

# hi-fi news

& Record Review

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**Oppo PM-3**

High-end cans on the move

**INVESTIGATION**

**Phase distortion**

We unravel the  
musical mystery, p22

**Thales TTT-C**

Battery-driven LP spinner



• **PLUS** 18 pages of music reviews & features • **VINYL RE-RELEASE** Led Zeppelin's debut on 180g vinyl  
• **OPINION** 12 pages of letters & comment • **VINTAGE REVIEW** A&R Cambridge's inaugural A60 amp  
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FREE! Audioquest's NRG-X3 power cable See page 88



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**RIGHT:** Oppo's headphones just keep getting better, and more affordable! We bench test the 'portable' PM-3 planar magnetics on p62



**ABOVE:** Cambridge Audio's flagship network player, the '851N, on p42

**N**ever let it be said that *Hi-Fi News* doesn't respond to the issues, questions and misconceptions that keep its readers up into the wee small hours, even if it means sacrificing the odd sacred cow. So when one enthusiast wrote to us about the thorny subject of 'phase distortion' we thought it an obvious candidate for this month's Investigation feature.

The topic of audio phase, encompassing group delay and phase distortion, has grown into something of an cryptic *cause célèbre* for some in hi-fi's chattering classes. But, as our in-depth exploration of the subject reveals, such concerns are far from groundless. Point is, this is no new blight on our quest for supreme sound quality, rather a fact of engineering life that much of the audio industry conveniently steps over, if not entirely ignores, for years at a stretch (see p22).

On the other hand, those hi-fi boffins that regularly push at the boundaries of audio excellence have recently proved adept at trickling-down flagship technologies into new products that are slightly more affordable.

At one extreme we have Oppo with a closed-back version of its planar magnetic headphone, stripped down for life on the move. On the other

there's Constellation Audio, famous for establishing itself almost overnight as the 'next big thing' in cost-no-object high-end amplification. The price of its Reference series components is sufficiently high that it might as well be in orbit, so the new Inspiration preamp and stereo power amp at 'just' £10k each mark a return to earth with no

## 'Constellation's new amps mark a return to earth with no bump'

bump, leaving the sound still up with the gods (see p34).

Neither is our other cover star, KEF's new and statuesque Blade Two, a mere pocketknife loudspeaker, distilling all that makes the original Blade great down into a very room-friendly package. In many respects it sets new technical standards (p28).

Oh yes – and I hope new and long-term readers alike will enjoy the return of the traditional *Hi-Fi News* cartoon on p112!

**PAUL MILLER EDITOR**

MARTYN ATKINS

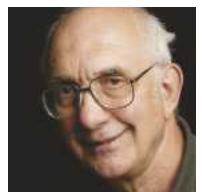


**VINYL:** Jeff Lynne's punk-defying triumph, ELO's *Out of the Blue*, is this month's Vinyl Icon (p78), while Steve Sutherland restores history as Led Zep's eponymous album is re-released on 180g vinyl (p76)

**RIGHT:** *Hi-Fi News & RR* is the exclusive UK representative of EISA's Hi-Fi Expert Group and editor Paul Miller is EISA's Hi-Fi Expert Group Manager



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has written about hi-fi for 30 years, and edited *Hi-Fi Answers* for nine. KH performs our speaker and headphone lab tests



**STEVE HARRIS**  
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Foremost collector and archivist of vintage hi-fi, famous for the UK's bi-annual Audio Jumble, John shares his experience with *HFN*



**STEVE SUTHERLAND**  
Worked on *Melody Maker* and then edited *NME* from 1992-2000, the Britpop years. Steve brings a unique slant to our Vinyl Release pages



# Focal Sopra

'UTOPIAN' INNOVATION TRICKLES DOWN TO A NEW LOUDSPEAKER RANGE

Utilising much of the driver, crossover and cabinet technology developed over nearly 20 years for its Utopia range of luxury loudspeakers, Focal has squeezed this know-how into two new models dubbed 'Sopra'. The Sopra No1 is a 2-way standmount, priced at €8000 including steel stand and toughened glass base, while the larger Sopra No2 (pictured, right) is a 3-way floorstander, priced at €12,000. Five finishes are offered at the same cost and include lacquered Black, Carrara White (white with a hint of grey), Electric Orange, Imperial Red and Dogato Walnut (with a gloss black baffle).

Both loudspeakers are reflex-loaded, both rated at a nominal 8ohm but with a 2dB difference in sensitivity between the 89dB No1 and larger 91dB No2. Again, both designs share

Focal's patented 25mm IHL (Infinite Horn Loading) beryllium tweeter which works into a shaped cavity that opens at the rear of the cabinet. Both Sopras' are also equipped with a 165mm 'W Sandwich' bass/mid driver – the cone comprising two layers of fibreglass with a plexiglass foam filling – incorporating 'tuned mass damping' resonance control and an improved motor system with a narrow Faraday ring dubbed 'NIC' (Neutral Inductance Circuit).

The extra cabinet volume afforded the Sopra No2 also accommodates two extra woofers – a pair of 180mm 'W Sandwich' drivers that extend the low frequency response down to a claimed 28Hz. The Sopra No2 is quite a bit heavier too – 55kg vs. 19kg.

**Focal-JM Lab UK Ltd, 0845 660 2680; [www.focal.com](http://www.focal.com)**



## Up tempo server

MÉTRONOME RANGE EXPANDS



Last year [*HFN* Dec '14] we reported that Métronome Technologie founder Dominique Giner had transferred management of the company to French audiophiles Christian Bat and Jean Marie Clauzel. Giner remains as designer and a raft of new products have been promised, including its 'Le Player' disc spinner which we review this month [see p46].

Now its CD8 Signature CD player and DSD-ready C8+ two-box DAC solution have been formally announced alongside its first foray into the world of media servers. The Music Centre 1 (or MC1) includes a slot drive and automated CD ripper with onboard HDD storage to accommodate 'all high resolution file formats'. The MC1 is driven by a bespoke smartphone/tablet app and includes wireless and wired Ethernet connections, USB inputs and outputs plus legacy S/PDIF and AES/EBU connections. **Métronome Technologie, 0208 971 3909 [www.metronome-technologie.com](http://www.metronome-technologie.com)**

## HI-FI NEWS' NUGGETS

### KEF GETS AHEAD

KEF's latest 'Personal and Digital Audio Range' includes several additions to its M-series headphones. Key newcomer is the £200 M400 portable on-ear headphone that features a 'sleek and robust design' incorporating a full-range 40mm driver with neodymium magnet, high-density memory foam ear pads and in-line mic and volume controls compatible with most iOS and Android devices. Available in Racing Blue, Sunset Orange, Deep Black and Champagne White colours, the M400 weighs a mere 175g. [www.kef.com](http://www.kef.com)

### RHODIUM STYLUS

Prolific cable innovator, Black Rhodium, has announced two new interconnects for tonearm-to-phono stage duty. The £350 Stylus and £500 Stylus VS-2 employ separately screened conductors with silver-plated copper cores and low-loss PTFE insulation. Rhodium-plated DIN and GN-3 RCA plugs are offered. [www.blackrhodium.co.uk](http://www.blackrhodium.co.uk)

## French fidelity

AUDIOMAT BRAND LANDS IN THE UK

Founded over 25 years ago, the French Audiomat brand has grown to encompass a considerable range of tube amplifiers, a CD/SACD transport, no fewer than four USB DACs and two streamer/media rendering products. Now available in the UK via Ikon Audio Consultants, Audiomat is hoping its 30W (up to a claimed 23W in Class A) tube integrated – the £3295 Aria – will tempt anglo-audiophiles. The tube complement includes 3x6X4 double-triodes and two pairs of EL34 output pentodes. **Audiomat, 07956 476299; [www.audiomat.fr](http://www.audiomat.fr), [www.ikonaudioconsultants.com](http://www.ikonaudioconsultants.com)**



## Wilson Audio Sabrina

UNASSUMING FLOORSTANDER IS PACKED WITH KNOW-HOW



The trickle-down trend has not escaped Wilson Audio's attention as its diminutive Sabrina floorstander clearly illustrates. Priced at £14,498 this new model is a 'distillation of everything Wilson Audio has learned in three decades of loudspeaker design'. As such, the Sabrina's front baffle is

made from Wilson's proprietary composite X-Material, the woofer is the same 8in unit employed in the Alexia while above the 5in mid driver is a specially adapted version of Wilson Audio's Convergent Synergy Tweeter.

**Wilson Audio, 0208 971 3909; [www.wilsonaudio.com](http://www.wilsonaudio.com)**

## AR takes on A&K

UPMARKET HI-RES PORTABLE PLAYER BOASTS TOP-END SOUND

Continuing the 'reboot' of Acoustic Research [see p68], the 60-year old brand has announced its first hi-res portable player, the £899 AR M2. Featuring a top-end PCM1794A DAC, quad-core processor, high current Class A headphone amp (rated at 250mW/32ohm) and 'audiophile grade' ALPS volume pot, the AR M2 also includes 64GB of storage and full Wi-Fi streaming. **Acoustic Research (AR), Vox International Corp, Hong Kong, 07734 064360; [www.acoustic-research.com](http://www.acoustic-research.com)**



## Icon Audio CDX2

TOP-LOADING CD WITH TUBE-BASED ANALOGUE STAGE

The compact disc may have been with us for over 30 years but Icon Audio is just launching its second-ever player, the £995 CDX2. More affordable than the earlier CDX1 model, this new CD spinner features a top-loading mechanism and contemporary 192kHz/24-bit upsampling digital section.

However, the real core of this player lies in its Class A, all triode valve output stage. Selected T J Full Music or original Mullard valves are employed here while, as the CDX2 player is assembled in the UK, Icon

Audio offers a range of 'David Shaw Signature' upgrades including Jensen copper foil oil-in-paper capacitors and premium 'new old stock' valves (price on application).

**Icon Audio, 0116 244 0593; [www.iconaudio.com](http://www.iconaudio.com)**



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## Upcoming Events

IMPORTANT DATES FOR YOUR HI-FI DIARY

- |                  |   |
|------------------|---|
| <b>29-31 MAY</b> | T.H.E. Show, Hilton Hotel, Newport Beach, CA, USA   |
| <b>28 JUN</b>    | N. West Audio Show, Cranage Hall, <a href="http://www.audioshow.co.uk">www.audioshow.co.uk</a>  |
| <b>04-09 SEP</b> | IFA Berlin, The International Funkausstellung, Germany<br><a href="http://b2c.ifa-berlin.de">http://b2c.ifa-berlin.de</a>                 |
| <b>16-18 OCT</b> | High End Swiss 2015, Hotel Moevenpick Zuerich Regensdorf, Switzerland; <a href="http://www.highendsociety.de/">www.highendsociety.de/</a> |
| <b>24-25 OCT</b> | The Hi-Fi Show Live 2015, Beaumont Estate, Windsor;<br><a href="http://www.hifinews.co.uk/show">www.hifinews.co.uk/show</a>               |



# Stockholm High End 2015

Words & pictures: Jonas Bryngelsson, Per Sundell, Mats Meyer-Lie



As was the case last year, the Stockholm High End Fair straddled two venues, with most exhibitors taking up residency at the Sheraton hotel while others chose the palatial surroundings of the Lundqvist & Lindqvist hotel just steps away. Visitors revelled in the sound of mighty systems comprised of components from the likes of Martens, Focal, dCS and Nelson while there was no shortage of valves, vinyl and headphones too. There was even an early demonstration of Meridian's MQA technology.

Meridian Audio demonstrated one of the most interesting new technologies at the show, namely the company's MQA super audio standard for HD streaming and downloading [see p21 and *HFN* Apr '15]. A Sooloos Streamer was used as source, hooked up to a Meridian 818 preamplifier (left). [www.meridian-audio.com](http://www.meridian-audio.com)



Advance Acoustic's X-L1000 is a three-way floorstander assembled in France. Standing 125cm tall, it comprises three independent MDF cabinets, each decoupled in a bid to control unwanted vibrations. The top cabinet houses a neodymium magnet ribbon tweeter measuring 125x35mm. [www.advance-acoustic.com](http://www.advance-acoustic.com)



This little cracker is the W5 standmount from Swiss company Boenicke Audio. Measuring just 30x10.4x20cm (hwd) it is designed to sit as happily on your desktop as a stand, thanks to four custom-made springs on its base. It's available in walnut, ash, oak and cherry. [www.boenicke-audio.ch](http://www.boenicke-audio.ch)



Swedish recording engineer Jan-Eric Persson (left) was in attendance with a wide selection of audiophile recordings released over the years on his Opus 3 label – the independent record company he founded back in 1976. One could not only buy these audiophile offerings but listen to the discs through headphones via TEAC's little 500 system with DSD conversion. [www.opus3records.com](http://www.opus3records.com)



PL Audio celebrated its 20th anniversary with a system that was one of the event's major draws: Focal's Stella Utopia EM loudspeakers coupled to a Pass Labs Xs preamp and Xs300 monoblocks – the company's latest flagship power amp with standalone power supplies. The source was just as ambitious: a four-box dCS Vivaldi. The sound? A sledgehammer wrapped in silk, as we say in Sweden. [www.focal.com](http://www.focal.com); [www.passlabs.com](http://www.passlabs.com)



Many visitors were curious about the exotic-looking Continuum Criterion turntable with its Copperhead tonearm. The deck features a 'nested platter' that weighs 30kg in total and measures 330mm in diameter. An inverted 30mm bearing shaft runs in steel bushings while the motor boasts proprietary DSP software 'designed for ultra-low cogging'. The turntable fed Engström & Engström's The Lars amplifiers with their mighty 300B XLS triodes, hooked up to Tannoy Prestige speakers. [www.continuumaudiolabs.com](http://www.continuumaudiolabs.com)



We were among many who were taken aback by the sheer sophisticated sound of these planar magnetic headphones. Custom made in the US by JPS Labs for Abyss, the AB-1266 may look brutal with their pitch black anodised aluminium sides and aluminium headband but in the grip of a Chord Hugo DAC/headphone amp the sound caressed the ears. [www.abyss-headphones.com](http://www.abyss-headphones.com)

Marten showed its majestic Coltrane Supreme 2 loudspeaker. Standing 200cm tall and sporting no fewer than ten front-facing drivers (including two diamond tweeters) it was driven by several thousand watts of amplification from German company Analog Domain. Unfortunately, the AD rep pushed the power to 2kW, blowing the speakers' tweeters and midrange. Only after several frenetic round trips to Germany was normal service restored. [www.marten.se](http://www.marten.se)





# High End – Made in Germany



Master Innovation

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Designed by Mark Levinson, the M1 speakers from Swiss-based company Daniel Hertz sport a 3in high frequency horn, 12in mid driver and an 18in woofer. The company has limited the dynamic range 'to around 126dB for ear safety reasons'. Electronics are Nagra. [www.danielhertz.com](http://www.danielhertz.com)

ENIGMAcoustics' Mythology M1 is one of the most remarkable speakers on the market right now, thanks to a frequency response said to reach a bat-friendly 40kHz when the 34mm tweeter and 7in mid-woofer are used with the optional 'self-biased' Soprano electrostatic supertweeter. [www.enigmaacoustics.com](http://www.enigmaacoustics.com)



Sennheiser was out in force with all manner of models from its Music & Entertainment series. Pictured are headphones from its Momentum line-up, which offer Bluetooth connectivity, noise cancellation plus headbands and earpads made of soft leather. [www.en-uk.sennheiser.com](http://www.en-uk.sennheiser.com)



Pictured here is Violalabs' Crescendo preamp racked above the company's Concerto power amp. The pre can be controlled via Wi-Fi using an app and features a USB DAC input compatible with music files up to 192kHz/24-bit. Meanwhile, the matching power amp delivers a claimed 125W into 8ohm. [www.violalabs.com](http://www.violalabs.com)

The Line Magnetic LM-501 IA integrated amp hails from China. Tube complement is a single 12AU7, twin 66SN7s and 12AX7s with four KT120 valves said to kick out 100W per side. Other niceties include point-to-point wiring throughout, 4, 8 and 16ohm speaker terminals, four line-ins, remote control of volume and a fascia coloured gold! [www.lm-audio.com](http://www.lm-audio.com)



This adorable little loudspeaker is the Micra III from Italian company Diapason. It features a 26mm soft dome tweeter, 110mm bass driver and claimed sensitivity of 88dB. Dimensions are 205x285x280mm. Driven by a Line Magnetic LM-2181A amp it was a sound to be enjoyed in the company of a glass or two of Franciacorta. [www.diapason-italia.com](http://www.diapason-italia.com)







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THUCYDIDES - Athenian Historian - 460 BC - 395 BC



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Andy Luckham of Meridian Audio takes questions from showgoers about the company's new MQA technology. His presentation may have taken place in one of the smallest rooms at the event, but the Meridian DSP5200SE speakers used for the dem left everyone impressed with the sound. [www.meridian-audio.com](http://www.meridian-audio.com)

It may have a hammered enamel finish and silver brushed enamel fascia – unlike the LM-501 IA pictured p19 – but this is one of Line Magnetics' more lavish amps. The LM-210 IA is a single-ended integrated using 300B valves in the output stage along with 310B driver tubes and twin 12AX7 input tubes. Said to produce 8W per channel, the LM-501 IA also offers a 'Japanese grade' ALPS volume control, four inputs and terminals to take 4, 8 or 16ohm loudspeakers. [www.lm-audio.com](http://www.lm-audio.com)



Thorens showed its new TD 203 turntable which it hopes will appeal to buyers of entry-level decks as it's supplied pre-assembled and is designed to be up and running out of the box. The arm is a unipivot type and comes fitted with a TAS 257 MM cartridge. [www.thorens.com](http://www.thorens.com)

The Model S-15 speaker is part of Steinway Lyngdorf's smallest system. It measures just 26x20x7.9cm (hwd) and features an AMT tweeter plus DSP room correction. [www.steinwaylyngdorf.com](http://www.steinwaylyngdorf.com)



Time to unleash your inner teenager! First released in 1957, the Heresy from Klipsch is now in its third iteration and, at 23.8cm tall, has to be one of the shortest floorstanders we've clapped eyes on. Beneath the Tractrix horn sits a 30cm woofer while mounted above it is a 2.5cm tweeter. Finishes are Walnut, Cherry and Black Lacquer. [www.klipsch.com](http://www.klipsch.com)



Jeff Rowland's diminutive preamp, Capri, was on display in the room of Swedish distributor, Perfect Sense. The preamp is said to be environmentally friendly, drawing just 6W of power in Class A. Optional phono cards are available to enable it to be used with vinyl sources. [www.jeffrowlandgroup.com](http://www.jeffrowlandgroup.com)

Next  
month  
We report from the  
Munich High End Show

# Fazed by phase?

Keith Howard explains phase and examines its effect on sound quality

**RIGHT:** The KEF KUBE was an electronic equaliser designed to be used in a tape loop or between a preamp and power amp. It enabled a speaker's effective cut-off frequency to be pushed down to below 20Hz. The effect on sound quality was surprising

**BELOW:** To provide accurate time alignment of its three drivers, the 'linear-phase' B&W DM6 of 1976 was one of the first to use a stepped baffle. Because of its novel appearance it was nicknamed 'the pregnant penguin'

Phase is a subject that tends to fascinate and confuse audiophiles in equal measure. As this article will attempt to explain, actually there is no mystery to it. But the effect of phase on sound quality – an issue made pertinent again by the increasing use of digital signal processing – is controversial, and has been for many decades.

To illustrate that last point, what follows are three snippets of audio history – all related to phase performance – that older readers may recall but our younger audience may never have encountered. Interesting not merely as historical items, they remain relevant because, surprisingly, the issues they raise remain largely unaddressed to this day. Later in the article I will explain those issues in more detail.

## FILLER DRIVERS

In 1975 Danish manufacturer Bang & Olufsen (then less a colour supplement brand than it is today) introduced a novel concept called the filler driver, first described in an Audio Engineering Society paper portentously entitled 'Loudspeakers – The Missing Link' written by Erik Baekgaard. At the time B&O was perhaps uniquely focused on phase performance whereas the subject was largely ignored elsewhere.

The previous year two other B&O researchers, Villy Hansen and Eric Madsen, had set the scene with earlier AES papers – 'On Aural Phase Detection: Part 1' and 'On Aural



Phase Detection: Part 2' – which questioned the generally held view that phase effects in audio equipment are inaudible.

Baekgaard's paper described B&O's practical response to this research, which would later come to market in the Beovox Uni-Phase M75 and M100 loudspeakers. These were four-way and five-way designs respectively, but one of the drive units – the so-called filler driver – had an unconventional role. It was included for one reason and one reason only: to cancel the phase distortion (I'll explain this term shortly) introduced by the woofer-to-midrange crossover.

A brief flurry of interest in 'linear-phase' loudspeakers notwithstanding, including the launch of the stepped-baffle B&W DM6 in 1976, the idea didn't catch on and both B&O and B&W eventually dropped it.

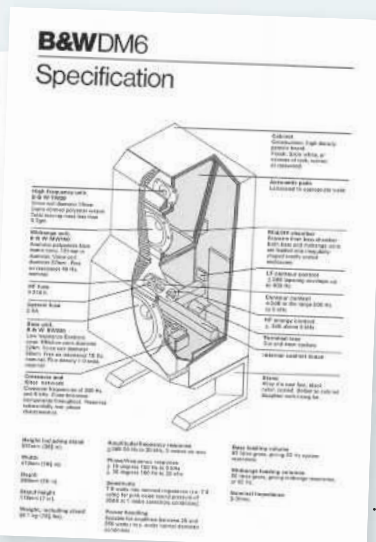
It was the following decade, in 1985 to be precise, that another aspect of loudspeaker phase behaviour came under scrutiny, this time in an AES paper by Laurie Fincham, then technical director at KEF Electronics.

*'It's as if the hi-fi industry has shut its ears to phase distortion'*

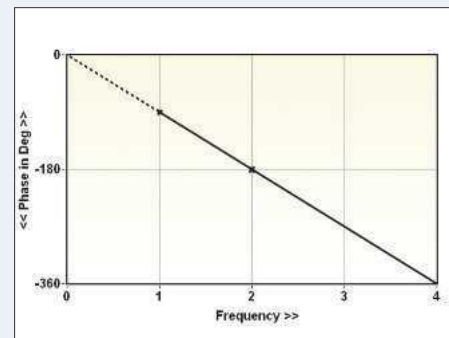
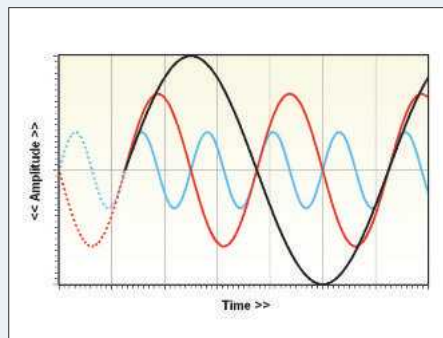
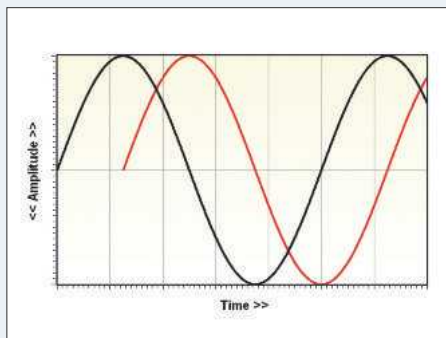
Entitled 'The Subjective Importance of Uniform Group Delay at Low Frequencies' it explored the audible effect of the phase distortion associated not with loudspeaker crossovers but with a loudspeaker's bass roll-off.

KEF had built an electronic equaliser to allow a speaker's effective cut-off frequency to be pushed down to 5Hz, three octaves or so below that typically achieved by an uncorrected loudspeaker, and the effect on sound quality proved to be surprising.

As Mike Gough, also at KEF at the time, recalled in *50 Years of Innovation In Sound*, the 2011 book celebrating the 50th anniversary of KEF's founding, 'Listening to a system that was truly flat down to 20Hz was weird, and not what you







would expect. You didn't always hear more bass... but male voice lost all its chestiness and we began to realise that what you heard as chestiness, what you thought was an excess of bass, was actually the transient response of the bass roll-off... Move that group delay... out of band and everything sounds much more natural.' KEF went on to market its equaliser as the KUBE (KEF Universal Bass Equaliser) but – not least because audiophiles were suspicious of the op-amps inside it – it wasn't a commercial success.

In his AES paper Laurie Fincham had remarked: 'Listening tests... indicate that a reduction in group delay [ie, phase] distortion at low frequencies is probably worthwhile only when the recorded material is itself also free from such distortion.'

Indeed KEF had made an orchestral recording especially for the listening tests, using a digital recorder and B&K 4133 pressure microphone, to ensure extended low frequency response, and minimum

phase distortion, in the source material. But while digital recording offered up the means for achieving this in a way that analogue had not, that didn't mean that commercial digital recordings always delivered; there were still many potential sources of low frequency roll-off in the signal chain. And, of course, there was – and still is – a large archive of analogue recordings.

This was a theme picked up on a few years later by Michael Gerzon when working as a consultant for B&W on an early digital room correction system that – despite being demonstrated to the press and extensively publicised – never saw the light of day as a commercial product as it was cancelled at the eleventh hour.

### HALF THE STORY

Calling the B&W project a digital room correction system is actually only half the story because it also acted as a loudspeaker equaliser. In particular, it was able to do

**ABOVE LEFT:** [Fig 1] Two sine waves of the same frequency, one (red trace) displaced relative to the other by a time delay equivalent to a quarter-wavelength

**TOP:** [Fig 2] Three sine waves, doubled in frequency (F, 2F, 4F) subject to the same time delay. As the delay is equivalent to a quarter-wavelength for the lowest frequency, it equals a half-wavelength and a full wavelength for the two higher frequencies, as shown by the dotted traces

**ABOVE RIGHT:** [Fig 3] Plotting the phase shifts vs frequency for the three sine waves of Fig 2 we find they form a straight line which passes through the origin (0,0)

**LEFT:** Beovox Uni-Phase M75 and M100, each with filler driver to cancel phase distortion

something that Laurie Fincham in his experiments had not: to correct the low frequency phase response of a loudspeaker without affecting its frequency response, ie, without extending the roll-off to infra-bass frequencies as KEF's analogue equaliser had done.

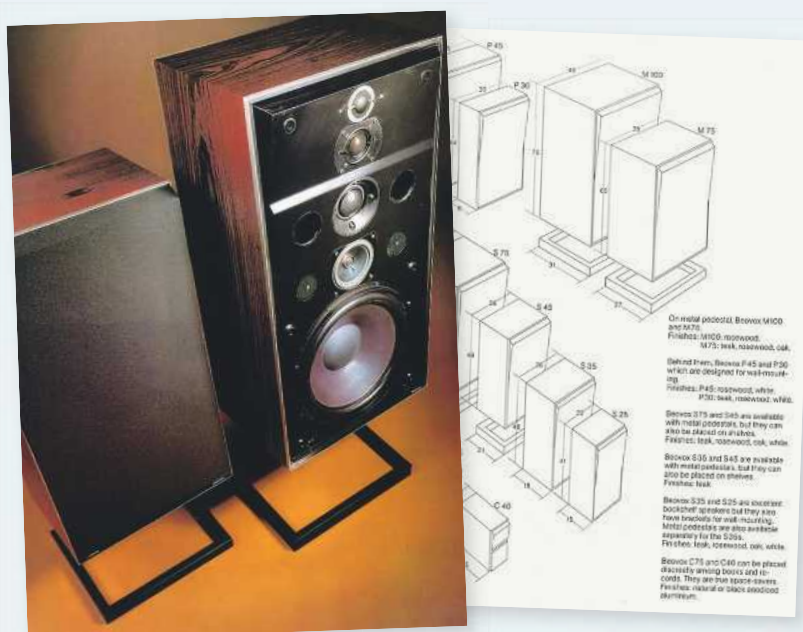
Intriguingly the phase correction appears, according to articles Stan Curtis wrote about the project [HFN Dec '91 and HFN Jan '92], to have had a more obvious effect on sound quality than the room correction system, or at least certainly in better-behaved rooms.

Gerzon himself wrote of it (in an article entitled 'Digital room equalisation' written for *Studio Sound* and downloadable from the Gerzon Archive at [www.audiosignal.co.uk](http://www.audiosignal.co.uk)): 'The subjective effect of phase compensation of the bass from loudspeakers is very marked, giving a much tighter and more "punchy" quality, with greater transparency, and interestingly a subjective extension of bass response of a least half an octave.'

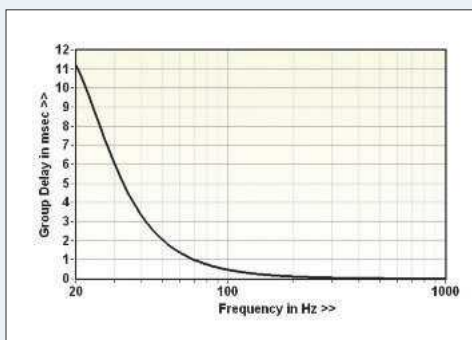
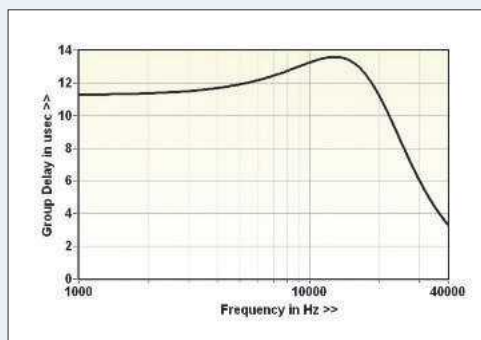
In the higher-spec of what were two planned versions of the B&W processor, low frequency phase correction was not just limited to correcting for loudspeaker phase but could be adjusted 'to correct for phase changes that have developed through the recording process'. In other words, to correct for low frequency phase distortion in the source material too.

### WHAT'S CHANGED?

In the 40 years that have elapsed since B&O conceived the filler driver, how much has changed in respect of the phase distortion introduced by loudspeakers? Actually, very little. Most speakers – with the exception of passive designs using first-order networks and DSP-equipped active speakers using digital linear-phase



## INVESTIGATION



filtering – still introduce phase distortion in their crossovers, and if anything the problem of phase distortion at bass frequencies has become exacerbated by the preponderance of reflex-loaded designs, which have now largely replaced sealed box types.

It's almost as if the hi-fi industry at large has determined to shut its ears to phase distortion. And yet experiments I've conducted with crossovers and bass correction have convinced me that its deleterious effects are discernible – and a few others in high-end audio agree.

### WHAT IS PHASE?

So what exactly is phase distortion, and how and where does it occur? To answer these crucial questions first we have to understand what phase is, then we have to grasp the significance of how phase behaves relative to frequency.

Figure 1 shows two sine waves which have the same frequency and amplitude but are slightly out of step. We can express their misalignment directly as a time delay or indirectly in terms of a phase difference, expressed in angular units of either degrees or radians. As degrees are the more familiar unit, we will use them in what follows. In this example the two waveforms are offset by one quarter of a wavelength so, as a whole wavelength is equivalent to 360°, there is a phase difference between them of 90°.

In Figure 2 we go a vital step further, with three sine waves of different frequency (and different amplitude to make them clearer). If the first has a frequency  $F$  then the second has a frequency double that ( $2F$ ) and the third a frequency quadruple the first ( $4F$ ). All have exactly the same time delay relative to the common reference point

**ABOVE LEFT:**  
[Fig 4] Group delay (in microseconds) for second-order Butterworth low-pass filter with a corner frequency of 20kHz. The filter introduces an almost (but not quite) constant time delay up to 20kHz, so its phase distortion is modest

**ABOVE RIGHT:**  
[Fig 5] Group delay (in milliseconds) for a second-order Butterworth high-pass filter with a corner frequency of 20Hz. Unlike the low-pass filter of Figure 4, here the group delay varies considerably within the audible frequency range, so phase distortion is large

represented by the vertical axis to the left, equivalent to 90° phase for the lowest-frequency sine wave. Because the frequency of the second sine wave is doubled, its phase delay is doubled too to 180°; likewise, the phase delay of the third sine wave is quadrupled to 360°.

If we plot these phase values on a graph versus frequency, we obtain Figure 3. Joining up the points (represented by crosses) we find that we have a straight line that passes through the origin (zero phase at zero frequency).

In other words, a constant time delay is equivalent to a linear phase versus frequency response, and vice-versa: if a system displays straight-line phase versus frequency and has zero phase at zero frequency, then it imposes a constant time delay.

When a complex signal like music, comprising many different frequencies, is passed through such a 'linear-phase' system, it emerges with the original waveform intact. Whereas if the phase versus frequency response is not a straight line, the different frequency components of a complex signal will be delayed by different amounts and the waveform will be altered.

This is what phase distortion is: non-constant time delay resulting in alteration of a complex signal's waveform. As such it is a linear distortion as opposed to a nonlinear distortion (such as harmonic or intermodulation distortion) because it doesn't introduce new frequencies to the signal. Rather, it alters the relationship between the signal's constituent frequency components.

Unfortunately it is not generally the case that audio equipment is linear-phase. Most of the items

that make up a complete audio chain – microphones, amplifiers, loudspeaker drive units – are not linear-phase by nature but 'minimum-phase' instead. What this means, in effect, is that they have (near-) linear-phase response within their passbands (where the frequency response is flat or thereabouts) but not at either frequency extreme where the response rolls off. Here they introduce phase distortion, changing the waveform of complex signals by more than that due to the amplitude changes inherent in the roll-off.

### DELIBERATE ROLL-OFF

Both high-pass and low-pass roll-offs result in phase distortion but, of the two, high-pass roll-offs are much the worse. One result of this is that while it's common for direct-coupled power amplifiers to have a low frequency corner frequency of around 2Hz, an order of magnitude lower than the 20Hz

nominal lower limit of human hearing, at the other frequency extreme it's unusual for bandwidth to extend out to 200kHz, an

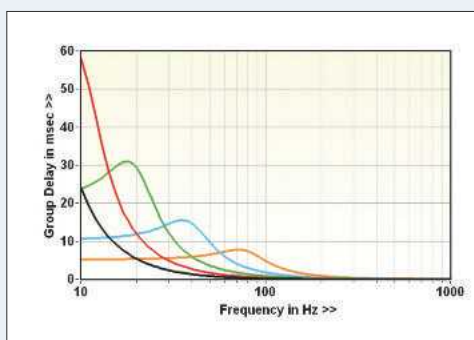
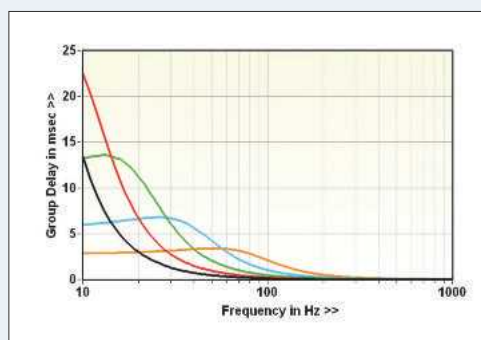
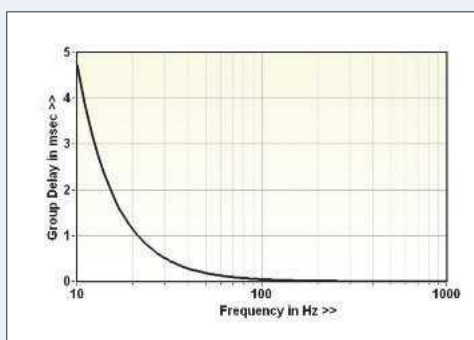
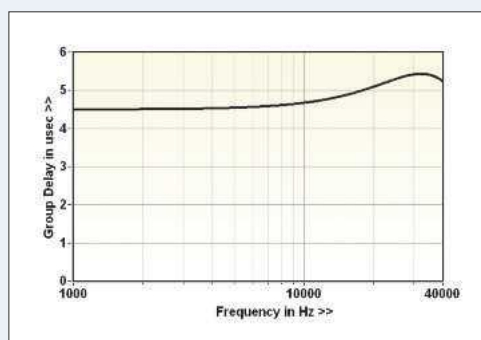
order of magnitude higher than our hearing's 20kHz nominal upper limit.

In fact the frequency response of many power amplifiers is deliberately rolled-off not far above 20kHz. Designers can get away with this because the consequences in respect of phase distortion are much less than for a high-pass roll-off at low frequencies.

This disparity in the severity of phase distortion introduced by high-pass and low-pass roll-offs is easily shown using graphs of group delay versus frequency, where group delay is defined as the negative of the local slope of the phase versus frequency curve. (There are alternative measures of phase linearity but this is the most commonly used.)

In a linear-phase system the group delay is constant with frequency and has a value equal to the time delay introduced by the system, whereas in non-linear-phase systems the group delay versus frequency curve is not flat over the

*'Phase distortion doesn't introduce new frequencies to the signal'*



entire frequency range, although it may be over part of it.

As examples let's look at the group delay versus frequency for second-order (12dB per octave roll-off) maximally flat high-pass and low-pass filters at 20Hz and 20kHz respectively. ("Maximally flat" means that the frequency response

**TOP: [Figs 6 and 7] Group delays at low and high frequency after corner frequencies of Figs 4 and 5 are moved to 50kHz and 2Hz**

**ABOVE LEFT: [Fig 8] Low-frequency group delay for closed-box loudspeakers with a maximally flat resp. Corner freqs. 5Hz (black trace), 10Hz (red trace), 20Hz (green trace), 40Hz (cyan trace), 80Hz (orange trace)**

**ABOVE RIGHT: [Fig 9] Low-frequency group delay for vented-box (reflex) loudspeakers with a maximally flat (B4) response**

**LEFT: Meridian's DSP7200SE has a linear-phase mid-treble crossover**

is as flat as can be achieved, without ripples or peaking near the corner frequency; such filters are alternatively known as Butterworth types.) The results are shown in Figures 4 and 5.

In the case of the low-pass filter with a corner frequency of 20kHz [Fig 4] the group delay curve is pretty flat over much of the 20Hz-20kHz passband, *ie*, the filter introduces an almost constant time delay. Only as the corner frequency is approached does the group delay change, and then not by very much. In other words, the phase distortion introduced by this filter is small.

Contrast this with the behaviour of the 20Hz high-pass filter, shown in Figure 5. Here the group delay is anything but constant versus frequency and so the resulting phase distortion is large.

If we lower the high-pass corner frequency to 2Hz and raise the low-pass corner to 50kHz, making the situation more typical of an amplifier, then the group delays at low and high frequency are as shown in Figs 6 and 7 (note here that the low frequency graph, Fig 7, now extends down to 10Hz). Group delay due to the low-pass roll-off varies by just 4.5 to 5.1µs up to 20kHz, while at 20Hz the group delay is limited to less than 1.2ms at 20Hz.

Such an amplifier introduces very little in the way of phase distortion

across the audible spectrum, particularly when compared to the loudspeakers it will typically drive.

It should never be forgotten that concatenating (chaining) filters with benign phase distortion may result in overall phase distortion that is audible. (Perhaps worse, accumulated filtering also progressively degrades system transient response.)

But for potentially troublesome, *ie*, audible, phase distortion we must look to loudspeakers, trusting that the engineers who make music recordings strive to minimise low frequency and high frequency phase distortion in our source material. (This may be wishful thinking and is probably worth an Investigation of its own.)

## VENTED SPEAKERS

As we've seen, loudspeakers principally introduce phase distortion at low frequencies, because of the minimum-phase bass roll-off, and in-band at the crossover frequencies. Let's begin with the former. Figure 8 shows overlaid group delay versus frequency plots for closed box loudspeakers with system Q of 0.7071 (Butterworth alignment) and octave-spaced bass resonance frequencies of 5, 10, 20, 40 and 80Hz respectively.

Figure 9 repeats Figure 8 but for a vented (reflex) loudspeaker, again with a Butterworth (B4) alignment. Due to the fact that vented loudspeakers have a steeper, fourth-order (24dB per octave) roll-off, not the second-order (12dB per octave) roll-off of closed box bass loading, their phase distortion is greater – although there are better behaved reflex alignments than the one illustrated here. Filter-assisted reflex alignments, with sixth- or higher-order roll-offs, are worse still.

What can be done about audible LF phase distortion in loudspeakers? The 'simple' solution is to push the bass corner frequency low enough to obviate it – what KEF did with the KUBE. But with a passive speaker this requires an external equaliser that may impact on sound quality in less desirable ways.

In an active speaker or powered subwoofer the equalisation can be applied internally and restricted to the LF section but the extension of frequency response to infra-bass ➔





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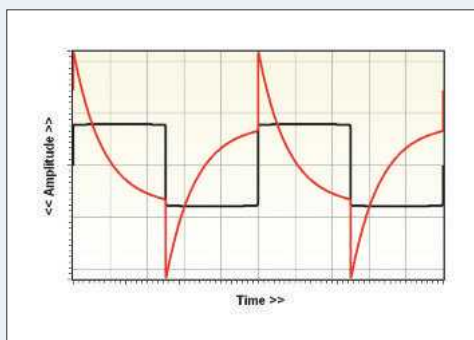
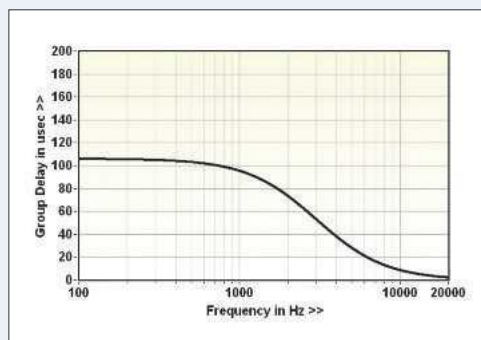
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**ABOVE:** [Fig 10a, left] Group delay (in microseconds) versus frequency for a second-order Linkwitz-Riley crossover network (low-pass plus high-pass) at 3kHz with [Fig 10b, right], the effect on a square wave at the crossover frequency. Black trace is the square wave input, red trace is the crossover output

frequencies means that digital sources are mandated, and even some digital recordings will have very low frequency content that overloads the bass driver. Vinyl replay would do this pretty much all of the time.

A DSP solution which doesn't require the frequency response to be pushed down to, say, 5Hz makes overload less likely. As an example, Meridian has patented such a system (WO 2014/106756) which is now deployed in its latest-generation DSP speakers under the name of EBA – enhanced bass alignment.

## 'Measuring speaker phase distortion is not straightforward'

### DRIVER CROSSOVER

The second area in which loudspeakers generate phase distortion is at crossover between drive units. Of the classic passive crossover alignments, only the first-order crossover – with high-pass and low-pass slopes of 6dB per octave – is linear-phase but it brings with it significant disadvantages (on which there is no room to expand here). Higher-order passive filters are more commonly used, therefore, but they are not linear-phase. Rather they have 'all-pass' characteristics – the name given to any circuit or device that has a flat frequency response but a non-linear phase response.

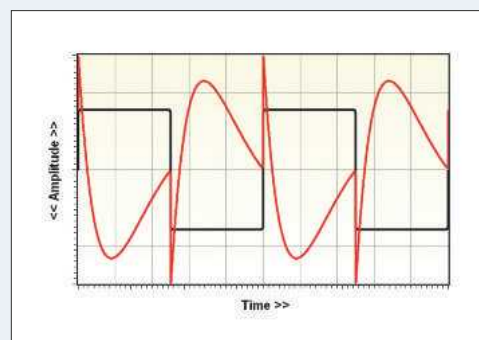
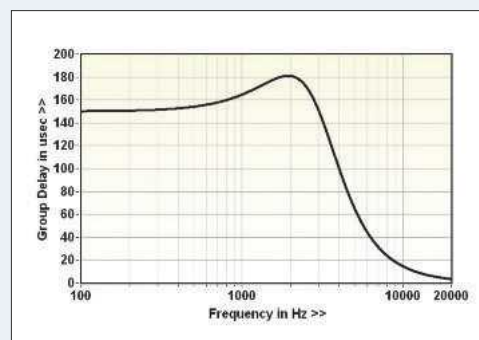
Figs 10a and 11a illustrate this for two popular crossover types, the second-order and fourth-order Linkwitz-Riley (aka double-Butterworth or Butterworth-squared) alignments. In addition to showing the graph of group delay versus frequency, these two figures also illustrate the resulting change in waveform for a square wave at the crossover frequency (here 3kHz). Square waves are useful

to illustrate the effects of phase distortion because they comprise a fundamental plus odd harmonics (3rd, 5th, 7th, etc) at decreasing amplitudes. If the phase relationship between the fundamental and harmonics is not maintained, *ie*, if the system through which the square wave passes is not linear-phase, then the square wave's characteristic shape is modified.

The mangling of the square waves [Figs 10b and 11b] looks spectacular but is this phase distortion actually audible on music? Some industry gurus, such as Siegfried Linkwitz, have concluded that it isn't; my own experiments suggest otherwise. The subjective benefit of linear-phase crossovers may appear relatively subtle, but then subtleties are high-end audio's bread and butter. And taking a pragmatic view, it seems only sensible to use linear-phase filtering if you can, provided that nothing desirable is sacrificed.

(I explored one potential issue – the off-axis time-misalignment of steep low-pass and high-pass linear-phase impulse responses – in a 2006 article ['Digital Dangers', *HFN* April] and concluded that the effect wasn't audible.)

**BELOW:** [Figs 11a and 11b]. As Fig 10a and 10b but this time for a fourth-order Linkwitz-Riley crossover, again at 3kHz



To implement high-order crossovers that are linear-phase requires the use of digital signal processing which (ironically, given DSP's increasingly wide application) explains why phase-distorting loudspeakers remain the norm. Despite the DSP active loudspeaker having been with us since 1990, when Meridian introduced the DSP6000, speaker manufacturers have mostly fought shy of the technology despite its manifold benefits – of which linear-phase crossover filtering is but one.

### ON MEASURING...

Why does *Hi-Fi News* not publish measurements of loudspeaker phase distortion? Unfortunately, measuring it is not straightforward. As Michael Gerzon observed in 'Digital room equalisation', 'Since the very low-frequency performance of a speaker in a room is very difficult to measure, even in most anechoic chambers, the phase compensation is derived from the theoretical bass alignment of the loudspeaker...' In other words, it is much easier for a loudspeaker manufacturer to specify LF phase performance than it is for a reviewer to measure it.

A more realistic prospect is to simulate the phase performance on the basis of impedance measurement – but that won't work with an active speaker, of course.

Measuring the phase distortion introduced by crossovers has its difficulties too but is easier. Perhaps when *HFN* implements its planned online expansion of our published loudspeaker test results, as is already in place for PM's lab reports on electronic items, then we will include there a graph of group delay versus frequency. Who knows: perhaps it would encourage the loudspeaker industry at large to examine this topic anew. ☹

# KEF Blade Two

Just slightly scaled down from the big, still-current Blade, the Blade Two might be a better fit for your listening room

Review: **Steve Harris** Lab: **Keith Howard**

There aren't too many speakers that successfully escape from the traditional straight-sided cabinet form, but the tall, slim, curvy KEF Blade does so with conviction. Now we have the slightly smaller but otherwise outwardly identical Blade Two, once again available in black, white, red, grey and metallic silver. It's priced at £16,000 a pair, but for an extra £2000 you can have the speakers in one of two Kent Engineering and Foundry Edition special finishes: namely Frosted Blue or Frosted Copper Black.

Seen from the listening seat, the Blade Two lives up to its name, its narrow frontal aspect and clean sweeping lines belying its size and weight. From this viewpoint, the only drive unit visible is the Uni-Q mid/treble, centred eyeball-like in an elliptical apron of soft black rubber material. You won't be aware of the four bass units clustered behind, two facing outwards from each cabinet side.

KEF first introduced this special driver configuration in 2009 with the Concept Blade, precursor of the current Blade and Blade Two. Concept Blade was ballyhooed as 'the world's first single apparent source loudspeaker', and with this description KEF lays claim to one of the great theoretical ideals of loudspeaker design [see boxout].

The striking cabinet shape was achieved in collaboration with Eric Chan, founder and principal of New York industrial design house ECCO. With all the drive units located up around ear-height, the design had to provide the necessary cabinet volume without looking too bulky, at least from the front. Chan's solution was a shape that tapered gracefully upwards from the base, inspired by Brancusi's sculpture 'Bird In Space'.

