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CES 2021: Virtually, a Non-Event

Normally in this issue we'd bring you a round-up of CES, held in Las Vegas every year in the first week of January, but this year, just like last year, there's no such thing as 'normal' thanks to Covid-19. So of course CES wasn't held this year. Or, rather, it wasn't held as a physical event. In true "the show must go on" spirit, the show's organisers decided that they couldn't forgo all that lovely exhibitor revenue and turned the CES into a 'virtual' event, proudly proclaiming on the opening day "*The first-ever, all-digital CES 2021, owned and produced by the Consumer Technology Association, opened its full digital experience to audiences around the world. This transformational event provides audiences with a front-row seat to the innovation and technologies that will move the world forward. CES 2021 will feature more than 1900 exhibitors ... attendees will experience a highly personalised show where they can see the latest product launches, hear insights from global visionaries, engage with global brands and startups, chat and meet with attendees from around the globe and receive recommendations based on personal preferences.*" This might have been all well and good except that 'virtual' really doesn't work where high-fidelity components are concerned, because much of the newsworthiness of a hi-fi product revolves around how it sounds, and this can't be determined via a 'virtual' event. So Australian Hi-Fi didn't go to CES this year, nor are we publishing our usual CES Report.

Truth be told, we weren't planning to go to CES this year anyway, even before Covid-19. Firstly CES is enormously expensive to cover, Vegas hotels being at least five times more expensive during CES than they are at other times, not to mention the cost of flights from Australia to the US even during a normal holiday season. But secondly (and mostly) we didn't plan to go because very few audio companies now exhibit at CES. It's too expensive for them too. So whereas once it took several journalists an entire week to cover all the rooms with audio exhibits, the last time we went, one person covered the entire show in just two days. Plus CES has lost its relevance for audio manufacturers. They now head for the Munich Audio Fair and also exhibit at the multiple smaller national shows across Europe and the USA (Milan and the Rocky Mountain Fair being two of the best-known of these).

Why are manufacturers bothering with smaller national shows? Mostly, it's because there are fewer hi-fi stores around the world than ever before, and fewer stores that can afford to stock high-end audio equipment. Just take the components we've reviewed in this issue, for example. Any hi-fi store that demonstrated a system comprised of the Pilium DAC, Gryphon amps and Harbeth speakers would be expecting customers to pay $126,490. And since it's likely that far more expensive speakers would be paired with an Elektra/Essence combo, all-up cost would be more like $200,000. Sure the store would be getting the equipment wholesale, but that's still a whole lot of money invested in one single system. And it's not just hi-fi stores that are affected by the spiralling cost of hi-fi components. We recently asked a large distributor for a loan of a product for review only to be told that it was an 'indent only' model. That is, they didn't bring it into the country and wouldn't do so unless they had a firm order. It's lucky that the great majority of Australian distributors are more far-sighted, otherwise even more Australian audiophiles would be travelling to overseas hi-fi shows (and stores!) to audition components they're interested in purchasing.

On the bright side, it means that hi-fi shows in Australia in future will benefit from increased numbers of exhibitors, which is great for audiophiles because these shows are (mostly) within driving distance. So far, the only show that has been announced for this year is the Stereonet show, at the Pullman Convention and Events Centre, Albert Park, Melbourne, which is scheduled to take place November 19–21, 2021. So put that date in your diary and cross your fingers that we have Covid-19 under control by then! ***greg borrowman***

australian hi-fi

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esoterica

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DEPARTMENTS

OUR FRONT COVER

Quiet seems to be the theme of this month's cover, with the totally silent Silent Angel, the superbly quiet Pilium DAC and the quiet revolution that's Gryphon's Green Bias circuitry.

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58 PODCASTING... FOR FUN AND FOR PROFIT

Whether you're doing it for fun, or profit—or both—podcasting is easy and cheap to do. We look at what you'll need to get started.

68 EIGENTAKT: IS IT THE ULTIMATE CLASS-D AMPLIFIER TECHNOLOGY?

Is Eigentakt, developed by the famous Bruno Putzeys at Purifi, a version of which is used by NAD in its brilliant M33 amplifier, the ultimate Class-D amplifier topology?

03 EDITOR'S LEAD-IN

CES is no longer the essential show on the hi-fi calendar, which is actually a great thing for most audiophiles, including here in Australia.

MUSIC

72 OLD TURNS

Tears For Fears' new box set contains ourstanding versions of their classic hits, along with a wealth of unreleased material. We also review box sets from two very under-rated bands, Trees and Rhinoceros.

73 TOP PICKS

Our very own Powderfinger has released an album of unreleased tracks that's so good it feels like a 'Greatest Hits' CD from a parallel universe. Whatever were they thinking not to release them 'way back when?

74 JAZZ TRACK

Harry Beckett's trumpet tone was astonishing and you can hear it at its best on 'Joy Unlimited'. You can also hear another side of Chick Corea on his album 'Plays', as well as blow your mind with Tomato Brain.

82 ROCK ON

This month we highlight a debut album from New Zealand's Grumblewood and look back in time to Tangerine Dreams recordings from the early 80s, which have just been re-mastered. Plus albums from Mark Kelly, Lykantropi, Avandra and Katatonia are also reviewed.

B&W 600 SERIES ANNIVERSARY EDITION

B&W has released the seventh generation of its venerable 600 Series, which was launched a quarter of a century ago. This means that the new 600 Series Anniversary Edition is the company's second-longest continuously-available line.

Despite many corporate and manufacturing changes over the years, Bowers & Wilkins still develops and manufactures all its key components in-house and gradually 'trickles down' technologies originally developed for flagship models to its lower-priced speakers. "This approach has consistently allowed 600 Series models to deliver better quality components and technologies than any comparable competitor, delivering sound quality rivalling that of far more expensive speakers," says **John Martin**, of B&W Australia. The new 600 Series Anniversary Edition range not only offers component and technological improvements over the sixth version of the 600 Series, introduced in 2018, it also adds new Oak and Red Cherry finishes to the existing matte black and matte white finishes.

The improvements include upgraded crossovers in every model plus the addition of new and improved bypass capacitors made by component specialist Mundorf.

The line-up includes the 603 S2 Anniversary Edition speakers at $2,999 per pair (floorstanders with a Decoupled Double Dome aluminium tweeter, a 150mm FST Continuum cone midrange driver and two 165mm paper-cone bass drivers), the 606 S2 Anniversary Edition speakers at $1,299 per pair (stand-mount with a DDD aluminium tweeter and a 165mm Continuum cone mid/bass driver) and the 607 S2 Anniversary Edition speakers at $999 per pair (stand-mount with the DDD tweeter and a 130mm Continuum Cone mid/bass driver.

Stands are optionally available for both stand-mount models, plus there's a matching centre-channel speaker for home theatre applications (HTM6 S2 Anniversary Edition, at $899). The three subwoofers available are the extant ASW610XP ($1,999), ASW610 ($1,099) and ASW608 ($849) which are not available in the new finishes, only in matte black or matte white.

For more information, contact
B&W Australia on (02) 9196 8990
or at www.bowerswilkins.com/en-au

DS AUDIO GRAND MASTER

DS Audio has released its Grand Master optical phono cartridge. It says that as well as being its third generation of optical cartridges, it's a completely new design with a different optical system that now uses completely independent LEDs and photo-detectors for the left and right channels. One result of this is that the company has been able to increase the cartridge output voltage from 40mV to 70mV and improve channel separation, including a 10dB improvement at high frequencies, as well as dramatically increase the signal-to-noise ratio.

"The implementation of independent left and right channel LEDs necessitated the use of new shading plates," said **Boris Granovsky**, of Absolute HiEnd, which distributes DS Audio in Australia. "These new plates are not only significantly reduced in size, but also much lighter, thanks to being made of pure beryllium, rather than aluminium as they were previously. At just 0.74 milligrams, the weight of the plates is now less than one-tenth that of the generator parts of a conventional moving-coil cartridge." In order to reduce mass even more, the Grand Master is the first DS Audio cartridge to use a diamond cantilever.

DS Audio's optical cartridges require a unique equaliser and DS Audio has built a new equaliser designed specifically for the Grand Master along with a completely separate power supply for it that has three transformers, one each for the left and right channel equaliser circuits and the third to deliver power to the Grand Master optical phono cartridge.

Available now, the DS Audio Grand Master optical phono cartridge system, comprising optical cartridge, equaliser and power supply, sells for $82,990 (RRP).

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

LEN WALLIS AUDIO

THE HI–FI HEADLINES

NEWSLETTER No.253

It's been a very big couple of months for Len Wallis Audio. We have greatly expanded our offering of Naim Audio electronics to include the '300 and '500 range of pre and power amps, we now (finally) have a pair of the fabulous $85k Sonus Faber Il Cremonese Ex3me speakers on the floor and we have also received stock of the new Sonus Faber budget Lumina range of speakers.

Starting at $1,595 a pair for the Lumina 1 bookshelf model the Lumina series makes Sonus Faber accessible to a much larger audience. It is a very small range – consisting of three models only - but it still encapsulates all the qualities (performance + finish) that has made this Italian brand famous.

The big news is that we have been appointed as Sydney's newest McIntosh outlet. The decision to add a new range of electronics to the Len Wallis Audio stable is never taken lightly, the last time this happened was many years ago when we took on the Naim range – which proved to be a very wise decision. After months of consideration and auditioning we decided to do it again...

McIntosh needs no introduction to anyone with a fleeting interest in our industry. Founded in 1949 McIntosh has come to represent to the audio industry what Harley Davidson represents to the motor bike world. Performance, reliability and tradition.

To round out our now extensive selection of high-quality electronics we have also just added the top-of the range **EVO 400 series** of amplifiers from **Prima-Lunar.** We have been a stockist of Prima Luna for many years but have not ranged the 400 pre, power and integrated amplifiers until now. Prima Luna is universally regarded as one of the industry bargains, and listening to this series shows why – great performance and realistic pricing. For example, the EVO 400 integrated sells for $7,295 – this is an impressive amplifier for that money.

CEDIA MEMBER

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ARTNOVION AT COGWORKS

Cogworks is once again distributing Artnovion's range of acoustic treatment products and has introduced new ranges of pre-mixed acoustic packages, including portable solutions and design concepts to use as exemplars, plus is providing a free design service to tailor specific acoustic solutions for individual rooms.

"Artnovion has been very busy producing many new lines to add to its already extensive range, and we plan to keep a range of best-selling products and colours in stock, and make the others available on a special order basis," said **Paul Clarke**, General Manager of Cogworks. "Many of the company's products are easy to install, which reduces installation time to a minimum, as has been demonstrated on the TV show 'The Block', where contestants installed such Artnovion products as the Avalon Flow." Clarke says that Cogworks is now able to provide an Artnovion 'Entry Level' pack of eight Helen Absorbers, including an Artnovion 'Instant Fix It Kit', for only $1,099 (RRP).

For more information, contact Cogworks on (07) 5415 0337 or visit www.cogworks.io

SONUS FABER MAXIMA AMATOR

Sonus faber has released its first-ever two-way floor-standing model with a solid walnut wood cabinet. Called the Maxima Amator, it's the latest addition to the company's Heritage collection. The Maxima Amator uses the same drivers as the Electa Amator III: a 28mm diameter H28 XTR-04 Neodymium tweeter

with Sonus faber's 'Damped Apex Dome' and a 180mm diameter MW18XTR-04 bass/mid-range driver that has an air-dried cone made of cellulose pulp and natural fibres, and a die-cast aluminium basket.

'The crossover circuit developed by Sonus faber's engineers for the Maxima Amator is unique,' says **Philip Sawyer**, of Synergy Audio Visual, which distributes Sonus faber in Australia. 'It's a new design that foregoes the classical first-order series iteration for a more complex third-order one, with non-academic transfer functions based on accelerated progressive slopes either side of a 2.1kHz crossover point. Sonus faber calls it an 'Interactive Fusion Filter', or IFF.'

The cabinet design sees it comprised of three separate internal chambers: one for the drivers, another for damping and stability and a third to house the complex crossover network, which uses Solen Clarity capacitors, Mundorf resistors and unusual Litz-wire coils. The crossover is so complex, and so unusual, that Sonus Faber has fitted a window in the rear panel to enable owners to see the crossover components.

Sonus faber rates the Maxima Amator's in-room frequency response as 35Hz to 35kHz ±3dB, its sensitivity at 88dBSPL and its nominal impedance as 4Ω. Each cabinet measures 1120×300×350mm (HWD) and weighs 38kg.

Sawyer says the Maxima Amator will be available from retailers throughout Australia in February, and will sell for $26,996 per pair (RRP).

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

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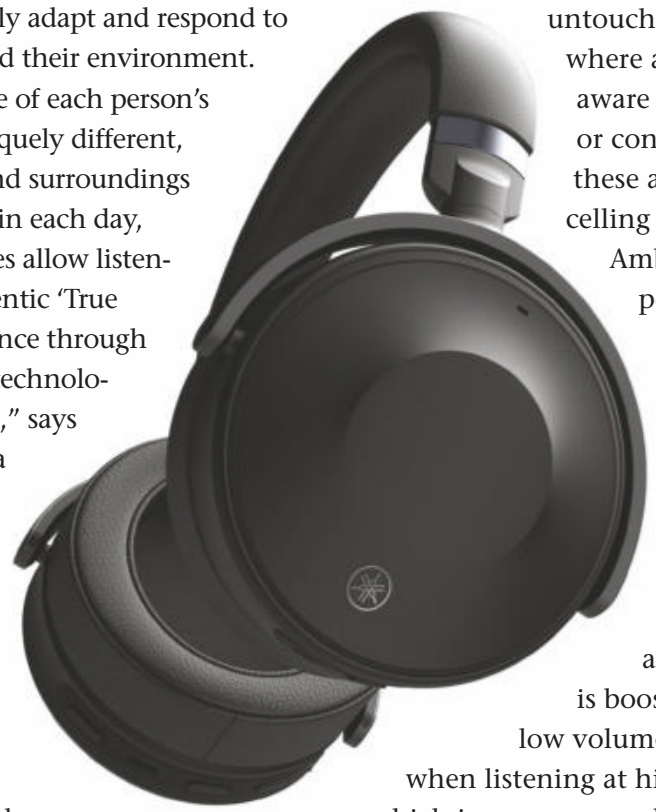
INTELLIGENT YAMAHA HEADPHONES

Yamaha's newest wireless headphones are claimed to intelligently adapt and respond to individual isteners and their environment. "As the size and shape of each person's ears and head are uniquely different, as are the acoustics and surroundings they find themselves in each day, these new headphones allow listeners to enjoy the authentic 'True Sound' music experience through proprietary adaptive technologies wherever they go," says **Boyd Gill** of Yamaha Music Australia.



There are eight new models in all, ranging from wireless earbuds including true wireless, to active noise cancelling over-ears. "The hero models in the new line-up feature a 'listening optimiser' that works in real time to make ongoing measurements and subtly adjust the sound if the fit or wearing conditions happen to change to ensure the best sound," said Gill.

The top-of-the-line Yamaha YH-E700A wireless noise-cancelling headphones use an advanced active noise cancelling technology developed at Yamaha that it says 'analyses and removes background noise while keeping the music signal pure and untouched'. And for situations where a listener wants to stay aware of their surroundings or conduct a conversation, these and other noise-cancelling models include an Ambient Sound mode to permit this.

All models in the new range offer a circuit Yamaha calls 'Listening Care' which works rather like the adaptive loudness control on some Yamaha amplifiers, so that bass is boosted when listening at low volume levels and reduced when listening at high volume levels, which improves sound balance and reduces the likelihood of hearing damage. Some models have a more advanced version of this circuit which analyses both the music and the background noise in real time to automatically achieve the optimum tonal balance at a listener's selected volume setting. "By adapting to each person and his or her surroundings, our headphones allow listeners to stay true to themselves and truly enjoy the music that shapes them," said **Yoshi Tsugawa**, Senior Manager at Yamaha Japan. "Now, with our new line of headphones, from the moment you wake up and head out for the day, to when you return home and relax with your favourite shows at night, Yamaha is there for you with unparalleled audio every step of the way."

All the new Yamaha models feature app control in addition to physical touch controls to make phone calls, activate your favourite voice assistant and control your music with easy-to-find buttons. Each model comes with a carrying case and charging cables.

The new models are the YH-E700A ($499) and WYH-E500A ($299) Wireless Noise-Cancelling Over/On-Ear Headphones, TW-E3A ($179) True Wireless Noise-Cancelling Earbuds, and the EP-E70A ($399), EP-E50A ($199), and EP-E30A ($99) Wireless Noise-Cancelling Earphones). Available now, all models come with a two-year guarantee.

For more information, contact Yamaha Music Australia on 1800 805 413 or at au.yamaha.com

AUDIOLAB 6000A PLAY

Audiolab's new 50-watt per channel (into 8Ω) 6000A Play uses the amplifier circuitry from the company's 6000A stereo amplifier and the streaming architecture of the 6000N Play, which is currently What Hi-Fi?'s reigning Product of the Year in the music streamer category.

"The result of such a formidable fusion is a fully integrated, highly versatile, multi-room-capable streaming amplifier that delivers everything a modern music lover could ask for in captivating style," said **Raffi Kevarian**, of AV Revolution, which distributes Audiolab in Australia. "Its Wi-Fi networking is powered by DTS Play-Fi, an app-controlled platform enabling high-quality, whole-home wireless audio, capable of streaming hi-res music up to 24-bit/192kHz from Spotify, Tidal, etc, as well as music stored on any DLNA-compatible NAS drive or media server." You can also stream via Spotify Connect, via aptX Bluetooth, or via Ethernet.

The Audiolab 6000A Play has three line-level and one MM phono input and five digital inputs. Digital inputs are served by an ES9018K2M DAC that uses ESS Technology's 32-bit HyperStream architecture and Time Domain Jitter Eliminator to deliver ultra-low noise and high dynamic range. Users can select between three different digital filters to best suit the source file and bandwidth of the partnering equipment.

Available now, the Audiolab 6000A Play sells for $1,999 (RRP).

For more information, contact AV Revolution on (02) 9521 4844 or at www.avrevolution.com.au

DENON 110-YEAR ANNIVERSARY QUARTET

Denon has released two new amplifiers, an SACD player and a phono cartridge to celebrate its 110th anniversary.

The new products are the Denon AVC-A110 A/V amplifier, PMA-A110 integrated amplifier, DCD-A110 SACD player, and DL-A110 MC phono cartridge. Each one has an exclusive silver-graphite colourway and features a 110th Anniversary logo. "These special 110th anniversary editions have been meticulously tuned by Denon's Sound Masters to set them apart from their standard counterparts and each one comes with a Certificate of Authenticity stamped with the approval of Denon's head engineer and a five-year warranty," said **Ralph Grundl**, of QualiFi, which distributes Denon in Australia. "All four 110 Anniversary products are manufactured exclusively at the Denon factory in Shirakawa, Japan and undergo an extended quality assurance process prior to delivery."

Now Denon's flagship A/V amplifier, the AVC-A110 is a 13.2-channel 8K AV amplifier, rated at 150-watts per channel into two channels (8Ω) that is equipped with, amongst others, Dolby Atmos, DTS:X, DTS:X Pro, IMAX Enhanced, Auro-3D, HEOS, and AirPlay2. For gaming applications, it has an Auto Low Latency Mode (ALLM), Variable Refresh Rate (VRR) and Quick Frame Transport (QFT).

The Denon PMA-A110 Integrated Amplifier uses Denon's patented 7th generation advanced Ultra High Current (UHC) topology to deliver 80-watts per channel into at 8Ω, with a frequency response that extends to 100-kHz. The digital inputs use Denon's Ultra AL32 Processing, which supports hi-res 384-kHz/24-bit PCM signals and DSD up 11.2MHz (DSD256) with decoding handled by four Burr Brown PCM1795 DACs in a differential configuration to achieve the highest accuracy and best signal-to-noise ratio. The multiple analogue inputs include a phono preamplifier with both MM and MC inputs.

As well as being able to play back SACDs and CDs, the DCD-A1100 can also decode DSD (2.8/5.6MHz) files and high-resolution audio files up to 192-kHz/24-bit recorded on DVD-R/RW and DVD+R/RW discs. Users can also play music files with sampling frequencies of up to 48kHz recorded on CD-R/RW discs. Digital data can also be input into the DCD-A1100 directly, via rear panel inputs. Processing is via a Quad DAC configuration, converting data coming from the Intel Cyclone 10-driven Ultra AL32 processing engine. "This advanced four times PCM1795 DAC topology delivers superb channel separation, ultra-low noise and THD levels," says Grundl. "And instead of using op-amp post filter circuits it has a fully discrete filter stage with carefully selected custom-tuned audio parts chosen to achieve outstanding audio performance."

The DL-A110 moving coil phono cartridge is based on Denon's famous DL-103 and, like it, is made by hand. "The DL-A110 delivers a balanced, detailed sonic signature with extended low frequencies," says Grundl. "By virtue of its heritage, it's the longest-running product in Denon's history."

For more information, contact QualiFi on (03) 8542 1111 or at www.qualifi.com.au

ASTELL&KERN KANN ALPHA

Astell&Kern has released the third model in its Kann line of portable digital audio players. As with the previous models, the new Kann Alpha's headphone amplifier is able drive any headphones. Users can select between low, mid and high gain modes to provide the precise power required, which is delivered via a 2.5mm unbalanced or 4.4mm balanced output.

"The Kann Alpha is the first Astell&Kern player to feature a 4.4mm Pentaconn headphone jack," said **George Poutakidis** of BusiSoft AV, which distributes Astell&Kern in Australia. "Users now have more options of headphones and IEMs without worrying about the need for adapters, and in another first for Astell&Kern players, the Alpha features Bluetooth 5.0 which has faster transmission speed and greater range than Bluetooth 4.2. It also supports both LDAC and aptX HD."

Features on the Kann Alpha include a 125mm HD touchscreen, 64GB of internal memory, support for microSD cards, Wi-Fi, DLNA networking, USB digital audio output, USB-C for data transfer and fast-charge support, and the ability to use KANN ALPHA as a USB DAC. Battery life is claimed as 14.5 hours.

The Kann Alpha supports up to 32bit/384kHz PCM and DSD256 playback. LED lighting indicates format playback information. MQA hardware rendering is built in to support MQA 8x rendering. MQA-CD playback possible if you connect an AC CD-Ripper and play back MQA-CDs. The Alpha also supports Android APK support, allowing users to install additional music streaming services to their player by simply copying and installing the corresponding APK file.

Available now, the Astell&Kern Kann Alpha sells for $1,699 (RRP).

For more information, contact BusiSoft on (03) 9810 2900 or visit www.busisoft.com.au

NEXT-GEN YAMAHA AVRS

Yamaha, which is a world leader in the audio-video receiver category, has released two new RX-V receivers that support the new era of 8K, HDMI 2.1 and HDR10+ dynamic display technologies.

The two new models are the 5.1-channel, 80-watt per channel RX-V4A and the 7.1-channel 100-watt per channel RX-V6A. "No other AV receiver on the market offers as many 8K HDMI inputs as Yamaha as of today, with three on the RX-V6A (seven inputs in total) and all four inputs on the RX-V4A," said **Boyd Gill** of Yamaha Music Australia. "So you get stunning visuals along with the authentic True Sound that Yamaha is uniquely positioned to understand and re-create, to put you in the centre of the action, be it an immersive movie, a live concert or an ultimate gaming experience."

Yamaha says that its advances to the RX-V line-up in 2020 are the most significant to date and include a simplified, modern, bold exterior design with a new, high-resolution LCD display and a jog dial with touch-sensitive buttons. HDMI 2.1 provides faster, smoother and uninterrupted entertainment and gameplay with auto low latency mode (ALLM), variable refresh rates (VRR), quick frame transport (QFT) and quick media switching (QMS).

Both models offer the entire suite of MusicCast capabilities and app control including Wi-Fi, AirPlay 2, Spotify Connect, built-in music streaming services TIDAL and Deezer, multi-room audio and voice control via Alexa, Google and Siri-enabled devices. Wireless MusicCast 20 and MusicCast 50 can optionally be paired and used as surrounds in a 5.1-channel setup.

All inputs on the RX-V4A and RX-V6A support Dolby Vision, with the RX-V6A adding DTS-X, Dolby Atmos and Dolby Atmos Height Virtualisation. Available now, the Yamaha RX-V4A sells for $899 (RRP) and the Yamaha RX-V6A for $1,299 (RRP).

For more information, contact Yamaha Music Australia on 1800 805 413 or at au.yamaha.com

MOON 40TH ANNIVERSARY COMPONENTS

Canadian high-end audio electronics manufacturer Simaudio has released 'Anniversary Edition' models of its Moon 680D Streaming DAC and Moon 600i v2 integrated amplifier to celebrate the 40th anniversary of the company's establishment. Each model is finished in a beautiful Millesime Red colourway designed to give a contemporary look plus a discreet styling cue recalling Moon's genesis in 1980. The remote controls are finished in matching Millesime Red and the Moon bridges are finished in Rose Gold. Only forty pairs have been built, and each model has a commemorative rose gold plate embossed with the Moon logo and a unique individual serial number.

"With an exclusive production run of just forty systems, this Anniversary Edition system is designed for passionate audiophiles who want to be part of Moon's audio heritage," said **George Poutakidis**, of BusiSoft, which distributes Moon in Australia. "This statement system will delight its owners as the units pair perfectly. The MOON 680D streaming DAC is a complete and modern high-end listening solution and the MOON 600i integrated amplifier is an ideal partner as it delivers the true power and emotion of music with its fully differential dual-mono design offering finesse and superb control."

Available now, the Moon by Simaudio Anniversary Edition system sells for $50,000.

For more information, contact BusiSoft AV on (03) 9810 2900 or at www.busisoft.com.au

ROTEL HONOURS KEN ISHIWATA

Rotel has released 'tribute' versions of its A11 integrated amplifier and CD11 CD player in honour of the late **Ken Ishiwata**, who was elemental in the design and production of Marantz products for more than forty years.

After leaving Marantz, Ishiwata joined Rotel and, with its engineering team, started the process of designing upgraded versions of the A11 and CD11. "Ken had approved the first prototypes of these two models but sadly passed away in November 2019, before the project could be completed," said **Daren Orth**, of Rotel. "Rotel then continued the work in order to complete the project to fulfil Ken's original vision in his memory."

"Ishiwata was widely admired in the hi-fi industry for his unique ability to identify the most ideal products for modification and take these products' performance to new levels", said **Sam Encel**, of Interdyn, which distributes Rotel in Australia.

"The design modifications Ken made to the A11 and CD11 although small, have resulted in increases in both resolution and detail, and the delivery of a more musical presentation with improved rhythm and timing. Available now, the Rotel A11 Tribute and CD11 Tribute are specially badged in honour of the man whose total passion for music was the impetus that inspired their creation."

Orth said that the changes Ishiwata made to the A11 involved upgrading around 50 per cent of the components in the signal path and adding damping materials to the chassis. "The changes Ken specified for the CD11 included eight capacitor changes and one resistor change in the DAC stage, nine capacitor changes in the power supply as well as alterations to the mechanical and electrical grounding systems, along with the addition of custom damping materials to the top cover," he said.

Available now in black and silver finishes, the Rotel A11 Tribute sells for $1,099 (RRP) and the CD11 Tribute for $649 (RRP).

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

KEITH MONKS PRODIGY UNIVERSAL DISC CLEANER

Famous British record cleaning machine manufacturer Keith Monks says its latest model, the Prodigy, will clean not only all sizes of vinyl records, but will also clean standard sized compact discs.

Unlike most record cleaning machines, the Prodigy uses a 'Threadless Point Suction System' that uses only a teaspoon of cleaning fluid per side that is discarded and replaced after each side is cleaned, so there's no cross-contamination possible. "In the Prodigy, a tiny suction tip scans across the disc a little at a time, removing every last trace of contaminated fluid, especially the mould release oils from the pressing stamper," says **Brian Maddern**, of Decibel Hi-Fi, which distributes Keith Monks RCMs in Australia. "Removing the dust and dirt particles that cause unwanted clicks and pops is of course important, but removal of oils and residues from the LP pressing process is the biggest benefit of proper record cleaning because removing these allows the stylus to track the groove more faithfully, optimising the clarity of sound and allowing your system to really sing. It also preserves your precious stylus by reducing unnecessary wear."

The Keith Monks cleaning process is more time-consuming than other systems, taking around five minutes to clean and dry both sides of an LP, something Maddern freely admits, but he says: "Miracles do take a little longer... but longer makes perfect and thanks to the Prodigy's largely automated operation, the cleaning process can take place unattended, so you really won't notice the extra time."

In an eco-friendly move, the Keith Monks Prodigy RCM is made almost entirely from bamboo, a sustainable renewable natural resource that is inherently noise absorbing, anti-static, moisture resistant, robust and hard-wearing.

Available now, the Keith Monks Prodigy RCM retails for $1,750.

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

COPLAND IS BACK

After a brief hiatus on the Australian marketplace, Copland high-end audio components are once more available. The new Australian distributor is the well-known Melbourne-based company Audio Magic.

Founded by **Olé Möller** in 1985, Copland is a small Danish company that designs and manufactures all its components in Denmark. Because of this, the product range is small, currently comprised of nine models, but will soon be increased with the addition of a new pre-amplifier and a new power amplifier. All models in Copland's range are amplifiers, including a DAC/preamp/headphone amplifier (DAC 215) through line stages, to integrated amplifiers and power amplifiers. What all models have in common is valves, used either solus or in hybrid arrangements.

As a small specialist valve amplifier manufacturer, Copland was one of the first to build amplifiers using the newest audio power valve, the KT150, which has now largely supplanted the almost century-old KT88. Although a KT150 can deliver 30 per cent more power than a KT88, so a pair in push-pull can deliver nearly 200-watts of power, Copland also uses them in lower-powered triode configurations where their use ensures what Möller calls, "an incredible quantity of headroom and dynamics without overloading."

One such design is the Copland CTA 506 power amplifier, whose push-pull output stages consist of a pair of matched KT150s in fixed ultra-linear configuration, providing the power of tetrodes and the low distortion of triodes. Copland rates the CTA 506 with an output of 90-watts per channel continuous into 8Ω from 20Hz to 20kHz with less than 1.0% THD. Designer Möller takes full advantage of the wide bandwidth of valves to deliver a frequency response of 5Hz to 100kHz (–3dB). The signal-to-noise ratio is specified as being in excess of 100dB (IHF-A). Möller also believes in putting his valves on show.

"The huge power valves in this amplifier are very pleasing to look at," he says "we have therefore decided to make them clearly visible by situating the valves behind lateral perforations on the front panel, thus creating a stunning design to match the sonic virtues of this amplifier."

"We will stock all models in Copland's range," said **Aleksandar Maksimovic** of Audio Magic. "We're waiting shipment of the newest models, but at the moment have available the DAC 215, CSA 100, CTA 408, CSA 75 and CSA 150."

The CTA 408 (pictured) is an integrated amplifier that, like the CTA 516, uses KT150s to deliver a rated power output of 75-watts per channel, both channels driven into 8Ω. It has a J-FET RIAA phono stage built in that uses more than one hundred discrete components rather than ICs. It's isolated in a shielded case and fed by a separate power supply. The CTA 408 also has a dedicated Class-A headphone amplifier on board. "The output transformers in the CTA 408 are a Copland in-house design, fine-tuned for optimal power bandwidth," says Maksimovic. "The massive size of the transformers prevents core saturation, and they are able to transfer full power well below 20Hz to the loudspeakers with a minimum of phase shift."

Möller says the superb linearity of the CTA 408's design, combined with an extended high-frequency performance that is only 3dB down at 100kHz, reduces the requirement for internal lag compensation after the amplifier's negative feedback loop is closed. "The CTA 408 simultaneously offers a midrange sound that is open and clear, highs with unconstrained mobility and acceleration, and a deep, tight and free-flowing bass reproduction, all in a single-chassis design for those who prefer the ease and convenience of a single chassis, but want the performance of separates," he says.

For more information, contact Audio Magic on (03) 9489 5122 or visit www.audiomagic.com.au

COPLAND

THE COMPACT SOLUTION

INTEGRATED VALVE AMPLIFIER

Copland CTA-408

There is nothing like an excellent tube amplifier.
An amplifier that simultaneously offers a midrange that is open and clear,
highs with unconstrained mobility and acceleration, and a deep,
tight and free-flowing bass reproduction.

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GRYPHON ESSENCE

PREAMPLIFIER & STEREO POWER AMPLIFIER

The Gryphon Essence stereo power amplifier is a very, very unusual audio amplifier. Which, if you know anything at all about this proudly Danish high-end audio specialist or its recently-retired founder, Flemming E. Rasmussen, should not come as a surprise.

Although Flemming is still associated with Gryphon, the company is now owned by Valdemar Martin Børsting and Gryphon's employees, which includes electronics designer Tom Møller, who has been the head of the design team at Gryphon for many years now.

The power amplifier is so unusual that it needs an unusual pre-amplifier to drive it, so for this review it is partnered with Gryphon's Essence Preamplifier. (In point of fact, the Essence power amplifier can be used with any preamplifier at all, but only Gryphon's pre-amplifier can take full advantage of the power amplifier's most unusual feature. Intrigued? You should be!

GRYPHON ESSENCE PREAMP

The Essence has so many unusual and interesting circuit features that it's actually difficult to know where to start to describe them.

The first point to note is that the Essence is a true 'dual mono' design, where the left and right channels are completely independent of each other. This is fairly common for power amplifiers (and also true of the circuitry inside the Essence Stereo power amplifier) but it's actually quite unusual to find in a preamplifier.

The next interesting point to note is that there's absolutely no signal wiring inside the Essence. The very few wires that are inside it are a short ground lead, some ribbons for the front-panel display and the mains power wires — and even these are contained within shielded channelling.

But perhaps the most interesting feature from a conceptual viewpoint is the Essence's 'Green Bias' link which, when the Essence pre-amplifier is used in conjunction with a Gryphon power amplifier, allows automatic selection of the level of bias applied to the power amplifier's output transistors. For information about this, refer to the section of this review titled 'Green Bias'.

In keeping with Gryphon's philosophy of maintaining signal purity (which mandates the use of d.c. coupling and eschews the use of global negative feedback), there is no volume control as such.

Gryphon instead uses a microprocessor-controlled 43-step fully-balanced relay-controlled ultra-precision resistor array to attenuate the signal. This works perfectly and is sonically transparent, but has one very small operational quirk, which Gryphon's Owners Manual explains thusly: "*This technology can sometimes — depending on the material played — make a very small clicking noise when used. This is not a sign that anything is wrong and is normal.*" There is no extraneous circuitry inside the Essence. If you want to add a digital stage, or a phono stage, this is achieved by the installation of an additional module. Intriguingly, although two modules are available, you can install only the one or the other of them, because there is only room for one. If you do need both phono and digital inputs, Gryphon suggests that you install the digital module (Zena DAC) and connect Gryphon's stand-alone Sonett phono stage to one of the Essence's line inputs, of which there are five — two balanced (using gold-plated XLR connectors) and three unbalanced.

The relay-controlled ultra-precision volume attenuator has one very small operational quirk

The latter also use gold-plated RCA connectors. In fact Gryphon recommends you connect the Sonett to 'Input 5' of the Essence, which is the reason the company has (mis) labelled it 'RIAA' even though it's not a phono input (though I guess it actually is if you install the optional phono stage).

It makes a lot of sense to provide a DAC via a module, rather than integrating it with the rest of a pre-amplifier's circuitry. The most important reason for doing this is obviously that if you don't plan to use any digital sources, there's no sense in paying for digital inputs on your pre-amp (or, indeed your integrated amplifier).

However equally important is that it's possible to upgrade a modular DAC, with Gryphon itself pointing out that its "future-proof digital module is ready for any current or foreseeable high resolution digital format."

If you do install the module, which uses an ESS Sabre ES9018 DAC chipset, you'll find it has five digital inputs: USB, balanced AES/EBU, Optical (Toslink) and two coaxial (BNC). The USB is able to process PCM up to 32-bit/384 kHz as well as DSD (on Windows OS up to DSD512 but only up to DSD128 on Mac). The coaxial and AES/EBU inputs can process up to192kHz/32-bit PCM and the optical input up to 96kHz/24-bit PCM. When the module is installed, the front panel display shows the sampling frequency and format of the incoming digital signal as well as the selected digital filter setting.

Gryphon's Zena DAC module itself is based on the company's award-winning Kalliope digital-to-analogue converter and, if it's not installed at the time of purchase, it can still be added at any time thereafter. The module allows you to select different filters for both PCM and DSD signals. For PCM you can choose between a fast roll-off (long group delay) or a slow roll-off (short group delay). For DSD you can choose between three different –3dB low-pass filter frequencies: 50kHz, 60kHz or 70kHz. As is usual, the DAC will work natively with any Apple computer, but if you use Windows, you'll need to download drivers from Gryphon's website.

If you choose to have the phono module (Option PS2-S) installed in the Essence you'll find that because it is based on Gryphon's Legato Legacy stand-alone phono stage, it has dual mono circuitry for both its moving-magnet and moving-coil inputs. As with the Zena DAC module, the phono module can be factory-installed at the time of purchase, or installed at any later date. Either way, the module will give you not only multiple options for load impedance for the moving-coil input of 20Ω, 100Ω, 200Ω, 499Ω or 806Ω, but you are also able to insert your own specific-value load resistor in order that you can perfectly match it to your cartridge. The moving-magnet input comes preset with the industry-standard 47kΩ/200pF load.

Take a look around the back of the Essence pre-amplifier and you'll immediately see one outcome of the dual-mono nature of the unit, which is that all the 'left' and 'right' inputs are at opposite ends of the rear panel, rather than being alongside each other.
I deliberately put the words left and right in inverted commas because Gryphon does not actually label them as such. The terminals are instead identified as Input 1, Input 2 and so on, but of course there are two Input 1s, two Input 2s and so on, the only identifier being that one of the Input 1s is on the left side of the rear panel and the other Input 1 is at the right side.

This means that you will have to pay extra attention to ensure that you don't accidentally mix up left and right channels when you're connecting your cables. Speaking of which, Gryphon also manufactures its own cables (Guideline Reference Interconnect) which are colour-coded, which should help avoid any confusion. However, Gryphon has a philosophy about cables — as, indeed, it does about everything involved in audio. It says: "Wires should never be utilised as 'equalisers' to correct errors elsewhere in the system. Instead, any error should be corrected at the source, so that interconnects and loudspeaker cables can be selected solely on the basis of sonic neutrality. For this reason, we employ Gryphon's own range of interconnects and cables at every stage in the design of every Gryphon product."

The Essence has only balanced outputs (via XLR) presumably on the assumption that anyone who buys an Essence will be using either a Gryphon power amplifier (all of which have XLR inputs) or if they don't that the amplifier they do use will have them. I'd agree with this assumption.

Rather unusually for a high-end audio-only pre-amplifier, there is a subwoofer output — or, more correctly, there are TWO subwoofer outputs: Sub Out and Sub Out. Note, however, that these are not your usual subwoofer outputs because they're full frequency-range — in other words, the outputs are not low-pass filtered.

So if you don't use them to connect to a subwoofer you could treat them as pre-amplifier outputs and connect them to any device you want that requires a line-level signal.

REMOTE CONTROL

The peculiarly-shaped remote control supplied with the Gryphon Essence Pre-amplifier is solid metal, so it's certainly sturdy. It also has two 'flat' sides, so you can stand it up on its end, or on its side, both of which orientations can be useful.

Its underneath is covered by a rectangular section of soft foam, so if you have a delicate surface on which you'd like to place it (a French-polished table, for example) putting it down on its back will ensure the metallic remote doesn't mark or scratch that surface. And on that — or any other — surface, it will also prevent the remote from sliding, as the foam is quite 'sticky.'

Into 4Ω ohm loads, Gryphon's Essence will deliver 100-watts per channel... and into 2Ω, 190-watts

However, being a foam composition, I assume that it will deteriorate over time and so will require replacement at some stage in the future. All the buttons are clearly labelled and all operate with a 'soft' touch and totally silently: no annoying 'clicks' here!

ESSENCE STEREO AMPLIFIER

If I told you that the Gryphon Essence Stereo Amplifier weighs 45 kilograms and is almost half a metre wide and half a metre deep, and a quarter of a metre high, would you care to guess how much power it can deliver to your loudspeakers?

If you're thinking it might be four or five hundred watts per channel, you're in for a bit of a surprise: It's rated at just 50-watts per channel. But that is assuming you have 8Ω speakers. If the impedance of your speakers is 4Ω ohms, Gryphon's Essence will deliver 100-watts per channel… and if you have 2Ω ohm loudspeakers, it will deliver 190-watts per channel.

This power output is managed by 10 Sanken bipolar output transistors per channel. (Interestingly, Gryphon's Essence Monobloc power amplifier has 20 of these same devices, which enables slightly higher power output into 2Ω, even though it delivers exactly the same power as the Essence Stereo into 8Ω and 4Ω loads.) The separate driver section has its own power supply, delivered from individual windings of the custom-made toroidal transformers.

'GREEN' BIAS

To understand what Gryphon's 'Green' biasing system does, you need to understand just a little about how audio amplifiers work. Basically, in order to 'amplify' an audio signal we need to use a special type of semiconductor called a transistor which allows you to use a low voltage (the input) to control a much higher voltage (the output). This means that the word 'amplify' is something of a misnomer because it's not actually making the low voltage signal any bigger, it's just making a different, higher-voltage signal increase and decrease in perfect unison with the low-voltage signal.

Various different types of solid-state devices have been invented to do this. The most common of these is the bipolar junction transistor (BJT). Another common one is the metal oxide semiconductor field effect transistor, or MOSFET. Because transistors can only handle a fairly small amount of power, multiple transistors are required to be connected together in order to achieve high power output levels.

When using multiple transistors, they can also be connected together in different ways, called 'Classes'. We're only going to deal with three of them here in this review: Class-A, Class-B and Class-AB.

