

# HI-FI WORLD

JANUARY 2022

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# AWARDS 2021



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# welcome

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## verdicts

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

## ELECTRONIC MAGAZINE

Go to our website [www.hi-fiworld.co.uk](http://www.hi-fiworld.co.uk) to buy an electronic version of this magazine, individual issues, back issues or a subscription.



**W**elcome to our annual Awards issue where we select the best products of 2021 – those we all feel are special. Many are affordable, some esoteric with a price tag to match, making for an interesting mixture from across the price spectrum.

With vinyl sales still rising, no surprise there are two affordable products in this category – the beautifully finished Teac TN-5BB turntable and Pro-Ject Phono Box RS2 phono stage. A link between them is that both cater for balanced cartridge connection through XLR cables, in order to eliminate hum and some forms of noise, improving sound quality. Teac's turntable was a delight to use and sounded good too. Pro-Ject's phono stage was superb all-round, with excellent facilities and balanced connection for MM as well as MC cartridges.

JBL's big floorstanding HDI-3600 price might not be large but its bass certainly was. Few loudspeakers go so low and sound so good doing it, impressing us all. Less obvious in stature but impressively concise and accurate was KEF's LS50 Meta. This finely honed bookshelf design was pure class.

Amplifiers over the year of 2021 were more ambitious. Smooth yet powerful and with a slick digital section based on a top AKM digital convertor chip, Creek's Voyage i20 impressed us greatly – an obvious winner. Audio Research conjured up their huge and extraordinary Reference 80S power amplifier to easily win our nomination of top valve amplifier of 2021, but there was another valve amplifier that was attention grabbing, Icon Audio's unusual HP 205D for headphones, based on one of the earliest triode valves ever, the Western Electric 205D from the 1920s.

With a premium ES9038Pro DAC in their ST60 network player, Arcam delivered a unit that did it all, even giving top results from CD if connected to a transport. An easy recommendation as a talented multi-role player.

The year of 2021 brought some great products, to look at and listen to. I hope you enjoy reading about them in this great Awards issue.

**Noel Keywood**  
**Editor**



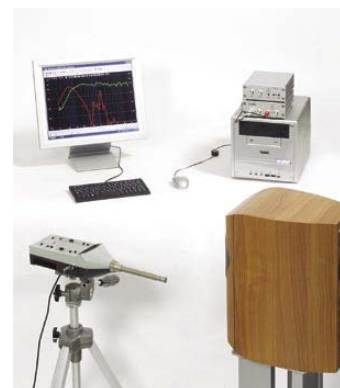
## testing (see [www.hi-fiworld.co.uk](http://www.hi-fiworld.co.uk) for full explanations of all our tests)

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

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

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

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



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# news

KEF 60 YEARS

Listen and believe

## HAPPY 60TH, KEF!

One of the great names in British loudspeakers, Kent Engineering and Foundry (KEF) opened for business in October 1961. Founded by former Wharfedale and BBC engineer Raymond Cooke, KEF was an early pioneer in the use of synthetic materials and computer simulation. Over the past six decades, the firm has been proud of its record of using advanced technology to push the boundaries of audio reproduction.

KEF's innovations include Thiele-Small computer analysis of drive unit behaviour, coupled-cavity bass-loading, Uni-Q, Acoustic Compliance Enhancement, Uni-Core, and Metamaterial Absorption technologies. Genuine KEF classics to benefit include the R105 monitor, Coda range and Reference 203 as well as more recent designs like the R3 and LS50 Wireless.

Hi-fi speakers apart, today's KEF also makes headphones, architectural transducers for integration into buildings, Bluetooth audio and home cinema gear. As part of its birthday celebrations, KEF will launch several new products which it claims will be "boundary-pushing" – and a charitable foundation as well.

Further details, KEF: [bit.ly/3bxSozQ](http://bit.ly/3bxSozQ)



## GOING, GOING, GONE...

At a recent Sotheby's auction, Lot 36 - Jerry Garcia's personal McIntosh MC2300 amplifier, nicknamed 'Budman' by the Grateful Dead guitarist - fetched a whopping \$378,000. Seven other MC2300s, from the band's famous 'Wall of Sound' PA system, each sold for between \$25,200 and \$94,500. Evidently, some Deadheads have plenty of money (a certain Don Henley single springs to mind).

If you're prepared to accept McIntoshes of newer vintage and lean more towards movies than iconic American rock, you might be interested in their new M11250 - a snip at £4,995. Billed as a 12-channel 'digital distribution amplifier' its Class-D output stages offer 50W per channel (8 ohms) and are claimed to bring McIntosh's "legendary sound quality" to AV systems and custom installations. Unlike the classic MC2300, with its trademark blue meters, the low-profile M11250 is intended for mounting in an equipment rack that's hidden out of sight.

Further details: [www.finesounds.uk](http://www.finesounds.uk)



## BABY BLU

iFi continues its onslaught of the bijou hi-fi market with an MQA-ready update of its hip-dac (the £189 hip-dac2) and the all-new £199 GO blu – a 26gm combination of Bluetooth DAC and headphone amplifier. The GO blu might occupy roughly the same volume as a matchbox, but iFi is keen to point out that it has squeezed "expertly-designed, individually-optimised circuits" into the diminutive device.

Sound quality, it argues, is better from this sort of arrangement than the 'systems-on-a-chip' of competing products. iFi's custom electronics is fitted in a plastic enclosure – which, we're told, won't block Bluetooth radio signals – with watch-like control dial, CMOS-MEMS microphone for hands-free calls and a USB-C charging port that doubles as a 24/96 USB audio interface. Other features include 8-hour battery life, high-res Bluetooth with multiple codec support, Cirrus Logic 32-bit DAC, low-jitter clock and audiophile-grade amplification for balanced or unbalanced headphones.

Further details: iFi, [bit.ly/2ZNIWaN](http://bit.ly/2ZNIWaN)



CENTRAL STATION  
ELIZABETH BAY  
ERSKINEVILLE  
EXPRESS  
PIERS STREET  
FLOWER AND SUN ST  
FALLIN STREET  
GARDEN ISLAND  
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HIGH SPEED AVE  
HIGH ST JACKSON



## HIGH ENERGY

Now taking pride of place atop the 300 Series from Acoustic Energy is the slot-ported £1599 AE320, described as a 3-way slim-line floor-standing loudspeaker of compact (1000x175x320mm) dimensions. Suitable for “medium-to-large” rooms, the 26kg AE320 uses three of Acoustic Energy’s latest 130mm ceramic aluminum-coned drivers. One of these long-throw transducers handles the midrange, the other two being responsible for bass duties. Looking after the treble, meanwhile, is a 28mm aluminium-domed tweeter with ‘Wide Dispersion Technology’ waveguide’ to match its acoustic output to that of the woofer.

Acoustic Energy claims the ‘sweet spot’ is widened, as a result. The AE320’s drivers and crossover are built into a spiked low-colouration cabinet, with mass loading and proprietary bracing techniques borrowed from the Reference Series. Available with a glossy finish (black or white) or walnut veneer, the 8-ohm AE320 is said to offer 200W power handling and 90dB sensitivity.

Further details: [Acoustic Energy](https://www.acousticenergy.com), [bit.ly/3wc2aBb](https://bit.ly/3wc2aBb)



## IT FLIES AGAIN!

Back in 2007, Bowers and Wilkins launched its £400 Zeppelin – probably the most distinctive iPod dock then available. Its aluminium tweeters, glass-fibre midrange drivers and central Kevlar-reinforced woofer contributed to a sound quality that trounced most rivals.

Apple’s once-ubiquitous iPod is practically a museum-piece nowadays – and so when B&W decided to revive the Zeppelin, its focus shifted to streaming. Described by B&W as a “complete stereo system in one component”, this new £699 Zeppelin updates the original design with “Decoupled Double-Dome” tweeters, proprietary 90mm “Fixed Suspension” midrange drivers and a 150mm subwoofer – backed by 240W of amplification. The Zeppelin’s distinctive “ultra-rigid” enclosure also hosts an upgradable app-controlled streaming engine. This supports AirPlay 2, Bluetooth, aptX, Alexa and a range of streaming services including Spotify, Qobuz, Soundcloud, TIDAL and Tunes. Multi-room support is planned for the Zeppelin, which is available in ‘midnight’ or ‘pearl’ grey finishes.

Further details: [B&W](https://www.bowers-wilkins.com), [bit.ly/3vX3xDU](https://bit.ly/3vX3xDU)

## SILENT TYPE

There’s much to be said for using SSDs, rather than hard drives, in your music server. SSDs are quicker, less power-hungry, quieter and don’t wear out (no spinning platters, and in this application they tend to be ‘read from’ far more often than ‘written to’). No wonder they form the basis of the £5k N50-S38, billed by manufacturer Melco as a “mid-range digital music library”. Said SSD is a “specially-selected” 3.84TB device, which fits to the N50-S38’s neat full-width chassis via a cradle. As well as USB connectivity for maintaining and backing up your music library, there’s a dedicated USB DAC port for enjoying it through compatible ‘local’ equipment.

Of the two Ethernet ports, one is optimised for playback. Other features include a new PSU, enhanced main board, ‘Room Readiness’, DSD/DLNA compatibility, support for various streaming services, a friendly OLED screen/push-button user interface and Melco’s Intelligent Music Library software.

Further details: [Melco](https://www.melco.com), [bit.ly/3q1WcCl](https://bit.ly/3q1WcCl)





## A&K ON THE MOVE AGAIN

Its £649 selling price didn't stop Astell&Kern from describing the A&norma SR25 portable music player as "entry-level". That aside, the hi-res SR25 performs very well; indeed one is used here for reviewing headphones. Things move fast in this game, prompting A&K to replace the SR25 with a £699 second-generation model. The "eye-catching" angled-screen design has been tweaked slightly – the power button has been moved to the side, so that the top panel can accommodate a second (4.4mm) balanced output. A&K reckons the latter yields improvements in dynamics, bass-response, imaging and detail.

Other SR25 MKII refinements include SP2000T-inspired RFI shielding, 'Replay Gain' for uniform sound levels, 'File Drop' wireless transfers, simpler 'BT Sink' Bluetooth connectivity, a new volume-wheel design and darker finish. To go with them, A&K has launched the £649 ZERO I. This sophisticated 'hybrid' IEM features a micro-planar dynamic driver, dual balanced-armature drivers and dynamic driver in each 'bud'.

Further details: [bit.ly/3nENiYu](https://bit.ly/3nENiYu) (SR25 MKII); [bit.ly/3bpbQZj](https://bit.ly/3bpbQZj) (ZERO I)



## I AM METALLIC, ORANGE

New from Audio-Technica is a limited-edition of the ATH-M50BT2xMO wireless closed-back over-ear headphones that, following an online colour poll conducted worldwide, is finished in metallic orange (hence that 'MO' suffix). The £190 ATH-M50BT2xMO (and, for that matter, the 'regular' £180 ATH-M50xBT2) are descendants of the "legendary" ATH-M50 and ATH-M50x studio models.

They are claimed to be "faithful" to the latter's sonic signature, described by A-T as "exceptional clarity and deep, accurate bass response". Features of these high-tech wonders include proprietary 45mm drivers, app-controlled EQ settings, a hands-free feature with beamforming microphones and intelligibility-boosting sidetone circuitry, 50-hour battery life, built-in Amazon Alexa, an AK4331 32/192 DAC chip, a low-latency mode for video and gaming, 10-minute rapid charge and convenient 'multipoint' pairing. Charging is via USB-C, and a 3.5mm cable is provided as a connection alternative to Bluetooth 5 (with SBC, AAC and LDAC codec support).

Further details: *Audio-Technica*: [bit.ly/3GFEH0d](https://bit.ly/3GFEH0d)

## FLYING THE FLAG

Ruark Audio kicks off its 'Made in England' project – "bespoke, beautiful products...hand-built using traditional techniques" – with a luxurious version of the £999 R5 'all-in-one' system. Exclusively-available from John Lewis for a not-insignificant £2000, the limited-edition R5 MiE is built into a distinctive grille-fronted enclosure that's sustainably-manufactured from the "finest FSC-approved timbers...and Italian veneers".

Made by artisans in a Suffolk workshop, it's sent to Ruark's Southend HQ where the electronics are added. As with the 'standard' R5, the latter are – Ruark's PR admitted to us – "sourced elsewhere". She points out that the R5 MiE is however "fully-designed and assembled in the UK, with everything else made here". Features are similar to the those of the now-discontinued R5 Signature, complete with 'Stereo+' tuned 90 Watt 2.1 audio. Playback sources include AptX HD Bluetooth, slot-loading CD, DAB/FM/Internet radio, USB, hi-res streaming and MM phono stage.

Further details: *Ruark*: [bit.ly/3Bw6o7N](https://bit.ly/3Bw6o7N)



## INTRO SCAN

In a bid to capture some of the budget interconnect market from the likes of Chord and QED, Black Rhodium has launched its "accessibly-priced" Intro range. The Derby firm's Graham Nalty told us that Intro's "main purpose" is to introduce end users to his brand (and the benefits of audiophile cabling). As with Black Rhodium's other offerings, Intro products are handmade and backed by a lifetime warranty.

The current Intro offerings are a £25 1m S/PDIF interconnect, £45 1m analogue pair and speaker cables in three lengths - 2m (£60), 3m (£70) and 5m (£90). The copper-cored digital and analogue interconnects are internally-screened, terminate in REAN phono plugs and feature strain-reliefs. Gold-plated 4mm 'banana' plugs are specified for the copper speaker cables, although shrouded BFA types can be specified. They're available in a choice of sleeving colours. In other news, Black Rhodium is now offering more expensive digital interconnects in twin-packs for those with multiple sources or Chord-type 'two-wire' transmission.

Further details: *Black Rhodium*, [bit.ly/3nSvo4i](https://bit.ly/3nSvo4i)



# MUSICAL FIDELITY



INTRODUCING THE:

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The M2si integrated amplifier takes our peerless premium amp experience and applies it to a more affordable price point. It boasts trickle-down technology from our mighty and legendary Titan flagship, plus other high-end touches such as solid metal controls, keeping its clean style easy to maintain.

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# HI-FI WORLD 2021 AWARDS



**W**elcome to Hi-Fi World's 2021 Awards, given to the products that we judged outstanding over the past year. These passed the intense scrutiny of measurement, sounded good to all of us and were easy to use, the inevitability of awkward apps accepted. Not necessarily the most expensive products we're glad to say, many offering surprising value.

In popular product categories such as streamers there has been consistent improvement, but as the tentacles of digital spread through the home by wi-fi they have also become complex and challenging to operate. At the other end of the scale remains LP, easy to use and gaining in popularity also. And of course the headphone market provides us with more choice than we can handle. The year of 2021 has delivered a variety of greats – from the complex down to the simple – that you can find in our nominations below.

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# ★ BEST LOUDSPEAKER

## JBL HDI-3600



Reviewed: December 2021 issue

**J**BL of the USA know all about producing a massive sound, for stadiums and studios across America. Their large HDI-3600 floorstander does just the same for the home: this is a loudspeaker to shake the foundations with massive bass that runs deep, yet is not bloated. Bass quality we found superb.

Add in a smooth mid-range and extended treble from the horn tweeter and you have a sound that will impress all who hear it. For a price of just £3198. This is half that of rivals lacking the low bass octave JBL deliver.

“Music jumped out of a dark space, rather than from the brighter hue of zingy alloy drivers. With superb insight and detailing, a lovely smooth yet tonally accurate sound plus ground shaking lower octaves, there was little to loathe and much to like. Johannette Zomer’s voice soared beautifully in Handel’s *Lascia chi’io Pianga* (DSD64), projected strongly outward without blemish”.

With its thunderous sound and reasonable price, JBL’s HDI-3600 is an easy winner of our award for Best Loudspeaker of 2021.



# ★ BEST STANDMOUNT

## KEF LS50 META

Reviewed: February 2021 issue

**K**EF's LS50 Meta is a high-tech mini-monitor fitted with their Uni-Q driver that combines tweeter and woofer into a single point-source. Metamaterial Absorption Technology (MAT) works by absorbing 99% of unwanted sound from the rear of the tweeter. KEF engineer this speaker for accuracy, a goal they achieve our measurements showed.

Reviewer John Pickford said: "Filigree detail was revelatory, allowing me to hear a strummed acoustic guitar usually buried beneath a sea of Mellotron, while tonal balance was spot-on. Bass, aided by near rear wall placement, was deep and expressive yet also fast and fluid with no boom or audible overhang. Midrange clarity was outstanding too, with no disconcerting honks or artifice of any kind, while integration of bass, middle and upper frequencies was seamless; a brilliant performance".

For anyone wanting a high technology, seamlessly accurate mini-monitor KEF's superb LS50 Meta is a great choice. It deserves our award as the best Standmount loudspeaker of 2021.





★  
**BEST  
AMPLIFIER**

**CREEK AUDIO  
VOYAGE i20**



Reviewed: March 2021 issue

**H**ere's a 120 Watt amplifier with smooth sound, a full complement of digital inputs, balanced analogue input and remote control, price £4495. Creek's Voyage i20 uses a top quality digital convertor chip from Asahi Kasei of Japan for superb results from Bluetooth, USB and S/PDIF digital inputs. There's even a phono stage.

Reviewer Noel Keywood said: "plenty of fine detail was mined from the vivid guitar of Nils Lofgren's Keith Don't Go, our ESL-X XStat panels loving what they were fed. The furiously strummed strings slashed out of the 'speakers, as they should, but the Creek sounded deliciously sweet; I believe AKM's Velvet Sound DAC contributed strongly here. I was also aware of a solid, cohesive sense to the sound that comes from a good digital amplifier with DAC tightly connected to the amplifier stages, without intervening cables and connectors that hamper an external DAC".

By combining smooth sound with all digital conveniences this amplifier easily gains our recommendation as the best all-round amplifier package of 2021.



# ★ BEST VALVE AMPLIFIER

## AUDIO RESEARCH REFERENCE AMP 80S

Reviewed: June 2021 issue

**T**he Reference 80S valve amplifier from Audio Research is a recent introduction showcasing specialised design, price £14,998. It is fully balanced and should be used with a matching balanced preamplifier; we used the matching Reference 6SE, price £16,998. It produces 70 Watts per channel from KT150 valves, automatic internal biasing circuits removing the need for user adjustment. Big illuminated power meters add visual appeal.

Of its sound we said: "The sound stage was wide and open, backing violins separated from each other and with distinct lateral position. Marianne Thorsen's violin floated out with sublime ease, smooth, natural in tone and perfectly rendered. I could hear the strings suffering under the bow, appreciate her ability and effort. Funny how a communicative amplifier draws you in and this the Reference 6SE preamplifier and Reference 80S power amplifier did, staring right into what was happening in this recording".

A large, heavy but highly sophisticated valve amplifier with evocative styling and fabulous sound quality.





★  
**BEST  
 HEADPHONE  
 AMPLIFIER**

**ICON AUDIO HP  
 205D**



Reviewed: September 2021 issue

**A** valve headphone amplifier with analogue input and digital Bluetooth receiver – unique. The onion shaped valves are modern day replicas of a 1924 design. Icon Audio’s HP 205D, price £2999, looks like a museum piece but is modern under the skin, delivering hi-res digital from Bluetooth 5.1.

Reviewer Noel Keywood said: “the HP 205D struck me by its speed, solidity of images and cosmic stereo positioning. Fine percussive details like a maraca in Holly Cole’s Train Song, were coming from outside the immediate sound stage, from a space beyond. It had a pushy midband, forward and ‘in my ears’, with extraordinary revelation of timbral richness – to the bouzouki and plucked bass at the start of Loreena McKennitt’s Gates of Istanbul for example. For air and space there was little I have heard to compare”.

The HP 205D we thought was glorious in both appearance and sound – a worthy Award Winner for 2021.





# ★ BEST NETWORK PLAYER

## ARCAM ST60

Reviewed: October 2021 issue

**A**part from internet music streaming services (Tidal, Qobuz, etc) Arcam's ST60 handles most digital sources, directing their output through a top quality ES9038Pro DAC from ESS of California. Able to play DSD music files and send analogue out from balanced XLR sockets, it packs a sonic punch. Play music from a USB flash drive, from a digitally connected external CD player/transport, from a computer – it can do it all. Price just £1200.

We said: "hi-res from flash drive showed greater cohesion and body to the sound than is available from CD, a benefit the ST60 made clear. I was a bit taken aback by Diana Krall's Narrow Daylight (DSD). There was intense speed to plucked guitar strings: they cut out of the loudspeakers in a way I have not heard before. The Arcam was dramatic. It is able to bring very high resolution to the reproduction of hi-res digital, where with some players the benefits are not obvious".

A 'streamer' that can do it all – and with great sound quality. Arcam's ST60 deserves our citation as best network player of 2021.





★  
**BEST  
TURNTABLE**

TEAC TN-5BB



Reviewed: September 2021 issue

**T**each's TN-5BB turntable is a three-speed belt drive with electronic speed control and – unusually – balanced outputs in addition to common unbalanced outputs. With a powered cue platform, auto stop and lift and a beautifully finished plinth it's a quality design easy to use, coming with a budget Ortofon 2M Red MM cartridge. All for £1449.

We said: "good speed stability came as a sense of pitch confidence; notes were rock stable, never wavering or sounding watery. This was an obvious strength of the Teac: the electronic timing of synth in Alison Goldfrapp's *Lovely to CU* (Supernature) was delivered with a tight grip. Rolling drum work in *Sing, Sing, Sing*, from the Syd Lawrence Orchestra (*Big Band Spectacular*) strode along to perfection. As the LPs passed by I found the turntable a delight to use. Put arm over LP, press the big button up front and walk away. When the music ends the arm lifts and all falls silent".

A great package that easily deserves our World Award for 2021 of Best Turntable.



# ★ BEST PHONOSTAGE

## PROJECT PHONO BOX RS2

Reviewed: March 2021 issue

**H**ere's an esoteric phono stage that doesn't break the bank. Costing £1300, the Phono Box RS2 comes with fully balanced inputs and outputs for both MC and MM cartridges – rare. It has a wide range of user adjustable settings, again for both types, plus good warp filtering. Measurement revealed a well honed design able to complement the best cartridges.

Of this phono stage Noel Keywood said: "I started out with Hugh Masekela's Hope LP – and Abangoma showed the RS2 delivers a strong, expressive bass line. Uptownship confirmed this, revealing air around the miked-up hand drums. Kick drum strikes were weighty and well resolved; I again got to hear the timbral properties of the instruments better than usual. It was a sophisticated sound.

Spinning Jackie Leven's Young Male Suicide Blessed by Invisible Woman, his big-man vocals were just that: rich and full sized in front of me".

This is a sophisticated phono stage that easily gains our World Award for the best of 2021.





★  
**BEST  
HEADPHONES**

**HIFIMAN  
SUNDARA**



Reviewed: November 2021 issue

**P**lenty of excellent earwear has passed through these portals over the last year, making it difficult to pick a winner. After much deliberation, we chose the Sundara from the extensive range of Chinese manufacturer Hifiman.

Reviewed in the November 2021 issue, the Sundara is an open-backed circumaural design built around 80mm planar magnetic drivers. These feature Hifiman's patented diaphragm that combines lightness and strength for enhanced performance.

Partnered with amplification of sufficient drive, the Sundara gives you a taste of high-end headphone listening for a modest £300; in terms of detail and musicality, it approaches models selling for twice the price, a strong point being its almost-analytical resolution of detail. The breathing of saxophonist Alan Skidmore was as apparent as the highly-complex combination of harmonics that gives his instrument its distinctive timbre.

Big and indeed beautiful, the Sundara is comfortable to wear over extended periods – and, thanks to plug-in cables, has an upgrade path. A top choice.



# ★ BEST LOUDSPEAKER CABLE

## CHORD C-SCREEN X

Reviewed: June 2021 issue

In the face of stiff competition, another affordable Chord product takes the prize this time round. The £7.50 per metre C-screen X (£165 for a 3m pair, terminated with ChordOhmic banana plugs) is, like last year's winner, an 'X' (XLPE insulated) upgrade of an existing product. Where it counts, the C-screen X – reviewed in the June 2021 issue – is an improvement over the DIY-store stuff. Over the XLPE-covered wiring is wrapped a twin-foil shield to keep external interference at bay. Doing so, it's claimed, helps to convey subtlety while aiding coherence and timing. In terms of the all-important midrange, it never fails in its ability to communicate expressively; furthermore, dynamics and imaging are a cut above what you'd expect from a cable at this price point.

The C-screen X proves that cables can make a positive difference to even budget hi-fi systems, and paves the way for the more esoteric varieties that benefit higher-end installations. This also weighed our decision in Chord's favour. A fine performer.



## NEWCASTLE & CARLISLE SHOWROOMS



B&W 800 Series / Nautilus Dealers • Naim Statement  
Linn Klimax / LP12 experts • KEF Blade and Reference centre  
Chord Music Cables

Interest free credit • Parking • Atmos home theatres  
Part exchange considered • Ex demonstration deals available  
Lovely coffee, real people and great advice

naim



LINN

Bowers & Wilkins

KEF



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# 2021 AWARDS

## Original Reviews



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# Go Big

**JBL's HDI-3600 floorstander has impact, says Noel Keywood.**

If you want to go big with a loudspeaker – as in big sound, then JBL is your brand. This US company specialises in conspicuous power and they don't let up. The large HDI-3600 floorstanders (£3198) I'm reviewing here radiate bass from three drive units, just to make sure it gets through. I'll say straight away they are designed to shake a house, just so you know in advance what we're discussing here!

What JBL tell us is this loudspeaker uses “three 6.5in (165mm) aluminum matrix cone woofers”. You might be surprised to know that this still doesn't add up to the area of one 12in bass unit, just bettering a 10in driver, so you can see why JBL have made them all radiate bass, because the more surface area the better. Only the top 6.5in unit handles mid-range also, reaching all the way up to the horn loaded tweeter situated directly above it. Surprisingly, the two lower bass units also cover a lot of midrange, making for a vertically extended line-source array. I suspect JBL have done this to improve stage height and presence; it's usual to limit bass drivers to bass only (below 100Hz), but not here. So in a





demo the HDI-3600 will sound rather different – larger – to other loudspeakers whose lower drivers handle bass only. Hence my comments on JBL going for a big sound.

Big bass comes from a big cabinet and this one looks slightly larger than most, although it's only just above the popular 1 metre mark, measuring 103cm high according to our tape measure – if not JBL's. They get width and depth right though, at 255mm and 342mm, the latter including the (removable) grille that projects slightly. A weight of 28kg makes each speaker quite awkward to move: these are not lightweights. The cabinets feel very solid and are heavily braced internally JBL say.

Finishes are gloss black, satin grey Oak wood veneer, or satin Walnut wood veneer. Our review samples were the latter. The company say they use wood veneers, but these days real veneers are finished with acrylic coatings that make them look artificial, grain being filled in – and that's how ours appeared. Tannoy used real wood veneers but they supplied a tin of wax with their loudspeakers and requested the curtains of the castle not to be opened to avoid discolouration from sunlight! Modern lacquers have advantages.

At rear of the cabinet lie two large ports that may well vent one internal chamber, since they gave identical output. Below them lie a conventional set of gold plated bi-wire terminals, with removable straps to facilitate bi-wiring. JBL quote a sensitivity of 90dB and that's exactly what we measured, meaning amplifiers down to 20 Watts are suitable. Three large drive units can absorb power too, giving a maximum of 250 Watts they say, but this would be insanely loud. Even getting 60 Watts through them on peaks would be challenging, except in a very big room (>25ft long).

At top sits the company's patented horn tweeter with 'High Definition Waveguide technology', driven by a patented 1in (25mm) compression driver. Just like that used in the HDI-1600, reviewed in our November 2021 issue, it covers a wide range, terminating in a distinctive peak above 16kHz. JBL make its output strong and obvious, but not excessive (see Measured

Performance). This is an accurate loudspeaker, not an 'enhanced' one, but treble horns are usually quite obvious in their contribution, unlike smaller area domes.

### SOUND QUALITY

The JBLs were run in then connected to our Creek Voyage i20 and – alternatively – our Icon Audio Stereo 30SE single-ended valve amplifier whose 30 Watts is plenty enough for such a 'speaker. Having reviewed the HDI-1600 I suspected the Icon would be a symbiotic match for JBL's horn tweeter. Cables were Chord

"The rumbling lows added weight and majesty, without becoming intrusive or overwhelming"

Company Signature Reference (screened).

Sources were an Oppo UDP-205D universal player acting as a CD transport, digitally connected by QED Quartz glass optical cable to the Creek's internal AKM DAC. I also used Bluetooth fed by the Hi-Res section of an Onkyo HF Player app. on an iPhone 11X Pro that gives 24bit resolution, plus a wider selection of music from a MacBook Pro running Audirvana+ player software, specifically to access Chessky low bass test tracks as well as DSD transmitted as such, not PCM (iPhone/HF Player).

As measurement suggested the HD-3600s go low – very low. They start delivering deep bass almost before a track has started; when I pressed Play on my iPhone with Fleetwood Mac's Dreams (24/96) I was hit immediately by powerful low bass that energised the floorboards and just about all else. Seemingly there was a whole extra octave of bass I rarely get to hear. There wasn't the sonic grip of a big 12in driver, but there was prodigious power and presence all the same, John McVie's bass line striding across the room at me like a hippopotamus – big, unstoppable.

That doesn't sound complimentary, but it is; the HDI-3600s deliver bass with laconic ease and it brought a smile to my face, as well as better appreciation of all that goes on in the lower octaves we commonly don't get to hear. And I was impressed that even in my 17ft long lounge they did not invoke boom, nor any sense of disproportion. The rumbling lows added weight and majesty, without becoming intrusive or overwhelming. The big ports and multiple bass units drive the air load effectively, rather than flailing at it (producing distortion) – and

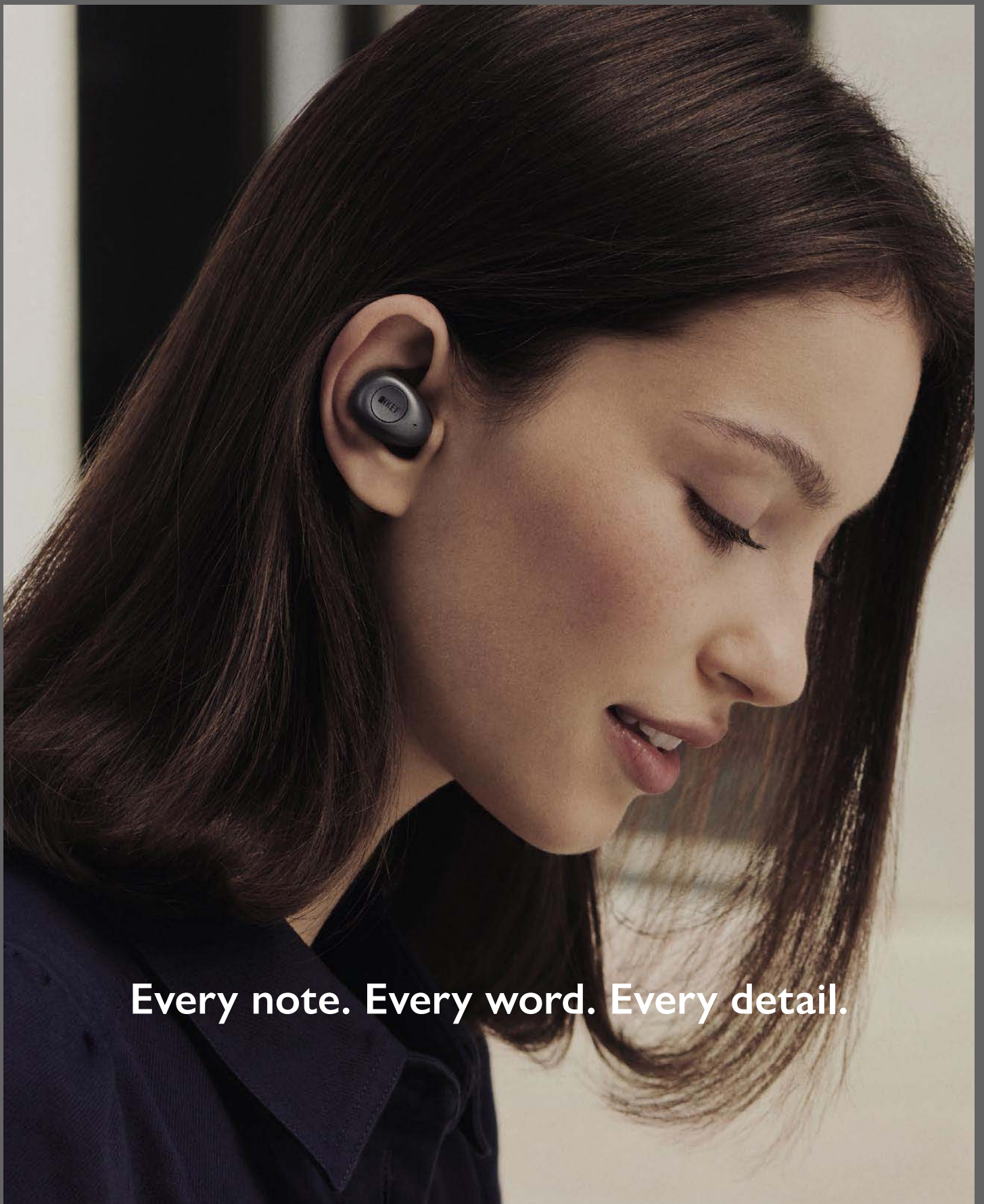
this is important in the home. With Dadawa's Canton Story (CD) I was rather expecting the sudden entrance of the drum to be overwhelming – but it wasn't. The big JBLs revealed its qualities better than most, but kept its power in correct proportion to the rest of the track, making for a great listen.

The big 3600s sounded smooth and dark in general tonality,



**The shape and flair of JBL's horn is patented. It gives wide dispersion, high sensitivity and flat frequency response over a wide band. Plus a projective sound.**

something I appreciate. Music jumped out of a dark space should I better say, rather than from the brighter hue of zingy alloy drivers. This I like. With superb insight and detailing, a lovely smooth yet tonally accurate sound plus ground shaking lower octaves there was little to loathe and much to like here, much to like very much.



Every note. Every word. Every detail.



**Mu3 noise cancelling true wireless earphones**  
Sound by KEF. Design by Ross Lovegrove.

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

Listen and believe

**KEF** 60  
YEARS



**Two large ports provide generous low frequency output, at fairly low distortion, supporting subsonics.**

Johannette Zomer's voice soared beautifully in Handel's *Lascia chi'io Pianga* (DSD64), projected strongly outward at me but without blemish.

There were a few odd moments when the horn tweeter suddenly seemed to want to strut its stuff. One was with The Eagles 'Somebody' (CD) where high treble had a piercing quality that sounded to me I was hearing the tweeter's treble peak above 16kHz, even though with steady signals I can't hear up that far. Whatever, the horn tweeter is powerfully projective and can at times be a bit too strong with recordings that have their own problems. The 'speakers were generally easy going yet balanced and revealing, but every now and then they would bite. JBL's treble horn was the reason; its peak needs removal.

With the Icon Audio Stereo 30SE valve amplifier there was some loss of bass resolution: the HDI-3600s need electrical damping and here a valve amplifier does not suit. However, this was only obvious with prodigious deep bass; most of the time the two worked together beautifully, the Icon delivering a timbrally rich sound that fleshed out the shimmering strings of Nils Lofgren's guitar in 'Keith Don't Go'. Would the tweeter's peak above 16kHz drill my ears? It did not, but I was aware

of strong high-highs on this track. And all the time the Icon's output meter just bounced around against its zero end stop, even though I was playing loud. The 'speakers are valve amplifier friendly, having a relaxed and easy demeanour, but the resultant sound is unusual in nature.

**CONCLUSION**

JBL's HDI-3600s were laconic giants. They cruised through all I threw at them, rarely putting a foot wrong. From powerfully projected high treble down to deep room shaking subsonics, these loudspeakers carry a powerful punch that is the epitome of high fidelity. Yet they are also subtle and insightful too, just as good with the massed strings of an orchestra as with Rock. Now and then needles hit my ears, but for the most part I loved what I heard: exciting yet balanced and truthful. A great loudspeaker.



**Below the horn lie three drivers delivering bass. The lower two reach up to 900Hz, the top one 2kHz.**

**MEASURED PERFORMANCE**

Frequency response of the HDI-3600 was essentially flat across the audio band, from a very low 30Hz up to 16kHz. The dip and peak around 55Hz is a phase rotation due to the room so can be ignored. A dip at 800Hz exists at the crossover point – but it is a small effect of little subjective consequence.

The lowest driver works up to 800Hz, the next up to 900Hz and the third up acts as a bass/midrange unit, reaching right up to 2kHz where it crosses over to the tweeter. So in effect there are three bass units, one midrange and one tweeter – an unusual arrangement that maximises bass cone area.

As with the smaller HDI-1600 reviewed in our November 2021 issue the horn loaded tweeter gives smooth, even output up to 16kHz, above which it peaks sharply; luckily, few can hear this high.

JBL have obviously designed the HDI-3600 to be technically accurate, rather than contrived. It will not sound overly bright, but the tweeter is no

shrinking violet either. Our measurement is slightly off-axis (20degrees), with grille off. Putting the grille on made no difference. The speaker is best aimed straight down the room, its dispersion being sufficiently wide and smooth to make positioning uncritical.

This loudspeaker reaches very low: few run flat down to 30Hz. The ports (red trace) peak broadly around 40Hz, suggesting good bass damping. The impedance curve reflects this situation too, by a fairly wide dip around port frequency. Powerful low bass will be produced in any room, but especially a large one 18ft long or more.

Impedance (measured with pink noise) was exactly 6 Ohms and bass unit combined d.c.r. 4.3 Ohms, as seen at the terminals, all standard nowadays. Sensitivity was high at 90dB from one nominal Watt of input (2.8V) so amplifiers of 20 Watts or more suit, with little need for more than 100 Watts.

A nicely engineered loudspeaker

that's accurate, will have powerful bass yet not wallow. Very good all round. **NK**

**FREQUENCY RESPONSE**

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



**IMPEDANCE**



**JBL HDI-3600**  
**£3198**



**OUTSTANDING - amongst the best.**

**VERDICT**

Plentiful subsonic bass, accurate and revealing. Very exciting: a big sound.

**FOR**

- endlessly deep bass
- accurate tonal balance
- dark tonal hue

**AGAINST**

- occasional sharp treble

JBL  
<https://bit.ly/3luRL0a>



# Meta Made

KEF's popular LS50 gets a facelift to Meta form. John Pickford pricks up his ears.