As originally conceived, the Blade cabinet was to be constructed in laid glassfibre, but this would have been too expensive and cumbersome for continued series production. So instead, Both the Blade and Blade Two are moulded in a special composite material, a plastic that is loaded

with glass fibre. Each cabinet is made from two half mouldings which are subsequently bonded down the centre-line. Needless to say, you can't see the slightest trace of the join in KEF's peerless paint finishes. Although the initial cost of tooling was extremely high, the moulding approach made it easy to build in all the necessary partitions and other internal features, and ensured consistency.

## THE SINGLE POINT CONCEPT

Despite this radical design, the Blade and Blade Two can be seen as much evolutionary as revolutionary. That's because the technical back-story really starts in 1988, when KEF introduced its very first Uni-Q coincident-source drive unit. Uni-Q is so long-established and so well documented that it hardly needs introduction here. But for those who've been living on another

planet, the basic idea was to take a midrange (or bass/midrange) drive unit and build a tweeter into its centre.

With Uni-Q, KEF was able to approach the speaker designer's ideal of a single point sound

source. In practice the early Uni-Q designs had definite shortcomings, but KEF firmly believed in the rightness of the principle and continued to develop its Uni-Q mid/treble drive units through many iterations over the next 20 years. Then, with Concept Blade, the idea of a coincident source was extended to the bass end. Here, working in combination with the Uni-Q mid/treble, the four bass units 'are mounted symmetrically equidistant on either side, so that their acoustic centres occupy exactly the same point in space'.

By the time Concept Blade emerged in 2009, the Uni-Q unit itself was a very far cry from the 1980s combination of a simple Bextrene-coned bass and soft-dome tweeter, and included many refinements aimed at

'Blade Two can be seen as much evolutionary as revolutionary'

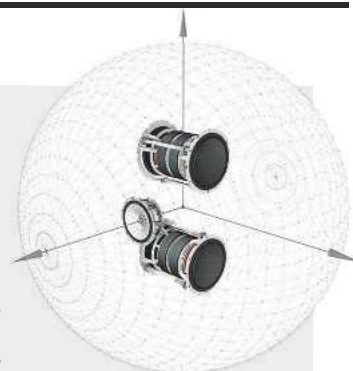
**RIGHT:** The Blade Two's sleek moulded cabinet stands on a substantial oval plinth with sturdy feet. The standard of finish is superb, with no visible fixings for the drive units





## POINT SOURCE

In acoustic theory a point source is an infinitesimally small source of sound which radiates equally in all directions, *ie*, is omnidirectional. Because a loudspeaker is of finite size it can never be a true point source but it can approximate point source behaviour, as the Blade Two does. While it isn't – and KEF almost certainly wouldn't want it to be – omnidirectional, it does behave, to a close approximation, as if it radiates sound from a single point in space (the acoustic centre). Of course, the Uni-Q array of midrange cone plus dome tweeter, positioned where the dustcap would otherwise be, has always achieved this; what makes the Blade, and now the Blade Two, different is that the arrangement of the four bass drivers – two on either side, at levels above and below that of the Uni-Q driver – ensures that this behaviour is extended to low frequencies. The behaviour of the acoustic centre at LF can be complex but with opposed drivers it is stably located mid-way between them, coinciding here with that of the Uni-Q array. KH



making sure the mid and treble sections really did blend seamlessly together, while achieving the desired wide dispersion. But you could say that the modern history of Uni-Q started just before this, with the unit introduced in the spectacular Muon flagship speaker, launched in 2007 [HFN May '08].

### THE TANGERINE WAVEGUIDE

This wasn't the first Uni-Q tweeter to feature a metal dome, but it was the first to offer a frequency response that extended out to 35kHz. This meant that the separate supertweeters (which KEF called Hypertweeters) of the early-2000s Reference models could be dispensed with. Then came the next-generation Uni-Q used in Concept Blade itself. This used a liquid crystal polymer midrange cone, so that both mid and treble sections now had rigid diaphragms, and it was also the first Uni-Q unit to include the now-familiar tangerine waveguide. After this, lower-priced models were given a version of the tangerine waveguide too, essentially for tweeter protection.

In the production Blade speaker, the Uni-Q unit was similar but the front skin of the midrange diaphragm was now formed as a metal pressing, actually a lithium/magnesium/aluminium alloy, braced behind by a liquid crystal polymer skeleton. Further stiffening of the cone is provided by KEF's 'nodal drive', in which a larger than usual 3in-diameter voice coil is used to bear on the cone at the point of its first resonant mode. The Uni-Q units used in the current Reference series look similar but do not have this feature. Finally, the aluminium-dome tweeter now had a deeper dome shape than before, and with this went a new style tangerine waveguide.

Naturally, the 165mm (6.5in) bass units used here essentially are a smaller

variant of the 225mm (9in) units from the original Blade, and incidentally [see sidebar, p31] they are also used in the current KEF Reference series. In these bass units, the space between the voice coil and the diaphragm is vented, allowing air to escape freely however hard the speaker is driven.

With the Blade, where the drivers are mounted rigidly back-to-back, this venting is essential. Also, instead of using a high-order crossover filter to prevent the bass unit operating up to its break-up frequency, there is a decoupling element between voice coil and diaphragm. This has allowed the use of a low-order filter.

As KEF points out, even in the Reference 5 with its pairs of bass units above and below the Uni-Q unit [HFN Oct '14], the apparent acoustic source does not shift away from the axis of the Uni-Q at any frequency. But the way this tall loudspeaker interacts with the room can be quite different.

In the Blade and Blade Two, each back-to-back pair of bass units operates into its own section of the enclosure volume, each with a curved internal port tube leading to a separate flared port or vent on the back of the speaker. Rear terminals provide for single or bi-wiring [see photo on p33].



### ALL THE DETAILS THERE

Auditioning the Blade Two, once we'd found the optimum placement, became an entirely pleasurable experience. It's quite hard to sum up the speaker's sonic character in words, though, since it is very neutral. The treble is smooth and unexaggerated, so it does not throw detail in your face, and yet all the detail is there. It gives excellent stereo imaging, while the bass is clean, even and quick, and seemingly goes deep enough to deal with anything that a recording engineer might throw its way. ➞



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**LEFT:** The twinned pairs of 6.5in bass drivers are mounted into separate chambers and operated back-to-back to cancel out the large kinetic forces generated. Note selective use of damping pads

controlled. Tracks that featured acoustic double-bass rather than an electric instrument confirmed the accuracy and impressive extension of the Blade Two's bottom end. On the classic 'Easy Money' from *Rickie Lee Jones* [Warner 256 628], jazzman Red Callender's string-bass intro was reproduced with absolutely even weight, and with that rock-solid certainty that comes from a response extending well below the lowest fundamental.

### EVERYTHING IN PLACE

In theory, the Blade Two should give you a decent stereo image whether toed-in or pointing straight ahead. After settling temporarily on a slight toe-in, where a centrally-seated listener could just see the inner sides of the cabinets, we returned to the conventional angles, with speakers aimed directly at the listening seat.

With this setting, on suitably coherent recordings, everything just fell naturally and effortlessly into place. A good example was Patricia Barber's 'Snow' from *The Cole Porter Mix* [Blue Note 50999 5 01468 2 6]. Here Barber's intimate vocal was centred with a real sense of depth, while Neal Alger's guitar was full-bodied and luscious.

With Rebecca Pidgeon's 'Kalerka' from *The Raven* [Chesky SACD329], the speaker gave the vocal a real focus while allowing the mixed plethora of backing instruments to provide a gently rolling background, more rhythmically enticing than on many a system, perhaps because the bass end was so clean and free from overhang.

Although the Blade Two could be very informative about the quality of recordings, sometimes devastatingly so, it wasn't unforgiving. On 'Dog Days Are Over', [*Lungs* – Island/Moshi/Moshi], the speaker clearly exposed the gritty low-res character of the

CD master. Importantly, it did this without making the record sound unpleasant. You could still admire and enjoy Florence's gutsy delivery and the sheer energy of the band, but it was as if you were

looking into the production with a higher magnification than usual.

Classical music provided some rather different examples of the speaker's analytical ability. One was an old standby of mine, Heifetz, Munch and the Boston Symphony in the Mendelssohn Violin ➔

## JACK OCLEE-BROWN

Here's how KEF's Head of Acoustics, Jack Oclee-Brown, explains the rationale for the Blade Two.

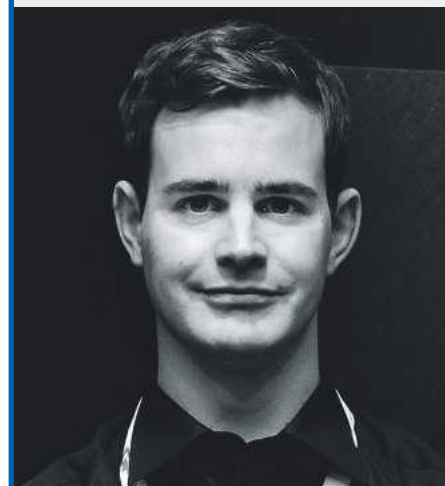
'We had pretty good feedback on the original Blade, but people have said that it's bigger than they can accommodate without necessarily being out of their budget range. So we aimed to design something smaller while retaining as much of the performance as possible. And because we were developing the Reference range at the same time as the Blade Two, we developed a bass unit that we could use on both.'

As with the Blade Two, each Reference 5 [HFN Oct '14] uses four of these bass units. How does Oclee-Brown view the comparison between the two models?

'They're actually very similar on measurement, but they do sound quite different. I'm not exactly sure if that's down to the positioning of the drivers in the room, being that much higher above the floor. The other difference is the Force Cancelling configuration, which does change how the output from the four drivers adds up. On the Reference 5, you've got a much taller overall array, and on the Blades it's more omnidirectional.'

'One more thing which makes a surprisingly big difference is that by just having the drivers on the side, you don't get little reflections off the trim rings and so on.'

Some buyers might like to see an even smaller Blade, but the concept doesn't lend itself to scaling down further. Jack Oclee-Brown confirms that there are absolutely no plans for a 'Blade Three'.



Listening started with speakers placed by rule of thumb fairly near the back corners of the Editor's listening room [see [www.hifinews.co.uk/news/article/meet-the-team;paul-miller/9952](http://www.hifinews.co.uk/news/article/meet-the-team;paul-miller/9952)], and driven by Devialet 800 monoblocks. In that position the bass end was overpowering and subjectively tended to muddy up the whole sound. But this effect disappeared when we moved the speakers further out into the room, to positions just over a metre from the side and rear walls.

'Barber's intimate vocal was centred with a real sense of depth'

A track with really weighty bass, 'Mary Magdalene' from Me'Shell Ndegeocello's *Peace Beyond Passion* [Reprise Records 9362 46033-2], which had been almost unlistenable before, now sounded engagingly layered while the bass was well-





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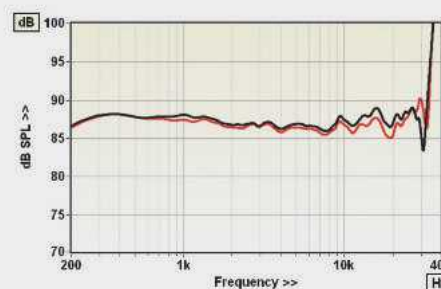
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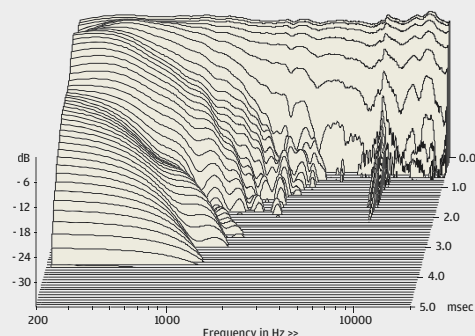
## KEF BLADE TWO

KEF claims 90dB sensitivity for the Blade Two (just as for the Reference 5, which uses a similar driver line-up) but our measured pink noise figure of 87.2dB, averaged for the review pair, is significantly below this. Nominal impedance of 4ohm is in keeping with the specified impedance minimum of 3.2ohm but we measured a dip to 2.7ohm at 37Hz. This explains why, despite quite good control of impedance phase angles, the EPDR (equivalent peak dissipation resistance) dips to a narrow minimum of 1.7ohms at a low 34Hz – not that this figure marks the Blade Two out as anything atypical among modern floorstanders. Elsewhere the EPDR is above 2.0ohm, which I understand to be the current KEF design target.

Forward frequency response measured on the tweeter axis [Graph 1, below] is significantly flatter than we recorded for the Reference 5, albeit with a mild presence band dip. Response deviation is exceptionally well controlled at  $\pm 1.5$ dB and  $\pm 1.6$  respectively for the pair – the best figures I can ever recall from a passive loudspeaker, and even more remarkable for one having a coaxial mid/tweeter array. Pair matching was also impressive at  $\pm 0.8$ dB over the same 200Hz–20kHz. Bass extension of 55Hz (–6dB re. 200Hz, diffraction-corrected near-field measurement) is exactly as we obtained for the Reference 5 but some uncertainty is involved due to the oval shape of the twin rear ports, which makes it difficult to weight their contribution correctly. Ultrasonic output is dominated by a very high-Q dome resonance at 39kHz. The cumulative spectral decay waterfall [Graph 2] evinces fast treble energy decay and well controlled treble resonances. KH



ABOVE: The Blade Two offers an exceptionally flat axial resp. Note ultrasonic (39kHz) tweeter resonance



ABOVE: The Blade Two's cabinet is well damped with only the merest resonance at 10kHz in the treble

## HI-FI NEWS SPECIFICATIONS

<b>Sensitivity</b> (SPL/1m/2.83Vrms – Mean/IEC/Music)	86.9dB/87.2dB/87.0dB
<b>Impedance modulus min/max</b> (20Hz–20kHz)	2.7ohm @ 37Hz 13.8ohm @ 2.5kHz
<b>Impedance phase min/max</b> (20Hz–20kHz)	–35° @ 6.5kHz 42° @ 1.5kHz
<b>Pair matching</b> (200Hz–20kHz)	$\pm 0.8$ dB
<b>LF/HF extension</b> (–6dB ref 200Hz/10kHz)	55Hz / >40kHz/>40kHz
<b>THD 100Hz/1kHz/10kHz</b> (for 90dB SPL/1m)	0.2% / 0.6% / 0.1%
<b>Dimensions</b> (HWD)	1461x338x475mm

**LEFT:** Rear view shows the two reflex ports for the upper and lower bass unit pairs. Fitments between the two pairs of bi-wire connectors connect links to facilitate standard single wiring

presentation. It was intriguing then to hear how the Blade Two handled the typically 'left/right' miking of an early stereo jazz recording.

On *Art Pepper Meets The Rhythm Section* [Contemporary 0025218633826] from 1957, Pepper's alto sax is placed hard over the left while the rhythm section is grouped somewhere behind the right speaker. In this case, the matchless double-bass of Paul Chambers had tremendous body and drive, each note in the low register seeming to move air without any hint of sluggishness.

## CYMBALS SPARKY AS EVER...

The sound here also exemplified the Blade Two's slightly laid-back treble quality. If you'd never heard these speakers before, you might at first have thought that Philly Joe's cymbals could have had more sparkle. But after listening for a very short time it became clear that while those cymbals were as sparky as ever, they just weren't over-emphasised.

Finally I turned to a big, lush rock production. With the reunion version of 'Hotel California' from The Eagles' *Hell Freezes Over* [Warner], the Blade Two was truly luxuriant. The bass end was warm, generous and powerful with truly satisfying depth, yet quick and rhythmically convincing. That huge soundstage populated by multiple guitars was as impressive as I've ever heard it. ☺

## HI-FI NEWS VERDICT

This speaker can produce great results in rooms that aren't big enough for the original Blade, although it still needs plenty of space to breathe and should be placed at least 1m away from the walls. It is very revealing of source quality but, quite admirably, it manages to achieve this without making poor recordings less listenable than they need to be. A well-judged and subtle design, recommended for larger rooms.

Sound Quality: 86%



Concerto, from 1959 [JMCXR-0010]. With the Blade Two you could be aware of Heifetz's characteristically piercing sound, yet it didn't assault your ears. Instead, you were just impressed with his sheer presence.

You could be aware too of the boxy quality of the orchestra, which sounds strictly contained rather than blooming in an open space. Nonetheless, the orchestral timbres made sense and there was a reality and immediacy to the overall

# Constellation Audio Inspiration 1.0 Preamp & Stereo

Eagerly anticipated, this new and more affordable Inspiration Series faces internal competition from the Performance Series. Does a fair price preclude a fair match?  
Review: **José Victor Henriques** Lab: **Paul Miller**

**L**aunching a new high-end amplifier brand from scratch and then establishing it as arguably *the* high-end amplifier brand in just a few short years might seem an impossible dream. But audiophile entrepreneurs Murali Murugasu and David Payes, have done just that with Constellation Audio. Seasoned audio engineer, Peter Madnick, was commissioned to drive the project and given *carte blanche* to create the world's ultimate audio amplification system.

Madnick put together a task force of the best specialists in each area of audio expertise: John Curl, Bascom King, Demian Martin, Keith Allsop, James Bongiorno – who sadly passed away in 2013 – and many others. Alex Rasmussen, the industrial designer co-responsible for all the amazing metalwork at the Neal Feay Company, was also part of this outstanding think tank.

Its debut Reference Series products – the Altair, Hercules (and Pegasus), Sirius and Orion – were certainly the stuff of audiophile dreams and were closely followed by the slightly more affordable Virgo and Centaur Performance Series pre/power amps [*HFN* Jul '13]. But if the Reference Series was a leap of faith and the Performance Series an example of prudence then the new Inspiration amps are positively pragmatic – £10k a pop is 'entry-level' by Constellation standards!

## TAKING INSPIRATION

If the Reference and Performance ranges are inspired by demi-gods and mythological beasts, then the Inspiration 1.0 preamp and Stereo power amp are mundanely-named. But don't be dismayed, for the Inspiration amps not only uphold the brand's state-of-the-art sound, they

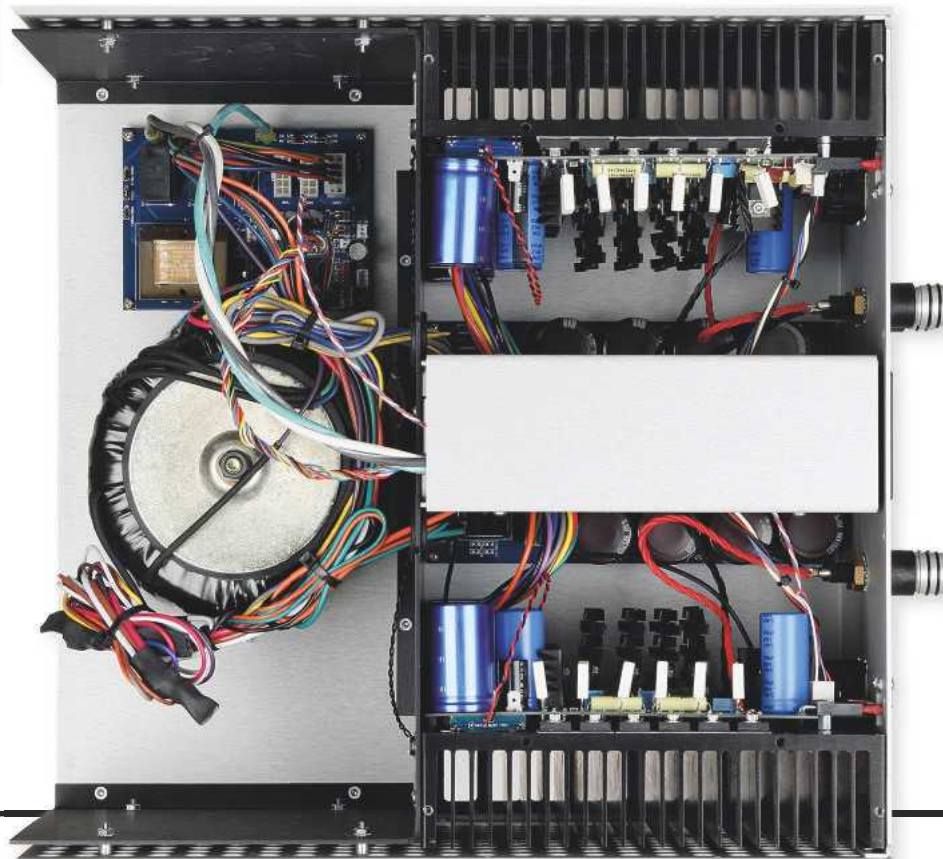
also threaten to set new standards of performance at this price point.

Now, for a fraction of the price you can have the same core circuit topology and features that set the Reference/Performance apart from the pack, albeit in an aesthetically simpler package. So cost savings have been made by building the cases from aluminum slabs rather than solid billets, and the front panel is flat, not sculpted – gone are the sensuous curves and fancy ripples. But the bee-hive side panels were kept. Hence the sweetness of the Constellation sound? I wonder...

*'The 1.0 combo has guts, wallop, punch, impact, kick, whack...'*

Meanwhile, the Inspiration Preamp 1.0 has its power supply built into the front of the unit, rather than outboard – though this is still shielded to protect the audio circuits – and the Stereo 1.0's input and gain stages are on one PCB instead of separated as in its larger amplifiers.

Nothing else has altered, not even the unexpectedly messy innards with its bundles of wires (contrast, say, such industry exemplars as Demian Martin's own Spectral Audio). In short, The ethos is essentially unchanged, only the ingredients are more cost-effective. All the other genes



**RIGHT:** FETs throughout – a J-FET voltage stage and six pairs of N-channel MOSFET power devices per channel on each of the Inspiration's Stereo's internal heatsinks





**LEFT:** A 432x230-pixel screen on the Inspiration preamp's fascia is flanked by rotaries for balance and volume. Pressing and holding the bar on the front of the Stereo 1.0 initiates a series of self-diagnosis checks. Once ready, the LED switches from red to blue

that inform the Constellation DNA are there: the 'Line Stage Gain Module', the 'Direct' interface, the fully balanced audio circuitry, the mechanically isolated circuit boards [see PM's boxout, below].

The Inspiration preamp 1.0 design is simple. The fascia has one rotary button for balance, another for volume, either side of a generous touch screen. Five buttons control all the menus – power on/standby, input selection and levels (with a Min and Max setup), mute, phase, bypass (for home cinema integration), screen setup (brightness, contrast and timeout).

Nevertheless, its operation is sometimes embarrassingly slow, so keep your cool while you wait for power-on from standby mode (ten seconds). And, as we reported

with the Virgo preamp, the volume control is also slow as a turtle. It's a rotary encoder type with no built-in hysteresis so use the remote if in a hurry.

The Stereo 1.0, too, is simplicity itself. Yet like a triode tube amplifier the circuitry takes its time – one minute – to warm up (LED flashing green) and cool down (LED flashing red). Hold the left side of the bar across the front for three seconds until the LED turns red, wait till it turns blue and you are ready to go. Just touch it again and it goes into Mute mode (flashing blue).

### MUSIC OF THE GODS

In Lisbon in March, I attended a presentation of Magico's M-Project loudspeakers, driven by Constellation's

Reference Altair/Hercules II combination [see PM's Opinion, *HFN* Jun '15]. I started my evaluation here with that memory indelibly imprinted on my mind. It was an absolute reference by which to judge Constellation's younger brethren.

Alas, the Inspiration Preamp/Stereo 1.0 didn't come close to recreating the former's overwhelming sense of musical plenitude. I know it's not a fair comparison: the Altair plus Hercules costs ten times the price and the M-Project is simply in a league of its own. So I settled instead for an A/B comparison of the Preamp/Stereo 1.0 and Virgo II/Centaur combos driving a pair of Wilson Audio Sabrinas [full *HFN* review next month] in the same room, using the same Transparent Ultra V cables and Metronome sources.

Additional sources included the proven Audio Research CD9 [*HFN* May '13] and my desk iFi Micro for DSD (for DXD my preference goes to the excellent Chord Hugo), using JRiver software on my portable as media server.

For both Performance and Inspiration combos the proprietary Direct mode connection (bypassing one internal 'Gain Module') offered increased refinement and transparency over the ostensibly gutsier but more opaque Balanced mode.

And that's when things got really weird because the Inspiration Series comes dangerously close to the Performance Series. There are differences, of course. The Performance's soundstage is ever so ➔

## DIRECT INSPIRATION

Instead of using one power amp stage comprising multiple complementary transistor pairs, the Inspiration Stereo employs matched N-type MOSFET modules in a balanced bridged configuration. The concept, according to Constellation, is to achieve the delicate sound and musicality of a small single-ended triode amp, albeit one with the capacity to 'play much louder'.

Each Stereo 1.0 has three inputs, including traditional RCAs and balanced XLRs. The latter may be switched to Constellation's 'Direct' mode which omits one of its proprietary J-FET line stage modules, making use of the higher (voltage) output capacity of the Inspiration preamp [see Lab Report, p39] thereby demanding less voltage gain in the Stereo 1.0. The overall pre/power voltage gain remains the same just as there's no change in the maximum power output of the Stereo 1.0. It's likely that the relative sensitivity of the loudspeakers and analogue output level of the source will play a big role in determining which mode is preferred. **PM**

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## PRE/POWER AMPLIFIER

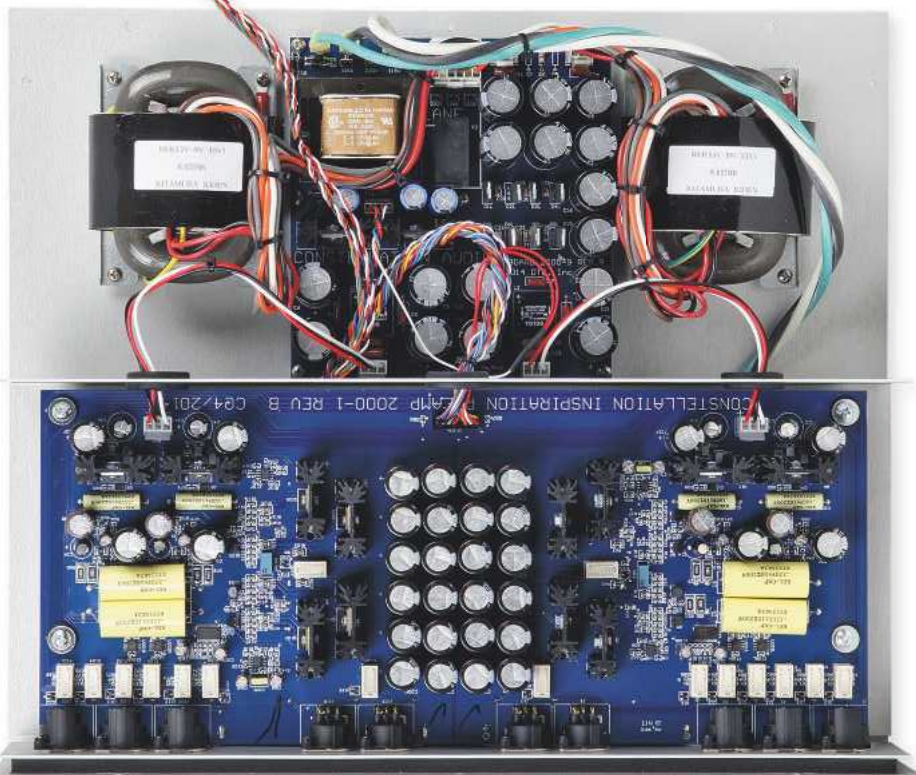
### MURALI MURUGASU

We asked Murali Murugasu, Constellation's CEO and co-creator of the Continuum turntable brand, about the prospect of more Inspiration separates. 'The Inspiration Integrated 1.0 amp is nearly ready to ship and we'll also be adding a phono stage and a DAC/media player to the range.'

However, this looks about as far as Constellation will 'downsize', as Murali explains, 'We have no plans of introducing anything lower-priced or smaller than the Inspiration line. When David Payes and I started Constellation Audio, we conceived it from the start as a no-compromise brand, constantly pushing to exceed the state of the art. We originally planned on having lines in three price ranges. Now we've got that.'

Constellation unveiled its Virgo III and Centaur II amplifiers at Munich High End but hinted at more to come. 'Constellation Audio was founded and based on the concept of a "dream team". We got the best engineers and designers in the world, and encouraged them to work together without constraints so they could pursue their wildest ideas. Now that we've proven the concept works, we're going to take it to the next level.'

'We're immensely strong in analogue design and in standard approaches to digital audio. But we know if we want to expand into new technologies, we have to bring new members to the team. We're excited to see what will happen when we add more great minds to the mix.'



**ABOVE:** Inspiration preamp employs separate R-core transformers for left and right channels, and a third transformer to power the control circuits. The FET-based audio line stage is fully balanced

slightly wider and deeper, if a little more laid-back, and the resolution level is a notch higher, while the Inspiration's bass has better foundation and articulation.

If the Altair/Hercules II combo had managed to get the best out of the M-Project's outstanding tweeter, then the Inspiration Series did the same to the Sabrina's XLF-based tweeter – the whitish, etched character of the old design had now gone, and the treble became an inextricable extension of the midrange, as it should.

### SUPERCHARGED TRIODES

Constellation has a 'house' sound, a character reminiscent of a fine single-ended triode amplifier but without the hindrance of harmonic distortion and other colorations, not least lousy control of the associated loudspeakers and failure to reach realistic sound pressure levels (unless, that is, you have glaring horns to shout at you convincingly).

All Constellation Audio amplifiers allow you to enjoy a degree of transparency which has until now, with a few honourable exceptions, eluded solid-state technology. And yet, paradoxically, the sound is on the dark side of neutral. Not 'dark' in the sense

of absence of light or lack of clarity, more like dark chocolate. It's a sound you can almost taste.

With a clear recording you can hear all the way into the back of the stage without any impediment or obstruction.

*'We just sat there flabbergasted, as if beamed up to the MUPA Hall'*

This see-through magic also applies with small-scale recordings that otherwise might sound claustrophobic. Take António Zambujo's 'Nem às paredes confesso' [Outro Sendido, Universal

Music Portugal, 0602537713400] by way of example. It's a simple studio recording (voice and guitar) but also slightly claustrophobic. So the engineer placed him inside an 'electronic bubble' that seems to expand with each heartbreaking utterance, hence his bigger-than-life image. The Inspiration allows one to distinguish between the fake hazy air inside the 'bubble' and what little air there is in a small dead studio.

The Inspiration stereo 1.0 also reproduces the airiness of concert hall acoustics with uncanny realism. A good example is Mitsuko Uchida playing Mozart's Piano Concerto No 23, live with the Cleveland Orchestra [Decca 478 1524]. The power of resolution is so high you ➡





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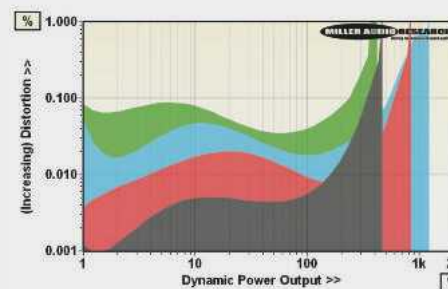
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## LAB REPORT

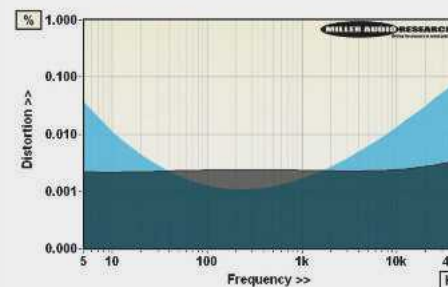
### CONSTELLATION INSPIRATION

As the core, fully balanced audio circuits of the Inspiration pre/power are 'distilled' from the Virgo/Centaur there are strong parallels to their performance [see *HFN* Jul '13]. The Inspiration preamp still uses a rotary-encoded volume control (addressing a polysilicon resistor array), offers the same +26.5dB gain (balanced) and remarkably flat and extended response ( $\pm 0.01$ dB from 1Hz-100kHz). Noise and distortion are higher than with the Virgo but the 91dB A-wtd S/N ratio and 0.0015–0.0019% distortion (both re. 0dBV) are still impressive – the latter for its consistency with frequency [see black trace, Graph 2]. Distortion increases with preamp output above 1V to 25V (0.002% to 1%) which may explain any differences heard between Normal and 'Direct' power amp inputs as the preamp augments the former's reduced +14dB gain in this mode.

Constellation rates its Inspiration Stereo at 200W/8ohm – a specification smashed by the 2x395W/8ohm and 2x660W/4ohm measured here, increasing to 470W, 845W and 1.20kW into 8, 4 and 2ohm under dynamic conditions. Output into 1ohm loads is limited [see Graph 1] but it'll still drive any likely partnering speaker with ease. Output impedance is a uniform 0.033–0.045ohm (20Hz–20kHz), increasing thereafter, while the response into 8ohm is flat to –0.3dB/100kHz but (unlike the Centaur) rolled away to –2.1dB/20Hz and –10dB/10Hz in the deep/subsonic bass. The 91.6dB A-wtd S/N (re. 0dBV) actually bests the Centaur while THD is not dissimilar – 0.0013–0.033% (20Hz–20kHz, 1W). Readers may view comprehensive QC Suite test reports for the Constellation Audio Inspiration preamp and Stereo 1.0 power amp by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'download' button. PM



ABOVE: Dynamic power output versus distortion into 8ohm (black trace), 4ohm (red), 2ohm (blue) and 1ohm (green) speaker loads. Maximum current 24.5A



ABOVE: THD vs. extended freq. Stereo Pre (1V out, black trace) vs. Stereo Power (10W/8ohm, blue trace)

### HI-FI NEWS SPECIFICATIONS

Power output (<1% THD, 8/4ohm)	395W / 660W
Dynamic power (<1% THD, 8/4/2/1ohm)	470W / 845W / 1.20kW / 420W
Output imp. (20Hz–20kHz, pre/power)	119ohm / 0.033–0.045ohm
Freq. resp. (20Hz–100kHz, pre/power)	–0.0 to +0.0dB / –2.1 to –0.4dB
Input sensitivity (for 0dBV/0dBW)	47mV (pre) / 157mV (power)
A-wtd S/N ratio (re. 0dBV/0dBW)	91.0dB (pre) / 91.6dB (power)
Distortion (20Hz–20kHz, 1V/10W)	0.0015–0.0019%/0.0013–0.033%
Power consump. (pre/idle/rated o/p)	27W / 127W/856W
Dimensions (WHD Pre/Power)	432x133x381/432x216x483mm



ABOVE: Constellation's Inspiration preamp [top] has three balanced (XLR) and single-ended (RCA) ins with pairs of XLR/RCA outs. The USB port is for control/updates. The Stereo 1.0 [bottom] has 4mm speaker outlets, RCA and low/normal gain XLR ins

can hear the air set in motion by the audience swarming into the hall even before the concert begins. Stage noises, the squeaking of a distant door, and the occasional coughing off-axis in both channels sound so clearly located they help to map the concert hall precisely. You can almost feel the audience slowly shifting from the restlessness that anticipates the first piano notes to being moved by the masterful playing as the music develops and penetrates their souls.

### AIR AND POWER

You need lots of power to achieve the goal of reproducing a big band or a symphony orchestra at full throttle, the vastness of a huge choral work at fortissimo or a rock band at live concert levels. The 1.0 combo has guts, wallop, punch, impact, kick, whack... you name it. The same Inspiration Stereo 1.0 that reproduces the eerie lightness of air with physical palpability can also deliver clean, awe-inspiring power well beyond the specified 200W [see PM's Lab Report, opposite].

The final test was the most revealing of the Inspiration's high level of resolution. Native DSD [see [www.nativeDSD.com](http://www.nativeDSD.com) and see p111] is a small Dutch company that makes pure DSD recordings – the closest thing to direct-cut vinyl available today, according to some

commentators. Until now I couldn't detect any significant improvement when listening to DSD64 versus DSD256 other than in dynamics. But it only took a few bars with Iván Fischer conducting his Budapest Festival Orchestra in *Mendelssohn Session* [JLBFO Mendelssohn session], to discover the beauty of the holographic image, the texture of its harmonic fabric, the purity of timbre and the awesome dynamic swings, without congestion, or hardness as conveyed by the DSD265 master.

And the magnificent soundstage didn't change significantly whether I sat (or stood) in the sweet spot or moved off-axis. Indeed, I had to call two witnesses for fear I was hearing things, and we just sat there flabbergasted, listening repeatedly as if we were beamed up to the MUPA Concert Hall. ☺

### HI-FI NEWS VERDICT

Constellation's Inspiration Series is aptly named for the Preamp and Stereo 1.0 power amp combination reproduces music with a freedom, neutrality and conviction that belies even this substantive price tag. Its sheer honesty is something of a revolution in the world of audio. The stars just got a little closer, for no longer will you need a king's ransom to buy a Constellation system.

Sound Quality: 90%



# Thales TTT-Compact

With its revolutionary take on tonearm tracking alongside a battery driven motor, does this Swiss precision vinyl spinner show that great things come in small packages?

Review: **Andrew Simpson** Lab: **Paul Miller**

**T**he tag 'Made in Switzerland' immediately puts your name amongst brands offering some of the most luxurious craftsmanship on the planet, while at the same time it implies a standard that you need to reach to be worthy of the association.

HiFiction AG's founder, owner and designer of all Thales products, is Micha Huber, a man with an enviable background in the mechanical engineering of high-end watch brands before he turned his hand to vinyl replay. Rather like SME (and unlike most turntable manufacturers) Huber started out by making top-flight tonearms, before expanding to include a range of equally unique partnering turntables.

## A CONCEALED SOPHISTICATION

The £8795 TTT-Compact is the more costly of Thales' two decks, priced above its stripped-back TTT-Slim turntable and partnering Easy tonearm package (£8850). The Compact is graced with Thales' higher specification Simplicity II tonearm (£6190 as standard, or £6850 with 'direct' wiring, as per our review sample) and the deck's deceptively understated aesthetic hides some very sophisticated technologies.

Its elegantly shaped chassis is milled from an oversized slab of low-stress black anodised aluminium. Within this plinth sits the main bearing, comprising a hand-polished chrome-plated carbon tool steel main shaft, which runs against a hardened steel ball in two sintered bronze bushings – the preparation involving a specifically formulated oil.

And for the bearing's outer casing, 'spheroidal graphite iron' is the order of the day, given its noise and vibration absorbing qualities. Of course, all of this is fairly standard fare for a turntable of this calibre, and this is also where the Compact's homage to traditional turntable design largely ends.

Lifting the deck's 6.5kg alloy platter, which makes up a sizeable chunk of the deck's overall 16kg total weight, reveals its mass to be concentrated around the outer edge – which, says Thales, makes its *effective* mass equal to that of an 8kg platter. The platter's hollowed-out inner circumference hides a stepped sub-platter, 15cm across its lower section and with a groove around its periphery to receive a short precision-ground circular rubber belt. Drive is by a customised Portescap brushless DC motor with ironless windings.

Exploring the deck's inner workings further reveals exquisite levels of detail, including the gold-plated motor sited at the nine o'clock position, which is suspended between two decoupling towers via a flat metal spring to isolate it from the main chassis, while preventing it turning on its own axis under load.

To get the motor running, in place of a mains controlled supply, four LiFePo batteries are housed within the base of the plinth supplying the power within a closed loop system, which keeps the motor

speed constant by comparing its feedback to a precise reference voltage. When fully charged, the batteries have a claimed 16 hours of use, before needing a boost via a supplied charger which plugs into the back of the Compact's chassis.

## GETTING A QUICK FIX

With the unit powered down, these batteries can hold charge for many months, while a recharge takes up to four hours, with the bulk-charge achieved within an hour. And if you need a 'vinyl fix' before a full charge is achieved, you can part-charge without worry, as the LiFePos don't suffer from any memory effect.

To get the Compact up and running, you first have to free the sub-platter that's raised from the bearing during transit via a pair of precision-made locking towers (turntable makers using cheap cardboard wedges take note). With their hex bolts removed, rotating these towers a half-turn allows the sub-platter to drop fully into the bearing, ready to receive belt and platter. You can then turn your attention to the



**RIGHT:** Solid alloy chassis hides a battery-driven, suspended DC motor. Platter has a rubberised surface and note how the headshell's angle adapts as the twin arm tubes pass over the LP





equally well finished partnering Simplicity II tonearm, which employs two chopstick style aluminium arm tubes (available in a range of finishes) to reduce tracking error [see boxout], alongside a wealth of adjustment options.

Armed with Thales' alignment tool and some of the smallest hex keys known to man, I couldn't help thinking its 'Simplicity' name carried a certain sense of irony. But with a steady hand the arm allows degrees of fine adjustment you'd only expect from a precision watchmaker. Cartridge fitting is made convenient by a removable headshell plate (held fast with a minuscule hex bolt), and there's a supplied site stand to get your stylus aligned bang-on, before reinstalling and connecting the cartridge tags. These are joined to some of the thinnest wires I've experienced. This implied delicacy is further brought home by the lack of any clamp to secure the arm to its rest when not in use.

Azimuth and VTA can also be fine-tuned using more hex-key tweakery, which can be done on the fly, thanks a short threaded

rod which winds vertically against the base plate to lift the arm. Downforce is set using one of three supplied weights (7-23g) which clamp to the arm's rear

via two sliding rods. Once set, all that's left to do is place your LP of choice onto the platter's proprietary high density surface, before adding the short, yet surprisingly heavy, clamp which

sports the same rubbery finish on its base. This material affords it impressive amounts of grip for a non-threaded record clamp.

### BEGUILING VOCALS

After cueing up the opening track, 'Stop Your Tears', from Aldous Harding's self-titled debut album [Lyttelton Records LR-006], and with the Compact hooked up to my Primare R32 phono stage [HFN Jan '12], feeding Musical Fidelity M6PRE/PRX amplifiers [HFN Nov '13], I depress the deck's 33.3 button and watch an inset orange ring rapidly cycle through a dozen flashes, before settling to a static glow with the platter up to speed. Continuing the refined Swiss theme having fitted a


'Stereo images are rendered with such an even-handed control'

**ABOVE:** Three threaded feet with captive ball-bearing tips give firm support. Speed change is via plinth-top buttons for 33.3/45rpm with fine adjustment through two fascia holes

Benz Micro ACE high-output MC cartridge [HFN Sept '11], the music that greets me is immediately defined by a broad and dense soundstage. The Compact lets my Dynaudio Focus 260 speakers simply fall away as both stereo channels combine to ensure Harding's voice and plucked acoustic guitar sound clear and confident.

What's apparent from the outset is the Thales' ability to render a stereo image with such even-handed control across the board that you're at once made aware of nuances and details which could have previously passed you by. Gone is the slight hardness that I'm used to hearing as Harding's vocals become more firmly projected, replaced by a gentility that allows all the emotion to come through as her singing gets more powerful, leaving her sounding frankly beguiling – more so than with most other turntables I've heard.

This ability to bring each performance to life is further underlined by how the Thales reveals the haunting background vocals within the track to steadily grow from deep within the soundstage, and with all the sonic drama of a large choir in a cavernous cathedral acoustic.

Many high-end machines can create a sonic landscape that catches your attention, but with the Thales there's an added sense of *harmony* within the soundstage it conjures, suggesting that very little, if anything, is being compromised as it throws open a grand window onto the music. Fleetwood Mac's 'Caroline' from their *Tango In The Night* album [Warner Bros 925 471-1] has plenty going on in the mix, which can leave even the most measured decks a little 

## TWIN TONEARM

From 12in pivoting tonearms to parallel trackers floating on beds of air and mimicking the travel of the mastering cutting head, tonearms come in many shapes and executions in their attempts to minimise variations in tracking angles, as the stylus sweeps its way to the run-out groove. Thales' 'tangential' approach uses two separate arm tubes, independently attached to a fixed rear bearing of inner/outer rings and precision micro ball bearings, which determine the pivoting headshell's angle, keeping it tangential to the LP groove. Using two tubes in this way has allowed Thales to adopt the compact proportions of a standard 9in arm while replicating the behaviour of a more substantial parallel-tracker. Hi-fi historians may also recall tonearm designs of decades past using the twin-tube method: Garrard's Zero 100 leading the charge in the '70s.

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**ABOVE:** The Simplicity II tonearm wires can be terminated via block connections with DIN/RCA/XLR sockets or direct wired phono (RCA) leads which cost extra. Rocker switch next to its charger input caters for standby/off/charge settings

flustered. With the Thales taking charge there's no sense of it being in anyway overwhelmed by the track's complexity. Instead it seems to revel in the challenge, going beyond simply pulling out all the musical detail, and presenting it with a cohesion that brings it all together as the recording engineers intended.

As the track's dazzling intro drums and vocals make way for the opening lead and bass guitar riffs, you can hear how each instrument feeds off the other, while being granted lots of their own air and space within the soundstage.

The Thales sound isn't forward or too centrally focused, so no instruments or parts of the audio spectrum are to the fore or shown obvious favour. Instead, you get a soundstage that's more evenly formed, affording you greater access to *all* that's going on within the mix.

## END OF SIDE CHALLENGE

As it's sited so close to the run-out groove, the last track on the A side of Fairport Convention's *Unhalfbricking* LP [Island ILPS 9102], 'A Sailor's Life' has caused many a turntable gracing my reviewing shelf to 'cower', as the threat of the those low rumbling bass notes and Denny's majestic vocals lay down a challenge for pitch-perfect tracking.

But with the Simplicity tonearm I'm treated to a sure-footed performance, which allows me to spend less time concerned with the physicalities of playback and more time to simply enjoy the music.

Denny's voice sounds without constraint as it swoops within the soundstage uninhibited, and when the rumbling low bass kicks in, there's no sense of erring towards bloom or bluster at the extremes (which I have had with the Benz mounted on lesser tonearms with this particular track).

Via the Thales, bass sounds lithe, well rounded and of a depth you perhaps wouldn't expect from such a tidy package. The lower notes on Daft Punk's 'Giorgio By Moroder' [*Random Access Memories* – Columbia 88883716861] underpin the music with plenty of punch in the upper bass, seamlessly reinforced with lots of body in the lower registers.

There's lots of bass *texture* too for my Dynaudio drive units to chew on, which shows how this deck isn't just about moving lots of air to show off, since it can define each note and instrument in a lifelike manner. In a similar vein, the stripped-back piano of REM's 'Nightswimming' from *Automatic For The People* [Warner Bros 9362-45055-1] reveals how the Thales' sound is nicely balanced through midrange and treble.

The midrange piano notes have more sustained weight in their echo compared to the upper ones, highlighting their differing reverberation qualities and offering an insight into the way the piano was played during recording. It's these qualities that set the Thales TTT-Compact apart. ☺

## HI-FI NEWS VERDICT

Rival superdecks can command prices in this bracket, but few can equal the Thales for its Swiss watch build quality, or offering such a small and stylish package. The jewel in its crown is of course the gorgeous 'tangential' pivoting tonearm, which offers the usability of a standard 9in arm while providing a longterm cure for tracking paranoia. The result is a sound that's exceptionally open and balanced.

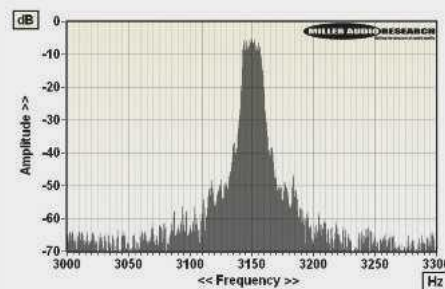
Sound Quality: 83%



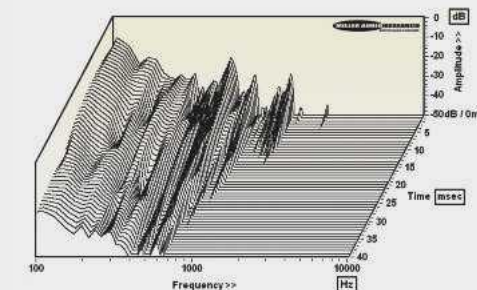
## THALES TTT-COMPACT

Thales' TTT-Compact is an undeniably innovative, very finely engineered and finished deck but it was not without technical issue on the lab bench. The main bearing employs a hardened and 'hand-polished' shaft running in a graphite sleeve but the DIN-B weighted through-groove rumble was an acceptable, but not exceptional, -66.6dB (re. 5cm/sec), a figure which actually fell slightly to -65.5dB once the LP was coupled more closely to the heavyweight platter via Thales' clamp. Measured through the bearing, rumble components at ~75Hz and particularly ~112Hz held the figure to -67.4dB. The onboard DC supply, decoupled motor with 'short belt and flywheel' are other innovations and while flutter is kept low at 0.04% (peak weighted) the wow figure is mildly influenced by a low-rate drift [see Graph 1, below]. We have reported the same phenomenon with other DC motor-driven turntables [see *HFN* Apr '08].

