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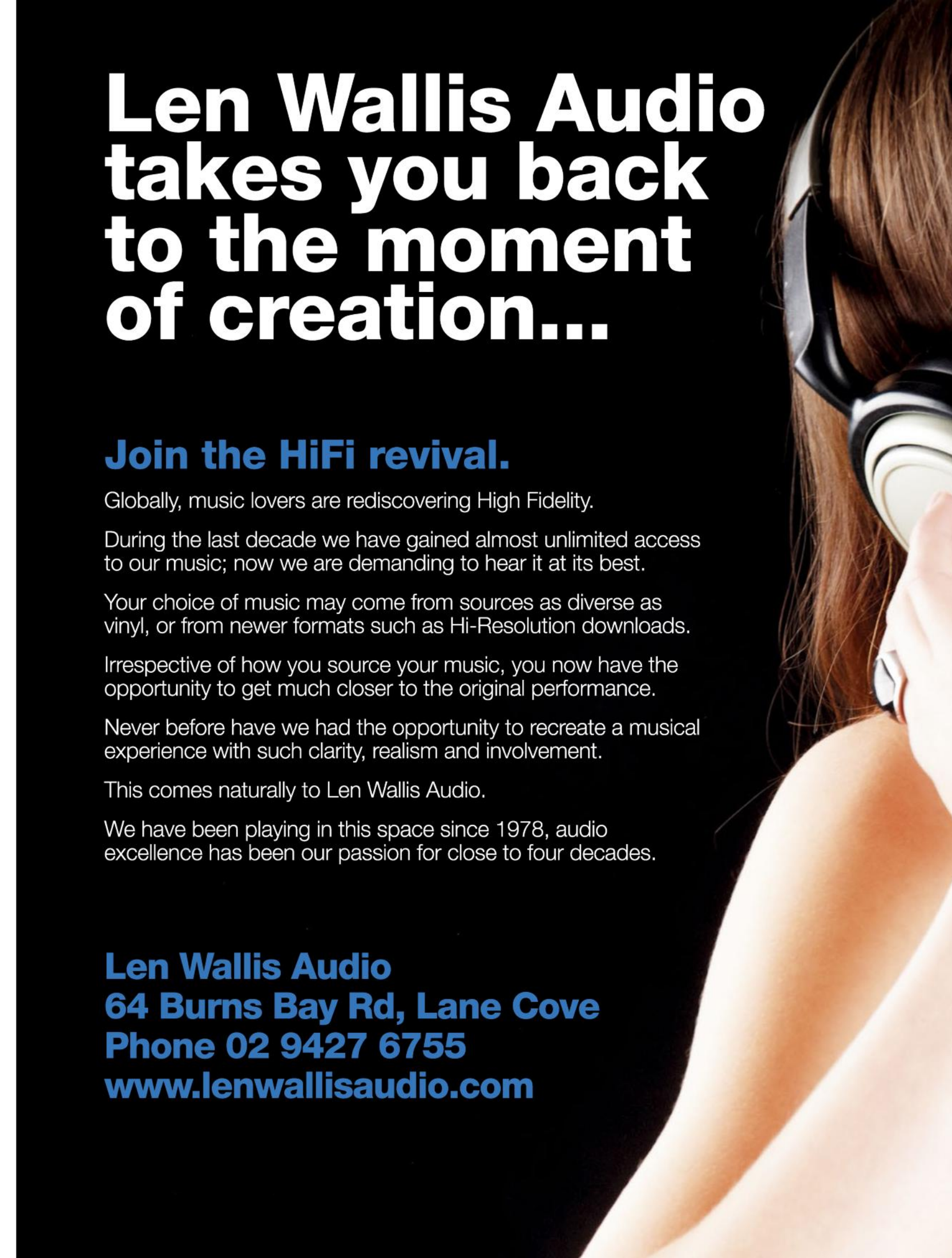

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# AUDIO ESOTERICA


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# BOULDER GETS SOFTER

**BOULDER 1110 STEREO PREAMPLIFIER**

Boulder has softened the lines of the casework on the second iteration of its 1110 stereo preamplifier, with rounded edges that include radii and curves, while the front panel now features a reproduction of the topographical map of Flagstaff Mountain near Boulder HQ. Internal improvements from increased use of surface mount devices include better ground paths, thermal management and noise floor, while a new 64-bit, multi-core ARM processor handles supervisory functions including management of turn-on/turn-off, input selection and user interface, error notification, display driver, web page generation, and HTML- or IP-based external control. Also new is a CMOS-actuated fully-balanced stepped volume control that can be programmed for step resolution, start-up level, maximum output level, and custom volume scaling. More information from *www.absolutehiend.com*

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## TRIANGLE AUSTRALE EZ STEREO LOUDSPEAKERS

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REVIEW

# DAN D'AGOSTINO PROGRESSION

## PREAMPLIFIER & PROGRESSION STEREO POWER AMPLIFIER

**Reviewer** greg borrowman

Dan D'Agostino has gone over to the dark side! Yep, his new Progression Preamplifier and matching Progression Stereo Power amplifier are finished in lustrous, shiny black… plus the pre-amplifier actually has a 'Dark Mode'.

OK, so a silver finish is available as an option, and so is grey, plus custom finishes are available to special order, but once you've seen this pair (well actually not a pair, but a trio, because the preamplifier has a separate power supply) you wouldn't even consider the alternatives. (Though if Dan ever brings out one finished like his top-line Momentum amplifiers, we'd have to give that one some serious thought!)

A good part of what makes the black finish look so good is the copper-coloured trimming on both the Progression Preamplifier and the Stereo power amplifier, primarily the trim around the output meters — twin multi-purpose meters in the case of the preamplifier, and a complicated dual-needle power meter in the case of the Stereo power amplifier.

### PROGRESSION PREAMPLIFIER

Dan D'Agostino's Progression preamplifier has one of the best-looking volume controls we have ever seen, thanks to its black surround and copper-coloured inlay. It's also one of the nicest we've ever

△ THE REMOTE CONTROL IS NOT YOUR 'STANDARD' DEVICE NOT ONLY BECAUSE OF ITS DESIGN AND SHAPE, BUT ALSO BECAUSE IT TRANSMITS CONTROL SIGNALS VIA BLUETOOTH, NOT INFRARED.

used, due to the fact that it's neither a 'standard' nor a 'motorised' potentiometer, but instead a rotary encoder that drives a stepped precision resistor ladder via high-linearity relays. Part of what makes it so nice, apart from its looks, its 'feel' under the fingers and its ability to make such high-precision adjustments in volume is that it's weighted so that if you want to decrease volume very rapidly, you can just flick it anti-clockwise, after which it will continue spinning until there's no sound coming from the speakers at all.

We weren't quite so keen on the ratchet sound the encoder makes when it's 'encoding' (once you've turned it full left, you can continue spinning the control left, but the 'clicking' sound ceases) with the sound reminding us of a chocolate wheel. But we came to appreciate the clicking because if you don't have any music playing through the speakers, you can both 'feel' (if your fingers are on the control) and hear from the volume control itself when it is completely counter-clockwise, so you can be sure that when you switch to another input (for example), you won't be served a sudden blast of sound through your speakers.

To the left of the volume control are the input selector buttons, which run, from left to right: Phono, Auxiliary, Theatre, Radio, Server and DAC. These selector buttons are surrounded by bezels which makes the 'touch' a bit vague, but there's a confirming central LED that glows to show the input has been correctly selected — red (Phono), blue (Aux), green (Theatre), red (Radio), blue (Server) and green (DAC). If you select the DAC input — assuming the optional DAC module has been installed! — additional LED tell-tales alongside show the active digital input.

The ability to install a DAC in one of its preamplifiers is a first for Dan D'Agostino — it's never been previously available on any Dan D'Agostino preamp. The newly-designed module adds coaxial, Toslink, and USB capabilities. It contains a fully-differential DAC that handles PCM (up to 24-bit/384kHz) and DSD (up to 4×/11.2MHz). Irrespective of whether you option it in at the time of purchase or add it later, the DAC module lists at $6895 (RRP).

The front panel also has a 'Zone' button that allows you to send music to one of two 'zones' or both. When playing Zone 1, a small green LED lights as a tell-tale, a red LED when playing Zone 2, and both LEDs illuminate when playing both zones. Curiously, although Dan D'Agostino labels them 'Zones' on the front panel, the Owners' Manual describes them as: '*independent outputs that can be individually operated or used simultaneously for driving a second amplifier in a subwoofer-based system*.'

So why not print Output 1/Output 2 on the front panel, rather than Zone 1/Zone 2?

If you were wondering about the seeming omission of a 'Mute' button in the Progression Preamplifier's arsenal, you will find one on the remote control. When the preamplifier is muted, the front panel meters indicate this by alternately pulsing their back-lights between showing green and green/white (the Zone button LED also flashes). The Owners' Manual says that: '*If the polarity of the preamplifier is inverted, the multi-function meters will alternate between white and red,*' — though we can't attest to this, because we didn't test this mode.

The two meters on the front panel of the Progression Preamplifier (which have a soft green illumination that's stronger at the base of the meters than it is up near the top) default to showing output voltage, though rather than showing output voltage *per se*, there are instead markings at 0, 25, 50, 75 and 100. The needle movement is fast but also nicely damped, so it's easy to read peak levels and also to estimate average levels, if you're so inclined. We'd rather ignore the meters entirely and instead adjust volume entirely by ear.

On most amplifiers which have meters on the front panel, the meters are really only there for show, but on the Progression, Dan D'Agostino has given them real purpose because in addition to the extra-curricular display functions noted in the previous paragraphs, they have other functions.

The first of these is that when you are adjusting the level of the volume control, the meter's action changes to show the volume level you have set. The second is that when you're


SO FAR AS WE CAN RECALL THIS IS THE FIRST TIME ANY DESIGNER HAS EVER THOUGHT TO USE METERS TO PERFORM THESE FUNCTIONS.

adjusting the channel balance (only possible by using the remote control), the needles' operation changes to show the relative gain in each channel.

After you have finished adjusting volume or balance, the meters immediately revert to show output voltage.

So far as we can recall, this is the first time any designer has ever thought to use meters to perform all these functions, so we'll definitely have to put this down as a 'first' for Dan D'Agostino.

We thought the meters looked great, and the LEDs on the front panel are not intrusively bright. But if you'd prefer not to not see them at all, the Progression Preamplifier has what designer Dan D'Agostino calls a 'Dark Mode' that, if activated will, 15 seconds after you've touched a control, turn off the lights in the multi-function meters as well as all the front-panel LEDs. You can select (or deselect) this mode by holding the Standby button in for several seconds whilst the unit is in Standby Mode. If whilst in 'Dark Mode' you adjust a front panel control, the relevant LED will glow briefly and then switch off.

> On most amplifiers which have meters on the front panel, the meters are only there for show, but on the Progression, Dan D'Agostino has given them real purpose

The design of the Progression Preamplifier's front panel is curious. The front panel itself is flat, but has a 'curve' at the top to meet the top surface. But rather than this curve being smooth and continuous, it's a series of 'flats' that are formed into a curve, so the curve feels quite granular under the fingers. (It's also a contrast to the other corners of the chassis, which are quite sharp.

Other than the Phono and Auxiliary line-level inputs, which are via unbalanced RCA sockets (and not gold-plated), all the other inputs are balanced XLR using gold-plated Neutrik fittings. There are so many of these — and they're so closely packed together — that from the rear it looks a bit like a piece of professional studio equipment... not that there's anything wrong with that!

The remote control (which we didn't get to use, as it was unavailable at the time of the review) is not your 'standard' device, as you can see from the photograph opposite. It's not only not standard because of its design and shape, but also because it transmits signals via Bluetooth (hence the reason for the antenna fitted to the rear panel of the Progression Preamplifier). This means that you don't


△ THERE ARE SO MANY XLR BALANCED INPUTS — AND THEY'RE SO CLOSELY PACKED TOGETHER — THAT FROM THE REAR THE PROGRESSION LOOKS A BIT LIKE A PIECE OF PROFESSIONAL STUDIO EQUIPMENT...

The circuit is so clean that Dan D'Agostino says its bandwidth extends beyond 100kHz, and that THD measures lower than 0.006%

need line-of-sight in order to use the remote, which could come in very handy in larger, more palatial homes (or wildly cluttered smaller ones).

The circuitry of the Dan D'Agostino Progression Preamplifier is discrete, fully-complementary and balanced from input to output, and negative feedback is not used, yet the circuit is so clean that Dan D'Agostino says its bandwidth extends beyond 100kHz, and that THD measures lower than 0.006%.

## PROGRESSION POWER SUPPLY

As stated in the introduction to this review, the Progression Preamplifier's power supply is contained within a completely separate chassis whose power supply circuitry is both electrically and magnetically shielded.

Incoming a.c. voltage is high-frequency filtered to remove radio frequency noise and Dan D'Agostino says additional conditioning circuitry is included to compensate for asymmetric mains power waveforms. The power supply has two d.c. outputs. One is for the Progression Preamplifier. The other has no purpose as yet, with Dan D'Agostino stating only that it has been included: '*to power future Progression source components*.'

The power supply is considerably smaller in all three dimensions — height, width and depth — than the Progression preamplifier itself. This introduces a 'visual disconnect' in that the two components don't seem to relate to each other at all, particularly if the power supply unit is placed underneath or on top of the preamplifier. We assume this is a deliberate tactic on Dan D'Agostino's part, to ensure that owners will place the power supply as far as possible from the preamplifier… which is of course the ideal location. If so, it's a very clever strategy, because the very worst place you can put any power supply is on top of — or underneath — the unit it's powering. To that end, maybe a slightly longer power cord might be nice: the one provided with our review unit was not overly long.

## PROGRESSION STEREO AMPLIFIER

Dan D'Agostino's new Progression Stereo power amplifier is essentially a dual-channel version of his Progression Monobloc and like that monobloc, it uses what Dan D'Agostino likes to call his 'Super Rail' circuitry.

The various technical descriptions we've seen of the 'Super Rail' technology seem contradictory, with one describing the output stage as having a higher voltage rail than the input stage, and another describing the input stage has having a regulated high-voltage rail that's completely separated from the output stage's rail, so that in cases of overload, the input stage's performance remains the same, even when the output stage is starved of voltage.

But whatever the Super Rail actually is, it is unlikely that the output of the Progression


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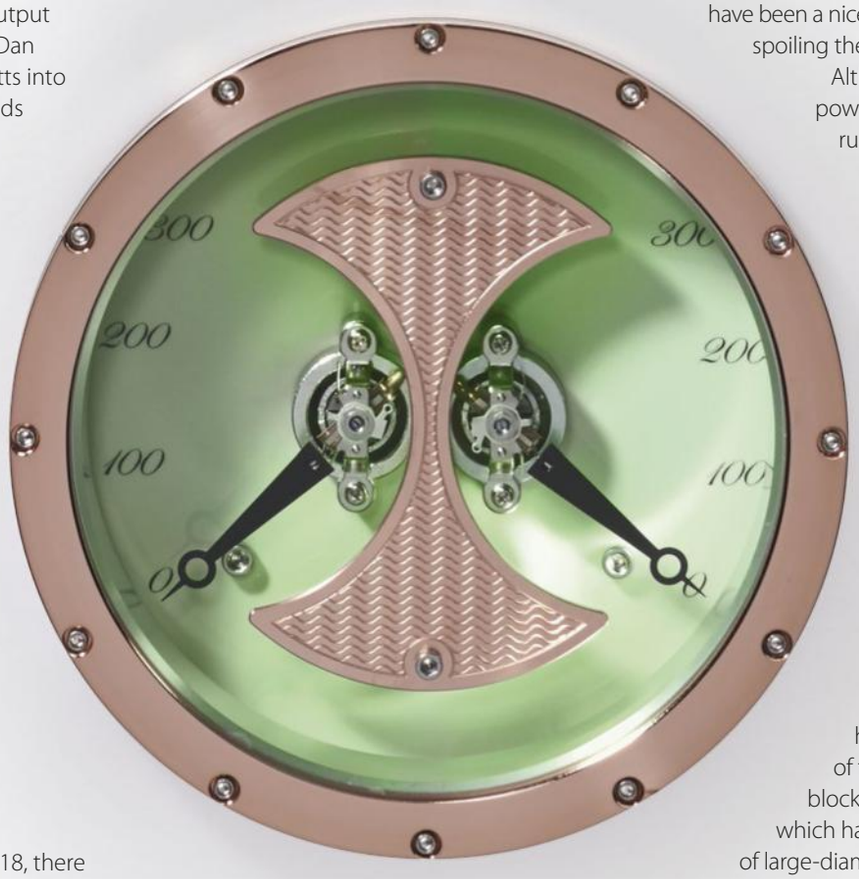
amplifier could ever be starved of voltage, seeing that the power supply comprises a 3,000VA (nearly) 240V transformer and a capacitor bank with a storage capacity of 400,000µF. Nor are you ever likely to run out of power to drive your speakers — whatever they may be — because the output stage uses 24 bipolar output transistors per channel, which Dan D'Agostino says deliver 300 watts into 8Ω loads, 600 watts into 4Ω loads and 1200 watts into 2Ω loads.

In common with many high-power amplifiers, the Progression Stereo's output stage uses a bridged circuit topology to deliver this power (though Dan D'Agostino prefers to refer to this topology as being 'balanced' rather than 'bridged'). This represents a major difference between the Progression and Dan D'Agostino's top-line Momentum power amplifier, as the Momentum uses a standard (unbalanced) output stage despite being more powerful than the Progression Stereo.

As you can see from the photographs on pages 16 and 18, there are no controls at all on the front panel of the Progression Stereo power amplifier, just a very large circular power output meter (shown here) that has dual needles, of which the left-channel needle moves upwards first to the left then to the right with increasing output power, while the right-channel needle moves upwards first to the right and then to the left... which can make the two needles looks like they're dancing whilst ever music is playing, which makes for a very nice visual illusion.

The meter dials have calibration points marked 0, 100, 200 and 300. Although these are intended to indicate actual power output, they can only ever be an indication of the true power, as the meters will only ever be exact if your speakers have an impedance of precisely 8Ω ohms at every frequency — which they won't (though some planar magnetic speaker designs get close).




△

THE TWO POWER OUTPUT INDICATOR NEEDLES LOOK LIKE THEY'RE DANCING WHENEVER MUSIC IS PLAYING, WHICH MAKES FOR A VERY NICE VISUAL DISPLAY.

Dan D'Agostino says the meter was: '*inspired by the elegant faces of classic Swiss watches*' and says the needle swing arms have '*high-speed ballistic circuitry that enhances their responsiveness*'.