**K**EF's Uni-Q driver array has been the centrepiece of the LS50 for ten years, the original model first appearing in 2011. I had the privilege of hear-

ing the Uni-Q driver system slightly earlier than that – when it featured in KEF's Concept Blade loudspeaker, launched at the Bristol Hi-Fi Show in 2010. I didn't book myself in for the show demo – never an ideal

listening environment – as I knew they would later be heading to the show organiser's acoustically tailored listening room and an invitation would be forthcoming. Attached to top-of-the-range Naim electronics,





**The 12th generation Uni-Q unit now incorporates MAT technology to absorb 99% of unwanted sound from the rear of the tweeter.**

they produced a full-range yet utterly focused sound that remains one of my all-time favourite listening experiences; I'll never forget it.

When the first LS50s became available I made it my business to hear a pair and shortly thereafter recommended them to a friend who still uses them with no intention of changing.

The new LS50 Meta shares the visual style of the older model but there have been many significant improvements, not least in the Uni-Q driver array, now in its 12th generation. The word Meta is important here. One definition of Meta is 'referring to itself or to the conventions of its genre; self-referential', which makes perfect sense when you look at the lineage of this new loudspeaker; however that's not the reason for its appendage here.

Metamaterial Absorption Technology (MAT) is the main improvement in the Uni-Q design and is a joint development with the Acoustic Metamaterials Group. I could provide a lengthy explanation of this technology but it would make your eyes water. I'll leave it to KEF to give the concise report: "Metamaterials are specially developed structures that use existing materials in such a way that they exhibit new, desirable properties that are simply not found in naturally occurring substances". All clear? In practice, MAT works by absorbing

99% of the unwanted sound produced at the rear of the tweeter, reducing distortion to vanishingly low levels, for a cleaner and more accurate sound.

Other improvements are evident in both the cabinet and the rear-firing flexible port, making use of state-of-the-art technologies, three of which also boast their own 3-letter acronyms.

"A superb example of point source performance, a master-class in coherence, articulation and focus."

Technical innovations aside, the LS50 Meta remains a 2-way bookshelf loudspeaker inspired by the legendary BBC LS3/5a monitor. KEF produced the drivers for that classic design but that's where comparisons end. Most LS3/5a wannabes follow its conventional design principles - separate woofer and tweeter housed in a traditionally styled infinite baffle (sealed box) cabinet. The Meta is no ordinary foursquare box design; its curved dimensions are not only sleek

and stylish but also ensure ultimate performance.

Available in four silky matte finishes; black, grey, white and the Royal Blue Special Edition our review samples, the LS50 Meta sports a contemporary modern look quite unlike wooden BBC-type designs. Those who find the form and finish of the LS3/5a to be dull or even dowdy will appreciate the more

high-tech visual appeal. They certainly look cool in blue with champagne-coloured Uni-Q drivers, though my friend's original black and copper LS50s have earned themselves a 2-word nickname from me too rude to print here. Let's just say they remind me of the rear view of one of our feline friends with its tail raised.

Dedicated stands are available but not supplied for review so the LS50s replaced my LS3/5as atop Target stands, 7-inches from a rear



**The flare and profile of the offset port is calculated to delay the onset of turbulence and the flexible port walls prevent resonances from colouring the midrange.**



**Foam port bungs are provided to tailor bass to room. Useful when positioned close to a rear wall, reducing possible room boom.**

wall and toed-in just enough for the cabinet's inner surface to be visible.

**SOUND QUALITY**

Auditioned primarily in the all-analogue domain – Goldring Lenco GL75, Denon DL103, Leema Elements Ultra phono stage and the current Naim Nait – I eagerly cued-up my first LP.

Out And In from The Moody Blues' To Our Children's Children's Children (Threshold 1969) is a lovely Decca studio recording with a surprisingly modern sounding stereo mix – no wacky hole-in-the-middle 60s stereo here. Through the LS50s, the track was masterfully delineated in perfect proportion, presenting a wide and deep soundstage that betters the LS3/5a's imaging capabilities by some degree. Filigree detail was revelatory, allowing me to hear a strummed acoustic guitar usually buried beneath a sea of Mellotron, while tonal balance was spot-on. Bass, aided by near rear wall placement, was deep and expressive yet also fast and fluid with no boom or audible overhang. Midrange clarity was outstanding too, with no disconcerting honks or artifice of any kind, while integration of bass, middle and upper frequencies was seamless; a brilliant performance.

Laura Marling's Alexandra from her 2020 album Song For Our Daughter (Partisan Records) is a recording in the style of singer/songwriters from the Moodies' era (think Joni Mitchell) but with a modern, up-front production style. Here, the LS50's impeccable timing and control was on display, with no smearing of the leading edges of acoustic guitar and percussion. This wasn't at the expense of body and soul as these speakers can play a tune and cut a rug with the best of them.

Playing some forward thinking

(for 1959) jazz courtesy of Ornette Coleman's The Shape Of Jazz To Come (Atlantic 1959) confirmed the LS50's ability to faithfully replay acoustic music convincingly. I welcomed some honk in the midrange listening to this LP; that's how the recording should sound. Smooth as they are, the LS50s do not smooth over tone or dynamics present in the original recording.

**CONCLUSION**

For my money the new LS50 Meta is the best small speaker currently

available at the £1,000 price point. They are playing as I write and the LS3/5a pair shall remain silent until it's time for them to go. A superb example of point source performance, they offer a master-class in coherence, articulation and focus. That's not a keyhole surgery, small-scale type of focus though, as they effortlessly fill a (smallish) room with a wonderfully all-of-a-piece sound. The best just got better.

**NOEL SAYS -**

I listened to the LS50 Meta's and was immediately drawn to fabulous filigree detailing in the treble; the benefit of Meta technology is quite obvious. As measurement suggests they do not have a warm sound, but are lively and vivacious in modern fashion, spectacularly clean and revealing. Impressive, especially at the price.

**MEASURED PERFORMANCE**

Our frequency response analysis of KEF's LS50 Meta clearly shows this is a very well engineered loudspeaker, running almost academically flat from 80Hz to 16kHz. The lack of peaks and dips indicates low level of narrow band mechanical/acoustical resonances, so low colouration. That makes the LS50 Meta technically a very accurate reproducer. There is some slight lift around the 4kHz-5kHz region, enough to ensure a sound on the bright rather than dark side, but with strong delivery of detail. A modern forward sound balance rather than a traditional one.

The port output (red trace) is tuned to 50Hz, extending output down to 40Hz, so deep bass is possible. The forward response has been proportioned for near wall use, rolling down below 80Hz to lessen the effect of room resonances (room boom). The KEFs are for small to medium sized rooms, no larger than 16ft long or so. They are not bass heavy our analysis show.

Sensitivity was as expected at 84dB sound pressure level from one nominal Watt (2.8V) of input; a 100 Watt amplifier would be best. As a load the LS50 Metas measured 6 Ohms with

pink noise, dropping to a minimum of 4 Ohms (dcr). The impedance trace shows crossover to the tweeter occurs at 2.5kHz and also a port tuned to 55Hz, somewhat asymmetrically. Inserting the foam bung supplied negated port action, raising drive unit resonance to 85Hz.

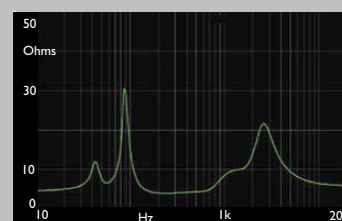
The LS50 Meta is very accurate in tonal balance, but it will come across as bright. Smoothness at high frequencies suggests quality treble. **NK**

**FREQUENCY RESPONSE**

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



**IMPEDANCE**



**KEF LS50 META**  
**£999**



**OUTSTANDING - amongst the best.**

**VALUE - keenly priced.**

**VERDICT**  
Superb sound far beyond their size and price.

**FOR**  
- coherence and articulation  
- accuracy of tone  
- robust bass quality  
- uncoloured midrange  
- clean and extended treble

**AGAINST**  
- nothing at the price

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# Easy Voyage

Noel Keywood lives with the new Creek Voyage i20 amplifier and finds it easy going.



Creek's latest Voyage i20 amplifier I'm reviewing here reminded me of their first amplifier, the CAS4040 from 1982. What that simple but clever design did was reproduce music without nasties – no gritty transistor distortion. The Voyage i20 carries on the Creek sound with exemplary ability.

And there's good reason. It is Mike Creek. Still very much in charge today, his knowledge of audio amplifier design is extraordinary – as I know from long and intense explanations to me about where every electron was going and how it should behave!

In the new Voyage i20 that's a lot more places to go and many more ways to behave – and there is big price increase as a result, to £4495. Where Creeks have been affordable in the past, £99 for the CAS4040 in 1982 equating to £352 today (Bank of England inflation calculator) and our Evolution 100A costing £1499 when reviewed in our March 2015 issue (£1674 today), the new i20 has

become in Creek's own words "a premium product".

This is a powerful 'digital' amplifier, meaning it has an on-board digital section, unlike the Evolution 100A we have heavily used as a reference amplifier from some years now. I've been writing about 'digital' amps recently as they are morphing into an interesting place to be. Until recently their on-board digital-to-analogue converters (DACs) have been a low-cost addition unable to compete with more sophisticated and expensive external DACs, but that is changing. Audiolab, Quad and Leak are all now using acclaimed ESS DAC chips, whilst Creek have chosen to use an AK4493EQ DAC chip from Asahi Kasei Microsystems (AKM, Japan) they tell me. This is a premium chip, part of AKM's Velvet Sound range that I know well justifies the title; they are even more "velvety" in sound than ESS chips, albeit by minor degree. But a top chip all the same, with quoted 123dB dynamic range – as you might hope in a premium priced amplifier.

From a compact chassis measuring 430mm wide, 80mm high and 350mm deep the i20 delivers 120 Watts into 8 Ohms and 225 Watts into 4 Ohms our measurements showed – in line with Creek's claimed power output. As today's loudspeakers are rated as 6 Ohms nominal make the power figure 155 Watts then – more than enough to go very loud.

Size-wise the i20 is similar to our 100 Watt Evolution 100A. How come? Purists will need to take a deep breath: it uses a switch-mode power supply. No big toroidal mains transformer any more, with consequent





and size. It's a custom design they told us, allowing the amplifier to handle low loads with ease, with minimal power reduction.

In keeping with price, the i20's front panel is slickly sculpted and finished, a work of art. The rear case is a conventional pressed steel type with heavy folded steel cover. There's a master power (rocker) switch at rear and a soft-start at front on the left rotary control. These functions also exist on a supplied remote control. The left rotary primarily selects inputs, but it has a push-to-

strongly rolled off upper treble, Slow and Slow+ were less aggressive at doing so, whilst Sharp and Sharp+ extended response to 21kHz with just slight roll down to take out the sting out of CD. The lack of correlation between handbook and production suggested to me the i20 was being built and programmed by a sub-contractor and a quick ferret around revealed it is made in Slovakia

What I noted immediately is that the single pair of XLR-socket balanced inputs can run through the volume control or direct. There

sample-rate is available: I'd suggest setting a Mac to 96kHz output sample-rate in its AudioMidi Setup menu. But good to see the abilities of the AKM declared and available; the TOSLINK optical inputs work up to 192kHz I found during tests, important to avoid silence from – say – a digital portable player optically connected (e.g. Astell&Kern) and playing a 192kHz sample rate file.

The volume control at right can be pressed to Mute and the remote also provides this function. There is a balance control too. You get a



select function that brings up a Menu on the display panel with various adjustable settings. Those that caught my attention were five PCM digital filters (Sharp, Sharp+, Slow, Slow+, Natural), plus two DSD filters (Wide, Narrow). There are also gain settings to increase sensitivity, only available in start-up mode, not in main Menu.

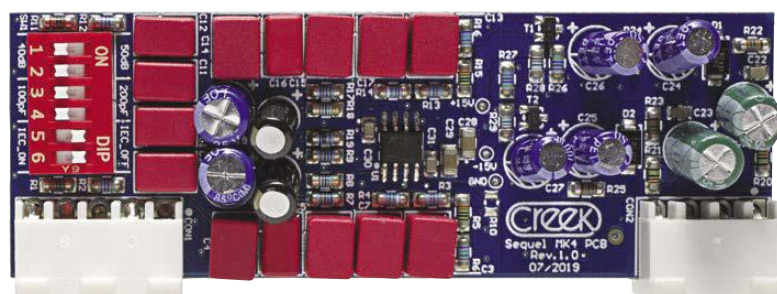
Some peculiarities. The i20 has an optional plug-in phono stage board for LP and ours was so fitted. The website mentions "RIAA filtering, to reduce disc warp frequencies" but this IEC filter is not available from the Menu (software control), only on the internal Phono circuit board (hardware control), meaning the cover must be removed to get at it – best left to a dealer.

The Manual says there are six PCM filters but our full production sample had five, with different naming. Changing filter produced no effect; it appeared stuck on Slow under tests, when I was using the rotary selector at left. The remote control did, however, work and measurement showed that with CD, Natural most

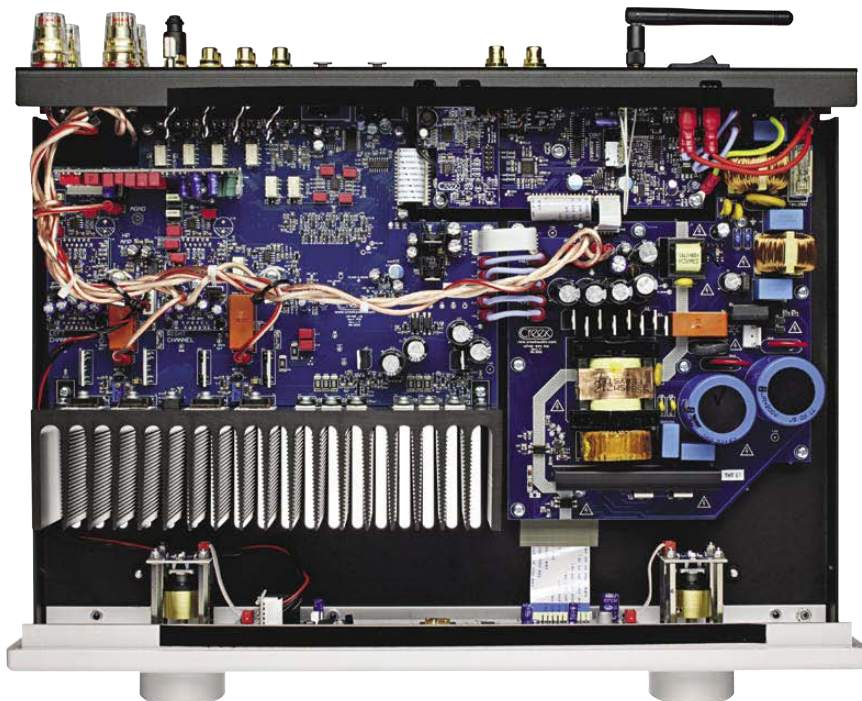
are three standard (unbalanced) Line inputs, one occupied by the Phono stage board when fitted, plus a Preamp output. Digital inputs comprise two opticals (TOSLINK), two electricals (phono sockets) and one USB. The AKM DAC chip has on-board DSD decoding, only accessible by using DoP over the USB link. You'll need the Audirvana+ computer music player or similar to manage this.

Connecting up via USB (MacBook Pro) brought up a declared menu

standard 1/4in (6.3mm) headphone socket on the front panel driven by its own amplifier, with the ability to mute the loudspeakers whilst headphone listening. Geeks can even check out heatsink temperature, 28 degree C in our case, the thermal limit being 90 degrees C. Protection circuits guard against overheating, d.c. offset and over-current. The output stage is Class G, meaning a small amp supplemented by a larger one to handle peaks, a small G logo lights up in the display when this happens; I got



**The Sequel Mk4 MM phono board, fitted to our sample. DIP switches at left set capacitive loading and IEC warp filter on/off. The board is best removed to set.**



**Creek's custom design switch-mode power supply (right) is substantial, but still lighter than transformers. It delivers a voltage-regulated supply. At top left sits the Phono board and below lie heatsinks for the Class G amplifier that uses Sanken output transistors.**

it to do so, but only at shatteringly high volume.

There's a Bluetooth short-range radio link that connected immediately from my iPhone 10X with no codes or difficulty.

**SOUND QUALITY**

I ran the i20 with our Martin Logan ESL-X hybrid electrostatic loudspeakers and also used it with the B&W and Triangle loudspeakers in this issue, to see how it fared with different loads. A useful feature of the Evolution 100A as a review amplifier was its compatibility with all loudspeakers.

Source was our Oppo UDP-205 D universal player acting as CD transport, connected by a QED glass fibre optical cable (I use optical rather than electrical to avoid earth loop noise) but the electrical input is galvanically isolated

Creek say, avoiding this problem.

Hi-res digital was fed in via USB from a MacBook Pro running from battery again to avoid earth loop noise that measurement shows degrades DAC dynamic range. I used the Audirvana+ player to deliver DSD.

It's sort-of difficult to describe a Creek amplifier. "Quietly powerful" perhaps. A small start and steerage in the right direction. Creek amplifiers were never a sonic assault course, so much as a refined way to listen to music, underpinned by bass strength that gives a sense of underlying power – and the i20 stated its ability here immediately. With one of my bass test tracks, Safri Duo's Samb Adagio (CD), the pounding synth was as heavy and solid as I could wish for – and there was a feeling of subsonic power to it as well. Although the amplifier has a very high damping factor it didn't sound dry and tight as many do, just thunderous. There was

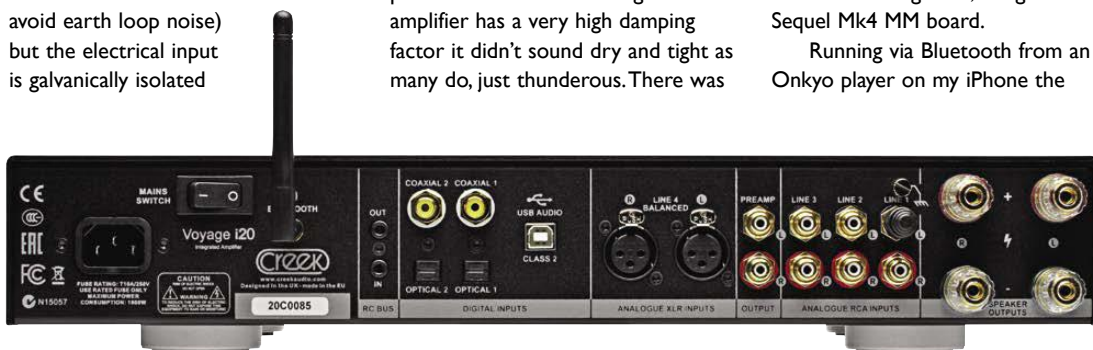
good bass control and expression, obvious in string bass lines with humans involved, such as that behind Holly Cole singing the laconic Train Song. Here the amplifier dug out some texture in the bass as well as giving it strong dynamic push.

Plenty of fine detail was mined from the vivid guitar of Nils Lofgren's Keith Don't Go, our ESL-X XStat panels loving what they were fed. The furiously strummed strings slashed out of the 'speakers, as they should, but the Creek sounded deliciously sweet; I believe AKM's Velvet Sound DAC contributed strongly here.

At this point I was also aware of a solid, cohesive sense to the sound that comes from a good digital amplifier with DAC tightly connected to the amplifier stages, with no intervening cables and connectors that hamper an external DAC. The only caveat here being I hear this on the XStat panels that are free of loudspeaker phase anomalies, but not on conventional dynamic loudspeakers that are just a hopeless mess in this respect. If you have a panel loudspeaker though, Magneplanar or Martin Logan perhaps, this is a digital amplifier worth hearing.

Spinning LP was a must, so I connected up our Timestep Evo modified Technics SL-1210 Mk2 Direct Drive turntable, with SME309 arm and an Audio Technica VM750 SH moving magnet (MM) cartridge. There was total silence until needle hit groove and I got to hear a rich rendition of Dire Straits Brothers In Arms (Mobile Fidelity, 45rpm) with firm bass line underpinning Ride Across The River. Hugh Masekela's Uptownship, from his LP Hope, came across as vividly clear and punchy yet confidently relaxed, the bass line striding along with easy strength. Since Creek also make fine phono stages it was unsurprising the i20 would be strong here, using their Sequel Mk4 MM board.

Running via Bluetooth from an Onkyo player on my iPhone the



**A neat rear panel with Bluetooth aerial, mains power master switch, digital inputs, balanced XLR inputs and a single pair of loudspeaker terminals.**

sound was a tad bland, likely from the compression Bluetooth uses, but I noticed it was slightly warmer and fuller than from the other digital inputs or LP, the Creole singers behind Mercedes Sosa in Misa Criolla occupying what seemed cavernous warm space behind him.

DSD from the MacBook Pro brought up clear indication that the i20 was receiving DSD64 or 128 on its display (I didn't try any higher) and Diana Krall's Narrow Daylight was, on Wide filter, more sharp edged and vivid than I recall, but Narrow filter brought back the usual easy balance here. However, I preferred Wide – and as always with DSD well resolved (Japanese chip – they take it seriously) there was a subtly more even and expansive delivery of analogue nature than PCM. Digging out more edgy detail in this smoky performance that slid out from our electrostatics.

It's a good heads-up to talk about negatives, but there are none other than the i20 is not dry and tight like amplifiers from Chord Electronics, Musical Fidelity, Yamaha and others. It has great bass grip but also warmth – and it thunders



Part of the Menu list, showing PCM and DSD filter options.

better: Willy DeVille singing Spanish Harlem loomed large in front of me, less chiselled in outline and hard in definition, more full bodied and organically natural. Neil Young's acoustic guitar in After The Goldrush was conspicuously fleshed out to have body and scale. An easy but satisfying sound I felt, but then, being a valve amp man, you might expect that.

Bringing up another small observation. The CreeK had a similar milieu to our Icon Audio Stereo 30SE single-ended valve amplifier. It has a broad timbral palette – broader than most – plus an easy naturalness. Both also have a sense of warmth and body in their sound, something that is apparent with string instruments such as Nigel Kennedy's Stradivarius violin playing Massenet's Meditation, as well as a range of close-miked acoustic

guitars of Rock that I span through the system. Transistor amps don't have the spaciousness of valves, but that apart the two were quite close in basic character.

**CONCLUSION**

I think the CreeK i20 justifies being in the 'premium product' category. It offers a svelte alternative to others around it, and the digital section is well honed. 'Tis a pity that at the price it slips out of easy mortal grasp, unlike the CAS4040 I will remember – and was so popular in its time. But that amplifier introduced the fluid CreeK sound and the new i20 continues the tradition, now with a lot more wallop and fancy digital technology. Certainly an amplifier to hear for its smooth charms and thunderous sound.

**MEASURED PERFORMANCE**

The CreeK Voyage i20 produced 120 Watts into 8 Ohms and 225 Watts into 4 Ohms – powerful considering its compact dimensions. Output impedance measured 0.04 Ohms giving a very high damping factor of 180, suggesting well controlled bass.

Frequency response of the amplifier via Line input ran from a low 2Hz to 53kHz our analysis shows. Distortion was low at 0.007% in the midband, rising to 0.1% at 10kHz, some crossover distortion appearing at and below 1 Watt.

Input sensitivity was low at 700mV via Line in and 1.4V via XLR in. However, gain can be increased by up to +12dB (x4) bringing Line to 175mV – very high sensitivity.

The digital section was strongly band limited to 20kHz (-1dB), output rolling down to the 96kHz upper limit for 192kHz sample rate PCM via both optical and electrical S/PDIF inputs with all filters. This will give a mild subjective balance.

With CD (44.1kHz PCM) the filters had substantial effect, 'Natural' rolling off treble to -1dB at 10kHz.

Distortion (24bit, -60dB) was low at 0.04% from both loudspeaker and preamp outputs, and EIAJ Dynamic Range high at 116dB via both outputs – good if not up

to the 123dB figure quoted by AKM for the AK4493EQ DAC chip.

The MM phono stage was insensitive, needing 6mV for full output, falling to 1.5mV with +12dB gain selected. Equivalent input noise – a true measure of perceived noise – was normal enough at 0.47µV. Frequency response was flat from 10Hz to 20kHz without the IEC warp filter, or -1dB at 50Hz with warp filter, giving -14dB attenuation at 5Hz to suppress warp signals.

The compact Voyage i20 was powerful and measured well all round, if with digital dynamic range below that possible from the AKM DAC. **NK**

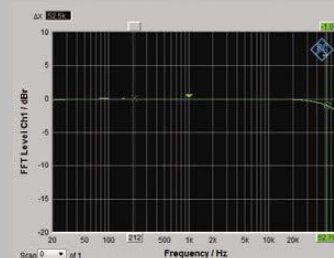
**Power** 120W  
**Frequency response (-1dB) 2Hz-53kHz**  
**Distortion (10kHz, 1W)** 0.1%  
**Separation (1kHz)** 94dB  
**Noise (IEC A)** -106dB  
**Sensitivity** 700mV

**DIGITAL**  
**Frequency response (-1dB) 5Hz-20kHz**  
**Distortion (1kHz, 5mV in)** 0.04%  
**Separation (1kHz)** 78dB  
**Noise (IEC A)** -114dB  
**Dynamic range (EIAJ)** 116dB

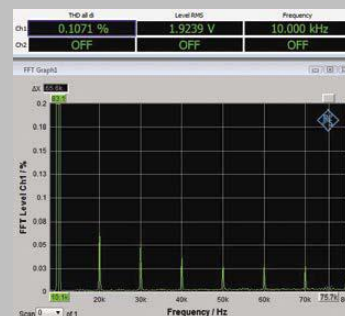
**PHONO (MM)**

**Frequency response (-1dB)** 10Hz-20kHz  
**Distortion (1kHz, 5mV in)** 0.02%  
**Separation (1kHz)** 68dB  
**Noise (IEC A)** -90dB  
**Sensitivity** 6mV  
**Overload** 90mV

**FREQUENCY RESPONSE**



**DISTORTION**



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**+ £129.00 FOR MM PHONO MODULE**



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Big bass and almost eery smoothness, with relaxed rhythm and insight, from all inputs including digital. A class act, if at a price.

**FOR**

- smooth fulsome sound
- bass dynamics
- superb digital
- small size

**AGAINST**

- poor LP warp filter
- gain setting in start-up only
- filter selection from amp unoperative

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# Hot Reference

**Audio Research turn up the heat with their new Reference 80S valve power amplifier. Noel Keywood warms to it.**

**V**alve amplifiers – you have to admit – are wacky and gorgeous. That’s in appearance and in sound. Here’s one that meets both criteria – the new Audio Research Reference 80S (70W) power amplifier, price £14,998. Built in Minneapolis, USA and aimed at a market more receptive to such esoterica than the UK, the 80S is certainly gorgeous, and also wacky too I think – although I’m sure Audio Research would contest that.

Importers Absolute Sounds wanted us to run it with a suitable preamp – so it’s reviewed here with the Audio Research Reference

6SE preamplifier, price £16,998. There’s good reason for this as I’ll explain later.

You won’t find many reviews of the Reference 80S power amplifier because at 28.2kgs (62lbs) it’s difficult to handle: a two-person lift. Measuring 483mm (19in) wide, 470mm (18.5in) deep and 260mm (10.5in) high we were challenged getting it photographed, tested, then into a hi-fi system. Because of size, weight and internal complexity this is very much a dealer installed and maintained item I’d suggest, something I’ll also go into further later.

Because the rear casework measures 18.5in (47cm) wide it

will fit a 19in rack but the fascia of both units measures exactly 19in and is likely to protrude – and even appears to be chamfered to do so. Just think ‘big’ here. “Suitable for the larger home” an estate agent might say. Much of the casework is alloy, most weight being in the single mains and dual output transformers at chassis rear, beneath a black screening cover. The front panel, with its handles, is firmly attached to the chassis by cast alloy brackets in order to withstand the load of being used to lift the entire amplifier but we didn’t try this: it was a man at rear and one at front to move it. There are plenty of transistor amplifiers

around that match or exceed this weight – the Musical Fidelity M8xi at 46kgs for example (Dec20 issue) – but they usually offer more power.

To develop 70 Watts per channel Audio Research use the rugged and reliable KT150 valve that is to my mind undoubtedly the most practical proposition available nowadays, since it offers a consistently smooth sound, unlike the higher powered KT90 and KT120 valve that I never got along with and were, I'm told, not especially reliable. All the same, I noted straight away Audio Research say on their website the output valves have fuses to guard against catastrophic failure, as can happen if run past their suggested (handbook) life span of 3000 hours, due to physical distortion of the electrode structure from thermal cycling. This phenomenon applies to all valve amplifiers.

The valves are run in before the amplifier is shipped, necessary to catch early valve failures caused by manufacturing defects. We once had to return an entire batch of new KT88s at World Audio Design because none worked properly; QC in East European factories was somewhat lacking in the 1990s. Audio Research use Russian Tung-Sols, linked to New York's New Sensor Corporation



**Behind, a KT150 power output valve. In front a 6H30 double-triode with damping rings.**



**The Reference 80S can be run with cover removed. Then the "ghost meters" become ethereal. At rear the black case screens mains and output transformers.**

whose founder Mike Mathews financed Hendrix into the UK no less. A nugget of important useless information! KT150s are known for being consistent and reliable but Audio Research play safe by running them in first.

The Reference 80S is a fully-balanced design, Audio Research say, for best sound quality. This makes it quite a lot different to most valve amplifiers that are single-ended (unbalanced) up to the phase splitter stage. There are however standard unbalanced inputs via phono sockets as per usual, the handbook noting that both cannot be used at the same time. Ideally the amplifier should be run from a balanced preamplifier via XLR cables, explaining why Absolute Sounds wanted it paired with the Reference 6SE preamplifier. I used Chord Company Epic balanced cables between them.

Biasing is automatic – in effect fixed bias that does not need to be user-adjusted. It compensates for changes in valve characteristics over time, running the KT150s at 65mA. There is a small elapsed time meter on the rear panel to show how many hours are on the valves and is user-resettable to zero when a new set are installed. The handbook states 6550s, KT88s and KT120s will run in the amplifier

but give less power, whilst EL34, KT77 and 6L6 types are unsuitable.

The perforated top cover is user removable for a clear view of the valves and to improve ventilation. It's suggested 8in is needed above the amplifier to allow hot air to escape but four KT150s don't run super-hot, unlike the Russian 6C33C double-triode 'trawler tube', even though the heaters draw a few more Watts than usual. A 'quiet' fan is fitted to the bottom plate to draw cool air in from below and help expel it above, but it can be heard to gently whirl from close up, if not at a distance.

Audio Research state the bottom panel should not be removed of course, since it exposes lethally high voltages. We did so for photographic purposes and to check out the fuses but they run up to F15 and are not clearly identified on the circuit board for rating or function; a service manual is needed here – best left to a dealer.

The front panel carries what the company describe as "illuminated ghost meters" that show power output. Surprisingly, they are traditional analogue meters with white needles, lit from below by white LEDs. The scales are white too, printed onto clear acrylic background. Behind



**At left the 80S power amplifier with perforated grille behind the meters. At right the grille has been removed to show valves at rear. Two different views, easily set at home.**

this clear panel lies a removable perforated cage panel that gives a visually peculiar background I thought, but it can be removed to show the valves behind; I preferred it removed.

The amplifier can be switched from Ultralinear mode to Triode mode just by pressing a front panel button. A relay clatters in the background and the power warning light turns from green to blue. Triode mode always gives less power, in the Reference 80S 36 Watts per channel, but many prefer the slightly easier sound on offer, unless that is the loudspeakers need pepping up.

The Reference 6SE preamplifier is specifically suited because it too uses balanced circuitry in a single

gain stage that employs six 6H30 tubes – a Sovtek double-triode that's unlike anything else (so no alternatives available) and preferred by Audio Research (as they once only used 6550s). Talking of which, they use a 6550 and 6H30 in this preamp within a regulated power supply.

As you might guess then, the Reference 6SE focuses on balanced inputs, no fewer than four of them. There are two sets of balanced outputs, plus fixed-gain Record balanced outputs. All balanced inputs and outputs are duplicated by unbalanced phono-socket inputs and outputs for convenience, but the preamp, like the power amp, majors on being a balanced design. This is its *raison d'être*. Not fitted

are digital inputs, nor a Phono stage.

The amount of gain available is also limited to x4 or 12dB from XLR in/out, or phono in/XLR out. If only the phono sockets are used then gain falls to x2 or 6dB. This gives an input sensitivity value of 350mV for the preamplifier in conjunction with the power amplifier – not high, if sufficient for digital sources. Low gain external phono stages may need volume to be turned right up.

Warm up after switch on takes about 45 seconds, after which Mute releases. Alongside the right hand volume control lies a massive green dot-matrix fluorescent display that runs from 0 to 103 (don't ask) and a remote control is supplied for this purpose too. The remote also switches inputs, alters balance, has mute, can select mono or phase invert and even display-brightness. The preamp has a 12V trigger to the power amplifier so they can be switched on together and there's an input for an external remote control sensor for enclosed use, although with valves always best not to enclose to avoid overheating. There are many side functions such as auto shut-off, tube hours, volume re-set, input naming – all aids to use.

The Reference 6SE preamplifier is as wide as the Reference 80S power amplifier, measuring 483mm (19in) across the front panel, 419mm (16.5in) deep and 198mm (7.8in) high. Behind the front panel the case is 465mm wide so will fit into a 19in (483mm) rack. A weight of 17kg (37.5lbs) makes the unit liftable, but it is still weighty. Inside sits a large C core mains transformer as part of its linear power supply, all visible through the clear acrylic top panel.



**From below the Reference 80S power amplifier board is packed with smoothing capacitors (centre), safety fuses and special parts. At right is the mains transformer (yellow) and – above and below – output transformers with connection boards.**



*At rear the 80S power amplifier has three loudspeaker impedance options: 4, 8 and 16 Ohms. A small window showing hours of use sits at left of the central power input. There are balanced XLR sockets at left and right, as well as unbalanced phono sockets.*

**SOUND QUALITY**

The Reference 80S power amplifier was connected to our Martin Logan ESL-X hybrid electrostatic loudspeakers through Chord Company Signature Reference cables. I also hooked it up to the Fink Team KIM loudspeaker as a more conventional but sufficiently revealing alternative.

Sources were an Oppo UDP-205D spinning CD through its ESS ES9038Pro DAC, connected balanced through Chord Company Epic cables. Hi-res and DSD were fed into the Oppo over USB, from a MacBook Pro running the

Audirvana+ software player.

Being a balanced analogue amplifier I had to feed it balanced analogue from LP. To this end I used our Timestep Evo Technics SL-1210 Direct Drive turntable, its SME309 arm with Audio Technica OC9X MC connected up balanced to a Pro-Ject RS2 phono stage whose balanced output was fed into the Reference 6SE preamplifier.

I'll kick off, as I prefer to, by outlining basic properties – what to expect. As with Audio Research amplifiers I have reviewed in the past, this pre and power were far from many people's expectations

of valve sound – not warm, not languorous, instead speedy and revealing. There was clean, solid bass free from wallow, because of the way Audio Research handle feedback around their output transformers, explaining our very low bass distortion figures. But you get the aural benefits of valves all the same – the smoothness and the sense of air and space around images.

As I played through a selection of high quality modern LPs, plus older not-so-high-quality ones, certain traits emerged. Running all-balanced sets up a manicured



*The Audio Research Reference 6SE preamplifier has a very large green dot-matrix display of volume level, plus input in use at left. Below are push-buttons for Ultralinear/Triode mode. Mono, Phase invert, Mute, option Select and Power – all available by remote control also.*



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sound stage and that's what I heard from our audiophile LPs, such as 2L's superb recording of Marianne Thorsen playing Mozart violin concertos, backed by the Trondheim Soloists. The sound stage was wide and open, backing violins separated from each other and with distinct lateral position. Marianne Thorsen's violin floated out with sublime ease, smooth, natural in tone and perfectly rendered. I could hear the strings suffering under the bow, appreciate her ability and effort. Funny how a communicative amplifier draws you in and this the Reference 6SE preamplifier and Reference 80S power amplifier did, staring right into what was happening in this recording.

The sheer clarity and separation of threads within a performance was an outstanding feature and, curiously – perhaps bizarrely you might think – I got to hear it in a strange place, my old 12in 45rpm disco singles. These things from the 1980s were cut at huge levels, as you can do with a track that lasts 10 minutes on 12in of vinyl. With Billy Ocean's Get Outta My Dreams, Get Into My Car the manic mix was better sorted – less confused – than I have heard it before. Similarly, Carol Kenyon's Dance With Me was clinically clean yet stabbingly powerful – not what you might expect from a 1984 cut.

Moving on to digital, Josefine Cronholm was put up in clear but almost barren form singing In Your Wild Garden (CD) and here the balanced nature of this combo

became even more apparent. Balancing subjectively strips the sound to its bare bones, or so it seems. Gone is something you don't consciously hear, a subliminal mush I speculate

**Most preamplifier functions are available on the remote control.**



**A top view of the 6SE preamplifier with clear acrylic cover removed. At right a C-core mains transformer, and at top centre 6550 and 6H30 valves to provide power regulation. Six 6H30s provide balanced amplification.**

– and this is what faced me with the Audio Research combo: less! Singers and instruments came over as starkly defined and less hazy, for want of a better explanation. This isn't about dynamic drama so much as insight and stage composition. In photographic terms, losing haze and gaining better image focus.

In terms of dynamics this Audio Research pair were strengthy if tight and controlled. The Reference 80S delivers fast and clean bass but it is free of wallow or bloat. This took me by surprise a few times, tracks like Loreena McKennitt's Gates of Istanbul suddenly shaking the room low down with its introductory bass line after a seeming absence of subsonic bass from preceding tracks. I did however notice that with LP the Reference 80S was driving big bass into both our Martin Logans and the Fink Team KIMs, so was aware the Reference 80S packs a punch lower down.

With preened hi-res recordings such as Cyndee Peter's House of the Rising

Sun (DSD64) fine cymbal taps rang out clearly whilst plucked bass laid down a firm backing. Her vocals hung in a clear open space it seemed, the whole performance having that strong sense of live



**The 6SE has a valve regulated power supply for better sound quality. It comprises a 6550 power valve (rear) and smaller 6H30 double triode.**

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LS50 Wireless II



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Four sets of XLR balanced input sockets (left) take up space on the preamplifier's rear panel. They are accompanied by matching phono sockets. Two sets of balanced and unbalanced outputs sit at right, plus a fixed-level Record output.

presence valves bring.

