE BASIC+** 2012 £600  
Seriously confident, assured and capable vinyl spinner. More than capable of getting the best out of your record collection.

**ROKSAN RADIUS 5.2** 2011 £1,450  
Although getting expensive, the latest Radius is a highly grown up package with a flowing yet engaging nature; a fine package.

**ACOUSTIC SIGNATURE STORM** 2011 £3,612  
An excellent high end design with a smooth, solid, open and lyrical sound and razor sharp styling and build.

**FLETCHER AUDIO OMEGA .5** 2010 £3,699  
Charming high end turntable that's a fitting testament to the late Tom Fletcher.

**PALMER 3** 2010 £3,750  
Eccentric hand built high end turntable with a pleasingly smooth, sweet and lucid sound.

**E.A.T. FORTE S EVO 12** 2010 £4,750  
Excellent premium price turntable with power, precision and passion aplenty, but relaxed and easy going by nature too. Great value package with the Pro-ject Evo 12" arm option.

**DR FEICKERT WOODPECKER** 2010 £3,445  
Elegant deck with great low frequency solidity, coherent soundstaging and a precise midband.

**AVID DIVA II SP** 2010 £2,599  
New twin belt drive and power supply make this a more commanding performer although there's a substantial price hike. Speed, dynamics and detail are hard to beat anywhere near the price.

**NOTTINGHAM ANALOGUE HYPERSPACE** 2010 £2,390  
Deliciously spacious, lyrical and beguiling sounding turntable, but lacks ultimate grip.



**LINN LP12SE** 2010 £3,600  
Surely hi-fi's most iconic turntable, the legendary Sondek goes from strength to strength. New Keel subchassis and Radical DC motor add precision and grip to one of the world's most musical disc spinners. Expensive, though.

**INSPIRE ECLIPSE SEV2 12** 2010 £2,349  
Finely engineered, smooth and detailed sounding deck offering valuable twelve inch tonearm compatibility.

**REGA RP1** 2010 £225  
Pleasing sound, fine build and ease of set-up and use make this a great first 'real' hi-fi turntable.

**BRINKMANN BARDO** 2010 £5,845  
Unique high end direct drive turntable with amazing grip and focus, albeit not the most romantic of natures.

## TONEARMS

**ORIGIN LIVE ENCOUNTER MK3C** 2012 £1,745  
Origin Live combines carbon fibre and ebony to marvellous effect in its new 12-inch arm. Creamy and rich in presentation, the Encounter delved deep into the mix for a satisfying listen.



**REGA RB202** 2012 £198  
Replacement for the venerable and much-loved RB251. Three-point mount design serves up a taut and detailed sound.

**HADCOCK GH-242 EXPORT** 2010 £793  
Consummately musical, lyrical sounding tonearm, but needs the right turntable. Excellent value.

**FUNK FIRM FXR II** 2010 £1,175  
Clever reworking of the ubiquitous Rega platform, the FXR II gives a wonderfully musical, almost unipivot like performance.

**ORIGIN LIVE ONYX** 2011 £450  
Easy, smooth, creamy nature that reminds you why you're listening to vinyl in the first place. Essential audition at the price.

**SME 312S** 2010 £1,750  
Twelve inch magnesium alloy armtube plus SME V bearings makes an impressive transcription tool with an insightful yet composed sound. Superlative build completes the age.



**ORIGIN LIVE SILVER 3C** 2010 £599  
Excellent mid-price tonearm with a clean and open yet lyrical sound.

**AUDIO TECHNICA AT-F3/III** 2010 £189  
Great value entry level moving coil with detail and grip you just can't get from similarly priced moving magnets.

## PHONOSTAGES

**PRO-JECT TUBE BOX DS** 2013 £425  
Compact MM and MC phonostrage with valve output circuit and a big sound.



**IFI IPHONO** 2013 £350  
Multi EQ phono stage from British manufacturer that punches well above its weight. Substantial bass and open midband.

**TIMESTEP T-01MC** 2013 £995  
New, minimalist phono stage that sonically punches well above its weight.

**LEEMA ACOUSTICS ELEMENTS**

**ULTRA** 2012 £1,199  
Smooth and detailed sound with the ability to accommodate most modern cartridges. Exceptional value for money.

**WHEST AUDIO PS.30SE** 2011 £4,500  
Amazing incision and grip, the Whest manages to eke out information from low-level phono signals to an almost microscopic level.

**CARTRIDGES**

**REGA CARBON** 2013 £35  
Budget price for a competent and musically coherent-sounding cartridge with a fairly unflappable nature.

**ORTOFON 2M 78** 2013 £80  
Well thought-out mono, standard groove version of respected 2M series of cartridges. Detailed sound with low surface noise.



**BENZ MICRO ACE SL** 2012 £595  
Smooth, lucid and full-bodied, award-winning, hand-made cartridge from Switzerland.

**VAN DEN HUL DDT-II SPECIAL** 2011 £995  
Long-established cartridge from Holland with an open and dynamic sound.

**BENZ MICRO WOOD SL** 2010 £945  
Highly finished Swiss moving coil that plays music with riflebolt precision.



**ORTOFON CADENZA BRONZE** 2010 £1,350  
Smooth and engaging high end MC with a slightly warmer and more relaxed presentation than its superb bigger brother.

**ORTOFON CADENZA BLACK** 2010 £1,650  
Ultra incisive, transparent and dimensional moving coil with grip and punch aplenty.

**ORTOFON CADENZA BLUE** 2009 £1,000  
Musical, out of the box sound, allied to real finesse, makes this a great do-it-all high end moving coil.

**PREAMPLIFIERS**

**MING DA MD7-SE** 2012 £1,520  
A valve preamplifier with an open, effortless sound and a big soundstage. It has plenty of gain so will accept any source and drive any power amp. A real beauty.



**ICON AUDIO LA-4** 2011 £800  
Uses early 6SN7 triodes for liquid sound. Has plenty of gain and a remote control into the bargain.

**DPA CA-1** 2010 £2,650  
Excellent solid-state preamp with a meticulously detailed and propulsive sound, but a deep velvety tonality.

**MF AUDIO CLASSIC SILVER** 2010 £4,500  
One of the best preamplifiers we've heard any price, this transformer-coupled marvel does very little wrong. It's powerful, clean and open yet delicate. Its sound is unmatched at or near the price.

**INTEGRATED AMPLIFIERS**

**ICON AUDIO STEREO MKIIIM** 2013 £1,500  
Excellent starter tube integrated with plenty of detail and an expansive soundstage. Revised 2013 model features easy bias meter for even easier set-up.



**ARIAND PRO845SE** 2013 £1499  
Pure single-ended valve magic. Low-powered but immediately gorgeous, easy-going yet forcefully dynamic at the same time. At twice the price it would still warrant the entrance fee.



**CAMBRIDGE AUDIO AZUR 651A** 2012 £450  
Dual-mono construction and meaty toroidal power supply combine to produce a rich, mature sound that produces sonics far beyond its price point.

**NAIM NAIT 5SI** 2013 £925  
Naim's fabled entry-level integrated amplifier is updated to si status. Retains Naim's superb musicality with an extended bandwidth and smoothness.

**PRIMALUNA PROLOGUE** 2013 £2,349  
Fabulous pure, organic, liquid sound from this 40 Watts per channel valve amplifier. Slightly light bass is the only drawback.

**CANOR TP-134** 2013 £2,495  
Great build quality sonics makes for hassle-free, sophisticated valve amplification. One of the great bargains in audio.



**NUFORCE IA-18** 2013 £2,899  
Class D amp from undoubted experts in the field with bags of detail, clean sound and fantastic imaging.

**CREEK EVOLUTION 50A** 2013 £750  
Flexible, friendly design marked by transparency and dynamism. Best new value-for-money standard.

**BURMESTER 032** 2012 £11,500  
Undeniably expensive - but if you treasure a large yet subtle presentation with plenty of air and space around the performers then the Burmester will provide. Also built to last a lifetime.

**ICON AUDIO LA-4 MKIII** 2012 £1,100  
Vintage 6SN7 valves provide liquid sound with plenty of gain. Comes with remote control for added convenience.

**EXPOSURE 1010** 2012 £425  
Entry-level integrated from Exposure has excellent upper mid-performance with an almost valve-like sound.

**CAMBRIDGE AUDIO A851 A** 2012 £1,199  
Feature-packed amplifier that turns in a mightily accomplished performance offering power allied to superb levels of finesse and detail.

**DENSEN B-175** 2012 £5,500  
Stylish, minimalist-designed amplifier which offers a combination of low frequency power and higher frequency finesse.



**VTL IT-85** 2012 £5,100  
Valve-encrusted integrated with a surprisingly strong bass kick and a sense of passion and emotion that drags you into the music.

**CYRUS 8A** 2011 £1,250  
Trademark shoebox-sized Cyrus integrated now offering 70Watts per channel. Majors on insight and clarity without sacrificing an ounce of musicality.

**QUAD II CLASSIC** 2010 £4,500  
Beautiful retro styled integrated amplifier with a subtle, supple sound - although needs matching to speakers that are easy loads.

**SIM AUDIO MOON 600I** 2010 £5,750  
Sturdy build, useful facilities and a wonderfully relaxed, seamless and even-handed sound will win this many friends.

**MUSICAL FIDELITY AMS35I** 2010 £5,999  
One of the best high end integrations we've come across, this combines hear-through transparency with musical get-up-and-go.

**DPA CA-1** 2010 £2,650  
Stylish, minimalist-designed amplifier offers a combination of low frequency power and higher frequency finesse.

**DARTZEEL CTH-8550** 2010 £16,500  
Charismatic and quirky high-end solid-state integrated amplifier with superb sound and a charming visage.

**POWER AMPLIFIERS**

**AUDIO RESEARCH VS175** 2013 £7,498  
Powerful, fast valve sound that makes everything else look weak at times. Needs careful matching but well worth the effort.

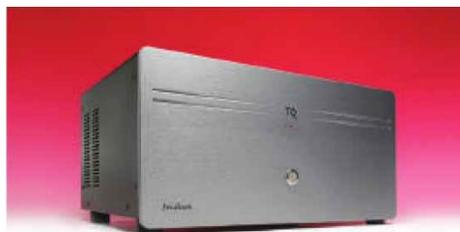
**ICON AUDIO MB845 MKIIM** 2013 £5,999  
Offering 120Watts from big 845 valves the Icon Audio offers power right down to low frequencies providing massive dynamics and bass swing yet always remaining easy on the ear.

**QUAD ELITE QMP MONOBLOCKS** 2013 £1,195 (EACH)

The proverbial iron fist in a velvet glove. Plenty of power but delivered with an assured and confident nature. Smooth on top and easy on the ear but can rock out when needed.



**TELLURIUM Q IRIDIUM** 2012 £4,800  
Single-ended Class A solid-state with a beautifully smooth, transparent and three-dimensional sound. All the refinement of a good valve designer but with a tighter and firmer lower end.



**QUAD PLATINUM STEREO** 2013 £2,495  
The best solid-state amplifier yet from Quad. Combines power, poise and control with superb authority.

**CHORD SPM 1200 MKII** 2013 £8,200  
Stunning looking amplifier with masses of grunt and a clean, detailed delivery that combines power with precision.

**MUSICAL FIDELITY AMS50** 2010 £7,000  
Mighty, assured high end full Class A integrated proffering icy clarity allied to real musicality. Lacks the lucidity of the best tube amps but redeems with power and punch.

**XTZ AP-100** 2010 £520  
Decently smooth yet usefully muscular, this power amp punches way beyond its price point in sonic and value terms.



**ICON AUDIO MB845 MKII** 2010 £5,500  
With 120W from big 845 valves right down to low frequencies, this power amplifier has massive dynamics and bass swing, yet is easy on the ear.

**AUDIO RESEARCH VS115** 2012 £5000  
Oodles of power with enormous punch. Rafael Todes found the Audio Reserach provided "shock and awe" while retaining incredible smoothness and texture.



## LOUDSPEAKER FLOORSTANDER

**QUADRAL PLATINUM M50** 2013 £3,150  
A superbly engineered loudspeaker combining low-end authority with midband detail and a clean spacious treble. Very few to touch it at the price.



**QUAD ESL-2812** 2013 £6,500  
The latest incarnation of Quad's classic design is better than ever. Brilliantly open and natural with a cohesive quality that puts conventional box loudspeakers in the shade.

**TANNOY PRECISION 6.4** 2013 £2,399  
Clear, forward sound with great projection. Need little power to go loud and have superb fit and finish into the bargain.



**SPENDOR SP100 R2** 2013 £6,495  
Retro looks but a sound that's hard to match. Spendor's 12" bass unit provides massive of low-end grunt with a room-filling sound.

**QUADRAL ORKAN VIII AKTIVS** 2013 £6,200  
Active loudspeaker with tight, powerful bass, perfect accuracy and detailed treble from a ribbon tweeter.

**CABASSE PACIFIC 3 SA** 2013 £11,500  
Superb speaker which resolves a vast amount of detail. Needs top quality source to be at its best.

**SONUS FABER VENERE 2.5** 2013 £1,198  
Great bass, superbly neutral midband and musical authority to spare make this a great introduction to the Italian maker's range.



**WHARFEDALE AIREDALE CLASSIC** 2013 £24,995  
Classic name and styling allied to 21st century cabinetry, crossover and drivers to produce a class-leading loudspeaker. Just make sure you have the room!

**AURUM WOTAN VIII** 2012 £2400  
A supremely well-balanced loudspeaker. Clean and detailed with great treble and a real sense of presence. A big, bold sound from a relatively compact cabinet.

**EPOS ELAN 35** 2012 £1,200  
Enthralling loudspeaker with prodigious bass power, detail and depth. A 93dB sensitivity means it works well with lower-powered valve amplifiers.



**USHER DANCER MINI-TWO** 2012 £3,500  
Fitted with Usher's own diamond-coated tweeter, these loudspeakers glisten with detail while the massive cabinet delivers deep, powerful and controlled bass. Offer great sound from a price-tag half that of some rivals.



**MARTIN LOGAN ETHOS** 2012 £6,698  
Matches Martin Logan's XStat electrostatic to a powerful subwoofer to provide extended, powerful bass with dramatic sonic purity. Demands careful partnering to give of its best.

**PMC TWENTY.24** 2012 £3,100  
Stylish, detailed and thoroughly enjoyable, the PMCs have the deep bass of a transmission line with the heart of a mini-monitor.



**SPENDOR A3** 2012 £1,295

Fine little floorstander with a smooth, natural mid-band and even tonal balance. Ideal floorstander for smaller rooms.

**Q ACOUSTICS 2050i** 2012 £525

A large floorstander at a budget price. Offers high sensitivity and big sound and has very few flaws for the price.

**SPENDOR ST** 2010 £5,995

This classy sounding, superbly presented big floorstander will appeal to those seeking high end sonics with subtle looks.

**VIVID V1.5** 2010 £6,000

Breathtaking transparency, superlative coherence and dizzying speed make these one of the best standmounters ever made - providing you like their 'studio sound'.

**B&W 800D** 2011 £18,000

B&W's statement floorstanders are a veritable study in hi-tech design. They deliver depth and definition with breathtaking speed and authority. Expensive – but endlessly impressive.

**GERMAN PHYSIKS LIMITED 11** 2011 £7,800

Don't be fooled by the austere looks; this is a superbly enjoyable omnidirectional speaker with a wonderfully fast, expansive sound.

**ECLIPSE TD712Z/2** 2011 £5,100

Flawed genius, and wilfully so. These loudspeakers don't do everything well, but what they can do is profound and enthralling; rhythms, dynamics and soundstaging.