The partnering Simplicity II tonearm is an exquisite piece of design that succeeds in minimising tracking error throughout the arc its describes across the LP radius. Friction within the fine gimbal bearing is very low indeed at <10mg (both planes) and achieved without play. However the necessary complexity of the structure encourages a more complex resonant behaviour [see Graph 2, below]. The various bending and torsional modes of both arm tubes are reflected at the headshell from 105Hz-450Hz with higher-Q modes (possibly from the bearing or arm lift structures) at 580Hz and 1.4kHz. Readers may view full QC Suite reports for Thales's TTT-Compact turntable and Simplicity II tonearm by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'download' button. PM



**ABOVE:** Wow and flutter re. 3150Hz tone at 5cm/sec (plotted  $\pm 150$ Hz, 5Hz per minor division). Note very low rate drift as the W&F signal is averaged over time



**ABOVE:** Cumulative tonearm resonant decay spectrum, illustrating various bearing, pillar and 'tube' vibration modes spanning 100Hz-10kHz over 40msec

## HI-FI NEWS SPECIFICATIONS

Turntable speed error at 33.33rpm	33.31rpm (-0.08%)
Time to audible stabilisation	5sec
Peak Wow/Flutter	0.10% / 0.04%
Rumble (silent groove, DIN B wtd)	-66.6dB
Rumble (through bearing, DIN B wtd)	-67.4dB
Hum & Noise (unwtd, rel. to 5cm/sec)	-49.2dB
Power Consumption	1W
Dimensions (WHD)	435x100x313mm / 16kg



# Lehmann Audio Silver Cube

Better known for its more affordable designs, Germany's Lehmann Audio also offers a more aspirational phono stage option, in the form of its Silver Cube  
 Review: **Adam Smith** Lab: **Paul Miller**

**M**ention the name 'Lehmann Audio' to a vinyl enthusiast and, chances are, their first reaction will be to refer to the company's Black Cube range of phono stages. Any one of these models has been a first step on the ladder towards vinyl heaven for many, and deservedly so. However, what is often forgotten is that Lehmann Audio has also offered a distinctly high-end option for a number of years now, in the form of its £3000 Silver Cube.

This was first introduced in 2002 and while the circuit topology has remained largely unchanged, its flagship performance has been kept 'up to speed' with running production enhancements to the gain stages and passive components.

## AMPLE SETTING OPTIONS

Currently the main amplification duties are performed by a Burr-Brown OPA637 op-amp alongside a high precision THAT Corporation 1510P instrumentation amplifier. All other signal circuitry is discrete and the output stage is a Class A type using FETs implemented with a claimed no (overall) feedback.

In terms of compatibility, the Silver Cube scores very highly. It offers four gain settings through two switches per channel on the rear panel. One is labelled 'MM/MC' and the other 'HI/LO' and in combination they give gains of 36 and 46dB (for MMs) and 56 or 66dB (for MCs). Unfortunately, the MM/MC and HI/LO labels are both



below the switches in question, with no clue as to which position corresponds to which. Naturally, it is not difficult to work this out with music playing but I would recommend keeping your amplifier's volume low while you experiment.

Also at the rear of the unit are two rows of inline DIP switches that permit a range of input resistance and capacitance values to be selected. As standard the resistor options are 47kohm, 470ohm and 100ohm but there is an extra position on the PCB for custom-loading a particularly fussy pick-up. A further three switches select the input capacitance values of 47pF, 100pF, 220pF and 470pF.

Once again this row of switches is merely labelled 1-6 with 'Res' marked near the switch 6 end and 'Cap' near the switch 1 end. No hint is offered as to which switch selects which option so the user manual is essential when configuring the unit.

Internally the Silver Cube is beautifully laid out in a true dual mono configuration – hence the duplicate gain and loading switches. Solid WBT RCA sockets facilitate the inputs and outputs, but the lack of a

**ABOVE:** The Silver Cube is built into a milled-from-solid (rectangular) aluminium case and features 'vibration-damping' feet from SSC

balanced connection is disappointing at this price. An XLR connector is present on the rear panel but this just carries the  $\pm 18V$  rails from the standalone PSU unit. This is heavy and hardly an aesthetic match for the Cube, but the interconnection lead is lengthy so it can be hidden away.

The Silver Cube's build is, frankly, gorgeous. Machined from a single piece of aluminium, it bestows a solidity and sense of purpose, while opening up the unit and peering inside is even more of a delight. It reveals a meticulous circuit layout with the PCB itself supported on strategically-located alloy struts.

## BEAUTIFULLY CLEAN SOUNDS

I listened to the Silver Cube at both its lowest and highest gain settings using an Ortofon 2M Black MM cartridge and a Charisma Audio MC-2 MC [HFN Feb '15]. In both cases it was remarkable how consistent the Lehmann proved to be, offering up a sound that was beautifully clean and detailed throughout the frequency range. I was also pleased to note that the Silver Cube seemed to have no preference for MC over MM. It handled both types with aplomb, allowing the true sonic character of the cartridge in question to shine through.

Norbert Lehmann's background in circuit analysis and component selection [see boxout] is also clear to hear, as the Silver Cube has a remarkable purity to its performance. I can't help but feel that the Lehmann really does offer a sense of precision and insight that is usually the

## LEHMANN'S LEGACY

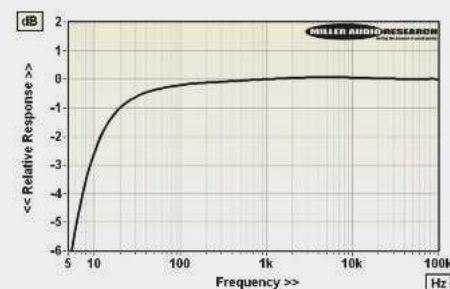
Norbert Lehmann is an audio engineer who originally studied at the Robert Schumann Hochschule in Düsseldorf. During this period, Norbert found himself comparing two amplifiers that exhibited ostensibly similar (albeit basic) measurements, but sounded very different. This in turn led to his investigations into circuit details and the components themselves. He founded Lehmann Audio in 1988, with the intention of building audio equipment that 'communicates the musician's intentions as musically and faithfully as possible'. The Black Cube phono stage was launched in 1995 and this was followed by the original incarnation of the Silver Cube in 2002 and the Linear headphone amplifier in 2004. Today, Lehmann offers a range of six phono stages and six headphone amplifiers, the latter covering domestic, studio and portable use.

## LEHMANN AUDIO SILVER CUBE

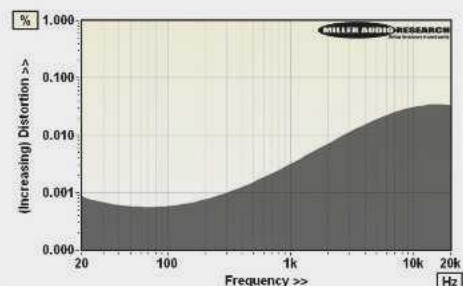
Not new but progressively improved over its decade-long life with latest-generation op-amps and passive components, the Silver Cube remains as fresh as ever. Four gain settings are offered, the lower two defined for MM pick-ups at +36dB and +46dB while the MC option adds a further +20dB to deliver +56dB and +66dB. In practice these settings are accurate to within  $\pm 0.6\text{dB}$  (the channel balance of this dual-mono design) while the A-wtd S/N ratio(s) are rather better than Lehmann suggests (to the tune of 8-9dB) at 88.8dB (MM gain settings, re. 5mV) and 77.2dB (MC gain settings, re. 500 $\mu\text{V}$ ).

Your choice of gain setting should be governed by matching the output of your MM/MC against achieving the best S/N ratio without overloading the Silver Cube's input. Fortunately, in this case, input headroom scales with sensitivity so the +36dB MM setting (15.8mV input for 0dBV output) clips at 158mV; the +46dB MM setting (5.5mV) clips at 52mV; the +56dB MC setting (1.45mV) clips at 14mV and the +66dB MC option (484 $\mu\text{V}$ ) has sufficient headroom for a 4.9mV input.

Distortion is also broadly consistent with gain and, unlike some recent phono stages we've tested with wholly passive RIAA networks, Lehmann's part-active eq. offers a very low <0.001% THD below 300Hz, rising gently to 0.03% above 10kHz [see Graph 2, below]. The response is also extremely extended from 100Hz-100kHz at  $\pm 0.05\text{dB}$ , with a selectable bass roll-off offering a -3dB point of 9Hz in its default position [see Graph 1]. Maximum output is a generous 9.5V but the source impedance is 53ohm, not the quoted 50ohm. Readers may view a full QC Suite test report for the Lehmann Audio Silver Cube phono preamp by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'Download' button. PM



ABOVE: RIAA-corrected frequency response via MM input from 5Hz-100kHz ('soft' LF roll-off selected)



ABOVE: Distortion versus frequency from 20Hz-20kHz at 1V output. THD increases gently with frequency

## HI-FI NEWS SPECIFICATIONS

Input loading	100ohm, 1kohm, 47kohm
Input sensitivity (re. 0dBV)	15.8mV/5.5mV/1.45mV/484 $\mu\text{V}$
Input overload (re. 1% THD)	158mV/52mV/14mV/4.9mV
Max. output (re. 1% THD) / Impedance	9.5V / 53ohm
A-wtd S/N ratio (re. 0dBV, MM/MC)	88.8dB / 77.2dB
Frequency response (20Hz-20kHz)	-0.95dB to +0.02dB
Distortion (20Hz-20kHz, re. 0dBV)	0.00055-0.034%
Power consumption	13W
Dimensions (WHD)	185x50x300mm



ABOVE: Input/outputs are via WBT Nextgen RCAs, loading via DIP switches and MM/MC gain via toggles

territory of even more expensive units. As a result, instruments are beautifully defined and it was easy to follow them in a complex mix. In fact, the Lehmann turned out to be something of a master in gently coaxing the finest details from an LP.

With Pink Floyd's recent release, *The Endless River* [Warner 825646215478], each performer occupied a well defined space between my loudspeakers. Gilad Atzmon's tenor sax on 'Anisina' was absolutely glorious in terms of atmospheric detail, and blessed with a delightful brassy rasp. The central image was perhaps a little softer than I would have liked but the Lehmann otherwise had no trouble in creating a wide soundstage.

At the bottom end, the Silver Cube strikes just the right balance. It does not seek to impress with a thundering bass that would become wearing but, rather, holds itself in check until required. As a result it can almost appear a little bass shy at times – right up until the point

when a proper bass note arrives and one realises that it's really missing nothing at all.

### SNAP AND PRECISION

Stanton Moore's drum strikes on DJ Shadow and Little Dragon's 'Scale It Back' from *Reconstructed – The Best Of DJ Shadow* [Island 3712862] were snappy, precise and punchy. They never overstayed their welcome

– at all times there was a real sense of purpose behind them which propelled the track along superbly. Again, though, the vocals were perhaps not as centrally

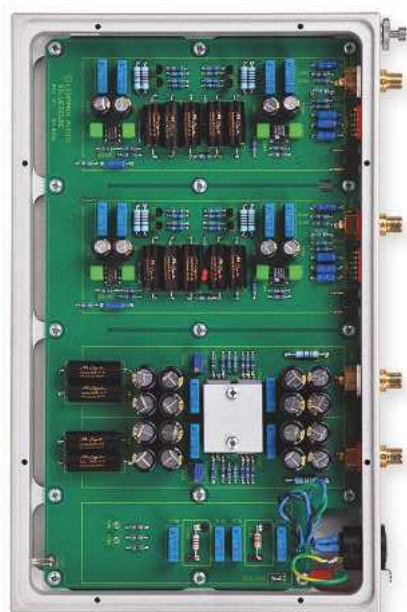
*focused* as I am used to.

Nevertheless, I played a handful of tracks that I know to offer a good sense of sonic perspective and, generally, the Lehmann took these comfortably in its stride. The instruments on Bach's Double Harpsichord Concerto with the Sarre CO under Karl Ristenpart [Nonesuch H-71019] were all neatly arranged across the soundstage. Equally, Ol' Blue Eyes' performance from *Sinatra At The Sands* [Reprise RSLP-1019/1] was first-class in terms of depth, atmosphere and detail. ☺

## HI-FI NEWS VERDICT

The Silver Cube is a fitting pinnacle to the Lehmann phono stage range, with a build quality that would embarrass some dearer designs. Sonically, it expands on the strengths of its cheaper brethren to offer a remarkably even-handed performance. Although I felt its stereo presentation might have enjoyed a sharper focus, the unit is still blessed with sound that is smooth, detailed and punchy.

Sound Quality: 78%



ABOVE: Mundorf tin foil and mica caps feature in the dual-mono eq and input amps, the latter using mic-grade op-amps

# Métronome Le Player

In a multipurpose age, this French machine does (almost) no more than play CDs, via a top-loading transport. Freed from the burden of excess features, how does it deliver?

Review: **Andrew Everard** Lab: **Paul Miller**

For those accustomed to the French being held up as leaders of fashion, Métronome's Le Player is going to come as quite a shock. For, flying in the face of the current trend towards multifunctionality, Le Player is just a player, and only a CD player at that. Yes, it has a USB input to allow a computer or external digital source to be connected and play through its onboard conversion, but then just about every budget CD player does that these days. At heart this really is a single-function piece of equipment, hand-built around technology designed and customised to get the very best from those silver discs.

## 'OLD SCHOOL' STYLING

It will cost you £5490, placing it at the entry-level of a range extending all the way up to the massive Kalista CD transport with its separate Elektra power supply and Nausicaa DAC [*HFN* Dec '13]. As befits its function, Le Player only comes in silver, and while it's undoubtedly beautifully put together, there's so much here that's almost defiantly 'old school' – from that top-loading mech through to the basic blue-on-black display, the little pinhead pushbutton controls with their slight 'form over function' labelling, and miniature toggle switches.

This is how high-end CD players used to look some decades ago, when several French manufacturers were still championing the top-loading design, requiring that their products took pride of place atop any equipment rack. In an age when the upper-mass-market is dominated by drawer- or slot-loading players, most of which use variations on DVD-ROM or 'universal' drives, the Métronome is designed to stand out from the crowd.

The transport here is essentially a high-grade Philips device, but in the

usual Métronome fashion it's extensively modified with a proprietary shaft on which the disc spins, and a Delrin polymer clamp to hold the CD in place. Taking a leaf out of the book of the upmarket Métronome transports, the entire disc-reading mechanism is mounted into a Perspex support, chosen for its rigidity and inert nature, thus keeping vibration away from the business end of the player.

The design also incorporates a continuous ground link all the way from the mech's surfaces to the player's electrical earth, to dissipate static electricity created by the spinning disc, and avoid it interfering with the electrical and optical assemblies. Covering the whole transport mechanism is a sliding lid, operated

manually, and if there's a drawback to this design it's that putting a disc in and extracting it is something of a tight fit. I have to say standard drawer-loaders are, in my experience, just that more convenient.

## REDUCING INTERFERENCE

Like all of the company's products, Le Player is built in-house in France, with particular attention being paid to the power supply design. Three toroidal transformers are used, feeding seven independently regulated power supplies, no fewer than four of which are dedicated to the transport section, with one each for the display, servo mechanism, motor and digital output stage. It's all done in the quest for interference reduction, as well as



**RIGHT:** Top-loading CDM12Pro mech with Daisy SD8.1 software on a MediaTek platform. A CS8421 192kHz/32-bit upsampler and 192kHz/24-bit AK4395 DAC with pairs of OPA604 op-amps drives the balanced analogue output





the removal of EMI/RFI radiation between the stages of the player.

There's an entirely conventional S/PDIF coaxial digital output, limited to 44.1kHz/16-bit, and while that USB input will accept files at up to 192kHz/24-bit, as explained in PM's Lab Report [p49], such content is downsampled to 96kHz/24-bit before passing through to the DAC stage. There's also no provision for DSD content, which will either be a major annoyance or a total irrelevance, depending on your point of view.

My take on it is that this is something of an omission at a time when there appears to be a resurgence of interest in DSD content, especially in some non-European markets. While I can see that Le Player is entirely optimised for CD playback, the fact that even budget DACs and headphone amplifiers now offer DSD compatibility makes its absence all the more disappointing.

The USB input is selected using one of two little toggles on the front panel – the other turns the player on and off – but it's worth noting that while most products with a USB input require a driver for use

with Windows PCs, but are plug-and-play with Mac OSX hardware, the Métronome also requires Mac users to load a proprietary driver onto their computers.

A software disc is supplied with the player but it would be more helpful if the drivers were also available as a download from the Métronome website. Not ideal...

Analogue output is on a choice of RCA phono or balanced XLRs, both sets being permanently active, and that's about it – as

I said, this is a pretty simple, straight-down-the-line CD player. Completing the design is a trio of compliant feet, and the player comes partnered with a slimline remote handset in a classy

black rubberised finish [see p49]. So often high-end hardware is let down by the use of inexpensive-feeling 'parts bin' remote controls, but there's no such problem here.

### A CULTURED PRESENTATION

So the Métronome doesn't look like a common-or-garden CD player, and neither does it sound anything like the old clichés of digital audio. OK, so we've all moved on a long way from the hard-edged, glary

'Le Player's big, lush sound suited the Bach track extremely well'

**ABOVE:** The display is distinctly retro, as are the stylised legends for the little pin-head control buttons. Toggles at either end of the control panel select on/off and CD/USB functionality

sound of early CD players (we've had more than three decades to get it right) but even by modern standards there's something warm, generous, even 'analogue-sounding', about the way Le Player handles music.

It's a very cultured presentation, as well suited to high-quality audiophile-approved jazz recordings as it is to large-scale classical works, and while this means it trades away a little openness and ambience – meaning this isn't the crispest or most sparkling listen in the world – there's no denying the sense of scale and substance this presentation delivers.

Spin Blur's comeback outing *The Magic Whip* [Parlophone 0825646141692], and while there's not quite the bite and edge on offer with some players, it's hard not to like the rich, full-bodied sound of 'I Broadcast', with the bass and drums having both pace and weight, and the sparky lead instrumentation and vocals presented with good detail – even if things could do with a shade more eagerness and slam at times.

The Métronome is on safer ground with Marcus Miller's sinuous take on 'Papa Was A Rolling Stone' from his *Afrodeezia* set [Blue Note 472144-2], giving the lead instrument – Miller's bass – both great character and definition, and the accompanying second bass-line, percussion and brass plenty of punch. Again the sound is certainly a little on the warm side of neutral, but in this context there's really nothing wrong with that.

It's rather less happy with the dense, guitar-driven mixes of Johnny Marr's 2014 *Playland* album [Warner Bros NVCD002], with tracks like 'It's A Trap' sounding a little splashy and constrained. Yes, the vocals are clear and intelligible, the music motors along pleasantly enough, but that warm bass can tend to muddle things a bit.

There's a strong argument to be made that a player with a slightly leaner sound ➔

## MÉTRONOME'S MOMENTUM

Founded in 1987 by Dominique Giner, Métronome Technologie was set up as a loudspeaker company, before moving on to the digital products for which it's now best known. Those products are still hand-assembled at its facility at Roquemaure, near Toulouse, and for a long time the company's focus was entirely on CD playback, with not even a sniff of a digital input for other formats, let alone a USB socket. The flagship of the range is the Kalista/Elektra/Nausicaa CD player referred to in the main review, to which can be added the company's Silent Base supports or even tripod legs to create a floorstanding player sitting right at the very top of the high-end CD-spinning market. Of late the company has expanded its line-up with more players and DACs, and now even has a music server, the Music Centre 1, as part of 'a new start' for Métronome. Le Player is the first fruit of that move, which began with Giner transferring the company to new 'associate managers' Christian Bat and Jean Marie Clauzel. With this new management in place, Métronome is promising 'a huge program of new products' – including the adoption of DSD64/DSD128 capability.



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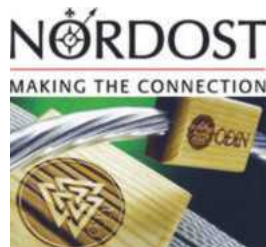
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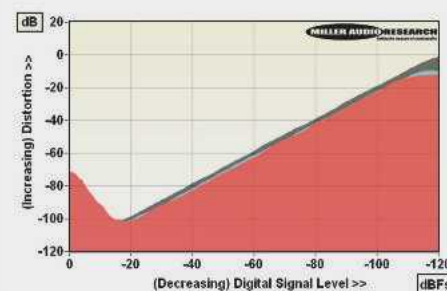


## MÉTRONOME LE PLAYER

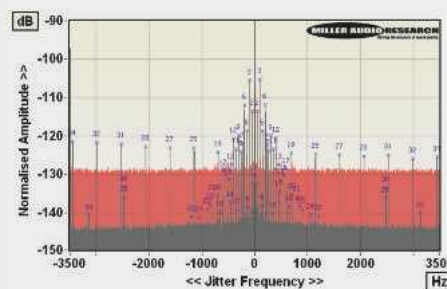
It has been reported that Métronome's entry-level player/DAC has a 'tube-based' output stage, but it doesn't. The OPA604 op-amps driving the analogue output are resolutely solid-state. Furthermore while both balanced and RCA outputs are specified at 2.5V, in practice the XLR outs actually deliver 4.8V at 0dBfs from a relatively high 575ohm source impedance. The output is also phase-inverting – worth noting before anyone leaps into an A/B comparison!

The USB 2.0 driver performance mirrors that we obtained for Métronome's Nausicaa DAC [HFN Dec '13] with its 16-bit 96dB A-wtd S/N ratio and re-sampling to 96kHz (including 192kHz inputs which are downsampled). Via CD, the A-wtd S/N ratio is a rather fine 114dB although distortion, courtesy of a raised 3rd harmonic, is higher than we might expect for this DAC at 0.015-0.04% (0dBfs, 20Hz-20kHz). The lowest distortion (<0.001%) is achieved between -15dBfs to -20dBfs and – in common with other Métronome players/DACs – is remarkably consistent with frequency [see Graph 1, below]. The difference in white noise between CD and USB inputs is clear from the jitter spectra [black and red, respectively, Graph 2 below] while the artefacts are largely PSU-driven, lending Le Player a slight warmth. The frequency responses are astonishingly flat and extended right out to the Nyquist limit with HF points of -0.01dB/20kHz (CD and 48kHz USB inputs) and to -0.05dB/45kHz (96kHz and 192kHz USB inputs).

Readers may download full QC Suite reports for Métronome Le Player's CD and USB performance by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'download' button. PM



ABOVE: Distortion vs. digital level over a 120dB range at 1kHz (16-bit CD, red; 24-bit USB, black) and 20kHz (24-bit USB, blue)



ABOVE: High res. jitter plots with 16-bit/44.1kHz data (CD, black with markers) and 24-bit/48kHz (USB, red)

## HI-FI NEWS SPECIFICATIONS

Maximum output level (Balanced)	4.82Vrms at 575ohm
A-wtd S/N Ratio (CD / USB input)	113.9dB / 95.9dB
Distortion (1kHz, 0dBfs/-30dBfs)	0.017% / 0.0035%
Distortion & Noise (20kHz, 0dBfs/-30dBfs)	0.011% / 0.0004%
Freq. resp. (20Hz-20kHz / to 45kHz via USB)	+0.0dB to -0.01dB / -0.05dB
Digital jitter (CD / USB input)	401psec / 250psec
Resolution @ -100dB (CD / USB input)	±0.2dB / ±0.3dB
Power consumption	15W
Dimensions (WHD) / Weight	450x115x435 mm / 15kg



ABOVE: A USB-B input addresses the same DAC stage as Le Player's CD section. Outputs include S/PDIF digital and both single-ended (RCA) and balanced (XLR) audio

would bring out the raw edge of the music rather better, as is made even clearer with the charging 'Playland', which only really snaps into focus when it breaks down momentarily and the bass-line is exposed. Once the listener has something to latch onto, the track becomes easier to unravel, but it's still rather hard work, and just a shade more 'wall of sound' than would be ideal.

### THE HIGHER-RES OPTION

Slow things down with the exemplary Linn release of Bach sonatas for violin and harpsichord, played by Lucy Russell and John Butt [CKD 433], and the big, lush sound Le Player can conjure suits the music extremely well, and the focus on the two musicians is extremely persuasive. Whereas brighter players might make this recording a bit too spiky, the weight in the lower octaves of Butt's harpsichord gives it a solid foundation.

There's even a decent sense of ambience, although playing the same set in 96kHz/24-bit through the USB connection (from a Mac running Audirvana) shows that the recording has more to give in terms of space and airiness than the CD section of the Métronome can deliver. That's a bit intriguing, as experimenting with CDs played conventionally and CD-quality rips fed in via USB suggests that Le Player has just a shade more definition when used as – well – a player, rather than as a DAC, with just a little edge of bite in evidence, and a slightly tighter bass.

However, comparing CD with a 'hi-res' version of the same recording sees the soundstage open up and 'breathe' a little more freely, with an increase in three-dimensionality and body of instruments.

That's even true when comparing 'hi-res' and CD-quality files of the

same recording, the playing field levelled by downsampling the files to CD quality to obviate any mastering differences between CD and beyond-CD versions.

However, it's as a CD player that the Métronome will be bought, with the USB input as a bonus facility. And although Le Player has a somewhat mannered sound, for more than a few buyers this will be just what is required for their systems, and with more than a hint of the capability of its manufacturer's flagship products.

Just before returning the Métronome to its box at the end of the review, during which it had been subjected to extensive listening, I loaded up Coltrane's *My Favourite Things* [Atlantic 8122-79577-0], and just sat back and let this 50-plus-year-old music wash over me. It was at that point that I think I finally 'got' what Le Player is all about, as the gentle strains of 'Everytime We Say Goodbye' poured from the speakers – all delicate piano, brushed skins, subtle bass and that characteristic sax, along with the sense of musicians working with an easy familiarity. Unforced, generous and easygoing – that's the sound here. And in a dwindling CD player market, such character should find itself some firm fans. ☺

## HI-FI NEWS VERDICT

This is less of a fully-fledged CD player/DAC than a disc-player with benefits – there's only a USB input, and even that downsamples higher-resolution files to 96kHz/24-bit. However, what Le Player does, it does very well, and although the slightly over-warm sound might not be to every taste, it certainly makes for an enjoyable – and easily-enjoyed – listen across a wide-range of well-recorded music.

Sound Quality: 82%





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**Robert Deutsch – Stereophile Feb 2015**



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# Benchmark SMS1

From Benchmark, one of the pioneer makers of DAC/headphone amplifiers, comes a small monitor that's served the brand at hi-fi shows for years: the SMS1 two-way  
 Review: **Ken Kessler** Lab: **Keith Howard**

Without knowing it, I had been repeatedly auditioning the £2499 Benchmark SMS1 speaker, albeit in an earlier form. It has been a habit of mine to drop in on Rory Rall, Benchmark's Sales Manager, at the International CES and any other shows we might be attending, because he and co-exhibitor Dave MacPherson of Studio Electric have a penchant for The Beatles – often using the 24-bit versions on the USB 'apple'. Their room has always been a haven for weary visitors, and the sound, via Dave's speakers, complemented Benchmark's electronics.

## COMPLETES THE SYSTEM

Because Benchmark is more of a pro brand than audiophile, it was a pleasant surprise that its compact, high-value-for-money, combination DAC/preamp/headphone amp units found such favour among domestic users [*HFN* Jul '13]. Recently, the AHB2 power amp joined these control units [*HFN* Mar '15], so it was natural that the company would want a speaker to complete a system.

Subconsciously, they'd been 'road testing' Dave's now-discontinued SE Monitor, on which this is based, in the toughest of conditions: at shows. The SMS1 is a re-worked speaker [see boxout], not least in its more elegant appearance. I loved the steam-punk/retro aesthetic of the original SE version, but this is even prettier.

Despite serving studios since 1983, Benchmark chose to make the speaker domestically tolerable, offering it in a choice of black, mahogany or padauk side panels, the latter two of solid hardwood and adding £100 to a pair. In addition to matching your décor, they are removable for repair or replacement.

Benchmark also adds that the panels aren't purely cosmetic because they stiffen and dampen the sides of the enclosure,

'contributing to a tight and well-defined bass response' [see Lab Report, p55].

Still, given that its customers are, in the main, professional users, Benchmark has made the speaker rugged in a chunky, off-road-vehicle way. The durable stainless steel mesh grilles are fabricated from the same material used for fine microphones, boasting excellent acoustic transparency. And the toggle for selecting between single and bi-amping modes is industrial-grade, rather than use a teensy-weensy mini-switch.

Benchmark proudly calls the speaker 'a return to acoustic suspension', arguing that small, ported speakers 'create the illusion of bass extension by emphasising certain frequencies – hence the name "tuned port".' It feels that ports, at least in smaller speakers, 'often produce a non-linear bass response', or the dreaded 'one-note bass'.

Returning to a sealed enclosure, Benchmark says that the performance is more linear, and capable of 'impressively deep bass'. As audiophiles are aware, and as users of original AR speakers learned a half-century ago, the cost of this is sensitivity. As a result, Benchmark advises against using low-power single-ended

valve amplifiers, though large valve amps will suffice. Naturally, they recommend the brand's own solid-state AHB2.

Vertically arrayed are a 170mm custom-made co-polymer woofer and a 25mm

soft dome tweeter.

The passive crossover, operating at 3kHz, is fitted with audiophile-grade components including non-inductive wire-wound power resistors. Benchmark is obsessive about

tolerances, especially to ensure unit-to-unit matching [see boxout].

Interestingly, instead of fitting two pairs of binding posts, the company chose to use

*'Voices sounded lifelike, with a blessed absence of sibilance'*



**RIGHT:** Beefy black cabinet with wooden side panels is fronted by a mesh grille with robust frame in a natural metal colour, protecting a 170mm woofer and a 25mm soft dome tweeter



a conventional pair of multi-way binding posts for single wiring, with a SpeakON 4-pole connector for bi-amping. This is certainly more convenient for all the wiring needed to bi-amp.

## A TIGHTER BASS

While studio users might simply position these on mixing desks, I gave them the full audiophile treatment. Benchmark recommends 36in-high stands, but – relative to my listening seat – there was a trade-off. Bass increased slightly when I put them on 24in Cliff Stone Foundation stands, and they were better vis-à-vis my ear-height but resulted in a slightly reduced soundstage. I suppose I could have piled cushions onto the seat, but the trade-off was not so great as to alter the performance in a crippling manner. Toe-in is a matter of taste.

Despite the reduced sensitivity noted in our Lab Report [p55], they didn't seem inordinately hungry – I even gave them a burst of PS Audio's wee Sprout [HFN Feb '15], which coped nicely. Things changed dramatically, however, when they were connected via Crystal Cables to the D'Agostino Stereo Momentum [HFN Aug '12] – more in keeping with the

## READY MADE MONITOR

Benchmark's VP of Engineering, John Siau, told HFN, 'The SMS1 was designed by Dave Macpherson of Studio Electric. We had shared space with him at a number of shows because we appreciated the clarity and overall sound of his speakers.' Benchmark subsequently purchased exclusive rights to the design and moved production to its facilities in Syracuse, NY. The crossover was split to facilitate bi-amping and upgraded with audiophile components including custom-built Clarity caps, from the UK, and close-tolerance air-cored inductors.

'A key to Dave's design' says John Siau, 'is the crossover frequency set above the midrange, which we believe contributes to the vocal clarity of the SMS1. At the low end, the sealed-box design was chosen for a tight, well-controlled bass while the tweeter was selected for low distortion and a smooth response.'

recommendation of an amplifier in the 30-200W region. My trusty Audio Research REF 5SE preamp, Marantz CD12/DA12 CD player and Pono and Astell & Kern digital players completed the system.

It struck me that I had heard this speaker's parent at least a half-dozen times, and figured that I had a pretty good measure of it, enough to start not with my verdict on the SMS1, but with the differences between the old and the new. The natural choice of music was the 24-bit Beatles material mentioned in my intro.

Memories play tricks, but my gut feeling is that Benchmark has tweaked the SE by tightening up the bass

– which is still a bit rich – and refining the top end. I loved the original SE simply because it was so musical.

That has not been lost, as evinced by George Martin's piano solo during 'In My Life' from *Rubber Soul*, which had the same engaging naturalness (despite being speeded up).

But I was thrown by a couple of things, having lived for many years with AR's 2ax and Radford's TriStar 90. Both were sealed enclosures, the latter also having a woofer that seemed too large for its volume. What

they had was a characteristically tight and dry bass. The Benchmarks are nowhere near as overly damped as those much larger classics, sounding in many ways more natural, if arguably less precise.


## COPING WITH KODO

Instinctively, I put on Kodo's *Heartbeat: Drummers Of Japan* [Sheffield Lab CD-KODO], which exacerbates shortcomings found in mini-monitors. Bless 'em, the Benchmarks coped better than manfully, delivering extension that would have rattled an LS3/5A to destruction. The weight and the mass were convincing, leaving the listener in no doubt that one was hearing absurdly oversized percussion.

Only a slight fluffing in the decay of the bigger 'thwacks' reminded me that my customary, and significantly costlier, Wilson Alexias were not in use [HFN Mar '13]. To reproduce those notes, a lot of air has to be moved with incredible fluidity and control. Even so, the SMS1 was more than convincing: it was exceptional given the speaker's size.

Because anomalies in the low end are less offensive to me – *too* much bass notwithstanding, which will drive me from a room – I was more concerned with the mid and treble. The SMS1 has a high crossover point, so the larger driver is acting as a true mid/bass unit. Suffice it to say, voices sounded genuinely lifelike, with a blessed absence of sibilance.

Wanting to hear how the character of the bass might affect voices delivered through the same transducers, I put on the Four Seasons' 'Walk Like A Man' [Rhino Box Set 8122795939]. Its 'footsteps' ensured that there was bass present below the harmonies and that world-class falsetto, and it was a reminder never to presume – whatever experience tells you – that a speaker will do such-and-such.

There was no compromising of the vocals' clarity, no clouding of the space. The bass was soft-ish, as it should be, but 





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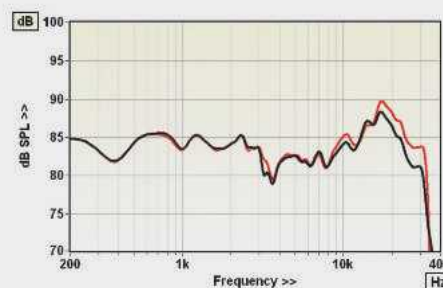
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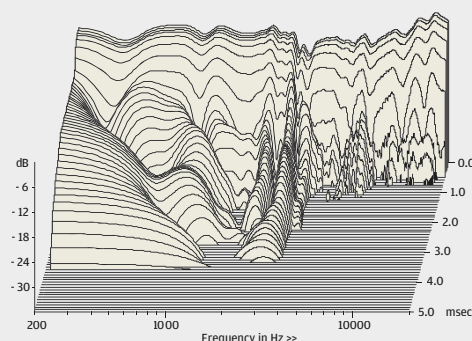
## BENCHMARK SMS1

Benchmark claims 88dB sensitivity for the SMS1 but our measurements suggest this is a considerable overestimate. Our pink noise figure of 84.3dB indicates that 84dB is a more representative figure, and much as you would expect of a closed box speaker of this size. The quoted nominal impedance of 6ohm is also too optimistic: we measured a minimum modulus of 3.6ohm, indicating a 4ohm nominal figure. Impedance phase angles are well controlled, as a result of which the minimum EPDR (equivalent peak dissipation resistance) is a relatively high 2.2ohm at 54Hz, although a second dip to 2.3ohm at 358Hz means that the SMS1 isn't quite as amplifier friendly as that figure suggests.

Measured at 1m on the tweeter axis with grille removed, the forward frequency responses [Graph 1, below] show a distinct presence band dip followed by a rise to a peak at 17kHz. As both occur above 3kHz they must largely be laid at the door of Benchmark's choice of tweeter. Response errors are consequently a little on the high side at  $\pm 4.7$ dB and  $\pm 5.1$ dB respectively (200Hz–20kHz). Pair matching error is a little high too at  $\pm 1.3$ dB but would be much tighter but for narrow-band disparities near 3kHz and approaching 20kHz. Diffraction-corrected near-field measurement showed the bass extension to be 56Hz (–6dB re. 200Hz) – fair for a small cabinet – but with a peak of +4dB at 100Hz, suggesting that the bass alignment is underdamped. This is confirmed by analysis of the impedance which indicates a system Q of  $>1.5$ . Stir in the obvious breakup resonances seen in the CSD waterfall [Graph 2] and it's hard not to conclude that the bass driver is oversized. KH



ABOVE: Forward response shows a dip in presence followed by a treble peak. Bass is underdamped



ABOVE: There's a clear breakup mode at 3-4kHz that correlates with the dip in its forward response

## HI-FI NEWS SPECIFICATIONS

Sensitivity (SPL/1m/2.83Vrms – Mean/IEC/Music)	85.5dB/84.3dB/83.7dB
Impedance modulus min/max (20Hz–20kHz)	3.6ohm @ 20Hz 22.2ohm @ 1.9kHz
Impedance phase min/max (20Hz–20kHz)	–37° @ 2.7kHz 42° @ 996Hz
Pair matching (200Hz–20kHz)	$\pm 1.3$ dB
LF/HF extension (–6dB ref 200Hz/10kHz)	56Hz / 31.9kHz/32.8kHz
THD 100Hz/1kHz/10kHz (for 90dB SPL/1m)	1.9% / 0.9% / 0.1%
Dimensions (HWD)	345x260x250mm

**LEFT:** Rear has terminals for conventional wiring via multi-way posts, or SpeakON NL4 4-pole twist-lock input connector for bi-amping, selectable through a substantial toggle switch

with speakers of higher cost and greater dimensions: a 'real' sense of the metallic resonance to his banjolele.

The effect was as pronounced with the piano playing throughout Lou Rawls' *At Last* [Blue Note CDP 7 91937 2], essentially the correct

reproduction of the sonic clues that, for example, distinguish one make of piano from another.

Studio denizens and audiophiles are inherently suspicious of each other. Few in either camp realise that they should have a mutually beneficial interplay. In this instance, Benchmark has been working with and selling to receptive audiophiles for some years now, so it is among the very few from the pro sector that realises hi-fi enthusiasts actually *listen*, and for the music – not just an earth loop or some overload that might have crept into a recording. With this background, the SMS1 standmounts join a select group that includes the JBLs, KEFs, Tannoys, Harbeths and others with both studio and home suitability. ☺

## HI-FI NEWS VERDICT

This classy monitor has a distinct character, leaning toward the rich at the bottom and the analytical at the top, rather than the totally neutral 'studio' sound I might have anticipated. If the balance suits your taste, you'll find it sounds bigger than a small two-way, it's easy to drive and the perceived value suggests a price of at least a grand more. And it is defiantly, unapologetically, a speaker for rockers.

Sound Quality: 84%



with more weight than I expected. What made it so involving was the way the harmonies meshed, the resolving power of the tweeter ensuring that each singer could not only be heard clearly, but defined in their own space.

## RETRIEVING DETAIL

With such fecund lower registers, Little Feat was an inevitable choice, the *Rad Gumbo: The Complete Warner Bros Years* collection [Warner 8122796057] allowing me to indulge in their hits. For those who attribute rhythmic properties to a hi-fi system, the boogie that is 'Oh, Atlanta' shuffled and slid with the requisite swampy feel. Even the forlorn ballad, 'Willin'', impressed with its precise, perfect tempo. Little Feat always married super-tight playing with a *faux*-sloppiness. This sophisticated playing with rhythms never caught the Benchmark SMS1 speakers unawares.

Given that Benchmark's roots are in studios, making the SMS1 a monitor in the true sense, it was important to hear what they could do with detail retrieval and clearing away sonic debris. George Formby's *When I'm Cleaning Windows – His 52 Finest 1932-1946* [Retrospective RTS 4104] had, I thought, yielded all of its riches over wide bandwidth systems into which I've fed it. Silly me... to my delight, the Benchmarks delivered a little benefit of their own that I had previously noticed



# Cambridge Audio Azur 851N

The London-based company's latest network music player is its most ambitious yet, doubling as a DAC and digital preamp. But just how good is it at multitasking?

Review: **Andrew Everard** Lab: **Paul Miller**

Cambridge Audio has been involved in digital audio as long as almost any manufacturer, having launched the Stan Curtis-designed CD1, a multi-box CD player, back in 1984 [see Vintage Review, *HFN* May '14]. Over the years, with a change of ownership along the way, it built a strong following for its DacMagic digital-to-analogue converters, from the early designs through to the current range, which encompasses models down to the pocketable DacMagic XS. It's also brought affordable streaming/network audio products to the market, starting with the NP30 and StreamMagic models. Now it has launched its most ambitious network music player to date, the £1200 Azur 851N.

## COMPREHENSIVE FRONT END

The Azur 851 range runs from the 851A integrated amplifier [*HFN* Aug '12] to the all-analogue 851E preamp and 200W 851W stereo power amplifier [*HFN* Jun '14]. The only CD player, the 851C, is actually a player/upsampling DAC/preamp, while there's also a dedicated DAC/preamp, the 851D. So, it's to be expected that the 851N should be something beyond 'just' a network audio source component.

And so it proves, for though described by the company as a network audio player, it's also a DAC, complete with USB and S/PDIF digital inputs, and a preamplifier, usable straight into a power amplifier via its variable outputs. As well as wired Ethernet connectivity and built-in Wi-Fi (with a USB antenna provided), it supports Apple AirPlay for direct connection of iOS devices and computers running iTunes, and can also accept an optional BT100 Bluetooth 'dongle', selling for £70 and compatible with aptX, to allow a wider range of computers and Android devices to be connected.

**RIGHT:** A SHARC DSP handles all digital processing (including the 2nd-gen ATF2 384kHz upsampling and switchable digital filter modes) while twin AD1955 DACs feed a balanced analogue audio and preamp output stage

Digital inputs are provided on two RCA phono coaxial sockets, one AES/EBU input and two optical, the former supporting file formats up to 192kHz/24-bit, as does the Ethernet/Wi-Fi streaming capability, while the asynchronous USB 2.0 Type-B connection also allows DSD64 files to be played from a connected computer.

The three USB Type-A sockets to the rear can be used for the connection of storage media, with one also being enabled for the charging of connected smartphones and laptops, and there's a further USB on the front panel. Add internet radio and Spotify Connect, and you have a pretty comprehensive digital front end for any system, and just for once all this flexibility isn't achieved at the expense of usability.

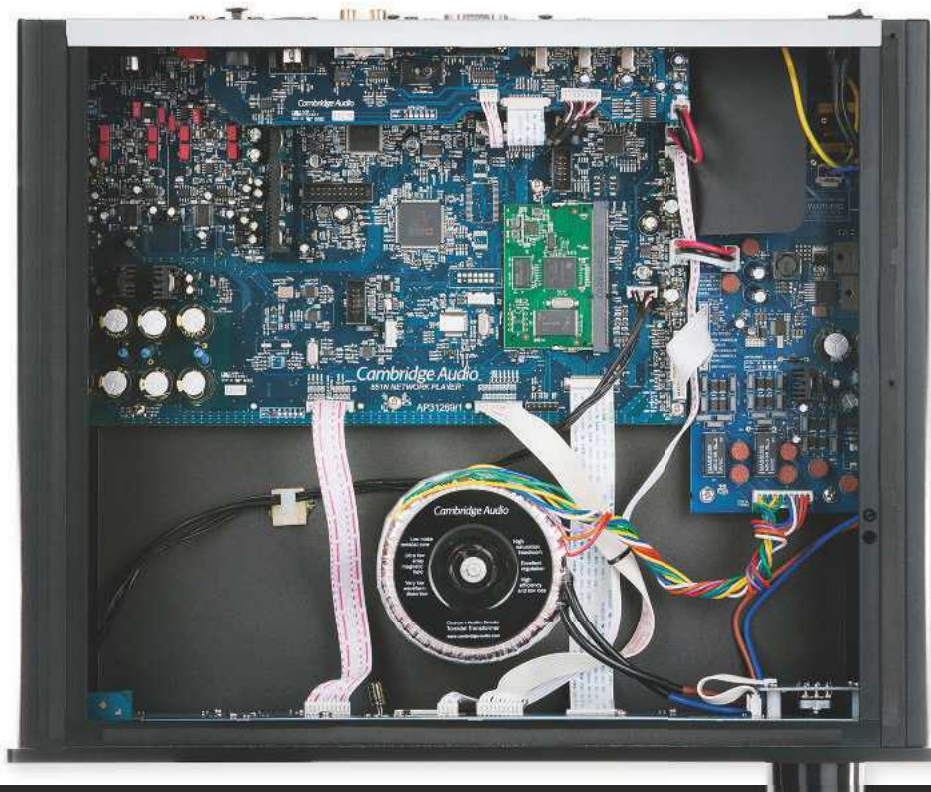
Thanks to a large, clear display – the visible face of a new streaming module, internally known as Zander, and running the in-house StreamMagic software stack – it's possible to operate the 851N either

from its front panel or across the room with no additional equipment, the main control providing simple scroll and click operation when using it 'hands on'.

## CAMBRIDGE'S CONNECT APP

There's a perfectly functional remote control handset supplied, but for the smoothest experience it's best to use an Android or iOS tablet or smartphone running the redesigned Cambridge Audio Connect app, available free from the Google Play and iTunes stores. This is one of the best-designed network player control apps I have yet encountered, combining clarity with flexibility, and it works pleasingly with that display, showing both what's playing together with sleeve/radio station artwork.

An interesting aspect of the app's design is the way it interacts with both the 851N and the music stored on the user's network. Usually in such systems





the app merely controls the player, which browses the network music store(s), but not here. As Cambridge Audio's Dominic Baker explains, 'Although Zander is one of the fastest modules available, it's no match for a modern smartphone when it comes to network browsing. So we now use that power that you have in a smartphone to do all of the browsing, select tracks, etc. Only when you press Play does the app point the product at the correct file. This makes for a faster and slicker experience.'

Under the lid, the 851N draws on digital design already familiar from the flagship range's 851C CD player and 851D DAC/preamp, using twin Analog Devices AD1955 DACs in dual differential mode, one DAC dedicated to each channel.

Ahead of this conversion, there's the ATF2 upsampling also found in the 851C and 851D: this second-generation 'Adaptive Time Filtering' system provides flexible upconversion to 384kHz/24-bit before the digital data hits the DACs, and is used to reduce jitter as well as shifting digital noise far beyond the audible band.

*'Immediately apparent was the 851N's low-end clarity'*

In addition, there's a choice of digital filter settings, also as seen on the player and DAC. Linear and minimum phase filters are available, as well as a steep filter setting, all selected using a front-panel button, which also reverses absolute phase if held for a couple of seconds. Cambridge Audio suggests a 'suck it and see' approach – there's no 'right' setting, but rather only the one best suited to source, system and personal taste. The player memorises the setting chosen for each input, so it's possible to employ different filters

dependent on the source, internal or external, you're using [see PM's boxout].

Running the show is a 32-bit SHARC processor, responsible for not just the upsampling but also the volume level when the 851N is used straight into a power amp. This processor is designed to maintain full digital resolution even as the volume is reduced, by resampling the signal at every level-step – rather than resorting to the bit-reduction used in some digital preamps.

The other 851-series digital products use a Blackfin processor, but the more

**ABOVE:** Big, clear display provides track/album/artist info and album/station artwork. Main rotary control offers turn-to-scroll/press-to-enter operation for simple 'hands on' navigation

powerful SHARC was chosen here in order to support DSD64 over USB (DoP). Baker explains that the choice of DoP, and thus the SHARC, was a prosaic one: 'At the time we were developing the 851N we couldn't find any DACs that supported DSD natively that would outperform the AD1955s.'