Despite this, needles can never move fast enough to capture transients, so peak LEDs might have been a nice touch — though perhaps spoiling the steam-punk aesthetic.

Although the Progression Stereo power amplifier has heat-sinks running down each side of the chassis, they're not 'standard' heatsinks. This is at least partly because Dan D'Agostino is touchy about the heatsinks he used on his designs for Krell, which were renowned for being so sharp-edged they'd draw blood and rip clothing — even D'Agostino's own. "*I have a very expensive Canali suit with a big rip in it from a heatsink, and it can't be fixed*," he once told Jason Serinus.

So instead, the heatsinks down either side of the Progression are huge blocks of aluminium alloy into which have been drilled a number of large-diameter holes through the full thickness — a design Dan D'Agostino calls a 'Venturi-style' heatsink, as used on the Momentum Series power amplifiers. We doubt this design is as thermally efficient as conventional fins, but it's certainly more attractive, and definitely far more user-friendly — we didn't rip anything during our review, and they make for handy handles when lifting the amp. They also obviously also do the job, no matter how (in)efficient they may be, because our review amplifier ran barely warm to the touch despite being played for long periods of time at very loud levels in a swelteringly hot listening room (the triple-wammy of an Australian summer, a flat tin roof and no air-conditioning!).

The rear of the Progression Stereo is almost as bare as the front panel, with just a single pair of balanced inputs (via XLR terminals), a single pair of unbalanced inputs (via gold-plated RCA terminals), left- and right-channel loudspeaker posts, and a mains power switch.

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△ THE REAR OF THE PROGRESSION STEREO IS ALMOST AS BARE AS THE FRONT PANEL, WITH JUST A SINGLE PAIR OF BALANCED INPUTS (VIA XLR TERMINALS), A SINGLE PAIR OF UNBALANCED INPUTS (VIA GOLD-PLATED RCA TERMINALS), LEFT- AND RIGHT-CHANNEL LOUDSPEAKER POSTS, AND A MAINS POWER SWITCH.

The balanced and unbalanced inputs cannot be connected simultaneously; you use only the one or the other of the pairs. There are also 12-volt trigger input/outputs so you can switch the amplifier off and on remotely, plus a small pushbutton that allows you to adjust the brightness of the front-panel meter (low, off, high). We were in no doubt that the Progression Stereo is a new model — the sample we auditioned bore the serial number PS0001P.

## LISTENING SESSIONS

There is something quite glorious about the moment when you have just started playing a track that has a few moments of silence before the start of the music, and the volume of an amplifier is turned close to maximum and yet there's absolutely no noise from the speakers at all… not even a peep. Maybe it's the satisfaction that the amplifier's noise floor is so low that it can't possibly interfere with the music, no matter how quietly you're playing, or maybe it's just the anticipation of knowing something wonderful is soon about to launch. But when the launch pad is the once-heard-never-forgotten triple-note entry to Bach's famous *Toccata and Fugue in D minor* (BWV 565), followed by that equally famous six-note run, well those are the moments when the sheer audio quality of a hi-fi component is etched into your consciousness.

In this case, of course, it was the sound of the Dan D'agostino Progression pre-power combo that was indelibly etched on our auditory memories… and not least the broken chord that brings the theme back up the manual. The majesty of the Great Organ of Saint Eustache was brought to life in the listening room, from the room-shaking pedals to the sound of the

multiple stops chosen by organist Jean Guillou to create a soundfield that Bach would no doubt have mightily approved. His own German organs did not compare with this modern French instrument, which has 101 stops and no fewer than 8000 pipes. *Magnifique!*

Despite the demands of the music and the volume level we were playing, the Progression pair didn't even raise a sweat, with absolutely no distortion on peaks (or at all, actually!) and the ability to convey the acoustic of the church not only in the longer moments but also in those 'space-between-the-notes' moments. And as for the slow decay of sound in the acoustic of the church…again, *trés magnifique!*

The way in which the D'Agostino Progression duo was able to reproduce the decay of sound in a live acoustic so realistically, without any feeling of the sound being stepped, and with the sound audible right into a silence that was the true acoustic silence of the venue — not a 'digital black' silence — had us reaching for a recording that allowed this superior performance to be examined more minutely: David Hyke's 'Hearing Solar Winds' (Ocora X558607)… co-incidentally also recorded in France. We were not disappointed… indeed we were even further enthused by this D'Agostino pair's performance. This album was recorded by Radio France in the dead of night at L'Abbaye du Thoronet, a 12th-century Cistercian monastery in Provence, and the atmospherics are truly ethereal, and thanks to Dan D'Agostino, the music becomes more than just music: it becomes a life-transforming experience, infusing one's soul with wonder.

That the D'Agostinos can also rock with the best of them was proved beyond any shadow of a doubt with a blast from the past in the shape of a selection of classics from Jethro Tull. The curious vocal presentations on 'Aqualung' are delivered with such precision we were lost in admiration. We have to confess that we'd totally forgotten there's a beautiful piano introduction to *Locomotive Breath*, but we did remember the stopped guitar sounds and the frenetic drumming and incessant bass... and of course Ian Anderson's iconic breathy flute, delivered with totally realistic breathiness by the D'Agostinos. With the volume maxxed out we were transported back in years to a smoky nightclub, listening to a live version. We'd also forgotten how prophetic Tull could be until the track *Too Old to Rock 'N' Roll: Too Young To Die*, started to play through the D'Agostinos. (Some of the acts that are touring these days would do well to add a cover version to their playlists.)

A problem that affects most commercial recordings is that they're compressed — via one method or another — which makes it easier for amplifiers — and loudspeakers — to reproduce their sound than would otherwise be the case. US musician Art Halperin was so annoyed by this that he created his own label (Soundkeeper Recordings) to make recordings that were not only completely free from compression, but also free from all engineering and production trickery: he simply puts all the musicians in a room and presses 'Record', a technique he calls '*recording without a net*' and the result is a sonic test for any system — particularly in high-res — yet playing Halperin's 'Winds of Change' it was easy to hear that this Progression duo was just taking it all in its stride — it sounded exactly as if all the musicians were in the room with us, complete with uncanny sonic effects, such as the tambourine really appearing to be at the back of the room. We did need to watch the playback levels, though, because Halperin has to record at a very low level to make sure he doesn't clip on peaks, which means that if you're not careful, it's very easy for a powerful amplifier like the Progression Stereo to overdrive the speakers on transients… so make sure your speakers can take the heat!

## CONCLUSION

Dan D'Agostino has never been shy about charging what he thinks his products are worth, a tradition that extends right back to 1980, when he founded Krell and first gained a reputation for building the world's most expensive amplifier. But he's equally prepared to invest significant sums in purchasing only premium components to use in his products and also proud that all D'Agostino products are: '*100% built in the USA with all parts procured in the USA.*'

D'Agostino is also proud of the fact that the audio products he's designed and built rarely appear on the second-hand market and, when they do, command premium prices… sometimes exceeding the original purchase price.

None of which will make it any easier if you decide to join a very exclusive club by signing the cheque that will turn you into a proud D'Agostino owner… but at least you can rest assured that there's even more to his products than just high performance, superb sound quality and stunningly good looks!

## SPECIFICATIONS

### DAN D'AGOSTINO PROGRESSION PREAMPLIFIER

**FREQUENCY BANDWIDTH:**
0.1Hz to 1MHz (–3dB)
**FREQUENCY RESPONSE:**
20Hz to 80kHz (±0.5dB)
**THD:** <0.018%
**S/N RATIO:** –95dB unweighted
**GAIN:** 8/14dB (switchable)
**STANDBY CONSUMPTION:** <40W
**ANALOG INPUTS:**
4 stereo pairs of balanced XLR
2 stereo pairs of single-ended RCA
**OUTPUTS:**
2 stereo pairs of balanced XLR
**CONTROL:**
RS-232, 2 × 12V trigger outputs
**FINISHES:** Silver, Black, Custom.
**DIMENSIONS–PRE (HWD):**
108 × 45 × 300mm
**DIMENSIONS–PSU (HWD):**
75 × 275 × 200mm
**WEIGHT:** 18kg (inc. PSU)
**WARRANTY:** Five years
**PRICE:** $33,995
(add $6895 for DAC module)
**CONTACT:** Advance Audio Australia
on 02 9561 0799
www.advanceaudio.com.au

### DAN D'AGOSTINO PROGRESSION STEREO POWER AMPLIFIER

**POWER OUTPUT:**
300 watts/channel into 8Ω
600 watts/channel into 4Ω
1200 watts/Channel into 2Ω
**FREQUENCY RESPONSE (1):**
1Hz to 200kHz (–1dB)
**20HZ TO 20KHZ (±0.1DB)**
**THD @ 1KHZ:** 0.15% (at rated output)
**S/N RATIO:** 105dB unweighted
**INPUTS:** 2 × balanced XLR
**INPUT IMPEDANCE:** 100kΩ
**OUTPUT IMPEDANCE:** 0.15Ω
**FINISH:** Silver, Black, Custom
**DIMENSIONS (WDH):**
457 × 508 × 190mm
**WEIGHT:** 57kg
**WARRANTY:** Five years
**PRICE:** $33,995
**CONTACT:** Advance Audio Australia
on 02 9561 0799
www.advanceaudio.com.au


MERIDIAN

# MERIDIAN
# SPECIAL EDITION DSP8000

**Reviewer** Jez Ford

## DIGITAL ACTIVE LOUDSPEAKERS

△ WHEN YOU AUDITION A PIECE OF HIGH-END MERIDIAN AUDIO EQUIPMENT, IT'S A WHOLE LOT MORE THAN A COLLECTION OF HARDWARE. YOU'RE ALSO ACCESSING A WELL-DEVELOPED KNOWLEDGE OF DIGITAL AUDIO AND A PHILOSOPHY OF PSYCHO-ACOUSTICS EVOLVED ALONGSIDE CONSTANT INNOVATION.

> The Special Edition DSP8000s contain not only eight drivers but also the entire system's amplification, plus DACs and DSP

It's hard to imagine a company more solidly founded on technology and design than the UK's Meridian. Even before it began, founders Bob Stuart and Alan Boothroyd had delivered a design legend in the unique and colourful Lecson knobless preamp and cylindrical amplifier, going on to set up Meridian Audio and enjoy 40 years of successful products underpinned as much by a stream of tech breakthroughs and patents in signal processing as in the hardware itself. Meridian Lossless Packing became the standard compression method on DVD-Audio content and within Dolby TrueHD, while the more recent MQA (Master Quality Authenticated) platform for "folding" high-res audio into smaller file sizes also originated with Meridian before being spun out to 'MQA Inc' for global licensing. Most recently of all, the company's 218 Zone Controller won the 2017 CEDIA EMEA 'Best New Hardware' Award for its delivery of high-resolution sound from local and distributed audio, including easy operation with the company's award-winning Sooloos music management platform.

So when you audition a piece of high-end Meridian Audio equipment, it's a whole lot more than a collection of hardware. You're also accessing a well-developed knowledge of digital audio and a philosophy of psychoacoustics evolved alongside constant innovation.

And at the tip-top of that philosophy and experience stands the company's statement product, the DSP8000, reviewed here in its even tip-toppier Special Edition version.

## A SYSTEM, NOT JUST A SPEAKER

Although listed by Meridian under 'loudspeakers', the stately 135cm-high dual enclosures of the Special Edition DSP8000s contain not only the eight-driver transducer complement but also the entire system's amplification, plus digital-to-analogue converters and the digital signal processing (DSP) which contributes to model name of this 'loudspeaker', which is actually a complete audio system lacking only the music signal at its inputs.

"Meridian breaks it down to selecting your source and connecting that with the speakers in the digital domain", as David Moseley of Meridian's Australian distributor Cogworks puts it. "The main influence after that is your room".

The advantages of active loudspeakers, especially when fed directly with a digital signal, are clear and well-established. You can enjoy bespoke matching of amplification with known speaker characteristics, and short internal cable runs compared with long runs from external amplification or digital crossovers.

And why does the DSP get top billing here? Because it allows Meridian to keep the signal digital until the last possible stage, undertaking all its processing in the digital domain — the crossover splitting, any equalisation or adjustment of treble or bass, and the volume control (to 48-bit precision), as well as digital protection of the loudspeakers against high-level low-frequency transients. In the last few years such digital-domain processing has become an increasingly used strategy at all levels of hi-fi. Meridian was several decades ahead of this trend, its first "digitally-driven" D600 loudspeaker appearing in 1989, and then the DSP6000 in 1991.

The DSP6000 is the clear antecedent of this DSP8000 and its SE variant, with similarly separated enclosures — a decoupled head unit for midrange and tweeter, and the same side-firing bass driver arrangement too.

This last feature takes you by surprise in a speaker the size of the DSP8000 — there are no forward-facing bass drivers lined up at you, Instead there is a smooth front panel of 6mm glass, with a window for the display and infrared sensor. It's an unusual styling developed to a mature perfection in the 8000 SEs with which we spent time, their white gloss wrapping seamlessly to the side interlaminated panels. All Meridian's DSP speakers use a cabinet construction of timber interlaminated with a layer of aluminium which keeps the entire speaker shielded from RF. In this lower cabinet sit the three pairs of 200mm bass drivers, directly opposed to help cancel cabinet vibration, of course, and in the SE version given additional clamp rings to improve isolation from the cabinet. The bass drivers are wired in pairs, each pair with their own amplifier, and with the first digital crossover point between them — the uppermost two pairs of bass drives receive the whole range of bass frequencies, while the lowest pair is fed only the very lowest bass frequencies.

Above and supported by the bass enclosure on three machined feet, the head assembly uses curved pressure-laminated panels with multiple layers of selected woods and metal to form a sealed and stiff enclosure, its tapered shape designed to optimise dispersion for the treble unit, a semi-horn-loaded beryllium dome with dual silver voice-coil, and the midrange unit, described as "a cone made from a uniquely light and stiff combination of polymers". The beryliium tweeter is part of the SE elevation, this element is half the density of diamond, seven times more rigid than aluminium and over twice as 'fast' — this, says Meridian, allows the SE to control transients across a wider frequency range.

The Special Edition DSP8000 also uses special solid metal rings that clamp the drivers more

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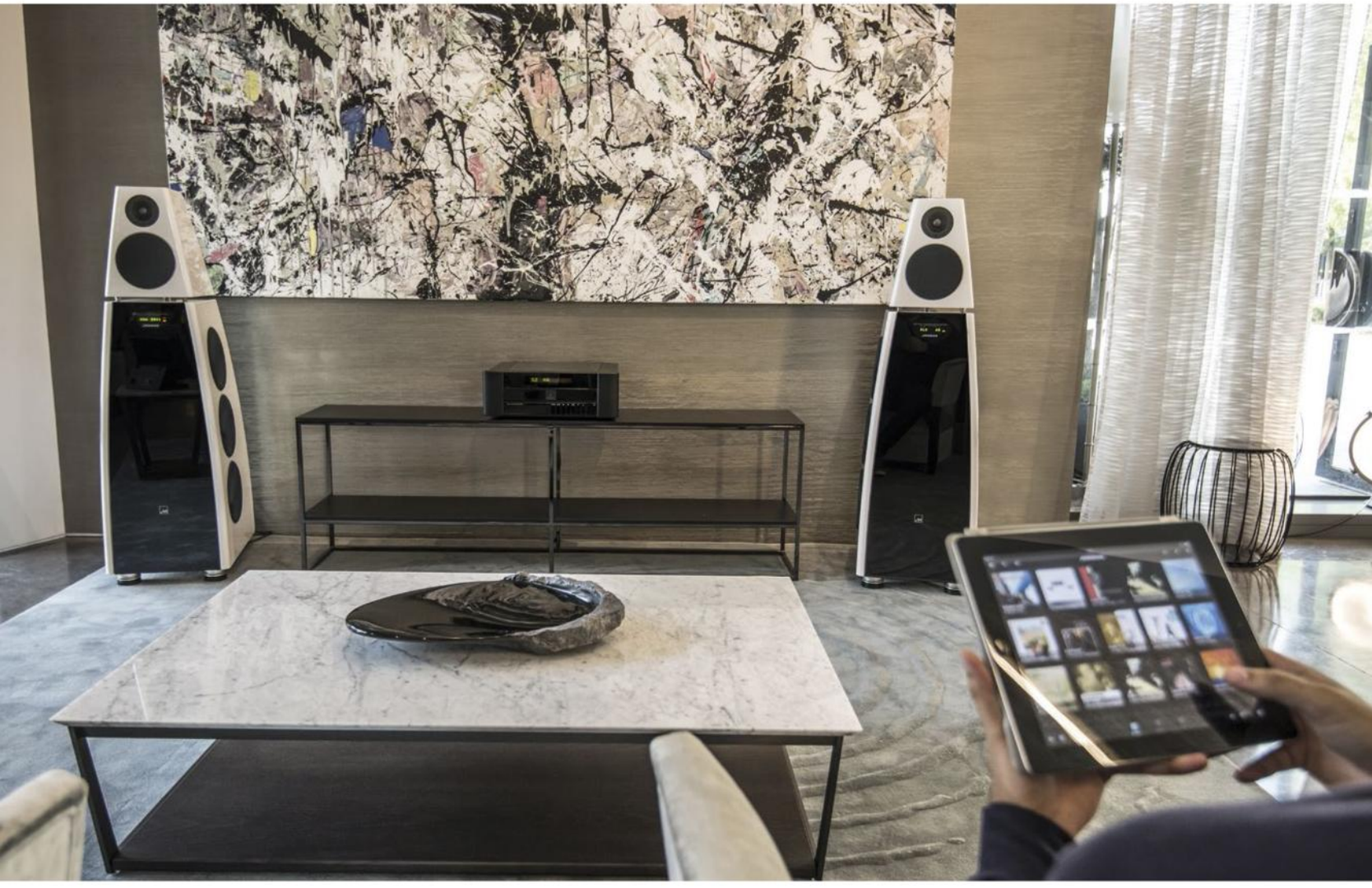

△ THE COMPLETE CABINET STANDS ON TRIANGULATED ADJUSTABLE MACHINED FOOT ASSEMBLIES WITH PROVISION FOR FLOOR SPIKES OR SKIDS

firmly in their cabinet. It uses a similar treble unit but with a lighter, more rigid, beryllium dome. This combination allows the Special Edition loudspeakers to have a more controlled transient response across a wider frequency range.

The complete cabinet stands on triangulated adjustable machined foot assemblies with provision for floor spikes or skids. And you know how some high-end multiple-enclosure speakers have you getting out the spanners to ratchet up or down the precise angles for time alignment? Meridian does all that in its digital processing too, with what it calls Enhanced Bass Alignment (EBA). To overcome the progressive delay of lower frequencies, a combination of digital filters and time delays make the mid and high frequencies 'wait' for the low frequencies to catch up, "delivering perfectly-timed music playback, additional clarity and an open, transparent sound-stage", says Meridian. The speakers have the EBA enabled by default — but an internal switch can be de-activated during configuration, so you can assess the effect.