I found the mono function on the remote control useful with John Coltrane's Easy to Remember (24/96) as his saxophone is placed in one channel, backing quartet in the other, which comes across as a trifle odd – bit like The Beatles early stereo! But the Audio Research combination brought a magnifying glass to Coltrane's sax, every small breath and keystroke made obvious. Again there was a washed-clean sense of clarity from balanced working.

In case you're curious I used Triode mode for the most part, rarely getting past a few Watts on the meters even when playing loud in a large room; 40 Watts

"The Reference 80S delivers fast, clean bass free from wallow or bloat"

is enough for me and most loudspeakers. Volume hovered around 30 on the display for the most part (103 is maximum).

**CONCLUSION**

Fully balanced amplifiers are rare beasts at present; many now have balanced inputs – but they are unbalanced internally. The Reference 6SE preamplifier and Reference 80S power amplifier are fully balanced throughout – and

that makes them unusual. Run from balanced sources – as I did for this review – they offer almost unique cleanliness, deep insight and pin sharp stereo imaging across a wide sound stage. With a good range of facilities, these all-analogue amplifiers are highly specialised and well worth hearing if you want to know where the world is going in terms of sonic direction. A fabulous duo from one of America's top manufacturers.

**MEASURED PERFORMANCE**

The Audio Research Reference 80S power amplifier delivered 72 Watts into 8 Ohms and 64 Watts into 4 Ohms, just before clipping (Ultralinear mode). It is rated at 70 Watts into 8 Ohm in the published spec. Switched to Triode mode power fell to 36 Watts. For full output, an input of 0.7V is required via the phono input sockets and 1.4V via the XLR input sockets.

Frequency response ran flat from 3Hz to 80kHz (-1dB limits) and distortion measured 0.25% in the mid-band (3rd harmonic) but just 0.1% at 10kHz and 0.06% at 40Hz (all 1W). Just below full output the result was 0.5% at all frequencies, all fairly typical for a valve amplifier using fixed bias. Bass distortion was very low as valve amps go.

The accompanying Audio Research Reference 6SE preamplifier had a modest gain of x2 (6dB) from phono socket inputs to phono socket outputs and x4 (12dB) from XLR in-XLR out, or phono in to XLR out. Useful but not large gain values. If the two units are coupled through balanced XLR cables, as they should be, input sensitivity is 350mV for both phono and

XLR sockets.

Frequency response ran flat from 3Hz to 100kHz at full volume (103) but fell to 25kHz (-1dB) at 80 then rose to 35kHz at 50 and 80kHz at 20. So bandwidth depends upon volume control position – not ideal. At normal control positions of below 50 the upper limit was acceptably above 35kHz. There was minimal noise at -100dB and distortion was negligible too, measuring 0.01%.

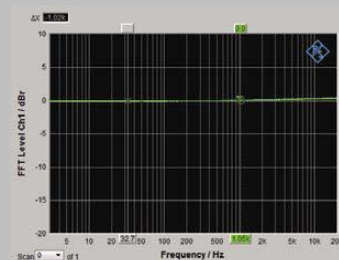
The Reference 80S measures well. The Reference 6SE preamplifier turns in a satisfactory if not impressive measured result due to low gain and bandwidth varying with volume position. **NK**

**REFERENCE 80S POWER AMPLIFIER**  
**Power** 72W  
**Frequency response (-1dB)** 3Hz-80kHz  
**Distortion (10kHz, 1W)** 0.1%  
**Separation (1kHz)** 94dB  
**Noise (IEC A)** -114dB  
**Sensitivity (phono/XLR)** 0.7V / 1.4V

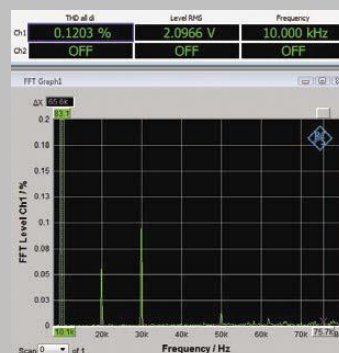
**REFERENCE 6SE PREAMPLIFIER**  
**Frequency response (+/-1dB)** 3Hz-30kHz  
**Gain / overload** x4 (12dB) / 72V

**Noise** -100dB  
**Distortion (10kHz, 1W)** 0.01%

**FREQUENCY RESPONSE**



**DISTORTION**



**AUDIO RESEARCH REFERENCE 80S**  
 £14,998

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# Hot Head

Nothing like a hot filament to warm the head with great sound. Noel Keywood reviews Icon Audio's new HP 205D valve headphone amplifier.





**W**ell, it does look good doesn't it! Even those not into olde-worlde aesthetics must be intrigued by what is going on here. Icon Audio's new HP 205D is an exotic valve headphone amplifier with a difference – it is equipped with a Bluetooth receiver, to play music wirelessly from a mobile 'phone or tablet. Price is £2999.

There are two sides to this headphone amplifier: functionality and appearance. It's a boutique item with honed good looks, yet it has a function to perform. The two are intertwined.

The HP 205D is available

without Bluetooth but just by fitting a modern technology such as this to a valve amplifier – styled for the steam age – rather makes a point: it's for users who want the best of today and yesterday – in what can be an uneasy match.

Those old fashioned looking onion-shape 205D valves are in fact recent production from China, not originals from 1924 that (untested) are currently priced at £400 apiece on eBay.

Let me go over just what this headphone amplifier does first. It can accept an analogue input from a preamplifier, an integrated amplifier with Pre Out sockets, a CD player or a phono stage, having both sufficient gain and an Alps

Blue high quality volume control. But there's no remote control of volume; this must exist in the source, as it does with Bluetooth.

Whilst there's Bluetooth input, there is no Bluetooth output; connection to 'phones is wired. An independent Bluetooth transmitter can be bought to overcome this.

To slide into valve issues, there are three output settings: for high, medium and low impedance headphones, ranging from 1000Ω down to 16Ω they say (most are 300Ω or 40Ω). The High Ω (250Ω-1000Ω) is suitable for sensitive in-ears (In Ear Monitors, IEMs), the Low Ω (8Ω-32Ω) for magnetic planar types and Medium (32Ω-250Ω) for anything in-between,

meaning most. This function exists because the HP 205D matches its 205D output valves to headphones through output transformers, housed in big black screening cans at rear.

The amplifier is single-ended (SE), not push-pull, avoiding crossover distortion. It means each headphone earpiece is driven by one 205D triode valve only – for purity that comes from simplicity and a valve that, even in its time, was rated at having less than 1% distortion for best audio quality. At this point I'll quickly note distortion measured 0.02% so is not an issue. In front of each 205D is an ECC88 (6922) double-triode preamplifier valve.

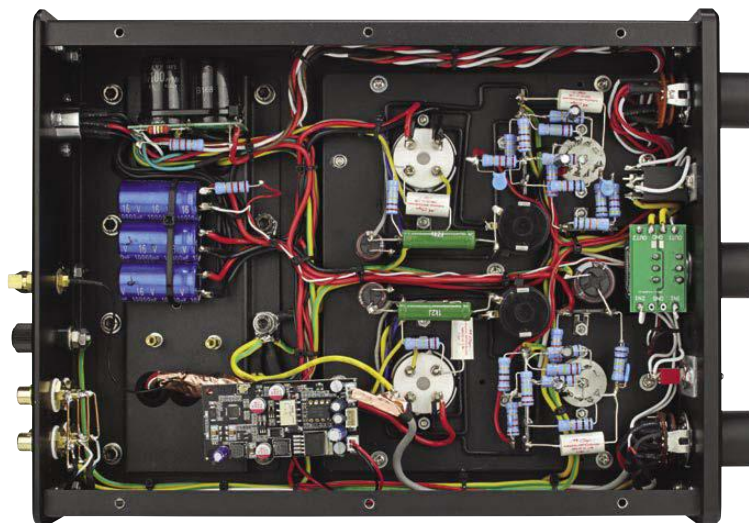
In keeping with this level of audiophile sophistication Icon Audio use a top quality Qualcomm



**The open electrode assembly of a 205D valve makes its glowing heater obvious. A visual treat from 1924.**

CSR8675 Bluetooth receiver hooked up to an ESS ES9018 DAC. There is aptX and aptX HD to improve audio quality but note that iPhones don't have this. Think Samsung for aptX. However, measurement shows an iPhones' iOS audio (24bit and 48kHz sample rate) manages full 24bit quality within Bluetooth 5 and that appears to be the case here (see Measured Performance). So this is high quality Bluetooth, not just budget functionality.

There are two Hum adjusters but since all feeds from the power supply are d.c. they presumably minimise ripple on the 4.5V d.c.



**The unit is hard-wired with sturdy discrete components. At low left lies a screened Bluetooth receiver and DAC board.**

heater supply. Icon say they need only be set once; I heard no hum at all. There is no bias adjustment.

Power comes from an external supply that follows thermionic best practice, notably a valve rectifier (GX34, 5AR4, 274B) feeding a choke for smoothing. This delivers out 300V H.T. There is a 6.3V d.c. heater supply for the ECC88s, 4.5V d.c. for the 205Ds and a 13V supply for the digital circuits. This little lot is piped in by a power cable 122cm (4ft) long and the main unit can sit up to 1m above the power unit. The supply accepts 110V or 230V, drawing 50W.

The main amplifier is relatively compact, measuring 220mm wide, 320mm deep and 170mm high. It will just squeeze onto a 12in shelf taking into account rear cables. Weight is 7.5kg. The power supply

is slightly heavier at 8.5kg, and also higher at 190mm with the 5AR4 rectifier but 230mm high with the 274B option. Chassis depth is the same but width is 130mm. The power switch is on the supply so it has to be accessible.

Build quality is superb, as is standard of finish – higher than in products of the past. Icon design and wind their own transformers in-house, by hand they say rather than with auto-winders, for smoother and more dense layering.

Now, take a deep breath. A new pair of Psvane 205Ds will set you back £700 from Icon Audio. There are cheaper U.S. prices but carriage, insurance and taxes will probably make differences small. Tian Jin Full Music also make this valve. Icon say that at a push a 300B can be used as a substitute



**At rear, analogue input and loop-through output. An earth terminal and stubby Bluetooth aerial. At right a 10-pin input socket for power.**

– but they're not cheap either. Few people around the world use 205Ds, making production quantities small so they're made by hand in China. Expect a life of around 3000 hours minimum I suggest, Icon putting it as 4-6 years.

**SOUND QUALITY**

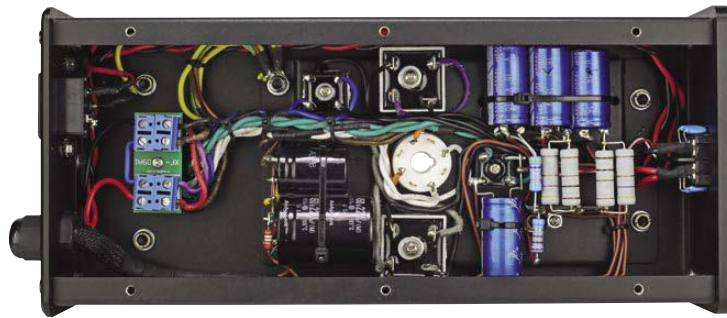
This took me by surprise. I'd expected a deeply smooth spacious sound, emotionally atmospheric like my 300B amplifier. Instead the HP 205D struck me by its speed, solidity of images and cosmic stereo positioning. By this I mean little fine percussive details like a maraca in Holly Cole's Train Song, were coming at me from outside the immediate sound stage, as if from a space beyond. And that effect continued: the HP 205D was



**The 274B rectifier stands high and glows brightly. This is an optional extra.**

peculiar-to-surreal in this respect when driven from the analogue outputs of our Oppo UDP-205D CD player with its ESS ES9038Pro convertor. Pure coincidence that it is a '205D' also.

Warm sound? Not at all. It had a pushy midband, forward and 'in my ears', with extraordinary revelation of timbral richness – to the bouzouki and plucked bass at the start of Loreena McKennitt's Gates of Istanbul for example. For air and space there was little I have heard to compare. There was also an almost peculiar form of tight, expressive bass, something the Oppo PMI magnetic planar headphones I used are intrinsically



**The power supply carries heater rectifiers (centre), a valve HT rectifier, and a supply for Bluetooth and DAC boards.**

good at, but only when driven well. The Icon propelled them along with seeming ease.

Whilst the midband and upper midband were quite forward, high treble was not. There was no sting or tizz.

Bluetooth is – potentially – a big plus point for the HP 205D. It turns it into a mini hi-fi in its own right, of outlandishly exotic nature. I mean, a single-ended 205D amplifier is barely imaginable in thermionic hi-fi land. But hooked up to an iPhone via Bluetooth? I was intrigued by the idea.

Playing hi-res tracks from an Onkyo HF music player on my iPhone 11X Pro, sound quality was exceptional, Norah Jones' vocals sounding silky smooth and breathy in Come Away With Me (24/192). Cosmic imaging made itself known with Cyndee Peters singing House of the Rising Sun (DSD64) where hand drum came from beyond one earpiece and triangle strikes from beyond the other.

Quite how the Onkyo's (paid for) hi-res folder processes music I'm unsure, but it seems to leverage the ability of iOS to handle 24bit resolution, giving a smoother, deeper sound. Even CD tracks like The Eagles 'Somebody' raced out of this folder and through the HP 205D in slick fashion, this being a track that seems to get easily mashed. Instead I heard sparkling cymbal strikes, Glen Frey at the mic and the whirling Hammond that brings feeling to the track. Pity that in actuality this track is compressed upward to an inch of its life, but somehow here it came over as fast, funky and listenable.

On a different tack, playing The Battle of Britain March by the Central Band of the RAF I was delivered a wonderfully wide sound stage with identification of the individual instruments of the

band; there was a sense of their character within the scope of the performance in a big space. Very enjoyable and organically real in true thermionic fashion. Nothing quite like hearing a military band to get a dose of the real instruments.

I do a lot of headphone listening with YouTube, to live performances especially. Would the HP 205D make a difference here? Feeding the analogue output of an Audiolab M-DAC+ in, sound quality took a whole jump up. The HP 205D brought its deep analysis and firm delivery into play, bringing vigour to the sound. Much of this came from fast, dynamically resolved bass – not something valves are associated with. But the Icon brought speedy heft into the sound, livening up YouTube – even extracting detail from its seemingly bland output.



**A conventional IEC mains input socket, plus sturdy output cable with 10-way socket.**

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Seeing music coming in at 96kHz sample rate from YouTube (displayed by the M-DAC+) sent me to my Mac's Audio/Midi player to re-set sample rate and it was clear that every setting had a different sound, something I have not noticed before. Higher specs were not better: I settled on 24/48 from the Mac to the Audiolab, to listen to YouTube through the Icon. The HP 205D was brutally revealing, but that is to be expected from such purist circuitry.

Listening brought up the fact that there is a lot of gain in



Supplied as standard is a 5AR4 rectifier from Tung-Sol.

the system: with Bluetooth if phone volume was at max then the HP 205D's volume had to be cranked down to little above zero. I ended up balancing the digital control on the 'phone against the 205D's volume control for best result. This amount of gain may explain my need to hook up an earth wire from the rear earth terminal to the M-DAC+ to cure a slight RF whine audible at maximum volume.

### CONCLUSION

The HP 205D is a strange headphone amplifier. Wonderfully wrought, peculiar in concept. But then, valves invite such scenarios. Running Bluetooth through amplifying devices from 1924 isn't the most obvious thing to do but Icon Audio have done it here – in glorious fashion.

Sound quality from the analogue inputs was beyond superb. Bluetooth gave a great result

### A MATTER OF SUPPORT

If you want to see glowing valves then this amplifier is surely it. The 205D was designed by Western Electric (U.S.) in 1924 as a simple, directly heated triode (DHT). There's no cathode surrounding the glowing heater filament, making it easy to see. The wire grid surrounding the heater is also visible, as are the external plates that form the anode. Clearances are enormous but gain is low. This is something of a display valve, showing how they work in basic form.

The electrode assembly must be rigid in itself and well supported to avoid microphony. I have encountered wildly microphonic Chinese onion-envelope valves in the past. Walk across the floor or speak loudly and ringing sounds emerged. Modern valves steady the top of the electrode structure against the envelope to prevent this, but for authenticity that cannot be done here. Psvane instead use a thick internal support pillar. Their 205Ds are improved replicas, not exact copies. Getters are used but there are no flash marks to spoil appearance.

The basic 5AR4 rectifier within the power supply is unlovely in appearance, but the 274B alternative is as attractive as the 205Ds – but you pay an extra £195 for this. David Shaw (MD) says it sounds better however. It certainly looks better.



too, in conjunction with a good software player and mobile 'phone. Eyes wide about long term running costs, with a valve pair coming in at £700 but – hey! – no one else will be using an amplifier so unique.

### MEASURED PERFORMANCE

The High  $\Omega$  setting delivered 14V max and had a gain of x65 (36dB), into a 300 $\Omega$  load (650mW).

The Low  $\Omega$  setting delivered 4.6V max. with a gain of x18 (25dB) into a 40 $\Omega$  load (530mW).

Since headphones need no more than 1V to go very loud, there is enough output swing here. The High setting is for IEMs, the Medium for dynamic types and Low for magnetic planars.

Frequency response measured flat from 30Hz to 20kHz through High  $\Omega$  and Low  $\Omega$  outputs (300 $\Omega$ /40 $\Omega$  loads), via the analogue Line input. Via Bluetooth response was similar except bass rolls off below 30Hz. Response did not change with volume position.

Distortion via Bluetooth (0dB) measured 0.05% at 1V out. There was good resolution, a -60dB signal being well resolved, distortion here measuring 0.3% – mostly noise. EIAJ Dynamic Range

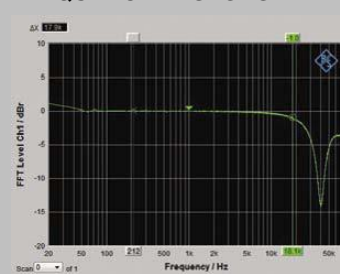
came in at 104dB, which is fractionally above CD (typically 100dB), so the Bluetooth transceiver is a good one, able to provide hi-res, curtailed by thermionic noise in this setting.

The HP 205D gave an unusually good set of performance figures all round considering its archaic valve technology. The Bluetooth transceiver performed very well in a supportive setting. NK

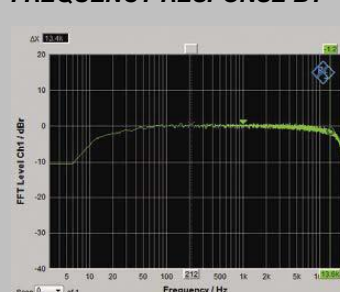
**Frequency response (-1dB)**  
30Hz-20kHz  
**Distortion (10kHz, 1W, 4 $\Omega$ )** 0.02%  
**Separation (1kHz)** 88dB  
**Noise (IEC A)** -82dB  
**Gain (High  $\Omega$ /Low $\Omega$ )** x65/x18

**BLUETOOTH**  
**Frequency response (-1dB)**  
40Hz-18kHz  
**Distortion (-60dB)** 0.3%  
**Dynamic range** 104dB

#### FREQUENCY RESPONSE



#### FREQUENCY RESPONSE BT



### ICON AUDIO HP 205D £2999



**OUTSTANDING - amongst the best.**

#### VERDICT

Vivid sound from a boutique amplifier, Bluetooth included.

#### FOR

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- sound quality
- Bluetooth

#### AGAINST

- two-box size

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Developer	audio web publishing ltd
Category	Entertainment
Updated	7 Dec, 2014
Version	1.0
Size	9 MB
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Family Sharing	Yes
Compatibility	Requires iOS 5.0 or later. Compatible with iPhone, iPad, and iPod touch.
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# Silver Surfer

Play silver discs with a streamer? Noel Keywood gives it a go with Arcam's ST60.

**M**any readers have asked us about a replacement for the highly regarded Oppo UDP-205D Universal Disc

Player with its super high quality ES9038Pro DAC from ESS of California. Well, here is a replacement – but it's a streamer! Perhaps better termed a Network Player. Arcam's ST60 (£1200) can do much the same job – something that will appeal to a lot of people I suspect.

There's nothing radical going on here. Arcam have simply come up with a sensible multi-role package that meets real life requirements in easy fashion. Plug in a CD player digitally and you get ES9038Pro sound quality from silver discs. You get the same from other digital sources – and the Arcam copes with a wide variety of them.

As a streamer there is network connection of course: the rear carries an RJ45 ethernet socket that's plugged into a router. For those unable or unwilling to use ethernet wi-fi is fitted as an

alternative. When I connected up our review sample it was seen by a BT Smart Hub 2 router as 'st60' on the client list – a useful step up on all the many devices that appear as 'unknown'. Once identified like this the likelihood of a phone app seeing it is high, not something I can say for many app controlled devices I've struggled with.

Arcam's Control app, downloaded to my iPhone 11XPro, saw the ST60 immediately, once it was fired up with white front light on. There are no non-working alternative apps to confuse the issue, and Onkyo HF player on my 'phone saw it too, via Airplay. So the ST60 was easy and hassle free to hook up and get running, including wi-fi that auto-connects.

As a streamer it will connect into all commercial music streaming services such as Spotify, Tidal, Qobuz, Napster, Deezer and what have you. Both Google's Chromecast and Apple's Airplay 2 are compatible, the latter allowing music to be 'push' played through the DAC section from a Mac computer. There is UPnP too, allowing music files to be read from

a PC in 'pull' play. Well, that's what usually happens, but things were a little different here, as I'll explain later.

There are four digital S/PDIF inputs, two electrical (RCA sockets) and two optical (TOSLINK), selectable on the front panel, the remote control or the app, and any one can accept digital from a CD player or CD transport. It gets better for anyone interested in doing so. Volume is controllable on the front panel, remote and app, and analogue outputs come as normal unbalanced RCA phono sockets, or balanced XLR sockets, the latter always being preferable because all DAC chips provide balanced output, unbalanced requiring another chip.

So just like the famed Oppo player, the ST60 has not only one of the best DAC chips in the world, it also has balanced outputs. The only difference I see between the two is that Oppo specifically used a linear power supply, where

Arcam use a switch-mode. If for some reason you'd rather use another DAC then there are optical and

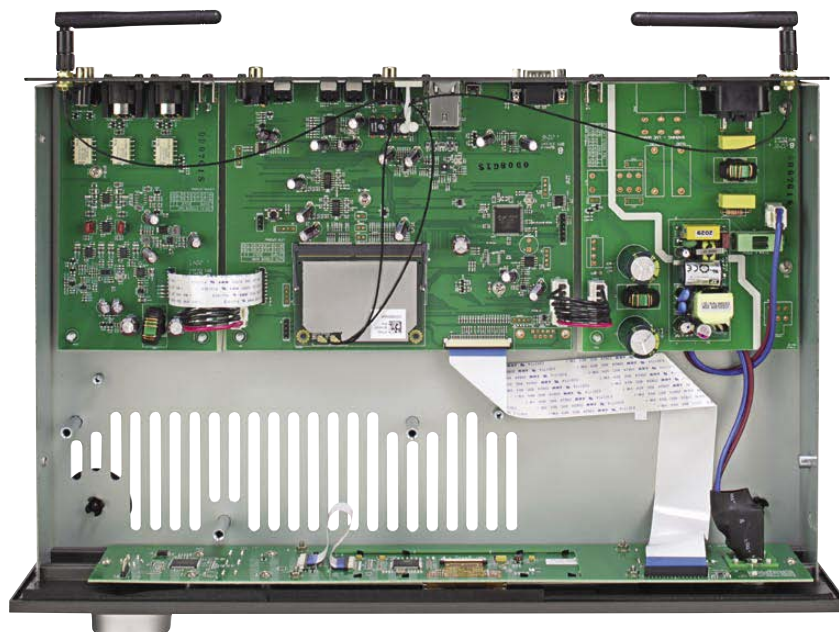


electrical digital outputs too. The volume control can be bypassed, but its presence allows the ST60 to drive a power amplifier direct.

Not wanting to leave anything out it seems, Arcam also fit USB media replay, so music files stored on a Flash Drive can be played too. The USB socket is awkwardly positioned under the RJ45 ethernet socket and although USB can be selected in the app there's no track listing and, in my case, selection was rejected so I don't know why it's in the app. Instead, the music folder/file listings come up on the player's Media Browser screen and can be selected at the front panel or by remote control.

Good news is that DSD is played (as it should be since all ESS DACs can do this) but disconcerting that although the .dsf file suffix is displayed 192kHz sample rate is flagged up, suggesting conversion to PCM. This may concern purists.

Missing from the front panel is a more accessible USB media socket, and also a headphone socket. Also missing is a software player in the app; it changes



**Compact low current switch-mode power supply at right and twin wi-fi aerials at rear that connect into a central wi-fi module. The DAC board and audio outputs are at left.**

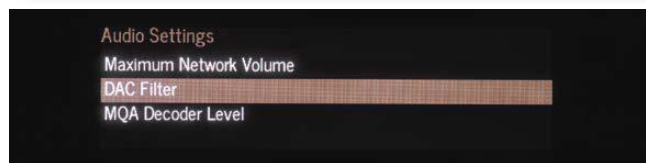
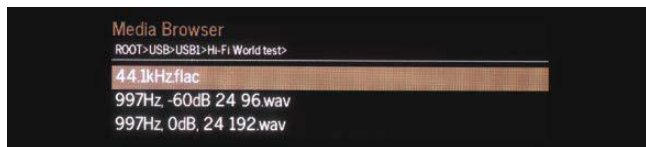
cables. Since the Creek has remote control of volume I turned off Arcam's control. In a rather sadly ironic coupling, our Oppo UDP-205D was used as a CD transport, connected into the Arcam through a QED Quartz glass optical fibre cable. The Oppo is not now available of course, but it still offers top quality from CD and I know its ESS sound well. Loudspeakers were Martin Logan ESL-X hybrid electrostatics connected via Chord Company Signature Reference cables.

Spinning Renee Fleming singing Un Bel Di Vedremo from Madame Butterfly (CD) made clear the silky smooth nature of the ES9038Pro DAC and its ability to inject a sense of depth and atmosphere into recordings of humans in front of microphones (rather than direct-to-desk electronically coupled instruments or synths). Was there any difference to replay

have been due to the difference in power supplies.

Bringing me to the inevitable question: would an Audiolab M-DAC+ with its ES9018 and linear power supply manage better? I fancy it would, especially with its superb filter set. However, the ST60 gets close enough for most people and the sonic differences I am talking about here are not only small but subjectively innocuous. They're also a matter of taste: different rather than better. Spinning through a wide selection of classical I heard the same traits: Nigel Kennedy's violin came over as having natural strings rather than ones made of steel and the London Philharmonic Orchestra playing Holst's Planets occupied a believably spacious Royal Festival Hall.

Moving onto something completely different and Lady Gaga's Bad Romance (CD) to



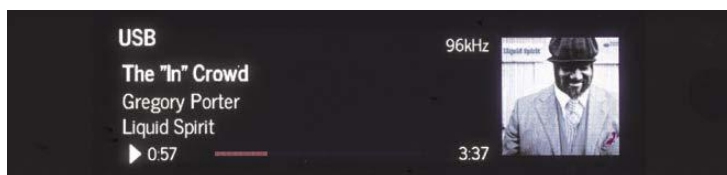
**The front panel Media Browser displays content on a USB stick. This does not appear in the app. Filters and other audio settings can be made here, as well as in the app.**

settings, including volume, but it does not play music. A phone's native player will do this however or, preferably, a dedicated freebie like Onkyo HF player.

Software can be updated by USB and there are numerous digital filters but differences between them are minor, measurement showed. MQA files are played and Roon end-point status exists.

**SOUND QUALITY**

Arcam's ST60 was connected to our Creek Voyage iA20 amplifier via Chord Company Epic balanced



**The play screen showing source, song, artist and sample rate at top right.**

from the Oppo? The Arcam had a tad less warmth, slightly less body to its sound and this could well

check out the pounding synth and seismic lows. This track showed the Arcam has plenty of low end

weight of slightly drier nature than the Oppo – some might say better defined. At this point I also noticed some spitch in the high treble and realised the player was set to Brickwall filter; best results came from Linear Phase Slow and this helped suppress any slight sharpness, but the filters were not majorly different as measurement suggested.

Playing hi-res from a USB flash drive showed greater cohesion and body to the sound than is available from 16bit, a benefit the ST60 made clear. I was a bit taken aback by Diana Krall's Narrow Daylight (DSD) that is weighty and warm through the Oppo but drier and seemingly more focussed through the Arcam. There was intense speed to plucked guitar strings: they cut out of the loudspeakers in a way I have not heard before and did not realise existed in this recording. The Arcam was dramatic in this respect, if a little brutal; quite sheeny up top. At least it is able to bring very high resolution to the reproduction of hi-res though, where with some players the benefits of hi-res are not so obvious.

Sound quality from Onkyo HF player (Hi-Res version) on the iPhone was superb, quite obviously leveraging the 24bit resolution possible from an iPhone. Playing Cyndee Peters' House Of The Rising Sun (DSD) again revealed startlingly solid high treble as a struck triangle fired out at me.

More weirdly, music played from my Mac with Audirvana+ was seen as UPnP on the Arcam and in the Audirvana+ player, the latter signalling full DSD and hi-res replay ability to the ST60. Since Macs don't do UPnP I don't quite know how this was happening! The Arcam was correctly seeing PCM Audirvana+ was sending, but flagging up DSD as 192kHz again, suggesting conversion of DSD to PCM.

**CONCLUSION**

Superficially a streamer, Arcam's ST60 can do so much more it defies simple description. The super high quality ES9038Pro DAC gave superb sound quality with CD and

managed conspicuously better with hi-res, stretching out the difference between them. As informed Hi-Fi World readers might hope it gives high-end sound from CD if a player is hooked up digitally, answering the prayers of all those who want to get the best from their CD collection. Add in ability to play music stored on Mac or PC computers, Flash drives and mobile phones and the ST60 becomes a powerful multi-purpose digital player.

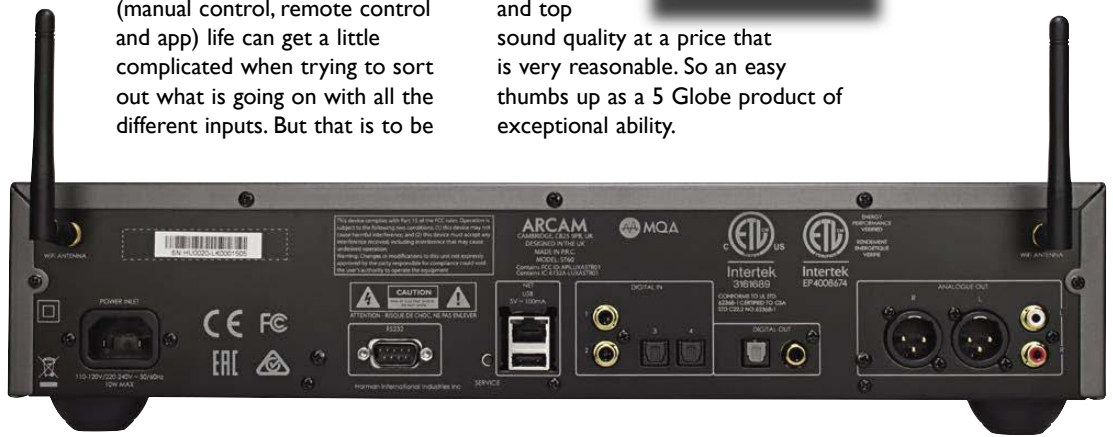
With ease of set-up there is little to criticise, except that with three methods of operation (manual control, remote control and app) life can get a little complicated when trying to sort out what is going on with all the different inputs. But that is to be

expected with the confusion of proprietary systems in action in today's digital melee.

None of this detracted from the fact that the ST60 offers massive ability and top sound quality at a price that is very reasonable. So an easy thumbs up as a 5 Globe product of exceptional ability.



*The app carries a large rotary volume control, can switch power and select input.*

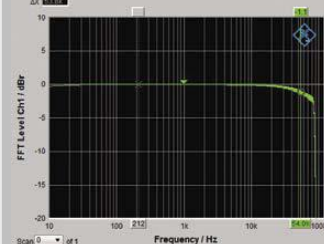


*At rear-centre lies the crucial ethernet RJ45 socket, with USB Flash Drive socket below. Twin wi-fi aerials aid stable reception. Centre-to-right: four digital inputs, two digital outputs – analogue outputs at far right.*

**MEASURED PERFORMANCE**

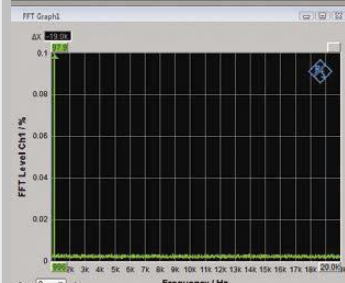
Frequency response of the Arcam ST60 with a 192kHz sample rate PCM input

**FREQUENCY RESPONSE**



**DISTORTION**

THD @ 1dB	Level (dB)	Frequency
0.0201 %	4.3805 mV	997.00 Hz
OFF	OFF	OFF



extended to 54kHz (-1dB) with the Brick Wall filter and changed little with the other filters, even the Slow ones. The upper limit was 96kHz as expected.

Filter behaviour was much the same with CD where they altered amplitude response little. None introduced a usefully well damped slow response for CD – unlike those from Audiolab.

Distortion measured a low 0.02% at -60dB (24bit) as our analysis shows, and EIAJ Dynamic Range (24bit) a high 120dB from the internal ESS ES9038Pro DAC.

Output at maximum met Philips Red Book standard: 2V on the phono sockets and 4V on the balanced XLRs.

The ST60 delivered fine performance figures, up with the best. **NK**

<b>DIGITAL</b>	
Frequency response (-1dB)	3Hz-54kHz
Distortion (-60dB, 24bit)	0.02%
Dynamic range	120dB
Output (phono/XLR)	2V / 4V

**ARCAM ST60 £1200**



**OUTSTANDING - amongst the best.**

**VALUE - keenly priced.**

**VERDICT**  
Great multi-purpose network player able to do it all – and well.

**FOR**  
- top digital sound quality  
- breadth of ability  
- ease of set up

**AGAINST**  
- lacks sonic warmth  
- very complex  
- inadequate User Manual

Arcam  
+44(0)1223 203200  
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# Introducing Balance

Teac fit their new TN-5BB turntable package with balanced outputs. Noel Keywood explains why.

“

beautifully built and finished Teac turntable” I thought to myself after unpacking. Then I turned it around and looked at its rear. Oh!

Balanced outputs. Teac’s TN-5BB turntable (£1449) has a more attractive rear than name, that’s for sure – if you dream about using a balanced turntable.

That’s unlikely – but you should. Because for technical reasons that

would fill a small book, turntables should be connected up in balanced fashion to banish hum and noise, giving a washed-clean sound. Few are.

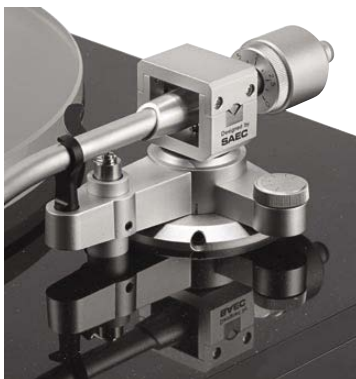
Just looking at the big XLR sockets at rear told me straight

away what Teac were thinking about when designing the TN-5BB. But this is a topic I will cover in detail later; there's plenty more of interest.

It looks like a standard belt drive – a “drive it yourself” two speed, but the TN-5BB is a three speed with 78rpm as an option. Add in a bayonet-fixing SME-style removable headshell for quick change to 78rpm cartridge and it will appeal to die-hards able to survive seeing their 78s shatter.

More surprising was an electronic lift/lower system that worked beautifully, in dependable Teac style. Place arm over record, touch the big button up front and it lowers smoothly of its own accord. Yep, they've fitted a motorised lift/lower platform and it worked so well I used it. Rather than my usually more reliable fingers.

Better, at the end of a side the turntable detects arm run-out and triggers the lift platform to raise the arm and stop the turntable. This gives end-of-side silence: no tick-pop, tick-pop until you get off the settee. How civilised! Trouble is, moving the arm back to its rest actuated the arm movement sensor; needlessly



**Height adjustable arm and lift platform; keys are supplied. Bias is set by a small rotary dial.**

re-starting the platter; I stopped it by switching the speed control to 0. Peculiar behaviour I thought, but then realised the speed had to be set to zero when the platter was stationary.

Whilst this is a belt-drive turntable that looks like many others it has some strong distinguishing features. The d.c. motor is electronically controlled so changing speed is simply a matter of turning the rotary speed selector at front from 0 to 33, 45 or 78. No need to fiddle with the belt. Unusually, however, the platter has a sensor



**At front sits a circular lift/lower button with light touch action and small red LED to signal Up. Behind it lies a rotary speed selector.**

to keep speed accurate and tightly controlled, confirmed by our measurements.

The power supply is a small external wall-wart style switch-mode delivering in 12V / 1A. Using a low d.c. voltage from an external supply means the turntable does not have to be safety earthed to the mains, eliminating hum – a now-popular design approach. It leaves the metalwork electronically ‘floating’ and it must be earthed to the amplifier using a supplied black earth cable.

Removing the TN-5BB from its box presented an array of parts, including clear acrylic platter; belt, power supply, 45rpm adaptor; hinges for the clear acrylic dust cover and hex keys for arm adjustment. Also packed separately was the headshell with an Ortofon 2M Red moving magnet (MM) cartridge installed, avoiding the need for alignment. However, Teac do also include an alignment gauge. Similarly the counterweight must be fished out of its hiddy hole and screwed onto the rear of the arm.

More unusual than these parts were a push-on pulley cover that must be carefully aligned so the belt doesn't scrape, and a set of packing washers to increase the height of the adjustable feet, should one or perhaps two need it. The feet on our sample were very tight and needed jiggling to free them. What you don't get is a 45rpm depression or anywhere to store parts, an arm lock, or balanced cables. Teac supply normal phono (unbalanced) cables only.

Tracking force for the 2M Red they quote as 1.8gm in the User Manual, but Ortofon quote 1.6gm-2gm range and I used the latter.