**MAD MY CLAPTON****GRAND MM** 2010 £3,599

Distinctive coaxial standmounters with wonderful soundstaging, bright lucid midband and true musical insight.

**REVOLVER CYGNIS GOLD** 2010 £15,000

Vast in scale with effortless dynamics and an easy, barrel chested bass, these big bangers are great for lowish power tube amps. Large room needed!

**TANNOY DEFINITION DC10T** 2010 £5,000

Wonderfully wide and open, super fast and amazingly engaging to listen to.

**LOUDSPEAKERS STANDMOUNT****MARTIN LOGAN MOTION 15** 2013 £800

Folded Motion tweeter gives a taste of Martinn Logan's electrostatic sound in a standmount. Very different from the standard mini-monitor and all the better for it.

**ACOUSTIC ENERGY 301** 2013 £425

Clean, crisp delivery with a good level of detail. Bass performance belies their size.

**WHARFEDALE DIAMOND 122** 2013 £280

Builds on the success of previous Diamond ranges with better bass, more detail and a much greater sense of scale.

**USHER DANCER MINI-X** 2013 £2,450

A highly-accomplished standmount speaker from Usher with outstanding sound and great build quality.

**KEF LS50** 2013 £800

Supremely musical mini-monitors which sound much bigger than they look.

**WHARFEDALE DENTON** 2012 £500

A beguiling mixture of retro looks with modern, high-technology drive units. The Denton has an easy-going, big-hearted sound with just a touch of warmth that should appeal to many listeners.

**PMC TWENTY.21** 2012 £1,375

Transmission line loaded standmount with a big box sound from a compact cabinet. Punches well above its weight.

**PARADIGM SHIFT A2** 2012 £658

Well-developed and hugely enjoyable active loudspeakers with distinctive looks and a big, bold sound.

**TRIANGLE COLOUR** 2011 £500

Taut, dynamic and immensely musical. Design, fit and finish comparable to models costing significantly more.

**MY AUDIO DESIGN MY 192** 2011 £1,350

Mini-monitors with an exceptionally smooth, spacious and refined sound that beguile and excite in equal measure.

**Q ACOUSTICS 2020i** 2010 £165

Great little bargain-priced standmounts with a friendly, fun yet surprisingly refined sound. Hard to better for a pair of starter loudspeakers.

**ACOUSTIC ENERGY NEO 1 V2** 2010 £225

Civilised sounding speaker with fast and tuneful bass.

**XTZ 99.25** 2010 £640

Disarmingly open and refined at the price, these standmounters bring unexpected civility, refinement and insight to the price point. Exceptional value for money.

**MY AUDIO DESIGN MYCLAPTON SE**

2010 £3,299

Powerful, dynamic, musical yet refined, this unconventional point-source design yields dramatic sonic benefits.

**ELAC BS243** 2010 £1,000

More transparent and spacious than they've a right to be at this price, these refined mid-price standmounters represent top value.

**ACOUSTIC ENERGY AE1 CLASSIC**

2006 £845

Brilliantly successful remake of an iconic design; not flawless, but surely one of the most musical loudspeakers ever made.

**HEADPHONE AMPLIFIERS****EPIPHANY EHP-02** 2012 £99

PP3 battery-powered portable gives great sound quality at an almost giveaway price. Happy with the output from an iPod or CD player, the little epiphany is a true bargain.

**GRACE M903** 2012 £1,980

A top-quality DAC and headphone amplifier in one. Shines a bright light on even the finest detail.

**ICON AUDIO HP8 MKII** 2012 £550

Offering a clean, open soundstage, the HP8 MKII valve-based headphone amplifier provides precision and detail over the entire sound spectrum.

**MUSIC FIRST PHONE BOX** 2012 £276

Brings a big stage, plenty of detail and rich, deep colours to the sonic spectrum.

**FIDELITY AUDIO HPA 100** 2011 £350

Great little headphone amplifier with a lively yet refined and open sound.

**CREEK OBH11** 2010 £150

Designed specifically for low to medium impedance (300ohm – 3000ohm) headphones the little Creek has a marvellously well-judged sound. Slightly lean in the bass but none the worse for it.

**GRAHAM SLEE NOVO** 2009 £255

Eminently-capable, dynamic headphone amplifier with a great sense of timing. Crisp, clear treble and warm midrange gives an involving sound.

## SYSTEMS

**LINN KIKO** 2013 £2500  
Great looks and good sound make the Linn Kiko one of the best all-round entertainment systems available today.

**PEACHTREE AUDIO IDECCO** 2012 £1000  
Excellent sounding iPod dock, impressive DAC and fine amplifier section make this an excellent one box style system.

**LINN AKURATE DSM** 2012 £16,250  
A technological tour-de-force of a system, largely due to the DSM preamplifier. The Akurate system has enormous ability plus a smooth sound.

## CD PLAYERS

**REGA APOLLO-R** 2013 £550  
Rega comes up with a cracking CD player again. Tremendous detail and an easy, unforced sound at all times. Few bells and whistles but made up for by its superb sonic ability.

**CAMBRIDGE AUDIO AZUR 651C** 2012 £450  
Mature, rich presentation from this budget CD player. Cracking audiophile entry point for any digital fan.

**CHORD RED REFERENCE** 2012 £15,000  
A unique and massive engineering exercise that could well be the best CD player available. Chord's Pulse Array DAC technology produces a musical experience like few others. This is a true reference player.



**SUGDEN A21SE** 2012 £2,480  
Class A amp with fantastic sound quality producing hard, sculpted images, deep detail and tight bass. Just don't expect disco-like sound levels!



**ESOTERIC K-03** 2012 £9495  
Superb high-end silver disc spinner that is beyond criticism. Devoid of its own character but has a flawless presentation.

**XTZ CD-100/11** 2012 £400  
Stunning CD player for the price that will give players costing three times as much a decent run for their money. Well-built, great sound and bags of features.

**CANOR CD2+** 2012 £3100  
Musically coherent and tuneful valve-driven CD player from Slovakia. Lovely liquid sound.



**DENSEN B-475** 2012 £5,950  
Ice-cool, luxury-designed two-box player with sublime sound quality. Could be the only CD player some people will ever need.

**EXPOSURE 101** 2012 £395  
Detailed player with fine sense of timing should be an automatic entry on any demo list at this price.

**ELECTROCOMPANIET EMP-1/S** 2011 £4,650  
Epic in scale, lavish in tone and exuberant in its musicality - this is a memorable SACD spinner. Quirky in operation and modest in finish, though.

**AUDIOLAB 8200CDQ** 2011 £949  
Inspired CD player and DAC with price-performance ratio like no other. Capable of matching designs costing much more.

**ROKSAN KANDY K2** 2010 £900  
A charmingly musical performer at the price - this is a surprisingly sophisticated CD player for the money.

**MARANTZ SA-K1 PEARL** 2010 £2,500  
Finely-honed, affordable high-end silver disc spinner; this has a musical lucidity that's unexpected at this price.

## TUNERS

**CAMBRIDGE AUDIO AZUR 651T 2010** £299  
Value-packed Am/FM/DAB and DAB+ ready tuner. Precise and detailed with excellent resolution of spoken word.

**CREEK DESTINY 2** 2010 £675  
Creek's tuner expertise shines through in the Destiny 2. This AM/FM receiver is wonderfully three-dimensional and smooth.



**MAGNUM DYNALAB MD-90T** 2010 £1,900  
Exceptionally able, but commensurately priced, audiophile tuner that cannot fail to charm.

## DACS

**TEAC UD-501** 2013 £699  
Feature-packed DAC with benefit of DSD playback. Superb sound means little to touch it at the price.



**CHORD QUTE HD** 2013 £990  
Superb build quality and exceptional sound from this compact unit. Boasts the ability to handle DSD direct via USB and has an exceptional soundstage. One of the best DACs you can buy.

**AUDIOLAB Q-DAC** 2013 £400  
Stripped-down version of Audiolab's M-DAC loses some features but retains much of the sound making it a veritable bargain.

**AUDIOLAB M-DAC** 2013 £600  
Excellent sound, a comprehensive feature count and impressive flexibility make the Audiolab a stand-out product at its price. A range of filter options is the icing on the cake.



**ANTELOPE ZODIAC GOLD/VOLTIKUS** 2013 £3,095  
DAC/preamp/powersupply combination majors on detail but has a remarkable un-digital sound. One of the best at its price.



**CHORD QUTE HD** 2013 £990  
Superb looks and seriously good sound make this little DAC a winner. Both 384kHz and DSD capable meaning it is also future-proofed.

**EXPOSURE 2010 S2** 2013 £810  
Superb performance from the USB input and various filter options make this a truly flexible DAC with great sound.



**NAD M51** 2012 £1500  
A sweet-sounding treble coupled with complexity and tonal depth makes for a rounded and smooth performer. HDMI functionality adds to the NAD's all-round value.



**REGA DAC** 2012 £498  
Lovely sound characterised by dimensionality and strong pace. Among the best at its price and destined to become a digital classic.

**DCS DEBUSSY** 2011 £8000  
DCS's bespoke 'Ring DAC' circuit gives a beautifully-fluid, almost analogue sound that encourages long listening sessions. Not cheap but worth every penny.

**METRUM OCTAVE** 2011 £729  
Unique two-box digital-to-analogue convertor with great sound at a great price. Cuts upper treble, though.



**NAIM DAC** 2010 £1,995  
Superb high-end digital convertor with a probing, punchy and fornically-detailed sound.

## NETWORK PLAYERS

**CHORD DSX100** 2013 £7500  
Chord's proprietary DAC circuit shines in their top-of-the-range streamer. Hear-through clarity with a sound rich in detail, dynamics and soundstage.

**NAIM NAC-N172 XS** 2013 £1650

A pre-amp/DAC/streamer package provides a taut, rock-solid presentation with a tonally rich midband and a superior sense of rhythm.

**SANSUI WLD+2012** 2012 £350

Offering great value for money with a variety of input options the Sansui was a deserved Hi-Fi World Award-winner in 2012. Few can match its ability at the price.

**CAMBRIDGE AUDIO NP30** 2012 £399

Budget offering from Cambridge offers a great introduction to network streaming.

**CYRUS STREAM X** 2012 £1400

Gorgeous sound quality even from compressed digital music. New control app makes everyday operation a doddle.

**MUSICAL FIDELITY CLIC** 2012 £1250

Smooth and easy on the ear but possessed of a big, bold sound that remains clean and airy at all times. Clear, colour display makes navigation a breeze.

**NAIM NDX** 2011 £2995

Clean, incisive and very detailed sound with Naim's traditional pace and timing make this one of the best network music players around.

**PRO-JECT STREAM BOX RS** 2013 £1095

Unusual valve-based streamer/preamp with variety of inputs and a lovely liquid sound. Not the most detailed but compensates with sheer musical verve.

**NAIM ND5XS** 2012 £2175

Great sound quality with traditional Naim heft. A wonderful DAC with full 24/192 handling. Only the display could be better.

**QUAD PLATINUM DMP** 2013 £2495

Comined CD/network player has all the usual Quad elements but with added zest and detail that brings life to everything you care to play.

**DIGITAL SOURCES****ASTELL&KERN AK120** 2013 £1,140

It's small - but packs a punch. Plays digital files up to 24/192, packs 32gb of memory (expandable up to 96gb via MicroSD cards) and has massive dynamic range with negligible jitter. Good enough to replace a CD in most systems.

**ASTELL&KERN AK100** 2013 £569

Portable high-definition digital player with fabulous sound quality.

**NAIM HDX** 2009 £4,405

Interesting one-box network-enabled hard-disk music system that gives superb sonics together with impressive ease of use.

**PORTABLE SPEAKERS****BAYAN SOUNDBOOK** 2013 £149.99

Superb design and great sound make for one of the best portable Bluetooth speaker/radios on the market. Not the cheapest - but worth every penny.

**IRIVER IBA-50** 2013 £69

Big, warm sound with plenty of volume and clean at high levels. Muscular sound compared to many rivals.

**CABLES****MAINS CABLES R US NO.27** 2013 £95

Offers a sprightly pace with a precise nature. Fast performance enhance frequencies and beautifully etched detail.

**BLACK RHODIUM LIBRA** 2013 £100

Opens up the sound stage and offers a significant upgrade to a basic power lead.

**TELLURIUM Q BLUE POWER** 2012 £399

This power cable is not cheap but is worth every penny. Top quality, high resolution and fine value.

**BLACK RHODIUM TWIST** 2012 £71/3M

Twisted to fight off radio frequency, the Black Rhodium speaker cable is easy on the ear with a fine sense of clarity and focus. A remarkable performer at the price.

**TELLURIUM Q BLACK** 2010 280/3M

A deep, dark, velvety performer that's nevertheless highly musical, it represents excellent value as mid-price cables go.

**HEADPHONES****PHILIPS FIDELIO X1** 2013 £270

Aimed firmly at the upper end of the market, these are super-accurate 'phones that can shame many a loudspeaker. Hear them before anything else.

**B&W P3** 2012 £170

Beautifully presented headphones from the loudspeaker specialists. Feed them a good quality source signal and they reward with excellent sound.

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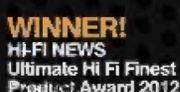
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# Unique Unico

Unison Research's Unico Secondo blends valves and transistors for an individual sound, finds Jon Myles.



**T**ake a quick look and you'd be forgiven for thinking the Unico Secondo is simply another big, relatively basic integrated amplifier. A largish silver (or black) box with just volume and source controls on the front, line level inputs on the rear and a remote control. Investigate a little more, however, and things begin to get more interesting.

For while Italian manufacturer Unison Research made its name with classic valve amplifiers such as the Triode 20 and the iconic Absolute 845, it has recently enjoyed great success with the Unico range – hybrid amplifiers marrying tubes with solid state.

In theory this arrangement makes sense. The tonal richness of

valves allied to the sheer grunt of transistors should have the ability to give you the best of both worlds, as well as the power to drive most loudspeakers.

So the Secondo uses a pair of ECC83s (12AX7) valves in its input stage, married to an FET transistor output circuit giving a claimed 100 Watts per channel into 8 Ohms (Our Measured Performance actually showed 144 Watts and a massive 225 Watts into 4 Ohms).

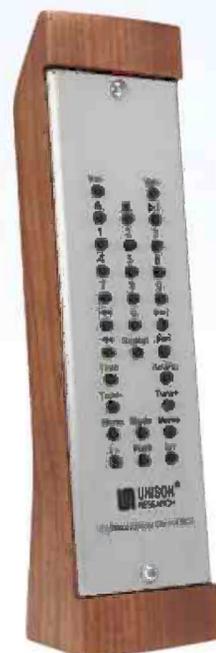
Not that you'd guess at the use of valves from the outside, the only clue being a slight glow on the left hand side of the chassis when you peer through the ventilation grilles on the top.

You would probably guess it is powerful though as the Secondo

is rather bigger than an average integrated, measuring 43.5cm x 13cm x 43cm (W/H/D) and weighing in at 15kg.

As mentioned, the machined aluminium front panel contains just the source and selector rotary controls, made big and chunky for easy use.

On the rear are five line inputs, as well as a balanced XLR input and tape and subwoofer outputs. Interestingly – and rather more



*One of the most handsome remote controls you'll see - carved from a solid block of wood with a metal face plate.*

unusually nowadays – there’s also a built-in MM/MC phonostage. Two pairs of ‘speaker binding posts’ make bi-wiring easier.