In a Class-A amplifier, the transistors handle 100 per cent of the audio signal, so they conduct though the full 360 degree sinusoidal waveform.

This means that the transistors are working at their maximum capability, which means they draw maximum power and generate maximum heat.

To avoid this, amplifier designers came up with a Class-B design, where two different transistors were used. One transistor handled the first half-cycle of the audio signal from (0 to 180 degrees) and the other handled the second half-cycle, (from 180 degrees to 360 degrees), after which it'd hand the audio signal back to the other transistor. Whilst-ever one transistor was 'on' the other one was 'off.' There were two problems with this system. The first was that you had to use one type of transistor for the 0–180° part of the cycle, and a completely different type of transistor for the 180–360° part, and the two different devices have different electronic characteristics.

The second, bigger, problem with this arrangement was that transistors cannot switch instantly, so there was always a 'glitch' at the point of switching which created so much distortion this circuit could not be used for amplifying audio signals. This is where Class-AB comes in.

In a Class-AB amplifier, each transistor conducts for more than 180 degrees, so there's an overlap that effectively eliminates the switching glitch.

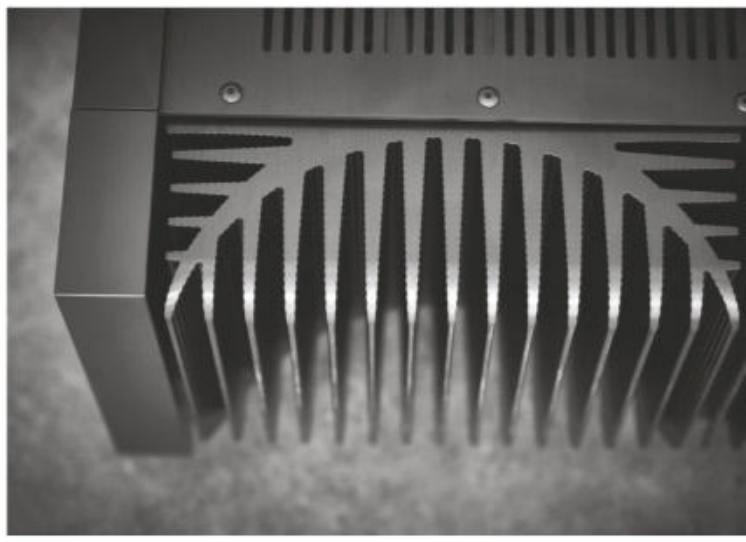
If you make the overlap quite small you are able to reduce the cost of the amplifier by having a smaller power supply, less expansive heat-sinking and a reduced number of output transistors. But there will still be a small glitch when the audio signal changes from one transistor to the other.

This can be partially overcome by increasing the size of the overlap, but of course as you increase the amount of overlap you also have to increase the size of the power supply, the area of heat-sinking and add additional output transistors.

The amount of overlap is determined by the amount of bias voltage you apply to the transistors. If you use a low bias, the amplifier will operate in Class-A mode up to a certain set power say, 10-watts, before switching to Class-AB. Let's call this Amplifier X. If you use a higher bias, the amplifier will operate up to 20-watts in Class-A before switching to Class-AB. Let's call this second amplifier Amplifier Z.

In the scenario described in the previous paragraph, so long as you listen at a volume level that requires these two amplifiers to deliver less than 10-watts, you'd be hearing 'Class-A' sound all the time from both amplifiers. If, however, you turn up the volume, so you're listening at a constant level of 15-watts, Amplifier X would be operating in Class-AB mode while Amplifier Z would still be operating in Class-A mode.

With the Essence amplifier (as with several other of its amplifiers) Gryphon allows you to select the level of bias you'd like to use (and therefore the amount of power that will be delivered in Class-A mode). Firstly, there's a manual selection on the Essence power amplifier, which has positions for 'Low Bias' and 'High Bias'. If you use the 'Low Bias' mode the amplifier will be more economical to run, but will switch from Class-A mode to Class-AB at a lower level than if you select the 'High Bias' mode.

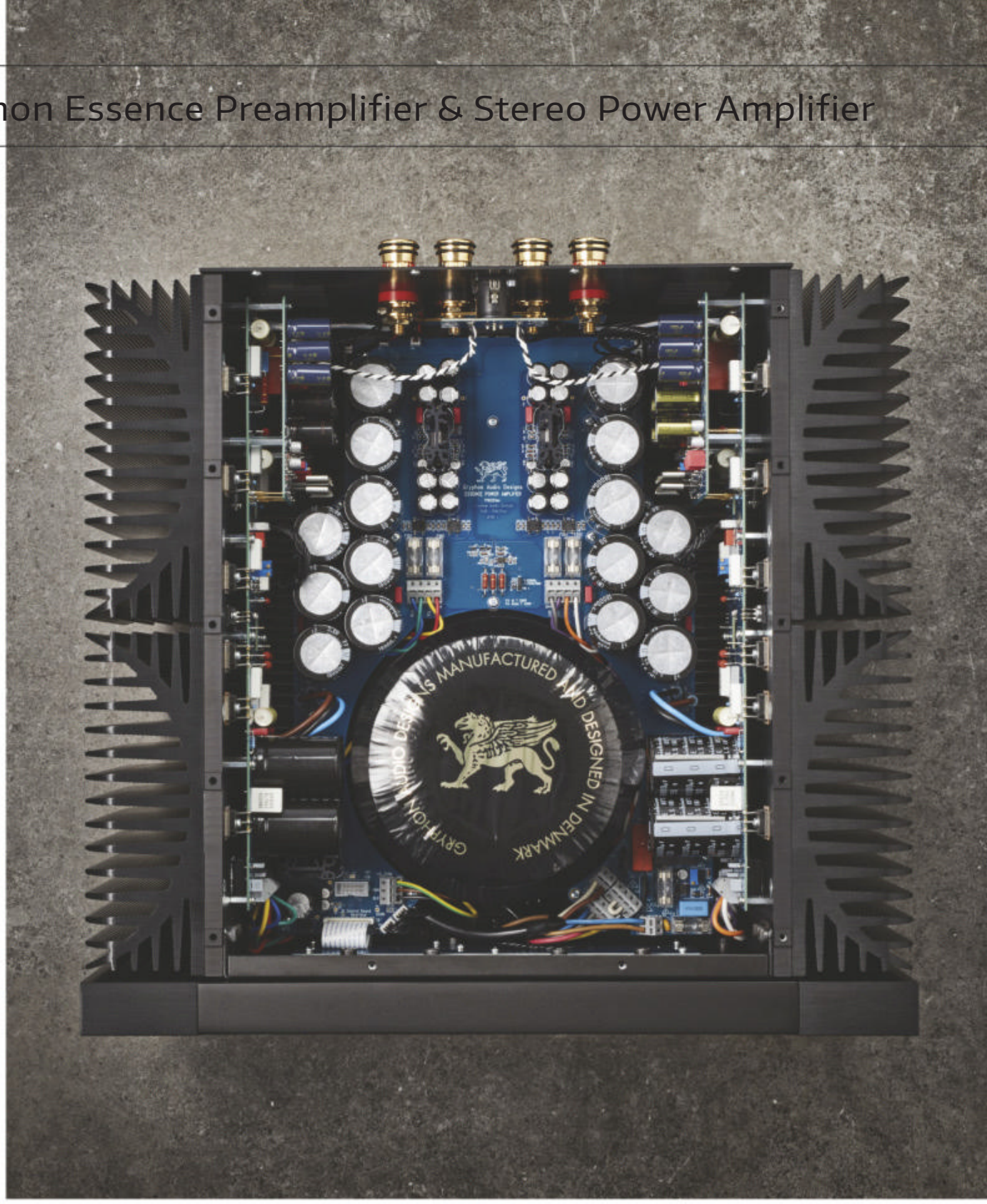


If you choose the 'High Bias' setting, the amplifier will operate entirely in Class-A mode, but will become very, very hot and be very expensive to run.

However, if you select the 'Green' mode, and link the 'Green Bias' terminal on the Gryphon pre-amplifier to the equivalent terminal on the Essence power amplifier, the power amplifier will select the bias level automatically, which it calculates using an algorithm that's based on the position of the pre-amplifier's volume control.

Using this mode enables Gryphon to offer a third (Medium Bias) mode in addition to the Low Bias and High Bias modes and vary when the mode will change. Choose one scenario and the Low Bias will apply for volume settings from 00 to 09, Medium Bias for 10 to 19 and High Bias for 20 to 42.

Choose the other scenario and Low Bias will be applied for volume settings from 00 to 15, Medium Bias for settings from 16 to 25, and High Bias for settings from 26 to 42.



It's a very clever design and a very convenient one for listeners. It will also help save the planet… hence the use of the word 'Green' before the word bias!

I should note that there is some disagreement about what constitutes a 'Class-A' circuit design—even amongst amplifier designers. Some designers claim that the only 'true' Class-A circuit is one where only a single semiconductor is used to produce the audio signal, and that there can be no 'sharing' of the audio signal between different semiconductors. The designers who hold this view would say that while Gryphon's Essence is a Class-A design, it's not a 'true' Class-A design because it uses multiple output devices. This is such an arcane difference that the only people arguing it should be those who have a degree in electrical engineering!

AUDITIONS

Although you might imagine given Gryphon's minimalist philosophy — and the lack of a balance control or tone controls — that its Essence pre-amplifier would offer no user niceties, nothing could be further from the truth. What you will discover if you explore the menu options on offer is that the Essence has some very cool—and very useful—features.

For my money, the most useful of these is the Essence's input level matching circuitry, which allows to to adjust the gain of the amplifier so that whenever you switch from one input to another, you will hear exactly the same volume level, irrespective of the signal level at that input. Unlike most such circuits, which introduce additional components into the signal path in order to accomplish this end, Gryphon does this by storing the offset values in the microprocessor that controls the resistor attenuator network, thereby ensuring the purity of the audio signal. This is really clever!

My next favourite circuit is actually two closely-related circuits, 'Start-Up Level' and 'Maximum Level.' Their names describe what they do, in that you can set a start-up volume level that will be applied automatically whenever you switch the pre-amplifier on, while the maximum level circuit allows you to set the maximum volume at which your system can be played.

The number of volume levels you can use, however, is fairly restricted, because the minimum volume level is 00 and the maximum is 42, so there are only 42 different settings. I'm going to guess that the reason for 42 being the maximum level is because Gryphon's designer is a fan of Douglas Adams and his book Hitchhiker's Guide to the Galaxy, in which the computer Deep Thought says the answer to the question of the meaning of 'life, the universe, and everything' is 42. However, it might equally be that 42 was the last number for which the Diophantian equation was solved. There are 42 other good reasons it could be 42 too, which you can find at https://tinyurl.com/gryphon42.

Unlike some similar systems I have seen, the maximum level you set on the Gryphon cannot be over-ridden without using the remote control, so once you've programmed in a maximum volume level it cannot be exceeded unless you re-program the max level circuit, a process that requires the use of the remote control. This means that if you lock your remote control away somewhere, no-one can mis-use your system, yet they can still actually use it. Again, very clever! Adjusting volume via the front panel or the remote control will defeat the muting circuit, which is exactly as it should be, though I think it would have been more elegant if adjusting volume upwards defeated the mute, but adjusting it downwards didn't. Switching inputs, incidentally, does not defeat the muting circuit: the amplifier will remain muted when you switch from one to another. (The mute indicator is an icon of a speaker followed by an '×'.)

I also liked the fact that the Gryphon Essence pre-amplifier lets you change the standard input names that are displayed in on the front panel (CD, DVD, DSD, Tuner, Tape, Phono, DAT, DAC, Stream and Aux) to anything you want… though the eight character limit might mean you have to be a bit creative in your input-naming procedure. This is nice, but lots of manufacturers do this, so the only surprise is that it's on a high-end device. Most high-end manufacturers eschew such pedestrian niceties.

And for those who don't like bright displays, which includes me, you can dim the display to 75% of its normal level, 50% or 25%. And if you really, *really* don't like displays at all, you can have it turn it off completely, though it will briefly turn on (for less than fifteen seconds) whenever you use a function so you can ascertain the operational status of the amplifier. In a rather sensible move, a small blue LED comes on whenever the display is off, so you will never accidentally leave the amplifier switched on when you'd prefer that it was off. And when might you prefer that it was switched off? I'd suggest that should be any time you're not using it, even if you are using the Green Bias mode. The display itself isn't state-of-the-art, rather a fairly old-fashioned dot-matrix type, albeit a fairly high-density one.

The first music that I heard delivered by this Gryphon Essence Pre/Stereo duo was from ex-pat Daniel Thorne. Now based in England, his first solo album, 'Line of Sight', is absolutely glorious. Though it's the last track on it, I generally play *Fear of Floating* first, because (a) I like it the most and (b) I can never quite get over how realistically Thorne's sax is recorded, and when I listened to it with the Gryphons I heard it more realistically than I ever had before. Whereas with lesser amplification I might never be quite sure I was hearing the sound of the pads landing on the edges of the tone-holes, I was left with absolutely no doubt when listening via the Gryphons.

As for the Gryphons' ability to soundstage, for that I used Thorne's spooky *Pyriscience*, which would be an excellent basis for the theme music of a science-fiction movie. The absolutely grounded way the Gryphons delivered the continuous bass sound while simultaneously suspending the almost supra-audible high-pitched keening treble was an object lesson in control. When I closed my eyes I found that the eerie soundscape was almost surround-like in its ability to envelop me in sound. Truly amazing for both the track and the amplification chain.

It is often difficult to explain how a superior amplifier can correctly deliver the emotion that caused a song's creation, but if you listen to Nine Inch Nails' *Right Where It Belongs* with this Gryphon pair, you will know immediately that it's delivering emotion in its truest form. When the final, sad and solo notes die out from that out-of-tune piano, I guarantee you'll just hit the play again button over and over…and over. This represents stunning presentation from the Gryphons. Few amps can do this.

And while we're talking Trent Reznor, why not use *Closer* as a taster for the insane ability of the Gryphon due to deliver deep bass. His bass drum sample (originally from Iggy Pop's *Nightclubbing*, but so heavily modified you'd never know… unless you did) was crushingly powerfully delivered, no matter how high high I cranked up the volume. (Warning, you should not watch the video version of this song if you are squeamish or are in any doubt of your own sanity).

Piano is a great revealer of sonic inadequacies, and you won't hear any sonic inadequacies at all if you audition Jon Hopkins' extraordinary third studio album, 'Insides'. Even if you don't know him, you've probably heard his collaborative work, for example on Coldplay's 'Viva La Vida' which features Hopkins' song *Light Through the Veins*. His style has been called 'sophisticated ambient electronica' because of his superb pianism, his classical training and his talent for complex composition.

Light Through the Veins is one of the tracks on Insides, but do make sure you listen to *Vessel*, with the overdubbed piano and the house music. As well as listening to the piano sound across its octaves, you'll also be able to hear the tonality of the performance of the Gryphon duo (and stretch the capabilities of your loudspeakers) as the music digs deep into the lowest frequencies. You can also admire the clarity of all the buzzes, beeps and sound effects as delivered by this Gryphon pair.

If you audition the Gryphon duo with a more conventional piano and pianist, such as Australia's own Stephanie McCallum, you'll find the same applies. I listened to a favourite of mine, her album 'Perfume', which obliquely references the fact that on it she plays works by French composers.

The composers whose works she plays include Debussy, Satie, Faure, Ravel, Saint-Saens and others. I was going to write 'famous' French composers in that previous sentence except that she also plays works by Alkan, Ropartz and Chabrier, none of whom are exactly household names unless you're a pianist or seriously into classical compositions.

Of course the Debussy she plays is *Clair de Lune*, which is one of the reasons this is one of her most popular albums, and a best-seller for ABC Classics (and her, of course). An acclaimed French music specialist, McCallum gave what is believed to be the first complete public performance of Alkan's T*hree Studies, Opus 76 (for the Left Hand, for the Right Hand, and for the Hands Reunited*). As you'd expect of her, her piano, her piano tuner and ABC Classics, the sound quality on this album is as glorious as her performances of all the works on it, and the Gryphons revealed to me the intimacy of the recorded acoustics, the sonorities of the piano, and the delicacy of her playing, all of which enabled me to reach that holy grail of hearing the very essence of the music.

Over the course of my listening sessions I tried the Gryphon's various bias settings and can recommend that if you use these as a pair, you should most definitely avail yourself of the 'Green Bias' setting, but if you are using the Gryphon Stereo on its own, then the 'High Bias' setting is the one to go for—but only if you make sure there's adequate ventilation to take care of the inevitable heat build-up because, as with all Class-A designs, after a while the Essence power amplifier gets very, very hot!

CONCLUSION

The exterior aesthetics of Gryphon's amplifiers may not appeal to everyone, being somewhat 'brutalist'—if I can use that word in its most architectural sense—in appearance, but the sound quality will have instant appeal, no matter what genre of music you prefer to listen to.

Gryphon goes into many technicalities when it's describing how its amplifiers are designed, and how those designs are executed, but there's no single individual element that can explain why these particular amplifiers perform at the spectacularly high level that they do. And perhaps we should not even be wondering about this, or trying to explain it. Whilst I was listening to *Clair de Lune*, I was reminded of something Claude Debussy once said: "*We should be constantly reminding ourselves that the beauty of a work of art is something that will always remain mysterious; that is to say one can never find out exactly 'how it is done'. At all costs let us preserve this element of magic peculiar to music. By its very nature music is more likely to contain something of the magical than any other art.*" So in order to help preserve the magic that is the Gryphon sound, I shall say no more. ***greg borrowman***

Readers interested in a full technical appraisal of the performance of the Gryphon Essence Preamplifier and Gryphon Stereo Power Amplifier should continue on and read the LABORATORY REPORT published on the following pages. Please 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.

CONTACT DETAILS

Brand: Gryphon
Model: Essence Preamplifier/Stereo Power
RRP: $26,995 / $34,995
Warranty: Five Years
Distributor: Advance Audio Australia Pty Ltd
Address: Unit 8, 509–529
Parramatta Road, Leichhardt
NSW 2040
T: (02) 9561 0799
E: sales@advanceaudio.com.au
W: www.advanceaudio.com.au

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- Immaculate musicality
- Incomparable tone

- Runs very hot
- Size and weight
- Price

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LABORATORY TEST REPORT

Newport Test Labs measured the power output of the Gryphon Essence Stereo power amplifier at exactly 51-watts per channel into 8Ω at all audio frequencies and irrespective of how many channels were driven: one or both. When driven into 4Ω loads, the Gryphon Essence's power output doubled, which is exactly what a 'perfect' amplifier should do, but so few actually really do when tested. Again, the output was exactly 102-watts per channel at all audio frequencies irrespective of how many channels were driven, as you can see from both the accompanying bar graphs and the tabulated chart.

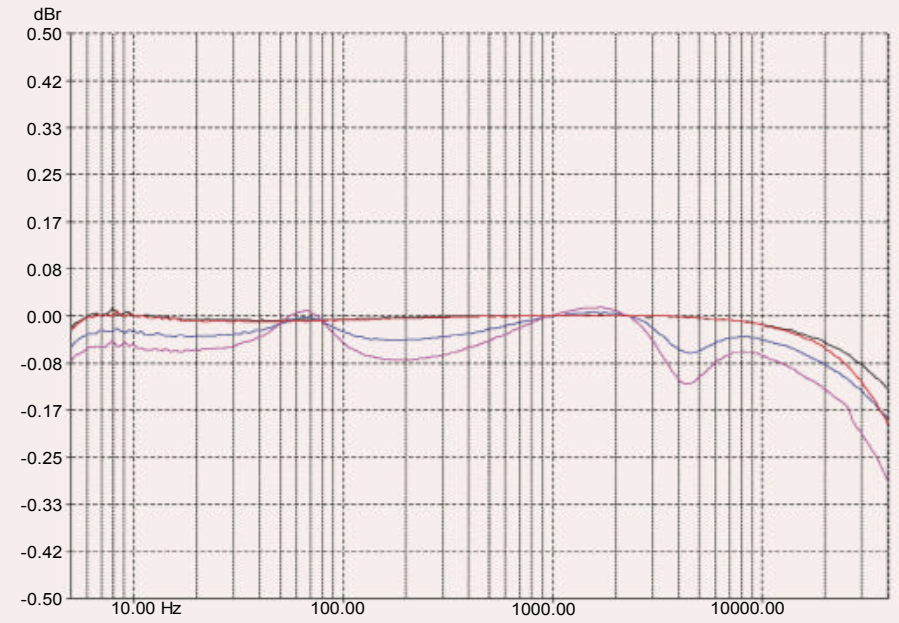
The Gryphon Essence very nearly pulled off the same trick again when Newport Test Labs dropped the load resistance to just 2Ω, but instead of delivering the theoretical ideal of 204-watts, the amplifier's output instead topped out just four watts shy of that figure, delivering exactly 200-watts per channel, again at all audio frequencies and irrespective of the number of channels driven. Although this figure was just short of the theoretical ideal, it was bang-on Gryphon's specification.

I need to emphasise at this point that these are absolutely fantastic results for a Class-A amplifier stage. It is an extraordinarily hard task for any amplifier designer to build a Class-A amplifier that will do this… just ask two of the world's pre-eminent amplifier designers, Doug Self or Nelson Pass!

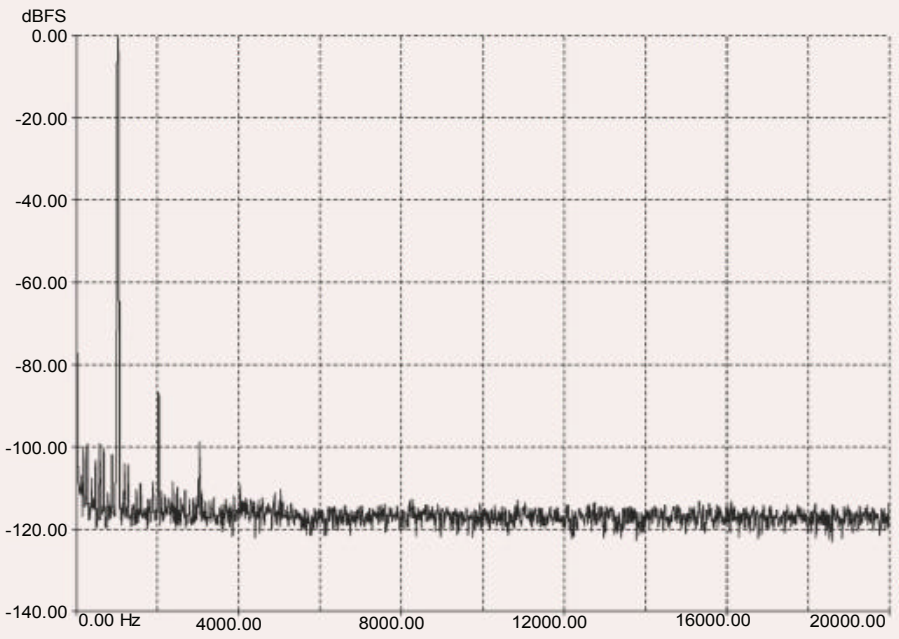
The frequency response of the Gryphon Essence pre/power duo was excellent, and remember that this is the response for both the pre-amplifier and the power amplifier combined, not individually, which is how the manufacturer lists the specifications. As you can see from the tabulated figures, Newport Test Labs measured the frequency response at less than 1Hz to 113kHz –1dB, and at less than 1Hz to 217kHz –3dB. Once again, this is outstandingly good performance.

Graph 1 shows the frequency response between 20Hz and 50kHz (again with both the pre and power amplifiers in the test loop) when driving a standard laboratory test load (an 8Ω non-inductive resistor) and when driving a load that simulates the one that would be presented by a two-way bass reflex loudspeaker (Newport Test Labs uses the same load for this test as *Stereophile* magazine: a load designed by Ken Kantor that John Atkinson modified to include Zobel impedance compensation in the treble).

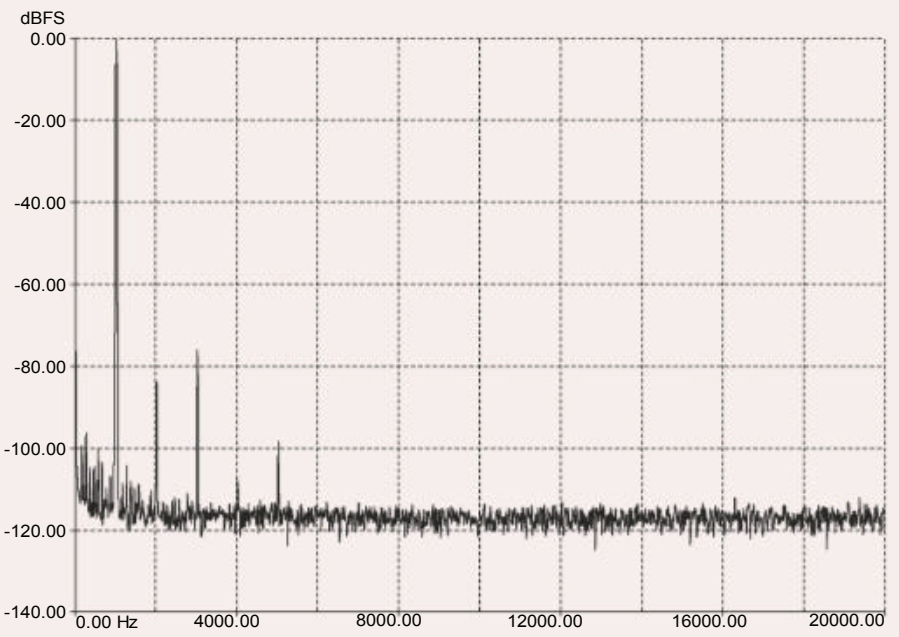
The black trace on this graph shows the frequency response into a standard 8Ω non-inductive when the amplifier is in



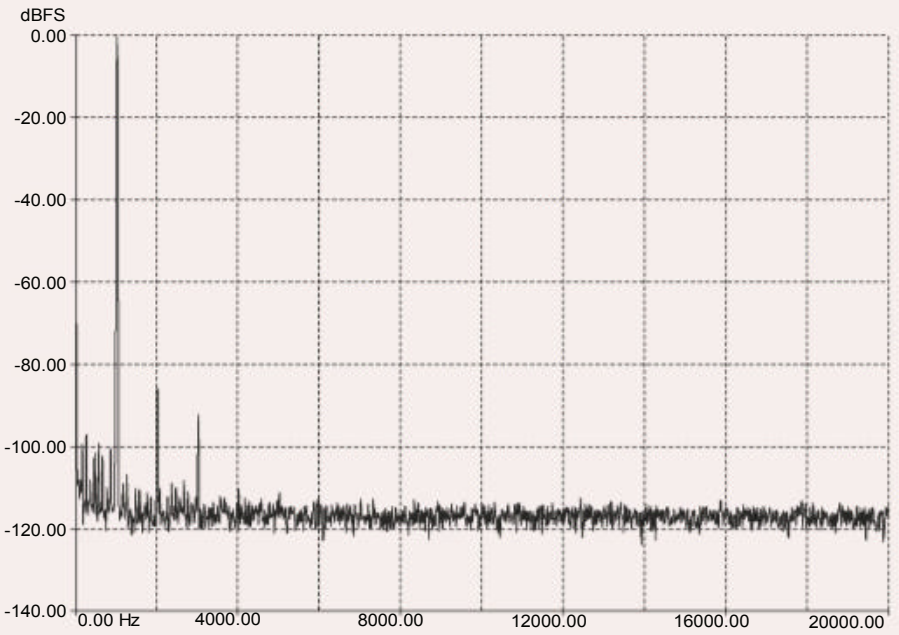
Graph 1: Frequency response at 1-watt into an 8-ohm non-inductive load (black trace-Class A, red trace-Class-A/B) and into a combination resistive/inductive/capacitive load representative of a typical two-way loudspeaker system (blue trace-Class A, purple trace Class A/B).



Graph 2: Total harmonic distortion (THD) at 1kHz at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB. Class-A mode.



Graph 3: Total harmonic distortion (THD) at 1kHz at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB. Class A/B Mode.



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

Class-A mode, while the red trace shows the frequency response using Class-AB mode into the same load. You can see there's a very slight sag centred around 50Hz with the high-frequency response 'rolling off' at around 4kHz, with the Class-AB mode rolling off a little earlier than the Class-A mode. Note that when I say 'rolling off' you need to bear in mind the vertical scale of the graph, where the top is +0.5dB and the bottom is –0.5dB, so the Class-AB mode's frequency response is actually a mere 0.75dB down at 20kHz and only 0.18dB down at 40kHz! This puts the normalised frequency response of the Gryphon pair across this band as 5Hz to 40kHz ±0.09dB. On any normally-scaled graph, both traces would be flat lines and indistinguishable from each other.

The blue and purple traces on Graph 1 show the Gryphon Essence pair's response into the simulated load, again for the Class-A and Class-AB modes respectively. As you'd expect, there's more variance in the response, but this variance is again exaggerated by the extreme vertical scale of the graph, so that overall, the normalised response into this load using the Class-AB mode is 5Hz to 40kHz ±0.15dB. Again, on any standard graph, these two traces would almost be straight lines, such that all four traces would be almost indistinguishable from each other (which is why Newport Test Labs selected a more expanded scale than usual).

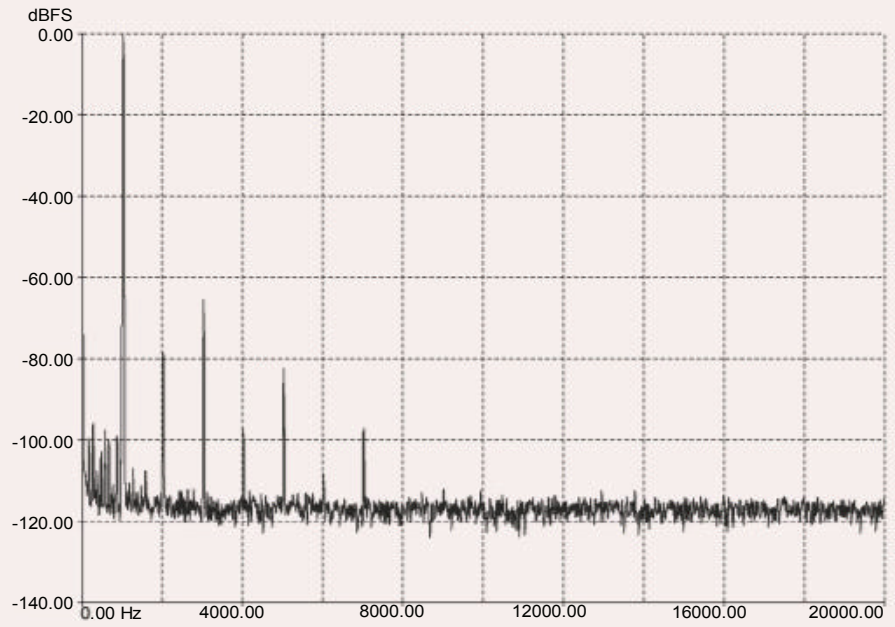
Although it's apparent from Graph 1 that performance in the Class-A mode is superior to that in Class-AB the actual differences in level are so small that they would be imperceptible to the human ear.

The balance between the two stereo channels of the Gryphon Essence duo was measured by Newport Test Labs as 0.002dB, which would be a stunningly good result at any time, but even more so when you consider the dual mono nature of the designs. I am amazed at such a good result.

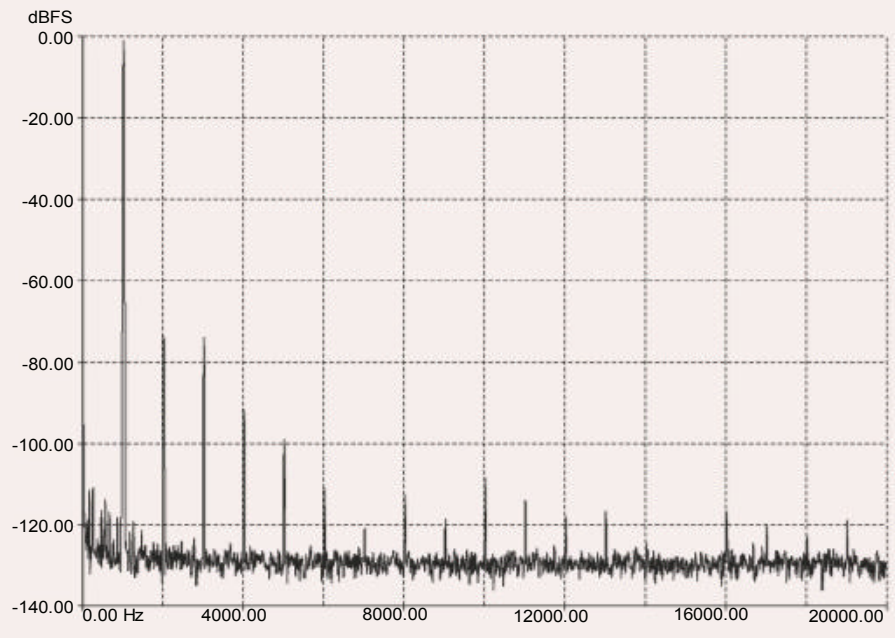
Channel separation, as you can see from the tabulated figures, is in triple digits for all three test frequencies, with measured results of 107dB at 16Hz, 111dB at 1kHz and 104dB at 20kHz. These are, self-evidently, all excellent results. However, given the dual mono nature of the design, I would not have expected any less. The interchannel phase results (also tabulated) were not quite as good as I might have expected, particularly at 20kHz, but are excellent nonetheless. These would be affected by cable choice, and the lab was not using Gryphon's own cables, so this would also be a factor.

Newport Test Labs has shown distortion test results for the usual output power levels of 1-watt and 20-watts into both 8Ω and 4Ω

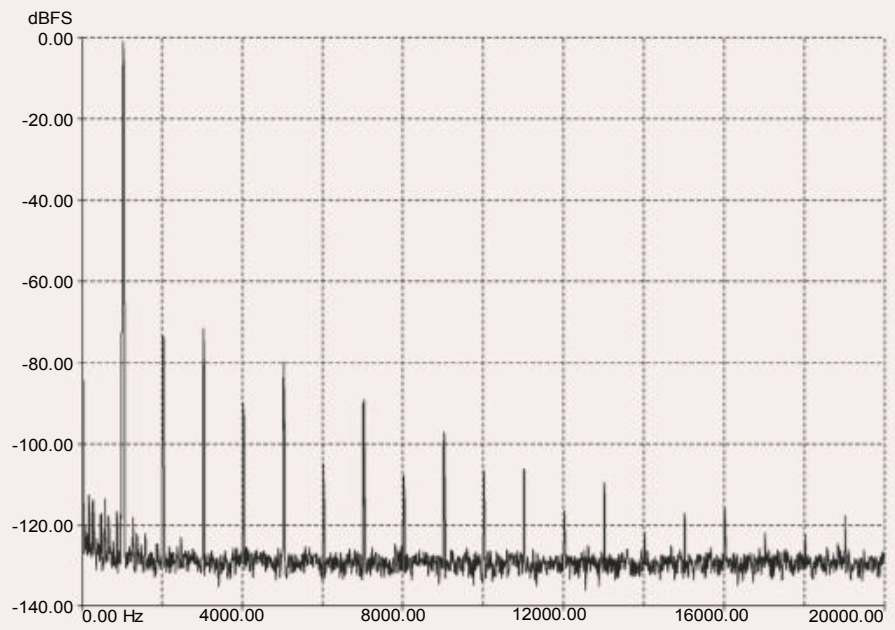
Graph 5: Total harmonic distortion (THD) at 1kHz at an output of 1-watt into a 4-ohm non-inductive load, referenced to 0dB. Class-A/B mode.



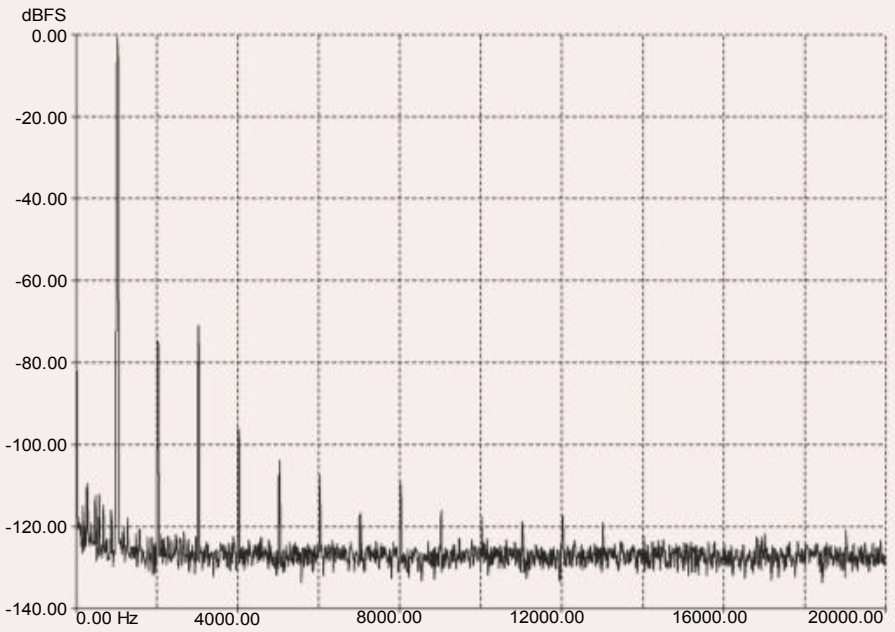
Graph 6: Total harmonic distortion (THD) at 1kHz at 20 watts) into an 8-ohm non-inductive load, referenced to 0dB. Class A mode.

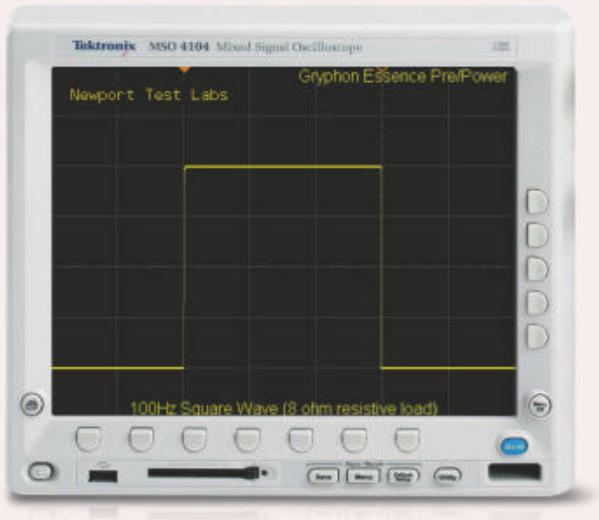


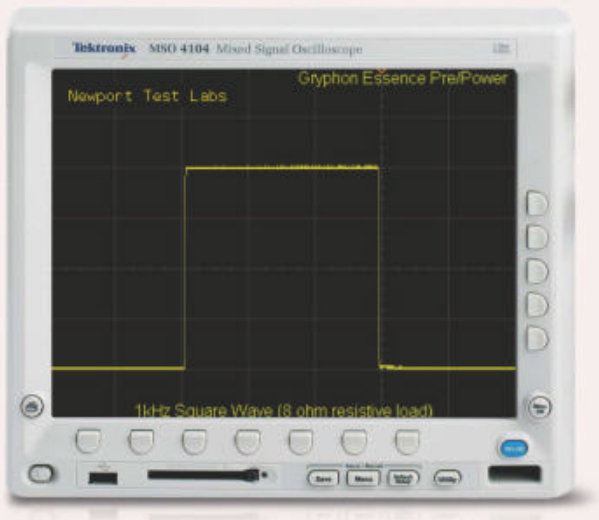
Graph 7: Total harmonic distortion (THD) at 1kHz at 20 watts into an 8-ohm non-inductive load, referenced to 0dB. Class A/B mode.

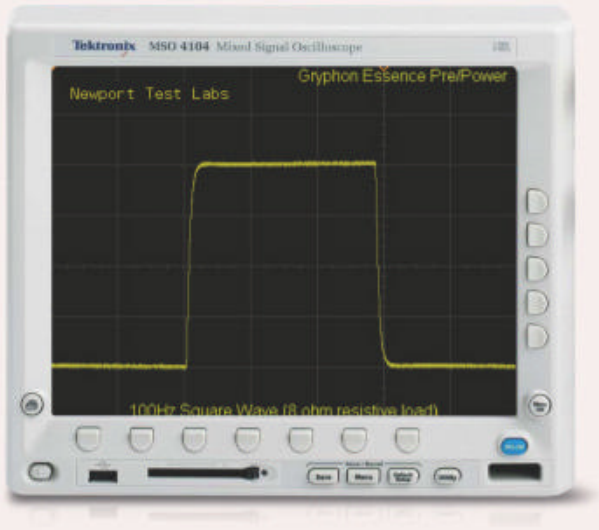


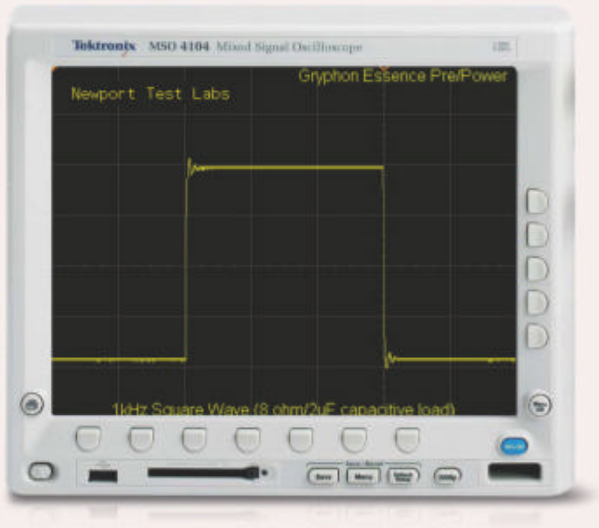
Graph 8: Total harmonic distortion (THD) at 1kHz at 20-watts into a 4-ohm non-inductive load, referenced to 0dB. Class A mode.