## PLUGGING UP

Connections on the Special Edition DSP8000 are firmly digital, with one S/PDIF coaxial electrical digital input for a local source, plus an RJ45 (Ethernet) connector for Meridian's SpeakerLink connection. Each type offers both the input and also an output onto another speaker, and there are sockets also for Meridian's 'Comms' system control. If you're using the SpeakerLink connection the separate system control connections won't be required, since SpeakerLink carries both two balanced digital connections (in a Meridian system, digital audio is distributed in pairs of channels) and the Meridian Comms control in that single RJ45 connection.

Switching the configuration from SpeakerLink to the coaxial input requires restarting both speakers in a different mode, but we gather you can use both of the speaker's inputs at the same time and assign the inputs to source keys on a Meridian MSR remote, or configure a controller like the 818v3 to switch between them. And if you do end up using the local SPDIF input as well, the local source can be forwarded on to other speakers via SpeakerLink.

So while you could use the Special Edition DSP8000s in stereo purely through their coaxial connections in a 'Master' and 'Slave' set-up, SpeakerLink is the optimal way to go, especially as it can scale up as easily for a full home cinema set-up as for stereo, using SpeakerLink cables either daisy-chained or star-connected from a central hub.

What central hub? Meridian calls them 'end points'. For home cinema you might be using Meridian's G68 Digital Surround Controller, or for stereo its 808 Reference CD player, or its UltraDAC (or both). Very convenient for additional zones may be the aforementioned 218 Zone Controller. Each of these provides physical inputs not only for your sources but also for Meridian's app-based "intuitive visual music management interface", Sooloos.

## SWIMMING WITH SOOLOOS

We needed no introduction nor convincing when it came to using Sooloos in our time with the Special Edition DSP8000s. We were convinced by the concept when we first met it in standalone form, and it received an award from our sister magazine *Sound+Image* all the way back in 2010. So this is a mature platform for organising your streaming file-based music from a networked drive of music, and also for integrating Tidal's online music service. With Tidal being among the first to make MQA files available for streaming, it's no surprise to find that Sooloos and the Special Edition DSP8000s will be delighted to perform the full double-unfold required to re-weave these streams to as high as 24-bit/192kHz when available. We gather that the first unfold (decoded MQA Core) occurs in the end-point, then the secure MHR digital transport system (over SpeakerLink) transmits the MQA Core data digitally to the DSP speaker which then renders the signal, performing the second unfold and also optimising the data for the speaker's DACs.

But the joy of Sooloos is not so much in the technology behind it, but in the pleasure of using it. Sooloos very much travelled first where Roon has followed (Roon was set up by former Meridian staff), harvesting metadata about your music and enabling a seamless 'swim' through strands of connection — from a featured performer on one song to their full catalogue, to a producer's other work or to other versions of a song. Alternatively it can 'focus' intelligently on whatever you please to build a smart playlist — 'jazz / from the 1990s / in high-res', say, and all with touch-screen control and a lovely interface with powerful indexing renowned for handling the largest of music collections.

In the early days Sooloos ran on a dedicated touchscreen controller, but of course now you can have Sooloos on your phone, on your tablet, and/or using software on your PC or Mac computer. In our time with the Special Edition DSP8000s we made

all our music selection using the Sooloos app on an iPad. We were able to access files previously stored on a Meridian Media Core storage device, and also to access Tidal, streaming files at CD quality and, using MQA, unfolded to high-resolution streams.

## BETWEEN INPUT AND DRIVERS

Behind those SpeakerLink connections each Special Edition DSP8000 uses two of NXP's Freescale CMOS 24-bit DSPs (56367) running at 150MHz, and on all incoming signals Meridian uses its proprietary jitter-reduction technique — a FIFO (first-in first-out) buffer reclocking using an independent output clock to reset any timing errors in the incoming signal. CD-quality and lower signals arriving via SpeakerLink are upsampled to 88.2kHz and 96kHz for the Digital Signal Processing within, with this upsampling also providing the opportunity to apply apodising correction, using a unique Meridian filter that avoids pre-ringing, so it can be steeper, potentially cleaning up the effects of less efficient filters used by the ADCs or other upstream processing.

The DSP also allows that digital user adjustment of volume, bass and treble, also an adjustment for speaker positioning, adjusting for potential room effects. And those without air-conditioning might like to note that there are also options for ambient temperature adjustment. "if the ambient temperature is greater than 24°C (75°F) you should adjust the ambient temperature setting" says the manual. Which probably doesn't happen much back in the UK, but hey Meridian, welcome to Australia!

Above CD quality the Sooloos system can handle FLAC, WAV, Ogg and AIFF up to 24-bit/192kHz, remembering that SpeakerLink itself is limited to 96kHz, so that higher sampling rates will be downsampled before transmission to the speakers — other than the final unfolding of high-res MQA files. A yellow light on the display is a 'High Speed' indicator showing a sampling rate of 88.2 kHz or higher.

The 96kHz limit of SpeakerLink seemed surprising, so we took the opportunity to ask Meridian Audio's Matt Holland about it.

"On paper it may seem like a limitation," he told us, "but I often use the analogy of the importance of camera lens versus the pixel count on the sensor on the final image quality. Our digital transport design allows us to achieve amazing resolution at the analogue output stage. We measure resolution in terms of noise, jitter, time smear, not just bit-depth and high frequency extension. We also do not believe there is any technical argument to support operating at bit-depths higher than 24-bit, as a correctly dithered 24-bit signal, when correctly converted to analogue, has no quantisation noise and more dynamic range than any recording microphone or studio preamp can capture. Bob [Stuart] has written and published some excellent technical papers on the subject over the years.

"Our ambition in the future is to increase the maximum sampling rate of our SpeakerLink transport. The current Meridian state-of-the-art is 24/96 for DACs. Our front-end processors, like 818v3 and UltraDAC, can handle much higher sampling rates at their inputs, so in terms of file compatibility we handle practically everything available."

With the processing and crossovers undertaken in DSP, twin 24-bit multi-bit delta-sigma DACs with 128x oversampling are deployed to deliver the inputs to five independent high-power low-feedback power amplifiers — one amplifier each for treble and midrange drivers, one for each pair of bass drivers. These are described as extended-bandwidth analogue electronics, optimised to deliver high-resolution recordings, but there seems little published information on the specifics of these amplifiers, although Meridian did send (in response to our queries) a 1981 white paper by Malcolm Hawksford describing an approach to power amplifier design where nonlinear distortion generated by the output transistors is compensated for by simple fast-acting local circuitry — essentially a design with low feedback at high bandwidth at the output stage only, to result in a high degree of linearity.

There's certainly heat produced —the Special Edition DSP8000s were producing a healthy amount, dissipated via the multi-finned extruded heatsink which forms much of the back of the speakers, while the whole electronic assembly is supplied from two substantial toroidal transformers feeding high-quality audiophile-grade capacitors.

One interesting note is that you should not use mains protection with the Special Edition DSP8000 (or any Meridian DSP speaker), as they rely on a brief high current burst to blow their fuses. That, of course, would only be *in extremis* — there is thermal protection for the midrange and tweeter, with the DSP reining them in above a certain operating temperature and a green LED coming on to warn you so (though your first warning may be their change in response). Beyond that comes 'Pro95' protection, dropping the level to 95 until sufficiently cooled to continue. The fuse blowing is, then, a final additional protection.

## LISTENING

No protection was required during our listening session before an imposing white gloss pair of Special Edition DSP8000s — the 'standard' finishes are white or black gloss but the Special Edition range is also available in any of 270 'Meridian Select' colours from the RAL colour chart, almost certain to satisfy anyone keen either to décor match or

> Digital active loudspeakers deliver clear advantages in signal paths and processing that allow digital signals to pass with purity to the last possible stage prior to still-analogue amplification

to achieve some requisite spousal acceptance. The 'speakers' were positioned a metre and a half from the rear wall and a metre or so out from the side walls as well — those side firing woofers need space. The room was one of Wavetrain Cinemas' demonstration suites , so impeccably sound treated, far from dead (more diffusers than merely absorbers), delivering a natural low reverb and an ideal situation to appreciate the Special Edition DSP8000's talents to their best advantage.

A Meridian remote was to hand — the classic wide tablet-shape that the company has favoured as a system remote for decades — but most of our musical selection was made on an iPad using the Sooloos software pulling tunes from both Tidal and from flies on a remote Meridian Core.

After allowing our ears to settle into the room for 20 minutes we began critical listening with Joan Armatrading's *Show Some Emotion* album, the Meridians delightfully portraying her vocal on the title track, while also revealing the subtle variations in strength and attack on the opening bass line, all under some scintillating ride and hi-hat in the upper frequencies. The stereo-panned guitar runs following the break of the first verse sounded studio-real and reference scale, while we could hear the extended reverb around her vocal spread and decay so slowly it was still subsiding when the following vocal line began.

Such a delight was this that we let the album run on, re-acquainting ourselves with old favourite *Willow*, delivered by the Meridians just pure and lovely, Joan in the centre with the panned acoustic/electric chops far more dynamic than we've ever heard them, the bass without a trace of bloat and hair-raising vocal overdubs entering for the choruses. This was heart-melting musical magic.

Paul McCartney and Wings' 'Band on the Run' album has benefited from an unlimited as well as standard remaster in 2010; though we're not entirely sure which version was available on Wavetrain's Sooloos collection, we jumped past the obvious to *Bluebird*, and enjoyed a presentation that can't be far from how it must have sounded in the studio on the day of playback, percussion zinging to the sides — such detail to the scraper in the right channel, Linda's slightly off-key harmonies with Paul central in in a tangible front-to-back soundstage; utterly real.

It's a rare day when a recording of utter familiarity is revealed anew, and that's what happened with *One of My Turns* from Pink Floyd 'The Wall' — not only the music, but the 'Oh my God what a fabulous room' recording of the young visitor to Pink's trailer. The DSP8000 window on reality gave the slam of the trailer door a wonderful clunking weight and opened wide the extended bathroom acoustic… while the richness of Rick Wright's synthesisers was skin-tinglingly scaled. And we'd never noticed Roger's vocal moving from stage-left to centre between lines one and two, clear and obvious as it now seemed. Equally thrilling was the sheer depth of the organ tones through *Don't Leave Me Now*, which rolled forth with room-activating resonance. Only when bass lines got bigger and faster did we need more tightness to lock things into place — with the slightly over-intense acoustic bass on Plant/Krauss's *Killing the Blues*, say, the many woofers of the DSP8000SE seemed to spread the edges with bloom. This could affect other deep elements, so that Leonard Cohen's wideband vocal on his O2 performance of *Tower of Song* was as crisp as we've ever heard it in the upper register, but again a bit of bloom below.

This is easily forgotten under the main flow of magic. One of our favourite testers for handling of layered complexity is kd lang's version of *The Air That I Breathe*, with its delicate verses rising to a dynamic and layered chorus — the Meridians not only aced this, they again revealed new nuances in the subtle brush work and even in the structure of the layered harmonies of the choruses, while the bass descended to a level which had the very floor humming. A joy.

## CONCLUSION

Meridian can seem such a technology-focused company that at times it's easy to be distracted from the whole point of their innovations — the delivery of music (and movie soundtracks) at the highest levels of reproduction. Their 'digital' active loudspeakers deliver clear advantages in signal paths and processing that allow digital signals to pass with purity to the last possible stage prior to still-analogue amplification and on to the drivers of, in this case, an established high-end performer which thrilled us from top to bottom with its music delivery.

## SPECIFICATIONS

**MERIDIAN SPECIAL EDITION DSP8000**

**INPUTS:** Meridian Speakerlink (RJ45), coaxial digital, Meridian Comms
**OUTPUTS:** Meridian Speakerlink (RJ45), coaxial digital, Meridian Comms
**AMPLIFIERS:** 5 × 150W (each)
**DRIVERS:** 1 × 25mm short-horn beryllium dome with silver voice-coil, 1 × 160mm midrange, 6 x 200mm woofers
**DSP:** 2 × Freescale 56367 running at 150MHz
**DACS:** 2 × 24-bit multi-bit delta-sigma DACs with 128× oversampling ×over: 2.6kHz
**DIMENSIONS (HWD):** 1350 × 158 × 210mm
**WEIGHT:** 105kg
**WARRANTY:** Five years
**PRICE:** $90,000
**CONTACT:** Cogworks on 02 9526 5497 www.cogworks.io

REVIEW

# MOON BY SIMAUDIO 888

**Reviewer** Peter Croft

## POWER AMPLIFIER


We've heard of RMS watts, we've heard of Peak watts, and we've heard of Continuous watts, but we've never heard of Lucky watts, which is what Moon's flagship monobloc power amplifier is claimed to be able to deliver 888 of. At least it's rated with a power output of 888-watts into 8Ω loads. Into 4Ω loads it's rated at 1776 watts. And here in Australia, because our mains supply is 230 volts (kinda), Moon says the Moon 888 is able to deliver 3550 watts into a 2Ω load.

### AN EXERCISE IN ENGINEERING

The Moon 888 is the amplifier you get when you ask your team of electronics engineers to build the best 888-watt amplifier possible, and give them *carte blanche*, so they don't have to worry about how large it is, how heavy it is, or how much it will cost to build. Moon's 888 it's not just huge, it's enormous. It's basically half a metre wide, half a metre deep and a third of a metre high. And because it's a monobloc amplifier, you need two of them, with a stereo pair weighing in at 272kg... not so much a 'two-man lift' as a team-building exercise in logistics.


MOON

THE POWER SUPPLY COMPRISES TWO ENORMOUS POTTED 1kVA TOROIDAL TRANSFORMERS WHOSE OUTPUT AFTER RECTIFICATION IS SMOOTHED BY A TOTAL OF 350,000 MICROFARADS SPREAD ACROSS THREE INDIVIDUAL CAPACITOR BANKS, ALL THE CAPACITORS IN WHICH ARE MADE SPECIFICALLY FOR MOON.

> Even when the Moon 888 is delivering its maximum 3550-watt power output, the output transistors are still working well within their comfort zone

The gorgeous heat sinks you can see down either side of the 888 are not ordinary extrusions, but moulded. What you can't see is that on the opposite side of the sink to the fins, the main printed circuit boards are mounted inside the heatsink itself, which Moon says ensures optimal thermal behaviour. The power supply comprises two enormous potted 1kVA toroidal transformers whose output after rectification is smoothed by a total of 350,000µF spread across three individual capacitor banks, all the capacitors in which are made specifically for Moon. The 24 bipolar transistors in the output have a total capability of 8000 watts, so even when the 888 is delivering its maximum 3550-watt output into 2Ω, they'll still be working well within their comfort zone.

## THE EQUIPMENT

The front panel is bare except for a single standby power switch, above which is a single blue-coloured LED status indicator. On the rear panel you'll find both unbalanced (via gold-plated RCA) and balanced (via gold plated XLR) input terminals. You can use one or the other of these, but not both. We'd recommend using the balanced inputs. Between these two inputs are two toggle switches, one for selecting the input type (balanced/unbalanced) and the other for selecting between a.c. input coupling and d.c. input coupling (about which more later). You'll also find two standby mode switches (also about which more later), and 12V trigger inputs and outputs, so you can have the 888 turn on automatically. There's also a 240V mains power socket (a non-standard 20-amp type) with associated mains power rocker switch and fuse, plus three red LEDs that glow if the amplifier's protection circuitry activates.

The Moon 888 has multiple protection modes. These include thermal protection, which shuts the amplifier down if the heat-sinks become too hot, and d.c. protection, which triggers in the event that d.c. is detected at the input. If this d.c. protection trips too often, Moon recommends you set the coupling switch on the rear panel to a.c. If the amplifier goes into protect mode, the speaker outputs will be disconnected, the front panel's blue LED will flash, and one of three red LEDs on the rear panel will illuminate to indicate the reason: 'Thermal'; 'DC Level'; or 'Other'.

Although there are two pairs of high-quality heavy-duty rhodium-plated speaker terminals, both sets carry exactly the same signal, and have been provided simply to make it easier to bi-wire your speakers.

## IN USE AND LISTENING SESSIONS

To turn on the 888, you operate the main 'Power' switch on the rear panel, after which the front-panel LED turns on and blinks while the 888's own internal circuitry stabilises, after which it turns off. If you now press the 'Standby' button on the front panel the LED will glow continuously to indicate the 888 is ready to use.

The Moon 888 has two basic standby modes: 'default' and 'low power'. If you elect to use the 888's default standby mode, all the various gain

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▷ THE MOON 888 HAS MULTIPLE PROTECTION MODES WITH LED INDICATORS ON THE REAR PANEL. THESE MODES INCLUDE THERMAL PROTECTION, WHICH SHUTS THE AMPLIFIER DOWN IF THE HEAT-SINKS BECOME TOO HOT, AND D.C. PROTECTION, WHICH TRIGGERS IN THE EVENT THAT D.C. IS DETECTED AT THE INPUT.

## SPECIFICATIONS

**MOON 888**

**CONFIGURATION:** Fully-balanced differential, mono
**POWER TRANSFORMERS:** 2 × 1.5kVA potted
**SUPPLY CAPACITANCE:** 350,000µF
**AMPLIFIER CLASS:** A/AB
**INPUT IMPEDANCE:** 24kΩ
**INPUT SENSITIVITY:** 2.4V
**OUTPUT DEVICES:** 24 × bipolar
**OUTPUT POWER INTO 8Ω:** 888 watts
**OUTPUT POWER INTO 4Ω:** 1776 watts
**OUTPUT POWER INTO 2Ω:** 3550 watts
**FREQUENCY RESPONSE:** 10Hz–200kHz ±3dB
**GAIN:** 31dB
**S/N RATIO:** 120dB (ref rated output)
**IMD:** 0.006%
**THD:** 0.04%
**POWER CONSUMPTION:** 50 watts (at idle)
**WEIGHT:** 136kg
**DIMENSIONS (WHD):** 561 × 351 × 676mm
**WARRANTY:** Ten years
**PRICE:** $188,888 per pair
**CONTACT:**
BusiSoft AV on 1300 888 602
www.busisoftav.com.au

stages in the amplifier will remain fully powered up, so that the amplifier maintains optimal operating temperature and will deliver maximum performance the minute you switch it to 'active' mode. The 'low power' standby mode, on the other hand, turns off all the amplifier gain stages, leaving only the control circuitry active. If you use this standby mode, the amplifier will not deliver its maximum performance immediately after you switch to 'active' mode. You'll instead have to wait a while (the wait time will depend on the ambient temperature and how long the 888 had been in standby mode). No matter which mode you use, you can elect for the amplifier to enter it automatically (which happens after the control circuitry has not detected an audio signal for 20 minutes) or for it to stay permanently powered on, ready for instant use.