## A WIDE OPEN SOUND

As the Lab Report suggests [p59], the Azur 851N turns in a fairly remarkable performance across a range of sources and bit/sample rates, but what immediately impresses is the fresh, clear and wide-open sound of which it's capable. This is as true when used as a source component into conventional amplification as it is making use of the variable output facility straight into a power amplifier.

I had some initial teething problems when playing files from my NAS drives using my preferred MinimServer streaming software, as the 851N had an annoying habit of skipping midway through a track and playing the next selection. The problem seemed linked to my preference for FLAC-to-WAV transcoding in MinimStreamer – it was less prevalent, but no more predictable, when transcoding was turned off. However, when using TwonkyMedia Server to dish up the data in straight FLAC there were no such problems.

As well as trying out the admirably well-sorted internet radio implementation and even Spotify Connect (the sound of which I still find rather bland and anonymous), I used music files from CD quality all the way up to 192kHz/24-bit over the network: CDs via Metronome's Le Player [see p46], and some DSD files played over USB via Audirvana Plus software.

While the S/PDIF inputs perhaps have a slight edge over the USB when all things are equal, with just a hint more ➞

## FILTER-FEST

Not only does the Azur 851N employ a SHARC DSP to upsample all internally decoded media to 384kHz/24-bit (and process DSD64 streams via USB and network connections) but there's plenty of spare overhead to accommodate three different digital filter algorithms prior to the Analog Devices DACs. (These replace the 192kHz Wolfson DACs used in its earlier USB DACs and players.) The Linear Phase filter offers a constant group delay, yielding a time-coherent output with limited pre/post ringing and is most listener's preferred option when streaming 44.1/48kHz media. The Minimum Phase option behaves rather like an apodising filter, freeing the impulse response of any unnatural, acausal pre-ringing but increasing the energy of its post-ringing and incurring a non-linear group delay. The final, Steep filter option is the classical brickwall approach that offers little damping of any pre/post ringing but provides a linear phase output with excellent attenuation of any digital images immediately outside of the audio range. Also, perhaps courtesy of higher-rate upsampling, the 851N offers a more extended and flatter response than its forebears. PM



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## NETWORK AUDIO PLAYER



**ABOVE:** Four S/PDIF inputs and two outputs, one AES/EBU in and out, asynchronous USB-B, four USB-A (including an iDevice-compatible USB-A on the fascia), trigger, external IR and RS232. Analogue outs (fixed and variable) via RCA and balanced XLRs

information, the balance is redressed when playing DSD files when the 851N offers just the right combination of smoothness and captivating detail.

This isn't really a 'kick back and relax' kind of player, as the sound is much too interesting and attention-grabbing for that – although using the 'Steep' filter setting did smooth things down a shade. It's never rough or unruly but manages to deliver a sound that's both musically satisfying and impressive in all those hi-fi ways, from soundstage depth and focus to power and definition.

### THE BLARE OF BRASS

Starting off with some classic prog in the form of Rick Wakeman's *The Six Wives Of Henry VIII*, in a 96kHz/24-bit rip from vinyl [A&M AMLH 6436], what was immediately apparent was the low-end clarity of which the 851N is capable. Add to this its ability to drive even complex rhythms and present a stinging, but never tortured view of cymbals, plus those characteristically 'period' synth sounds – now revealed in all their edginess.

This view was reinforced with Kyle Eastwood's *Timepieces* [Jazz Village JV 570034 – see *HFN* Jun '15] which makes clear the bass extension and definition on offer here as Eastwood and drummer Ernesto Simpson bounce off each other while, above, the piano of Andrew McCormack sounds deliciously full-bodied and the brass of Quentin Collins and Brandon Allen has beautiful breathiness and blare.

It's hard not to like the way the music explodes out of the speakers in all its three-dimensional glory, with performers reliably placed in an

unforced soundstage, and complete with real ambience and lovely instrumental textures.

Switch to 'Pyongyang', from Blur's comeback album *The Magic Whip* [Parlophone 0825646141692], and again there's that sense of the music breaking free from the speakers and filling the room. The sound is instantly attractive, and yet rewards close attention with the information it contains about the tonality of voices and instruments.

Unsurprisingly, this sonic ability means the Cambridge Audio also makes a fine fist of classical music, and I greatly enjoyed the Kansas City SO/Michael Stern recording of Britten's *Young Person's Guide To The Orchestra*. This music could almost have been written as a system-tester, and in DSD64 [from Reference Recordings RR-120 SACD] every instrumental timbre was crystal-clear, even in the relentlessly building final fugue. Hugely exciting.

It's hard not to conclude that this is a major league contender, and from a brand still (wrongly) associated with budget separates in the mind of many an audiophile. Which is their loss... ☹

### HI-FI NEWS VERDICT

Combining solid build (what Cambridge cheekily calls 'Full Metal Jacket') with flexible, intuitive operation and a glorious sound, fully capable of slamming home rock or drawing out the scale of classical music, this is a fine addition to the flagship Azur range. Network DSD streaming would have made it perfect, but whether as a source or keystone of a complete system, the 851N is excellent value for money.

Sound Quality: 87%

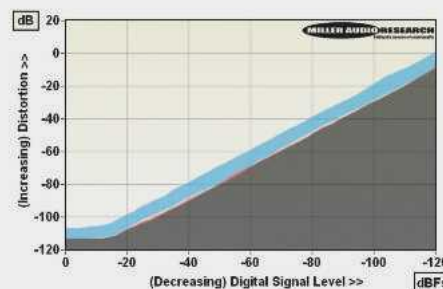


## LAB REPORT

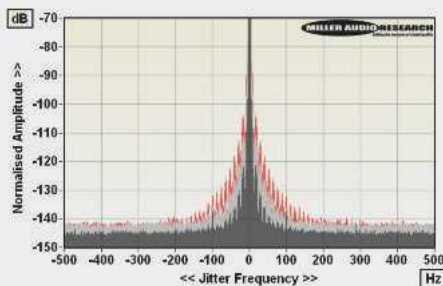
### CAMBRIDGE AUDIO AZUR 851N

Tested in its fixed analogue output setting (and USB configured for 192kHz-ready 2.0 mode), the 851N offered a near-flawless set of numbers. The by-now-familiar Linear, Minimum Phase and Steep roll-off filter options offer responses of -1.4dB, -1.3dB and -9.7dB at 45kHz, respectively, with 96kHz media and -3.3dB, -3.2dB and -11.5dB at 90kHz with 192kHz files. Maximum output is a heady 4.27V (balanced) via a 45ohm source impedance while the A-wtd S/N ratio is impressively wide at 112.2dB, 112.1dB and 111.3dB via S/PDIF, network and USB digital inputs. Distortion and low-level linearity are first-rate via all inputs but, if minuscule differences are analysed, the rank order is as above. Unlike with most DACs there's no peak-level compression here, so distortion remains incredibly low at ~0.0002% over the top 15dB of its dynamic range through bass and midrange, increasing to just ~0.0004% at 20kHz and ~0.0006% at 40kHz with 96kHz inputs [see Graph 1, below].

Jitter is also lowest at 50psec (48kHz) falling to 10psec (96kHz) via S/PDIF, increasing marginally to 60psec (48kHz) via USB and then to 385psec (48kHz) via the wired network connection. These are all low-rate jitter sidebands [see Graph 2, below] and decrease further to 125psec (96kHz) and 50psec (192kHz) via the network input. The latter does not handle 32-bit floating-point WAV files, by the way. The remaining, analogue, parameters including separation (130dB) and channel balance (0.04dB) are all superb. Readers may view comprehensive QC Suite test reports for the S/PDIF, USB and network audio performance of Cambridge Audio's Azur 851N by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'download' button. PM



**ABOVE:** Distortion versus 24-bit/48kHz digital signal level over a 120dB range at 1kHz (S/PDIF, black; Network, red; USB, grey) and 20kHz (USB, blue)



**ABOVE:** ±500Hz zoomed, low-rate jitter spectra comparing S/PDIF, black; USB, grey and Network, red

### HI-FI NEWS SPECIFICATIONS

Maximum output level (Balanced)	4.27Vrms at 45ohm
A-wtd S/N ratio (S/PDIF / USB / Net.)	112.2dB / 111.3dB / 112.1dB
Distortion (1kHz, 0dBFS/-30dBFS)	0.00020% / 0.00022%
Dist. & Noise (20kHz, 0dBFS/-30dBFS)	0.00024% / 0.00045%
Freq. resp. (20Hz-20kHz/45kHz/90kHz)	+0.0dB to +0.08dB/-1.4dB/-3.3dB
Digital jitter (S/PDIF / USB / Network)	50psec / 55psec / 385psec
Resolution @ -100dB	±0.1dB
Power consumption	22W (<1W standby)
Dimensions (WHD) / Weight	430x115x360mm / 8.1kg



# Unison Research Triode 25

With this handsome anniversary design, the long-established Italian valve amplifier specialist offers triode sounds without tears, and a convenient USB input to boot  
 Review: **Steve Harris** Lab: **Paul Miller**

**T**he triode tube (or valve) is the oldest and simplest amplification device, but for many audiophiles it still takes pride of place. There are plenty of practical, affordable and easily-accommodated triode amplifiers to choose from. Among these some of the most elegant are the wood-fronted creations of Unison Research, whose latest offering is this £2500 Triode 25 integrated.

## SO WHY NOT SET?

Unison Research owes its existence to Professor Giovanni Maria Sacchetti, who founded the company in 1987. Sacchetti had always nurtured a passion for music, and began experimenting and building amplifiers from a very early age. After graduating in electronics, he embarked on a career as a university lecturer, and continued to teach for some 25 years.

At the same time, he developed and designed all the products for Unison Research – although, in the case of the Unico hybrid series, he was assisted by a long-time university colleague, Leopoldo Rosetti. But at the end of 2014, after a period of serious ill-health, Sacchetti relinquished his role. The Triode 25 was in fact his last design for Unison Research. However, with improving health, there's a possibility that he'll be coming up with something new of his own in the future.

For some enthusiasts, the only amps worth considering use triodes in single-ended mode, where the audio signal is amplified by a just one tube. But single-ended triode (SET) power amplifiers are expensive to build, partly because they need a special type of output transformer; and they are bulky and low-powered in relation to their cost. So all but the most specialised tube amps today use the push-pull principle, where a pair of output stage tubes amplify the positive and negative halves of the audio waveform.

Unison Research itself has long created SET amplifiers. But the Triode 25, intended as a modern, versatile and user-friendly product, is a conventional push-pull design. It's essentially a new and thoroughly updated version of the original Triode 20 [see boxout]. But instead of a phono stage, the Triode 25 offers a built-in DAC with associated USB digital input.

Its output tubes are EL34 pentodes, with the circuit configured to run these in either triode or pentode mode – the latter specified at roughly double the triode-mode power output (50W). A further user adjustment gives two options for the level of negative feedback used. Along with the four EL34s the Triode 25's valve complement includes three small-signal double triodes, two ECC83s and a single ECC82.

With a well-made chromed valve cage surmounting the wood fascia, the Triode 25 is tidy and compact. There are only

three front-panel controls, an on/off switch, a rotary source selector and a volume knob. There is no standby function, while warm-up is quite rapid.

Below the on/off toggle is a receiver window for remote control commands, as the Triode 25 comes with Unison's system remote handset [see p63]. This too has a wooden housing. But of the 30 rather tiny buttons on its metal front plate, only two (volume up and down) are relevant!

While the volume control operates remotely thanks to a motorised potentiometer, the source selector is strictly manual. Switch

positions start with the USB input, and continue with three line inputs labelled CD, Tuner and AV, plus one for Tape. Above the fascia, on the apron beneath the chromed cage, are some further controls that won't be needed every day. To access these you need to loosen four bolts at the corners of

*'The Triode 25 presented vocals in an almost caressing manner'*



**RIGHT:** Lifting the protective cage reveals the choice of 2xECC83 (12AX7), ECC82 and 4xEL34 output tubes. Bias adjust, mode and feedback options are all accessible from here



**LEFT:** Rotary controls on the Triode 25's sculpted wood fascia are for source selection and volume, the latter also operable by remote control

the cage using the long hex key provided, when the cage can be removed.

In the centre are two small toggle switches, one to select triode or pentode mode, the other to change the negative feedback between 'high', nominally 5dB, and 'low', nominally 1.8dB. It's stated that the level of feedback is always relatively low in any case, never exceeding 12dB.

Nearer the front is a small illuminated meter, a toggle switch and a pair of rotary trimmers to adjust the output tubes' bias. The Triode 25's adjustment is described as 'approximately 20% self-biasing and 80% manual', Unison Research saying that its mixed approach 'minimises calibration errors while preserving the power tubes and other circuits.'

On the rear panel are the expected speaker terminals, though with no provision for load matching [see PM's Lab Report, p63]. Then come the ranks of

phono sockets for line input connections, along with a pair of outputs for Tape and another for line-level connection to an active subwoofer.

Finally, there is the vaunted USB digital input, specified as compatible with LPCM signals up to 384kHz and DSD up to 5.6MHz (DSD128) via DoP. Complete and helpful instructions are provided, covering driver installation and configuration for foobar and JRiver under Windows. As usual, for Mac users no driver is needed. No problems were encountered setting-up and the DAC worked very well.

### **FREE AND AIRY**

Once in place and warmed up, the Triode 25 made an immediately pleasing impression, sounding warm, sweet and appealing on many recordings that I tried. It could present vocals in an almost caressing manner, so that on familiar tracks

you could often find yourself being drawn almost unexpectedly into the meaning of the lyrics.

It didn't lack power at the bottom end, but with my B&W CM10 loudspeakers [HFN Sep '13], on some tracks a heavy bass line could seem to muddy the overall effect. However, I got very good results with the Dali Ikon 6 and the excellent little Dynaudio Excite X34 floorstanders.

Before going far, I naturally tried the pentode-mode option. But with repeated experimenting I found the comparison problematic and in the end I felt I just

couldn't be sure that the pentode function was operating as intended. Two samples were tested by PM with the same outcome, so I continued listening – as I'm sure most users of this amplifier will do anyway – on the Triode setting.

As for the high/low feedback option, after experimenting it became clear that the low-feedback position actually was preferable, breathing just a bit more life and realism into the sound.

Given a modern studio production the Triode 25 could deliver with warmth and power. On the 2003 re-creation of 'The Pink Panther Theme' from *Ultimate Mancini* [Concord SACD-1034-6] the heavy bass sound of Abraham Laboriel had real shape and depth. There was a feeling of air around Plas Johnson's solo sax, while the brass ensemble sounded free and airy. Joey DeFrancesco's Hammond-and-Leslie sound really swirled and overall the Triode 25 brought life to what can often seem a rather dry recording.

This amplifier was capable of bringing tangible sounds up out of a convincingly black silence, which is certainly not the case with some valve models! A good example was the beautiful unaccompanied voice of Rosa Passos on 'Duas Contas' from opening *Rosa* [Telarc CD-83646]. Here the singer's voice is heard in an environment that is dead quiet but not dead (if you see what I mean), so while her delivery is intimately miked, it is bathed in a delightful studio ambience. Rosa's voice and her gorgeous guitar were captivating. ➔

## **UNISON'S TRIODES**

Back in 1987, this Italian company got started with the Gloway, a five-tube preamp with phono stage. Its first power amplifier was the solid-state 80W Ruler, but this was soon followed by a valve power amp called Nimble, using KT88 beam-tetrodes in push-pull and claiming 25W in triode mode, or 50W in pentode mode. By the early 1990s Unison had launched its first all-valve integrated, the Triode 20, using two pairs of EL84 output tubes and again switchable between triode and pentode mode. Also using two ECC83 and four ECC82 tubes, the Triode 20 included a MM phono section. Unison Research continued to develop single-ended triode amps, from the baby Simply 2 up to the big Absolute 845. But for its 25th anniversary, the company has created a thoroughly modernised version of the push-pull Triode 20, the appropriately-named Triode 25.



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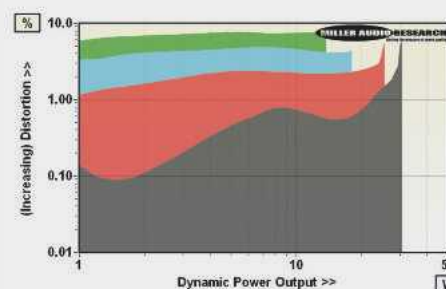
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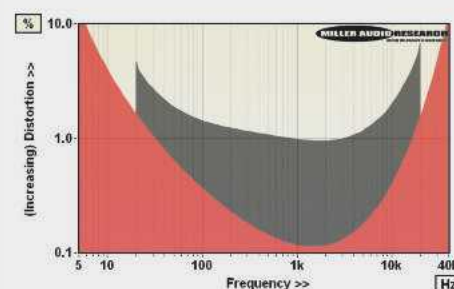
## UNISON RESEARCH TRIODE 25

Ordinarily I will test pentode/triode mode amplifiers in both settings but with greater deference to the higher output/lower THD typically offered by the former. In this case, with some uncertainty about the pentode configuration, and in the spirit of the amplifier's name, I focused on the 25's *triode* mode performance. With its output transformer broadly optimised for 6ohm loads, power output was roughly equivalent into 8 and 4ohm loads (2x28W and 2x23W respectively) with very little headroom beyond this under dynamic conditions – 30W and 25W into 8/4ohm loads, falling to 18W/14W into 2/1ohm loads [see Graph 1, below]. As ever with a low feedback triode mode amplifier, maximum power output is largely determined by how much distortion is tolerable rather than by a hard clip.

In practice THD rises from 0.14% at 1W to 1% at 8W, 1.5% at 25W and 5% at 28W (all 1kHz into 8ohm). Versus frequency, distortion rises through low bass and high treble (to 1.6/1.5% at 20Hz and 20kHz at 1W and 4.6/8.5% at 10W) as the transformer core begins to saturate and as the influence of any compensation falls away [see Graph 2, below]. Unison has engineered a very flat response from its Triode 25 – within  $\pm 0.3\text{dB}$  from 20Hz-20kHz and with no obvious ultrasonic resonance as the output falls away beyond 60kHz to a respectable  $-3\text{dB}$  point of 80kHz. There is a  $+3\text{dB}$  lift at 3Hz however, so turntable/reflex-loaded speaker combos will need to be used with care... Noise, meanwhile, is low for such a design, assisting an A-wtd S/N ratio of 83.5dB (re. 0dBW). Readers may view a comprehensive QC Suite test report for Unison Research's Triode 25 by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'download' button. PM



ABOVE: Dynamic power versus distortion into 8ohm (black trace), 4ohm (red), 2ohm (cyan) and 1ohm (green) speaker loads up to 5-10% THD



ABOVE: Distortion versus frequency at 10W/8ohm (20Hz-20kHz, black) and 1W/8ohm (5Hz-40kHz, red)

## HI-FI NEWS SPECIFICATIONS

Power output (<5% THD, 8/4ohm)	28W / 23W
Dynamic power (<5% THD, 8/4/2/1ohm)	30W / 25W / 18W / 14W
Output impedance (20Hz-20kHz)	1.9-2.2ohm
Freq. response (20Hz-20kHz/100kHz)	-0.3dB to -0.16dB/-9.7dB
Input sensitivity (for 0dBW/25W)	35mV / 123mV
A-wtd S/N ratio (re. 0dBW/25W)	83.5dB / 97.5dB
Distortion (20Hz-20kHz re. 10W/8ohm)	0.11-1.4%
Power consumption (Idle/Rated o/p)	105W/286W (1W standby)
Dimensions (WHD) / Weight	300x200x450mm / 20kg



ABOVE: Three line inputs are provided alongside tape in/out and a line-level 'sub out' connection. The fixed-tap speaker connections are via substantial 4mm posts/sockets while the USB input is compatible with 32-bit/384kHz and DSD128 files

With orchestral music, the Triode 25 once again seemed able to breathe life into recordings that can sometimes seem rather thick and uninspiring. Listening to a Barbican recording of Brahms' Symphony No 1 with Haitink [LSO Live LSO0045] the Triode 25 conveyed the timbres of the orchestra well, and although the overall feeling was still rather constrained, the recording became very listenable provided you had the volume setting just right.

### SWEET OLIVIA VOCALS

With 'The End', the opening track of Kings Of Leon's *Come Around Sundown* [Sony 88697782412], I couldn't help being impressed by the big drum sound and shimmering cymbals and, as I'd found on so many other examples, the Triode 25 gave a lively presence and tangibility to the vocals. But eventually I felt that it was in danger of running out of steam on this material.

Returning to female vocals, I put on Olivia Trummer's *Fly Now* [Contemplate CMN14005]. In the opening 'Precious Silence' I felt that the Triode 25 successfully made the most of the sweet and alluring texture of Trummer's voice, and the way she complements this with her liquid-sounding pedalled piano notes. The subtleties in this recording were well brought out, yet the Triode 25 sounded a little less graceful as the track built up to its loud and densely-recorded climax.

Listening to a recent jazz recording like the Tori Freestone Trio's *In The Chop House* [Whirlwind Recordings WR4648], which features just saxophone, bass and drums, proved intriguing with the Triode. It gave a warm and engaging result, with Freestone's sax singing and crying with real 'humanity'. The character of the double-bass was quite well conveyed with only its very lowest notes becoming a little soft and uneven.

As for soundstaging, the Triode could certainly deliver an expansive, open picture with plenty of atmosphere. On Muddy Waters' *Folk Singer* [Discovery Sounds HDR CD1001] a satisfying stereo image extended well beyond the speakers, and Muddy's vocals were compellingly intense, in the centre of an enormous and very 'live' space. The Triode 25 really seemed to thrive on the reverberant quality of recordings like this. ☺

## HI-FI NEWS VERDICT

Neat and stylish, the Triode 25 represents good value thanks to its inclusion of a more than satisfactory USB DAC. It gives a good deal of the enticing, tactile quality we hope for from tubes, without compromising too much on bass extension, and with commendably low noise. Despite a question mark over the pentode-mode option, as a *triode* amp, with suitable speakers, it performs admirably.

Sound Quality: 82%



# Oppo PM-3

At first sight this looks to be a scaled-down, closed-back version of Oppo's two earlier planar magnetic headphones, for use on the move. Only there's more to the story...

Review & Lab: **Keith Howard**

**S**pinning off technology from flagship products to more affordable cousins is an old and honourable tradition in audio, one which Oppo has quickly adopted with its expanding range of planar magnetic headphones. It is only a year since we reviewed the top PM-1 [HFN Jul '14] yet already we've had the less costly PM-2 [HFN Feb '15] and now, here, the yet cheaper PM-3. But the third in line, priced at £349 in the UK, is notable for a good deal more than its friendlier price tag, or that it's closed-back whereas the PM-1 and PM-2 are open-back.

## 'A TOUCH OF EXCITEMENT'?

What Oppo doesn't make crystal clear about the PM-3 – although the press release says it is 'tuned to have, deep, tight bass and a touch of excitement' – is that it embodies a significantly different frequency response, and hence tonal balance, from that of its forebears.

Whereas the PM-1 and PM-2 have a virtually flat uncorrected response below 1kHz, the PM-3 has a hump in output centred on 150Hz. It is also significantly more energetic in the critical presence band region around 3kHz, and further up the treble band too. So while the PM-3 may seem in many ways to be a chip off the same block as its costlier siblings, this new design actually sounds significantly different.

Oppo has made the PM-3 closed-back to provide the higher degree of sound isolation often necessary when listening on the move. It has also made the PM-3 lighter and smaller, but compared to some truly specialised, minimalist portable designs, it is still on the bulky side. Its capsules turn flat but don't fold up into the

headband, so in its zip-up denim carrying case the PM-3 is too large for most pockets. On the plus side, the just-circumaural earpads ensure more reliable sound isolation than is often provided by supra-aural (on-ear) alternatives.

While we don't measure isolation performance in our lab tests, Oppo's three headphones have all demonstrated consistent bass performance when, in our standard procedure, we record and average ten frequency responses per capsule, removing and replacing the headphone between each measurement.

Although it isn't published in the Lab Report, a statistical analysis is performed on the ten measurements to display confidence limits around each capsule's averaged response that reveal the frequency ranges of greatest variability. Often the bass is one of these, indicating capsule sealing issues, but with all three Oppo headphones the low frequency

variability has been small, albeit somewhat greater in the PM-3 than the PM-1/PM-2. This good sealing also bodes well for effective sound isolation in the PM-3.

## OPPO'S NEW DRIVE UNIT

To make the PM-3's capsules smaller, Oppo has developed a new, circular variant of its planar magnetic drive unit, which in the PM-1/PM-2 is oval. The same seven-layer diaphragm construction is used, as is

the double-sided spiral 'voice coil'. Despite this smaller 55mm driver the PM-3 retains much the same sensitivity as the PM-1 and PM-2 (all three are specified as 102dB SPL for 1mW) which means that it's broadly

similar to that of moving-coil alternatives.

Oppo has achieved this by decreasing the impedance slightly, from a nominal figure of 32ohm for the PM-1/PM-2 to 26ohm here. Although this requires commensurately more current from the driving amplifier, most headphone sources will easily accommodate the PM-3's demands, while its almost constant impedance ensures that frequency response is virtually unaffected by whatever source impedance is presented by the amplifier.

Headphone comfort is, necessarily, a subjective issue, affected by the wide variability that exists in head size, ear shape and – for some of us – the lushness or otherwise of our cranial upholstery.

But with its soft earpads, well-padded headband, medium if not featherweight mass and modest capsule clamping force (Oppo specifies 5 newtons, equivalent to the gravitational force of 0.5kg), the PM-3 will surely feel comfortable to most people while at the same time being secure enough for use peripatetically. Unusually, no fewer than four connecting cables are

'The PM-3 was very much at home with more lyrical pieces'



**RIGHT:** Inside the PM-3's closed-back capsules is a new version of Oppo's high-sensitivity planar magnetic drive unit, this time circular rather than oval





**LEFT:** Two finishes are available: this all-white option or the black and silver combination familiar from the PM-1 and PM-2

a result of which it sounded deliciously smooth and warm but perhaps not as directly informative as the very best headphones with a subjectively more even tonality. Sonically the PM-2 was more of the same and this model attracted equally positive reviews.

### A SIGNIFICANT DIFFERENCE

I fully expected the PM-3 to continue the trend, but as soon as I played some music through it – as part of the initial listening I habitually perform prior to putting a headphone on the artificial ear for measurement – I realised that my expectation had been confounded. The PM-3 may still have a warmer than neutral tonal balance to my ears but, as the measured frequency responses confirm, it sounds significantly different from its costlier forebears, principally because the vital presence band region is no longer so obviously denuded.

That 'touch of excitement' to which the PM-3 press release alludes is to be found right here, and it makes Oppo's third headphone iteration not just different but better. The review sample of Oppo's HA-1 headphone amplifier [*HFN* Sep '14] having long since returned whence it came, I used the PM-3 with my resident Teac HA-501 fed analogue signals from a Chord QuteHD DAC. A second-generation Mac mini running Windows XP and JRiver Media Centre v19 acted as music server, driving a TC Electronic Impact Twin FireWire interface that in turn fed S/PDIF signals to the Chord.

Mark-Anthony Turnage's *Grazioso!* (from *A Constant Obsession*, a 96kHz/24-bit download from Resonus Classics) is a piece you might well choose to start the second half of a concert if you suspected the audience might need waking up after 20 minutes at the bar. Its shrieking piccolo alone sets nerve endings a-tingle, appropriately for a piece which despite its refined sounding title was inspired by the works of Led Zeppelin (*Grazioso* being the make of Jimmy Page's first guitar). Turnage claims 'a very slight allusion to the group's 1971 'Black Dog' but I suspect only the most committed of Led Zep aficionados will recognise it.

As the notes put it, 'The music is highly energetic and there are few lyrical moments'. Absolutely: this is music which should sound anything other than cosy and comforting. Rather, it should slap you ➡

provided, all of which plug into a 3.5mm jack socket on the underside of the left capsule. The first, for home use, is 3m long and can be used from either 3.5mm mini-jack or 6.35mm jack sockets with a screw-on sleeve adapter. The three shorter cables are all 1.2m in length and offer mini-jack connection only. One is a straight cable with no inline remote, the second has an iOS-compatible remote and the third an Android-compatible remote. So the PM-3

is as accommodating of different signal sources as you could possibly wish.

When I reviewed the PM-1 I came to respect it rather than like it. For all its attributes – high sensitivity for a planar magnetic design and extended, low-distortion bass – it continued what had already become established as the trademark tonal balance of PM designs by Audeze. In particular it lacked a full-on presence band and treble output, as

## COMING OF AGE

With the arrival of the Audeze and Oppo planar magnetic (PM) headphones, this old technology has at last become a realistic contender to the otherwise ubiquitous moving-coil. Originally described in a patent application filed by two Israeli inventors in 1958 and granted as US Patent 3,013,905 in 1961, the planar magnetic drive unit came to audiophile attention when Wharfedale launched its futuristic-looking Isodynamic headphone in 1972, receiving a Design Council Award for it the following year. Promoted as combining the thin planar diaphragm of an electrostatic with the simplicity and ruggedness of a moving-coil, Wharfedale's design was in truth hamstrung by the magnetic materials of the day, rendering it highly insensitive. It took the development of neodymium-iron-boron magnets and the application of finite element analysis to the design process to achieve the competitive sensitivity of modern PM headphones.



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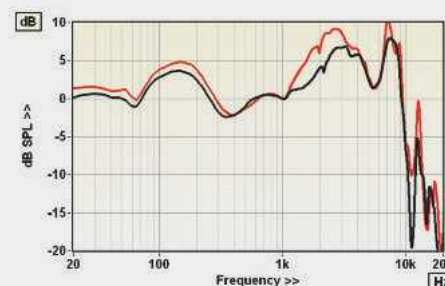
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## LAB REPORT

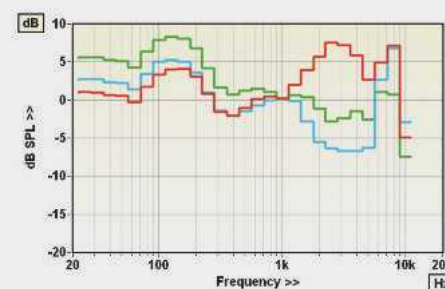
### OPPO PM-3

Oppo claims the same 102dB/1mW sensitivity for the PM-3 as for its PM-1 and PM-2 [*HFN* Jul '14 and Feb '15] but a lower nominal impedance of 26ohm (not 32ohm). This is equivalent to almost 118dB for 1V, which would be a very high value for a planar magnetic. We measured the lower value – averaged for both capsules – of 114.0dB at 1kHz (similar to the PM-1 and PM-2) but this is still impressive. Like the PM-1, PM-2 and Audeze LCD-X at 115.1dB [*HFN* Sep '14], the PM-3 is a planar magnetic that defies the type's increasingly out-of-date reputation for being insensitive. Indeed, many moving-coil designs are no more sensitive than this. As you'd expect, electrical impedance is almost constant across the audible range, ranging from a low of 24.9ohm to a high of 25.9ohm.

This exemplary consistency means that the PM-3 is largely immune to frequency response changes caused by differing (headphone amp) output impedance, amounting to a mere 0.1dB for a 10ohm source or 0.2dB for a 30ohm source. I always wear the headphone when impedance is measured, which, as well as providing an appropriate acoustic load, allows me to judge whether there is any perceptible carry-over of sound from the active to the inactive capsule due to headband resonance. I could hear no such effect with the PM-3, and no change in sound quality when I reached up to grasp the headband (thereby damping any vibrations). Uncorrected frequency responses for the two capsules [Graph 1] were obtained using a GRAS 43AG ear and cheek simulator fitted with KEMAR large left and right artificial pinnae. Compared to the PM-1 or PM-2, there's a hump in output between 70Hz and 300Hz, and a notably stronger presence band output around 3kHz and treble output around 8kHz. As a result the diffuse-field-corrected response [green trace, Graph 2] is much flatter above 1kHz but shows an excess centred on 130Hz. KH



ABOVE: The PM-3 shows a stronger mid-bass and presence band output than Oppo's PM-1 and PM-2, so the DF-corrected response [below] is flatter >1kHz



ABOVE: 3rd-octave freq. resp. (red = uncorrected; cyan = FF corrected; green = DF corrected)

### HI-FI NEWS SPECIFICATIONS

Sensitivity (SPL at 1kHz for 1Vrms input)	114.0dB
Impedance modulus min/max (20Hz-20kHz)	24.9ohm @ 358Hz 25.9ohm @ 20kHz
Capsule matching (40Hz-10kHz)	±3.0dB
LF extension (-6dB ref. 200Hz)	<10Hz
Distortion 100Hz/1kHz (for 90dB SPL)	<0.1% / <0.1%
Weight (inc cable)	352g

round the chops. For it to have its full stimulating effect it's vital that the instrumental timbres are not homogenised and that the well-defined, open acoustic in which the recording was made is allowed to play its full part too.

The PM-3 was guilty of some of the aforesaid homogenisation, but then, a lot of headphones would be, particularly the modern breed characterised by excess bass and a subdued presence band. But while Oppo's latest offering was less than outstanding in providing the necessary separation and therefore the intended impact of this piece, it didn't do a bad job – particularly for the type of listener who likes to keep his musical experiences the polite side of strident.

### A SMOOTH RENDITION

Although I had neither the PM-1 nor PM-2 to hand for comparison, I have little doubt that that I'd have found the PM-3's rendition even more captivating than theirs.

On classical programme the PM-3 was more at home with less gritty, more lyrical pieces such as Vaughan Williams's Oboe Concerto (ripped from EMI Eminence CD 5753112), although even here the soaring, keening quality of VW's string harmonies was a little under-developed, loosening somewhat the emotional grasp that this piece unerringly applies whenever I hear it. There was no gainsaying, though, the PM-3's smooth, polished rendition – further testament to sound quality a little on the emollient side of plain neutral.

Low-energy jazz suited the PM-3 rather nicely, and vice-versa, an example being 'Silence' from the 96kHz/24-bit download of Tony Overwater and Bert van den Brink's *Impromptu* [www.soundlison.com, also available in DSD64]. You might

**ABOVE:** Four connecting leads are provided to ensure the PM-3 broad compatibility at home and on the hoof

argue that the PM-3 should deliver a more percussive piano sound and be more explicit about the live recording venue and audience conversations in the background, but I suspect many people would settle for its slightly less explicit depiction of the event.

Was Tony Overwater's double-bass also a bit bloated sounding? I played two of my favourite bass test tracks – Jennifer Warnes' 'Somewhere, Somebody' (ripped from *The Hunter*, Private Music 82089) and Béla Fleck and the Flecktones' *The Flight Of The Cosmic Hippo* [Warner Records 9 26562-2]. In the event, I concluded that, yes, the PM-3's bass is just a little 'fat', perhaps because of that excess output centred on 130Hz, but is also well capable of delivering true low bass fundamentals.

All told, it's a combination many will relish and a far better compromise than that offered by many modern headphones with a similarly shelved-up bass. ☺

### HI-FI NEWS VERDICT

You had to suppose that Oppo would continue to bring its planar magnetic technology to a wider audience, but it may have made a rod for its own back in the PM-3. If you've found the PM-1 and PM-2 slightly lacking in verve then their younger sibling – while short of their ultimate in transparency and engagement – is likely to be more to your taste. That it costs less than its predecessors is just icing on the cake.

Sound Quality: 86%





# Acoustic Research AR-UA1

A famous brand is the latest arrival in the sprawling DAC/headphone amp arena, but if Acoustic Research's roots go back more than 60 years, this is no exercise in retro hi-fi

Review: **Andrew Everard** Lab: **Paul Miller**

One of the surprises of the 2015 Sound & Vision show in Bristol [see *HFN* May '15, p16] was the return of Acoustic Research to the mass-market fray. Another was the line-up of products with which it was making its comeback, including headphones, a personal music player and the combined DAC/headphone amp we have here, the £399 AR-UA1. In fact, the AR-UA1 is the first product in a complete reinvention of the AR brand, starting in the UK and Japan and then spreading out into other markets, and also the first arrival from the newly-formed Acoustic Research Digital and High-End Division.

In 2013 AR launched its AR-M1 personal music player, able to play FLAC files directly (unlike iPhones, iPads and the like), and fitted with a high-power amplifier module designed to drive even tricky headphone loads. The current version, the AR-M2, has expanded that capability to DSD and DXD playback, and the AR-UA1 is basically that player shorn of its battery power and player facilities, to create a USB-powered headphone amplifier with built-in hi-res D-to-A conversion.

## FREE JRIVER SOFTWARE

At £400 it's pitched rather higher than some of its obvious rivals, such as the TEAC HA-P50, Onkyo DAC-HA200 or Denon DA-10, but bundled in with the amplifier is a free licence for JRiver Media Centre, which would set you back £50 if bought separately. You don't have to use JRiver with the AR, which will also work perfectly well with a range of other software players, but if you want you can do so for free, using the software for Windows and Mac provided on the disc in the box, and a licence code on the rear of the disc sleeve.

The disc also contains the manual and Windows drivers for the DAC (as usual, no drivers are needed for Mac

OSX). And for those of us using computers without an optical disc-drive, the Windows driver can be downloaded from the AR website. (Media Centre software can be downloaded from [www.jriver.com](http://www.jriver.com).)

But back to the AR-UA1 itself, and the design will be familiar from those rival products mentioned above, with a couple of significant changes. As already mentioned, this DAC/amp is purely USB hub-powered, albeit via a decent quality AR-branded USB Type-A to USB Type-B cable, which also of course carries the digital audio from computer to DAC. It has no power switch – connect it and it's on – and has a headphone output on a full-size 6.35mm stereo socket, complete with a volume control, plus line-out on high quality gold-plated RCA phono sockets on the rear. There's also an optical digital socket, but this not an *input*, as one might expect, but an output limited to 96kHz.

That specification may seem lacking when compared to some of the rivals,

which have the ability to be used with a variety of sources such as smartphones/tablets or even conventional digital sources, but it makes complete sense when you consider that AR is targeting the UA1 purely as an adjunct to a computer, be it notebook or desktop.

## NO FIDDLY MICRO-USB!

Freed from the need to cart its own power supply around, in the form of an onboard

rechargeable battery, it can be optimised to work with USB as a source of both power and signal, not to mention fitted with a good substantial USB-Type B input rather than those

*'It encourages you to crank up that little click-stopped volume control'*

fiddly Micro USB sockets. And of course, that also opens the AR-UA1 up for those who like to experiment with different USB cables in their search for improvements in performance, since these are more readily available with full-size USB connectors.

The single indicator LED on the front panel is a multicolour device, changing



**RIGHT:** Wrap-around casework is made from high-grade aluminium, giving both durability and impressive looks. Two rubber grip-strips on the base keep it stable and slip-free on a desk

**RIGHT:** Keeping it simple in the quest for sound quality: front-panel has just a full-size 6.35mm headphone socket, a multicoloured LED for signal lock and a click-stopped volume control



to indicate the sampling rate to which the DAC has locked: white for 44.1kHz, cyan for 48kHz, blue 88.2kHz, purple 96kHz, red 176.4kHz and yellow for 192kHz. Dual clocks are used for accurate handling of digital signals – one for 44.1kHz and its multiples, the other for 48kHz, 96kHz and 192kHz.

Under the lid, or at least within the wrap-around aircraft-grade casework, the AR-UA1 has what the company describes as its 'M-Class Audio Engine'. This encompasses discrete circuits for its digital, analogue out and headphone amplifier stages, using Burr-Brown's PCM1794A DAC, and the same company's OPA2134-based line output. A proprietary headphone amplifier, complete with an ALPS analogue volume control, powers the front-panel output. It's worth noting that, as the only hardware control available, this one is well-judged, with a milled edge for easy operation and a click-stopped action to avoid accidental jogging of the setting away from the chosen level.

AR says that the design eschews almost anything likely to get in the way of the simple task of driving headphones, and

that this explains the simple single lamp indicator for lock and lack of additional digital inputs. Anything more, the company suggests, would draw power away from the job in hand. Instead, the headphone section has been designed with plenty of oomph to drive cans from 16 to 600ohm, and as you can read in PM's Lab Report [p71], does not clip when fed a peak-level digital input.



#### **BILLION DOLLAR BABY**

Listening was subject to some fits and starts, as the AR-UA1 proved rather susceptible to what we suspect was ESD, with one sample failing during the lab-testing procedure, and another when listening. The problem seemed to occur when hot-swapping the DAC – in my case between headphone listening and connection to my normal system via the phono outputs – so I handled the third sample rather more gingerly, making sure both computer and amplifier

were switched off when changing connections. That seemed to do the trick, but AR's UK distribution has agreed that normal consumers are likely to treat such a device with rather less care and expect it to keep on working, so the defunct samples were sent back to AR HQ for further investigation.

This hitch was something of a pity, as when the AR-UA1 is good, it's very good indeed. Re-starting my listening, a DSD rip of Alice Cooper's *Billion Dollar Babies* [Audio Fidelity AFZ 170] seemed appropriate, and though downsampled to 176.4kHz/24-bit, 'Elected' snarled out impressively, whether through the selection of headphones I had to hand or into my system. Used as a headphone amplifier, the AR-UA1 will drive as hard as any listener is sensibly likely to want it too, and while there are other – principally mains-powered – rivals able to deliver even more level if you really must, the most striking thing about the AR is that it sounds clean and neutral, with tight, driving bass, at lowish listening levels, and stays exactly the same all the way to the end-stop of the volume control.

There's no shifting of tonality, sense of compression or even any suggestion that the amplifier is working hard, even when it's going flat-out, and that can create the illusion that it really doesn't go that loud, even when it is... On the upside, that means the AR encourages you to crank up that little click-stopped volume control; the downside is it's not always apparent just how loud you're pumping music into your ears, so some caution is urged.

The neutrality and driving ability of the AR-UA1 means that the sound you get is all about the headphones in use, and whether driving the affordable, weighty and hilariously enjoyable PJB H-850 (designed for bass-players but so much more capable than that might suggest) or decidedly upmarket Oppo PM-1 [HFN Jul '14], it proved an attractive, involving and informative listen. As indeed it did with the likes of the Bang & Olufsen H6, Focal Spirit Pro and Musical Fidelity MF-200 models. ➔

#### **WHAT'S IN A NAME?**

Although it has a heritage going way back to postwar America, when so many well-known hi-fi companies appeared, in more recent years Acoustic Research has slipped off the hi-fi radar. Founded by 1952 by Edgar Villchur and Henry Kloss as a speaker company, the birth of AR was based around Villchur's invention of the acoustic suspension loudspeaker. Under his presidency, from 1954-67, the company expanded into making turntables and other components, and was famed for its 'live vs recorded' demonstrations. It still makes speakers, but in 1983 developed the first universal IR remote *en route* to becoming an accessory manufacturer: it launched premium interconnects in the mid-'90s, and expanded into HDMI cables in 2004. In other words, it's proved adept at reconfiguring its line-up to suit the demands of a changing market, and under its current owners Vox International, which – as Audiovox – acquired the company in 2003, it's again adapting to current trends with digital and desktop audio products.

“I don’t know these  
guys from Germany  
but the sound was  
fantastic...”

*Michael Fremer Stereophile,  
T.H.E. Show Newport 2013*



BERLINA-SERIES

## EDITORS’ CHOICE.

We are happy to receive a very special award at the end of this year: Besides the Editors’-choice-award in “The Absolute Sound” this year the major award was reaching the top of the all-time-ranking of our BERLINA RC 9 in Germany’s “Audio” like the RC 11 did in “Stereoplay”!

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## HEADPHONE AMP/USB DAC



In fact, I was completely unable to wrongfoot the little AR amp, whichever headphones I chose. It was amusing to be able to 'tune' the sound I was hearing simply by swapping cans, to the extent that I could almost understand the head-fi fanatics with a sizeable collection of models to choose from.

## DELIVERS ALL THE INFO

That said, most of the critical listening here was carried out with the Spirit Pros and the PM-1s, and with these headphones it was clear just how much information the AR can deliver, whether with mainstream rock and pop or intricately detailed acoustic music, from chamber and small-ensemble jazz to large-scale orchestral and choral works.

Worked a bit to get some heat into its circuits, at which point that sleek aluminium casework is at around body temperature, this little amplifier sounds much bigger and more forceful than anything powered by no more than the 5V USB hub has any right to do, as was clear with the recent set of Mahler, Zemlinsky and Wagner from Trevor Pinnock and the Royal Academy of Music Soloists [Linn CKD 481].

Wagner's *Siegfried Idyll* sounded especially glorious, with its rich instrumental textures beautifully realised and the dynamics of the piece enhanced by the effortless power of the amplifier. Similarly the high-quality recording of Norwegian choir Cantus on their SPES album [2L-110], with the sound of the voices wrapped in a richly captured church acoustic, was particularly convincing, with no sense of hardening even with the upper registers of the choir at high levels.

Connected into my main system, the AR-UA1 also proved highly adept when used as just a USB DAC. While

**ABOVE:** USB B input supports LPCM up to 192kHz (352.8/384kHz and DSD64/128 via JRiver Media Centre). Joined by Toslink optical digital output (to 96kHz) and RCA stereo outputs

there's no shortage of competition at around this price, the AR's big-boned yet finely detailed sound is more than competitive.

However, most buyers of this little unit will purchase it for use between a computer and a pair of high-quality headphones, and it's in this configuration that it is most convincing. This makes it a good choice for those wanting something for use while travelling – just as long as there's somewhere to power your computer as, obviously, the USB-powered nature of the amp does work the connected computer's battery a bit.

It does the hi-fi thing very well, giving fine insight into the character of voices and instruments, but at the same time makes a highly convincing musical case for itself. Handle it with care, and it'll reward you by making the most of a wide range of headphones, wherever you happen to be listening. ☺

## HI-FI NEWS VERDICT

We're assured the operational problems we encountered are being addressed as matter or urgency. With that note of caution sounded, there's much to like about the simplicity and capabilities of the AR-UA1, and the way it drives 'phones from the entry-level to the upmarket. The closely-detailed, unburstable sound puts the onus on the headphones you use – just be careful with that volume control!

Sound Quality: 84%

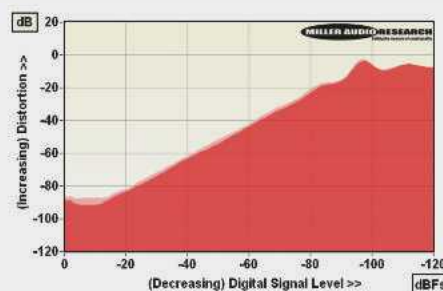


## ACOUSTIC RESEARCH AR-UA1

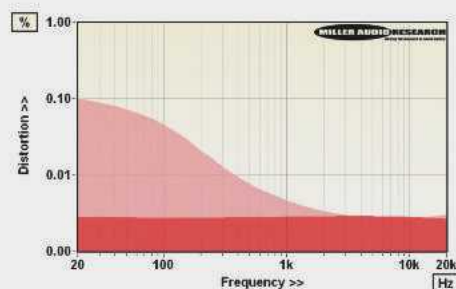
Based around the 192kHz/24-bit PCM1794 DAC from TI, along with the TPA6120A2 headphone amp that forms its 'M-Class audio engine', the AR-UA1 is one of the very few hub-powered USB DAC/headphone amps that *doesn't* clip when fed a 0dBfs digital input at full (analogue) volume. With the gain control wound fully clockwise and a maximum digital level applied, the AR-UA1 offers 285mW/1kHz/25ohm at just 0.005% THD – not far off AR's rated 400mW/32ohm. Into higher impedance headphones, the amp offers up to 3.8V – ten times higher than some competing hub-powered devices – and still at a consistently low distortion [see Graph 1, below].

The amp's response is ruler-flat with 48kHz files at –0.19dB/20kHz and only mildly rolled-off at –1.7dB/45kHz and –9.0dB/90kHz with hi-res 96kHz/192kHz files. Nevertheless this does rather depend on an undeviating headphone load, as the AR-UA1's high 10ohm source impedance will cause progressively wilder response variations when driving low and variable impedance 'phones. Into our flat 25ohm test load this already represents a loss of 2.8dB though channel balance remains fine at 0.09dB and separation excellent at 75-100dB (20Hz-20kHz).

