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powerful and
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The Overture range of speakers is inspired by its predecessor Euphony. Specially designed to be a cost-effective speaker with classic design and all the attention to detail of Audio Solutions top-of-the-range models. Overture allows entry into the world of high-end audio with a more modest price.

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O201C OAK

OVERTURE
O202B OAK

OVERTURE
O203F OAK

OVERTURE
O204F OAK

OVERTURE
O205F OAK

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For more information on the Overture range and other Audio Solutions loudspeaker models and the location of your nearest dealer visit the Absolute Hi End website detailed below.




EDITOR'S LEAD IN

TAYLOR SWIFT vs. CHARLES DICKENS

Sometimes editorials take on a life of their own. I was recently at a lunch when the topic of sound came up and one of the diners mentioned that his son had given him a sound system for his birthday. 'I couldn't get it to work,' he said. 'And when he told me I had to use my phone to operate it, I had to tell him that since I had trouble using it to make phone calls, my chances of operating my new system with it were going to be very slim.' At which point another guest chimed in to say that his 70s-vintage system had given up the ghost and that when he visited a hi-fi store to investigate his options, they'd showed him only phone-operated systems. 'I wouldn't mind that,' he said, 'except that they didn't sound any good.' In his opinion, whereas cars and computers had improved since the 70s, hi-fi systems had obviously gone in the opposite direction, despite there being more music around than ever. I thought this would be a great topic for an *Editor's Lead-In*: I even had my opening sentence prepared: 'It was the best of times, it was the worst of times' ... nicked from Charles Dickens of course (the opening lines to his novel 'A Tale of Two Cities') but if such theft was condoned by none other than T. S. Eliot, who am I to argue? (I learned only recently that Eliot always insisted on using both his initials, rather than just the one, simply because he couldn't bear what his name became when spelled backwards without the middle initial.)

Not at all co-incidentally, I had just finished a totally fabulous book titled 'The Elements of Eloquence' (by Mark Forsyth) in which he points out that Dickens' expression is a textbook example of a grammatical technique called epistrophe. When it came to writing this editorial, I thought I'd Google the Dickens line and, to my surprise, instead of Dickens, up popped Taylor Swift because of her clumsy but apparently more Google-friendly paraphrase of it: '*He was the best of times, the worst of crimes*' (the opening line to her song *Getaway Car*).

Unfortunately for her, not only is Taylor's line not an epistrophe, which would have least have given it some literary cred; it's also nonsense. But for me, the continuing story became even better when it turned out that Swift also lifted the line '*x marks the spot where we fell apart*' she uses in *Getaway Car* from Hilary Duff's song *Breathe In. Breathe Out* from her album of the same name. (Obviously a great fan of Thomas Stearns, Taylor also borrowed Matt Nathanson's line '*I'll forget about you long enough/To forget why I need to*' from his song *I Saw* for her song *All Too Well*... except she replaced his 'need' with her 'needed'.)

Where was I going with all this? Oh yes! It's that we have more music instantly available to us—and better equipment to reproduce it—than at any time before in history, yet because of methods that are used to deliver it, the quality of that music is being severely compromised.  **greg borrowman**



Commanding PERFORMANCE NEW REFERENCE PREMIERE SPEAKERS



Hi-Fi News Editors Choice – Klipsch RP-600M

"One of the most characterful affordable speakers I've heard in a long time".



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Home Cinema Choice Recommended Klipsch RP-500SA

"The sonic results are worth the extra outlay".



Home Cinema Choice 5-star review and Best Buy Klipsch RP-6000F 5.1 speaker system

"Those decades of experience have culminated in a line of speakers that's wonderfully effective."

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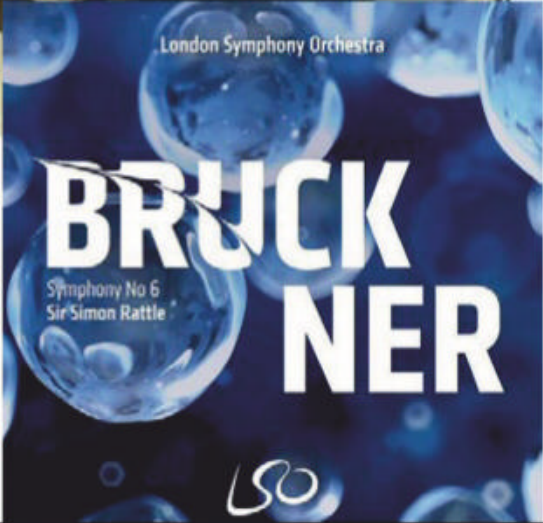
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OUR FRONT COVER

Vivid Audio's Kaya 90 speakers look every bit as good in the flesh as they do on our front cover. You can read our full review and laboratory test by turning to page 56.

HEDD NOW IN OZ

HEDD (Heinz Electrodynamic Designs) equipment has become available in Australia for the first time. It's distributed by Addicted to Audio (A2A), a Melbourne-based distributor that has retail stores in Sydney, Melbourne, Adelaide and Perth.

Headquartered in Berlin, Germany, HEDD is a family business founded 30 years ago by industry veteran **Klaus Heinz**. HEDD manufactures state-of-the-art professional studio monitors as well as home loudspeaker systems and, most recently, headphones. *'Our speaker designs are 100 per cent analogue, yet they incorporate some of the key*



advantages of digital signal optimisation using our HEDD Lineariser and also provide digital connectivity,' said Heinz. *'A modular system of input cards called the HEDD Bridge enables each of our Series One loudspeakers to handle digital audio protocols such as Dante (Audio-over-IP).'*

Heinz first came to fame 30 years ago, when he was responsible for designing what was hailed as being 'the first compact and marketable AMT tweeter.' It was based on Oskar Heil's original Air Motion Transformer invention. Greatly revised, that same tweeter is still used in HEDD's Series ONE studio monitor line (pictured at left), as well as in its domestic models, such as HEDD's imposingly tall (and appropriately-named) 'Tower Mains'.

More recently, Heinz has developed a full range (10Hz–40kHz) Air Motion Transformer driver for use in the company's first pair of headphones, called the HEDDphone. *'In order to reproduce the complete audible frequency band and beyond, our new HEDDphones incorporate a new diaphragm geometry we call VVT,'* said Heinz. *'Unlike the uniform fixed geometric structure of conventional AMT drivers, the folds of the VVT's diaphragm vary both in width and depth.'*

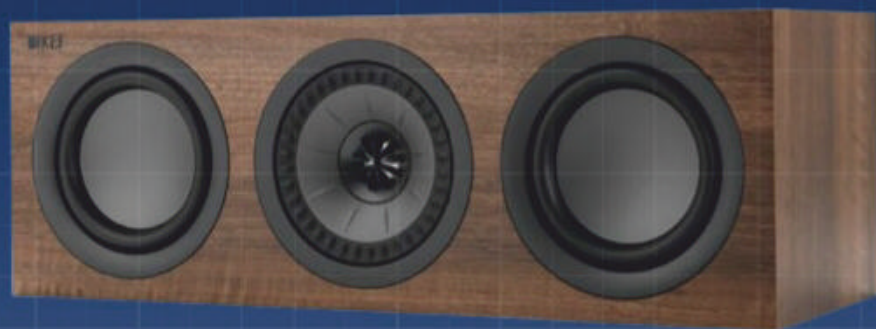
Jesse Ross, of Addicted to Audio, says that HEDD has applied for a patent for its new VVT technology, and has registered VVT as a trademark. *'The HEDDphone introduces a fourth transducer technology, bringing the enormous dynamic capabilities and the superior sonic resolution of the AMT principle to the world of top-end headphones,'* he said. *'HEDDphone excels where it really matters—in accurate, untamed, and touching music reproduction.'*

For more information, contact Addicted to Audio on 1300 888 602 or (03) 9810 2900, or at www.addictedtoaudio.com.au

RECORD DOCTOR VI

Brian Maddern, of Decibel Hi-Fi, the company which imports and distributes Record Doctor record cleaning machines says the new 20th anniversary model VI is this famous company's 'best yet'. The new RD VI is completely manual but includes the all-essential vacuum motor, protective felt cleaning strips, precision bearings and an 'easy-drain' storage tank for cleaning fluids. Maddern says the new RD VI has technical improvements that elevate its performance, including a new vacuum motor that is quieter than previous models, a stain-resistant aluminium top and an easy-turn knob that also keeps fluid away from the LP label. The new model also comes with a dust cover. *'The RDV was Australia's best selling vacuum-powered vinyl record-cleaning machine,'* said Maddern, *'and I am expecting that the 'best-selling' baton will pass to the new RDVI.'* Available now for \$485 (RRP), each machine comes with a bottle of RxLP cleaning fluid concentrate.

For more information, contact Decibel Hi-Fi on (07) 3344 5756 or visit www.decibelhifi.com.au



KEF Q250C LCR

KEF has released its Q250c LCR speaker; a smaller version of its Q650c. Available in three finishes, the KEF Q250c incorporates KEF's iconic Uni-Q driver, the tweeter in which now has a new loading tube to improve damping. The bass driver has also been improved, plus there's a new low-distortion inductor used in the crossover network. The external appearance has also been modernised through the use of seamless baffles with magnetic grilles. *'The improvements to the bass driver and crossover network mean cleaner, punchier bass, even at high volumes,'* said **Nigel Ng** of Advance Audio, which distributes KEF in Australia, *'and the compact, sealed enclosure is perfect for positioning within furniture, AV racks or close to walls. And as an LCR it can also be used vertically as left and right speakers as well as as a centre-channel or matched with other speakers in KEF's Q Series range.'*

The other speakers with which it can be matched include bookshelf speakers (Q150 and Q350), floor-standers (Q550, Q750, Q950), and the larger Q650c. *'KEF's eighth-generation Q Series has won many global accolades due to its ability to deliver a highly sophisticated and accomplished sonic performance,'* said Ng.

Available now, the KEF Q250c sells for \$795 (RRP).

For more information, contact Advance Audio Australia on (02) 9561 0799 or at www.advanceaudio.com.au



LEN
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THE HI-FI HEADLINES

NEWSLETTER No. 247



Every so often a product come along that challenges your expectations from your system. We recently installed the Trinnov Amethyst stereo pre-amplifier into our high-end room. Firstly the important bit – as you would expect this is a very good sounding pre-amplifier, certainly doing justice to the magnificent Halcro mono-block power amps we connected it to. And now for the magic. We have always considered our high-end room to be a pretty good sounding space. One of the things that the Trinnov does is calibrates and adjusts the output to suit the room. The difference is extraordinary! I can only

imagine what it can do to a poor-sounding room. Switch between the processed and non-processed signal and the non-processed (which up until now we thought was pretty special) just sounds wrong. One of the most extraordinary aspects of this device was what it allowed us to do with speaker placement. Anyone who knows our room knows that the speakers sit well forward of the rear walls, and a metre in from the side walls. This is where we get the best results, but as the good folk from Trinnov pointed out, this is not going to wash in most domestic environments. We then pushed the speakers into the corners of the

room, did a recalibration, and they system sounded like the speakers were back in our favoured position. We are all aware that the best position for speakers in any room is invariably impractical, and that the perfect room does not exist. This is the ideal way to get around these problems – and you still end up with a first-class pre-amp.

If you already have a pre-amp you wish to retain, Trinnov also make a processor-only version of the Amethyst – simply insert it into the signal path.

The Amethyst sells for \$15,995 and the ST2-HiFi processor sells for \$9,995.



We have also introduced a product that neatly blends the old with the new. The Prima Luna EVO 100 DAC is a valve Digital to Analogue Converter. Prima Luna have developed their SuperTubeClock, replacing the solid-state oscillator traditional used in DAC architecture with a mini triode valve. This lowers

the level of jitter and noise and results in improved levels of detail, better dynamics and a greater sense of 'musicality'.

Digital to Analogue Converters play a very important part in modern music reproduction and are now becoming common in as part of many amplifier designs. Yet they vary a lot in both performance and character. A good one, such as the EVO 100, can have a profound impact on the enjoyment of your music.

The EVO 100 is priced for \$4295

ON SPECIAL

Marantz hold a very special position with Home Theatre lovers who also wish to get the best out of their music. The SR5013 is their entry point to their full-sized AV receivers, and we currently have limited stock available. This is a fine sounding, well-built, fully spec'd AV receiver at a great price. **The Marantz SR5013 is on special for \$1499.**



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SONUS FABER MINIMA AMATOR II

Synergy Audio Visual has announced that the Sonus faber Minima Amator II released in Munich earlier this year is now available in Australia. 'The natural evolution of today's Sonus faber is embodied in this new creation,' said **Philip Sawyer**, of Synergy AV. 'This new Minima Amator II is the restatement of a fundamental product first introduced in 1992 when the company was establishing the key principles that would guide future production: accurate design and high-quality natural materials, combined to obtain a sound reproduction as natural as possible.'

The Sonus faber Minima Amator II is a two-way bass-reflex system that pairs a 28mm silk dome tweeter with a damped apex dome (DAD) via Sonus faber's 'Paracross Topology' crossover network with a 153mm bass/midrange driver developed in Vicenza. It has a cellulose pulp/natural fibre cone and a diecast aluminium chassis. The front baffle and rear panel are both covered in leather. The bass reflex port is located on the rear panel, close to the brass speaker binding posts. Although it was designed to be used on a bookshelf, Sonus faber says the Minima Amator II will also deliver maximal performance on either a Carrara stand (\$2,995) or the more affordable Unicum stand (\$549).

'The Minima Amator II is a creation clearly dedicated to music reproduction with a lifestyle aesthetic that effortlessly lends itself to any environment,' Sawyer told Australian Hi-Fi Magazine.

'The compact, solid walnut wood of the cabinet adds to the speaker's sound quality, resulting in a harmonious, smooth and consistent listening experience. The cabinet is embellished by a thin brass insert at the base, reminiscent of the elegant Electa Amator III design.' Available now, the Sonus faber Minima Amator II speakers sell for \$7,495 per pair (RRP).

For more information, contact Synergy Audio Visual on (03) 9459 7474 or visit www.synergyaudio.com



ARCAM SA30 HAS DIRAC LIVE

The Arcam SA30 integrated amplifier, which features Class-G amplification and Dirac Live room correction technology, is scheduled to be available in Australia later this month or early in January 2020.

The use of Class-G technology means that at low power output levels the Arcam SA30 is essentially operating in Class-A, and switches to Class-AB only when higher output powers are required, in which cases it will deliver up to a claimed 120-watts per channel into 8Ω loads, and up to 220-watts per channel into 4Ω loads. 'The result is an intoxicating blend of sonic power and low-level detail,' said **Nigel Ng**, of Advance Audio, which distributes Arcam in Australia.

Ng was also enthusiastic about Dirac Live, telling Australian Hi-Fi Magazine: 'Dirac Live really empowers audiophiles by enabling them to do their own professional level room correction, ensuring they'll always experience the very best sound in their room,' he said. 'This state-of-the-art room correction technology ensures that Arcam SA30 owners will experience the very best performance this amplifier has to offer, always individually optimised to its surroundings.' The Arcam SA30 has five analogue inputs including a switchable MM/MC phono input, four digital inputs, HDMI (ARC), AirPlay 2, and operates with uPnP streamer set-ups and Chromecast-enabled equipment. It also supports MQA (Master Quality Authenticated) as offered by the likes of Tidal Masters, and its Roon Endpoint status means that it is all set to receive audio from Roon's digital music player and library system.

For more information, contact Advance Audio Australia on (02) 9561 0799 or visit www.advanceaudio.com.au

BRYSTON BDA-3.14 STREAMING DAC

Bryston's new BDA-3.14 DAC includes a built-in music player, an on-board digital volume control and features Bryston's 'Manic Moose' interface. The Bryston BDA-3.14 is an enhancement of the multi-award-winning BDA-3 DAC that can decode up to 384kHz/32-bit PCM music and up to DSD×4 natively, so that each format is processed at its native resolution, without any fidelity-reducing conversions.

In common with the BDA-3, the new BDA-3.14 has ten discrete inputs including four two-channel HDMI connections, asynchronous USB, AES/EBU, TOSLINK, and digital coaxial, plus it includes Bryston's network module, which facilitates control via TCP/IP and RS-232. But the BDA-3.14 also offers a streaming capability via a built-in music player that delivers access to network-connected storage and USB drives as well as streaming services such as Qobuz, Tidal, Roon and Internet radio. The BDA-3.14's digital volume control enables users to drive an amplifier directly, eliminating the need for a preamplifier. There's no need for a remote control either, because the Bryston BDA-3.14 can be controlled via a phone, tablet or computer using Bryston's recently-updated 'Manic Moose' user interface.

'The Bryston BDA-3.14 delivers the performance and unmatched build quality that music aficionados and audiophiles have come to expect from Bryston,' said **George Poutakidis**, of BusiSoft AV, which distributes Bryston in Australia. 'It's a sleek, easy-to-use ultimate performance streamer/DAC that has all the features and facilities necessary to make it an essential inclusion in any modern home entertainment system.' Available now, the Bryston BDA-3.14 sells for \$6,499 (RRP).

For more information, contact BusiSoft AV on 1300 888 602 or (03) 9810 2900 plus you can visit www.busisoft.com.au





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Q ACOUSTICS Q B12 SUBWOOFER

Q Acoustics' new Q B12 subwoofer is the company's first to feature a 305mm diameter (12-inches, hence the model number) driver. The new subwoofer has been specifically designed to integrate with all the speakers in Q Acoustics' range, with distributor Indi Imports reporting particular compatibility with Q Acoustics' 3000i suite.

The Q B12, which retails for \$1,299 (RRP), is available in black or white. Its reinforced MDF cabinet is 400×400×446mm in size. It is a sealed 'infinite baffle' design with internal 'dart bracing' for additional cabinet rigidity and reduced cabinet resonances. The driver fitted to the baffle has a long-throw, high-stiffness paper cone and a 50mm diameter voice-coil. Q Acoustics claims a frequency response of 28–300Hz ±3dB.

Q Acoustics says that the 'dart bracing' used inside the cabinet provides high axial stiffness directly to the motor system. *'Effectively a mechanical ground to the drive unit, the dart bracing ensures the load is spread to all faces of the cabinet, reducing the 'ballooning' effect of the cabinet,'* says **Paul Riachi**, of Indi Imports, which distributes Q Acoustics. *'This is critical for subwoofers that inherently contain high internal acoustic pressures... and the pressures inside the Q B12 are very high, because the bass driver is powered by a Texas Instruments TPA3255 Class-D amplifier that delivers 220-watts of power and a peak current of 17 amps.'*

A custom die-cast aluminium heat sink on the rear panel supports and cools the power amplifier and power supply, while a recessed and hidden rear terminal panel not only hides all the pluggery, but also

enables the essential connecting and power cables to be routed neatly out through the base of the subwoofer. There's a choice of adjustable spiked feet for carpets or reinforced rubber caps for wooden floors.

Available now, the Q Acoustics QB 12 subwoofer sells for \$1,299 (RRP) in either the black or the white finish.

For more information, contact Indi Imports on (03) 9416 7037 or visit the website at www.indiimports.com



MCINTOSH MA352

McIntosh has released a new hybrid integrated amplifier with a valve preamp stage and a solid-state output stage. The preamp uses a pair of 12AX7As and a pair of 12AT7s. Its direct-coupled transistor output stage is rated at 200-watts per channel into 8Ω and 320-watts per channel into 4Ω. *'The new MA352 has more than enough power to properly drive virtually any loudspeakers,'* says **Philip Sawyer**, of Synergy AV, which distributes McIntosh, *'and being a hybrid design it combines the finest of vacuum tube and solid state design principles.'* The MA352 has two balanced and three unbalanced line level inputs plus a moving-magnet phono input. It includes McIntosh's 'Power Guard' and 'Sentry Monitor' circuits plus it has a 'High Drive' HCD headphone amplifier. To ensure McIntosh's 'classic' look, the new MA352 has McIntosh's famous blue 'watt meters', mirror-finish stainless steel chassis, illuminated logo, and black glass front panel with LED backlighting. Available now, the McIntosh MA352 retails for \$12,995 (RRP).

For more information, please contact Synergy AV on (03) 9459 7474 or visit www.synergyaudio.com

NEW VAF MODELS

South Australian loudspeaker manufacturer VAF has introduced two new loudspeakers. The VAF I-35 is an entry-level two-way floor-standing speaker that replaces the company's I-33. The VAF I-45 is a true three-way floor-stander. The VAF I-35 (pictured below, at the left) uses the same bass/midrange driver as VAF's stand-mount I-25



design, but because the driver is mounted in a cabinet with far greater volume than the I-25, it has a more extended bass response in the I-35, with VAF claiming its 3dB down-point in the I-35 is 35Hz.

The new three-way VAF I-45 (pictured below at the right) is exactly the same size as the I-35 but combines a proprietary magnesium-alloy framed bass driver which has a two magnets, copper shorting rings and an overhung voice-coil with a dual concentric midrange/tweeter driver. *'This is a highly*

linear and accurate driver with immense speed and detail capability,' said **Philip Vafiadis**, of VAF. *'The dynamic capability of this speaker combination is impressive, even more so because it all comes from a floor-standing speaker that's not even a metre high.'*

For more information, contact VAF on 1800 818 882 or (08) 8363 9996, or at www.vaf.com.au

DEGRITTER ULTRASONIC RECORD CLEANING MACHINE

Degritter's ultrasonic Record Cleaning Machine (RCM) is available in Australia for the first time. Unlike vacuum RCMs, the Degritter uses high-energy, high-frequency ultrasonic sound to remove dust and grit from LPs.

Although some other RCMs also use ultrasonic sound, Degritter says that its machine is the only one that has a 300-watt ultrasonic amplifier operating at a frequency of 120kHz. The amplifier drives four ultrasonic transducers, two on each side. *'In addition to using four transducers for improved surface coverage, the Estonian-designed Degritter has a unique frequency sweep circuit which provides better cavitation energy in the Degritter's water tank,'* said **Rom Beyerle** of Pure Music Group, which distributes the Degritter in Australia. Also unlike most RCMs, the small particles and dirt that are removed during the cleaning process do not stay in the water tank, but are actively removed by a fine mesh filter so they don't end up back on the LP being cleaned. Separate drying cycles ensure the efficacy of the cleaning process, with 20 different fan power settings able to be selected.

Beyerle told *Australian Hi-Fi Magazine* that the Degritter's attractive minimalist look was created in close collaboration between the team and an industrial designer. *'The design team also worked hard to reduce noise levels when the device is operating, with the result that the Degritter is almost totally silent when it's operating,'* he said. *'It uses essentially the same technology that's used to clean parts in the semiconductor industry, where surfaces need to be pure on a molecular level.'*

Available now, the Degritter sells for \$4,550 (RRP).

For more information, contact Pure Music Group on (04) 0950 4805 or at www.puremusicgroup.com



SOUNDBITES



LINN SERIES 3

The Scottish manufacturer has released its first wireless loudspeaker and claims that it's the best-sounding wireless speaker in the world. Linn's new Series 3 wireless speaker can play music streamed in most formats via Bluetooth, Wi-Fi and Airplay, plus it can also connect to your TV using its HDMI ARC connection, to your home network via Ethernet, and to another Linn speaker via Linn ExaktLink. It's compatible with both Google Assistant and Alexa.

The Linn Series 3 uses two Class-D amplifiers, each rated at 100-watts, to drive a 160mm bass/midrange driver and a 19mm silk dome tweeter. You can use ExaktLink to link a Series 3 to a Linn Series 3 Partner (302) speaker to create true stereo sound, plus, as with all Linn DSM systems, multiple Series 3 speakers can be connected around the home to play independently or synchronously. *'Blending timeless elegance with precision engineering, the beauty of Linn's new Series 3 isn't just skin deep,'* says **Nigel Ng**, of Advance Audio, which distributes Linn in Australia. *'Its flowing curves and natural materials have been carefully selected for their audio properties, ensuring that the Series 3 is a feast for the ears as well as the eyes and you'll be amazed at the way it brings your music to life in incredible detail, getting you closer to the original performance than ever before. When you hear it, you'll immediately realise why Linn says it's the best-sounding wireless speaker in the world.'*

Ng says the Linn Series 3 does not require specialist installation. *'It uses a simple plug and play setup,'* he said, *'so you just take it home, plug it in and you can start hearing your favourite tracks like you've never heard them before.'* Available now, the Linn Series 3 wireless speaker retails for \$5,995. Its partner speaker (302) retails for \$4,995.

For more information contact Advance Audio Australia on (02) 9561 0799 or visit www.advanceaudio.com.au



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LITHE AUDIO AT AUDIO ACTIVE

Melbourne audio distributor Audio Active is now distributing the Lithe Audio range of Wi-Fi and Bluetooth ceiling speakers in Australia. *'Lithe Audio's custom install products provide an all-in-one simple plug-and-play solution that's perfect for bedrooms, bathrooms, and anywhere around the home,'* said **Bruce Thierbach**, general manager of Sales and Marketing at Audio Active. *'No more speakers lying around on kitchen benches or on the floor. This discrete audio performance product adds real value to both domestic and commercial applications.'*

Each of Lithe Audio's active Wi-Fi ceiling speakers has an amplifier rated with an output of 60-watts built in and it's possible to stream audio to a single speaker, or to up to 30 speakers simultaneously for multi-room audio. Lithe Audio also has passive models available which can be partnered with active models to double the number of speakers operating at the same time. Lithe Audio's active Bluetooth 5 ceiling speakers have amplifiers rated with an output of 50-watts per channel and are intended to be used in single to three-zone applications. Both Wi-Fi and Bluetooth models are controlled via a dedicated App that also allows streaming from most popular music content providers, including Spotify Connect, Deezer, Tidal and Tune-In. The Wi-Fi models can also be integrated into Control 4 systems.

'Lithe Audio was established in 2008 by two real tech geeks, Wesley Siu and Amit Ravat,' said Thierbach. *'The simplicity and beauty of these integrated speakers are resonating with people around the world. These ceiling speakers combine amplifiers, receivers and audio in a single, compact and easy-to-install unit without the need for speaker cables in the walls.'*

The company catchphrase says it all: Power It. Sync It. Play It.' Prices start at \$549 for the Lithe Audio Bluetooth models, and \$699 for the Lithe Audio Wi-Fi models.

For more information, contact Audio Active on (03) 9699 8900 or visit www.audioactive.com.au



MIYAJIMA TAKUMI L

Japanese artisanal cartridge manufacturer **Noriyuki Miyajima** has released an 'enhanced' L version of the company's entry-level stereo moving-coil cartridge, the Takumi. The Takumi L has a nude line-contact stylus rather than the bonded elliptical stylus that's used on the standard Takumi. The lower tip mass of the nude line-contact stylus enables a more extended high-frequency response, with Miyajima claiming a frequency response of 20Hz–32kHz. As with all Miyajima stereo cartridges, the Takumi L uses the company's unique, patented 'cross ring' design with a non-magnetic core where, rather than using a tie-wire to hold the cantilever and coil assembly against the magnet pole piece, a pointed slide bar is used to correctly locate the coil assembly. This means that the coil assembly can pivot unimpeded by a tensioning wire. *'The end result of this unique mechanical cartridge configuration is dramatically lower distortion leading to a 'just right' sonic balance of silky smoothness and precise bite, and of delicious detail and delicacy,'* said **Boris Granovsky**, of Absolute HiEnd, which distributes Miyajima cartridges in Australia. *'There is an incredible sense of air and space in and around vocals, and of instrumental separation, all of which combine to deliver a gratifyingly fluent and eloquent musical presentation.'* The Miyajima Takumi L Phono Cartridge sells for \$4,195 (RRP).

For more information contact Absolute Hi End on (04) 8877 7999 or at www.absolutehiend.com



AUDIO TECHNICA ATH-CK3TW

Audio Technica has released a pair of low-cost wireless in-ear phones—ATH-CK3TW—with Bluetooth 5.0, Clear Voice Capture and automatic power switching. They turn on whenever you remove them from their portable charging case and turn off when you put them back in the case for charging.

Audio Technica's ATH-CK3TW earphones have 5.8mm drivers in a compact housing that includes a built-in microphone and touch controls that are easy to find with a fingertip so you can manage your music and phone calls. Call quality is said to be improved by the inclusion of Qualcomm's cVc (Clear Voice Capture) circuitry. The ATH-CK3TWs have an IPX2 water-resistance rating and are compatible with aptX and have Qualcomm's 'TrueWireless' Stereo Plus low-latency functionality. Audio Technica claims six hours of continuous use on a full charge, with 24 hours of additional power available from the USB-C fitted charging case. The Audio Technica ATH-CK3TW is available now in three different colour finishes—black, blue and white—from Australian distributor Technical Audio Group (TAG).

For more information, contact Technical Audio Group on (02) 9519 0900 or at www.tag.com.au.





AUDIOSOLUTIONS VIRTUOSO M

Two firsts for Italian loudspeaker manufacturer AudioSolutions. It has appointed its first Australian distributor, Absolute HiEnd, and it has released the first model in the Virtuoso range, a true three-way design called the Virtuoso M in Australia. *'The Virtuoso M uses many of the technologies developed for and used in the Vantage, but design-wise takes its looks from the company's Figaro,'* says **Boris Granovsky**, of Absolute HiEnd. The Virtuoso M uses two 190mm bass drivers, a 165mm mid-range driver and a 12.5mm dome tweeter. The efficiency of the small-diameter tweeter is enhanced through the use of what AudioSolutions calls a 'mini-horn', which it first introduced with its Overture series. *'The mini-horn was introduced to fight an unwanted soft dome resonance problem, but also had the happy result of not only removing the resonance but of also lowering THD, increasing sensitivity and providing additional damping,'* said AudioSolutions' founder, owner and chief designer, **Gediminas Gaidelis**. The Virtuoso's 165mm midrange driver is operated over an extremely wide range, being rolled on at 500Hz and rolled off at 7kHz. *'The human ear is most sensitive in the 800–2000Hz region, which means that if you use two drivers to cover this bandwidth—as most other loudspeaker manufacturers do—the ears can detect the two different point sources and flag the sound as being 'not real',* said Gaidelis. *'In addition to this, even the ideal crossover will introduce both phase and harmonic distortions, which the ears can also detect. We use band-enhanced midrange drivers to make the crossover points as distant from the midband as possible.'* The unusually low and high crossover points have also enabled AudioSolutions to include in the Virtuoso for the first time an adjustable crossover network that offers three different sonic profiles: Balanced, Softened and Enhanced. *'The Balanced profile offers everything you would expect from this class of speaker,'* said Granovsky, of Absolute HiEnd, *'whereas the Softened profile is generally preferable when listening to metal or rock at high volume for prolonged periods. The Enhanced profile is essentially only for those listeners who demand to hear the tiniest details in their music, even if it might not benefit the musical intent. It's also perfect to anyone evaluating other components, such as a new cable, CD player or DAC.'* SoundSolutions' Virtuoso cabinet is made using the same 'double box' construction technique employed in the Figaro, where a fully-sealed cabinet with heavy internal bracing is enclosed inside another, outer cabinet. According to Gaidelis, this prevents the cabinet walls from flexing, providing ten times the panel stiffness with only two times the mass.

The SoundSolutions Virtuoso M retails for \$45,900 per pair (RRP).

For more information, contact Absolute HiEnd on (04) 8877 7999 or at www.absolutehiend.com

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MELCO S100

Melco has released a data switch which it says will improve the sound quality of any network audio device that uses both an Ethernet connection and a data switch.