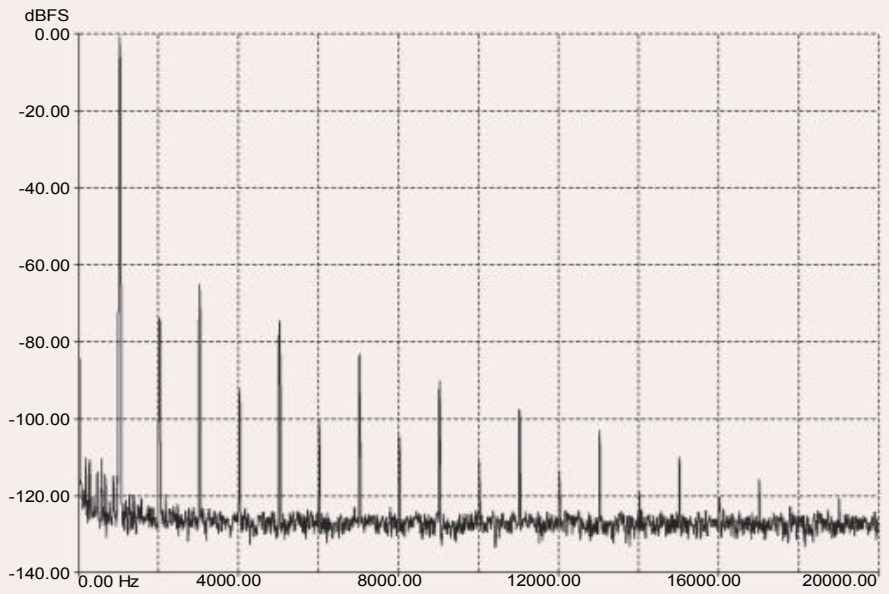




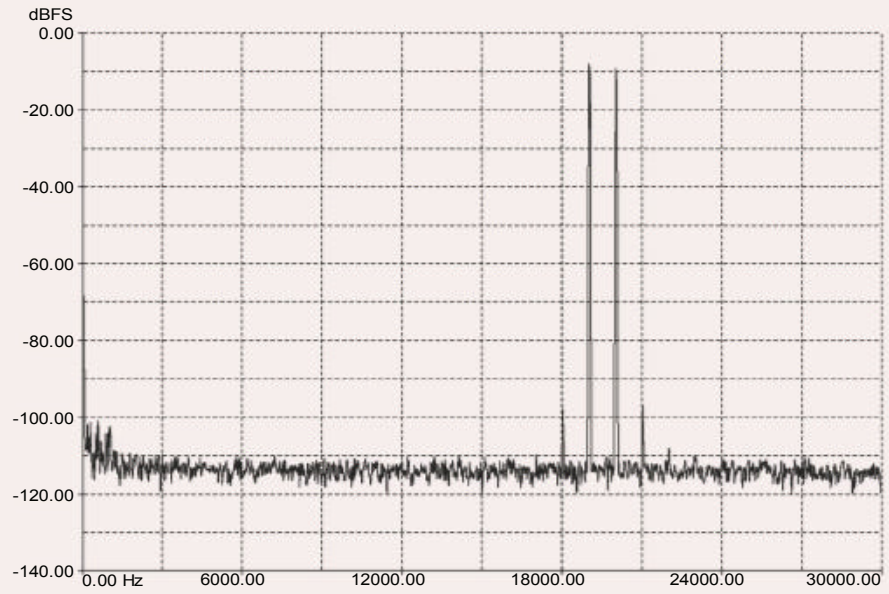




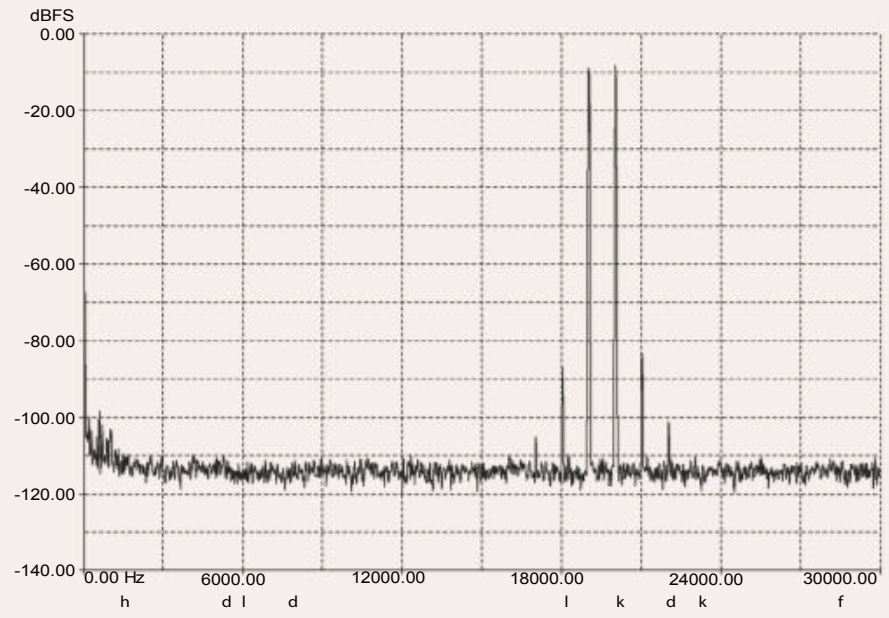
Graph 9: Total harmonic distortion (THD) at 1kHz at 20-watts into a 4-ohm non-inductive load, referenced to 0dB. Class A/B mode.



Graph 10: 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. Class-A mode.



Graph 11: 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. Class A/B mode.



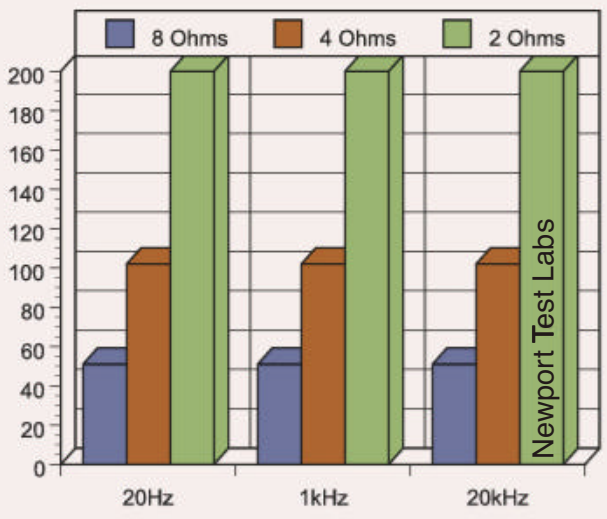
test loads, using a 1kHz test signal for both Class-A and Class-AB modes and, as you can see, Class-A mode resulted in less distortion in every test.

Graphs 2 and 3 show output at 1-watt into 8Ω for Class-A and Class-AB modes respectively. You can see that in Class-A mode there are two primary harmonic components, a second at –87dB (0.00446%) and a third at –98dB (0.00125%). There's a fourth at –111dB (0.00028%) and a fifth at –112dB (0.00025%) but both these are essentially buried in the noise floor.

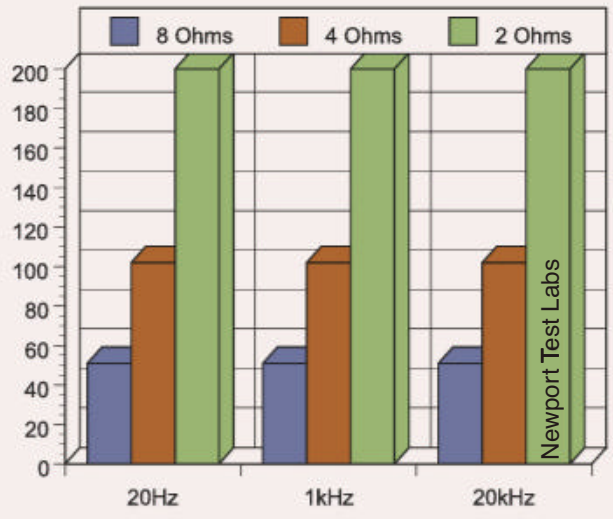
In Class-AB mode you can see that the levels of the second and third harmonics have increased, to –84dB (0.00630%) and –77dB (0.01412%) respectively with the third harmonic predominating. This is important because all things being equal, second harmonic distortion 'sounds better' than third harmonic distortion, although both are actually euphonious, being the octave and the fifth. You can also see that the fourth and fifth harmonics are now clearly clear of the noise floor, at –109dB (0.00035%) and –98dB (0.00125%) respectively.

When output load is reduced to 4Ω, the distortion spectrum when the amplifier is in Class-A mode (Graph 4) is very similar to that when it's driving an 8Ω load, however, in Class-AB mode there's a substantive difference, particularly in the higher-order harmonics, with sixth and seventh-order components at –112dB (0.00025%) and –97dB (0.00141%). Sonically, distortion components become less benign as their frequency gets higher, so low-order distortion components are always to be preferred to high-order.

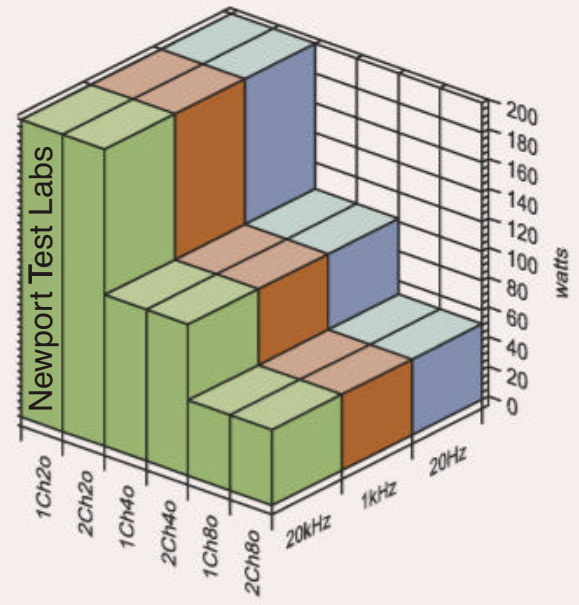
Distortion increased as power output increased, as I'd have expected. Graph 6 shows that when the Gryphon was delivering 20-watts in Class-A mode into 8Ω second- and third-order harmonics were both at close to –75dB (0.01778%), plus there was a fourth at –92dB (0.00251%), a fifth



Power Output: Single channel driven into 8ohm, 4ohm and 2ohm non-inductive test loads, at 20Hz, 1kHz and 20kHz.



Power Output: Single channel driven into 8ohm, 4ohm and 2ohm non-inductive test loads, at 20Hz, 1kHz and 20kHz.



Power Output: Single and both channels driven into 8ohm, 4ohm and 2ohm non-inductive test loads, at 20Hz, 1kHz and 20kHz.

at –99dB (0.00112%) and a sixth at –110dB (0.00031%). All other harmonics visible on this graph are close to or more than 110dB down.

When driven into 8Ω using Class-AB mode at 20-watts (Graph 7) distortion increased across the board, plus the predominance of the odd-order harmonics (3rd, 5th, 7th, etc) at fairly high levels becomes very marked.

This disparity becomes even more obvious when the load impedance is reduced to 4Ω, as in Graphs 8 and 9.

Newport Test Labs' measurements not only showed that intermodulation distortion (IMD) was also lower in Class-A mode than in Class-AB mode, but also that it was particularly low in Class-A mode, as you can see in Graph 10. There are only two sidebands accompanying the test signals and both are down around –98dB (0.00125%). There's no obvious difference signal down at 1kHz but if there is, it's down at around –112dB (0.00025%).

Contrast the IMD result obtained in Class-A mode with that for Class-AB mode in Graph 11. You can see the two sidebands have increased in level and been joined by two further sidebands, plus there's now an obvious difference signal at 1kHz, albeit still very low in level at –98dB (0.00125%).

Newport Test Labs measured the A-weighted signal-to-noise ratios of the Gryphon Essence pair as 77dB referred to one-watt output and 93dB referred to the 50-watt rated output. Despite being quite respectable results, these should be regarded as 'worst-case' figures since these measurements were made with the pre-amp sitting directly on top of the power amplifier in order to give a worst-case result. You will be able to improve on these figures by siting the amplifiers side-by-side, and also positioning them at a little distance from each other.

Output impedance was measured as 0.059Ω (at 1kHz) which gives a damping factor of 135, far more than will be required for the Gryphon Essence Stereo power amplifier to have complete control over any loudspeaker system.

As I would have expected from a Class-A amplifier, the Gryphon Essence is going to consume a lot of power, no matter whether you're playing soft or loud music. In fact, as you can see from the tabulated figures, this 50-watt per channel amplifier is going to pull more than 300-watts from your 240V mains power supply any time it's not actually either switched off or in stand-by mode! And you could quite happily leave it in stand-by mode when you're not using it, because it will draw only 0.67-watts in this mode.

In fact, I would strongly recommend you do leave the Gryphon in standby whenever you are not using it because even if you are not worried about the electricity it will otherwise consume — not to mention the heating effect on your room! — you will extend the operational life of essential semiconductor components inside the amplifier, as well as the operational life of the capacitors in the power supply and elsewhere in the circuitry.

This pair of Gryphon amplifiers delivers very high performance thanks to excellent and innovative design and engineering.

Steve Holding

Gryphon Essence Power Amplifier – Test Results – Power Output

Channel	Load (Ω)	20Hz (watts)	20Hz (dBW)	1kHz (watts)	1kHz (dBW)	20kHz (watts)	20kHz (dBW)
1	8 Ω	51	17.0	51	17.0	51	17.0
2	8 Ω	51	17.0	51	17.0	51	17.0
1	4 Ω	102	20.0	102	20.0	102	20.0
2	4 Ω	102	20.0	102	20.0	102	20.0
1	2 Ω	200	23.0	200	23.0	200	23.0
2	2 Ω	200	23.0	200	23.0	200	23.0

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

Gryphon Essence Pre/Power Amplifiers – Laboratory Test Results

Test	Measured Result	Units/Comment
Frequency Response @ 1 watt o/p	<1Hz – 113kHz	–1dB
Frequency Response @ 1 watt o/p	<1Hz –217 kHz	–3dB
Channel Separation (dB)	107dB / 111dB / 100dB	(20Hz / 1kHz / 20kHz)
Channel Balance	0.002	dB @ 1kHz
Interchannel Phase	0.01 / 0.06 / 1.81	degrees (20Hz / 1kHz / 20kHz)
THD+N	0.04% / 0.04%	@ 1-watt / @ rated output
Signal-to-Noise (unwghted/wghted)	71dB / 77dB	dB referred to 1-watt output
Signal-to-Noise (unwghted/wghted)	87dB / 93dB	dB referred to rated output
Power Factor	+0.648	
Output Impedance	0.059Ω	at 1kHz
Damping Factor	135	@1kHz
Power Consumption	0.67 / 327	watts (Standby / On)
Power Consumption	330 / 346	watts at 1-watt / at rated output
Mains Voltage Variation during Test	241 – 251	Minimum – Maximum

BOWERS & WILKINS PX7

WIRELESS NOISE-CANCELLING HEADPHONES

While Bowers & Wilkins has been making speakers since the 1960s, it entered the headphone market only a decade ago with the on-ear P5 Mobile Hi-Fi headphones.

The P5s strongly leveraged B&W's reputation for luxury, all leather and shining metal, connected stethoscope-like with twisting metal rods — one reviewer back then called them "truly drop-dead gorgeous things shouting executive luxury from every curve."

It was to be three years before B&W launched an over-ear model, a more serious headphone, again linked up with sculptural swirls of steel but — as with the P5 — there was no noise-cancelling, and no wireless operation either, depite the premium pricing.

The PX7 brings the company fully up to date with a technological full monty of wireless (or wired or USB) playback, active noise-cancellation, and app control.

THE EQUIPMENT

The B&W's PX7 arrives at the same price as other premium wireless noise-cancellers such as the Sennheiser Momentum Wireless and Bose 700. Yet their build and construction now seems focused more on solidity than the overtly executive luxury of previous designs. The PX7 is initially available in black or grey, not the browns, golds and silvers of previous models. The cascades of steel connectors have been replaced by remarkable moulded arms made of a composite which includes carbon-fibre, yielding a slightly strange patchy matte native finish, but positively screaming strength and rigidity, while also keeping down the weight, which is 310g, not bad for a full-size headphone.

They sit comfortably over the ears for long periods — a little firm for pressure out of the box, but happy to endure a bit of stretching to the very top (non-carbon fibre) centre section in order to loosen up as you wear them.

The headshells and headband are covered in a tightly woven fabric which has a stain and moisture-repellant coating, and which can, says B&W, be cleaned by a gentle wipe or dab from a soft, damp microfibre cloth.

All in all, the effect is to make these headphones look solid and purposeful, rather than simply luxurious for the sake of it. The hard grey case is similarly practical — kept as slim as possible, and using more of that cleanable fabric wrap, mercifully free of bling.

SMARTS AND THE APP

The PX7's smart functionality is also up with its competitors at this price-point.
Both headshells have wear sensors so that lifting an earcup will pause the music. These are headphones with a proper on/off switch, which I much prefer, but the wear sensors can also put the PX7 into standby when you take them off your head entirely, pausing media playback, disconnecting Bluetooth and switching to a low power state. When worn again, PX7 will wake and reconnect to the last-connected Bluetooth source (or two, if both are nearby and awake).

In the past I have found such auto-off functionality can get a bit annoying if it happens too quickly, but B&W's Headphone App lets you customise how long the headphones will wait before switching to auto standby (from five minutes to an hour), or you can disable this feature entirely. Either way B&W claims 30 hours of battery power when listening via Bluetooth with ANC, after which the battery can be boosted back up quickly for an extra five hours of playback after just a 15-minute quick charge.

B&W's Headphone App, which is clean, even basic in its design, finds and connects to the headphones, then offers three main sections: 'Noise Control', 'Connections', and 'Settings'. But in contrast to some headphones where the app is obligatory to make many adjustments, B&W's buttonry is comprehensive enough that you may rarely need to open the app. For example the 'Noise Cancel' section of the app lets you select from three NC options — low, high and auto, with a separate slider for the important option of 'off'. But really it's easier just to use the button on the left headshell which quickly shuttles through the NC modes. Indeed I was pleased by a small thing when pressing the NC button on the headphones — on first press it says 'noise cancelling auto', or whatever is the current/next setting, but thereafter

it says only one word — 'high', 'low', 'off', — where all other headphones I've tested say 'noise cancelling high', 'noise cancelling low' etc in full every time. B&W's sensible abbreviations speed up selection considerably.

A long press of this button invokes Ambient Passthrough, which feeds through the external mikes, of which the PX7 has six — four for noise-cancelling and two for calls, these using CVC2 (Clear Voice Communication v2) to maximise call quality.

The app's Connections setting allows you to choose two active Bluetooth connections out of the eight that can be stored; if both devices are nearby and powered up then the headphones will connect to both simultaneously, so that music started on either device will interrupt the other one from playing.

The Settings section accesses that standby timer selection to govern how long before the headphones turn off if you don't throw the power switch, and you can also adjust the Wear Sensor sensitivity between three levels or turn the Sensors off entirely. The voice prompts can also be disabled, and you can check for software updates. That last function aside, I found the app to be pretty much set-and-forget, and the button layout so intuitive and comprehensive that I rarely opened the app.

A NEW CODEC

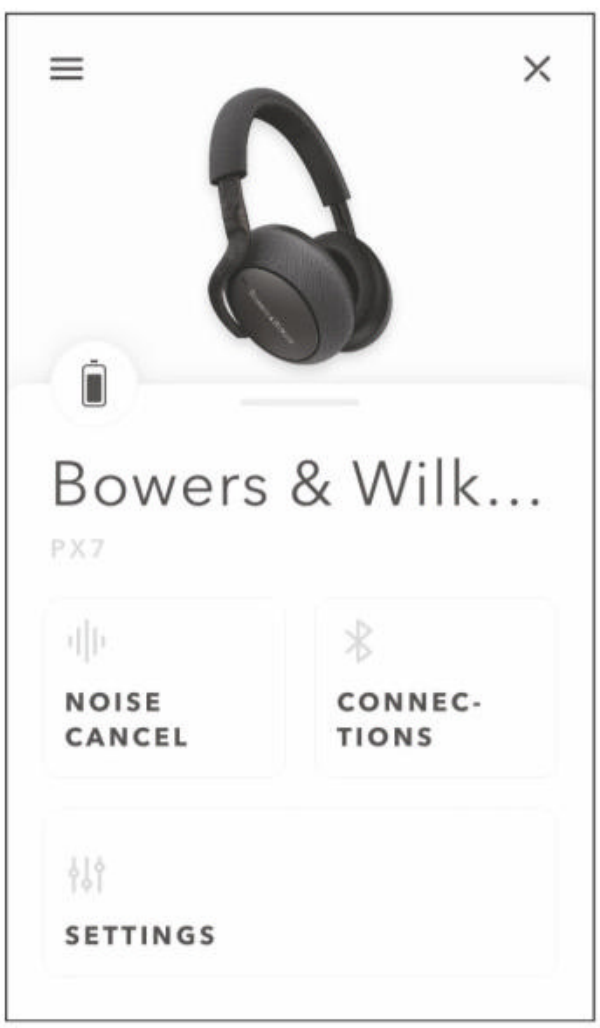
Still more to the point, these are the best-sounding B&W headphones I've yet heard, delivering a big, wide, almost open sound, assisted no doubt by the PX7's over-size 43.7mm drivers, and a full range of Bluetooth codecs, with SBC, AAC, aptX and aptX HD, and also aptX Adaptive. This is Qualcomm's latest Bluetooth codec which aims to deliver the higher resolution of aptX HD in a more robust way, while also incorporating the advantages of aptX Low Latency, a codec which it will apparently replace.

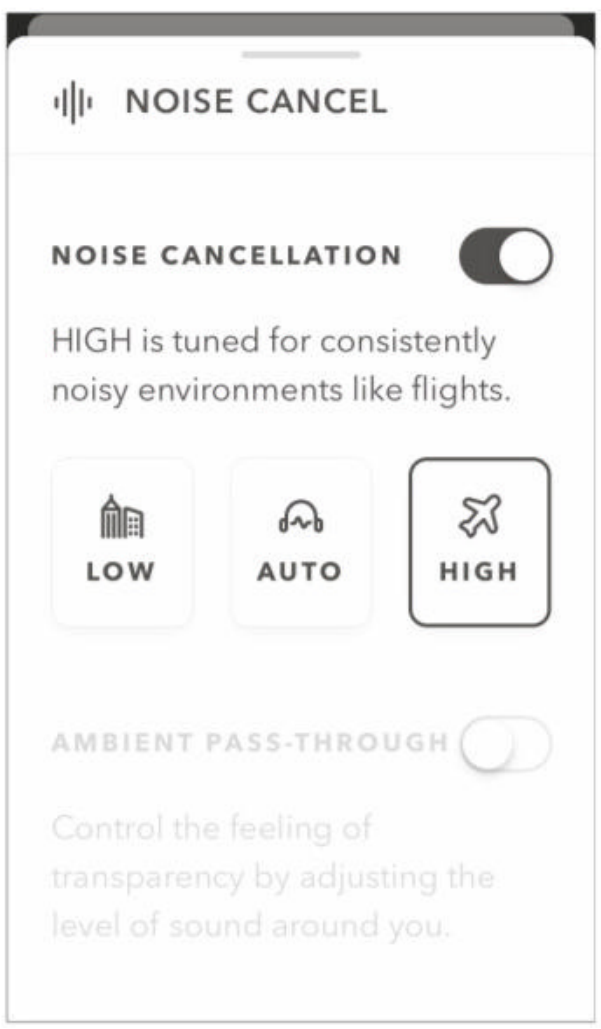
It is also backwards-compatible with aptX and aptX HD; indeed to enjoy aptX Adaptive's full abilities you'll need a phone that specifically supports aptX Adaptive — which will likely mean that unless you recently purchased a phone, you'll need a new one. Qualcomm says that aptX Adaptive achieves its quoted 24-bit/48kHz streaming quality using remarkably low bit-rates, typically 279kbps to 420kbps, far below the actual 2304kbps of native 24/48 files. This indicated to me that, as with aptX HD, the transmission is not lossless (which I confirmed with Qualcomm). Lossless transmission can usually roughly halve a bit-rate while maintaining the file's full integrity, so it seems that in aptX Adaptive a further lossy compression is used to drop the bit-rate to between and half and a third of that required for lossless 24/48. Of course the lossiness would be significantly less when transmitting a CD-quality file of 16-bit/44.1kHz.

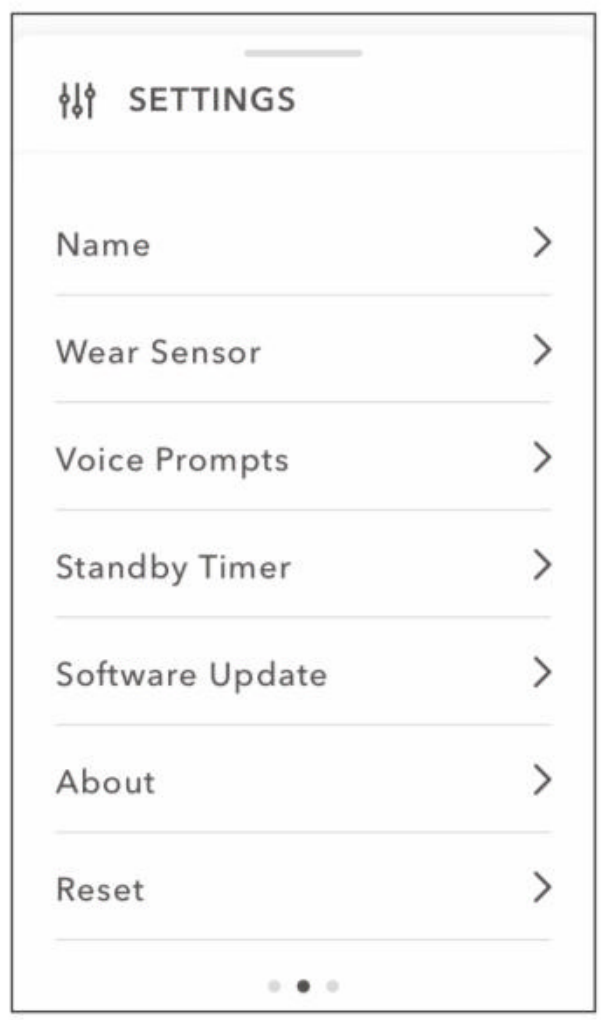
Since even the quoted lower rates could cause glitches in transmission in difficult areas, the new aptX codec allows a further reduction to now happen on the fly, and this is the 'Adaptive' part, designed to remove the occasional glitchiness of the fixed-rate aptX HD, which runs at 576kbps when at maximum quality. *"Dynamic bit-rate adaptation is designed to ensure consistently robust audio streaming in challenging RF environments, based on handset user application focus without user intervention,"* says Qualcomm.

In my books that's still significantly lossy compression, especially if the Adaptive reduction kicks in without you knowing it. The question, then, is whether you would be able to hear its effect. I couldn't tell you, having no aptX Adaptive source, but Qualcomm offers a very interesting snippet in the form of a quote, saying "*No statistically significant difference between Qualcomm aptX Adaptive at 420kbit/s and Linear Audio at 24bit / 96kHz*". The quote is attributed to "Salford University independent test results, June 2018". So that's Salford Uni in the UK, which has a legendary Electroacoustics department (as well as the longest bar of any UK university), claiming no measurable let alone audible difference between the best level of aptX Adaptive and the native file.

This might seem quite the claim, except that I've heard a very similar statement before from an equally impeccable source — Sony's Chief Sound Architect.







Using the app you can select from three levels of noise-cancelling, or turn it off using the slider. You can also do this using the buttons on the headphones. The settings menu accesses unusually versatile customisation of 'wear sensor' sensitivity, time to standby, and more.

He told me in a face-to-face Q&A that no-one at Sony could either hear or measure any difference between files of 256k up when played through Sony's DSEE HX upscaling technology in comparison to a high-res version. The exceptions, he said, were dense high-information musical files, but he claimed these were rare.

Both these statements, then, point once again to the argument that high-res files are excessively large containers which are largely empty — memorably described by *The Absolute Sound's* Robert Harley as "*like shipping a paperback book in a box the size of a filing cabinet*". The problem is you're not sure exactly where the book is, so if you keep only half the filing cabinet, you might miss some important bits of the book. Most of the time, on the other hand, you'll not notice the difference. Besides, my view is that any technology which aims to improve the quality of wireless Bluetooth transmission is to be welcomed!

Meanwhile there's no separate listed support for aptX Low Latency, which would otherwise be of particular use for gamers on headphones, and for viewing videos with the audio played over Bluetooth, where delays can cause lip-sync issues (or sudden death for gamers!), so presumably that's not available until you have an aptX Adaptive device in your hand.

But I used the PX7s for video watching on an iPad with absolutely no discernable lag (and with the Wear Sensors even politely pausing the video when I lifted the earcup), so no problems there anyway.

LISTENING SESSIONS

I did much of my listening using various Apple devices which, since Apple has yet to give aptX the Cupertino tick, still use the AAC codec. And the B&W PX7 shows what a well-designed wireless headphone can achieve with such an input.

Bass was rich, solid, and low — my frequency sweeps barely had time to start playing before the PX7's bass was audibly rumbling down at and even beyond 20Hz, and I don't recall ever hearing an entire frequency sweep sounding so perceptually flat in its delivery: no dips, no bumps. With music, one organ recording on which the bottom D is rarely delivered by headphones, was here present and only just slightly curtailed in power. The bass in the 30s of Hertz on Neil Young's *Walk With M*e came through loud and huge. The synth-bass opening The Ohio Players' fabulous *Funky Worm* was positively forehead-thrumming, indeed there seemed a little emphasis down low in general: the usually bass-light early 80's recording of *Colours Fly Away* by The Teardrop Explodes received unusually broad bass support, which was particularly welcome on the move, though this slightly softened the track's edginess on the heavier sections.

But it's the overall balance which impressed me the most. Midrange and treble were both strengths, with spoken word very close to the original tone (deep male voices perhaps a little over-full), while the light and airy portrayal of higher frequency detail was a delight for the cues of jazz and classical music, with a rich yet delicate portrayal of Chick Corea's 'Australia' piano concerto from its rich yet percussive piano tone to the light flute and tapping ride cymbals. Their low frequency prowess showed up my digital file of Dinah Washington's *Mad About The Boy* as having something akin to turntable rumble going on underneath. Male and female vocals were tonally accurate, no thinning of male voice, no spitting or sibilance on female voice, and even the wideband vocal of Leonard Cohen was delivered as an integral image, with no smearing. So if there is a bass lift here, it's impressively benign.

You can use a cable for playback, but it won't save you if the PX7's power runs out, because it needs power even to play from an analogue source. This likely explains why the sonic balance remains so similar, though that background rumble of bonus bass content disappeared when using the cable; male vocals and spoken word were lighter and things felt a little faster. But there are not the significant tonal differences common on many headphones when switching from Bluetooth to cable, including previous B&W designs.

CONCLUSION

Undoubtedly B&W's best headphone yet, the PX7 combines high-tech design with top-notch sound (wirelessly and wired) plus delivers good (and variable!) noise-cancelling when required. There's no EQ, even in the app (but then, they don't need it), nor any button to invoke a smart assistant, unlike some of its rivals. But the PX7s score over such rivals in their ease of use — all the buttons clear, obvious and requiring no training, and an app which really just gets out of the way so that you can enjoy your music rather than fiddling about. I recommend them wholeheartedly. *Jez Ford*

CONTACT DETAILS

Brand: Bowers & Wilkins
Model: PX7
Price: $599.95 (RRP)
Warranty: One Year
Distributor: Bower & Wilkins Australia
Address: Suite 303, 754 Pacific Highway
Chatswood, NSW 2067
T: (02) 9196 8990
E: info@bowers-wilkins.com
W: www.bowers-wilkins.com/en-au

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- Impressive noise-cancelling
- Superb ease-of-use

- Smart assistant
- EQ (but see copy)

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HARBETH COMPACT 7ES-3 XD

LOUDSPEAKERS

Harbeth tricks me every time. Every time the courier delivers a pair of Harbeth loudspeakers for review, I prepare to lift the first carton by bending my knees and keeping a straight back, then when I lift, I end up virtually launching the carton towards the ceiling, so light-weight is the speaker inside it.

If you are familiar with Harbeth, its illustrious history, and its BBC heritage, you'll already know that the speakers are designed to have as little mass as possible, because it is precisely this lack of mass that contributes to their unique sound. But if you are more used to speakers that weigh as much as the average person, the weight of the Compact 7ES-3 XDs will come as a total surprise. I will discuss the reason for this later in this review. The question you should be asking yourself right now is why I am reviewing a pair of Harbeth loudspeakers at all.

The answer is that Harbeth's owner and head designer, Alan Shaw (pictured below right), has bought himself some new test equipment and its increased resolution has enabled him to pinpoint a few small issues that had bothered him in the past, with the happy result that he has been able to make some incremental improvements to every one of the speakers in the range, so they've been re-named 'XD' (eXtended Definition).

Shaw says: "My test and measurement facilities give me a sonic 'microscope' into the performance of the speaker. Over the years I have invested in a more and more powerful analytical 'microscope', and small deviations from perfection that I could not observe years ago are now very obvious. So I have flattened-out small 'lumps and bumps' in the frequency response by using custom made resistors, coils and capacitors. So the overall sound is better integrated bass/mid/top."

These 'XD' series speakers (P3ESR XD, C7ES-3 XD, Monitor 30.2 XD, Super HL5plus XD and Monitor 40.2 XD) supersede the previous 40th Anniversary series but, as you can see from the model numbers, are essentially the same speakers in that all the drive units and the cabinets are identical.

Although there are electronic differences between the older models and the XD models, which I will discuss a bit further on in this review, there has been a massive change in cosmetics because unlike the Anniversary models, which didn't offer a choice of cabinet finishes, the new XD Series models are available in a wide range of finishes, although rather strangely, not all the same finishes are available for every model.

THE EQUIPMENT

Some of those incremental electronic improvements have come about by using new binding posts, British-made audio-grade poly capacitors, and an XD version of Harbeth's ultra-pure OFC cable for all internal links. The new terminals on the rear panel connect directly to the printed circuit board that contains the crossover components, which shortens the signal path and minimises transition losses. As for the crossover network itself, in addition to the new capacitors, other parts on it have been subtlely modified, as per Shaw's explanation in the introduction.

The 200mm diameter bass/midrange driver in the 7ES-3 XD is injection-moulded and uses the second generation of a special formulation of polypropylene that Harbeth developed in partnership with the University of Sussex, using grant money from the British Government Science & Engineering Research Council. The first generation of this material was dubbed 'RADIAL', which was an acronym invented by Shaw to stand for 'Research And Development In Advanced Loudspeakers', and in fact the very first speaker in which it was used was an early ancestor of the 7ES-3 XD, the C7. RADIAL2 is an evolution of that original formulation.

Designing and building a custom bass/midrange driver is a very expensive process so it's little wonder that Harbeth uses the exact same driver that's used in the 7ES-3 XD in other of its models, such as the Super HL5plus and M30.1. Although Harbeth rates this cone as being 200mm in diameter, its Thiele/Small diameter (which—along with other important driver parameters—is what's used by designers to determine the correct volume for the cabinet and the dimensions of the bass reflex port) is just 165mm, which results in an effective cone area (Sd) of 214cm².

As for the surround suspension, it's made from rubber, which is excellent news for Australians!

Fairly unusually, the cone's dust-cap is made from exactly the same material as the cone. The driver is so well-made that initially it appears as though the cone and dust-cap are a single moulding, but in fact the dust-cap is attached separately. In fact it's the very last item to be added, which is one reason the join is nigh-on invisible. As for the surround suspension, it's made from rubber, which is excellent news for Australians, because the extremely high levels of ultraviolet (UV) radiation in Australia mean that roll surrounds made from foam usually start to fall apart after about five years, whereas rubber roll surrounds are virtually indestructible.

The 200mm diameter bass/midrange driver in the 7ES-3 XD is injection-moulded and uses the second generation of a special formulation of polypropylene that Harbeth calls RADIAL2.

The surround is also unusual, being a ‘reverse’ roll that dips inwards, rather than bulging outwards

The surround is also unusual, being a ‘reverse’ roll that dips inwards, rather than bulging outwards. There are many advantages to this design, but in the case of the 7ES-3 XD one of them is that the grille cloth can be fitted tightly over the front baffle without affecting cone movement. The tweeter on the 7ES-3 XD is ferrofluid-cooled with a 25mm dome that’s protected by a black metal mesh.

As you can see from the photographs of these Harbeth speakers, they’re front-ported, using a single conventional tubular port that’s 70mm long and 50mm in diameter. There is no radiusing at either end of the port, but the business end has a ‘half-arrow-head’ profile, so it sits a little proud of the baffle, with the external surface running at an angle down to the baffle. This makes for a very ‘neat’ visual appearance.

Harbeth speakers don’t weigh much because the company prefers to control panel resonances with tuning devices (damping mats, mostly) rather than by increasing the mass of the panels, so whereas most loudspeaker manufacturers use 19mm material, all the panels on the 7ES-3 XD except for the front baffle are only 12mm thick… and even the baffle of the 7ES-3 XD is only 18mm-thick stock.

As for the wood Harbeth uses for its cabinets, it’s high-density fibre-board that is veneered on both sides. This ‘dual-side’ veneering technique is a much better than using just a single veneer on the outer wall (the technique used by most speaker manufacturers) as it seals the board better against climatic conditions and ensures dimensional stability.

Unlike most modern loudspeaker cabinets, which are constructed without any visible seams, joints or fixings, the Harbeth 7ES-3 XD cabinets have clearly visible joints and fixings, in particular the 12 screws that hold the rear panel to the two side panels and to the top and bottom panels. The heads of these screws holding the 30.2 together are ‘tamper-proof’ Pozidrive PS2 types, so you’d need a special screwdriver to remove them (something that I strongly recommend you not do!).

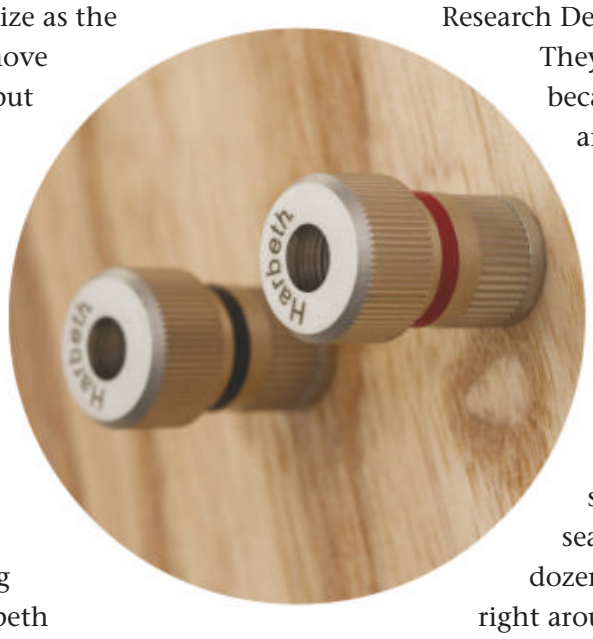
The screws on the rear are stainless steel, which I think look great. The screws on the baffle are black steel so that when the grille is on you can’t see them at all.

As for those grilles, Harbeth’s grilles are, to the best of my knowledge, unique. Instead of being made from the usual wood or plastic and attaching to the front panel using plastic pegs, the frame of the grille on the Compact 7ES-3 XD is made from flat mild steel, which press-fits into a rather deep and very narrow groove that runs around the periphery of the front baffle. This technique means you won’t get any unwanted reflections from the grille frame when you are using the speakers with the grille in place (those reflections being one of the reasons many audiophiles remove loudspeaker grilles for their serious listening sessions).

In my previous Harbeth reviews, I have nearly always mentioned how difficult it is to remove these grilles, indeed on one occasion I had to point out that a previous reviewer had damaged the cabinet of my review sample by using a sharp tool of some kind — probably a flat-bladed screwdriver — to pry the grille off. Why would you want to remove the grilles? As I said earlier, some audiophiles think speakers sound better without grilles. Others just like to see the drivers of their speakers, even if there’s no difference in sound quality. And if you don’t fit into either of these categories, you will sometimes have to remove the grilles to remove dust so that they maintain their ‘black’ appearance. I once suggested you could vacuum speaker grilles whilst they were on the speakers… though I did point out you’d need to do this very carefully! Given the power of modern vacuum cleaners, I don’t think I’d recommend this now.

One thing I had never thought to do is actually ask Harbeth how to remove the grilles. And to tell the truth, it wouldn’t have occurred to me to ask. In fact it was this magazine’s editor who asked, because he wanted to photograph the speakers without their grilles. It turns out there’s a trick to it, and the trick is to get a neodymium magnet—two would probably be better—and use these to remove the grilles. Easy! (You are able to buy neodymium magnets from any Jaycar store.)

If you want to remove the frames regularly, you should buy four or more neodymium magnets and glue them into the corners of a board that's the same size as the front baffle. Then to remove the grille, you'd simply put the board up against the grille, at which point the magnets would interact with the steel frame so that when you pull away the board, the grille will come with it.



Do you remember that I said earlier that different finishes were available depending on model? Well the Harbeth Compact 7ES-3 XD is available only in Cherry or Tamo Ash. Each cabinet measures 520×272×305mm (HWD) but if depth is critical for you, you'll have to add 12mm to that to account for the length of the binding posts on the rear panel.