Completing the package is a gorgeous remote control which is hewn from a solid block of wood with a metal faceplate. Unfortunately it doesn’t control input selection – only the motorised volume control so is rather less useful than it could be. Also, changing between MM and MC for the phono input means accessing the internal board and changing jumper settings.

Overall, then, the Secondo is

pretty much free of any frills such as a headphone input, mini-jack for mobile devices or a DAC stage. It is well built and finished, though, and once slid into the rack has a purposeful, powerful look about it.

**SOUND QUALITY**

When first switched on there’s a delay of about 20 seconds while the valves get up to temperature indicated by two blinking green lights on the right and left of the fascia. Once they turn solid green, all is fine.

Hooked up to a pair of new Epos K3 floorstanding loudspeakers (see

"It's immediately evident that the Secondo has a big, rich sound with a good degree of drive and musical energy"

review elsewhere this issue) it was immediately evident that the Secondo has a big, rich sound with a good degree of drive and musical energy.

On Led Zeppelin’s ‘Communication Breakdown’ there was both depth and quality to the bass – a rock solid foundation underpinning Jimmy Page’s dazzling guitar work.



**A neat internal layout with a large toroidal transformer in the power supply to give the Unison Research a measured output of 225 Watts p[er] channel into 4 Ohms.**

But it was also well-controlled, never allowing the low end to become flabby or indistinct.

It’s the same effect on New Order’s ‘Age Of Consent’ where the Secondo grabs hold of Peter Hook’s bassline and powers it along, giving plenty of verve and life to the track. There’s no doubt the Secondo doesn’t lack for energy when the music demands it.

Midband is also tonally rich and sonorous. The piano on Neil Cowley



**Two ECC83 (12AX7) are used in the Unico's input stage for a distinctive sound.**

Trio’s ‘Face Of Mount Molehill’ has a lifelike tonality and the switches in tempo between the light and dark passages are handled with aplomb, notes stopping and starting in strict time.

In absolute terms there was a slight softening of detail here and there at times as the amplifier seems to prefer conveying the rhythm and tempo of the music, as opposed to its last absolute nuance. Listening to Kraftwerk’s ‘Minimum-Maximum’ the atmospherics of the various venues didn’t come over as clearly as I’ve heard on some other amplifiers – the Exposure 3010S2-D being a prime example. Similarly the sound of tinkling glasses and muted conversation at the start of The Clash’s ‘Jimmy Jazz’ seemed more ill-defined than it should be.

Pushing the amplifier hard also induced a slight hardening of the sound, the chorus on Haydn’s ‘Te Deum’, for example, becoming a little edgy at higher volumes. Bringing the level down to more sensible levels helped but there’s no doubt the Unico seems happier with less densely textured music.

Having said that it’s not a major deficiency as the Secondo does so many other things well. Switching it to our reference Tannoy Definition DC10Ti floorstanders the pair made a big, bold and exciting sound.



Two pairs of loudspeaker binding posts make bi-wiring loudspeakers a simple task while the inputs include a built-in MM/MC phono stage.

The Tannoys are renowned for their bass and power and the Unison Research made the most of it. Energetic pop or rock such as Goldfrapp's 'Ride A White Horse' romped along with a slam that could not help but bring a smile to my face, while the bassline in Lady GaGa's 'Monster' has enough force behind it to blow you off the sofa. The soundstage of this amplifier is big and wide too, music being pushed out into the room wide right and wide left. Again thought it was not as explicit, detailed or smooth as some amplifiers at this price.

The phono stage proved it's

no mere afterthought but in MM mode it gives a good presentation of itself. Bass was again clean and lively while treble was nicely poised with good definition and cohesion. The Unico does not have the absolute clarity of more expensive standalone phono stages but it would suit entry-level or mid-price turntables well.

**CONCLUSION**

Overall, the Unison Research Secondo is a characterful yet enjoyable product. The combination of a valve input stage with a powerful transistor output works well, bringing a sense of depth to the sound. The

Secondo is not the most accurate or detailed amplifier out I feel, instead preferring to simply get on with the job of playing music in its own particular yet enjoyable way.

If you are looking for something a little different in an amplifier, then the Secondo could be just for you. It has that big, rich, vibrant sound characteristic of valves that will put a smile on the faces of lovers of pop and rock, with enough detail and definition to appeal to fans of most other genres. It also has masses of power and an MM/MC phono input too so the magic of LP can be enjoyed by its hybrid sound.

**MEASURED PERFORMANCE**

The FET output stage of the Unico Secondo delivered 144 Watts into 8 Ohms and a massive 225 Watts into 4 Ohms, so into modern loudspeakers of around 6 Ohms it will deliver around 170 Watts in effect. Its damping factor of 24 is not especially high, but any value above about 20 usually makes an amplifier sound well controlled in the bass.

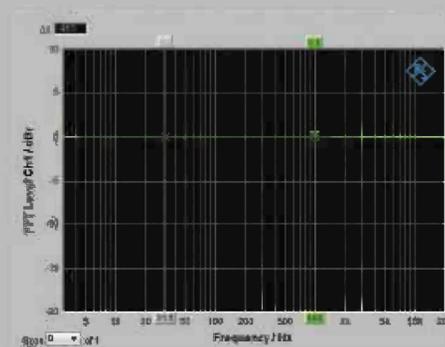
FETs produce distortion unless a lot of gain and feedback are used, but the Unico seems to eschew this approach; distortion was on the high side as a result. At high frequencies it measured 0.3% at 1 Watt into a 4 Ohm load and as power increased distortion rose to around 0.4% -1dB below full output, a high figure. The distortion harmonics were odd order and extended our analysis shows, and this may well be just discernible as a slight roughening of treble.

Frequency response was very wide, again a characteristic of FETs, the Unico measuring flat from 1Hz to beyond 100kHz via its CD input. Input sensitivity was low at 500mV, OK for CD and silver disc players, but inadequate for older equipment.

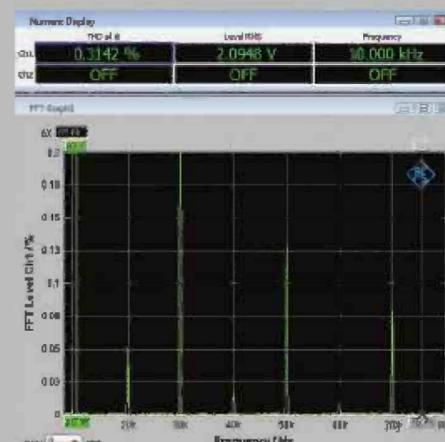
Both MM and MC phono stage was

accurately equalised, with a roll off below 10Hz to reduce warp signals a little (-5dB at 3Hz). Sensitivity was normal at 5mV and 0.5mV for MC, and overload high at 85mV/7mV. Noise (hiss) was high at

**FREQUENCY RESPONSE**



**DISTORTION**



0.5µV (equivalent input noise) for MM and MC, where 0.2µV or less is common; this is 8dB higher than usual. The Phono board, which uses NE5532s, was very difficult to change from MM to MC; this is a dealer mod.

The Unison Research Unico Secondo is a powerful FET wideband amplifier, with valve preamplifier, that measured reasonably well all round. Distortion from the FETs was on the high side however, by current standards – especially at higher powers. And the phono stage was a mediocre add-on. **NK**

<b>Power</b>	<b>144watts</b>
<b>CD/tuner/aux.</b>	
<b>Frequency response</b>	<b>1Hz-100kHz</b>
<b>Separation</b>	<b>88dB</b>
<b>Noise</b>	<b>-101dB</b>
<b>Distortion</b>	<b>0.3%</b>
<b>Sensitivity</b>	<b>500mV</b>
<b>Disc</b>	
<b>Frequency response</b>	<b>7Hz-20kHz</b>
<b>Separation</b>	<b>81dB</b>
<b>Noise</b>	<b>-78dB</b>
<b>Distortion</b>	<b>0.12%</b>
<b>Sensitivity</b>	<b>5mV/0.5mV</b>
<b>Overload</b>	<b>85/7mV</b>

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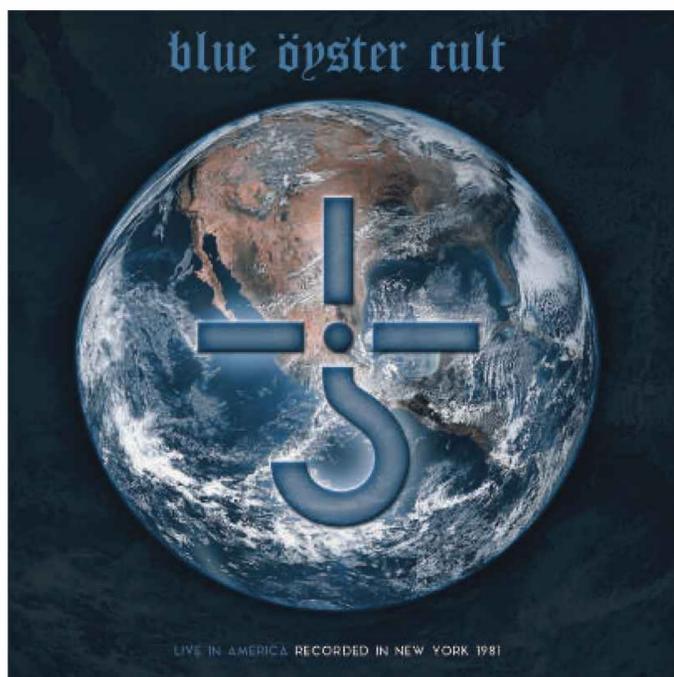
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**AGAINST**

- slight congestion at times
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**BLUE ÖYSTER CULT**

**Live in America: Recorded in New York 1981**  
**Back on Black**

**J**ust prior to the release of their 1981 LP, 'Fire of Unknown Origin' (a fierce and very creative release that was, too), the band appeared in Bond's International Casino, a Times Square nightclub in New York.

In aesthetic terms, the LP of this performance is a lovely thing: a double album pressed on blue vinyl in an attractive gatefold. That said, sonically, the coloured vinyl means that you are playing the actual colouring pigment and the vinyl.

What all live vinyl albums need is atmosphere. That's part of the reason you buy them in the first place, not to hear naff chatter between band and crowd. Such philosophical debates as, "Hey New York! [cheers] Are you ready to rock? [cheers], etc, etc". There's some of that but not too much.

In terms of balance, the production guys got it just right. You can hear the crowd but it never dominates, as on some live

recordings.

The band is the star here. You really want to key into their adrenalin and the fact that this is really what they're all about: playing live in front of their fans.

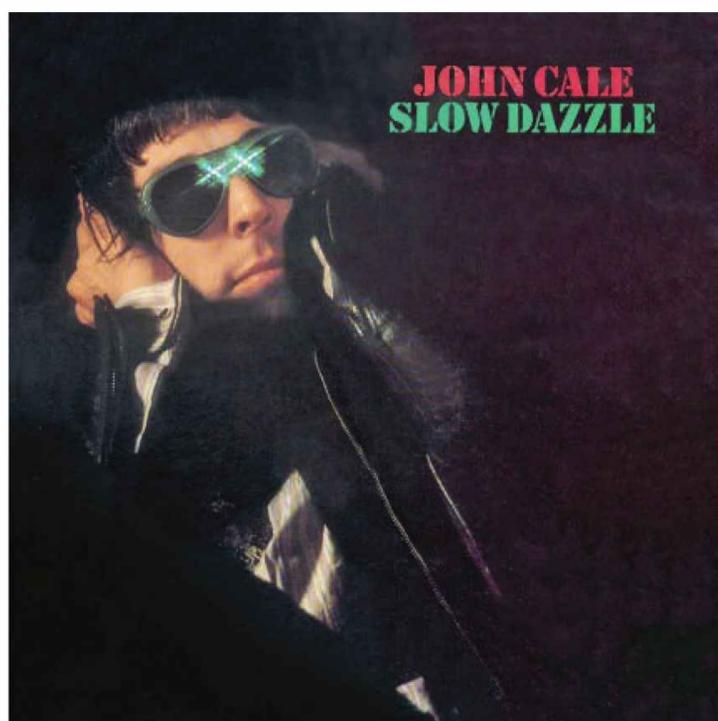
So you get the classics such as 'Don't Fear The Reaper' and 'Me 262' but also three from the 'upcoming' album: 'Joan Crawford', 'Veteran of the Psychic Wars' and 'Burnin' For You'.

The music has a warm feel to it with upper mids and treble being rather veiled with lack of air and space.

That said, the band's energy and enthusiasm wins through, creating a memorable live release.

Check out other Back on Black live releases including Lynyrd Skynyrd's 'Taking the Biscuit: The Classic 1975 Broadcast'; 'The Definitive Ian Gillan Live', live tracks from 1977-82 and Bachman Turner Overdrive's 'Taking Care On The Highway: Chicago Broadcast 1974'.

# AUDIOPHILE VINYL



**JOHN CALE**

**Slow Dazzle**  
**Wax Cathedral**

**T**his album features the talents of Roxy Music's Phil Manzanera along with noted guitarist Chris Spedding and Brian Eno contributing on synths.

In terms of mastering and pressing, this album is not bad. In fact, it's pretty good. It's not up there with the Vinyl on Demand production reviewed elsewhere and does, at very high volume, include some hardening during the upper mids which results in slightly shouty vocals during crescendos.

Nevertheless, I have heard far worse, which is to Wax Cathedral's credit. During the tribute to Beach Boy Brian Wilson, 'Mr Wilson' offers a light, airy production. Structurally, it is a heartfelt, sensitive and affectionate paean to the genius who was largely contemporary to Cale himself as an artist.

When you get to the third track you really see the soul of the album. 'Dirty Ass Rock 'n' Roll' is a

comment on the lifestyle associated with the business itself.

The most startling track on this album is the cover of Elvis Presley's 'Heartbreak Hotel'. It begins with a long guitar scream that is right out of a slasher horror movie. This is not a hotel that you want to visit anytime soon. It's production is decidedly Nick Cave in tone. The song is dark, nasty and almost melodramatic. Even, at times, pantomime villain-like in its portent. A dramatic re-appraisal, nevertheless.

A decent pressing and I like the fact that the label packs its record in a gentle, soft plastic inner sleeve. The little things are the most important for the discerning audiophile.

Also look out for two other Cale releases on the Wax Cathedral label. The very wonderful 'Fear' (1974) including Phil Manzanera and Brian Eno plus 'Helen of Troy' (1975), including Chris Spedding and Eno again.

You can place Lorenz in the same company as Conrad Schnitzler, Edgar Froese, Dieter Moebius and Hans Joachim Roedelius. Lorenz was an innovator, grabbing an early Moog but then constructing his own synths plus effects boxes.

What you've got here are a series of four early tape works released in the early eighties on his own label: 'Queen of Saba', 'Silversteps', 'Wonderflower' and 'Earthrise'. At this time Lorenz was an important figure in the cassette culture of the time. He and Peter Schäfer launched the tape-label Syntape and released more than thirty albums over five years.

Vinyl on Demand deserves a pat on the back. Not only for utilising the original sources but for their implementation – which is impeccable. While other records in this review were 'loud' at my default '65' volume setting on my pre-amp, this recording has so little noise

attached to it that I was encouraged to up the gain on two occasions, enhancing the lower frequencies and giving me a thunderous lower end. Bass fairly shook the room while the upper mids were insightful and detailed.

Lorenz presents a series of intriguing soundscapes, sometimes with a rolling heartbeat...beat that is not only hypnotic but it's multi-layered construction sucks you into the music.