Melco leveraged the design expertise of its parent company, Buffalo Technology, to create the S100, which it says features architecture unlike that of any other data switch, including an audio-specific low-noise main board with a 1.5MB packet buffer and an audio-grade capacitor bank. *'The Melco S100's low-noise design, coupled with highly precise data-handling, gives the S100 uncompromising sound quality when used with Ethernet audio devices,'* said **Mark Gusew**, of BMC Wholesale, which distributes Melco in Australia. *'It's a complete audiophile data switch solution designed to not only complement Melco's digital music libraries, but to also offer a clear and easy upgrade path for any systems using Ethernet for audio, especially those using Roon devices and streaming services such as TIDAL and Qobuz.'*

The S100's internal packet-traffic settings have been optimised for use with IT NAS drives, IT routers (for streaming services), Roon Core processor devices and Roon Bridges, as well as with Melco's own N1, N10, and N100 digital music libraries.

Alan Ainslie, Melco Audio's General Manager, told Australian Hi-Fi Magazine: *'Digital music relies on perfectly timed data in a low-noise environment. Therefore, the limitation for sound quality on an*

Ethernet network is the network itself, plus the components used. Standard IT parts are simply inadequate for high-quality digital music. While the S100 is clearly a benefit for Melco owners who use the Player Ethernet port, the difference an S100 can bring to non-Melco systems is quite surprising, especially for the heavy traffic created in a Roon environment, as well as for streaming services such as TIDAL and Qobuz, where the data has been seriously compromised on its journey from distant servers into the user's home. The S100 restores the magic of the source stream as no IT device can possibly do.'

The Melco S100 has 4×100MbE ports with RJ45; 4×1GbE ports with RJ45; and 2×SFP optical fibre ports and features the same vibration-isolating aluminium-chassis construction and form factor used in Melco's N10 series.

Available only from BMC, the Melco S100 sells for \$3,495 (RRP).

For more information, contact BMC Wholesale on (03) 8683 9910 or at www.bmcw.com.au



IFI ZEN DAC

iFi has released a full-featured high-performance desktop USB DAC that retails for less than \$200.

The iFi Zen USB DAC's digital section is based around a Burr-Brown (Texas Instruments) DSD1793 DAC that supports PCM and DXD data up to 24-bit/384kHz, as well as DSD from 2.8MHz to 12.4MHz (DSD256). *'Thanks to what iFi calls the 'True Native' design of the DSD1793 decoding process, PCM and DSD take separate pathways, which enables DSD signals to remain bit-perfect in their native form, right through to analogue conversion,'* said **George Poutakidis**, of BusiSoft, which distributes iFi in Australia. *'Many DACs that claim DSD compatibility accept DSD data but then convert it to PCM; for DSD purists, the Zen DAC is a fantastic affordable solution.'* The asynchronous USB Type B input supports the 'SuperSpeed' USB 3.0 standard and is also compatible with USB 2.0. Unusually, iFi enables users to download and install different versions of iFi firmware for the Zen, should they wish to experiment with, for example, different digital filters.

The iFi Zen DAC's analogue stage is a balanced design, though you ultimately have the choice of using balanced or unbalanced outputs. The headphone amp stage has switchable gain, (iFi calls it 'Power-Match') so you can match the output level to the sensitivity of the headphones you connect to it. The iFi Zen also has iFi's 'TrueBass' bass boosts circuitry.

'An evolution of iFi's established XBass circuit, TrueBass is a sophisticated form of bass boost that subtly enhances low frequencies without muddying the midrange, which I find particularly useful with earphones and open-back headphones that may lack deep bass,' said Poutakidis. *'It operates entirely in the analogue domain rather than messing with the digital signal via DSP and may be switched in or out via a button on the front panel.'*

The iFi Zen DAC uses Pentaconn 4.4mm balanced terminals, rather than traditional XLR sockets, one of which is on the front panel alongside a standard unbalanced 6.35mm headphone socket. There's

another Pentaconn output on the rear panel, alongside a pair of unbalanced RCA outputs. These rear line-level outputs, both balanced and single-ended, can be switched between 'variable' and 'fixed', so that if used in the vari-



able mode, the Zen DAC can act as a preamp feeding a power amp or active speakers. *'Compared to simply plugging headphones directly into a computer or smart device, the iFi Zen transforms the listening experience,'* said Poutakidis. *'The sound is clearer, more detailed, more expansive and engaging, and makes the most of whichever headphones are connected.'*

Available now, the iFi Zen USB DAC sells for \$199 (RRP).

For more information, contact BusiSoft on 1300 888 602 or (03) 9810 2900 or via the website at www.busisoft.com.au

RICHTER



RICHTER WIZARD 6

Richter Audio has released the Series 6 version of its famous 'Wizard' design. Richter claims to have sold more Wizards than any other Australian-designed loudspeaker. *'For many years the Australian brand Richter has and continues to deliver award-winning Australian-designed audio products and following on from the recent award-winning Thor Series 6 Subwoofer, which was awarded Subwoofer of the Year by Sound & Image Magazine comes the long-awaited Wizard S6,'* said **Brian Rodgers** of Richter Acoustics. *'The Wizard Series 6 project focused on delivering a new loudspeaker that meets today's customer's expectations and equipment choices. This meant listening to and responding to the market by designing a loudspeaker that raises the bar from a visual and entertainment perspective.'*

The new Wizard S6 uses new 165mm-diameter stiff coated paper midrange and bass drivers developed by Richter specifically for the S6. *'These new drivers effectively minimise breakup and roll off resonance,'* said Richter designer **Dr Martin Gosnell**, *'plus we've paired them with a new low-distortion soft dome tweeter whose resonance is well below 900Hz to achieve the desired phase and frequency responses out beyond 30kHz.'*

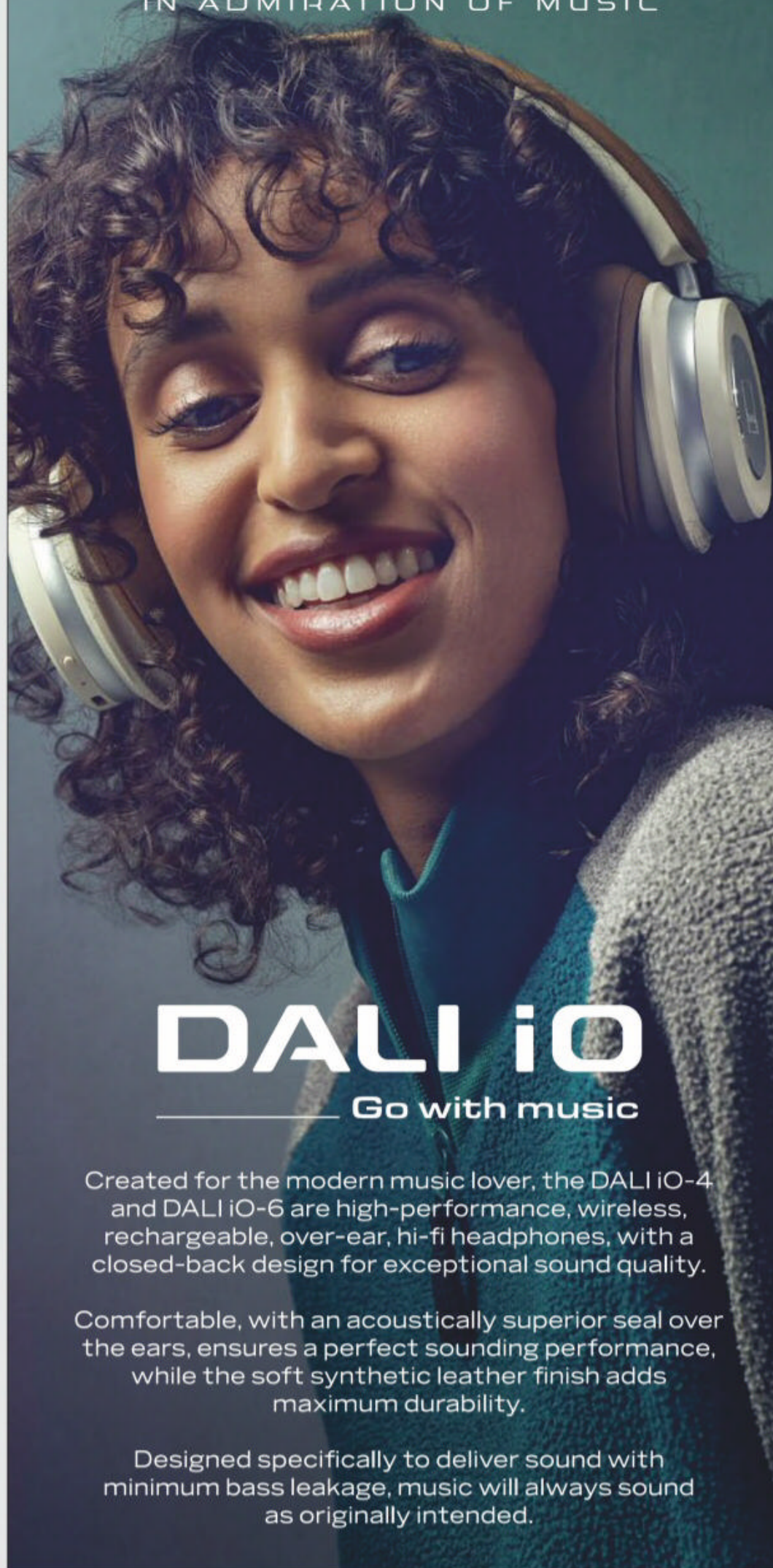
The Wizard S6's custom drivers are complemented by a newly-designed crossover network that uses high-quality audio-grade polypropylene capacitors, air-cored and ferrite-cored inductors as well as a large laminated-core inductor for the bass driver. Richter rates the new Wizard Series 6 design with a frequency response of 25Hz–30kHz (–6dB), a sensitivity of 90dB SPL (2.83Vrms, 1m on axis) and a nominal impedance of 4Ω.

To ensure the physical stability of the Wizard S6, which is a tall, floor-mounting rear-ported design, Gosnell has developed new speaker stabilisers that improve the stability of the cabinets (an issue in the home for many tall, narrow, speaker designs). He says they also improve the acoustic performance of the speakers. The Wizard Series 6 speakers come standard with the stabilisers but the stabilisers are also available separately (at \$249 per pair) as an after-market upgrade for use with the previous Richter loudspeakers. The stabilisers will also fit a wide range of floor-standing models from other brands. Available in Matte Black or a New Walnut-look finish, the Richter S6 speakers sell for \$2,299 per pair (RRP).

For more information call (04) 1886 3309 or visit the website at www.richter.com.au or call (04) 1886 3309

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PRO-JECT VC-S2

Interdyn has released Pro-Ject's VC-S2 ALU record cleaning machine (RCM) which it says takes record cleaning to new levels both in terms of the efficacy of the cleaning process and the speed at which LPs are able to be cleaned.

*'The new Pro-Ject VC-S2 is super powerful and cleans records in as little as two rotations, which is around three times faster than comparable cleaning machines,' says **Leigh Fischer** of Interdyn. 'The result is a much faster and more effective cleaning process, plus the improved motor that Pro-Ject developed to enable this high level of performance is also more robust, so it will last for a long and extended lifetime.'*

Unlike many RCMs, the VC-S2 is built from aluminium, so it's able to withstand fluid spills without compromising the chassis. The VC-S2 has a 2.5 litre container to collect used fluid and although Pro-Ject says it is *'effortlessly easy to empty'* the company also claims that if you use its Wash-IT non-alcoholic vinyl cleaning solution you won't need to empty it at all, because the fluid will evaporate in the container before it ever fills.

'The VC-S2 has an aluminium clamp that seals the record label from cleaning fluid to avoid damage to the label and the robust suction arm is easy to use, mechanically stable and focuses all suction power directly onto the record surface,' says Fischer. 'With its many practical features and excellent mechanical

operation, Pro-Ject's VC-S2 effectively combines industrial design appeal with an easy solution to ensuring great sound from your vinyl records.' Available now, the VC-S2 sells for \$899 (RRP).

For more information, contact Interdyn on (03) 9426 3600 or at www.interdyn.com.au



BOSE 700 NC HEADPHONES

Bose claims that its new 700 series wireless noise cancelling headphones represent the biggest leap forward in NC headphones since the iconic QuietComfort, which were likely the world's most popular noise-cancelling headphones for in-flight use.

*'The new Bose 700s have a revolutionary new voice interface that redefines mobile communication the way Bose noise cancellation redefined mobile audio,' says **Brian Maguire** of Bose. 'New technology inside the 700s isolates a user's voice from unwanted sound, allowing Bose 700 owners to do something that's never previously been possible: Surrounded by noise from competing conversations, rush-hour traffic and loud subway platforms, they can share their quiet—and not the noise around them—for crystal-clear calls to home and work, and gain unprecedented accuracy from virtual personal assistants such as Siri, Alexa and Google Assistant.'*

The Bose 700s use eight microphones to help cancel noise and improve voice pick-up while rejecting external noise. *'The microphones first create a beamform-array that isolates your speech, and suppresses everything else that's audible, then a rejection-array adds a second line of defence, tracking then blocking the most disruptive remaining sounds—from a coffee grinder to other dialogue nearby,' said Maguire. 'It all happens in real-time and works with any VPA, and with any phone paired to the 700s.'*

Bose says its noise cancellation circuitry eliminates the hiss added by most other noise cancellation circuits, and offers variable levels of cancellation, plus has a 'Conversation' mode.



The Bose Music app works with the 700 to allow you to customise and change operational preferences, update software, and potentially access additional features such as noise-masking tracks. Battery life is claimed to be 20 hours. Available now in either black or white livery, the Bose 700 NC headphones retail for \$599.95 (RRP).

For more information, contact Bose Australia on 1800 023 367 or (02) 8737 9999 or visit the website at www.bose.com.au

ASTELL&KERN

ASTELL&KERN SA700

Astell&Kern has released a new portable high-resolution player called the SA700 that's modelled on the company's original AK120, which debuted in 2013 and was the first portable player in the world to feature dual DACs.

The SA700 also features dual DACs but, like everything else inside this new player, they're the latest AKM AK4492ECBs which will replay all PCM signals up to 32-bit/384kHz and include native support for DSD256 playback. Although the exterior of the SA700 pays homage to the old AK120, the seemingly familiar volume wheel on the SA700 has a new LED whose visual output varies depending on the bit depth and volume of the song currently being played, with colours ranging from red, green, and blue to purple, and with the colour brightness and saturation also varying according to music content. *'First shown in Korea at BSK 2019, the new Astell&Kern SA700 features the latest DACs and amplifier design technologies coupled with the nostalgic look of the AK120,'* said **George Poutakidis** of BusiSoft, which distributes Astell&Kern in Australia. *'The new player delivers a deeper and more robust sound, providing users with new sound experiences.'*

Because battery technology has improved immensely since the original AK120, the 3.7V Li-Polymer battery inside the new SA700 is reported to be able to play back (continuously) for up to 8.5 hours and be re-charged completely in just 4.5 hours. Available now, the Astell&Kern SA700 sells for \$2,149 (RRP).

For more information, contact BusiSoft on 1300 888 602 or (03) 9810 2900 or visit its website at www.busisoft.com.au



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ON TEST

DALI OBERON 1

LOUDSPEAKERS



This new Dali Oberon 1 has the distinction of being the lowest-priced Dali loudspeaker ever to use Dali's patented soft magnetic compound (SMC) technology, which the company claims '*drastically reduces non-linear magnetic distortion*'. It also has the distinction of being one of the smallest speakers Dali has ever made, this Danish company being rather better known for its larger bookshelf models and its much larger floor-standing models.

THE EQUIPMENT

The Dali Oberon 1 is two-way bass reflex design with a 29mm soft-dome h.f. driver, a 133mm bass/midrange driver and a rear-firing bass reflex port.

The h.f. driver (which is used in all five models in the Oberon range, about which more later) was reportedly designed and engineered specifically for this new range. It's a 29mm ultra-lightweight soft-dome tweeter, made by Dali itself in its factory in Ningbo, China (also about which more later). The company claims that the fabric it uses to form the dome weighs less than half that of most fabric dome tweeters, with a weight of 0.06mg per square millimetre. The efficiency of the tweeter is enhanced through the fitting of a 220 gauss magnet and the use of ferro-fluid in the voice-coil gap. The slightly-larger-than-usual diameter of the tweeter means that Dali's engineers were able to use a slightly lower crossover point (2.8kHz) to better-integrate the tweeter with the bass/midrange driver. Power-handling ability is also enhanced.

The bass/midrange driver is rated with a diameter of '5¼ inches' (133mm) but the diameter of the chassis is a little larger than this, at 138mm and that of the moving parts a little smaller, at 115mm. The important measurement, the Thiele/Small diameter, is 106mm, which translates to an effective cone area (Sd) of just 88cm². The cone, which has a dished dust-cap, rather than a bulbous one, is made from a blend of fine-grained paper pulp that has been reinforced with longer wood fibres to give added stiffness.

Dali's Soft Magnetic Compound is made using coated magnetic granules and unlike many magnetic materials, is able to be easily shaped, which means Dali can use it to make the various different parts that go into making a complete driver. Since it's very expensive, only the highest-priced models in Dali's range use drivers that are made with multiple parts made from SMC.

In the Oberon 1, the only part of the bass/midrange driver that's made from SMC is a single disc at the top of the pole-piece. All other parts of the Oberon 1's bass/midrange driver are made from irons, alloys and ferrites, but you can still tell it's a substantial

Ash, White Oak and Dark Walnut) and one painted (White). The grille is made from a section of solid PVC that's peppered with hex-shaped holes to make it acoustically transparent. The visible face is covered with a textured fabric, the colour of which varies depending on the cabinet finish you choose: 'Shadow Black' for the Black Ash and Dark Walnut finishes and 'Mountain Grey' for the White Oak and White finishes. (A 'Marshmallow White' grille is available as an option.)

I rather liked the textured cloth Dali is

Providing such an obvious incentive to wall-mount seemed at odds with the provision of the rear-mounted bass reflex port

build from the weight of the Oberon 1 itself: a hefty 4.2kg.

In the bass/midrange drivers Dali uses in its Opticon series, for example, the pole-piece used in the bass drivers is entirely made from SMC. Dali says that the more SMC used in a driver's construction, the better that driver's performance. In the Oberon 1, despite the fact that only the disc is made from SMC, Dali still claims that this SMC disc '*greatly reduces mechanical distortion, which lowers third-order distortion.*'

The Dali Oberon 1's seven-element crossover network is mounted on a PCB affixed to the rear of the rear terminal plate—which has only two speaker posts, so bi-wiring is not an option—and comprises three 5W cermet resistors, a pair of bipolar electrolytic capacitors and two inductors: one air-cored; the other iron-cored.

Above the rear terminal plate is the Oberon 1's bass reflex port. Constructed of smooth black ABS tube, it's 130mm long and 35mm in diameter. Above this port is a key-hole steel fitting to facilitate wall-mounting the Oberon 1. Providing such an obvious incentive to wall-mount seemed at odds with the provision of the rear-mounted reflex port, since wall mounting would effectively block—or at least muffle—the output from the port, affecting the bass response. Then again, if you use the Oberon 1s in conjunction with a subwoofer—which I'd certainly recommend if you want to extend bass response—you'll get better integration of the low-frequency output of the Oberon 1 with that subwoofer if the port is blocked, either by the wall, or by a piece of soft foam. (Although many manufacturers provide foam bungs precisely for this purpose, Dali doesn't supply any such bungs with the Oberon 1.)

The Oberon 1's cabinet measures 270×160×230mm (HWD) and is available in four finishes: three vinyl wood-grain (Black

using, and have to agree with its description of it as being 'rustic.' The grille attaches to the baffle via plastic pegs, rather than the (these days) more usual magnets, so if you choose either of the light-coloured cabinet finishes, and you use the speakers without the grilles fitted, you'll have four black plastic sockets marring the otherwise clean lines of the baffle.

I was initially perplexed that the Oberon 1 comes with neither feet attached, nor with threaded holes for spikes or other footers. Then I realised that anyone who wall-mounts the Oberon 1s would firstly have no need of the feet and secondly would not want to see such feet poking unnecessarily from the base of the cabinet. Nor would they want to see threaded holes. But although they don't come attached, Dali does indeed provide feet

for those who would prefer to shelf-mount or stand-mount the Oberon 1s. Rather small, undignified stick-on transparent rubber feet, to be sure, but feet nonetheless.

Established in 1983 by none other than industry legend Peter Lyngdorf (who in the past has also owned NAD, TacT and Snell, and currently owns his eponymously-named company) Dali was originally an acronym for Danish American Loudspeaker Industries. This interesting name came about because Dali was at the time assembling speakers in Denmark for US speaker manufacturer Cerwin-Vega, which was trying to avoid shipping costs and duties on the speakers it sold into Europe. When Dali stopped building speakers for Cerwin-Vega, the acronym's 'meaning' was quietly changed to Danish Audiophile Loudspeaker Industries. However although Dali still manufactures many of its models in Denmark, all the models in the company's Oberon range are manufactured in a Dali-owned factory in Ningbo, China, which it founded in 2007 and is, physically, almost a clone of Dali's factory in Nørager, Denmark.

LISTENING SESSIONS

Given that the Oberon range includes a centre-channel speaker (the Oberon Vokal) as well as three floor-standing models (Oberon 3, 5 and 7), it seems obvious that Dali is expecting that many buyers will 'mix 'n match' the various models for home cinema use, perhaps using four Oberon 1s, a Vokal and a subwoofer, or floor-standers for the front channels, a Vokal for the centre and Oberon 1s for the surround channels.



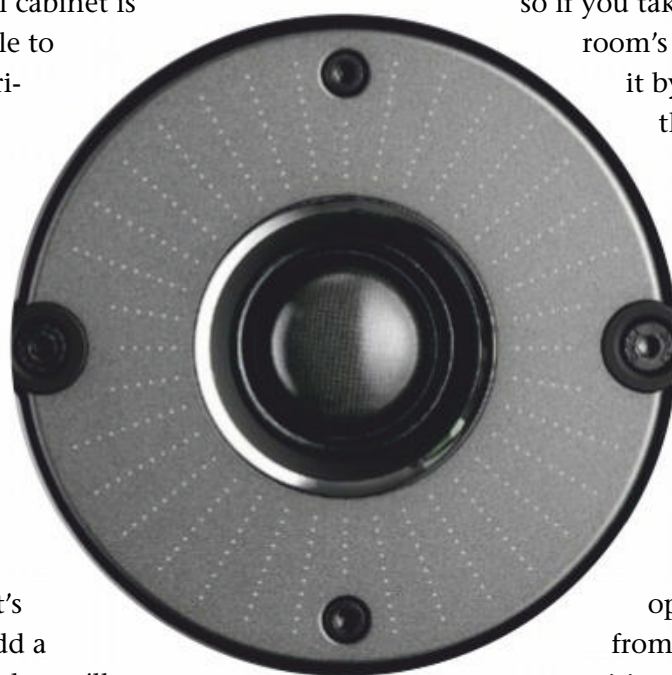


If you do this, and don't use identical speakers, the best combination (IMHO) would be the Oberon 5s as the front left and right channels, a Vokal as the centre-channel and Oberon 1s for the surround channels.

I listened to the Oberon 1s as a straight-forward stereo pair, and what a great-sounding pair of speakers they turned out to be.

The bass response of the Oberon 1s was satisfyingly extended for such a small loudspeaker

As you'd expect, their bass response was necessarily limited by the unavoidable laws of physics—a very small bass/midrange driver in a very small cabinet is never going to be able to produce truly authoritative deep bass, but if you're in a flat or apartment, or you're using the speakers in a study or a bedroom, you may not want too much bass in the first place. And, as I stated in the introduction, if you do want deep bass, it's a simple matter to add a subwoofer, after which you'll get better bass from an Oberon 1/subwoofer combination than you would from even a very large pair of floor-standing speakers.



That aside, the bass response of the Oberon 1s was satisfyingly extended for such a small loudspeaker, and particularly so if you take advantage of your room's acoustics to maximise it by careful positioning them not too close to a rear wall (but then again not too far from it either). Around 20cm was the sweet spot for my room. I placed the Oberon 1s on my own stands, which were coincidentally the same height as the ones optionally available from Dali that it says will position them 'the correct distance from the floor.' The stand in question, the Dali Connect Stand E-600, comprises a high-gloss lacquered aluminium tube (which incorporates cable management)

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at the base of which is a matte-painted glass plate and at the top a black-painted iron plate with adhesive pads (so you won't need those little translucent rubber feet). So placed, I was able to follow bass lines with ease, double bass or electric bass, and marvel that the Oberon 1s delivered such a clean and realistic bass drum sound... albeit minus the stomach-punching thwack of the fundamental that I'm used to from my large floorstanding speakers.


When it comes to the reproduction of upper bass and midrange, the Dali Oberon 1s sound ab fab (that's absolutely fabulous for those who aren't fans of the show), particularly when reproducing works played by smaller ensembles, and most especially when the musicians in such ensembles are playing acoustic instruments. If jazz is your thing... or singer/songwriters... then the Oberon 1s could very well have been custom-made for you. But although the Oberon 1s absolutely excel with such fare, they also put on an outstanding showing when playing rock music... you can even turn the volume up... if not to 11, then certainly all the way to 'too loud for comfort' without distortion and without the sound of the tweeter becoming hard (which often happens with smaller diameter tweeters).

But although I thought the sound quality of the upper bass and the midrange sound was outstandingly good, it turned out to be just a taster for the treble... just wait until you hear the beautifully sweet, beautifully smooth and beautifully translucent high frequencies these speakers deliver with properly-recorded material. The tinkle of bells, the hiss of cymbals, and not least the uncanny sense of 'air' to the sound of the acoustic when playing music that has been recorded live on location.

CONCLUSION

As I have pointed out a number of times in this review, the Oberon 1s are part of a range of speakers, and I feel that it's now time to reveal that it's a range of speakers that is the current winner of the EISA *Best Buy Home Theatre Speaker System Award* (2019–2020) with the EISA judges (one of whom is the editor of *Australian Hi-Fi Magazine*), saying in their commendation: *'from the ultra-compact Oberon 1 and small Oberon 3 bookshelf to the slender Oberon 5 and the flagship Oberon 7 floorstanders, the Series offers top-notch performance from very attractive enclosures... with music or movies these speakers have a wide dispersion and a clear, balanced and convincing presentation. They look great, and sound even better.'*

I have not heard any of the other speakers in Dali's Oberon range, but if my personal experience of the performance of the Oberon 1s is anything to go by, I can certainly see

why the EISA judges were so enthusiastic. Dali's Oberon 1s are small enough to be used anywhere, in any application, and in all applications they will deliver superbly balanced and dynamic sound with a verve and enthusiasm that will truly surprise you. Highly recommended.  *Bruce O'Brien*

CONTACT DETAILS

Brand: Dali

Model: Oberon 1

RRP: \$799 per pair

Warranty: Five Years

Distributor: Amber Technology Limited

Address: Unit 1. 2 Daydream Street
Warriewood NSW 2102

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LABORATORY TEST REPORT

Newport Test Labs measured the overall frequency response of the Dali Oberon 1 as being 70Hz to 32kHz ± 3.5 dB, which is an excellent result, particularly so at high frequencies, where the tweeter's response extends far beyond the 26kHz specified by Dali.

The low-frequency down-point measured by *Newport Test Labs* is not quite the 51Hz specified by Dali, but Dali's measurement may include boundary assistance. The difference between the specification and the measurement result in musical terms is a mere six notes (G1# to C2#).

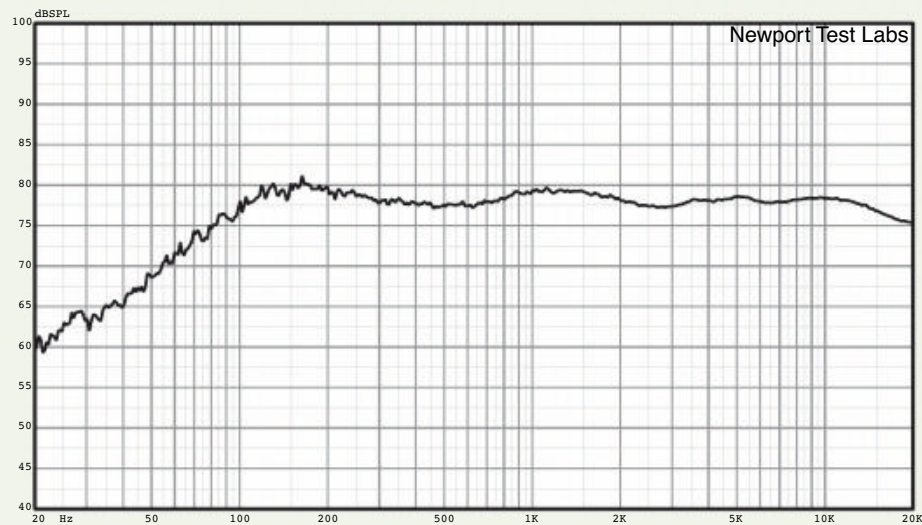
The in-room frequency response (without boundary assistance) measured by *Newport Test Labs* is shown in Graph 1 (note the upper graphing limit of 20kHz). You can see the response is superbly smooth, extending from 70Hz to 20kHz ± 3 dB. Across the upper bass, midrange and the high-frequency regions

the Dali Oberon 1's response is even flatter again: 100Hz to 15kHz ± 1.25 dB! The frequency response is also beautifully linear across this measured bandwidth with no spectral tilt.

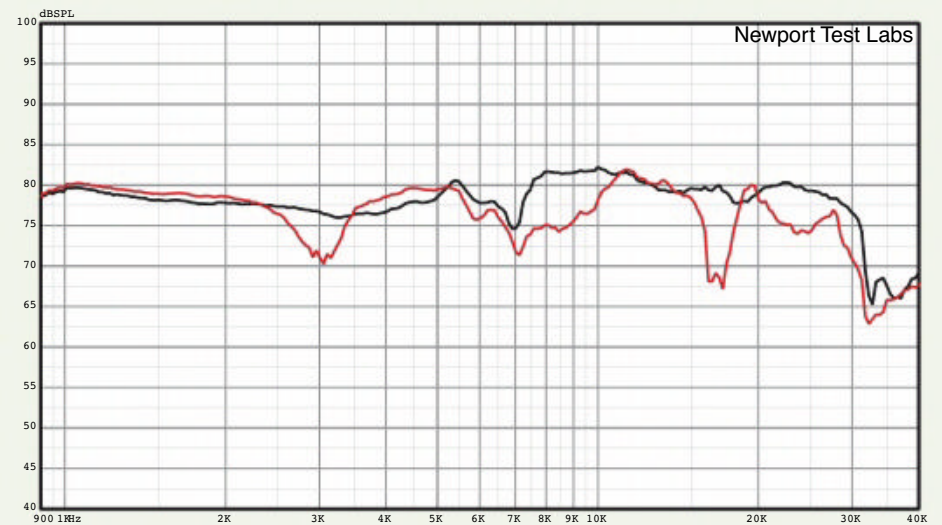
A detailed view of the anechoic high-frequency response of the Dali Oberon 1, as measured by *Newport Test Labs*, is shown in Graph 2, both without the grille in place (black trace) and with the grille fitted (red trace). Due to the different test technique the resolution of this graph is far higher than in Graph 1, so even the smallest variations in the frequency response become visible. You can see that even with this higher measuring resolution, the Oberon 1's frequency response without the grille is still superbly flat and extended. There's a sharp dip at 7kHz, which would not be audible due to its high Q, and a very mild depression between 1kHz and 5.5kHz whose lowest point is at 3.5kHz, but despite these, the frequency response across the graph is still within ± 3.5 dB right out to 32kHz. The linearity of the tweeter above 15kHz is impressive.