We auditioned a pair of Moon 888s used in a combination with a Moon 780D DAC and Moon 850P preamp and Moon 820S power supply and using two different speaker systems — a pair of Rockport Technology Cygnus speakers and a pair of Dynaudio Evidence Platinum loudspeakers, both of which have a reputation for being difficult to drive. The Moon 888 obviously hadn't been told about their reputations, because it drove both systems with consummate ease.

The sheer amount of power that's on tap from a pair of 888s is mindboggling, and of course we're spoilt here in Australia with our 230-volt mains supply, because the Moon is able to use our high mains voltage to deliver even more power — and thus greater current — than it is in either America or Canada, where the mains voltage is only 120 volts. Not that we ever got anywhere near utilising the 888s' maximum power output capabilities. Despite the thunderous and at times ear-splitting volume levels at which we were listening, the 888s were just idling along, no matter how hard we tried. We did check the heatsinks from time to time, and they were barely above blood temperature.

But it's not enough for an amplifier to have power — it also needs to be able to demonstrate finesse, and the 888s exhibited this too, whether they were delivering the twangy yet delicate sounds of Joni Mitchell's Appalachian dulcimer, or the pure voice of Melody Gardot as she almost scats *Ain't No Sunshine* over a background of double bass, brass and a tinkling tambourine. On more sparse arrangements of jazz trios, the individual timbres of the instruments are extracted from the recording and placed delicately in the room, seemingly holographically removed from the plane of the loudspeakers.

Indeed, no matter what music we played, or how loudly we played it, this Moon 888 pair proved to be a truly superior amplifier system.

### CONCLUSION

It turns out that Moon calls them 'lucky' watts because the number 888 is considered a lucky combination of numbers in Chinese numerology; in part because when you say '8' in Cantonese, it sounds similar to the word meaning 'to prosper'. So '88' is doubly lucky, and '888' triply so. And to make sure the amplifier is even luckier, Moon not only rates it at 888 watts, but makes sure there are lots of 'eights' in the price as well, no matter what currency you're using to buy it. With regard to that, we don't know if buying a pair of Moon 888s will bring you luck, but we do know you'll be very lucky if you own a pair!

INTRODUCING

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SERIES 2

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WILSON AUDIO

LOEWE'S CREATIVE DIRECTOR BODO SPERLEIN WAS INSPIRED BY BAUHAUS AND THE GOLDEN TWENTIES IN STYLING THE STUNING BILD 9 SERIES, WITH ITS THREE OPTIONS OF WALL, BENCH OR FLOOR MOUNTING.

# LOEWE
# BILD 9.65 OLED
# BILD 7.77 OLED

## OLED TELEVISIONS

Loewe today is most famous for making perhaps the world's most desirable televisions, melding magnificent aesthetics with the highest of technologies for both picture and sound. Here in Australia the brand has recently come under the distribution of Indi Imports, which prides itself on delivering hi-fi at prices near parity with Europe or the States, where possible. Customers over there benefit from the economies of scale available in their larger, more dense markets, so when it happens here, the result really is a win — world-class equipment without the tariff from our tyranny of distance.

### GOING OLED

And where television panel quality is concerned, recent years have seen OLED technology take an unassailable lead over the incumbent LCD panels. In contrast to the LED backlights of LCD panels, OLED shines from the front surface, its self-illuminating pixels allowing infinitive contrast, with the secondary effect of lifting OLED's amazing colours to a thrilling level. By contrast LCD backlights are never fully off, just blocked by tiny holes in the front panel, so that 'absolute' blacks are never achieved. Hence OLED has lifted television to a new level.

So it was perhaps inevitable that Loewe would deliver OLED televisions — how could it not, when it promises the very best! Enter the Loewe bild 7.77 OLED, and the bild 9.65 OLED. The first of these uses the latest 77-inch panel size to deliver a huge television (that's a 195cm diagonal), yet one that Loewe has nevertheless succeeded in making look elegant, with many of Loewe's classic design marks — the central circle and the slim built-in soundbar below, but here only revealed when the screen slides upwards to reveal it, and to deliver a sound backed by 120 watts of internal amplification.

The bild 9 series goes into extraordinary new design territory, as the images here show. Inspired by Bauhaus and Art Deco, Loewe's London-based Creative Director Bodo Sperlein has placed the OLED televisions of the bild 9 range within warm matte-gold or graphite-grey steel stands, creating sculpture that complements the technology.

For each design, Loewe has fashioned a set of mounting options, allowing these super-thin near bezel-less frames to sit oh-so-flush to the wall, or to sit benchtop, or on floor-stands which really do present these televisions as artworks in themselves, coming to life with dazzling images. Again the bild 9's soundbar is hidden until required, while a fabric cover conceals all connections and cables behind.

These Ultra-HD OLED panels support High Dynamic Range in not only the base-level HDR 10, but Dolby Vision and the broadcast HLG standard too, along with all the UHD benefits of wider colour gamuts and high resolution. And as Loewe's Ulf Kaempfer emphasises overleaf, even if the panels are sourced (all the world's TV-sized OLED panels currently come from LG.Display), the final result is still dominantly Loewe, from the image processing 'engine' and software to the supporting components and power supplies. Both ranges here also come with a terabyte of internal storage,

△ MANFRED VON ARDENNE WITH HIS IMPROVED TV TUBE IN 1933. IMAGE: DAS BUNDESARCHIV

so you can record as well as watch TV. And there are matching sound systems — *klang* — with Loewe's Digital Audiolink ensuring best possible quality and an app which links with the likes of Tidal and Spotify to make Loewe TVs also the heart and control centre of a complete audio system. Loewe's user interfaces have long been praised as intuitive demonstrations of the company's software expertise.

## "THE INVENTOR OF TELEVISION"

Such longstanding expertise indeed, that Loewe claims a position as the inventor of television. We have to say 'claims' because they're not entirely alone in doing so — indeed some Scottish, or Japanese, or Russian, or even American readers may have leapt from their reading chairs to hear this, since each of these countries has a foot in the door of this particular Hall of Fame. We can at least elaborate on the Loewe claim, which dates back to 1931, only eight years after Loewe was founded in Berlin by the Loewe brothers Siegmund and David L. They first developed radios, and entrepreneur Sigmund took under his wing one Manfred von Ardenne, wo had already made the significant development of the triple tube, which can be considered a contender for the world's first integrated circuit. Loewe bought the patent, and used the multi-tube in the inexpensive Loewe-Ortsempfänger OE333 radio receiver.

Von Ardenne continued to collaborate with and receive royalties from Loewe, as well as going on to found his own research institute, developing the first electron microscope — and Europe's first all-electronic TV system.

The first public demonstration of this television system, using a cathode ray tube for both transmission and reception, took place on the Loewe stand at the 8th Berlin Radio Show in 1931. Ardenne achieved his first transmission of television pictures on 24 December 1933, followed by test runs for a public television service in 1934, after which the first commercially-made electronic CRT televisions were manufactured in Germany by Telefunken in 1934. (Mechanical televisions called Televisors had been commercially sold by Baird from 1928, though these were more akin to radios with an add-on neon tube, the output of which was moderated by a front-mounted spinning disc.) Ardenne was involved with the world's first electronically scanned television service in Berlin from 1935, culminating in the live broadcast of the 1936 Summer Olympic Games from Berlin to public places all over Germany.

So whether that is enough for Loewe to own the role of inventor of the television, we shall leave to the judgement of history! What is in no doubt at all is the continued ability of Loewe to reinvent the television ever since. The amazing sculptural design of the bild 9 models pictured on these pages — and the exceptional technology within — shows how that art of reinvention continues to this day.

## PRICES & INFO

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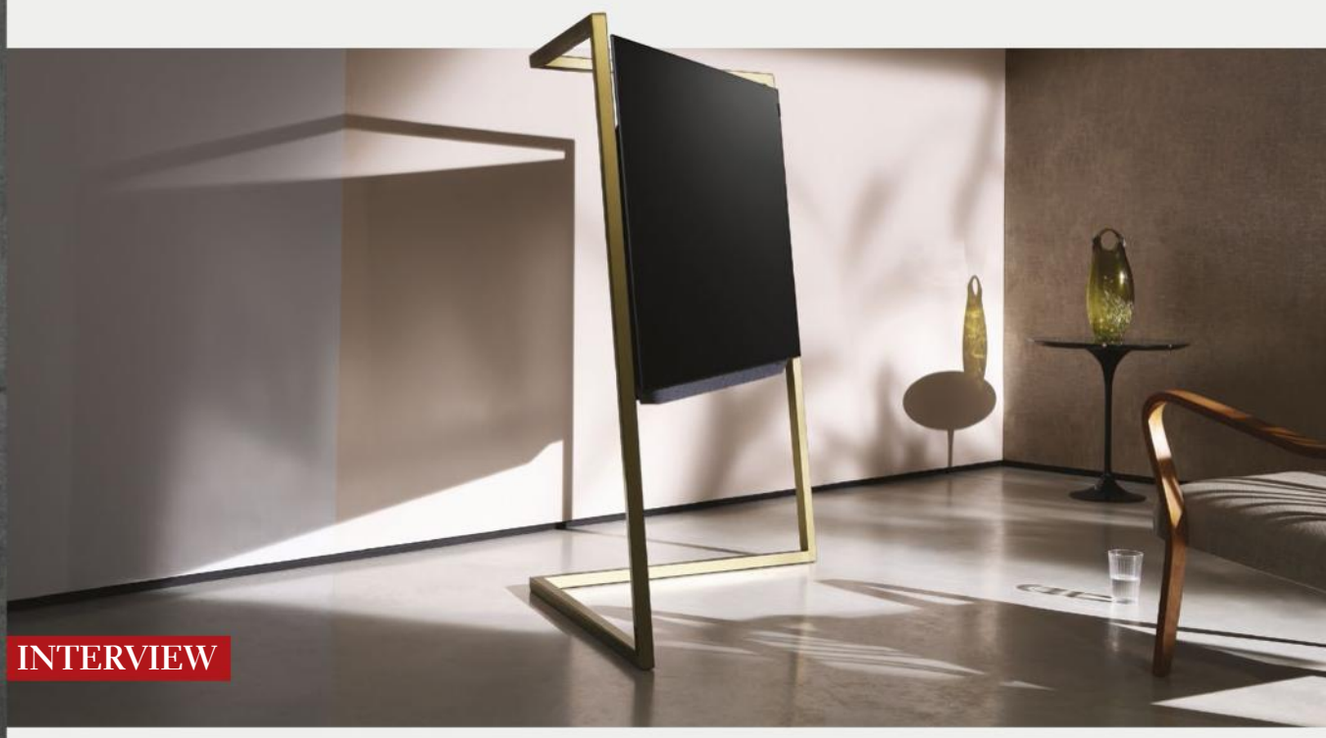

# INTERVIEW

**ULF KAEMPFER** of Loewe Technologies GmbH speaks to *Audio Esoterica*'s Jez Ford regarding what makes Loewe different, and why the company has adopted OLED for its latest premium models.

***Audio Esoterica:*** *What do you feel makes a Loewe different to other TVs?*
**Ulf Kaempfer:** At Loewe we have a history like no other TV in the world. We invented TV, we have been renowned as having the very best tuners and processors. Our dedication to quality has never changed in nearly 100 years... and we are 100% made in Germany. No other brand can claim this.

***AE:*** *What were the design and technical goals for the bild 9 and 7 series? How was Bodo Sperlein involved?*
**UK:** Bodo is our special designer, we believe in him and we know whatever he touches turns to a class winner. His style extends throughout the design world and everyone respects him and his foresight. We wanted the bild 9 to be exactly that… Class. We also wanted something that reflects Loewe's desire to forever push the look and feel of TV further forward. We didn't want just a TV – we wanted a masterpiece. And we believe we have achieved this.

***AE:*** *And why OLED?*
**UK:** We always believed in OLED and we have a strong partnership with LG. Loewe and LG go back to even the tube era. OLED is by far the very best in panel technology, and we also believe we have perfected this by implementing VANTA VISION, the truest black, utilising nano technology.

***AE:*** *The bild 9 has a built-in soundbar but also works wirelessly with the klang 9 — can you explain what audio configurations this makes possible? And how does your Digital Audiolink operate?*
**UK:** Yes this is correct, the sound system is brilliant on its own, however add the klang 9 and you can get yourself a true 5.1 surround sound system with Dolby HD and DTS HD. You have a choice of either 2.0, 3.0, 4.0 — or 5.0 and 5.1 for full surround. The Loewe Digital Audiolink is configured to suit our klang systems plus with the ability to stream any music from Tidal or Spotify etc… so the TV can become your sound system too.

***AE:*** *I was at Loewe's Berlin press conference at IFA in 2013 — at that time you were looking for investors and announced a cooperative relationship with Hisense. Can you briefly bring us up to date on what has happened since then, and how Loewe currently works with different partners?*
**UK:** Hisense is a partner with Loewe only in a small way, and only in the bild 1. However the bild 1 is 80% made by Loewe and Loewe only. We only use their panel, while the engine, power supply, chassis and circuitry is all Loewe proprietary, the software utilises the Loewe OS software which provides seamless connectivity to all Loewe products. Loewe had many offers — including Apple — however Loewe had to be owned 100% under German influence. The heritage and the history must be kept the same for it to be successful and to remain true to its word. We are very proud of this. So since then Mark Huesgues our CEO and his investors have the growth plan to propel Loewe to once more become that brand that consumers believe in and trust, and our partner in Australia, Indi Imports, is already moving with the passion and drive that we have here in Kronach, Germany.

# YAMAHA & THE ART OF MUSIC

## 'NATURAL SOUND'

Of all the companies in the world that manufacture high-end audio equipment, Yamaha is the only one that also manufactures the instruments that are used to make the music that is played using that equipment. Indeed this famous Japanese manufacturer started out making musical instruments (with reed organs in 1887 and following on with upright pianos in 1890). It didn't start manufacturing electronics until 1954… the same year it also established the Yamaha Music School, a now world-wide programme that teaches children to play musical instruments.

Yamaha certainly has a vested interest in teaching children to play musical instruments, because it is not just the world's largest manufacturer of musical instruments, it makes the finest pianos in the world — under its own name and under the 'Bösendorfer' name as well. It keeps these two businesses separate though. All the grand pianos bearing the Yamaha name are made in Japan, and all those bearing the Bösendorfer name are manufactured in Austria. Two other businesses it owns and also keeps separate are Line 6, Inc, a US company that makes electric guitars, guitar amplifiers and guitar accessories, and RevoLabs, a US company that manufactures wireless audio equipment.

Yamaha was for many years also the only high-end audio equipment manufacturer in the world that manufactured the semiconductors that are used in its equipment. In the past, that

manufacturing took place in Yamaha's own wholly-owned factories, but in 2015, like most semiconductor manufacturers, Yamaha decided to go 'fabless', so now, although it still designs its own semiconductors, it outsources their fabrication. Yamaha's ability to do this enables it to achieve things most other manufacturers cannot, such as designing digital signal processors that allowed its receivers to emulate the sound fields of famous venues such as the Village Vanguard nightclub, or the Roxy Theatre.

## MULTI-CHANNEL...

This ability to innovate through processor design put Yamaha in a sweet spot when surround sound took off — indeed when it comes to multi-channel audio, Yamaha has been the undisputed champion of the category ever since. Top billing today goes to the pair of CX-A5100 AV preamplifier and the MX-A5000 11-channel power amplifier (pictured) from the Aventage series, but it is the top one-box Aventage AV receivers that have been awarded 'AV Receiver of the Year' every year for the past eight years by *Sound+Image* — an achievement unequalled in the 29 years the awards have run.

▽ YAMAHA HAS BEEN SO SUCCESSFUL WITH AV RECEIVERS IN RECENT YEARS THAT SOME PEOPLE NEED REMINDING OF THE COMPANY'S LONG STEREO HERITAGE.



△ DEFINITIVELY YAMAHA — THERE'S A CLEAR DESIGN LINE BETWEEN THIS 1954 R-3 HI-FI TUNER AND THE COMPANY'S HIGH-END STEREO SEPARATES TODAY.

This year's winner of that receiver award, the Yamaha Aventage RX-A3070, not only uses the company's processing expertise to deliver the very latest 'object-based' movie soundtracks in Dolby Atmos and DTS:X, it incorporates many of Yamaha's own proprietary circuit technologies under the bonnet, plus some of the best circuits from other manufacturers, such as ESS Sabre ES9026PRO DACs.

Besides the processing, the Aventage receivers are also renowned for the quality of their power. The A3070 includes nine amplifier channels, each rated at 150 watts, plus pre-outs for two more channels — so if you add an additional stereo amplifier, you can implement a full 7.2.4 Dolby Atmos home cinema speaker arrangement.

## ...AND MULTI-ROOM

But Yamaha's receivers are not just for the movies; the RX-A3070 is a music machine as well, coming with the company's full MusicCast offering — another example of Yamaha's ability to develop its own technology. The MusicCast platform was introduced several years back as one of the most versatile wireless multiroom systems on the market, and the one which was applied across the widest range of product, not kept only for a small ecosystem of wireless speakers, as were

> Yamaha's receivers are not just for the movies; the RX-A3070 is a music machine as well, coming with Yamaha's MusicCast...

It was to these classic designs that Yamaha's team turned when it was developing its current top-of-the-line speaker, the NS-5000

▽ THE NS-5000 LOUDSPEAKER IS A CLEAR STATEMENT THAT YAMAHA, WITH AN EYE TO ITS PAST, IS RETURNING TO THE TOP LEVELS OF STEREO REPRODUCTION.

many rivals. Instead Yamaha's MusicCast platform operates across Yamaha's extensive range of audio and AV components — in small wireless speakers, soundbars, AV receivers, stereo receivers, micro systems, standalone speaker units, active stereo speakers… even one of Yamaha Music's Clavinova baby grand pianos. MusicCast brings support for music streaming services such as Spotify, Tidal and Deezer, plus high-res network streaming, Bluetooth in (and out), and AirPlay.

Then there are the multiroom abilities of MusicCast, allowing several rooms or a whole home to be easily 'grouped' using Yamaha's app for smartphones and tablets (iOS or Android). With everything connected via your home network, any of the many inputs to the A3070 can be shared with those other 'grouped' MusicCast rooms, even a turntable plugged into its phono input. Multiroom vinyl — there's a technology tailored to the wants of today!