Sometimes his work is meditative, presenting synth drones which build and expand, creating magical air sculptures. In this way, Lorenz combines power and beauty. Many a time my sole response to this music was a quiet and elongated "Wow!"

Also look out for the experimental synth work of Fockewulf 190 and 'The First and Second Side of the Mystic Synth', limited to 400 copies over two discs featuring 'In The Rooms of Memory', rare demos from 1986.



RÜDIGER LORENZ

The Syntape Years 1981-1983  
Vinyl On Demand

AUDIOPHILE VINYL

A real gift to those of you into Krautrock – and created way back in 1971. Orschakowski was a true artist in that he produced music but he also painted and more.

This release was only ever sold as a private pressing from Hamburg in Germany. The man himself produced it, which means that rare original copies are horribly expensive.

If, as I assume, the creation of this LP was wrought from a vinyl dub then this is a remarkably good pressing/master. The sound quality is open and airy. More so because the album has, in effect, been produced 'live'.

With live recordings from the Blow Up club in Munich, 1969, a festival in the Hamburg Melle Park in summer 1971 and some studio jams, you can hear that Orschakowski has placed a microphone or two in a room and then the band has given it

all they had.

In terms of studio positioning and creating a soundstage, well, there isn't one. The drums are...here and the guitar? Well that's...over there, somewhere. What the performance lacks in finesse, it more than makes up for in terms of sheer energy, grit and passion. This is a total freak-out jam. A complete acid, psyche happening. For Krautrock fans, it's a must buy because it is infused with the soul of the entire genre. Bizarrely brilliant.

This release also includes a cracking CD compilation exhibiting another of Orschakowski's projects. This one is called 'WoOZ!' Featuring ten tracks, it offers further acid psych and is featured in a fold-out poster, liner sheet-type cover plus plastic outer.

Also look out for another Krautrock rarity reissued, Hardy Kukuk's 'Atemot' from 1981 which takes a Tangerine Dream template and gives it an eighties twist.



WOLFGANG ORSCHAKOWSKI

Zippo Zetterlink In The Poor Sun  
Wah Wah

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# "CD has come and has gone whilst LP steadily improves to wow today's listeners"



Noel Keywood

**F**or mystical reasons, the LP delivers wonderful sound quality. And if you want to hear LP at its best, the way to do this is with a moving coil (MC) pickup cartridge.

They're expensive and delicate – a dangerous combination that is wallet threatening – but they also deliver a lovely sound. And this has always been the case; MCs have reigned supreme for a long time now.

To date I have never heard a moving magnet (MM) cartridge – most cartridges under £500 are MM – sound better than an MC, although Ortofon's 2M Black is so good that differences may, for many listeners, seem academic. All the same, for some reason I struggle to understand, MCs offer a better sense of space, both within the dimensions of the soundstage that stretches out further all round, and also in the apparent separation of instruments in the soundstage.

Since the advantage of an MC has always been described as such, whoever listens to one, and since this has been the case ever since they came onto the scene, I'm not alone in preferring the sound of an MC over all else. And since group experience isn't usually delusional, in spite of what sceptics think – especially in the field of cables – you'd think there would be concrete reasons for these perceived differences between the two types of cartridge.

But there aren't – and to some extent I remain baffled. Recently I thought I had finally come to understand the reason for the difference in sound between them, at least on a firm, arguable scientific basis, but when I did the sums I realised that I was thinking wishfully; well, no, actually I had decided I knew the answer before inspecting the facts – and I was wrong! This is

always a dangerous thing to do.

But no problem, because putting pen to paper to work out the dynamic range of an MM cartridge and an MC cartridge gave me a surprise, one I think any vinyl lover will find interesting.

I will get to the surprise first: pickup cartridges have an intrinsic dynamic range that's much the same as CD. The dynamic range of CD – the difference between highest and lowest sound levels it can reproduce – is usually quoted as 96dB, whilst on the notebook beside me lie the calculated dynamic range value for both MM and MC cartridges: 94dB. Superficially, that puts LP and CD a whisker apart and brings a new light to the strengths of analogue LP replay.

Demonised in its time as noisy and plagued by scratches, ticks and pops, the LP was – at its end – confidently categorised as inferior by pop science, but potentially it never was. It was an analogue system that could improve through development and whilst that theoretical 94dB figure is not currently attained, my measurements have shown that with The Beatles In Mono LPs we have got to 87dB. That's not bad going. CD has come and has gone (well, almost) whilst LP steadily improves to wow today's listeners, turning in an ever better performance

The sound quality of LP is rising all the time as cutting lathes are revived and fettled, as vinyl gets quieter and as masters, including metal masters, improve. Amongst all the discussion and argument about analogue and the LP I think we sometimes fail to see that sound quality and enjoyment are its big strengths. Wrought properly, the LP reigns supreme here.

Without a doubt, high-resolution digital is more pristine and arguably offers a more accurate represen-

tation of reality, but the LP still sounds fabulous – especially through a moving coil cartridge.

That it also contains a vast historical record of music and is a cultural artefact is another big plus point of course, but not my interest here and now.

So I recently got my head buried in the figures to sort out an obscure property of pickup cartridges, one I have hardly ever seen mentioned: they produce noise. And MM cartridges are so noisy they even swamp MM phono inputs, but again few realise this. It's easy to hear though, by plugging a shorting phono plug and then an MM cartridge into a phono input and listening to the hiss at full volume: the cartridge will be far noisier than the shorting plug, the latter allowing you to hear the noise produced by the phono stage alone.

This had led me to suspect that the lower noise of an MC cartridge gave it greater dynamic range than an MM, explaining its superior sound quality. But not so, calculations showed me. This isn't the reason MCs sound better; they both have an intrinsic dynamic range value of 94dB.

OK, that puts me back to square one in the conundrum of why an MC sounds better than an MM, but at the same time I became yet more impressed by just how good the LP really is, at heart. Juggling with the figures showed it was easy to nudge dynamic range up to over 100dB and some cartridges, like the high output Ortofon 2M Black and Cadenza Bronze, approach this.

What I haven't made clear so far is that my dynamic range figures are of the electrical generator alone; they don't include vinyl noise.

Or in other words, they are that of the cartridge when not playing an LP. But as vinyl gets quieter the gap closes and the wonder of the analogue LP grows. ●



# "This snarling, sneering noise emerged from the mouth of Pistols' lead singer Johnny Rotten"



Paul Rigby

I'd have been around thirteen or fourteen when punk hit. Not quite old enough to fully immerse myself into the scene but certainly aware of the effects. The Sex Pistols, for example, were rather scary. One minute, I'd be used to the complex prog tones of Genesis and Yes plus the bombastic glam of Queen and then this snarling, sneering noise emerged from the mouth of Pistols' lead singer Johnny Rotten which, frankly, stunned me.

I first saw the Pistols on a Granada TV programme, run and presented by soon-to-be Factory Records supremo Tony Wilson called 'So It Goes'. During the original broadcast, The Pistols violently stomped all over our family's front room causing my mother and father to physically flinch.

Then, back at school, I noticed that the most disruptive boy in the class had bought the Pistols' debut album 'Never Mind The Bollocks'. Then I saw the growing amount of punks walking around Liverpool's city centre. I also noticed that music had changed.

Interestingly, Johnny Rotten himself, aka John Lydon, was not overly impressed with the maturing punk movement.

After the first fresh roots of the scene, "...punk grew into a standardised uniform, with the charge lead by the mass media. The Daily Mirror would put out articles: 'How to dress like a punk'. Many of the bands that came along then thought that the whole idea was to out-Rotten Rotten. And so violence crept in. Dumb, moronic, smashing-their-heads-off-walls-to-show-how-tough-they-were-fools. They weren't listening to nothing. They were incapable of learning or growing...or seeing any hope or prospects for the future".

One of Lydon's reviled groups was Sham 69 who offered 'working class punk'. Cockney Rejects were of a similar ilk, popularising a sub-genre of punk called 'Oi!'. You can hear the latter on the punk label Anagram ideally via 'The Very Best Of Cockney Rejects' to get an idea of what all the fuss was about.

Another Anagram band that I'm sure Lydon would have hated were The Macc Lads who offered three-chord boogie, metallic riffs and punk. They insulted and entertained their audiences and were the epitome of the macho, male-dominated pub scene.

Albums such as 'Beer & Sex & Chips N Gravy' plus 'Bitter, Fit Crack' say it all really. Other bands of the same stripe include Peter and the Test Tube Babies (Anagram has a 'Best Of' of this lot too).

People like Lydon enjoyed the punk scene when he saw it as something inspiring. When bands like the Slits, for example, showed that women in rock could be a force but also that women in punk had something unique to offer the genre. What he saw as "awe-inspiring" were those bands who were not into the scene to compete but to add and join to push boundaries.

Without wanting to put words into the mouth of Lydon, I wonder if a few of those bands could have included outfits such as Alternative TV, The Drones and Slaughter and the Dogs?

All three of the above are available on Anagram. Alternative TV included Mark Perry who was responsible for 'Sniffin' Glue', the first and most famous punk fanzine and a publication that showed that 'Do It Yourself' was a possibility. Culturally, Perry was a significant figure.

For 'The Image Has Cracked', is an unfairly neglected punk classic album, the essence of the collection

was for punk to be an 'expression' rather than a template of rules to work towards.

As such, it offers an innocence and worthy integrity lost in many other punk bands. This edition provides great value for money as it comes with ten bonus tracks.

The Drones were a Manchester band, managed by future Art of Noise band member and journalist Paul Morley, and were about as popular in that area of the country as their direct competition, the Buzzcocks. They fizzled out but left enough music to occupy 'Further Temptations' which arrives here with eight bonus tracks.

Also from Manchester, Slaughter and the Dogs were founded in 1976 just as punk began to catch fire and were the first true punk group to release a single (the overlooked classic 'Cranked Up Really High' - which appears on the Anagram CD set 'The Best Of').

They had issues with their record label Decca and then their lead vocalist decided to leave, which meant that superstardom, which should have been theirs for the taking, never quite materialised.

For a short time, they were even going to have a certain Morrissey (yes, him) as a replacement lead vocalist but the band decided to promote from within until they broke up in 1979. Band member Duffy later co-founded successful band Theatre of Hate and the Cult.

The essence of a top punk band is not the 'me too' factor. To be a great punk band and, as a prospective listener searching for top punk music, you really don't want more of the same.

Individuality is what you need. And bands such as Alternative TV and Slaughter and the Dogs had it in spades and so were great examples of this. ●



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# "We may be looking at small microchips implanted directly into our brains"



Jon Myles

**T**he music business is renowned for having made some spectacularly bad mistakes down the years. Decca's A&R man turning down the chance to sign The Beatles with the damning verdict "guitar groups are on their way out" immediately springs to mind as one of the most famous. Decca signed The Tremeloes instead while The Beatles went to EMI. The rest is history.

As does Factory records supremo Tony Wilson's decision to send Happy Mondays to Barbados for the recording of "Yes, Please!" in an effort to keep the band away from drugs – not realising the island was renowned as a hot bed of crack cocaine abuse. After a disastrous series of incidents Factory were forced to fly the band back, sowing the seeds for the label's later financial demise.

But for a real eye-opening look at just how ham-fisted some record company executives can be then I'd recommend a read of Simon Witt's entertaining new book *How Music Got Free*.

A closely-written and detailed description of how the invention of the MP3 by the Fraunhofer Group in Germany ushered in the world of music downloads in the 1990s, the book contains some fascinating and eye-opening insights.

Chief among them is how a clandestine on-line group called Scene stole literally thousands of forthcoming releases from CD pressing plants and released them onto the internet as MP3 files despite being vainly pursued for years by a team of investigators from the FBI the Recording Industry Association of America and a bunch of crack private detectives employed by various record companies.

But there's also the battle

the MP3 developers had to get their invention acknowledged as an industry standard. They were repeatedly rebuffed in favour of alternatives and had just about abandoned any hopes of a commercial return for years until people started uploading MP3 tracks onto the internet. Suddenly demand was ignited – with even Microsoft wanting to licence the technology for their Windows operating system.

Perhaps more entertaining, though, are the series of hare-brained business decisions made by music industry chiefs as they struggled to stem the tide of illegal downloads.

For example, when one of the inventors of MP3 suggested in 1997 that a new copy-protected version of the technology should be adopted to prevent piracy he was politely informed "the music industry does not believe in electronic music distribution". Just 10 years later CD sales had fallen by more than half and the industry was facing a crisis which it initially failed to acknowledge.

The Fraunhofer Group itself, though, may have regretted one decision of its own as well. After inventing the MP3 their engineers also came up with a portable MP3 player – but didn't think it was worth patenting. Nor did Dutch electronics giant Philips – with one of the firm's senior figures predicting "There will never be a commercial MP3 player".

As predictions go, that's right up there with Michael Fish assuring TV viewers Britain wasn't about to be hit by a hurricane – right before the worst storm in three centuries swept in. Or, as a business decision, Kodak's refusal to pursue developing digital cameras as they thought it might hit sales of their photographic film.

Having said that, the Fraunhofer guys themselves are probably not

fretting too much about the lost opportunity – as they went on to make millions from the invention of MP3s and are still raking in licensing fees.

Now, of course, MP3s themselves are facing a decline as the rapidly increasing capacity of digital storage devices makes higher bit-rate files a feasible proposition.

But the story shows just how difficult making predictions on the way we'll be consuming music a few years into the future can be. After all, few people predicted that the CD would supplant the LP quite as quickly as it did – nor that come 2015 vinyl itself would be making something of a comeback as silver disc sales went into free-fall.

And who would have thought a once almost-bankrupt computer company called Apple would become a major music industry force through inventing the iPod and accompanying iTunes music store?

So how will we be listening to music a decade from now? At the moment the smart money would probably be on a small number of giant streaming services spanning the entire globe and giving you access to every track ever recorded for a monthly fee. That concept itself would have seemed just as far-fetched as the MP3 did at its inception but seems to be the way we are heading.

So maybe in the not too distant future we may be looking at small microchips implanted directly into our brains to stimulate the auditory cortex – as science fiction sounding as that might be!

But if there's one salutary lesson the above history tells us it's never to rule anything out – no matter how outlandish it might seem at the time. For it could well be the future if only we had the imagination to realise it. ●

# RETRO

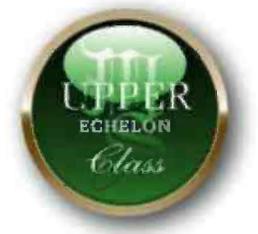
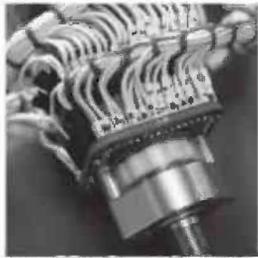
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# "I'm surprised there's not more music optimised for headphones"



Martin Pipe

**W**ith the current popularity of headphones, and the possibilities of rapidly-evolving technology (virtual-reality, gaming etc.)

I'm surprised that we're not being treated to more music and other mainstream audio content optimised for headphone listening.

I'm referring specifically to 'binaural' material, which can yield a seemingly three-dimensional soundfield. Binaural recordings are usually made with an artificial (or 'dummy') head, like the MKE2002 from headphone pioneer Sennheiser, that contains microphones embedded within accurate reproductions of the pinnae (outer ears).

These two mikes then drive the two channels of a stereo audio recorder. The idea is that the information your ears would be receiving is actually what's recorded. These two channels of information are then played back directly into your ears through headphones.

Actually, human hearing is more complex than that; it can locate sounds in three dimensions (above and below, as well as the sides and front/back) despite the apparent limitation of having only two ears. The inner and outer ear work with the brain to localise sound. Much of this information, in the form of spatial cues, is lost by the binaural capture and playback chain.