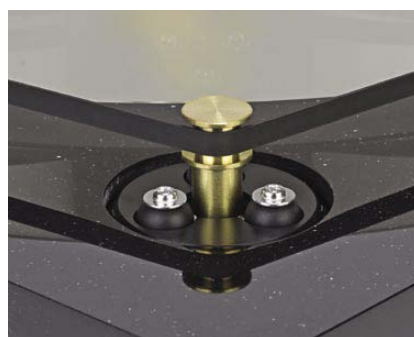
The Red used to be quite a bright sounding MM, one lacking traditional warmth, but Ortofon have tamed it to lessen this. What you get is detail rather than warmth.

Putting it all together made clear to me how solid and well made the TN-5BB is. The dual layer plinth comprises an MDF base with a synthetic marble top, separated



**A bayonet fixing detachable headshell, fitted with Ortofon 2M Red MM cartridge.**

by a Washi paper layer; Teac say, for best sound quality. The plinth is heavy, having a weight of 8.8kgs. Overall weight of the turntable is 10.5kg (23.2lbs) and it feels rigid, that's for sure, needing a strong shelf or support surface. Whilst plinth



**A mached single-step brass pulley drives the belt.**



**Teac supply a neat cover for the motor pulley. It must be aligned to avoid the belt.**

depth is 350mm, taking into account lid rear overhang when open think around 400mm. Plinth width is 450mm and height without lid is 150mm, but with it at least 430mm is needed between shelves when open.

The arm is developed by Japanese company SAEC. It uses knife edge bearings for vertical movement, but ball races for lateral (like old SMEs such as the 3009). The arm is an alloy tube that felt and sounded undamped and a bit ringy to me, but its S shape detunes the first bending mode to keep structural resonances in check, measurement showed. Its height can be adjusted, and height of the cue platform too.

**SOUND QUALITY**

First peculiarity. In their literature Teac say only that balanced connection is for MC cartridges. And that's it – there's no elaboration. Since an MM cartridge is fitted and conventional phono leads supplied,



**The platter spindle is captive, with a tapered brass bush for the platter.**



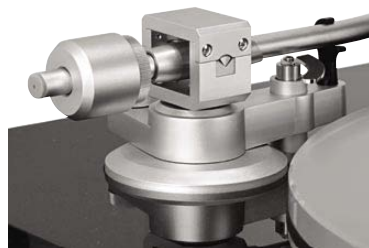
**To stop the platter speed (at rear) must be turned to zero.**

initially I used it how anyone might, unbalanced into our Creek Voyage i20 amplifier driving Martin Logan ESL-X hybrid electrostatic loudspeakers.

But musing on this I could not help feeling users might wonder why the XLR sockets can't be used with the cartridge fitted, or even what they are for. And what about

changing over from MM, that the kids use, to dad's precious MC? Change the leads as well?

Turns out, after checking the earthing system with a meter, you can connect it up balanced with the cartridge supplied or any other MM. It connects the cartridge screening can to one signal line (Left ground, green) but this is no disaster – and apart from this you get fully balanced working with MM that will eliminate hum, buzz, ground currents et al. Well, that's the theory. Trouble is only one phono stage offers balanced connection for MM, Pro-Ject's Phono Box RS2. Teac's PE-



**The rear counterweight is rotated to apply tracking force.**

505 does not – likely why Teac don't mention using MM balanced. More on this later.

To review this turntable I realised that the budget 2M Red could usefully be upgraded to 2M Black with its better stylus, and also that it should be connected to our Phono Box RS2 to provide balanced working. Then, for MC, I had to change over to Teac's PE-505. Running a balanced turntable unbalanced is rather missing the point, after all.

With the Ortofon 2M Red fitted, connected up with the phono cables supplied, I got much the sound expected from previous experience. This is now a cartridge accurate in tonal balance, meaning it lacks the warmth of old MMs, being more open and revealing. Yet without high-end spit from the stylus, ticks and pops don't fly out like bullets, making treasured old LPs playable.

I can't say "detailed" because the elliptical stylus sounded slightly blurred, and this demanded a change to the 2M Black stylus with its Shibata profile. At this point I found our Black stylus did not comfortably fit this Red unit, so the whole cartridge was changed. It brought an immediate and significant improvement, the 2M Black with Shibata stylus imposing focus and

solidity to the Trondheim Soloists behind Marianne Thorsen, playing Mozart violin concertos. Not only were strings less mellifluous – individual violins rather than a blob of them – but the performance seemingly came to life.

Next it was time to switch to MM balanced working. Before doing this, turning volume to maximum with unbalanced there was a slight buzz at full volume even though the earthing was perfect. Moving to balanced with the Pro-Ject Phono Box RS2 one channel went silent but the other still had a very slight buzz, if much reduced. This came from the screening can connected to the right channel (green) ground I found by removing the stylus assembly and touching it. So the can does pick up external noise, but it was barely audible and balanced with MM was slightly quieter and better.

At full volume (which introduced massive gain from the Creek) I noticed two other issues. The arm was slightly microphonic: lifting it put handling noises through the 'speakers, and the phono sockets (now unused) were 'live'. Touching either of them put a massive buzz through the speakers, because they are fully floating and connected to the XLR lines. Not ideal, but as the Left channel remained totally silent at full volume these floating sockets were not injecting hum or buzz, unlike the floating screening can. Note that I'm talking about very low levels of buzz here, inaudible at normal listening levels.

So onto MC. I strapped in our Ortofon Cadenza Bronze. Switching to MC on the RS2 and turning volume to maximum there was no buzz at all, just very slight residual hiss. Playing the Trondheim Soloists again I was greeted by an even purer sound, one with more depth and body to it, as you'd hope from a high quality MC. Now the TN-5BB was really motoring – I was getting a lovely sound. Swapping over to Teac's PE-505, connected balanced through Chord Company Epic cables, again there was no buzz at full volume and the sound brightened slightly because it has a lighter hue than the RS2.

Good speed stability came as a sense of pitch confidence; notes were rock stable, never wavering or sounding watery. This was an obvious strength of the Teac: the electronic timing of synth in Alison Goldfrapp's Lovely to CU



(Supernature) was delivered with a tight grip. Rolling drum work in Sing, Sing, Sing, from the Syd Lawrence Orchestra (Big Band Spectacular) strode along to perfection.

TEAC's SAEC arm lacked the low frequency definition of structurally more rigid designs – from Rega and SME for example. Hand drums and percussion in Hugh Masekela's Uptownship (Hope) weren't as separated and solid as I know them from our SME309 and my SME12, but then these arms cost more than the Teac in its entirety. At the price it did a good job.

And as the LPs passed by I found the turntable a delight to use. Put arm over LP, press the big button up front (which has a light action) and walk away. When the music ends the arm lifts and all falls silent.

**CONCLUSION**

Beautifully built and finished Teac's TN-5BB turntable was visually attractive, leveraging every little feature of these complex contraptions for maximum advantage – even its feet look good! The only thing missing was a flashing stroboscope. I found it lovely to use as well, the motorised arm lift/lower engineered to perfection, the plinth solid and steady.

With the budget Ortofon 2M Red moving magnet cartridge fitted it gave a balanced and entertaining sound from vinyl, free of old-world problems like watery musical pitch

Moving magnet cartridges can be connected up balanced, as shown in our diagram of the Teac. Whether the screening can, earthed to the left (green pin) channel, produces slight hum or buzz depends upon surrounding conditions. The turntable must be kept away from other mains powered equipment and also away from (or outside of) a ring-main induction loop or lighting circuit with dimmers. These set up fields that can be heard as buzz, even when earthing arrangements are correct. Moving Coil (MC) cartridges have few coil turns, making them far less sensitive to outside electromagnetic fields, and they don't have screening cans. The body, if metal, is earthed to the arm, not to Left ground (green). The phono sockets float electrically on the Teac; they are not earthed.



At rear are balanced XLR outputs and isolated (balanced) phono socket outputs. The earth terminal grounds the arm, as do the XLRs via Pin 1.

or sharp ticks and pops. Upgrading to better cartridges showed it was able to reveal quality improvements, especially when the balanced outputs were used. The arm tube could

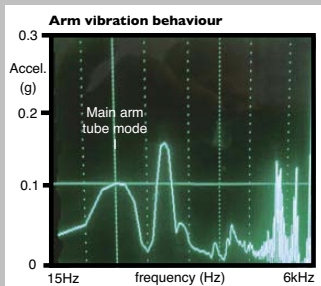
usefully have been less lively, but at the price it was acceptable. This is a fine turntable, able to deliver great sound in easy and convenient fashion. So highly recommended.

**MEASURED PERFORMANCE**

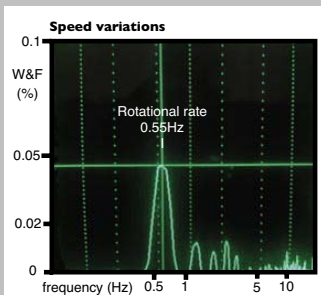
The 3150Hz test tone of a DIN 45-545 test disc was reproduced as 3152Hz on our Wow&Flutter meter – close to perfect. Wander around nominal was

small at 3Hz, making basic speed both correct and very stable. As a result variation values were very low for a belt drive, wow measuring 0.1% and flutter 0.05%. Total W&F (European DIN weighted) came in at just 0.06%, falling to 0.04% with Japanese JIS weighting (as Teac will measure it). This is a very speed stable turntable, within a whisker of Direct Drive. Our analysis shows relatively low variance at 33rpm (0.55Hz), with low harmonics and flutter to right – a fine result.

**ARM VIBRATION**



**WOW & FLUTTER**



The arm had a strong first bending mode at 100Hz and a third-order related harmonic peak at 300Hz, our analysis made with a Bruel&Kjaer accelerometer on the headshell shows.

The turntable measured very well but the arm was mediocre, due to main bending mode resonances in the light, undamped alloy tube. **NK**

<b>Speed error</b>	<b>0%</b>
<b>Wow</b>	<b>0.1%</b>
<b>Flutter</b>	<b>0.05%</b>
<b>Wow &amp; Flutter (DIN wtd.)</b>	<b>0.06%</b>



Supplied phono cable and earth lead. Hex keys for arm adjustment and washers for the feet.

**TEAC TN-5BB TURNTABLE £1499**



**OUTSTANDING - amongst the best.**

**VALUE - keenly priced**

**VERDICT**

An elegant turntable package with good sound, one that's upgradable.

**FOR**

- build quality and finish
- ease of use
- balanced connection

**AGAINST**

- lively arm tube
- budget cartridge

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# Keeping Balance

**Pro-Ject's Phono Box RS2 gives Noel Keywood balance issues.**

**T**his, for me, is a deeply exciting product – a balanced Phono preamplifier for LP. And that means – specifically – with balanced inputs. I designed one some time ago because it's the only way to go for top quality sound, especially from moving coil (MC) cartridges. Pro-Ject now offer one in their RS2 that I'm reviewing here, so hang on to your seat for some deep discussions about all this!

The RS2 is a fully discrete, fully balanced amplifier with no OP amps

(silicon chips) Pro-Ject say. Designing such an amplifier is an analogue horror story only the best design engineers can tackle. That's why they are so rare – both the amps and the engineers! You'll see from our internal pic a massively complicated circuit board, explaining its price of £1300. A bargain methinks, considering the sweat to design such a thing. But why would you want it?

In a nutshell, a pickup cartridge is a fully floating generator that is best connected into a balanced input to cancel noise and interference.

Meaning no hum, no common-mode RF interference or other nasties. With a low output moving coil cartridge this is potentially a great benefit.

So far, so good, but there is another more prosaic difficulty – turntables do not come with balanced output wiring terminated with XLR plugs. It only takes a nifty re-wire to do this but that means either a DIY job or a dealer able to do so, or even our columnist and repair man Dave Tutt (see his column for contact details). Importers Henley



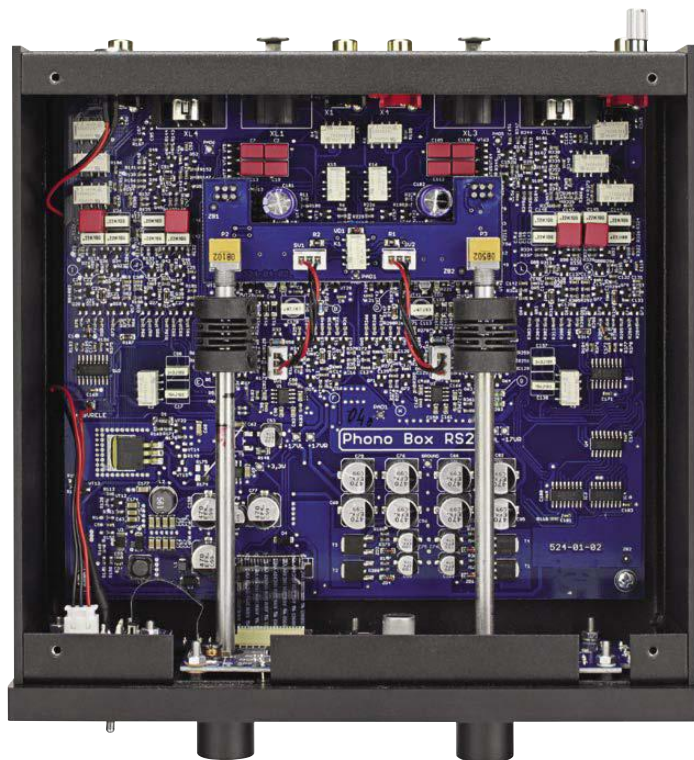
Audio, based in Didcot (UK), work closely with Pro-Ject (Austria) and can also provide solutions; perhaps best to phone or e-mail them about this unusual issue if running a balanced record deck interests you.

I run a Garrard 401 with SME312S arm that I wired balanced long ago for my own prototype balanced preamplifier – so was very happy to receive the RS2. My prototype was just that: designing the servos to keep discrete transistor pairs balanced was going to take more time than I had available; it never reached completion. Also, being a valve man, I ran the output at high voltage (50V) to avoid gain switching and needed to use a four-channel switched-resistor volume control to handle it, a serious complication. The RS2 does not have a gain/volume control, avoiding such difficulties, but that does mean it cannot drive a power amplifier direct.

What does it have? The exciting bit was balanced XLR input and output sockets on the rear panel! But there was no disappointment either at all its facilities and the user interface, which was slick beyond all else.

Moving magnet (MM) and moving coil (MC) cartridges can be handled. There are four gain settings for each that cover all possibilities. Curiously, the specs say XLR adds +6dB but measurement showed it doesn't, gain being identical from XLR-in to XLR-out, or phono-in to XLR-out. XLR has double the output swing so gives +6dB greater overload margin, but in this design gain remains the same.

The XLR output maintains low noise through a balanced cable to an accompanying amplifier, good for long



**A heavily populated internal circuit board full of discrete components, but some chips also (bottom right), likely for control purposes. The unit works from 20V d.c. of external power, so no internal power supply.**

loading from 10 Ohms to 1000 Ohms. Best to set it at 100 Ohms and turn down slowly for a better damped sound (volume will decrease slightly), but I have never been convinced by low loading an MC, the few times I have done it. It may well be that some MCs will benefit.

No need to turn loading up except for high output MCs (e.g. Clearaudio) that need a 300 Ohm load. Good to have the ability to make such a continuously variable

The RS2 measures 206mm wide, 72mm high and 200mm deep, so it is compact. There is an external power supply of usual switch-mode type that runs from 110V-240V, 50/60Hz, delivering 20V at 3A through a slim cable. Distance from mains plug to the RS2 input plug is 2m with cables supplied, so this is maximum distance from a mains outlet unless a longer mains lead, terminated in a two-pin calculator plug, is used. Weight of the RS2 alone is 1.6kgs.

### SOUND QUALITY

I used the RS2 with the Creek iA20 amplifier also reviewed in this issue, fed from our Timestep Evo modified Technics SL-1210 Mk2 Direct Drive turntable. Connection from RS2 to iA20 was through Chord Company Epic balanced XLR-terminated cables. Loudspeakers were Martin Logan ESL-X hybrid electrostatics. The Evo has conventional unbalanced phono plug terminated cables, as it must for review purposes. Cartridges used were an Audio Technica VM750 SH MM and OC9X SH MC.

To assess the balanced inputs I ran the unit at home with my Garrard 401 and SME3012S arm that has balanced cables, plus an Ortofon Cadenza Bronze MC cartridge. The

"a richly detailed, natural and engaging sound, free from sharpness or sheen"

cable runs especially, but that does mean to best appreciate the RS2 it needs an amplifier with balanced XLR inputs that run through a volume control (some do not). There is a conventional RCA phono socket output too.

For MM cartridges load capacitance values can be selected, from 50pF to 400pF. For MC cartridges there is a continuously variable control to set resistive

adjustment available all the same, unique to the RS2 I believe.

Another nice touch is a switchable balance control to compensate for the differing left/right outputs of pickup cartridges. And there is a sharp roll-off switchable warp filter that does not attenuate low bass, plus Decca EQ for old Decca London LPs, as an alternative to RIAA. This is a very well thought out phono stage, that's for sure.



*A simple rear panel that almost uniquely carries balanced XLR input sockets for connection to a turntable wired with a balanced output cable. There are conventional phono socket connectors too. The balanced XLR outputs have higher overload (x2) than the phono socket outputs, so are best used.*

amplifier was a World Audio Design 300B (valve) feeding Martin Logan Electromotion hybrid electrostatics. Unbalanced Chord Company Epic cables connected the RS2 to the amplifier.

Here's the basic outline: the RS2 offers a richly detailed, natural and engaging sound, free from sharpness or sheen, a tapestry of analogue detail. Also, bass quality is superb.

Ignoring bass quality for the moment I'll talk about the LP that nailed a lot of what it does – Marianne Thorsen playing Mozart Violin Concertos, backed by Norway's Trondheim Soloists. This is a very high quality recording (DXD 386) from 2L of Norway, and Thorsen is a sublime player. The RS2's contribution was to reveal her violin as a strongly embodied instrument, one with a feeling of weight and size, as well as tease out all the textural detail within its body and strings. I got to hear a large and fruity rendition then, backing strings of the Trondheim Soloists similarly having a weighty presence. When they suddenly pitched in behind her, there was a sense of strong dynamic push to an orchestra comprising humans with instruments! The RS2 resolved the dynamics of this performance nicely, making for an engaging listen and my listening notes talk about "rich insight into strings".

I started out however with Hugh Masekela's Hope LP (Analogue Productions) and Abangoma showed the RS2 delivers a strong, expressive bass line. Uptownship confirmed this, revealing air around the miked-up hand drums. Kick drum strikes were weighty and well resolved; I again got to hear the timbral properties of the instruments better than usual. It was a sophisticated sound.

Spinning Jackie Leven's Young Male Suicide Blessed by Invisible Woman, from Forbidden Songs of the

Dying West, his big-man vocals were just that: rich and full sized in front of me.

As I moved through our high quality review LPs it was clear that the RS2 has bottom-end power; the rolling drum work in Sing, Sing, Sing, from the Syd Lawrence Orchestra (a live recording) moving our listening room nicely due to easily expressed dynamics, but there was also atmosphere from the studio microphones. The brass section blared out, individual instruments being discernible.

All the above was from our in-house turntable connected unbalanced.

At home, using the balanced XLR inputs, all the strengths of the RS2 were magnified. There was greater

clarity and a sense of precision timing unbalanced never seems to quite manage, no matter what the context. With Ortofon's bass-powerful Cadenza Bronze in a Garrard 401 the RS2 was able to resolve their massive bass power and pace, making for dynamite dynamics. The 300B better resolved a sense of air and space the RS2 was able to offer.

**CONCLUSION**

A highly sophisticated phono stage, fully balanced and with all-discrete circuitry, for MM and MC cartridges, with loading options for both, the Phono Box RS2 has no equal. For those interested in running a fully balanced turntable to eliminate hum and noise this is the one. Great sound quality and easy to use as well.

**MEASURED PERFORMANCE**

Frequency response of Phono Box RS2 ran flat from 3Hz to 20kHz with MM and 8Hz-20kHz with MC at full gain – where gain loss can curtail subsonic response, but not here as our analysis of MC at full gain shows. The warp filter introduced sharp cut-off at 40Hz, attenuating warps signals at 8Hz by a massive -30dB.

Gain values were exactly as indicated, up to 50dB for MM (x316) and up to 70dB for MC (x3162). With 10V output available from the unbalanced phono sockets this gives input overload as 32mV and 3mV respectively, but double the values from the XLR output able to swing 20V. Good figures, raised by lowering gain as always.

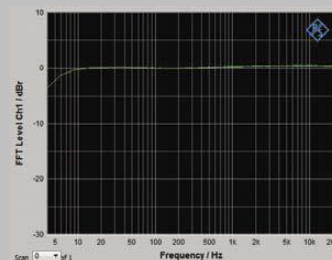
Equivalent input noise (MC at 60dB gain) measured 0.13µV, where 0.1µV is as good as it usually gets. So very good and good enough for hiss to be inaudible.

The Phono Box RS2 measured superbly well in all areas. It has been expertly engineered. **NK**

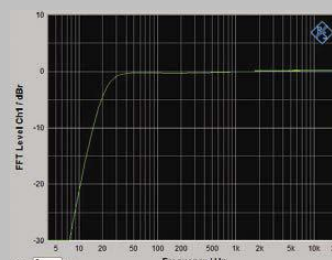
**Frequency response** 5Hz-20kHz  
**Distortion (24bit)** 0.02%

**Gain (MM)** up to x316/50dB  
**Gain (MC)** up to x3162/70dB  
**Overload (phono/XLR)** 10V/20V out  
**Noise (MM/MC)** -80dB/-78dB

**FREQUENCY RESPONSE**



**WARP FILTER**



**PRO-JECT PHONO BOX RS2 £1300**



**OUTSTANDING** - amongst the best.

**VALUE** - keenly priced

**VERDICT**

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**FOR**

- clear, clean sound
- cartridge matching for MM & MC
- balanced inputs and outputs
- warp filter

**AGAINST**

- no volume control

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# Beauty in Sound

**Martin Pipe enthuses about Hifiman's Sundara planar-magnetic headphones.**

**T**he Sundara – Sanskrit for 'beautiful' apparently – from Chinese manufacturer Hifiman is a step-up from the excellent Deva model we reviewed a couple of months back. It sells for the same £299, but the 372-gram Sundara has a more luxurious finish and sits in the lower echelons of Hifiman's surprisingly-large 'reference' range; the Deva occupied the less-prestigious 'premium' category. However, you don't get the Deva's innovative plug-in Bluetooth dongle. Neither is there a protective carrying case, but the Deva wasn't supplied with one of those either. Here we review the latest 2021-model Sundara, and not its physically-similar 2018 predecessor.

Like the Deva, the Sundara is an open-backed circumaural design of lowish 94dB (1mW @ 1kHz) sensitivity. This is however generally expected from headphones with planar-magnetic (PM) drivers, like the ones favoured by Hifiman's engineers. It's alas the price you pay for the clarity and openness associated with the technology.

Given their shared ancestry, it comes as no great surprise to learn that the Sundara's 80mm 37 Ohm PM driver also boasts a patented 'Neo Supernano' diaphragm similar to that fitted in the Deva. This, Hifiman claims, has the "width of a human hair". Lighter than usual, yet boasting high tensile strength to resist breakup, the diaphragm is embossed with the signal-carrying

voice-coil and sits between two powerful magnets. They interact, causing the diaphragm to move in time with your music – a different approach to the more conventional dynamic driver where an air-shifting diaphragm is coupled to a wirewound voice-coil surrounded by a magnet, as

in conventional loudspeakers.

These transducers are mounted in large, jet-black aluminium enclosures, with neat wire grilles that protect the drivers whilst preserving the open characteristic (you can faintly see the driver's magnet arrays through them).




*With the foam earpads removed the Sundara's 37 Ohm drivers are laid bare. Larger than usual, with a diameter of 80mm, each driver contains a patented 'Neo Supernano' diaphragm with a thickness "between 1 and 2 microns". The metallic printed patterns of the voice coils, which interact with magnets mounted on either side of the diaphragm, are also visible.*

# HI-FI WORLD

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**Description**  
Hi-Fi World brings you the best in hi-fi...from around the world!

- We listen and measure products in depth, at our London offices.
- Expert opinion from a team of renowned writers, musicians and engineers.
- International standard measurements using Rohde & Schwarz test equipment....

**Information**

Developer	audio web publishing ltd
Category	Entertainment
Updated	7 Dec, 2014
Version	1.0
Size	9 MB
Rating	Rated 4+
Family Sharing	Yes
Compatibility	Requires iOS 5.0 or later. Compatible with iPhone, iPad, and iPod touch.
Languages	English

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They connect to the adjustable headband via robust channel-identified yokes, and are fitted with replaceable earpads that are covered by a mix of cloth and synthetic leather. The supplied 1.5m lead plugs into both earcups via 3.5mm TRS plugs, opening up the possibility of switching to balanced operation via aftermarket cables. The supplied cable is, like the Deva's, unbalanced and terminates in a 3.5mm stereo jack plug.

Despite its size, the Sundara is comfortable to wear for hours at a time. The adjustable headband, with its 'weight-dispersal strap', is effective here; the pressure placed on your ears is far from excessive. As with other open headphones, though, external sound leaks in all too easily. The Sundara can struggle to compete with energetic gym ambience and Tube noise; similarly, your musical tastes will be evident to anyone sitting nearby. Headphones of this type, it has to be said, excel when listening in quiet rooms. Should you indeed be listening 'on the move' with a personal player, though, another practical point is that the solid right-angled 3.5mm plug tends to snag in pockets.

## PERFORMANCE

Hifiman is of the belief that its Sundara shouldn't challenge headphone amps, and in its opinion even the output stages of mobile phones are fair game. I'm not sure I agree. Although an Astell&Kern SR25 personal player and Prism Callia headphone-DAC successfully drove its transducers, the volume had to be turned up noticeably higher. The memorable hook of NZCA Lines fine 2016 synthpop outing Two Hearts (from Infinite Summer) sounds dirty even on a good system. Driven via my Google Pixel 3a smartphone, though, that hook sounded even grittier; deep basslines showed similar signs of stress. Furthermore, I found the Sundara to be fairly warm-sounding until broken in – a process that can, according to Hifiman, take up to 150 hours. Until then, there was also a tendency for the instruments lurking at this end of the frequency scale to sound rather similar.



**The 1.5m cable is terminated in an unusually-long right-angled 3.5mm stereo jack plug that can snag on clothing if you're using a portable player - handling noise can be a problem too. On the plus side, a 6.3mm adaptor is provided for full-size headphone jacks. At the other end of the cable are 3.5mm TRS plugs for each earcup - the left and right channels are identified. The use of detachable cables makes upgrades (and even balanced connectivity) practical.**

Thankfully, this disappeared and I was left with a far more neutral character. Having said that, slight but perceptible treble emphasis favours some elements more than others. The bite of electronic music's synthetic high-hats and snares was more apparent. Saxes too, among them the tenor line that runs through – appropriately enough, Kate Bush's The Saxophone Song (The Kick Inside) - were easy to follow among the other elements of the track. Indeed, one of the Sundara's strong points is its almost-analytical resolution of detail. The breathing of the saxophonist (in this case, jazzman Alan Skidmore) was as apparent as the highly-complex combination of harmonics that gives his instrument its distinctive timbre. A check out with Simon and Garfunkel's America, there was a welcome absence of the blurring that can merge the individual performers' contributions.

When listening without visual cues (i.e. seeing the musicians) you have to rely not only on the skills of the recording engineer, but your equipment's ability to get across the subtleties. In this, the Sundara was surprisingly capable. It was even able to highlight the difference between 16 and 24-bit versions of the

same music - more 'space' is evident in the latter. In this regard, the Sundara performs astonishingly-well for sub-£300 headphones. An expansive but credible stereo image is conveyed, even from complex orchestral/choral works like Britten's War Requiem (Noseda/LSO/LSC/Eltham College Choir) a 24-bit recording that also reveals the Sundara's dynamic capabilities. Bass-heads should note that the emphasis is on quality rather than quantity. The kick drum and bass guitar of Doves 'Cathedral of the Mind' (The Universal Want) have definite impact, but keep their place within the mix.

## CONCLUSION

To the man in the street £300 will sound like a lot of money to splurge on a pair of headphones – unless they come from the reassuring famous names in big-tech. Yet, for its comparatively low asking price the Sundara gives you a little taste of what high-end planar magnetic 'phones are capable of. And here brands like Audeze set the pace with prices far above the Sundara. I would compare them with cans selling for as much as £500 or so, but the need for a good headphone amp remains, as always with planar magnetics.

## HIFIMAN SUNDARA £299



**OUTSTANDING - amongst the best.**

**VALUE - keenly priced.**

### VERDICT

Couple with a capable headphone amp or personal player, and prepare to enjoy!

### FOR

- detail and musicality hard to match at the price
- comfortable and practical
- upgradable

### AGAINST

- no carrying case supplied
- needs drive to avoid audible strain
- right-angled 3.5mm plug awkwardly-long

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# Screen test

Martin Pipe tests Chord Company's 'X' upgrade to its budget C-Screen speaker cable.

**T**he latest speaker cable to get Chord Company's 'X' factor is the entry-level C-Screen. This is aimed not only at audiophiles on a budget, but also home-cinema enthusiasts with plenty of audio channels to worry about. Said 'X' refers to Chord's use of XLPE (Cross Linked PolyEthylene) insulation, which replaces the FEP (Fluorinated Ethylene Propylene) material used in the previous C-Screen version - at £5 retail per metre, a popular line for Chord Company. According to the Wiltshire firm, the choice of insulation has a "profound effect" on a speaker cable - get it wrong, and enjoyment of your music can be impaired by traces of colouration.

Of course, the signal-carrying conductors insulated by Chord Company's new wonder material are also important. Specified for the C-screenX are 16 AWG's worth of multi-stranded oxygen-free copper conductors, two bunches of which are arranged in a twisted-pair configuration. Over this XLPE-covered wiring is wrapped a twin-foil shield. Another of Chord's speaker-cable specialities, this design feature helps to keep external interference at bay. Doing so, it's claimed, helps to convey subtlety while aiding coherence and timing. Try finding that attention to detail in the cheap stuff masquerading as 'speaker wire' at DIY stores!

The cable is then enclosed in a

overall PVC jacket, which reduces 'mechanical noise' as well as spacing those all-important conductors correctly. Such construction is remarkably-complex for what is after all a budget cable, and it also has the practical advantage of flexibility. Unlike the conspicuous esoteric stuff that could be used to tow ships, C-screenX - which has an overall diameter of only 9mm - can be routed around corners without impairing performance. Note that its white jacket helps the 'installer-friendly' C-screenX to blend in with contemporary decor (white skirting boards, for example). Furthermore, Chord Company say that there's little audible deterioration over longer runs.

I reviewed the 'step-up' version



of this cable - the ClearwayX - a few issues ago. It's a truly excellent cable, but 'X' upgrades made it 50% more expensive than its immediate predecessor. So too is the C-screenX, which sells for £7.50 a metre. Our review pair was fitted with the same factory/

"the C-screenX represents a massive improvement over the DIY-store stuff"

dealer-terminated ChordOhmic 4mm banana plugs that graced our ClearwayX review samples. These alone sell for £120 - nearly three times as much as the actual cable used to make our 3m review pair! Dealers will sell you the desired lengths of C-screenX 'off the reel', and there's no obligation on your part to have them terminated. Audiophiles on a budget can thus instead feed bare wire into the binding posts of their amp and speakers - or opt for gold-plated 4mm Banana Plugs that Chord also makes available for £24 a set.

In performance terms, the review samples exhibited similar basic characteristics to the ClearwayXs I tested earlier with the same equipment (Cambridge CXN/AXR100D receiver/Q Acoustics 1030 speakers, Cambridge Edge NQ and W/

Quadral Aurum Wotan VIIIs). Yes, that Chord pedigree is present and correct. With the lower-priced kit, there's little to tell the two apart, the C-screenX being betrayed by nothing more than a very slight smearing of complex treble detail - and that was when listening to well-recorded 24-bit material. It is a credit to the worthiness of the C-screenX that I had to turn to the vastly-more expensive system to better-discern the differences.

Although the same low-frequency tautness is evident, a tiny but nevertheless perceptible

amount of impact is lost on pounding bass drums and synths (not really an issue with the cable's touted home cinema application, as the more visceral end of the spectrum would be handled by an active subwoofer). By any standards, though, the C-screenX represents a massive improvement over the DIY-store stuff. In terms of the all-important midrange, the C-screenX never fails in its ability to communicate expressively; into the bargain, dynamics and imaging are a cut above what you'd expect from a cable at its price point.

### CONCLUSION

Yes, as with other 'X' rated Chord updates the C-screenX is 50% more expensive than what came before - however, it's still only £7.50 per metre. I'm hoping that the low price (especially if you connect it directly, in 'bare wire' form, to binding-post terminals) will convince the cynical punter to give the C-screenX a try. It proves that speaker cables, carefully-designed with audio specifically in mind, do make a difference...and needn't break the bank.



**CHORD COMPANY  
C-SCREENX £165  
FOR CHORDOHMIC -  
TERMINATED 3M PAIR,  
AS TESTED  
(£7.50 PER METRE)**



**OUTSTANDING - amongst  
the best.**

**VALUE - keenly priced.**

#### VERDICT

An excellent choice for budget-conscious users - and those who believe cabling is of no benefit!

#### FOR

- bargain-hunters can order without terminations
- demonstrably superior to 'bell-wire' type cables
- make the most of even budget systems

#### AGAINST

- Chord Ohmic plugs add significantly to the price
- 50% more expensive than its predecessor...but hey, it's only £7.50/m

The Chord Company  
+44 (0)1980 625700  
www.chord.co.uk



website: [www.jordanacoustics.co.uk](http://www.jordanacoustics.co.uk)

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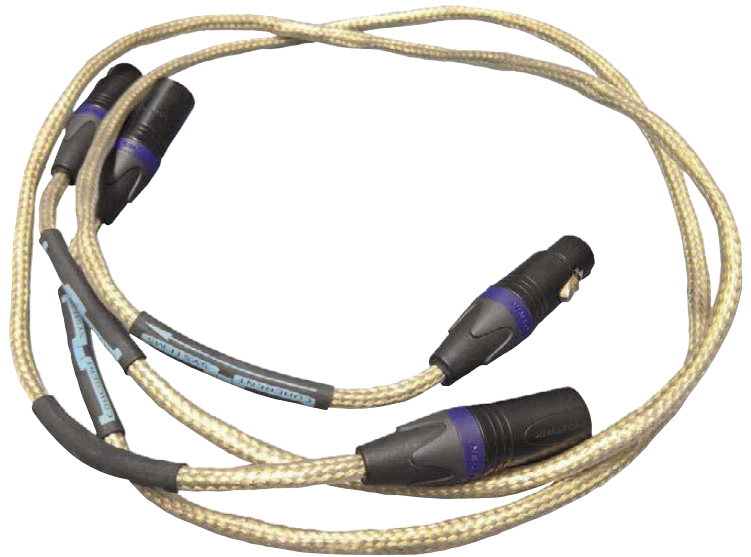
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Visit our website at [www.hi-fiworld.co.uk](http://www.hi-fiworld.co.uk) or send your emails to [letters@hi-fiworld.co.uk](mailto:letters@hi-fiworld.co.uk). Letter of the month wins a pair of new hi-end Coherent Intro cables.

Answers by: NK - Noel Keywood; PR - Paul Rigby; MP - Martin Pipe; DT - Dave Tutt; JP - John Pickford.

## LETTER OF THE MONTH PRIZE

### NEW HI-END COHERENT INTRO CABLES

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[subject to availability - 1mtr analogue interconnect, choice XLR or RCA]

**A PAIR OF WHARFEDALE 12.1 LOUDSPEAKERS are on their way to TIM KEENEN, Letter of the Month winner in our December 2021 issue.**

## Letter of the Month

### DEMO DISCS

I fear that you have got a couple of years wrong in your article on test discs. The EMI "Stereophonic Sound" LP was first issued in the autumn of 1958 and not in 1957 (see jpg of Gramophone advert in August 1958 issue).

The first LP using the Blumlein-Westrex system issued in 1957 was an Audio Fidelity demo disc released on December 13, 1957 in a very small quantity. Mass market stereo LPs didn't really appear until later in 1958. EMI, of course, had been releasing stereo recordings from 1955 onwards but only on very expensive (3 guineas each) reel-to-reel tapes.

And CDs first appeared on the mass-market in the autumn of 1982 rather than in 1983.

Best wishes,

**David Mansell.**

Hi David. Thanks for your detailed knowledge, insight and corrections as always. But I think you are sailing close to the statistical wind here! Our EMI LP's label says recording "first published 1957". The advertisement appeared in 1958, after the record I'd suggest.



**EMI's SDD1 music demonstration LP "was first issued in the autumn of 1958 and not in 1957, see jpg of Gramophone advert in August 1958 issue".**

But that's a lovely add all the same – thanks for sending it in.

That EMI were releasing stereo recordings on open-reel tape from 1955 is fascinating. Technically it's easier to get two channels of audio onto tape than onto LP so it makes historical sense.

Sony was determined to get The Beatles onto first release CDs – Abbey Road I recall. But whilst a small number of CDs were released in Japan during 1982, the format got going in 1983. The problem back then was

getting access to a high technology pressing plant; only Sony and Philips had them. I had to book a plant ten years later and it still wasn't easy to get space in their schedules. **NK**

### ANOTHER DEMO DISC

Another interesting stereo test record to add to your list was produced in 1963 by Stereo Review magazine. It had many standard test and set up tracks on side one but what made it special were the two pieces of music on side two which were direct cut



### The centre label of SDD1 dates it at 1957.

to vinyl years before that technique became popular for audiophiles in the 1970s.

The first cut was *Procession Du Vendredi-Saint* from *Fanfares Liturgiques* by Tomasi. The second cut was *Ricer* from *Musical Offerings* by J. S. Bach. And what made it even more unusual was the listener had to lift the tone arm after cut one ended to start cut two because the two pieces were recorded separately and a direct to disc recording must be recorded in one shot in order to be able to listen to a record side from beginning to end.

**Allen Edelstein,  
Highland Park,  
New Jersey, USA.**

Hi Allen. I had a voice in my head suggesting that historically the U.S. was likely to have produced stereo demo LPs at this period or even before it, that I do not know about. So thanks for the update.

Early music demo discs were peculiar and imaginative it seems, from the content of Stereo Review's LP and EMI's demo disc. A world gone by and lost to us today.  
**NK**

### THE DARK SIDE

I read with interest Paul Rigby's chronicle about Elvis Presley and mister Fuller: let's say that music even before Faust deals also with evil forces.