Possibly unrelated to the high source impedance, and while the AR-UA1 boasts very low distortion at midrange and high frequencies, THD does increase under load at *low* frequencies, reaching 0.09% at 20Hz/10mW/25ohm [see Graph 2]. On the digital front, AR's jitter rejection is truly superb as the AR-UA1 suffers a mere 25psec, loaded or unloaded. Readers may view a comprehensive QC Suite test report for Acoustic Research's AR-UA1 USB DAC/headphone amplifier by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'download' button. PM



ABOVE: Distortion versus digital signal level at 1kHz (red = unloaded; shaded red = loaded where 0dBfs = 285mW, –10dBfs = 28.5mW and –24.6dBfs = 1mW)



ABOVE: Distortion versus frequency from 20Hz-20kHz (solid red, 1V unloaded; shaded red, 10mW into 25ohm load)

## HI-FI NEWS SPECIFICATIONS

Maximum output (re. 0dBfs into 47kohm)	3800mV @ <1% THD
Max. power output (re. 0dBfs into 25ohm)	285mW @ <1% THD
Output Impedance (20Hz-20kHz)	9.7-10.8ohm
A-wtd S/N ratio (re. 0dBfs)	89.5dB
Distortion (20Hz-20kHz, re. 10mW)	0.0026-0.085%
Frequency response (20Hz-20kHz)	+0.0 to –0.19dB
Stereo separation (20Hz-20kHz)	101dB to 75dB
Digital jitter (unloaded/loaded at 25ohm)	25psec / 25psec
Dimensions (WHD)	84x25x138mm

Trigon's team of "no compromise" sound engineers, have pushed the envelope again with the release of the hotly anticipated Energy Special Edition Integrated Amplifier.

2 years of development of the already world class Energy Integrated amplifier, has resulted in an amplifier which combines truly outstanding musical performance at a price which places it within reach of those passionate music lovers who thought that true 'High End' was not within their reach.

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## High precision azimuth adjustment

To set up a pickup perfectly it is required to compensate the possible misalignments of the cartridge tip and do a proper adjustment of the angle. Many tonearms do not have this adjustment. With the TA-1000 it can be achieved very easily and the solution is also very rigid and solid so we do not lose sound quality. At the end of armtube before the bearing there is an adjustment option. To adjust you simply open 3 small screws and the arm tube can swivel  $\pm 5$  degrees so the angle can be adjusted perfect for each cartridge. If these screws are again tightened the arm tube remains perfectly stiff and perfectly adjusted.

## Dual carbon armtube

When it comes to arm tubes - two mutually exclusive conditions need to be combined - maximum stiffness and low resonance achieved by internal damping. Very stiff materials are hard and therefore very susceptible to resonances. On the other side low-resonance materials are not stiff enough. The solution is a dual carbon tube. The two pipes are joined by connecting elements. This creates a very light arm tube which still has high damping and very low resonance.

## Preloaded precision bearings

Specially selected and calibrated miniature precision bearings are used for the horizontal and vertical assemblies. These are truly exceptional bearings manufactured to the very highest of levels. The precision bearings are ultra-precisely adjusted during the production process. The bearings are added with minimal pre pressure for zero backlash to achieve minimum friction and maximum stability.

## End to end direct wire

When you consider that the signals of a pickup are very small, as you can imagine, any interruption and each solder joint makes the signal worse. To overcome this Acoustic Signature have opted for a Teflon insulated 6N copper cable which runs from the cartridge pins to the RCA plug without any interruption - in one piece. For customers who like to try different cables the TA-1000 is also available with a 5 pin connector in the arm shaft.



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HiFi News



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# Classical Companion

BEHIND THE MUSIC WITH HI-FI NEWS & RECORD REVIEW

## Beethoven *The Pastoral Symphony*

Composed at the same time as his Fifth, this was Beethoven's only programmatic symphony. **Christopher Breunig** takes a trip out into the *Wienerwald*...

Post-Christmas I made the mistake of going to see a BFI screening of Disney's 1940 *Fantasia*. Very soon, the kids ill-advisedly brought by their parents were fidgeting, while I was inwardly groaning at the pretentious intros, the posing maestro and – above all – the banality of the animation concept. I didn't mind the musical cuts, though even Mickey Mouse (*Sorcerer's Apprentice*) outstayed his welcome, so much as the tweeness. Beethoven's *Pastoral Symphony*, for instance, brought coy encounters between camp male centaurs and pubescent girls bathing.

Beethoven himself enjoyed walking in the woods and fields outside Vienna, though precluded from hearing the birds he introduced into his programmatic Sixth Symphony. It was the nightingale, cuckoo and quail cited in the score at the end of the second movement,

➔ The music for Walt Disney's 1940 film *Fantasia* was prepared and conducted by Leopold Stokowski

↙ Stefan Decker's chalk portrait of Beethoven (May 1824) is now in the Vienna Historisches Museum



PHOTO: DECCA RECORDS

together with the Storm, that made the work suitable for 'music appreciation' classes at school (do these still exist?). But it's the Scherzo, with its amateurishly inept wind band players, that delights me more today.

In his succinct note for a new LPO CD [see boxout] Lindsay Kemp

describes how 'the music tips over into an earthy dance where we can almost hear feet stamping'. The movement circulates the Peasants' relaxed enjoyment until darkening rain clouds send them scurrying for cover – a transitional link such as Beethoven exercised in his Fifth Symphony, which he composed at the same time. The Vienna concert when it was premiered in 1808 comprised both these symphonies, the Fourth Piano Concerto, the *Choral Fantasy*, excerpts from the Mass in C, and a keyboard extemporisation, no less!

If I were to pick a single recording, at the moment it would be the 1947 Decca, made with Erich Kleiber and the London Philharmonic – tremendous in Scherzo and Storm, as I suggested in last month's Classical Companion. But it's mono

only and it will cost you around £85 as part of a boxed LP set. So that won't do.

### THE CLUYTENS PASTORAL

In the early 1950s we had the extremes of Furtwängler with the VPO on HMV (lethargic) and Toscanini with his NBC Orchestra (rigidly driven) on RCA. Later on we also had, on LP, Toscanini's preferable 1937 recording with the BBC Symphony Orchestra. This is now on a Naxos CD in transfers by Mark Obert-Thorn, from Victor 78s and restoring material lost in EMI's LP updates [8.110877].

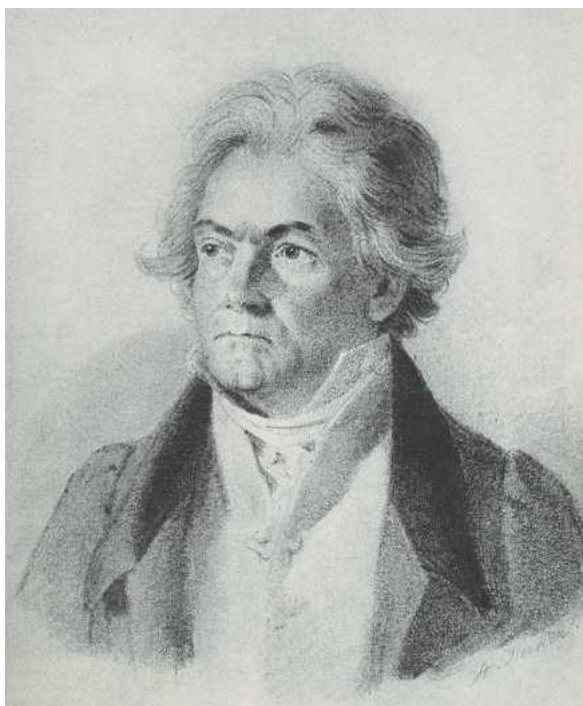
More central interpretations came from Kleiber again, this

time with the Concertgebouw (Decca, 1954), Karajan and the Philharmonia (EMI, 1953) and – even finer – André Cluytens's earlier version with the

'Klemperer conducted the Scherzo as a dogged tread'

BPO [HMV ALP1408]. He went on to record all nine symphonies with the Berlin Philharmonic in stereo. Good though it was, his second *Pastoral* didn't surpass the 1957. I would have thought this would now be a collector's item, commanding high prices, but it only seems to reach about £10 on ebay. However, in 2000 Testament added it to its CD catalogue [see boxout].

Early stereo versions included Bruno Walter's very amiable account, part of a 1960 cycle with the hand-picked Columbia Symphony Orchestra. The Sixth had been the odd man out in Walter's earlier set, as it was with the Philadelphians rather than the NYPO. His prewar 78s with the VPO (1937) were transferred to EMI's 'Great Recordings' series, in their stiff blue, gold-labelled covers. What



surprised me there were the tempo discrepancies from one 78rpm side to the next.

A Decca stereo with Ansermet and the Suisse Romande had principally an attractive freshness in its sound quality, while Szell's with the Cleveland [CBS] reflected little of the composer's 'Awakening of cheerful feelings upon arrival in the countryside' but was predictably efficient in terms of execution.

A good choice, from 1960, was Kubelík's HMV LP with the Royal Philharmonic Orchestra. The original vinyl [ASD349] now commands anything up to £200, but it's in a Warner budget 13CD set with all of Kubelík's EMI recordings, dating back to 1937 and a Czech PO *Má Vlast*.

Uniquely, Kubelík's much later complete – if rather variable – DG cycle had a different orchestra for each work: the Orchestre de Paris for No 6. There is also a 1967 Audite recording: see boxout.

After the success of his (mono) Beethoven Fifth, Third and Seventh



Symphonies, Otto Klemperer was engaged to complete all nine. What drew much comment was the tempo he preferred for the Scherzo in No 6: a dogged tread. 'You'll get used to it!' he's supposed to have said at the Philharmonia recording sessions in Oct 1957 – but would his EMI producer really have been taken aback? He had made a not dissimilar earlier VSO version for Vox in 1951, and performances with the RIAS Berlin and Concertgebouw were broadcast in 1954/56 (both much later to appear on CD – see boxout).

#### WHICH KARAJAN – IF ANY?

Of the three Berlin/DG cycles made by Karajan I have always preferred the first. His Feb '62 *Pastoral* attracted plenty of criticism – Philip Clark's view at [sinfinimusic.com](http://sinfinimusic.com) the exception – yet for me (few repeats notwithstanding) it is still enjoyable

➔ Karl Böhm's 1971 VPO *Pastoral* is now on a DG Originals CD [447 433-2]

➔ Probably not what Beethoven had in mind: a clip from *Fantasia*, which you can see complete on YouTube



– more so than No 1, for example. It's a shame that the Speakers Corner LP transfers have gone, although DG itself has produced a recent 6CD set with all nine symphonies duplicated on a Blu-ray 96kHz/24-bit bonus disc; it also includes rehearsal excerpts for the Ninth [479 3442]. Presto Classical offers high-res FLACs as single tracks if preferred (with [highresaudio.com](http://highresaudio.com) it's the whole set or nothing).

With so many Sixths tucked away in box sets (Abbado's, Bernstein's, Kletzki's) it's good to find that the version Karl Böhm made with the Vienna Philharmonic, in excellent 1971 analogue sound, can still be found separately [DG 447 4333-2].

Some of his recordings were without

spark – indeed Sergiu Celibidache once pronounced, to a French television interviewer, that 'he didn't have any music in him at all.'

But his *Pastoral* (Böhm then 77) was extremely successful: with some flexibility within well-chosen tempi and with the first-movement repeat observed, you could hardly wish for more from the Vienna Philharmonic.

Coming more up to date, there's a fine Channel Classics coupling of Nos 4 and 6 with Iván Fischer and the Budapest Festival Orchestra [CCSSA 30710, SACD or downloads on DSD64]. Rather as Stokowski might have done, he decided to reseat certain wind soloists to 'immerse them' more in the sound of the music. ☺

## ESSENTIAL RECORDINGS

### LPO/Klaus Tennstedt

LPO LPO-0085

A new release from a Feb '92 RFH concert (with an earlier Egmont Overture), this typifies the intensity of a Tennstedt/LPO live performance when he was principal conductor.

### Berlin Philharmonic/André Cluytens

Testament SBT 1182 (mono)

The earlier, preferable, 1955 *Pastoral*, now coupled with a 1960 stereo 'Unfinished' – Cluytens's only Schubert recording.

### Concertgebouw Orch/Otto Klemperer

Music & Arts MACD0246 (mono)

Coupled with Symphony No 8, this 1956 *Pastoral* is available (albeit in rather dim

sound), only as a 44.1kHz/16-bit download, at Presto Classical or from The Classical Shop.

### Bavarian RSO/Rafael Kubelík

Audite 95.531

Recorded live in Munich, this 1967 *Pastoral* is coupled with Symphony No 2 (given in Paris) and is a warmly affectionate, humane reading – even in the Storm. Strongly recommended.

### Bavarian State Orch/Carlos Kleiber

Orfeo C600031B

Only for Kleiber completists: from Nov '83, this was his only performance, preserved on a family cassette tape. So poor sound and given with all Beethoven's repeats cut. Some argue it's worthwhile for its lack of sentimentality.



# Vinyl Release

BEHIND THE MUSIC WITH HI-FI NEWS & RECORD REVIEW

## Led Zeppelin *Led Zeppelin (180g)*

Talent borrows, genius steals... as Led Zeppelin's debut album is reissued on 180g vinyl **Steve Sutherland** looks at the musical past the band took and made their own

The blues had a baby and they named it rock 'n' roll.' Muddy Waters said that and Muddy should know. The Rolling Stones named their band after one of his songs, honed their chops covering his tunes and were evangelical in their admiration of his talent. But not every birth was so straightforward, as Led Zeppelin's debut LP – the one we're here to laud – will testify.

### STEEPED IN THE PAST

Recorded pretty much live in October 1968 in South London's Olympic Studios, in just 36 hours for less than a self-financed two grand, the album was the result of Jimmy Page rising phoenix-like from the ashes of The Yardbirds and taking everything – blues, rock, folk, pop – to another, never-before-imagined level.

Inventive, dramatic, sexy, heavy, steeped in the past with its head in the future, Led Zeppelin's first LP ushered in a whole new era of swaggering rifferama so ahead of what anyone else was cooking up it was

mostly panned by the critics on its January '69 release. Those critics came to eat their words while the band attained godhead beyond even their own wildest dreams.

But you probably know all that. What you may not know is that the majority of these songs were birthed in such an extraordinary fashion that *Led Zeppelin* not only goes down in history as one of the most ground-breaking albums ever, but also one of the most controversial, bullishly trampling all over the accepted line between inspiration and plagiarism.

Take the spooky 'Babe I'm Gonna Leave You', for example.

Credited on the album as 'Traditional arr. By Jimmy Page', it was actually the work of Anne Bredon, a student folk singer at Berkeley College in California who performed it on a local radio station in 1960. Another folk singer called Janet

*'Led Zeppelin's first LP ushered in a whole new era of swaggering rifferama'*

### STEVE SUTHERLAND

Steve edited NME from 1992-2000, the Britpop years, launching NME.com and reviving the NME Awards. Previously he was Assistant Editor on Melody Maker. Among his many adventures he has been physically threatened by Axl Rose, hung out awhile with Jerry Garcia and had a drink or two with Keith Richards...



Smith picked up on it and started playing it in her live shows, one of which was attended by Joan Baez, who recorded it on her 1963 LP *In Concert, Part 1*, mistakenly crediting it as 'Trad. Arr Baez'.

Due to that mis-credit, Mr Page could be given the benefit of the doubt, and by the 1980 reissue, Bredon shares co-authorship with Page and Plant. 'Dazed And Confused', on the other hand, is an entirely different

matter. Arguably the album's centrepiece, Page famously utilises a violin bow across the strings of his Fender Telecaster, a technique suggested to him

by classical musician David McCallum Snr (father of the groovy *Man From UNCLE* actor) who'd done a few sessions with Page on other people's records. On the album, the Wagnerian masterpiece is credited to 'Jimmy Page' but it was actually composed by a bloke from San Francisco called Jake Holmes who recorded it on his 1967 LP, *The Above Ground Sound Of Jake Holmes*.

### OUT OF COURT

Page knew this because when The Yardbirds were on tour in the US during August 1967, Page saw Holmes perform it at a folk club in Greenwich Village and went out and bought *The Above Ground Sound* the very next day, assimilating the song thereafter into the band's live set. It took until 2010 for Holmes to get paid in what is assumed to be an out-of-court settlement, the version on the live *Celebration Day 02 Arena* release and the 2014 re-master credited as 'Written by Jimmy Page, inspired by Jake Holmes'.

Another bone of contention is the intricate acoustic showcase, 'Black Mountain Side'. Credited to 'Jimmy Page', it is actually a traditional Irish folk song called 'Down By Blackwaterside'. The tune was taught to top folkie Bert Jansch by fellow folkie Anne Briggs, and Jansch recorded a



The band in 1969 (l-r): bassist and keyboardist John Paul Jones, singer Robert Plant, drummer John Bonham and guitarist Jimmy Page. The band formed in London in 1968





➔ Priced £14.99, the 180g vinyl reissue of *Led Zeppelin* on the Atlantic label is available for order online at [www.1note.co.uk](http://www.1note.co.uk)

strikingly similar version to the Led Zep one on his 1966 LP, *Jack Orion* which another folkie, Al Stewart, claims to have taught Page to play when he was helping out as a sessioneer on Stewart's first album.

Jansch got the hump and took legal advice but it was found there was no case to answer because, although Page may have been 'inspired' by Jansch's version, Jansch did not own the copyright.

Then again there's the tortured rocker 'How Many More Times'. On the B-side of Jimmy Page's Yardbirds pal Jeff Beck's 1967 hit single, 'Hi Ho Silver Lining', is a track called 'Beck's Bolero', a guitar piece fashioned loosely on a classical piece composed by Ravel in 1928.

Page plays on the track and claims to have written it. Future Zeppera John Paul Jones plays bass. Beck claims at least co-authorship but it didn't pan out that way and imagine his chagrin when just over a year later, the track pretty much shows up again in the middle of 'How Many More Times', credited to Page, Jones and Bonham, with lyrics partially borrowed by Robert Plant from 'The Hunter', a track released by Albert King in 1967 on his Stax LP *Born Under A Bad Sign*, which was written and backed by Booker T & The MGs.

More straightforward is 'I Can't Quit You Baby' which is duly acknowledged as the work of Chicago blues legend Willie Dixon, though it pretty much copies the 1956 Otis Rush version, released on Cobra. We'll let that one lie, and turn instead to a gentleman called Earl Hooker, a snappy dressing slide guitar wizard who did all the behind-the-back and playing with his teeth stuff at least a decade before Jimi Hendrix and used a double-neck guitar again a good decade before Jimmy Page.

On the 3rd of May 1961, Earl was warming up in the studio for a recording session, putting his band through the paces with an impromptu slow blues. As he coaxed out the cool, moaning notes,



his producer, Mel London (an extremely talented bloke who wrote Muddy's signature anthem 'Mannish Boy'), hit the record button and thought no more of it until a year later, when, looking for more product for his Age label, he released the instrumental as a single called 'Blue Guitar'.

### GOBBLED UP

The single did ok, well enough to attract the attention of Leonard Chess who bought the rights, passed it to Willie Dixon who fashioned some lyrics with JB Lenoir about an extra-marital affair, then overdubbed Muddy singing them onto the track.

Hey presto, 'You Shook Me', which arrived in the UK on an EP on the Pye label in 1963, credited to Dixon and Lenoir, with no mention of Earl Hooker. The EP was gobbled up by such whippersnappers as Page and his pal Jeff Beck, who recorded a version of it for his post-Yardbirds album *Truth* with John Paul Jones on bass.

Nine months later, the Led Zeppelin version appears, uncannily like the Beck one with the addition of some lyrics by Robert Plant taken wholesale from Delta blues giant Robert Johnson's 'Stones In My Passway'. Beck was furious.

And just to add insult to injury, the Muddy 'Shook Me' single was so successful, Chess bought three more Earl Hooker tracks off Mel London for Muddy to overdub. One of these, 'You Need Love',

complete with more Willie Dixon lyrics, was picked up by The Small Faces who reworked it on their eponymous debut album as 'You Need Loving' in 1966, credited to Steve Marriott and Ronnie Lane. By the time Page got hold of it for Zeppelin's second LP, he was calling it 'Whole Lotta Love' and claiming authorship as his own. A 1985 lawsuit saw another out of court settlement to see Dixon all right.

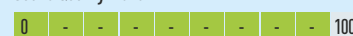
Page earned millions from the track. Earl Hooker, whose name appears nowhere, died poor from tuberculosis in 1970, aged 41. No wonder they called it the blues. ☹

### RE-RELEASE VERDICT

Remastered by Jimmy Page and packaged in a sleeve that replicates the LP's first pressing in exact detail, this release is part of an extensive reissue programme that will eventually see all nine of the band's studio albums reissued on 180g vinyl, in chronological order.

Our copy was in great shape, being ruler flat and having no noticeable needle weave or inner-groove distortion. Even the artwork looks crisp – quite a feat given the origins of the cover image. Sonically punchy, at £14.99 this is a great buy. HFN

Sound Quality: 90%





## ELO *Out Of The Blue*

As the pubs and small clubs on both sides of the Atlantic pounded to the sound of punk, one of the biggest selling rock acts of the mid '70s set about booking string sections and commissioning artwork for a lavish double LP. And it all began with Peter Frampton...

Words: **Johnny Black**



Music that was reviled by the critics in its day frequently proves to have lasting merit which only reveals itself in the fullness of time. ELO's 1977 double-album *Out Of The Blue*, their seventh studio opus, is a perfect example.

With the lo-fi DIY punk ethic ruling the day, *Sounds* whined, 'Why do ELO sell so many records?' Similarly, *Melody Maker* grumbled that, 'the experimentation between orchestra and pop music has become somewhat watered down over the years.'

So, given that the flavour of the moment was the frantically thrashed three-minute, three-chord single, what inspired ELO founder Jeff Lynne to create a lavishly-produced, lushly-orchestrated double album?

## AMERICA CALLS

The answer lay on the other side of the Atlantic. 'The boss of United Artists asked me if I would do a double live album, because Peter Frampton had just had a huge hit with his *Frampton Comes Alive!*,' Lynne has explained. 'I said, "Oh, I wish you'd said studio album. I'd have done that, but I don't want to do a live album." Later on he came back to me and said, "OK, you're on. Studio album!" It was terrific that I got the freedom to do it.'

In the spring of 1977, Lynne rented a chalet in the village of Bassin, overlooking Lake Geneva in Switzerland, giving himself a month to write the necessary songs. 'I was there for two weeks and didn't come up with anything,' he remembers, 'but finally they started coming.'

ELO drummer Bev Bevan has recalled how, 'He suddenly began to produce song after song at an



➔ The band pictured in 1973. Standing (l-r): Richard Tandy, Bev Bevan, Jeff Lynne, Michael De Albuquerque and Wilf Gibson. Sitting (l-r): Colin Walker and Mike Edwards



➔ Epic/Legacy publicity photo of Jeff Lynne

➔ Live in Oslo, Norway, 1978

➔ 7in single of 'Mr Blue Sky', on blue vinyl

incredible rate. "There's going to be no problem," he told me on the phone. "I've started writing at last and I can't seem to stop."

One of the first to emerge was 'Mr Blue Sky'. 'It had been cloudy and misty and horrible, you couldn't see where you were, and then one day the sun came out and the mist disappeared. It was fantastic, these giant mountains appeared everywhere. So I wrote "Mr Blue Sky" – very literal!'

A week later, Lynne brought the other members of the band out to Switzerland, by which time, says Bevan, 'He had every song for that album on tape. As usual, he had done it with a piano, guitar and by humming the tune.'

By May the 22nd, 1977, when they started recording at Musicland Studios in the Arabella House Hotel complex in Munich, Lynne had the makings of a clutch of



pop classics – 'Turn To Stone', 'Sweet Talkin' Woman', 'Wild West Hero' and 'Mr Blue Sky' among them – plus prog-rock epics 'The Whale' and 'Concerto For A Rainy Day'.

## STRANGE PRACTICES

The sessions lasted three months, during which Musicland's house engineer Reinhold Mack found Lynne's personality hard to comprehend. 'Every morning, his

attitude would be cold – walking straight past me without even saying hello, whereas at night, after about 12 pints of beer, he'd be sitting on

'Engineer Mack found Lynne's personality hard to comprehend'

my lap, kissing me goodnight.'

Mack also found Lynne's working method difficult to get to grips with. 'He'd leave the engineering completely to me and ask things like, "Can you get a big piano sound?" After I tried my best to do that, he'd then say, "OK, that's really good. Now can you screw it up?" "What's the point of doing this?" I'd ask. "I could have screwed it up in the first place."

Bevan, however, asserts that Lynne was, in fact, very methodical. ➔







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## VINYL ICONS

### PRODUCTION NOTES

Musicland Studios, birthplace of *Out Of The Blue*, was established in the late '60s by disco-synth pioneer Giorgio Moroder in the basement of Arabella House, a 21-storey mixed commercial development in Munich. Situated several miles from the town centre, this grim edifice was surrounded by bleak building sites, towering cranes and industrial wasteland. Nevertheless, it was a favourite studio of Led Zeppelin, Deep Purple and The Stones, to name only a few. Jeff Lynne recorded several albums there with house engineer Reinhold Mack.

While working on *Out Of The Blue*, Mack was using Westlake monitors and the latest Harrison console, a boon because, 'You could pretty much do anything at the push of a couple of buttons. It had a very clean recording sound. You'd go from the preamp over the monitor port onto the tape machine, and that was it: a really short and clean signal path.'

Part-way through the sessions, Mack suggested recording the 54-piece string section on the huge sound stage at Munich's Bavaria Film studio but, 'it was a complete disaster. I could not get the right



sound.' Undeterred, he crammed the strings into Musicland. 'There was also a 32-piece choir,' he recalls. 'It had to perform in the lobby while some of the orchestral musicians played their instruments lined up against the walls. The place was mobbed, and in those circumstances the sound we got on tracks like "Mr Blue Sky" was pretty good.'

Drummer Bev Bevan has also revealed that one ELO technique involved double-tracking all of his drum parts, playing the second track while listening to the first on headphones. 'The concentration hurts. If I'm a split second out the whole thing has to be repeated, but Mack gets a drum sound that I like, big, heavy and powerful.'



← United Artists press shot of the band from 1975, used to promote their *Face The Music* LP

'We always build up an album in the same way,' he states. 'Drums and bass first, then piano, followed by rhythm guitar. Electronic keyboards would come next, finishing with guitar solos.' Only once the instrumental tracks were complete would Lynne write and sing lyrics.

### SONS OF THE BEATLES

Lynne has admitted that he has to 'chain myself to the desk when it comes to writing words' and his lyrics can change dramatically as a song progresses. 'Living Thing', on the previous album *A New World Record*, famously began life as a rumination on the grim after-effects of food poisoning. Yet despite his idiosyncratic methods, Lynne's finished lyrics on *Out Of The Blue* are generally hard to fault.

The album opens with 'Turn To Stone', a beautifully-textured track with a beat which prefigures early techno, a quirky Moog bass played by Lynne, and a vocal melody in which each line is answered by tight multi-part harmonies. It became the first of four major hit singles to be drawn from the album.

The second single was the aforementioned 'Mr Blue Sky', a song so Beatlesque that it's easy to hear why John Lennon once hailed ELO as the 'Sons of the Beatles'.

Understandably, Lynne remains particularly proud of 'Mr Blue Sky'. 'The song captured what my vision of ELO was all about. All the bits that come in and out, the backing vocals, the cellos sliding, all the little

naughty bits, the sound effects, everything is exactly what I imagined ELO to be..

Particularly distinctive was the track's inclusion of voices rendered electronic via the era's hottest new musical toy, the Vocoder 2000. 'The factory that had just built the prototype was in Stuttgart, only an hour from Munich,' Lynne has explained. 'So we sent the girlfriends off to pick it up. There was no manual, it was that new. We spent the whole day just getting it to do something, but once we got it going it was beautiful.

It's still the best Vocoder I've heard. That was a treat, you always want to innovate and get ahead with technology.' Because the song is located

at the end of Side 3 of the album, the Vocoder voice at the end sings, 'Please turn me over'.

Lynne has also revealed that the album's epic 19-minute 'Concerto For A Rainy Day' grew naturally out of 'Mr Blue Sky'. 'I loved the second side of *Abbey Road* and I thought I wouldn't mind trying a suite like that. Because it was a double album I had so much room to work with. It was quite complex to make.'

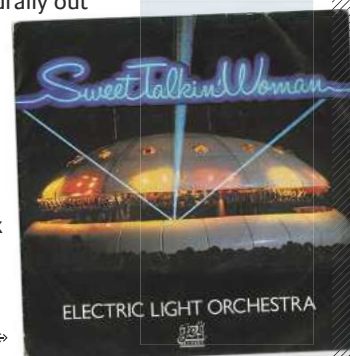
The album's third hit single was 'Sweet Talkin' Woman' of which Lynne ➞



↑ Poster for the original LP release, playing on the fact that it is a double album

← Lynne at work in the recording studio in the mid '70s

↓ 'Sweet Talkin' Woman' went to No 6 in the UK singles chart



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# Alternate Format Discography



➔ In 2014 Lynne received a star on Hollywood's Walk of Fame

has recalled, 'It was a song called "Dead End Street". I'd done all the words and everything, finished it. And I came down the next day in the studio and I went, "I hate that. Let's rub all the vocals off." Which is exactly what Mack did. And I'd been sitting up in the hotel, which is above the studio, working at night just trying to think of a new tune and new words, which I did. I tried them the next day and they worked. But it also meant changing the arrangement slightly. So a lot of pairs of scissors were used that day.'

The album swoons to a close with the filmic grandeur of its fourth hit single, 'Wild West Hero', a tongue-in-cheek cowboy pastiche on which Melvyn Gale, normally the band's cellist, provided distinctive piano stylings.

## ULTIMATE ALBUM

To an extent, *Out Of The Blue*'s runaway commercial success became something of a millstone round Lynne's neck.

'There was no way of following that, but there were contracts to fulfil, so I was forced to do things I didn't want to do, just because of signing bits of paper when you don't know what you're doing: "Sign that?" "Oh yeah, of course, thank you". You can have 50 quid and all the brown ale you can drink. You don't realise what you're getting into. So it turned out I had to do another 93 albums for ELO!'

Whatever Lynne's misgivings, with four massive hit singles and some of Lynne's most memorable production work, *Out Of The Blue* is arguably the ultimate Electric Light Orchestra album, even if some of its more experimental material, notably ambient/orchestral eco-hymn 'The Whale', still induces the screaming abdabs in some critics. ☺



With over 80 different iterations of *Out Of The Blue* released globally since 1977, please consider this discography merely a representative selection of the more interesting variations.

## ORIGINAL LP 1977

The first issue of *Out Of The Blue* beamed down in a lavish full-colour gatefold sleeve adorned inside and out with sci-fi artwork by acclaimed album cover illustrator Shusei Nagaoka. It depicted the exterior and interior of a flying saucer/mothership that always looked a bit too much like a frisbee – a tad too Hasbro – for my liking. ELO didn't penny-pinch when putting the package together, because the artwork also included a cardboard cut-out of the spacecraft and a fold-out poster of the band.

The number JTLA 823 L2, shown on the shuttle arriving at the space station, is the album's original UK catalogue number [UK, Jet Records, JTLA-823-L2 1198/ USA, United Artists, JT-LA-823 L2]

Shortly after release, however, copies of *Out Of The Blue*, deemed to be defective, turned up at discount prices in record shops in the US and Canada, affecting the album's sales. Consequently, Jet sued United Artists and switched distribution to CBS Records [KZ2 35530] worldwide early in 1978.

The US version of the vinyl, cut by Stan Ricker and said to have been half-speed mastered from the original master tape, is generally considered preferable to the UK release. Ricker himself, allegedly, once asserted that the whole band came to his studio to deliver the master by hand.

## TAPE VERSIONS 1977

Hi-fi aficionados at the time briefly enjoyed the delights of somewhat better audio on reel-to-reel tape

and *Out Of The Blue* was one of the handful of double albums accorded this treatment [JT-EA823-L2].

Because of the short playing time on each track of an 8-track cartridge, the songs 'The Whale' and 'Night In The City' are divided somewhat awkwardly between tracks and, as ever, the LP artwork cannot be replicated [JT-EA823-L2].

Similar artwork restrictions apply to the cassette [2TCK 100] but the sound isn't quite as bad as that of the 8-track release.

## FIRST CD 1986

The first CD version of *Out Of The Blue* [CDJET 400] appears to have emanated from Holland, and came as a two-disc set in a fatbox jewel case. Within a year the set was reissued as a single CD [JETCD400]. Sound quality was more than decent, offering an almost analogue-like reproduction.

## POLISH CASSETTE 1989

This hard-to-find item [MT-064] was an 'unofficial' cheaply-knocked-off release by the Polish company Megaton, featuring only ten tracks – including the four singles. Amusingly, the label bears the warning: 'Unauthorised duplication is a violation of applicable laws'.

## CD REISSUE 1992

This release [EPC 450885 2] didn't sound significantly better than the first one on CD, but did boast a 28-page full colour booklet with lyrics, credits and pictures from the original album artwork.

## 180G VINYL 1999

The jury is still out on whether this 180g release on the Simply Vinyl label [SVLP 101] was an improvement on the 1977 original

or not. Those who prefer it cite a more open soundstage and a generally livelier sound as its distinguishing characteristics.

## 30TH ANNIVERSARY EDITION

This appeared in February 2007 with three bonus tracks, as part of the Sony/BMG Music Epic/Legacy series. A desirable, great-sounding artefact, it was a limited pressing inside a hardback book with an expanded 24-page full colour booklet. Sleeve notes by Lynne and ELO archivist Rob Caiger, as well as rare photos and memorabilia, add to the interest. A push-out replica ELO Space Station [smaller in scale than the 1977 original] is included and there's a standard jewel case edition with an edited full colour 12-page booklet [82796942722].

A single, 'Latitude 88 North', was released in the form of a digital download and as a 7in promo single.

Two additional rarities were included – a home demo version of 'Wild West Hero' with a different bridge and 'The Quick And The Daft'. The album

again reached the UK Top 20 album charts, peaking at No 18

## BLUE VINYL 2012

Courtesy of Music on Vinyl [MOVLP383], this was another 180g release but the first 1000 copies were on transparent blue vinyl.

## BLU-SPEC CD2 2013

The latest regurgitation of *Out Of The Blue* [SICP 30111] boasts 'Phase Transition Mastering, the technology developed for mastering of Blu-ray discs, to further perfect the acclaimed characteristics of Blu-spec CD.' Doncha just lurve the concept of 'to further perfect'?



# Coachella Festival, *Indio, CA*

Now spanning three consecutive weekends in April each year, this music and arts festival is as famous for hosting appearances by groups that have reunited as it is for showcasing emerging acts. **Steve Sutherland** has the story of the Coachella Festival

**Y**ou must remember this, a kiss is just a kiss, a sigh is just a sigh...' Try telling that to Madonna. When she leaned over and snogged Drake onstage at the recent Coachella Music & Arts Festival, lingering just long enough to be captured by several thousand cameraphones, it was no impromptu surrender to passion, nor an intimate display of affection. This was Madonna, remember, a lady who'll do – and has done – just about anything to remain in the headlines.

According to the Twitterati and Instagram crowd, Drake didn't look too thrilled at Madge's pucker, but hey, any publicity's good publicity, right? So, job done!

But the Material Girl's blatant bid to grab the headlines is merely the latest in a long run of resurrections at Coachella, a festival which, sometimes by plan and sometimes by accident, has become famous for bringing the dead back to life.

## TAKING UMBRAGE

The whole thing started out as the brainchild of a clever and passionate gentleman called Paul Tollett who'd been tasked with helping Pearl Jam arrange a tour of the USA that would bypass any Ticketmaster involvement. This was back in 1993 when the band were at their grungey peak and took umbrage at what they considered the ticketing company's high, and sometimes hidden, service charges.

Tollett found the Empire Polo Club in Indio, a small ex-South Pacific Railroad town in Riverside County, California, some 127 miles and two hours East inland from Los Angeles, a lush man-made oasis in the harsh Sonoran Desert. Twenty-



➔ Sunset at the festival in 2014 and (inset) fans in front of the stage in 2013

➔ A kiss in 2015 and Madonna hit the news



five-thousand fans showed up to the event, which passed off so successfully that Tollett, a big fan of the UK festival scene, began to scheme his own US version.

It was a plan which came to fruition over the weekend of the 9th and 10th of October 1999, when a \$50 ticket gained access to the beautifully manicured polo grounds and performances by

Beck, Morrissey, Rage Against The Machine, Tool, Perry Farrell, Underworld, Spiritualized, Pavement and Moby.

Unfortunately, the good vibes were hampered somewhat by a camping ban (which was enforced until 2002) brought about by authority fears that there could be a repeat

*'Peter Murphy hung bat-like, his hair bleached pure white'*

of the ugly riots which had marred the revived Woodstock festival just three months earlier.

Only 37k attended across the weekend (expected capacity was 70k), Tollett's company Goldenvoice took a bath to the tune of \$80k and the Festival took a year off in 2000,

to return in 2001 after Tollett had sold his company (but kept his role) to promoters AEG. And that's when the career resurrections began.

Struggling to attract a headliner that would sell out the now one-day, \$65 event, Tollett convinced Perry Farrell to reform local alt-heroes Jane's Addiction, a trend of reunions that carried on the next year with a reformed Siouxsie & The Banshees

sharing a bill with Björk, Oasis, Prodigy, Foo Fighters, Queens Of The Stone Age and flavour of the month, The Vines. The event was held in April, a slot which it still occupies to this day, specifically to avoid the 100+ degree dry heat that hangs over Indio through the Summer and Fall.

## ANOTHER COUP

The next year, 2003, saw the return of the two-dayer and boasted The Beastie Boys as headliners. They'd been out of action since 1998's *Hello Nasty* album and their signing up for a comeback was another Coachella coup. Sharing this bill were Blur, The Libertines and Pharrell Williams' NERD, while Iggy





Pop reunited with The Stooges on day two to maintain the theme of the festival providing nuggets no other rival event could deliver. Also on this excellent bill were Red Hot Chili Peppers, The White Stripes, Sonic Youth and Primal Scream.

## HOLLYWOOD TYPES

The following year's main attraction – despite the headliners being Radiohead – was the first festival appearance in 11 years of the reformed original line-up of The Pixies, who played a stunning set to a massive crowd who were also treated to sets by The Cure, Flaming Lips and Kraftwerk.

By now the festival, with its beautiful site, wonderful weather, weird sculptures and air-conditioned tents, which went by such names as Gobi and Sahara, was attracting its fair share of fashionistas and cool Hollywood types. In fact, if I hadn't started this article quoting 'As Time Goes By', it was going to read: 'So Danny DeVito and I are sitting around on a sofa backstage discussing the Polyphonic Spree when Juliette Lewis and Winona Ryder walk right over...' But that would have been showing off.

Back from the dead in 2005 were goth shockers Bauhaus with singer

Original posters for the 2001 and 2003 events. The latter was the first year that on-site camping was provided

Pharrell Williams on stage at the 2014 Coachella. The rapper and record producer also appeared in 2003 with NERD

Jesus and Mary Chain's William Reid at Coachella in 2007

French electro music duo Daft Punk in robot suits



Peter Murphy, as I recall, hanging bat-like upside-down from the rafters of the main stage, his hair bleached pure white. Coldplay headlined while Trent Reznor's Nine Inch Nails also returned to the fray after six years out of action, headlining the second day over New Order.

A year on found Depeche Mode headlining over Franz Ferdinand, with Tool, Massive Attack and Yeah Yeah Yeahs also on the bill. But the big story was Daft Punk, who were playing the States for the first time in nine years and performed in their famous robot suits inside a pyramid to an ecstatic reception.

Indeed, such is their affinity with the Coachella audience that when they chose to preview their 2013 masterpiece Random Access Memories with a video teaser of the Pharrell/Nile Rogers collaboration 'Get Lucky' at the 2013 Festival, it was greeted with mass hysteria and reported as the highlight of the whole weekend.

The 2007 reanimations came in the form of The Jesus & Mary Chain, who'd recently gotten back together despite the glowering sibling rivalry between Jim and William Reid. The highlight of their set was a pure Coachella moment, A-list actress Scarlett Johansson joining them onstage for a lovely rendition of the song 'Just Like Honey'.



The other big revitalisation was Rage Against The Machine. The band had split back in 2000 over some policy issues but chose Coachella as the kick-off point for a reunion to protest against the Bush administration. Also on the bill were Arcade Fire, Kings Of Leon, The Good, The Bad & The Queen, LCD Soundsystem, the Black Keys and 13th Floor Elevators' psychedelic legend Roky Erickson who turned out to be nowhere near as crazy as rumoured. The festival stretched across three days, a sure sign that, eight years in, it was making good money and here to stay.

## PIGS WILL FLY

The Verve were arisen in 2008. They'd jacked it in in 1999 after the rest of the band couldn't deal with singer Richard Ashcroft anymore but time healed the wounds, albeit temporarily, and they played Coachella, released 'Love Is Noise' and then fell out again. At the time of writing, they are still 'on holiday'.

Others on the comeback trail in '08 were Kim Deal's Pixies side project The Breeders, Prince, who headlined with a greatest hits set, >





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## CLASSIC VENUES



and Roger Waters, who released the famous Pink Floyd flying pig and performed the whole of *The Dark Side Of The Moon*.

Twelve months later, the big attraction in indie circles was the reformed My Bloody Valentine who were coaxed back by Tollett, who is a big fan, after over a decade in the wilderness. Paul McCartney was one of the headliners, The Cure had the power cut on them after breaking the curfew, and M.I.A. replaced the ailing Amy Winehouse.

### SCHMALTZY COVER

Again for the indiekids, the talking point in 2010 was the re-formation of Stephen Malkmus' Pavement, who'd last played Coachella 11 years before, and the Second Coming of Faith No More who played their first US gig since returning from a decade-long hiatus with a round of UK shows in the summer of 2009, opening their set with a schmaltzy cover of the Peaches & Herb MOR classic 'Reunited'.

Jay-Z headlined, joined on an encore of 'Young Forever' by Beyonce. Muse, Gorillaz, The Dead Weather and Them Crooked Vultures also put in a shift.

A year on and the Festival was uncharacteristically bereft of reunions. Tollett had failed to coax The Cocteau Twins back together so the only real revival was that of Mick Jones' Big Audio Dynamite

who returned after 16 years (and a brief UK tour) to perform on a bill alongside Kings Of Leon, Arcade Fire, Kanye West and The Strokes.

Twelve months later, though, and Coachella delivered the daddy of all resurrections when, during an extremely rare Dr Dre headline set that also starred 50 Cent and Snoop Dogg, Tupac Shakur rose from the grave.

Assassinated in Las Vegas in 1996,

Tupac was brought back to life in hologram form to perform freakily realistic versions of 'Hail Mary' and, in a duet with Snoop, '2 Of Amerikaz Most Wanted'.

Pulp were also making their American comeback on this bill after

a nine-year rest and some UK festival warm-ups.

Twenty-thirteen found The Stone Roses reformed and headlining the first weekend and then swapping with Blur for the second. Meanwhile, indietypes salivated over the reformed Postal Service, playing live for the first time since they packed up in 2005.

### THE REAL BIG THRILL

Outkast were the comeback kings the next year, celebrating their 20th anniversary with their first show in seven years, a gig that kicked off a summer of some 39 other festival appearances. Also back from oblivion were The Replacements, who'd knocked it on the head in '91.

And so to 2015 and that Madge smacker. She may have grabbed the headlines, but the real big thrill was the live return after five years' absence of AC/DC who played a resplendent set despite the sad absence of guitarist and founder member Malcolm Young, hospitalised with dementia.

So that's Coachella's MO – bringing 'em back. If that Morrissey/Marr Smiths thing ever does happen, chances are it will happen here. ☺

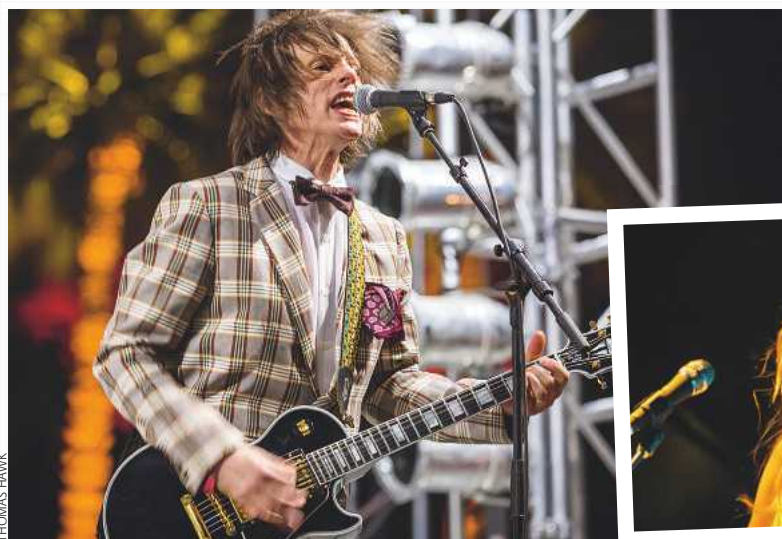


↑ In 2008 Prince took to the stage. The festival was said to have grossed \$13.8 million

↖ Dr Dre at Coachella in 2012. His set saw him share the stage with a hologram of the deceased rapper, Tupac

↖ Kanye West on stage at the event in 2011

↓ The Postal Service (below) and The Replacements (left) both re-formed for the 2013 festival



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## ALBUM REVIEWS: VINYL

STEREO

# folksy nina



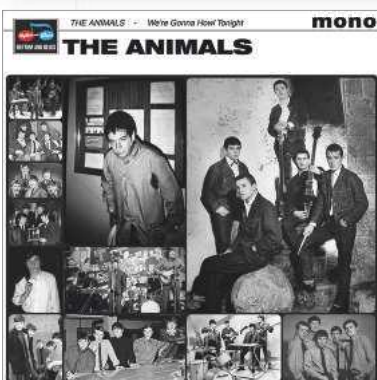
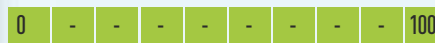
### NINA SIMONE

Folksy Nina

Pure Pleasure PPAN SCP 465 (180g vinyl)

Yeah, I had to laugh at the title, because – overall – folksy she ain't. But this unusual release from 1964 finds the versatile, enigmatic jazz chanteuse moving with the times, the USA then on the tail-end of a frenzy of folk music (being squeezed by British pop bands). Simone, to be fair, was always eclectic, and never strayed too far from blues or gospel influences. Recorded in Carnegie Hall in May '63, it features her with a drum/bass/two guitar backing and her own exquisite piano playing, covering folks tunes from the USA, Great Britain, Israel and other cultures, delivered in her own, inimitable style. But – in the context of this magazine – sound quality is paramount, and trust me: it's sublime. **KK**

Sound Quality: 91%



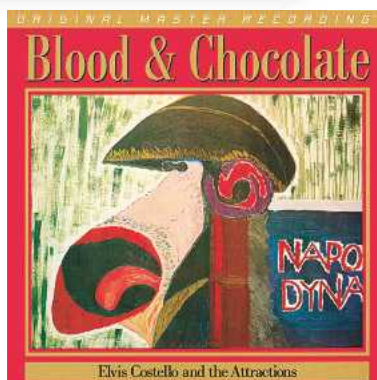
### THE ANIMALS

We're Gonna Howl Tonight

R&B Records R&B2 (180g vinyl)

Limited to 2000 copies worldwide, this 'Record Store Day' mono set contrasts vividly with the later, hippie-period LPs reviewed here in May/June: it's all blues, R&B and hard rock. The 13 tracks come from live sessions broadcast in 1964, the Newcastle band soaked in R&B, blues and early rock 'n' roll, with standards from the likes of Jimmy Reed, John Lee Hooker and Chuck Berry. Among them are songs which would become signature tunes, including 'Boom Boom' from their debut LP that year and their biggest hit, the best-ever take of 'House Of The Rising Sun'. The rating is about sound quality and doesn't reflect how, musically, this is a '90'. **KK**

Sound Quality: 85%



### ELVIS COSTELLO & THE ATTRACTIONS

Blood & Chocolate

Mobile Fidelity MFSL 1-433 (180g vinyl)

Back with the estimable Nick Lowe as producer – in my opinion, probably his finest collaborator – and with The Attractions behind him, Costello enjoyed a return to post-punkish form in 1986. Not only was he re-discovering synergy with his old band, he managed (and this was something like his 11th studio album) to sound like the angry, if resolutely obnoxious young man that first brought him to the world's attention a decade earlier. There are few stand-out moments here, and the sound is less than pristine (not, I hasten to add, MoFi's fault), but then this is not a happy, touchy-feely set. Mid-level Costello – not a throwaway, but neither a classic. **KK**

Sound Quality: 80%



### FAIRPORT CONVENTION

Myths And Heroes

Matty Grooves MGLP053 (180g vinyl)

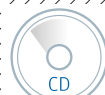
With a sleeve parodying 1970's *Full House*, the Fairports' first in four years – and their first on vinyl since the '80s – lacks four of the CD tracks, but sandal-wearing, granola-crunching fans will probably buy both. The 2015 line-up of founder member Simon Nicol and long-term Dave Pegg, with post-1985 veterans Chris Leslie, Gerry Conway and Ric Sanders, employs an if-it-ain't-broke-don't-fix-it stance. There's the usual mix of British folk of a finger-in-the-ear/medieval vibe, light rock and roots music, with self-composed and guest-writer tracks, including a new Ralph McTell song, 'Clear Water'. Still sounds to me like an English version of The Grateful Dead.