The Harbeth-branded binding posts (I believe they're made for Harbeth by German connector specialist WBT) are, incidentally, a truly excellent design, being multi-way with a collar included to make it really easy to get a 'bite' onto bare wire, if this is your preferred method of speaker connection. You may need help connecting them if you're colour-blind though, because although the terminals are colour-coded (red and black) there are no '+' or '–' symbols. This is not an oversight, it's because unlike most terminals, which are fitted on metal or plastic plates, those on the Compact 7ES-3 XD go directly through the wood of the rear panel and locate directly on the x/o PCB.

HARBETH HISTORY

Harbeth was founded in 1977 by ex-BBC engineer Hugh Dudley Harwood who created the name by joining the first three letters of his surname to the last four letters of his wife Elizabeth's Christian name. He founded the company to commercialise the use of polypropylene as a material to form speaker cones.

Harwood worked in the British Broadcasting Corporation's Research Department (Engineering Division) for nearly twenty years and was instrumental in the design and development of many loudspeakers for the BBC, including the famous LS3/5 and LS 3/5A broadcast monitors, the manufacture of which the BBC subsequently licensed to various famous British speaker manufacturers, including KEF, Rogers and Chartwell. Although Harwood always gets the credit for the design, he was aided by BBC designers Michael Whatton and Reg Mills, as well as Gordon Monteath, who was Head of the Research Department at the time. They designed the LS3/5 because the BBC required an accurate, low-distortion loudspeaker with good dynamic range in order that its studio operators could use them in tightly confined spaces to monitor broadcasts and, at that time, despite a well-documented search that evaluated dozens of contenders from right around the world, it could find no commercially-produced small loudspeaker that met its stringent requirements for naturalness and sonic neutrality.

Harwood and his team first came up with the LS3/5, then the LS3/5A, and followed up with the lesser-known LS 3/7 and LS 5/8 models. It was while developing these that Harwood became dissatisfied with the Bextrene copolymer being used to manufacture the cones for these speakers. One issue was that it was difficult to maintain consistency from batch to batch, so they ended up throwing many cones away. Another issue was that raw Bextrene tended to have a 'quacking' sound at certain frequencies, and so all the cones, once formed, had to then be damped by applying a coating, which was known as 'doping the cone'. Because this doping was done by hand, it was not only labour-intensive, but also meant that every cone was slightly different, because the coating could not be applied consistently.

It was because of all these issues that Harwood was instrumental in pioneering the use of polypropylene copolymer cones at the BBC, and while he was there, patented — in his own name — the use of polypropylene as a cone material (UK Patent 1563511). In order to commercialise his patent, Harwood left the BBC and established Harbeth. His first speaker (originally called the 'HL Monitor', but now retrospectively identified as the 'HL1'—was the first loudspeaker in the world to use a polypropylene cone.

Harwood used polypropylene cones for more than a decade until he switched to using the then-new TPX material, first in the HL Monitor Mk4, and later the original Compact (which was designed by Alan Shaw). Although TPX was superior to polypropylene as a cone material, it was difficult to source, and it was because of this difficulty that Harwood and Shaw applied for and won a British

Government Science & Engineering Research Council research grant that allowed them to thoroughly examine alternative material solutions and then invent, patent and trademark their own plastic formulation: RADIAL [Research and Development In Advanced Loudspeakers].

Harbeth is now solely owned by Alan A. Shaw, who is also its sole speaker designer. He says that all his designs are still based on the BBC's loudspeaker legacy and on progressive improvements, one of which was the development of the improved RADIAL2 cone material.

IN USE AND LISTENING SESSIONS

Harbeth is very helpful about telling you where you should position its 7ES-3 XD loudspeakers in order to extract the best performance from them, saying that they should be 30cm or more from a rear wall and placed on stands that bring the ears level with the tweeters. It also helpfully notes that the tweeters are '440mm up from the cabinet base' which should help you when shopping for stands, as Harbeth doesn't make stands for its speakers.

I can only assume this is also part of the BBC heritage, where the speakers were in most cases placed on wall-mounted brackets. (Note that they were not actually attached to the wall or to the brackets, just sat on the angled brackets themselves.) This may suit you, and because of the front-firing bass reflex port, it's certainly an option… but you may prefer to use stands.

Whatever method you use to support these speakers, you should be aware that you should not 'anchor' the cabinet to the stand by using Blu-tac or a similar substance. Although you'll always find the sound of Harbeth speakers 'dynamic' (about which more later on) you'll find their sound is more dynamic and expansive when that lightweight cabinet is free to do its thing.

I would imagine that 'best' performance would come about if the cabinet was suspended in mid-air but as this is obviously impossible, the next best solution is to minimise the areas where the cabinet touches whatever is supporting it. Some experimentation with support devices might be profitable.

'If you don't get the midrange right, nothing else matters.' Never a truer comment was made!

I could not find any information about this topic on Harbeth's website, but since that site also serves as the home for the very active Harbeth User Group (which goes by the friendly acronym 'HUG'), I am sure the members of that group would be more than happy to tell you what works and what doesn't. Obviously, you should also consult your Harbeth purveyor, who I am certain would be more than happy to sell you a pair of suitable stands.

Obviously the tweeters need to be at ear level, but I also found that I far preferred the sound when both the left and right speakers were toed-in so the sound-paths converged exactly at my listening (head) position, because I found that—in my room at least—this configuration not only delivered the best stereo imaging but also the best high-frequency response.

I think it was J. Gordon Holt, the founder of *Stereophile*, who said something along the lines of 'if you don't get the midrange right, nothing else matters' and never a truer comment was made. Basically, this is because all human speech lies within a very narrow range, in general the fundamental frequencies are at around 100–120Hz for men and around 200–240Hz for women, but in order to understand speech, it's essential to be able to distinguish consonants (k, p, s, t, etc.) and these are found above 500Hz and more specifically around 2–4kHz.

This means the human ear and the brain that analyses the sounds detected by that ear are superbly tuned for the vocal range and can hear even the tiniest errors and discrepancies at these frequencies… errors that, quite frankly, it cannot detect at all at lower and higher frequencies.

The two instruments loudspeakers find most difficult to reproduce are the human voice and the piano. The voice is most difficult because the ear can detect even the smallest changes in timbre and pitch, and the piano because, well, it's a percussive stringed instrument, so it seemed appropriate that I should start my auditions with recordings that involved both the human voice and the piano.

Alicia Keys seemed a good place to start, so I fired up 'VH1 Storytellers,' recorded live at New York's Metropolis Studios. It's a great album with great sound that's not overproduced, though I think I would have balanced the volume of the piano against her voice a little better, as it's mostly a little too forward in the mix. But what piano sound it is, and the Harbeth Compact 7ES-3 XDs delivered it fabulously well. It also delivered her unique voice fabulously well. You can hear every crack in her delivery, every strain as she reaches up into territory where she shouldn't really take her voice. And then there's the incredible warmth of her spoken voice! The sounds made by the small audience are also reproduced with uncanny realism.

From there it was on to one of my favourite albums, 'Mary Ann Meets the Gravediggers and Other Short Stories' by Regina Spektor. Hard to pick a favourite track on this one. I'm in total admiration of the pianism on *Lacrimosa* in particular, but she's incredible throughout. Again the piano sound is as extraordinary as Spektor's voice: it's no wonder she's an official Steinway artist.

Watch her live and you'll see she has beautiful 'hands' too, as pianists say.

Because Spektor might be a little too out there for some readers, I'd instead suggest that you might like Sara Bareilles' incredible album 'The Blessed Unrest'. Track 4, *You Can Have Manhattan*, is one of my all-time favourite tracks of anyone. Don't know why exactly, but it just has an eternal atmosphere to it despite the backing she included. It would have been better with just her and her piano.
If you're familiar with the introduction to *Cassiopia* you may feel the 7ES-3 XD is a little light-on in the very highest frequencies (and they're very, very high frequencies indeed!) but if you're not, you'll hear nothing amiss.

My investigations into voice and piano concluded, I decided to continue listening to the human voice, but switch out the piano for a violincello, because all musicians agree that the cello's sound is very close to that of the human voice. And what better music to listen to than *Chansons Madécasses* (*Madagascan Songs*) written by Maurice Ravel to words from the poetry collection of the same name by Évariste de Parny.

Several versions of this work are available, but I rather like the one recorded by Frederica von Stade (mezzo-soprano), Doriot Anthony Dwyer (flute), Jules Eskind (cello), and Martin Katz (piano) by CBS in its famous 30th Street Studio, where Glenn Gould made most of his recordings. I purchased it shortly after its 1981 release as an LP, which was lucky, because it was not released on CD until 2016 and then only as a part of an 18-CD set (Frederica von Stade: The Complete Columbia Recital Albums).

However, in the spirit of reviewing hi-fi components with recordings my readers can actually find, I instead listened to a stunningly good recording of the same work by flautist Andrea Oliva and her Hemisphaeria Trio, which comprises Damiana Mizzi (soprano), Roberto Mansueto (cello) and Marcos Madrigal (piano). Titled 'Songs of Nature and Farewell', this CD includes not only *Chansons Madécasses* but also other of Ravel's works, the first recording of pieces by the British composer James Francis Brown and a first recording of *Chant d'amour de la Dame à la Licorne* by the late Romanian composer Liana Alexandra.

Listening to them play *Chansons Madécasses* (the three songs open the CD) had me immediately riveted to my seat. For starters, recorded sound (courtesy Da Vinci Classics) is unbelievably good. The acoustic setting is perfect, and the background so silent you could hear a house fly land. But it's the aural tapestry Ravel weaves with the instruments and voice that riveted my to my seat.

It's absolutely magical. Mizzi's voice in not in the same league as Frederica von Stade's (and she's a soprano, rather than a mezzo), but her tone, timbre and pitching are outstanding. Listening to her voice as it melds with Oliva's flute on *Il Est Doux* sent shivers down my spine and then, when Madrigal's sparse piano notes start to sound... Wow! It sounds like a cliché, but I became so involved in the music and the performance that I did totally forget that I was listening to loudspeakers, it was as if I were in some magical alternate world—which was, of course, exactly what Ravel intended.

As I hope you've guessed from the above, the Harbeth Compact 7ES-3 XD's delivery of the music was perfection itself. I could really ask for no more. Indeed if I were to ask for more, it would be of the musicians, because I'd love to have a recording of this work where the singer was a baritone, because I think this vocal range works better against the sound of the cello. (I am rather hoping that Steven Isserlis might take this idea on.)

I'd never heard James Francis Brown's *La Libellule*, but the lowest-octave piano notes it contains demonstrated to me perfectly that the deep bass delivery of the 7ES-3 XD is exceptionally realistic, something that's rare to find in such a relatively small loudspeaker. If you listen to this too, pay attention to the stabbed, staccato piano notes and how the Harbeths deliver the starts and finishes with such precision, and with absolutely no distortion whatsoever. Super-impressive.

For further evaluation of the 7ES-3 XD's midrange delivery I decided to use the vocals from Hot Chip's fabulous (if rather dated) album 'Made in the Dark', which contains the band's Grammy-winning track *Ready For The Floor*. Taylor and Goddard's vocals whether sung, or spoken, and either solo or duo, were reproduced as accurately as I have ever heard them reproduced, and this is an amazingly cleanly-recorded album. The high-frequency extension was excellent, though again maybe very slightly recessed in the very highest octave, but since this resulted in a silky-smooth, non-fatiguing delivery, it was all good.

On *We're Looking for a Whole Lot of Love*, from the same album, I admired not only the way the Harbeths delivered the ultra-low synth bass line, but also the claps, the tambourine shakers and, not least, the electric organ. Many speakers have difficulty delivering the extreme syncopation on this track, as well as the anti-phase sounds, but the 7ES-3 XDs delivered everything flawlessly.

I evaluated the ability of the Harbeth 7ES-3 XDs to create a stereo image with the classic 'Never Mind the Bullocks, Here's the Sex Pistols'. I love this whole album, but my admiration is mostly for the way Chris Thomas captured the sound of Paul Cooke's drum kit.

His kit sounds impressive on all the tracks, but perhaps is most impressive on *Pretty Vacant* and the following track, *New York*. You're left in absolutely no doubt that you're listening to a full kit, and the drum and cymbal lay-out is made crystal-clear by the Harbeths, which formed a totally coherent whole-stage image. At the same time they also delivered the screaming tone of Steve Jones's lead guitar and Johnny Rotten's inimitable vocals, right down to the raspberry that concludes the album's closer (*EMI*). Nearly half a century later, this album's most controversial track, *God Save The Queen* (banned at the time by almost every radio station in the UK) now seems almost prophetic.

CONCLUSION

It's very appropriate that the Harbeth Compact 7ES-3 XD speakers are distributed in this country by Audio Magic, because these are magic-sounding speakers indeed! The midrange is truly miraculous, the level of bass from such a small cabinet/driver combo is magical, and the way the speakers reveal the highest treble sounds without etching it is also clever. But by far the biggest trick these speakers pull off is making you think you're listening to the real thing. Amazing!

Hugh Douglas

Readers interested in a full technical appraisal of the performance of the Harbeth Compact 7ES-3 XD 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.

CONTACT DETAILS

Brand: Harbeth
Model: Compact 7ES-3 XD
RRP: $7,000 per pair
Warranty: Five Years
Distributor: Audio Magic Pty Ltd
Address: 482 High Street
Northcote VIC 3070
T: (03) 9489 5122
E: info@audiomagic.com.au
W: www. audiomagic.com.au

- Sounds like live
- Midrange accuracy
- Ultra-clean bass

- Two finishes only
- Bi-wirability
- Custom stands required

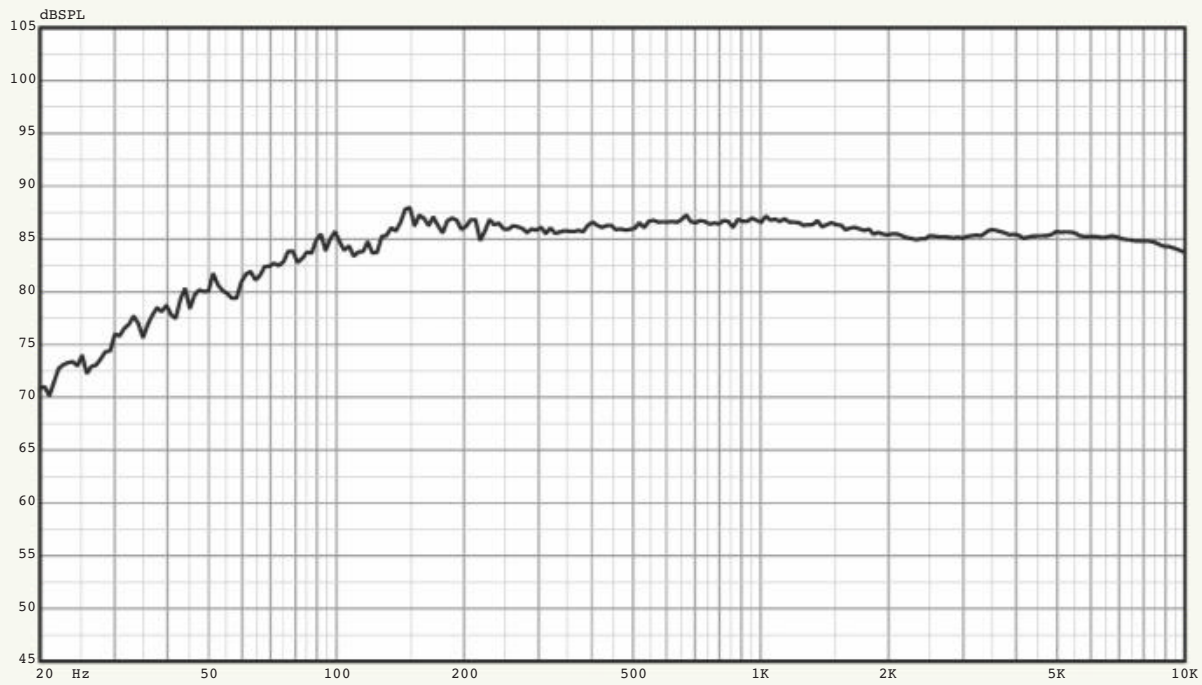
LABORATORY TEST REPORT

Graph 1 shows the in-room frequency response of the Harbeth Compact 7ES-3 XD loudspeakers when measured using a pink noise test stimulus. It's the averaged result of nine individual measurements, taken in a grid pattern with the tweeter at the centre of the grid. You can see that it's extraordinarily flat—monitor-standard flat in fact—not only across the midrange, but also in the upper bass and the lower and upper treble regions.

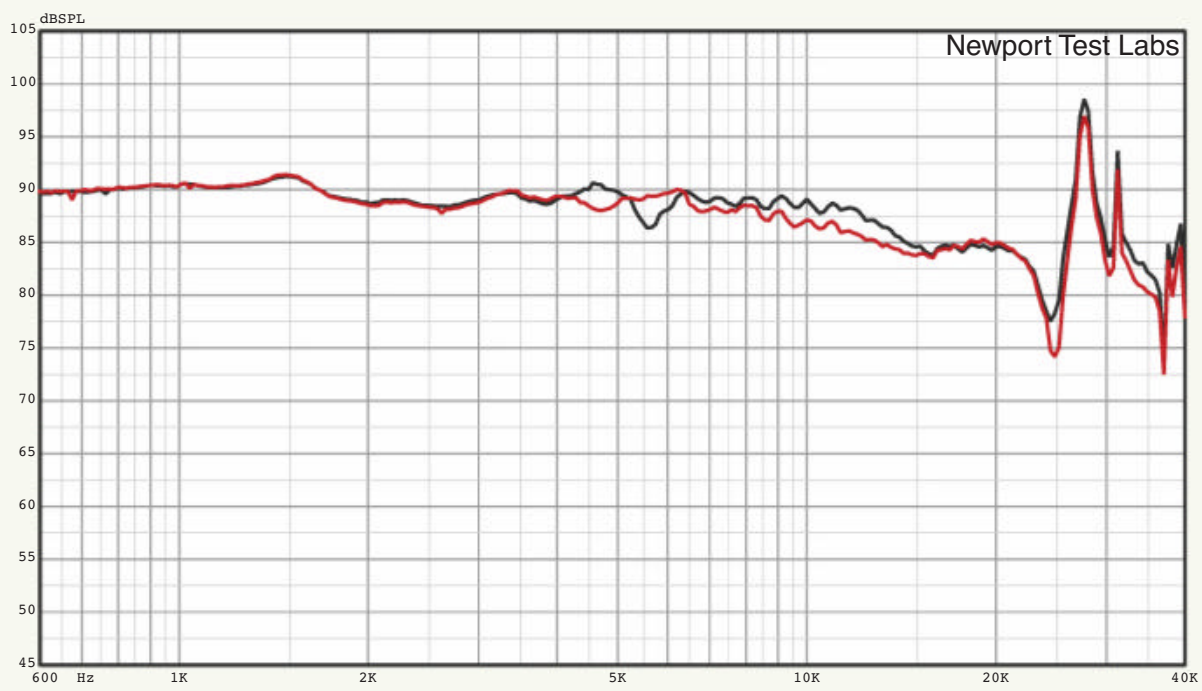
Across the area between 2kHz and 8kHz, the response is so linear that it essentially tracks the graphing grid, so it's essentially ±0.1dB. Between 140Hz and 2kHz, the frequency response is better than ±0.6dB! Rarely do I see such a linear response in any loudspeaker that does not have the benefit of an inbuilt amplifier that uses digital signal processing to compensate for loudspeaker irregularities.

If we take the 85dBSPL graphing line as the reference axis, you can see that the response is essentially only slightly above this axis between 350Hz and 2kHz, and at its greatest deviation, at around 1.1kHz, it's only about 1.2dB above it. And if we look at the region where almost all musical activity takes place (and certainly all singing), the Harbeth 7ES-3 XD's response is 100Hz to 10kHz ±1.25dB. That's an outstandingly good result, as you don't need me to tell you.

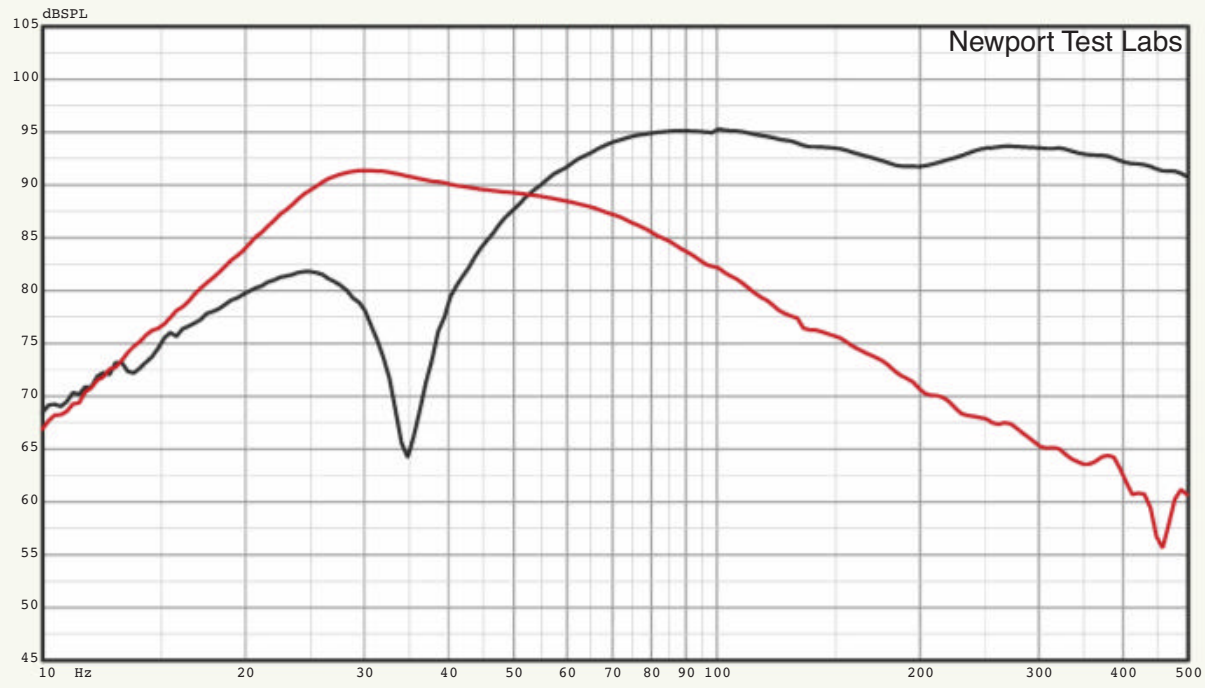
As you'd expect, given the size of the single bass/midrange driver and the size of the cabinet, the low frequencies roll off below 100Hz, but they do so only gradually and do so very smoothly. You can see where the output of the port kicks in to re-inforce and extend the bass, so we really don't see a steep roll-off until 45Hz. The in-room response of Graph 1 shows the response that will be delivered in a room as perceived by the human ear, but Graph 2 shows the high-frequency response in high detail, and with extended high-frequency capture. This is the frequeny response the Harbeth Compact 7SE-3 XD would deliver in an anechoic chamber.



Graph 1: In-room frequency response. Averaged result of nine individual frequency sweeps measured at three metres, central grid point on tweeter axis. Pink noise stimulus, capture unsmoothed.



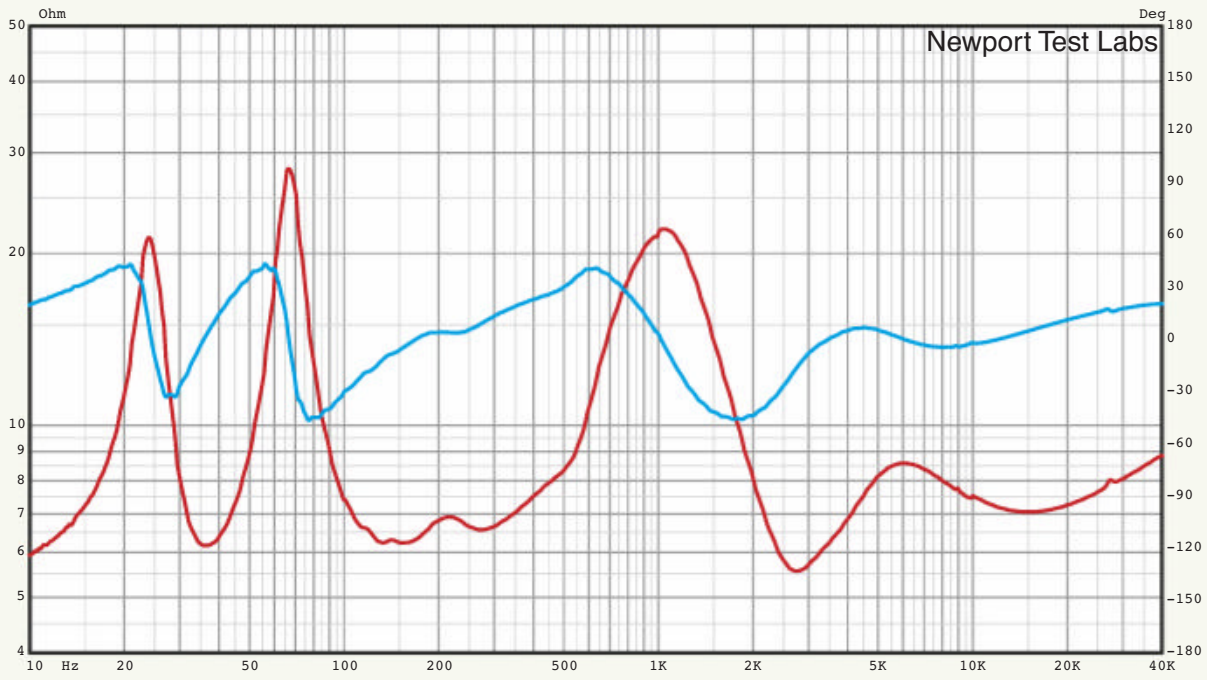
Graph 2: High-frequency response, grille on (red trace) and grille off. Lower measurement limit 600Hz.



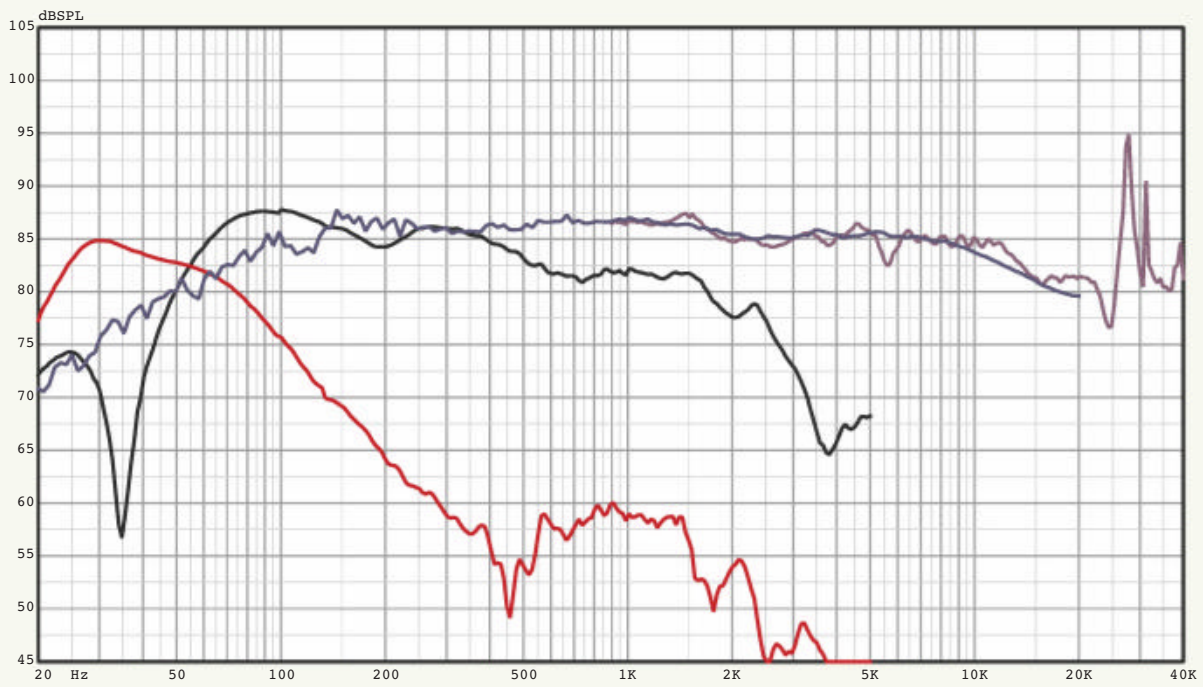
Graph 3: Low frequency response of front-firing bass reflex port (red trace) and woofer. Nearfield acquisition. Port/woofer levels not compensated for differences in radiating areas.

The requency response of the Harbeth 7ES-3 XD was measured as being 45Hz to 23kHz ±3.7dB

You can see that despite the increased resolution, the response is still spectacularly flat out to 4kHz, with no perturbations or significant deviations from reference.



Graph 4: Impedance modulus (red trace) and phase (light blue).



Graph 5: Composite response plot. Red trace is output of bass reflex port. Black trace is anechoic response of bass driver. Mauve trace is gated (simulated anechoic) response above 900Hz. Grey trace is averaged in-room pink noise response (from Graph 1).

Overall, Newport Test Labs measured the frequency response of the Harbeth Compact 7ES-3 XD as being 45Hz to 23kHz ±3.7dB.

The 'wobbles' in the impedance trace measured by Newport Test Labs of the Harbeth Compact 7ES-3 XD between around 120Hz and 300Hz are most likely due to cabinet resonances, but are quite minor. The impedance itself remains completely above 6Ω except for a very small region between 2.4kHz and 3.3kHz where it drops to 5.6Ω. This relatively high impedance, combined with the benign phase response (blue trace) means this Harbeth design will be a very easy load for any amplifier. It also means the design is nominally a 6Ω one, exactly as claimed by Harbeth.

However, the amplifier you use should have a rather higher output than you might expect, because in delivering such a linear response, it appears that Shaw has sacrificed a little efficiency, with Newport Test Labs reporting that using its standard stringent test methodology, the Harbeth Compact 7ES-3 XD delivered an output of 86dBSPL at one metre for a 2.83Veq input level. This result exactly reflects Harbeth's specification for this parameter. But when I say 'higher output' I mean only that you'll extract best performance if your amplifier is rated at more than 60-watts per channel.

Achieving an overall frequency response of 45Hz to 23kHz ±3.7dB, along with a very respectable sensitivity of 86dBSPL and a very easy-to-drive impedance is no mean feat for a speaker designer, and I can only say that Shaw has done an outstandingly good job. ***Steve Holding.***

Above 4kHz, the response is quite different depending on whether you decide to leave the grille in place (red trace) or remove it (black trace). With the grille in place the response is smoother out to 8.5kHz than with the grille off, but above 8.5kHz it rolls off a little more quickly than without the grille and is somewhat lower in level overall out to 16kHz, where the output becomes identical, no matter whether the grille is on or off. Personally, I'd prefer the increased linearity below 8.5kHz, so I would recommend leaving the grilles on.

You can see that the tweeter is 6dB down at 20kHz referenced to the midrange driver's level at 600Hz. Above 20kHz the tweeter exhibits a fairly strong resonant peak at 27kHz of the type I'd expect to see in a hard-dome tweeter. The smaller resonant peak at 32kHz could be due to the perforated metal cover protecting the tweeter, or related to the dome in some way.

Either way, both these peaks are comfortably above the range of human hearing.

Newport Test Labs measures low-frequency extension using a near-field test method, the result of which is shown in Graph 3. You can see from the output of the bass/midrange driver (black trace) that the cabinet is tuned for 35Hz, but that the port delivers its maximum output at just a little below this frequency. This would suggest to me that designer Alan A. Shaw is doing his best to extract maximum bass output from it. The port's output is very well-behaved: there's a nice smooth roll-off either side of its peak output and there is no leakage of higher frequencies from it at all. Very nice!

▼ Brian Russell, pictured at a hi-fi show in 2011

Brian Russell
BRYSTON

If you've visited any hi-fi show in Australia and gone into the Bryston room, you will most likely have met the President of Bryston, although you probably didn't know it, because Brian Russell rarely identified himself as one of the owners of this famous Canadian manufacturer, much less the President of it. He also didn't talk much about the products he demonstrated — he preferred to let the music he played speak for him. So if you can now recall a very large man in a short-sleeved Hawaiian shirt wearing sandals who almost always remained seated, selecting songs manually on his laptop for replay through Bryston electronics and, most recently, Bryston loudspeakers, well that was none other than Brian Russell.

Sadly, Brian passed away on September 28th last year, aged 68. James Tanner, Bryston's VP of Sales and Marketing, posted that: "Saturday I lost a terrific friend and business associate. Brian Russell passed away in his sleep from a suspected heart attack. He was 68 year old. I worked with Brian for more than 45 years and he was the most kind and caring individual I have ever known. He came across as a rough gruff bear of a guy but deep down he had the emotions of a teddy bear. I will miss him a lot and I am still in disbelief over this."

His brother Christopher Russell, who is Bryston's CEO, issued the following statement to the media: "It is with utmost sadness and a broken heart that we pass along the news of the sudden passing of Brian W. Russell, our President and Overseas Distributor Liaison. Brian was well-liked by all who knew him, his travels took him to all parts of the globe and he made friends and cohorts everywhere he went. Brian had worked at Bryston since the 1970s, and was easily one of the most valuable and hard-working members of the Bryston team. We will miss his hearty, jovial presence and his warm-hearted good spirits most deeply."

Although the Russell brothers — Christopher and Brian — are often credited with founding Bryston, the company was actually founded in 1963 by Tony Bower, Stan Rybb, and John Stoneborough, who used the first letters of their surnames to form the now-iconic company name. But the trio did not built audio equipment back then, they built medical equipment and industrial electronics. Bryton's best-selling and best-known product was for many years its AG-1 Aggregometer, a blood analyser used to diagnose platelet disorders, but sales had dropped away because one of its competitors developed and patented a new type of aggregometer that delivered faster, more accurate results, and required less blood for analysis. Chris and Brian's father (John Russell Sr), a former NASA engineer had purchased Bryston in 1967 just prior to the invention of the new aggregometer. However it wasn't until Chris joined the company a few years later that the company built its first audio product, the Pro 3 power amplifier, whose performance and reliability were so good they turned the company's fortunes around.

When asked by Stereophile magazine's Richard Deutch why Bryston amplifiers were so popular with audio professionals, and used in so many recording studios around the world, Chris Russell told him: "The single biggest reason professionals like us — above and beyond that [we make] a great amplifier — is that they can make a lot of money with our product, because there's no down time. It lasts and lasts and lasts. And if they do have a problem, we typically solve it in less than 24 hours, which is highly unusual in the audio industry." He didn't mention the fact that Bryston amplifiers come with a 20-year warranty, because this is now common knowledge.

The story behind Bryston's 20-year warranty is worth re-telling. Says Tanner: "We implemented the 20-year warranty in 1990 when we were 18 years old. Even though back then we had a 5-year warranty we had never charged for a repair. So after 18 years, of seeing our original amplifiers operating without issues we decided to make it official and offer a 20-year warranty."

"So the warranty was never about who pays for it — it was the outcome of building a product with the best possible parts and with the longest-term reliability in mind."

"Many people assume that we just build in the cost of inevitable repairs, but we don't. We work really hard to design robust gear that will outlast us all. Furthermore, all our electronics products go through a 100-hour test cycle at our factory before shipping to ensure quality."

Richard Deutch posted the following tribute to Brian Russell on the Stereophile website: "A larger-than-life presence with a quick wit and extensive knowledge of audio, Brian was a stalwart representative of Bryston at audio shows. At one such show, the 2013 Montreal *Son & Image*, Brian was given a Lifetime Achievement Award. In my show report, I wrote: 'Brian is a big, tough guy, so I figured we wouldn't see him crying when giving his award acceptance speech — but I think he came awful close when he said that he owes his achievement to each and every member of the Bryston team.' With his passing, the Bryston team—and indeed the world of audio—has suffered a great loss."

George Poutakidis, the founder and general manager of Bryston's Australian distributor, BusiSoft, said he'd cherished Brian's visits to Melbourne, their dinners and their conversations and that he was deeply saddened by the news of his passing. "Brian was the first in the hi-fi industry to support me and BusiSoft and I will never forget this," he said. "He was a fantastic person and will be sadly missed by the hi-fi industry."

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esoterica

PILIUM AUDIO ELEKTRA DAC

A Greek DAC with mysterious origins!

PILIUM
ELEKTRA DAC – DIVINE LINE

A fascinating story. If you look at the rear of the Pilium Elektra DAC – Divine Line, you'll find a label that says 'Made in Greece' and the founder and owner of Pilium Audio, Konstantinos Pilios, is certainly as Greek as Greek can be. But Pilios lists his company's address as Tsar Boris III No 6, Petrich, 2850, Blagoevgrad, Bulgaria.

This I found a fascinating fact, because Greece and Bulgaria may share a border, but they're two different countries. Very different countries!

It turns out that when Pilios established Pilium Audio he had the bad luck to do it in 2012, which was the time of the huge economic crisis in Greece, during which many countries were trying to get Greece kicked out of the European Union.

Pilios wanted to have the financial stability of the EU to ensure the future of his business, so he decided to register Pilium Audio in Bulgaria, an EU country that was in no danger of getting kicked out it, even though he had no intention of moving there or of building his products there.

So despite its Bulgarian address, all Pilium Audio's products are — and always have been — designed and manufactured in Greece, in Pilium Audio's own factory — and mostly by hand, as we shall discover further on in this review. Pilium's DAC's name also has a fascinating history. It's named after Elektra, the main character in two of the most famous Greek tragedies, one written by Sophocles and the other by Euripides, both of which are named Elektra. In Greek mythology, Elektra was the daughter of King Agamemnon and Queen Clytemnestra and the sister of Iphigenia and Chrysothemis.

With her siblings, she planned the murder of their mother and her lover Aegisthus to revenge the murder of their father. In modern psychology, the phrase 'Elektra Complex' is now used to describe a psycho-sexual conflict between a mother and her daughter (the male version of this conflict is rather better known… an Oedipus complex).

A rather more modern take on this tragedy was written by American playwright Eugene O'Neill, titled Mourning Becomes Elektra. It's essentially an updating of Aeschylus' play Oresteia. I saw a fabulous staging of it put on by the Sydney Theatre Company at the Wharf Theatre in 1998, but you can now buy the film version (with Rosalind Russell playing Elektra) from Film Classics (www.filmclassics.com.au). (Trivia fans might be interested to know that Eugene O'Neill's daughter, Oona, was the fourth — and last — wife of the English actor and filmmaker Charlie Chaplin.)

Pilios says that when he decided to build a DAC (the company previously having built only hi-fi amplifiers), the decision was made to 'do things the hard way' and design everything from scratch. "We have designed and implemented on board our own special USB receiver — no OEMs here", he said, "and we have used our own special re-clocking technique, with only one software programmable femtoclock for extreme accuracy. We also use ten ultra-low-noise, fully discrete power supplies with extremely low output resistance in order to achieve the lowest possible noise floor that is commendably free from significant power-supply-related spuriae."

There are three custom toroidal transformers inside the Elektra, each one larger than I have ever seen in any other DAC

Digital-to-analogue conversion inside the Pilium Audio Elektra DAC is managed by no fewer than eight AKM AK4493EQ DACs used in dual-mono configuration (four DACs per channel). The AK4493EQ is a new DAC architecture from Japan's Asahi Kasei Microdevices Corporation.

It's a 32-bit two-channel DAC that has a switched capacitor filter 'OSR Doubler' that has low out-of-band noise. It also incorporates AKM's proprietary 'Velvet Sound' technology, which AKM claims delivers "the lowest distortion and widest dynamic range of any 32-bit DAC." As for that USB receiver, it's certainly programmed by Pilium, but it's a U30871C10 integrated circuit designed and built by XMOS, a fabless semiconductor company headquartered in the United Kingdom that develops multicore microcontrollers capable of concurrently executing real-time tasks. It's intended for use in DSP, edge AI processing and USB audio interfaces.

Cambridge Audio, FiiO Electronics and Meridian also use XMOS devices to implement their USB interfaces, so Pilium is in good company. Still, it's quite an achievement, of which Pilios is understandably proud, saying: "Our XMOS-based USB-receiver was a project by itself! Our team spent almost more than a year to develop it and the goal was to create a USB receiver onboard (not OEM externally placed like many manufacturers use) with a goal to achieve perfect signal transfer. After a lot of tests and comparisons with all available market solutions we came up with a design that could outperform all other solutions."

Pilios also says the Elektra uses a proprietary clocking scheme developed by his team that requires a large number of available clock frequencies. "Achieving this with conventional oscillators would require us to make compromises in board layout and signal integrity. We were not willing to make these compromises," he said. "Thus we made the choice of using a single high-end femtosecond programmable clock, powered by a dedicated fully-isolated and filtered ultra-low-noise power supply. This way the clock's signal path is optimal and thus signal integrity is guaranteed to perfection."

As you have probably gathered if you have peeked at the manufacturer's specifications, 31.3kg is pretty heavy for a DAC! That weight is partially from the number of components inside — more high-voltage capacitors than I have ever seen in any DAC, for example. But the weight is also because there's not just one, but THREE toroidal transformers inside the Elektra, each one larger than I have ever seen in any other DAC, and all custom-made for Pilium by Norwegian transformer specialist Noratel.

But the weight of 31.3kg is mostly because of the way the chassis has been constructed. It's built using a method that is very common for electronic products that are produced in small numbers, indeed most specialist scientific instruments are built in a similar fashion. You should be able to see the method from the photograph accompanying this review that shows the inside of the Elektra DAC. Essentially, the chassis is comprised of six powder-coated solid aluminium plates, with all these plates bolted together via butt joins using 15mm square aluminium bars and hex-headed bolts.