## YAMAHA LOUDSPEAKERS

One of our favourite examples of MusicCast's versatility is Yamaha's pair of active bookshelf loudspeakers, the NX-N500. In addition to their own in-built amplifiers to deliver anything plugged into the analogue and digital inputs (an on-board USB DAC supports both PCM and DSD bitstreams), the NX-N500's MusicCast abilities add all those wireless music streaming services, Bluetooth, AirPlay, and the multiroom grouping. These speakers are a system in themselves, ideal either as a desktop audio system or as a home hi-fi system, and all under the easy control of that MusicCast app.

And there's one last attraction of the little NX-N500. Its acoustic elements are based on a much earlier Yamaha loudspeaker design, the NS-10M, a small two-way monitor speaker that became a standard in professional recording studios right around the world. And this is, in itself, unusual for a Japanese company — Yamaha is the only Japanese manufacturer that has built loudspeakers that have really achieved world fame for their sound quality, becoming famous in the 1970s for the NS-1000M, a three-way studio monitor that used a beryllium tweeter, and also for the NS-10M monitor.

It was to these classic designs that Yamaha's team turned when it was developing its current top-of-the-line loudspeaker, the NS-5000 (pictured below left) — a clear statement that Yamaha, with an eye to its past, is returning to the top levels of stereo hi-fi reproduction. Of course, as you'd expect from a company that makes the world's best grand pianos, the finish of the NS-5000 speaker cabinets is outstanding — a perfect, rich, deep gloss, piano black finish that's been applied not over the medium density fibreboard that's usually used to construct speaker cabinets, but over white birch plywood sourced from the Japanese island of Hokkaido, where the cold climate gives birch a harder and tighter grain — a far better surface for applying paint, but also apparently sonically superior to MDF.

And just as Yamaha was the first company to use beryllium in speakers back in the 1970s, for the NS-5000 Yamaha became the first company to use Zylon, the world's strongest man-made fibre, one whose cross-sectional strength outperforms steel, carbon-fibre… and even beryllium. It is used to manufacture the NS-5000's bass and midrange drivers, *and* the tweeters, so that one reason for the NS-5000s' incredibly smooth and cohesive sound quality — one that's been commented on by reviewers right around the world — is that they are among the very few loudspeakers in the world where the same material is used for all the drivers. The material from which a cone (or dome) is made is a major contributor to sound quality, yet most manufacturers use different materials for different drivers — usually a paper or polypropylene cone and then either a fabric or metal dome. Obviously, the two different materials can never 'sound' the same, so such speakers' tonal quality must inevitably be different at different frequencies. The Yamaha NS-5000, on

△ YAMAHA IS ONE OF THE FEW JAPANESE MANUFACTURERS USING FIELD EFFECT TRANSISTORS IN THE OUTPUT STAGES OF ITS AMPLIFIERS, RATHER THAN BIPOLAR TRANSISTORS… A PREFERENCE IT SHARES WITH MANY OF THE WORLD'S FOREMOST AMPLIFIER DESIGNERS.

the other hand, has the same tonal quality right across the audio band, thanks to all three drivers being made of identical material.

The NS-5000's Zylon cones and domes are coated with Monel, an aerospace alloy containing nickel, copper and iron, both to add additional stiffness and to protect against both ultraviolet and visible light. Yamaha puts in the extra yards to ensure the longevity of the NS-5000s, and it provides a 10-year warranty, which is not only the longest in the loudspeaker industry, but also twice as long as the speaker warranty offered by all but a few manufacturers. In addition, the NS-5000 comes under Yamaha's one-year 'new-for-old' umbrella warranty, so that in the unlikely event of the speakers needing servicing within 12 months of purchase, Yamaha will give you a brand new pair of NS-5000s.

Before the NS-5000s were revealed to the world last year, Yamaha had already made a clear indication of its intention to reinvigorate its delivery of stereo hi-fi at a high level when it release its drop-dead gorgeous NS-F901 'Soavo' loudspeakers, conceptualised by the artisanship of renowned industrial designer Toshiyuki Kita, delivered in wood finishes (pictured right) as well as, of course, in piano-gloss black. Coming before the Zylon innovation, these featured a high-frequency driver with a dome made from aluminium, and midrange and bass driver cones made from what Yamaha calls A-PMD ('Advanced Polymer Mica Diaphragm'). Ever delivering the unique, these were custom-designed for Yamaha by famous speaker driver engineer Kurt Müller.

## YAMAHA STEREO AMPLIFIERS

Yamaha has also been a long-time innovator in two-channel amplifiers, having been one of the first to use vertical FETs (in its B-1 amplifier) and even going so far as improving on famous US designer Bob Carver's magnetic field amplifier concept by developing the iconic pyramidal B-6 amplifier. Today Yamaha is one of the few Japanese manufacturers using field effect transistors in the output stages of its amplifiers, rather than bipolar transistors… a preference it shares with many of the world's foremost amplifier designers.

The Yamaha A-S3000 is Yamaha's top-line two-channel stereo amplifier (we reviewed it in our second-ever issue of *Audio Esoterica*), and in addition to using MOSFETs, it also has a unique Yamaha circuit where instead of using complementary MOSFETs for positive and negative, it uses exactly the same MOSFET device for the positive part of the signal waveform as it does for the negative part of the waveform. Most amplifiers use complementary devices in their output circuits, an NPN transistor paired with a PNP type or, in amplifiers where MOSFETs are used, an 'N-channel' MOSFET paired with a 'P-channel' MOSFET. In the A-S3000, Yamaha is using only N-channel MOSFETs.

As for why Yamaha opted for MOSFETs rather than some other transistor type, Susumu

△ CUSTOM-DESIGNED DRIVERS IN THE DROP-DEAD GORGEOUS CABINETS OF THE NS-F901 'SOAVO'.


△ STYLE AND SUBSTANCE – YAMAHA'S TOP STEREO PAIRING OF THE A-S3000 AMPLIFIER AND CD-S3000 CD/SACD PLAYER; RETRO ON THE OUTSIDE, UNIQUE YAMAHA CIRCUITRY ON THE INSIDE.

Kumazawa of Yamaha's hi-fi development department says the reason is because MOSFETs have a lower 'on' impedance than bipolar transistors so, in his words: *"they are better to drive loudspeakers and can create the warm sound of valve amplifiers because they take advantage of the same voltage wave element as valve amplifiers."*

Recognising that not everyone will be able to afford an A-S3000 amplifier, Yamaha has leveraged its manufacturing capabilities to build two other almost-identical but slightly lower-powered versions of the A-S3000 in the A-S2100 and A-S1100, both of which use the same output circuitry as the A-S3000, but both of which retail for considerably less.

## CD & SACD PLAYERS

Even with CD and SACD players, Yamaha walks its own path, using Yamaha's own drive mechanisms as well as USB circuitry designed and manufactured by Yamaha. The drive mechanism has 'anchors' attached to it that improve rigidity, block the effects of external vibration, and prevent vibration caused by rotation of the CD or SACD from affecting the circuit board. In order to eliminate any tilting of the mechanism and to achieve stable rotation and ultra-precise signal reading — as well as to reduce the load on the laser servo — each mechanism has to be manually calibrated, which is a time-consuming and labour-intensive process that adds considerably to the cost.

The top-of-the-line CD-S3000 not only functions as a CD player, but also as an SACD player and a DAC. The DAC capability means you can send externally-generated digital information to the CD-S3000 via SPDIF or via USB (with USB you can use it to play back digital files stored on your computer). And if your finances don't stretch to being able to invest in a CD-S3000, Yamaha again leverages its manufacturing capacity to build two other very similar but lower-priced models, the CD-S2100 and CD-S1000.

## DEEP BASS

It should come as no surprise that Yamaha builds powered subwoofers, given its proven expertise in the manufacture of both amplifiers and loudspeakers… not to mention its prowess in the multi-channel home cinema market. And by now it should also come as no surprise that all its subwoofers use unique technology developed by Yamaha itself! Its most prominent subwoofer technology is known as YST, or 'Yamaha Active Servo Technology' (now in its second and 'Advanced' generation, so Advanced YST-II). This circuit combines negative-impedance and constant-current principles to dynamically optimise effective speaker impedance, which enables Yamaha's subwoofers to deliver flatter frequency response across their pass band, and their internal amplifier to better control unwanted cone motion to deliver better bass — a particular virtue when driving the larger bass drivers found in the larger subwoofers in the range, currently topped by the NS-SW1000, with its 12-inch driver and 1000 watts of power to drive it.

## FORETELLING THE FUTURE

No-one can foretell the future, of course, but *Audio Esoterica*'s crystal ball says that Yamaha will soon introduce more high-end loudspeakers, amplifiers and AV receivers, and increase its two-channel product line-up — which will soon include a high-end turntable (we didn't need a crystal ball for this last prediction, as a prototype was recently demonstrated in Tokyo). What is certain is that Yamaha's future will be inextricably mixed with music, and we say bring it on!

## CONTACT

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# McINTOSH MA9000

**Reviewer** Peter Croft

## INTEGRATED AMPLIFIER

Eye candy. Those two words pretty much describe McIntosh's new MA9000 integrated amplifier. It's the best-looking amplifier we've seen in quite a while. When you see one in the flesh, you'll be even more impressed, because there's plenty of it: the MA9000 is the largest integrated amplifier McIntosh has ever built, and if you know McIntosh, that's saying something! And to ensure that form follows function, the MA9000 is also the most powerful integrated amplifier McIntosh has ever built, being rated at 300 watts per channel which, thanks to McIntosh using the same autoformer technology it uses for its valve amplifiers, it can deliver into 8Ω, 4Ω or 2Ω loads. But the MA9000 has another feature that's also a first for McIntosh. The on-board DAC is modular, so should any future digital format come along (or one of the existing formats be upgraded), you won't have to buy a new amplifier. Instead it will simply be a matter of swapping out one module and replacing it with a newer one.


△ THE MA9000 IS NOT ONLY THE LARGEST INTEGRATED AMPLIFIER MCINTOSH HAS EVER BUILT, IT'S ALSO THE MOST POWERFUL.


△ THE SPEAKER TERMINALS ARE UNUSUAL BECAUSE EVEN THOUGH THE MA9000 CAN DRIVE ONLY A SINGLE PAIR OF SPEAKERS, THERE ARE EIGHT BINDING POSTS: FOUR EACH AT EITHER END OF THE REAR PANEL.

## THE EQUIPMENT

We seriously doubt you're ever going to use all the inputs McIntosh has fitted to the MA9000. There are ten analogue inputs and six digital inputs, so sixteen in all! Six of the analogue inputs are unbalanced line-level types, and two are balanced line-level inputs. The remaining two are phono inputs, one for moving coil cartridges, the other for moving magnet cartridges. On the digital side, the DA1 digital audio module inside the MA9000 has two coaxial digital inputs (via RCA), two optical digital inputs (via Toslink), a USB input (Type B) and one MCT input. This last input, the MCT input, is actually a DIN connector but it's used to provide a digital connection between the MA9000 and McIntosh's SACD players.

The DA1 Digital Audio Module contains an 8-channel, 32-bit digital-DAC that McIntosh uses in its quad balanced mode. The USB input can process PCM signals up to 384kHz and DSD signals up to DSD256 and DXD384kHz, while the other digital inputs can process PCM up to 24-bit/192kHz.

With so many inputs, you'd never really remember what's connected to what, so the default labels McIntosh assigns to them (COAX1, COAX2, OPTI1, OPTI2, etc) are not very useful. Luckily McIntosh recognised this itself, and has included a circuit that allows you to re-label all the inputs with custom names of up to ten letters or numbers, making it easy to re-label COAX1 to 'CD PLAYER' for example. You can also use McIntosh's 'TRIM' function to adjust the sensitivity of each of the inputs so that the volume of your loudspeakers remains the same when switching from one input to another. Input switching is via the rotary control on the left-hand side of the front panel, which has a click-stop action and feels beautiful under the fingers. The volume control on the right-hand side of the front panel is a rotary encoder with a silky-smooth rotational action. The output level you set is shown at the right side of the digital display on the front panel as a percentage, rather than a number.

By now you're probably wondering what those 12 small rotary controls on the front panel are for and why we haven't mentioned them already. They're equaliser controls. The MA9000 contains a 12-band equaliser that allows you to adjust the volume by up to ±6dB at 25Hz, 50Hz, 100Hz, 200Hz, 400Hz, 1kHz, 2.5kHz and 10kHz. You can think of a 12-band equaliser as a super-evolved tone control. The MA9000's input selector can 'remember' whether you want to use equalisation on one or more of the inputs. So you could have both your phono inputs 'equalised' and the McIntosh will automatically switch the equaliser 'On' when you listen to LPs, then back 'Off' when you listen to CDs.

Although the McIntosh has a standard 6.35mm (¼-inch) headphone socket on the front panel, the circuit that drives it is anything but standard. It uses McIntosh's 'HXD' (Headphone Crossfeed Director) circuitry to make headphone sound more realistic. The circuit is based on the fact that music played through headphones will always sound different to when the same music is played through a pair of loudspeakers. This comes about because when you're listening to loudspeakers, the signal from the right channel speaker goes directly to the right ear, but it also goes to the left ear, and *vice-versa* for the sound from the left channel speaker. But in addition to this, the sound arriving at the ear that's further away is lower in level, and also slightly delayed, so its phase is different from the signal at the other ear. When you normally listen with headphones, the right ear hears only the right-channel information and the left ear hears only the left-channel information. What a headphone crossfeed director does is try to simulate the 'speaker' experience by feeding volume-adjusted and delayed musical information from the left channel to the right earpiece and *vice versa*. It's not as easy as it sounds, because to sound realistic, the amount of the delay has to vary with the frequency being delivered, and the volume of the delayed signal also has to vary with the frequency being delivered. Dolby Headphone (which was actually developed here in Australia by Lake Technologies) is probably the best-known headphone crossfeed circuit, but many other manufacturers have developed their own, and McIntosh obviously thought it could do a better version. The HXD effect delivered by the headphone socket is not user-adjustable, so you can't control the crossfeed effect, but if you would prefer the standard 'headphone' experience, you can switch the HXD circuit off. As for the circuit itself, McIntosh says it is 'optimised for impedances ranging from 100 to 600 ohms.' You can also adjust the operation of the circuit so that the speakers either stay on when you insert a headphone jack, or are muted.

As you'd imagine, given the number of inputs and outputs on the MA9000, plus the various control features, the rear panel is very 'busy' so that despite the size, almost the entire rear of the amplifier is filled with connectors of one type or another. You'll notice that the speaker terminals are unusual because even though the MA9000 can drive only a single pair of speakers, there are eight binding posts: four at either end of the chassis. The lowest post in each set of four goes to the negative terminal of the speaker. The other three posts on either end are marked 2Ω, 4Ω and 8Ω.


△ AS YOU'D IMAGINE GIVEN THE NUMBER OF INPUTS AND OUTPUTS ON THE MA9000 PLUS THE VARIOUS CONTROL FEATURES, THE REAR PANEL IS VERY 'BUSY'.

You need to determine the nominal impedance of the speakers you're using and then connect the positive terminal of the speaker to one of these three posts. If your speaker has a 6Ω nominal impedance, we'd recommend connecting to the 4Ω terminal. However, if you want more precise matching, it's best if you can find an actual measurement of the speaker's impedance across a wide range of frequencies (called an impedance curve). Using this graph, you should note the speaker's minimum impedance at low frequencies (ignore the low frequency peaks), and use this to determine which of the three terminals should be used. (Our sister publication, *Australian Hi-Fi Magazine*, publishes an impedance curve for every speaker it reviews.)

> Our guess is that the company's primary reason for using autotransformers is to ensure the characteristic 'McIntosh sound' is the same as that of its valve amplifiers

We should point out that although almost all valve amplifiers use output transformers, it's extremely rare for a solid-state amplifier to use output transformers, yet this is the approach McIntosh uses with all its solid-state amplifiers. One reason it's rare is that it's very, very expensive to manufacture a high-quality autoformer. Another is that autoformers are very, very heavy, which dramatically increases the cost of packaging and shipping and the likelihood of the amplifier being damaged during transit. Also, autoformers are large, which increases the bulk of the amplifier. All these traits are evidenced in the design of the MA9000 which measures 445×240×558mm (WHD) and weighs more than 45kg. For transit, the amplifier is bolted to a slab of wood, then placed inside a padded heavy-duty carton, which in turn is placed inside another padded heavy-duty carton, which is then strapped with metal bands.

One advantage of using a transformer (technically an 'autoformer') is that no harm can be done if you use the 'wrong' tap for your speakers. If you connect 4Ω speakers to the 8Ω tap, all that will happen is that more power will be available for your speakers (but the amplifier will run hotter) and if you connect 8Ω speakers to the 4Ω tap the amplifier will still be able to deliver its rated power… unlike a conventional amplifier, where only half the rated power would be available. Another advantage of the autotransformer is that it provides additional protection for both your speakers and the amplifier in the event of an unusual fault condition. However, since McIntosh already has circuitry against fault conditions (PowerGuard), our guess is that the company's primary reason for using autotransformers on its solid-state products is to ensure the characteristic 'McIntosh sound' is the same as that of its valve amplifiers. Not all McIntosh amplifiers have autoformers, but this is likely because of cost (in the case of the MA5300) or size and weight (all the multi-channel units).


△ THE SMALL ROTARY KNOBS CONTROL A 12-BAND EQUALISER THAT ALLOWS YOU TO ADJUST THE VOLUME BY UP TO ±6DB AT 12 DIFFERENT FREQUENCIES. THINK OF IT AS A TURBO-CHARGED TONE CONTROL.

“

A McIntosh really wouldn’t be a McIntosh without those big blue power output meters and that beautiful black glass front panel

## LISTENING SESSIONS

A McIntosh really wouldn’t be a McIntosh without those big blue power output meters and that beautiful black glass front panel — not forgetting those stainless steel end caps — and we really have to hand it to McIntosh for sticking with the same look for so many years. The company came up with this design shortly after it was founded in 1949 and it’s stayed with it ever since, so even though the MA9000 is a brand-new model, it’s very obviously part of a lineage that stretches back nearly 70 years. To call this look iconic would be an understatement.

In fact the meters have changed over the years, in terms of both their electro-mechanical design and their appearance, but this current implementation is the best yet, with the meters moving fast enough to show what’s happening, but with a nicely damped peak hold. McIntosh has managed to arrange the ballistics so that even when the volume is low the meters are always quite active and not just noodling around at the left of the meter face.

You can hear the precision of the McIntosh MA9000’s pace, rhythm and timing on *Votes For Women*, one of the many great tracks on Harry Howard’s new album ‘Sleepless Girls’, a project with Near Death Experience (Dave Graney, Clare Moore, Edwina Preston). The intro has Graney (bass) and Moore (drums) playing around the beat with dazzling synchronicity yet at the same time managing to imply the off-beat. And the MA9000’s implacable hold on the pedal of the Moore’s bass drum is illuminating.