A considerable amount of research into these properties (known as head-related transfer functions, or HRTFs) is taking place. Digital signal processing and clever psychoacoustics can be used to 'fill in the gaps' and convince the listener.

Applications like simulation, modelling and VR – as well as consumer electronics – are moving things along apace. Some of the latest virtual-headphone technologies

are certainly effective. At a recent demonstration of DTS' latest, for example, I was wowed!

Nevertheless, the effect of 'stock binaural' can be quite astounding. Sennheiser's demonstration of its dummy head at a mid-70s exhibition in Berlin was a roaring success. Indeed, the bilingual demonstration record (one side German, the other side English) it subsequently released became a hit single!

The theme was a virtual tour of a German living room. Listening to the record now (<http://bit.ly/1D8agHS>) it's a little scary – the audio guide "approaching closer" and whispering in your ears. In Germany, a few musicians released records in binaural format. The first solo album released by Tangerine Dream co-founder Edgar Froese – 1974's 'Aqua' – featured two binaural tracks.

Hi-fi quality binaural recordings go back much further, though; in 1955 a performance of Bach's 'Goldberg Variations' by pianist Glenn Gould was captured with a dummy-head microphone system. It's available on CD today. Interest persisted beyond the 1970s too.

Headphone-maker Stax released its own binaural demo disc ('The Space Sound CD'), a varied 1988 collection that's great to listen to. Rock band Pearl Jam bigged-up the tech with its 'Binaural' album in 2000. And still there's interest.

A couple of years ago Jamey Haddad, Mark Sherman and Lenny White released the jazz album 'Explorations in Space and Time' in regular stereo and binaural versions. Also worth checking out is 2008's 'Up Close', a selection of binaurally-recorded guitar pieces by Ottmar Liebert and Luna Negra.

But where are the mainstream acts? Modern high-tech production systems ease the production of content multiplicity – e.g. stereo,

binaural and multichannel – while online music stores make the parallel-distribution of different versions of content easier.

Yes, you could argue that having separate binaural and stereo 'flavours' on sale might confuse consumers and it goes without saying that if you listen to these recordings through speakers you won't get the effect as intended; indeed, the 'stereo' image produced is weird and exaggerated. But sensible labelling and promotion gets around that. After all people don't get confused by different Playstation or X Box versions of the same game.

Portable playback through headphones is now very common, especially amongst younger listeners, and so there could be a definite market for it. Last year, Radio 1's Rob Da Bank show (re)broadcast a binaural '3D headphone special'. BBC Radio's drama department is not unknown to dabble with binaural either.

Then there's the DIY approach. Nearly 40 years ago JVC sold a pair of headphones with inbuilt mics enabling enthusiasts to make their own 'dummy head' recordings.

A few years back, I made my own 'you're-the-dummy' quasi-binaural mic out of a pair of redundant Walkman headphones.

The earpiece transducers were removed, and holes drilled in the backs of the cups for the outward-facing Panasonic WM61 omnidirectional mic capsules that replaced them. My device was used with a MD portable to make natural-sounding recordings.

But it's good to know that there's still interest in binaural audio. Let's hope that some of it rubs off on the mainstream music and radio industries. Headphone listening could become even more rewarding than it is now. ●



# Sound Value

**A good system should be more than the sum of its parts. In the first of a new series looking at the best sound for your pound Jon Myles puts together a set-up that will cost you just £2500 – yet still keep your toes tapping.**

**A**s hi-fi enthusiasts, we're ready to spend to get the sound we crave. But unfortunately not all of us have unlimited funds to spend on our desires. The good news is that you don't have to get something that sounds good, looks good and will have you playing

music long into the evening.

This system is a good example for you. I'm using a £350 C-N7050 Onkyo CD player/network streamer, Exposure 3010S2-D amplifier priced at £1700 and a pair of Epos K1 standmount loudspeakers costing £399. The total cost comes to a pound under £2500. For this you get

high-resolution network streaming, CD replay, smart device control and, most importantly, a rather delicious sound.

So what have we got here? Firstly the Onkyo belies its price point. Not only will it play CDs it will also allow you to access the world of high-resolution streaming (all the way up

to 24bit/192kHz as well as 2.4MHz and 5.6MHz DSD), as well as playing music direct from your smartphone.

Next the Exposure 3010S2-D is a muscular amplifier which delivers 136 Watts into 8 Ohms and a whopping 240 Watts into 4 Ohms – enough to get any room singing. But it does all this in a very civilised and detailed way. What you have is power with control.

Finally, the Epos K1s. At first glance they're a pretty standard pair of standmount loudspeakers, a two-way bass-reflex design housed in a 185 x 226 x 295mm (W/D/H) MDF cabinet. But that cabinet is uncommonly rigid and inert thanks to a new bracing and damping arrangement. They also look extremely classy as the 25mm soft dome tweeter and 150mm polypropylene mid-bass driver are clamped internally to the rear of the baffle so

thing you'll notice about this system is that it is lively, engaging and vibrant. But it also has detail and an innate sense of poise.

Individually the three components are very good – but put together they are rather exceptional. The Onkyo has a very crisp and lively sound, whereas the Exposure is a little bit more measured, which means they work well together.

The Epos K1s also have an extremely clean and open mid-band and treble with a good degree of bass for their size so everything is nicely balanced.

Playing all genres through this system shows just how good it is. A little slice of Leonard Cohen will sound atmospheric, some New Order will be propulsive and Mahler's No 2 will have the requisite power.

Slipping in Nick Cave's 'The Boatman's Call' into the Onkyo's



**The rear of the K1s feature twin pairs of sturdy loudspeaker binding posts to facilitate bi-wiring if required.**

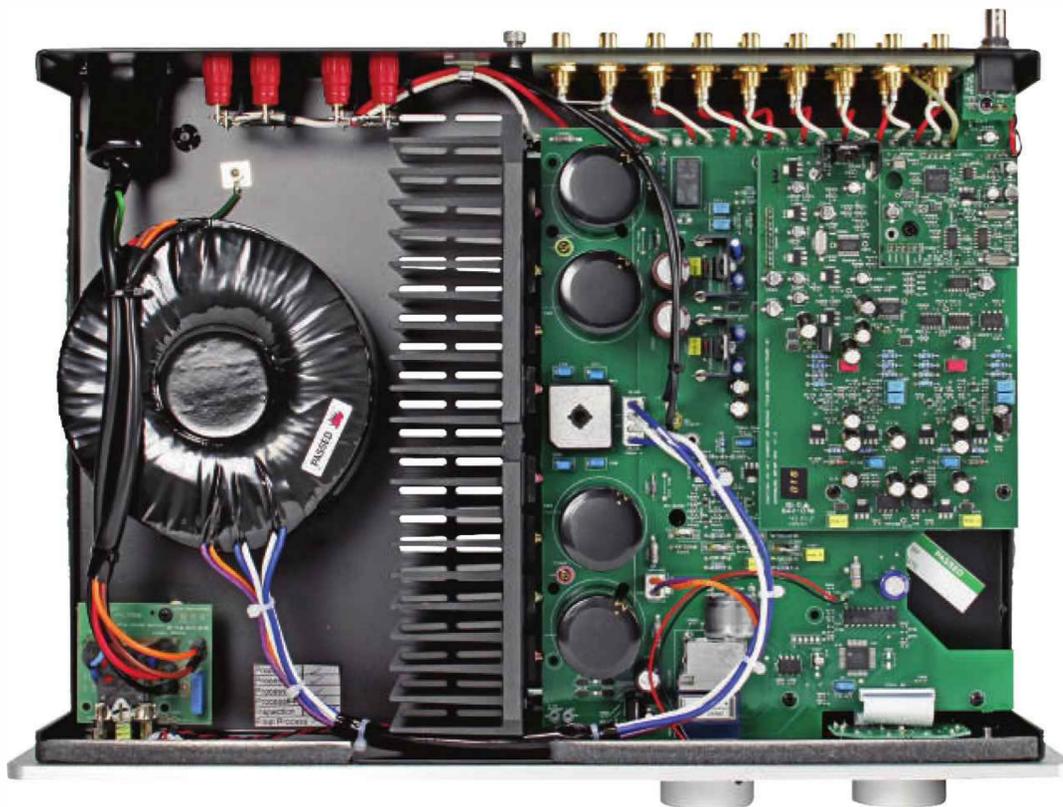
is quite firm and taut, but always musical. That's helped by the fact that the Exposure has good power delivery.

Which brings dividends when playing anything demanding real instrument separation. Mussorgsky's 'Great Gate of Kiev' for example breathes the way it should. While the K1s may not have the greatest response at extremes they never leave you feeling short-changed. So the clarinets can be easily picked out, trumpets are clear without being strident and when the music swells it does so in a way that isn't simply 'loud' but controlled in manner and kept in proportion.

You also get the advantage of network playback — meaning higher resolution files and storage become an important factor.

Add a Network Attached Storage box (capacities of 2TB are available for less than £100) and you can store thousands of CDs and high-

resolution tracks for streaming direct to the Onkyo. It will handle files up to 24bit/192kHz and also has the



**A beefy power supply means the Exposure 3010S2-D can deliver some 136 Watts into an 8 Ohm load – more than enough to bring the little Epos K1s alive and deliver high volume levels without any obvious strain.**

there are no visible fixing points on the fascia.

They might be small but they are extremely potent, sounding a lot larger than they look and having some real energy about them. In truth they can be a little too exuberant on the end of the wrong amplifier but with the control of the Exposure they work extremely well.

Bring the Onkyo into the system and things make complete sense. The first

CD drive, his distinctive vocals have air and depth about them, as do the instruments. The bass from the K1s



**The Exposure amplifier includes a full set of line inputs as well as pre-outs and the ability to add a phono stage or DAC section if required. Twin 'speaker outputs make bi-wiring the Epos K1s a simple matter.**

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*The rear of the Onkyo includes the captive mains lead plus an ethernet socket, USB port and optical and co-axial digital outputs along with standard analogue RCAs.*

added bonus of internet radio with a choice of stations from across the world.

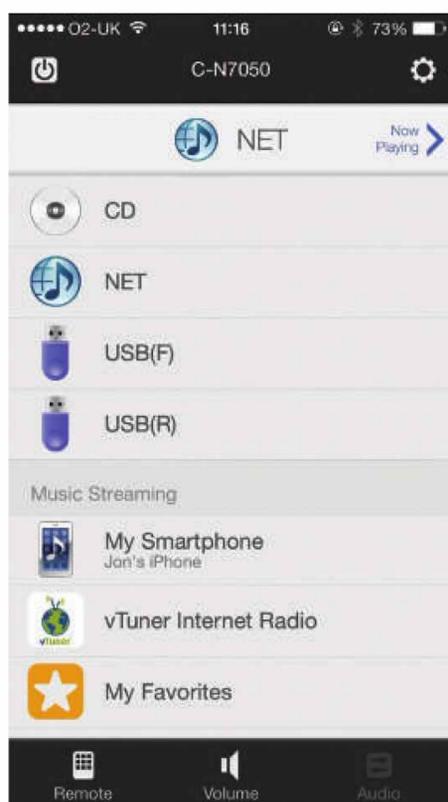
Onkyo's Remote 3 app (iOS and Android versions available) also allows you to control the player from your smartphone or tablet. Take a look at our handy guide to streaming music at [www.hi-fiworld.co.uk](http://www.hi-fiworld.co.uk) for details of how to set-up a system.

Suffice to say that, despite the Onkyo's bargain price, it has more than enough definition and detail to do justice to high-resolution files.

Streaming Led Zeppelin's recently remastered 'When The Levee Breaks' at 24/96 the Onkyo/Exposure/Epos combination creates a powerful



*Inside the Onkyo C-N7050 features a CD disc drive as well as full network capability - combining traditional silver disc replay as well as the ability to stream high-resolution files from a NAS drive or computer and tune in to thousands of internet radio stations from across the world.*



**Onkyo's free app for both Androids and iOS devices makes controlling the player from your armchair easy. As well as controlling inputs it also allows for the storage of favourite radio stations as well as selecting files from computers or NAS drives on the same network.**

wall of sound. This is an intentionally dense mix but the system separates the instruments extremely well — giving you the full force of John Bonham's pounding drums but never letting them overwhelm Robert Plant's vocals or Jimmy Page's stunning guitar work. Timing is also spot on, with notes stopping and starting without any obvious overhang.

Being standmounts, the Epos K1s also image extremely well. They are adept at pushing the music up and out of the cabinets so it hangs in the air in front of you.

Indeed, on John Coltrane's classic 'One Down, One Up: Live At The Half Note' you can lie back, close your eyes and be transported to that classic performance in a small club in New York.

Which is what makes this system so wonderful. It's nicely balanced with detail, depth and authority as well as being extremely musical and fun to listen to. You also have versatility with the streaming option and the ability to listen to internet radio — always a great way of discovering new music.

At a shade under £2500 you'd be hard pressed to find another system that offers so much sound for your pound. Undoubtedly a system that is more than the sum of its parts.

**UPGRADE OPTIONS**

At the heart of this system is the excellent Exposure 3010S2-D amplifier which is more than capable of driving some very good 'speakers indeed.

And while the Epos K1s are a bargain at £399 if they have one drawback it's a lack of absolute slam in the lower registers.

So those looking for a little more kick or with a larger room to drive might want to pay a little more for a pair of floorstanders. If so you could consider the Epos K1s' bigger brother the K2 which costs £1000 but has considerably more slam from its two bass drivers. Alternatively look at Spondor's small but potent A3 which has been tuned to give big bass from a small cabinet.

There's also the likes of the Quad 23L — which has a slightly more refined sound via its twin Kevlar cone mid/bass drivers but sounds extremely detailed.

Further down the line the Onkyo also has digital outputs - so there's always the option of adding a better DAC section in the future if you require.

# This is a comprehensive directory of Hi-Fi Dealers throughout the UK and Ireland.

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# vinyl section

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SEPTEMBER 2015

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### ORTOFON A95 82

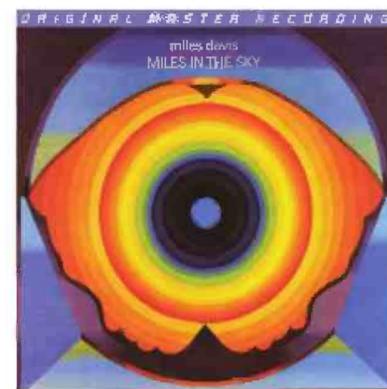
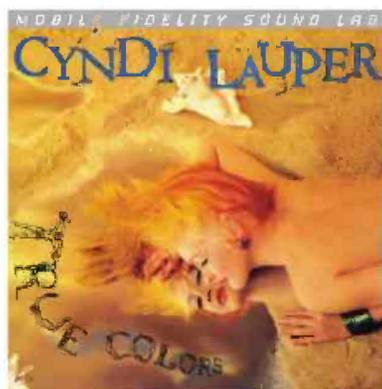
Ortofon's latest state-of-the-art MC cartridge impresses Noel Keywood.

### FOZGOMETER 87

A new electronic device makes setting cartridge azimuth easy, finds Noel Keywood.

### ANALOGUE PRODUCTIONS TEST LP 90

Noel Keywood tries a new low-priced test LP to get turntable set-up right.