The difference between the Elektra and all other products I have seen that use this assembly method is that whereas most other manufacturers use thin aluminium plates, the aluminium plates used in the Elektra are all 10mm thick except for the front panel, which is made from 20mm-thick aluminium plate. This construction method means that the top panel of the Elektra weighs 6.1kg, the side panels each weigh 1.5kg, the rear panel weighs a bit more than that, the bottom panel weighs around 6.0kg and the front panel tips the scales at 3.0kg. All told, these alone add up to a weight of around 20kg!

Surprising though it may seem, this is still a more cost-effective way to build a chassis than to have one made conventionally because there are essentially no tooling costs. It's also a lot more cost-effective than CNC milling the chassis from a solid billet of aluminium. However, there is yet another reason for the weight of the chassis, which is that down each side of the DAC Pilium has bolted on thick anodised aluminium plates that are 430mm long, 90mm high and 9mm thick and each one of which adds a bit over another kilogram to the overall weight of the chassis. There's no mention of the reason for these plates on Pilium Audio's website, but I guess there must be a reason, otherwise the company is just increasing build costs — and shipping costs — by so doing. But it certainly improves the appearance of the chassis. But I guess I should have been thankful that I was reviewing one of Pilium's DACs and not one of its amplifiers.

Pilium's Achilles stereo power amplifier (which is rated at 300-watts per channel into 8Ω, 600-watts into 4Ω, 1,200-watts into 2Ω and said to be stable into 1Ω loads) weighs close to 120kg!

Pilium's website states that all its products are "entirely hand crafted" though in fact this is not strictly true, since those military-spec printed circuit boards you can see in the photograph of the inside of the Elektra have surface-mount (SMT) components that are very obviously not hand-placed or manually soldered. Although this would technically be possible, it would not be practical, and when we asked Pilium's Konstantinos Pilios about this he confirmed to us that: "As for our PCBs it would be impossible to be hand-soldered and completely unproductive even if it was possible. All the SMT components that are placed in Elektra's PCBs are assembled by a very specialised SMT (Pick & Place) factory in Poland."

Was I happy with it? I was ecstatic! The Pilium Elektra is a truly wonderful-sounding DAC.

It also transpired that the aluminium plates are cut and anodised in Germany.

You may be a little disappointed by the appearance of the rear panel of the Elektra DAC depending on the colour of the chassis you choose, because the XLR and RCA output terminals are on black metal fixings that are screwed to the rear of the panel using bright steel screws, and the XLR and S/PDIF inputs use the same screw-on fixings. These fittings are less visible on the black chassis than they are on the silver chassis, but the lack of colour matching and the method of mounting are rather unsettling to find on a product that retails for more than $50,000. Personally, I would have rear-mounted these fittings so you couldn't see the mounting hardware and/or used black steel bolts instead.

PERFORMANCE

Because the only way to switch the Elektra DAC on (or off) is via the mains power switch on the rear panel, you need to install it so that you have easy access to this switch, but that's the only issue you might have with installation — other than making sure the shelf of your equipment rack is capable of supporting its 31.3kg dead weight, of course!

Once powered up, all operation is managed via a monochrome (black and white) touch-sensitive 108×65mm display that is the sole feature of the front panel. I must confess that I was rather expecting to see one of those flashy full-colour super-OLED numbers, but the Pilium Elektra's bland two-tone display does the job… albeit rather mutedly.

I was also expecting a dedicated remote control or at least an app to allow me to control the Elektra from my phone, but neither a remote nor an app is available.

Touch-screens can sometimes be a bit cantankerous by refusing to respond to the touch of a finger — particularly the touch of the finger of an older person, due to the lack of skin-oils — but I had absolutely no issues with the Elektra's touchscreen. It worked perfectly every time. Or, rather, I did have one issue, which is that the display stays 'On' all the time. Some type of Standby mode would have been nice.

Not that the Elektra draws enough power to require a standby mode; I measured power consumption as being between about 18 and 22-watts, depending on screen brightness and operating mode. You can alter the screen's brightness—through ten different levels—but even at its minimum screen intensity, the display is still quite obvious.

In 'Standby' mode, the display has a white rectangle at its centre with the word 'Power' at its centre. At top left is the word 'Pilium' and at top right the word 'Elektra'. Under both words, stretching the full width of the display, there is a thick white underline. A thinner line would have been a better design choice (IMO).

Press that central 'Power' button gently and the Elektra switches to its home screen which maintains the same branding at the top of the screen, but then dominating the display is a large square at the left that shows the frequency of the digital input signal

alongside an identically-sized square at the right that shows the active input. Arrayed across the bottom of the display are five 'soft' buttons labelled, from left to right: Power, Filter, Settings, Input and Output.

The 'Power' description is a bit of a misnomer though, because it doesn't actually switch the power on or off at all, whereas the 'Filter' button does allow you to cycle through the six different digital filters that can be selected thanks to their being available on the AKM DAC: Sharp Roll-Off, Slow Roll-Off, Short Delay Sharp Roll-Off, Short Delay Slow Roll-Off, Super Slow and Low Dispersion Short Delay.

The 'Settings' button takes you through to another menu which is the one that allows you to adjust screen brightness, but also lets you switch 'SPDIF ASRC Operation' between 'ByPass' and 'Enabled'. SPDIF (the correct abbreviation is actually S/PDIF) stands for Sony Philips Digital Interconnect Format. ASRC stands for Asynchronous Sampling Rate Converter which in the Elektra upsamples incoming S/PDIF signals. According to Konstantinos Pilios it was decided to make this feature switchable because, he says: "Keeping it enabled provides audio that is measured to be of extremely high quality. But bypassing it produces subjectively better sound quality. Thus it was decided to leave the decision of either enabling it or disabling it to the end-user."

'Input' switches between the XLR, RCA, BNC, Toslink and USB inputs and if you have looked very closely at the photo of the rear panel of the Elektra — or examined at the specifications — you may well be wondering how you select the HDMI input. The answer is that you can't… it is not selectable. According to Pilios, the presence of the HDMI terminal is "to enable future upgrade connectivity with our upcoming streamer."

As for that 'Output' button, this is used to select the analogue output you want to be active: XLR (balanced) or RCA (unbalanced). As the switchable selection would suggest, you can use only the one output or the other: you cannot use both simultaneously.

LISTENING

I started listening via the USB input which, because I use a Mac, is a simple 'plug 'n play' affair. If you use Windows, you will have to ask for a suitable driver from either Absolute HiEnd or Pilium itself, because the necessary Windows USB driver is not supplied nor was it (at least at the time of writing) available for download from Pilium's website. (Actually, the Elektra was so new that I didn't get an Owners' Manual either. Neither, for that matter, was packaging available: my review loaner was delivered in an expensive custom-fitted aluminium flight case.)

I have to say at the outset that I was impressed right from the outset with the sound quality I heard from the Elektra. It was immediately obvious that it was a cut above the average, but before I started listening in earnest, I first explored all the filter selections and, as I usually find, I did not really have a 'favourite' filter, because my filter preference changed depending on the type of music I was listening to, the quality of the recording, and the bit-rate of the digital stream.

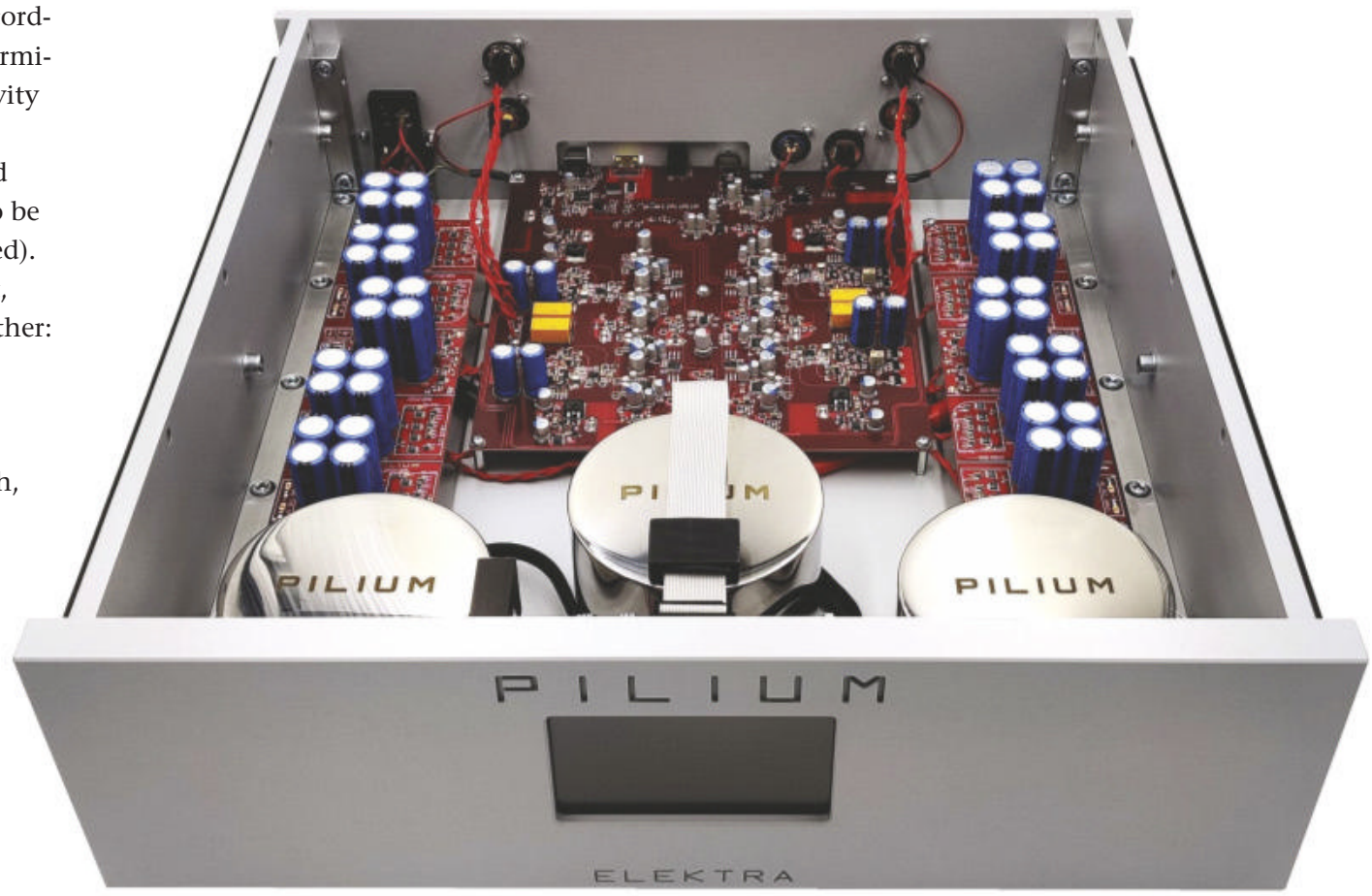
Because of all these variables, it would have been handy to have a remote control to allow filter switching from the listening position, because this would enable easy A–B comparisons to be made (I suppose I could have moved the Elektra up alongside my chair, but this would have meant using very long signal cables).

As it was, I simply enlisted the aid of family members to switch the filters while I listened, but the amount of switching I did during the course of this review rapidly turned me into 'Mr Unpopular', so I ended up with what I thought was the best all-round compromise filter, which was Sharp Roll-Off. For the record, Konstantinos Pilios' personal favourite of all the filters on offer is the Short Delay–Slow Roll Off. "This 32-bit filter has minimal echo and produces original sound as AKM claims," he says.

When using the S/PDIF input, which is actually my preferred digital input for listening to music, I tried switching between 'Standard' and 'ASRC' and found that again, I really would have preferred a remote control to evaluate these two modes because by this time I had exhausted the patience of all my family members to act as human remotes and the differences I was hearing between the two modes were so subtle that I'd really want to A–B them from my listening chair without moving my head at all in order to determine which one I preferred. So, sorry to leave this one hanging, but I am going to have to let you pick a winner between these two different settings.

Because of this, I simply followed Pilios' advice and went for the default option, plain vanilla S/PDIF, with no oversampling. Was I happy with it? I was ecstatic! The Pilium Elektra is a truly wonderful-sounding DAC. It has a pure, clean, delivery at all playback levels and when there's no music playing, it's as silent as a still evening in the Simpson desert. The sound quality is, to my ears, sweetly melodious and totally extended, reaching to the depths of the bass, and certainly far below the lowest note that could be played on any instrument.

At the opposite end of the audio spectrum the Elektra performs in a similar manner, though this time it reaches for the stars. And whereas some DACs begin to sound a little harsh in the highest treble regions, particularly at the lowest recorded levels, the high-frequency delivery of the Elektra remained totally pure and totally uncoloured at these levels, and that was true no matter whether we're talking fundamentals or harmonics of fundamentals.



I checked out the depth of the bass with Mala's *New Life Baby Paris*, a track I now play regularly when reviewing components. It was recommended to me by a friend in the UK. Mala (Mark Lawrence) plays electronic music in the dub-step style, where it's all about percussion, rhythm and bass. This particular track is just a bit too chilled to suit my musical preference, but for checking bass depth and rhythm control on hi-fi components it's fabulous. Scattered drum sounds with complex rhythms are interspersed with high-volume sub-bass 'hits' that seem to come out of nowhere. But don't start with this track on high volume lest your bass driver cones be ejected from your speaker cabinets!

The Pilium Elektra delivered the sonics with incredible precision, never blurring the transients and letting me hear the ambience even when Mala fills the foreground soundscape entirely.

Following up with Rage Against the Machine's *Bullet in the Head* revealed the Pilium can deliver rock like you were at one of their concerts. The sound of all the drums in Brad Wilk's kit are delivered with authority and you can hear the skin sound and sonorities, while the pacing of the Elektra is no better demonstrated than by the machine-gun-like drum attack that wraps up the track.

Tim Commerford's bass guitar is beautifully recorded, and the Elektra revealed the artful precision of his playing like no other DAC I have heard, as well as the glorious tone of the Music Man StingRay bass guitar he used back then. Weirdly, he ditched the StingRay first for a Fender Jazz, then a Lackland, before returning to the StingRay. Tom Morello's guitar antics on this track are absolutely insane, and the Pilium delivered all the insanity exactly as he intended.

A DAC has to get the midrange right, and the Elektra revealed to me that it had managed this the moment I span up Fleet Foxes' fantastic composition *Fool's Errand*.

Pitchfork's Matthew Strauss once wrote of Fleet Foxes: "*In many of their songs, desire is consistently hindered by reality, yet their grand sound renders simple moments triumphant.*"

His sentence describes this track to a 'T'. The richness of the track's sound was rendered to perfection and the crystal clarity of the echoed vocal harmonies was triumphantly delivered by the Elektra.

The *a capella* section that transitions the guitars and drums to the solitary slightly detuned piano that re-introduces the main theme sounds miraculous through the Elektra, as does the sound of the piano itself. You can't truly evaluate midrange sound without listening to a fabulous female vocalist, so I listened to Billie Eilish first singing *No Time To Die* and then *When the Party's Over*, after which I just had to listen to the whole album ('When We All Fall Asleep, Where Do We Go?') as well as those tracks again, because that's what happens when you're auditioning a superb piece of audio equipment… you get so carried away you want to listen to everything anew.

Eilish's *All The Good Girls Go To Hell* reminded me that I hadn't listened to Lisa Bassenge's version of it for a while, so I loaded her album 'Mothers' and started from the top (*Joanne*). Bassenge not only has a great voice, she also has great taste in the musicians she chooses to accompany her (so much so that she married one of them). If you like a sweetly syncopated funky smokey-sounding jazz style, she's a musician to follow. Again the Pilium Elektra DAC revealed the two totally different vocal styles brilliantly: Eilish's close-miked, breathy waif-like technique vs. Lisa's clear and mature projection. Mothers has an incredible version of Janis Ian's *At Seventeen* by the way, plus the recording quality of the album is superb.

If you want to test the upper reaches of your own hearing as well as the upper reaches of the Elektra's high-frequency response, you could do no better than listen to Kamasi Washington's epic album (appropriately titled 'The Epic') which is a sonic smorgasbord. Listening to the way the Elektra DAC so clearly revealed the different sounds of the different cymbals that are used throughout the album, the signature sound of the Hammond organ, and the sweetness of the soprano voices solo and in unison in the choir was a revelation.

But perhaps the most revealing aspect of the music on this album is if you can clearly hear all the myriad sounds without them being melded together, and the Pilium Elektra passed this test with flying colours.

CONCLUSION

My time spent listening to Pilium Audio's Elektra DAC reminded me of one of the most famous quotes from Euripides' play, Elektra: "To spend life's fleeting days mid joy that never meets an evil hour is to be blessed beyond compare." Listen to your music using a Pilium Audio Elektra DAC and you will be similarly blessed! *Alan Leith*

CONTACT DETAILS

Brand: Pilium
Model: Elektra DAC – Divine Line
Price: $57,500 (RRP)
Warranty: Two Years
Distributor: Absolute Hi End
Address: PO Box 370, Ormond, VIC 3204
T: (04) 8877 7999
E: info@absolutehiend.com
W: www.absolutehiend.com

- Unbelievable build quality
- Super-silent backgrounds
- Amazing sound

- Remote/app control
- Stand-by mode
- Ethernet input/streaming

Readers interested in a full technical appraisal of the performance of the Pilium Elektra DAC should continue on and read the LABORATORY REPORT published on the following pages. Please 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 output of the Pilium Elektra at a shade higher than 3.7-volts RMS via the XLR outputs for a 0dBFS digital test signal. This is fairly standard. The output at the RCA terminals (not measured) would be half this, or around 1.8-volts RMS. You can see from the tabulated results that the voltage was slightly different for the left and right channels, but the difference (i.e., channel balance) of 0.55dB, although somewhat higher than I might have expected, is not audibly significant.

Separation between the left and right channels was outstandingly good at all three frequencies tested, with a best result of 141dB at 16Hz. The 100dB of separation measured by Newport Test Labs at 20kHz was exemplary: there are few DACs that are able to deliver a three digit result at this high frequency.

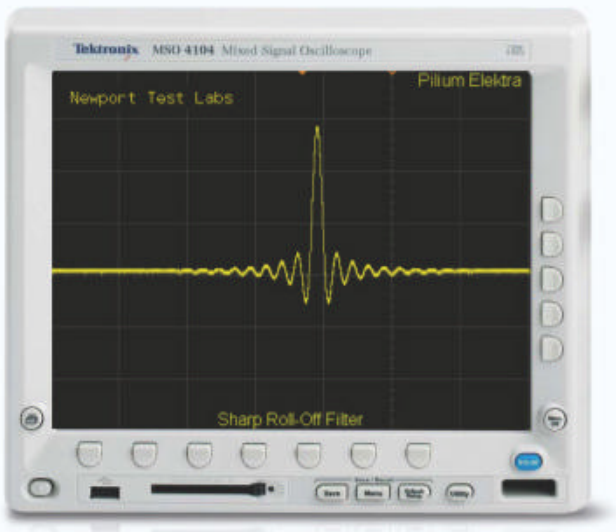
Inter-channel phase error was extremely low at low frequencies and although it gradually increased with frequency, was still only 0.94° at 20kHz. All the errors are so minuscule that they would not be audible and could be corrected, if required, by moving one speaker a few millimetres closer to the listening position. Group delay was typical for a standard delta-sigma DAC.

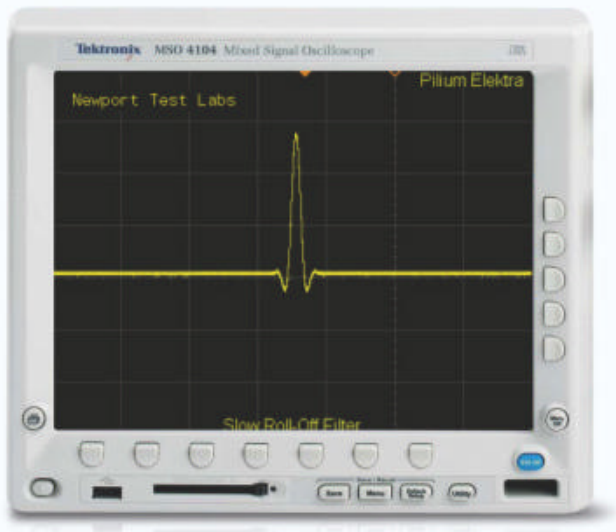
Overall THD+N was very low, as you can see from the result of 0.001% listed in the tabulated figures. Distortion was, however, related to level. You can see on Graph 1, which shows output at 0dBFS, that there is a second harmonic at –68dB (0.03981%), and a third at –80dB (0.01%), both of which would seem to be related to the output stage, rather than to the conversion process itself. Of the other distortion components visible on this graph, four are more than 100dB down (0.001%) and the other three more than 120dB down (0.0001%). Note that a 0dBFS signal is not one you'll find in any recorded music.

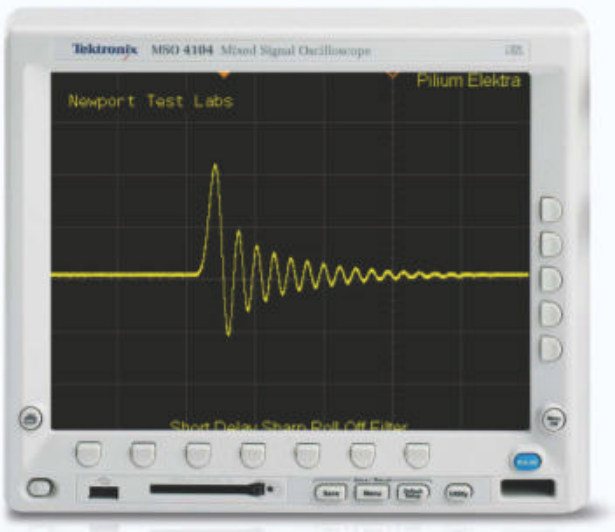
When the Pilium is reproducing a more representative signal level of –10dBFS (Graph 1), a second harmonic component is present at –90dB (0.00316%), a third at –98dB (0.00125%) with a fourth and fifth at –120dB (0.0001%). It's worth noting the exceedingly low noise floor of the Pilium Elektra, which is down at –140dB. It is rare to see such low noise in a DAC, particularly at the low frequencies, which you can see at the extreme left of this graph. Graph 3 shows distortion spectra for a 1kHz test signal at –20dBFS and you can see distortion has all but disappeared completely, with only a second harmonic at –117dB (0.00014%) and a third at –116dB (0.00015%). This is particularly good performance which again will be aided by the lack of noise introduced by the DAC itself.

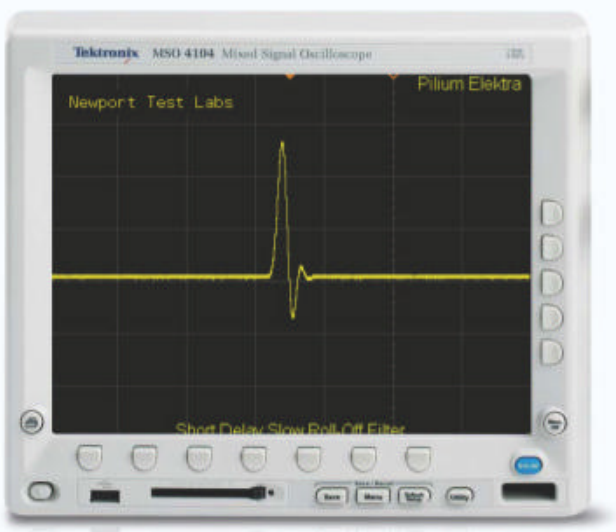
The Pilium's performance at –60dBFS shows some converter non-linearities (the 'grass' at the bottom of the graph), but these are well-distributed and very low in level, all being more than 120dB down (0.0001%). You can also see that the noise floor itself has dropped to below –140dB except at the very lowest frequencies. The non-linearities are due to the test signal not being dithered (see next paragraph).

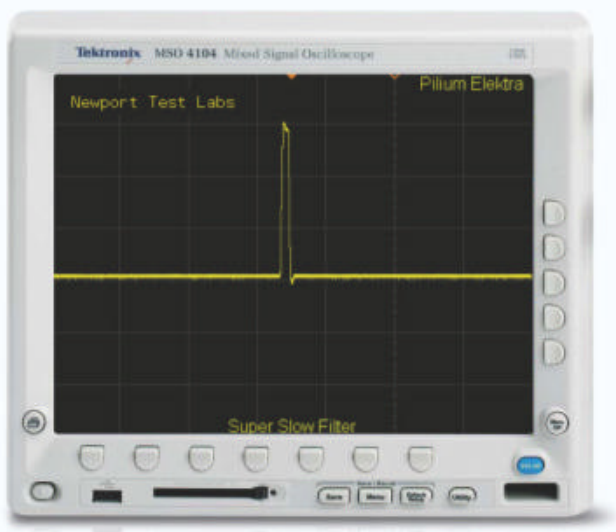
The effect of dithering the test signal is shown in Graphs 5 & 6 on the following page, where Graph 5 shows the Pilium's performance with a dithered signal and Graph 6 its performance with almost exactly the same test signal, except that it hasn't been dithered. You can see that dithering enables the converter to be better-behaved, so that it removes all the harmonic distortion components (even though all are more than 100dB down in any case) with the only trade-off being an increase in the noise floor, though since the noise floor ends up at –130dB, this is not an issue.

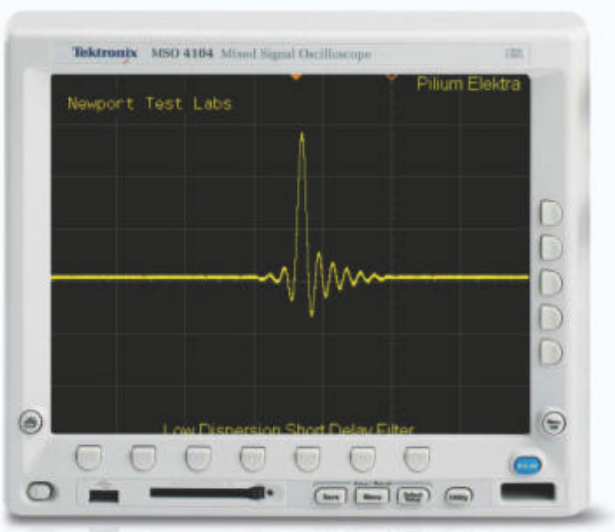


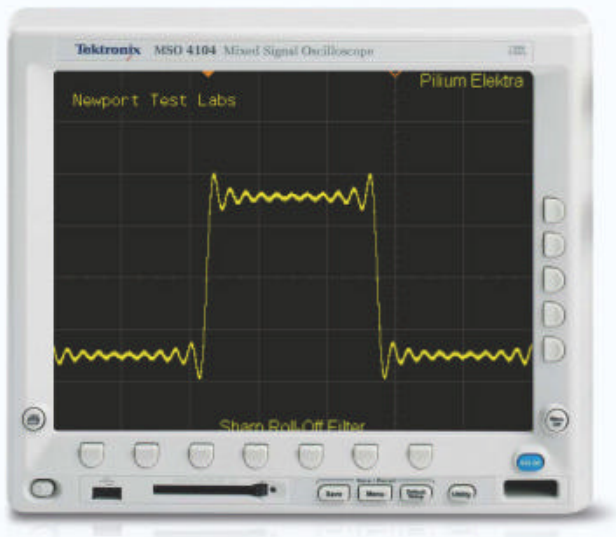


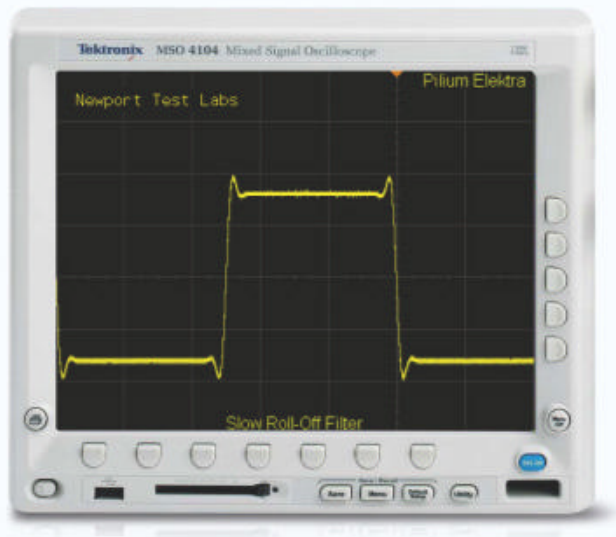


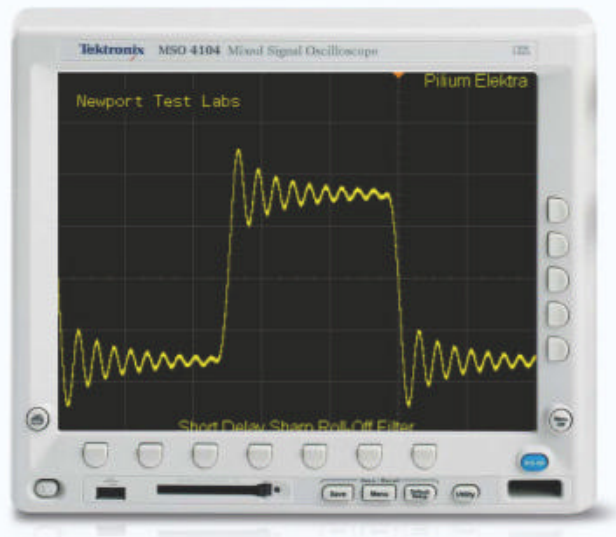


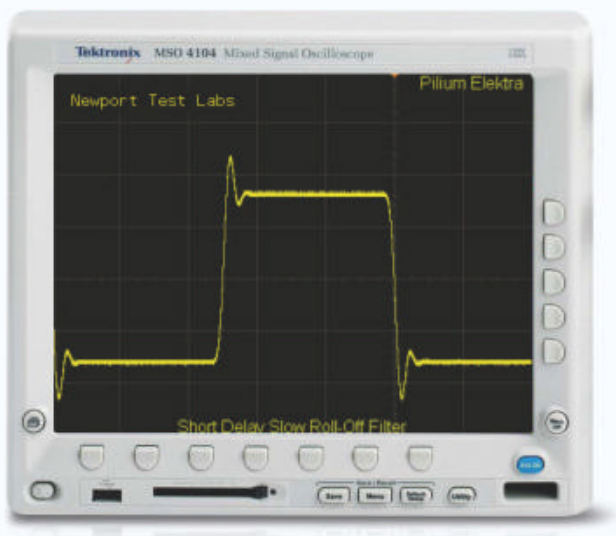


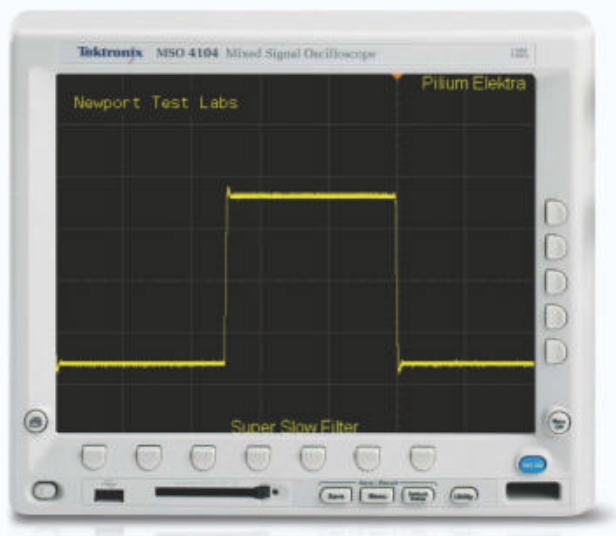


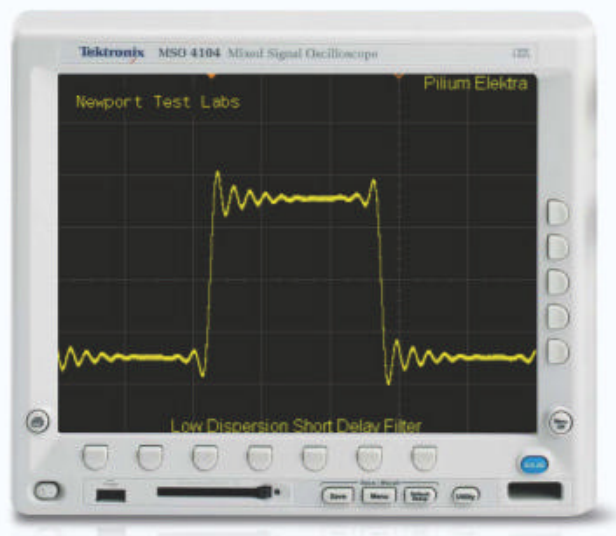












Graph 7 shows CCIF-IMD at 0dBFS. The two test signals result in the two nearest sidebands at 18kHz and 21kHz at more than 90dB down, and two more at 17kHz and 22kHz that are sitting down at around –110dB (0.00031%). The level of the unwanted signal regenerated at 1kHz is down at around –108dB (0.00039%). There are some sampling-related artefacts up around 44.1kHz which would not be audible.

Graphs 9, 10 and 11 show the effect on the Pilium Elektra's high-frequency response when using three of the different filters available. You can see when using the Sharp Roll-Off filter (Graph 9), frequencies above 20kHz are rolled off very steeply so at 24kHz signal level is 100dB down, while frequencies within the audio band are completely unaffected (at least in terms of level) by the filter.

Graph 10 shows the effect of the Pilium Elektra's Slow Roll-Off filter on the high-frequency response. As you can see, there's none of the sharp cut-off visible in Graph 9, with the high-frequencies slowly rolling off to be around 100dB down at around 35kHz. However, the slower roll-off means that the very highest frequencies in the audio band are slightly attenuated.

Using the Pilium's Super-Slow filter (Graph 11) there's no cut-off until up around 50kHz and an even-greater effect on the level of the frequencies below 20kHz.

The effect of the three filters on audio band signals is depicted in the frequency responses shown in Graph 12. You can see that the Sharp Roll-Off filter (green trace) is almost completely flat out to 20kHz, where it's only 0.2dB down. The Super-Slow filter starts having an effect on audio frequencies at 1kHz, so it's 0.5dB down at 11kHz and 1dB down at 10kHz. The Slow filter's response is flat out to 3kHz, then rises slightly before it starts its roll-off at 8kHz, to be 1dB down at 15kHz. It's arguable whether any of these differences would be audible.

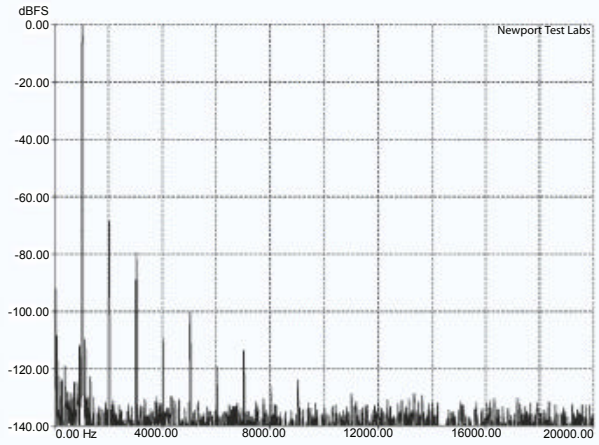
As with most modern DACs, the Pilium does not have a de-emphasis circuit enabled, which means that if you use it to play some CDs (or digital files) that were recorded more than forty years ago, you may hear slightly different high-frequency levels than the original producer intended. These differences may or may not be audible.

Linearity errors were very, very low, as you can see from the tabulated results, though interestingly the best (0.01dB) and 'worst' (0.05dB) results were measured at –60dB and –70dB respectively… and not that I put the word 'worst' in inverted commas because an error of only 0.05dB in level down at –70dB is evidently an excellent result!

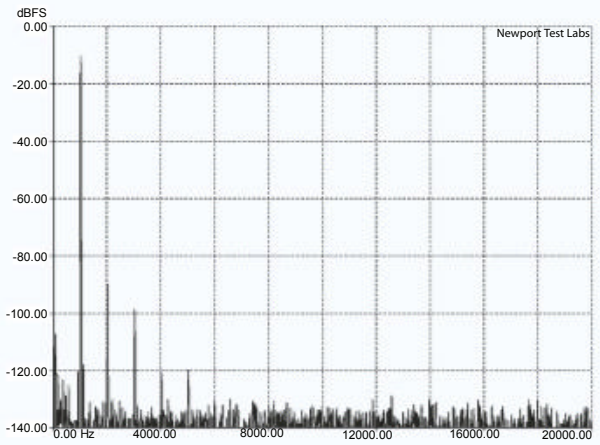
Also excellent were the signal-to-noise ra-

Pilium Elektra DAC — Laboratory Test Results

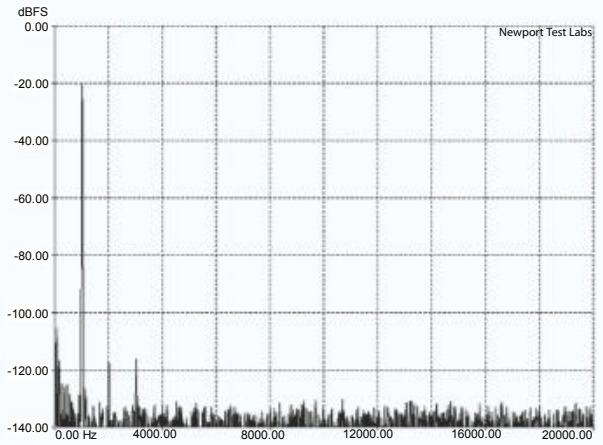
Analogue Section	Result	Units/Comment
Output Voltage (XLR)	3.7424 / 3.7871	volts (Left Ch/ Right Ch)
Frequency Response	See Graphs	dB (20Hz – 20kHz)
Channel Separation	141 / 124 / 100	dB at 16Hz / 1kHz / 20kHz
THD+N	0.001	@ 1kHz @ 0dBFS
Channel Balance	0.55	@ 1kHz @ 0dBFS
Channel Phase	0.01 / 0.06 / 0.94	degrees at 16Hz / 1kHz / 20kHz
Group Delay	180 / 14.44	degrees (1–20kHz / 20–1kHz)
Signal-to-Noise Ratio (No Pre-emph)	113dB / 121dB	dB (unweighted/weighted)
De-Emphasis Error	0.35 / 3.5 / 8.95	at 1kHz / 4kHz / 16kHz
Linearity Error @ –60.00dB / –70.00dB	0.01 / 0.05	dB (Test Signal Not Dithered)
Linearity Error @ –80.59dB / –85.24dB	0.03 / 0.01	dB (Test Signal Not Dithered)
Linearity Error @ –89.46dB / –91.24dB	0.04 / 0.03	dB (Test Signal Not Dithered)
Linearity Error @ –80.70dB / –90.31dB	0.03 / 0.04	dB (Test Signal Dithered)
Power Consumption	18.94 / 22.12	watts (Standby / On)
Mains Voltage During Testing	235 – 246	(Minimum – Maximum)



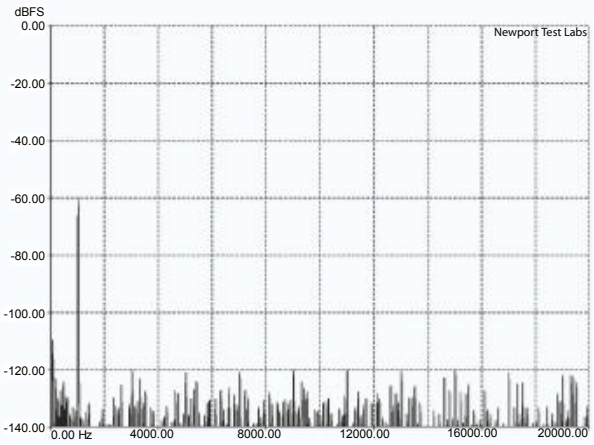
Graph 1: THD @ 1kHz @ 0dBFS.



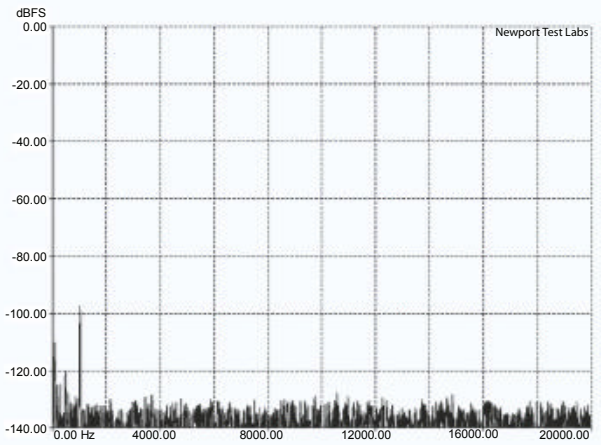
Graph 2: THD @ 1kHz @ -10dBFS.



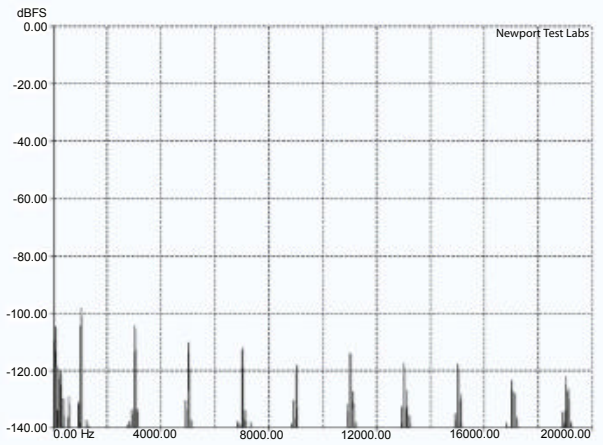
Graph 3: THD @ 1kHz @ -20dBFS.