The most famous example is Robert Johnson, the bluesman and his pact with the devil at the famous crossroads, symbol of uncertainty, there he sold his soul in exchange of giftedness and fame. After a difficult life RJ died in the most mysterious way, poisoned and his body never found.

From this time blues was called the devil's music. Nowadays it is still believed that some artists make such deals in order to gain success and money.

Whatever you believe or not in this assertion I suggest you have a glance in the interview of Bob Dylan with a US journalist on YouTube where he admits that his long

career is the consequence of a pact with the prince of this world as he calls him. Well, he wrote you have to serve somebody. Unfortunately he chose the dark side.

**Remi Balestie  
France**

### DON'T FREEZE LP

I've been reading the various articles posted in your magazine regarding the digitizing of vinyl collections and I must admit I am a bit confused as to why?

When listening to vinyl, what we hear is combination of what the cartridge, stylus and phono stage pulls from the albums as it plays. As we update and improve these bits of equipment we, hopefully, improve what we hear and our enjoyment of sound. Even the act of pulling the

ability to play vinyl on mobile phones/ car stereos/etc is convenient but to digitize and play on home equipment, rather than just play the album itself seems to defeat the object of playing vinyl in the first place.

Also, in the future if you upgrade your cartridge to the latest/greatest (sounds amazing) one that is released, then you would want to re-record all those albums again!

Having gone through the pain/hassle of converting all my CDs onto a NAS drive recently, I really don't want to think I would have to do this as a regular task! Transferring CDs to a NAS or other storage media does not suffer this issue as the source is frozen from the start.

I'm not trying to dictate how everyone should listen to their music, that is a personal area that people like all of us have the right to chose for themselves. I'm just confused as why someone would want to take a superior media format (that we can actually improve as new developments in stylus, cartridge and phono stages arrive) and freeze it, Surely, is this not what CD did years ago?

**Andrew Burtchael.**

Hi Andrew. Yes, good point. It was always the case that analogue could be continually improved whilst CD was a fixed snapshot in time. If that shot was a bad one, as early CDs due to distortion from the studio ADC, then so be it.

When Abbey Road Studios recently re-mastered The Beatles they did it from the original analogue tapes to 24/48 cutting masters working into modern lathes and used very high quality vinyl. Every part of the re-recording process was re-optimised and the result is quite stunning, especially for such old recordings like Abbey Road the album (their last) dating back to 1969.

Add in the ability to upgrade the play chain too, as you can do in all-analogue systems, and it does make the idea of recording LP digitally questionable. As you say, it freezes LP into the same state as CD – a worrying idea! **NK**

### CELESTION SL6000

Back in the 1980s there was an enthusiasm for the Celestion 6000 subwoofer system. They came as a pair and were intended to sit, one



**"An interesting stereo test record to add to your list was produced in 1963 by Stereo Review magazine" (USA) says Allen Edelstein.**

album out, cleaning and playing is quite a nice experience in my view!

As soon as this output is digitized it is in effect frozen. Even if we update the DAC that the digitized files play through, we may improve the output of the stored files but we cannot improve the source itself.

Now I will admit that to have the



**"That ungainly pile of Quads balanced on rotund Celestion 6000 subs" as James Ronaldson described our reference system from the 1990s!**

**A Celestion SL-6000 open dipole subwoofer sits below a Quad ESL-63 electrostatic, perched on a top plate designed for their SL-600.**

**This shot shows right speaker orientation as we used them, with SL-6000 side null pointing into the right corner, the Quad pointing in at listeners.**

each, beneath a pair of Celestion 600 top speakers. However, they were adopted by others to partner Quad electrostatics.

The 6000 was a boxless, nil-baffle subwoofer, which was controlled by the Celestion active crossover. To counteract the rapid bass roll-off of a naked subwoofer, the active crossover administered a bass boost to each subwoofer, which was adjustable

for both level and extension. Each subwoofer comprised two 12in speakers mounted in opposition, spaced apart 150mm and acting as a dipole: an arrangement seen in some boxed subwoofers today, for example the Bowers and Wilkins DB range.

Apart from the lack of colouration, there were said to be two other advantages of this arrangement: the main one being that the crossover

relieved the load on the amplifier for the top speakers, with consequent advantages for soundstage and so on. The other lesser advantage was that the dipoles could be turned to face the best direction in order to smooth out the room response. Dipoles fire directionally, rather than equally in every direction, and room modes could be minimised in this way. There is an article on the internet in the *Stereophile* series which describes the system in more detail.

Well, that was all a quarter of a century ago and a lot has changed since then. Subwoofers are everywhere in all shapes, sizes and costs, driven by the interest in home theatre. And there are now two theories about the best way to integrate subs with the upper speakers. REL have made it their chief tenet that top speakers integrate better when they do play right down into the bass region, alongside the subs. The other approach is to separate out the bass part of the signal to drive the subs, using some kind of crossover. This can be done digitally, appropriate for the current move to streaming, or by analogue means.

Furthermore, there is now much more awareness about the placement of subs to produce the smoothest bass response, with the consequence that top speakers and subs respectively can each take up their best position in the listening room.

And it's not just the position of subs that is attracting attention, but so has room correction processing, even with 2 channel stereo. There is now free room measurement software for Apple and other operating systems, which is an incredible advance since the 1980s; and we also have subs that contain the software which will automatically measure your room acoustics and apply the necessary correction, using the subs own inbuilt software and your phone as a microphone. [And so do some streamers and AV processors.]

I have three questions. First: where does this leave 2 channel stereo? Why buy top of the range 3-way floor standing speakers which lock the bass transducers to the spots dictated by getting the best stereo? This spot is not necessarily the best position to reduce the excitement of room modes and can produce lumpy bass. Would not stand mounted speakers with a room-tuned subwoofer [or better two] give an equal result at lesser cost?

Second: if my memory is correct, Noel's last mention of the Celestion





**Polygram Records used stripped down Quad ESL-63s and Celestion SL-6000s driven by Celestion's equaliser.**

6000 system was that he was not sure that the Quads integrated quite well enough with the Celestion bass units, and that he would build his own crossover to remedy this fault. I wonder if he ever did that?

And finally: if you rely only on just physical bass traps to smooth the bass response in a room, will they do anything to correct nulls? [Those areas in the room where a particular frequency is diminished.] These nulls are almost more annoying than a bass boom!

**James Ronaldson.**

P.S. We know that the listening room at Hi-Fi World now has Martin Logans, which also combine electrostatics with bass units. The Martin Logans certainly have a much more elegant appearance than that ungainly pile of Quads balanced on rotund Celestion 6000 subs!

Hi James. Indeed, it is likely that the sort of tuning system used in A/V receivers, that places a microphone in the listening position, could be used to equalise response in two channel amplifiers. I've found such systems very effective. But A/V receivers are all-digital, where an internal DSP sets levels during room tuning. Most hi-fi amplifiers aren't configured like this, lacking an internal DSP. There are some (where analogue inputs are turned to digital) that could room tune, but it adds to cost and complexity. It's best done externally, as an optional add-on.

As you suggest, small high quality stand-mount loudspeakers and one or two tuned subwoofers should give a good result – but this introduces yet more cables, complexity and significantly increases cost. People want less intrusion not more. Even with mains powered, auto-tuning, wi-fi connected subwoofers (I don't know whether such things exist) it means extra boxes in the room and added expense, for what many would perceive as small improvement (small subs. sound awful).

A two-channel stereo system needs to be easy to use, affordable and effective. Even though big A/V receivers with acoustic tuning are affordable and give a great result, they are too complex. Press the wrong buttons on the remote late at night and all of a sudden it all goes pear shaped I've found, not a problem that afflicts a simple stereo amplifier.

So you remember Celestion's unique SL-6000s from the late 1980s, designed by Dr Graham Bank – fascinating open dipole subwoofers that needed an external equalisation/crossover unit. I did indeed design an improved crossover that appeared in our December 1995 DIY Supplement. It boosted info around 150Hz by +2dB to aid subjective matching and had a high pass filter at 10Hz to limit cone excursion and "bottoming".

For bass traps to provide a useful result they need to be large to absorb sufficient energy and this makes them intrusive. They will damp down a room but not alter its

basic modal structure so nulls are unlikely to be affected. But nulls are everywhere in a room, as three-dimensional analyses show (Cara). If you sit in the centre at one end of a room you are right in a null! If they worry you then lie down with your head in a corner where there are no nulls :- ) or use headphones.

Martin Logans were a natural progression from Quad ESL-63s – mine fell apart in the end because I stripped so much off them, each layer removal revealing more fine detail. The open XStat electrostatic panel of MLs is what I was after all along.

The SL-6000s had problems, but at the same time dipoles give clean, even bass when orientated to cancel room modes, a feat beyond monopoles. I enjoyed them and have long dreamed about an improved design able to deliver the superb bass quality they showed possible.

**NK**



**Successor to the Quad/Celestion combo, a Martin Logan ESL-X – an electrostatic above a conventional (monopole) woofer. "More elegant" says James Ronaldson.**

# Open Baffle (Dipole) Subwoofers

Here's a quick, mostly non-technical look at open-baffle (dipole) subwoofers. As their name suggests they are a bass unit attached to a flat wooden board (baffle), it's as simple as that. Sounds good – no cabinet means small size, low weight and cost, since cabinets are expensive. Not many of them around though; it's an old idea that's never met success. Gilbert Briggs, founder of Wharfedale, devotes a chapter to them in his book *Loudspeakers* (1958) and his company produced a sand filled open-baffle, SFB/3, long ago.

Celestion re-visited the idea around 1987 with the very-different SL-6000. It was designed to work with their SL-600 mini-monitor but we used it with Quad ESL-63 electrostatic loudspeakers, also dipoles. Here's how it worked.

As a bass unit moves it produces a positive pressure wave one side (compression) and a negative at the other (rarefaction). It has two poles (like magnetic poles), hence the dipole descriptor. These cancel each other out. A large baffle can be used to lessen the effect, Briggs solution. Celestion chose a different approach, to electronically equalise the bass unit, cancelling out what is otherwise a steady bass roll off of -6dB/octave.

This is an immediate horror story, because it means pumping huge power into the bass unit to counteract the acoustic loss. However, in the late 1980s big power amps were available at reasonable cost, as were the components needed in the equalisation unit. Celestion used two of their 12in PA drivers to handle the incoming power. We're talking hundreds of Watts here, causing the drivers to 'bottom' at high volume. The frame shook as a result, so was made strong and heavy – barely liftable.

Why do all this? What were the benefits? Getting rid of the cabinet means smooth bass with no lower limit – ours reached down to 5Hz, truly subsonic. No cabinet



*Wharfedale's SFB/3 sand filled baffle loudspeaker from the 1950s.*

loudspeaker could approach such a performance.

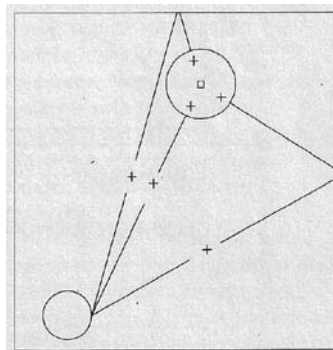
Bass quality was very good: fast and clean, with no cabinet whoomph, overhang, colouration etc. A good match for our Quad ESL63 dipole electrostatics, others also using this combo. for professional purposes. Volume had to be kept "reasonable" though; high volume was a no-no.

Importantly, Celestion explained the SL-6000 had a specific radiation pattern that would interact with room

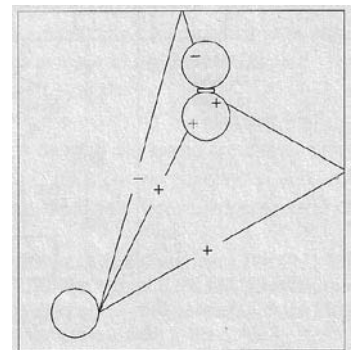
boundaries (walls, floor, ceiling) in a way box speakers (monopoles) do not, producing some acoustic polar diagrams to explain the issue. They suggested a dipole interacts strongly with a room, but did not elaborate. This is little understood even today, most people believing the opposite – that dipoles don't interact with rooms. They most certainly do, and it can be used in their favour.

We found that pointing the side null at corners gave the best result, all but eliminating room

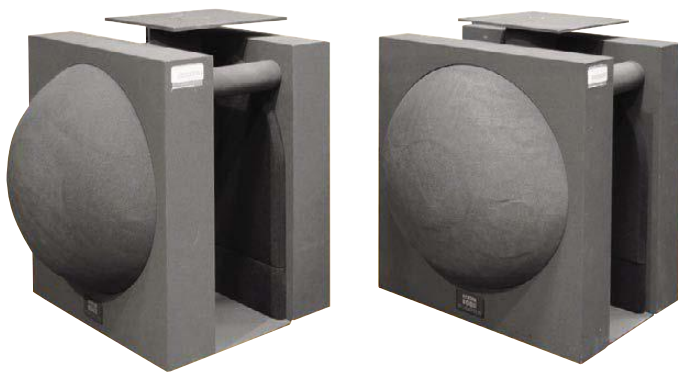
***For the SL-6000, Celestion provided these unusual acoustic diagrams to show how monopoles and dipoles behave differently in a room. Their explanations below show why they thought the dipole better "if properly arranged".***



***"A conventional monopole generates additive reflections off all walls. Their strength and phase depends upon speaker position. The result is unpredictable emphasis".***



***"A dipole can provide negative reflections and, properly arranged, this can be used to give a more balanced overall result in a reflective field like a room".***



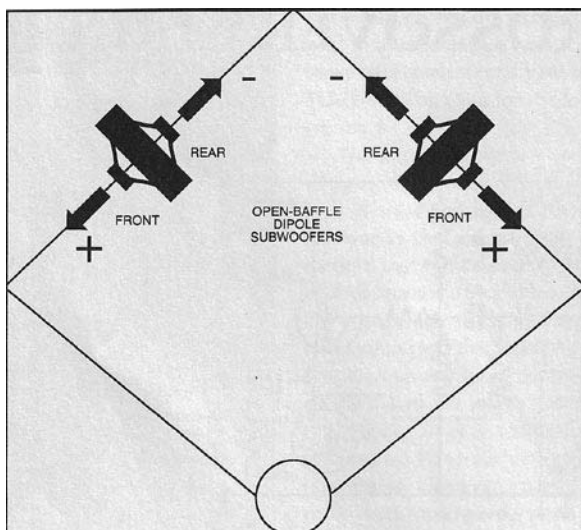
**Celestion SL-6000 open baffle dipole subwoofers. The top plates supported their SL-600 loudspeaker.**

boom. In effect the SL-6000s were dominating the room's acoustics, for better or for worse according to their orientation. They had to point outward, looking peculiar, but gave superb results in this position, better than that from box subwoofers (monopoles).

This is an interestingly different

its limitations I suspect.

Such loudspeakers are bubbling under even today and a company with powered subwoofer/DSP technology like Martin Logan could well produce an effective design I suspect. It may happen, if not in a form Gilbert Briggs would have recognised.

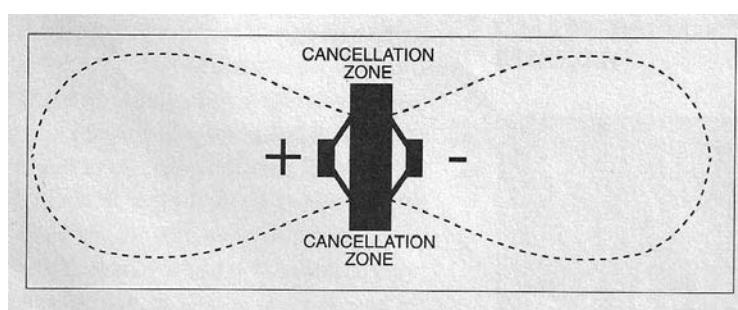


**Our diagram from 1995 showing how our SL-6000s were orientated ("properly arranged") in a room, side-nulls toward corners.**

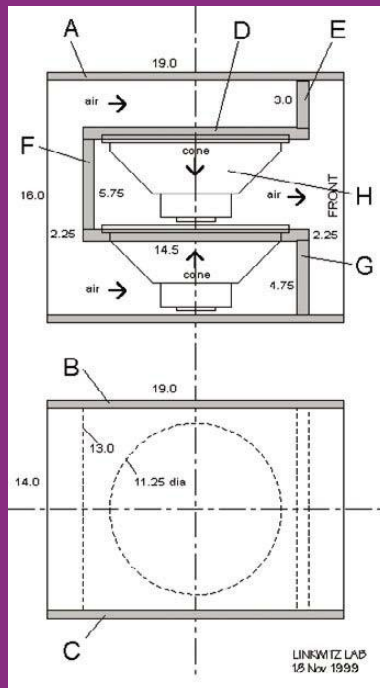
way to tune a room than using digital filters and such like. It's also a very effective one, but needs in-situ experiment that's difficult with heavy cabinets. See <https://www.linkwitzlab.com/models.htm> for more dipoles, including an interesting cabinet, if not much on room interaction.

The open-baffle dipole subwoofer has potential, as Celestion's unique SL-6000 showed long ago. Class D drive amplifiers, better filtering and a more effective cabinet would have solved many of

**A dipole radiates equally from front and rear but 180 degrees out of phase. Where front and rear waves meet they cancel, producing a dead zone either side of the loudspeaker. The + and - signs correlate with those in Celestion's diagrams.**



**LINKWITZ LAB DIPOLE**



**Here's an interesting dipole subwoofer from Linkwitz showing an alternative drive unit arrangement to Celestion's. Go to <https://www.linkwitzlab.com/models.htm> for more info. This is a well thought out DIY design. It needs an electronic equalising network however.**

# Mix'n'match

PrimaLuna mix valves with transistors in their new EVO 300 Hybrid and make a nice match thinks Noel Keywood.



If you want the lovely smooth sound of a valve amplifier but would like that magical 100 Watt power figure for a bit of AC/DC every now and then, a hybrid might be the answer. Not a new idea, but a good one that ticks a lot of boxes, one that valve amplifier manufacturer PrimaLuna have embraced with

need not happen. We have heard some lovely ones, notably from Vincent of Germany who have gained everyone's vote for a great sound. That isn't a valve sound, nor a transistor sound – but a hybrid sound! In a nutshell, tidy, powerful but full bodied. Would the EVO 300 Hybrid match up I wondered?

Rather than using any old transistors to deliver 100 Watts, PrimaLuna use a special type called a MOSFET. These devices have always been said to mimic valves in their electrical characteristics, and PrimaLuna evoke this similarity to justify their use as output devices. However, modern power MOSFETs are highly developed devices in whatever role they are used, so make a good choice in any case.

By now you'll have gathered that the EVO 300 Hybrid is a powerful hybrid amplifier – but it is not much else. There are five Line level inputs through phono sockets (unbalanced) and an optional Phono stage (moving magnet) for LP, something ours lacked even though the casework

a large 500VA transformer for the power amplifier, plus two separate transformers for the preamplifier they say, which may well be high voltage for the valves and low voltage for all else. I speculate because PrimaLuna use solid-state control and monitoring circuitry in their all-valve amps and likely do so here. There is for example a motorised volume control – likely Alps Blue – with associated remote control electronics, plus relay switching of the inputs and these all need a low voltage supply.

The remote control is a chunky alloy affair with a battery cover attached by four small cross-head screws, hidden beneath rubbered O-ring bump stops. It controls volume, input selection and has a Mute function too. There are unused buttons as this is a general remote for all PrimaLuna products, so TR/UL (Triode/Ultralinear) doesn't apply here.

As PrimaLuna note, they use valves extensively in this design, not just as unity-gain buffers. There are two 12AU7 (double triode) preamplifiers, one for each channel,

plus four 12AU7 phase-splitters/buffers to feed the push-pull Class A/B power amplifier. This uses paired JFETs from Linear Systems they say, plus custom power devices in push-pull pairs, clamped to heatsinks at either side of the rear cover. There is a long start-up delay of one minute and current draw from the mains is 0.4A (90W), there being no auto power-off function after a period of non use.

The EVO 300 Hybrid is solidly built and well finished, if functional in styling: it's not going to win any prizes here. The six 12AU7s have no under-lighting, McIntosh style, and the faint glow of their heaters is not obvious. Pepping things up a little PrimaLuna use red LEDs inside the rear power amplifier housing to give a cosy red glow if you look in from above, through the ventilation slots. Not visible from the front though, which is a shame. Dimensions were 468mm wide, 578mm deep and 316mm high.

### SOUND QUALITY

The EVO 300 Hybrid was connected to Martin Logan ESL-X hybrid electrostatic loudspeakers via Chord Company Signature



their new EVO 300 Hybrid (£6198) I am reviewing here.

Hybrids combine a transistor power amplifier with valve preamplifier, meaning you get a bit of both. They're a compromise that can fall between two stools, pleasing no one. Transistor power amplifiers can easily wreck the potential of a decent valve preamplifier, but done well that

is there. Absent are digital inputs, balanced inputs, Bluetooth or anything else. However, there is a Home Theatre input direct to the power amplifier, bypassing the volume control, as well as a fixed-level Tape output from the preamp, before the volume control. The front panel carries a full size 1/4in (6.3mm) headphone jack and the loudspeakers can be switched off for late night listening.

In underlying form this is a fairly ambitious design, explaining both cost and weight of 25kgs (55lbs) – a two person lift. There

Reference screened cables. Sources were our Oppo UDP-205D player, valued for its top quality ESS ES9038 Pro DAC that gets the best from CD. I also used hi-res from a MacBook Pro connected to the Oppo's USB input, using the Audirvana+ software player to read hi-res PCM and DSD files.

This is an amplifier with a characterful sound that was easy enough to sort out. As you would hope from a well developed MOSFET amplifier with big linear power supply there was superb dynamic contrast making for a meaty sound. I found it added muscle to whatever was connected, livening up a pair of Focal K2 906 loudspeakers under review, for example. With well lit, detailed treble in typical MOSFET fashion the EVO 300 Hybrid came across as having an airy, open wideband delivery that added sparkle to highs: this is not a warm sound and was quite different to our



*The inputs are selected by relays (top) and the two mains transformers for preamplifier are screened toroidals. There are specialised (white) capacitors and a motorised Alps volume control (bottom right).*



*At right a full sized 1/4in (6.3mm) headphone jack with rocker switch behind to silence the 'speakers'.*

Creek, that came across as softer and less forceful.

The big plus point however was that of timbral resolution. Those valves added in a richness that you just don't get from solid-state amplifiers, especially MOSFETs that can come across as sterile and soul-less. This worked wonders for orchestral works and especially

"With bass heavy tracks, like Giorgio by Moroder from Daft Punk (24/96), this amplifier had both grip and heft"

strings, the Trondheim Soloists located in a big space behind Marianne Thorsen, their massed strings sounding delightfully well lit and instruments convincingly differentiated playing Mozart violin concertos (2L Norway, 24/192). Marianne Thorsen's violin was vibrant centre stage, well in front spatially and with a richer timbre than I am used to, giving it a sense of body. Bright transistor amplifiers don't manage this well; they have speed and clarity on their side but also mechanistic sterility. And that is what the EVO 300 Hybrid avoided.

With bass heavy tracks, like Giorgio by Moroder from Daft Punk (24/96), this amplifier had both grip and heft, as it did with Fleetwood Mac's Dreams (24/96)



*A rank of 12AU7 double triode small signal valves handle preamplification (2) and phase splitting/buffering (4).*



**A 12AU7 double triode; six valves/twelve triodes in all are used. Typical life time is 10,000 hours and they are inexpensive.**

where John McVie's bass line similarly made its presence well known in the room. It's this low frequency heft that gives the amplifier its muscular sound. Bearing in mind valve amplifiers have big bass, if obviously softer bass than transistor amplifiers, and you get a satisfying amalgam here that's the best of both.

Drawbacks? Some older material with questionable treble quality, notably those Fleetwood Mac re-issue tracks in 24/96 hi-res digital could get challenging up top through the XStat electrostatic panels. It's impossible to know how well they were converted from the original analogue tapes to digital – my ears tell me through a yesteryear ADC that added audible digital distortion. Here the EVO 300 Hybrid was more revealing and challenging than our Creek or Icon Audio (valve) amplifiers: it threw out the problems in the recording. When reproducing clean modern recordings however, its well lit treble was a bonus.



Better, I suspect its strenuous approach to reproduction is what most people would identify as "hi-fi" and indeed I was a bit taken aback at how it energised our electro-

static loudspeakers in amenable fashion. Big MOSFET amps can be too challenging for me, but this one had civility. I started to wonder whether it was a symbiotic match for electrostatics, where normally I prefer valve amplifiers. That would make it a reference amplifier then.

**CONCLUSION**

Stand back and PrimaLuna's EVO 300 Hybrid amplifier is a peculiar proposition. Expensive, with few facilities and of lack-lustre appearance it's not going to be a

star attraction in any show room. But it is a truly specialised design: using valves as phase splitters is nuts, yet works well here it seems. Add in some serious linear power supplies and what you get is an amplifier with a sound that is both unique and impressive. Big, powerful, super clean – fast as well. This is arguably one of the best amplifiers a non-valve person could hear, and might even worry valve heads – as it did me! Well worth auditioning if you are in the market for a top amplifier.



**At rear a line of solid, gold plated phono input sockets, one pair of speaker sockets and – beneath – casework for an optional MM phono stage. Above lies the power amplifier with its 500VA mains transformer.**

**MEASURED PERFORMANCE**

Having an FET (transistor) output stage, the PrimaLuna EVO 300 Hybrid delivered 112 Watts into 8 Ohms, rising to 182 Watts into 4 Ohms. Output impedance was very low at 0.07Ω, giving a high damping factor of 109, suggesting well controlled bass.

Frequency response measured flat from 13Hz to 48kHz (-1dB) and remained unchanged at all volume control positions – always good to see.

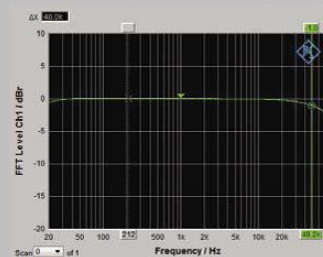
Even though distortion rises to 0.2% at 10kHz (1W) this comprised second harmonic only, much like that expected from a valve amplifier. Generally, distortion hovered around 0.1% and was always second harmonic in structure, which is innocuous.

Input sensitivity was on the low side at 400mV in for full output (30V), explaining the amplifier's low noise figure of -103dB. **NK**

<b>Power (8 Ohms)</b>	<b>112 Watts</b>
<b>Frequency response (-1dB)</b>	<b>13Hz-48kHz</b>
<b>Separation</b>	<b>68dB</b>
<b>Noise (IEC A wtd)</b>	<b>-103dB</b>

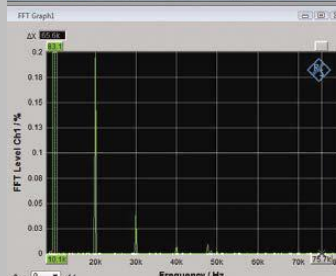
<b>Distortion (10kHz, 1W, 4Ω)</b>	<b>0.2%</b>
<b>Sensitivity</b>	<b>0.4V</b>
<b>Damping factor</b>	<b>109</b>

**FREQUENCY RESPONSE**



**DISTORTION**

THD at 10	Level (dB)	Frequency
0.2041 %	1.3874 V	10.000 kHz
OFF	OFF	OFF



**PRIMALUNA EVO 300 HYBRID £6198**



**OUTSTANDING - amongst the best.**

**VERDICT**  
Powerful, fast yet timbrally rich, a lovely sound.

**FOR**  
- muscular sound  
- spacious sound stage  
- strong yet fine treble

**AGAINST**  
- few facilities  
- no balanced inputs  
- dull appearance

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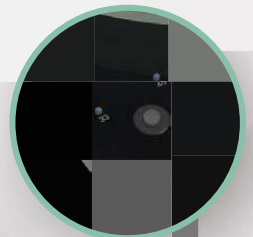
## THE NEXT GENERATION OF ENTRY-LEVEL TURNTABLES

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Electronic speed box available



All-new design and high-quality materials



Aesthetically pleasing glass platter as standard





# Hey Google ...Play Music!

The iconic Braun brand has been revived, courtesy of a top-of-the-line smart speaker. Martin Pipe has the LE01 at his beck and call.

**B**etween the 1950s and 1980s, the Frankfurt firm Braun - founded by mechanical engineer Max Braun in 1921 - made some pretty tasty audio equipment, in addition to distinctive radios, clocks and photographic gear. One of the first such products to generate interest was the plexiglass-topped 'Phonosuper SK4' mono

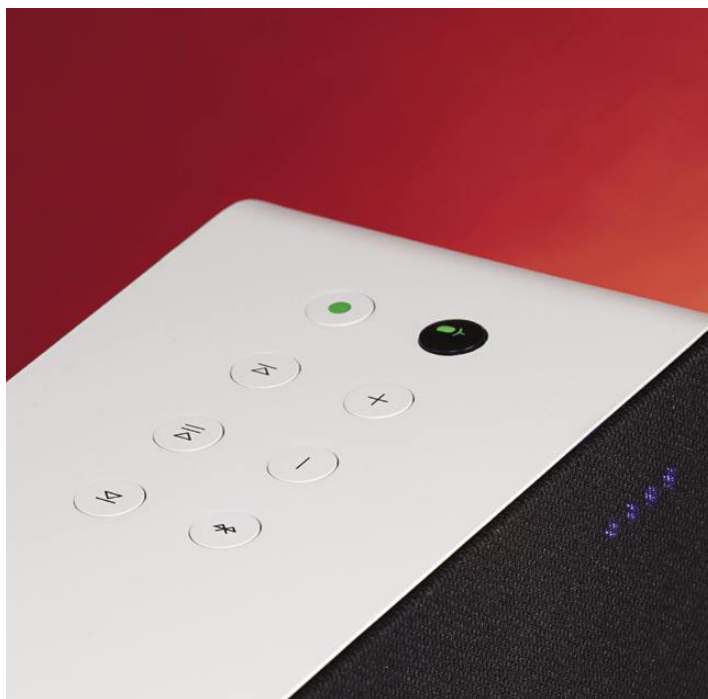


radiogram. Nicknamed 'Snow White's coffin', it was designed by Hans Gugelot and Dieter Rams in the mid-1950s.

Also worthy of note is the LE1 which, in 1959, was claimed to be Germany's first electrostatic speaker for home audiophiles (it relied on technology licensed from Quad though). Then there's Braun's wall-mountable 'Wandanlage' system, circa 1965. Consisting of turntable, tuner-amp, reel-to-reel tape deck and two-way speakers, it still looks fantastic more than half a century on. Bang and Olufsen didn't have style-conscious 'eye-fi' sewn up in those days! The Atelier range of slimline stackable components, Braun's 1980s proposition, looks similar to some of the gear sold by fellow Germans T+A to this day.

By the 1990s, though, the hi-fi market had declined sufficiently for Braun to pull out of it altogether. By this time a subsidiary of Gillette, Braun instead focused on shavers, electric toothbrushes, kitchen appliances and the like. The firm is today part of the Procter and Gamble multinational, thanks to the latter's 2005 acquisition of Gillette.

***The LE01's basic operating controls – volume up/down, skip back/forward, play/pause, Google Assist request and Bluetooth pairing. The green-backlight disables the microphone, and therefore Assistant, on those occasions when you want privacy. Under the speaker grille, those four LEDs blink in sequence whenever Android is processing voice requests.***



But what's this? Some new Braun products - one with a model number (LE01) that's suspiciously-close to that of the aforementioned electrostatic design! Can an operation better known for 'fast-moving consumer goods' like toothpaste, personal-grooming requisites and baby-care be diversifying into hi-fi? Might the involvement of an enormous corporation be heralding a revival in hi-fi, as a mass-market interest? Possibly, but alas highly unlikely. P&G has merely licensed use of the 'Braun' brand, on its centenary, to the firm that makes Pure digital radios. That means being made in factories closer to Beijing than Berlin...while the design work was carried out in the UK.

It's not just the factory location that's changed - the aluminium-enclosed LE01 is a completely-different beast to the LE1, although it retains that classic Braun styling. It can, like the Wandanlage, be wall-mounted. However, it's supplied with chrome stands for tabletop use. Distinctly non-electrostatic within, it's a self-contained 'smart speaker' with Google Assistant built in. A total of five drive units - two custom-designed 5.25in

aluminium-coned woofers with neodymium-iron magnets, flanked by three full-range 2.5in. 'balanced-mode radiator' drivers for mids and treble - are powered by three class-D power amplifiers and some sophisticated DSP running on a 32-bit ARM-based chip "for high accuracy and low noise". It's a pity that Braun didn't build in dedicated tweeters, but helping out at the opposite end of the audible spectrum are a pair of 8in. x 4.5in. passive radiators. In its defence, Braun explained that "the entire audio chain, from physical to software DSP design, is bespoke to maximise the audio performance". As the "ultrasonically-welded" front-facing grille is fixed firmly in place, the drivers would not yield their secrets to us.

**USAGE AND PERFORMANCE**

Set into the top panel are basic operating controls – volume up/down, skip back/forward, play/pause and Bluetooth pairing. Further buttons invoke Google Assistant without having to begin your request with 'Hey, Google...' or disable the microphone (and therefore Assistant) on those occasions when privacy is paramount. Braun doesn't supply a remote, because it expects you to use Assistant – or its own free app (available for both Android and iOS). A series of indicators under the speaker grille blink away, a bit like a computer out of a 1950s sci-fi movie, whenever Android is processing your requests.

The app is rather basic. You cannot, for example, use it to find music on local servers and start it playing (as you can with, for example, Cambridge Audio's app). Asked about DLNA/UPnP support to play local computer files, a Braun engineer told us - rather contentiously - that "with the rise of streaming services, we see a significant drop in the ownership of private files...and consequently a diminishing demand for DLNA/PnP".

The Braun app's main function is to set up your speaker, adjust bass/treble tone controls and discover how to connect sources – AirPlay 2 (for Apple junkies), Chromecast, Bluetooth or auxiliary input (a 3.5mm analogue jack on the rear panel, alongside Ethernet – an alternative to the

onboard dual-band Wi-fi – and the mains feed). It's a pity that no ARC-compatible HDMI or optical input have been included for improving TV sound. The app doesn't however actually switch sources – Google Assistant, or the unit's own controls, are required here. Connect the LE01 – in my case, via Ethernet – and then install the Braun app on your device, and it's time to go! You



**On the rear panel of the heavy aluminium shell - the LE01 weighs in at nearly 11kg - can be seen the 3.5mm analogue auxiliary input jack, Ethernet port (an alternative to the onboard dual-band wi-fi) and the socket for the mains lead. You don't alas get an ARC-compatible HDMI or optical input. One or both of these are usually fitted to 'soundbars', for the purpose of improving TV sound.**

may however also need to install Google Home/Google Assistant, which controls and manages compatible home appliances (including this speaker, on account of its Chromecast compatibility).

To configure your LE01, you basically tell the app how it's installed in your room by selecting a 'placement profile' – and Braun's

clever tech does the rest. These placement profiles, according to a Braun insider "adjust the DSP to allow for the physical effects of the environment...a good example is bass uplift". The LE01 is itself stereo, but it can be partnered with a second one (a total outlay of more than two grand!) to reproduce a wider soundstage and imaging than is possible from a single box. Arrange them vertically, so they look more like conventional speakers, and tell the app what you've done. Each LE01 then reproduces one of the two stereo channels. Annoyingly, no meaningful instructions are provided. There's a PDF 'user guide', but that's merely a list of infuriating links to web pages.

Bluetooth is easy enough to use, a wireless connection with AAC codec quickly being made to my Google Pixel 3a smartphone. Not having AirPlay, I stuck with the Google Assistant functionality - it's one or the other. Assistant can be

used to change input ("Hey Google, connect Bluetooth") or indeed access some streaming services directly ("Hey Google, play Radio 3"). The latter worked reliably, and was a lot of fun! According to Braun, 300 music-streaming services are supported, through one means or another. An alternative is to use a Chromecast-enabled app to stream music - I successfully used this with the VLC app on my phone, to play locally-stored files. Although the volume control of a Bluetooth device will change speaker volume, there's no such control on the Braun's app.

Under such circumstances, you must use Assistant for this purpose: "Hey Google, Volume 5" proved to be a comfortable listening level in a 10' x 12' room. Volume 0 mutes the LE01, and it would appear that 10 is the loudest setting. You can't turn off the thing altogether, though,

because Assistant is awaiting verbal input. The best you can do is shout "Hey Google, off!". Doing so stops whatever is currently streaming, and cuts off the sound. However, Braun's engineers have built in various technologies to keep power-consumption low, such as a "variable power supply that scales its delivery according to determined load" and the "processor core's ability to reduce the operating clock...(thereby) maximising power saving whilst maintaining network and audio reliability".

In performance terms, the LE01 does a creditable job with a sound quality that's best described as 'pleasurable' rather than standing up closely to critical listening. Sometimes, you get a sense of the individual instrumental strands that join forces to create a piece of music, but more often than not they merge together. It doesn't help that the stereo image is compressed by the speakers being so close together – the LE01 is, after all, only 700mm wide. A slight hollow colouration is evident at times, while there's a lack of output at the frequency extremes – the deep bass of an acid house track and the high-frequency harmonics of a struck triangle suffer as a result. Those simple tone controls can only do so much! In between those spectral extremes, though, the LE01 does a fair job.

## CONCLUSION

The LE01 looks fantastic, especially on its metal tabletop stands, and in this regard it's a definite nod to Braun's proud past. If my experience is anything to go by, the LE01 is certainly one of the better-sounding Google Assistant-ready devices I've heard. But then again, until enterprising manufacturers bring us devices like impeccably-engineered Assistant-controlled automatic turntables ("Hey Google, play Side 2 Track 1"), it will serve a mass market rather than a specialist audiophile one. In terms of music reproduction, you could do better with £1,000 to spend on 'real' hi-fi equipment. But I guess that style, which the LE01 has in spades, is probably more important to the prospective buyer than musical enjoyment in its purest (but maybe less convenient) form.

### BRAUN LE01 £1,099



**EXCELLENT - extremely capable**

#### VERDICT

One of the better smart speakers out there, but it can't compete with 'real' hi-fi.