The way the McIntosh MA9000 delivers the drum sound is impressive. The next track, *Primitive Girl*, aurally contrasts Howard’s clangy guitar against Preston’s keyboard and yet again the MA9000 pulls it all together, bringing a cohesiveness that lesser amps just can’t manage. Listen too to the tone of Moore’s drum kit in the run-out, as well as in the lead-in to *Thunderclap*: you’re listening for the clarity and the tonal depth of the sound. The guitar harmonics are also beautifully rendered.

The depth of the stereo image created by the MA9000, along with the way it’s able to transmit the actual acoustic of the venues in which musicians are playing, is insightful. One of our favourite venue-demonstrators is Cyndi Boste’s album ‘Scrambled Eggs’ (also known as ‘The Rose Street Sessions’) which was mostly recorded in an ordinary room straight to DAT, but has one track recorded in a wine bar (*Roller*) and one on stage at the Port Fairy folk festival (*Holy Waters*). You can hear Boste’s voice bouncing off the walls and appreciate the differences in tonality as she moves to and from the microphone. We get the bonus of Linda and Vika Bull on backing vocals and Mia Dyson on lap steel. But contrast this acoustic with that of the wine bar, then listen to how the walls disappear on *Holy Waters*.

The same disc also served to demonstrate the neutrality of the MA9000’s midrange… a neutrality that extended way up into the treble register and beyond, though becoming perhaps a little warm at the extreme top end… a warmth that was rather welcome, actually.

## SPECIFICATIONS

**McINTOSH MA 9000 INTEGRATED AMPLIFIER**

**POWER OUTPUT:** 300 watts/channel
**SPEAKER IMPEDANCE:** 2Ω, 4Ω, or 8Ω
**RATED POWER BAND:** 20Hz to 20kHz
**THD:** 0.005%
**DYNAMIC HEADROOM:** 1.8dB
**FREQUENCY RESPONSE:**
20Hz–20kHz (±0.5dB)
**FREQUENCY RESPONSE:**
10Hz–100kHz (–3dB)
**SENSITIVITY PHONO:** 0.3mV (MC)
**SENSITIVITY PHONO:** 3.0mV (MM)
**SENSITIVITY HIGH LEVEL:**
0.6V/0.3V (Bal/Unbalanced)
**SENSITIVITY (POWER AMP INPUT):** 1.7V
**S/N RATIO:** 82dB (MC)
**S/N RATIO:** 84dB (MM)
**S/N RATIO (HIGH LEVEL):** 98dB
**S/N RATIO (POWER AMP INPUT):** 114dB
**INPUT IMPEDANCE:**
10kΩ/22kΩ (Bal/Unbal)
**HEADPHONE IMPEDANCE:** 100–600Ω
**DAMPING FACTOR:** >40
**MAXIMUM OUTPUT:** 8V/16V (Bal/Unbal)
**HEADPHONE OUTPUT:** 6.35mm with Crossfeed Director (HXD)
**DAC) TYPE:** 8-channel, 32-bit/192kHz PCM/DSD, Quad Balanced
**COAXIAL INPUT SAMPLE RATE:**
24-bit/44.1kHz to 192kHz
**OPTICAL INPUT SAMPLE RATE:**
24-bit/44.1kHz to 192kHz
**MCT INPUT SAMPLE RATE:**
16-bit/44.1kHz (CD), DSD64 (SACD)
**USB INPUT SAMPLE RATE:**
32-bit/44.1kHz to 384kHz (PCM), DSD64, DSD128, DSD256, DXD352.8kHz, DXD384kHz
**STANDBY POWER:** <0.25 watts
**DIMENSIONS (WHD):** 445 × 240 × 558mm
**WEIGHT:** 45.8kg
**WARRANTY:** Three years
**PRICE:** $19,995
**CONTACT:** Synergy AudioVisual on 03 9459 7474
www.synergyaudio.com

The top-end warmth was certainly preferable to the steeliness of the high-end sound delivered by a great many solid-state amplifiers. So definitely no glare, and very definitely no harshness, but at the same time not quite as warm as McIntosh's tubed amplifiers. But the definition was still super-precise, there was no blurring of any kind and absolutely no distortion.

Melba has a reputation for producing some of Australia's best-sounding CDs and SACDs, thanks not only to the performers it's signed, but also because of its fanatical attention to recording detail. That's evident on its recording of Christopher Wrench playing J.S. Bach's Organ Sonatas (BWV 525–530) on the organ in Garnison's Kirke, Copenhagen. The 1995 Carsten Lund instrument has a gloriously bright, vibrant sound and the organ's size perfectly complements the size of the church itself, so it neither overpowers the acoustic space nor falls short in filling it. But as well as capturing the sound of the organ, which is delivered exactly by the MA9000, Engineer Viggo Mango has captured the acoustic space perfectly as well. The background noise of both the recording and the MA9000 is so low that in the quieter passages you hear the sound of the manuals of the organ. You can also hear perfectly the sound decaying in the furthest reaches of the church. Such is the noise floor of the MA9000 that you can also hear the exact point faders have been introduced during post production at the conclusion of movements… and a little too prematurely by our estimation. Perhaps there were constraints on playing time that caused the decay to be curtailed… 77:45 is approaching the limit of an SACD's playing time.

The tunefulness of the deep bass sonorities of the Carsten Lund organ was also the perfect vehicle for demonstrating the tunefulness of the McIntosh MA9000's own bass delivery—strong and highly controlled, as well as outstandingly clear and highly dynamic. If you'd prefer to hear this demonstrated using rock music, you could do as we did and play Rage Against The Machine's self-titled album, throughout which Brad Wilk's kick-drum is a constant pulse, sometimes soft yet other times threatening to crack the skin, while all the time Tim Commerford's bass is a perfect foil, always nimble, sometimes explosive, but always the driving force behind the maniacal energy, not least on *Bullet in the Head*. You might also try the late David Bowie's *Putting Out Fire* where the kick drum catapults what starts as a sleepy opening into a masterpiece of driving anthemic rock.

### CONCLUSION

OK, we were wrong, McIntosh's MA9000 is more than just eye candy, it's ear candy as well. It also has more inputs than you'll ever need, more power than you'll ever use, and its digital section is upgradeable so you won't ever be caught out by a new format. And we were also wrong about having to use two words to describe the McIntosh MA9000. We can do it in one. *Sweet!*


▷ WE SERIOUSLY DOUBT YOU'RE EVER GOING TO USE ALL THE INPUTS MCINTOSH HAS FITTED TO THE MA9000. THERE ARE TEN ANALOGUE INPUTS AND SIX DIGITAL INPUTS, SO SIXTEEN IN ALL.

# CANTON
# VENTO SERIES

**Report** Jutta Dziwnik

## LOUDSPEAKERS

We've always found it interesting that Canton, which is a German company, should use an Italian word to name its penultimate speaker range. That penultimate range is called the 'Vento' Series, and in Italian, 'Vento' means wind. But when you look at the speakers in Canton's Vento Series, from the smallest stand-mount model (Vento 826) to the largest floor-stander (Vento 896 DC) you can see why Canton chose that name, because all the cabinets are very Italianate in their styling… and by Italianate, we mean 'curvy'.

Unlike many manufacturers, which curve the walls of their cabinets by cutting dozens of grooves on the inner

surface and then 'concertinaing' the panel into a curve, Canton uses six layers of laminate, each one of which is individually pressure-moulded into the curve required, after which the cabinets are then coated with a high-gloss lacquer in an eight-stage affair involving multiple sanding processes and lacquer applications. Currently available finishes include Cherry and both Black and White 'high gloss' finishes.

The three floor-standers in the Vento Series, the 896 DC, 886 DC and 876 DC, have 'DC' suffixed after their model number to indicate that these models include Canton's 'Displacement Control' technology, which the company claims can 'decrease the lower cut-off frequency of the drivers by as much as a full octave.'

What Canton's 'Displacement Control' technology does is insert a second-order (12dB/octave) high-pass filter in the low-pass section of the crossover to reduce the bass drivers' output at extremely low frequencies. But by varying the knee frequency of the filter according to the speaker model means that in combination with the filter behaviour of the reflex port itself (at 12dB/octave), the total effect is that of a fourth-order (24dB/octave) high-pass filter, and what this does is prevent unwanted cone movement at low frequencies whilst also eliminating the harmonics of those infrasonic frequencies.

Although the Vento Series has been around for more than a decade, Canton has been continually upgrading and improving it. In some years those improvements have been subtle, such as slight changes in the cabinet design and crossover networks.


However some of the changes have been dramatic, such as the most recent upgrade of the 876 model to include Displacement Control technology. But prior to that, the most recent dramatic change (in 2015) involved replacing the aluminium alloy cones that were previously used to build the bass and midrange drivers with new aluminium cones to which a titanium coating had been applied to the outer surface… an upgrade that applied across all models in the Vento Series.

The titanium is not just 'applied' to the surface as a coating, it's molecularly bonded to the aluminium so that up to 20 per cent of the aluminium is transformed into a unique material. The result, according to Canton, is a much more rigid cone structure that delivers better pistonic motion and is very light in weight, so the motor can be more efficient, resulting in higher overall sensitivity. The titanium also contributes to improved internal cone damping so the cone itself contributes less to the speakers' sound quality. The light weight of the cone means less inertia as well, so the cone can be more easily controlled by any amplifier driving it — even one with a low damping factor, such as a valve amplifier.

Another dramatic upgrade to the Vento Series took place back in 2009, when Canton replaced all the tweeters across the entire Series. In that year, Canton switched from using aluminium dome tweeters to using ceramic dome tweeters. According to Canton, the ceramic domes it uses now are both lighter in weight than the aluminium domes it previously used, as well as being more rigid, thus moving the resonance frequency even higher in frequency and even further away from the audio band. Unlike many so-called 'ceramic' dome tweeters, where a ceramic coating is applied over a metal dome, the dome used on Canton's Vento Series is entirely made of ceramic.

Canton's Vento Series has, over the years, also benefited from technology 'trickled down'

▽ ALL THE CONED DRIVERS IN THE VENTO AND KARAT SERIES USE WHAT CANTON DESCRIBES AS A 'TRIPLE-FOLD WAVE SURROUND.'


from Canton's top-line Karat series. One such is the 'wave' roll surround used on its bass and midrange drivers. Whereas most manufacturers use a standard 'half-roll' suspension to allow cone movement — though some use pleated suspensions — all the coned drivers in the Vento and Karat series use what Canton describes as a 'triple-fold wave surround.' Canton says this type of surround enables greater cone excursion than conventional roll surrounds and less distortion when the cone is operating close to its maximum excursion capability. Because the surround is not symmetrical, it also prevents any potential asymmetric 'rocking' movement of the cone.

The floor-standing models in the Vento series all have down-firing bass reflex ports. The usual problem with down-firing ports is that their performance depends on the floor surface, the speaker height and other variables. Canton has solved this by integrating the plinth into the design and raising the base of the cabinet above the plinth, so the down-firing port always 'sees' exactly the same acoustic environment… and thus delivers perfect performance every time. The plinth is separated from the cabinet by meticulously crafted conical spacers, while high-quality diamond-cut aluminium rings underneath the plinth are said to increase the stability of cabinet and thus improve sound quality.

There are no subwoofers in the Vento Series itself, but Canton has subwoofers in other of its many ranges. Paul Riachi, of Indi Imports, which distributes Canton in Australia, recommends two new Canton subwoofers for use with the various models in the Vento Series — the Canton 1500R ($3299) and the Canton 1200R ($2299). Both these subwoofers use 310mm bass drivers, 310mm passive radiators and have 500-watt amplifiers.

Almost all models in the Vento Series have bi-wireable/bi-ampable 24-carat gold-plated multi-way connection terminals so that the tweeter (and midrange driver, if applicable) can be driven separately to the woofer/s.

Because all the speakers in Canton's Vento Series use either identical or very similar drivers, it also gives users extraordinary flexibility when assembling various different models into a multi-channel speaker system, due to their sonic signatures being almost identical.

## CONCLUSION

Although the Vento Series has changed dramatically over the years, and improved with each iteration as a direct result, one thing that hasn't changed is that Canton is still building them entirely in Germany, and still examines and tests every single speaker it builds, so it can guarantee its customers 100% quality control.

And to us, the combination of German engineering, German build quality and Italian styling, seems the perfect partnership.

> To us, the combination of German engineering, German build quality and Italian styling seems the perfect partnership...

△ UNLIKE MANY SO-CALLED CERAMIC' DOME TWEETERS, WHERE A CERAMIC COATING IS APPLIED OVER A METAL DOME, THE DOME USED ON CANTON'S VENTO SERIES IS ENTIRELY MADE OF CERAMIC.

| CANTON | 896DC | 886DC | 876DC | 836 | 826 | 816 | A800 | 866 |
|---|---|---|---|---|---|---|---|---|
| **Type** | Floor | Floor | Floor | Stand | Stand | Stand | Atmos | Centre |
| **Design** | 3-way | 3-way | 3-way | 2-way | 2-way | 2-way | 2-way | 3-way |
| **Enclosure** | Reflex | Reflex | Reflex | Reflex | Reflex | Sealed | Sealed | Sealed |
| **SPL (dB)** | 88.5 | 88.0 | 87.5 | 85.1 | 85.0 | 86.0 | 86.0 | 87.0 |
| **Freq. Resp** | 20-40 | 22-40 | 23-40 | 27-40 | 32-40 | 40-40 | 50-30 | 26-40 |
| **Crossover** | 250/3k | 300/3k | 300/3k | 3kHz | 3kHz | 3kHz | 3.2kHz | 300/3kHz |
| **Woofer (mm)** | 2 × 200 | 2 × 180 | 160 | 180 | 160 | 160 | 160 | 180 |
| **Midrange (mm)** | 180 | 180 | 160 | - | - | - | - | 180 |
| **Tweeter (mm)** | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| **Height (mm)** | 1100 | 1025 | 950 | 360 | 300 | 300 | 270 | 200 |
| **Width (mm)** | 285 | 250 | 225 | 220 | 195 | 195 | 195 | 600 |
| **Depth (mm)** | 370 | 330 | 300 | 300 | 270 | 90 | 145 | 350 |
| **Weight (kg)** | 28.6 | 18.0 | 15.0 | 8.7 | 6.0 | 4.5 | 3.6 | 14.5 |
| **Price (RRP)** | $6999 | $5999 | $4999 | $2299 | $1999 | $1499 | $1999 | $1599 |

## CONTACT

**CANTON**

**CONTACT** Indi Imports
on 03 9416 7037
www.indimports.com

# GOLDENEAR TRITON REFERENCE

**Reviewer** greg borrowman

## LOUDSPEAKERS

GoldenEar's Triton Reference is this US company's flagship model. It was originally going to have a six-figure price tag, but it was apparently decided that this price would not be in keeping with the company's motto, which is "*We make high-end affordable*".

Yet despite the reduction in resources necessitated by having to build to a selling price less than one twentieth that of the original figure, GoldenEar has still managed to pack more technology — and more drivers, and more amplifiers — into the Triton References than most other speakers selling for two to ten times the price. So it wasn't too surprising that at its very first outing (CES 2017) GoldenEar's Triton Reference picked up its first industry award (for Design and Engineering).

### THE LOUDSPEAKERS

The Triton Reference design is fairly unusual, by which we mean to say it is a type that is very popular with GoldenEar's engineers, but not often found in the products from other speaker manufacturers. That's because it's partially active and partially passive… a so-called 'hybrid' design.

Most loudspeaker manufacturers who build active speakers (where one or more amplifiers are built into the speakers) tend to make their speakers completely active, so there is no need to use an external amplifier at all… indeed that's one of the active design's biggest selling points… buyers don't have to fork out for an expensive amplifier! The GoldenEar Triton Reference has an amplifier built in (two, actually…one in each cabinet), but those amplifiers only power the multiple bass drivers in each cabinet. You still need to use an external stereo amplifier to provide power for the midrange drivers and the tweeters (which are all passive).

◁ THE TRITON REFERENCE DESIGN IS FAIRLY UNUSUAL, THOUGH OF A TYPE VERY POPULAR WITH GOLDENEAR'S OWN ENGINEERS.

GoldenEar's engineers haven't skimped on power it comes to driving the Triton Reference's bass drivers, because the amplifier in each cabinet is rated as being capable of delivering 1800 watts. This power is delivered not to one, nor two, but to three 'race-track' bass drivers, all of which are mounted on the front panel. The reason for the 'race-track' shape is that it has allowed GoldenEar to maximise the cone area on the front baffle whilst at the same time minimising the width of that baffle, which has the effect of improving both dispersion and imaging. Each of these drivers measures around 153 × 254mm, so the total radiating area is about 1650cm$^2$, which means that if GoldenEar had used just one regular circular (conical) driver to move the same amount of air, it would have required a diameter of around 381mm — in other words, there would have been absolutely zero chance of fitting such a driver on the front baffle!

One electronics issue with using three drivers is that their combined impedance is quite low if they're paralleled. For example, if GoldenEar is using three 4Ω drivers in parallel, which is likely, the combined impedance would be just 1.3Ω… a bit lower than the 'comfort zone' for most amplifiers.

This is no doubt one of the reasons GoldenEar is using its own (Class-D) amplifier to drive them. However, it isn't just a power amplifier: GoldenEar has also incorporated a DSP processor ahead of the amplifier which means it can smooth out any 'kinks' in the low-frequency response of the speaker, plus it can build in circuitry to prevent the amplifier from being overdriven… and from overdriving the speakers. Using DSP has also allowed GoldenEar to provide a bass level control so users can adjust the level of the bass to compensate for room placement, poorly recorded music and/or personal preference.

△ IN ADDITION TO THE THREE BASS DRIVERS ON THE FRONT PANEL OF THE TRITON REFERENCE, GOLDENEAR HAS FITTED FOUR PASSIVE RADIATORS (TWO ON EACH SIDE OF THE CABINET) TO AUGMENT THE BASS RESPONSE.

This isn't as easy to do as it sounds, because the upper end of the bass drivers' response always has to integrate smoothly with the response of the midrange drivers… which is another reason for using digital signal processing, rather than trying to do it in the analogue domain. The subwoofer amplifier and the 56-bit DSP control unit inside the Triton Reference are apparently the only components inside it that were not specifically designed for it, but are instead, according to Sandy Gross of GoldenEar: "*an evolution of those used in our Triton One and our SuperSubs*".