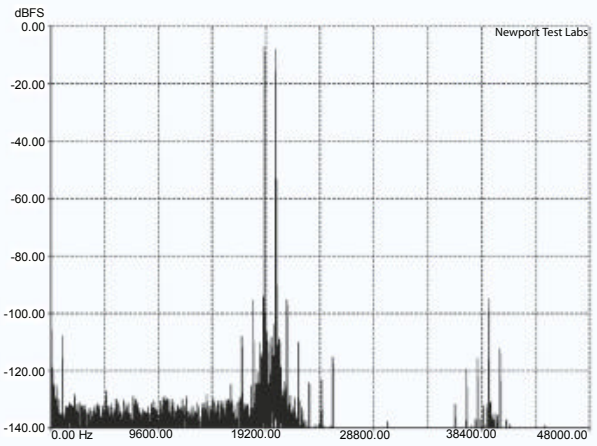
Graph 4: THD @ 1kHz @ -60dBFS.



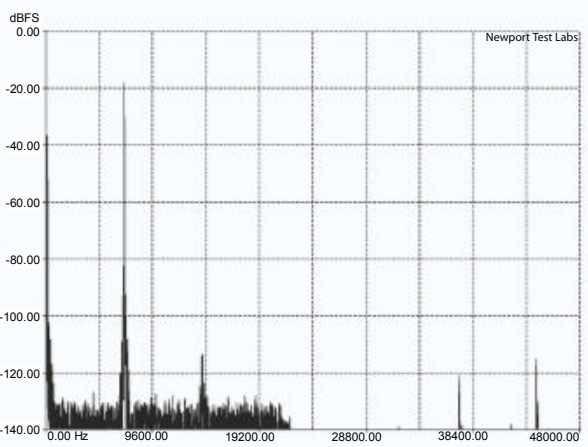
Graph 5: THD @ 1kHz @ -90.31dBFS with dithered test signal.



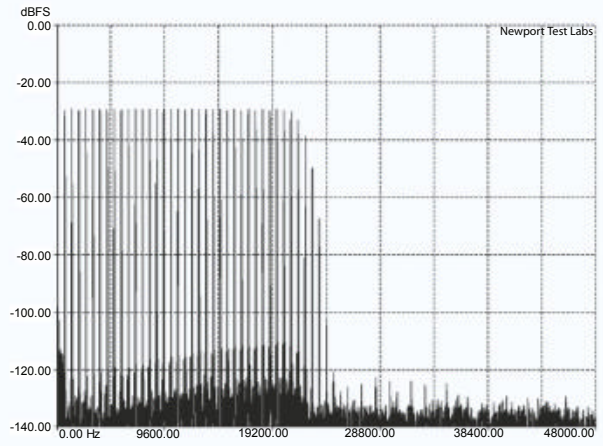
Graph 6: THD @ 1kHz @ -91.24dBFS with undithered test signal.



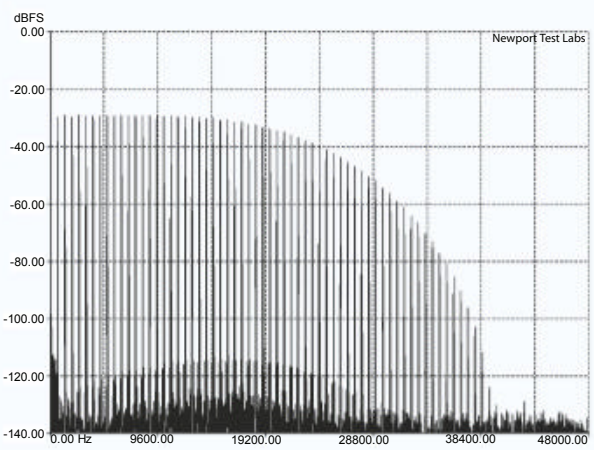
Graph 7: CCIF IMD 19kHz + 20kHz (1:1) at 0dBFS.



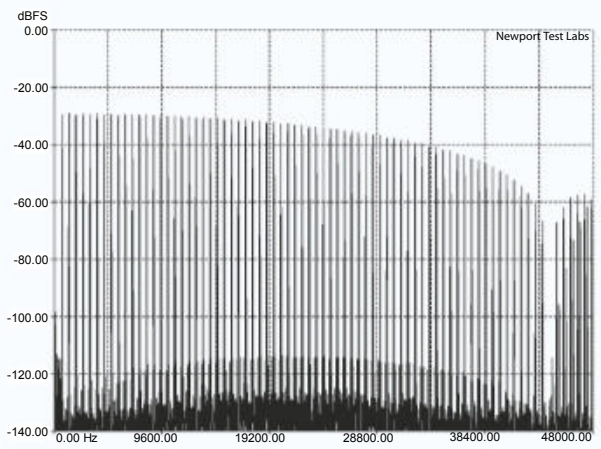
Graph 8: SMTE IMD 60Hz + 7kHz (4:1) @ 0dBFS.



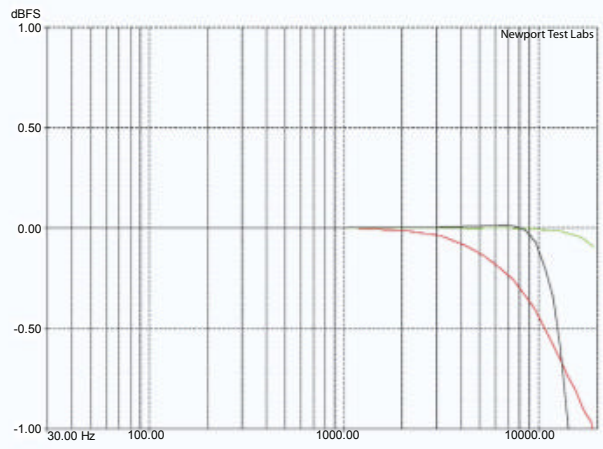
Graph 9: Frequency spectrum using 630 single sample pulses per second and Sharp Roll-Off Filter.



Graph 10: Frequency spectrum using 630 single sample pulses per second and Slow Roll-Off Filter.



Graph 11: Frequency spectrum using 630 single sample pulses per second and Super-Slow Roll-Off Filter.



Graph 12: Freq. response showing Super-Slow (red trace), Slow (black trace) and Sharp (green trace) filters.

tios measured by Newport Test Labs, with the Pilium Elektra returning wideband results of 113dB unweighted, and 121dB IHF-A weighted. This will make it the least-noisy link in your system, interconnects excepted.

The effect of the six different filters on a single impulse is shown in the oscillograms. You can see the primary differences concern the presence and the level of pre-ringing (unwanted signal prior to the pulse) as well as the extent and level of ringing after the pulse. Also that the Super-Slow filter appears to distort the pulse itself, which the other filters leave untouched.

Newport Test Labs also measured the effect of the six different filters on a 1kHz square wave, with the results shown in the twelve accompanying oscillograms. Contradictingly enough, the square wave that most resembles an analogue square wave was produced by using the Super-Slow filter.

The performance of the Pilium Elektra DAC, as measured by Newport Test Labs, was excellent. It's clearly a very superior DAC, particularly with regard to noise, having the lowest levels of it I can recall seeing on any DAC. ***Steve Holding***

SILENT ANGEL RHEIN Z1 V2

MUSIC SERVER

The Silent Angel Rhein Z1 V2 is called a music server. But it perhaps is better thought of as an interface to digital music within—and without—your system.

THE EQUIPMENT

To understand the Silent Angel Rhein Z1 V2, it's probably best that I simply describe what it does and how you use it.

First, you connect it to your home network via Ethernet. None of that Wi-Fi stuff here. The Ethernet is gigabit speed. Take it from me: there is no audio format that will come anywhere close to challenging the speed of a gigabit connection.

Inside it is a 250GB system solid-state drive. This is primarily for holding the VitOS operating system. VitOS itself is a customised Linux based operating system designed for music players, so this combination is designed to prioritise music performance—so no interruptions while your Windows or Mac computer goes off to do something else it considers more important. My review unit was running VitOS-1.1.1414.

That's it for storage in the standard unit. But you can option it up with a 1TB Silent Angel customised solid-state disc to store your music on. If that's enough.

I am told that most audiophiles who buy the Rhein Z1 V2 buy the basic unit and keep their music on network attached storage. That makes sense because it makes upgrades easy. Just keep the music on the NAS (upgrading the storage as required, and with it secured by some kind of RAID disc arrangement) and simply change the playing hardware and software as required. Hearing that made sense to me, because that's what I do, but it's good to hear that it's a preference for others as well.

Now you can manage all this yourself, or you can subscribe to the ROON player and server system, because the Silent Angel Rhein Z1 V2 fully supports the ROON system. This is much used amongst those who want to combine top-end, bit-perfect audio performance with ease of use. I haven't stumbled, yet, onto that boat, though one day I may.

The Silent Angel Rhein Z1 V2 fully supports the ROON system, much used by those who want ease of use

I want the top-end, bit-perfect audio performance, but after years of carefully managing my digital audio files, filling their ID3 tags with useful indexing information, and structuring the folders on my storage to make sense, I am not yet ready to jump over to automated management. Besides, you have to pay for ROON.

But those who do use ROON have access to such sources as the streaming service TIDAL. But there are other ways of using TIDAL with the Z1 V2. Some non-TIDAL sources are directly supported outside of ROON: Spotify Connect, Apple AirPlay 2 and, of course, DLNA. That last is a standard system for network audio. Apple AirPlay 2 will work with all modern Apple devices. iPhone users can stream anything their iPhone is capable of playing to the Silent Angel Rhein Z1 V2. You need a Spotify subscription for Spotify Connect. For DLNA you need music files stored on devices on your network, and suitable server software. Fortunately, the latter is ubiquitous.

The unit also has its own DLNA server software built in—MinimServer—so any music on the unit's internal SSD/s, or on any USB drives plugged into it, can be delivered to any DLNA player or renderer on the network. (And since the Z1 V2 is a DLNA player, it can of course play the stuff on the Z1 V2 acting as a server.)

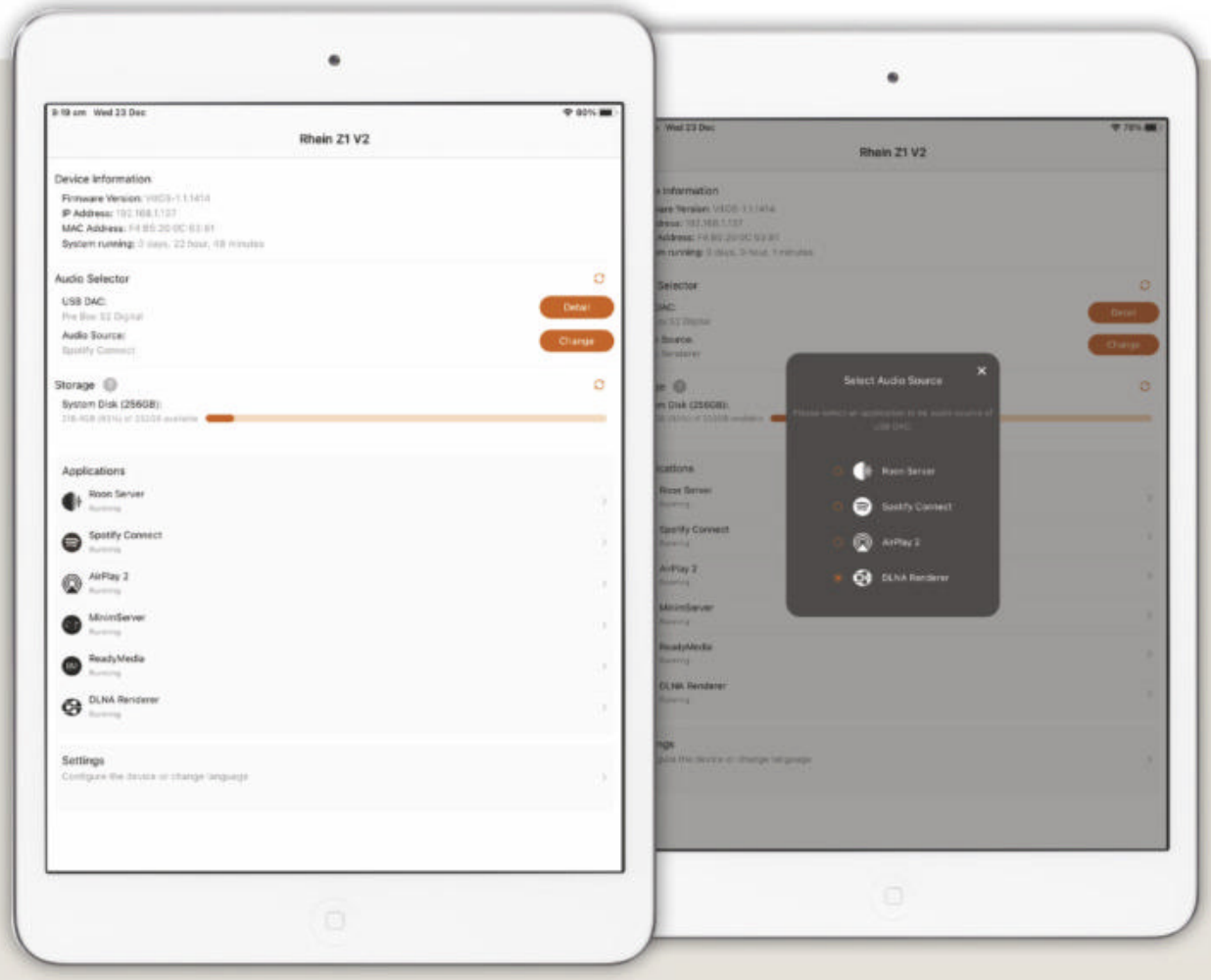
In addition to the Ethernet connection there are four other physical connections fitted: 2×USB-2.0, 1×USB-3.0, and 1×USB for use with an external DAC. Power is provided by an external switch-mode power supply (SMPS) that supplies 12V d.c. via a cable terminated with a standard d.c. plug. There is an HDMI socket, but it's only a service port for use by technicians, and not to be used for HDMI signals.

Physically, the Silent Angel Rhein Z1 V2 is presented as a cleanly designed square with rounded corners, a little bigger than a Mac Mini, at 200mm wide by 65mm tall by 200mm deep and weighing six kilograms.

There's a computer in there, of course—on the website its performance is compared (favourably) with that of a Mac Mini. But there are no fans or even vents. Cooling fans make noise, so it's welcome that they aren't fitted. Nor are they needed. The unit after extensive use was, to my touch, barely above room temperature. A Silent Angel indeed!

INSTALLATION

Apart from the front-panel power/standby switch, there are no controls on the unit. So all control must be done by apps.



THUNDER DATA

Silent Angel products are built in China by the Chinese-owned Thunder Data Co. Ltd, founded in 2014 by Dr Eric Jian Huang, a former technical director at EMC China. The audio products it builds are something of a sideline for the company, whose main business is building products for 5G mobile networks and 8K video signal transmission. The company's website says its mission is "to improve signals quality of computing, networking, and storage." In addition to its two audio brands, Silent Angel and Thunder Data, the company also builds LAN switches which it sells under the Bonn brand and also builds for other manufacturers to sell under their own brand names, one such being English Electric (owned by Chord Company). The company also makes its the operating system (VitOS) it uses in the Rhein Z1 available for Raspberry Pi 4 owners. They simply need to download an image file from the Thunder Data site (www.thunderdata.com) and write it to a micro SD card so the card can be plugged into their Raspberry Pi 4. The VitOS Manager iOS/Android app can then manage the VitOS. With a USB DAC connected to the port on the Raspberry Pi 4 and Roon Bridge you can then use the Raspberry Pi 4 to play music to a DAC. #

The VitOS Manager app is available for both iOS and Android from their respective stores. Apart from a few setup functions, the purpose of this app is to allow you to select inputs. There are no 'Play' buttons or such. All that kind of control is performed in other apps.

If you are playing Spotify music, you'll dial up music in the Spotify app. If you're using DLNA, you'll use a DLNA app on your device. I used the apps recommended by Silent Angel: BubbleUPnP on Android and mConnect on iOS. And, of course, for AirPlay use I selected the Z1 as a player in the usual way by using the control panel on an iPhone and on an iPad.

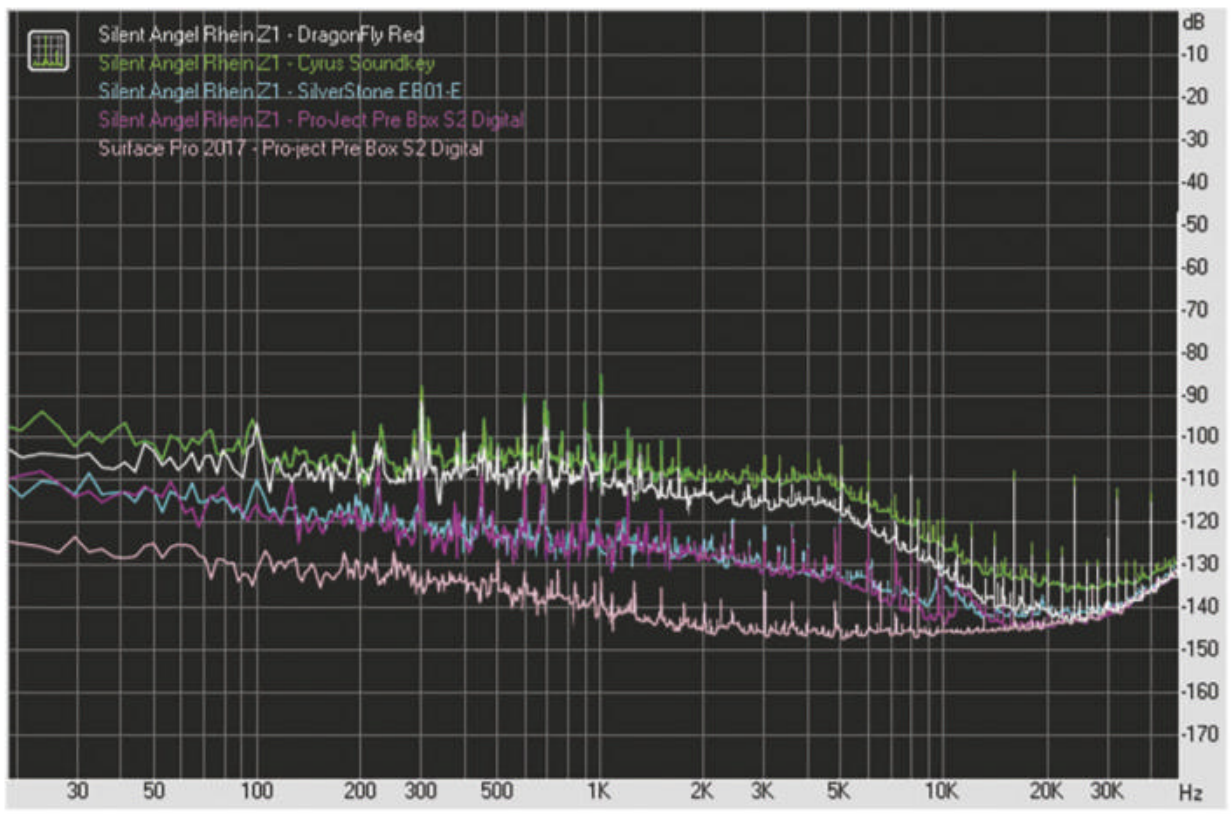
I do think that the user experience could be improved. First, the VitOS Manager app looks very utilitarian. A streamlined look with prominent selection buttons would seem an obvious change. Second, most devices which support things like AirPlay and DLNA streaming do not have to be explicitly switched to that input. Generally with AirPlay, for example, you find the player on the iPhone's list of devices, tap it and the device will connect and start playing music. When you change the playback device to the iPhone, the other device just goes back to what it had been doing.

It happily passed through DSD256 so the original signal was there... and it sounded perfect

DAC MATTERS

Of course, to use the main functionality of the Z1, you'll need a DAC. The question is, which DAC? Well, if you wish to avail yourself of some the pretty impressive high-resolution audio formats around these days, ideally you'll look for a DAC that supports PCM up to perhaps 384kHz and 24-bits, but at least to 192kHz. And consider at least regular and double-speed DSD: i.e. DSD64 and DSD128. And perhaps DSD 256 as well, which the Z1 does support.

But one other performance aspect occurred to me: noise isolation. I wondered whether the Z1 would pass much electrical hash out of its USB connection. If so, then good noise isolation on the DAC would be important. So while I did virtually all my listening using the Pro-Ject Pre Box S2 Digital DAC, I looked around the office to see what other DACs were available and decided to measure the noise performance of them all. I ended up with four in total. Two of them, including the Pro-Ject, were USB Audio Class 2.0 devices, while the other two were USB Audio Class 1.0 gadgets. The latter are limited to 24-bit, 96kHz signals, and definitely no DSD. But since they were both slim portable devices, I had an idea they might pass through noise more readily than the Pro-ject, which has proven able to deliver rather good noise performance even when plugged into a rather noisy computer.



So the first one I went to was an AudioQuest DragonFly Red. I plugged it in, rebooted the unit, and was surprised by a rather high level of background noise. It worked, but it was noisy—and I am not speaking as an audiophile here, with particularly acute hearing. It was obviously noisy. But then, after a while, the noise just went away. I still have no idea what caused the noise in the first place, or why it went away. And after replicating the exact way I plugged in the DragonFly Red and booted up the Rhein Z1 several times, that clearly audible noise did not reappear. But there was definitely noise there still, just at a much lower level than it had been. It was audible in between tracks when I was playing back the music at a satisfyingly high level. With 24-bit audio, I measured this noise at –82dB A-weighted. I have measured this DAC at –109.5dBA running from a computer not plugged into anything.

Then I moved to the other tiny unit I had on hand, the Cyrus Soundkey. This one measured at –77.3dBA with 24-bit audio (it does better than –103dBA with a clean connection).

A nondescript Taiwanese desktop XMOS-based DAC, the Silverstone EB01-E, which

I've had for five years, did rather better at –97.3dBA. But the same DAC managed –107dBA with computers.

Finally, the big surprise was the Pro-ject DAC. With the Rhein Z1 V2 it managed only –96.1dBA with that 24-bit audio. I am so used to it delivering much better than that, even with noisy USB inputs, that I explored a bit further. First, I plugged the Pro-Ject back into the Surface Pro 2016 and made sure that the computer was powered and connected to Ethernet. The result, in those somewhat adverse circumstances, was a noise measurement of –111.5dBA. I plugged the Pro-ject back into the Silent Angel and it returned within a couple of tenths of a decibel of the original –96.1dB.

That got me to wondering—was the data being transferred somehow as 16-bits rather than 24-bits? That would be an explanation. To check, I repeated the test, but this time fed the test signal in DSD format. The measured noise level with DSD64 was –95.3dbA. With DSD128 it was –97.8dBA. The Pro-ject DAC reported that it was receiving the relevant DSD format, so there was no question of the audio being bit-depth truncated. I guess that somehow the noise made it past the DAC's defences.

I have included with this review a graph showing the noise performance of the four different DACs, all with 24-bit audio input, along with the Pro-ject being driven by the Surface Pro for comparison. In practice, noise was simply inaudible with the two desktop DACs, but able to be perceived with the two portable DACs when used at high playback levels. (But let's be clear about this. This noise is nothing, really, to do with the digital signal. It is analog noise coming through the USB connection and making its way through the DAC to the analogue outputs.)

IN USE AND LISTENING

Apart from the low level noise permitted by some DACs, there's little a device like this can do to influence the sound quality—I know some will disagree and will argue even things like the brand of hard disk or SSD can have its effect. If so, they are beyond my ability to detect. What can more plausibly have an effect on sound is whether the signal is delivered absolutely bit-perfect, and whether any enhancements are properly transmitted. On these fronts the Silent Angel Rhein Z1 V2 was absolutely perfect. It happily passed through DSD256 to my DAC, which confirmed that the original signal was being received. And it sounded perfect. As I am writing, I am using the mConnect app on an iPad to stream MQA-encoded music from TIDAL through the Z1 to my DAC. Said DAC confirms the MQA encoding is intact and is unfolding the signal to 96kHz sampling.

One last observation about my time with the Silent Angel is that it worked with utter and total reliability. No weirdness, and nothing at all untoward. It just soldiered on, delivering the music I dialled up on my various devices and assorted apps. Just as you'd want.

CONCLUSION

All the data representing music signals that went into the Silent Angel Rhein Z1 V2 went through to the DAC exactly, and there's nothing more I could ask for than that—except for a bit more analogue noise isolation. But the lack of isolation is unlikely to be an issue for anyone who uses a competent DAC, which I'd assume would be anyone who is reading this review. ***Stephen Dawson***

CONTACT DETAILS

Brand: Silent Angel
Model: Rhein Z1 V2
RRP: $2,600
Warranty: Two Years
Distributor: Absolute Hi End
Address: PO Box 370, Ormond, VIC 3204
T: (04) 8877 7999
E: info@absolutehiend.com
W: www.absolutehiend.com

- Very flexible with streaming and serving digital audio
- Stylish, minimalist casing
- Can be upgraded with internal storage

- SNR from various DACs less than one would expect
- Manual input changes required

RICHTER HARLEQUIN S6

LOUDSPEAKERS

Richter Acoustics can lay claim to being one of Australia's oldest loudspeaker manufacturers and the Harlequin S6 is one of its longest-running designs. It takes its name from the famous mischievous 'devil' or 'demon' character in French passion plays that were popular in the 16th century, and it's a name that is very appropriate considering that top-of-the-range model in Richter's speaker line-up is called the Wizard.

THE EQUIPMENT

As you can see from the photographs of it accompanying this review, the Harlequin S6 is an unusual design, a two-way, two-driver floor-standing loudspeaker. Unusual because most two-way designs are in small cabinets that are intended to be placed on stands or on shelving or a side-table (and indeed Richter has just such a model in its range, called the 'Merlin' after Great Britain's most famous 'wizard').

Floor-standing two-way speakers have many advantages over their smaller counterparts. Foremost amongst these is that the larger cabinet enables a more extended bass response than would otherwise be possible, because any given bass driver will always deliver more bass in a large enclosure than the same driver in a smaller enclosure.

An important but less immediately obvious advantage of a floor-standing two-way design is that it means there's no need to buy a pair of stands, as there obviously is with a stand-mount design. And lest you underestimate the importance of this, I suggest you investigate the current retail price of a decent pair of loudspeaker stands!

There's also the look. It may just be me, but I think a pair of floor-standing loudspeakers looks better in a typical lounge-room than a pair of small speakers on stands.

The 165mm bass/midrange driver in the Harlequin S6 (the S6 is short-hand for Series 6, this being the sixth series of these particular Richter design) is new for this model but has already been used in the Wizard. It's a brand-new driver not only for the Harlequin design, but also for Richter, and it's one that was designed by Richter's very own Dr Martin Gosnell.

Although the driver is 165mm in diameter, the Thiele/Small diameter is 128mm, which gives an effective cone area (Sd) of 129cm² which is slightly greater than that of the previous model Harlequin (S5). Although the cone looks like it's made from polypropylene, looks can be deceiving, because it's actually made from a mixture of paper, hemp, kapok and wool. The blackness and gloss of the cone's surface is due to a sealant coating to ensure the cone is not hygrosopic, in order that its performance will be uniform irrespective of humidity.

I must say that Richter has really tidied up the look of this driver, which is not only recessed into the front baffle, but also has the periphery of its chassis neatly covered by a black rubber dress ring, so it's not possible to see the bolts that secure it to that baffle.

The tweeter is also a brand-new design for Richter, and uses a high-power neodymium magnet to drive a 25mm soft fabric dome. Says award-winning designer Dr Martin Gosnell: "It has lower distortion than the tweeter we previously used in the Harlequin, and also has a lower resonant frequency that gives us the desired phase characteristics and a frequency response that extends to beyond 30kHz." I should note that because it is expensive for small loudspeaker manufacturers to design their own drivers, and have them built, Richter uses this self-same tweeter in its Wizard and Merlin models. The advantage is that it can order the tweeter in larger numbers, to constrain materials costs.

The new drivers meant the Harlequin's crossover network was also re-designed, during which process Richter took the opportunity to upgrade the various components on the PCB, so this 'S6' version has high-quality acoustic polypropylene bipolar capacitors, high-power cermet wire-wound resistors and

both air cored and ferrite cored inductors with the former and latter cross-mounted to eliminate unwanted magnetic interactions.

The Harlequin is a bass-reflex design, with the port at the rear of the cabinet for which Richter provides foam plugs that can be optionally used "for even greater control of room and equipment variables" (as the company says in its brochure). Although many manufacturers now supply 'bungs' that can be used to 'tune' the bass response, the ones provided with the Harlequins work better than most when they are inserted because of the greater volume of air inside the cabinets.

Bass is tight, rhythmic, and has the slam and pace you'd only expect to find in a much larger, more expensive loudspeakers

Just below the bass reflex port is a single pair of very high-quality gold-plated speaker terminals that is both colour coded and clearly marked with '+' and '–' identifiers. These, too, are new for Richter, and they easily accommodate bare wire, pin connectors, spade connectors, ring connectors and banana plugs… the full gamut.

Also new for the Harlequin is the cabinet itself. Although the raw measurements don't really reflect it, the cabinet's walls are now not parallel, sloping inwards from being 221mm wide at the front to 210mm wide at the rear. This is presumably to ameliorate the creation of standing waves, but it also makes the cabinets appear less 'boxy' than the standard rectangular prismatic shape that's used to build loudspeaker cabinets.

To complement the new and shapely cabinet is a new 'Matte Black' cabinet finish that's textured on all sides except the baffle, which has a smoother, 'slicker' black finish. There's also a new wood-grained finish that Richter's proud Aussie owner, Brian Rodgers, calls 'New Walnut'.

Irrespective of which finish works best for your decor, your speakers will come with a black speaker grille that attaches magnetically, so if you choose not to use it, you won't see any unslightly grille fixings. Richter also puts its silver/black embossed logos on both grille and baffle, to ensure brand recognition.

The modern trend to make floor-standing speakers tall and narrow, has implications for their stability, which can be a serious issue in households with pets, small children, or both!

Richter has addressed this on the Harlequin S6 by providing a pair of almost boomerang-shaped 'speaker stabilisers' that it says brings their stability up to furniture-industry safety standards.

These stabilisers come included as standard with the Harlequin S6 speakers but they're also available separately (for $249) because their clever design is such that they can be fitted to a wide range of floor-standing speakers made by manufacturers other than Richter. So if you already own a pair of floor-standing speakers whose stability you're unhappy with, I'd encourage you to see if the Richter outrigger feet will fit them. The stabilisers come with spikes, spike protectors and rubber feet, so they can be used on any type of flooring.

As for how tall and narrow the Harlequin S6 speakers might be, I measured them as being 930mm high, 300mm wide and 310mm deep, and they tipped my (admittedly bath-room!) scales at a tad more than 15kg.

LISTENING SESSIONS

Yes it's a floor-stander, and yes they deliver more bass than a stand-mount loudspeaker with an equivalently-sized bass/midrange driver, but don't expect the bass extension and sheer 'thwack' from the Harlequin S6s that you'd get from, say, a pair of Richter Wizards.

That said, you're going to be very pleased with the bass you will hear when you audition the Harlequins because it's tight, rhythmic, and has the type of slam and pace you'd only expect to find in a much larger and more expensive pair of speakers, plus its bass goes deeper than you're likely to need unless you're using them for the front channels of a home theatre system and need to hear movie sound effects. (In which case I'd suggest Richter's Thor 6 subwoofer would be an ideal choice.)

I fired up one of my favourite bass testers, which happens to be one of my favourite disco/funk tracks as well. The track to which I refer is *Act Like You Know*, by Fat Larry's Band, on the album 'Break-Out'. (Larry really was fat too… which no doubt contributed to his death aged only 38, reportedly of a heart attack.) This track is notable not only for Larry's drumming, which really sizzles on this track in particular, but for the fabulously fluid, inventive—and complex!—bass lines by Larry La Bes. If you're a gamer, you'll have heard this track, because it's part of the soundtrack CD to the 2002 video game Grand Theft Auto: Vice City. Later on when the boogie synth line kicks in and then the horns, you'll get to hear the Harlequin S6s' great midrange delivery. But while you're waiting, listen to the depth of the skin sound on Larry's kick drum and the 'string' sound of La Bes' bass, as well as the way you can hear the attack on the bass strings distinct from the fundamental. Impressive stuff.

To listen to the midrange, I'd recommend Sarah McLaughlin's sad but beautiful song *Angel*, which she wrote following the death of the Smashing Pumpkins' keyboard player, Jonathan Melvoin. The Harlequin S6s reveal McLaughlin's fragile voice to perfection, especially when she shifts register.

You'll also hear the sympathetic way the Richter Harlequin S6s handle the rather poorly-recorded piano sound.

Can the Harlequin S6s rock? You bet they can! I fired up *Sympathy for the Devil* and cranked the volume as high as I dared. I love the sonic complexities of this song, the samba rhythm, the lyric, the slow burn that climaxes with arguably the most significant lead break Keef's ever played. The scream of his guitar leapt out from the Harlequins like a banshee, so clean yet so raw I was surprised even though I knew exactly when to expect it. The Richters delivered the totality of the sound-field and all the instruments with accuracy and precision throughout the entire track. I personally found the Harlequin S6s' highest frequencies a little forward in the mix but also found that by leaving the grilles on and turning the speakers so that my listening position was a little off-axis, I easily reduced the highs and achieved my preferred sonic balance. I think being able to tune the high-frequency delivery this way is a definite advantage. (If a speaker has too little treble, there's no way to fix it!) Whatever midrange/treble balance you prefer to arrange for yourself, you will hear that these Richters deliver beautifully crystalline treble that transmits the air around the highest notes totally transparently.

CONCLUSION

Richter's Harlequin 6Ss are outstandingly good speakers. I liked everything about them: their sound quality, their appearance, their power handling ability, and their efficiency. I most particularly liked their price which, given their high level of performance, came as a particularly nice surprise. These are speakers you should most definitely audition!

Nick Townshend.

CONTACT DETAILS

Brand: Richter
Model: Harlequin S6
Price: $1,899 per pair (RRP)
Distributor: Richter Acoustics Pty Ltd
Address: PO Box 231 Church Point NSW 2105
T: (02) 9999 3176
E: info@richter.com.au
W: www.richter.com.au

- Great sound
- Very efficient
- Top value

- Not bi-wirable
- Finish choices

Readers interested in a full technical appraisal of the performance of the Richter Harlequin S6 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 graphsand/orphotographsshouldbeconstrued as applying only to the specific sample tested.

LABORATORY TEST REPORT

Newport Test Labs measured the in-room averaged frequency response of the Richter Harlequin S6 speakers using pink noise as this is the test method that most closely simulates the response that would be perceived by the human ear. The result, shown in Graph 1, is obviously excellent, with very good low- and high-frequency extension.

The low-frequency response is 3dB down at 38Hz, which means that it's probably exactly what Richter would have measured, except that Richter's specification of 31Hz is the speaker's –6dB downpoint. The room in which the speakers are used, and the speakers' proximity to boundaries (walls, etc) will have a significant effect on the low-frequency extension, and in all cases will give greater extension than the one measured (and graphed) by Newport Test Labs. However, to put things into a musical perspective, 31Hz (D_1) is just three semitones below 38Hz (B_0) on the tempered scale, so it's a tiny difference in extension.

Although frequency extension is important, it's also important that a loudspeaker exhibits linearity across the midrange, in particular, as well as a neutral spectral skew. As you can see from Graph 1, the Richter Harlequin S6 excels in both areas with the midrange linearity from about 100Hz up to 1.5kHz being within ±1.5dB and there's a completely neutral spectral skew.

As you can see on the graph the S6's frequency response is not completely flat, with a mild (–2.5dB) but broad dip that starts a bit above 1kHz and runs up to 8kHz. Above this frequency the response continues to rise before peaking at around +2.6dB at 20kHz, which is the effective measurement limit for this particular test.

The Richter Harlequin S6's high-frequency response is shown in greater detail in Graph 2, but this time, rather than an in-room pink noise response, as in Graph 1, it's a gated sine measurement, which gives the response the speaker would return if it were measured in an anechoic chamber and enables the accurate measurement of frequencies above 20kHz. This graph also shows the response measured with the grille off (black trace) and with the grille in place (red trace).

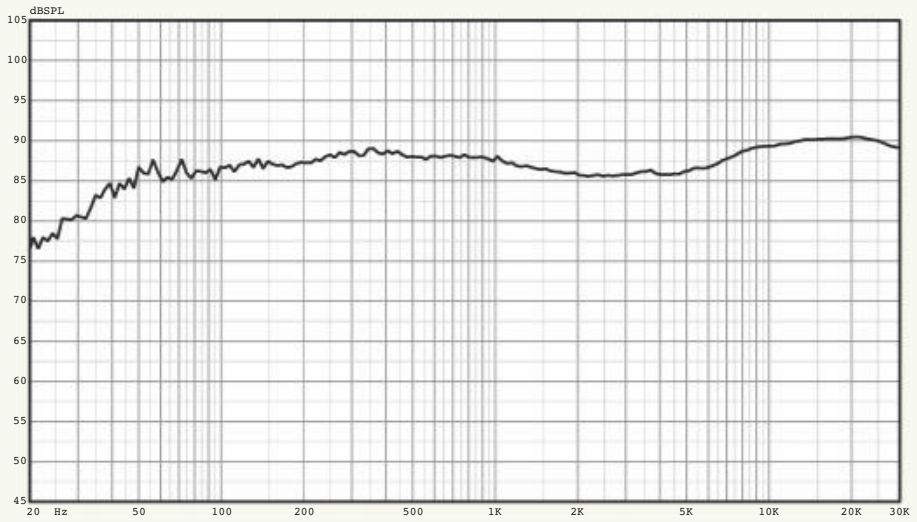
You can see that the increased resolution enabled by the gated sine measurement technique shows a high-frequency roll-off above 30kHz. The increased resolution also shows that the broad dip shown in Graph 1 is rather more complex, with a shelf from around 2kHz up to 3kHz, followed by a peak, then a suck-out from 4.5kHz to 7kHz, after which there's a steep rise to 21kHz. It should be noted, however, that some of these peaks and troughs are measurement errors, due to the different path lengths to the measurement microphone from the two drivers, as both are producing the same frequencies in this region of the audio spectrum.

Graph 2 also shows that the Harlequin S6's frequency response is marginally smoother without the grille than with, but there's so little difference that it will be a matter of whether you prefer the look of the speakers with the grilles on or off—though of course using the grilles affords a level of physical protection for both drivers, so it would be safer to use them than not.

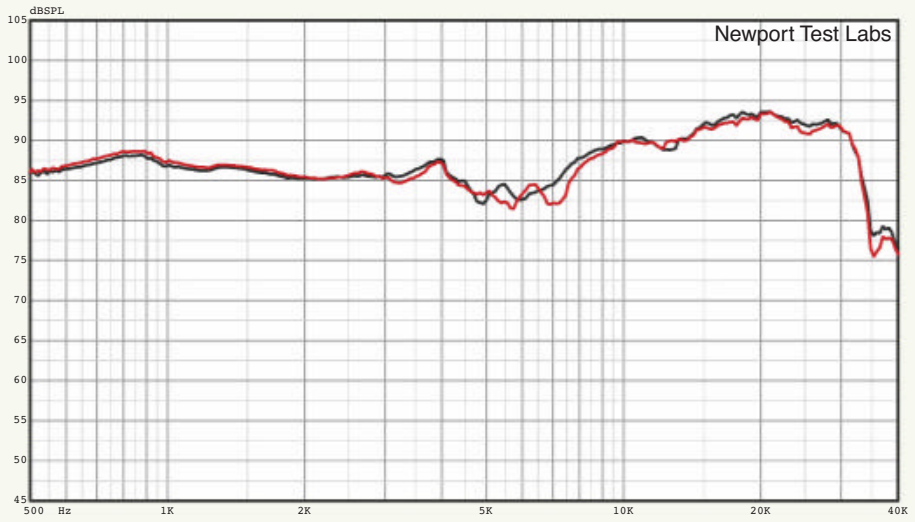
The low-frequency response of the Harlequin S6 design is shown in Graph 3. The black trace shows the nearfield response of the bass/midrange driver when the rear-firing bass reflex port is left open, while the green trace shows the response when the port is blocked using the bung.

As you can see, the response is identical above 60Hz, but below 60Hz the output of the driver rolls off steeply when the port is open, but shallowly when it's blocked, exactly according to theory for the two different cabinet alignments. The red trace on the graph shows the cabinet is tuned for 37Hz, so this is the frequency at which the port delivers maximum output.