Fitting the grille introduces quite a few frequency response anomalies, essentially taking the dB variations to ± 6 dB over the same bandwidth. The largest of the dips, at 16–18kHz, has a very high Q, so would likely be inaudible because of this, but it's also likely to be inaudible simply because most people will not be able to hear such high frequencies.





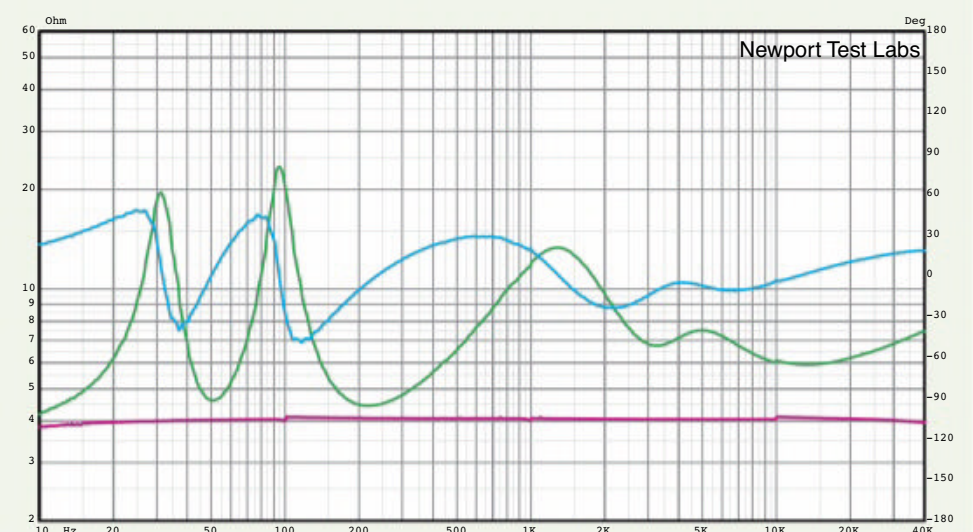
Graph 1. In-room frequency response using pink noise test stimulus with capture unsmoothed. Trace is the averaged results of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter.



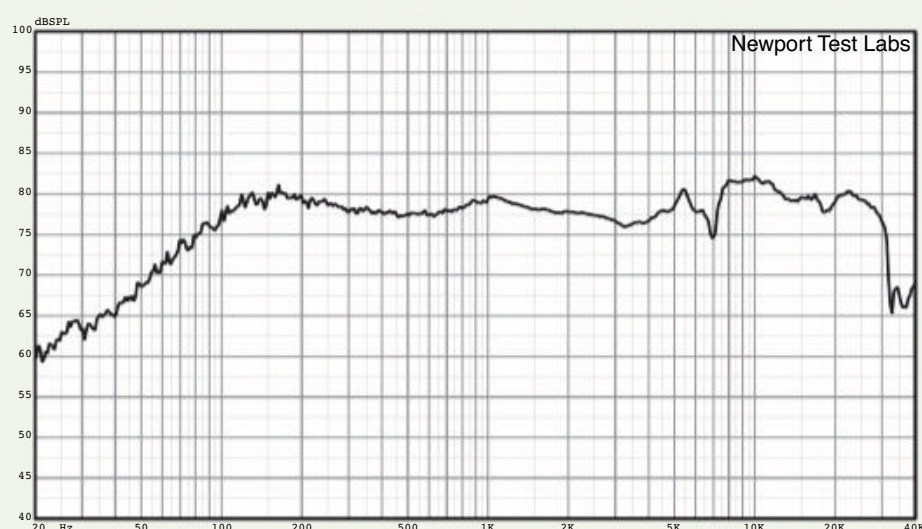
Graph 2. High-frequency response, expanded view showing response with grille off (black trace) vs grille on (red trace). Test stimulus gated sine. Microphone placed at three metres on-axis with dome tweeter. Lower graphing measurement limit 900Hz.



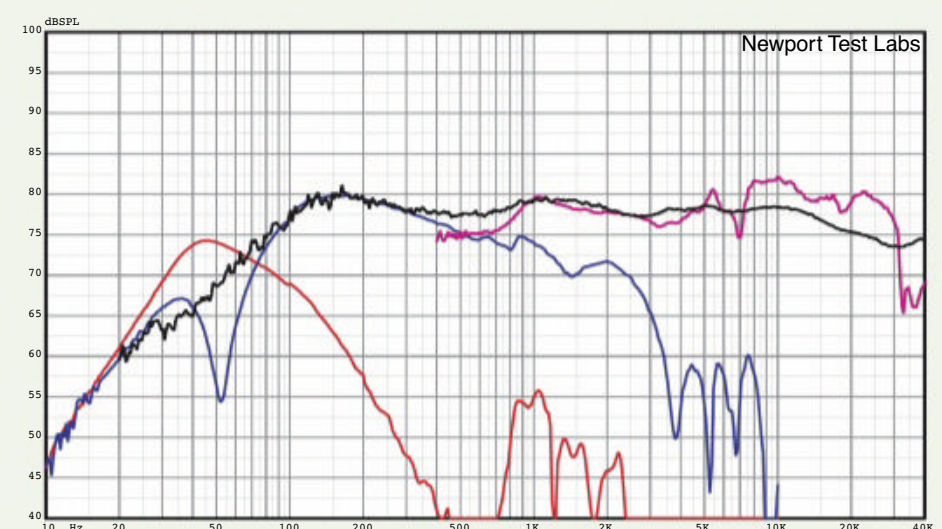
Graph 3. Low frequency response of front-firing bass reflex port (red trace) and woofer. Nearfield acquisition. Port/woofer levels not compensated for differences in radiating areas



Graph 4. Impedance modulus (green trace) plus phase (blue trace). Pink trace under is reference 4 ohm precision calibration resistor.



Graph 5. Frequency response. Trace below 1kHz is the averaged result of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter using pink noise test stimulus with capture unsmoothed. This has been manually spliced (at 1kHz) to the gated high-frequency response, an expanded view of which is shown in Graph 2.



Graph 6. Composite response plot. Red trace is output of bass reflex port. Dark blue trace is anechoic response of bass driver. Pink trace is gated (simulated anechoic) response above 400Hz. Black trace is averaged in-room pink noise response (from Graph 1).

However this particular test result suggests that for best performance you should listen to Dali's Oberon 1s without grilles.

Low frequency performance is shown in Graph 3. You can see the bass/midrange driver's response starts rolling off at 150Hz to reach its minima at 52Hz. The output of the port has been tailored to peak at 45Hz, presumably to add some bass extension.

The impedance of the Dali Oberon 1 remains very comfortably above 4Ω over the entire range shown in Graph 4, with a mini-

mum impedance of around 4.4Ω at 225Hz, so Dali's 'nominal' rating of 6Ω is spot-on. The phase angle is largely benign, so in combination with the impedance, the Oberon 1 is a very amplifier-friendly design... very easy to drive. The trough between the two low-frequency peaks is at 50Hz-ish meaning that you won't be able to extract any appreciable output below this frequency, even with optimum room positioning.

Using its standard test regimen, *Newport Test Labs* measured the sensitivity of the

Oberon 1 design as 86dB SPL at one metre for 2.83V_{eq}, exactly as specified by Dali. This is an excellent result for a small speaker that's as physically small as the Oberon 1, and it means you won't be wasting any of your amplifier's power trying to drive it.

Dali's designers have excelled themselves with the Oberon 1. It has high sensitivity, it's very easy to drive and, most importantly, its frequency response is extraordinarily flat and linear as well as being particularly well-extended at high frequencies. ⚡ Steve Holding



COCKTAIL AUDIO N15D

DAC/NETWORK STREAMER

The Cocktail Audio N15D is a compact and very versatile device which can handle more of one's digital audio needs than most similar devices. And, by 'compact' I really do mean compact. This unit is only 180mm wide, 195mm deep and 50mm tall. I kept it on my desk for several weeks and barely even noticed the loss of space.

THE EQUIPMENT

At the front is a power button, a 6.5mm headphone socket, a level control and a USB port. At the back are:

- a proper 3-pin power socket—the power supply is in-built
- two hefty RCA sockets for analogue output
- a coaxial digital audio output
- an optical digital audio output
- two USB 3.0 Type-A ports
- a USB Type-B socket for connecting to a computer so you can use it as a USB Audio device for playback
- an Ethernet connection for streaming network audio

You can plug in USB mass storage devices—a thumb drive, or USB hard disk or SSD—with music on them for playback, or you can plug in an optional Wi-Fi attachment. The standard unit is wired Ethernet only.

There is also a bay for installing a 2.5-inch hard or solid-state drive. That could be up to four or five terabytes these days. Unfortunately, that does not mean that you can run the unit independently of the network because the only real way to control it is via the network using an app.

The Music X app is available for iOS and Android. You use it with the unit to play music from the disk installed in the unit, from a hard disk or flash memory attached to one or more of the USB ports, from local network resources and from a number of Internet streaming services. Those services are Qobuz, Tidal, Deezer, Napster, HighResAudio and Amazon Music. If your preferred streaming source is Spotify or Google Music sorry, but you're out of luck.

I was going to add the same with regard to Apple Music, but since the unit also supports Apple Airplay, I guess you can just use the app on your iPhone or iPad. But remember, the music will be coming to your device and then being sent on to the Cocktail Audio N15D, not being fed directly to it from the Internet.

But you can, of course, plug the unit into your computer and use its DAC capabilities to stream from the likes of Spotify.

INSTALLATION

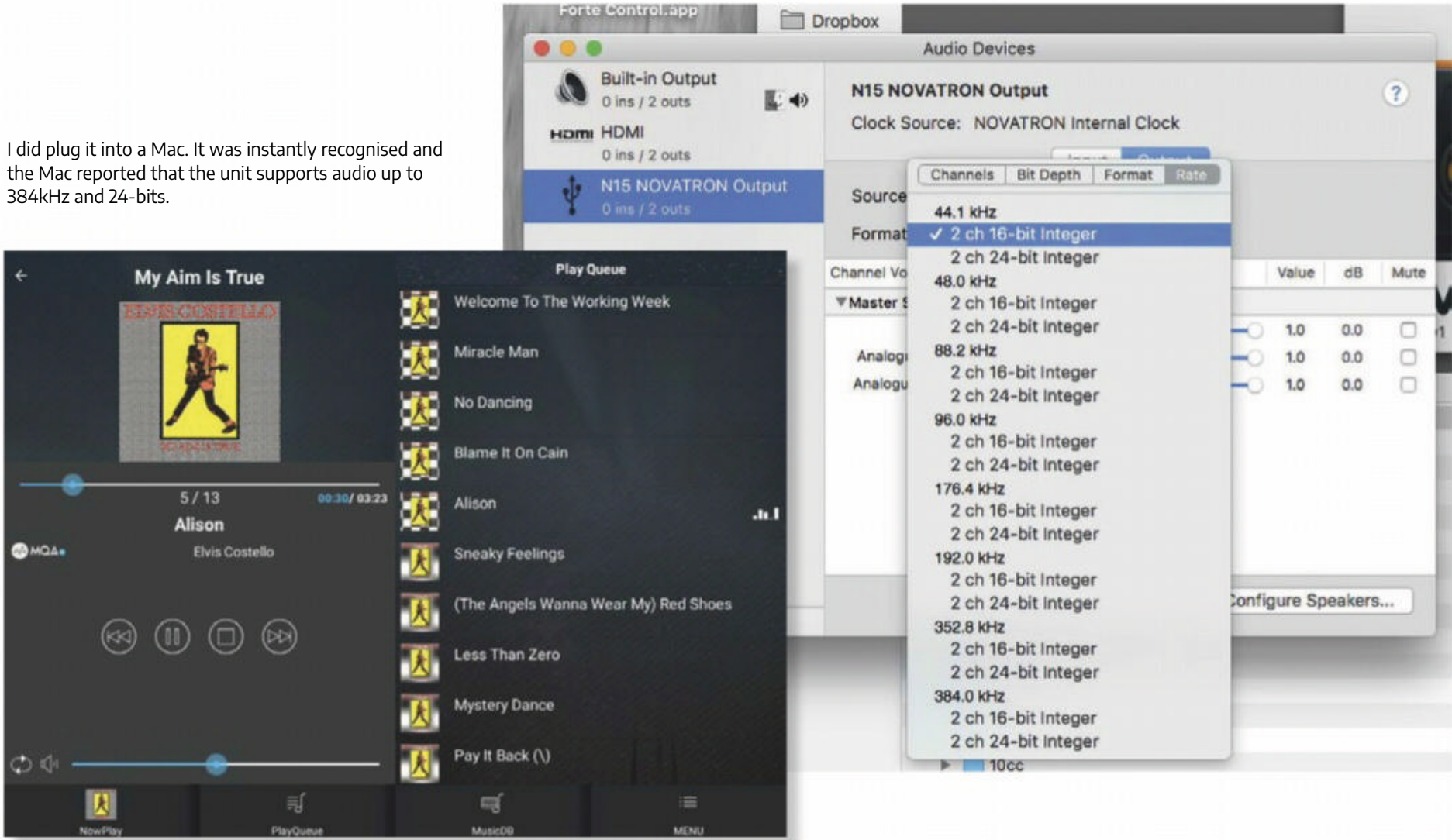
I didn't spend much time on the computer DAC functionality. The point of a device such

as the Cocktail Audio N15D is to provide digital audio without the need to resort to using a computer. But I did plug it into a Mac. It was instantly recognised and the Mac reported that the unit supports audio up to 384kHz and 24-bits.

The tray to install a hard drive is easy to use. The screws used to secure the drive in the tray are provided. Use them or you'll have trouble getting the tray back out. I used a 500GB hard drive. After I'd done that I went into the system settings in the app and told it to format the drive—it defaults to the Windows standard NTFS format. That process took around ten seconds. I also plugged a 5TB hard drive into one of the USB 3.0 ports. And of course I plugged the unit into my network. I tried out the Novatron Music X app on both an iPad and a small Android tablet. It worked pretty much identically on both.

If your preferred streaming source is Spotify or Google Music sorry, but you're out of luck

I did plug it into a Mac. It was instantly recognised and the Mac reported that the unit supports audio up to 384kHz and 24-bits.



As is the way of these things, the unit's firmware is updated from time to time. So after installing it, I went to the relevant bit of the app and had it check via the network. It found an update and asked if I wanted it updated. I did. It took about ninety seconds to download (via NBN). And then the app crashed out. When I fired it up again, it found the unit, but said something about either sending a 'WOL packet' or 'deleting' it. I had no idea what to do, but deleting it didn't seem wise so I chose the former. I had to repeat it one or two times—I suspect the unit hadn't finished rebooting—after which it started up normally.

I relate this because even though I have played with dozens of these devices, I still feel some trepidation during firmware upgrades. What if something goes wrong and the unit is bricked? Also, devices ought to hold one's hand and not leave one trying to interpret

obscure tech messages. The firmware used for this review was N15D-CA-1.0.0.r1454.

THE APP

With great power comes great complexity and not a small amount of confusion (with apologies to Spider-Man). It wasn't helped by some poor design aspects. The main screen of the app looks clear enough. At the top is Music DB, then Browser, then Playlists, then i-Service. At the bottom is Setup.

The 'i-service' item provides access to internet streaming services. I set up Tidal, to which I have a subscription. But it was cumbersome process to do such a simple thing as play a whole album. After selecting Tidal I would drill down through the folder structure to an album. But there was no way of just playing it at that point. I'd have to go into the track list. Then I'd have to tap on a small tick box to the top right of the list.

That caused another small tick box on the other side of the list to appear, as well as a bunch of tick boxes next to the files so that you can choose which ones you want to play. If you want to play the whole album—you know, the kind of thing one generally wants to do—you then have to tap that new tick box, which fills in the boxes next to all the tracks. So how do you then play them? Well, you have to then tap the first tick box again, which pops down a 'Play' option.

Which, really, is just about the most difficult way I have ever experienced of simply playing an album.

For several weeks that was also the only way I could play a lot of stuff accessed through the 'Browser' menu option, but it unexpectedly reverted to a proper way of working, which was: tap down to the album level, tap the dots next to a folder or album name and choose Play Now.



There are other useful options, such as ‘Add to Last’ to tack it onto the current play queue. A pity you can’t do that with Tidal.

The Browser menu option gives you access to the various drives you have plugged in (or installed), as well as to DLNA/UPnP material on your local network, plus (in theory) to network ‘shares’.

LOADING MUSIC

As I mentioned, I formatted within the unit the hard drive that I installed. How to load music onto the Browser-accessible part of that drive?

Well, you have to go into the settings and enable the Samba file server and change the Workgroup to whatever yours is called. It required a switch off-and-on for that change to take. I spent quite a bit of time trying to get it to work, but it wouldn’t. My Windows computers reported that ‘The remote device or resource won’t accept the connection’.

It also offers an FTP (File Transfer Protocol) interface. I downloaded and installed an FTP client, and this did indeed work. Slowly, though. It took several hours to copy just 30GB of MP3 files across.

And then, after I’d finished my draft of this review, removed my hard drive, performed a factory reset on the unit and packed it up, I decided to double-check something. And since I was doing that, I tried enabling Samba again, and this time it did work! And that meant I could just drag and drop music from other places on my network onto one of the drives attached to the N15D. However it was pretty slow, running at about 1MB/s. My network speeds are usually up around 60 to 80MB/s. It took about ten minutes to copy across sixteen MQA-encoded files amounting to 674MB.

The unit also has a web interface. That works quite well and shows a nicely formatted list of tracks in the Music DB.

THE MUSIC DB

When using the Browser on attached storage, you just navigate through the file structure.

I could just drag and drop music from other places on my network onto one of the drives attached to the N15D

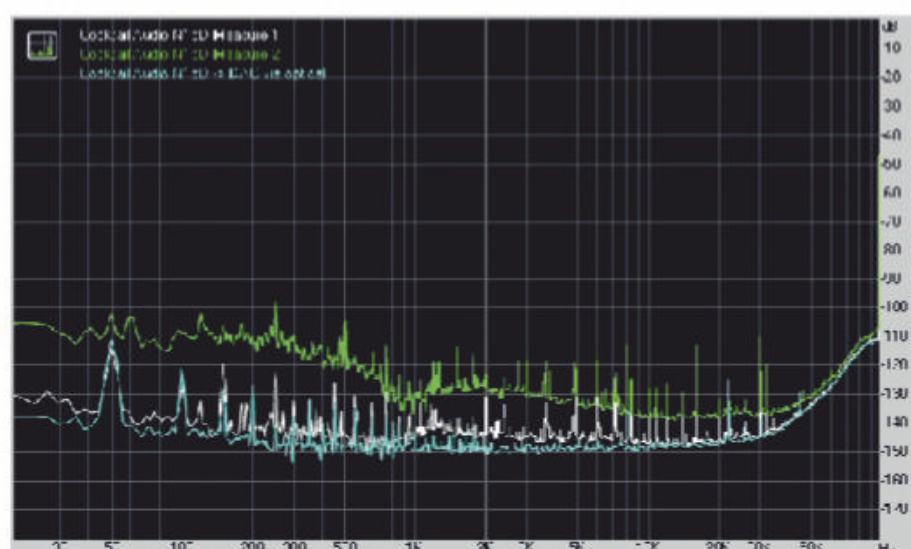
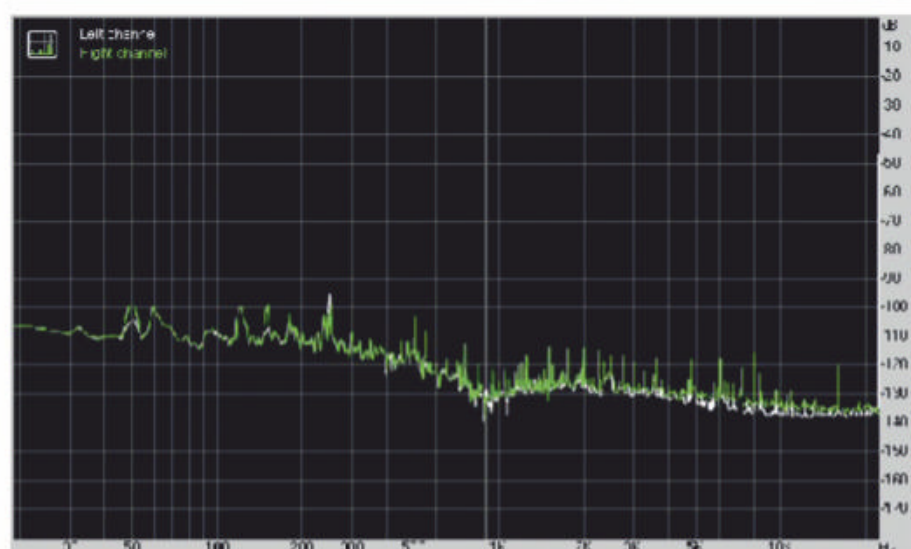
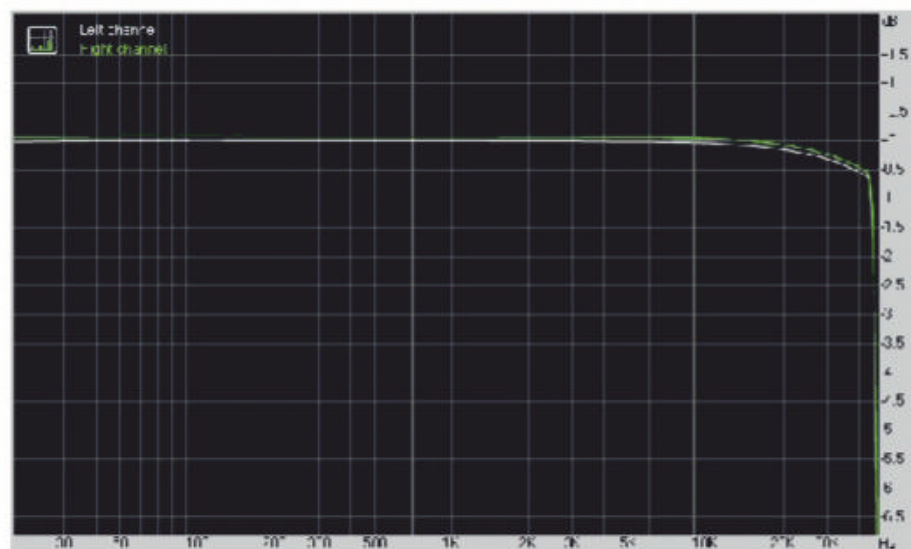
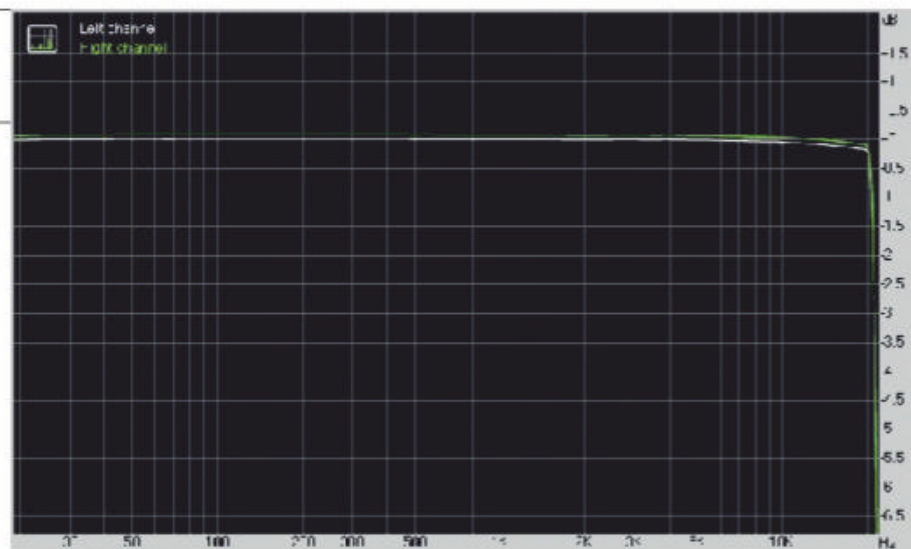
Graph 1. Frequency response using 16-bit/44.1kHz test signal. Left channel (white trace) vs. right channel (green trace).

Graph 2. Frequency response using 24-bit/96kHz test signal. Left channel (white trace) vs. right channel (green trace).

Graph 3. Frequency response using 24-bit/192kHz test signal. Left channel (white trace) vs. right channel (green trace) vs. external DAC (blue trace). See copy for explanation.

Graph 4. Noise floor using 16-bit/44.1kHz test signal. Left channel (white trace) vs. right channel (green trace).

Graph 5. Noise performance with 24-bit/192kHz test signals was inexplicably inconsistent, as shown by traces above. (See copy.)



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But the Music DB allows navigating using ID3 tags in a way similar to DLNA playback.

I imagined that the Music DB would just index the various connected resources, including the internal drive. Using the Browser, you tap on the menu dots next to a music file or folder and select the option to add that file or folder to the Music DB.

But what does it mean to add to the Music DB? The first hint was when I went to the terabyte or so main music folder of the USB drive. Add to the Music DB I told it. It popped up a message: did I want to copy or move the files? I didn't want either. I wanted them indexed. At that point I should have cancelled the function. But here's where the poor app design becomes apparent. You can't cancel. There was no cancel button. Tapping outside the box on the iPad didn't make it go away. I could have zapped the app, and perhaps I should have, but a kind of morbid curiosity took hold. What would happen?

I told it to 'copy'. And then the box changed to a copy dialogue showing the files, one by one, as they copied across to the hidden Music DB section of the internal hard drive. It turned out that, yes, the whole files were being copied across. A typical 200MB DSD file took around five seconds.

It seems that the Cocktail Audio N15D divides the internal hard drive into two portions: one part that's accessible to the user via the Browser function, and a second, inaccessible part which holds the Music DB music.

As I watched the process unfold, the accessible part of the internal disc kept shrinking. It started at around 450GB in size, and as I write now, several hours later, it's down to 250GB. The copying speed was around 37GB per hour.

If I have understood this correctly, this does not seem like a good idea. As I said, the music folder I selected has about a terabyte of music in it. That entire disc is only half a terabyte in size so there's no way that the music will fit. Good design would have had the unit check this before it started and then give some options.

As it is, the process seems unintermittible. I can find nothing in the app to stop it. When I shut down the app and switch off the iPad, it just continues the copying. In the end, with time pressing, I just had to switch off the unit. Since I was planning on reformatting that drive later, I could take that chance. Then I went through and selected a number of specific folders for importing to the Music DB for use.

While I am complaining about the Music DB, it does index the music it imports and you do have several ways of displaying the music for selection, such as by Artist, Com-

poser, Artist/Album and so on. But you have to pick one of those in Settings. Why aren't they all available as options in the Music DB screen?

(I later examined what the unit had done with the drive. It had created a new folder, called '.DB' in the root folder of the drive with copies of all the music, plus some artwork it had extracted. The N15D hides that from the user.)

DLNA

The Cocktail Audio N15D worked well with Apple Airplay (it uses a third-party Airplay clone called Shareplay) and it mostly worked well with my usual DLNA player software on my Android tablet. But I could not get that player to stream DSD music to the Cocktail Audio N15D without converting it to PCM. This was most likely something to do with MIME file types (don't ask). And, of course, it didn't give access to Internet streaming services.

TEST RESULTS

The Cocktail Audio N15D provides a classic output frequency response: down less than

0.05dB at 20kHz and then a brick wall after that (-6dB at 21.5kHz) with 44.1kHz, 16-bit signals. Using that same digital standard, noise came in at -94.9dB A-weighted, with a fair bit of (measured) noise breakthrough, particularly in the low mid and bass registers. THD was 0.0037%.

With 96kHz, 24-bit signals the unit was again clearly optimised for a flat, extended frequency response. The output was down by 0.5dB at 43.5kHz before hitting the brick wall filter.

The unit is supposed to support audio playback up to 384kHz sampling, and it certainly played those files, but with 192kHz, 24-bit signals something odd became apparent. The output was maintained out to 36kHz (-0.5dB) after which it then fell off rapidly, never getting past the Nyquist frequency for 96kHz sampling. To explore what was going on, I plugged the optical output of the unit into an external DAC. It reported 96kHz sampling. So 192kHz content, at least, is being downsampled to 96kHz.

The noise performance with 24-bit audio was inconsistent and I was unable to isolate a specific cause for the differences.



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Essentially, the noise was down either around -95.5dBA or around -110dBA . I presume that somehow noise from the Ethernet connection was getting through, so perhaps there were different noise states in my network during the different measurements. (Why did I not disconnect the Ethernet cable? Because the N15D won't work without it!) Graph 5 shows two of those measurements, along with a third where I fed the output of the Cocktail Audio N15D to a separate DAC via optical (this gave a result of -116.1dBA). I stress, none of that measured noise was audible, whether via headphones or line output. THD with 24-bit audio was down at 0.0008%.

The unloaded voltage of the headphone output was at 3.67-volts RMS for sine waves modulated to peak at 0dBFS. Into a 295Ω load, that reduced to 3.55-volts, for 42mW output or 16.3dB above headphone sensitivity. Into a 15.9Ω load, the output remained unclipped, but reduced to 2.22-volts due to internal resistance. That works out at 310mW and 24.9dB above headphone sensitivity. Both of those are more than ample.

The voltages I measured put the internal resistance of the N15D at just over 10Ω . That's higher than I'd like, but the frequency response influence on most headphones should be minimal, especially those with an impedance higher than 32Ω .

LISTENING SESSIONS

I normally put the testing (objective) section of these reviews after the listening section, but I reversed it for this one so I could think and talk about the discrepancy between some marked imperfections in measured performance and my listening.

That's in large part because, using the Cocktail Audio N15D as my main listening platform for several weeks, I found the listening experience (as opposed to the practical one) to be an utter delight. I fed its line outputs into my audio system, but I mostly listened with headphones, switching between an Oppo PM3 (closed back, and exactly 26Ω right across the audio band), Focal Elear (open back, 80Ω nominal) and Beyerdynamic Amiron Home (open back, 250Ω nominal). Oh, plus my ancient Sennheiser HD 535 headphones (open back, fairly low sensitivity, 150Ω impedance, varying across frequency band).

First, the Cocktail Audio N15D happily, easily, drove all four sets of headphones to unreasonably high levels. And that includes both of the higher-impedance models. It delivered the sound cleanly with zero audible distortion. I don't know the impedance curves of the Focal or Beyerdynamic head-

phones, but the Sennheisers are all over the place. The in-line impedance had no noticeable effect on the frequency balance.

But one word of caution, when you pull out a set of headphones, the unit seems to reset itself to maximum volume. It cuts the level again when you plug in another (or the same) set of headphones, but it takes a second to do so and is thus very loud for that instant, so it's a good idea to pause the music when switching headphones... or when unplugging and replugging the same pair.

I am inclined to think that that Cocktail Audio N15D imposed no particular character of its own on the sound, leaving it up to the headphones to decide that. But I did have a sense that the Beyerdynamic headphones, which tend to be quite bright, sounded a little smoother, and a little more in check in the treble than usual. There was a slight narrowing in the range of characteristics between the headphones. It was as though the N15D was making each of them be the best headphones they could be.

Genre didn't matter much. At this moment I'm listening to ELOII through the Focal Elear headphones, but I've also been through some early Black Sabbath, much of Elvis Costello's early catalogue (on Tidal, many of them Master Authenticated), the Muse-like 30 Seconds to Mars, Vladimir Ashkenazy playing Beethoven on Decca, the Schedrin version of Bizet's 'Carmen' on Chandos, and a whole lot more that have escaped my memory. And in every case they sounded—I have to return to that word—delightful.

So how do I reconcile my aural experiences with the measurements I made that were well short of state of the art?