Sound Quality: 90%





## AUDIOPHILE: DIGITAL



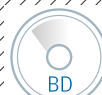
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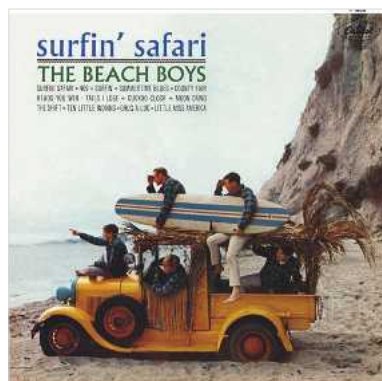
BLU-RAY



VINYL



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### THE BEACH BOYS

#### Surfin' Safari

Analogue Productions CAPP058SA (mono SACD)

Let's get this one out of the way: the first in Chad Kassem's series of Beach Boys reissues is their so-so debut, running to just under a half-hour. Value-for-money does not enter into it: you will buy this if you're a Beach Boys completist. And, yes, it sounds pretty fine, retaining much of the sound of the vinyl, with plenty of detail. The harmonies were just starting to take shape and Brian Wilson co-authored nine of the dozen tracks – impressive for a debut. But that aside, it's banal surf music and even Capitol didn't reissue it in the 2012 digipac remasterings. The best was yet to come... as you'll see next month. (This will also be issued on 180g vinyl.) **KK**

Sound Quality: 80%



### HAWKWIND

#### This Is Your Captain Speaking – Your Captain Is Dead: The Albums and Singles 1970-1974

Parlophone 1729790825646 (11 discs)

Do you know what it's like listening to *eleven* Hawkwind CDs in one sitting as a non-drug user? I'm now a gibbering wreck, OD'ing on acid rock excess. This is 'the United Artists' era, the seminal early period when Lemmy joined, 'Silver Machine' was issued and they delivered the collectible live *Greasy Truckers Party*. Over the span of seven albums (including three doubles) – the eighth in the box collects the 45s – they laid the foundations for space rock, worked with Michael Moorcock and had nude women on stage. This is definitive English psychedelic/prog/whatever... and it gave us Motörhead. **KK**

Sound Quality: 89%



### TED NUGENT

#### Ted Nugent

Analogue Productions CAPP33692 SA (SACD)

Everyone's favourite bow-and-arrow-wielding headbanger went solo with this eponymous, double-platinum-selling release in '75. Those who followed Nugent from his days in the Amboy Dukes knew what to expect, because that band – though borne of psychedelia – rocked in the true manner of its Detroit roots. This set showcased Nugent's fiery, ferocious guitar work to excess, its opener, 'Stranglehold', featuring a lengthy solo rated as the 31st greatest lead break of all time by a leading guitar publication. This is no-nonsense hard rock, the SACD's clarity making the screaming highs all the more intense. Nice to see that metal fans aren't being neglected. **KK**

Sound Quality: 89%



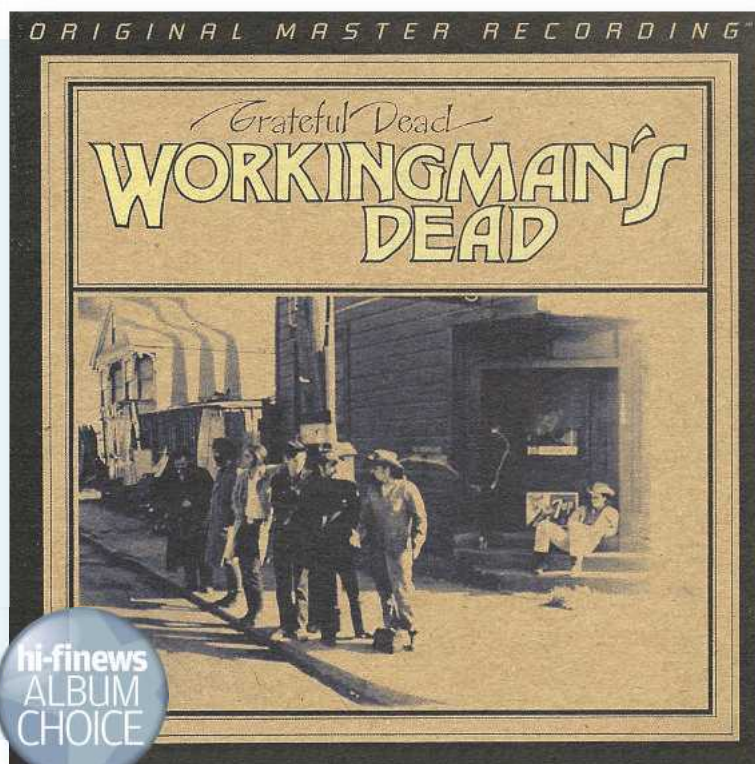
### GRATEFUL DEAD

#### Workingman's Dead

Mobile Fidelity UDSACD2137 (SACD)

Definitely the album that broadened the Dead's appeal beyond the hippie/druggie crowd, this 1970 release eschewed the turgid psychedelic excess of the previous studio album, *Aoxomoxoa*, but expanded on its acoustic component. The resultant set is a gorgeous progenitor of alt.country and roots music, as important as any of the earlier country rock milestones. Indeed, one might rate it alongside The Band's eponymous second album. The guitar work is sublime, the songs memorable: 'Uncle John's Band', 'Casey Jones', etc – a perfect example of the down-home vibe that signified the times. And I write this as the only American long-hair of that era who detested the Dead with a passion. **KK**

Sound Quality: 92%



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### MARIALY PACHECO

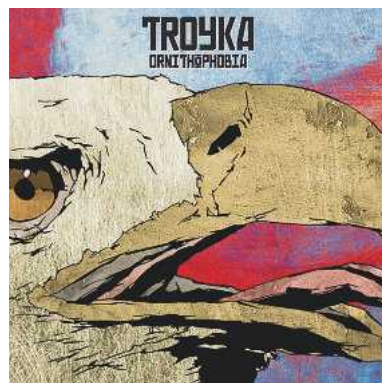
Introducing (96kHz/24-bit; FLAC)

[www.hifiresaudio.com](http://www.hifiresaudio.com); Neuklang NCD4091

We've only just been introduced, and already 32-year-old Cuban-born Ms Pacheco is sitting at her piano in just her drawers – what is one to think? Actually, Marialy Pacheco already has six previous releases under her belt (not that she's wearing one), and is an acclaimed classical and jazz pianist. This is simply her first album for the Neuklang label, and finds Pacheco going back to her Havana roots, accompanied by Colombian bassist and drummer Juan Camillo Villa and Miguel Altamar.

It's a tight little trio, able to kick back on tracks such as 'Cambodian Smiles' or motor through 'En El Camino', while the album centres around the pianist's three-part 'Cuban Suite', exploring the country's dance styles. And the 'klang' here is certainly impressive: yes, the piano is rather spotlit, but the bass and drums are resolved well, and this is a very attractive-sounding set. **AE**

Sound Quality: 95%



### TROYKA

Ornithophobia (44.1kHz/24-bit; WAV/FLAC/ALAC)

[www.naimlabel.com](http://www.naimlabel.com); Naim CD210

So what's with the Hitchcockian title? Well, London-based trio Troyka tells us the title of its new album comes from guitarist Chris Montague's fear of birds – this 'escalated' into an album set in a fictionalised London: a post-apocalyptic dystopian nightmare in which people have contracted a form of avian flu that is slowly turning them into human-size birds'. Hmm... so the concept is high, but fortunately so are the playing and production values: the sound is dense and convoluted, but retains good impact and clarity, while the ever-changing rhythms and clear musicianship lift this set above being yet another teenage rough-book jotting – always a danger when jazzers get an idea for a 'concept'. Producer Petter Eidh holds it all together well, despite the complexity, and this is an album with demo-quality sound that you might actually want to listen to a second time. **AE**

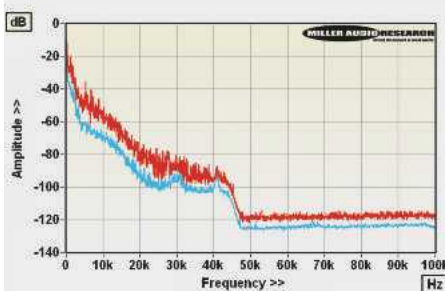
Sound Quality: 90%



### OUR PROMISE

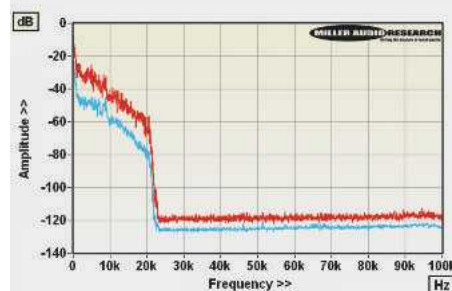
Following our Investigation feature [*HFN*, Jun '11] where we examined the claimed quality of high-resolution downloads, *Hi-Fi News & Record Review* is now measuring the true sample rate and bit-depth of the HD music downloads reviewed on these pages. These unique reviews will be a regular source of information for those seeking new and re-mastered recordings offered at high sample rates and with the promise of delivering the very best sound quality. (Note: asterisk in headings denotes technical reservation explained below.) **PM**

### LAB REPORT



The bandwidth of the piano is necessarily limited to ~12kHz but percussion makes better use of this 96kHz file's 40kHz+ span. The artefacts at ~30kHz/41kHz [see Graph] are from the piano feed and absent from the vocal intro on trk 7. **PM**

### LAB REPORT



Densely recorded in parts with plenty of percussive energy right up to the end stops of this (necessarily band-limited) 44.1kHz file, it's clear that a substantive chunk of ultrasonic content – real or distortion – has been lopped off! **PM**



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## CAROLL VANWELDEN

Shakespeare Sonnets 2 (96kHz/24-bit; FLAC)

[www.hiresaudio.com](http://www.hiresaudio.com); Jazznart Records JNA7014

Belgian singer/songwriter Caroll Vanwelden takes another stab at the Bard's back-catalogue with this collection – the follow-up to her first disc of sonnets, released a couple of years back. Ms Vanwelden has a decent set of pipes, which are unleashed full-blast on tracks such as her take on Sonnet 124: 'If My Dear Love'. She is well recorded, as is her backing trio of Thomas Siffing (brass), Mini Schulz (bass) and Rodrigo Villalon (drums), even if the overall sound is perhaps a bit 'in yer face' and relentless in some instances. However, her vocal style is somewhat mannered, at times sounding almost like a parody of female jazz singers, and the incongruity of this and the words being sung, plus a sense that there's often a disconnect between the subject-matter of the sonnet and the music we hear, makes this set something of an acquired taste. *AE*

Sound Quality: 80%



## BARBER/BRITTEN

Piano Concertos, etc; Elizabeth Joy Roe/LSO/Emil Tabakov (96kHz/24-bit; FLAC)\*

[www.hiresaudio.com](http://www.hiresaudio.com); Decca 478 8189

Elizabeth Roe is a young Chicago pianist with already an impressive CV. Well worth hearing, she's also half of a piano duet (see <http://www.andersonroe.com/videos/a-kiss.html>). Here, she rounds out her programme with two solo 'night pieces' – Barber's *Nocturne 'Homage To John Field'* and Britten's *Notturmo* written (1963) as a test piece for the very first Leeds Pianoforte Competition. Both main works exist in definitive recordings: John Browning's (for whom the Barber was written) with Szell/Cleveland on Sony; and Richter's with Britten/ECO on Decca. The Barber *Nocturne* restores calm after the motoric drive of his concerto finale – the work far more spaciouly conceived than the Sony (6m longer). The Cadogan Hall recordings are reminiscent of Decca's best analogue work with piano/orchestra. *CB*

Sound Quality: 85%



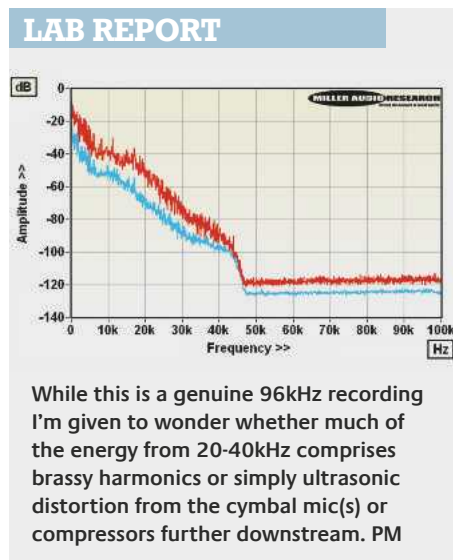
## DE PROFUNDIS

Russian National Orchestra/Moscow Synodal Choir, et al/Hilarion Alfeyev (96kHz/24-bit; FLAC)

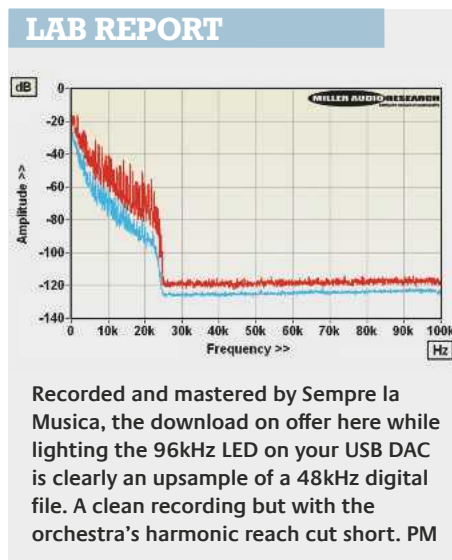
[www.hiresaudio.com](http://www.hiresaudio.com); Pentatone PTC 5186486

You can of course sample tracks at HRA and read the booklet PDF (texts dangerously close to 'Pseuds' Corner territory) before thinking of buying, which is probably just as well for the compositions of this Russian Orthodox Bishop (Metropolitan), born in 1966. There's a *Concerto grosso* and a fugue on B-A-C-H – 'the sense of the infinite contained in these four notes continues to excite', we are told – but the rest is vocal: an ultra-conservative *Stabat mater*, which I admit I quite enjoyed, *Songs of Death* (after Lorca) and *De Profundis*, a 24m Psalm settings piece. The *Concerto grosso* is pure Baroque-pastiche, the fugue like an old Stokowski Bach transcription. While nothing will frighten the horses, it's depressing to find this sort of sub-Pärt 'me too' music, copying its 'sawing' motifs and liberal use of tolling bells, being written today. *CB*

Sound Quality: 65%



While this is a genuine 96kHz recording I'm given to wonder whether much of the energy from 20-40kHz comprises brassy harmonics or simply ultrasonic distortion from the cymbal mic(s) or compressors further downstream. PM



Recorded and mastered by Sempre la Musica, the download on offer here while lighting the 96kHz LED on your USB DAC is clearly an upsample of a 48kHz digital file. A clean recording but with the orchestra's harmonic reach cut short. PM



Recorded by (Dutch) Polyhymnia International B.V. at the DZZ Studio 5 in Moscow, the engineer's penchant for SACD and DSD is illustrated by this Pentatone download which is evidently an asymmetrical 96kHz downsample. PM





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Paul Miller, Hi-Fi News, March 2015

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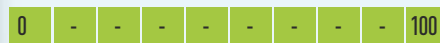
### CORNELIA

Balun

Camp Mozart

**Big Bang-type techno-geeks out there may already know that a balun is an electrical device which 'converts between a balanced signal and an unbalanced signal'. I had to look it up and I still don't quite understand. What I do understand is that this is a stunningly lovely hi-tech electronic pop album by Swedish singer-songwriter and innovator Cornelia Dahlgren. Not only does Dahlgren possess a gorgeous voice, but she writes songs infused with Bjork-like imagination and records them via her laptop, anywhere from kitchens to church halls. She won't immediately have any international EDM smash hits, but she will stretch your mind. Balun is also available as a 'limited edition audio poster'. This may just be the future. *JBk***

Sound Quality: 95%



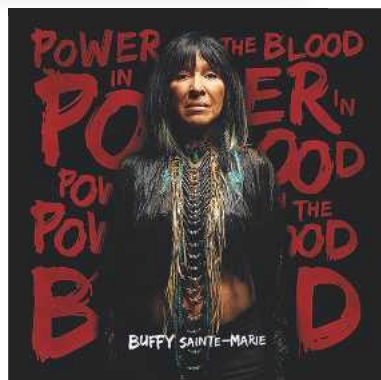
### NAI HARVEST

Hairball

Topshelf Records TSR129

This Sheffield-based 'fuzz punk' duo drags the spirit of mid-'70s New York CBGB's-style rock kicking and screaming into the present day with a reckless abandon that must be heard to be believed. Their simplistic, distorted, hi-speed guitar riffs are overlaid with electronic howls and effects pedals set to 11, making the two-piece sound like an axe army. What really makes it work, though, is that guitarist Ben Thompson and drummer Lew Currie write melodically-rich, emotionally resonant songs that soar up through the sonic murk to implant themselves in your head for the rest of the day after one listen. Why can't all noisy head-banging rock music be like this? *JBk*

Sound Quality: 88%



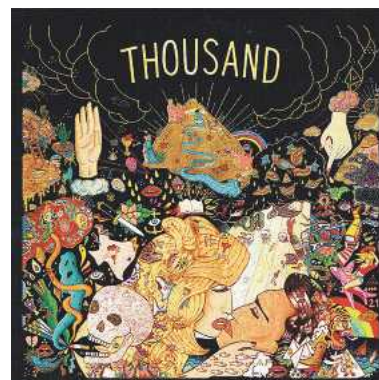
### BUFFY SAINTE-MARIE

Power In The Blood

True North Records TND603

Much as I loved Buffy Sainte-Marie back in the days when she wrote 'Universal Soldier', 'Cod'ine', 'Until It's Time For You To Go', and other folk-rock protest classics, I had no serious expectations from this, her 20th album. It's good to have your expectations over-turned now and again, so I'm delighted to report that Buffy took me entirely by surprise with a dozen songs that ingeniously combine her folk roots with techno beats and rhythms bringing a new validity and vitality to her Native-American-inspired craft. Now 74, she also sounds genuinely angry, as befits any politically-inclined songsmith, on cuts like 'Not The Lovin' Kind' and 'The Uranium War'. *JBk*

Sound Quality: 91%



### THOUSAND

Thousand

Talitres Records TAL083CD (LP: TAL083LP)

Opening cut 'The Flying Pyramid' starts out like a folksy-version of Lou Reed and then un-expectedly transforms into African-inflected pop à la Vampire Weekend. It's followed by 'The Kill', a potent melange of chilled pop-rock and disco whoops, and the spooky 'To Dance In A Circle Of Fire', making it clear that Stephane Milochkevitch, aka Thousand, is an imaginative newcomer on the international landscape. Essentially, he's a folksy singer-songwriter, but his easy familiarity with a range of eclectic instruments and exotic percussion sets him apart from most musicians in that currently over-subscribed category. Ed Sheeran he ain't, but that's no bad thing. *JBk*

Sound Quality: 93%



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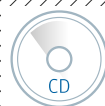
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### REZ ABBASI ACOUSTIC QUARTET

#### Intents And Purposes

Enja ENJ-9621 2

Back in 2010, putting aside his electric guitar, Abbasi teamed up with New York vibes player Bill Ware, bassist Stephan Crump and drummer Eric McPherson to create this unusual acoustic group. RAAQ's first album *Natural Selection* reflected the Karachi-born guitarist's eastern heritage as well as the jazz he'd grown up with in the US. This time, he's focused on tunes from the '70s fusion era, digging out their acoustic potential from the old electric shell. So his 'Black Market' is bright, light, and upbeat, more engagingly melodic than Zawinul's dark original, while his takes on songs by Corea, Hancock, McLaughlin, Coryell, *et al*, are equally appealing. *SH*

Sound Quality: 85%



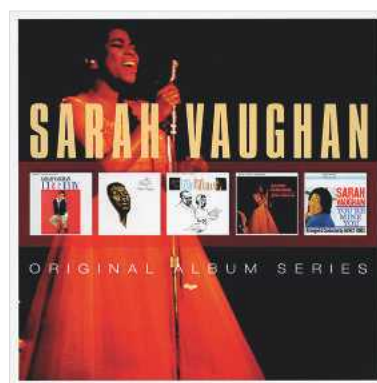
### THE BEN COX BAND

#### This Waiting Game

Cinnamon Records CINNC01

Though he'd also learned piano, Ben Cox cut his performing teeth as trumpeter and vocalist with the Essex Youth Jazz Orchestra, then went on study at the Guildhall. Singing live in London, his distinctive vocal timbre caught the ear of Ian Shaw, who became Cox's mentor and the finally the producer of this much-vaunted album. Most of the songs are by Cox and his co-writer, pianist Jamie Safiruddin, while the covers range from 'And I Love Her' to 'A Nightingale Sang In Berkeley Square' (with Claire Martin). There are also guest spots for Kirk McElhinney and Emily Dankworth, rounding off a pop-jazz package that marks an impressive debut. *SH*

Sound Quality: 85%



### SARAH VAUGHAN

#### Original Album Series

Warner1 Jazz 0825646179787 [5 CD box set]

This budget box puts together five of the dozen or so albums Vaughan recorded for Roulette between 1960 and 1964. You get *Count Basie/Sarah Vaughan* plus the more adventurous big-band treatments of Quincy Jones on *You're Mine You*, but you might prefer the small group settings of *The Divine One*, with long-time Vaughan pianist Jimmy Jones and trumpeter Harry Edison. There are gorgeous moments too with guitarist Mundell Lowe and bassist George Duvivier on the intimate *After Hours*, though it doesn't include the song of that name which Vaughan made memorable years earlier. And you can hear her soaring incomparably over strings on *Dreamy*. *SH*

Sound Quality: 80%



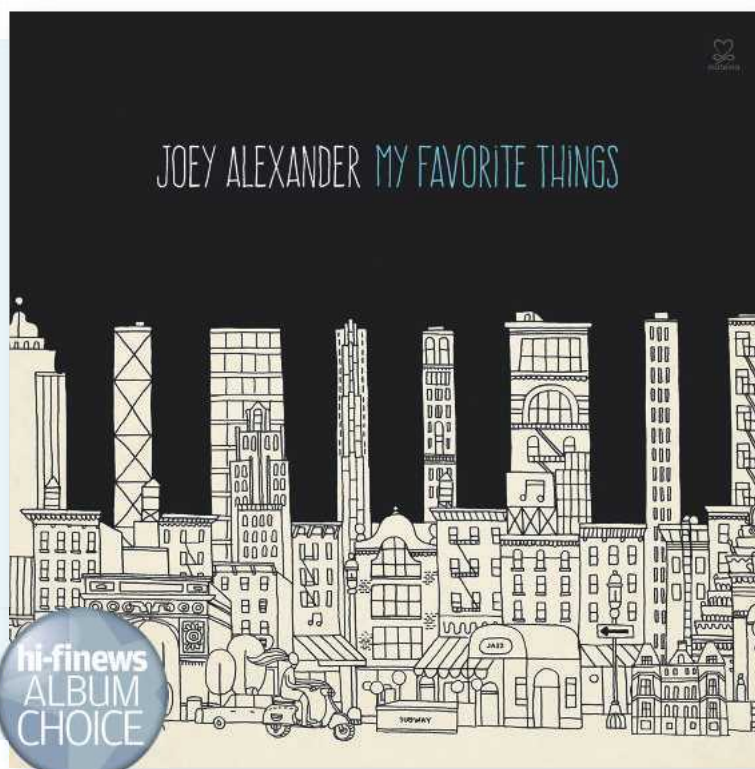
### JOEY ALEXANDER

#### My Favorite Things

Motéma 233988.

At six, at home in Bali, Joey Alexander was picking out tunes from his father's jazz record collection. At nine, he was invited by UNESCO to play solo piano for visiting celebrity Herbie Hancock. A year later, in 2013, he won the international improvisation contest in Odessa. By 2014, he'd reached New York, where he made this debut recording with name players including bassist Larry Grenadier and drummer Ulysses Owens Jr. So, here we have an album of jazz standards, interpreted with unerring harmonic sense and a pleasing combination of fresh melodic ideas and traditional values, put over not just with ample technique, but also with mature musicality. And all this from a pianist who is just 11 years old. Astonishing. *SH*

Sound Quality: 90%



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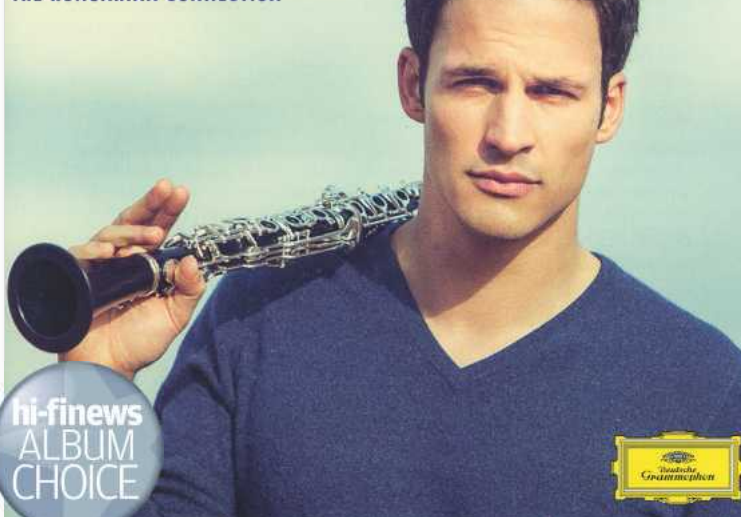


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# ANDREAS OTTENSAMER

## BRAHMS

THE HUNGARIAN CONNECTION



### BRAHMS/WEINER

Clarinet Quintet; Two Waltzes, etc/Two Movements  
Otto Andreas Ottensamer, et al

DG/Mercury 481 1409

In the wake of a fine BIS recording of the Clarinet Quintet with Martin Fröst, this new DG also finds the clarinetist in company with some 'star' string players: Leonidas Kavakos, Antoine Tamestit (vln/vla), et al. The expressive warmth makes a very different impression from old versions like the classically constrained Berliners on Philips or even the Vienna Octet on Decca. The theme here is Brahms's 'Hungarian connection' (Ottensamer himself is half-Hungarian). So we move via two *Waltzes* and *Hungarian Dances* – cimbalom joining in – and short pieces by Budapest teacher-composer Leo Weiner to a lively 'pot pourri' of traditional music, accordion now added to the group. **CB**

Sound Quality: 85%



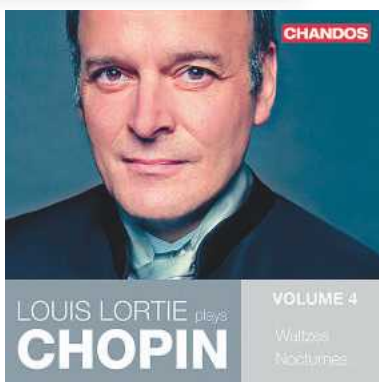
### BEETHOVEN

Piano Trios Op.1:1 and Op.96; Allegretto, Hess 48  
Gould Piano Trio

Somm SOMMCD 0144

Ending their Beethoven cycle (recorded live at St George's, Bristol – applause included) the Gould Trio sets an attractive little *Allegretto* from 1792 between the early E-flat and the final 'Archduke' – where direct competition comes from Cropper/Welsh/Roscoe on a Sonimage CD. Their readings are not without a few minor mannerisms whereas the Gould Trio creates an entirely clean, fresh effect here, with complete unanimity in phrasing. Recorded with good spread and ambience, this is perhaps the best modern-instrument 'Archduke' to be had today. (Faust/Melnikov/Queyras for fortepiano, etc – on Harmonia Mundi.) **CB**

Sound Quality: 80%



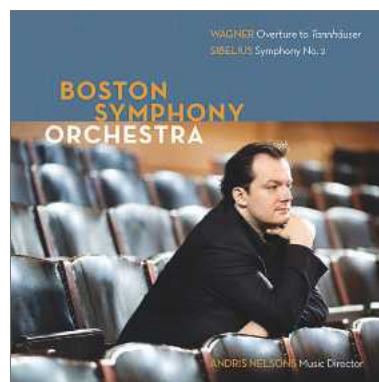
### CHOPIN

Piano works Vol.4 (Waltzes; Nocturnes)  
Louis Lortie

Chandos CHAN 10852 (downloads up to 96kHz/24-bit resolution)

Lortie likes his Chopin programmes to make a pleasing sequence, rather than a numerical one in a specific genre. So towards the end of the 21 *Waltzes* grouped here he intersperses four *Nocturnes*. He's playing on a pair of Fazioli F278 grands at Potton Hall (only in Vol.2 do we have a Steinway); the recordings were made in 2011, '13 and '14. There's a wonderful elegance to Lortie's Chopin. Try the E-flat, Op. Posth B21, or the way in which the quick phrases are spun in Op.64:1 ('Minute') – never rushed – then contrasting with the inward-looking C-sharp minor *Nocturne* that follows. A lovely recital. **CB**

Sound Quality: 90%



### SIBELIUS/WAGNER

Symphony 2 in D/Tannhäuser Overture  
Boston Symphony Orchestra/Andris Nelsons

Boston Classics BSO1401 (downloads up to 96kHz/24-bit resolution)

With a high-res option at \$10.99 at the Boston orchestra's website, this is the first coupling to appear under Andris Nelsons' name: live recordings from Sept/Nov '14. An odd pairing, but the Wagner (from his inaugural concert as Music Director) is the piece which sparked the idea – when he was five – of becoming a conductor. It's great to hear the Boston Orchesra again, conjuring up qualities we heard in its Munich, or early Ozawa periods. No minute detail escapes Nelsons in the Sibelius, in this spacious account (but will those daringly extended pauses bear repetition?). Telling spatial separation in the symphony. **CB**

Sound Quality: 80%



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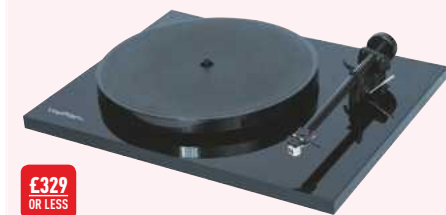


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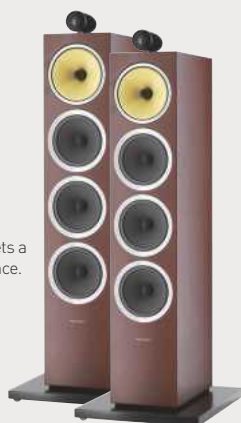
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## Paul Miller Editor

Technician and writer on all things audio for some 30 years, Paul Miller took over the editor's chair in 2006. He invented the QC Suite, used across the audio industry

# Lightspeed USB

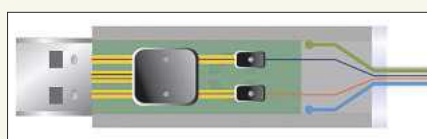
By breaking circulating RF earth currents, optical digital interconnects lay a potential sound-enhancing trump card over electrical coax, says **Paul Miller** – a concept now extended to USB

Onboard DACs are now more firmly embedded in the hi-fi mainstream than at any time in the past – including the early '90s heydays of the two-box CD player. The difference is we're now connecting to our DACs via network or USB rather than the S/PDIF standard of the past (though new DACs still accommodate this legacy interconnect). And, just as the two-box disc spinner helped spawn an entire industry of audiophile S/PDIF cables, today's DACs are indulged by an equally diverse range of 'audio specific' USB cables.

### CORNING'S CONNECTION

We've tested a large number of these USB cables [see *HFN* Jul '13 & Jul '14] and while they employ different metal conductors and supportive dielectrics, there's a limit to how far their design and construction may evolve without moving outside of the (very strict) USB specification. Until now, that is, with the launch of the first optical USB 2.0 and USB 3.0 cables from US communications giant Corning Incorporated.

We've had optical cables before, of course, but the Toslink interconnects used between transports and DACs are necessarily limited in their scope. Compared with coaxial S/PDIF interconnects, optical digital links do not suffer from electrical interference or the need to match termination impedance



**ABOVE:** Inside both USB connectors an electrical-to-optical converter is linked to a pair of high speed photodiodes

**RIGHT:** The first 'conductor-free' USB interconnect from Corning Optical Communications extends the reach of 5Gbps USB-to-USB 'cable' to 50m



(75ohm for S/PDIF, 90ohm for USB and 110ohm for AES/EBU). But while the optical link offers the great advantage of breaking any circulating RF earth currents between source and DAC, the 1mm-thick PMMA plastic Toslink fibre together with the limited pulse response of the opto-transmitter/receiver restricts both its bandwidth (the risetime of digital edges) and the practical length of the fibre.

Five metres is about maximum thanks to signal degradation along its length and insertion losses between the cable and the opto-coupler (Toslink) sockets. The longer the optical fibre, the higher the likelihood of digital jitter. This is the trade-off between electrical and optical audio connections and the reason behind many of the specific differences in their sound quality.

### OPTICAL USB

All of which brings me on to the exciting prospect of optical USB interconnects where the electrical-to-optical data conversion (and vice-versa) is embedded into the plugs themselves. Ironically, the very high data rates associated with USB 2.0, 5Gbps USB 3.0 and the new 'SuperSpeed' 10Gbps USB 3.1 standards means even the hardwired electrical USB

interconnects are limited in length to around 5m. Audio data rates, even for DXD or DSD128, are a mere splash in this surging white water of data, but that doesn't mean we audiophiles cannot take advantage of new technologies.

Utilising Corning's 'ClearCurve VSDN' optical fibre these new USB cables are up to '50% thinner and 80% lighter than comparable copper cables'. They also boast a 'zero-bend' radius and ability to withstand 'more bending, squeezing, and tangling without damage or loss of function', while operating over extended 50m lengths.

### MUSICAL MUSINGS

These optical links may turn out to be the dream interconnect for custom installers and those of us who'd rather push music files from PC to DAC via USB than over a network. The real benefit here is we're no longer tied by proximity to the DAC or by bulky cables.

I'm straining at the gate to test a 10m set and report back next month because, for all their technical advantages, we have no idea what impact these optical USB interconnects will have over sound quality. Presently available in 10, 15, 30 or 50m lengths, they are terminated in A-type connectors only, so we'll need A-to-B adapters at the DAC end. Price is just €109/10m. An audiophile bargain? Let's wait and see... ☺



# CS-300X(S) | integrated amplifier

by Leben

The EL84 based CS-300X(S) is for music lovers who value simplicity, nuance and tonal correctness.

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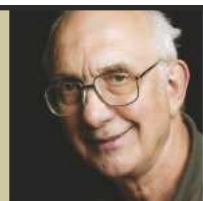


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## Barry Fox Technology journalist

Barry Fox trained in electronics with the RAF and worked as a patent agent, but he gave that up to enter journalism. He is one of the world's top technology writers

# Blumlein remembered

In April, a plaque was unveiled at Abbey Road Studios in honour of engineer Alan Blumlein, the inventor of stereo sound. **Barry Fox** was there and returned with some fascinating audio tidbits

I can't help wondering whether the long overdue honouring of Alan Turing's work at Bletchley Park on cracking the Enigma codes, helped achieve the equally overdue unveiling of a plaque to honour Alan Dower Blumlein's seminal work at EMI on stereo, telecoms, *eg*, long-tailed pair circuit design, electronic TV and radar.

Although there was nothing secret about Blumlein's work on stereo discs, film and TV, he died aged 38 in a UK aircraft accident while testing the H2S radar system in 1942. This had to be hushed up at the time.

### CRUMBLING TO DUST

After the war, son Simon Blumlein agreed for a tapestry enthusiast called Francis Thomson to hold the family archive with a view to writing a biography. The biography never appeared, and anyone asking Thomson when it might be expected received obfuscating replies. The Blumlein family only got their papers back after Thomson died.

EMI management showed little interest in company history and had to be shamed into letting an outsider, ITV Technical Chief

Norman Green, rescue the stereo sound films which Blumlein had made in the mid-1930s. These were on nitrate stock and crumbling to dust. Norman Green transferred them to video. At the same time worried insiders at EMI made sure copies of the original stereo disc tests went into safe keeping.

Then, like buses, two biographies came along at pretty much the same time. Universal merged with EMI and the new company seems to have put some money into preserving historical relics. They are not on public view and we

**RIGHT:** Several generations of the Blumlein family, IEEE officials and industry stalwarts gathered at Abbey Road Studios in London to see the plaque unveiled



only know of their safe existence because the original 1930s ribbon and moving-coil microphones and disc-cutting heads were on show at a full-day celebration of Blumlein's work, held recently at Abbey Road studios when the IEEE (Institute of Electrical and Electronics Engineers) unveiled its 154th Milestone Plaque – to A

D Blumlein, 'the first name in stereo'.

Over a hundred industry veterans, along with some audio engineers and students, got the chance to hear rarely heard or seen audio and film recordings,

including early stereo music tests with Sir Thomas Beecham and Ray Noble, and the world's first ever stereo sound film, *Trains At Hayes Station*.

The new plaque is for the front door of the studio building, alongside a memorial to composer Sir Edward Elgar, and close to the road crossing where tourists flock daily to take photos which try to re-create the sleeve for The Beatles' *Abbey Road* album.

It was especially good to see the US-based IEEE honouring Blumlein in this way because when the RIAA set the standard for mono-compatible single

groove LP stereo in 1958, it was described as the brainchild of American company Westrex. This prompted British technical journalist Percy Wilson to write a series of blistering editorials, which set the record straight.

### AUDIO TIDBITS

During the Abbey Road event some fascinating audio tidbits came out of panel discussions. David Fisher of the University of Surrey owned up to a mistake made by himself and other BBC engineers when FM stereo signals were being routed to transmitters round the country by early 14-bit PCM links.

All the measurements, he recalled, were done with high level signals and showed 'perfect' lack of noise and freedom from distortion.

'But if we had thought to measure low level signals,' Fisher admitted, 'we would have found the distortion that FM listeners were complaining about – and being brushed off.'

Respected cutting engineer Sean Davies had an interesting theory on why vinyl sounds 'warm'.

'Often there is very low level vertical cut rumble with antiphase effects,' he explained to the audience. 'That reproduces as a feeling of space.' ☺

'Worried insiders ensured copies of the original discs went into safe keeping'

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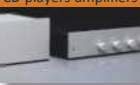
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## Barry Willis

Journalist for top American audio-video publications

While his main interest is high-end audio, Barry Willis also writes about the culinary industry, visual art and theatre for a huge variety of US newspapers and magazines

# A little-noted centennial

A sculpture celebrating the invention of the loudspeaker has **Barry Willis** wondering if we have now extracted the maximum performance possible from components with inherent limitations...

Nineteen-fifteen was a pivotal year. The European continent was consumed by a savage, intractable mass insanity that would determine the course of the world's events to the present day. Albert Einstein published his *General Theory Of Relativity*, and in May that year, far away in the idyllic wine country town of Napa, California, Peter Jensen and Edward Pridham invented the loudspeaker.

Or so proclaims the plaque attached to a commemorative statue of their invention, which stands at the edge of a plaza on Napa's First Street, next to one of many ornate old buildings undergoing repair after last year's earthquake.

Perhaps the only public tribute to the ubiquitous device, this statue by sculptor Franco Vianello was unveiled in 1985, 70 years later.

If this is true – Wikipedia has no entries under 'invention or history of loudspeaker' – Jensen and Pridham had the insight of mounting an electro-magnetically-controllable vibrating

diaphragm in the small end of a horn, thereby taking advantage of the horn's ability as a natural acoustic amplifier.

It's likely that others may have been working along similar lines at the same time – there would have been nothing unusual about this, given that the vibrating diaphragm was well-known in the 19th century, and an essential element in the first practical telephone patented in 1876.

## IMPOSSIBLE CHALLENGE?

The loudspeaker enjoyed a tremendous spurt in growth, prompted by the development of better amplification in the 1920s. Engineers and inventors tweaked its basic design and in relatively short order

it morphed into the many variations we know today – tweeters, midrange drivers, woofers, subwoofers.

Material science and electrical refinements have led to the many

high-performance varieties in use today, but the fundamental principles of the loudspeaker's operation haven't changed. Nor have its fundamental limitations.

Loudspeakers have colorations that impart dominant flavours to everything they play, to our pleasure or dismay. It's something we all know, and all accept as a fact of life. It's something glaringly obvious when comparing a live performance to any recording, regardless of its quality or the quality of the playback gear.

Damage to signal integrity occurs at the air/transducer interface. The 'acoustic transparency' that we audiophiles gush about is translucent at best.

A century of progress has brought us to what may be an impossible challenge – attempting to extract increasing levels of fidelity from devices with inherent limitations. Research and development may have gone as far as possible in refining



**ABOVE:** Monument in Napa commemorating the debut of the moving-coil loudspeaker

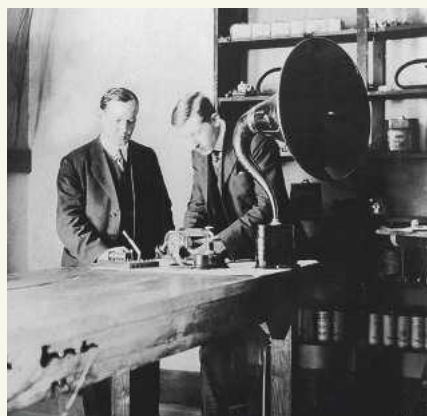
the basic design. What's needed to bring recording-and-playback performance up to the level of contemporary electronics is a complete re-examination of how to convert electrical signals into sound.

## A GENERAL GOODNESS

There may be other more transparent and more realistic ways to do so than the methods we now use, but current technology is so widely available and easy to implement that no-one would bother to seek alternatives. It's like the global dominance of entrepreneurial capitalism – it's the most efficient economic system developed so far, but that doesn't mean it's the only possibility.

The audio frontier is stagnant because there isn't much widespread dissatisfaction with electro-magnetic transducers. Many of them are quite good and their limitations aren't sufficiently egregious to interfere with our enjoyment of recordings. Their general goodness, in fact, is what prevents us from looking elsewhere.

Even so, we can dream, can't we? ☺



**ABOVE:** Pridham and Jensen at work in Napa. In 1917 they founded the Magnavox company

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*modern design*



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## Jim Lesurf Science Journalist

Jim Lesurf has spent a lifetime in audio, both as an engineer at UK hi-fi company Armstrong and reader in Physics and Electronics at St Andrew's University

# The AudioFactory

**Jim Lesurf** offers some background on the changes at the BBC which resulted in users being unable to access its internet radio stations. Could the jams of today mean jam tomorrow?

Earlier this year, some people found that access to the BBC radio iPlayer services on their Wi-Fi radios and network music players abruptly ceased after the corporation changed the way it provided content [see *HFN* May '15]. The immediate reaction of many was to blame the BBC. But in the rush to complain, the bigger picture tended to be overlooked.

At the time, I was putting together a look at the changes from an engineering perspective. For those interested, there is more at <http://www.audiomisc.co.uk/BBC/AudioFactory/AudioFactory.html>. But, of course, there's *much* more to the story than engineering...

## CUTS AND COSTS

The BBC has had its funding steadily cut, and more cuts are to follow. So it is under pressure to reduce the operating costs of its iPlayer. Yet the number of requests for iPlayer access continues to rise. In addition, the system had treated various radio stations in differing ways. So some listeners felt they were receiving a poorer quality service than others. All of this meant changes were becoming unavoidable.

Further fuel to the fire comes from the fact that when a consumer buys a commercial 'closed box' internet 'radio' they're actually relying on its maker – or in some cases a third party paid by the makers – to ensure that it works correctly, and goes on working. Yet the user's only agreement or contract is with the retailer and not the service provider, which in this case was the BBC. It can be misleading to call these devices 'radios' because they're essentially special-purpose computers.

Over a year ago, the BBC decided that the only practical way forward was to completely replace its pre-existing radio iPlayer arrangements with a brand new system. This saw the creation of the AudioFactory project. The end result will be that – for UK listeners – all the BBC's UK radio stations will become available via 320kbps AAC streams for both 'live' and 'on demand' listening.

This is a big upgrade from the previous situation where only Radio 3 was available at this quality level. In the process, the stream sample rates have also been upgraded from 44.1kHz to 48kHz, removing one conversion that used to be in the audio path from station to listener. The new system should also cope more easily as the number of listeners rises.

The snag has been that old equipment and services have had to be removed to make space and save costs. In some cases, the dates for this procedure had to be set in stone well in advance. With that in mind, the BBC says it did begin contacting manufacturers of equipment able to access its content, in early 2014.

As I've touched on briefly, many users of certain types of modern consumer equipment may not realise that it relies on a continuing service by a third party. In the event of a problem this situation is very different to traditional broadcasting where

you could expect the BBC to ensure its stations were transmitted over the air. Your TV/radio set then either worked, went back for repair, or you bought a new one.

The internet has changed everything. A few years back when listening to the iPlayer the service would suffer from regular breaks. Digging deeper it was on account of my Digital Service Provider deliberately trying to deter iPlayer use

'My Digital Service Provider was trying to deter iPlayer use during office hours'



**ABOVE:** A peek at the new BBC equipment as it processes data feeds for net streaming

during office hours. If I hadn't discovered this, I might easily have blamed the BBC!

## OLD FASHIONED

A decade from now, using traditional broadcast transmissions for TV and radio will probably be regarded as absurdly old-fashioned. The radio spectrum will eventually be taken over for use by mobile devices. No satellite or terrestrial broadcasts can match the eventual range of choice and flexibility that the net will offer. And 'real time' viewing and listening for much beyond news or sport may disappear. I suspect the AudioFactory will aid the BBC – and its listeners – to navigate towards this. ☺



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## Steve Harris Contributing Editor

Steve Harris edited *Hi-Fi News* between 1986 and 2005. He loves jazz, blues music, vinyl and vintage hi-fi and anything that makes good music come to life

# The numbers game

In the '70s and '80s we were bombarded with impressive figures that turned out to mean little, and we had to accept physical source media as it came. Things have changed, says **Steve Harris**

In 1961, in what now seems a quaint article on hi-fi for the *Harvard Crimson* student newspaper, David Paul wrote: 'The man in the street will tell you a [frequency] response from 20-20,000cps is the test of a good set. The fact is that even the worst Japanese amplifier will advertise this rating.'

Back then, you couldn't have said the same for the rest of the system. But with the arrival of CD, 20Hz-20kHz could be taken for granted. The once-vital statistics of distortion and wow & flutter lost all significance too.

Instead, we started to be told about 18-bit, then 20- and 24-bit processing, 96kHz and 192kHz sampling. Misleading, if you didn't realise that these numbers described the converter, not the converted. The CD signal itself could never be more than 44.1kHz/16-bit.

That 1961 article had gone on, dismissively, 'The ability to detect ultra-high tones above 15,000cps [15kHz] is limited mostly to babies and dogs.'

But by the 1990s, there was a growing consensus that CD's 20kHz upper frequency limit was too restricting.

Since the sampling frequency must be at least double the highest audio frequency, a higher sample rate was needed. Crucially, this would also move any unwanted effects of the digital filtering further above the audio band and further out of harm's way.