In addition to the three bass drivers on the front panel of the Triton Reference, GoldenEar has fitted four (count 'em!) passive radiators: two on each side of the cabinet. These are truly passive, because they are not connected to anything at all… they're essentially just flat vibrating plates. They do, however, provide additional bass output, harnessing the air pressure from the rear of the three bass drivers and re-directing it into the listening room. Each of these passive radiators measures 260 × 242mm.

The 'passive' section of the Triton Reference is comprised of two 153mm conical drivers that are mounted above and below a folded ribbon 'HFVR' tweeter in a geometry that's usually referred to as 'MTM' (midrange-tweeter-midrange)… except that in this case the 'midrange' drivers are not typical midrange drivers because they actually deliver far more bass than you'd expect from a 'typical' midrange driver. It is for this reason that GoldenEar specifically refers to them as 'upper-bass/midrange drivers'. The company says that despite the visual similarities between these drivers and those used in the lower-priced 'Triton' models, the drivers in the Triton Reference have a different cone and larger and more powerful magnets.

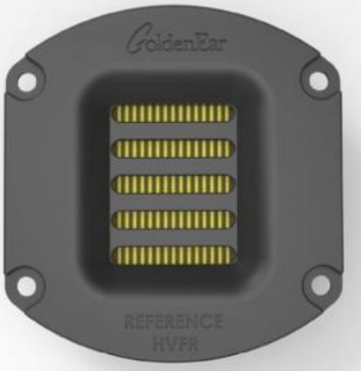
The 'HVFR' tweeter (the initials stand for 'High Velocity Folded Ribbon') is described by GoldenEar as being a 'ribbon' tweeter, but this is not an accurate description, since it's really nothing like the style of tweeter most audiophiles would regard as being a 'ribbon' design. It also works completely differently to true 'ribbon' tweeters. It's actually a variant on a design patented by legendary loudspeaker pioneer Oskar Heil, who called his version an 'air motion transformer' or 'AMT'.

Heil called this tweeter design an 'air motion transformer' because of the method by which it creates air pressure variations (which the ear perceives as 'sound'). Whereas all other loudspeaker designs depend on a diaphragm (or membrane) 'pushing' and 'pulling' the air in front it, the AMT instead 'squeezes' air between different parts of its membrane, and it's this squeezed air that causes the air pressure variations in front of the speaker. To do this, the membrane of an AMT tweeter is not flat but pleated, rather like a child's paper fan. As the pleats move towards each other the air is compressed between the two pleated surfaces, then as the pleats move away from each other, the air is rarefied, and it's in this way that the high-frequency sound waves are created. The pleats in the membrane are super-efficient at moving air (think of the difference between 'squirting' an orange pip away from you by squeezing it between your fingers, compared to throwing the pip with your hand!). Also, because the pleated membrane is inherently 'loose' it has a resonant frequency that's well outside its operating range, which isn't true of, for example, dome tweeters… and especially untrue of hard-dome tweeters!).

Because Oskar Heil's AMT patent has expired, all loudspeaker manufacturers are free to create their own versions of his tweeter… which, because of its superior performance, a great many have done. However, they can't use the letters 'AMT' to describe the tweeter, because these are trademarked. It's for this reason that GoldenEar calls its version an HVFR. Other well-known versions of Oskar Heil's design are made by Elac (which calls its version 'JET'), Precide Audio (which calls its version 'AVT'), Adam Audio (ART), and Sorasound (FAL).

Adam Audio has a particularly clear description of how the tweeter works on its website that's rather more technical than my explanation. It says: *"All other loudspeaker drive units — whether they are voice-coil driven, electrostatics, piezos or magnetostatics — act like a piston, moving air in a 1:1 ratio. This is undesirable, as the specific weight of air is much lower than that of the driving mechanics. Speaking in terms of electrical engineering one could say there is a bad match between source and load. The [air transformer] principle achieves a 4:1 velocity transformation between (the) driving diaphragm and the driven air. In other words, the air moves in and out four times faster than the folds are moving. This superior motor system is responsible for the enormous clarity and transient reproduction…"*

▽ THE 'HVFR' TWEETER (THE INITIALS STAND FOR 'HIGH VELOCITY FOLDED RIBBON') IS DESCRIBED BY GOLDENEAR AS BEING A 'RIBBON' TWEETER.



Although GoldenEar uses 'HFVR' tweeters in other of its models, according to Sandy Gross the neodymium magnet in the version fitted to the Triton Reference is a 50 per cent larger — and thus more powerful — than the magnet in any other GoldenEar HVFR tweeter. He says this results not only in an increase in efficiency, but also an improvement in its transient response. Other refinements in the Triton Reference that are not available in other GoldenEar models include film capacitors to bridge the high-pass section on the upper-bass/midrange drivers.

Visually, the most obvious difference between the Triton Reference and previous Triton models is the external finish of the cabinet. Whereas GoldenEar usually favours the rather cost-effective method of finishing its speakers by covering a raw wooden cabinet with black cloth, it's pulled out all the stops with the Triton Reference, which has a beautiful hand-rubbed piano-gloss black lacquer finish. The speaker bases are not only curved front-to-back — the base itself is higher close to the cabinet, so it curves down as it moves away from the cabinet. All the corners on the cabinets are curved, but the curve at the top edges is more pronounced than the curves from the sides to the back or from the top to the back.

Internally, there are other differences between the Triton Reference and other Triton Series models. The cabinet itself is damped with a newly-developed and apparently proprietary mix of long-fibre lambs-wool, plus it has a 2.5mm-thick steel plate built into the base which not only stiffens it, but also lowers the centre of gravity, and thus gives the cabinet increased resistance to any side-forces that might topple it — which is important for tall speakers with small footprints… which certainly describes the Triton Reference to a 'T'. (Speaking of which, GoldenEar's employees have apparently dubbed theTriton Reference the 'T-Ref' for short… a moniker so quirky it might just catch on.)

## LISTENING SESSIONS

Visually, these are imposing speakers. We thought the black looked gorgeous, which is just as well, because they only come in black — there are no other colour options. The side-firing passive radiators mean the speakers will be very forgiving of less-than-ideal room placements, plus also mean you will be able to put these speakers closer to a rear wall than speakers that have rear-firing drivers and/or ports… though placement at least one metre from a rear wall will almost always result in the best sound.

Despite the addition of weight at the bottom of the cabinet, and the large base, the Triton

△ THE RACE-TRACK SHAPE OF THE BASS DRIVERS ALLOWS GOLDEN-EAR TO MAXIMISE THE CONE AREA ON THE FRONT BAFFLE WHILST AT THE SAME TIME MINIMISING THE WIDTH OF THAT BAFFLE, WHICH HAS THE EFFECT OF IMPROVING BOTH DISPERSION AND IMAGING.

Van Der Hoeven explores the lowest notes of his double bass on this album, and the GoldenEars follow downwards in pitch with unerring obedience

Reference is still not overly stable if you give the cabinet a good push from either side… though it's very stable front-back. This front-back stability is good, because we found that for perfect imaging the tweeters need to be aimed at the listening position, which means tilting the cabinets forward a little by adjusting the spikes in the base and toeing the speakers inwards. The further away your listening position from the speakers, the easier this will be to accomplish. But if you can't quite manage this ideal, you'll still get excellent imaging… just not perfect imaging. The sonic balance is the same in this situation, but the stereo image will snap into focus when the tweeters are aimed directly at your head.

Our first-up listening task was to establish the best setting of the volume control on the rear of each speaker, and an excellent work to use for this task is 'Who's Got Its Own?' (Stazioni Sonore) where you can balance Nicola Vernuccio's beautifully-mic'd double-bass against Claudia Tellini's stunning voice using such tracks as *Money* (Roger Waters) or *Mountain O' Things* (Tracy Chapman). Once achieved, we simply revelled in the exquisite tonal delivery of the double-bass's sound, all 'stringy' and 'depthy' and with just the appropriate amount of 'woodiness'. The Triton Reference delivered the bend of the strings and the sound with an exactitude that was truly uncanny.

That the Triton References' frequency response is not only flat across the midrange but also truly flat and extended at both ends of the audio spectrum was immediately made evident when we played Glenn Gould's 1981 recording of Bach's *Goldberg Variations*, where he not only artistically re-imagines the work completely from his 1955 reading, but also has mastered the art of extracting the exact sound from his piano that he wanted (not only from the piano itself, as regards tuning, but also the sound of the recording of that piano). We found that the GoldenEars perfectly delivered what Gould intended, with exactly the correct pianistic tonality and a beautiful balance of the lower octaves against the upper. Where Gould plays staccato, the GoldenEars respond instantly and exactly, no matter how hard Gould attacks the keyboard (and he could be very brutal). In such moments we heard no signs of overload or distortion, and each note started and stopped at exactly the right time, demonstrating both the superb transient response of the drivers and the suspensions' control of them, to prevent overhang. It can sometimes be difficult to hear the more subtle shading Gould uses in his playing, but with the Triton References that wasn't an issue — even the subtlest shading was perfectly audible… and it's this that lifts Gould's performance to the highest echelons.

The ability of the GoldenEars to play both deeply and loudly at the same time really came into play when we played well-recorded pipe organ works, in particular our favourite Jean Guillou disc on Dorian, where he plays the Great Organ of Saint Eustache, in Paris. This disc has some of the lowest musical frequencies ever recorded... notes that you'll not only hear when you audition the Triton References, but will also feel — particularly if you crank up the volume. The low-frequency energy created in the room is such that you may have to Blu-tac small objects in your room to the shelves they're standing on in order to prevent them from vibrating off! But it isn't only power and majesty at these high volume levels — just listen to the way the Triton Reference reproduces the delicate stopped sounds on Mozart's *Fantasy in F Minor* (K608).

As for potential maximum volume levels, we were listening in a large room 5.5 metres by 10 metres with a 3.0-metre ceiling — and with 300-watts per channel at our disposal — and we were regularly cracking sound pressure levels of more than 100dBSPL at the listening position, during which times the Triton References sounded just as clean and sweet as when we were playing *pianissimo* down in the low 70dBs.

We used a 300-watt per channel amplifier, but the fact that the Triton References' own amplifiers are doing all of the heavy lifting in the bass means you could easily get away with using a much lower-powered amplifier and achieve exactly the same result.

The GoldenEar Triton References handle sibilants beautifully. On Janis Ian's most recent digital remaster of her song *Stars*, for example, all the 'ess' sounds (and there's a lot of them on a song called *Stars*!) can sound a bit too sibilant on speakers that are overly articulate, yet played on the Triton References the sibilance was certainly there (it's on the original analogue tapes, after all) but it's not emphasised at all... it just has you thinking to yourself: '*If only she'd moved back a little from the microphone*.' Although *Stars* is a favourite track for testing a loudspeakers' ability with sibilants, we can't ever play it without following up with *At Seventeen*, not just because of the quality of the song-writing, but also for the purity of Janis Ian's vocal, which was reproduced with delightful accuracy by the Triton References.

Listen carefully to the backing on this track and you'll also clearly hear some unwanted fretboard squeaks that aren't as audible on lesser speakers, so you can be assured that the GoldenEars are 'telling it like it is' and not glossing over imperfections in recordings.

Listening to the Triton References playing Jethro Tull's classic 'Thick as a Brick', the percussion

sound was a standout throughout, and the height of the speakers helped in delivering a soundstage that was not only wide and deep but also had realistic height, so you could actually hear the hi-hat sound as issuing from 'above' that of the rest of the kit.

The dynamics of flamenco are a superb test for any loudspeakers, not just for the guitar sound, but also for the hand-clapping and the percussion. One of the best recordings we've ever heard is of Carlos Heredia on the album 'Gypsy Flamenco', recorded by Bob Katz for Chesky. Close your eyes and you can almost visualise the 'palmas' (hand clappers) at the side of the stage. If this recording has a fault, it's that the acoustic is more 'live' than you would hear when you're actually listening to flamenco live — either in-doors in small or large venues… or even outdoors. I guess it wasn't practical for Chesky to make the recording with a live audience to soak up the echoes… and the high-frequency purity of the Triton References is such that you hear all these echoes very clearly.

When it was time for something completely different (as the Pythons would say), we turned to Abbe May's 'Kiss My Apocalypse', which was a great test of the Triton References' powered bass section, thanks to the extensive use of synthesised bass on this album, not to mention the extensive use of synthesisers and drum machines. Listening to the machine-gun-like bass in the track *T.R.O.U.B.L.E.* via the GoldenEars was like listening to an alternate reality.

The sound of a violincello is a great test for any loudspeaker, and Maya Fridman plays cello like you've never heard it before. Pianist Atzo Kohashi says of it: "*When I first listened to Maya's cello playing, I was intrigued by its hue changes — various shades and colours... her cello sometimes sounds like Albert Ayler's saxophone and sometimes just like a human crying.*'

The two musicians team up with Frans Van Der Hoeven (double bass) on the album 'Elegy', which is a sonic miracle… and you can hear just how miraculous it is when listening to it using the GoldenEar Triton References. The cello sound in Carla Bley's *Utvikingssang* is from another world entirely, its high frequencies so high as to be almost beyond human hearing, and reproduced sublimely by the Triton References. Van Der Hoeven also explores the lowest notes of his double bass on this album, and the GoldenEars follow downwards in pitch with unerring obedience. Piano sound, reproduced a single note at a time (via a Prosonus Test Disc), showed the GoldenEar Triton Reference's frequency response to be very flat right across the entire 88-note range of the grand piano.

We put this enviable linearity to a more musical test by playing Simone Dinnerstein's magnificent performance in Berlin at the Philharmonic, captured for posterity on 'The Berlin Concert' (Telarc CD-80715). She delivers a stunning rendition of Bach's *French Suite No 5 in G Major* (the Gavotte of which is one of the most joyous pieces of music you'll ever hear).

Her performance of Beethoven's *Piano Sonata No 32 in C Minor* is also pretty special. Telarc's engineers did a superb job with this recording, managing to capture the exact sound of the hall's Steinway, as well as that of the acoustic of the hall itself. Both are delivered to perfection by the Triton References. Turn off the lights, relax and you could be in the hall itself (though not in a seat, mind you, but floating in the air where the microphones were positioned).

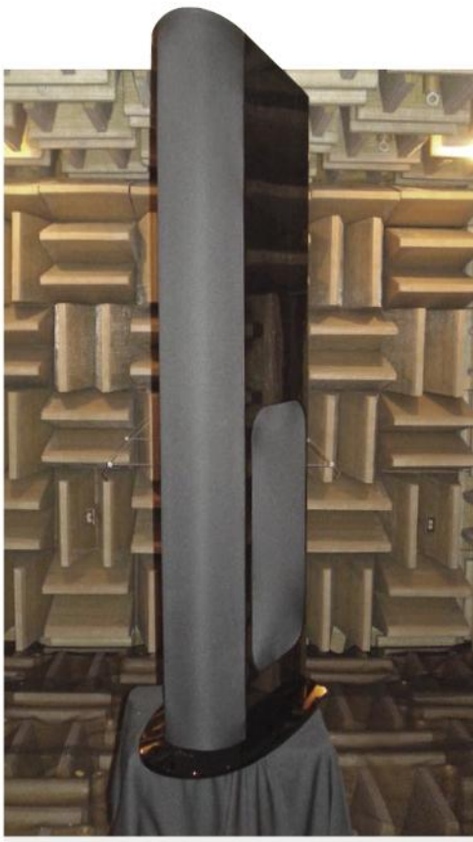
Great audience too. You don't even hear them until they start clapping. (And the sound of that applause is exactly true-to-life as well.) Listen also to the sympathetic resonances of strings that haven't actually been struck, but are simply resonating because of the lyre of the piano and other strings alongside them — all of which deliver the sound of a 'real' piano into your room, and the Triton References do this as well as any speakers we've ever heard.

The GoldenEar Triton References delivered Leonard Cohen's gravelly baritone on *Chelsea Hotel #2* with the same distinctive timbre we've experienced in his earlier live performances, yet is one that eludes lesser loudspeakers. On *Take This Longing*, the sound of the bass lines are outstandingly good, as are the tonalities of the various guitars. The intakes of breath on *Famous Blue Raincoat* are so realistic that it was almost as if there was someone hiding behind the right speaker… something that's almost possible: they're that big!

## CONCLUSION

It seems strange to be saying it of a pair of loud-speakers with the sticker price of the GoldenEar Triton References, but they really do live up to GoldenEar's famous claim of 'making the high-end affordable', because they are truly 'high-end' loudspeakers, and although they are expensive, they are far, far more affordable than almost all their high-end competitors, plus they also sound a whole lot better than many of them as well.

GoldenEar's biggest problem is going to be how to convince someone who has already planned on buying one of the 'big-name' high-end loudspeaker brands to give the Triton References an audition before doing so. We can only hope this review encourages them… and that's you, dear reader… to do just that.



## SPECIFICATIONS

**GOLDENEAR TRITON REFERENCE**

**FREQUENCY RESPONSE:** 12Hz–35kHz
**EFFICIENCY:** 93.25dBSPL
**IMPEDANCE:** 8Ω (Nominal)
**BUILT-IN SUBWOOFER POWER:** 1800 watts
**DIMENSIONS (WDH):** 343 × 565 × 1474mm
**BASE DIMENSIONS (WD):** 345 × 564mm
**WEIGHT:** 49kg
**PRICE:** $15,495 per pair (RRP)

**CONTACT:** Kedcorp Pty Ltd
on 02 9561 0799
www.kedcorp.com.au


△ THE SHANGRI-LA AMPLIFIER IS QUITE THE PHYSICAL PRESENCE, ITS TOP PLATFORM OF TEMPERED GLASS EXTENDING WELL FORWARD OF THE MASSIVE SUPPORTING BASE OF AIRCRAFT-GRADE ALUMINIUM ALLOY — ITS DESIGN WAS, WE GATHER, INSPIRED BY THE LANDING STRIP OF AN AIRCRAFT CARRIER...

REVIEW

# HIFIMAN
# SHANGRI-LA

**Reviewer** Jez Ford

## ELECTROSTATIC AMPLIFIER & ELECTROSTATIC HEADPHONES

△ SET-UP OF THE VALVES IN THE MAIN UNIT REQUIRES THE USUAL BIAS ADJUSTMENT AFTER A FULL WARM-UP, PERFORMED HERE THE OLD-FASHIONED WAY WITH A MULTIMETER AND TEST POINTS.

In the 1930s, James Hilton's novel 'Lost Horizons' became America's first ever mass-market paperback, its tale of a lost Himalayan kingdom finding millions of readers, including Franklin D. Roosevelt, who later named his Presidential country retreat (now known as Camp David) after the book's mythical land — Shangri-La.