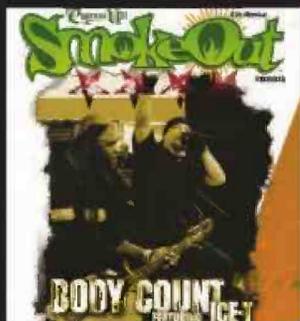


### MO-FI

Two new issues from the American audiophile label ([www.mofi.com](http://www.mofi.com)). Cyndi Lauper's 'True Colors' (1986) features the hit single of the same name. Ambitious despite production issues.

Miles Davis' 'Miles in the Sky' hints at his later fusion LPs based around long jazz jams. Transitional in feel.

## news



### HIGH ENERGY MOV

A tidal wave of high energy new releases from Music on Vinyl ([www.musiconvinyl.co.uk](http://www.musiconvinyl.co.uk)) begins with Delinquent Habits' self-titled album (1996). They were one of the first Latino hip hop acts - offering traditional rhythms and obscure funk.

On the same theme is Body Count's '6th Annual Smoke Out Fest' (2003). An Ice-T spin-off featuring live tracks from the festival - a confrontational performance.

From X and the 35th anniversary of 'Los Angeles' (1980) blending rock, punk and hardcore including gifted musicianship and poetical lyrics. Includes the classic 'Your Phone's Off The Hook, But You're Not'.

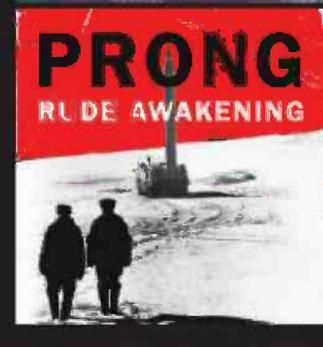
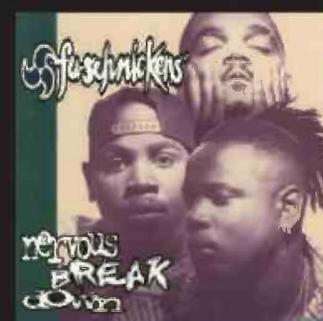
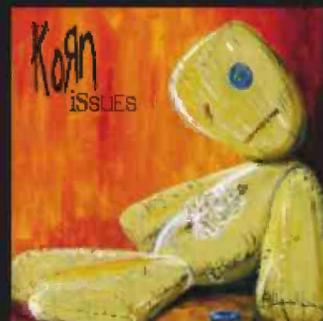
Moving to Korn now and 'Issues' (1999) which re-established their leadership in the field of murky sonics, volume and power. This is aggressive mood music.

Post-hardcore now from Sparta and 'Wiretap Scars' (2002) which bathes on rage and is Fugazi-esque in tone. Plenty of hooks to get your teeth into, though.

More post-hardcore from Rival Schools and 'United By Fate' (2001). Released on green vinyl and including an eight-page insert. Melodic but equally forceful they offer a grand, almost noble form of hardcore.

More rap and hip hop from Fu-Schnickens and 'Nervous Breakdown' (1994). It shows a growing maturity but retains the innovation and boundary-breaking hip hop constructions. A fast-paced whirlwind of an album.

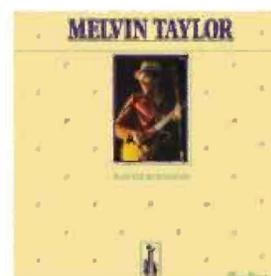
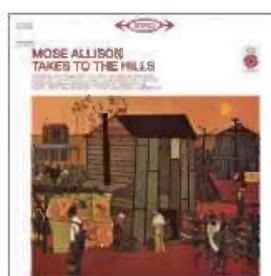
Finally, from Prong, is 'Rude Awakening' (1996) mixing industrial rhythms plus effects plus non-stop, insistent riff drilling.



### 3 FROM PURE

A Pure Pleasure trio ([www.purepleasurerecords.com](http://www.purepleasurerecords.com)) including Duke Ellington's 'The Great Paris Concert', basically an unedited live performance over two discs. Previously only edited takes have been available commercially.

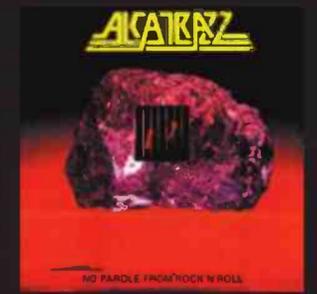
Also check out the wonderful Mose Allison and 'Takes To The Hills' (1962) plus Melvin Taylor's 'Plays the Blues for You' (1984), an appealing set from the Chicago-based blues guitarist.



## ROCKIN

From Todd Rundgren is a sort of follow-up to 2013's 'State'. 'Global' (Esoteric Antenna; [www.cherryred.com](http://www.cherryred.com)) features social protest and discontent but never strays too far from the comical. An inscrutable release. From the same label is Moody Blues man John Lodge's '10,000 Light Tears Ago'. Long overdue (his last solo effort was thirty-eight years ago!) It was worth waiting for, though, nostalgic with Moody Blues overtones.

Also look out for Alcatraz's 'No Parole From Rock'n'Roll', a 2LP. The band is famous for launching both Steve Vai and, here, Yngwie J. Malmsteen. It blends Malmsteen and Rainbow-like vibes.



## THIRD MAN THREE

From US-based Third Man ([thirdmanrecords.com](http://thirdmanrecords.com)) comes three 'Live From...' releases: acoustic guitar instrumentalist Peter Walker whose modal drone LPs in the mid-sixties were influential. Superb stuff. If you like John Fahey...

Also, The Duchess and the Duke's "campfire punk" LP is a roots-based dirty rock with lazy, swampy vocalisations.

Also look out for the comedy LP, Aziz Ansari's 'Dangerous Delicious'. Funny guy...but hide the children.

## ECM

A trio of releases ([www.ecmrecords.com](http://www.ecmrecords.com)) includes Mathias Eick's 'Midwest', a satisfying blend of American jazz with flavours from his Norwegian homeland.

Jakob Bro's 'Gefion' is his first LP as leader. A Bill Frisell-like guitarist. Deliciously ambiguous.

Vijay Iyer Trio's 'Break Stuff' is innovative, modern jazz. He disassembles, reconstructs but remains melodic.



## ...AND FINALLY

Kathryn Williams (One Little Indian; [www.indian.co.uk](http://www.indian.co.uk)), a British folkie, has released 'Hypoxia' an examination of depression, using Sylvia Plath's novel 'The Bell Jar' as inspiration. Sensitive and empathetic.

Also rock duo God Damn's debut LP, 'Vultures'. They bludgeon you with powerful percussive riffs. Relentless.

Their first album in seven years, Wu-Tang Clan's 'A Better Tomorrow' (2014) features five bonus cuts. A thoughtful, collective, solo 'compilation'.

From e.s.t is the unique 'tuesday wonderland' (ACT, [www.actmusic.com](http://www.actmusic.com)), inspired by Bach's 'The-Well Tempered Clavier' mixing tones and moods with innovation and flow. Attention grabbing.

Also on ACT is Nils Landgren Funk Unit's 'Teamwork' (2013). It oozes soulful, organic jazz-funk that remains challenging.

Shiny Darkly's 'Little Earth' (Crunchy Frog; [crunchyfrog.bandcamp.com](http://crunchyfrog.bandcamp.com)) has a real Echo and the Bunnymen vibe. Fans of The Bunnymen should buy!

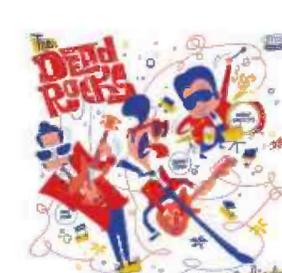
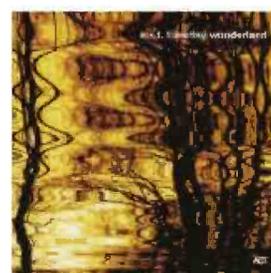
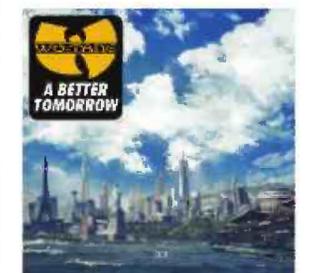
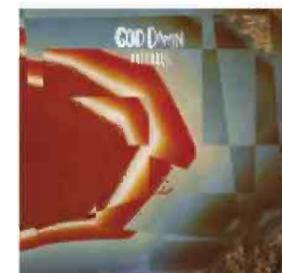
Unusual arrangements and Dylan-type songs from obscure singer/songwriter Bill Fay. 'Who is the Sender?' (Dead Oceans; [www.deadoceans.com](http://www.deadoceans.com)) is his second album in forty years. Poignant, poetic, simple and profound.

A beautiful vinyl double album including a DVD and CD plus 24-page booklet, Motorpsycho's 'En Consort For Folk Flest' (Rune Grammofon; [www.runegrammofon.com](http://www.runegrammofon.com)) documents a live Trondheim event. Magnificent prog/psychedelic invention.

First time on vinyl is the only commercially recorded live performance from Steve Jansen & Richard Barbieri. 'Lumen' (Kscope; [kscopemusic.com](http://kscopemusic.com)), from 1996, also features Mick Karn and Steven Wilson.

Sara Lowes' 'The Joy of Waiting' (From Railings; [artistxite.co.uk/label/FRM-RAILINGS-RECORDS](http://artistxite.co.uk/label/FRM-RAILINGS-RECORDS)) is quality Bat For Lashes-Type pop.

Finally, The Death Rocks' 'Surf Explosao' is full of high-tempo, retro guitar surf noises. Bouncy, lively, poppy and very, very twangy.



# Art Of Sound

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

A small, specially ground nude

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

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

## SOUND QUALITY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

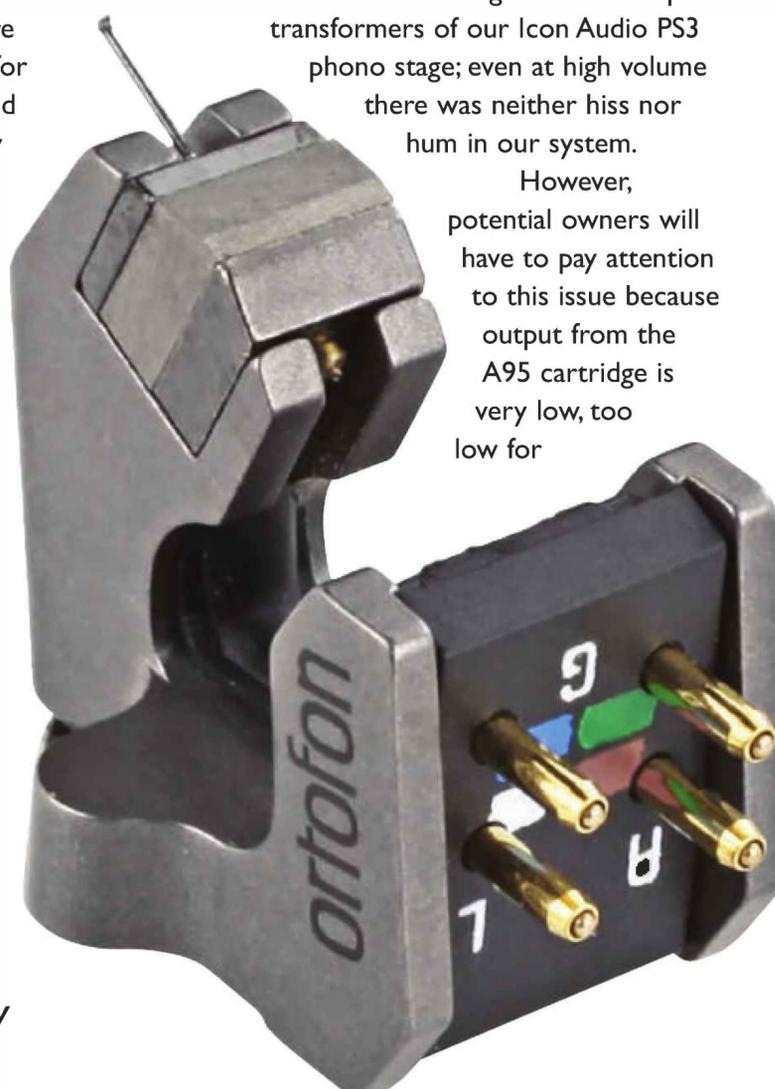
Spinning a far newer LP, from 2L of Norway, made from a DXD 352kHz sample rate/24bit digital recording onto a Direct Metal

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

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

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

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



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



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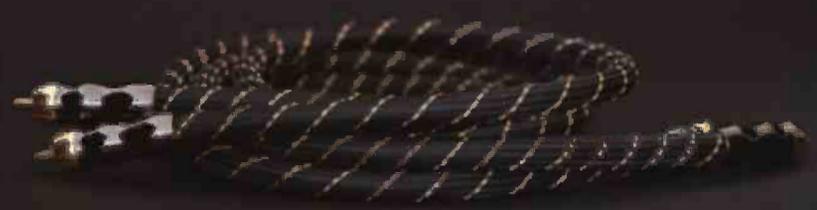
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Also, the A95 stylus is quiet in itself, but especially on modern low noise vinyl such as that of the 2L LP, where I heard no groove noise either. But to appreciate all this Ortofon's new cartridge does need especially good matching equipment.

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

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

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

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

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

## CONCLUSION

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

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



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

## MEASURED PERFORMANCE

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

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

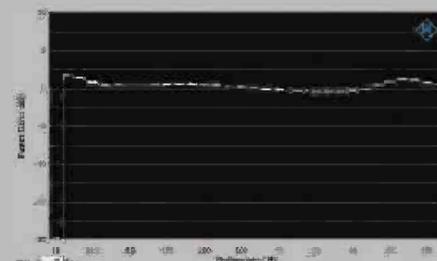
Frequency response analysis comes from JVC TRS-1007 test disc, equalised digitally in our Rohde&Schwarz UPV analyser.

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

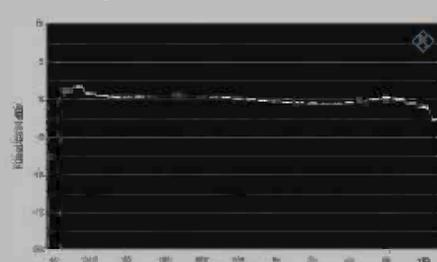
also cleared, so the A95 tracks very well, clearing all test tracks.

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

### FREQUENCY RESPONSE



### Outer grooves



### Inner grooves

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

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

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

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

## ORTOFON A95 £3,750



**OUTSTANDING - amongst the best.**

### VERDICT

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

### FOR

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

### AGAINST

- needs super quiet preamp
- cool character

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# Fozgometry

Noel Keywood gets into a new pastime: Fozgometry. This is the art of using a Fozgometer to set up the turntable. Yep, it's obscure – but it's interesting!



**T**his little device, the Fozgometer from Musical Surroundings – a hi-fi dealership in Oakland, California – raises heat and light within the vinyl faith. It offers perfection but then reveals imperfection – and it costs £350 with associated test LP. What we have here is a small box that can optimise cartridge azimuth alignment, but raises a lot of issues in doing so. I liked it, but I also liked the test LP that came with it. That the Fozgometer made sense of this test LP and the debate this raises about how best to play LPs are wide issues I will touch on here.

As our pictures show the Fozgometer, named after Jim Fosgate, its US designer, is a simple alloy box – a nice sturdy one – with meter, on/off switch and three LEDs. It also has two phono inputs, into which you plug either your turntable leads or phono stage leads. Since it accepts up to 3V in, you could conceivably plug in the loudspeaker output of an amplifier, keeping volume down. Even though Musical Surroundings quote a minimum input of 3mV, meaning it will work directly with a Moving Magnet (MM) cartridge but not a Moving Coil (MC) cartridge, that gives around ten times less signal, I used it with both and readings with an Ortofon Cadenza Bronze MC were fine. So it has wide applicability.