First off, I'd note that what's going on inside the Cocktail Audio N15D is fairly opaque. How can I tell whether DSD tracks are being decoded natively and converted to PCM and then decoded? As I have demonstrated, it turns out that 192kHz tracks are being converted to 96kHz and I was none the wiser until I noticed the measurement anomaly. The unit does apparently recognise MQA and flashes up an authentication mark and reveals in its 'Meta Info' page tracks that it can be unfolded to 352.8kHz, 192kHz or whatever. But does it actually do that? I defy anyone to be able to tell by ear.

But I would argue that the state of audio development in the electronics and digital portions (but not in transducers) has well and truly exceeded the ability of the human ear to discriminate. Once a device delivers a noise floor better than -90dB , high frequency extension to well beyond 20kHz that's flat across the audible band, along with distortion levels which require at least two decimal

points to measure, further improvements will make for nice numbers, but no audible difference to the sound.

Actual audible differences, all of the above being achieved, come from other things, the main one probably being the ability of the output stage to control the transducer.

CONCLUSION

To reiterate, the Cocktail Audio N15D is a compact and very versatile device which can handle more of one's digital audio needs than most similar devices and will also guarantee you an utterly delightful listening experience no matter what type of headphones you're using, or what devices you connect to its other outputs. I just hope that that the app can be improved.  Stephen Dawson



CONTACT DETAILS

Brand: Cocktail Audio
Model: N15D
RRP: \$1,299
Warranty: Two Years
Distributor: Audio Dynamics Pty Ltd
Address: 5/3 Wellington Street
Kew VIC 3101
T2: (03) 9882 0372
W: www.audiodynamics.com.au

PRODUCT DETAILS

Inputs: USB-B×1 (for computer audio), Ethernet×1, USB 3.0×2, USB 2.0×1
Outputs: 6.35mm stereo headphone (×1), optical digital audio (×1), coaxial digital audio (×1), RCA analogue stereo (×1)
Digital Formats: PCM to 24-bit and 192kHz sampling; DXD 24-bit, 352.8kHz; DSD to 11.2MHz; FLAC; APE/CUE; WAV; ALAC, AIFF, AAC, M4A, MP3, Ogg Vorbis and more
Dimensions (WHD): 180×50×195mm
Weight: 1.42kg



- Excellent sound
- Versatile functionality
- Almost unlimited storage



- App needs work
- Could do with better isolation of analogue outputs from noise on Ethernet connection

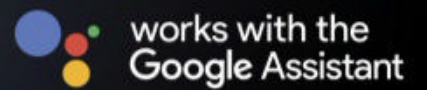
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HEGEL H590

INTEGRATED NETWORK AMPLIFIER

Hegel is a small company based in Norway that had been flying under the radar for more than twenty years until about five years ago it became a huge blip on the screens of audiophiles right around the world, after which the sales of its amplifiers went through the roof. Which was a problem at the time, because the company was literally too small to meet the demand. It now manages to keep up with demand... just... but the company is still very small—currently just nine people, according to Anders Ertzeid, Hegel's VP of Marketing and Sales—though he was quick to point out that that figure does not include those whose job it is to assemble its products... and if you take a peek inside one of them you'll immediately realise that some of Hegel's 'employees' are in fact very sophisticated robots!

One reason the company flew under the radar for so long is that it isn't at all interested in gimmicky marketing slogans or self-promotion, and seemingly not even overly-interested in the appearance of its products, all of which look pretty-much identical. In fact, when asked to describe Hegel's corporate ethos, Ertzeid had to think for a

moment before he answered, saying: 'All we have is good sound quality: There is nothing else.'

Pushed to elaborate further on this fairly understated mission statement, he thought a while more before adding: 'It's a no-nonsense product. Everything is measurable and quantifiable. And, for the high end, it's very reasonably priced.' If you've glanced at the price of the Hegel H590 you might be wondering about Ertzeid's description of it being 'very reasonably priced'... or you might be until you find that not only is it an extremely powerful integrated amplifier, one rated with an output of 301-watts per channel into 8Ω, but that it's also a full-featured DAC (with MQA... but only via USB), Spotify and AirPlay, as well as a full-featured streamer, so you're getting rather more for your money than would first appear.

THE EQUIPMENT

There is certainly nothing nonsensical about the front panel of the Hegel H590. As you can see, there are just two rotary controls and a front panel display, Hegel having decided to hide the main 'Power' switch underneath the amplifier. This is, as Ertzeid said, a 'no-nonsense product.'

The rotary control on the left side of the front panel display is an encoder that allows you to select the input you wish to listen to, offering a choice of five line-level analogue inputs—two balanced (via XLR connectors), and three unbalanced (RCA)—and seven digital inputs: one coaxial (BNC), one coaxial (RCA), three optical (Toslink), one USB (Type B), and one network (RJ45). You can, if you wish, change one of the analogue inputs to be a 'home theatre' input, to facilitate

using the Hegel H590 to drive the front left and right speakers in a multi-channel home theatre system. (If you do this, you need to exercise caution, because doing so bypasses the Hegel's volume control.)

The rotary control to the right of the front panel is the volume control encoder (that is, it's not a standard potentiometer, but digitally controls a switched resistor network). This control has two really neat features. The first is that you can set the switch-on volume so that whenever you bring the amplifier out of standby, the volume level will be a previously pre-set level... not minimum or (as is more common) the level you were last using. The second neat feature is that you can set a maximum level. Once this is set, it doesn't matter how far you (or more importantly, someone else!) rotates the volume control to the right, you won't run the risk of overpowering your loudspeakers... or of upsetting the neighbours.

As you can probably tell from the photographs accompanying this review, the front panel display is blue on black, and shows the selected input (XLR1, XLR2, etc) at the left and the selected volume level—shown as numerals from 0 (no sound) to 99 (maximum output)—at the right. When the amplifier is muted, the numerals flash.

The Hegel H590 comes standard with the same Hegel RC8 remote control that is supplied with Hegel's other products, so it can control them as well as the H590, but means that in some cases, some of the buttons on it do nothing when it is used in conjunction with the H590. However, because Hegel is using standard infra-red command codes, it's likely you'll be able to use it to control play and pause functions on many products that

With the H590, you're getting rather more for your money than would first appear

are not made by Hegel. What the Hegel RC8 remote definitely does allow you to do is control the H590's volume, switch inputs, mute the amplifier's output and switch the Hegel H590 in and out of its Standby mode.

There are no 'direct access' buttons on the remote, so in order to select an input, you have to step through them one by one, using the IN- and IN+ buttons. Also, the 'DISP' button on the remote control does nothing at all. I was rather expecting that it would either dim the Hegel H590's display or turn it off. Instead it did neither. Presumably it dims or switches the display on some other Hegel component, so surely it couldn't be too hard to arrange for it to do the same for the H590?

You can use the remote to reset the H590 to its factory default settings for switch-on level, source and so on. All you need to do is hold down the DAC+ button and then press and hold the Mute button. This will clear all the user-defined settings, including the IP settings.





The remote control uses two AAA batteries which Hegel does not install inside it at the factory in order to, in the words of the User Manual, *'avoid damage to the remote control by leakage from the batteries during transport and storage.'* The only problem is that the two batteries Hegel does supply so you can install them yourself are not of particularly good quality. I would recommend you don't use them at all, and instead buy and install two high-quality Eveready alkaline batteries. A word of advice here, which is that it's a good idea to replace all the batteries in all your remote controls on Jan 1 each year to avoid the potential for the batteries to leak, which could potentially damage the control they're powering. Replacing all the batteries at once makes it easy to remember to do it (as well as when you did it), and also allows you to buy 'bulk' packs of batteries, so you can get them at the best price.

Because the Hegel RC8 remote is not a cheap, plastic 'off-the-shelf' remote, and has a substantial black metal case, you will need to use a Phillips screwdriver to remove the screws underneath the remote control to install (and replace) the batteries. And you will need to supply your own screwdriver, because

Hegel doesn't supply one. Rather disappointingly, although the company specifically warns against tightening these screws too much *'as this can damage the screws and the soft metal chassis of the remote control'* two of the screws on the remote I was supplied were so tight that I had difficulty undoing them.

The bottom edge of the remote is curved, which makes for a more attractive appearance, but meant that I could not stand the remote on its end to make it easier to find, and easier to pick up. (The other end of the remote—the one that in the photographs appears to be 'flat'—has an infra-red transmitter bulb protruding through it, so you can't stand the remote on that end either.)

The Hegel H590 has sophisticated protection circuitry built in that will protect against excessive current and over-heating. Unlike some such circuits, Hegel's is self-resetting, so when the event that caused the protection to activate is no longer present, the amplifier will switch itself back on (but always with the volume set at '0', over-riding any level you may have preset). I was rather amused by the message that's shown on front panel display if the amplifier does overheat, because it simply says 'HOT!' Speaking of which, because all the H590's heatsinking is inside the amplifier, rather than on its exterior, you do need to make sure the amplifier is well-ventilated and placed on a hard surface that allows plenty of ventilation underneath.

The rear panel of the Hegel H590 is nicely laid out, with high-quality connectors used for all inputs and outputs. The layout has obviously been thought-through, but looks a little weird if you're looking directly at the rear of the amplifier, because all the left-channel inputs and outputs are on the 'right' side of it, and all the right-channel inputs and outputs are to the 'left' side. As I said, this looks odd if you're looking directly at the back of the amplifier, but makes perfect sense if you're leaning over the amplifier from the front, because then the 'left' inputs

and outputs are on your left, and the 'right' inputs and outputs are on your right. Maybe it would have been less weird if Hegel had gone the whole hog and printed the type on the rear panel upside down as well as right-side up, as some other manufacturers do.

It is well worth making special note of the fact that at a time when many manufacturers have so-called 'balanced' XLR inputs that are in reality only unbalanced inputs with XLR connectors, Hegel's balanced inputs are not only true balanced inputs, but also use very high precision discrete instrumentation amplifiers with high common mode rejection ratios.

WEBSITE AND MANUAL

I feel the need to commend Hegel on its website, which is an object lesson in what I think the website of a manufacturer of audio equipment should look like. Each product gets its own page, and on this page there's an excellent, easy-to-read description of the product's capabilities, plus a complete set of specifications, links to reviews, links to explanations of the technologies used in the product, links to dealers, plus a link to a dedicated support page that in turn contains links to the Owner's Manual, the IR and IP codes, firmware upgrades and drivers as well as helpful guides about UPnP, Tidal and more. There are no fancy sliders, overlays or dissolves, so it's a fast, informative, and easy-to-navigate site. For example, if you're connecting a computer to the Hegel H590 you won't need a driver if you're using Windows 10 or Mac OS... or even Linux, but if you're using an old version of Windows you will need a driver, and this can be downloaded from the support page.

As you'd expect from the professionalism of Hegel's website, the Owner's Manual provided with the amplifier (which is also available on-line) is also outstandingly good... very high-quality printing, well-written, well laid out, and with useful and informative illustrations.

Sophisticated protection circuitry protects against excessive current delivery and over-heating

Maximum flexibility in every room.



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There's even, on page 9, a bit of light relief! The website and the manual certainly give you confidence in the product.

IN USE & LISTENING SESSIONS

Your first quest will be to find the main power switch. Luckily, it's a huge rectangular push-button and although it's underneath the amplifier, Hegel has located it midway across the amplifier and very close to the front panel, so it's really easy to find and operate. I say this specifically because some of the manufacturers that hide their power switches under or behind their products put them in really inconvenient locations.

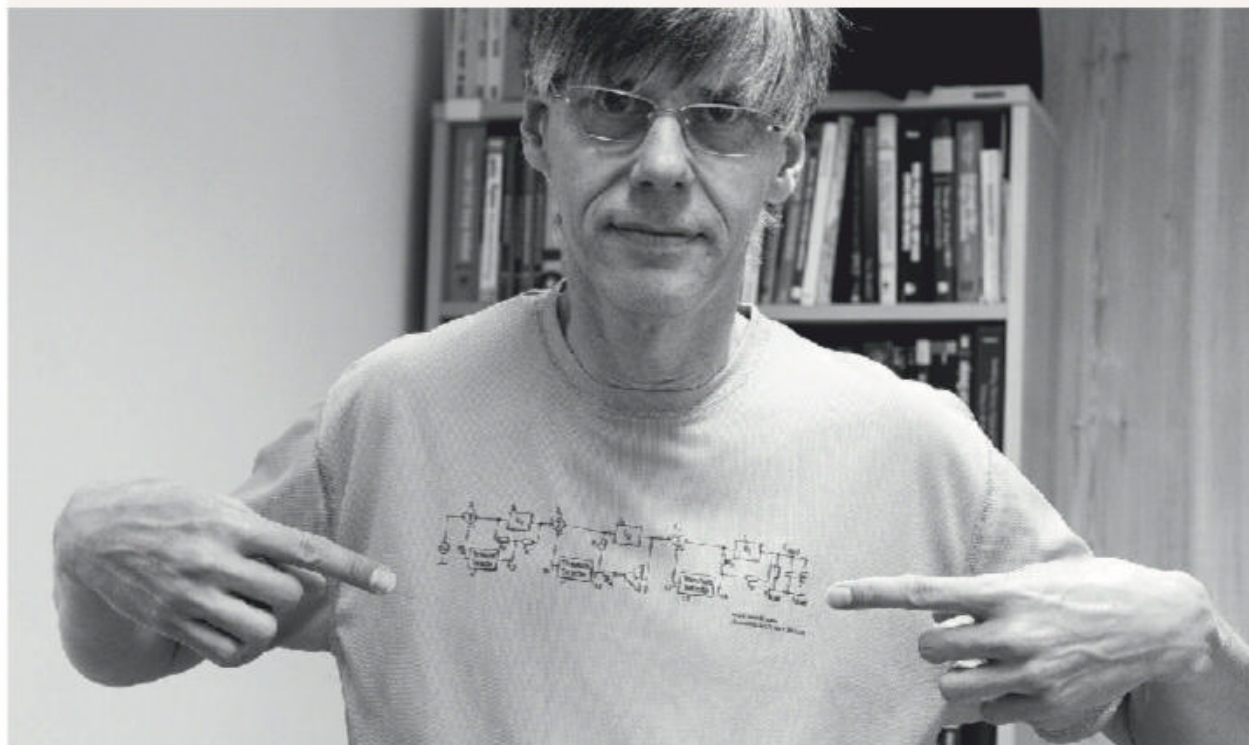
Once you have powered up the Hegel H590, the display briefly flashes 'Hegel' before taking a few seconds to go through a 'self-check' routine that presumably makes sure you haven't accidentally made a misconnection. During this time, the output is muted. If the amplifier passes the self-check it defaults to Volume 20, and the source you last used.

The volume and source selection rotary controls operate almost noiselessly and rotate very smoothly, and both have a 'soft' feel that came as a very pleasant surprise.

Hegel has designed its muting circuit correctly, so that if it's muted, the amplifier will automatically unmute itself and restore normal operation if either the front panel volume control is moved, or one or the other of volume controls on the remote control is pressed. This is an excellent safety feature, and prevents anyone from turning up the volume whilst the muting circuit is active. Hegel has also made sure that the amplifier stays muted when you're switching from one source to another, which is very useful, very sensible, very safe... and very rarely implemented. Curiously, the 'unmute' action is not instantaneous, as I would have expected, but it is quick enough to be effective.

Speaking of switching from one source to another, I did find it a bit tedious stepping through inputs, because if you're playing back an analogue source via XLR1, for example, and want to listen to a digital source via the coaxial input, you need to press the remote IN+ button six times, but in my experience, this is only a nuisance when I am reviewing equipment, in which case I am switching inputs far more often than I would normally. In real life, I tend to leave my amplifier switched to one source or another for very long periods of time.

Speaking of sources, the Hegel H590 does not have a phono input. I mention this only for completeness, because my experience is that these days, most audiophiles who are using turntables prefer to use an outboard phono stage and connect this to a regular line input, rather than use built-in phono stages. As such, and given the price of the H590, this is probably a sensible move on Hegel's part.



HEGEL: THE BACK STORY

Hegel is a Norwegian company which had a rather strange beginning. Back in 1988, a young electrical engineering student called Bent Holter [pictured above] was studying at the Technical University in Trondheim (NTNU), paying his way through his degree by playing in a heavy metal band called 'The Hegel Band'. As the band became more successful and started playing larger venues, it needed more powerful amplifiers, so Holter decided to save the band some money by building them himself, using a new amplifier topology based on a circuit he'd developed for a thesis in which he'd proved that it was possible to reduce distortion in an audio amplifier without adversely affecting other performance parameters—in particular frequency response and damping factor. That circuit is now trademarked by Hegel as 'SoundEngine Technology'.

Rather than build 'one-off' amps, Holter decided the circuit was so good it deserved to be built into commercial products. Of course the new company required a name, so Holter decided on using his band's name for both the name of the company and the brand name of the amplifiers.

As for the 'SoundEngine Technology' for which Bent holds a patent (US6275104B1), it appears to be a unique implementation of a technique called 'feed-forward' that was first

proposed and used by Harold S. Black in 1923 when he was working at Western Electric. Then Seidel and Beurrier developed it further for Bell Laboratories in the late 60s, and of course none other than John Vanderkooy and Stanley Lipshitz (University of Waterloo) also applied themselves to improving it in the early eighties.

The version Bent patented uses several series-connected amplifier stages with each one having its own voltage and current gain function, as well as its own local error correction. Distinctively, correction is applied dynamically so that no correction at all is applied under a threshold level, in which circumstance the gain stages work as cascaded local feedback gain stages with the specified voltage and current gain. Stages that are error-corrected are able to apply different amounts of voltage and current gain.

Bent's patented circuit has multiple advantages, including increased immunity to radio frequency interference, higher tolerance to reactive speaker loads, reduced levels of harmonic, intermodulation and transient intermodulation distortions, stable phase across the audio frequency range, and increased linearity at high voltage/current levels, particularly at high frequencies.



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KRIX
EXPERIENCE SOUND

There's no point in providing an input that its customers are not going to use. However, an omission that did surprise me is that the H590 does not have a headphone output.

The DAC inside the Hegel H590 is AKM AK4490 which has selectable filters of which Hegel has implemented the minimum phase/fast roll-off implementation. Using the digital inputs is straight-forward—nothing required other than to input PCM up to 32-bit/384kHz, or DSD64, DSD128, DSD256 (via DoP). Using Spotify is equally simple, just connect the H590 to your network, open the Spotify app on your device (phone, tablet or laptop) using the same local network, choose 'Hegel H590' from 'Devices Available' and start listening.

Using AirPlay on the H590 is similarly straightforward. Once you have connected the H590 to your network via the Ethernet socket on the rear, it will automatically receive an IP address, after which all your AirPlay compatible devices will show the H590 in their list of 'Speakers'. As already noted in the introduction, the Hegel H590 supports up to MQA 8x (352.8kHz/384kHz) but only via its USB input.

Streaming music from a NAS drive, computer or the Internet requires a little more effort because the H590 is a renderer and requires that you download and install one of the many free media servers that are available, such as MinimServer, Asset uPnP, Kinsky or Twonky. I won't go into too much detail about this because if you already know your way around media servers, I'd be telling you how to suck eggs, and if you don't currently use a media server, I would recommend that you ask your hi-fi dealer to install and set up their preferred media server for you, after which it can become your preferred media server on whatever device you're using. This will ensure you can always get instant, informed advice, even over the telephone.

One advantage of having its heatsinks inside the chassis, rather than outside it, is that the Hegel H590 comes up to its opti-

mum operating temperature very quickly, so there's no need to leave it switched on all the time. This means you can leave it in its standby mode whenever you're not using it, which means you will save money on power bills (the Hegel consumes quite a bit of power even when it's idling), plus you will also extend product life.

The Hegel H590 demonstrated its ability to deliver enormous levels of power, and its ability to control even the largest-coned, lowest-impedance loudspeakers right from the outset, while I was playing Sara Bareilles' 'The Blessed Unrest' from a few years back. Listening to *Brave*, I turned the volume right up to glory in the drumming, the bass lines and Bareilles' sparse piano chords and no matter how far I went, the Hegel H590 just responded instantly and accurately. The abrupt conclusion to the song made me realise how quiet the amplifier is, too. I literally went from the music being ear-shatteringly loud to hearing a total and complete silence. It's eerily satisfying when I hear an amp do this... because not many can.

I admired the Hegel H590's tonal transparency first with Bareilles' voice on her song *Hercules*, where she demonstrates her vocal range, and the Hegel demonstrates that no matter where she is in it, it will reproduce it perfectly. I followed on in track order not least to play my favourite track on this album, *Manhattan*, which is a beautiful piano ballad on which Bareilles demonstrates her delicate touch on the keyboard, and the Hegel demonstrates that it can deliver piano sound as exactly as if you were listening to the instrument live, complete with growly notes in the lower octaves and gloriously tinkling ones in the upper octaves. The sustain pedal is left pressed down for long periods for much of this track, so the sounds become mixed, but I heard exactly what was going on thanks to the clarity of the Hegel H590's delivery. The sound effects of *Satellite Call* made my listening room sound like an echo chamber and highlighted the smoothness of the Hegel H590's delivery with a completely sustained soundfield.

The super-high synth sounds of *Cassiopeia* didn't faze the Hegel H590 at all, and it separated the synthesised sounds from the real sounds with aplomb. Then I got to love how real the Hegel H590 made the sound of my second-favourite tune on this album, *1000 Times*. The sound of Rich Hinman's pedal steel is a standout on this one, as is that of the cello, and the purity of the Hegel H590's delivery is such that you can hear it's Colette Alexander's cello and not Cameron Stone's.

The Hegel H590's astounding transient ability is amply demonstrated on *Eden* with its blips, syncopated beats and stuttering

rhythms. Bareilles' usually deft lyrics come up short on this track as she includes some lines that would be better left out... but it's all good, as they say. Her lyrics certainly come good again on the close-out *December*, where she kicks off with 'Afternoon has settled long and heavy on my shoulders/The winter's light feels different on my skin/It doesn't seem to strike as far below the surface so/I have to conclude that shadow won't let it in.' A gloriously anthemic ending to a fantastic album.

I then extended my examination of the Hegel's power output and bass delivery with Telarc's 'Great Fantasy Adventure Album', a collection of movie themes and sound effects that includes frequencies down to 10Hz, (*Terminator*) plus you get everything from T-Rex footsteps to the interior of a submarine at depth (*Hunt For Red October*). Listen to this album to be amazed at the dynamic capabilities of the Hegel H590, and be even more amazed that this powerhouse amplifier obviously has more—far more—power stored in reserve for when it's required. It just delivers and delivers. Even when I tried my unrealistic test of wiring multiple loudspeakers in parallel, to create an unrealistically low 'killer' load that usually has the protection circuits of most amplifiers tripping immediately, the Hegel H590 didn't even miss a beat, sounding just as musical, just as rhythmic and delivering even more power to all of them. It was as if the Hegel were asking: 'Is that all you've got? Give me more!' After hearing how the Hegel performed on my 'killer load' test, I was not at all surprised to learn that Paul Miller measured the dynamic power output of the Hegel H590 at an incredible 2.28 kilowatts (into 1Ω) when he bench-tested one for the UK magazine *Hi-Fi News*. (*Newport Test Labs* does not measure dynamic power, but you can see the continuous power levels it measured in the accompanying test report.)

Of course I had to give the Hegel an enormous symphonic work to sink its teeth into, and it was my favourite version of Tchaikovsky's Symphony No 4, with the Leningrad Philharmonic Orchestra under the whip of Evgeny Mravinsky (DG 477 5911) that stepped up to the plate to this end. I say 'whip' rather than baton, because the energy in the playing is palpable—listening to this version is truly exciting. Also exciting is the sound quality, which is superb, so it's doubly exciting to be able to experience a great performance with great sound. You'll know you're in for a true experience right at the start of the first movement, where after the horn and woodwind opening (and then the trumpets) you hear the large, slow syncopated chords and then, out of the blue, two short chords, each *fortissimo* and each followed by silence.

The Hegel H590 demonstrated its ability to deliver enormous levels of power ... right from the outset

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The Hegel seemed born to be used to play this work, with its super-high power and super-low noise floor and its exceptionally low levels of distortion. The whole passage is reprised—even louder, and with added percussion—in the *finale*, and to even greater dramatic effect. Such was the energy of the sound that after the coda died away I felt the amplifier’s heatsinks, but they were only warm to the touch, so the sinking is obviously more than adequate. (And if you’ve never heard Tchaikovsky’s Fourth, and the *finale* sounds familiar when you do, it’s because a very short excerpt of it is included in the opening to the track *Wish You Were Here*, from Pink Floyd’s album of the same name.)

CONCLUSION

Hegel makes many claims for its H590, including that it’s ‘a master at musicality’ and that it’s ‘the commander of any set of loudspeakers’ as well as it being this Norwegian manufacturer’s ‘ultimate integrated amplifier’. Ordinarily, I’d dismiss such claims as advertising puffery, except that in this case, the company is absolutely correct. The Hegel H590 is an immensely powerful and totally musical amplifier that will easily and gracefully drive any loudspeaker load. It’s also outstandingly well-designed, beautifully built and packed with circuitry that will enable it to do pretty much everything you need a modern hi-fi amplifier to do. The fact that its price reflects all these highly desirable attributes should not come as a surprise.  greg borrowman

Hegel H590

Brand: Hegel
Model: H590
RRP: \$15,995
Warranty: Two Years
Distributor:
Advance Audio Australia Pty Ltd
Address:
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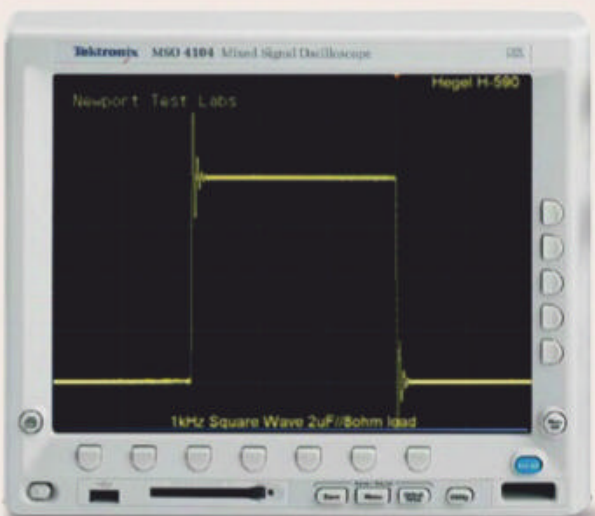
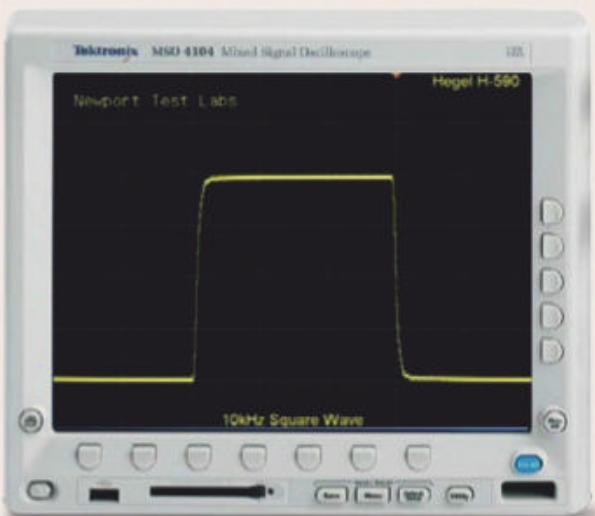
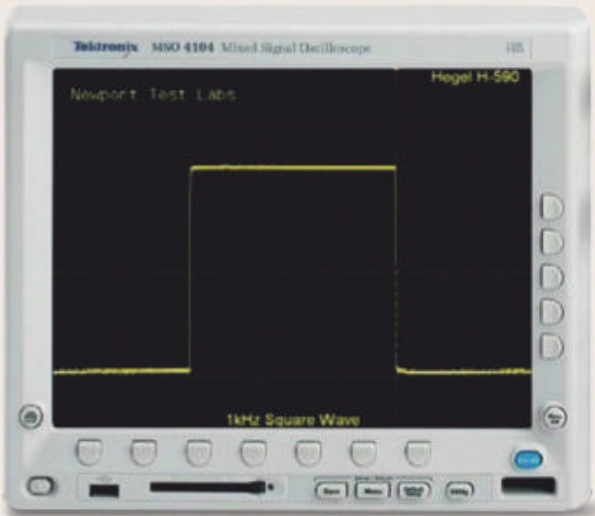
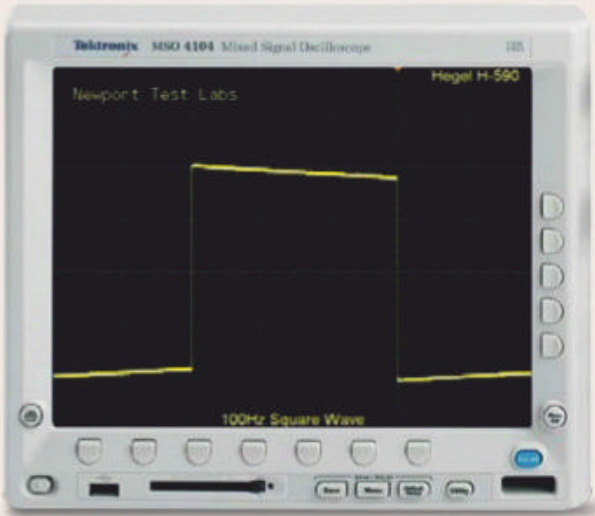
Readers interested in a full technical appraisal of the performance of the Hegel H590 Integrated Network Amplifier should continue on and read the LABORATORY REPORT published on the following pages. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

LABORATORY TEST REPORT

Newport Test Labs measured the power output of the Hegel H590 at 1kHz as 295-watts per channel when both channels were driven into 8Ω non-inductive loads. This is a touch under the claimed 301-watt specification, but then again Hegel doesn’t specify whether its 301-watt rating was measured with one or two channels driven, or the frequency at which it was measured. And, as you can see from the tabulated results, Newport Test Labs did measure an above-specification 303-watts per channel (both channels driven) when using a 20Hz signal, and another above-average specification 305-watts single channel driven at the same test frequency. At 20kHz, output dropped to around 280-watts per channel single channel driven and 276-watts when both channels were driven. However, even if we take the lowest measured result (276-watts), this is only 0.3dB lower than specification, a difference too small to be noticeable.

Hegel does not specify power output into 4Ω loads (though it does specify that the H590 will drive 2Ω loads), but Newport Test Labs measured it with this load anyway, and you can see that at 1kHz, the Hegel H590 delivered 552-watts per channel when a single-channel was driven, and 530-watts per channel both channels driven. Again, the maximum power output increased slightly at low frequencies, and decreased slightly at high frequencies.

Frequency response was extremely flat, and more than adequately extended, with Newport Test Labs measuring the overall frequency response as 3Hz to 210kHz –3dB. With a slightly tighter level variation window, the measured result was 7Hz to 120kHz ±0.5dB. Across the audio bandwidth Newport Test Labs measured the Hegel H590’s frequency response at 20Hz to 20kHz ±0.5dB, irrespective of whether it was driving a standard 8Ω non-inductive laboratory test resistor (the black trace



on Graph 7) or a reactive load simulating the load which would be presented to it by a typical two-way loudspeaker (the red trace on Graph 7). You can see from this graph that the deviation in the response (tiny though it is) essentially occurs only due to the amplifier’s low-frequency roll-off.