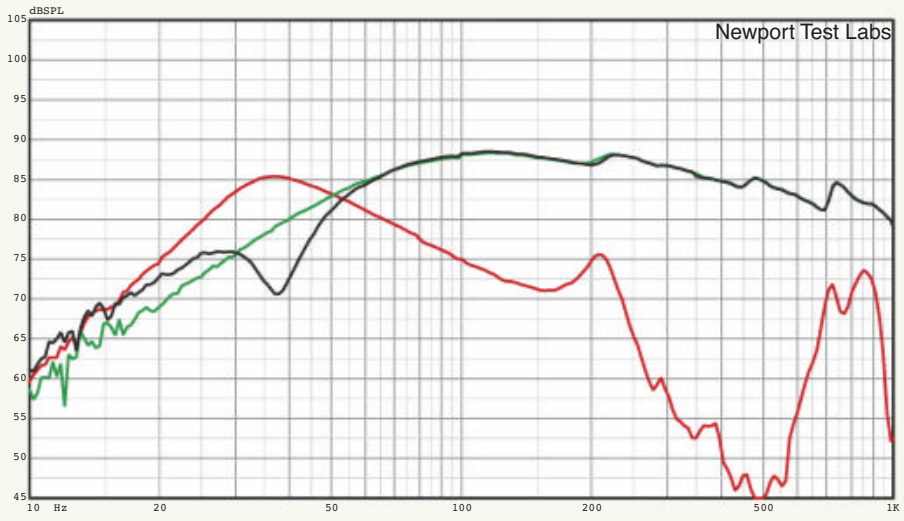
The Harlequin S6 is more efficient than I would normally expect for a two-way design



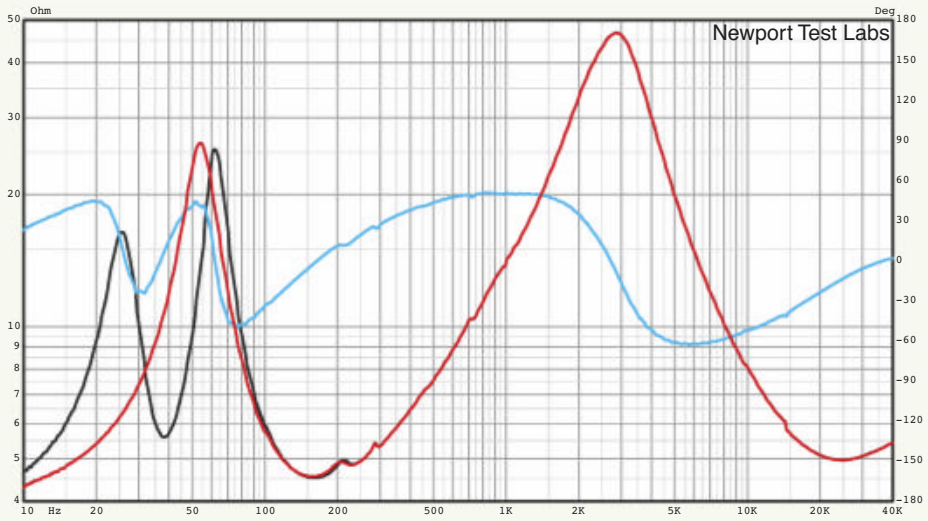
Graph 1: Averaged in-room frequency response using pink noise test stimulus with capture Trace is the averaged result of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter.



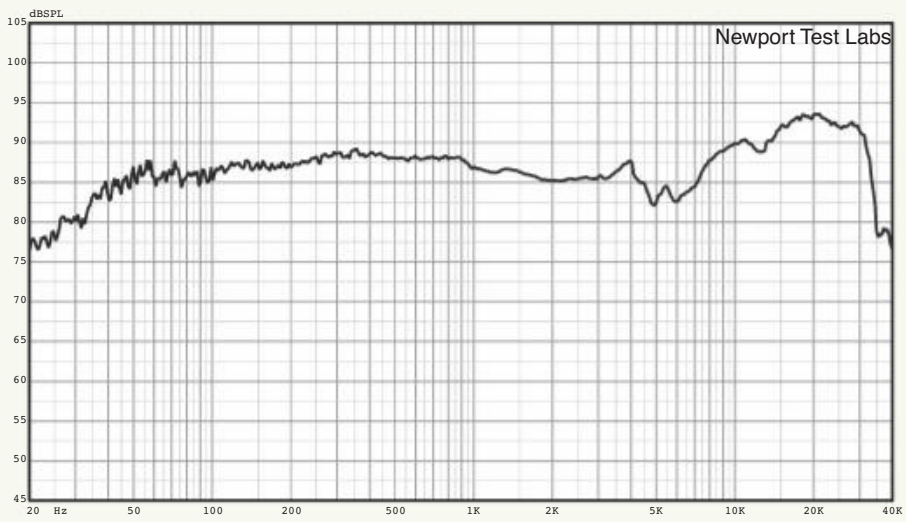
Graph 2: High-frequency response, expanded view, with grille (red trace) and without grille (black trace). Test stimulus gated sine. Microphone placed at one metre on-axis with dome tweeter. Lower measurement limit 500Hz.



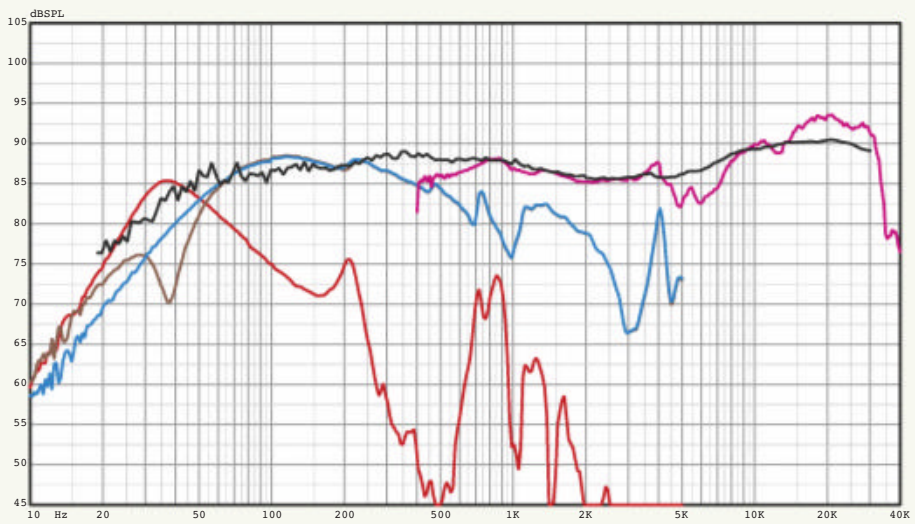
Graph 3: Low frequency response of front-firing bass reflex port (red trace) and woofer with open bass reflex port (black) and with port blocked (green trace). Nearfield acquisition. Port/woofer levels not compensated for differences in radiating areas.



Graph 4: Impedance modulus with reflex port open (black trace) and blocked (red trace) plus phase (blue trace).



Graph 5: Frequency response. Trace below 800Hz 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 800Hz) to the gated high-frequency response from 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 600Hz. Black trace is averaged in-room pink noise response (from Graph 1).

Although Richter rates the nominal impedance of the Harlequin S6 as 6Ω, Graph 4 shows that it's been given this rating primarily because the minimum specified impedance is 4.6Ω, and this is exactly what Newport Test Labs measured. Richter should probably also have specified the frequency at which it reaches the 4.6Ω minimum (it's at 160Hz) but full marks for specifying a minimum at all (since so few manufacturers do and they all should), and extra bonus points for being realistic about the nominal impedance. (You can see that the impedance actually falls below 4.5Ω below 12Hz, but impedance is usually measured—and stated—only across a 20Hz to 20kHz bandwidth.

In addition to showing the impedance of a speaker, Graph 4 also shows cabinet and other resonances and you can see very small ones at 200Hz, 280Hz, 700Hz and 14kHz. Although the impedance falls above the crossover frequency (at around 3kHz), it's still a little above 5Ω at 20kHz and rises above 25kHz, which means amplifiers will be happy to drive them, not matter what Class the output stage might be—from Class-A right through to Class-G, but most importantly with Class-D amplifiers. Amplifiers will also be happy driving the Harlequin S6 speakers, because the phase angles are controlled and at phase angles of ±45 degrees their impedance is always 6Ω or higher.

The Harlequin S6's fairly large cabinet volume means that it's more efficient than I would normally expect for a two-way design, with Newport Test Labs reporting a sensitivity of 87dBSPL at 1 metre for 2.83Veq input. Although this is an excellent result, it is a little lower than Richter's claim for 88.5dBSPL.

As for the overall frequency response of the Richter Harlequin S6, Newport Test Labs put it at 38Hz to 33kHz ±3dB. ***Steve Holding***

PODCASTING... FOR FUN AND FOR PROFIT

If you're going to start recording your thoughts for posterity, the benefit of your children or simply to amuse your friends and family, podcasting is a great way to do it. You might also make a few bucks along the way.

But what's a podcast? According to that modern font of knowledge, Wikipedia: "A podcast is an episodic series of spoken word digital audio files that a user can download to a personal device for easy listening. Streaming applications and podcasting services provide a convenient and integrated way to manage a personal consumption queue across many podcast sources and playback devices." Wikepedia then expands further on the topic: "A podcast series usually features one or more recurring hosts engaged in a discussion about a particular topic or current event. Discussion and content within a podcast can range from carefully scripted to completely improvised. Podcasts combine elaborate and artistic sound production with thematic concerns ranging from scientific research to slice-of-life journalism."

But what would Wikipedia know? I rather prefer the explanation on a website that is actually dedicated to podcasting—www.thepodcasthost.com—which says: "Simply put, a podcast is an audio program, just like *Talk Radio*, but you subscribe to it on your smartphone and listen to it whenever you like. In a little more detail, a podcast is a series of spoken word audio episodes, all focused on a particular topic or theme, like cycling or start-ups. You can subscribe to the show with an app on your phone and listen to episodes whenever you like on your headphones, in the car or through speakers."

The podcasthost site even has a podcast telling you what a podcast is. You can listen to it here: *www.tinyurl.com/hifipodcast*

But if you'd like my description of it, a podcast is simply an old-fashioned audio recording that's available for listening and/or download from the internet.

So how do you go about making a podcast (or series of podcasts!)?

First, you'll need some hardware as well as some software, in the form of a DAW.

PODCASTING HARDWARE

The hardware you need is nothing more than a decent microphone (or two if you're planning on doing any interviews, being one for you and the other for your interviewee). There are many great podcasting microphones out there, some of the best of which are made in Australia by our very own Aussie company RØDE, whose founder, Peter Freedman, recently purchased Donald Bradman's first baggy green test cap for $450,000 (something of a snip considering he previously paid $9 million for a guitar used by Nirvana front man Kurt Cobain.)

There are a number of RØDE microphones suitable for podcasting. The first is the RØDE Podcaster (the model name says it all, really) which is a specialist dynamic microphone with a cardioid polar pattern with both a headphone output and a USB output that has been specially designed for podcasting applications. It has an RRP of $345 but can usually be found in-store for around $299.

The RØDE Procaster ($250) is a specialist dynamic vocal mic with a cardioid polar pattern that has a standard professional XLR line output, meaning that you'll need to buy an XLR to mini-jack lead if you want to plug it directly into your computer. Otherwise, you'll need a USB audio interface of some kind, in which case I'd recommend a Focusrite Scarlett 2i2 (3rd Gen), which retails for around $300.

If these prices are making your eyes glaze over, you might like to consider RØDE's brand-new RODE NT-USB Mini ($149).

Other microphones you might like to consider are the Blue Microphones Yeti USB, a condenser microphone with a switchable polar pattern (cardioid, bidirectional and omnidirectional) that retails for around $200 and the Mackie EM-USB Condenser Microphone, which retails for $389.

If you plan on using only a single microphone, one with a USB output will be

Can you make money from podcasting? Absolutely! Some podcasters earn more than a million dollars per year.

Beringer's Xenyx 802 mixer is just a simple, low-cost microphone/line mixer. The two Zoom models, the PodTrak P4 and P8, are sophisticated mic/line mixers that can also record and act as USB audio interfaces.

the simplest and most fuss-free initially, but if you think you will be using two microphones, or even three, four, or more, buying microphones with XLR outputs will future-proof your podcasting set-up. Although you can mix the outputs from multiple USB microphones, it's preferable to mix mic outputs in the analogue domain.

If you are using more than one microphone you'll need either a USB audio interface with more than one input (the Scarlett 2i2 will let you connect and adjust the volume of two microphones) or a dedicated microphone mixer. A Behringer Xenyx 802 8-Input Mic/Line mixer will set you back around $129. These two units can be used in conjunction with each other.

If you think you might like to take your podcasting project outdoors, or be easily set up at some remote location, you might like to consider a really great little portable mixer/recorder from Zoom, called the PodTrak P4.

As the name suggests, the PodTrak P4 is both a mixer and a audio recorder, but it's also a 2-in, 2-out USB audio interface. And as well as being able to mix the outputs from four microphones, it can also link to your mobile phone, so if one interviewee is remote, you can mix their voice in with the output from the local microphones. Amazingly, given all its features and the battery-powered portability, the Zoom PodTrak P4 sells for around $355. Zoom also has a large, full-featured 8-channel professional desktop mixer in its catalogue, the PodTrak P8, which sells for $829.

Whatever microphone/s you end up buying, don't forget that you will need connecting leads and microphone stands. Although many microphones come with a simple desk stand, it's far better to use a boom stand, as this will allow you to position the microphone in such a way that you'll get uniform volume levels and maximal signal-to-noise ratios.

You'll also need that essential item used by all professionals—a 'pop' screen for each of your microphones.

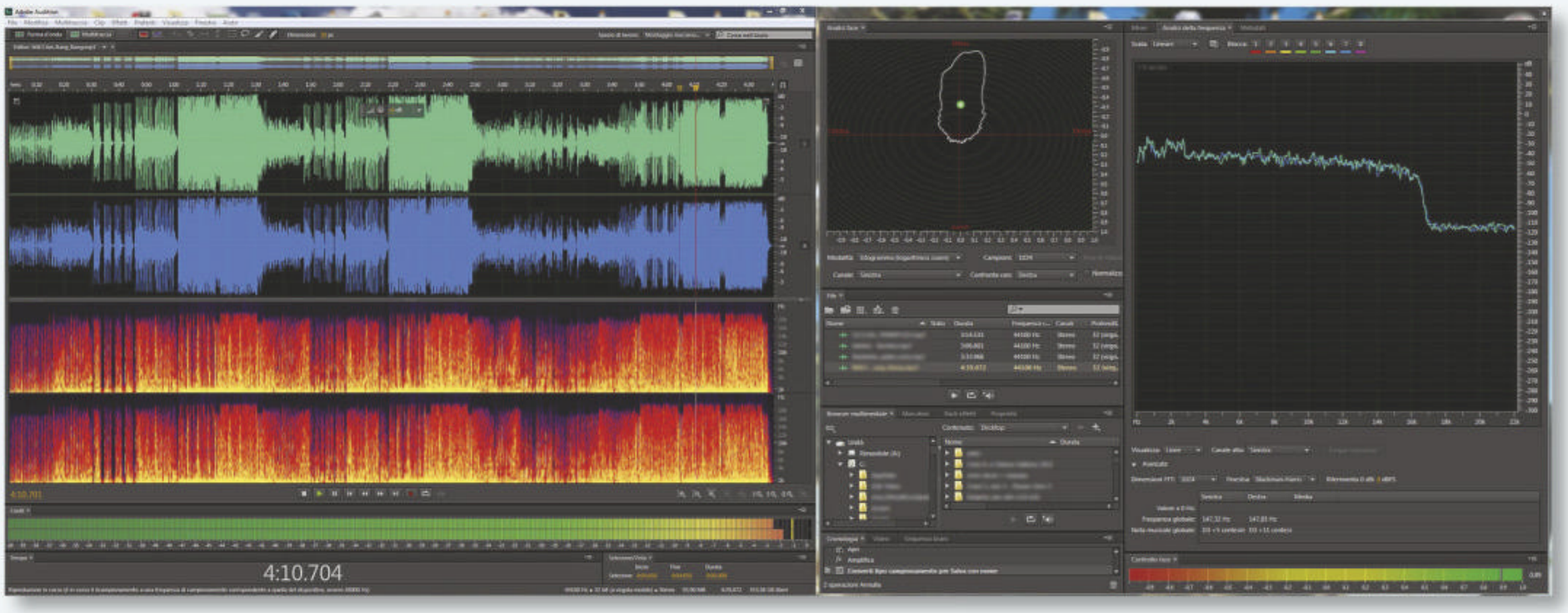
Pop screens not only reduce the 'pop' sounds that are inevitable when you and your interviewees use words starting with the letter 'p' but will also reduce this hiss of sibilances (when speaking words beginning with the letter 's'). On a practical level, they will protect your microphone from sprays of saliva! Mackie's PF-100 Pop Screen will fit a wide range of microphones.

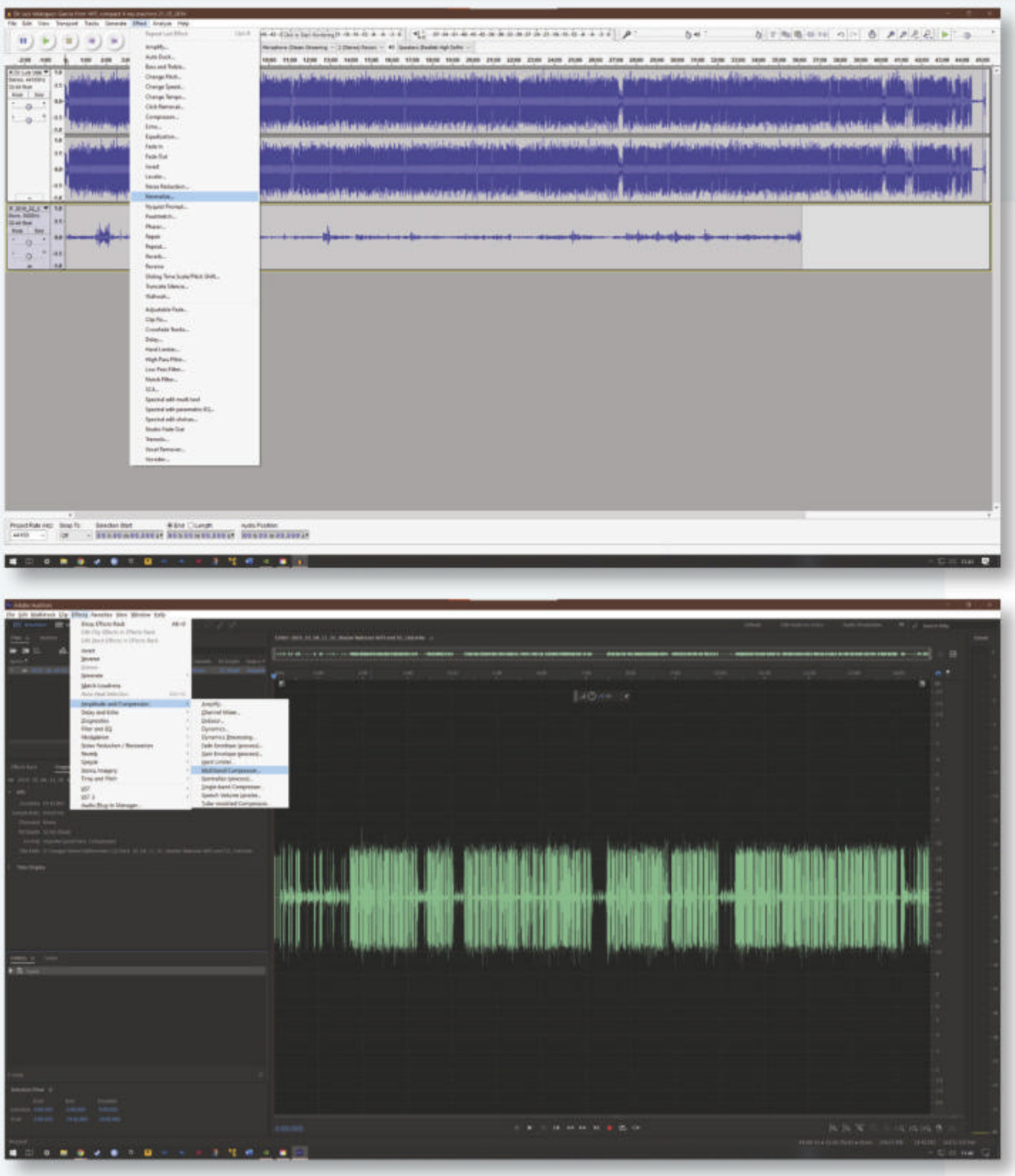
PODCASTING SOFTWARE

As well as a microphone or two, you're also going to need a piece of software to record your podcast and edit it into shape. While there are as many software applications (often referred to as Digital Audio Workstations, or DAWS) made to help with podcasts as there are microphones, I am only going to refer to two of most popular—Audacity and Audition. Other popular programs include Hindenburg Journalist ($139), Logic Pro X ($199) and Steinberg Cubase Elements 10.5 ($149) as well as Alitu and GarageBand (both free) plus lite versions of DAWs that ship bundled with hardware, as in the next paragraph.

Microphones come in all different shapes and sizes, and offer different connectivities. You'll also need microphone stands and cables, and perhaps a USB Audio Interface, such as the Focusrite Scarlett 2i2.

PODCASTING FOR FUN AND PROFIT





There are as many software applications (often referred to as Digital Audio Workstations, or DAWS) made to help with podcasts as there are microphones. Find the one that best suits not only your budget, but also the one that you find the easiest and most intuitive to use, and make sure it has the features you want.

AUDACITY vs AUDITION

Audacity is a free DAW created by a team of volunteers whereas Audition is a part of Adobe's Creative Cloud and costs money. Both are multi-track audio recorders with editing functions, but whereas Audition is focused on podcast creation, Audacity attempts to be a bit more of a general-purpose audio solution. Being commercial software, Audition has the more polished, professional interface, but this means it comes with a steeper learning curve than Audacity, which has a less polished interface, but a less-steep learning curve.

Selecting your mic input and beginning to record in Audacity is simplicity itself. It also enables you to import an existing recording and record a new track alongside it, as well as starting new tracks automatically when you stop recording and start again.

In Audition, you need to choose multi-track recording from the toolbar. Audition does, however, make it easier to record the input from different microphones onto different tracks simultaneously—something that's not possible in Audacity, though it depends on driver support.

If you are recording a round-table discussion with multiple mics and participants, Audition is the way to go, as you'll find mixing and editing much easier later on. Audition also shows stronger performance than Audacity when it comes to actually putting your podcast episode together.

Adobe's Audition uses a non-destructive editing approach similar to its video-editing programs, which means you can always go back to the media bin and replay bits of audio you'd already cut out. The downside of this is larger file sizes, but modern hard drives should have no problem coping.

If you are going to buy a USB audio interface, you should be made aware that most now come bundled with audio editing software that is perfectly suitable for podcasting (and more). The Scarlett 2i2 comes with both Ableton Live Lite and Pro Tools | First.

These 'free' software inclusions are mostly stripped-down versions of more full-featured packages that are available for sale, but they're usually not otherwise separately available in their stripped-down version. The idea is that you become familiar with the stripped-down version and upgrade to the full-featured paid version. However, despite being stripped down, these 'lite' versions will have all the tools you'll need to create a professional podcast.

Audacity offers the option of creating copies of your recordings before you start to edit (an option you should always choose!) but it remains that you are editing in a destructive manner, with no way of getting back what you've cut without using the unlimited undo/redo feature or re-importing the audio from backups as a new track.

Mixing, particularly the equalisation, limiting, and normalisation processes used to ensure that the various different people who are speaking sound like they were recorded in the same room at the same time even if they weren't, is portrayed using a skeuomorphic mixing desk metaphor in both DAWs, with Audacity showing a waveform that represents your audio, with a number of sliders underneath to adjust the tone. Audition's interface is roughly the same, but dispenses with the waveform.

There are presets in both DAWs, and Audition's are probably more useful than Audacity's — those in the latter are aimed at re-creating the sounds of voices on the telephone or broadcast on radio.

Normalisation — the process of limiting the volume of the loudest parts of multiple tracks so they sound more alike — sees both DAWs take a similar approach, with a hard limiter that clips the peaks. Audition's is easier to use than Audacity's, however, and the same is true of its noise reduction process, which cuts out any hiss in the background.

The way both DAWs (all DAWs with noise reduction, actually) address the process of noise reduction is to take a few seconds of silent recording and subtract this from the main tracks, but Audition has a clever adaptive system that analyses files in a way that gives better results.

FOOTPRINTS

A great thing about Audacity is that it's very light in terms of its hardware footprint. Whereas Audition will only run on a 64-bit version of Windows 10 with a 1080p display, Audacity will run well on pretty-much any modern-ish PC. There's also nothing to say that you can't use both programs to produce your podcast.

If you can inspire one person, that's gratifying. If you can inspire 100,000 people, you're on your way to being a millionaire.

I came across a Reddit thread in which one user wrote that he used Audacity to record and Audition to mix and edit, as that's where the DAWs' different strengths lie. Audacity is simpler, and what it lacks in options it makes up for with a clearer interface. But if Audacity can do something, then Audition probably does it too… only slightly better.

Adobe also has features exclusive to it, as you'd expect for something you pay a monthly fee for, one such being able to export as an MP3 file. For copyright reasons Audacity doesn't support this process natively, you have to install a (free) external encoder.

As there are other podcasting software programs you might be considering, as I've already discussed, a reminder to make certain that any program you're considering will run on your computer. Any program you're looking at will advise the minimum processing and memory requirements required to run it, but in the end, if you are podcasting, it's best to be running your software on a fast computer with a current operating system.

FINAL DAW CHOICES

If you're creating podcasts all day, every day, then Adobe's Audition is definitely the way to go. But if you are going to pay for a professional package, I would strongly suggest you first at least try out demo versions of Hindenburg Journalist (or Journalist Pro), Ableton Live 10 (or Live 10 Pro) and Pro Tools (or Pro Tools Ultimate) to see if one suits you better than another. You should also factor in that Hindenburg Journalist ($139) and Ableton Live 10 ($110) are once-only costs whereas the other programs require either continuing monthly or yearly subscriptions or, in the case of Pro Tools, payment of a 'perpetual' licence fee of around $1,000.

But if you'd rather not pay for your software, why not go with Audacity or Alitu, or one of the 'lite' versions of the various professional programs already mentioned? And of course if you're not sure what features and options you might need before you shell out your hard-earned, the very best way to find out is to start honing your recording and production skills first, and leave making a final decision as to which software package will be best for you until some later time.

PODCASTING FOR PROFIT

Can you make money from podcasting? Absolutely!

Timothy Ferriss is a famous American entrepreneur, investor, author… and podcaster. His five books are all best-sellers, yet he says his podcast (The Tim Ferriss Show) makes him more money than the royalties from the sales of all five combined. He doesn't say exactly how much money his podcasts make, but he charges his advertisers $US60 for one thousand impressions (CPM) and he claims 500,000 downloads per episode. So the math is 500,000 downloads × $US60 CPM × 2 ads = $US60,000 per episode. And, since he puts out episodes weekly, that works out to be about $US3 million per year. What are his podcasts about? You can find out by listening, but primarily they're about personal development and methods of making money(!) but he also does podcasts revealing the morning routines and meditation habits of celebrities and famous sportspeople.

Pat Flynn is an architect-turned-entrepreneur who has two podcasts. One, called 'Ask Pat' has sponsorships that earn him around $US4,000 per episode. His other podcast, called 'Smart Passive Income', is all about telling you how to start your own business. This one doesn't have adverts. Instead, he uses what are called 'affiliate links' to direct his listeners to companies that sell the products or services he recommends. Whenever you click on an affiliate link, he makes money. If you then purchase something via the affiliate link, he gets a percentage of the sale price. This little earner brings him in more than $US1.5 million dollars per year!

However, although you can make money from podcasting, the fact is that you probably won't, because numerous experts state that when you look closely at the figures, more than 90 per cent of podcasting ventures run at a loss. This is because even if you don't charge for your time in creating the podcast, or the time it takes to sign up an advertiser or three, you will still need to pay a fee for your podcast to be hosted, and the money you make may not cover even that.

Although you can make money if your podcast takes off, podcasting professionals advise that you shouldn't even think about quitting your day job until each of your podcast episodes is being downloaded at least 40,000 times. This figure sounds daunting in itself, but becomes even more so when you consider that the average podcast is downloaded fewer than 150 times per episode. That said, if you earn even twenty cents for each episode, that works out at around $120 a month, which is not to be sneezed at.

But really, podcasting shouldn't be about the money. It should be about telling somebody about someone or something you're passionate about, and hopefully inspiring that same passion in some other person somewhere on the planet.

If you can inspire just one person, that's gratifying. And if you can inspire one hundred people, that's a job well done. But if you can inspire 100,000 people, well then you're on your way to being a millionaire.

NEXT ISSUE: WE LOOK AT HOW TO GO ABOUT CREATING AND PUBLISHING YOUR FIRST PODCAST.

Q ACOUSTICS QB12

SUBWOOFER

Q Acoustics' newest powered subwoofer, the QB12, is the first to use a 305mm diameter bass driver, and was specifically designed to integrate with Q Acoustics' 3000i series speakers, but its design and performance are such that you'll be able to use it in partnership with speakers from any other manufacturer… and to great advantage.

THE EQUIPMENT

When I first unpacked the Q Acoustics QB12, I'd done so by upending the carton on a soft rug, so that when I removed the cloth that protects the finish (four finishes are available, about which more later) I was more than a little taken aback to see that there was a fairly rough-cut hole in the bottom of the cabinet around the size of a 20-cent piece. I could not imagine what this hole might be for, but it seemed mighty strange to find on a subwoofer that retails for $1,449.

Since I was looking at the base of the cabinet I thought I would check out the feet while I was there, and discovered that Q Acoustics has been very clever, because what I initially thought were ordinary rubber feet turned out to be rubber 'cups' that fit snugly over four chromium plated spiked feet, so you could use the spikes on carpeted floor and fit the rubber cups to use the QB12 on polished wooden floors.

Once I'd placed the QB12 on those feet, I looked at the back of it and was again a bit surprised to see just two rotary controls, one for volume and the other for crossover frequency selection, both of which were almost completely recessed into a metal plate. Slightly above and midway between these two controls was a chameleon power LED. It was only when I removed this plate (easily done, because it's held in place only by magnets), that I was able to see what that hole in the bottom of the subwoofer was for, because removing the plate revealed a rather large rectangularly-shaped recess behind it, inside which was a two-pin socket for a 240V mains power lead fitted with a Figure 8 mains power connector.

So what you do is feed the 240V mains power lead up through the hole in the bottom of the subwoofer—along with the audio signal cables—and because that means there are no wires coming out of the back of the cabinet, you will be able to push it right back against a rear wall. And, if the cabinet is sited somewhere in your room that the back of it can be seen, it will be nice and tidy, with no visible wiring. If you'd prefer not to run your signal wires alongside your mains cable, there's a small cut-out in the bottom of the plate covering the recess that is large enough for two signal wires.

In addition to the mains power socket, the rectangular recess also has a pair of RCA sockets for signal input (left and right, but the left input can be used to feed in an LFE signal), a mains power rocker switch, a two-way switch to choose whether you'd prefer the subwoofer to be permanently 'on' or switch on when it detects an audio signal and switch itself off after a period during which no audio signals had been detected, and a two-way phase switch (0/180°).

Q Acoustics rates the diameter of the QB12's front-facing bass driver at 305mm but this is overall diameter of the basket. The diameter that really matters when it comes to evaluating the driver's ability to deliver deep bass is the Thiele/Small diameter, which is what Q Acoustics' engineers would have used to derive the piston area of the driver, and is the distance across the driver from the mid-point on the roll surround to the same point on the opposite side of the driver, and in this case I measured it as 245mm, which gives a piston area (Sd) of 472cm². As you might have guessed from the substantial difference between the overall diameter and the T/S diameter, the driver's roll surround (which is made of rubber, rather than the more perishable foam) is quite large, presumably to enable the greatest driver excursion. The driver itself is made from paper, but the dustcap, which is made from plastic, is so large (140mm in diameter) that its surface area (at 154cm²) is almost one quarter of the total area. The diameter of the dustcap does not reflect that of the voice coil, which is much smaller, at just 50mm. Although it is possible to remove the QB12's grille, I would not recommend you try, because Q Acoustics has made it extremely difficult to do by way of fixing it to the front baffle using 12 steel pegs, which is around eight more than would usually be used to attach a grille. It can be done, but you run the risk of damaging either the cabinet or the grille, or both.

The amplifier powering the QB12's bass driver is a Texas Instruments TPA3255 Class-D monolithic device that's actually a stereo amplifier that can be bridged for mono operation. Texas Instruments' own specifications put its mono power output at 480-watts into 2Ω, so since Q Acoustics is claiming an output of 220-watts we can deduce that the impedance of the QB12's driver is 4Ω. Like most monolithic devices, the TPA3255 has the full gamut of self-protection circuits built in to guard against under-voltage, over-temperature, clipping, and short circuits, amongst others, plus it also has d.c. protection to protect the driver. Unlike most monolithic devices, the TPA3255 has extremely low distortion, with Texas Instruments rating it as being less than 0.006% at low power output levels and still less than 0.01% just below clipping. It's also a very low-noise device, with an A-weighted signal-to-noise ratio ratio of 111 dB. These outstanding performance figures would suggest that it's probably a little over-specified for use as a subwoofer amplifier, but Q Acoustics is obviously going all-out for best performance.

Although the TPA3255 is a very efficient Class-D device, and thus generates nowhere near the same amount of heat as a Class-AB amplifier would, it and the fairly complex power supplies required to operate it do create a certain amount of heat and, since the QB12's cabinet is completely sealed, Q Acoustics has fitted them to a very nice custom die-cast aluminium plate on the rear panel that acts as a heat sink to dissipate this.

As you should be able to see from our photographs—and you will see for yourself in the flesh—it's a far better-looking plate than most such rear-panel amplifier plates.

The QB12's cabinet is beautifully built, with curved edges and a total weight of 21.5kg.

As I said previously, the QB12 is available in four different finishes: black or white vinyl finishes or black or white gloss painted versions. The vinyl editions cost $1,499 (a price recently reduced as a result of a change in the Australian distribution for Q Acoustics).

I was amazed to learn that there's no price premium for either of the gloss painted finishes—they're exactly the same price as the vinyl versions. I have seen the white gloss version of the QB12, and it's certainly a premium finish, beautifully done. What may surprise you is that the vinyl versions also look great… the standard of the finish is much higher than you'd expect for vinyl. My review sample was finished in black vinyl, and I was impressed that the vinyl is stippled in such a way that it has very low reflectivity, and also by the fact that it's very easy to clean (don't ask!) and doesn't show marks (again don't ask!). The fact that the corners are rounded means that unlike rectangular-edged vinyl cabinets, the vinyl will never 'peel' or fracture at the corners.

As well as looking beautiful, the QB12's cabinet is also not particularly large—particularly when you consider that it's a sealed enclosure, rather than the more usual bass-reflex design. The fact that at 400×400×446mm (HWD) it's also almost a cube makes it a most attractive proposition for unobtrusive placement in even the smallest room.

The advantages of not having a bass reflex port are many, and include greater flexibility for room positioning (particularly since the cabinet can be pushed back against a wall) and also that it makes the subwoofer easier

to build into a cabinet, recess into a soffit, or simply hide underneath or behind an item of furniture. There's also the not-inconsiderable advantage that whereas small creatures have been known to make their home inside bass reflex subwoofer cabinets (using the port as a means of ingress and egress), this is clearly impossible with a sealed enclosure such as that of the QB12.

IN USE AND PERFORMANCE

You can own the best and most powerful subwoofer in the world, but if you put it in the wrong place in your room, it's not going to work well at all. It's like that mantra that real estate salespeople are fond of quoting: "It's all about position, position, position".

As a very first step, this means what you will have to do is place the subwoofer where your head would normally be when you're listening to music (and/or watching the screen).
I appreciate this may mean some creative use of stacked milk crates and/or furniture items, and the temporary moving-aside of the seat or couch you would normally be sitting on, but it's worth it. Once the subwoofer is in place in this exact position, connect it to your system (you will need a long RCA–RCA lead, which you can either buy or borrow from your friendly local audio store), after which you should start playing a music track with plenty of low bass. Turn up the volume of the subwoofer a little higher than normal, so you'll be ready for the next step.

The next step is to start crawling around the floor (and no, I am not joking) with some white electrical tape in your hand. As you crawl around, you'll hear the bass alternately get stronger and weaker… in fact at some points in the room the bass might be so weak that you will barely be able to hear it at all. Mark all the spots where the sound is strong by sticking some white tape to the carpet. Once you have covered the entire floor area, your carpet should be littered with bits of white tape. For best sound, you then place the subwoofer on the bit of tape that's roughly equidistant from your main speakers and you're done. If this position is aesthetically unappealing to you or your better half, choose the next closest position, and if this isn't OK, then the next, and so on. Ultimately, so long as the subwoofer is positioned over a piece of tape you'll get good sound from it, but the further it is from the main speakers the less well-integrated its sound will be in relation to those speakers.

Once you have positioned the subwoofer, it's then time to tune the sound using the volume and crossover controls. I've never seen anyone do this successfully by ear, so it's best to use test equipment, though in this case that test equipment will be nothing more complex than a special audio test track (from a CD or a digital copy of that track) and an ordinary mobile phone onto which you've loaded a low-cost spectrum analyser app. The calibration process is quick and easy, even if you're non-technical, but it's a little too long-winded to go into in this review, so you'll find all the information about how to go about it here: *www.tinyurl.com/sub-cal*

Having already established the best place for a subwoofer in the three differently-sized rooms I use for reviewing I didn't have to do the crawl-around, but I did have to do the volume/crossover calibration and during the calibration process I realised the performance of the Q Acoustics SB12 was pretty special because it went so smoothly, was so easy to do, and returned absolutely fabulous measured results in all three rooms, so I was expecting great things even before I'd played my first bar of music.

However, as fate would have it, my first experience of the sound of the Q Acoustics QB12 was with a movie, and I have to report that the QB12 smashed through the action like a steam train, hitting me right in the stomach and taking my whole body along with it. What we have here is a subwoofer that can realistically deliver the deep bass component of the explosions, the high-speed crashes, the intergalactic space battles (even those these would actually be completely silent due to taking place in a vacuum, but let's not bring reality into this) and all the deep bass sounds that make action movies so thrilling to watch… in other words, the Q Acoustics

It's been too recently released to have won any awards yet, but I have absolutely no doubt it will win a great many in the very near future

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QB12 lets you hear—and feel—the action as if you were there.

But the QB12 isn't all about brute force, just as all movies aren't action; it's also about precise, detailed and really rather dynamic sound, so you can quite happily while away a few hours watching a regency costume drama and barely notice that the QB12 is even there, except to realise that the lower-pitched instruments in an orchestral score are being reproduced rather well, with a fullness and richness you may not previously have experienced. Indeed it's quite instructive to watch a drama with the QB12 switched on, then watch the same movie all over again with it switched off. Do this and you'll find that even ordinary sounds, such as footsteps on wooden floors, doors closing, and everyday background sounds, such as city traffic noises, have low-frequency sound components whose sonic authenticity is enhanced by using a subwoofer that can deliver them realistically.

When I finally did get around to playing music I was even more impressed by the performance of the Q Acoustics QB12. It's very fast and very tuneful. If ever a subwoofer were blessed with pace, rhythm and timing, it's most certainly the QB12. The pitching is perfect, with no doubling, so you can instantly hear the exact pitch when a double-bass is bowed or plucked, or an electric bass string is hammered. Notes that are closely spaced in pitch are also easily distinguished—there's no blurring of sounds that are close in frequency and/or time to each other. Level accuracy is also outstandingly good. Playing a test track I regularly use that consists simply of a sequence of ascending notes on a piano—a chromatic scale—proved to me without any shadow of a doubt that the Q Acoustics QB12 was reproducing each note at exactly the same volume, from the very lowest note on the piano keyboard to the highest before the QB12's frequency response started rolling off, which was just a bit below middle C.

This high-frequency extension was rather more than I was expecting from a subwoofer, so it would appear that Q Acoustics has specifically designed the QB12 so that it will integrate well even with the smallest bookshelf/standmount speakers in its range, which means that it will also integrate well with small models from other loudspeaker manufacturers. I was even able to achieve excellent integration with a tiny pair of completely waterproof speakers that I use when I am playing music outdoors in my garden.

Because of the linearity and extension of the bass, the very deepest bass was very slightly curtailed, but not so you'd notice. It's certainly more than sufficient to deliver a noticeable downwards extension of the bass from any pair of floor-standing loudspeakers selling for under $20,000 or so. Just wind the crossover back to 40Hz and prepare to be amazed at the overall improvement in the soundfield in your listening room.

The automatic on/off switching circuitry worked so well that I'd be happy to let it do all the work, and leave the QB12 switched on permanently. If you do this, my recently-acquired power usage meter showed that in standby mode, the QB12 draws only 0.66-watts. When the QB12 was switched on but not being used, the power consumption rose to 11.26-watts. When I was playing music, the power comsumption varied continuously, as you'd expect, but no matter how loudly I played, it never drew more than 30-watts.

CONCLUSION

I rather regretfully returned the Q Acoustics QB12 some months ago, yet I can say that I am still in awe of its performance, particularly given its relatively compact dimensions and its modest recommended retail price. And considering all these, along with its attractive design and the quality of its fit and finish, I can wholeheartedly recommend the Q Acoustics QB12 for either home theatre or home hi-fi use… or both. It's been too recently released to have won any awards yet, but I have absolutely no doubt it will win a great many in the very near future. *Scott Andrews*

CONTACT DETAILS

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Brand: Q Acoustics
Model: QB12
Price: $1,449 (RRP)
Warranty: Two Years
Distributor: Addicted To Audio
PO Box 352, Kew East, VIC 3102
T: 1300 888 602
W: www.busisoft.com.au

- Superbly linear
- Excellent frequency extension
- Powerful bass

- Two-position phase switch
- Crossover calibrations

Readers interested in a full technical appraisal of the performance of the Q Acoustics QB12 Subwoofer should continue on and read the LABORATORY TEST 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

In order to acquire the frequency responses shown in Graph 1, Newport Test Labs used a near-field microphone measurement technique that effectively returns the same response one would expect when measuring the QB12 in an anechoic chamber. The top (black) trace shows the Q Acoustics QB12 subwoofer's response with the crossover control in the AV position and you don't need me to tell you that it's flat. Indeed it's so flat that I'm sure that it's the flattest response that Newport Test Labs has ever measured from any subwoofer. So flat, indeed, that I would not be at all surprised to find that Q Acoustics was using DSP to help the bass driver deliver it.

As you can see from the scale at the left of the graph, the QB12's frequency response is within ±1.25dB all the way from 31Hz up to 210Hz. That's flat. Measured using more conventional dB criteria, this graph shows that Newport Test Labs' measured response was 26Hz to 230Hz ±3dB. The red trace on Graph 1 shows the QB12's frequency response when the crossover control is at its minimum setting (40Hz) and you can see that the QB12's maximum output is at exactly 35Hz, and it returns a frequency response of 23Hz to 58Hz ±3dB for this setting of the crossover control. Since the frequency response of most floorstanding speakers rolls off below 50Hz, this would be an ideal setting when paired with such speakers.