#### FOR

- Google Assistant is a lot of fun!
- fast and responsive
- very attractive design

#### AGAINST

- limited app
- lack of connectivity
- £1,099 will buy some 'real' hi-fi

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# Christmas Wishes

**NAME:** Paul Rigby

**STATUS:** Hi-Fi World's music reviewer

**Here's my idea of ideal Christmas presents – and as you'll see vinyl gets my attention. There are no end of clever gadgets designed to keep audiophiles happy at Christmas.**



**ORIGIN LIVE PLATTER MAT: £43 [www.originlive.com](http://www.originlive.com)**

One of the easiest and fastest turntable upgrades out there, is the platter mat. You lift off the old one and, well, drop the new item in its place. Vibrations are a good thing. They help music to breath, adding space for reverb tails and more but allow vibrations to get out of control and the resultant noise will cause chaos, masking detail. There's plenty of vibration in the vinyl itself as well as the platter beneath it. Origin Live's own mat controls that chaos but also opens up the soundstage.

**MILTY ZEROSTAT 3: £60 [www.armorhome.co.uk](http://www.armorhome.co.uk)**

This one should be resident by your turntable and used before every play. Static electricity is bad for three reasons. Firstly, it causes those clicks and pops that are wholly irritating during vinyl play. Secondly, the static draws dust and other particles to the grooves of your vinyl which, in themselves, contribute to the wear of the record itself because they are attritional to the vinyl surface. Thirdly, static causes high-frequency noise which raises the noise floor. The Zerostat 3 helps to combat all of these things.



**DEGRITTER RECORD ADAPTERS: £60 EACH [www.degritter.com](http://www.degritter.com)**

If you have 10" singles and EPs then you owe it to yourself and your vinyl to grab a set of these adaptors to give these unusual audio discs the once over.

Both adaptors ultimately work in the same way as 12" records and are gentle on the discs, holding them only hard enough to get the job done, without squeezing or scratching.

**ZAZEN II: £199 [www.scvdistribution.co.uk](http://www.scvdistribution.co.uk)**

Made from "dense fibre material" this isolation platform arrives in varying thicknesses depending on the weight of the item you propose to place upon it. Underneath the block is a set of four IsoAcoustics patented isolation feet that are recessed into the body of the block. The combination aims to reduce vibration, lower the noise floor and increase available information floating towards your ears. The zaZen II helps to clear out the sonic rubbish. It allows you full access to the midrange and opens up the bass to produce a layered, organic and detail-rich presentation.



**DF DAMPING ISOLATION FEET: £52 [set of four] [www.sounddampedsteel.com](http://www.sounddampedsteel.com)**

Simple and basic in appearance, these accessories offer everything that is useful to a hi-fi fan and everything that is abhorrent to a policeman - flat feet. Isolation feet, to be exact.

They consist of two plates of damped steel in either 75mm square or 80mm circular disks. Each plate is bonded together with a visco-elastic polymer. As the metal plates are agitated by vibration, they flex. This movement stretches and contracts the polymer which generates heat. This energy transfer is, effectively, where the noise goes.

# Christmas Wishes

**NAME:** Martin Pipe  
**STATUS:** Hi-Fi historian

**After consultation with the Ghost of Christmas present(s), I'm pleased to list a few affordable goodies for audiophiles.**



**3M LAPPING-FILMS: £2.45-£3.25 EACH (PLUS POSTAGE/VAT): Cousins UK Wholesale. [bit.ly/3GyX5Yy](http://bit.ly/3GyX5Yy)**

Unlike solid-state devices, analogue media aren't wear-free; styli go blunt, and the passage of tape erodes grooves into magnetic heads. Many of the latter can be given a new lease of life by 're-lapping'. Just as well, given that replacement heads aren't easy to come by nowadays. Carefully applying successive grades of lapping-film, basically a fine-grained abrasive surface that's made to an exacting standard, can restore a head's surface. Lapping-film is also rather expensive, and not easy to come by. Restoring tape heads is a perfect pastime for those miserable winter evenings, and one I hope to describe in a future article.

**RX REELS NAB-HUB TAKEUP SPOOL: \$239 (plus \$51.36 UPS shipping and customs duties). [www.rxreels.com](http://www.rxreels.com)**

Still on the subject of tape, here's something that could grace the Christmas wish-list of many an analogue audiophile. This 10.5 in. quarter-inch take-up spool is probably the first of its kind to be produced in many years. Unlike the older plastic and aluminium varieties, it won't warp or bend because it's made of an esoteric aerospace-grade carbon-fibre material. As a result, the edges of your precious tape are safe. Supplied in a luxurious presentation box, its cut-outs will be familiar to owners of Technics RS-series decks. Choose from six finishes, one of which is a 'wood-grain' pattern that recalls '70s side-panels.



**SOUNDECK PM MAT: £95 (inc. UK postage). [www.soundeck.co.uk](http://www.soundeck.co.uk)**

An unusually solid turntable mat, the Soundeck PM is made by the audio offshoot of a firm that specialises in supplying vibration damping materials to industry. Thin enough to replace an existing mat without the need to adjust tonearm VTA, it consists of two non-magnetic aluminium discs separated by a thin polymer layer. Soundeck's clever structure converts unwanted vibrations into tiny amounts of heat that are safely-dissipated by the mat's metalwork. It offers an audible improvement, especially in terms of detail retrieval, and the owner of a musically-sound but noise-prone idler-driven deck would appreciate one in his Xmas stocking!

**BLACK RHODIUM OPERETTA DIGITAL INTERCONNECT: £330 [www.black-rhodium.co.uk](http://www.black-rhodium.co.uk)**

Few of us listen exclusively to analogue. Music is increasingly being streamed to us, and then there are the legacy digital disc and tape media. You'll need to use a digital cable between components, and this well-made coaxial digital interconnect from Black Rhodium fits the bill (and many Xmas budgets). A metre in length with silver-plated conductors, the carefully-screened Operetta Digital is available with phono or BNC connectors. With hi-res material, musical details that had previously blended into the background are revealed. The Operetta will help streamed Xmas hits and Nine Lessons to sound their best!



**JBL CHARGE 5: £180 <https://bit.ly/3luRLOa>**

A little gadget that will be hard not to fall in love with under the Xmas tree is JBL's Charge 5 Bluetooth speaker. The perfect partner for a smartphone, the water-resistant Charge 5 is ideal for kitchen music as well as outdoor use. Although its surprisingly-big sound is mono, two will work together for stereo reproduction. Another great feature of the unusually-shaped device is its integral 27Wh power source, which will not only give you sound reinforcement but charge your mobile device - good news, if you're caught in a snowdrift with a dying battery (and haven't forgotten the USB cable)!

# Christmas Wishes

**NAME:** Chris Frankland  
**STATUS:** Audiophile of ages

**Chris Frankland sets out a few suggestions for gifts under £500 for the audiophile who has everything.**



**DEVIALET GEMINI NOISE CANCELLING HEADPHONES: £280 [www.devialet.com](http://www.devialet.com)**

Designed for use on the move and supplied with a free app, these headphones come in a neat holder and charging station with a selection of different-sized ear pads. They bristle with interesting tech such as Devialet's own active ear-matching and a three-vent decompression system that is said to optimise sensitivity at low frequencies. It also uses meshes to dampen internal sound propagation. And it all seems to work beautifully, with the Gemini delivering a well-balanced, musical and coherent sound blissfully free from any nasties. They will more than hold their own against anything at the price. They also look great and offer good battery life. Noise cancelling is also adjustable so that you can let in a little more of the outside world if required.

**CHORD COMPANY GROUND ARRAY: £549 [www.chord.co.uk](http://www.chord.co.uk)**

When Chord sent me one of these to try, I was rather amazed at the improvement it made, in my case when plugged into a DAC.

The GroundARRAY is designed to remove 'undesirable high-frequency electrical noise on the host device'. They are hand-made in Chord's factory and contain five separate noise-reduction systems. They are available in USB A, RCA, DIN, XLR, BNC, RJ45 and HDMI formats and plug into any unused socket on the host device. I also tried one plugged into my wireless router and that improved in the same way. Try one. You will be pleasantly surprised.



**VINYL ART PLAY & DISPLAY FLIP FRAME £39.99 [www.artvinyl.com](http://www.artvinyl.com)**

There has been a lot of great art on album covers, so why not display it? Who wouldn't like design classics on their wall such as Bowie's Aladdin Sane, Love You Live from The Rolling Stones (by Andy Warhol), Bitches Brew by Miles Davis and so many more.

A company called Art Vinyl has the answer. This clever frame has a mechanism that flips open so that the album inside can be removed quickly and easily without even having to remove the frame from the wall. It also provides protection against UV so that your favourite album sleeves will not fade. Genius idea and a great gift for the vinyl lover who has everything.

**NVA AP10H HEADPHONE AMPLIFIER: £475 [www.nvahifi.co.uk](http://www.nvahifi.co.uk)**

Two headphone amplifiers in my list this year, serving different market areas.

The NVA is housed in a smart, non-magnetic black acrylic case and is minimalist. It has one 1/4in headphone jack and a well-regarded ALPS Blue volume control. No Bluetooth or USBs. Sound is detailed, dynamic, musical and layered with great subtlety and power. Bass lines have real oomph, yet subtle percussion detail was well revealed. A headphone amp for music lovers.



**IFI ZEN CAN HEADPHONE AMPLIFIER: £149 [www.ifi-audio.com](http://www.ifi-audio.com)**

This headphone amplifier will drive most headphones easily thanks to its 1.6W (7.2V) into 32 ohms. It certainly drove my Focal Clear headphones. On the front there is an on/off button, input selector, four gain settings (0dB, 6dB, 12dB, 18dB), a volume control, a 6.3mm standard headphone output jack, a 4.4mm Pentacore balanced headphone jack output. Its sound quality certainly belied its size and I found it detailed, well balanced, dynamic and articulate. If your budget is tight, the iFi Zen CAN is a fine pressie for Christmas.



# Christmas Wishes

**NAME:** Dave Tutt

**STATUS:** Hands-on audio engineer

I don't really buy stuff for me – and I like to be given tools for repairs. But here's some presents for others at Christmas.



**FX-AUDIO DAC-X6 MINI HIFI 2.0 DIGITAL AUDIO DECODER DAC: £59.99**  
[www.amazon.co.uk](http://www.amazon.co.uk)

So my first three purchases are three different DACs using three different chips.

FX-Audio's DAC-X6 is cheap at £60 and uses the Cirrus CS4398 DAC. Lots of good chips in there so someone thought about buffering and driving the outside world. Its got just what you need, coax, USB and Fibre inputs and a pair of phono outputs. Simple. First choice then is the FX-Audio DAC-X6 – a nice choice for Christmas.

**CAMBRIDGE AUDIO DACMAGIC 100: £169** [www.cambridgeaudio.com](http://www.cambridgeaudio.com)

This has to be the benchmark for very reasonably priced DACs. Been around for so long in various versions and, being reliable, I have yet to have one in the workshop. Wolfson WM8742 DAC in this case so a different chip and no doubt a different presentation. £170 is the usual price and there are enough of them around for there to be no supply difficulties come Christmas.



**TOPPING E30 DSD DESKTOP DAC: £149** [www.electromod.co.uk](http://www.electromod.co.uk)

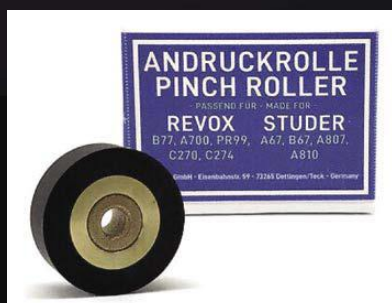
Third choice is again an unusual one but something I would like to try. The Topping E30 DSD desktop DAC at £149. This one uses the AK4493 chip so again another potential different presentation no doubt. About the same size as the FX-Audio – as are many of the pieces of kit from the Far East.

Like much equipment at the edge of acceptable hi-fi this could be either a disappointment or a revelation so it is an experiment that might be a real winner.



**5.25-INCH-KEVLAR CHASSIS BASS SPEAKER: £35** [www.cricklewoodelectronics.com](http://www.cricklewoodelectronics.com)

Do you remember the B&W speakers that came with those yellow impressive looking Kevlar cones? Well these have to be ones to try but they are rather more true bass/mid than the B&W ones were. They have ARAMID fibre cones on a 5.25inch chassis these will be ideal as part of my upgrade to Celestion Ditton 11 'speakers I have here. A nice present for DIYers at £35 a pair.



**REVOX PR99 MK2: £32** [www.ebay.co.uk/itm/123955535825](http://www.ebay.co.uk/itm/123955535825)

Finally a new part that I need for my Revox PR99 Mk2 reel to reel tape deck. The pinch roller looked as though it had melted and given the number of half track tapes I have digitised over the past year with lots of oxide shedding it is no surprise it finally gave up. I purchased a new one via eBay from Heroms Professional Supplies in Germany which is a beautifully made precision part at a not too unreasonable price of £32. It would have been a nice present.

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# Christmas Wishes

**NAME:** John Pickford

**STATUS:** Vintage, valves and vinyl

**A bit of a mix here in my selection for Christmas – and something for everyone I hope, if you want Christmas ideas.**



**KONTAK AUDIO CLEANING FLUID: £19.95 [www.kontakaudio.com](http://www.kontakaudio.com)**

Still using isopropyl alcohol to clean your plugs and connectors? Perhaps it's time to treat yourself to some hi-tech juice. Originally designed for military aerospace applications, Kontak is a technologically specific electronics cleaning solution ideal for eliminating contamination and oxidation from all your plugs, pots and switches, ensuring best possible electron flow and signal integrity. And unlike other contact cleaners it leaves no residue whatsoever. Don't be put off by the price for such a tiny bottle of fluid as a little goes a long way and provides long lasting protection against loss of signal and power in electrical connections.

**MCRU ULTIMATE IN LINE DC BLOCKER: £375 [www.mcru.co.uk](http://www.mcru.co.uk)**

If your low-level late night listening sessions are compromised by transformer hum from the amplifier you need one of these. DC on the mains is the cause of this hum and removing it with the internal filters of the DC Blocker improves audio dramatically, bringing music to life.

Amplifiers benefit, as do mains conditioners, mains regenerators and power bars.

It's built into a non-resonant metal case fitted with a Furutech gold plated IEC inlet or can be supplied with a 16 amp IEC. A good present for Christmas.



**MCRU AUDIOPHILE MAINS BLOCK: £85 [www.mcru.co.uk](http://www.mcru.co.uk)**

An affordable option to get the best from your mains supply is to invest in a decent mains block. This 6-gang extension power block features filtering stages in both inside the block and in the mains plug.

All internal contact strips are silver plated by a company with over 50 years experience in their field. The cable used is the legendary Belden 19364, still going strong after 20 years as it offers superb performance at relatively little cost, and it's terminated with a silver-plated Permaplug. The cherry on top of this Christmas cake is a silver plated Bussman fuse fitted as standard. Price is for 1 metre cable; longer lengths available at extra cost.

**CHORD COMPANY C-STREAM STREAMING CABLE: £40 [www.chord.co.uk](http://www.chord.co.uk)**

Even those who recognise the benefits of good quality analogue cables often raise an eyebrow at the suggestion of higher quality digital cables, however they really do make a difference. The C-Stream features high-speed oxygen free copper conductors, low-loss low-density polyethylene insulation and 24ct. gold plated signal contacts. Available in various lengths from 0.75m to 20m, this dedicated streaming cable brings out the best in hi-res audio. Try one and hear for yourself. A great little present for Christmas.



**FUNK FIRM ACHROMAT: £76-£104 [www.thefunkfirm.co.uk](http://www.thefunkfirm.co.uk)**

One for the vinyl spinners, the Achromat turntable mat remains the mat by which others are judged. Designed to absorb energy from vinyl records, the Achromat contains millions of tiny bubbles, creating complex pathways where the energy gets lost as heat. Available in either 3mm or 5mm thickness, the range of mats has been expanded to cater for users of Garrard 301/401 and Technics SL1200 turntables for which the original standard Achromat is not suitable. Get those Christmas hits spinning!

Look Like Me

Well I would not say I'm overly con- fess- ing with what I'm not to wear  
 And I would not say I'm over-ly im- pressed by what I've seen out there  
 I do not think it's up to some-one else to tell me how to dress And I do  
 not think my aim in life should be to look like all of the rest of the girls I see I  
 see them, look- ing like each oth- er But me, you see, like,  
 I want- a look like me I want- a look like me



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**H**ere's your chance to win a pair of the superb Martin Logan 15i loudspeakers we review in this issue. Read the review excerpt below and answer the questions.

"The folded ribbon tweeter is well forward in the sonic scheme of things – but such drivers have a sweet sound that is acceptable, where cheaper domes get coarse and edgy as they break up.

The aluminium bass/midrange unit covers most of the audio band, the tweeter just high treble – so the former does most of the work.

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What you get here is a small, solid cabinet measuring 290mm high, 173mm wide and 220mm deep (bare wires; a bit more for connectors) and weighing just 5.4kgs, so easily movable. It's a bookshelf loudspeaker with a rear port, but that's fine as long as a small amount of breathing space – 2cms or so – is left behind. The rear port loads a 133mm aluminium cone bass/midrange unit set into a "non-resonant asymmetrical chamber" Martin Logan say, but the important part is in truth the "rigid structured dust cap" because this is the bit that contributes much to high frequency output.

The 15i was successful

in getting out the essence of electrostatic, without overstepping the mark – except on the odd occasion. It is starkly clear in its delivery of vocals, shading most else: Josefine Cronholm hovered well forward of the cabinets and every word tumbled out clearly from In Your Wild Garden (CD).

The bass/midrange unit's alloy cone came across as fast and concise in its delivery, and treble remained smooth and clear – if obvious. There was an airy quality to high treble that made for a more attractive character than is common from dome tweeters, especially metal ones".

For a chance to win this great prize, just answer the four easy questions at right. Send your entries on a postcard only, by 7th January 2022 to:

**January 2022 Competition**  
**Hi-Fi World magazine**  
**Office 052**  
**464 Edgware Road**  
**London W2 1AH**

### QUESTIONS

**[1] The tweeter is a -**

- [a] glass dome
- [b] folded ribbon
- [c] steel disc
- [d] plastic piston

**[2] There was essence of -**

- [a] electrostatic
- [b] eau de cologne
- [c] Brut
- [d] old socks

**[3] The bass/mid-range unit has a -**

- [a] paper cone
- [b] copper dome
- [c] alloy cone
- [d] wooden disc

**[4] High treble had a -**

- [a] distant demeanour
- [b] dark flavour
- [c] pleasant colour
- [d] airy quality

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**OCTOBER 2021 WINNER: BLACK RHODIUM STREAM S MAINS CABLE**  
**Mr. K Norris of West Glamorgan, South Wales**

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# Philips N4520



**Martin Pipe remembers Philips' most accomplished domestic reel-to-reel machine, which took on the Japanese and Swiss...and quite successfully too!**

Philips may have invented the Compact Cassette in the early 1960s, but it continued to make reel-to-reel decks well into the 1980s. By this time its cassette, once sold purely on its compactness and ease of use, had become 'hi-fi'. Pre-recorded music in the format was beginning to out-sell vinyl – and CD, which Philips had co-developed with Sony, was on the horizon.

Today, we forget just how big Philips was. Its dominant position and sheer size allowed them to push clever technologies and formats – among them V2000 'flipover' home video, CD-Interactive and a digital revision (DCC) of its cassette. The considerable resources then at the firm's disposal allowed it to produce studio equipment and hi-fi, at roughly the time the Japanese

began their dominance.

At the end of the 1970s came Philips hi-fi swansong – the flagship Black Tulip range. It didn't sell particularly well outside of its loyal European customer base – even though much of the hardware was very good (it's prized by collectors today). There was one exception, though – the giant N4520 reel-to-reel tape deck that formed part of the range.

Made in Netherlands it was the last reel-to-reel tape deck offered to audiophiles by Philips. Many consider the quarter-track (two stereo pairs, 4 mono tracks or a combination thereof using both sides of the tape) machine, and the half-track (2 mono tracks, across the width of the tape – i.e. stereo 'in one direction only') N4522 version that joined it later, to be the best consumer decks ever made by Philips. It's certainly as

desirable as anything produced by Akai, Revox or Teac.

Looking as good as the best of the competition, the N4520 had a professional 10.5in. spool capacity and a symmetrically-rolled tape path not dissimilar to that of Revox's then top-of-the-line A700 model. Indeed, the tape-driving capstan motors of both machines are quartz-referenced; the A700's forms part of the direct-driven capstan shaft, while the N4520's belt-drives a hefty flywheel with the capstan at its core. Plenty of metal ensures chassis rigidity, as well as explaining the 25kg weight.

Like the A700, the N4520 offers three speeds – 9.5, 19 and 39cm/s – and, like the Revox's older A77 brother, can be switched between NAB and IEC equalisation.

Very unusual and indeed welcome are a fine-bias control to ready the deck for different tape



**The large, wide-range meters are switchable between VU and peak characteristics. LEDs indicate peaks of +3dB and +6dB.**

formulations (something more common on cassette decks), and the ability to adjust the winding speeds of the separate supply and take-up reel motors between 0.6m/s and 7m/s. English firm Ferrograph made the only other machines I'm aware of to have a feature of this nature, which allows delicate tapes to be wound with appropriate care.

The stereo balance and levels of the line and mike inputs – here, quarter-inch jacks on the front panel, rather than the DIN sockets Philips used previously – are independently-adjustable via a quartet of rotary knobs, a 'master' slider allowing fades. Vertical switches change inputs (with or without multiplex filtering, for recording from FM radio), equalisation, source/tape monitoring, speed and track (left-channel/tracks 1 or 4 depending on the tape side, stereo, or right-channel/tracks 2 or 3). Similar controls keep the 'monkey chatter' audible during

winding (and cueing – another beneficiary of variable winding speed), and engage a 'sound-on-sound' facility that allows creative users to gradually build up recordings, playing one instrument at a time.

Such users would appreciate the deck's capable headphone amplifier which benefits from both balance and level controls. With the basic design, control layout, 5-digit fluorescent digital tape counter and large wide-range meters – switchable between VU and peak characteristics – it all looks distinctly Japanese-influenced. The counter, which measures in distance (metres) rather than time, is accurate because its drive is optocoupled to one of the tape rollers.

Philips paid considerable attention to the heads. Naturally, the N4520 is a three-head deck (hence its provision for off-tape monitoring). For the record and

playback heads, which are of parabolic profile, Philips specified its own hard-wearing FSX material – its homegrown answer to Akai's glass and Sony's ferrite. They allowed the N4520's frequency-response to extend from 30Hz to 16kHz within 2dB limits at the 9.5cm/s speed. A good cassette deck could manage similar performance but the N4520 was capable of bettering that spec considerably, provided you were prepared to sacrifice tape economy. Switching the machine to 19cm/s or 38cm/s, without the multiplex filter engaged, raised the respective upper limits to 20kHz or 26kHz – beyond the capabilities of any cassette deck, in other words.

Similar frequency-response specs were claimed for the half-track N4522, but the signal-to-noise ratio figures were some 4dB better than the N4520's 64dB (at the higher speed; NAB/DIN curve-



**The N4520's hefty flywheel – coupled to the capstan that moves the tape – is belt-driven by a quartz-referenced motor. There are 9.5, 19 and 39cm/s speeds.**



**The record and playback heads are of parabolic profile for improved performance. Philips specified its own FSX material for the tape contact surface but it was not as robust as Japanese alternatives.**

A weighted, 3% THD) on account of the wider tracks.

Other benefits of sacrificing the N4520's quarter-track tape economy include freedom from dropouts, lower crosstalk between channels and the potential for special effects (such as playing a tape backwards). In the analogue era, half-track was standard practice in broadcasting and the recording industry, where performance and reliability were important.

Cramping as much material



onto expensive and space-consuming tape as possible was more important at home; tellingly, the vast majority of home-use hi-fi machines were quarter-track.

As it stands, my N4520 is a fine performer – or rather, it could be! Bought at an audiojumble a few years ago, I've used it for transferring existing tapes to digital; the only problem I discovered on acquiring it was that one of the playback head wires had become detached. This was quickly remedied with a soldering iron. I found its playback sound, which is open and clean across the entire audio band, to surpass that of the big Akai machine I had hitherto been using. It's better at bringing out the low-level detail locked in tapes.

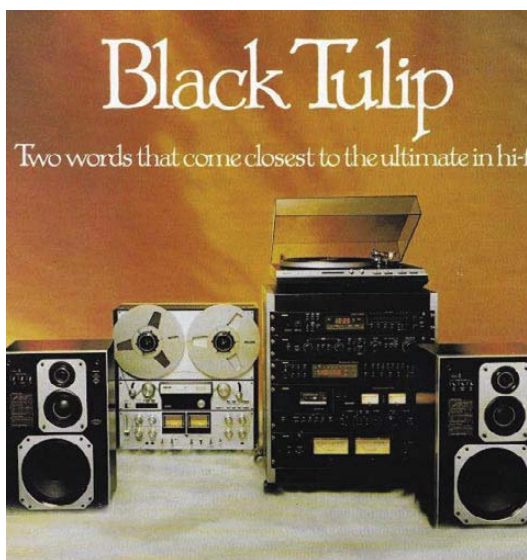
The quartz-locked belt-driven capstan is fantastically stable, and for as long as I've been using the machine I've never heard a sustained piano, synth or sax slur – even at the slowest speed.

I never felt the need to make a recording on this N4520, until it

material is evidently not as hard-wearing as the GX and ferrite stuff of Akai and Sony heads!

On close inspection I discovered that one of the tape lifters – which push the tape away from the heads during winding – had been incorrectly-aligned, meaning that the tape was more likely to rub against the heads in such modes. The previous owner may well have used fast-forward and rewind regularly, the transport in this state causing premature head wear.

In the light of revived interest in analogue tape, I'm nevertheless curious to discover how this machine sounds as a recorder – and that means replacing, or restoring the head. Replacement is out of the question for a machine that's over 40 years old (the N4520 was available between 1979 and 1984). These



**Finished in 'odd-man-out' silver, the N4520 was a key component in Philips' Black Tulip range. This was intended to compete with risingly dominant Japanese manufacturers.**

chip fails. Although this component is obsolete, the circuit can be modified for use with an alternative chip.

Some owners have also reported noisy transistors in the signal path. These are cheap standard types, and easily-replaceable. Other parts (motors, pinch rollers and specific items) are specific to these machines and will – like the heads – be difficult to obtain. Although the N4520 is an excellent performer, this must be borne in mind if you're considering buying one.

Thanks to the reel-to-reel revival, I've seen these machines selling recently for well over £300 – with some examples breaking the £1,000 barrier. As they say "you pays yer money...".



**A legacy DIN connector was fitted, plus recording calibration and output level controls. Mechanical pushbuttons meant that remote control was not possible.**

was time to prepare this article. I found that one channel was crisp and clear at all speeds, but the other sounded as if it had been strained through cotton wool! Carefully cleaning and demagnetising the heads had little effect. Using a headphone amp with mono switch, I heard a 'phasey' effect akin to azimuth misalignment. Record head adjustment didn't help. When one channel broke into clarity, the other became muffled! Careful inspection of the recording head revealed it was worn, with a tell-tale groove on its face. With a head in this condition, it's almost impossible to align azimuth properly.

Surprisingly, the playback head – key to the job I had in mind for the machine when buying it – was in much better shape. Philips' FSX

machines may have sold better than other Black Tulip components, but due to their cost of ownership (£700 for the N4520 and £850 for the N4522, in 1982) they could never have been expected to shift by the container-load. Spare parts and 'donors' are difficult to come by today.

Restoration is a possibility. A process called 'relapping' can be used to wear down the metal on either side of the groove, so that the head face is uniform again; the all-important gaps tend to be fairly deep. I have ordered some different grades of 'lapping film' (very fine sandpaper) to experiment with. Before buying inspect heads!

Other problems? If the capstan motor isn't lubricated, its drive circuit is stressed and a UA78MGCUI voltage-regulator



**The stereo balance and levels of the line and mike inputs are independently-adjustable, allowing mixing and panning. A master slider allows the resulting combination of signals to be faded.**

# Festive Quiz

Our annual quiz that's got simple ones – and difficult ones! Our staff dream up questions that will challenge your knowledge of audio. We hope you enjoy it over Christmas.

## QUIZ RATINGS:

**25:** Supreme audiophile mastermind. Double portions of turkey.

**20:** Audio expert level. Have another brandy.

**15:** Not quite an aficionado but you're learning fast!

**10:** You may be a newbie but that's not bad.

**5:** Everyone has to start somewhere. Welcome to the club.

**1) Who was the first female presenter on BBC Radio One in 1970?**

- A. Jo Whiley
- B. Zoe Ball
- C. Janice Long
- D. Annie Nightingale

**2) Where was Factory Records founded in 1978?**

- A. Chichester
- B. Dorchester
- C. Manchester
- D. Winchester

**3) What material are long playing records (LP's) made from?**

- A. Monosodium Glutamate
- B. Polyvinyl Chloride
- C. Nitrogen Trichloride
- D. Sodium Hydroxide

**4) What was the name of the London record shop in the 1995 novel 'High Fidelity' by Nick Hornby?**

- A. Haggle Vinyl
- B. Crucial Platters
- C. Harlequin Spinners
- D. Championship Records

**5) Broadcaster and entertainer Kenny Everett began his DJ career on which pirate radio station?**

- A. Radio Invicta
- B. Radio Caroline
- C. Dread Broadcasting Corporation
- D. Radio London

**6) Pink Floyd's first album, Piper At The Gates of Dawn, was also a chapter-name in which book?**

- A. A Room With A View
- B. The Trail Of The Lonesome Pine
- C. The Man Who Was Thursday
- D. The Wind In The Willows

**7) What was the name of the dog looking quizzically at HMV's gramophone horn?**

- A. Rover
- B. Grommit
- C. Nipper
- D. Lassie

**8) Which instrument does the eminent consulting detective Sherlock Holmes play?**

- A. Lute
- B. Violin
- C. Clavichord
- D. Harp

**9) Who sings the theme song to the new James Bond film, No Time To Die?**

- A. Amy Winehouse
- B. Taylor Swift
- C. Adele
- D. Billie Eilish

**10) A loudspeaker designed for high audio frequencies is known as:**

- A. woofer
- B. tweeter
- C. waffler
- D. headache

**11) Famous UK tape deck manufacturer, based in South Shields, who supplied BBC and Armed Forces?**

- A. Revox
- B. Ferrograph
- C. Stellavox
- D. Tandberg

**12) Dansette record players were a common sight in British households in the 1950s and '60s. When were they first manufactured?**

- A. 1961
- B. 1949
- C. 1952
- D. 1955

**13. Who are the organisers of the UK's Bristol Hi-Fi Show?**

- A. F.W. Woolworth
- B. Richer Sounds
- C. Marks & Spencer
- D. Audio T

**14) On a tape recorder, what does a pinch roller do?**

- A. Engages input selector switch
- B. Presses tape against capstan
- C. Demagnetizes the heads
- D. Resets the tape counter

**15) American country rock band formed in 1967, Commander Cody and...**

- A. Lord Rockinghams XI
- B. The Screaming Abdabs
- C. His Lost Planet Airmen
- D. The Screaming Lord Sutch

**16) British manufacturer of the ESL63 electrostatic loudspeaker:**

- A. Wharfedale
- B. Rodgers
- C. Radford
- D. Quad

**17) Who composed the Pink Panther film theme song?**

- A. Henry Mancini
- B. Peter Sellers
- C. Graham Stark
- D. Hans Zimmer

**18) Who founded Wharfedale Wireless Works in Yorkshire, England to manufacture loudspeakers?**

- A. Gilbert Arthur Briggs
- C. Alastair Robertson-Aikman
- C. Raymond Cooke
- D. Arthur Conan Doyle

**19) Icon Audio are known for...**

- A. vases
- B. glasses
- C. valve amps
- D. ornaments

**20) How old was Michael Jackson when he passed away in 2009?**

- A) 50
- B) 45
- C) 55
- D) 40

**21) He is often described as "the ears for Sony"**

- A. Eric Cantona
- B. Eric Kingdon
- C. Eric Digest
- D. Eric Estrada

**22) Who launched The Flat Response hi-fi magazine in March 1984?**

- A. Peter J. Walker
- B. H. J. Leak
- C. Chris Frankland
- D. John Atkinson

**23) How many pairs of strings on a mandolin?**

- A. Two and a half
- B. 4
- C. Half a dozen
- D. 1

**24) Where were British rock band Marillion formed in 1979?**

- A. Hemel Hempstead, Hertfordshire
- B. Guildford, Surrey
- C. Aylesbury, Buckinghamshire
- D. Colchester, Essex

**25) Speaker cable terminator named after a fruit:**

- A. Strawberry spade
- B. Plantain pin
- C. Coconut clip
- D. Banana plug

## ANSWERS

1) d; 2) c; 3) b; 4) d; 5) d; 6) d; 7) c; 8) b; 9) d; 10) b; 11) b; 12) c; 13) d; 14) b; 15) c; 16) d; 17) a; 18) a; 19) c; 20) a; 21) b; 22) c; 23) b; 24) c; 25) d

# “This system was a mish-mash – one that worked brilliantly”



Noel Keywood

**B**y some strange alignment of the moon with the planets I have been listening to a system so good it is almost puzzling, even unbelievable. Did that mushroom soup have something in it that should not have been there?

Not likely. Heinz don't do psychedelics. Instead I invoke happenstance (I like that word!) – an alignment of products that came together by happy accident to produce a sound that had me nailed to the settee in awe.

What had me nailed was Ortofon's diamond cantilever Verismo cartridge, feeding our Icon Audio PS3 MkII valve phono stage connected into a PrimaLuna EVO 300 Hybrid amplifier – thence on to Martin Logan ESL-X hybrid electrostatic loudspeakers. What a mish-mash!

There was almost violent solidity of the sound stage images from Alison Goldfrapp's Ride A White Horse, the speed, power and sheer visceral drive of the sound, in this case from a 12in 45rpm single. Whatever Rock I put onto the turntable it came out the same.

I had reservations about the intensity of sheen to Marianne Thorsen's violin on a superb LP from 2L of Mozart violin concertos. This is a sheeny sounding LP, a Direct Metal Master and they always sound a bit hard and remorseless. Was the system just revealing the qualities of a DMM, or was it enhancing them? Judging what's correct is difficult.

The sound of the system excited me, the mish-mash worried me. Which part of this system was sounding so good? And were problems in the recordings overwhelming problems in the equipment reproducing it? In which case my review of the products would be more a review of the recordings being played through

them – a worrying thought. As products steadily improve recording quality is increasingly an issue, digital recordings in particular being a concern since many were made long ago through what is, by today's standards, archaic equipment. Recordings from back then especially those digitised for CD, are around today and sound worse on a revealing system. Old LPs don't sound so clever either and some – especially re-issues – are cut from old digital recordings!

There's no doubt that Ortofon's jewelled Verismo, with diamond cantilever and tip, delivers a sound that is eye popping. Quite different to all else. I've heard diamond cantilevers before, but the cartridges had peaky treble and stung my ears. The Verismo measures flat and has no sting. Yet it has a sound that is best described as diamond hard and fast, with diamond clarity. A 'take no prisoners' sound so vividly crystalline it was a shock.

Not just that, it was also deeply detailed: sounds were coming out of the groove that had, it seems, been smothered by all those aluminium cantilevers I've used – we've all used – over the years. And super fast, punchy bass too – as in our collective audiophile dreams!

A cartridge like this is best connected into step-up transformers, not transistors. They perform a power conversion transistors do not, giving super low noise and an altogether more svelte sound. Icon Audio's PS3 MkII with transformers and valves was a perfect match. I have no doubts about this pairing. Ortofon would doubtless recommend one of their transformers that, lacking RIAA equalisation, must feed an MM input – not the best solution.

I settled on using PrimaLuna's EVO 300 Hybrid amplifier with Verismo and this was the other

part of happenstance. Where our Creek Voyage i20 had smoothed the Verismo, this amplifier did the opposite, pouring Red Bull down its throat. The two were made for each other. Whatever I put onto the turntable pinned me backward with an assault that seemed inconceivable. Yet all was in order: there was no artificial enhancement, I was listening to a totally accurate system measurement had shown. But one optimised for speed, punch, and revelation.

What I was listening to was revealed by our Martin Logan ESL-X electrostatic loudspeakers that highlighted sound quality differences so clearly. I can't leave out their part in this story, because the incoherence of multiple-driver, various-colour dynamic drive unit loudspeakers is an ever changing stew of flavours no one can know is right or wrong. The see-through XStat electrostatic panels by way of contrast lack flavour, and also crossover phase errors, colouration and even distortion, producing around 0.1% against 0.3% for conventional loudspeakers. The result is a clean, see through sound that delivers the unvarnished truth of what goes before – which is why I use these loudspeakers for reviewing. At the end of this particular system they showed just how much information Verismo was mining from the groove, as well as its diamond hue.

This system was a mish-mash, but one that worked brilliantly, each item having a valuable role to play. Most assertive and dramatic were Verismo and EVO 300 Hybrid. The Icon Audio PS3 MkII phono stage was a crucial match-maker between them and Martin Logan's XStat panelled electrostatics were able to clearly convey all this to my ears. High fidelity wrought large, without artifice. I was wowed! ●



ortofon  
accuracy in sound

# CADENZA

The Cadenza Series of high-end Moving Coil (MC) cartridges allow you to get the most from your vinyl records. By carefully implementing cobalt-iron pole pieces, using new improved winding processes on the armature, and employing an extruded aluminium housing - amongst other changes - the Cadenza Series is able to out-perform all those that came before it.

The name *Cadenza* comes from the Italian word for cadence, which refers to a soloist during an orchestra performance where they play alone in an elaborate manner. It therefore seemed fitting that such a capable and nuanced cartridge series should use the same name.

Like other modern ranges, the Cadenza Series is structured in Ortofon's preferred colour-tier nomenclature; so there are Red, Blue, Bronze, and Black variants available to suit varying budgets and tastes.



## Red

This MC cartridge and introduction to the series features a Nude Fine Line stylus which delivers open, dynamic sound with a touch of warmth.



## Blue

Featuring much greater dynamics and resolution, the sound is more open and reproduces more accurate details thanks to the Nude FG 70 stylus.



## Bronze

A step up in the range, this cartridge boasts a Replicant 100 stylus to produce stereo imaging capabilities that illuminate the farthest corners of the soundstage.



## Black

Flagship of the range, the Cadenza Black is simply the best and features a Nude Shibata stylus which guarantees amazing tonal neutrality, dynamics and purity of sound.

# "What they were facing that evening was old fashioned British reserve"



Paul Rigby

Often attributed to George Bernard Shaw but more likely Oscar Wilde, the quote was apparently: "We really have everything in common with America nowadays except, of course, language". It says everything about the little things.