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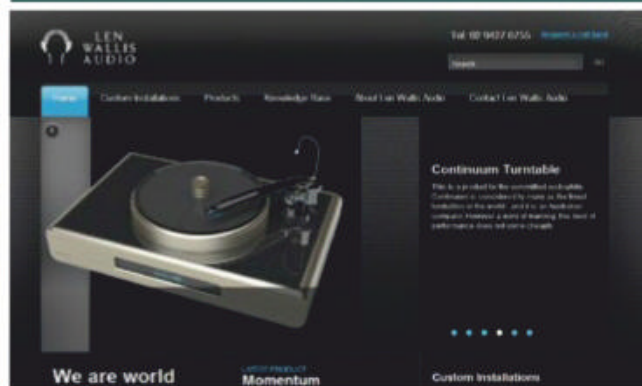
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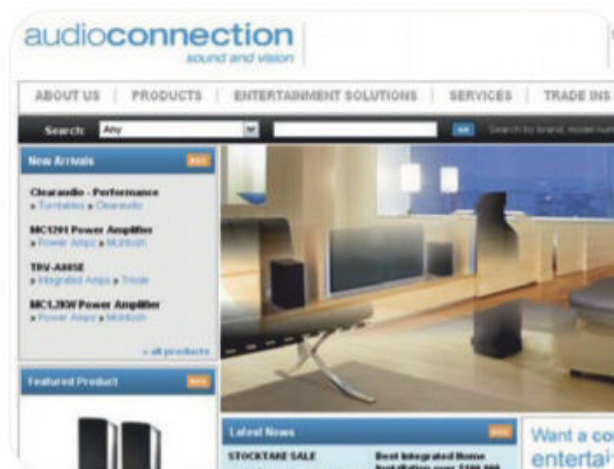
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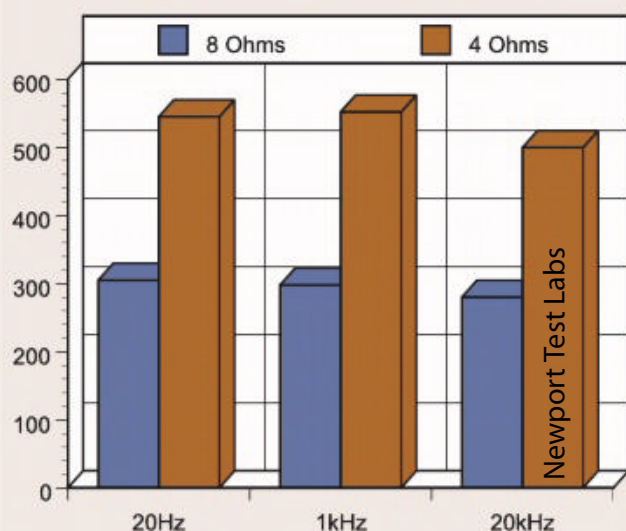
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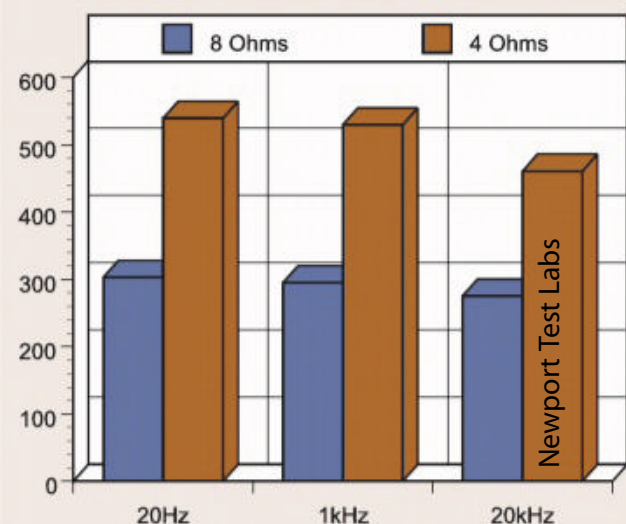


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Power Output: Single channel driven into 8-ohm and 4-ohm non-inductive loads at 20Hz, 1kHz and 20kHz.



Power Output: Both channels driven into 8-ohm and 4-ohm non-inductive loads at 20Hz, 1kHz and 20kHz.

Above 70Hz the response is ruler-flat to 20kHz and only around 0.05dB down at the 40kHz upper graphing limit.

Channel separation was outstanding at low frequencies (121dB), superior at mid-range frequencies (112dB) but slightly less than stellar at high frequencies (77dB). That said, 77dB is far more than required to provide channel separation and stereo imaging beyond what the human ear is capable of resolving. Interchannel phase was excellent at low and mid-frequencies—0.01° at 20Hz and 0.03° at 1kHz, with the error increasing to an again-inaudible 0.99° at 20kHz. Channel balance was 0.1dB at 1kHz.

Distortion at an output of 1-watt into 8Ω was very low. *Newport Test Labs'* spectrogram shows only a few distortion components, all of which are at or more than 100dB down. As you can see from Graph 1, there's a second harmonic component at -104dB (0.0006%), a third at -100dB (0.001%), an eighth also at -100dB plus one at 15kHz at -110dB (0.0003%) and another at 20kHz at -105dB (0.00056%). Overall THD+N at 1-watt was 0.005%.

Distortion at an output of 1-watt into 4Ω was also very low though, with the exception of the 2nd harmonic at 2kHz, it was fractionally higher than it was into 8Ω loads. Significantly, the Hegel H590's noise floor referred to the 1-watt output was down around

-128dB except at low frequencies, suggesting that most of the noise measured by *Newport Test Labs* (as shown in the tabulated results) was mains-related.

At higher output levels (20-watts), the Hegel's distortion signature was almost the same irrespective of load impedance, but the H590's performance into 8Ω was clearly superior. Into 8Ω (Graph 3) you can see a second harmonic at -96dB (0.0015%), a third at -90dB (0.0031%) and then five higher-order harmonics that vary in level between -110dB (0.0003%) and -130dB (0.00003%). Into 4Ω the third harmonic component increases to -80dB (0.01%) and the fifth to -110dB (0.0003%) but most others are reduced or remain the same. Note that thanks to the higher 0dB reference, the overall noise floor has dropped further, to -140dB, and you can see the mains noise contribution has also dropped equivalently.

So far as overall noise levels are concerned, *Newport Test Labs* measured results of 72dB unweighted and 86dB A-weighted referred to 1-watt, and 97dB unweighted and 111dB A-weighted referred to rated output. These last two results are spectacularly good for an integrated amplifier with an on-board DAC.

Intermodulation distortion (CCIF) was very low for both the tested levels (1-watt and 20-watts). The sidebands immediate-

ly adjacent to the two test signals were 95dB (0.0017%) down at 1-watt and 90dB (0.0031%) down at 20-watts, while the regenerated difference signals were 94dB (0.0019%) down at 1-watt and 83dB (0.007%) down at 20-watts.

In all the square wave testing performed by *Newport Test Labs* the Hegel H590 returned excellent waveforms, as you can see for yourself from the oscillograms. At 100Hz, there's the tilt you'd expect from a non-d.c. amplifier, but none of the bending that would be indicative of low-frequency phase shift. The 1kHz wave is nigh-on perfectly shaped, while the 10kHz square wave is very nearly as good as the 1kHz wave, exhibiting a very fast rise-time... rather as you'd expect from an amplifier whose frequency response is so flat and extends beyond 210kHz. Square wave performance into a highly reactive load (2μF in parallel with 8Ω) is excellent, with very little initial overshoot and very quickly damped ringing (just three cycles), suggesting that the H590 will be unconditionally stable into any loudspeaker load, and easily up to the task of driving electrostatic loudspeakers.

As suggested by the H590's frequency responses into a typical loudspeaker load, its output impedance was measured by *Newport Test Labs* as 0.015Ω at 1kHz, which translates to a damping factor of more than 500, which

Hegel H590 Integrated Amplifier – Test Results – Power Output

Channel	Load (Ω)	20Hz (watts)	20Hz (dBW)	1kHz (watts)	1kHz (dBW)	20kHz (watts)	20kHz (dBW)
1	8 Ω	305	24.8	298	24.8	280	24.5
2	8 Ω	303	24.8	295	24.7	276	24.4
1	4 Ω	545	27.4	552	27.4	500	26.9
2	4 Ω	540	27.3	530	27.2	461	26.6

Note: Figures in the dBW column represent output level in decibels referred to one watt output.

Hegel H590 Integrated Amplifier – Laboratory Test Results

Test	Measured Result	Units/Comment
Frequency Response @ 1 watt o/p	7Hz – 120kHz	-1dB
Frequency Response @ 1 watt o/p	3Hz – 210kHz	-3dB
Channel Separation (dB)	121dB / 112dB / 77dB	(20Hz / 1kHz / 20kHz)
Channel Balance (Direct/Tone)	0.1	dB @ 1kHz
Interchannel Phase (Direct)	0.01 / 0.03 / 0.09	degrees (20Hz / 1kHz / 20kHz)
THD+N	0.005% / 0.005%	@ 1-watt / @ rated output
Signal-to-Noise (unwghted/wghted)	72dB / 86dB	dB referred to 1-watt output
Signal-to-Noise (unwghted/wghted)	97dB / 111dB	dB referred to rated output
Input Sensitivity (Balanced Inputs)	68mV / 1.15V	(1-watt / rated output)
Output Impedance	0.015Ω	at 1kHz
Damping Factor	533	@1kHz
Power Consumption	29.57 / 99.55	watts (Standby / On)
Power Consumption	138.36 / 940.40	watts at 1-watt / at rated output
Mains Voltage Variation during Test	238 – 256	Minimum – Maximum

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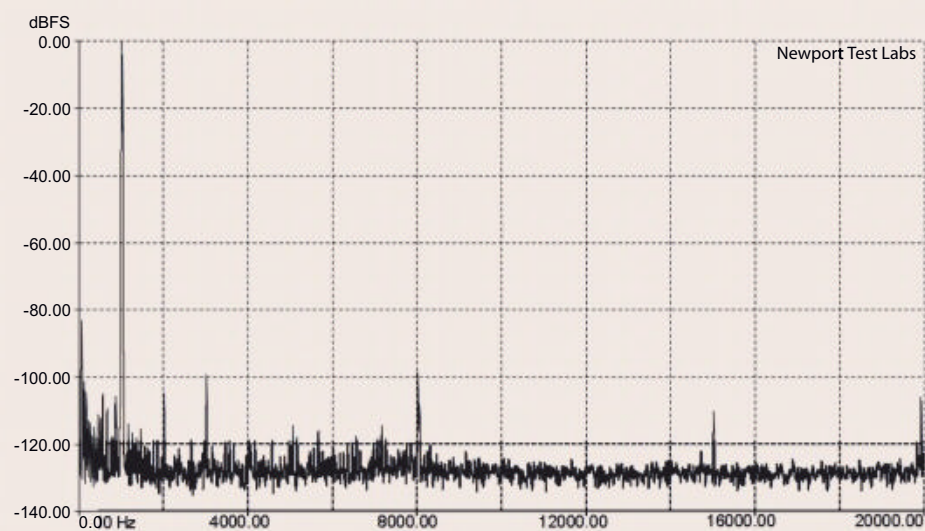


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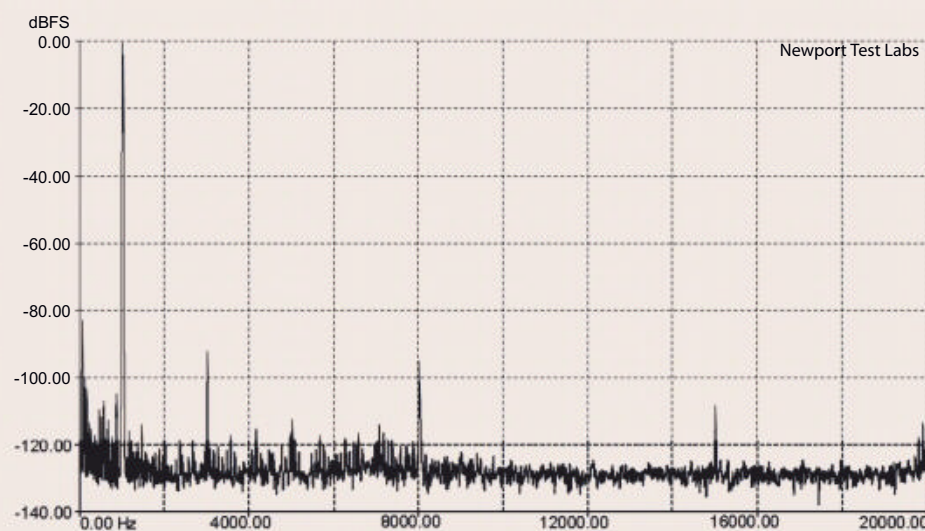
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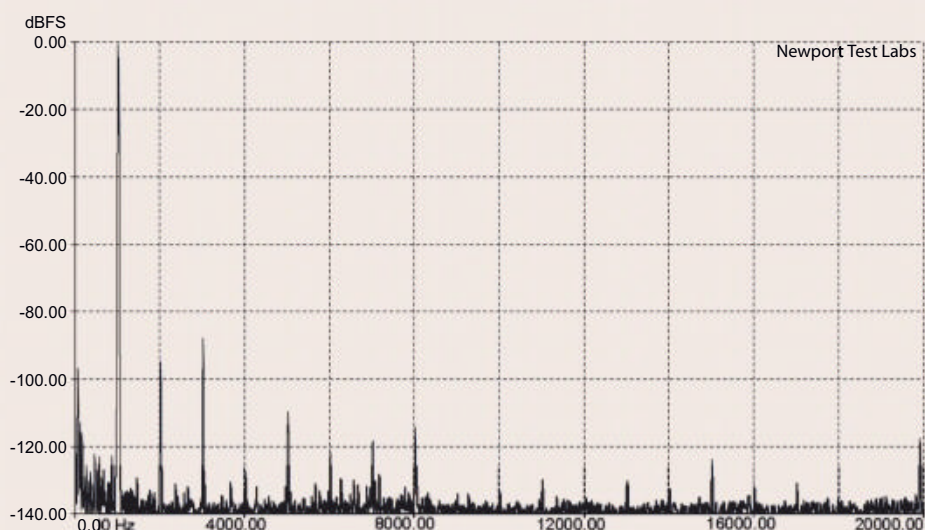




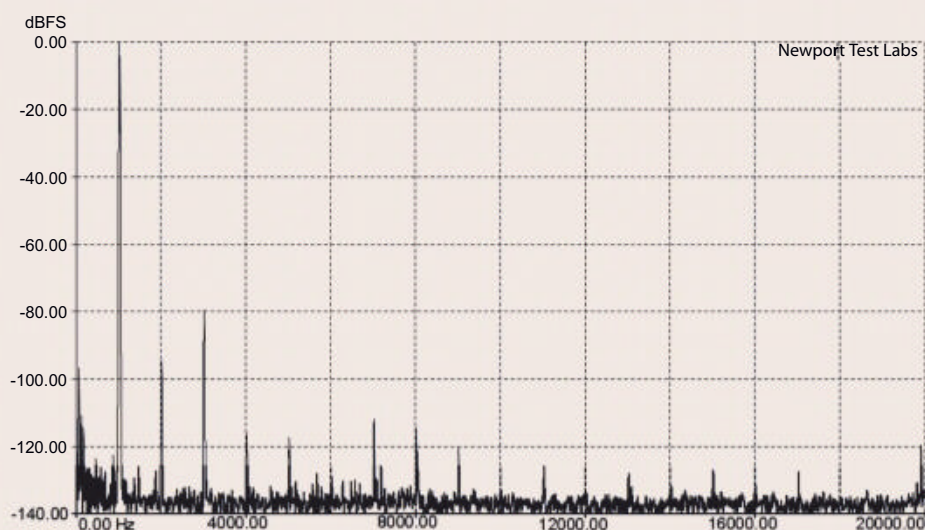
Graph 1: Total harmonic distortion (THD) at 1kHz at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB.



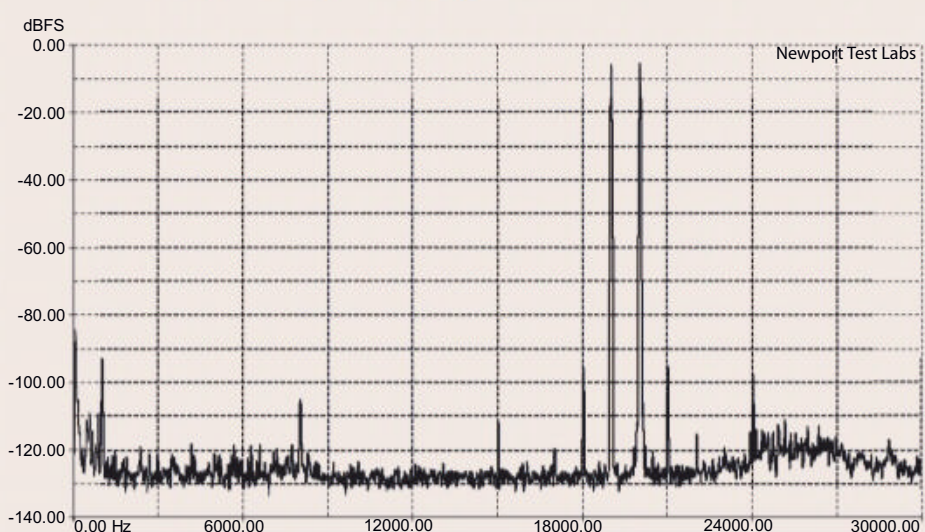
Graph 2: Total harmonic distortion (THD) at 1kHz at an output of 1-watt into a 4-ohm non-inductive load, referenced to 0dB.



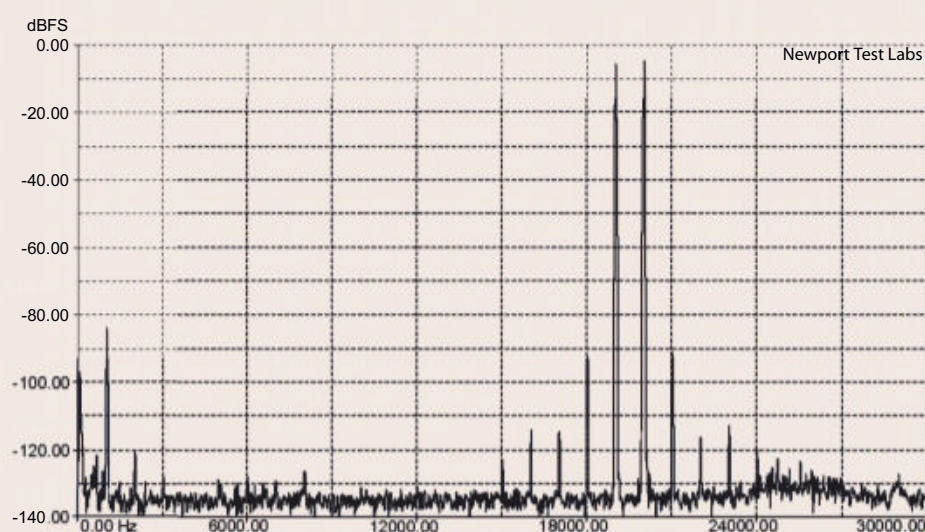
Graph 3: Total harmonic distortion (THD) at 1kHz at an output of 20-watts into an 8-ohm non-inductive load, referenced to 0dB.



Graph 4: Total harmonic distortion (THD) at 1kHz at an output of 20-watts into a 4-ohm non-inductive load, referenced to 0dB.



Graph 5: Intermodulation distortion (CCIF-IMD) using test signals at 19kHz and 20kHz, at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB.

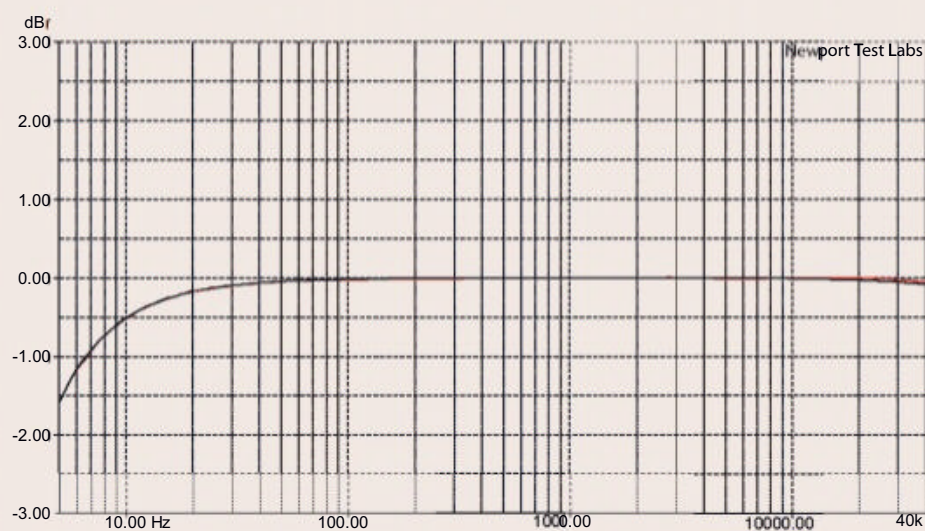


Graph 6: Intermodulation distortion (CCIF-IMD) using test signals at 19kHz and 20kHz, at an output of 20-watts into an 8-ohm non-inductive load, referenced to 0dB.

is in turn more than ten times more than required to ensure perfect control over any bass driver. Overall amplifier gain was measured at 32.8dB, with the amplifier requiring a voltage of 1.15V at its balanced input in order to deliver its rated output power of 301-watts.

As you can see from the tabulated figures for power consumption, the H590's circuitry is not overly efficient, consuming nearly 100-watts when idling and close to a thousand watts when operating at full power. Interestingly, according to *Newport Test Labs'* measurement, the amplifier still draws nearly 30-watts in its standby mode, which is no-where near the 0.5-watts it should be in order to conform to the Australian government's legislation regarding standby power consumption. Given this level of stand-by consumption, I would recommend turning the amplifier off completely whenever it's not going to be used again for more than 24 hours.

Overall, the Hegel H590 returned excellent results in all the tests performed on it by *Newport Test Labs*. It's clearly a very well-designed, high-performance amplifier. ⚡ *Steve Holding*



Graph 7: Frequency response of line input at an output of 1-watt into an 8-ohm non-inductive load (black trace) and into a combination resistive/inductive/capacitive load representative of a typical two-way loudspeaker system (red trace).



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SENNHEISER MOMENTUM3

WIRELESS HEADPHONES

Sennheiser's third-generation of its original Momentum Wireless model is a major launch from Germany's headphone-meisters given the success of the original and its follow-ups: I counted five useful innovations that make their first appearance on these new Momentum3 'phones.

Yet surprisingly the packaging doesn't scream new-release status, and still more curiously their noise-cancelling abilities get a mere feature point on the box, behind 'music & calls', 'smart pause', and 'voice assistant'. Other brands tend to give noise-cancellation naming rights, or at the very least include the letters 'NC' in their model number.

Perhaps the feature/innovation count on these new Sennheiser Momentum3s is so high that their wirelessness is the one that floated to the top. But wirelessness and noise cancellation aside, there's a whole lot

of other smart stuff going on in the new Momentum3s, some of which I've not seen elsewhere.

THE EQUIPMENT

So far as styling is concerned, these 3rd-Gen Sennheiser Momentum3s are only minimally restyled from previous generations. Some earnest style gurus will be pointing to a curve here and an entirely re-thought-out button layout there, but let's say that when you see a pair, you'll immediately pick them as Sennheiser Momentum3s.

One Sennheiser innovation that took my fancy right away (Innovation No 1) is that there's now a plastic overlay on the right earcup showing what all the buttons do. Having spent many a morning at the bus stop with new headphones trying to work out how the hell to Bluetooth pair them, or worse, how to turn them on at all, I heartily approve of this helpful gesture.

The one thing *not* on the sticker is how to turn them on and off—and there's no button for this, about which more later—but I soon realised they'd turned on by themselves, so I was able to enjoy them for the trip home.

Once home, I realised I couldn't work out how to turn them off, and I'd left the printed quick guide back at the office. Normally at this point I would google the full instruction manual, but I'd been lucky enough to be loaned this pair for review prior to their official release, so there was nothing available on-line. So I just left them on the table, aware that I'd have lots of time, because the battery will power the headphones for 17 hours, even with wireless and noise cancelling active. Twenty minutes later I picked them up and put them on and within half a second they started playing the music from where I'd left off. It turns out (Innovation No 2), that you fold the headphones into storage position to turn them off.

A few days later, after I'd folded them off in this way, I received a call on my phone, but mid-call it kept switching to the supposedly 'off' Sennheiser Momentum3s, then back to the phone, then back to the Sennheisers. It turned out you must fold in the left headshell first because the on/off switch is in the left hinge. If you instead fold in the right cup first they're likely to unfold on their own sufficiently far for the left hinge to trigger them back on (during my phone call cut-outs it must have been right on the cusp). It does say all this in the Quick Guide, and soon enough I was managing to remember which way to do it, though it would be far better if the hinge switch worked properly either way—or, and I know this is a radical idea, but maybe have an actual power button...

Once I had worked the on/off process out, I found the Sennheiser Momentum3s astonishingly quick at powering up, pairing to my device(s) and kicking off tunes wherever I'd left off. (You can stop the autoplay with an option in the app if you prefer to start things manually.)

The Sennheiser Momentum3 headphones also have 'smart' pause, which stops the music whenever you take the Momentum3s off or drop them down around your neck. The sensor for this is in the right headshell, so you can just lift off the right cup to have a quick conversation. It's highly sensitive—indeed just poking a finger under the earpad was enough to invoke a pause. You can also engage 'transparent' pass-through mode, using either the toggle switch on the right headshell, or by selecting it in the app; you can choose whether music is paused or not during 'transparent' mode.



SMART CONTROL APP

Indeed you can do a fair deal with the Smart Control app, including firmware updating, and an unusual 'tilt' style of EQ which has a single-point adjustment (Innovation No 3). This is nicely visual, although you can't, say, add bass without also curbing either treble or midrange, and *vice versa*. According to Sennheiser, this somewhat inflexible method of equalisation is designed to make things easier for the average user and I'd agree that it is rather intuitive. But it's a moot point, because I found the Momentum3s sounded their best without any equalisation: the native balance is excellent, as I'll explain later.

You can also adjust the level of noise-cancelling, something I am finding increasingly necessary given that the race to proclaim 'world's best noise-cancellation' has led some manufacturers to develop levels of cancellation sufficient to suck out your eyeballs, as well as being detrimental to the music quality. Sennheiser's three variations include an 'Anti Pressure' setting, the first time I can recall any manufacturer acknowledging that uncomfortable issue of ear pressure and eyeball-sucking. (Innovation No 4.)

A dedicated button gives one-touch access to your phone's default voice assistant (Siri or Google Assistant), while Alexa was enabled with a firmware update just as I finished this review. (The Alexa app wouldn't recognise the Sennheisers, but it was its first day on the job, after all.)

Another slap-us-in-the-face-that's-neat innovation is 'Tile'. You may have seen these small square key-rings which can be found within Bluetooth range by using the Tile app—I used to attach one to our dog who had a wayward habit of disappearing into bushes to eat dead things, and he seemed genuinely confused that we could suddenly find him so easily.

Well the Tile folk have been spreading their wings, working with BLE (Bluetooth Low Energy) chip companies including Qualcomm and Silicon Labs, to get Tile tech into headphones made by Bose, Plantronics, Skullcandy, Sol Republic and, now, Sennheiser. So should you forget where you put your Momentum3s, or your teenage child (or dog) steals them, you'll be able to track them down with the Tile app.

Bear in mind that unlike most 'Find My Phone' services, Tile works only within Bluetooth range, though there is a premium service which crowd-hunts missing Tiles. I queried with Sennheiser how long this lasts, as conventional Tiles are only guaranteed for a year, after which you're bombarded with emails encouraging you to buy new ones (the latest Tiles have user-replaceable cells). It turns out that rechargeable headphones like these will keep Tile eternally active. (The one-year limit was down to an internal power issue for the little Tile keyfobs.) While others offer Tile as an option, it's the first time I've ever reviewed a pair of headphones that include it. (Innovation No 5.)

LISTENING SESSIONS

Innovations are one thing, and technology another, but the fundamental *raison d'être* for any pair of headphones is sound quality, and without this, all else matters not. And sound quality is something the Sennheiser Momentum3s have in spades, and especially in the clarity and quality of their treble, which is served even wirelessly with great purity, and not a hint of fizz or sibilance; it opens up the soundstage of recordings for a thrillingly immersive listen, while also giving voices excellent shape as well as tone, since the progression down through the midrange seemed impeccable in flatness, with not a dip or peak to be noted.

The bass of the Sennheiser Momentum3s is full, just a little dominant in the lower bass, so that I might have dialled in a little correction were it possible, but I couldn't achieve what I wanted from that intuitive but inflexible single-point EQ, which insisted on shoving up the treble if I wanted to dip the bass. This made the flat setting the best option.


There wasn't a musical genre that didn't sing under the Sennheiser Momentum3's native musical balance. Spoken voices were full and rich but not bloated. There was a head-shuddering thrum of bass under Neil Young's *Walk with Me*, a track that pushes down into the 30s of hertz. Just a little of the softness of Paul McCartney's *My Valentine* remained, but that's no real criticism, as it's a soft track. Edgy recordings had their peakiness tempered under Bluetooth transmission, and when I switched

to cabled connection, the Momentum3s clearly reached to higher frequencies.

Via Bluetooth Dion's *I Read It* (from 'Rolling Stone') was remarkably full, his vocal barely at all edgy, whereas via the cable the hi-hat was more clearly portrayed, Dion's vocal given back the edgy spit which is in the original recording. Cabled use was a little tricky on the move with an iPhone 6 because the plug kept popping out, but the sound clearly rises a notch even above the excellent Momentum3 Bluetooth performance.

One early oddity, later solved, is that I initially had issues with connection drop-outs, which seemed not to be a range issue, indeed at home I could wander further than usual without losing the connection. Especially oddly, the music would often fade out, as it does when switching apps, before reconnecting. This happened a great deal with the iPhone 6 and a little less using a brand-new iPad Pro. A possible cause was the additional Bluetooth Low Energy connection made by the Smart Control app (this shows up in settings as a second Bluetooth connection called LE-Momentum). When I killed the secondary LE-Momentum connection the app was disabled, but the drop-outs stopped completely. However, the most recent firmware update seems to have fixed this, so if you experience it, check the app for the latest firmware.

CONCLUSION

Sennheiser's Momentum3 Wireless headphones are magnificent wireless noise-cancellers—musical in performance, versatile, smart, stylish, and with all those innovations working in their favour. So forward-looking Momentum3s indeed!  Jez Ford

CONTACT DETAILS

Brand: Sennheiser

Model: Momentum3 Wireless

RRP: \$599.95

Warranty: Two Years

Distributor: Sennheiser Australia Pty Ltd

Address: Tower A, Level 14, 821 Pacific Hwy
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HEADPHONE OUTPUTS: WHAT'S WRONG?

BY [STEPHEN DAWSON](#)

Is your hi-fi amplifier or AV receiver spoiling your headphone sound? It's very likely that it is. In this article, Stephen Dawson looks into the problems confronting the manufacturers of hi-fi equipment, and headphone manufacturers, and the potential solutions...

Many amplifiers, receivers and home theatre receivers have a nice 6.35mm diameter hole on the front. It is designed, of course, for headphone listening. And it may deliver a nice signal to your headphones... or it may not.

Indeed, many headphone outputs deliver a potentially poor signal... and have for very many years. And the reason is not what we in the high-fidelity community regard as the traditional culprits—mere integrated circuits rather than proper discrete transistor-based amplifier stages. Indeed, as we'll see, IC-based headphone amps are typically better than many headphone outputs built into otherwise high-quality gear.

No, the culprit is usually the addition of resistors in line with the headphone output.

WHY DO THEY DO THAT?