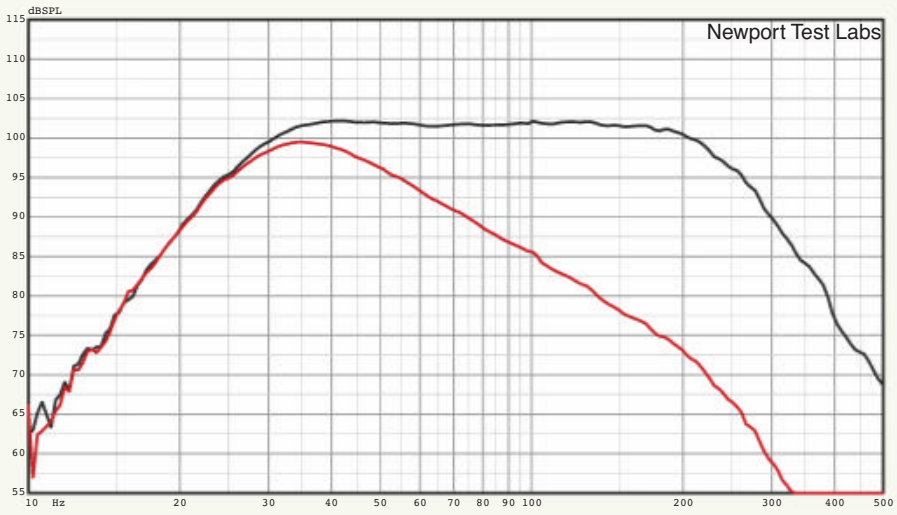
Graph 2 also shows the near-field frequency response of the Q Acoustics QB12, this time for multiple settings of the crossover control. I was a tad surprised at the lack of difference between the response in the AV setting versus the response with the crossover set to 130Hz.

In the AV setting the response is 6dB down at 230Hz, whereas with the crossover set to 130Hz, it's 6dB down at 220Hz. Looking at the huge difference in roll-offs between the 130Hz setting and the 100Hz setting, I suspect that the calibration of the crossover control isn't overly accurate in this area, and it may be that Q Acoustics has optimised the control to be more accurate at the lower-frequency segment of the control's rotation.

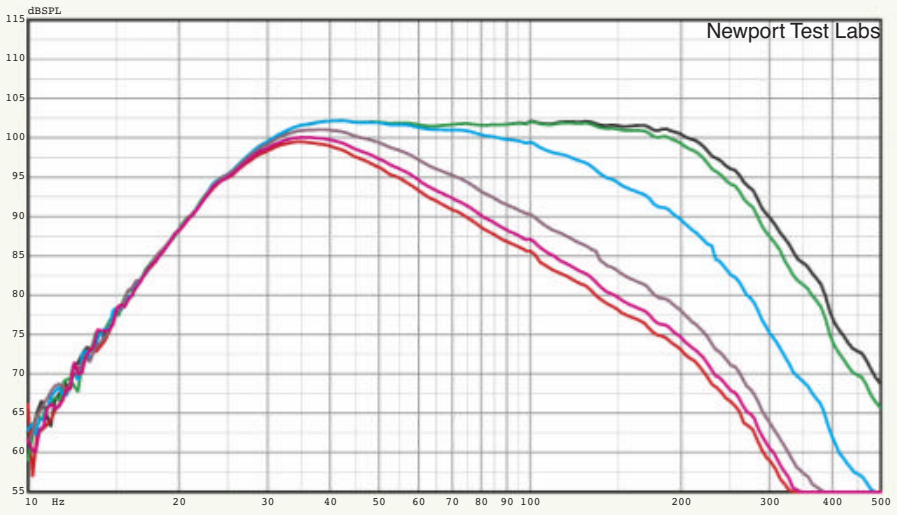
Looking at the 40Hz, 60Hz and 80Hz traces on Graph 2, which are all exactly where I would have expected them to be, I am pretty sure that I'm correct. Since the control is continuously variable, the slight inaccuracy at high frequencies is of no concern at all: it simply means that you will need to depend on your calibration technique to determine the correct setting of the crossover control if you have small bookshelf speakers. If you have floorstanding speakers, you could place more reliance on the calibrations marked on the control.

The final graph accompanying this test report shows the in-room frequency response of the Q Acoustics QB12 measured at listening distance, using a pink noise test signal, with the acquired traces having been smoothed via post-processing to one-third octave. The measured traces are not as flat as those acquired using the nearfield technique, because nearfield measurements measure only one single frequency at any given time, so a subwoofer's cone has the fairly simple task of reproducing just that single frequency. In this graph, the use of pink noise as a test stimulus means that the subwoofer's cone is required to deliver every single audio frequency in its pass-band simultaneously—something it would never be required to do in real-life—so it's effectively a 'worst case' scenario for the speaker. You can see that despite this, the QB12 yet again performed very well indeed. This time, it's the 40Hz response that's the best, because the driver is

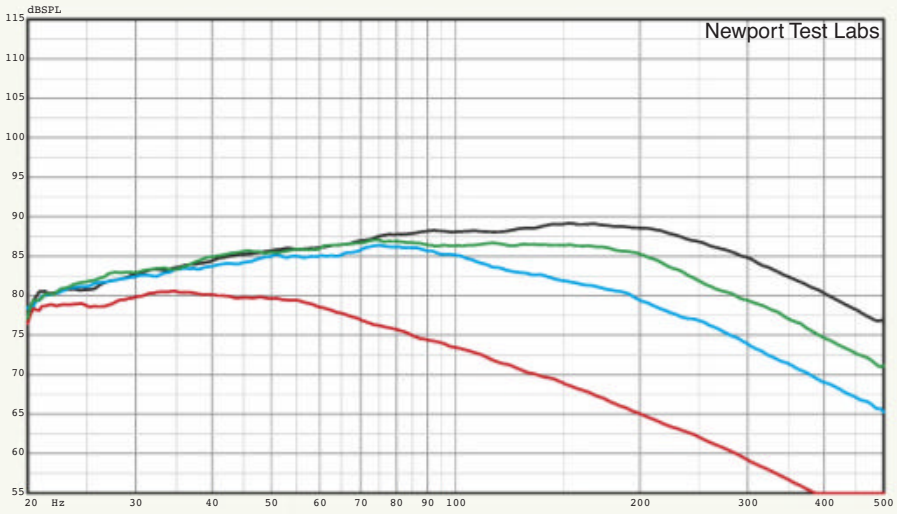
Graph 1. Nearfield frequency response with crossover set to maximum (AV, black trace) and minimum (40Hz, red trace).



Graph 2. Nearfield frequency response with crossover set to maximum (AV, black trace); 130Hz (green trace); 100Hz (blue trace); 80Hz (brown trace); 60Hz (purple trace) and minimum (40Hz, red trace).



Graph 3. In-room frequency response with crossover set to maximum (AV, black trace); approximately 120Hz (green trace), 100Hz (purple trace) and minimum (40Hz, red trace). Traces are the averaged result of nine individual frequency sweeps measured at three metres, using pink noise, with capture smoothed to one-third octave.



working the least hard with this test signal, as higher frequencies are being filtered out by the inbuilt crossover. You can see this enables the response to extend from 20Hz up to 85Hz ±3dB (and the 20Hz is actually the graphing limit… the QB12's response extends lower than 20Hz). The green trace shows the best extended high-frequency response that Newport Test Labs was able to measure. Although the graph caption suggests that this trace was acquired with the crossover set at 120Hz, there is no 120Hz calibration on the QB12's crossover, so this is just an approximation based on the settings to either side. As you can see, this '120Hz' trace extends from 26Hz to 240Hz ±3dB. Q Acoustics' specifications show the QB12's frequency 'range' at 28Hz to 300Hz.

Overall, Newport Test Labs' measurements prove that the performance of the Q Acoustics SB12 subwoofer is outstandingly good. This is a truly excellent design.

Steve Holding

▲ 'New heights of musicality, impeccable build, and great looks', said one reviewer of the NAD's ground-breaking M33. It also has Eigentakt Class-D technology inside!

EIGENTAKT

IS IT THE ULTIMATE CLASS-D AMPLIFIER TOPOLOGY?

There's a new amplification technology in town, which purports to take Class-D concepts to a new level, with negligible distortion, extraordinarily low noise, load-invariant response, exceptionally clean clipping, low losses and high efficiency, while delivering 400-watts of power without even getting hot. It comes from Purifi, in Denmark, which has named the technology 'Eigentakt', which is German for 'self-clocking'.

We'd exercise our usual caution with such remarkable claims, but what makes us more inclined towards credence in this case is NAD's rush to adopt it, and also the team that's behind it. The three listed co-founders of Purifi Audio are Bruno Putzeys, Lars Risbo and Peter Lyngdorf — a pretty illustrious trio.

MEET THE TEAM

Bruno Putzeys is a Belgian engineer who spent a decade at Philips working on switching amplifier technologies before striking out on his own with Hypex, also as a collaborator in Grimm and later as CTO with Kii Audio. NAD's adoption of Hypex's Universal Class-D amplification and Ncore revolutionised its amplifier range a decade ago, and for the last few years Ncore has been the go-to audiophile Class-D topology for many audiophile brands. Putzeys seems an entertaining individual beyond his audio prowess: his personal website is well worth a visit, where he describes his professional activities as "including most things audio, analogue hardware in particular."

▼ Purifi co-founder Lars Risbo (left) and Director Claus Neesgard, whose connections go back 20 years through Texas Instruments to Toccata Technology, and who together hold a raft of patents.

Eigentakt has raised the bar both technically and subjectively over Bruno Putzeys' previous Hypex Ncore Class-D designs. If there were any slight deficiencies in the sound of older Hypex Ncore designs they are now banished

"My first hobby is trying to be relaxed about being not at all good at my second hobby, which is trying to be zen about failing miserably at the first." Other posts include his formulation of a 'Quantum Theory of Female Vestimentary Preparedness', which states that "Teenage women preparing to go out will remain in an indeterminate state of readiness until observed, at which point the wave function instantly collapses into an immaculately dressed and quite stunning apparition."

Lars Risbo, meanwhile, first established his musical credentials as principal cellist of the Copenhagen Youth Symphonic Orchestra, going on to develop 'equibit' technology in his Danish company Toccata Technology, as used in the highly regarded TacT Millennium amp way back in 1999, this early 'digital amp' circuit gaining rare audiophile praise. He was also early in more carefully defining the technology to overcome the general disdain for 'digital' amplification, really being a powered DAC in which the signal remains digital all the way through to the point it exits to the speaker terminals, achieved by switching from a PCM bitstream to pulse-width modulation (PWM), although he notes that "the PCM-to-PWM process is the easy part — the power stage was the hard part", where the PWM is integrated at the output by switching a steady voltage.

Toccata was subsequently purchased by Texas Instruments in 2000, where Risbo started a project called 'SmartAmp' and went on to be elected a TI Fellow in 2012 and Audio CTO in 2013, now holding more than 30 patent 'families'. This connection has seen several other TI personnel come to work with Purifi. One of these is the company director Claus Neesgaard, who developed several core innovations in Class-D amplification for Toccata and went on to head TI's Audio DSP product line, leading the transition into streaming-based system solutions.

Also involved in the TacT amplifier was hi-fi luminary Peter Lyngdorf — also now a co-founder of Purifi. Lyngdorf brings his connections to the likes of DALI, Steinway Lyngdorf and the Hi Fi Klubben retail network, as well as a close relationship with NAD dating back almost to its earliest days.

Put these Purifi co-founders together and you have a team able to develop switching amplification at its highest level, to bring it to market, and to enjoy themselves in the process. The resulting Eigentakt module is small given its stated output of 400-watts, although it is notable that NAD, which adopted a version of the technology for its Masters series, the first model of which to use it was the M33, rates that model with a power output of 200-watts continuous, perhaps because the distortion characteristics of the module rise dramatically above 150-watts into eight ohms, reaching 1% THD+N, whereas below that the figures are astonishingly low: 0.00017% at 100-watts into eight ohms across the full audio spectrum, and output noise of just ~11.5µV A-weighted. Putzeys says the module has the frequency and phase response of a second-order Butterworth filter cornering at 60kHz, so very nearly 'linear phase' in the audio band. The quoted dynamic range for the module is 131dB, and its efficiency greater than 94%. Chunky heatsinks are not be required.

Another reason for the power discrepancy might well be that NAD says that it and Purify co-operated to adapt the Eigentakt circuitry it uses in NAD products to meet NAD's own signature design requirements, so although Eigentakt circuitry is at the core of the design, the circuitry in NAD amplifiers is different to modules used by other manufacturers using Eigentakt circuitry, as well as to the modules Purify is selling as kits (about which more later).

▲ Bruno Putzeys, the man behind Hypex Ncore, and 'bro-mance' collaborator with Lars Risbo on the new Purifi Eigentakt amplification.

THE SECRET OF EIGENTAKT

Eigentakt's secret, says Purifi, is the application of nonlinear control theory, with a "mathematically exact" optimisation of the feedback circuit that improves performance by at least an order of magnitude over existing implementations. The result is a large-signal self-oscillating amplifier which is extremely stable, has an output impedance below 65µΩ at 1kHz(!), and makes the impedance curve of the speaker irrelevant (though it is, of course, subject, to a minimum impedance requirement). There's also an immunity to noise from even simple

▼ March Audio's P451 monobloc design, the first Eigentakt amp available in Australia.

There's much more to NAD's M33 than just its Eigentakt Class-D output stage. It's also a pre-amp, a DAC, a streamer, has DIRAC on board, and BluOS, plus it's modular, so it can be updated in the future.

switched-mode power supplies, as well as a comprehensive protection system which makes it robust in operation and particularly easy to integrate into complete amplifier designs.

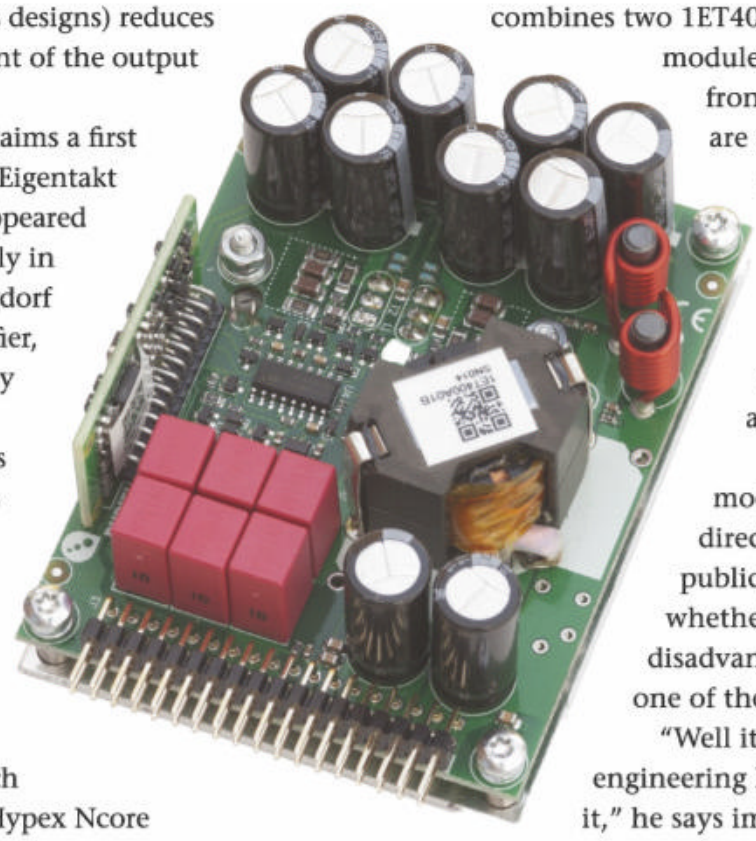
There's one particular development highlighted by Putzeys and Risbo (who admit to their 'bro-mance' being the spark which brought the new company into being), and that is best explained in a Q&A with the pair published by audiophilestyle.com, where Putzeys explains: "The only real surprise we had recently was to do with the output choke. Magnetic materials have something called hysteresis, but there is precious little information about what this really does. If you test a magnetic core with a sine wave, the distortion looks a little like soft clipping, perfectly benign. But what came out of tests on iron parts in loudspeakers was that hysteresis has a long-term memory, so you can get intermodulation between things that happen now and things that happened 10 minutes ago. With music, this distortion sounds like half correlated noise."

"Crackling," interjects Risbo. "You hear when each magnetic domain flips."

Eigentakt has a sweet extended high-frequency range with great power and definition and tightness in the bass

"When you put the coil inside the amplifier's feedback loop, that distortion gets reduced along with the distortion of the power stage and everything else," continues Putzeys. "We have a strong suspicion here that the most audible distortion in typical Class-D amplifiers may very well be that."

In the Eigentakt circuit, he says, the extreme amount of loop gain (about 75dB all the way to 20kHz, 20dB better than Putzeys' previous designs) reduces the sonic footprint of the output choke.



While NAD claims a first in the use of the Eigentakt module, it has appeared elsewhere, initially in a prototype Lyngdorf 8-channel amplifier, and more recently in amplifiers by Nord Acoustics as well as amplifiers sold by Australia's own March Audio, such as its P451 monobloc amplifier (which retails for $1,295). March Audio also uses Hypex Ncore modules in its P701 amplifier, but founder Alan March is clear about his preference. "The 1ET400A [Eigentakt] modules from Purifi have raised the bar both technically and subjectively over Bruno Putzeys' previous Hypex Ncore designs", he says. "If there were any slight deficiencies in the sound of older Hypex Ncore designs I think they are now banished. They have a sweet extended high frequency range with great power and definition and tightness in the bass. They are just neutral — but don't think for one minute that means clinical or unengaging. They just let the music through. Tremendous power output with low power consumption and cool running temperatures in a very compact format. What more do you need?"

EIGENTAKT DIY?

Purifi also sells its Eigentakt modules (as well as other of its Class-D modules) to the public, via its website and other suppliers, for those indivduals who prefer to build their own amplifiers (DIY). Its EVAL1 kit combines two 1ET400A amplifier modules and a stereo front-end board which are said to be "highly suited for DIY projects", for 4,700 Danish krone, which at current exchange rates, is around A$1,000. Because such modules are available direct to the general public, we asked March whether there were any disadvantages to building one of these kits.

"Well it's having the engineering knowledge behind it," he says immediately.

"Some of the OEM manufacturers do see it as a problem, but do-it-yourselfers are a different market. DIYers are going to DIY — I used to DIY. They're going to do what they're going to do, so they're not a customer you're going to lose. "And if you look at the total cost required to build an amplifier yourself, it's not economically worth it. We're charging not much above DIY prices, and for that you get a nice enclosure milled from a solid block of anodised aluminium that looks great, is professionally put together, and is fully tested and guaranteed for three years.

NAD

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VARIOUS ARTISTS
Living On The Hill [Esoteric]

Every country had a thriving 'underground' music scene in the 60s and 70s. This superb 3CD showcases the one in Denmark, which takes elements from American psychedelia, British blues rock and German krautrock, but is still its own thing. Young Flowers' Cream-esque groover *Overture/Take Warning* begins with an eerie space rock drone; Day Of Phoenix's *Wide Open N-Way* features a trippy, almost proto-techno mid-section; Alrune Rod's *Natskyggevej* broods and crashes in a credibly Floydian manner. But it's Burnin' Red Ivanhoe who make the greatest impression: *Ksilioy* sounds like Soft Machine jamming with Can plus Nik Turner on flute, while the brilliant *Jingle Jangle Man* could be The Man Who Sold The World-era Bowie backed by VdGG. The sound of Midnight Sun's *Living On The Hill* parallels Traffic, while Secret Oyster's *Fire And Water* offers a more refined take on Mahavishnu-style jazz-rock. Wonderful stuff.

BRIAN ENO
Film Music 1976–2020 [UME]

Brian Eno's music is perfect for the movies. The 17 songs here are just the tip of the iceberg, but what's clear is that, throughout those years, Eno's ear for evocative tones and timbres means that his work rarely sounds dated. There's a timeless quality to the earliest piece here — F*inal Sunset* from *Sebastiane* — and the lush ebb and flow of synth and piano on *Decline And Fall* from *O Nome da Morte* could have been recorded yesterday. Listen too, to the glitching, digital percussion of *Design As Reduction*, the classy electronica plus hard beats of *Reasonable Question* and the parping pseudo-bass of *Under*, which also features Eno's unvarnished vocal, highlighting what's one of the great English art school voices. Of course, no album of Eno's film work would be complete without the cosmic exotica of *Deep Blue Day* and *An Ending (Ascent)*, both originally composed for Apollo documentary *For All Mankind*, but repurposed widely ever since.

TEARS FOR FEARS
The Seeds Of Love [UMC]

Featuring a wealth of unreleased recordings, this 4CD+1BD box represents a truly jubilant celebration of Tears For Fears' original, chart-topping 1989 album. If The Seeds Of Love story is about two young men changing musical direction in the aftermath of global chart success, this expanded edition proves it's also about the creativity and talent of two women and their decisive contribution to making the record the classic it is. Oleta Adams' rich contralto radiates a degree of warmth and balm that was sometimes absent from Orzabal and Smith's overwrought emoting, while Nicky Holland guides TFF through the maze of choices and possibilities with the pearlescent thread of her keyboards as they inch their way to the finishing line. A high-stakes, high-wire act between artistic aspiration and integrity on the one hand and commercial, Platinum-friendly pay dirt on the other, this set is a triumph.

TREES
50th Anniversary Box Set [Fire]

Trees never achieved the commercial success that they clearly deserved having released two successful studio albums and shared bills with Genesis and Yes. This box set shows that Celia Humphris is an exceptional singer with stratospheric top notes, that lead guitarist Barry Clarke plays with attack and imagination, and that Unwin Brown's crisp stickwork is inspired. Also that their original material, mainly written by bass and keyboard player Bias Boshell, has a timeless feel. When Trees stretch out instrumentally on a 'live in the studio' first take of Cyril Tawney's *Sally Free And Easy* and the traditional *She Moved Thro' The Fair* they do veer towards psychedelia, particularly in the knotty and angular guitar interaction between Clarke and Dave Costa. Elsewhere you'll hear them taking liberties with the folk/rock form, particularly on *Lady Margaret.* As for the track *The Iron Is Hot*, decorated with harp and strings, it's one of Boshell's best.

RHINOCEROS
The Elektra Albums 1968–1970 [Esoteric]

Rhinoceros was assembled Monkees-style by hot-shot Elektra producer Paul Rothchild after his success with The Doors gave him *carte blanche* at the label. Rothchild brought together ex-members of Iron Butterfly, Daily Flash, Electric Flag, and the Mothers Of Invention. The band deftly straddled musical styles, fermenting US progressive rock, robust post-psych rock, strong dramatic ballads, and funky R&B vamps. Album 1 has organ-driven instrumental *Apricot Brandy, which* scraped into America's Top 50 and Rod Stewart loved *You're My Girl (I Don't Want To Discuss It)* enough to cover it. Album 2 saw them deliver gospel-flavoured ballads such as *Take My Hand* and *Don't Stop Crying* plus *Monkee Man*, *Top Of The Ladder* and *Back Door*, which are funky blues-rockers. Album 3 has the perennial ballads *Sweet, Nice N' High* and the atmospheric *Rain Child* as well as the heavier rock of *Lady Of Fortune*. Nice.

YES
The Royal Affair Tour [BMG]

Taken from their 2019 appearances at the Las Vegas Hard Rock Hotel, The Royal Affair Tour sees the Steve Howe-led Yes energised by an enthusiastic crowd, with only two overlaps (*Roundabout* and S*tarship Trooper*) with 2018's 50 Live. *Tempus Fugit*, *Going For The One*, and *Siberian Khatru* positively swing. Jon Davison leaves his imprint as lead singer, even if the similarities with Jon Anderson are marked; his version of *Onward* from Tormato works best, as it's not overly linked to his predecessor. It's also a deeply beautiful song. The inclusion of *Imagine* takes us back to the days when Yes covered Beatles songs. It left this writer with the idea that there's a Yes show to be staged one day, featuring a compendium of members' notable outside work in the first half and the group's greatest songs in the second. For now, though, The Royal Affair Tour sits in the top half of Yes' many live album releases.

PILLOW QUEENS

In Waiting [Awal]

With razor-sharp riffs, belting hooks and vocal runs drenched in emotional fury, this unforgivingly catchy and wickedly poignant debut is sure to make Pillow Queens an alt scene staple. This Irish quartet juggles atmospheric indie numbers and incandescent rock anthems with virtuosic aplomb, dipping and diving around varying notches of intensity so that the bigger jams feel earned and exciting, but the slower cuts never even border on boring. So too does this showcase the dizzying deftness of string-splitter Cathy McGuinness—whether she's ripping a thick, thunderous onslaught of volcanic distortion or a tight, temperamental emo strum, her work with the fretboard is always effortlessly enchanting. This is definitely one to crank up high.

THE FRONT BOTTOMS

In Sickness & In Flames [Atlantic Records]

This record is truly, utterly, uncontrollably off-the-rails. And it's golden. Sella's trademark beaten, scraggy and honeyed strum lingers around every corner, but it's rarely a track's focal point—choruses rein in deep, gravelly electric juts and vicious wallops of distortion, while mid-song detours throw wide, wailing feedback into the foreground for some added 'oomph'. *Montgomery Forever* and *Leaf Pile* are prime examples of Sella's big six-string moments, while cruisier jams such as *The Truth* and *Love At First Sight* embrace cooler, more summery acoustic melodies. One moment, it's all cutesy and chill—the next, you're hoping Sella's next therapy sesh isn't too far off. Altogether, LP5 is nigh-on an hour of a glowingly tight, stunningly dynamic and absolutely essential pop-rock.

POWDERFINGER

Unreleased (1998–2010) [Universal]

This album brings 40 minutes of previously unheard gold from Australia's most charismatically crushing rock titans. Fully intact is the emphatically youthful prickliness in Bernard Fanning's singing, the dry, unpolished grit in his voice carrying a wallop of character with every earnest line he belts out. The interplay between his and Darren Middleton's rugged and rough shredding feels beautifully authentic. You can really hear when a riff came about in the spur of the moment, or when there's a tinge of improv being weaved into a solo. It's not all squeaky clean or overly tight—it's fun, which is what defined Powderfinger at their strongest points. It's absolutely mind-boggling to think Powderfinger was just going to let these gems rot away in the vault. They offer some of the band's catchiest, liveliest and most all-out rockin' material. It feels like a 'greatest hits' CD from a parallel universe where each track was a platinum-selling single in its own right.

BILLIE JOE ARMSTRONG

No Fun Mondays [Reprise/Warner]

It's rare for an album of covers to rival any great artist's own work. But the effort Billie Joe Armstrong put into his 2020 lockdown project can't be understated. No matter how disparate the source material, Armstrong ties each track together with his big, soaring singalong voice and loveably gritty fretwork. You can hear how much fun he had dipping into his new-wave edge on *Kids In America* (Kim Wilde); when he hits the chorus on *Corpus Christi* (Avengers) you can tell how strongly he envisioned howling it out to a jam-packed stadium. Perhaps most importantly, though, Armstrong doesn't merely emulate his heroes (The Bangles/*Manic Monday*, John Lennon/*Give Me Some Truth*, Billy Brag/*A New England*, Starjets/War *Stories,* The Wonders/*Anything You Do,* The Equals/*Police On My Back*), on this tirelessly spirited love letter to them—he makes each song entirely his own, keeping the integrity of each intact while spinning them all through his own jammy and jovial punkabilly lens.

HACHIKU

I'll Probably Be Asleep [Milk!/Remote Control]

There's a gorgeous undercurrent of ethereality that ripples through Hachiku's endearing and dynamic (if a tad on the short side) debut. But it's crucial, here, not to mistake delicateness for simplicity: the soundscapes on display swell and soar with mountainous highs and harrowing lows—the focal point is always Anika Ostendorf's honeyed and heartfelt vocal melodies, but peer beyond and you'll see a forest of bustling musical foliage. One wonders if a debut album's track titles should include *You'll Probably Think This Song Is About You, A Portrait of the Artist as a Young Woman* and, of course the title track, but I guess all these 'borrowed' titles might simply be homage to her heros and heroines. Guitars simmer along with a warbly psych-rock warmth that beautifully accompanies the bright, glittery keys in the foreground; they're understated, but play their role perfectly. The chemistry can feel a bit kitschy at times, but that's part of the charm to Hachiku's vibe: it's supposed to be a little jagged around the edges, like a diamond necklace with a rusted chain.

NOVA TWINS

Who Are The Girls? [333 Wreckords Crew]

Who are the girls indeed? With the bite of Ecca Vandal, the energy of WAAX and the grit of DZ Deathrays, we admittedly thought the Nova Twins were Aussies at first. And we were bummed to learn they aren't, because we'd have done anything to catch the cuts on this rip-roaring debut—raw, spry and intense—in the flesh right now, though we guess that until Covid-19 goes away, we wouldn't have been able to catch them even if they were our local band. The Christmas/New Year lockdown sucked! Fans of our local punk output will adore this punchy and impassioned set of devilish dance-punk, from the speaker-throttling *Bullet* and mosh-ready *Play Fair* to the outright hypnotising *Ivory Tower*. Equally as poignant as the barbed vocal quips that Amy Love and Georgia South trade is the former's fretwork, grungy and punchy and almost dubstep-esque, each riff belted out with more energy than most hardcore bands could muster. It's hard not to envision a huge future ahead for these up-and-coming rippers.

THE END
Allt Är Intet [Frontiers]

Allt Är Intet is comprised of Swedish saxophonist Mats Gustafsson, Norwegian saxophonist Kjetil Møster, Ethiopian-born vocalist Sofia Jernberg, Norwegian guitarist Anders Hana, and Norwegian drummer Børge Fjordheim. Their performances are always at the freerer end of the musical spectrum, and incendiary blowing is very much to the fore on this second album (the first being their audacious SvarmodOch Vemod Är Värdesinnen). The unbridled saxes of Gustaffson and Møster create a structured maelstrom that's visceral, dense and exhilarating. Arguably more rock than jazz, super-tight hypnotic rhythms pummel and entrance in equal measure, deftly providing an anchor point in what is certainly a turbulent and bracing musical experience, but one that's undeniably rewarding.

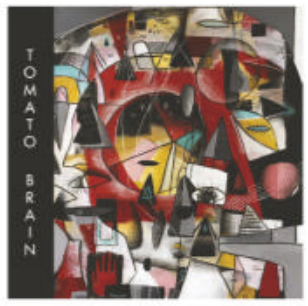
MAJOR SURGERY
Rare Live Performances 1978 [Last Music]

This album represents a new chapter in an otherwise forgotten and overlooked outfit active in the 70s. It's not actually a recording as such,but a compilation of the band's repertoire as recorded on cassette tape by The Last Music Company's Malcolm Mills. He explains: 'In early May 2020, I dug out the cassettes from my archive and engaged Baz Farmer to recover the contents. I was blown away with what I heard. It was almost the entire Major Surgery repertoire… and the band were clearly at their peak for these live shows.' Don Weller was one of the finest saxophonists ever to emerge from Britain and these previously unreleased live sessions bristle with elements of Soft Machine and Nucleus, wherein smartly crafted tunes are delivered with razor precision, offset with Weller's customary passion. Pete Jacobson's keyboards spar with Jimmy Roche's biting lead guitar, expanding the band's tonal range as Bruce Collcutt's bass and Tony Marsh's drumming mine a funkish undertow.

REUTER MOTZER GROHOWSKI
Shapeshifters [Moonjune]

Fans of the kind of musical telepathy demonstrated by the King Crimson fractals ProjeKcts 1, 3, and 4 in the 90s will find much to enjoy in the latest collective improvisations of Reuter Motzer Grohowski's Shapeshifters. A collaboration between touch guitarist Markus Reuter, guitarist Tim Motzer, and Brand X drummer, Kenny Grohowski, their rapid-fire, intensive jousting and inquisitive, discursive solos cover a lot of sonic ground across four pieces that never fail to deliver bold results. As to what Shapeshifting might be is described in John McGuire's extraterrrestrial album liner notes. "*Shapeshifting refers to an act of rapid physical transformation, from one form to another by supernatural means. Whether its origins can be traced to a genetically inherited superhuman ability, incidences of the spirit world manifesting into the physical, shamanism, black magic, or something still completely unknown, has been the subject of much speculation for those who have dared question whether the concept is, indeed, a fictional one.*" He concludes: '*Prepare to be amazed, earthling*!'

THE GOLDEN AGE OF STEAM
Tomato Brain [Limited Noise]



The name might suggest a gentle diversion into the realms of nostalgia, but that's far from the case on the third album from this avant-garde ensemble led by saxophonist and composer James Allsopp. Their sound conjures visions of an exploratory jazz group improvising in an abandoned Radiophonic Workshop. In fact, that's not far wide of the mark, with Loftopus, a six-part, 31-minute tone poem, recorded live in a single take. It begins with blippy electronica and disembodied voices, like something approaching from inner space, before a wave of sax breaks against the digital ether, producing slow, elegant lines that hang in the air. The song eventually builds to a parping, skirling climax against celestial organ, bringing a righteous Soft Machine meets Sun Ra vibe.

HARRY BECKETT
Joy Unlimited [Cadillac]

As the title cunningly suggests, Harry Beckett's Joy Unlimited accentuates the positive with good vibes abounding in this handsome reissue from 1975. Beckett's mellifluous trumpet and flugelhorn daub the stratosphere with gorgeous streaks of vibrant colour against the busy interactions of Isotope's Nigel Morris (drums) and Brian Miller's Rhodes piano. The criminally underrated bassist, Daryl Runswick, is frequently astounding, nipping, and tucking around Ray Russell's surging guitar. All six tracks were written by Barbados-born Beckett (1935–2010) and all are tuneful, spirited and attractively arranged and despite his UK residency, a Caribbean lilt infuses a sunny, relaxed atmosphere. Beckett's solo playing is quite astonishing, indeed jazz reviewer Dave Gelly says Beckett had one of the most beautiful trumpet tones he's ever heard. '*It was firm, but soft at the edges, with a chuckle lurking somewhere inside*,' he wrote in his positive review of this album for *The Guardian*.

CHICK COREA
Chick Corea Plays [Concord Jazz]

This live solo performance available on two CDs (or three 180g LPs) sees Corea chatting between numbers, performing some genuinely dazzling improvisations, and performing engaging renditions of pieces across multiple genres including classical (Mozart, Chopin, Scarlatti, Scriabin), jazz (Thelonious Monk, Bill Evans, Antonio Carlos Jobim), soul (Stevie Wonder) and even Broadway (Jerome Kern, George Gershwin). While clearly having lots of fun illustrating a six-decade career for his audience, it has to be said that sometimes things get a little schmaltzy. At times I was reminded of *JazzNews*' Nick Lea's comment: '*There is no disputing his technique and knowledge of the music he performs, but it may be that his all-encompassing, genre straddling has meant that at times he has spread himself a little too thin.*' However, Corea's bravura reading of highlights from his 1984 recording, *Children's Songs*, reminds us of the poetic, harmonic beauty informing all his best works.

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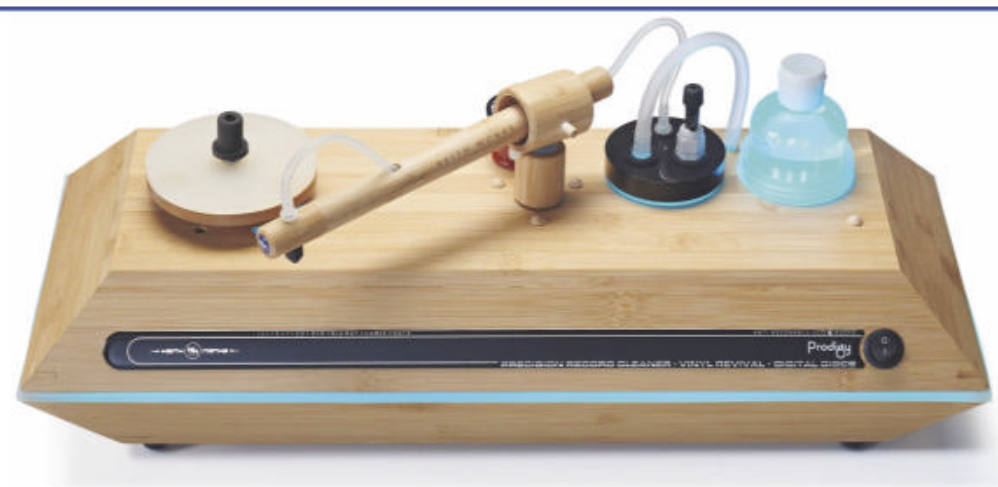

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KATATONIA

Dead Air [Peaceville]

Dead Air comprises the band's streamed live show from Studio Grondahl in their native Stockholm back in May 2020, and it's as dazzling a silver lining as you could hope for. Denied the opportunity to tour in support of new album City Burials, the Swedes deliver a career-spanning, 20-song set, taking in everything from breakthrough gems such as *Teargas* and *Ghost Of The Sun* through to new songs *Winter Of Our Passing*, *Lacquer* and *Behind The Blood*. The band is In absolutely blistering form right now. Highlights are legion: opener *Lethean* is a gloriously understated epic, and a master-class in melancholy and wild dynamics; *Forsaker* is a churning, brutal howl of anguish; *In The White* is the Swedes in swirling, prog waltz mode and front-man Renkse is in fine voice throughout.

AVANDRA

Skylighting [Layered Reality]

Guitarist/vocalist Christian Ayala Avandra has a knack for mixing sophisticated aggression and atmospheric surfaces that was clear on 2017's Tymora and 2019's Descender. Skylighting upholds that balance with even more cohesion and poignancy. Opener *Celestial Wreaths* and the penultimate track *Afferent Realms* effectively juxtapose hypnotic guitar riffs and vivacious percussion with divine harmonies and touching lyricism. Elsewhere, *Life Is Not A Circle, But A Sphere* channels soaring emotions and djent gymnastics, while *Noetic Probes* evokes Haken's soothing textures and catchy melodies. The most moving passage, however, is *New Origins* since its prophetic narration, distressing strings, and wavering synths yield such an inspiring final statement. Much of Skylighting sounds alike, but it flows so well!

MARK KELLY

Mark Kelly's Marathon [Earmusic]

Marillion's keyboardist Mark Kelly has been toying with the idea of a non-Marrillion album for years and other than a guest spot by Marillion colleague Steve Rothery and DeeExpus bandmate Henry Rogers on drums, Marathon sees him joined largely by novices. How nice to report that each excels in their field. A barrister and Marillion fan by day, Guy Vickers transforms into a gifted lyricist after sundown, Oliver M. Smith is a virtually unknown singer more inspired by Eddie Vedder than Peter Hammill, while one of its two guitarists, John Cordy, was a YouTube recommendation from Rothery. Throwing in Mark's nephew Conal Kelly on bass is simply more proof that Kelly has chosen to dabble in uncertainty. It pays off. There's apparently a convoluted hypothesis behind the album about Man (and Woman) striving for the ability to fly, but Marathon doesn't labour under the weight of a concept album—it's a thought-inspiring yet slickly despatched pop rock record. Kelly's debut deserves a medal.

TANGERINE DREAM

Pilots of Purple Twilight [Virgin/UMC]

Tangerine Dream might always be best known for the mind-blowing albums they recorded in the 1970s, but as amply demonstrated on this sumptuous box set subtitled 'The Virgin Recordings 1980–1983' which includes remasters of Tangram, Thief, Exit, White Eagle, Logos–Live and Hyperborea, plus discs of rare and unreleased material as well as a book, they remained one of the world's most innovative bands well into the 1980s. It's easy to hear why the band became in-demand soundtrack composers, their brooding electronic vistas instantly giving any film a steely, modernist edge. That's certainly the case on the music they produced for Michael Mann's Thief, yet the looser, even bluesy vibe of Beach Theme and the gothic swagger of Dr Destructo belies their image as cosmic overlords surrounded by banks of frightening machinery. Hyperborea is perhaps the odd album out here, due to TD incorporating more abstract, Eastern melodies and rhythms.

GRUMBLEWOOD

Stories Of Strangers [Gravity Dream]

The debut album from New Zealand quartet, Grumblewood deliberately seeks to evoke the sensibilities of the electric folk-prog movement of the early 70s: Jethro Tull, Renaissance, and Fairport Convention. While the shifting time signatures of *Fives And Nines* and the eight-minute The Band-meets-Christy Moore stylings of *The Minstrel* overlay some twists atop traditional tropes, this band also has an affection and respect for folk history, as its interpretation of *The Sheriff's Ride* demonstrates. Alongside liberal applications of flute, banjo, mandolin and harpsichord, Gav Bromfield's rich vocals fulfil the all-important folk storyteller role. Many bands would have striven for a more precise and controlled product, but Grumblewood eschews such modernity with a real dedication to the analogue world, with everything recorded, mixed and mastered to tape. The result is a warm, organic sound which captures the intimacy of a band performing live. The sense of space is at times almost tangible.

LYKANTROPI

Tales To Be Told [Despotz Records]

On their gorgeous third album, Sweden's Lykantropi conjure up memories of 70's vintage San Francisco rock interwoven with rich seams of psychedelia and folk. The long-haired six-piece bring an unhurried, pastoral ease to their music, married to a lyrical romanticism that's flavoured with an occult twist on tracks such as *Spell On Me*, with its warnings about the seductive lure of evil. It's all deeply groovy, with songs that drip with intoxicating harmonies as entrancing as any Odyssean siren. Front-woman My Shaolin has the dreamlike delivery of Coven's Jinx Dawson. She sings with wistful longing on *Come Take Me Out* which feels like Lykantropi's most personal work to date. *Axis Of Margaret* was inspired by bassist Tomas Eriksson's experience of losing his mother, but it's not a gloomy listen. The album closes with *The World Goes On*, ending with the promise of renewal and rebirth, reaching out of the darkness of winter towards the warmth and light of spring.

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