Little things, as you know, matter most of all because little things get under your skin. Because little things are often taken as sacrosanct, they are taken as read. Beyond appraisal. They are part of how the world moves.

So when those little things are questioned or challenged, it can shake you up. Probably more than it should. Probably out of proportion to their real importance.

Let me give you an example. I remember listening to the radio back in the seventies. I must have been what, twelve? Thirteen? Something like that. At that moment, I was listening to jazz. This piece of music was a live recording, taped within an iconic New York jazz club, perhaps? Who knows?

What I do remember is this. About a third of the way through the music itself, one of the musicians stepped forward and played a solo on the saxophone. When he was finished in his task, he stepped back and the group carried on. My personal, earth-shaking moment was this. The audience applauded.

This one moment shook me to the core. I even forgot the music because of my confusion and bewilderment. Why was the audience applauding? Had something happened away from the stage to trigger this spontaneous reaction? It couldn't

have been anything to do with the music. Why did I think that? Because the music hadn't finished yet.

So the music carried on. A trumpet player contributed a solo, stepped back and, would you credit it, there was that applause again.

I couldn't understand it. The music still had not finished. How – thought thirteen year-old I – how thoroughly disrespectful to applaud in the middle of a performance.

I felt completely grumpy about this but my demeanour only worsened when the music finished because not only did the audience applaud, they then acted wholly inappropriately by hollering and shouting. They even added a series of tasteless noises that sounded suspiciously like "whoop, whoop".

I switched off the radio. Had the world gone mad? This undisciplined, discourteous response to the artist on the stage was certainly not something you would hear in the UK during that time. It's not something you would have heard or seen during the regularly televised variety show, 'Sunday Night at the London Palladium', let me tell you.

Am I the only one that recalls this sense of behaviour? UK audiences back then would sit, listen and wait.

Check out YouTube if you don't believe me. ELP's 1970 London Lyceum concert begins with raucous applause. Then the audience settles down to listen and all goes quiet because the band is...creating. Creating on the stage. They must not be disturbed. During the quiet moments there is silence. There is no 'whooping'. When one song is ended, there is

respectful applause. That dies away. Another song begins.

Take the Caravan LP, 'Caravan & the New Symphonia'. This live, 1973 Theatre Royal performance is full of quiet areas, full of mid-performance silences but the tension is never broken by the audience who seem wholly wrapped up in the moment.

Which is part of the reason why Beatlemania, screaming girls, drowned out performances, audience chaos, bodies flying around and about, the expulsion of bodily fluids and fainting were so alarming, disturbing and threatening to many people in the UK. It just wasn't 'done'.

It also shows that this uncontrolled chaos wasn't the norm. Even then. Take another UK-based live concert of the time, Booker T. and the MG's 1967 performance in London – again on YouTube.

The young audience, half of them looking like clones of their mum and dad, no doubt, sit there in their hats and their coats. Their expressions reveal how engrossed they are in the music but they sit in silence. Waiting. Drinking it all in. Some gently clap (not too loudly, now), others nod imperceptibly. One chap looks down to the ground, concentrating. Contemplating. Studious.

As for the American musicians on the stage? I wonder if they were thinking that they were doing badly that evening? Where was the reaction they were used to seeing and hearing from their compatriots?

Little did they know, they were a smash hit. What they were facing that evening was old fashioned British reserve. What I want to know is this: where did it go? ●

# ifi

## ZEN Stream

Wi-Fi audio transport

## ZEN CAN

Headphone amp

## ZEN DAC v2

USB DAC and  
headphone amp

## ZEN Phono

MM/MC phono stage

## ZEN Blue v2

Bluetooth DAC



# "We are putting all our eggs in the online basket these days, which is disturbing"



Martin Pipe

One of the year's biggest consumer-electronics stories was the launch of Sky Glass, a smart ultra high definition TV that can be bought outright or by paying an additional £13/month on top of a Sky subscription. Sky's website allows new customers to choose between Sky Q, its current-generation personal video recorder (PVR) that is designed to work with a satellite dish, or Sky Glass connected to the internet.

Since launch Sky's direct-to-home service has relied primarily on satellites for delivery. By way of contrast Sky Glass lacks dish inputs, although there are three HDMI ports to which set-top boxes (STBs) could be connected. There are three screen sizes.

Sky Glass is clearly a statement of where the company sees its future – delivering content via Internet rather than eyesore dishes. In some parts of the country, among them postcard-pretty villages, dishes require planning permission. By happy coincidence there has been considerable recent effort to install high-speed broadband throughout the UK. A few weeks ago I travelled through East Anglia and everywhere I went, roads and pavements were being dug up for fibre-optic cables.

Sky Glass is very clever. Designed mostly by Sky (as were its STBs), it's made by TP Vision – once Philips' TV division. Installation is plug-and-play, the instructions consisting of a single sheet. High-definition content is standard. There is functionality through apps and it provides a cloud-based PVR of effectively-infinite capacity (Sky Q has a comparatively-measly 2TB maximum).

This TV is ready for 'Ultra HD' services, which require a "minimum

25Mbps" download speed...it's evidently a beneficiary of that 'breakneck broadband' rollout!

Sky proudly-reports that Glass is "the world's first TV to be certified CarbonNeutral". No bad thing; the broadcaster is keen to stress its environmental credentials, although its past STBs were gas-guzzlers. I discovered that Sky+ HD consumed almost as much power in standby as it did in use! If there's no hard-drive spinning, in anticipation of a recording, then you've saved power. However, the energy consumption of the vast data centres holding your precious content mustn't be ignored.

Sky Glass's 'intelligent zonal' LED backlighting TVs will save power in use, as well as improving black levels and contrast ratio. On the subject of performance, we cannot (this is a hi-fi magazine, after all!) ignore sound quality. Most TVs I've experienced sound terrible. Anaemic, thin and 'hollow' in the midrange, they simply don't do justice to the programmes. Sky Glass, on the other hand, builds in a six-speaker Dolby Atmos-capable soundbar. There's no dedicated audio output (not even headphones!) but one hopes the HDMI ports support ARC (Audio Return Channel) for serious home-cinema.

There have been teething troubles: flickery pictures, unresponsive remote controls and problems with its 'playlist' take on the PVR. Sky has, however, issued new firmware updates to fix at least some of them.

I can't help wondering what's in it for Sky, long-term. I have repeatedly contacted Sky's press office, to confirm how much it pays the Luxembourg-based SES consortium to rent Astra satellite transponders but, despite promises,

no answer was forthcoming. The sums are, however, enormous. After subscribers have switched from satellite to broadband, fortunes will be saved; offsetting this are of course the costs of maintaining data infrastructure.

When Sky Digital launched, it was a condition that the set-top box's modem be locked into an active phone-line for at least a year. Some believed that Sky would be using this feature, intended for pay-per-view (PPV) ordering, to 'harvest' viewing data. Such information, impossible to obtain via conventional one-way broadcasting, would appeal to broadcasters and advertisers alike. Traditionally, the TV industry relied on organisations like Nielsen and BARB to monitor representative households. At the time, Sky strongly-denied using the 'phone line return path for such purposes. Online's return path has, temptingly, made targeted-advertising fortunes for firms like Google and Facebook!

Every time a programme is streamed, there's a record – if only a server access log. Such information could be used to charge for what's consumed. It could, amongst other things, also evaluate content popularity, thereby influencing commissioning or even profiling consumers so they can be targeted with advertisements or similar content (will future viewers have to put up with the TV equivalent of that annoying GDPR warning?).

We seem to be putting all our eggs in the online basket these days, which is quite disturbing – for music, as well as TV content. Audiophiles may be loyal to physical formats (play these as often as you like, and nobody's monitoring!) but streaming is now the reality for most people. And how safe is radio in this 'on-demand' era? ●



# Klipsch®

REFERENCE™  
PREMIERE



August 2019

## RP-600M

## NO-NONSENSE GREAT SOUND

Leveraging a 1" titanium tweeter Mated to Klipsch's proprietary hybrid Tractrix® horn - the RP-600M bookshelf speaker delivers incredible acoustics to fill your home with loud, crystal-clear sound and robust bass that no ordinary bookshelf speaker can.

Copper anodized trim rings, satin painted baffles and a laser etched logo treatment give the Reference Premiere series a modern, premium feel.

### KEY FEATURES

- 1" Titanium LTS Vented Tweeter with Hybrid Tractrix® Horn
- 6.5" Spun Copper Cerametallic™ Woofers
- Bass-Reflex via Rear-Firing Tractrix® port
- Dual binding posts for bi-wire/bi-amp
- Strong, Flexible Removable Magnetic Grill



# "Problems were a burnt out tweeter, bass drivers out of alignment and rubbing on the magnets"



Dave Tutt

I am working on three pairs of speakers at the moment, my Castle Chester loudspeakers to get them up to living room standard, a pair of Celestion Ditton IIs from a street market and a pair of home built speakers that use an 8inch bass driver and a ferrofluid cooled soft dome tweeter.

For my home built speakers it's all very well going through the mechanics of the changes I wanted to make to both pairs but it is quite another to get them looking so they are finished. I well remember when I created my biggest speakers and how, having spent hours working through the changes of drivers, crossovers, porting, internal bracing, grills etc. that it was then time to make them presentable.

Two sheets of 8ftx4ft 6mm ply at the time in the early 1980s you could order and buy with a finish that was far and away better than the sort of sub standard stuff available now. It had a fine grain, pale, almost beech wood finish without the bold red tint that seems the only look available these days.

Once the internal bracing was complete a wrap around of the ply worked well, with mitred corners and then an African walnut stain.

The 'speakers with the 8inch drivers – which I think I should call "honeys" – were never finished. The baffles were double thickness 19mm MDF so that the bass driver could sit flush with the front panel, some soft sculpturing carried out with sandpaper. The tweeters were only ever fitted on the surface as, having never finished the speakers and only ever having done a 5 minute listen, it wasn't really informative enough to decide where to go next. So they have been in store for the best part of 10 years.

The front ports were never put

in, which didn't help the bottom end. So, buying in some tubes that, once I found my original designs, suggested I needed around 90-110mm long ones then brought up the bottom two octaves and knocked back the forward midrange that was confusing the issue somewhat.

Crossovers were basic heavy duty designs I had hanging around at the time and needed some work doing to them. The resistor droppers for the tweeters were far too strong and so needed to be changed.

Connected to a Sony TA370 amplifier they need to run a while so that I can decide where to go next. Probably a change to polyester capacitors in the crossovers while I have them out. I fitted speaker stand mounts so they could sit on my PA stands.

Why honeys? The main enclosure is rather nasty looking gloss black paint whilst the baffle is painted bright yellow textured paint, rather like a honey bee without stripes! They are definitely not a disappearing speaker. They were never intended to be a finished product, just an experiment, but they definitely have promise so will probably develop into something better.

The Castles came with a dark rosewood finish that is just a bit too much. My wife would prefer a light beech look but that would be a much bigger job requiring a new veneer. Rubbing down brought me to a lighter but warmer finish that was closer to teak and worked well with the new hardwood baffle extension arrangement I have built which is almost identical colour hardwood.

I am working my way through bringing the top baffle out further, fitted now with two bass drivers, one just bass the other bass/mid

with the help of an additional crossover section. This should give a 4 Ohm bass impedance and better drive.

The Celestions were a street market find and were externally quite good looking. Their problems though were rather extensive. A burnt out tweeter, bass drivers out of alignment and rubbing on the magnets. The tweeter, an HD1000 model, can be repaired with a cone coil unit available on line.

The faulty capacitors in the tweeter section of the crossovers were replaced with polyester ones but the bass drivers were rather more problematic. Removing one and feeling the way the cone moved, the spider had become weak so that when driven forward the cone moved sideways as much as in and out.

Some thin stripes of Evostick adhesive were applied across the spider, about 3mm wide whilst holding the cone slightly to one side with some soft foam. The resulting very slight stiffening on one side made most of the nasty noises go away and another application a little further around the spider finished the job.

This sort of thing is kill or cure. Many old loudspeaker drivers are not available as spares except as scrap items that may be no better than what you already have so anything is worth a try. One bass driver had a broken wire from the cone to the tag, a fiddly job but a little solder and some glue put it back together.

It was difficult to tell if the Celestions sounded as they were originally after so many changes but they were clean and had some upper midrange detail that I liked, although the bass was somewhat less than the size of the box would suggest. Ideal match to a subwoofer I felt. ●

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Developer audio web publishing ltd  
Category Entertainment  
Updated 7 Dec, 2014  
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Size 9 MB  
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Compatibility Requires iOS 5.0 or later. Compatible with iPhone, iPad, and iPod touch.  
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# SOUNDBITES



## CHORD ELECTRONICS ANNI £1,195

I'm not afraid to admit when I am confused by a product, and the Chord Electronics Anni is a product that really did have me scratching my head when it comes to what it is meant to be and the type of customer it is aimed at. It says 'amplifier+' on the front and the press release I was sent bills it as a 'desktop amplifier+' capable of driving headphones and compact loudspeakers. The instruction manual, however, says that it is a 'next-generation headphone amplifier' that is also capable of driving loudspeakers, irrespective of size. Confused? Well, I certainly was.

But what kind of use is it meant for? 'Desktop' suggests it is intended for use in a small room, maybe hooked up to a computer as a digital music source and a pair of small desktop speakers. That is all very well but you will need to add a DAC at least, and that, if you choose one at the level of the Qutest, ups the combo to £2,250, which would buy you a decent amp with built-in DAC and much more power. And for such applications, wouldn't a wireless speaker be the usual choice?

Anyway, I decided to assess the Anni in two ways. First off, as a headphone amp pure and simple, and then as an amplifier driving a pair of small desktop speakers.

The manual tells us that Chord set out to design a powerful headphone amp capable of driving any headphones and that to this end they incorporated the Ultima amplifier technology that was previously only found in its top amplifiers. Rated at 10W into 8 ohms, the Anni uses dual feed-forward error

correction circuitry to deliver high peak currents that detects if it is being over-driven and collapses the waveform on each over-driven half-cycle, which it says means it does not clip like other amplifiers, thus avoiding harm to the amplifier or speakers.

The tiny Anni (160mm wide x 42.5mm high x 96.6mm deep) is nicely made in a solidly machined aluminium case. At £1,195 is part of the Qutest range and is built on the same form factor, so can be stacked in Chord's QSS (Qutest Stand System) modular rack along with the Qutest DAC and Huei phono stage.

And you will need those, or at least something like them, because the Anni has no DAC built-in, nor a phono stage. Nor does it have Bluetooth or wi-fi connectivity. On the back there are two line level inputs, a DC in and out and two sets of 4mm speaker terminals. The front is minimalist with just 6.3mm and 3.5mm headphone output jacks, a volume control-cum-input selector and Chord's signature, quirky illuminated coloured buttons on the top. The lefthand one selects high (glows red) and low (blue) gain, and the righthand one switches it on and off – it starts green, turns cyan when the unit is ready to use and red indicates standby. When you turn it on, you will also notice the noise of a cooling fan, but to be honest I did not find it intrusive.

## SOUND QUALITY

I started my listening to the Anni using it as a headphone amplifier. My music source was the excellent Pro-Ject Stream Box Ultra streamer with its PreBox Digital S2 DAC. Headphones used were the Focal Clear.

First track I played was I Can See Clearly Now from guitarist Peter White's Groovin' album. From the first few notes the Anni impressed with its openness and articulation, revealing nuances in his play and how he held and shaped notes. Bass line was powerful and tuneful while percussion was crisp and lively. All in all, the sound was well balanced and very easy to listen to.

Switching to Build Me Up from Bones by Sarah Jarosz, the Anni

impressed again with how it handled not only her voice and mandolin, but also by how well it separated the cello and violin backing and gave the cello great weight and poise.

Track after track brought the same result, with Anni seducing me with its dynamics, power, poise and articulation on vocals – all delivered without any harsh edges. I quickly popped on a very well respected headphone amp that I knew well at around £800, and the Anni showed it a clean pair of heels. The other model lacked its warmth, 'humanity' on vocals and sheer drive and was rather more clinical. Something I could never accuse the Anni of.



**Two line level inputs are provided plus 4mm sockets for speakers.**

I am afraid that my enthusiasm did not extend to its performance as a pure amplifier. I hooked it up to a pair of PSB P3 desktop speakers and have to say that the Anni's sound was slow, rather 'closed-in' and uninvolved. It had no get up and go. I quickly switched to a Rega Brio I had to hand (circa £600) and it was chalk and cheese. On the Brio, the music came to life and was more involving.

## CONCLUSION

This makes my conclusion difficult. As a headphone amplifier, the Anni was excellent and I suspect it will see off most things at the price and probably more. As such, I highly recommend it. As an amplifier, it did not impress. How much that matters to the end user will depend on the use they have in mind for it. **CF**

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**My thanks to Home Media and Sevenoaks Sound & Vision in Maidstone for their assistance.**

# Stealth Mission

Martin Pipe takes to the clouds with Dan Clark's flagship Stealth headphones.



**D**an Clark headphones swap traditional moving-coil technology in favour of planar-magnetic (PM) and electrostatic transducers. The earcups used in several models – including the flagship £4,100 Stealth here – are not only visually-distinctive but, in Dan Clark's words, comfortably “ear-hugging” too.

When designing the Stealth, Dan Clark's objective was a top-class pair of closed-back headphones with a presentation more akin to that of open-back designs. The latter tend to sound clearer and more natural but allow in ambient noise. Such leakage is two-way, wearers sharing their musical tastes with others.

A key part is the ‘Acoustic Metamaterial Tuning System’ that sits between transducer and ear. Into its complex AMTS structure, DCA designed “waveguides, diffusion control, quarter-wave, and Helmholtz resonators”. 3D printing, a technique

familiar to DCA, appears to have been used in its manufacture.

AMTS, DCA claims, helps the Stealth to achieve “refreshingly smooth, accurate, and detailed delivery across all genres”. Also important here are the planar-magnetic transducers. They use the firm's patented ‘v-Planar’ technology to reduce distortion, an incredible 0.03% or less is claimed for Stealth. The PMs improve low-frequency performance and achieve levels of detail normally-associated with “top-of-the-line electrostatics”.

According to DCA, the Stealth's transducers are matched within 0.25dB. DCA gives no figures for impedance, but UK importer Electromod told us “they're around 23 Ohms”.

I'm sure some esports winners can afford to indulge themselves with the Stealth, but it's aimed fairly and squarely at audiophiles. The headband has a gentle elastic suspension, enabling it to fit the wearer's head without the need

for adjustment. Joining together the folding gimbals are a pair of headband wires, which are made from a tough nickel/titanium alloy.

It all looks rather insubstantial, certainly compared to some rival headphone esoterica. Thanks to DCA's design and choice of materials, though, the Stealth is tough enough to withstand the rigours of everyday use.

Hirose locking four-pin connectors are on the base of each cup. Our review sample was supplied with balanced cabling, terminated in a 4-pin XLR plug. However, alternatives are offered; a 2.5mm balanced plug is, for example, available as an digital audio player alternative, allowing Stealth to be



**Cables can be replaced or upgraded. The DCA website lists no fewer than ten different types. Our review sample was terminated in a 4-pin XLR plug.**

used on the move. It folds down neatly into a surprisingly-compact carrying case that forms part of the package.

**USE AND SOUND QUALITY**

At 415g Stealth isn't light, but similar to competing models. However, they are among the ear-friendliest headphones I've ever worn, listening for several hours at a time without sweat or other discomfort. However, the headband wires ring alarmingly when tapped.

The Stealth was partnered with the Ragnarok 2 integrated amp from fellow Americans Schiit, as it has excellent headphone facilities - including an XLR balanced output needed to drive my review sample. A range of different sources and DACs provided the music.

One of the first things I noted is that the Stealth is insensitive. I switched Ragnarok 2 to its highest gain setting. In contrast my Focal Utopias, were happy with the first. But magnetic-planar phones are known for low sensitivity.

The Stealth is probably one of

the most neutral transducers I've ever heard. No colouration, even with vocals, and all instruments were given equal prominence within the mix. Such tonal balance is quite an achievement

On occasions Stealth surpassed even the excellent Utopia. Take for example All I Need, from Air's Moon Safari. The guitars, played by Patrick Woodcock and Nicolas Godin, I heard with nothing less than total clarity. Likewise, singer Beth Hirsch might as well have been in the room with me. Every note of JB Dunkel's piano contribution to the following track, Kelly Watch The Stars, was distinct - and while Nicolas Godin's Minimoog bassline was given due depth, the audible result was in no way overblown or stodgy. Similarly, Alison Goldfrapp's intimate close-miked vocals in Ooh La La wrapped seductively around my ears.

With Britten's War Requiem (LSO/Nosedra, 2012) I was treated to an expansive and believable soundstage with pin-point focus. Percussive bursts like drum rolls snapped to my attention, brass fanfares trilled with exquisite detail. With the music of Talking Heads, the energetic polyrhythms of Born Under Punches, from Remain in Light, were fast, clear and clean.

Also great fun was some BBC binaural material from the 'In My Head' series. Whether it's a heavy



**DCA has specified four-pin Hirose locking connectors for the Stealth, located on the base of each cup.**

metal loving Bosnian defusing bombs, circus antics, a Fern Britton-chasing paparazzo or York Hill boxing, I was taken into the action by the Stealth's stereo imaging prowess and ability to keep out external sonic distractions.

**CONCLUSION**

The Stealth is quite an achievement, having a balanced and detailed sound that doesn't come at the expense of comfort. Talking of expense...it's a pity that they cost so much. But if you can spend the sort of money that would buy a good hi-fi system on a pair of cans, the Stealth should be on your shortlist, alongside more established contenders like the Focal Utopia and Meze Empyrean.



**The Stealth's clever gimbaled frame folds down to a size that can be accommodated by the compact zip-up case. Unfortunately, there's no room left for the cable.**

**DAN CLARK AUDIO  
STEALTH £4,100**



**OUTSTANDING - amongst the best**

**VERDICT**

About as affordable to most of us as its military namesake, the DCA Stealth will nevertheless reward a fortunate few with astonishing performance

**FOR**

Long-term comfort  
Tonally neutral  
Fast and detailed, and naturally so

**AGAINST**

Rather inefficient  
Very expensive, especially in the UK

Electromod  
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BLACK SABBATH



TECHNICAL ECSTASY

BLACK SABBATH

Technical Ecstasy  
BMG

When this album was released in 1976, it wasn't the best of times for the group in terms of their place in the music firmament, their musical directions and their health. To begin, the group were moving away from their earlier core sound.

"We could've continued and gone on and on, getting more technical, using orchestras and everything else which we didn't particularly want to" said Osborne. "We took a look at ourselves and we wanted to do a rock album; 'Sabbath, Bloody Sabbath' wasn't a rock album really".

Osborne was actually talking prior to the release of 1975's 'Sabotage'. His notion of a back-to-basics release. Which it wasn't. It certainly has plenty of fans, of that there is no doubt, but it wasn't what Osborne was referring to.

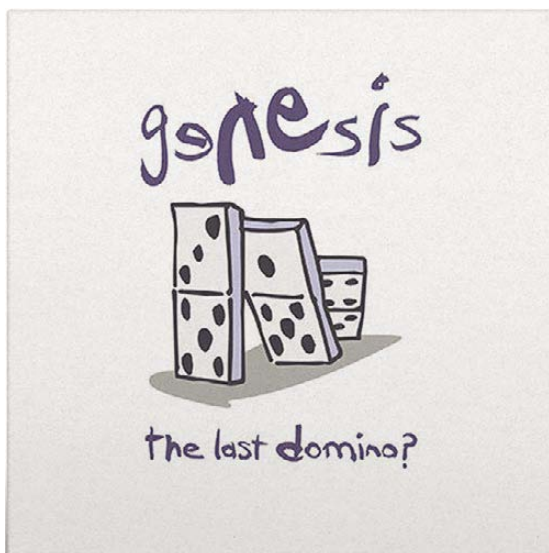
'Technical Ecstasy' didn't return Osborne back to his rock roots either. Again this album has

plenty of fans. Many Sabbath fans love it to bits but I get the feeling Osborne was feeling disconnected (from his music and reality). The next album, Sabbath's 'Never Say Die!' Would be Osborne's last as front man. For those who can move beyond a metal-centric viewpoint, however, this album remains under-rated, with a sparkling selection of Osborne lyrics, some of the best riffs of the period from Tony Iommi and interesting keyboard experimentation to boot.

This five LP Super Deluxe Edition box set includes the remastered album, two discs of new mixes and alternative versions and a live concert recording covering dates from the 1976-1977 tour; a book and poster.

Mastering? There is a good tonal balance overall, spanning a broad soundstage. Upper mids might be a tad narrow but I suspect the original mix may have something to do with that.

AUDIOPHILE VINYL



GENESIS

The Last Domino?  
Virgin

Released to accompany the tour, this 4LP collection arrives in a book case. The music is collated mainly from Collins-era past although the Gabriel era does receive a nod via tracks like 'Carpet Crawlers', 'Firth of Fifth' and 'I Know What I Like'.

Within the Collins-era collection there are the expected hits such as 'Abacab', 'Follow You Follow Me' and 'Turn it On Again', more nods towards the classic prog of the past with the likes of 'Duke's End' plus live favourites like 'Fading Lights'.

The band are displayed very nicely on the outer disc covers and the individual sleeves so there's plenty of illustrative adornments here to keep you company while you listen.

The compilation is nice but also disappointing. It seems like a tour afterthought. A bit rushed, perhaps? This tour might be the

band's final outing (well, you never know). Hence, what I would have liked to have seen was some text. A band retrospective, history, discography, essays from the great and the good, that kind of thing. Some sonic rarities to add value to the collection, perhaps?

There's also no specific credit information on the rest of the support band. Sure, they are 'only' wage-earning jobbers but you've got long time guitar-playing associate Daryl Stuermer (who deserves lots of respect) and even Collin's own son, Nic on drums, pictured frequently but neither have picture-based or any other credits. So no-one officially knows who they are. Shame!

The mastering is rather lovely. Neutral, balanced, the soundstage is broad while transparency is a feature note here. The ear can weave itself slowly through the mix to reach the rear, delighting in detail during the journey.

Subtitled 'Remixed & Updated', this project sees the master tapes of the original album, originally created in 1987 and reissued on CD for the 'The Later Years' box set, transferred to vinyl.

That means we hear more Richard Wright. Wright's original keyboard takes were re-run and Nick Mason provided new drum tracks to accompany them. I have to mention, this means that there is technically a different drummer on this LP. Mason has aged, let's face it. Most people won't care and Mason sounds superb on the finished LP but purists might want to bear this in mind. Both David Gilmour and Bob Ezrin, sat at the faders to change the balance between the three Pink Floyd members.

According to Mason, "I think there is an element of taking the album back in time and taking the opportunity to create a slightly

more open sound - utilising some of the things we had learned from playing so much of the album live over two massive tours".

The problem with the original, according to Mason, was that it was "...recorded under considerable stress and time constraints, and indeed some of the final mixing was done at the same time as rehearsals for the forthcoming tour".

Note the new album cover using an alternative 'beds' photo by Robert Dowling from the original album cover shoot directed by the late Storm Thorgerson.

When I looked the double-album, half-speed gatefold edition, played at 45rpm. The pressing could have been flatter. It was playable but not perfect.

As for the mastering? Excellent. Half speed pushes any master up a couple of rungs in the ladder and this one benefits by exemplary instrumental separation, midrange detail and overall clarity.



## PINK FLOYD

**A Momentary Lapse Of Reason**  
Parlophone

# AUDIOPHILE VINYL

You could get the idea that this box set covers all of the band's albums recorded in the studio but that's not the case. For this Brazilian heavy metal outfit inner politics caused ructions that threatened their existence. After 1996's 'Roots' the band ran through a crisis which led to guitarist/vocalist Max Cavalera leaving. In 1998, Derrick Greene, a US-based singer, replaced Cavalera.

This box set is the band found anew. A band on a new path, starting with 'Against' (1998), 'Nation' a double album from 2001, another double and including the 'Revolusongs' EP as 'Roorback' (2003), 'Dante XXI' (2006) and a final double, 'A-Lex' (2009). Five albums in all and eight vinyl discs in this weighty set.

More than that, though. These albums have been cut as half-speed masters so sound quality promises much here. All of the albums are individually packaged and stored in an outer slip case.

As for the mastering? Praise must go to BMG for retaining the energy and vigour of the performance but never degrading that passion by masking detail. With 'Nation' for example, there is plenty of hard-edged, angular moments during the often relentless progress from the track but singular cymbal taps, for example, are never hidden behind the guitar sludge or the powerful end vocal.

So this music is still capable of triggering midnight nightmares but doing so now with enhanced clarity.

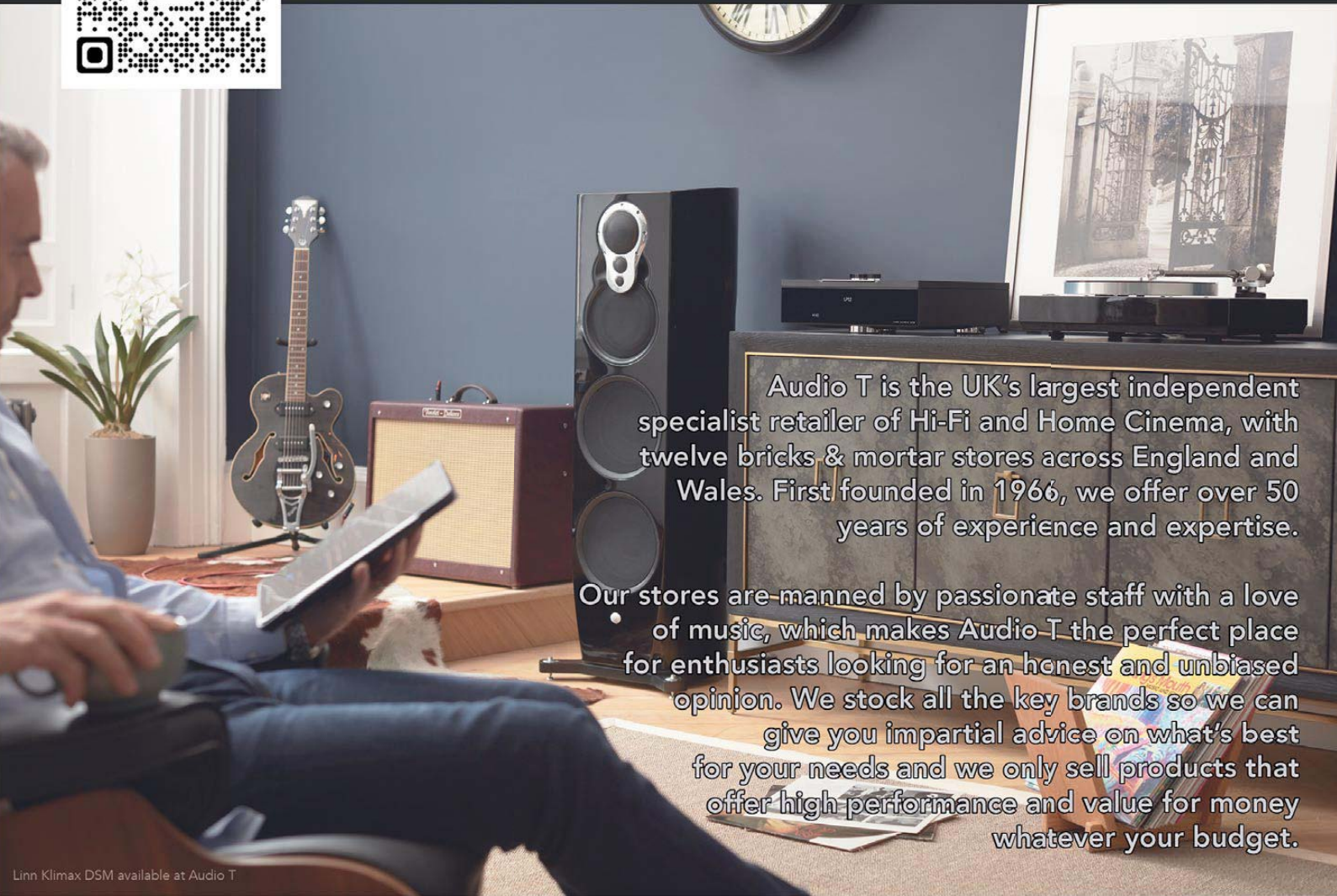


## SEPULTURA

**Sepulchrum: The Studio Albums, 1998-2009**  
BMG



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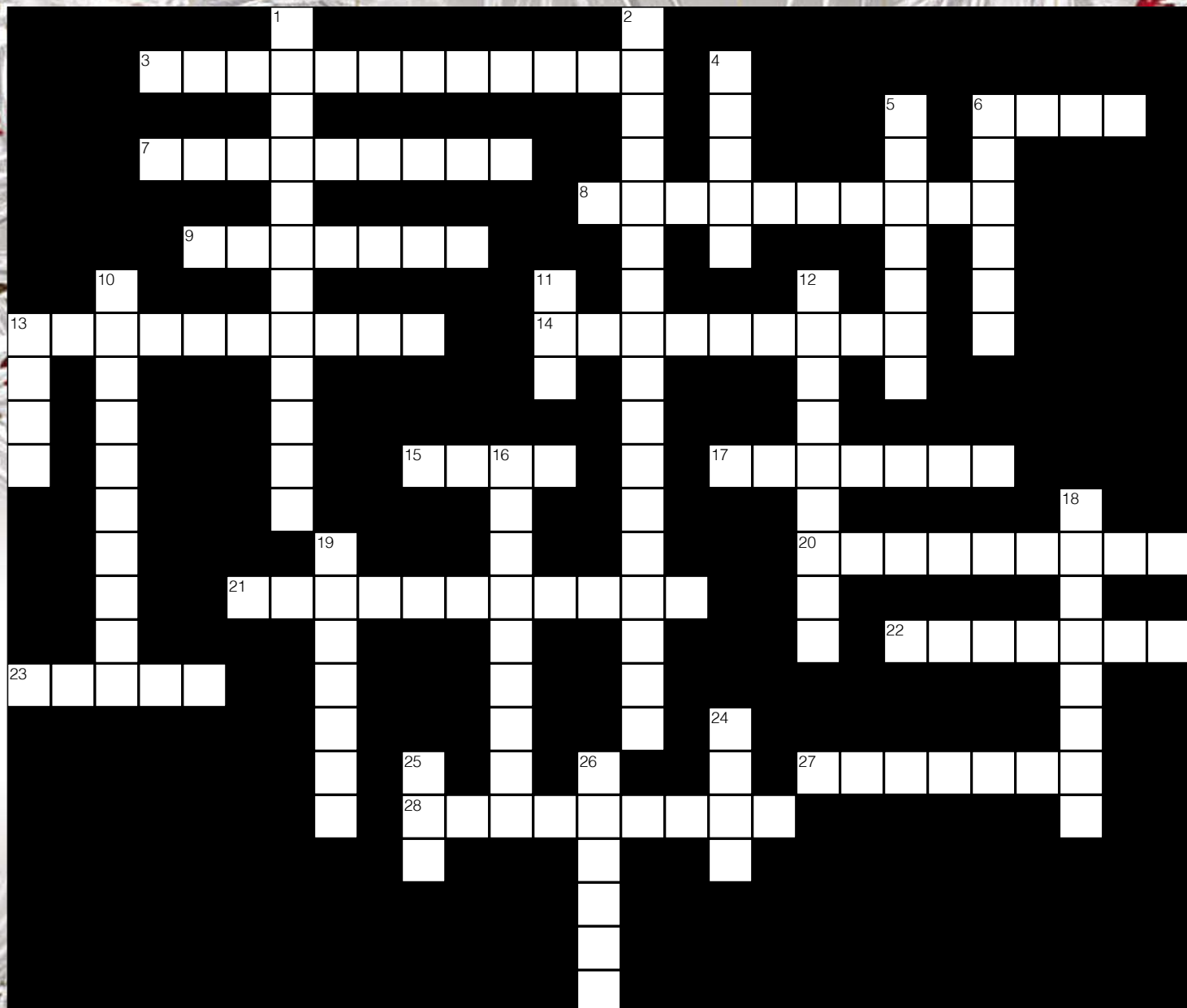
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# Christmas Crossword



## ACROSS

3. early gain stage (12)
6. a steady sound (4)
7. a wireless technology to exchange data (9)
8. an enthusiast for high-fidelity (10)
9. chirpy bird (7)
13. they go over ears (10)
14. loudspeaker cabinet (9)
15. watery brand name (4)
17. Danish cartridge manufacturer (7)
20. a place for small speakers (9)
21. UK's largest & longest running show (2 words: 7/4)
22. it's round and goes around (7)
23. without a paddle you're up the... (5)
27. came from Sony, before ipod (7)
28. a content delivery method (9)

## DOWN

1. it records and plays magnetic tape (2 words: 4/8)
2. depicts tonal accuracy (2 words: 9/8)
4. food for the soul (5)
5. they're made of cloth, to be taken off (7)
6. hi-fi tone control (6)
10. has a soft orange U.S. glow (2 words: 6/4)
11. UK 'speaker manufacturer who just celebrated their 60th Anniversary (3)
12. plays LPs (9)
13. high fidelity in short (4)
16. makes small signals large (9)
18. they keep amplifiers cool (2 words: 4/4)
19. not analogue (7)
24. one channel and speaker (4)
25. another type of digital (3)
26. open-reel studio recorder of the 1990s (6)

## Answers

**Across:**  
 3) preamplifier 6) tone 7) Bluetooth 8) audiophile 9) tweeter  
 13) headphones 14) enclosure 15) Leak 17) Ortofon  
 20) bookshelf 21) Bristol Show 22) platter 23) creek 27) Walkman  
 28) streaming

**Down:**  
 1) tape recorder 2) frequency response 4) music 5) grilles  
 6) treble 10) vacuum tube 11) KEF 12) turntable 13) hifi  
 16) amplifier 18) heat sink 19) digital 24) mono 25) DSD 26) Tascam

## The AC-2K Balanced Power Supply

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**DEEPLY  
GROOVY**  
9/10

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HIGH-END SHOWS | NEWS | REVIEWS

# Mini Motion

Martin Logan's latest Motion 15i small bookshelf loudspeaker, reviewed by Noel Keywood.

**M**otion 15i is the smallest loudspeaker this company make, Martin Logan being known for their vast and extraordinary electrostatic loudspeakers like the Neolith that I once sat in front of at a San

Francisco show. Coming in at £850 the 15i is meant to give you a taste of the £80k Neolith!