What's the value of these resistors, you may ask, and why would they put them in line with the headphone output in the first place?

Well, first, some measured examples. And remember, these are all fine piece of equipment in every other respect. It's just that they happened to pass through my office over the past few months. Here are all five that I measured:

- ▶ 99Ω — Yamaha Aven99tage RX-A3080 Home Theatre Receiver.
- ▶ 325Ω — Pioneer VSX-LX303 AV Receiver.
- ▶ 465Ω — NAD T 758 v3 Home Theatre Receiver.
- ▶ 469Ω — Marantz NR1609 7.1-channel Home Theatre Receiver.
- ▶ 479Ω — Denon AVR-X3500H Home Theatre Receiver.

(Each of the values stated for measured impedance is an average of six measurements, based on two different load voltages at three different frequencies. The standard deviation for each is less than 2.5%.)

OK, can we say: oh, they just don't make things like they used to? Well, no, we can't. I cast around the office and found:

- ▶ 237Ω — an ancient NAD 1010 preamp from the early 1980s.
- ▶ 234Ω — an elderly Denon DCD-755AR CD player from the mid 1990s.
- ▶ 100Ω — a Yamaha RX-V659 home theatre receiver from the mid 2000s.

So these high impedances are not new. And it is not surprising that they should be in place, even though, as we'll see, they introduce real problems.

NO STANDARDS

First, we should realise that there are no standards for the output impedance of headphone amplifiers. Oh, I understand that in some international standard or other there's talk of 50Ω, but we can safely say that no-one pays any attention to it. Disagree? Look at the figures above. And see some of the others we'll check out below. So they can do what they like.

So the question is: why would NAD, Denon and Marantz put in more than 450Ω of resistance?

Because, if you don't mind the downsides, it's a safe practice. For one thing, with a high resistance in place, it's impossible for the headphone output to be shorted, which might cause damage to the equipment.

For a second thing, it seems likely that on those three units this arrangement allows them to avoid adding an extra amplifier to the receiver. Take the NAD T 758 v3 for example. Its headphone output delivers more than 28-volts into an open circuit. Were the volume up too high when headphones were plugged in, that could potentially result in severe ear damage to the person wearing the headphones, and would likely destroy the headphones. Plug in 300Ω headphones, and the maximum voltage drops to a bit over 11-volts. That's still high enough to do dam-

age, but nowhere near as much, and headphones with that high an impedance are rare. Use 16Ω headphones/earphones, though, and the maximum voltage drops to just under 1-volt. That's about the same as the maximum delivered by an iPhone 6 (before Apple dropped the headphone output).

Things are different for the Yamaha receiver. Its maximum output into an open circuit is only 3.2-volts, so it would seem to have a dedicated headphone amplifier. So its almost-100Ω resistance would be solely for protection of this amplifier. One downside is that the maximum voltage it can deliver into a 16Ω load is a less than half that of an iPhone, at just 0.44-volts.

HIGH IMPEDANCE: THE DOWNSIDES

So, you might ask, what are the downsides of high impedance headphone outputs?

Well, let us briefly consider voltage dividers. You can think of any voltage source as consisting of a pure voltage with an in-line resistor. As a dry cell goes flat, the best way to model it is as a pure 1.2 (or so) volt source with a variable resistor. As the battery gets flatter, the voltage remains the same but the resistor value increases. That's why you can't test batteries with a multimeter—the meter looks, in effect, as an open circuit. Any internal resistance is insignificant. (Unless the battery is completely cactus!)

So when you plug headphones into a headphone socket, the amp will be producing a certain voltage. Some of that voltage will be applied to the notional internal resistance. What's left over will be applied to your headphones. The voltages applied are proportional to the resistances.

So, if your headphones are a 50Ω load and the internal resistance of the headphone amplifier is 100Ω, your headphones will receive precisely one third of the voltage that the amplifier is providing.

That's why that NAD I mentioned above delivered 28-volts to the outside world when it was an open circuit (effectively an infinite load resistance), only 11+ volts into 300Ω, and only 0.95-volts into 16Ω. So one problem is wasted power.

THE BIGGEST PROBLEM

But the main problem is that many headphones are like loudspeakers: they have an impedance curve, not just a fixed resistance. That is, their impedance varies according to the frequency of the sound.

Typically, the impedance will be higher at some point in the bass than in the midrange. And that means that the amount of voltage that the amp provides will be different at different frequencies.

This is best illustrated by actual measurements. Graph 1 **does not** show the frequency

response of the headphones. It shows the frequency response of the headphone amplifier (with a 470Ω in-line load) when connected to a pair of Sony headphones (blue trace), a pair of Sennheiser headphones (green trace) and a pair of Oppo headphones (white trace).

The Sony headphones were a mid-priced model from a few years ago. They clearly have a peak in impedance at around 60Hz, leading to a +2dB hump at that point.

The Sennheiser ones are twenty years old, and still sound delightful. But with that 470Ω load they vary over a range of 4dB, with a lumpy mid-bass.

What about the Oppo PM3 headphones? There are quite a few headphones with an even impedance across the frequency spectrum. This model, which uses planar magnetic drivers, is just such a pair, so the voltage offered to them by the amplifier remains fairly even across the frequency range as a result.

Let's look at it in a slightly different way. The Audiofly AF140 in-ear monitor earphones aren't cheap. They sold for about \$400 a couple of years ago (there's a newer model out now). They use three drivers per earpiece and accordingly have a wide impedance variation across their operating range.

Graph 2 shows the level of signal delivered to a pair of Audiofly AF140 IEMs for two different source impedances. One comes directly from a Pro-Ject Pre Box S2 Digital DAC/Headphone amp. That's the green trace and it shows a smooth, unperturbed response. I have measured the output impedance of the Pro-Ject device as 0.24–0.37Ω. (This is hard to measure accurately because the value is so low.)

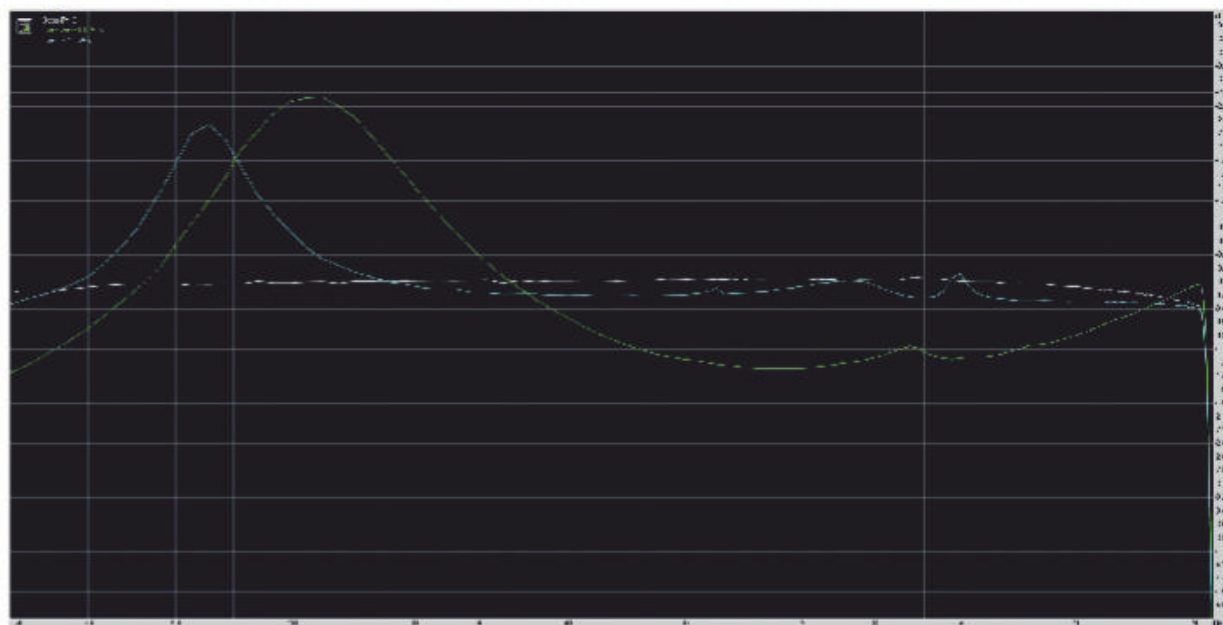
The white trace shows the response with 470Ω in line. This swings wildly over an 11dB range, with a hugely emphasised bass.

When listening, the difference is absolutely, thoroughly obvious.

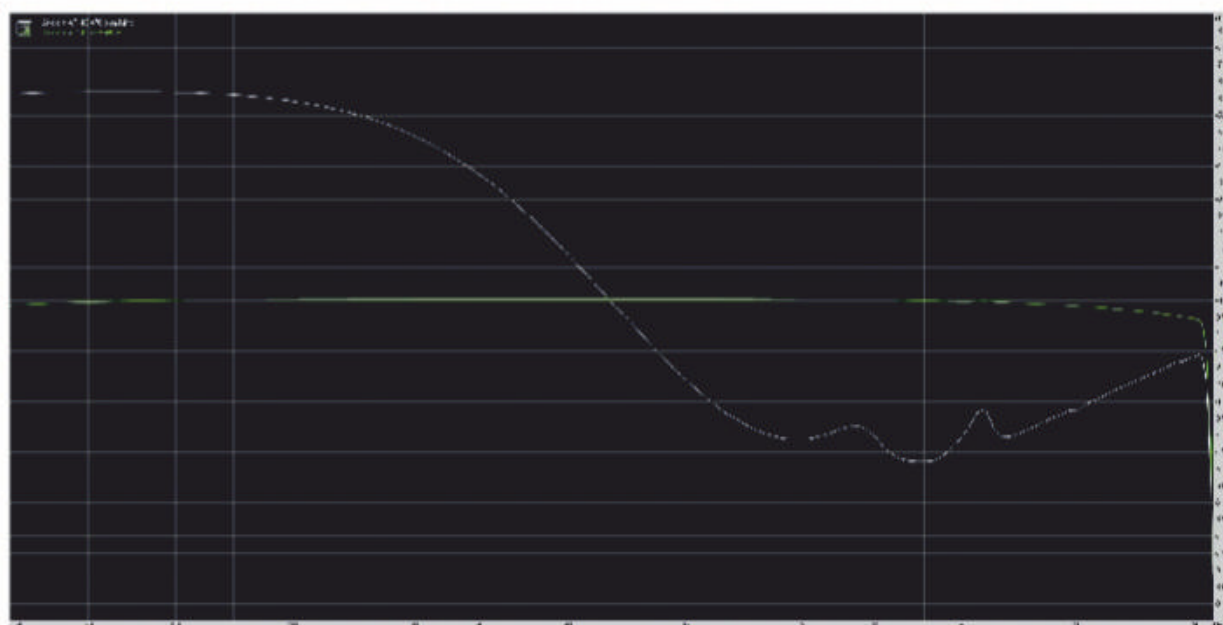
Of course, the overall output is much lower with 470Ω: 0.045-volts RMS versus 0.631-volts RMS.

For that test I used a 1kHz sine wave modulated to peak at 0dBFS, with the output level of the Pro-Ject box set to -10dB, out of a desire not to destroy the earphones.

The main problem is that many headphones are like loudspeakers: they have an impedance curve, not just a fixed resistance



Graph 1. Input voltage to three different models of headphone from headphone socket with 470Ω ohms of in-line resistance. [Note that this is not the frequency response of the headphones... see copy.]



Graph 2. Audiofly AF140s driven by high-impedance source (white trace) vs. low-impedance source (green trace).

We can calculate that at full bore, the unloaded output of the Pro-Ject box would be 2.0-volts RMS, but with the 470Ω in line, it would be only 0.14-volts. I tried the earphones with that load, and indeed at maximum output the volume level was quite low.

Now, if there were a standard headphone output impedance, and if it were routinely adhered to, then headphone makers could design their devices to work to best effect with that output impedance. But there is no standard. The output impedance of amps is rarely men-

tioned in the specifications, and the impedance curve for headphones is almost never published. So in the present state of the industry, one buys headphones with unknown impedance characteristics to use with headphone outputs of unknown internal impedance.

A BETTER WAY

Is in-line resistance necessary?

No, not at all. Audiophile-aimed headphone amplifiers frequently boast of their low output impedances. As mentioned, the Pro-Ject unit is well under 0.5Ω, and a number of other devices I have measured in recent years have been in that same ballpark, with only a few above about 2Ω, and even this impedance will result in negligible voltage variations across the frequency range.

And somehow these devices do this without any danger of short circuits as plugs are being inserted and withdrawn.

Still, surely one can't expect a \$1,500 home theatre receiver to have \$500-worth of headphone output circuitry. It really is merely frosting on the cake, not the main purpose of the unit.

Well, here's the thing: I have measured the output resistance of some other devices too.

The last iPod Nano before it was discontinued had a resistance of 2.24Ω. Let's go even cheaper. You can duck into an Apple store and for \$12 pick up a Lightning headphone adaptor. This lets you use your choice of analogue headphones or earphones with an iPhone 7 or later, which famously lack headphone sockets. This is a 48kHz DAC and headphone amplifier. Its internal resistance is just 1.5Ω. The equivalent headphone adaptor for the Google Pixel 2 phone is around 0.6Ω.

For use in a hefty bit of gear like a home theatre receiver, I'd like to see a heftier version of these: say one that can deliver 1.2-volts into 16Ω rather than 0.6-volts (0.8-volts for the Google one). But that still proves the point: decent headphone outputs are do-able at low cost.

CAN YOU TEST FOR YOURSELF?

One quick and dirty way to tell whether your device has a high or low headphone impedance doesn't require much in the way of equipment at all. Do you have a pair of Bluetooth headphones? Or other headphones with a built-in amplifier? Do they come with a cable in case the battery runs down so you can use them passively? Typically the input impedance of the headphones with the amplifier powered-up will be quite high, perhaps several thousand ohms. Plug them in to an amplifier with a fairly high output impedance, and they will get pretty close to the full voltage it is producing (unless the amp has an unbelievably high output impedance.)


And just as typically they will have a fairly low impedance in passive mode, just like regular headphones, maybe 20–100Ω. But you can expect it to be at least an order of magnitude lower than in active mode.

So? Well, switch the headphones on and plug them in. Set a comfortable listening level. Then switch them off so they go into passive mode. If the headphone output has a high internal impedance, there will be a big drop in listening level, because suddenly much of the voltage will be applied to that internal impedance instead of the low-ish impedance headphone load.

If this happens, you will know that there's potentially a problem.

CONCLUSION

I think we should push for a new standard for the output impedance of headphone amplifiers, one that clearly states that the output impedance should be less than 2Ω.

This is clearly do-able, because many devices already achieve it, and would mean that headphone makers could then focus on the most important task of designing the sound of their headphones and earphones, without having to worry about what semi-random alterations different amplifiers might make to the signal.  Stephen Dawson

Currently, we buy headphones with unknown impedance characteristics to use with headphone outputs of unknown internal impedance

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VIVID AUDIO KAYA 90

Polarising public opinion
has never worried
famous speaker designer
Laurence Dickie!



SOUND TRAVELS

Is Dutch Vinyl the best-sounding
record store in Australia?



SOUND TRAVELS

INTERVIEW **PETER XENI** WITH **PAUL BOON** PHOTOGRAPHY: **PAUL BOON**

Mark Reuton began his life in audio as an audiophile and huge music fan in Holland. His passion for music is given voice through his love of hi-fi, with the recorded performance over-riding audio. 'It can be a rough sound, as long as it's a great tune, I don't mind,' he says. A genial sort, Mark enjoys music ranging through blues to folk to soul to jazz, to classical and modern. 'Where I lived in Holland there was a lot of soul, disco, hip-hop and reggae around,' he says, and that all sparked his interest in music which

grew in tandem with his interest in audio.

'I used to daisy-chain all these speakers together, about 15–20 of them, and run them off a small cassette player that I was given for my birthday,' he said. 'Aged 14 or 15, I had a Superscope R340B receiver (a Marantz product); it had this pink glow—it looked sexy—and I had a Pioneer turntable. I also had a Philips CD100 top-loading CD player. Later I added JM speakers with a Rotel amp. By then I was writing and ringing high-end gear distributors asking for their glossy brochures—Nakamichi, Technics, Infinity, you name it. I would dream over them, and had piles of them under my bed—it was like porn.'

Three years ago Mark established a record store in the Melbourne suburb of Collingwood so he could indulge both pursuits.

He says that his customers tell him it's the best-sounding record store in Victoria... if not Australia. It boasts Infinity RS 4.5 speakers and AR 9Ls, a classic Kenwood L-07D turntable with a Cadenza cartridge and Clear Audio Double Matrix Professional Sonic record cleaning machine, and more. The store's full name is The Dutch Vinyl Record Store, but it's better-known as just 'Dutch Vinyl'.

As a teenager in his hometown of Oosterhout (Eastwood city), he'd visit the four or five major hi-fi stores in town which provided his parents and their friends with excellent systems. 'In Holland it was common amongst my friends' parents to have great audio gear. When they got married, they bought a house, a car, a nice sofa and a good hi-fi system which they spent thousands on. It was the same all over Holland and Germany. There was good gear everywhere. That's the environment I grew up in.'



There is no absolute sound; there are only differences and it's those differences that intrigue me

ST: What do you love most about audio?

MR: To this day I enjoy swapping and changing equipment, in the shop and at my home. In effect I run a multitude of hi-fi systems. As for equipment, at the moment I'm over-awed by MF's Supercharger (Musical Fidelity 550K). It is absolutely extraordinary; nothing I've had is quite in the same class in sound improvement, and yet it is only a link between the amplifier... any amplifier... and your speakers. It works effortlessly and works best with the Luxman rather than the tube Quad II's you're hearing. I'm an audiophile so I won't say I won't change it (winks) to get a different sound, but it is genuinely a revelation what having an enormous (supercharged) amount of power can do to the sound. The use of step-up transformers is another major improvement I have recently experienced.

ST: How do you perceive the shifts of audio focus when changing your equipment?

MR: There is no absolute sound; there are only differences and it's those differences that intrigue me. But if there is one component that's revolutionised my perception it's the Musical Fidelity 550K, which I regard as a 'sound disperser', because it doesn't alter the sound, it simply expands it, adding space between the instruments. The sections of an orchestra for example are better delineated, distinct and separate, and the overall quality can best be described as transformative... and I've heard a lot of equipment, believe me.

ST: Aside from the Supercharger, what else is interesting in your system?

MR: My favourite amp today is the Luxman 507UX, then there's my Dr Fieckert turntable with its Stobi S arm and Kiseki Silver point cartridge, which I run through a

step-up transformer rather than through a phono amp. The Kiseki duo arrived covered in dust, part of a job lot of equipment and records that I'd bought sight unseen. I didn't even know they were there.

ST: What do you enjoy most about owning an audiophile record shop?

MR: It's like a private party on weekends, it kicks ass, and you're sharing the joy of discovery with customers, the camaraderie is energising. I can separate the musical experience I'm sharing from the experience of just listening to audio. They are separate things for me. We have a McIntosh pre/power combo, Infinity and AR speakers, a big Kenwood and Pro-Ject Xtension turntable, Cadenza cartridge and so on, but music is the thing... the music is the big thing.

ST: What do you think of recording techniques and how they are rendered by home audio systems?

MR: Too many producers aim for perfection. I studied photography in Holland: guys would showcase a print-perfect photo. For me, it didn't matter if a print had a few flaws: that it was a bit grainy, or not perfectly exposed. A good image is a good image and a bad print should not be able to kill it. (Echoes of Anton Corbijn, the great Dutch rock music photographer). In fact, I think that the roughness of some old recordings adds to the pleasure of listening.

If you get ten top-class record producers, all will have different hearing and varied music knowledge. Even if they are all recording exactly the same thing—say a three-piece acoustic jazz band—they will use different microphones and position them differently, and will also use different studio equipment, and mix-down differently, so you will end up with ten different versions of music that started out exactly the same. Even then, trying to use this level playing-ground you won't get a replica of what you're hearing.





But as soon as you get a band using a PA, you know for certain that it is a produced product and then it doesn't matter what it sounds like through your system, because it's not true to acoustic reality. There are so many variables in recording. Room acoustics

are a major factor. I like hearing a room in a recording. A good system captures the sound of a room... think Sun Records or Chess Studios.

A jazz band is different; unlike the pop bands there's real conversation between



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instruments and you can hear interplay in the recordings. Pop is recorded with one guy recorded here and another guy recorded the next day overseas, it doesn't matter. It's all processed.

ST: *What influences your choice of components?*

MR: I'm a bit random in my audio component selection. I'm not one to visit a multitude of shops and make comparisons, and audition with the same two or three recordings. I like the 'swapping of parts' approach. I can't wait at the moment to insert an old Marantz amp I found, and the same goes for an old Thorens TD 160. At the shop I went from a Denon DL-103 cartridge to an

Ortofon Cadenza at ten times the price. I got it for a good price, but it's certainly nowhere near ten times better.

ST: *What are your future plans?*

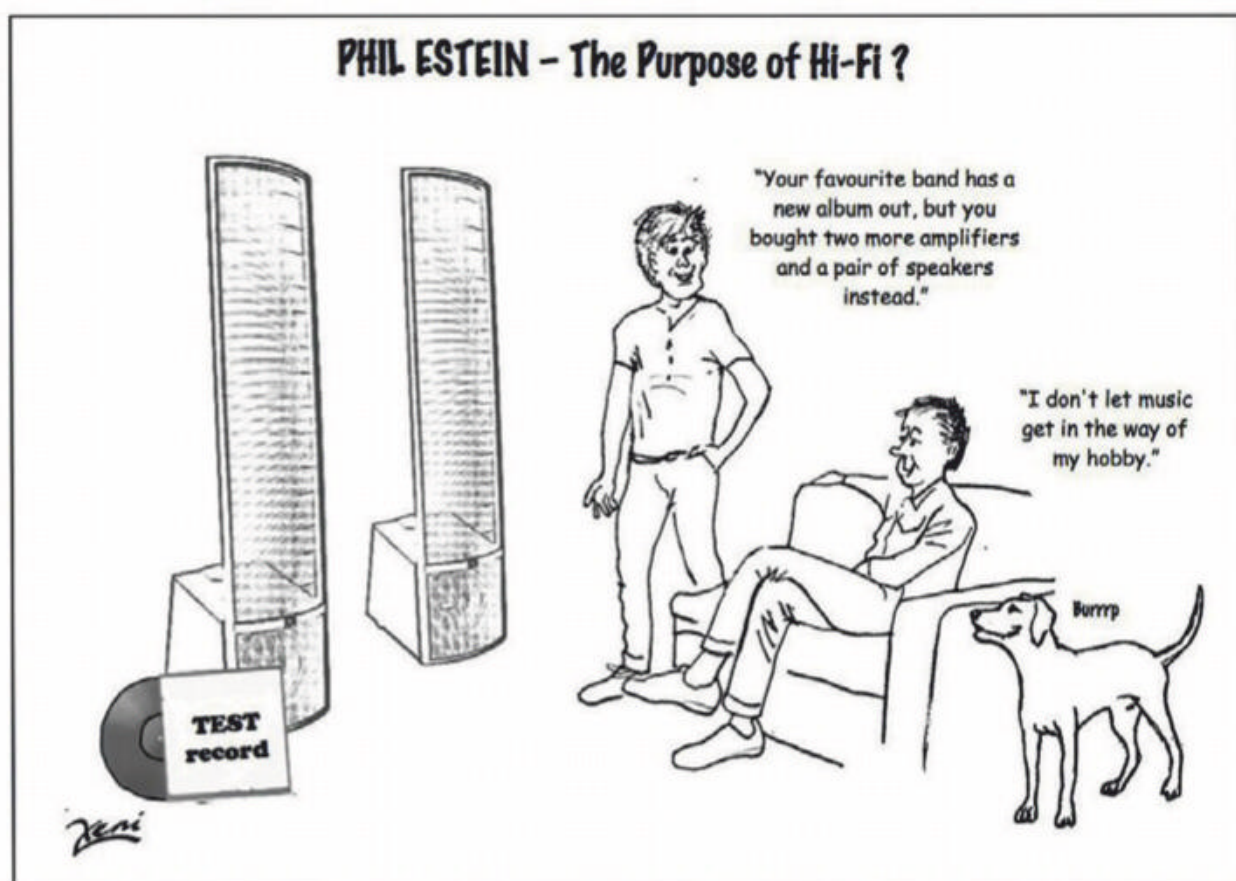
MR: I am playing with a few ideas and new ventures at the moment, but all of them focus on mixing music and great audio gear.

ST: *What would be in your desert island disc collection?*


MR: (Rolls his eyes and smiles...) I would take all Francois Hardy's records because there would be no women on the island and she has a pretty face and a sexy voice, plus all her records sound great! No, that's a joke... except that I do like her records. I'd probably take Velvet Underground and Lou Reed's Berlin and—at least if I went right at the moment—I'd also take anything by Townes Van Zandt.

ST: *How do you see the way we will consume music in the future?*

MR: I think it will continue to commodify, so as you play your music, intelligent assistants will learn what you like and will then suggest



other music they think will please you, but because the music they suggest will be similar to the stuff you already like, it means you will never hear anything challenging or different. I think there needs to be a dial you can turn to indicate how far you're happy to stray from

your musical comfort zone. If you really want to broaden your musical horizons, you should be listening to radio, because it's the best medium for introducing listeners to a broader range of music. 

[System photos by Mark Reuton]

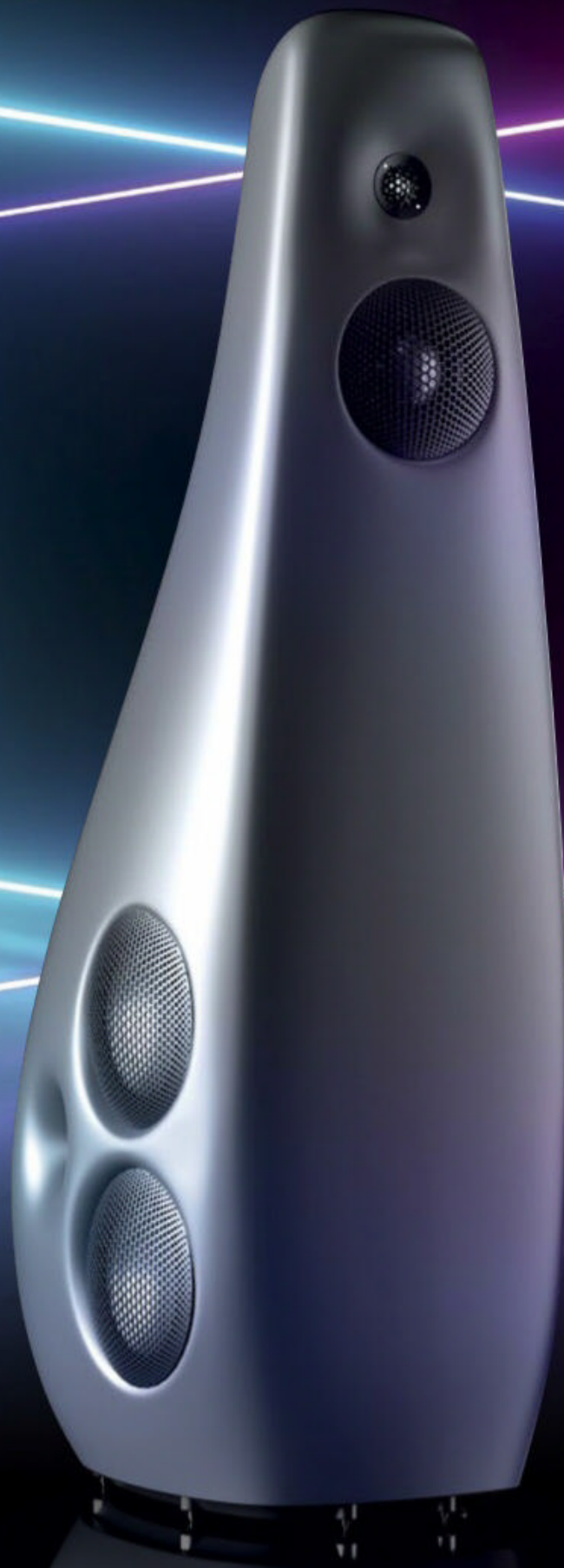


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VIVID AUDIO KAYA 90

LOUDSPEAKERS

Sound quality should be the only criterion used to judge loudspeakers, but since all the very best loudspeakers need to be present in the room with the listener, their visual design is always a consideration. The visual designs of the loudspeakers built by Vivid Audio stop most people in their tracks, and always polarise public opinion. Some compare Vivid Audio's cabinet designs to modern sculptures. Others see resemblances to famous robots, drawing similarities between the Vivid Audio B1 and R2D2, for example.

The appearance of Vivid Audio's top-line Giya G2 is often compared to that of Maïwenn: Diva, a character in the movie *The Fifth Element*.

As for the Kaya 90 reviewed here, viewed from some angles it could be a model for a friendly cartoon character. But the common word with all these resemblances is that 'character', because it's something that all Vivid Audio's loudspeakers have in spades.

THE EQUIPMENT

Putting aside for a moment the industrial design of the unconventionally curvy cabinet, the acoustic design of the Vivid Audio Kaya 90 is also unconventional in itself, because it's a three-way, six-driver bass reflex system that uses four 125mm-diameter alloy-coned bass drivers, a single 100mm-diameter alloy cone midrange driver and a 26mm alloy dome tweeter. Both the midrange driver and the tweeter are 'loaded' at the rear by tapered tubes, and the two bass reflex ports are also

loaded by exponentially tapered tubes. The purpose of these tubes is to eliminate destructive resonances and reflections.

The four bass drivers are mounted in pairs on opposite sides of the cabinet. Vivid Audio calls these 'reaction-cancelling drivers' but it's actually the way the drivers are mounted that results in the 'reaction-cancelling'... it's not something inherent in the drivers themselves. The term describes a driver mounting arrangement that not only means the reactive force from the drivers is cancelled but also means that no vibration is transferred to the cabinet from the drivers. How this works is that the bass drivers are suspended from silicone O-rings to ensure their chassis vibrations are not transferred to the cabinet, while the rear of each driver is mechanically linked to the rear of the corresponding driver on the

opposite side of the cabinet via a 'beam' inside the cabinet. This means that the motion of the cones is in opposition on either side of the cabinet, as too are the airflows from the reflex ports and so, *à la* Mr Newton's famous third law, the forces cancel.

In the Kaya 90, each driver's 125mm-diameter cone is driven by a 50mm-diameter

There are sound reasons for building loudspeaker cabinets from curved panels, based on solid research by Harry Olson

copper ribbon voice coil. The width is partly a function of the coil being short, so it's much shorter than the magnetic gap, which means the flux density is consistent irrespective of cone travel. This geometry also helps with heat dissipation, effectively reducing the effects of dynamic compression.

The Kaya 90 (the model name means 'home' in Zulu, and the numerals quantify the internal volume, in litres, of the cabinet) is a bass-reflex design, with two ports that exit on opposite sides of the cabinet. The ports you see are not just short tubes, as most reflex ports are, but are instead the business ends of what Vivid Audio calls a 'bass absorber horn' that is the defining external feature on its Giya loudspeakers.