In outline, what you do with this device is play three test tracks from the accompanying, but optional, test LP, called “The Ultimate Analogue test LP” – cut by Sterling Sound of New York – and adjust your pickup arm headshell by twisting it until the Fozgometer shows it is accurately aligned.

Usually, azimuth alignment is a visual process where the headshell is rotated left

or right by a small amount until the cartridge is, visually, perfectly upright: you'll even find a white sighting line on the front of some cartridges to help in this alignment process. I usually sit the arm on an LP and use a big magnifying glass plus a bright white bench lamp to pour in light. The Fozgometer offers greater accuracy by aligning the cartridge based upon measurement of its electrical output, specifically channel crosstalk balance. You play a left channel tone and it measures crosstalk in the right channel, then

cartridge changing, by the way, not because they are in any way better. The 309 is mounted on a Timestep Evo modified Technics SL-1210 Mk2 turntable that, being quartz speed locked, ensures any test LP is running at the right speed and giving the right frequencies.

Should you worry about azimuth adjustment then, or should you not? Cartridges can have their generator axes mis-aligned and LPs can also have their groove mod axes misaligned – see our box-out diagram for an explanation of this.

dismiss the Fozgometer. It isn't the Fozgometer at fault though, it is the cartridge.

Axial misalignment of a cartridge generator system by 15 degrees is just about inconceivable, so something else is likely going on here, possibly asymmetric flux leakage. In such a case the cartridge must be set visually upright so its stylus correctly contacts the groove; you have to accept the crosstalk imbalance, but it's not fatal.

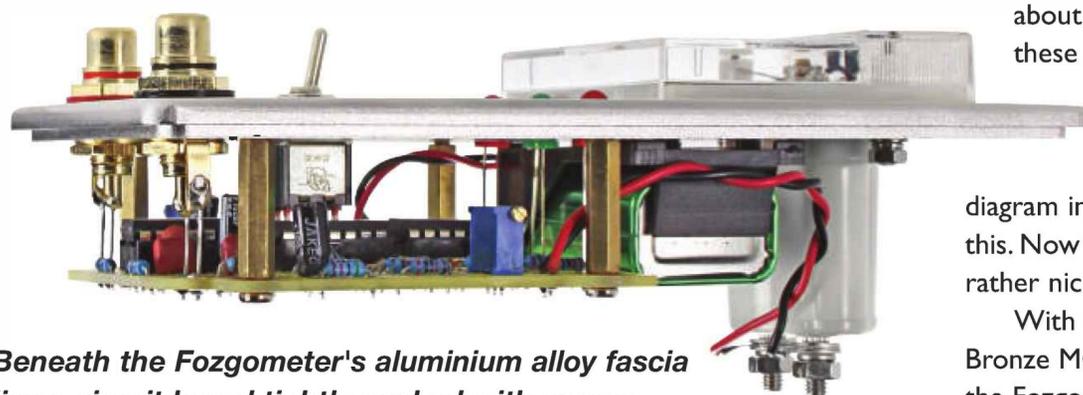
I mention all this just to warn you the issue is complicated, as well as political – and I haven't even started! There is a strong argument for not worrying about azimuth alignment for these reasons – and because

LPs come with their own axial alignment, or misalignment – see my

diagram in the box-out explaining this. Now I must get back to the rather nice Fozgometer.

With Ortofon Cadenza Bronze MC cartridge in headshell the Fozgometer gave a reading of 19.5 when playing first the left channel (Left red LED on) then the right channel; it was perfectly aligned. So I loosened the headshell clamp screw and twisted it out of alignment. It then showed a very obvious imbalance of readings and it took some time to get back to correct alignment, which was a tad off vertical, perhaps 0.5 degree, clockwise.

During this procedure it was obvious the Fozgometer has excellent resolution. It is better than the human eye and what I liked was that it gave very stable readings and was easy to use. I usually measure crosstalk on a spectrum analyser and



***Beneath the Fozgometer's aluminium alloy fascia lies a circuit board tightly packed with components, including a number of silicon chips mounted in sockets. These contain an ac/dc convertor and log amps, among other circuits. The unit is run by an internal 9V PP9 battery. There are two, blue, multi-turn set up potentiometers but these are carefully adjusted at the factory we were assured. Just plug in the turntable's phono leads or the output from a phono stage.***

you play a right channel tone and it measures crosstalk in the left channel. The headshell is then twisted left or right until these readings are the same – and that's it. Time to tighten up the headshell clamp screw; the cartridge is aligned.

At this point Rega owners will protest - they don't have one; the headshell is fixed and cannot be so turned. Roy Gandy, founder of Rega, has told me in the past that they don't believe in making this adjustment and a headshell joint that allows it will compromise the arm's structure with a mechanical impedance change that causes reflections, as well as increase its effective mass. Or in other words, providing this adjustment degrades its sound.

For the same reason SME also produce fixed headshell arms, although I use a removable 'shell SME312S at home and for this review used our office test turntable, with an SME 309 removable headshell arm. We use removable 'shells to facilitate the on-going process of

The Fozgometer adjusts the former; using a test LP whose modulation axes must be correct. I checked this against Shure's TTR-109 test disc and they were correct.

You will see complaints on the 'net about the Fozgometer because it showed alignment was optimum when a cartridge was tilted by 15

"For vinylistas who wish to get every turntable adjustment right to the last fraction of a mechanical degree I recommend it, if you don't mind shelling out"

degrees, meaning it was visually far from upright. This may well seem implausible but I have encountered this issue on our test bench: some cartridges seem to be way out of alignment, so much so it is hardly credible – so owners then

it wanders in level unless averaging is used; the Fozgometer uses a well damped reading system.

After getting left and right crosstalk levels matched, a lateral test track is then played and a green LED should light up, showing each channel

## AZIMUTH ALIGNMENT

Our diagram shows what the issue of cartridge azimuth alignment is all about. In essence the electrical generator system must be aligned to the LP, to balance and minimise crosstalk.

Our red arrows show direction of movement caused by a Right channel only signal (Left channel silent) in the groove. The right channel magnet passes through the coil and its flux cuts the coil turns, producing a voltage; the left channel magnet doesn't pass through the coil; it moves sideways to it, so it produces no voltage. If the generator system is slightly misaligned then the Left magnet starts to move relative to the coil, producing an unwanted crosstalk voltage.

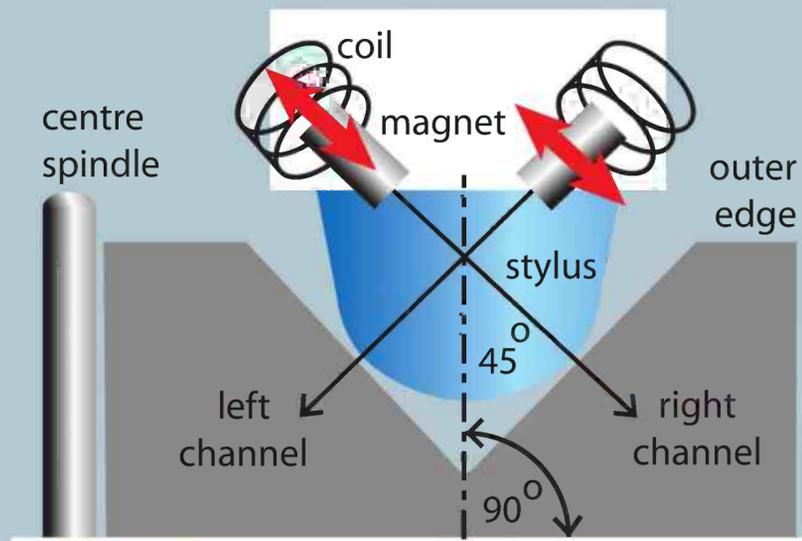
Ideally, if a cartridge is perfectly upright, both its generator system and stylus should then be perfectly aligned. Adjusting azimuth with a test LP and Fozgometer corrects minor generator mis-alignment errors. Note that the stylus is part of this mechanical system and modern complex tip geometries must also be correctly aligned relative to the groove, so it is impractical to twist a cartridge too far left or right. But Fozgometry is about aligning the electrical generator; it isn't about aligning the stylus – as the test LP's instructions incorrectly suggest.

Also, LPs can have misaligned modulation axes, if the cutting lathe itself was misaligned. This includes the ones you buy in shops; there's no guarantee they will be properly aligned – variation is known to exist.

Dished LPs will also be in serious error here; an LP must sit flat on the turntable platter. That's one reason why modern, heavy 200gm vinyl LPs with no guard lip sound better: they sit flat on the platter.

LPs become dished when they have been removed from the press too quickly, deformed by differential cooling.

Test LPs should be cut into flat, heavy vinyl by a perfectly adjusted lathe if the modulation axes of the vinyl groove are to be perfectly aligned, as they need to be for valid measurements.



was giving identical output. It lit up with our cartridges, but if it doesn't there's not much you can do, because this is a cartridge problem: the channels are giving different outputs. Correction must be applied with a balance control.

After this I then pulled out Shure TT109 test disc and ran through the whole thing again. This is, effectively, a check to ensure that the modulation axes of "The Ultimate Analogue test LP" are correctly aligned. Happily, the Fozgometer showed perfect initial alignment and then misalignment as I again started turning the headshell. So both test LP and Fozgometer together got it right, and a spectrum analyser confirmed what the Fozgometer was reading.

And that, in essence is my review of the Fozgometer. I'd guess it uses log amps and window comparators, plus a bit of electronic logic to switch the meter to left and right channel automatically, all of which I

have built in the past for test bench equipment like the a.c. log amps preceding X-Y recorders (when they once roamed the earth).

There's quite a lot in the box then, well designed to give an easy-to-interpret result. Providing you keep the internal 9V PP9 battery in good shape, the Fozgometer is a neat device that does what it says – and well. I found it very easy to use, easier than the spectrum analyser.

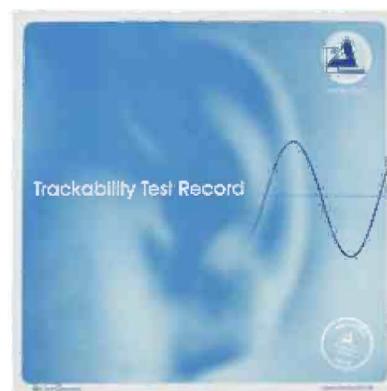
For vinylistas who wish to get every turntable adjustment right to the last fraction of a mechanical degree I recommend it, if you don't mind shelling out.

There may well be cheaper ways to measure crosstalk from a test LP like this one, with a Maplins a.c. voltmeter for example, but this is a hassle – and hum is likely to corrupt the measurement.

The Fozgometer is a hassle-free solution that gets it right, without worry; that's what you pay for.



*The Ultimate Analogue test LP purposed to work with the Fozgometer, see page 90. This must be purchased from the USA direct.*



*The test LP that Sound Fowndations supply for use with Fozgometer and for general turntable setup. We will be reviewing this in our October 2015 issue.*

**MUSICAL SURROUNDINGS  
FOZGOMETER  
£350 INC. LP**



**OUTSTANDING - amongst the best**

### VERDICT

A clever little device that allows crosstalk to be balanced and minimised. Works well.

### FOR

- sensitive to error
- easy to use
- fast

### AGAINST

- lengthy process
- not always suitable
- needs a test record

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# The Ultimate Analogue test LP – but is it?



**Noel Keywood takes a close look at an interesting new U.S. test LP, price just \$40. It can be used with Fozgometer - see our review on p88-89.**

**T**his is an interesting, well made and reasonably accurate test LP, if not what I would use on the test bench. It is put together for home enthusiasts equipped with an “A.C. millivoltmeter”, as Analogue Productions put it. It is also cut by studio engineers looking at their VU meters, which isn’t how it is best done.

The LP itself is superb, a heavy

and flat 200gm pressing with no lip and no sign of dishing, due to differential cooling in the press, that misaligns the modulation axes. There are clear spaces between the tracks too, to aid their location.

The reference tone is quoted as 7cm/s velocity, and this appears to be a peak lateral value, that gives effectively 5cms/sec peak into a 45 degree angled left-field coil. The Left and Right tracks (Tracks 2 & 3) were

identical in level to those on Shure TTR-109 crosstalk test disc, cut at 5cms/sec peak.

I checked the 10kHz level (Track 5, Side 1) with our Cadenza Bronze and it was +1dB at 10kHz (after RIAA correction), exactly the same result given by JVC TRS-1007, which was half-speed mastered and then two-speed tested (a technique developed by Shure) to validate its accuracy – and is known to

be accurate. So you can rely on the accuracy of this track on the Analogue Productions LP. Bear in mind that the 10kHz tone is actually +13.7dB above the Track 4 -20dB, 1kHz reference tone if you measure the cartridge direct, without RIAA.

The VTA adjust (Track 9) needs a spectrum analyser and is way beyond the home enthusiast. Our Rohde&Schwarz UPV analyser showed the 60Hz sidebands around the 4kHz tone with SME309 arm set fully up, then fully down – a 10mm/2.5 degree VTA change – and their rms summed level decreased just 0.2dB, so I'm inclined to think the track is of no use in assessing VTA. At -25dB (5.6%) there is too much recorded Mod Distortion on the LP. An effective test of VTA lies on DIN 45 542 where 370Hz and 630Hz test tones produce a sum

product at 1kHz and in the same test this changed by 5dB. This is a VTA test methodology that works well and we use it in cartridge measurement.

The W&F track (Track 10) relies on the Neumann cutting lathe used to cut this LP running at the right speed, without variation. It read 3150Hz more or less exactly (DIN 45 545 gave 3154Hz) so speed was correct.

However, Wow (variation of speed) from DIN 45 545 was 0.1% unweighted, but from The Ultimate Analogue Test LP a high 0.2% unweighted. Spectrum analysis showed a very large 0.55Hz component, meaning the speed was changing regularly once per 33rpm revolution – a common problem. This variance lies in the cutting lathe and renders this test track

misleading for Wow & Flutter measurement and of little value.

On balance then, The Ultimate Analogue Test LP is a bit of a mixed bag. It is well made and accurate in most parameters, when compared to professional test LPs. But it does have limitations, VTA and W&F being of little use. All the same, at the low price of \$40 the LP is still a bargain; I simply think they bit off more than they could chew with VTA and W&F.

At \$40 the LP is well worth buying if you like tinkering with turntables and know how to use an AC millivoltmeter. A Fozgometer makes azimuth measurement easy.

**SIDE 1**

- 1 1kHz Reference tone (lateral)
- 2 1kHz Reference tone (Left Only)
- 3 1kHz Reference tone (Right Only)
- 4 1kHz Reference Tone (-20dB)
- 5 10kHz Reference Tone (-20dB)
- 6 1kHz - 20kHz Sweep (-20dB)
- 7 1kHz - 20kHz Sweep (0VU)
- 8 100Hz Reference Tone (0VU)
- 9 VTA Adjust
- 10 Standard Wow & Flutter Test (3150Hz)

**SIDE 2**

- 1 Anti-Skate Test (315Hz, Sweep 0dB - +12dB)
- 2 Pink Noise (Lateral)
- 3 Pink Noise (Vertical)
- 4 1kHz Reference Level (Out-of-phase)
- 5 1kHz - 10kHz Sweep (-20dB)
- 6 Silent Groove

**SIDE 1**

**Track 1**

General Reference Level. A 1kHz reference tone 7cm/s Mono, in-phase (lateral) basic reference for all measurements. Adjust preamp channel balance for equal output. Also used to check the offset angle of the phono cartridge; L&R signals should be exactly in phase as displayed on an oscilloscope.