Then came DVD-Audio, which did offer 24-bit, 96kHz and 192kHz-sampled PCM audio. For the first, abortive, DVD-A launch in 1998, Technics was ready with a complete system that claimed a frequency response extending to 90kHz.

Rather than offering cogent engineering arguments for such a wideband response, though, Technics

**RIGHT: DSD, the 1-bit recording format behind SACD, is still thriving in the era of hi-res downloading. See [www.dsd-guide.com](http://www.dsd-guide.com) for information on sites offering DSD content, like [nativesdsd.com](http://nativesdsd.com), which was founded in 2014**

seemed to imply that there could be significant music content extending to 50kHz and beyond. But in any case, the DVD-Audio launch had to be put on hold because of the copyright protection issue.

### INITIAL CLAIMS

Meanwhile, Sony's rival SACD system also initially claimed a frequency response extended to around 100kHz. Yet in production, SACD players were given a 50kHz low-pass filter to avoid

the possibility of connected equipment being damaged by high-frequency noise energy.

DVD-Audio never got off the ground and DualDisc, launched in 2004

with hi-res DVD-Audio on one side and CD audio on the other, made no lasting impression either. This left SACD as the only viable physical music release format that offered higher resolution than CD.

So DSD, the 1-bit recording format behind SACD, is still alive and well in the era of hi-res downloading, even if it remains a minority interest in a PCM world.



As the Editor has explained ['Opinion', May '15, p103], DSD audio owes its accessibility to the DoP [DSD over PCM] protocol. And, as PM goes on to point out, there is really no way of knowing for sure whether the file you've acquired has always been DSD, or has been converted to PCM at some stage.

Once free of the restrictions of an optical disc, the DSD sample rate could optionally be doubled from SACD's 2.8224MHz to 5.6448MHz, or 128 times that of CD, hence DSD128. This moves the inevitable ultrasonic noise to higher frequencies, further away from the audio content. Doubling again produces DSD256, and the next step, to DSD512, is possible, but gives daunting file sizes.

So, while hi-res audio has really come to fruition with 96kHz, 192kHz and even 384kHz PCM, there are some new flavours of DSD as well. But even if the terminology and the numbers sometimes seem bewildering, I don't think we're seeing a return to the empty audio specmanship of the 1970s and 1980s.

There may still be hype, but there is passion too, and we have at least a chance of getting the sound of an original master recording at home. More than ever before, we have a choice. ☺

"The ability to detect tones above 15,000cps is limited to babies and dogs"

## YOUR VIEWS

# Sound Off!

Correspondents express their own opinions, not those of *Hi-Fi News*. We reserve the right to edit letters for publication. Correspondents using e-mail are asked to give their full postal address (which won't be published). Letters seeking advice will be answered in print on our Sound Off pages, but due to time constraints we regret we're unable to answer questions on buying items of hi-fi or any other hi-fi queries by telephone, post or via e-mail.

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## REPLACING AN '80S KRELL AMP SOUGHT FOR CURRENT-HUNGRY SPEAKERS

Two recent articles have led me to write with a question that has been bothering me for some time. Firstly, your piece on Class A versus Class AB amplification [see *HFN* Feb '15] in which you noted that the original Krell KSA-100 ran in pure Class A and sounded more valve-like than typical solid-state amplifiers of the time. Secondly your From The Vault piece on the Audio Research D-70 power amp [see *HFN* Mar '15] led me to dig out the original issue and re-read the review of the Acoustat Two Plus Two loudspeakers.

I still have a Krell KSA-100 driving a pair of Acoustat Two plus Two speakers, which for me makes a perfect match. It is an extremely revealing combination and this has led to some fascinating component matching issues. Some very highly rated items actually have less than ideal characteristics in this system – a critical lesson in hearing components in your own system before committing to buying them.

I have no plans to change either my amp or speakers but, as you can appreciate, they are ageing. I have, on occasion, tried other power amplifiers, the limitation being current capability as

anything with less than 20 amps peak current quickly overloads and shuts down.

The question bothering me is this: if my Krell gives up, are modern amplifiers costing under £10,000 likely to drive the low impedance of the Acoustats, which drops to 1.3ohm at its worst? Or would I be in for a huge bill for a Dan D'Agostino or similar?

Ken Kessler would probably have heard the combination as he was reviewing high-end equipment when both the Krell and Acoustats were new.

The front-end of the system comprises a Lyngdorf CD1 player and an Avid Volvere turntable with SME 1V arm and Zyx 4D cartridge. Other amps are an Audio Research PH6 phono preamplifier and Audio Research LS3B preamp (also vintage) while cabling consists of Ecosse interconnects and Townshend Isolda speaker cables.

*Arthur Boyle, South Africa*

Ken Kessler replies: The safest bet for Mr Boyle will be to enquire of each manufacturer about the suitability for the Acoustats' driving needs. PM's lab reports published in *HFN* every month suggest that most of today's powerhouse amplifiers will successfully drive low sensitivity, low impedance speakers.

Brands including D'Agostino, Chord, Krell, Constellation and similar are renowned for making robust, stable amplifiers able to deal with unusual loads. Equally, if provided with the specifications and electrical characteristics of older speakers, they would be able to advise to the suitability. I hope and suspect the Acoustats might be less problematic than you fear.



**ABOVE:** The Krell KSA-100 power amp, which was first released back in 1980

## No need to fear computer audio

**SUPPLIED DRIVERS AND GOOGLE ARE YOUR FRIENDS**

I read the letter from Robert Petersson in the June pages of Sound Off and the reply by Barry Fox with dismay. While I take Mr Petersson's point that configuring a PC for use as a music server can take a little work, it is no more time-consuming than setting up a hi-fi system, with its cables and speaker positioning – not to mention setting-up and tweaking a turntable.

For myself, venturing into computer audio has proven to be rather fun. Programs like foobar2000 and JRiver are a click away via Google while in my experience drivers for USB DACs intended to be used with a PC are supplied in the box. I just hope the views of Messrs Petersson and Fox do not feed into any fears readers might have about exploring the world of computer-based hi-fi.

*Robert Wood, via email*

Paul Miller replies: I concur with your observations, Robert. We test USB-enabled separates every month in *HFN* and have never had any difficulty loading the audio drivers for PC operation. For Mac users the plug 'n play process is simplicity itself.

## WhitWorld

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RADIO 3'S DIGITAL STREAM."**



# Looking back at LP sleeves

FROM THE VAULT FEATURE EVOKES MEMORIES FOR ONE VINYL COLLECTOR

I was interested to read the From The Vault piece on LP record sleeves in the May issue. The article brought back many memories and I well remember how varied sleeve notes could be. Many only spoke of the music and mentioned nothing about the performers, or it was all about the soloist or conductor and not much about the music. In later years, the typeface used on some issues in the Decca SXL series was so small and indistinct as to be hardly legible, and I needed a magnifying glass!

However, there certainly is something special about having a record sleeve with attractive and appropriate photographs and artwork – of the size of a 12in disc. This is something lost with CD covers and notes being so much smaller, or almost non-existent.

One of the writers of the republished piece, Trevor Swinson, mentioned that the DG Archiv label was always well detailed and the LP cover stitched at its edges, and also included an index card with a summary of the details and track numbers. This encouraged me to dig one out – the four Handel Organ Concertos – which I purchased in March 1964. The sleeve and inners may bring back happy memories to other collectors. I continue to play LPs and would never part with them.

*John Winterbottom, via email*

Christopher Breunig replies: I am glad you enjoyed the reprinted article although your letter gives me pause for thought. I



**ABOVE:** Reader John's copy of Handel Organ Concertos, bought in March 1964



**ABOVE:** Inner sleeve and index card

began collecting in 1958 and wish I had kept all that I bought. Often I replaced LPs when a midprice reissue turned up, as the cut would often show an audible improvement. But mostly the reissues artwork wasn't as good as the original!

What is interesting when you look back is to see that sleeve-note writers often expected a fair degree of technical knowledge when describing a piece of music. Today, of course, you might get an illustrated puff for a new artist and nothing at all about the music performed.

I can't actually recall LP notes which were all about the artists and not the music, even with the likes of EMI's 'Great Recordings of the Century' or, say, Decca, DG or CBS 'artist profile' compilations.

While CD offered convenience it was, as you suggest, at the cost of the 12in cover, although you could hardly criticise the booklet annotations always provided by Hyperion. What we now have too often are thin digipacks with barely legible spine information (or none at all), so filing and finding has become a problem.

I personally had no gripes about the gatefold LP sleeves but DG/Archiv discs were not at all easy to slide out of the stitched covers you mention! And do you remember the polythene inners used by Decca at one time which left residual markings on the disc playing surface – with consequent surface noise?

# 8

## Lanes On Your Entertainment Superhighway



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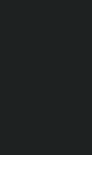
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The particulars of the RJ45 connectors have also received extreme attention. The plugs used on the Vodka and Diamond models (and available for use with bulk Cat 700 models), feature a unique patented transition-compensating system which reduces reflections caused by the impedance mismatch where 4 twisted pairs meet a straight line of 8 plug contacts.

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For a no obligation demonstration please contact one of the following approved PS Audio dealers:

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## Ripping SACD to hi-res PCM

HOW IS THIS ACHIEVED AND WHICH SOFTWARE IS NEEDED?

For some time now I've been considering how I best move to a file-based music system. Late last year I purchased a Naim Unitiserve and Devialet 200 amplifier. I'm very happy with this set-up and, used in conjunction with a turntable, can see it meeting my music needs into the foreseeable future.

My only issue is with my collection of SACDs. Neither the Naim nor the Devialet handle DSD. I used to play the discs through an Oppo universal player but the signal was sent through the analogue RCA outputs. The Oppo does not convert to PCM and output SACD through the S/PDIF outputs and, unlike Devialet's D-Premier amp, the 200 doesn't have an HDMI input.

In reviews written by Keith Howard he often refers to 88.2kHz PCM rips from SACD. Could Keith please tell me how he does this and which software he uses? Do I have any other options to get higher than CD resolution files from my SACDs?

*Jeff Tacey, via email*

Keith Howard replies: I'm in the fortunate position (because I put myself there) of having a Sony PlayStation 3 of appropriate vintage which I've hacked to rip SACDs. Anyone who wishes to equip themselves likewise needs to perform a web search to determine precisely which machine is required, how to do the hack, and where to obtain the ripper software to install. Then specify your PS3 requirements on eBay (other e-commerce sites are available, etc) and wait, being very careful to establish that machines on offer really do meet the necessary criteria in



**ABOVE:** Certain Sony PlayStation 3 models can be hacked to rip SACDs

respect of serial number and firmware version. In my experience most sellers, particularly when asked for the latter, either don't know or couldn't care. It took me three months to find a suitable machine, and then it was in Austria.

If I seem coy about aspects of this process it's because it is not a route to take unless you are at least moderately competent with computers (in a general sense, *ie*, you're not just a 'power user' of certain software). It takes some ability and determination to achieve and so I don't recommend it to audiophiles *per se* unless they are appropriately able.

The legality of the process I'm not qualified to pronounce upon but given that the BPI has publicly stated that consumers who rip CDs for their own use will not be prosecuted, I see no reason why the same should not apply to SACDs.

Of course this is not the case, morally at the very least, if you download ISO files or other SACD rips from dodgy sites online. I maintain a clear policy on this, particularly as I'm a journalist: I regard my own SACD rips as entirely defensible whereas downloading rips others have made is absolutely not.



**ABOVE:** The Naim Unitiserve is a slot-loading, CD ripping, hard disk music player and server

## WIRELESS FRONTIER?



Not only are wires still very much the lowest-distortion highest-performance way to send both analog and digital audio information, but when it comes to sending power, "wireless" is just a nifty science project, not part of a home entertainment rig.

The challenge of not adding distortion as AC power goes from the wall to the electronics, and the challenge of not adding distortion as audio power is sent to a loudspeaker, are almost the same. The amount of energy transferred through these cables, and the size of the associated magnetic fields, puts them in a different class from all other audio and video cables.

Speaker cables need to maintain perfect integrity across the audio band and then some, while AC cables only have to try to be perfect in a narrower band. AC cable design is therefore a subset of speaker cable design because AC cables are subject to almost all the same distortion mechanisms, and benefit from almost all the same damage minimizing techniques.

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# Internet radio and the BBC

READER SHARES HIS EXPERIENCES AFTER STREAMER LOSES ACCESS TO RADIO STATIONS

I read Andrew Everard's comprehensive Investigation 'Trouble Downstream' [see *HFN* May '15] with much interest, being one of the listeners caught out by changes the BBC has made to its internet stream. I acquired a streamer three years ago to listen to Radio 3 and especially its regular live evening concerts. I was quite impressed with the station's 320kbps AAC output but it would appear my streamer cannot now process the BBC's new AAC bitstream and has defaulted to MP3, whether 128kbps or higher I haven't been able to find out. Not surprisingly, I am not at all happy with this. According to the unbiased and acute ears of my wife, the sound is 'soft and homogenous'.

I loathe DAB, and not wishing to go back to FM reception with its wretched 'Optimod' dynamic compression, I decided to phone around manufacturers and hi-fi dealers to see what, if anything, could be done. The situation is, alas, even more confusing than Andrew says in his article. The company that made my streamer was unhelpful. Both hardware and software had moved on, I was told, and the model that I owned, by implication, was now Neanderthal. In short, I was foolish to expect the company to do anything about it.

Dealers, too, proved disappointing. Though there are many fine streamers out there, nobody seemed to know very much about the issue and no-one could assure me that any streamer was compatible with the latest BBC Radio 3 AAC bitstream, nor tell me how long the BBC would continue with this service.

Given this, I am not willing buy another (to me, quite expensive) streamer which will be obsolete in a couple of years. Can you give me any advice apart from 'Get your Leak Troughline tuner down from the loft and try to ignore the Optimod'?

*Dr Roger Simmonds, via email*

Andrew Everard replies: I suspect the manufacturer of your network player is as frustrated as many with the unexpected turn the BBC took with its delivery of its internet radio streams. As I suggested in my piece, some companies have faced considerable expense and time in re-development in their efforts to return the owners of their products to 'where they were' before these changes

were made, and even those who thought they'd been working closely with the BBC to ensure continuity for their customers found themselves wrongfooted.

To then read the BBC's announcement that all of its 2015 Prom concerts would be available in what it calls 'HD' sound – ie, 320kbps HLS AAC live streams – might just be seen as rubbing salt into the wounds of designers and users alike, deprived of the means of receiving these streams on high-quality audio equipment.

However, the problem is even greater for those manufacturers using an 'off the shelf' module to build their streaming



ABOVE: Lost BBC radio streams – *HFN* May '15

products – a 'turnkey' solution meaning the company only needs to engineer the more conventional parts of a product, such as the DAC, analogue section and, of course, the casework and power supplies.

Such packages have been available for some time, coming as a complete chipset, display and even remote control set-up, and delivering on one circuitboard network streaming, internet radio, and even niceties such as AirPlay and Bluetooth.

As such, they present a simple route into network audio capability for a manufacturer, but the downside is that adapting to changes in format – as has happened here – places the audio manufacturer at the mercy of a third-party developer, which may or may not be interested in rewriting code to service products already in the field.

You can see how widespread is the use of such modules simply by looking at a number of network-music-capable devices across the price spectrum: identical displays are something of a tell-tale sign!

The good news is that there is a workaround hopefully able to restore the

BBC stations to most streaming hardware, and it's courtesy of the ever-resourceful Simon Nash, whose range of 'Minim' software products – notably MinimServer and MinimStreamer – are used in the network systems of many enthusiasts, either running on a network attached storage (or NAS) device, or on a home computer.

I'm assuming here that as you have a network music player, aka (if incorrectly) a 'streamer', then you either have music stored on a computer or NAS device, or at least a computer on the same home network, be it Ethernet or Wi-Fi, as the network player. Using one of these, you can employ the workaround Simon explains on his website at <http://minimstreamer.com/bbcradio.html>.

This involves using both the MinimServer and MinimStreamer packages to make your network player 'see' (and thus play) the radio streams as if they were a playlist stored on the server. The basic set-up – a text file loaded into your 'library' – will provide a solution as long as your network player can handle AAC ADTS network streams. If it can't, MinimStreamer has that covered, too, in that it allows you to set it to transcode the stream into a format with which the network player can work, such as WAV.

The instructions on the site, though they look daunting at first, are explained in detail, and provided you follow them methodically, should provide a solution. Simon Nash also provides support for the products via the MinimServer forum at <http://forum.minimserver.com>, where you will also find fellow BBC sufferers and those who have been through the same process.

Best of all, it won't cost you anything to give it a try, as the Minim products are available for free from the company website – though if, as I hope, this provides a solution, I should point out that Simon accepts online donations, to enable him to continue the good work.

Jim Lesurf replies: Roger Simmonds has my sympathy. The fundamental problem is that when you buy a 'computer in disguise' – be it an internet radio or a 'smart' TV – you rely on the maker and probably some form of 'service aggregator' to ensure it continues to fully function. I prefer to use a PC for internet radio as I this helps me bypass having to rely on third parties. However, I understand this isn't practical or preferable for many. I look at the background to the BBC's recent moves in my Opinion this month [see p109].

# Help with first separates

READER SEEKS TIPS TO ENSURE VINTAGE DECK AND RECEIVER GIVE OF THEIR BEST

I have inherited a Beogram 3000 turntable from the 1970s and a Beomaster 3000-2 receiver. Cosmetically both are in good condition and, as far as I can tell, working quite well. However, this is the first turntable I have ever owned while the 3000-2 begins to produce an annoying hum after around 15 minutes of use.

I've had the SP10 stylus on the turntable cleaned and retipped by the Expert Stylus Co and am happy with the work. I do wonder if the belt is in the best condition, and where I might get a good quality replacement.

As for setting the downforce: with the cartridge in place, I set the pressure dial to '0' then turned the counterweight at the rear of the tonearm until the support post floated about 1mm high. I then set the pressure dial to around 1.2. It would be comforting to know whether or not I've done this correctly.

The Beomaster 3000-2 only played through one channel when using the Tape input, but I cleaned the switches with DeOxit D5 and that solved it. The hum can be annoying when listening at low volumes as it can be heard over the music.

I would like to know how to determine whether this hum is caused by the transformer, the reservoir capacitors or something else entirely. The capacitors appear OK – no leaking but I'm afraid I'm no electronics engineer!



**ABOVE:** The Beomaster 3000-2 receiver was released in 1972 and cost £157.50

Would any of the team be able to advise a young man who has not only acquired his first separates, but vintage separates at that!

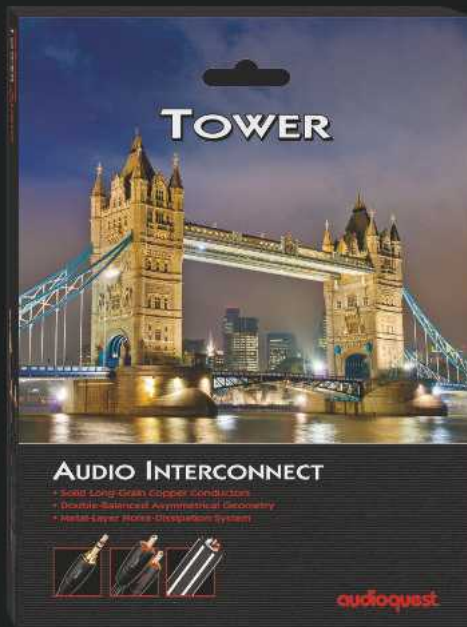
*Jon Lewis, via email*

Tim Jarman replies: The belts used for your model of B&O turntable are of good quality rubber and seldom give trouble. However, parts of the speed changing mechanism (the 3000 uses a combination of belt and idler drive) will almost certainly be seized up with old grease by now if it has not received recent attention. The symptoms are poor speed stability and noisy operation. Downforce is most accurately set using a test record. Your method is correct, but from experience a setting of about 2.5 is needed for best results and minimum record wear.

The humming noise from the receiver is a common fault; it is due to loose laminations inside the mains transformer. Since the assembly is sealed in resin there isn't much you can do about it, other than to place the set somewhere where the effect isn't so annoying!



**ABOVE:** Reader Chris's Beogram 3000 turntable complete with C E Watts Dustbug



## We've Got Your Back ...

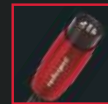
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# A&R Cambridge A60 amplifier

Stealing a march on the UK cottage hi-fi industry of the time with an amp promising reliability, the company soon had a classic on its hands. How does it shape up today?  
Review: **Tim Jarman** Lab: **Paul Miller**

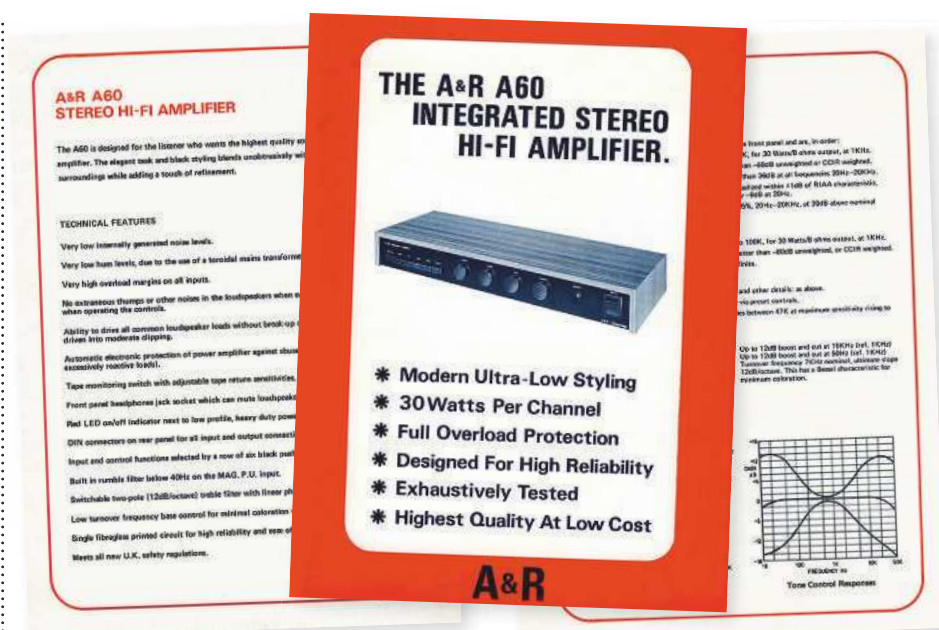
**T**he A&R A60 amplifier is one of those hi-fi components that most audiophiles – in the UK at least – either seem to have owned, used, had on their wishlist or, at the very least, known someone who did own one.

Positive press coverage and a long production life played a part in this. After all, the A60 first appeared in 1976 and remained in production for ten years – an eternity in what was a fast moving market at the time. During this eventful period, which saw CD replace the LP as the dominant source, numerous detail revisions were made to the circuitry yet the essential character and appearance of the amp remained unaltered.

## SOMETHING EXTRA

The A60 was the model on which A&R (Amplification & Recording (Cambridge) Ltd, latterly known as Arcam) was founded. At the peak of the '70s hi-fi boom, something extra was needed if a component was to stand out among the crowd, so A&R heavily promoted the A60 for its reliability.

While the Japanese by and large had the reliability problem licked by this stage, the same could not be said for many of the British cottage industry brands. By combining homespun looks with niche



**ABOVE:** Sales brochure for the A60 amp from the mid 1970s offers a comprehensive list of its technical features together with measurements for 'Magnetic Pick-Up', Tuner/Aux and Tape inputs

credibility and reliability not far off industry best practice, A&R had come up with a compelling package and, naturally, huge sales followed with a reported 32,000 A60s finding homes over ten years.

The original specification for the A60 was for 30W per channel (2x30W being, of course, 60W, hence 'A60') with four inputs: MM cartridge, tuner, tape and auxiliary. Tone controls were fitted along with a switched HF filter, set at around 7.5kHz, and a mono button.

A headphone socket completed the front panel and this switched out one set of loudspeaker sockets when in use. Meanwhile, a second pair of speaker sockets was wired directly to the amplifier's output. Although the fittings look generic, some were custom made, as was the case with the four rotary knobs.

**LEFT:** 1st November 1985 and former Foreign Secretary Francis Pym (right) joins John Dawson (centre) as he holds the 25,000th A60 amp to be built. They are joined by Peter Cowley, then owner of the second A60 amp ever to be made

As would be expected from a quality amplifier, the A60's output stage was directly coupled to the speaker load with no intervening capacitors or transformers. The design of the circuit here is unusual in that both output transistors in each channel are of the same polarity (NPN) with the inversion necessary for correct operation being done in the driver stage.

The transistors used were a classic design in themselves being part of the 3055 family, whose other versions are common fitments in early transistor amps such as the Quad 303 [see *HFN* Jul '11] and the Beolab 5000 [see *HFN* Dec '13].

## KEY MODIFICATIONS

It would be impossible to detail every change that was made to the A60 in the space available here but a few key modifications are worthy of detail. The phono stage evolved over the years from a simple two-transistor affair to a more sophisticated five-transistor circuit. Later still, an operational amplifier chip (op-amp) was used with the RIAA characteristic







dialled-in via the components in the feedback loop. Originally MC cartridges could not be catered for but subsequently an external preamp, the HA10, was made available for those who wished to use MCs.

This unit was powered from an extra connection in the phono input connector of suitably equipped versions (the A60 used 5-pin DIN plugs for all its inputs) so this unit was unobtrusive and required no further attention once installed.

Later the arrangement was changed again and the MC preamp became an internal module known as the MC60.

Most A60s also featured a provision for internal loading networks to aid the matching of certain cartridges. To keep up with developments, the A60's 'aux' key was latterly labelled 'CD' and fitted with a 'divide by 2' attenuator and a fixed super-sonic filter. By now, so many changes had been made that the model was given a new designation: the A60+.

The aux socket had a number of roles over the life of the A60. Its original purpose

was as a connection for tape recorders built to the DIN standard with sensitive inputs and no requirement for monitoring. The 'tape' input was built for line-level machines and offered basic loop facilities. The output level of the aux was raised to line level when the 'CD' labelling was introduced; DIN standard tape machines were no longer common by this stage.

A special version of the A60, the A60AP, was built for those who needed the option to split the pre and power stages of the amplifier. In this model, the aux socket provided the necessary input and output connections.

The aux function was retained by using the previously blank pins of the tuner socket, a special lead being made available to split the two inputs.

The A60AP was intended for use with the SA60X, an extra power amplifier and filter unit which together with the A60AP and a pair of suitable loudspeakers could create a basic active set-up. In line with the development of the normal A60, the

**ABOVE:** Original slimline A60 with its tape monitoring and mono switches, headphone socket that could mute the speakers, and red LED on/off indicator next to the power switch

A60AP became the A60AP+ when the aux input became labelled for CD, although the actual connection remained a part of the tuner socket.

## STIFF COMPETITION

By the mid 1980s the A60 was beginning to face stiff competition from a number of quarters. The ever present big Japanese brands had endless models offering greater power, more facilities and a better standard of finish for less money. For those who preferred British equipment, the Naim Nait was a cheaper (£180 against £200) and more fashionable alternative, despite having fewer facilities and less power.

Then came the Audiolab 8000A, launched in late 1983. For a little more money (£250) the 8000A offered 50W instead of 30W and a fresh, modern look. It was in some ways an intelligent updating of the same ideas on which the A60 was founded and effectively replaced the A&R in the hearts of many British listeners.

The A60's other drawback was the matching T21 tuner, which was expensive and not especially capable when compared to similarly priced imported equipment.

One thing that must be remembered is that the A60 straddled a time when the way a system was constructed changed at a fundamental level. During the LP era, it was common to pick a combination of deck, arm, cartridge, amplifier and speakers which gave the desired tonality. Any part could be 'tuned' to obtain the required result, the other sources (tuner, tape, etc) being considered secondary.

The introduction of CD brought with it a source with line level outputs whose tonal balance changed much less between different makes and models, reducing the potential to fine tune a system in this way. ☞

**LEFT:** The A60 amplifier was first reviewed in *hfn* Nov '77 and later, as part of a full system from A&R Cambridge, in *hfn* Oct '84

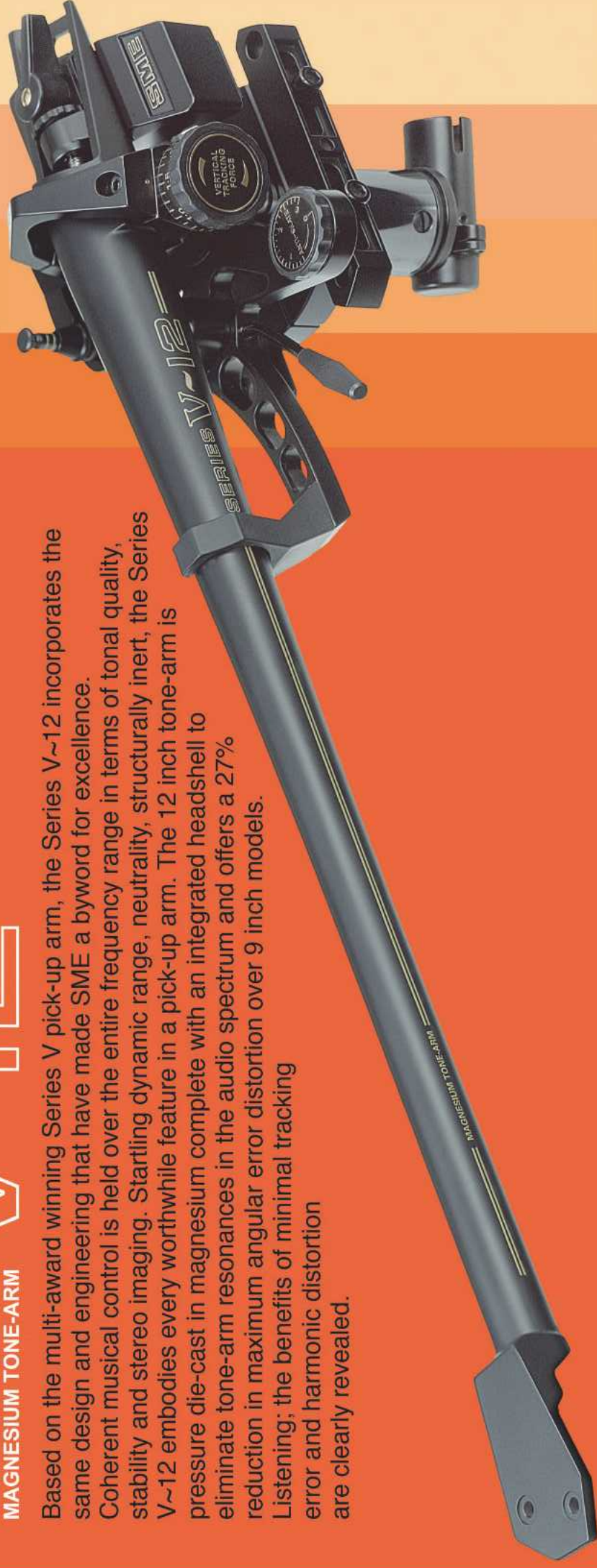
*'The amp plays its best suit strongly, which is clarity and transparency'*



# SERIES V~12

MAGNESIUM TONE-ARM

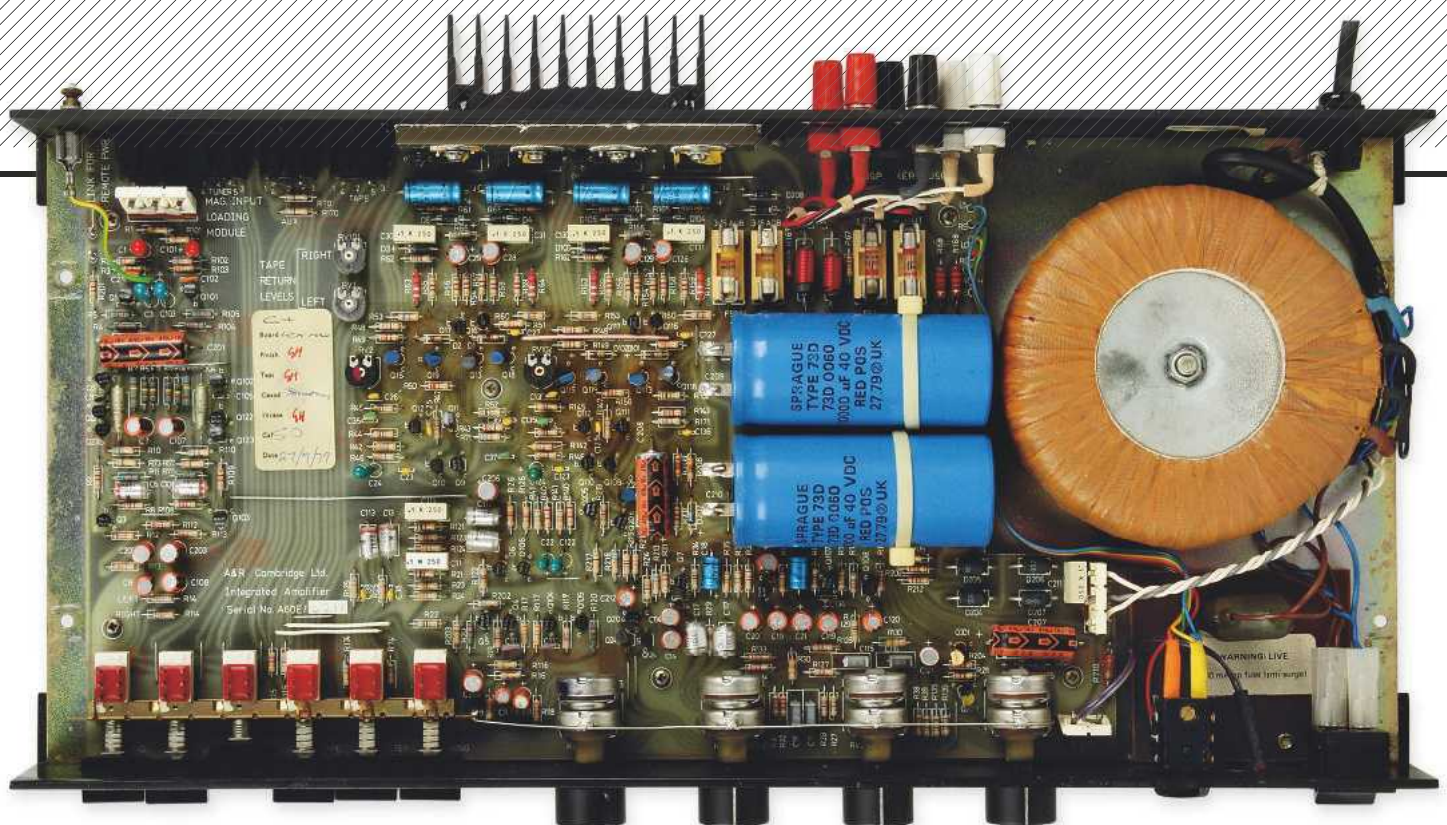
Based on the multi-award winning Series V pick-up arm, the Series V~12 incorporates the same design and engineering that have made SME a byword for excellence. Coherent musical control is held over the entire frequency range in terms of tonal quality, stability and stereo imaging. Startling dynamic range, neutrality, structurally inert, the Series V~12 embodies every worthwhile feature in a pick-up arm. The 12 inch tone-arm is pressure die-cast in magnesium complete with an integrated headshell to eliminate tone-arm resonances in the audio spectrum and offers a 27% reduction in maximum angular error distortion over 9 inch models. Listening; the benefits of minimal tracking error and harmonic distortion are clearly revealed.



# SME

*“The best pick-up arm in the world”*





Some contemporary reviewers found that a certain hardness was revealed in the A60's midband when it was hooked up to a CD player and that some aspects of the sound appeared compressed. Neither were said to be evident when the amplifier was used with a turntable.

## TIM LISTENS

The review sample used here is not of the very earliest type but it does represent a typical specification of those units made before the A60+ was announced. As such, it lacks the CD input attenuator and filter but since the inputs feed the volume control directly with no active circuitry in

between there is no chance of overload. Commonly available DIN-to-RCA adapters were used to connect the A60 to my Cyrus CD8 SE2 CD player, while the 4mm output binding posts accepted my usual Chord Odyssey loudspeaker cables easily.

An amp of this size would have typically been used with smaller loudspeakers so my reference Monitor Audio PL100s represented a realistic load. The A60 needs no skill to operate, the controls are clearly labelled and all worked smoothly.

The sound of the A60 is typically 'British' and similar in character to that of the Nytech CA252 [see *HFN* Jul '14]. It may lack the sheer speed and sparkle of the best amps from Japan or the luxurious indulgence of Europe's finest, but it plays its best suit strongly which, it will come as no surprise to discover, is clarity and transparency around the vocal registers.

This is a trait which gives the amplifier a sense of accuracy and precision, backed up by a neat and tidy bass whose consistency over a wide range of output levels hints at a well designed and generously specified power supply section.

Using the line-level inputs the treble comes over as soft, a feature that may have been designed-in to tame aggressive-sounding cartridges when using the phono input. In short, it is an ideal amplifier for a

**ABOVE:** The ticket shows our A60 was built and tested on the 27th of July 1979. The phono stage features a (white) plug-in loading module while the power amp uses one pair of (quasi-complementary) TIP3055 devices per channel

mid-priced LP based system of its era: no wonder it sold so well.

One of the albums used for the listening that showcased the A60 at its best was an early CD copy of Nana Mouskouri's *Passport* [Philips 830 764-2]. The opening number 'The White Rose Of Athens' saw beautifully

rendered vocals well placed over the soft warbling guitars, while the simple percussion sounded crisp.

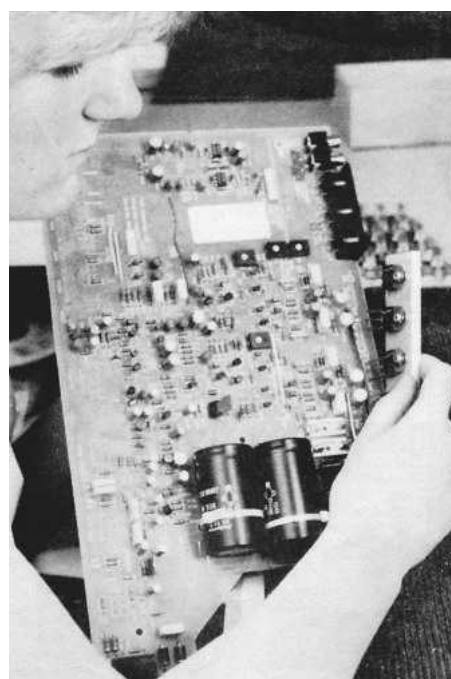
As the track progressed, the soundstage opened up nicely and Mouskouri's

voice was presented as if a separate entity: such was the definition of its rendering. This 1969 recording can sound overly bright when played through some systems, but the A60 kept this in check, suggesting it would be an ideal addition to a system that tended towards an aggressive, fatiguing sound.

## TYPICALLY BRITISH

Moving on to more modern material, the A60 demonstrated its typically British sound with Crowded House's album *Together Alone* [Capitol 7243 8 27048 2 9]. The bass was tight and dry with good control, but now the vocals were perhaps a little prominent. It is the sort of sound that slowly equalises in your mind, however, allowing you to enjoy the detail in the

*'It has a sense of accuracy and precision, backed up by a tidy bass'*



**LEFT:** From Arcam's archive and the production line at the original Cambridge factory – the heatsinks and transistors were not flow soldered on to the A60 circuit board but added later



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IsoTek EV03 Premier, Hi-Fi Choice, March 2013



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IsoTek EV03 Polaris, Hi-Fi Choice, March 2013



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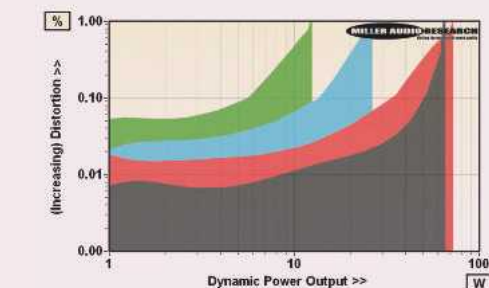
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## LAB REPORT

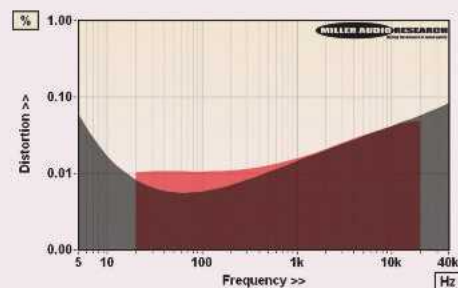
### A&R CAMBRIDGE A60 (Vintage)

In the decades that 'A&R Cambridge' has become known as Arcam its amplifiers have always been generously under-specified, so it's good to see that the tradition began with its very first model – the A60. Rated at 30W/8ohm our original sample actually achieved 2x45W/8ohm and 2x59W/4ohm with 65W and 73W available under dynamic conditions into 8 and 4ohms, reducing to 27W and 12W into lower 2 and 1ohm loads [see Graph 1, below]. Full gain, via the 'Tuner' inputs, was a solid +44dB, requiring 100mV for its rated 30W output, although the A-wtd S/N ratio was a little behind modern-day amplifiers at 77.5dB (re. 0dBW).

With no tone defeat facility, the response of the A60 is still impressively 'flat' with bass and treble set to 12 o'clock. Treble is good to -0.6dB/20kHz, rolling off to -3dB/40kHz and -16dB/100kHz. The bass circuit has some residual influence at LF, offering a gentle +0.6dB lift centred at 30Hz – sufficient to impart a warming glow! Stereo separation is a little weaker than we'd see today at 53dB through bass and midrange, falling to 32dB at 20kHz, but this would have been (and still is) perfectly acceptable for phono sources. Channel balance is rather better at 0.26dB (500mV in/0dBW out), especially bearing in mind the A60 used a good, old-fashioned analogue potentiometer. Distortion is fairly consistent at ~0.01% through bass and midrange up to 10W, increasing to 0.04% at 30W, but increases more obviously at HF to 0.06%/20kHz/1W [see Graph 2]. Readers may view a full QC Suite test report for the A&R Cambridge A60 integrated amplifier by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'Download' button. PM



ABOVE: Dynamic power output versus distortion (up to 1%) into 8ohm (black trace), 4ohm (red), 2ohm (blue) and 1ohm (green) speaker loads



ABOVE: Distortion versus frequency, 5Hz-40kHz at 1W/8ohm (black) and 20Hz-20kHz at 10W/8ohm (red)

### HI-FI NEWS SPECIFICATIONS

Power output (<1% THD, 8/4ohm)	45W / 59W
Dynamic power (<1-2% THD, 8/4/2/1ohm)	65W / 73W / 27W / 12W
Output impedance (20Hz-20kHz)	0.155-0.540ohm
Frequency resp. (20Hz-100kHz, 0dBW)	+0.5dB to -15.6dB
Input sensitivity (for 0dBW/30W)	18mV / 100mV
A-wtd S/N ratio (re. 0dBW/30W)	77.5dB / 92.3dB
Distortion (20Hz-20kHz, 10W/8ohm)	0.008-0.048%
Power consumption (idle/rated output)	10W / 128W
Dimensions (WHD)	450x60x255mm



ABOVE: Four DIN connections service Tuner (line) and MM phono inputs with Tape and Aux in/outputs alongside. Headphone-switched and direct speaker outputs are protected by in-line fuses. Note the finned heatsink for power amp stage

recordings without too much clutter at the extremes. I was aware that some aspects of the percussion, for example some of the cymbals and snare drums in the song 'Distant Sun', were not as vivid sounding as they would be heard live, but otherwise the A60 would not be found lacking by the standards of its market sector today.

Want to hear the A60's talent? Try listening to the sounds of the street landscape that opens the song 'Private Universe'. It was so finely detailed that I felt I could almost see the street before me, especially the Volkswagen that crosses your listening space from left to right as the section closes...

### BUYING SECONDHAND

The A60 has proven itself to be a reliable amp. However, faults can and do occur. Expect problems due to noisy controls, worn out connectors and cracked soldering should a sample be well used.

Heat is one enemy of the A60; the cabinet is slim and lacks any ventilation slots while the heatsink

to the rear is small for a unit that has this power rating. The effects of this can be seen in the interior view of our sample, note the discoloration of the PCB near the centre.

The output stage relies on two 1.6A fast-blow fuses for protection against shorts and overloads. These must be replaced with identically specified ones or an important part of the amp's protection regime becomes ineffective.

A&R is to be commended for publishing excellent circuit diagrams and full technical information for the A60 so faulty units need not be too difficult to revive. There are no key parts that cannot easily be replaced.

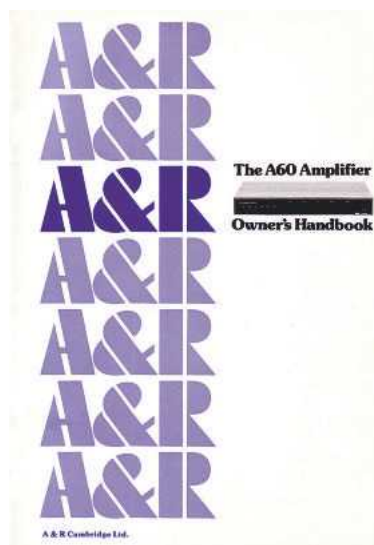
For those wanting a particular version or specification of the A60 it is important to be aware that A&R issued update kits of components and other parts (including fascia overlays) for older models. This means that some examples may not be what they initially appear.

The contents of the kits are detailed in A&R's documentation so it is in theory possible (with patience) to verify exactly what work has been done. Prices for the A60 are still sensible and they represent good value, both as vintage collectables and as everyday working units. ☺

### HI-FI NEWS VERDICT

It is not difficult to see why the A&R A60 sold in such huge numbers. It is a well considered package and one that is still useful and relevant today. Easy to find, not expensive to buy secondhand and a practical proposition to repair and maintain, it could form the basis for a wide variety of systems both vintage and modern. For the latter, the A60+ variant is possibly the better choice.

Sound Quality: 79%



ABOVE: Original owner's handbook from 1982, the year in which the A60's preamplifier circuit was revised



# The amplifier/loudspeaker interface

US designer **Tomlinson Holman** – the ‘TH’ in Lucasfilm’s THX – outlines his ideas on designing power amplifiers to cope with ‘real’ loudspeakers



*Hi-Fi  
News  
Dec 1980*

Each month **HFN** will bring you an article from our vast archive of features and reviews from yesteryear

Where technology is employed to reproduce art, engineering concerns itself with trade-offs of one kind or another between various aspects of technical performance, according to certain criteria which, in the case of audio, are derived from listening tests. However, as the human ear is not a calibrated test instrument, the results of subjective listening tests are excruciatingly difficult to translate into engineering language.

While some of the world's largest companies are slowly extending the science of psychometrics to correlate sensual perception with technical measurements, there is no rigorous body of knowledge in this area for the hi-fi designer to draw upon. The result is that most hi-fi equipment is designed with little

regard for subjective performance. Instead, the design process follows certain established criteria which may or may not have anything to do with perceived performance.

## NUMBERS GAME

In high fidelity, the numbers game prevails – higher and higher input overload, higher and higher slew rate, greater and greater power. Which of these is worthwhile? How much of a given property is necessary or sufficient is becoming the pertinent question. In power amplifier design basic specifications are usually limited to frequency response, power output capability into resistive loads, S/N ratio, total harmonic distortion and the like. While the information thus gained is certainly useful we will see that the sum of the information is usually woefully inadequate to understand what is going on in light of the complexity of program material and real loudspeaker loads.

The output transformer of valve amplifiers provided a way for the amplifier to be matched to its load impedance. That is, the 4ohm tap on the output transformer gives a greater current capability with less voltage swing than does the 8ohm tap. Thus, although amplifier designers heaved sighs of relief when the advent of transistors made it easy to dispense with the formidable (and expensive) task of designing a high-quality output transformer, nevertheless the transformer does have this useful matching property which, in the headlong rush to transistorise everything, somehow got lost.