Kaya designer Laurence Dickie says of this design: *'As with everything we do, it's there for unarguable engineering reasons: it absorbs resonances and coloration, so you can hear every note with perfect precision and clarity. But we'd be the first to admit such a radical look isn't for everyone. With the Kaya 90, the horn is still there; for the same reasons, and giving you the same benefits. The difference is that it's folded back on itself, so it curves round inside the enclosure. So Kaya 90 gives you the same resonance-free sound in the lower midrange from a slimmer, more understated profile that you may find easier to live with.'*

The Vivid Audio Kaya 90s' 100mm mid-range driver is, as with all other of Vivid Audio's drivers, made in-house by Vivid Audio itself, using radially-polarised neodymium magnets. This is an expensive way to build drivers, but it has many advantages, including being able to use more powerful magnetic material, the ability to focus the magnetic field more intensely in the gap, and the lower levels of magnetic 'leakage'. Although it's technically a 'cone' driver, dispersion is

almost that of a dome midrange, due to the enormous size of the dust-cap, which is fully 70mm in diameter, sitting atop a cone that's only just a bit wider than it, at 100mm.

The tweeter in the Kaya 90 is the D26, which features on almost all Vivid Audio's models. It has a 26mm anodised aluminium dome with a catenary—rather than a

hemispherical—dome mounted atop an edge-wound aluminium voice coil that is driven by eight radially polarised neodymium iron boron magnets.

According to Vivid Audio, the magnetic flux density in the gap that results is so powerful (2.4Tesla) that it

could not use ordinary ferrofluid and had to commission Ferrotec Corp (USA) to formulate a special one specifically for the D26. Pressure from the rear of the dome is dissipated inside a fibre-damped, exponentially tapered tube which, according to Dickie: *'has an acoustic performance identical to that of an ideal enclosure, being completely free of resonance or reflection.'* Cognisant of the fact that most metal-dome tweeters have a fairly low resonant frequency, Vivid Audio uses a special fabrication technique to manufacture the dome which it claims pushes the resonant frequency *'above 44kHz'*. Catenary domes, by the way, have been used by engineers and architects since the 14th century, and very possibly even earlier. *'For an arch of uniform density and thickness, supporting only its own weight, the catenary is the ideal curve,'* says one textbook. If you have ever visited one of Antoni Gaudi's buildings you will have walked under one or more of his catenary arches, most famously in Casa Batlló in Barcelona.

The nominal crossover frequencies for the Vivid Audio Kaya 90 are at 300Hz (bass to mid) and 3kHz (mid to tweeter). All crossover components are of high-quality, and include air-cored inductors and polypropylene capacitors. The Kaya series cabinets are of composite construction, with a honeycomb-like centre (presumably Soric XF, which is manufactured by Dutch company Lantor), both sides of which are reinforced by fibreglass. This means the outer layer can be tinted almost any colour you want—an option that is listed by Vivid Audio as its 'bespoke' colour option, and attracts a price premium over the standard colours. The standard colours are Piano Black, Pearl, and Oyster Matte. This method of construction results in a very light cabinet, so that despite the cabinet being 1.2 metres high, it weighs only 38kg.

I thought this would make them ideal for shipping in standard cardboard boxes but each Kaya 90 comes in its own solid wood packing crate that, at 17kg, approaches the weight of the speaker it contains. Clever design means that uncrating the speakers (and in my case, recrating them) is straightforward. My only issue with this form of packaging is that it's so large and bulky that you can't really store it on the off-chance that you may move house at some point in the future. If you do move, I think it would be a case of wrapping the speakers in doonas and transporting them in your own car, rather than leaving them to the tender mercies of a removalist.

But let's get back to the curvy nature of the Kaya 90 enclosures (and, indeed all Vivid Audio loudspeaker enclosures). There are sound acoustic reasons for building loudspeaker cabinets from curved panels, based on solid research that goes all the way back to Harry F. Olson, who was director of acoustical research at RCA in the USA from 1934 onwards, and wrote the definitive work on loudspeaker enclosure design (Direct Radiator Loudspeaker Enclosures, JAES, Vol 17 No 1), in 1979. (In between he found time to patent the first air-suspension cabinet—in 1949, with J. Preston—pre-dating Edgar Vilchur's acoustic suspension cabinet by four years, and to design and build [with Herbert Belar] the world's first music synthesiser [the Olsen-Belar Sound Synthesiser]. Over the course of his working life, Olson patented more than 100 significant inventions... most involving sound and acoustics in one way or another.)

Olson proved that all other things being equal, the sound from a loudspeaker with curved walls will sound better than if any other cabinet shape is employed. He detailed and quantified all the technical reasons—superior dispersion, reduced diffraction, absence of interference effects, and so on—but

in layman's terms, his conclusion was that 'curves are best'.

So why don't all speaker manufacturers build cabinets with curved walls? Want the real reason? It's just too difficult... and too expensive. And we're not only talking manufacturing. Curvy speakers are difficult (and expensive) to store and ship. There's a reason the Kaya 90s come in huge wooden crates, you know! Plus, of course, the minute you build something colourful and curvy, you know you're going to lose a whole lot of customers straight away, most especially the curmudgeons who insist that 'speakers should look like speakers'.

When designing the external appearance of the speakers in the Kaya range (other models available in the same range include the Kaya 45, Kaya 25 and Kaya 15) Dickie enlisted the aid of industrial designers Matt Longbottom and Christoph Hermann, who both worked at Lovegrove Studios for industrial designer Ross Lovegrove, the man responsible for the exterior design of the KEF Muon.

The odd shape of the Kaya 90 means that Vivid has had to provide six feet rather than the more usual four, which in turn means that it can be a bit tricky to get the Kaya 90 completely stable, with each foot taking its proper share of the weight. Once you achieve this, the side-to-side stability is not particularly high—a good hard shove on one side of the speaker could see it topple to the other side. The shape also means that the speaker terminals are rather difficult to access if your speaker cables are not terminated at all, or terminated by anything other than banana plugs.

I guess it's partly because of this difficult access that Vivid Audio provides only a single set of speaker terminals, thereby removing the possibility of bi-wiring or bi-amping.

IN USE & LISTENING SESSIONS

Read the *Owners' Manual* for the Kaya 90 and you'll find the following advice: *'The great clarity delivered by the Vivid Audio approach*

The Kaya 90s are much more efficient, far more dynamic, have superior bass and are considerably smaller in size



can be a little disconcerting at first if you have been used to the sound of mid-range cone break-up, and the first reaction is that something is missing. Bit by bit you realise that nothing is missing and you are really hearing through to the original recording in a way that you never experienced before... suffice to say that you shouldn't be too surprised if, after owning your speakers for a few weeks, you really get very excited about what you're hearing.'

This advice is startlingly accurate, but it seems to assume you have bought the speakers without first auditioning them! But what it means is that you're going to have to set aside some quite long periods of time in your friendly hi-fi dealer's listening room, because the sound of the Kaya 90 speakers is so clean and free of distortion that it may initially seem somewhat 'lean' across the midrange, and the speakers will also sound a bit 'light-on' in the deepest bass.

If you can, I would recommend that you arrange to hear a live—preferably unamplified—musical performance immediately prior to listening to the Kaya 90s so you can hear exactly how closely they replicate the sound of a live performance... and if you can't arrange to audition the speakers on the same day as that performance, or the day after, don't listen to any other speakers in between.

If the bass from the Kaya 90s turns out to be a bit light-on in your own home compared to what you experienced in-store, be aware

that there's a positioning issue that affects side-firing bass drivers, because you can fairly easily get standing-wave effects in rooms with parallel walls, especially if the left speaker is the same distance from the left wall as the right speaker is from the right wall, so you should try to avoid symmetry in the speaker layout, and preferably toe both speakers in so that the tweeter paths cross just in front of the listening position. Exact positioning will all depend on your room and its furnishings of course, but be prepared for plenty of experimentation with speaker positioning... something that will be made considerably easier because of the relatively light weight of the speakers. Vivid Audio is obviously aware of this, and it gives excellent and relevant positioning advice in its Owner's Manual. It also recommends that for best sound quality, the ear height of seated listeners should be within $\pm 15^\circ$ of the tweeter axis, so if you'd like to check your own seat heights in advance, the tweeter in the Kaya 90 is 106cm above floor level.

After running in the Vivid Audio Kaya 90s for several hundred hours (preferable with all speakers, but essential with Vivid Audio's hand-made drivers) I started my listening sessions with Ed Sheeran... initially his album ÷ (Divide). This, of course, kicks off with a perfect demonstration of the sheer clarity and distortion-free delivery at which the Kaya 90s truly excel.

THE B&W CONNECTION

When you read Vivid Audio’s brochures and delve more deeply into the technologies it uses in its loudspeakers, you might start to experience a certain sense of *déjà vu*... the strange feeling that you’ve heard about Vivid Audio’s technologies previously... but maybe in relation to some other very famous loudspeaker manufacturer. If so, you should trust your sixth sense, because Vivid Audio was founded in 2004 by two men who spent a very long time at B&W and were instrumental in that company’s success: Robert Trunz and Laurence Dickie. Trunz was for many years not only B&W’s managing director, but also its majority shareholder. Laurence Dickie was a research and development engineer at B&W for thirteen years during which time he developed for B&W not only the ‘Matrix’ cabinet bracing technology the company still uses to this day, but also its most famous flagship loudspeaker design, the Nautilus. Also instrumental in founding Vivid Audio were Philip Guttentag, B&W’s South African distributor, and Bruce Gessner and his wife Deone—all of whom were partners at Gessner Guttentag & Associates, a well-known South African acoustical consultancy.

Though Vivid Audio was originally founded in South Africa, and all its production facilities are still located in New Germany, KwaZulu-Natal, South Africa, its design, technical and administration facilities are now situated somewhat further north... in West Sussex, England.

That track is *Eraser*, which has Sheeran rapping over an initially acoustic backing with a lyric about which music critic Laura Snapes said ‘his words fit together with the elegance of *Stickle Bricks*’ (though she did add that the song ‘*feels like the only true reflection of his psyche*’ on the album). His voice and the guitars are recorded dry, so you can hear how accurate the sound of the Kaya 90s really is. Then, when the full band kicks in, the electric bass and kick drum bring all eight of the bass drivers in the Kaya 90 pair into the picture, with a solid rhythmic drive that will have you tapping your toes in an instant.

But if you think that experience was great, just wait until you hear the Kaya 90s with Sheeran’s hit *Shape of You*. The staccato sound effects that mirror his staccato rap delivery are delivered with razor-sharp precision by the Kaya 90s, and the multi-tracked vocals leap out into the room and hover in mid-air, exactly midway between the two speakers.

The ultra-low synth bass is perhaps a bit further back in mix than it should be, but it’s there, it’s solid, it’s tangible, and it’s ultra-clean. The phasing effects on *New Man* seem to make the air in the room waver like a mirage, so you just know that the Kaya 90 drivers are perfectly matched.

Sheeran’s break-through album ‘+’ (Plus) is also a great demo for the Kaya 90’s capabilities, particularly *Grade 8*... just listen to those hi-hats! By the way, if you haven’t seen Sheeran’s self-deprecating cameo on the movie ‘Yesterday’, you owe it to yourself to buy a ticket... and, as a bonus, you’ll get to hear a lot of Beatles compositions! (When I say ‘cameo’, he actually has a significant part, which he plays very well, having trained as a professional actor in Britain’s National Youth Theatre.)

You can’t play Ed without playing Taylor Swift, and so it was that her amazing *All Too Well*, from 2012’s ‘Red’ was blasting (well... *emanating*, the Kaya 90s are a little too polite to ‘blast’) from the Kaya 90s. Piano sound is so hard for speakers to do well, but the Kaya 90s make it seem easy. The clarity of the midrange makes you appreciate how well Swift manipulates her vocal characterisations to emphasise her lyrical content, from sugar-sweet to a bitterly harsh croak, and she certainly writes some great lines, such as ‘*so casually cruel in the name of being honest*’ on *All Too Well*, or from the title track of this album, ‘*loving him is like driving a new Maserati down a dead-end street.*’ She’s such a social media phenomenon that it’s easy to forget that she’s a truly wizard lyricist and a mean composer. And there’s barely a single bad line on her album ‘Speak Now’, which includes the track *Ours*, which has one of my favourite Swift lines: ‘*Don’t you worry your pretty little mind/People throw rocks at things that shine.*’

Although the Kaya 90s’ bass delivery is depth, extended and perfectly paced, it’s certainly not ‘in-your-face’, not least because there’s only so much bass you can extract from four smallish drivers (whose combined cone area is roughly equivalent to that of a single 305mm bass driver) mounted in a 90-litre cabinet, but also because it seems as though Dickie has opted for realism in the department of low frequencies, rather than delivering a too-hot bass signature that, although it sounds impressive during a short session in a demo room, would become wearing once you had to live with it.


Given its pedigree, I was expecting great things from the Kaya’s catenary-domed tapered tweeter, and I was not disappointed. The very highest frequencies and their harmonics were etched cleanly, and despite the metallic nature of the catenary dome,

the high-frequency sound I heard throughout my auditioning sessions was consistently sweet with no ‘forwardness’ at all in the upper highs. Although the tweeter level remains good off-axis, it falls away if the tweeter is not at ear level, so Vivid Audio isn’t mucking about with its $\pm 15^\circ$ positioning advice.

An important characteristic of the Kaya 90’s sound is that it remains properly spectrally balanced irrespective of the volume at which you’re playing your music so, unlike many speakers in conventional wooden cabinets, the bass does not become ‘boomy’ when you turn the volume up, nor does the sound of the tweeter become ‘brittle’ at those higher playback levels. Conversely, at low volume levels the sound is just as ‘lively’ as it is at higher levels, whereas the sound from conventionally-housed speakers can become less involving at reduced volume levels. These desirable characteristics might also be a function of the Kaya 90’s very high efficiency, meaning that for a given amplifier power, they’re going to sound noticeably louder than most other speakers.

CONCLUSION

Vivid Audio’s Kaya 90 loudspeakers sounded so pure and clean that all throughout my listening sessions I had it in the back of my mind that I could almost be listening to a pair of high-quality large-panel electrostatic loudspeakers... except that the front of my mind at the same time informed me that the Kaya 90s are much more efficient, far more dynamic, have superior bass and are considerably smaller in size.

They are extraordinary loudspeakers... in every sense of that word.  *greg borrowman*

LAB REPORT NEXT PAGE

CONTACT DETAILS

Brand: Vivid Audio
Model: Kaya 90
RRP: \$35,000 (per pair)
Warranty: Five Years
Distributor: Avation Pty Ltd
Address: Unit 2, 55 Newheath Drive
Arundel QLD 4214
T: (07) 5580 3300
E: info@avation.com.au
W: www.avation.com.au



- Efficiency
- Sonic purity
- Appearance



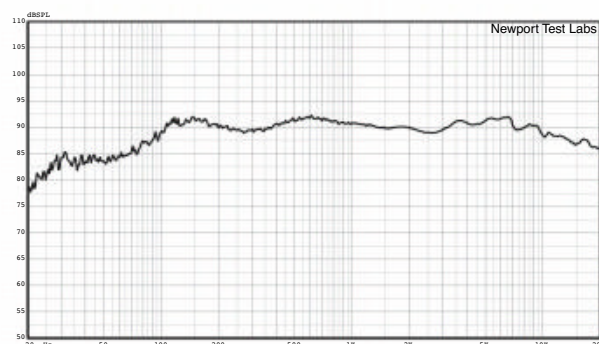
- Speaker terminals
- Cabinet stability
- Price

Readers interested in a full technical appraisal of the performance of the Vivid Audio Kaya 90 Loudspeakers should continue on and read the LABORATORY REPORT published on the following pages. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

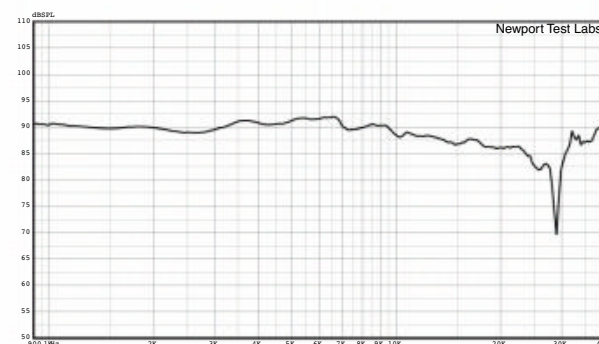
LABORATORY TEST REPORT

Graph 1 shows the in-room frequency response of the Vivid Audio Kaya 90, as measured by *Newport Test Labs* between 20Hz and 20kHz, using pink noise for the low-frequency response, and gated sine signals for the high-frequency response, with the two spliced together via post-processing at 1.5kHz. You can see that it extends from 55Hz up to the limit for this graph of 20kHz within ± 4 dB. This is a little outside Vivid Audio's specification of 35Hz–25kHz (± 3 dB), but it's close enough that variations in measurement techniques could easily account for the differences, particularly since they're primarily in the low frequencies, which are extraordinarily difficult to measure accurately. Perhaps most importantly, the frequency response between 80Hz and 14kHz is flat to within ± 2 dB, which is excellent. Being an in-room response, the level and extension of the low-frequency response is dependent on speaker position and the room in which the speakers are located (see Graph 3).

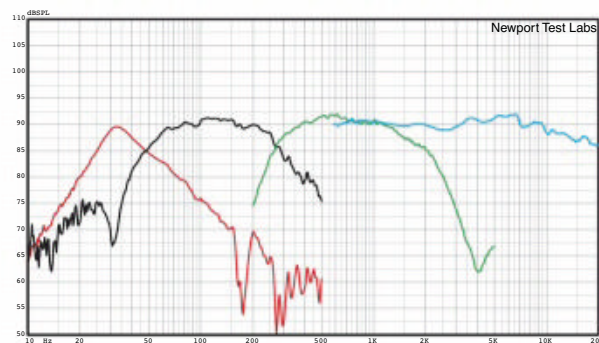
The high-frequency response of the Vivid Audio Kaya 90 is shown in Graph 2, this time with a greatly expanded horizontal scale, so you can see a highly detailed view and with the lab's measurement of the Kaya 90's high-frequency response extended out to 40kHz. The most significant feature is the deep



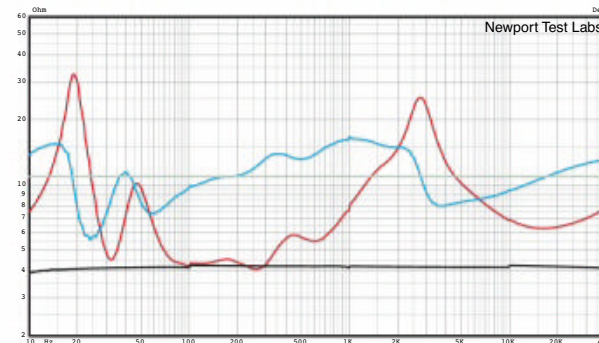
Graph 1. Frequency response. Trace below 1.5kHz is the averaged result of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter using pink noise test stimulus with capture unsmoothed. This has been manually spliced to the gated high-frequency response, an expanded view of which is shown in Graph 2.



Graph 2. High-frequency response, expanded view. Test stimulus gated sine. Microphone placed at three metres on-axis with dome tweeter. Lower measurement limit 700Hz.



Graph 3. Low frequency response of side-firing bass reflex ports (red trace), side-firing bass drivers (black trace), midrange driver (green trace) and tweeter (blue trace). Nearfield acquisition (except tweeter far-field). Port/woofer levels not compensated for differences in radiating areas.




Graph 4. Impedance modulus (red trace) plus phase (light blue trace) with precision 4 ohm resistor for reference calibration.

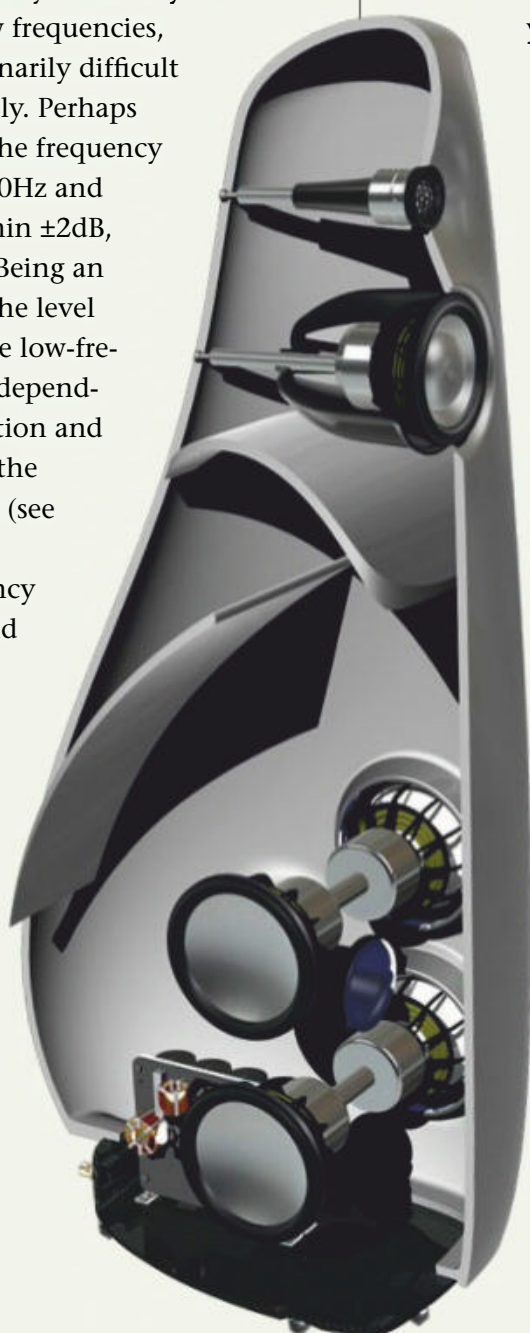
suck-out at 29kHz, but this is at such a high frequency and has such a high Q that it would not be audible. Otherwise, you can see that the Kaya 90's high-frequency performance extends out to 23kHz, coming up just a little shy of Vivid's 25kHz spec. You can see the high-frequency response rolls off smoothly and evenly from around 9kHz up to 23kHz.

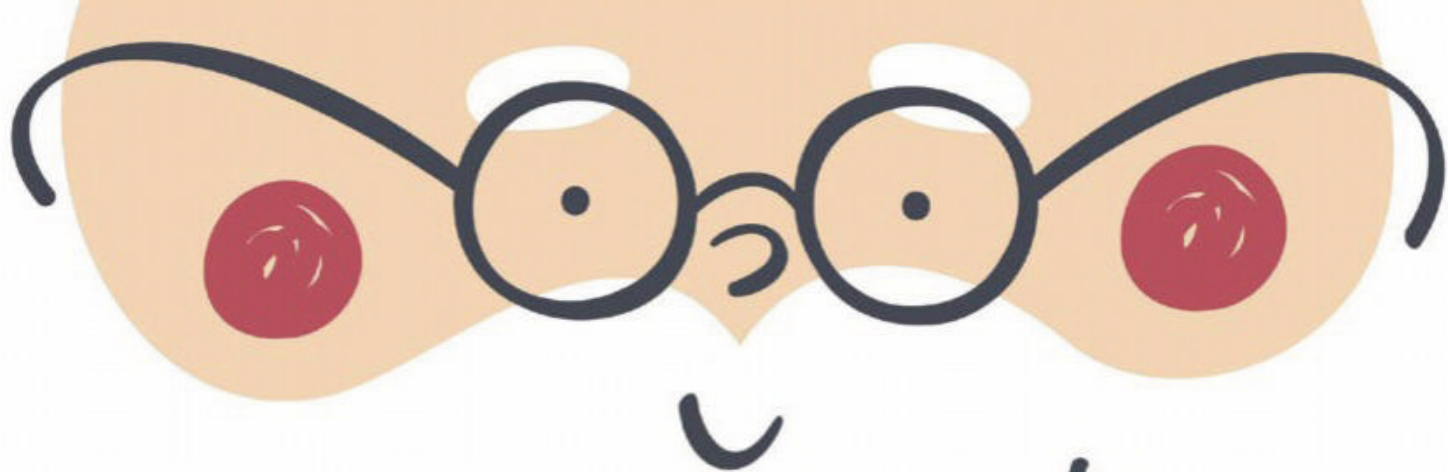
Graph 3 shows the low frequency response of the bass reflex ports (red trace), the side-firing woofers (black trace), the midrange driver (green trace) and the tweeter (blue trace). Apart from the tweeter's response, which was measured by *Newport Test Labs* in the far-field using gating techniques, all the others are nearfield acquisitions, effectively simulating the response that would be obtained in an anechoic chamber. You can see that the ports' maximum output is at 32Hz, but there's effective output from around 24Hz to 55Hz. The response of the woofers is relatively flat between 60Hz and 300Hz, rolling off steeply either side of these frequencies.

This graph shows the potential to optimise the Vivid Kaya 90s' low-frequency response with correct positioning.

The Vivid Audio Kaya 90 will present a minor challenge to its driving amplifier because the impedance essentially remains below 6Ω from around 28Hz up to 750Hz (except for the bass resonance peaking at 48Hz), remains continuously below 5Ω from 70Hz to 350Hz, and hovers either side of 4Ω from 100Hz to 300Hz, with a minimum of around 3.9Ω at 260Hz. I would personally rate the Kaya 90 with a nominal impedance of 4Ω, rather than 6Ω, as Vivid Audio has done. Luckily, the phase angle at these low impedances is benign, so it won't present quite as difficult a load as it might otherwise have. Nonetheless, amplifiers that are happy driving 4Ω (and lower) impedances should be preferred to drive the Kaya 90s. [Editor's Note: Readers interested in the discrepancy between *Newport Test Labs*' impedance measurement of the Kaya 90 and the measurements made by Keith Howard for *Hi-Fi News* should note that the Kaya 90 review sample Howard measured was subsequently discovered to be missing a crucial crossover component.] The position of the 'saddle' between the two low-frequency resonant peaks suggests that the Kaya 90 would produce very little output below 35Hz.

Newport Test Labs measured the sensitivity of the Vivid Audio Kaya 90 as 91dB SPL at one metre, which is a full 1dB higher than Vivid Audio's specification of 90dB SPL, and an excellent result.  Steve Holding





Dear Santa

For Xmas my perfect present would be tickets to **find my sound** at the all-new Sydney hi-fi show **HIFI2020**, so I can experience the world's best audio + AV all in one central Sydney location, try out the latest headphones, enjoy classic vinyl sessions through superb hi-fi, shop at the record fair, and so much more. And with one-day passes on sale **40% off** until Jan 8th, it's a bargain!



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MERIDIAN FACTORY TOUR

Whether they're making cars, computers or coloured candy, the great bulk of factories have a few things in common; they're noisy, they're busy and they're big. Which is what makes Meridian's factory so interesting.

BY ROD EASDOWN

This is the quietest factory I've ever been in. OK, maybe you won't hear a pin drop but you will hear a pencil hitting the floor. Nor is it big. I can walk around it in just a couple of minutes.

And it certainly isn't busy. People here do not rush to keep up with an unthinking assembly line; they can interrupt what they're doing to talk to me, and leave one job to demonstrate what happens with another. There are only 20 employees in the factory and according to Meridian's CEO and major shareholder, John Buchanan, they're all multi-skilled.

NO PICTURES PLEASE!

We enter the factory midway along its length I am asked not take pictures of staff members, so I point my camera to the left because over

that half of the factory I cannot see a single soul. Buchanan likes it this way. 'We have twice as many workstations as staff members,' he says. 'If one workstation can't provide enough work for someone, then that person simply moves to another workstation and gets on with something else.'

With an output of only 2,000 to 2,500 loudspeakers a year Meridian is an unashamedly boutique operation. Economies of scale don't apply here... well not in the normal sense of manufacturing anyway. A great deal in this factory is done by hand and with a few exceptions what automation there is, is kind of quaint; I spy one computer running a machine that checks printed circuit boards that's operating on Windows XP.

This all adds up to final products that are expensive. But there's much to be said for hands-on manufacturing.





With an output of only 2,000 to 2,500 loudspeakers a year Meridian is an unashamedly boutique operation. Economies of scale don't apply here...

There's quality control for one thing. It's not a computer that rejects a printed circuit board, it's a person reading the screen, tracing the problem and talking to another person about fixing it before another one comes along with the same trouble. There's a guy working in a partial anechoic chamber checking the performance of every speaker that goes out of the place by matching its readouts against the objectives laid down by the engineers. This means every speaker has exactly the same timbre. They don't have to match pairs of speakers here—all of them sound exactly the same.

Such high levels of involvement by humans goes against the ideal presented at practically every other factory, whose trust

This means every speaker has exactly the same timbre. They don't have to match pairs of speakers here—all of them sound exactly the same

Meridian's private cinema is kitted out with seats that were left over from cars stripped down for a couple of James Bond movies and they prove inordinately comfortable.



in electronics, robotics, and production lines is often complete. Meridian proves that people can get it right too, and more than that, do something about it when it's not right. If you need convincing, you only have to listen to the products they're making. I am reminded of the guy I met who ran a car factory and told me that cars coming out of fully automated plants always have higher warranty costs than those coming out of factories where humans work in amongst the machines.

ALL ABOUT LISTENING

Listening is how we start the journey through Meridian, whose facility is located about two hours north of London in a town called Huntingdon where, incidentally, Oliver Cromwell was born. Meridian's reception area has three separate listening areas all featuring

▲ Now people shopping in the big electrical superstores will become aware of the Meridian brand and its premium place in audio.

different equipment.

One is for a home theatre and the other two are for listening to stereo. These keep people occupied while they're waiting. The

serious listening is done elsewhere and I'm getting to that. All Meridian speakers are active, and always have been. Indeed a pair of Meridian's ground-breakers, the original M1 speakers of 1977 (just plug in your turntable or tape deck), is in Meridian's museum. Maybe 'museum' is too grand a word for this spot, in fact it's just a lost corner of a hallway with some signage and a collection of components gathered on bookshelves. The company's founders, Bob Stuart and Allen Boothroyd, show little evidence of being much into history and actually never retained an M1 for posterity.



This pair of them came only recently from an elderly owner who was moving into a room at a retirement cottage that wasn't big enough for his M1s. He rang Meridian asking for advice on how to sell them and Des Ford, the product resources manager, did a deal with him; one pair of used M1s for a pair of brand new Meridian bookshelf speakers and a streamer. Both parties went away smiling.

On one shelf is a Lecson system, Boothroyd and Stuart's original collaboration which led to them going into business together. Hi-fi veterans may not remember the name but they will certainly remember the product for the coloured slide controls that put it on the covers of hi-fi magazines around the world.

The folk at Meridian (there are 87 of them) seem most proud of its electronics and they've always been pace-setting. In fact after purchasing agreements, some of Meridian's electronic inventions now bear the name of Dolby. Meridian is the home of an engineering department of 26 people, all of whom are true believers in digital signal processing, or DSP.

DSP: A SPECKLED HISTORY

DSP has a speckled history in audio. It started off mostly as a gimmick, mimicking the acoustics of a stadium or a jazz club or whatever at the press of a button, and this is

why there are audio buffs who still pooh-pooh it. But where it proved itself was in car audio, correcting for the fact that a driver sits far closer to the right speakers than the left.

The home audio industry followed with DSP devices such as Audyssey, which tailors sound to a specific room. Meridian has thought well beyond this to address many other problems common to audio, and now has reached extremely sophisticated levels.

For example, in one of Meridian's listening rooms I am played a track by London Grammar called *Hey Now*. It has an immensely powerful bass line throughout, and yet the vocals remain sharp and defined, completely unsullied by all that's going on at the bottom end. I raise this with Hugo Fitzjohn, the education manager, who tells me this is all due to DSP.

Larger speaker drivers, he explains, take longer to reproduce their notes than far smaller tweeters, meaning the difference in time between a high note leaving the cabinet and the corresponding low note leaving it can be as much as 28 milliseconds. Depending on its power, the type of music being played—and what's going on elsewhere in the audible range—Meridian's DSP thus releases the big bass note immediately and holds the high one for anything up to 28 milliseconds so they both reach your ear at the same time.