Well, in your dreams perhaps, yet there is essence of Neolith in this small box. The distinguishing feature of all Martin Logan's Motion series loudspeakers is use of a little folded ribbon tweeter

that can "mimic the performance of a large electrostatic panel" they say, "in the confines of a traditional loudspeaker enclosure". The Motion series aims to offer a taste of electrostatic then in a conventional cabinet; there's something different in this small loudspeaker. I'll dive into this issue straight





**The aluminium cone bass/midrange driver covers most of the audio band, its central concave dust cap extending response right up to 3kHz. Above lies the folded ribbon tweeter.**

away. Martin Logan have raised tweeter output to make its contribution obvious, for projective electrostatic-style clarity. Yep, this is not an academically accurate loudspeaker. The folded ribbon tweeter is well forward in the sonic scheme of things – but such drivers have a sweet sound that is sonically acceptable, where cheaper domes get coarse and edgy as they break up. Also, folded ribbons are expensive, with Mundorfs costing hundreds (UK £) for example.

There is suggestion in the literature that the tweeter sets the tone, but measurement showed that is not entirely true. The aluminium bass/midrange unit covers most of the audio band, the tweeter just high treble – so the former does most of the work.

What you get here is a small, solid cabinet measuring 290mm high, 173mm wide and 220mm deep (bare wires; a bit more for connectors) and weighing just 5.4kgs, so easily movable. It's a

bookshelf loudspeaker with a rear port, but that's fine as long as a small amount of breathing space – 2cms or so – is left behind. The rear port loads a 133mm aluminium cone bass/midrange unit set into a “non-resonant asymmetrical chamber” Martin Logan say, but the important part is in truth the “rigid structured dust cap” because this is the bit that contributes much to high frequency output.

At rear lie mono-wire terminals with Martin Logan's own terminal connectors that accept bare wire, spade connectors or 4mm banana plugs. There are clip-on front grilles that have light, thin plastic frames and acoustically transparent material that made no different to forward response.

**SOUND QUALITY**

The Motion I5is were connected to our Creek Voyage i20 and alterna-

tively PrimaLuna EVO 300 Hybrid amplifiers, via Chord Company Signature Reference cables. Sources were CD from an Oppo BDP-205D player with its ESS ES9038 Pro DAC.

Hi-res came from the Creek's Bluetooth 5.1 link to an iPhone 11X Pro with an Onkyo HF player app running 24bit PCM and DSD, channeled through an AKM DAC.

The I5i was successful in getting out the essence of electrostatic, without over stepping the mark – except on the odd occasion. It is starkly clear in its delivery of vocals, shading most else: Josefine Cronholm hovered well forward of the cabinets and every word tumbled out clearly from In Your Wild Garden (CD).

The bass/midrange unit's alloy cone came across as fast and concise in its delivery, and treble remained smooth and clear – if obvious. The resonating guitar strings of Antonio Forcione playing Tears of Joy cut out strongly, without hiss or spit, just a great sense of projection. There was a nice airy quality to high treble that made for a more attractive character than is common from dome tweeters, especially metal ones.

When I pushed up volume with heavy Rock I did get to hear some boxiness from the cabinet, identified by the large peak in the



**The folded ribbon tweeter, or Air Motion Transformer (AMT) as termed by its inventor Oscar Heil, Mundorf and many others. Expensive to manufacture but becoming popular for excellent sound quality, similar to that of a flat ribbon tweeter.**

port trace that shows the cabinet is internally lively. Although the 15i has measurably more bass than its predecessor it remains dry and on the light side overall; you can't expect too much from such a small cabinet. It is meant for bookshelf use in a small room (less than 14ft long) that is itself lively at low frequencies. It's best not to over excite a small room, to avoid boom.

The 15i's clarity and projection suited classical, Bach's Concerto for Flute, Violin and Harpsichord

"There was a nice airy quality to high treble that made for a more attractive character than is common from dome tweeters, especially metal ones"

(DSD) came over well, but flute occasionally jumped at me. Intrigued, I looked at the Onkyo HF Player's spectrum analyser and, sure enough, the steady tone of the flute was often at 1kHz where the 15i projects strongly. Also evident though was a bowed cello at around 60Hz – quite low – so the small cabinet was delivering lower octaves well enough. Strings shone and had a good sense of air around them, as well as sounding deliciously detailed.

Similarly, Stevie Nicks high pitched vocals at the start of Silver Spring (24/96), from Rumours (re-release version) were lifted to become a little strident as harmonics were emphasised: I know from our smooth ESL-X electrostatic that this is not how she sounds. For the most part the 15is were fine, it was on the odd occasion like this that the speaker's tilted tonal balance revealed itself.



*A large rear port tuned to 70Hz helps toward delivery of fast bass when placed on a bookshelf in a small-ish room, meaning 14ft long or less. This mini needs the bass gain a small room provides.*

**CONCLUSION**

Purposed to give a sense of electrostatic clarity, Martin Logan's little 15i bookshelf loudspeaker is quite different to most else. The folded ribbon tweeter and aluminium bass/midrange together project higher frequencies

powerfully and smoothly, giving a sound that puts clarity and insight into the headlines. Warmth takes a back seat. The result is undoubtedly dramatic and works for most of the time, if not all the time. A loudspeaker that makes others sound laid-back and worth hearing.

**MEASURED PERFORMANCE**

The small folded ribbon tweeter of the Motion 15i runs from 3kHz to 20kHz measurement showed, the 133mm aluminium cone bass/midrange unit reaching up to 3kHz. Overall response extended from 50Hz up to 20kHz our analysis shows (green trace), the port (red trace) giving support over a wide area centred at 70Hz – shown by the dip in the impedance trace caused by the port.

This is better bass extension than that of the original Motion 15, tested in our Sept 2013 issue. Otherwise, the Motion 15i measured like its predecessor in every respect. Tweeter output is raised above that of the bass/midrange unit by around 2dB – enough to make its contribution obvious. It has a smooth response, suggesting absence of minor resonances and low colouration – in typical ribbon tweeter fashion. For a sense of balance though the Motion 15i needs to be used close to a rear wall – within 12in – to sustain low bass.

Sensitivity was a very high 89dB from one nominal Watt (2.8V) of input. It will go loud even from 40 Watts as a

result. This is partly because impedance is low at 4.7 Ohms, so the speaker draws more current than most.

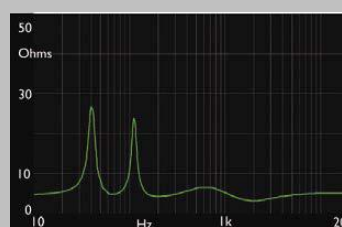
The Motion 15i will have a bright balance but smooth treble that's clean; it is designed for use close to a rear wall. Little power is needed. **NK**

**FREQUENCY RESPONSE**

*Green - driver output  
Red - port output*



**IMPEDANCE**



**MARTIN LOGAN  
MOTION 15i £850**



**EXCELLENT - extremely capable.**

**VERDICT**

Fantastic clarity and projection, but tonally tilted.

**FOR**

- super clear
- clean, airy treble
- forward projection

**AGAINST**

- lacks warmth
- lacks low bass

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# vinyl section

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**ORTOFON VERISMO CARTRIDGE 121**

A top diamond cantilever moving coil, reviewed by Noel Keywood.

**AUDIOPHILE BOOKS 125**

Three books – Wembley or Bust, Bowie Odyssey, God is in the Radio, reviewed by Paul Rigby,

**CLASSIC CUTS 130**

The Doors L.A. Woman, reviewed by Paul Rigby.

# news

## A BIT OF A CHAT

Swiss jazz drummer and percussionist Florian Arbenz is back with 'Conversation #2 - Oracle' and 'Conversation #3 - Neologism' (combined in a gatefold) plus, obviously on a roll, 'Conversation #4 - Vulcanized' in a separate package ([florianarbenz.bandcamp.com/album/conversation-4-vulcanized](http://florianarbenz.bandcamp.com/album/conversation-4-vulcanized)).

Arbenz plays alongside Jim Hart on vibes and marimba for #2 and adds Heiri Kaenzig on bass for #3. Arbenz has Cuban saxophonist Maikel Vistel and French bassist François Moutin on #4.

#2 is almost 60s lounge jazz in scope and is my favourite of the three - I almost expected to see experimental Czech animation accompanying it.

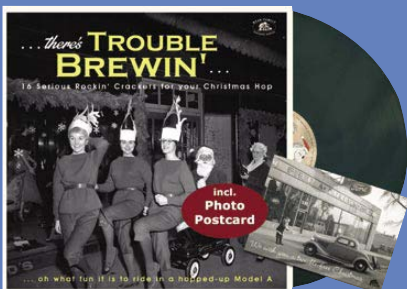
#3 retains elements of #2 but swings more and bops with angular joy.

#4 combines improv with bop-esque structures to provide a spacious, free-flowing presentation.



## GENE VINCENT

It's been fifty years since Vincent died. This Bear Family website exclusive ([www.bear-family.com](http://www.bear-family.com)) 'We Sure Miss You' is a 10", twelve song vinyl 50s-era compilation. It also includes twenty two more 50s-era songs, plus live rarities and Blue Caps songs.



## XMAS COMBO

And on the Bear Family theme, the label has two 12" Christmas compilations on offer. 'Here Comes Santa Claus' includes cuts from Judy Garland, Bobby Darin and Ella Fitzgerald. 'There's Trouble Brewin' includes Johnny Cash, Chuck Berry and The Moonglows. Includes a welcome series of liner notes on each.

## SARAH DAVACHI

I loved the list of instruments on this one: Mellotron (English horn, bass flute, clarinet, recorder, oboe, French horn, chamber organ, nylon string guitar), tape echo, Korg CX-3 electric organ, pipe organ, harpsichord, piano, ARP Odyssey synthesiser, acoustic guitar, violin, voice. Blimey! And yes, the album sounds as it reads from this talented multi-instrumentalist that mixes ambience, drone, meditation...

Had a bad day at the office? Talk to Sarah.



## WAR

You don't see much from War on the reissue circuit. This 'Greatest Hits 2.0' (Far Out) is welcome, then. A double album that carries on after the initial 1976 Hits package was released, it's set in a gatefold.

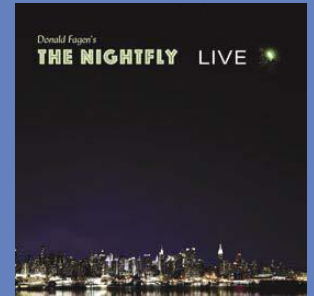
## OPHIDIAN I

From the Icelandic combo, 'Desolate' ([ophidiani.bandcamp.com/album/](http://ophidiani.bandcamp.com/album/)) offers – wait for it – 'technical metal' replete with demonesque vocals, devious guitar riffs and drumming balanced on rhythmic complexity. It has pace, intensity but also melody in stark and unadorned contrast.



## DONALD FAGEN

'The Nightfly - Live' presented Steely Dan's 2019 live performance of Fagen's 8-track solo work via the Orpheum and Beacon Theatres. The live setting retains that noir sophistication and loses none of jazz-pop flair.



## LARAAJI

A performer on the streets of New York since the 70s, Laraaji's experimental improv electronica continues with 'Flow Goes The Universe' ([laraajimusic.bandcamp.com/album/flow-goes-the-universe](http://laraajimusic.bandcamp.com/album/flow-goes-the-universe)). Arriving as a double album gatefold, this is an archival 1992 ambient original and adds treatments by Michael Brook. Inspirational stuff.



## BOB DYLAN

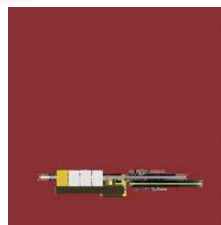
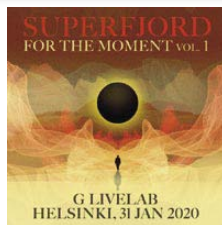
Volume 16 of the Bootleg Series is a 11-track vinyl highlights package of the 57 track, 5CD full set covering 1980-1985. Called 'Springtime in New York', it enters troubled creative times for Dylan that many refer to as "a minor period".

These lost gems would have served Dylan better than many of the official tracks that filled the six albums this period covers, as well as the production on those albums. Fans will talk of 'coulda beens'.



## OMD

Celebrating the 40th anniversary of Orchestral Manoeuvres in the Dark's 'Architecture & Morality', this packed 3LP triple gatefold package includes the album's three original singles on 45rpm coloured vinyl, unreleased demos and mixes, and a Drury Lane live concert from 1981. Essential for fans.



## ...AND FINALLY

Check out Belgium-born Esinam's ambitiously titled 'Shapes in Twilights of Infinity' ([esinam.bandcamp.com/album/shapes-in-twilights-of-infinity](http://esinam.bandcamp.com/album/shapes-in-twilights-of-infinity)) offering multi-cultural grooves with Ghanaian infusions.

Progressive psych band from Finland, Superfjord's 'For the Moment Vol. I' features innovative instrumental, live excerpts from the January 2020 concert at Helsinki's G Livelab. Improv? Zappa freak outs? Hendrix deep diving? Yes.

Sweet Thing's 'Moonshine Society' (Mojo Music). Goodness, this is a dirty album. Blues dirty, that is. Covering originals and covers, its gritty and abrasive but also plaintive and mournful. Listen to this and bring a cloth.

A man of the Scottish Highlands Lomond Campbell's LP ([lomondcampbell.bandcamp.com/album/l-p-2](http://lomondcampbell.bandcamp.com/album/l-p-2)) varies its tone from harsh and industrial to gentle and flowing, riding simple melodies but also some attractively complex pieces. Variety folks, variety.

Spearmint's 'Holland Park' ([waiwya.bandcamp.com/album/holland-parktells](http://waiwya.bandcamp.com/album/holland-parktells)) the true story of band vocalist, Shirley Lee's fathers' seventies prog band (named Stupid) over twin 10" discs. A bit Lightning Seeds, a bit Grand National, a bit bland.

Bristol duo, Run Logan Run's third album 'For a Brief Moment We Could Smell The Flowers' ([runloganrun.bandcamp.com](http://runloganrun.bandcamp.com)) presents synth-based jazz around a energetic, powerful sax pivot.

Kondi Band's 'We Famous' ([strut.k7store.com/kondibandfamous](http://strut.k7store.com/kondibandfamous)) is a collaboration between Sierra Leonean kondi (thumb piano) player, Sorie Kondi and US producer/DJ Chief Boima, mixing African roots music and hip hop to produce a sparkling, hip swinger.

From Kit Sebastian, 'Melodi' ([kitsebastian.bandcamp.com/album/melodi](http://kitsebastian.bandcamp.com/album/melodi)) has an attractive, lounge-grounded, 60s TV show, French pop feel.





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# Pure Diamond

With a pure diamond connection to LP, Ortofon's new Verismo cartridge has a unique sound says Noel Keywood.

**L**isten to the cantilever. Every cartridge has one and the music passes through it, gaining flavour on the way. At the

quality level I'm talking about here, it's a major issue. That's why Ortofon have given their new Verismo moving coil cartridge a diamond cantilever, with a diamond stylus bonded to the end. Yes, we're talking all-diamond here, if not slivers of the Koh-i-Noor. Instead, CVD industrial diamond – but it still doesn't come cheap, the Verismo carrying a lofty £5349 price tag.

With vinyl becoming a contested market once again, sales rising steadily, there's an audience prepared to consider buying a cartridge this specialised and expensive, especially as a diamond rod is stronger than a fine alloy tube so the Verismo isn't super-delicate, as high-end cartridges were in the past.

But Verismo isn't the same as the many other Ortofon's that have passed through my hands either, from the A95 to the Cadenza Bronze I use regularly and sonically favour (to Ortofon's bemusement). But then pickup cartridges can become quite distinctive in their sound, especially when they use exotic materials – as I was to find here.

The Verismo has a skeletal body built from sintered titanium by a Selective Layer Melting (SLM) technique, as in the A95. This puts three ridges on top for contact with the head shell, in a form of three-point fixing. There are two threaded screw holes and four sets of fixing screws Ortofon



say, most likely brass (our review sample came with none). Although the body looks light, it's weighty at 9.5gm – 10gm being the upper limit for many arms. That makes it as weighty as the Cadenza series if not as massive as the MC Anna Diamond (also with diamond cantilever) that comes in at a whopping 16gm.

That the Anna Diamond is their "highest performing" MC cartridge Ortofon say, suggests the Verismo is a more conventional variant better aligned to everyday expectations. Apart from having broader arm compatibility due to its lower weight, it also has higher quoted compliance than the Anna, yet it has a slightly higher quoted tracking force of 2.6gm optimum, with 2.8gm quoted as maximum – one of the highest down force values of any Ortofon

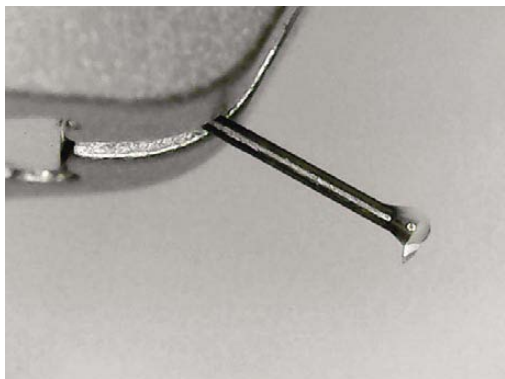
cartridge. In use it needs all of 2.6gm I found and 2.8gm makes it less skittish when hand cueing as I do. It also improved tracking which otherwise is inferior in the mid-band to the Cadenzas and even 2M Series moving magnet types.

Which brings me to the important issue of tip mass, that has to be kept low for good tracking of vocals and high frequencies, such as Shure's orchestral bells on their TTR

series test records. As lovely as the material properties of diamond might appear it is denser than both boron and aluminium and I cannot help but wonder whether this comes into play with the Verismo, explaining why its midband tracking doesn't match that of other cartridges, especially those with boron rod cantilevers, including those made by Ortofon.

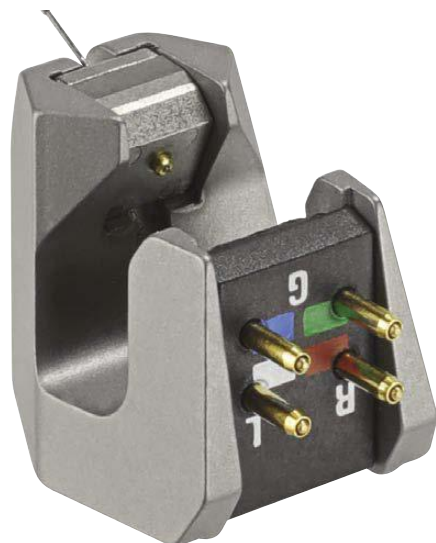
I'll say straight away that I'm no fan of boron rod cantilevers, finding them sterile sounding at best, but they do track, that's for sure – and give flat frequency response. In other words, they are the answer to a maiden's prayer, but I'm no maiden – so not my prayers.

To keep tip mass down the signal coil needs to be small, needing fine wire and few turns. The Verismo uses gold plated high purity copper windings, with a quoted electrical resistance of 6 Ohms. Curiously, Ortofon suggest a load of 10 Ohms as ideal – a very low value. The usual rule of



**The diamond cantilever with diamond stylus bonded direct at 90 degrees.**

thumb is x10 for a load to avoid voltage loss, meaning 60 Ohms, a rule they use for the Cadenzas, but not the Verismo. So there's a reason, unstated in their literature. It would work for power transfer into a step-up transformer and since output is very low this might be the thinking, Ortofon producing a small range of such transformers. Like me they prefer the sound of a transformer to transistor preamp, so bear this in mind. This



**Rear connection plate carries colour coded gold plated pins. The Grounds are isolated from each other and the metal body, to suit balanced connection.**

persuaded me to use our Icon Audio PS3 valve phono stage with input transformer, in addition to our Pro-Ject Phono Box RS2 that can be dialled down to 10 Ohms input resistance – no coincidence since Pro-Ject work closely with Ortofon. They later told me that in fact the spec was missing a > (greater than) sign – simple as that! No matter, step-up transformers

are still preferable I found.

To the diamond cantilever Ortofon bond a nude Replicant diamond stylus with rectangular shank for accurate orientation of the long contact tip. Minor radius is 5µm and major radius 100µm.

Of stylus and cantilever they told me “The diamond is CVD diamond, which is 100% the same as natural diamond. But the CVD diamond corresponds to the absolute best natural diamond grade (Type IIa ) due to the absolute purity. Also it is 100% uniform. We use this CVD diamond for the styli in many of our cartridges. It is not fragile, with no more returns than with boron. Cantilever replacement comes in at €3000”.

## SOUND QUALITY

The Verismo was installed into our SME309 arm on Timestep Evo modified Technics SL-1210 Mk2 turntable. After measurement and running-in usage I settled on 2.8gm downforce. Initially, our Pro-Ject Phono Box RS2 phono stage was employed, connected up via balanced input from the SME, with balanced output taken to our Creek Voyage i20 amplifier, feeding Martin Logan ESL-X electrostatic loudspeakers. But I moved on to our Icon Audio PS3 MkII valve phono stage (with input transformers) feeding a PrimaLuna EVO 300 Hybrid amplifier, since this combo worked better all round.

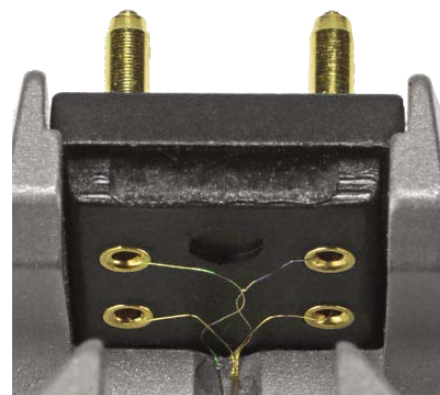
With Phono Box RS2 set to 10 Ohms the Verismo was, as expected from previous experience with a diamond cantilever cartridge, crystal clear, fast and deeply detailed. Every LP I played had a bright white light shone on it, most revealing being Hugh Masekela's Uptownship, from Hope, where his trumpet was more vivid than I have ever heard before. Where boron cantilevers are sterile to being ho-hum, the Verismo's diamond absolutely threw trumpet at me, doubtless helped by its strength of output at higher frequencies. Being a fan of a fuller,

more rounded sound with greater timbral resolution I was deeply impressed but not altogether wowed.

Spinning old discs like Fleetwood Mac's Rumours showed the stylus was mining information that I'd never heard before and wasn't too edgy with old vinyl, but Mick Fleetwood had popped out for a sandwich it seemed; the patina was a light one. Turning input resistance up to 100 Ohms brought up level and opened the sound up slightly, making the stage usefully more expansive; I heard no merit in a 10 Ohm setting.

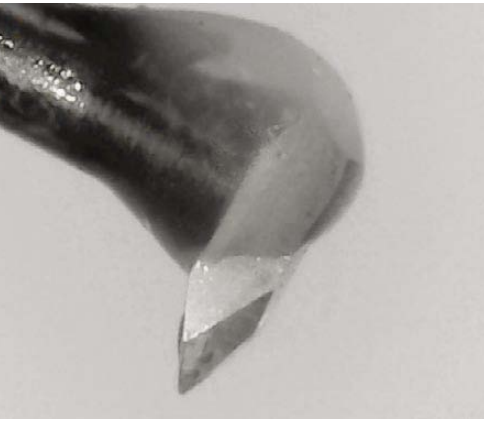
Up-ending our long-suffering turntable and plugging in an SME unbalanced arm cable allowed connection to the input transformers of the PS3 and this changed the presentation substantially, bringing in a whole layer of depth and timbral resolution, whilst not negating the sense of extreme speed and impact to the layered percussion work in Uptownship. It could have been that this was the cartridge and preamp balancing out in a tonal sense, but I suspect there was something more fundamental going on as I use the RS2 a lot and it's not bright. The Verismo benefits from being used with transformers it seems from this comparison.

With the PS3 Ortofon's Verismo delivered what was undeniably the fastest and most insightful sound I have ever heard,



**Fine wire leadouts are soldered into the rear pins. They are exposed and should not be touched.**

having a sense of crystalline clarity boron lacks. Mark Knopfler's guitar work in True Love Will Never Fade, from Kill To Get Crimson, was shimmeringly detailed and precise, each and every plucked



**The square shank of the bonded diamond stylus aids axial orientation. Although tilted relative to the LP surface, the Replicant grind gives a side contact face upright to the groove.**

string ringing out with a sense of sweetness as to be almost honeyed. For the most obvious and delightful harmonic decays this cartridge has no peers. Diamond shades aluminium and boron in obvious fashion: I got to hear it all. The stage lights are turned up to maximum; no romantic shadows hide unnoticed details in the groove.

The drama of 12in 45rpm singles was heightened, the repetitive synth kick-drum beat on Alison Goldfrapp's Ride A White Horse taking on strong outline backed by brute power, as this track shook the room. I ploughed through many 12in 45s to check out tracking, since these are relatively hot cuts, and the



**At top the three support ridges that raise body off headshell. Fixing screw holes are tapped and blind.**

cartridge remained secure in the groove.

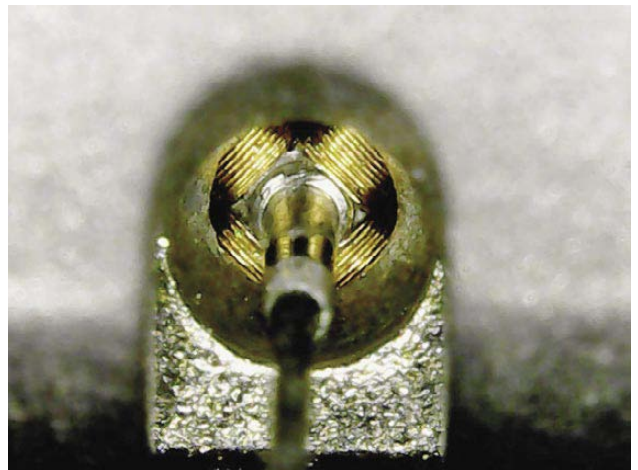
With classical there was a bright hue to the strings of the Trondheim Soloists playing Mozart violin concertos, but they sat in spacious surroundings. Marianne Thorsen's violin was sheeny, but highly detailed. But then this DXD digital transcription onto vinyl does have a sheen to it and the PrimaLuna EVO 300 Hybrid helped make it obvious.

Spinning Shure's Era IV tracking test disc (TTR115), Verismo took fright and jumped out of the groove on Level 4 of the Harp and Flute test (Side Two), with another level to go – a mediocre performance. Level 3 is as high as commercial LPs are likely to go, Levels 4 and 5 being torture tracks, so it's satisfactory, but with little leeway. In ordinary use I did not hear it mistrack, but Era IV showed that it will jump out of the groove if the going gets tough, as other test discs had suggested.

**CONCLUSION**

This cartridge gets more from the groove of an LP than any other I've heard – delivering it

in dramatic fashion. For insight and sonic speed it has no rivals. Tracking is not stellar even at 2.8gm downforce and it needs the help of input transformers to sound sonically balanced I found, but such tunings are to be expected at this level of specialisation. Not a soft or warm sound, but vivid beyond belief. Anyone looking for the ultimate in speed and revelation must hear the Verismo: it has extraordinary sound quality.



**Signal coils at top of the cantilever. A sheath accepts the diamond rod.**

**MEASURED PERFORMANCE**

Frequency response of the Verismo measured almost ruler flat to 20kHz our analysis shows (JVC TRS-1007 test disc). On inner grooves (red trace) there is a slight fall in high frequency output, due to stylus tracing loss. With output flat to 12kHz this won't be readily apparent, but the amount of loss is slightly greater than other Ortofon cartridges, which is odd.

Tracking of 300Hz test tones on CBS STR-112 test disc was secure up to the 80µm peak amplitude quoted, with Ortofon's 2.6gm quoted optimum down force.

At 1kHz (B&K2010 test disc) where acceleration is higher and tip mass more influential, 18cms/sec was cleared, with slightly mistracking at 20cms/sec, a mediocre result for a quality MC, Ortofon's other cartridges managing better at lower downforce.

Distortion was as expected, measuring 1.2% on lateral modulation. On vertical modulation the figure was a reasonable 3.6% due to a measured vertical tracking angle of 29 degrees (DIN 45-452 test disc). Optimal is 22 degrees.

Output was low, measuring 0.18mV

at 3.45cm/sec, making a quiet preamp or step-up transformer necessary.

The Verismo did not measure as well as Ortofon's less expensive moving coil cartridges such as the Cadenzas. Results were satisfactory all the same, with notably smooth frequency response right up to 20kHz. NK

<b>Tracking force</b>	<b>2.6gm</b>
<b>Weight</b>	<b>9.5gms</b>
<b>Vertical tracking angle</b>	<b>29degrees</b>
<b>Frequency response</b>	<b>25Hz-20kHz</b>
<b>Channel separation</b>	<b>20dB</b>
<b>Tracking ability (300Hz)</b>	
<b>lateral</b>	<b>80µm</b>
<b>vertical</b>	<b>45µm</b>
<b>lateral (1kHz)</b>	<b>18cms/sec.</b>
<b>Distortion (45µm)</b>	
<b>lateral</b>	<b>1.2%</b>
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<b>Output (3.45cms/sec rms)</b>	<b>0.18mV</b>

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# Old Stories

**Three books: on ELO, Bowie and the writings of journalist Barney Hopkins. Paul Rigby gives his frank opinions.**

## ELO

What confused me was the '50th' appellation on the front cover. I thought this is a band biography or at least the story of the 1978 'Out of the Blue' Wembley show using archival images and interviews. It isn't (which is a shame because that book needs to be written). This book chronicles the 24 June 2017 Wembley concert (so 4th then, not 50th). Essentially, it was a Jeff Lynne solo show.

This tome is mainly a picture book with extended captions. That means many concert images but also technical stage plans, artist photographs, set lists, audience shots and the like.

Lynne does provide some text on each song sung which is frankly the best part of the book – there's just not enough of it though. At least they provide some insight (at last). So you get details of his vocoder use on 'Sweet Talkin' Woman' and the arrangement to '10538 Overture'.

Some captions are a couple of hundred words, others barely sixty. I got the feeling that Lynne hurriedly threw this part together in the company of a Genesis staffer with a voice recorder in a couple of hours, in between appointments. In a hotel lobby.

This is a coffee-table picture book, full of fluff and not enough meat. Fans may like it but really, it's non essential.

## DAVID BOWIE

Next in Goddard's apparent ten-year 'history' project from a largely cultural and highly interpretive perspective this book follows the release of last year's 'Bowie Odyssey 70'. Taking the slightly disengaged, rather contrived, novelistic approach to music history (as also seen in Goddard's earlier book, 'Ziggyology'), we wander through events of the year like an audience might wander through scenes in a play: scene by dazed scene.

The style of the book verges on

the poetic, the romantic, as opposed to a blow by blow account backed up by the witness and the source.

This is less a history and more an analysis. Bowie on the couch. Bowie from a dream.

Switch a spotlight on this book though and, in short, it is Goddard wondering how to make yet another history of this iconic musical artist palatable to the casual and hard core Bowie fan as well as his publisher.

I wonder if this series might make a better graphic novel. A comic character as a comic character?

## BARNEY HOSKINS

'God is in The Radio'? In the context of this month's reviews, I thank Hoskins and the almighty for a book with direction, content, focus, clarity and real substance.

This author of multiple books and contributor to both the NME music paper and Mojo magazine (among others) provides an archive of his work for our perusal. As we have Bowie on our minds, take Hoskins' review of the 1975 album, 'Station to Station' in which Hoskins manages to whip up mentions of fascism, cocaine, Aretha Franklin and Joni Mitchell and explains why 'Station...' might look into the dark but it's not a drug album.

For a longer 1984 NME piece (eleven plus pages) on Bobby Womack there's certainly power and emotion. Womack sounds incredibly tired. His outlook on the music he loves and the scene he emerged from verges on the bleak. He talks about his loneliness. The essential falsity of the people orbiting him: "It's a funny thing, man. I know a lotta people, but I don't have no friends".

The insight continues: Lee Hazelwood, Laura Nyro, Dr John and the author's own love/hate relationship with The Rolling Stones.

A fine book of old times. Old heroes. Old memories. Now recaptured.

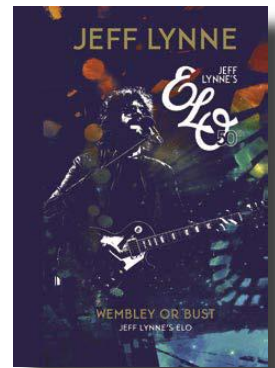
**Title:** Wembley or Bust

**Author:** Jeff Lynne

**Publisher:** Genesis

**Price:** £35

**Pages:** 212



**Title:** Bowie Odyssey 71

**Editor:** Simon Goddard

**Publisher:** Omnibus

**Price:** £14.99

**Pages:** 163



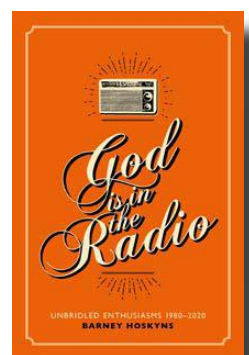
**Title:** God is in the Radio, Unbridled Enthusiasms 1980-2020

**Authors:** Barney Hoskins

**Publisher:** Omnibus

**Price:** £18.99

**Pages:** 287



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**NAIM NAIT XS**,  
excellent condition, boxed, manual, Chord RCA interconnect cable. £625. Tel: 07864 034 087 (Eastbourne)

**MARANTZ PMA4200**  
amp, plus remote, black, £120. CD6311KI, black, £100. PM6010SE, silver, £100. Yamaha RXV363 surround receiver, remote, black, £75. Yamaha NS200 floorstanders, very good condition, £100. Wanted: Audiolab amp, IMF TLS80II. Tel: Jim 07845 231 992 (Colchester)

**QUAD ESL 988** speakers, matched pair in black. Immaculate, leads, original packaging boxes. Full Quad service history. Downsizing, so sadly they must go. £1250 ono. Could deliver. Tel: 01827 284 023 or 07855 599 792

**LONDON DECCA** Gold cartridge. Bought in 1990. Was mounted on Linn Ittok and used for one week. Not used since. Boxed. As new as you can imagine. Please call 07505 057 414. (London)

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**2 NAKAMICHI CR-7**  
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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, we cannot guarantee that all products listed above will appear.

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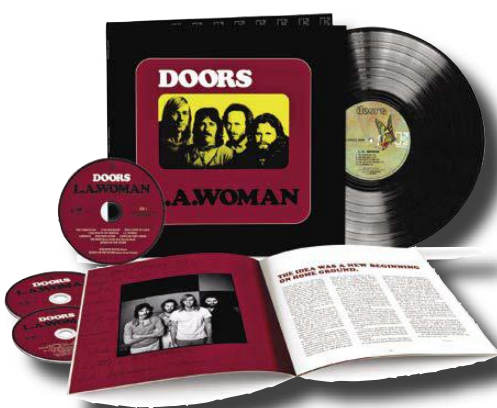
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# THE DOORS

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"Morrison was... definitely a little rough. He wasn't feeling too well health-wise. But in my mind, Jim was indestructible"

This was quite a release for the band, back in 1970. It reached double-platinum status and featured a host of recognisable ditties including the Top 20 hit 'Love Her Madly', 'Riders On The Storm', and the title track.

This was the final Doors album to have Jim Morrison at the vocal helm. He hadn't exactly been looking after himself by this time – sometimes reflected in his vocal delivery.

Its blues excursions include Junior Parker's 'Mystery Train' (appearing here on the Sessions disc), John Lee Hooker's 'Crawling King Snake', Big Joe Williams' 'Baby Please Don't Go' (also on the Sessions disc), and 'Get Out Of My Life Woman' (ditto), Lee Dorsey's 1966 release, written by his producer Allen Toussaint.

Drummer John Densmore commented: "I love LA Woman. I am pleased with how we approached it, which was to record it quickly in a couple of weeks and with a couple of takes for each song. We didn't get hung up in perfectionism like we did for a few albums".

Nevertheless, the production was infused by the spectre of Morrison's addictions. "We didn't have substance abuse clinics back in those days" Densmore says. "We didn't know Jim had a 'disease' called alcoholism. He knew I didn't approve of his drinking but it was a different time...with musicians like Eric Clapton clean these days, I think Jim would have cleaned up his act, but that wasn't his road".

According to guitarist Robby Krieger, Morrison was "...definitely a little rough. He wasn't feeling too well health-wise. I remember him coughing and spitting up blood, probably from smoking too many cigarettes. But in my mind, Jim was indestructible. I thought he'd be drinking a fifth of whiskey a day until he was 90 years old. Guess I misjudged that..."

In many ways then, the Morrison performance on this album reveals a man in a struggle, in conflict. Speaking as a selfish listener though, it gives the performance a certain frisson. It moves it nearer to the edge. More than that, the entire enterprise sparkled in terms of its production. That was down to one Bruce Botnick.

It's been a while but I remember talking

to Bruce Botnick (and his black cat) about 'L.A. Woman'. He was its original producer (he also worked with The Beach Boys recorded Love's Forever Changes, he worked with Buffalo Springfield, Tim Buckley, The Rolling Stones, Marvin Gaye plus many more).

"I've been there with The Doors from the very beginning", said Botnick. "19th August 1966, when we started recording them. We remained friends, been god parents to children...our relationship has been good" said Botnick. "At that time we were the same age, single and fancy free. They were this unknown band that had been playing up at the Whisky A Go Go club. In fact, when they finished recording for the day in the studio, they went over to the Whisky and did a set. They were a working band, no-one knew them. In those days, we didn't work late evenings. Working until 8pm was a long night, for example".

Ever since Paul Rothschild (producer of The Doors' first five albums) passed away in 1995, Botnick has been the band's producer and 'Keeper of the Flame', in terms of everything and anything to do with putting music on the shelf: "Great care goes into going back to the original analogue masters", he said.

And those masters are intriguing in themselves.

Those original masters were recorded on Scotch 111 tape, offering "...huge particles. It was like early Agfa. You could do anything to it and it kept on ticking. Incredible tape. We've been very careful with our stuff all these years. We've kept the tapes in excellent condition, the environment at the Hollywood Vaults (a storage facility designed from the ground up for long-term preservation of film and tape) has the best archive in the world in terms of standards".

You can experience this album via a new 50th year anniversary set from Rhino featuring three CDs and a vinyl disc. In the set there's the original album newly remastered by Botnick, two bonus discs of unreleased studio out-takes and the stereo mix of the original album on vinyl. The music will also be available from digital and streaming services the same day, as will a new Dolby Atmos mix of the original album by Botnick. **PR**



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