**Track 2**

A 1kHz reference level, Left channel only. Measure Right channel output (crosstalk).

**Track 3**

A 1kHz reference level Right channel only. Measure Left channel output (crosstalk).

**Track 4**

1kHz tone at -20dB below reference level. Lateral reference for high frequency test.

**Track 5**

10kHz reference tone at -20dB, lateral. Output should equal that of Track 4 if cartridge has flat frequency response (needs RIAA correction, so a phono preamp must be used).

**Track 6**

1 kHz to 20 kHz sweep at -20dB, Mono (Lateral) An AC millivoltmeter reading should stay constant across all frequencies.

**Track 7**

1 kHz downward in frequency to 20 Hz sweep at 0 VU (Lateral) Measure output with an AC millivolt meter. Ideally, it will be flat across all frequencies. If viewed on an oscilloscope, the amplitude should remain constant during the frequency downsweep.

**Track 8**

100 Hz reference tone at 0dB (Lateral).

**Track 9**

VTA adjust This is an IEC intermodulation distortion (IMD) test signal; 60Hz & 4kHz 4:1 ratio. Using an IMD tester, adjust VTA by raising or lowering the tonearm for minimum distortion.

**Track 10**

Standard Wow & Flutter (W&F) test signal; 3150Hz. The W&F meter will give dynamic speed variations as a percentage deviation from nominal. A frequency counter should read exactly 3150 Hz if turntable speed is correct, but it may well wander up and down in frequency due to low rate speed variation.

You can use the Hz function on your multi-meter (if so equipped) to verify speed here as well. The correct reading at 45rpm would be 4253Hz –  $[45/33.33] \times 3150$ .

*The track listings and uses shown here are from the manufacturer, but edited by us to improve grammar, spelling and technical meaning/accuracy.*

**SIDE 2**

**Track 1**

Anti-skating test; 315Hz amplitude sweep to +12db (Lateral) Signal should remain clean in both channels up to the highest level, both audibly and as viewed on an oscilloscope. In case of distortion, increase anti-skating force or decrease anti-skate until breakup occurs equally in both channels. The left channel information is inscribed on the inner groove wall, the right channel information, on the outer groove wall.

**Track 2**

Pink noise lateral.

**Track 3**

Pink noise vertical. Track 2 & 3 are used for cartridge demagnetising. You can also use this track to loosen up the cantilever's suspension to help break-in a new cartridge.

**Track 4**

1kHz at reference level, vertical. This out-of-phase signal should cancel to nothing when summed to mono. Any signals still present are distortion artefacts, lack of channel balance or timing (phase) anomalies. This test can be a second confirmation of anti-skate adjustment.

**Track 5**

1kHz to 10Hz sweep, -20dB below reference level. Vertical resonances in the tonearm/cartridge interface will show up as amplitude peaks and dips as the frequency sweeps down. Listening in Mono makes it easier to hear the distortion artefacts.

**Track 6**

Silent groove for bearing rumble and table isolation checks. During playback of this track, nothing should be transmitted from the turntable to the speakers. Replay the track and gently tap on the rack or base that the turntable is resting on. There should be little or no thump transferred to the speakers. This track will help you experiment with turntable isolation methods and products to be able to get the most out of your playback system. You may want to use a closed or sealed headphone for best listening results or a stethoscope on the plinth.

# Good To Go

**Jon Myles takes to the road to test out two new portable headphone amplifiers/DACs from iBasso and Beyerdynamic.**

**P**ortable headphone amp/DAC combinations are a growth area at the moment — and it's not hard to see why. With increasing numbers of people listening to music on-the-go via smartphones or portable digital music players connected to quality headphones, it's only natural they should be looking for better sound quality.

And while the DAC and output sections of iPhone and Android devices are not too shoddy, nobody would ever label them state-of-the-art in hi-fi terms. So adding a portable amp/DAC to boost sound levels and improve digital playback quality makes sense.

Which is where the Beyerdynamic A200 p and iBasso's D-Zero MkII come in. Both are compact units (the Beyerdynamic exceptionally

so) small enough to be slipped in a pocket or strapped to the back of your chosen player — without adding much bulk. And they both hold out the promise of better sound quality and increased volume.

So how do they measure up? I took them both on the road in a variety of environments with headphones ranging from a pair of Sennheiser CX 300 II earphones to AKG's over-ear K45 I's and a set of Noble's K10 custom in-ear monitors which with their 10 driver array will show up the pros and cons of any partnering equipment.

## BEYERDYNAMIC A200 P

To say German company Beyerdynamic's first entry into the portable headphone/DAC market is miniscule would be an understatement. It's the smallest

example of the breed I've ever come across — measuring just 55mm square by 13mm deep. The top of the unit is almost entirely taken up by the circular volume control, while the play/pause/forward and lock buttons are arranged around the sides, along with the 3.5mm headphone jack and micro-USB socket. I found the controls a little fiddly at first due to their small size, but after a bit of practice operation became more intuitive.

Inside, the unit uses a Wolfson WM8740 DAC chip. For some reason Beyerdynamic have limited this to 24bit/96kHz when it is actually capable of 24/192 operation — although I suspect they're guessing most people won't be carrying such high-resolution files around on their mobile devices.

The only way to get music into it is via the USB socket — and the A200





**The front of the iBasso contains the rotary volume control, headphone jack, lock switch and auxiliary in/out socket.**

comes supplied with a short Apple Lightning cable for later iOS devices, a micro-USB cable for Android devices (4.1 and above) as well as a standard USB connector for charging and playback from computers. Bear in mind that not all Android 'phones or tablets will work — but there's a guide to compatible models on the Beyerdynamic website. Users of pre-Lightning iPhones or iPod Touch models will have to buy their own 30-pin connector cable.

Also supplied is a nifty leather case with strap which wraps around the A200 but leaves all the buttons accessible and makes wearing it on your belt a viable proposition.

## SOUND QUALITY

Don't let the A200's diminutive dimensions deceive you — it's actually quite a potent performer.

Connected to an iPhone 6 Plus and with the AKG headphones in place there was a noticeable increase in quality playing The Smiths' 'Louder Than Bombs' collection in 24/96, and the music had much more detail and presence than I'd got from the iPhone alone. Johnny Marr's layered guitar work was crisp and clear, while Morrissey's vocals on 'Please, Please, Please, Let Me Get What I Want' were suitably plaintive.

Listening to Arvo Part's 'Cantus In Memoriam Benjamin Britten', the overtones of the final bell toll reverberated cleanly, seemingly going on longer than I'd expect, showing me the DAC was extracting a fair amount of detail.

Playing this piece through the extremely revealing Noble in-ear monitors I was struck by just how extended and accurate the Beyerdynamic sounded. Its treble is slightly forward without being harsh and while there is a slight warmth to the bass it's not so much as to sound spongy.

Volume-wise, the Beyerdynamic doesn't give a massive

boost to the iPhone's output — just enough to make a difference for those who want to play their music a bit louder (one tip here; as supplied the A200 is EU volume-limited but there's an override function set out in the instruction manual).

## CONCLUSION

If you're looking for a small headphone/amp DAC to improve the sound of your portable device then it's hard to fault the A200 p. It's certainly the smallest option you are likely to find but it doesn't skimp on sound quality. Well worth a listen.

## IBASSO D-ZERO MKII

The iBasso D-Zero MKII is — as the name suggests — an update to the popular original model. Not surprisingly it's a bit larger than the Beyerdynamic (it couldn't really be any smaller) — measuring 55mm x 101mm x 11mm (W/L/H) which makes it around the same size as most smart 'phones.

The front of the device features a headphone jack, an aux-in jack, power switch with white LED to let you know when the device is on and volume control. On the back there's a USB socket as well as two LEDs, a red one to indicate charging and battery status, as well as an orange one to indicate USB connection. Inside iBasso employs two WM8740 DACs (again limited to 24bit/96kHz) and there's also a Lo/Hi gain switch for matching to your chosen headphones. Supplied is an OTG



cable for Android users (4.1 and above) but iPhone owners will have to purchase Apple's camera kit to get a digital signal from their 'phone or tablet into the D-Zero.

The device itself is made from anodised aluminium and feels nice and sturdy while the controls are precise and easy to use.

## SOUND QUALITY

Immediately evident from the iBasso is the amount of power it has on tap. It will go loud with little difficulty, giving an attention-grabbing sound. This is accentuated by the fact that it is also explicit in its delivery.

The D-Zero doesn't try to smooth things with a warm bass or smoothed out treble. Instead it has a punchy low-end and crisp treble which works well on higher-resolution tracks. Playing The Smiths' track again its sound was more sharply-etched than on the A200, but not in an overly-fatiguing way.

It also made more of the bass extension of the Noble K10s — giving them a tighter, more rhythmic quality that sounded slightly punchier. The violins on the Arvo Part selection had presence, with good tonality and a great sense of space around the notes.

The iBasso not quite as good with lower bit-rate material because it didn't gloss over the deficiencies of anything less than 16bit/44.1kHz. But when fed CD-quality and above and it had a very nice, detailed sound.

## CONCLUSION

The iBasso is a well-built, clean-sounding headphone amp/DAC combination that goes very loud but retains a sophisticated sound. At just £100 it has to be considered a bit of a bargain.

**The face of the A200 p is almost entirely devoted to the volume control while the play/pause, lock and headphone sockets are on the sides.**

### BEYERDYNAMIC A200 P £270



**EXCELLENT - extremely capable.**

#### VERDICT

A potent portable amp/DAC that has impressive sound allied to small form factor. Complete set of bundled cables also a bonus.

#### FOR

- size
- smooth bass
- accessories

#### AGAINST

- fiddly controls
- amp not the most powerful

### IBASSO D-ZERO MKII £99



**OUTSTANDING - amongst the best.**

**VALUE - keenly priced**

#### VERDICT

A bargain-priced unit that has a crisp, detailed sound with bags of volume.

#### FOR

- price
- good amplifier section
- detail

#### AGAINST

- doesn't flatter low bit-rate material
- no supplied cable for Apple devices

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Wanted: Shanling  
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**BLACK RHODIUM** Fusion I.E.C. mains lead. 1.25m long, £25. Denon DV 2500 BD H.D. Blu-ray transport. Silver. Excellent condition. £80. Tel: 07555 263931 (Northamptonshire)

## CLASSIC CONTACTS

When a classic goes 'poof' your troubles have just started, but there may be a good ending. Replacing failing parts can improve the sound, so here is a short listing of all these companies who specialise in getting a classic up and running again after its deposited a small ring of soot on your ceiling!

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Classic tuners, radios and amplifiers restored, repaired.  
Tel: 01895 833099  
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MCINTOSH MC152 POWER AMP  
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PLUS  
WIN A COPY OF THE ULTIMATE GUIDE TO UK ROCK & POP WORTH £100

**...and much more.**

This is a selection of what we hope to bring you, not a complete list. We regret that due to a wide range of issues, such as failure under review, we cannot guarantee that all products listed above will appear.

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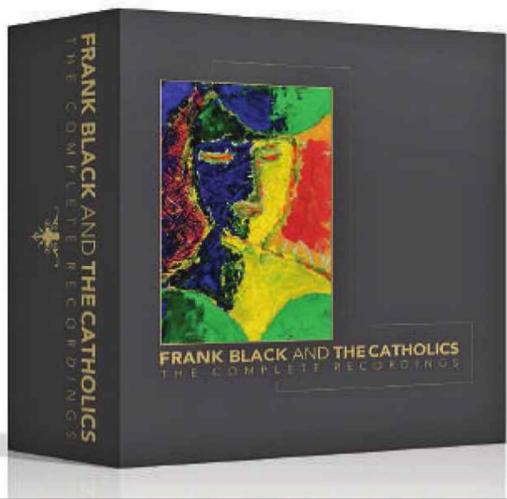
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# FRANK BLACK AND THE CATHOLICS

## DOG IN THE SAND COOKING VINYL



"It builds upon the past and ends up being Black's most influential LP release to date"

**T**he former lead singer for the seminal rock group, The Pixies, Black went solo after he broke up the band in 1993. From there, he decided to invert his name from Black Francis to Frank Black.

His formation of the band the Catholics occurred in 1998 and lasted for seven albums. 'Dog in the Sand' was the third and was released in 2001.

His solo work changed him. Encouraged him to mature, even. He recognised that himself. Taking his solo works on the road, "... has helped me on every session I've done since. I'm much more consistent with my playing and singing. Also, I'm very comfortable recording in a performance-based situation with other musicians".

Maybe this is why Black's solo albums and those with the Catholics can confidently be set apart from those he created as a young man with the Pixies.

By the time Black had released this album, 'Dog in the Sand', he had also released more albums as a solo artist than he did with The Pixies.

Up to this particular point, though, Black seemed eager to distance himself, in creative terms, from the band in which he had made his name. Because of that, you sometimes felt that he was holding back, conscious to avoid any comparison. Consequently, there was a thought that he wasn't giving his all or, rather, modifying his output. So you had the whimsy and the direct approach to his rock music but missing was that famous eccentricity. You felt that he wasn't really comfortable to let go and relax. 'Dog in the Sand' changed that.

This album saw the return of compatriots Eric Drew Feldman and Joey Santiago. Because of this, the album appeared to go back further to Black's roots and, in fact, America's roots while slowing the pace a tad too. The Stones-like 'Hermaphrodites' is one example of this retreaded style which emerges as a totally convincing rock song, brilliantly conceived. Some of the songs, such as 'Bullet' and 'Llano del Rio', wouldn't even sound out of place on The Pixies' own classic LP 'Doolittle'.

Don't get me wrong, though, this album was never backwards looking or wallowing in

nostalgia. It builds upon the past and ends up being Black's most influential LP release to date.

The album has emerged within a new box set called 'The Complete Recordings'. This set was created by PledgeMusic, a sort of Kickstarter campaign website vehicle in which people contribute money to allow a project to be made. It's an intriguing method to publish music but, in these modern times, one that is becoming more popular and frequent.

As Black himself said, "Frankly, I really needed the help. I have a small imprint and I've released a few oddball items through it but this project was physically so large that I fear it would have financially decimated me if I had done the production myself.

Also, the PledgeMusic platform is comforting in the sense that it is so precise in its gauge of how many customers there actually are in the world. It would be nice to think we are entering an era where manufacture numbers represents the actual numbers of customers. Overstock is depressing for everyone".

As a set, the box is quirky, as the songs from the Catholics' six albums are arranged in alphabetical order. Even listening to the set in this manner, it's clear that 'Dog in the Sand' has two of the best songs on the entire set: 'St. Francis Dam Disaster' and 'Hermaphrodites'. For prospective boxed set buyers, though, along with the generous amount of previously unreleased songs, including the entirety of the band's scrapped 2000 album 'Sunday Sunny Mill Valley Groove Day', you also get an additional seventh disc called 'True Blue' and demos for 2002's 'Black Letter Days'.

Looking again at 'Dog in the Sand' and reconstructing it for this box set, Black realised that he was hearing this music as if it was created yesterday. "There is the familiar sound and memory of me, the band, the extra musicians, each represented by their instrument, each represented by the muscle memory of having done many takes of the songs and in the case of songs we played on the road a lot, the muscle memory of having performed it hundreds of times. When I hear back a Catholics recording it is very familiar, almost intimate, like it happened last week".

**PR**

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