'Is a gap of 28 milliseconds enough to be audible?' I ask, and then realise it's a dumb question, because I've just heard the effect of it myself. Fitzjohn goes on to explain that to achieve the same effect without DSP the tweeter would need to be mounted almost eight metres behind the woofer.

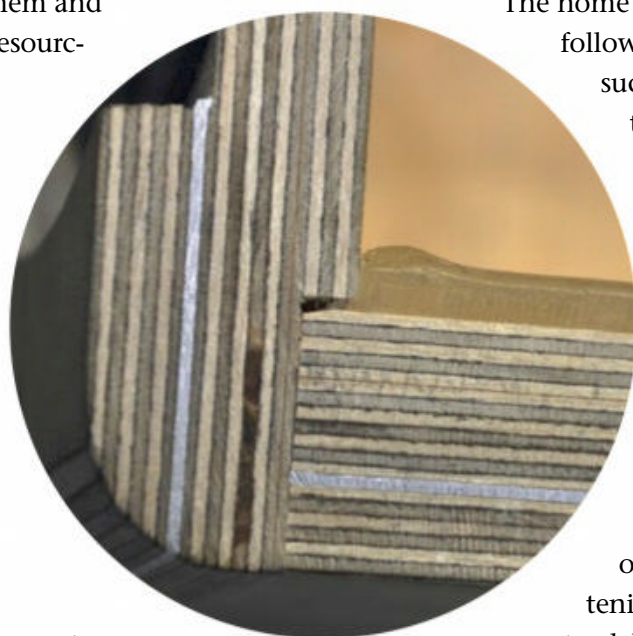
So it's not surprising that so much of the factory floor, and so much time during my tour, is devoted to the assembly and checking of circuit boards. This is where Meridian's most sophisticated production technology can be found and there are some ingenious ideas at work here, but it's hard for an audiophile to get as emotional about such stuff as these folk obviously are. Not when cabinets, drivers and two anechoic chambers, one partial and one full, lie ahead. I resist the urge to hurry them along as they gaze with adoration at impossibly complex electronic assemblies and the clever little devices that ensure everything on them is going to plan.

THE GOOD STUFF

We get to the good stuff eventually. Meridian does not make its own drivers, it buys in what it figures will do the job best. It also buys in its cabinets... but not from China—they're made for Meridian up near the Scottish border where aluminium sheeting is spliced between layers of timber to kill resonances.

It's in this part of the factory where you reach out to touch stuff, where you pick things up to test their weight and wonder why the internal tubes for the bass reflex chambers are so long ('trial and error' seems to be the answer).

It's where you discover that the M6 speakers, which look a little like what Kim Jong Un likes firing into the Sea of Japan, achieve all that bass with downward-firing woofers, and that the six side-firing bass drivers in the



Meridian's cabinets... are made up near the Scottish border where aluminium sheeting is spliced between layers of timber to kill resonances.



Quality Control: It's not a computer that rejects a printed circuit board, it's a person reading the screen, tracing the problem and talking to another person about fixing it before another one comes along with the same trouble.





A pair of Meridian's original M1 speakers of 1977 is in Meridian's museum (left) along with a Lecson system (above), Boothroyd and Stuart's original collaboration which led to them going into business together.

We finish up in what has to be one of the nicest private cinemas I've ever experienced. It's kitted out with seats that were left over from cars stripped down for a couple of James Bond movies and they prove inordinately comfortable. Suitably softened up, I'm played a scene from *A Star Is Born* which looks and sounds so good it makes me think I should maybe buy this movie on 4K HDR Blu-ray even though I have earlier dismissed it as an unapologetic chick flick.

No wonder; the front right, left and centre channels are all delivered by DSP8200SEs hiding brightly (they're pink—I guess no one would buy them) behind the enormous acoustically transparent screen. But the rear and side channels, providing mountains of hugely voluptuous sound, blow me away. They're in-walls and I have never heard in-walls that provide such volumes of distortion-free sound. I am also a bit surprised to see no speakers in the ceiling. I guess Atmos is still coming.

After a day at Meridian I am still coming to terms with just how compact this operation is

DSP8000s share a common enclosure. What impresses me most, however, is the size and number of the capacitors being fitted, even in the most compact in-wall models.

I suspect my interest in such stuff is all a bit old-fashioned for the electronics guys. They move me on to the full anechoic chamber which is actually the smallest I've ever been in, but it works a treat at measuring that initial blast of sound while it's free of reverberation, and despite its compact dimensions it has still managed to be breathtakingly expensive to build.





Meridian's reception area has three separate listening areas all featuring different equipment. One is for a home theatre and the other two are for listening to stereo. They're for visitors only: the serious listening is done elsewhere.

Even so I ask if I can come back for my summer holidays.

MERIDIAN & LG

Sound quality is what Meridian is—and has always been—about, which makes its name on some LG soundbars a little mystifying. LG has never had a big name in audio and Meridian has now partnered with it to lift this. I can't see the advantage for Meridian in the deal apart from maybe receiving pots of money from Korea, so I ask Buchanan about it.

'It's about elevating the brand,' he says, and goes on to explain that now people shopping in the big electrical superstores will become aware of the Meridian brand and its premium place in audio. I see his point; I guess if I asked 100 people in the street what Meridian does, at least 99 of them would have no idea.

But it's a delicate balancing act. Meridian has to ensure that the LG products carrying its name have to be a cut above average which means liaison with LG from blueprint stage and interaction throughout the product's development. Buchanan is adamant that his company will not sign off on a project unless it meets Meridian's requirements.


'We want to make the experience better for the consumer,' he said.



And he's been surprised by the challenges of the partnership. LG moves quicker on things than he expected. So far there have been no deal breakers. Joe Luzarraga, Meridian's senior loudspeaker engineer, walks me through a several different LG products that have been developed jointly, including a clutch of Bluetooth speakers, a smart speaker and three soundbars, all of which are available here in Australia. One product, a large one-box active speaker music system, was developed entirely for the domestic Korean market and

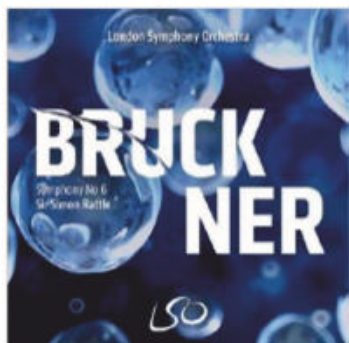
has proved popular there.

After a day at Meridian I am still coming to terms with just how compact this operation is. I try to think of other small European operations that design and manufacture in Europe and I can come up with just a handful. I ask Buchanan if he'd like his company to be another Dynaudio, a small manufacturer certainly, but way bigger than Meridian. It would mean great change and substantial growth, both in real estate and staff numbers.

'Oh yes!' he says.  Rod Easdown

BRUCKNER SYMPHONY No 6

Simon Rattle/LSO (LSO 0842)



Bruckner's Symphony No 6 seems apart from some of his other symphonies, being distinct for its rhythms and dynamics. To my ear, it's the 'freshest' of his canon. There's no shortage of great performances of this stirring work, but finding one that has a great and passionate performance along with a fine modern recording is a little harder. I've always been partial

to the Solti on Decca, and the Klemperer on EMI. Both are fiery performances. But this new recording with Rattle and the London Symphony is a serious contender. Recorded live in January of this year at the Barbican, I love the detail in this SACD graced with 5.1 channels. Too often in recordings the dynamics are lost, but this recording lets Sir Simon let it out without fear of audio overload. The musicians are at their best, with precise entrances and the vigorous playing that this music requires. Recommended. *Mel Martin*

THE CARTER FAMILY

Across Generations (Reviver Records RR1909-1)



If there was a 'First Family' of American music, it would undoubtedly be The Carter Family. When the Carters first recorded in 1928, it was widely considered to be the birth of country music. The group consisted of A.P. Carter, Sara Carter (vocals/guitar) and sister-in-law Maybelle Carter (guitar). Maybelle's technique of playing lead and rhythm together, a technique now

known as 'Carter Scratch' was trend-setting. Daughter June married Johnny Cash and their son John Carter Cash became the third of what is now five generations of players. On this album classic songs from the Carter family have been remixed with contributions from all five generations. This album (available on vinyl, CD and digital) is more than just a country music album; it is an historical document. Cash has brought some modern aesthetics to the classic recordings, but the inherent authenticity remains. *Robbie Gerson*

JACKSON BROWNE

Running On Empty (Rhino Entertainment (2019)



Jackson Browne recorded this album live in 1977, with material recorded not only on stage but also backstage, in hotel rooms and even on the tour bus. It reached No3 on the *Billboard* Pop Album Chart, and the singles *Running on Empty* and *The Load-Out/Stay* reached No11 and No20 respectively. It features the vaunted 70's studio group The Section (Craig Doerge/keyboards;

Russ Kunkel/drums; Danny Kortchmar/guitar and Leland Sklar/bass) plus David Lindley on fiddle and pedal steel and Doug Haywood and Rosemary Butler (backup vocals). Rhino Entertainment has done an exceptional re-master, capturing the raw, live sound without distortion. Browne's expressive voice is at the centre of the mix and the stereo separation is flawless. Browne's creative intellect and stage exuberance make this album a must for any rock fan. *Robbie Gerson*

CHICAGO TRANSIT AUTHORITY

50th Anniversary Remix (Rhino Entertainment)



This group (with some personnel changes) has been performing continuously for 52 years. The original line-up comprised guitar virtuoso Terry Kath and three lead vocalists (Robert Lamm/keyboards; Peter Cetera/bass and Kath), drummer Danny Seraphine plus with Walter Parazaider (woodwinds), James Pankow (trombone) and Lee Loughnane

(trumpet). In 1969, they released a double album for their self-titled debut that would spend an astonishing 171 weeks on the *Billboard* charts. That album has now been re-mastered and re-released by Rhino on 180-gram double vinyl. The overall sound mix is vibrant, and the stereo separation is flawless. The mix is solid and the different voices of the singers are captured with clarity. Kath's guitar pyrotechnics are exhilarating. Whether you are a vinyl *aficionado* or a Chicago fan, this album is a must! *Robbie Gerson*

HARRY NILSSON

Nilsson Sings Newman (Speakers Corner LP)



The ten-song session (barely over 25 minutes) is a 180 gram re-release of an evocative collection by a quirky singer covering a quirky songwriter with Newman on piano that was first released in 1970. Many of the satirical lyrics might be misunderstood in the present societal environment, but these guys could probably pull it off anyway. The arrangements on this

album are impeccable, the backing harmonies are fluid and striking, Newman's understated flowing piano playing is exquisite and steady but perhaps most amazing is the vast complicated musical tapestry. Nilsson overdubbed vocals (up to 100!) for six weeks. The re-master is superb. Nilsson's voice is captured with crystalline specificity, the glowing backing harmonies are extraordinary and the noise levels so low you can even hear studio instructions from the intrepid Nilsson. This vinyl belongs in everyone's collection, irrespective of their musical preferences! *Robbie Gerson*

BEETHOVEN

Piano Concertos & Rondo (Naxos 8.574151)



On this new (2019) Naxos release Boris Giltburg uses his Fazioli to inject vivid, thrilling energy into Nos 1 & 2 before embarking equally thrillingly on the Rondo in B-flat Major. Both he and conductor Petrenko inject a palpable *schwung* into Beethoven's figures, at once paying homage to Haydn but no less infusing the symmetry of volatile momentum and poised lyricism with a

shimmering elegance. Giltburg has several moments alone, pseudo-cadenza, in which his clear, liquid tone elevates the tissue with a fervour that nods to late Mozart. The playful scale passages sojourn through multifarious colours and suave rhythmic shifts, girded by the opening motif, ready to propel us into the recapitulation. Limitless *élan* suffuses Giltburg's rendition of the Rondo, with his fleet ministrations finding equally potent response in the orchestra. 🎹 *Gary Lemco*

PRESS CLUB

Wasted Energy (Independent)



In one storied year of hard-nosed hustling, Press Club have vaulted from virtual nobodies to veritable superstars of the Australian rock scene. LP2 is forcibly tight, viciously dynamic and endlessly compelling from Rietwyk's first thrashing Telecaster jut to front-woman Natalie Foster's last dry, battered howl. Wasted Energy does what Late Teens succeeded at with just

that little bit more oomph—it's more melodic, more stimulating, more aggressive and more thoughtfully produced. *Get Better* sees the band play with shifting tempos and see-sawing velocities with supernatural smoothness. *Dead or Dying* swells and swells until it crashes beautifully into itself. Though it's certainly a full-band effort, each member shining in their own right, the biggest jaw-dropper on show is the musical chemistry between Foster and Rietwyk. *Matt Doria*

BEC SANDRIDGE

Try + Save Me (Independent)



The Melbourne native pop goddess has always shone with a head-tilting hodgepodge of manic electronica and downright chaotic vocal melodies, but on her (long-overdue) debut album, Bec Sandridge warps us to a whole new dimension of bright and brilliant eccentricity. Guitars are notably subdued here, but not to a fault: rather, Sandridge uses them as

one cog in a much larger machine of instrumental intricacies—the mustard in this Sandridge sandwich, if you will. Twisting around a kaleidoscope of sonics and exploring lyrical themes of heartbreak, mental health and queer liberation, Try + Save Me is a retro-tinged fever dream from which you won't want to wake up. *Matt Doria*

KNOCKED LOOSE

A Different Shade of Blue (Pure Noise/Sony)



For not so much as a second does this venomous onslaught of downtuned hardcore let up. The authentic ire that Bryan Garris and Co. revel in is colder and more callous than ever on LP2, each track slamming into the breakdowns like a truck into a Prius. Listening at high volume may be terrible for your hearing, but goddammit, this record demands to

be blasted. Its 38 minutes zip by with plot twists aplenty—there are 12 tracks to lend your mind to, but densely layered beyond the usual riffs and roars there are a million chances to have it blown by industrial quips and experimental shake-ups. Knocked Loose tours here in December, and if this album is any indication of what we can expect, then may God have mercy on our souls. *Sarah Comey*

BARE BONES

Rival Minds (Resist)



Sydney thrashcore titans Bare Bones have long reigned over the city's underground, but with their slick and spicy new set of mosh anthems, I predict a crack into the mainstream on their horizon. Drawing on classic metal techniques to dole out their punkish ferocity with a tasty dose of swagger, the five-piece shine with motley layered guitars, tearing

bass-lines, and screams that teeter back and forth between mildly destructive and downright deadly. It's a clear step up from their 2017 debut (which, mind you, was fantastic) to a heavier and harder-hitting, yet more experimental and melodically resonant sound so that LP2 sees Bare Bones master their genre-bending idiosyncrasy to a T. *Matt Doria*

CAUTION:THIEVES

The Blueprint for Moving Forward (Independent)



On EP2, post-hardcore outfit caution:thieves combine soulful melodies with a merciless energy, raising a middle finger or two to life's trials and tribulations whilst simultaneously rendering themselves completely and endearingly vulnerable. It's a juxtaposition if ever there was one, the band clearly wrangling with confusion and

anger—as demonstrated by some penetrative and electrifying guitar swoops (*Better Living* is an excellent example). And if the course and cut-throat lyrics that collide with the whirlwind guitars are anything to go by, caution:thieves could well have re-defined the limits of post-hardcore with this release. The quintet is nothing if not living, rocking enigmas over the course of this release—and we love it. *Anna Rose*

TURNOVER

Altogether (Run For Cover/Cooking Vinyl)



While retaining the low-key shoe-gaze chillness that's come to define them since they shed their emo-punk roots, LP4 sees Turnover dial up the liveliness with a groovier, more synthpop-centric flavour. The guitars are janglier, the bass thumpier and the keys more prevalent—warbly and distinctly disco-esque, blending sweetly with Austin Getz's palmy strumming. The

frontman's vocal game has been raised, too, ebbing and flowing between keys like it ain't no thing. Where dreaminess defined their last two records, Altogether is all about the party vibes; exploring twinges of funk, jazz and electronica in their path, Turnover have crafted a record that's impossible to feel sad when put on. It's like an antidepressant pressed on 12 inches of PVC. 🎸 *Sarah Comey*

ANDREA KELLER & MIROSLAV BUKOVSKY

The Komeda Project (andreakellerpiano.com.au)

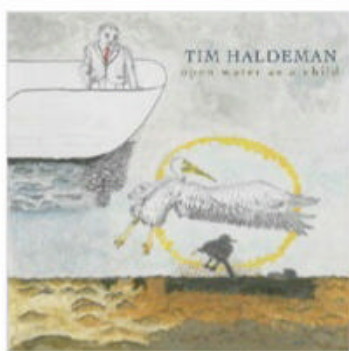


The great Polish composer and jazz pianist Krzysztof Komeda left a musical treasure-trove and pianist Andrea Keller and trumpeter Miroslav Bukovsky have arranged material from such famed film scores as *The Fearless Vampire Killers* and *Rosemary's Baby* for an improvising octet. Komeda had a way of writing material that seems to cloak the listener in darkness, through which snippets of

melody glint like silver light. When rendered as improvising vehicles perhaps more of the light is allowed in, but without any sacrifice of the music's essential moodiness. Keller and Bukovsky are joined by violinist Erkki Veltheim, saxophonist Andrew Robson, trombonist James Greening, guitarist Ben Hauptmann, bassist Jonathan Zwartz and drummer Evan Mannell, whose enthralling improvising does not just decorate the compositions, it even deepens the shadows.

TIM HALDEMAN

Open Water as a Child (Woolgathering WR006)

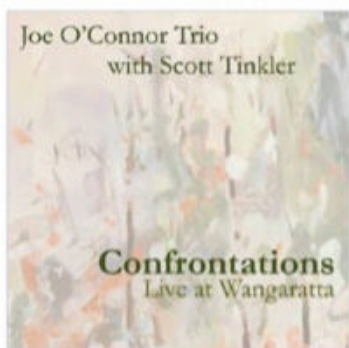


John Goode's opening line, '*I followed whiskey into the country of Legionella*', grabs you by the throat, and drags you into a Kerouac-influenced poem graffitied through this album in three instalments, with Goode's voice a scythe slicing straight into your central nervous system. When he stops, the band surges into the breach, the energy

having a serrated edge, partly thanks to Jordan Schug's cello and partly to bassist Ben Willis and drummer Jonathan Taylor generating a ferocity reminiscent of the 1960s. Even on a gentler groove you feel the tension, like an attack dog striving to break its leash. Tim Haldeman, who plays flute or searing tenor when not accompanying Goode on piano, favours transparent textures, emotional enigmas and high stakes, and his band is completed by Dan Bennett (alto) and Justin Walter (trumpet).

JOE O'CONNOR TRIO WITH SCOTT TINKLER

Confrontations (joeoconnor2.bandcamp.com)



If this music contained any more tension it would snap. Each note seems stretched dangerously taut, and the instruments do not so much cohere as collide. Pianist/composer Joe O'Connor invited incendiary trumpeter Scott Tinkler to join his trio (with bassist Marty Holoubek and drummer James McLean) for this live, digital-only release. O'Connor's compositions have this

tension inbuilt, with their contrasts of mood and density, of notation and improvisation; with the acute angles integral to the rhythmic ideas and soloing the material encourages. But it's not all nervous friction, with the glorious *Sarabande* drawing out a collective lyricism, like squeezing juice from an exotic fruit. Elsewhere Tinkler's diamond-edged trumpet sound compounds the dynamism and heightens the drama, while O'Connor sometimes drapes a silken surface atop the rhythm section's agitation.

MYRA MELFORD'S SNOWY EGRET

The Other Side of Air (Firehouse FH12-04-01-029)



The intensity is unrelenting. Even when it comes in the form of lyrical beauty rather than ferocious energy, it's as dazzling as a butterfly's wing caught by the sun—listen to Myra Melford's piano on *Chorale*. When grooves emerge they are enigma-laden, courtesy of bass guitarist Stomu Takeishi and especially Tyshawn Sorey, a genuine revolutionary who may be the most important jazz

drummer since Paul Motian. Guitarist Liberty Ellman and cornetist Ron Miles are distinctive, innovative improvisers, and this band presents them with wide-open fields of creativity upon which to play. A highlight is the textural interaction, as when the ensemble plays for an extended period with miniaturized, muffled or prepared sounds, and then, like topping a rise, they enter a slow-motion world in which the trumpet cries out its heartbreaking lament.

GEIR SUNDSTOL

Brodlos (Hubro CD2603)



Were this a soundtrack, the film would juxtapose blasting sun with extreme close-ups of squinting eyes, and convey an impression of time being suspended, while shots of a clock show time is, in fact, running out. Norwegian guitarist Geir Sundstol's flair for evocation is underpinned by a deeply affecting melancholy, and his breadth of influences is encapsulated


when he flows directly from the Gothic gloom of David Bowie and Brian Eno's *Warszawa* into the dignified anguish of *Alabama*, Coltrane's hymn to victims of racism. A multi-instrumentalist, Sundstol primarily plays acoustic slide guitar with a sparseness that has loneliness seeping from every note. He surrounds it with surprises that swiftly assume an air of inevitability, such as Sansskriti Sheresta adding her tablas to David Wallumrod's analogue synths. Trumpeter Nils Petter Molvaer is another guest.

DAN BARNETT BIG BAND

Strictly Swinging (danbarnett.com.au)



This recording has such presence as plants you smack in the middle of the live (and excited) audience. Singer/trombonist Dan Barnett's 13-piece band is choc-full of gifted improvisers, but even if a solo never came along one could happily ride an ensemble wave that never loses its panache or cohesion. Rigorous in its control of dynamics, Barnett's band

has that cruising smoothness of its forebears from 80 years ago, as well as the ability to turn up the heat when required. The songs are mostly kept short and punchy: little gems of big-band art that never outstay their welcome. Barnett is in fine voice, although this album primarily shows off the band as a whole: timeless, feel-good, swinging music, laced with fine solos from the like of trombonist James Greening.  John Shand

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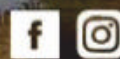
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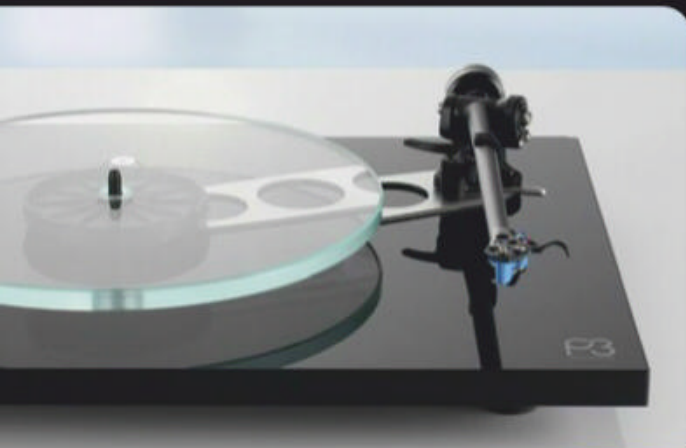
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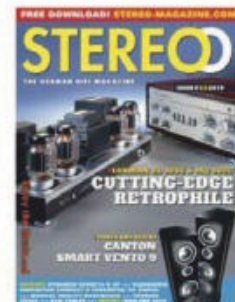
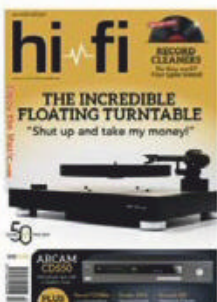
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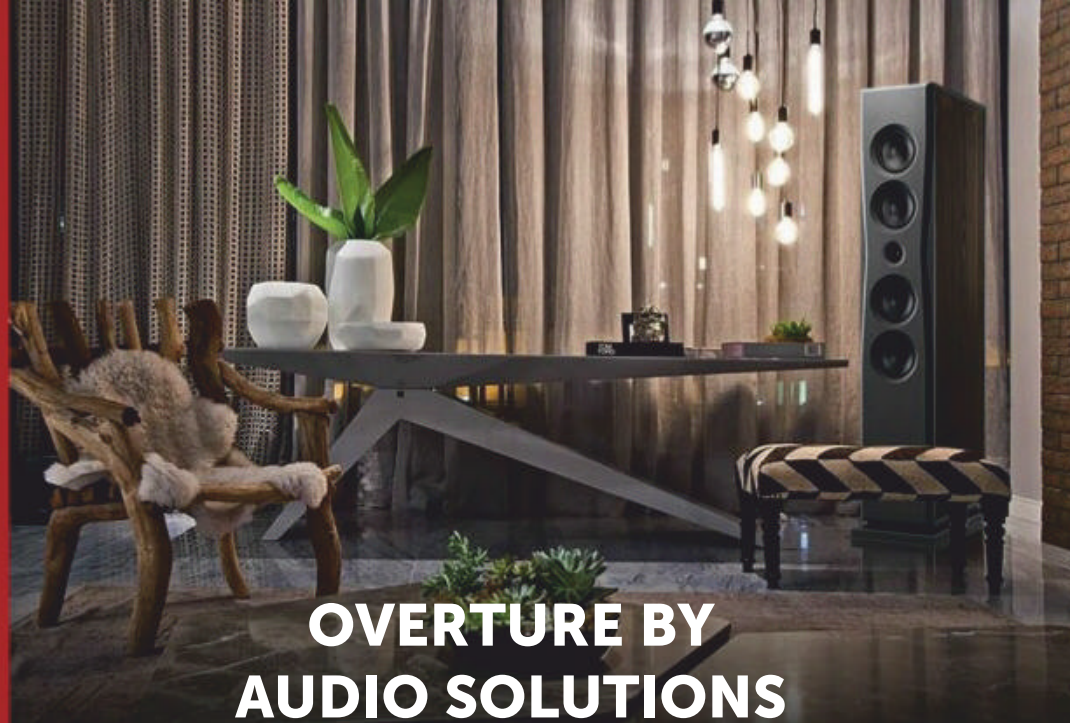
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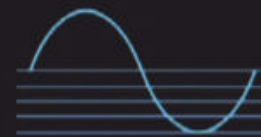
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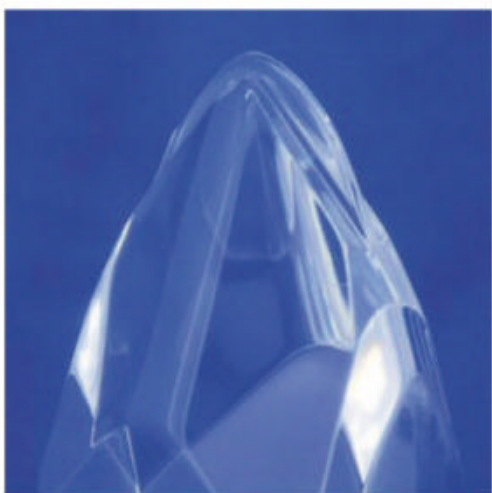
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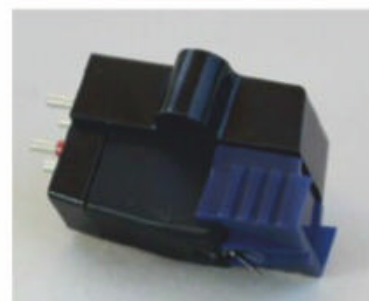
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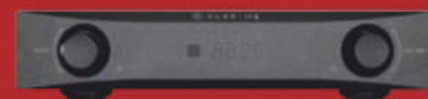


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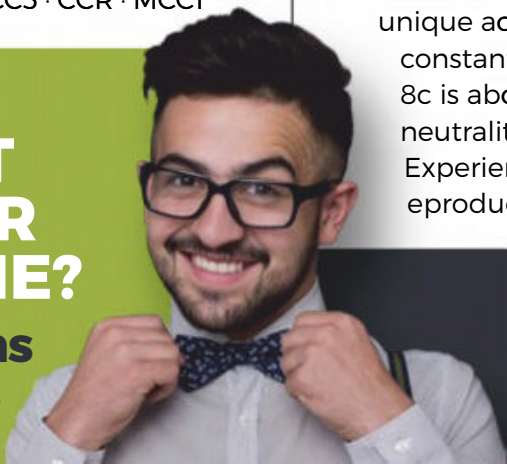
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BEAUTY AND THE BEAST

In which Rod Easdown meets a man who knew a lot about hi-fi, but very little about, well...

Beauty, as Spike Milligan once observed, is in the eye of the beholder. He continued: 'Get it out with Optrex.' I will need a great deal of Optrex to shed my beholding of the latest speakers from Kostas Metaxas, a once well-known identity in Melbourne's upper echelon audio circles for his boutique amplifiers, although Kostas called them bespoke. He's lately surfaced in Holland where he has just unveiled the Siren speaker.

The esteemed editor of this publication, referred to throughout the office as Sir, recently told me that there are three things going on in speakers right now, all as a result of the fact that significant others, in most cases the female half of the equation, don't like speakers. The three things are; little linked wireless boomboxes in every room, speakers hidden in walls and ceilings so no one sees them, and finally speakers that don't look like speakers but more like, for example, sculptures (KEF's Muon), robots (practically anything from Wilson Audio or B&O) and now, with Metaxas Sirens, women.


OK, I accept that the Siren seems to gain inspiration from the traditional female form but to that I would add a traditional female form heavy with child and clad in a burkha. Or is that just me? I guess the acid test is this: Would you have them in the house? If you're a traditional reader of this magazine your answer will probably be 'yes as long as they're so good that my crew, having inserted wax into their ears so that they may hear not, must first lash me to the mast so I can experience the Siren's song and not be irretrievably drawn to them and held such that

I am dashed to death on the rocks' so maybe the real acid test should be: Would your significant other have them in the house? I'm guessing here, but I suspect your answer will be something along the lines of 'not a snowflake's chance in hell, especially when that other discovers we could otherwise have a large and very nicely-equipped BMW.'

The problem is that if your ear and your wherewithal dictate a passion for ultimate audio and you decide to go into six figures for a pair of speakers, then you want a pair of speakers that make a statement. To wit: I can afford a pair of six-figure speakers.

And there are plenty of options. Focal's Grand Utopias look like phone boxes that are gently disintegrating into an abyss, Cabasse's la Spheres more resemble a giant albino meatball rising from a sea of spaghetti, and whenever I see B&W 800s I think of a short but stocky Welsh coal miner wearing a headlight. Needless to say, she-who-must-be-obeyed wouldn't give any of these a second reading.

She might, just might, entertain Steinway Lyngdorf Model Ds, but only if we could get a new lounge suite, redecorate with some serious art and raise the ceiling about a metre. Ah, but then we'd have to go through the Steinway Lyngdorf Thing. It's not enough just to have the money when shopping for Model Ds, one must also have the acoustics. And so after, I suppose, paying a suitable deposit (probably enough to buy a modest 3-series BM) an engineer from the factory will come out for a visit. Be on your guard! He is not just there just for a cup of tea and a chat, he's actually testing the acoustics of the room.

If it all shapes up he will sign off on the sale, your new Model Ds will be commissioned and the little French gnomes will be set a-hammering. If not he will suggest the changes necessary to make to your house before delivery can be entertained. Yes, there are several Model D customers who have made the necessary renovations and extensions to their houses to achieve ownership. I once saw a pair of exceptionally weird-looking speakers in an up-market hi-fi shop in one of Melbourne's leafier suburbs. They were composed of several curvaceous and very large horns curling from much smaller drivers, all contained in a minimalist steel frame so that one's vision of the horns remained totally unimpeded. The man who ran the business offered to crank them up for me but I politely declined, explaining that my considerably better half wouldn't have them in the house. Even for a demo. 'Ah,' he said, smiling confidently and raising a finger into the air, *'blindfold her, lead her into the room and start them playing. Once she hears them she will have no problem at all with the way they look.'* This was a man who knew a great deal about hi-fi but at that moment I realised he knew absolutely nothing about women. 

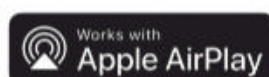
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