## POWER SUPPLIES

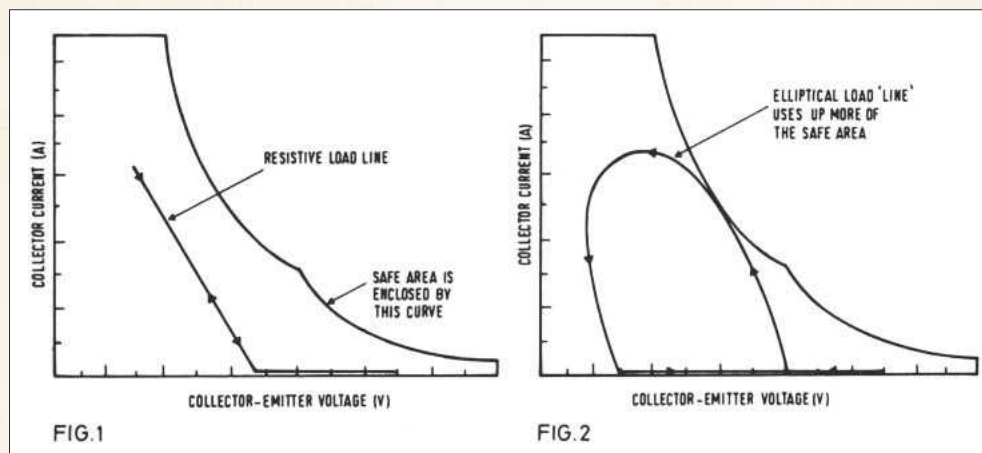
In today's solid-state amplifiers the designer has made a choice of (largely) power supply output impedance to determine load matching. Those amplifiers with



‘stiff’ supplies – which change little under loading – provide the best match into low impedances, while those with relatively ‘loose’ regulation can actually outperform the stiff supplies so long as the load stays within a certain range.

Let me illustrate. Say that we have an infinitely ‘stiff’, and infinitely expensive, supply where the rail voltage does not change at all with respect to the load current drawn. Then the power output capability versus load impedance would be 50W/16ohm, 100W/8ohm, 200W/4ohm, 400W/2ohm, etc. Enthusiasts with low-impedance speakers benefit from this design, but at a cost.

With a less regulated PSU, the supply voltage will ‘sag’, that is, go down under load. But the amplifier can be designed to deliver the same 100W/8ohm. An amplifier so designed with ‘saggy’ rails could have a power output versus load impedance of 70W/16ohm, 100W/8ohm, 150W/4ohm and perhaps 200W/2ohm. For the user of relatively high-impedance loudspeakers, clearly this second amp is the better one since not only does it produce more power into impedances above 8ohm, but it also costs a great deal less. Thus one design benefits the user of low-



impedance loudspeakers, and the other the user of somewhat higher impedance speakers.

### DYNAMIC HEADROOM

So far we have only been discussing the long-term average power delivered to the load. But the two amplifier designs illustrated also differ on their short-term power output capability. The stiffly supplied amplifier has a fixed power output by definition, since its supply voltages do not change under load. Thus it has no short term higher output capability and no consequent Dynamic Headroom.

The IHF defines Dynamic Headroom as the extra power (in dB) available beyond the rated power for 20 milliseconds every 1/2 second. The loosely regulated supply which 'sags' under load has more voltage swing capability in the short-term than the regulated supply, and thus the amplifier has a greater-than-zero Dynamic Headroom. In our example, the Dynamic Headroom would probably be about 2dB.

Now the concept of Dynamic Headroom would not be of use if the only program material to be played were sine waves (as assumed by the US FTC test procedure widely used to evaluate the power output capability of amplifiers). Fortunately for listeners, however, composers steadfastly refuse to compose with pure sine tones alone (what a dull world that would be). Any signal more complex than a sine wave has associated with it a dynamic range, and thus the property of Dynamic

Headroom is very useful in an amplifier designed for music.

When we came to examine the problem of designing a modern power amplifier, our thinking went along these lines: the output transformer of the valve amplifier provided a useful function; the power supply stiffness required for

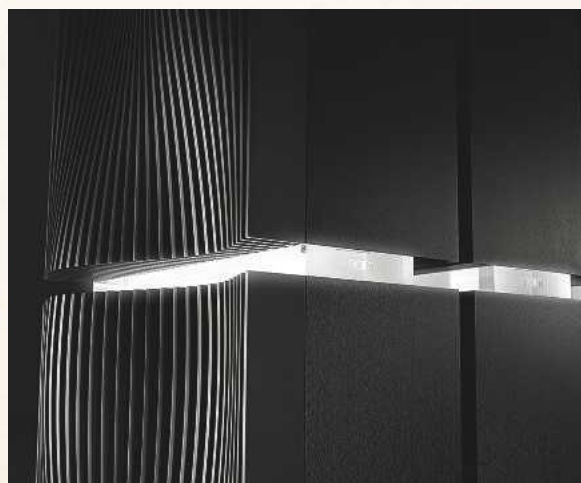
best utilisation of the power transformer depends on the load impedance; and loudspeaker impedances do in fact range from at least

2ohm to 16ohm nominal.

The solution for our 'test bed amplifier' was to make its power transformer switchable into two configurations. Several identical windings on the secondary of the power transformer could be switched into either series or parallel connection. Thus all of the copper in the transformer is utilized all of the time, yet the

**ABOVE: (Right)** Fig. 2 shows the elliptical load line of a 'real' speaker load impinging more closely on the power transistor's safe operating area than the straight, diagonal, line of a purely resistive load (left, Fig. 1)

**BELOW: Naim's very modern-day Statement amplifier has an extremely stiff power supply. Continuous power output virtually doubles between 8 and 4ohm loads but there's no dynamic headroom [see HFN Jun '15]**



series configuration gives higher voltage (at lower current capability) while the parallel connection gives higher current capacity (at lower voltage). The power transformer in effect makes the voltage/current trade-off formerly made by the output transformer. The resulting amplifier has more (nearly) constant power output capability versus load impedance than other solid-state amplifiers: 75W into 16ohm, 100W into either 8 or 4ohm, and 150W into 2ohm.

### THEORY VS. PRACTICE

By far the most important findings we made in the development of the test amplifier concerned the real-life difficulty of loudspeaker loads compared to their theoretical models, and how badly some kinds of designs behave when confronted with these non-theoretical loads.

Thoughts along these lines first came to mind a few years ago when choosing an amplifier for the difficult task of driving a loudspeaker for a piano recording session. We found that, although many different amplifiers were all right for this situation on paper, in fact only very few could reproduce piano music at realistic levels when one has the actual piano for comparison.

Remembering this subjective experience, we examined the traditional engineering notion of the power amplifier 'load-line', which is related to the loudspeaker impedance. A simple test-bench resistive load gives a straight load-line, one which is relatively easy to drive down to fairly low values of resistance because the line does not go outside the 'safe-area of operation' of the output devices [see Fig. 1, above].

On the other hand, it is known and predictable from low-level speaker impedance curves that at the frequencies where the loudspeaker is a reactive load (ie, at most frequencies for most loudspeakers) more safe area is used up since the load 'line' has become elliptical [see Fig. 2, above]. All this has been recognised in the past, though the information has been applied with only variable success.

Looked at another way, a reactive impedance means that the loudspeaker has the capacity to store energy. It may store energy →



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in the compliance of the drivers interacting with the box volume, or in the crossover. One need not be an engineer to understand 'stored energy' as both types of energy storage are present in the ignition system of a car.

## DRIVING REAL LOADS

The stored energy in the speaker has but one place to dissipate that energy since it is connected to but one thing – the amplifier. The work we carried out recognises the value of the text-book load-line theory, but extends it to include more actual cases. For example, Figs. 3A and B are perfectly predicted by theory but Fig. 3C [see above right] is not, although it is derived from the same loudspeaker as A and B but at a different frequency. Figs. 4A, B and C show the machinations of load-line changes with fixed frequency at increasing drive level [see right].

Fig. 5 [below] shows a triangular load-line with a peak current of 24A caused by saturation of a loudspeaker's input transformer. This property of loudspeakers must give one pause in evaluating the power required to be dissipated in the output stage of a conventional Class A/B amplifier. The ability to drive such loads thoroughly calls for a great deal of safe area for a given output power, much more than might have been thought necessary in the past. An amplifier having adequate 'elbow-room' for anomalous load impedances is indeed valuable when it comes to

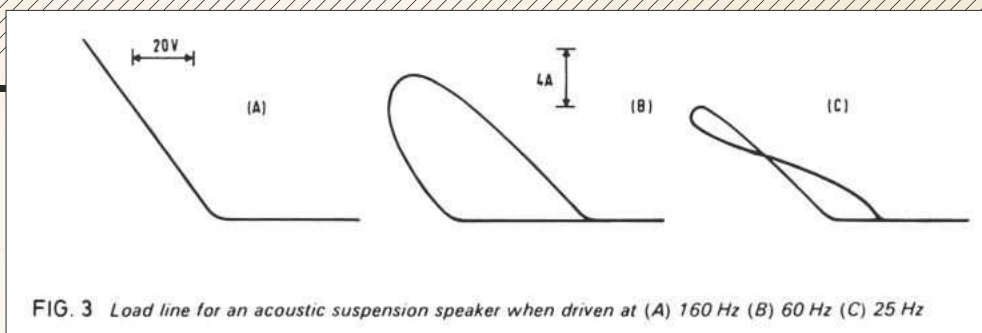


FIG. 3 Load line for an acoustic suspension speaker when driven at (A) 160 Hz (B) 60 Hz (C) 25 Hz

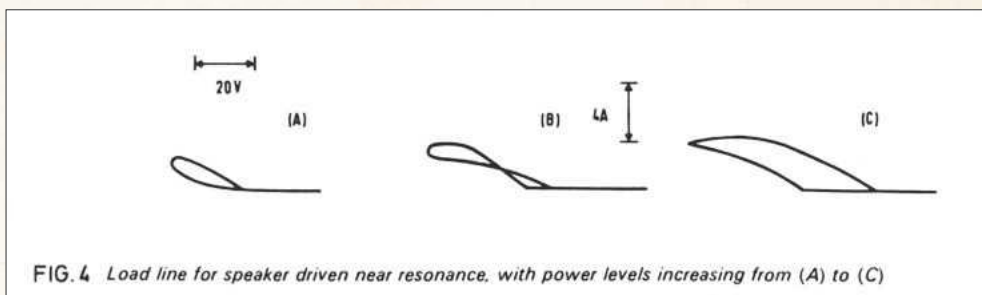


FIG. 4 Load line for speaker driven near resonance, with power levels increasing from (A) to (C)

**ABOVE: (Top)**  
Figs. 3A, B and C – load line for a loudspeaker when driven at (left-to-right) 160Hz, 60Hz and 25Hz. (Below) Figs. 4A, B and C – load line for a speaker driven near resonance, with increasing power levels

**BELOW: (Top)**  
Fig.5 – triangular-shaped load-line for speaker with autotransformer. (Below) Fig. 6 – waveform distorts as protection trips

actually driving a loudspeaker with program material, yet does not show up in conventional power output specifications.

The IHF has dubbed this capacity 'Reactive Load Drive' and although few companies in the US use it, Reactive Load Drive capability should be used as an important measure of actual loudspeaker driving capacity.

## PROTECTION CIRCUITS

Conventional wisdom (such as RCA application notes) have said in the past that we should employ safe-area limiters to prevent output stage voltage/current/time excursions outside the safe limits to prevent destruction of the output stage. The

usual circuitry to accomplish this trick consists of a safe-area limit detector transistor which switches on at the sight of impending doom and steals drive current away from the output stages.

This is where conventional wisdom goes wrong – let us say that current is flowing down from the positive power supply through the top-half output transistor and out into an inductive load. Further, let's say that the voltage/current/time conditions have been exceeded and the drive current is stolen by the safe-area detector transistor. Then no current can come from the top transistor as it has no drive, but the property of inductance says

that current must keep flowing no matter what. So the output voltage snaps to a point where current can keep flowing [see Fig. 6, below left], but a burst of oscillation may occur as the protection circuit and load inductance seek a balance.

The irony is that the very circuit designed to protect the amplifier from excursions outside the safe-area, itself causes excursions outside the safe area. (During the snap, one circuit in an amplifier from a well-respected source we measured produced 15A of current through the output transistor at the moment

there was 90V across it!)

To avoid these difficulties, I feel it is practical to include a relay circuit operating on the same voltage/current/time

conditions in the output stage which disconnects the load when necessary, thus obviating any trouble. (The relay can be made to operate in about 2 milliseconds, and this is adequate time for even the worst-case conditions.)

## CRIPPLING CAPACITORS

Conventional amplifier tests do not employ asymmetrical waveforms but music, and especially speech signals, can be strongly asymmetric. We have found that the conventional use of large capacitors within the amplifier to increase AC gain or to block offsets can have detrimental effects when asymmetrical (music-like) waveforms are reproduced. ➔

Load line for an obsolete speaker, with autotransformer input, driven at 25 Hz at high power

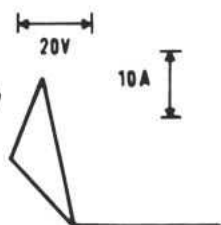


FIG. 5

Amplifier output voltage jumps from positive to negative rail, driving speaker, when protection circuit trips

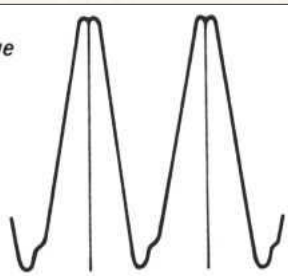


FIG. 6

'Safe-area protection comes on at the sight of impending doom'





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Such capacitors tend to take on a net charge due to the asymmetry which must then be discharged by any available path in order to recover equilibrium.

The problems caused by such capacitors also extend to reliability in loudspeakers. When such capacitors become charged due to asymmetry and subsequently discharge, they generally do so with a very low frequency time-constant. This means that the effect is not directly audible but that woofer cones are driven through long, unnecessary excursions.

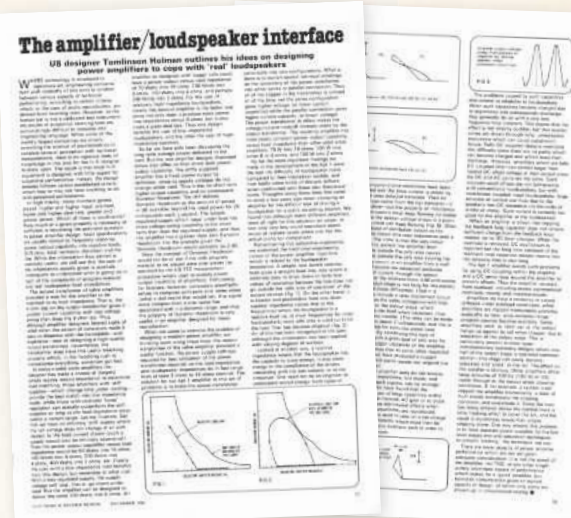
Fully DC-coupled designs overcome this difficulty since there are no paths which can become charged and which must then discharge. However, amplifiers which are fully DC-coupled often can exhibit a moderate DC offset voltage at their output since the DC and AC gains are the same. Such relatively small offsets are not bothersome with conventional loudspeakers (transformer-coupled input loudspeakers are another matter).

## OVERLOAD AND CLIPPING

When an amplifier is driven into clipping the feedback loop capacitor does not receive sufficient charge from the feedback loop resistor, so its DC level changes when the overload is removed. DC equilibrium is regained but the long time-constant of the feedback loop capacitor/resistor means that the recovery time is also long.

Amplifiers do have a tendency to sound different under overload conditions, and are often clipped momentarily as new, wide-dynamic-range program sources become available. Some amplifiers 'stick' or

*'If a cymbal crash clips an amplifier, it's accompanied by a blast of hum'*



'latchup', ie, the output hangs up against its rail when clipped, due to saturation of the output stage. This is particularly present in older quasi-complementary designs where one half of the output stage is operated in common emitter mode – this stage can easily become saturated and 'stuck' to the rail. The effect on the speaker is obvious.

Other amplifiers allow large amounts of 100Hz (120Hz in the US) ripple through to the output under clipping conditions. If, for example,

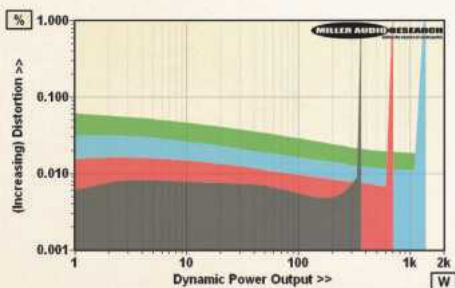
a cymbal crash clipped the amplifier momentarily, a blast of hum would also accompany the clipping condition. Since

the hum lies many octaves below the cymbal there is little masking effect to cover the sin, and the result is muddiness worse than simple clipping alone. One way around this problem is to have separate power supplies for the low level stages and anti-saturation techniques to prevent 'sticking'.

There are many aspects of power amplifier performance that are not yet given adequate consideration. It is not the 'speed' of the amplifier, its THD or any other single widely-advertised aspect of performance which makes for a 'good' amp, but balanced consideration given to myriad aspects of design, of which only some are shown up in conventional testing. ☺

**ABOVE:** Pages from the Dec 1980 issue of *Hi-Fi News* in which Tomlinson Holman sets out his parameters for designing the ideal power amplifier to cope with 'real world' speaker loads

**LEFT:** Today's amplifier reviews in *HFN* are accompanied by extensive lab tests, including a profile of the amp's dynamic behaviour (power output versus distortion) into 8, 4, 2 and 1ohm loads [GamuT M250i shown here, *HFN* May '15]



Also in *HFN* this month in 1980

## POWER MOSFETS

John Linsley Hood's outline of this new transistor.

## AUDIO ACCESSORIES

A survey of 'hi-fi bits and pieces' by D. Aldous and J. Atkinson.

## TAPE MATTERS

By Douglas Brown.

## FM RADIO

Angus McKenzie's monthly column on all things FM.

## AUDIO PATENTS

By Barry Fox.

## GRAMOPHILE

The record and music scene.

## MID-PRICED CARTRIDGES

Martin Colloms tests the Audio-Technica AT24, Dynavector 20BII, Ortofon MC20II, B&O MMC 20CL and Technics EPC-205 III.

## PIANISTS EARL WILD & ANGELA BROWNRIDGE INTERVIEWED

By Andrew Keener.

## RECORD REVIEWS

Including classical collections, reissues, cassettes and records of the month.

## LOOKING BACK

By Peter Gammond.

## THE THINGS I HEAR

By David Pickett.

## READERS' LETTERS

This month's correspondence.



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Moth phono stage  
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Consonance Cyber 10 Integrated  
used 599  
Consonance Ref 8.8 integrated valve amp  
used 149  
Consonance Cyber 211 monos c/w Pavane valves  
used 1499  
Creek OBH21, excellent  
used 779  
Creek 4330mk2, excellent  
used 449  
Cyrus acA7.5, excellent boxed remote  
used 499  
Cyrus Power, vgc+  
used 349  
Cyrus XPower, excellent boxed  
used 3499  
DartZeel NHB108B, excellent £20+k new  
dem 249  
Denon PMA1500AE, excellent  
used 199  
Graef GM50B Mk11 Integrated  
used 1499  
Graf GM100 valve power amp  
used 199  
Jolida Envoy 211 Monoblocks, £7k new, superb  
used 179  
Leema Hydra 2, vgc+ boxed  
used 999  
Leema Elements Amplifier, excellent  
dem 999  
Leema Tucana 2, excellent  
dem 849  
LFD L51 lineage, reasonable shape  
used 199  
Linn Majik Kontrol & 4100 Power, excellent  
used 199  
McIntosh C22 & MC275 Commemoratives, boxed  
used 249  
McIntosh MA5100, excellent!  
used 599  
Meridian 501V preamp, excellent  
used 179  
Meridian 501 Pre  
used 399  
Micromega IA100, great integrated, boxed  
used 649  
Moon W7RS, excellent  
used 2899  
Musical Fidelity M3i, excellent boxed, **REDUCED**  
used Call  
Musical Fidelity A1000 Two box monster Integrated!  
used 799  
Musical Fidelity A1 FPB Preamp and PSU, excellent  
used 249  
Musical Fidelity 550K Superchargers, sealed boxes!  
used 1499  
Musical Fidelity X-T100 Integrated  
dem Call  
Musical Fidelity Pre 8 and 2 x MA65 chrome fronted  
used 599  
Naim NAP100, vgc+  
used 399  
Naim NAPC82, excellent boxed  
used 499  
Naim NAP250, olive excellent boxed  
new 299  
Naim NAP250, very late olive excellent  
new 1199  
Naim NAP42.5/NAP110, vgc  
used 249  
Naim NAP250, excellent late boxed olive  
used 349  
Naim NAP150, excellent boxed  
dem 699  
Naim NAPC202 with NAPSC, boxed  
new 999  
Naim AV2/NAPV175, remote, excellent boxed  
used 399  
Naim NAP180, excellent boxed  
used 849  
Naim NAIT 5, excellent remote boxed  
used 799  
Naim NAP152/NAP155XS, excellent boxed  
used 799  
Naim NAP90/NAP92, vgc  
dem 2999  
Naim NAP250, chrome bumper  
new 1999  
Neutonia Salis Integrated, classy Restek built  
used 1499  
Onix OA32 Integrated, excellent  
used 999  
Onix OA25 Integrated, excellent  
used 799  
Pathos Logos Integrated  
Placette Audio Passive Linestage  
Prima Luna Prologue 3 Preamplifier vgc+  
Prima Luna Prologue 2 Integrated, good shape  
Prima Luna Prologue 3 Preamplifier, **REDUCED**  
Puresound L300 valve preamp  
Quad 99 Pre/Power, excellent, remote, Quadlink  
Quad 405, from  
Quad 33/303, vgc, serviced  
Resolution Audio Opus 21 S80 Integrated  
Renaissance RA02 Monos, vgc and excellent value  
Roksan Kandy K2 Power, nr mint boxed  
Sugden Masterclass Monoblocks, in titanium  
Sugden A21a line Integrated  
Sugden Masterclass Pre/Monos in Graphite  
Sugden Masterclass Pre/Monos in Titanium  
Sugden Masterclass Integrated in Titanium  
TagMcLaren 60iRV, excellent boxed  
Talk Electronics Hurricane/Tomado Pre/Power  
Tannoy TA1400, excellent boxed  
TEAC Distinction A1000 Integrated, ex demo  
Trio L07C good condition  
Union Research Prelude Integrated, excellent boxed  
Union Research Simply Italy Integrated  
Union Research S2K Integrated, excellent  
Yamaha AS500, excellent boxed  
Yamaha A-S3000, nr mint boxed

## Digital

used 1199  
Arcam Alpha 8, excellent  
dem 1999  
Arcam Alpha 8se, excellent boxed  
used 499  
Arcam CD17, excellent  
used 299  
Arcam CD73, vgc+, remote  
used 249  
Arcam CD37, remote excellent, reduced  
used 199  
Atoll 100SE DAC  
used 99  
Audio Alchemy digital transmission interface/psu  
used 499  
Audio Analogue Maestro SE CD  
dem 3999  
Audio Analogue Paganini (later model)  
dem 3999  
Audio Synthesis Transcend CDT (Modded SONY)  
Ayre Evolution DVD  
dem 379  
Bryston BDA1 DAC, excellent boxed  
dem 3999  
Cary Audio CD306 Pro, near mint boxed  
dem 3999  
Chapter Audio Sonnet CD & Nevo remote  
dem Call  
Chord 'One' CD player  
used 14299  
Chord Qute EX DAC, excellent boxed  
used 899  
Consonance CD120 Linear  
used 199  
Consonance CD2.2, new sealed  
used 299  
Consonance Droplet, vgc+  
dem 499  
Creek Destiny Integrated CD player, boxed  
dem 499  
Cyrus Discmaster/Dacmaster, vgc+  
used 1749  
Cyrus CDX12, mint boxed just back from Cyrus  
used 2499  
Cyrus CD8, boxed remote  
used 2099  
Cyrus CD7Q chip, vgc+  
used 2249  
Cyrus dAD3, remote, vgc+  
dem 1999  
Cyrus CD8se, boxed remote  
used 2499  
Denon DNP720AE, near mint boxed  
used 3749  
EAR Acute 3, mint boxed  
dem 799  
Exposure 2010CD, remote  
dem 2999  
Goldenote Kala, near mint boxed  
used 119  
Klein Design Katana cd player (no remote)  
used 119  
Kelvin Labs DAC, rare  
used 249  
Leema Elements CD player sealed box  
used 199  
Linn Majik CD, just factory serviced, excellent!  
used 599  
Linn Karik 3, excellent boxed remote  
used 199  
Marantz CD6003, excellent boxed  
used 7999  
Marantz CD17, remote, excellent  
used 749  
Marantz CD63K1, remote, boxed excellent  
dem 2999  
Marantz NA7004, nr mint boxed  
dem 1999  
Meridian 506/20 with MSR  
used 1999  
Meridian G08, remote boxed  
dem 899  
Meridian 563 DAC reasonable condition  
dem 1899  
Meridian 500 Transport, excellent boxed  
used 299  
Meridian 602/606 combo with remote  
used 1499  
Metrum Acoustics Octave NOS DAC  
used 6999  
Micromega MyDAC, excellent boxed  
used 749  
Musical Fidelity 3.5 CD  
used 299  
Musical Fidelity KW SACD, new laser, upgraded ps  
used 4499  
Musical Fidelity M1 DAC, excellent boxed  
used 329  
Musical Fidelity M1 CDTB  
dem 499  
Musical Fidelity M3 black boxed  
dem 499  
Musical Fidelity M1Clic  
new 699  
Musical Fidelity XDac, excellent  
used 199  
Myriad Z20DAC, excellent boxed  
used 199  
Naim CD5i, excellent boxed  
used 449  
Naim DAC, nr mint boxed  
dem 1499  
Naim CD5i, nr mint boxed  
used 699  
Naim CD53, excellent boxed, remote  
used 1899  
Naim CDi, excellent boxed  
used 599  
Naim CD3.5, vgc  
used 299  
Naim CDX2, excellent boxed  
used 1099  
Naim CDX2, excellent boxed  
used 349  
Opus BDP83se, excellent boxed  
used 1199  
Peachtree DACi, excellent  
used 349  
Prima Luna Prologue 8, ex demo boxed  
used 1199  
Quad 99CDP, excellent **REDUCED**  
used 1199  
Rega Planet 2000, excellent  
used 599  
Rega Apollo R, excellent  
used 449  
Rega Apollo 35th Anniversary, excellent  
used 349  
Rega Lo DAC, excellent  
used 699  
Rega Saturn, excellent boxed  
used 399  
Roksan Kandy K2CD, excellent boxed  
used 299  
Rotel RCD965BX, excellent boxed  
used 399  
Sugden Masterclass CD original version  
used 1999  
TAG McLaren DAC 20, excellent  
dem 599  
Tube Technology Fulcrum CD transport  
used 649  
Tube Technology Fulcrum DAC (inc DAC64 chip)  
dem 799  
Yamaha CD-S3000 near mint

## AV/Accessories/Cables

dem 599  
Audeze LCD2 excellent  
dem 899  
Audeze LCDXC excellent  
dem 899  
Beyer Dynamic T1, vgc boxed  
dem 999  
Bryston BHA-1 Headphone amplifier, superb  
used 3999  
Cyrus PSXR, excellent from  
dem 999  
Elemental Audio Equipment Rack  
dem 499  
Elemental Audio speaker stands  
dem 499  
Ergo AMT phones with Amp 2 (£2.5k new)  
dem 1499  
G-W T2.6F Valve headphone amplifier, excellent  
used 159  
Grado GS1000 and RA1 amplifier  
used 599  
Isotek Nova power conditioner  
dem 1199  
Lehmann Rhineland  
used 199  
Musical Fidelity M1 HPAB  
dem 399  
Musical Fidelity TripleX power supply  
new 199  
Naim XPS DR, ex demo  
dem 2599  
Naim XPS, excellent boxed  
dem 1499  
Naim HiCap, various  
used 399  
ProAudio Bono Reference Platform  
used 999  
Stax SR404/SR0060i, stand, cover etc boxed

## Loudspeakers

new 799  
Acoustic Energy AE1 Classic  
dem 799  
Acoustic Energy AE1 Mk11 in Gloss black  
used 3249  
Apogee Duetta Signature (Reality rebuit) Superb  
dem 599  
Art Audio Stiletto in Maple  
new 1999  
Aspara Acoustics HL6 in Oak  
dem 699  
Audio Physic Tempo in Cherry, fair  
used 749  
Audiovector Si3, near mintboxed  
dem 1199  
Audiovector Si3 Super, near mint boxed  
dem 699  
Aurum Cantus Music Goddess in Gloss black  
used 3499  
Avalon Ascendant Mk2, mint crated, £10k new  
used 1749  
B&W 805s in cherry, excellent  
used 349  
B&W CDM1se in cherry, excellent  
used 299  
B&W CDM1nt boxed, excellent  
used 299  
B&W DM601s3, vgc+  
used 249  
B&W DM602s3, vgc+  
used 349  
Castle Howard, excellent  
used 1999  
Castle Chester vgc later versions  
used 1999  
Davone Ray, vgc in walnut, great!  
used 499  
Eminent Technology LF78, some marks  
dem 549  
Epos M22 in Cherry  
used 349  
Ferguson Hill FH007&8 'desktop' audio set boxed  
dem 999  
Final 400 Electrostatics with ES400 Sub  
dem 2249  
Focal Electra 1008, mint boxed  
dem 2749  
Focal Electra 1028, mint boxed  
dem 3999  
Focal Electra 1038, mint boxed  
used 1999  
Gallo Nucleus Reference 2, rare, superb & boxed  
dem 499  
Heco Celan 500 in Silver  
dem 399  
Heco Celan 300 in Mahogany  
dem 1499  
Heco Statement in gloss black, £3k new  
used 249  
Kef Q100, brand new, sealed box  
new 999  
Kudos C10, boxed vgc and cheap  
new 2499  
Leema Xandia Mk1 in black  
dem 349  
Leema Xero in Mahogany  
used 2249  
Living Voice IBX R2 in stunning Zebrano, excellent  
dem 999  
Mark & Daniel Maximus with treble extenders E250sh  
dem 699  
Mark & Daniel Mini in Grey inc. Marble cabinets.  
used 699  
Martin Logan Mosaic, excellent boxed  
used 1299  
Martin Logan Quests, superb sound, reduced  
used 3499  
Martin Logan Prodigy, excellent  
dem 8999  
Martin Logan Summit X, ex demo  
used 199  
Mission 782se nr mint boxed  
used 399  
Mission Freedom 5, vgc in Rosewood  
used 179  
Mission 752, rosewood excellent  
used 399  
Monitor Audio RS8 excellent  
new 1999  
Monitor Audio GX300, ebony near mint boxed  
new 4999  
Monitor Audio GX 5.1 Home Cinema set **BARGAIN**  
new 699  
Monopulse Model S  
new 1499  
Monopulse Model A speakers  
new 399  
Monopulse Model C  
used 499  
Musical Fidelity MC8 Floorstanders, boxed vgc+  
used 1749  
Naim Nsat x4, NCent and NSub, boxed excellent  
dem Call  
Naim Ovator S400, excellent  
used 399  
Naim Credo, excellent  
used 699  
Naim SBL, vgc+  
used 999  
Naim SBL mk2, vgc+  
dem 3999  
Nola KO speakers in black  
used 5995  
Nola Micro Grand Reference inc stands, £15k new  
used 599  
PMC GB1, excellent, new boxes  
used 899  
PMC Twenty 21, excellent boxed, ex dealer demo  
used 1399  
PMC Twenty 22, excellent boxed, ex dealer demo  
used 1599  
PMC Twenty 23, excellent boxed, ex dealer demo  
used 2499  
Proac D38 in Yew, boxed fair  
used 1999  
Proac D28, good condition in cherry boxed  
used 1399  
Proac Studio 140 mk2, nr mint boxed  
dem 1199  
Proac Studio 110, excellent boxed  
used 499  
Proac Studio 115, excellent boxed  
used 749  
Quad 21L Floorstander  
used 249  
Quad 11L2, excellent boxed  
dem 799  
Red Rose Rosebud £2.5k new with (used) stands  
used 149  
REL Sterling, black ash vgc  
new 599  
Revel M22, excellent boxed  
used 699  
Revolver RW45 floorstander in Cherry  
dem 4995  
Revolver Cygnis Gold in Black, £14k new  
used 5999  
Sonus Faber Elipsa, superb boxed  
used 1199  
Sonus Faber Cremona Auditor, boxed  
used 999  
Spendor A6, in Walnut excellent boxed  
dem 399  
Sunfire True Sub Subwoofer  
used 999  
Tannoy Prestige Autograph Mini, ex boxed  
used 2499  
Thiel CS7.2, vgc, just refurbished...  
used 2999  
Totem Mini Signature, boxed near mint  
dem 449  
Totem Mite in black  
used 249  
Totem Rokk in mahogany, excellent  
new 999  
Totem Staff, near mint boxed  
dem 499  
Usher N6311, transit damaged to clear  
dem 2999  
Vandersteen Quattro, accessories, transformers etc  
used 1999  
Vedolyned DD18 sub in black  
dem 2999  
Veritas H3 (Lowther drivers) in gloss black, 100db  
used 4899  
Wilson Audio Duette, excellent  
dem 1999  
Wilson Benesch Actor floorstanders

## Special system deals

dem 599  
Consonance Ping CD/AMP  
used 699  
Linn Klassik Movie 05, excellent boxed  
used 1349  
Naim Uniti 24/192, excellent  
used 799  
Orelle EVO CD and Amp was £2700  
dem Call  
Yamaha CXA5000/MXA5000 as new boxed

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VPI HW19 Mk3	£600	Brylston SP3	£7,000	Sonus Faber Amati Homage	£7,990	Artisan Silver Cables Digital (Pure Silver 1m)	£180
Brylston 3-way speaker switch box	£495	McIntosh MCD550 CD/SACD player	£5,000	McIntosh C2500	£4,500	Welborne Labs DRD45 monos Rectifying psu	£1,995
Transparent Audio Reference XL 1.25m XLR	£1,200	Transparent Audio Music Link Plus	£135	Audiolab 8200 CDQ	£650	Avantgarde Acoustics Duo 2.2 & 225 subs	£5,750
Transparent Audio Reference XL SS 12R/ spades	£1,990	Cargas Audio Golden cross tone arm cable	£350	Wadia Digimaster X64.4	£990	Nordost Vishnu Power Cable	£250
Goldmund Telos 150	£1,690	Kondo KSL vc tone arm cable	£450	Focal JM Lab Diablos Utopia III & Stands	£4,990	VPI Classic 2/JMW 10.5i & SDS psu	£2,490
<b>CD Players and DACs</b>							
Accuphase DP500	£2,490	Avalon Time	£42,500	ATC S1A2-150	£2,200	Gryphon Sonata Allegro	£5,490
Arcam iDAC + Squeeze	£250	Avantgarde Acoustics Duo 2.2 & 225 subs	£5,750	Audio Note Kegan	£35,000	Jadis JPS2S	£9,990
Audio Aero Caplitte Signature	£3,300	B&W htm 2D	£1,800	Audio Research DS450 (New-sealed box)	£4,995	Klyne Audio Arts 7LX3.5 & phono	£2,790
Audio Aero La Source	£29,500	B&W Matrix 800	£5,990	B.A.T. VK-255 SE	£3,700	Krell Evolution 202	£5,990
Audio Aero La Fontaine	£17,500	Beauhorn B2.2 Revelation	£1,800	Bel Canto Ref 1000 M (Mk2) Mono blocks NEW	£4,300	Linn Klimax Kontrol	£4,250
Audiolab 8200CD	£600	Dali 300 MK2 in Rosewood	£1,650	Bel Canto Ref 1000 monos	£1,990	Luxman C900f	£8,990
Audiomeca/ Pierre Lurme Mephisto CD Transport	£790	Eclipse TD512, A502 + Stands	£2,000	BMC Audio CS2 Integrated/ Power Amplifier	£5,495	Mark Levinson No 326s Reference	
Bel Canto Dac3	£2,199	Eggleson Works SAVOY	£15,000	BMC Audio M2 Monoblocks	£10,990	Dual Mono Pre	£8,170
Bel Canto USB Link 24/96	£349	Elac FS 207.2	£450	Boulder 2060	£14,990	Mark Levinson No 380	£1,790
Bluenote Stillbert valve improved	£1,800	Focal JM Lab Diablos Utopia III & Stands	£4,990	Chord Electronics 1200c	£1,690	McIntosh C2200	£3,750
BMC Audio BDCC1.1 Belt Drive CD Player	£3,795	Focal JM Lab Electra 1028Be	£2,695	Conrad Johnson Prem 8A monoblocks	£4,950	McIntosh C2500	£4,500
BMC Audio PureDAC	£1,550	Focal JM Lab Grande Utopia III EM	£121,999	Crimson Electronics 640 E3 Monoblocks	£3,399	Musical Fidelity Kw Phono	£1,450
Cambridge Audio dacmagic plus	£165	Focal JM Lab Scala Utopia 3	£18,999	Edge NL Reference Monoblocks	£34,990	Sony TAE 900	£2,990
Copland CDA822	£650	Focal JM Lab Stella Utopia III EM	£47,990	Goldmund Telos 150	£1,690	Tom Evans The Vibe pre & Pulse power supply	£2,750
Esoteric P05 D05	£5,500	Focal JM Lab Alto Utopia Be	£4,750	Gryphon Antileon	£5,990	VTL TL 6.5 Signature Line Pre	£9,990
Krell EVO 505 (110v)	£3,395	Gamut SS	£9,490	Halcro DM 88 Monoblocks	£24,950	<b>Turntables/Arms/Cartridges &amp; Phonostages</b>	
Krell Evolution 525	£5,990	Genesis Technologies Genesis G200.	£15,000	Jeff Rowland Model 3 Monoblocks	£15,000	Aesthetix IO Eclipse	£15,590
Krell KPS25ac	£2,995	4 box system	£12,990	Karan Acoustics KA M2000	£22,990	Audio Research PH8 black	£3,890
Marantz UD 9004	£2,690	Genesis Technologies 5.3	£7,500	Krell 400e Evolution Monoblocks	£11,990	BMC Audio MCCL Phono MC	£2,590
Mark Levinson No 31.5 Reference CD Transport	£3,590	Hansen Audio Emperor	£32,500	Krell EVO 302	£5,500	Boulder MM/MC Phono stage & psu	£1,795
Mark Levinson No 512 CD/SACD	£12,255	Hansen Audio Prince V2	£18,000	Lamm Lamm M1.1	£6,990	Cello Cartridge	£4,000
Mark Levinson No 512 CD/SACD	£7,995	Hansen Audio The Knight	£9,900	Leema Acoustics Corvus	£999	Clear Audio da Vinci V2	£2,890
Mark Levinson No 31 & 30.5 Transp/Dac	£7,450	Heco celan 500	£550	Linn Klimax Solos	£8,995	Clear Audio Insider Gold	£500
McIntosh MCD1100	£7,490	Infinity Kappa 9	£1,990	Luxman M800A stereo power	£8,990	Dr. Feickert Analogue NG High-Precision	
McIntosh MCD550 CD/SACD player	£5,000	JBL 250 Ti	£2,890	Mark Levinson No 33H	£9,900	Cartridge Alignment Tool	£149
Meridian Audio 508	£600	KEF Moun	£85,000	Mark Levinson No 532	£17,362	ELP LT-1LRC	£3,500
Micro Seiki CDM2	£1,190	Krell resolution 3	£2,700	Mark Levinson No 532H Reference		EMT 950 Broadcast Turnta Fabulous	
MICROMEGA Microdac	£295	Living Voice Auditorium	£1,350	High current Dual Mono Power Amp	£7,500	BBC Wide body	£6,500
Mocon 300D	£850	Loewe Reference stand speaker	£1,400	Mark Levinson No 532H stereo power amp	£4,995	Gale GT2101 Turntable	£7,990
Musical Fidelity M6 CD	£899	Martin Logan Summit	£5,500	McIntosh MC275 (2 available)	£4,250	Jan Allaerts MC1B mk1	£1,495
Naim Audio CDI	£650	Martin Logan Logos Centre	£890	Musical Fidelity 308 K Mono-blocks	£650	Klyne Audio Arts 6PE mm/mc	£1,950
Naim Audio CDX2	£1,490	Meridian Audio DSP 5200	£7,500	Naim Audio Nap 180	£600	Kuzma Stabi (wood) & Ref psu	£1,990
Opera Consonance Droplet CDP 5.0	£1,295	Meridian Audio DSP 7200	£16,500	New Audio Frontiers NAF Performance 2A3	£4,000	LFD MCT SE Phono mc	£3,500
Perreaux DP32	£1,475	Merlin VSM MXR	£6,495	Plinius SA 250mkIV	£3,495	Manticore Mantra	£300
Plinius CD-101	£1,800	Quad ESL 2905	£3,750	Rotel RB-1510	£295	Nottingham Analogue Wave Mechanic	£250
Plinius CD Player101	£2,400	Revel Ultima Studio 2 NEW	£8,490	Sony TAN R1 monoblocks	£8,990	Origin Live Digital Stylus Force Gauge	£65
Plinius CD101	£1,890	Rogers LS3/5A & AB1 Subs	£1,290	Soulution Audio 711 upgraded from 710	£29,990	Pink Triangle Export/ Zeta	£1,495
Primare BD32	£3,500	Ruark Rapsody	£200	Tenor HP 300	£15,500	SME 312s	£2,050
Proceed CDP CD/HDCD player	£995	Sonus Faber Amati Homage	£7,990	Tom Evans Linear A	£4,750	SME Model 10A turntable	£4,490
Shanling UD300	£1,795	Sonus Faber Minuetto & Ironwood stands	£890	Tube Technology Genesis Monoblocks	£1,390	SME Model 30/2A	£8,790
Theta Data Basic	£390	Sonus Faber Amati Anniversario GR	£11,990	VTL MB 450-III Signature Monoblocks	£14,500	SME Series V Gold plated arm	£2,395
Theta Compli	£1,595	Sonus Faber Cremona	£2,000	Welborne Labs DRD45 monos Rectifying psu	£1,995	SME Model 20/12A	£11,567
Wadia S7i	£7,490	Sonus Faber Guarneri Homage Palladio		Welborne Labs DRD45	£1,490	SME Model 20/3A	£7,990
Wadia 381i	£3,490	Reference LE	£6,750	YBA Passion 1000 monoblocks	£6,890	SME Model 30/12A	£23,950
Wadia Digimaster X64.4	£3,990	Spendor A3	£600	<b>Pre Amplifiers</b>		SME Series V (gold print)	£2,490
Wadia S7i	£7,990	Spendor s100	£1,500	3D Labs Exquisite + Exclusive	£1,150	SME Series V-12	£3,668
Yamaha S2000 CD/SACD	£495	Titan 3Way	£1,295	Audible Illusions Modulus 3A	£2,250	Sonic frontiers SFP-1 Phono	£750
<b>Loudspeakers</b>		Transmission Audio M11	£1,750	Audio Research LS2	£950	Sumiko Pearwod Celebration II	£1,150
Acoustic Energy AELITE THREE	£350	wharfedale 1950's Corner Horns	£6,990	Audio Research LS25 (mki)	£1,800	Thorens TD 126 mkIV	£590
Adam Audio Compact Active Version	£1,295	Wilson Audio Watt Puppy 7	£7,490	B.A.T. VK-53 SE	£8,240	Tri-Planar MK Ull	£2,890
Alon Phalanx	£4,990	Wilson Audio WATT Puppy 7	£7,490	BMC Audio DAC1PreHR	£3,990	Voyd Reference+ Ref psu + Cyalene+	
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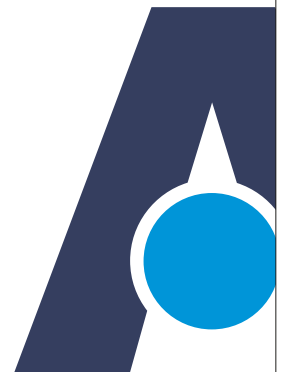
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## LAST WORD

# OFF THE LEASH!

KEN KESSLER TELLS IT LIKE IT IS...

**Ken Kessler** takes time to celebrate the lives of two audio luminaries who recently passed away



As time cruelly moves on, we lose more of the high-end's most important figures. Recently another two entered that listening room in the sky: journalist Robert Reina and mastering wiz Doug Sax. I knew Bob from encounters at hi-fi shows back in the day when there were enough of them to be monthly occurrences. One of the more refined individuals in an occasionally coarse profession, Bob was a renaissance man. My colleague Mikey Fremer recalls that dining with him was a primer in wine knowledge.

Robert Reina was rare among audio journalists in that he delighted in low-cost components, writing in US magazines about small two-way speakers and affordable integrated amps. He will be missed.

So, too, the great Doug Sax. I first met him 30 years ago, during my marathon trip to cover the high-end in the USA.

I recounted, briefly, the initial meeting in *Sound Bites* – the now out-of-print account of *Hi-Fi News'* first 50 years – pianist and audiophile recording pioneer James Boyk having arranged a visit to meet Doug at his independent Mastering Lab.

Doug, of course, had a resumé that included mastering hundreds of the greatest albums of all time, including jazz masterpieces by Thelonius Monk, Art Pepper and Bill Evans, Pink Floyd's *Dark Side Of The*

*Moon*, the Doors' first, the Rolling Stones' *Exiles On Main St*, albums from James Taylor, Bonnie Raitt, Jackson Browne, Joe Cocker and so many more, up to Bob Dylan's latest, *Shadows In The Night*, probably his last.

### GREATEST CONTRIBUTION

But you are audiophiles, so it is appropriate that we recall his greatest contribution to our little world. Doug founded Sheffield Lab with pianist Lincoln Mayorga to make direct-to-disc recordings, some of the finest-sounding LPs and CDs ever issued.

Andrew Teton, the label's manager from 1979-1993, recalled the making of a particular milestone in *Sound Bites*,

condensed here:

'While Sheffield Lab always strove to make their recordings of the highest quality musicianship, many hi-fi fans treasured their records just as much for their incredible

demonstration, showcase qualities. This was the case for the *Sheffield Drum Record*.

'In the late '60s, Doug Sax did a brief recording of a drummer, Dennis St Johns, who was setting up his kit in the studio behind Doug's facility in Hollywood. In essence, he was checking the practicality of direct-disc recordings since it was nearly impossible to move the recording lathes.

'If the Mastering Lab was to cut a direct-to-disc record, the musicians would

have to use the small studio, Producer's Workshop, located down the hallway from the Mastering Lab. An unassuming cable ran down the hallway from the output of the mixing board in Producers Workshop into the Mastering Lab lathe console.

'Doug recorded this brief drum performance both on tape and also by cutting a direct-to-disc master lacquer. After he pressed a few copies of this record, with one side from a tape-generated master and the other side pressed from a direct-disc master, he was impressed with the improvement direct cutting yielded. The result of this test pressing was that Doug and Lincoln pressed forward with their plans to record pop music direct-to-disc.'

'By chance, Doug gave me a copy of this extremely rare drum demo disc. As I became familiar with the nature of Sheffield's audiophile fans I became convinced a drum album recorded specifically to demonstrate the quality – and robustness – of audio equipment would be very popular.

'Doug expressed some scepticism about this, so I took my copy of the Dennis St Johns drum album to the 1980 CES in Chicago, and played it for the late Bert Whyte, recording engineer and columnist for *Audio* magazine. When Mr Whyte raved about the sound of this early direct-disc drum album, I showed the review to Doug and he said 'I'll call Bill Schnee to engineer it for us. I think we'll call Jim Keltner and Ron Tutt, too, and ask them to record drum solos for us.'

### YET TO BE SURPASSED

'Within a few weeks, we were recording on the soundstage of MGM Studios. During the sessions I sat in front of the drum kit with a stopwatch and at six minutes I signalled the drummer they had one minute to wrap up their improvisation.'

The rest, as they say, is history. At hi-fi shows throughout the world... *The Sheffield Drum Record* blew more amp fuses – and at car audio shows blew out more windows – than any other demo album.'

Only someone of Doug's stature could simply 'call Jim Keltner and Ron Tutt' to do a drum solo record. It has yet to be surpassed. Doug, beyond *The Sheffield Drum Record*, thanks for enriching all our lives. ☺

'The record blew more amp fuses than any other demo album'

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