Well, mass market is definitely not a term that could be applied to this remarkable product from HIFIMAN. Quite the opposite: we believe the Shangri-La currently qualifies as the world's most expensive headphone system, challenging Sennheiser's HE 1, successor to the Orpheus, which was previously reviewed in these pages. The Australian price for the Shangri-La is $77,999. The Sennheiser is priced here only in Euros, so it changes every day, but as we write it's a few grand cheaper. Let's not quibble. We came here to listen. What exactly makes the Shangri-La such an uber-high-end proposition? And does it, as the name is presumably selected to imply, deliver on its promise of transportation to a sonic paradise?

## WAVING THE FLAGSHIP

The Shangri-La is the "ultimate flagship" of HIFIMAN, a company which today is headquartered in Tianjin, China, with R&D in Shanghai, software development in Shenzen and production facilities in Dongguan. But it was actually in New York that the company's founder Feng Bian, widely known as Dr Feng, first began his adventure in personal audio, founding Head-Direct.com in 1995 as a "head-fi" web-store, introducing the HIFIMAN brand in 1997 for humble in-ear headphones before moving into the planar magnetic designs for which the company has since become famous. (Our sister magazine *Sound+Image* has twice awarded HIFIMAN designs with the accolade of Headphone of the Year.) It also notably released a very early high-res audio portable player — two years before the first Astell&Kern player of that ilk appeared.

The Head-Direct web store still operates in the United States as a portal for the brand, but you won't find the Shangri-La available for purchase there. The company is fully aware that this is a product requiring professional demonstration and set-up, so that only authorised dealers will have it available, or on display, and purchasers will have full assistance in setting it up in their own home after the wait period required to build each individual order. Set-up of the valves in the main unit requires the usual bias adjustment after a full warm-up, performed here the old-fashioned way with a multimeter connected between earth and the testing points. Test, adjust, wait half an hour, test, adjust. And again. And again if necessary. While your average audio geek may revel in bias adjustment as part of the true valve experience, those who are in it simply for the music will appreciate a professional eye — and steady hand — in setting up such a premium product.


## THE THICK AND THIN OF ELECTROSTATICS

HIFIMAN has become best-known for its planar magnetic headphone designs. Planar magnetics are entirely different from the usual cone speaker design, instead using a large flat surface excited into motion by the electromagnetic force created by conductors woven across its surface. These move as their electrical signal varies within a fixed magnetic field generated by magnets on each side, thereby driving the membrane across its entire surface, as opposed to the pistonic motion of a conventional dynamic headphone. The technology is notable for allowing smaller signal details to be portrayed and far more rapid transients to be reproduced. Hence planar magnetic headphones are famed for their detail and speed.

But the Shangri-La design is not planar magnetic, it's electrostatic. Dr Feng has previously delivered an electrostatic design in the 'Jade', and the Shangri-La originally began as the development for a 'Jade 2'. And in electrostatic designs it is the diaphragm which is held at a fixed charge, while the varying voltage from the

△ 300B TRIODES ACT AS THE DIRECT DRIVING STAGE, WITH NEITHER A TRANSFORMER NOR CAPACITORS BETWEEN THE VALVES AND THE HEADPHONES' STATORS.

amplifier is applied to the metal plates (stators) on either side — though here the metal 'plates' are in fact an exceedingly fine mesh metal grille (a full metal plate would block the diaphragm's sonic output) with the mesh here specified at 50 micrometres, which HIFIMAN promises will be acoustically transparent to any audio frequencies below a million hertz... which should about cover it. A dust cover a mere "nanometer-thick" prevents the anaethema of any small particle 'spotting' the diaphragm, while still ensuring that acoustic transparency.

> In an electrostatic design it is the stators, not the diaphragm which receive the varying amplifier voltage that then drives the diaphragm

So in an electrostatic design it is the stators, not the diaphragm which receive the varying amplifier voltage that then drives the diaphragm. But electrostatic diaphragms are so thin that they are generally some form of plastic, and so non-conductive. Here a coating of unspecified nano-particles has been applied to the diaphragm in a regular lattice pattern, to allow the required static charge to be maintained, with the bias up at 650V. Remarkably, even with its coating the diaphragms here are claimed to be less than 0.001mm thick — that's a single micron. (For comparison purposes, a single page of this magazine is more than 100 times thicker than the diaphragm of the Shangri-La headphones.) The voltage on the stators, which are held in place by an alloy frame, varies up to 450V RMS (1200V peak), and the biased diaphragm is forced to move by the resulting electric field.

Do we worry about putting such high voltages rather close to our ears? No we don't, because they will only kill you in combination with high current, and the currents here are tiny (and there is protection circuitry in the amplifier to prevent them becoming any higher).

The Shangri-La headphones themselves are utterly comfortable, their ear-oval headshells feeling light and spacious to wear, a perforated leather fit-band keeping them perfectly in place. They're good-looking things, too, with their wooden edging and wide open outer cheek.


HIFIMAN

THE SHANGRI-LA HEADPHONES THEMSELVES ARE UTTERLY COMFORTABLE, THEIR EAR-OVAL HEADSHELLS FEELING LIGHT AND SPACIOUS TO WEAR, A PERFORATED LEATHER FIT-BAND KEEPING THEM PERFECTLY IN PLACE.

## DESIGNATED DRIVER

The Shangri-La amplifier is quite the physical presence, its top platform of tempered glass extending well forward of the massive supporting base of aircraft-grade aluminium alloy — a grade of appropriate quality since its design was, we gather, inspired by the landing strip of an aircraft carrier (though we couldn't tell you quite why). The wide top platform extends forward in gloss black with its valve complement to the rear, the large output valves outflanking the smaller preamp tubes across the unit's width, all eight surrounded by a three-level ´tube guard protector' which, we might note, may protect the valves but won't stop anyone who doesn't know better from touching them.

Connections at the back include one balanced pair of inputs and one unbalanced; a small switch at the rear defines your choice. To the left of the inputs is the adjustment window with which you do the bias check on the main triodes (see below), and to the left of those are the mains input, fuse and voltage selector.

The sides of this main unit are fully ribbed with heatsink, and these get similarly hot even when the amp is idling — good old Class A! — so that HIFIMAN's advice about positioning should most definitely be heeded — 30cm of space on all sides to allow sufficient room for heat dissipation.

We'd suggest you keep yourself a similar distance — as you lean in you can feel the warm glow from the valves and heatsink… sit too close and we reckon you'd end up with a suntan after a lengthy listening session.

> A further and particular path to purity here is that the Shangri-La amplifier is an OTL (Output Transformer-Less) design

At the front of the extending top plate is a wide silver knob for volume control, which clicks audibly as you step through its 24 levels, since this is a digitally controlled relay-switched resistor matrix, employing 23 separate resistors to eliminate noise.

Below the top surface are the two five-pin headphone connectors — yes, you can listen with a friend given a second suitable pair of electrostatic headwear — a big illuminated power button, and the screenprinted company logo and model name.

So those large valves in the output stage are 300B triodes, a design adored by audiophiles for their linearity, low noise and good reliability — despite being created in the 1930s for use in telephony and later as voltage regulators. Indeed we can thank audiophiles of the 1990s for their survival to the present day, since the last Western Electric Type 300B was manufactured in 1988, and a decade of scarcity followed before several companies began manufacturing them again in the late 1990s. Valve quality today can vary enormously, but it seems safe to say that those in the Shangri-La, which come as matched pairs, are of the highest order, being a custom design supplied by Full Music, a valve specialist conveniently located in HIFIMAN'S HQ city of Tianjin. These are custom 300Bs made specifically for the Shangri-La — you can see the handwritten stock numbers if you peer through the glass.

These four 300Bs in the output stage are preceded by a set of four 6SN7 dual-triode preamp valves, another valve design which enjoyed a 1990s resurgence among audiophiles, and here again a custom version; they are direct-coupled to the 300Bs with the entire design being fully balanced through the two gain stages, and pure Class-A in operation throughout.

A further and particular path to purity is that the Shangri-La amplifier is an OTL (Output Transformer-Less) design, with the 300B triodes acting as the direct driving stage, with neither a transformer nor capacitors between the valves and the headphones' stators. With four 300B valves in the amplifier, that translates to each one feeding a single stator directly, so two 300Bs dedicated to delivering the movement of each diaphragm.

It's perhaps ironic that valve amps which do use output transformers can often expend much of their budget there, with hand-wound silver wiring and the like. OTL valve amp designs are exceedingly hard to deliver for driving loudspeakers, at least without great stress on the valves, but the lesser demands of a headphone diaphragm have given HIFIMAN this option, which effectively puts your ears as close to the pure output of the 300B valves as is possible.

## LISTENING

Which brings us to the sound. We listened through the balanced inputs using Cardas Clear interconnects to a Resonessence Invicta Mirus Pro DAC playing via USB from a Macbook running Audirvana Plus, and we ran everything from med-res files through CD quality to 24-bit/192kHz PCM and double-DSD. It's a delightful way to enjoy music — bar Audirvana's habit of clipping song starts.

We warmed up our ears with some gentle delights — Naim's 24/192 remastering of *Night Train* by Antonio Forcione and Sabina Sciubba,

## SPECIFICATIONS

**HIFIMAN SHANGRI-LA**

**DESIGN:** Electrostatic headphones with valve headphone amplifier
**QUOTED FREQUENCY RESPONSE:**
20Hz–50kHz ±1dB;
7Hz –120kHz ±10dB.
**VALVES:** 4 × 6SN7 Dual Triodes, 4 × 300B Triodes
**VOLUME CONTROL:**
24-step discrete resistor relay-switched matrix
**BIAS VOLTAGE:** 550V-650V
**DIMENSIONS (AMPLIFIER):**
438 × 459 × 336mm
**WEIGHT (AMPLIFIER):** 16kg
**WEIGHT (H/PHONES):** 374g
**WARRANTY:** Five years, One year on valves
**PRICE:** $77,999

**CONTACT:** Addicted to Audio on 03 9810 2999 (Melbourne); 02 9550 4041 (Sydney)
www.addictedtoaudio.com.au

and immediately the electrostatics were demonstrating their spectacular speed and delivery of detail minutae… the delicacy of touch to the twin panned guitars, their slides, their plucks, while Sciubba's central vocal was no big solid midrange lump, rather the half-whispered light vocal that it should be. Nick Drake's *Poor Boy* (24/96) followed, from his second album — the tape hiss evident but soon forgotten under such realism in presentation, and when the right-channel backing vocals arrive (PP Arnold and the Apple-signed 'Mama Soul' Doris Troy), the stress-melting process delivered by the finest of audio had begun.

And nothing melted us more than Holly Cole's take on Tom Waits' *(Looking For) The Heart Of Saturday Night* (CD resolution), just super-sultry from the first touch of piano, acoustic bass and Holly humming — and what shape and reality of form to the acoustic bass here, and how well the dynamic lift of the middle eight was handled — lifted, but not to the slightly shouty effect we've heard on lesser equipment.

'Such audiophile fare is easy!', we hear you cry. Let's get crankier (in the sense of volume rather than moodiness) with Bowie's enigmatic *Blackstar* (24/96). Every inch of its strange mix of softness and drum'n'bass beat was revealed in extraordinary detail. The drums — which can sound programmed on lesser equipment — were here not only clearly an acoustic performance but their dynamic give and take through the verses, their support by occasional synth bass and guitar chops were all unstranded and on display within Tony Visconti's carefully constructed whole. By the four-minute breakdown and the divinely dreamy middle eight we were fully blissed-out, eyes moist, skin in 'alert' mode from forearms to neck nape. This is the magic we seek.

We ran through our favourite Holst — *Jupiter* and *The Perfect Fool,* the latter by the BBC National Orchestra of Wales on 24-bit/44.1kHz, and how magnificent the orchestral portrayal, the acoustic space, the staging of individual groups and soloists within the whole — electrostatics are invariably a classical buff's dream and the Shangri-Las give you as good as it gets. A double-DSD dose of Martin Vatter, the German pianist, showed the Shangri-La's absolutely accuracy with piano tone, attack and rivetingly real dynamics — in-the-room stuff.

We did run some of our standard sweeps and test tones through the Shangri-La system; we could hear from 20Hz up, and as high as our hearing allowed, and with not a perceived bump or dip between; response was as flat as we've heard.

We did expect trouble with our shriek-testers — but even here the Shangri-La's revealing nature proved able to present Dion's *(I Read It) In the Rolling Stone* without pain, in fact, utterly accurate, just on the turn, which makes it such a good shriek-tester in the first place. On the other hand it took the stodginess of Paul McCartney's *My Valentine* and clarified the vocal identifiers so effectively that we've never heard this more enjoyably delivered. As for the unlimited high-res re-master of Macca's *Every Night*, how that right-channel snare did snap in this simplest and cleanest of recordings.

The rapid jazz of Acoustic Alchemy's *Marrakesh* (24/96) is one we play as a timing test, and here the handling of the hyper-rapid leading edges of the lead acoustic guitar plucks we've never heard more effectively clicky. Oh those 300Bs!

We were notching the level up fairly slowly with the audible clicks of the resistor matrix; the danger of such exceedingly low distortion as this is too turn things up further than required. We did this with Led Zeppelin's *In The Light*, and for the most part it was just as thoroughly enjoyable at such a high whack, but we could sense that too loud could mean too pushy… backing off slightly delivered the true perfection that the Shangri-La combo can achieve at its best.

So, every genre nailed, every detail revealed — the speed and deftness of the Shangri-La proved a thrill a minute, not through pyrotechnic performance but by sheer delight in finding not only the truth of a recording being revealed, but the musical intent flooding through as well.

### CONCLUSION

Crazy money? The entire first run of Shangri-Las sold out. So apparently not. This is a no-compromise design, each one built to order, taking around 120 days to build. The good news is that you can arrange for an audition of the Shangri-La in order to experience for yourself the extraordinary sensation of having your ears so close to the unbridled output of the wonderful 300B valves. One warning — make sure you get any other auditions out of the way first, because after a session in the not-so-mythical paradise of this Shangri-La, everything else becomes an unbearable downgrade.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REVIEW

# MICROMEGA
# M-150

**Reviewer** Jez Ford

## AMPLIFIER

What is it with the French? As a nation they celebrate their *joie de vivre*, and in hi-fi there is certainly a *soupçon* of *vive la difference* to their creations, a penchant for that *je ne sais quoi* which lifts their products above the crowd. French loudspeaker companies famously favour the sphere as an acoustic enclosure, and more recently French audio electronics companies have delivered wild levels of innovation, notably Devialet's sleek Expert amplifiers and rather less sleek (some might say bonkers) Phantom active speakers.

From a first glance at the new M-One, you might think that Micromega has been watching this development closely — there's a certain *déjà vu* in the company's choice of a wide flat amplifier chassis. *Mais au contraire* — the M-One diverges from Devialet's offerings on almost every level, from its choice of amplification genre to its delivery of aesthetic finish. Besides, Micromega needs no new urge to diverge — this is a company which has long walked paths less travelled. We remember its avant-garde designs in the late 1980s polarising opinions — the Trio system in particular providing cachet for a clique of connoisseurs. While the new Micromegas share the Devialets' wide flat form and dual-position wall-mountability, they deliver plenty of differentiations all their own. Let's open a dossier.

### BLACK, SILVER OR RAINBOW

The M-150 arrives in a wide box, its outer cardboard carton looking much like a flatpack table, except for its proud announcement that it is not merely designed in France but made there as well. The internal packaging is stylish but not extravagant, a foam insert lifting to reveal the 430 x 345mm footprint of the amplifier inside, wrapped in transparent plastic. Our review sample came in silver — not shiny chrome like Devialet's amps, but rather the luxurious matte silver of anodised aluminium, with horizontal ridges dividing it into three sections, the centre of which is etched with the distinctive Micromega logo.


micromega
micromega


△ CUSTOMISATION EXTRAORDINAIRE: ANY 'RAL' COLOUR OPTION CAN BE ORDERED, WHILE THE STANDARDS ARE HIGH QUALITY ANODISED ALUMINIUM IN SILVER OR BLACK.

> Making the USB connection delivered our first moments of listening — gigantically scaled, startlingly real in clarity and accuracy...

The M-Ones are indeed made from a single block of this aluminium, and very sleek it looks in its natural silver. But one of Micromega's selling points here is a perhaps unprecedented level of external customisation in 'MCF' (Micromega Custom Finish). Standard finishes are anodised silver or black, but through a tie-in with French loudspeaker company Focal your M-One can perfectly match the paint options offered on Focal models (Black Lacquer, Carrara White, Imperial Red, Electric Orange and Bleu Nogaro) adding $1700 to the price, and you can go further, selecting any colour from the central European RAL colour chart ($2100 over the standard price, and a pause while your bespoke M-One is created). There was early talk that textures such as 'carbon' and leather finishes might be added to the M-One range, but these haven't (yet) surfaced.

Further potential décor-friendliness comes from the neat optional wall-mounting system. To this end there are twin displays, one at the top, with four clicky press-stud buttons, and a second on the low front, both operating simultaneously, useful even in a rack if the Micromega is below eye level. One of the remote control's buttons toggles the display's lettering size, with the smaller lettering adding additional information depending on the input, such as sampling rate when using the USB input.

## CONNECTIONS

At first glance the connections list seems limited — a single pair of analogue line RCA sockets, for example, plus a turntable phono input switchable between moving magnet and moving coil, and a balanced analogue input on XLRs. So that's three analogue inputs in total. Then the digital inputs — one coaxial, one optical, one AES/EBU on XLR. And USB-B, to plug in your computer. The M-150 networks via Ethernet, and via the Micromega app plays internet radio and networked files via UPnP/DLNA.

Both the coaxial and AES/EBU digital inputs claim to be good to 32-bit/768kHz data rates (we tested only to 384kHz) with the M-150 accepting PCM DSD and DSD over PCM (up to 11.2MHz DSD), and the optical to 24-bit/192kHz. Twin USB-A slots were marked as for firmware updating only (which we did), but then why two? Sure enough we were informed these will soon get a firmware update for file replay from sticks and drives, with the same compatibility as above.

The USB computer connection popped up immediately on our Mac Mini (Windows may need a driver for USB 2.0), offering up to 24-bit/384kHz under the control of its own clocks (45.1584MHz and 49.1520MHz, true multiples for 44.1 and 48kHz respectively). The Micromega USB remained available to our computer even when we had switched the amp away from it to another input. We've seen many designs where the USB driver deactivates at that point, sometimes requiring manual reselection when restored. Micromega's is the correct choice, even at the expense of leaving digital circuits active during analogue listening. But then as with many systems using DSP (for example the Meridian system in this issue), the analogue inputs are digitally sampled anyway (at what level Micromega didn't choose to divulge when confirming the conversion), allowing them to be subject to the room EQ described on page 82.

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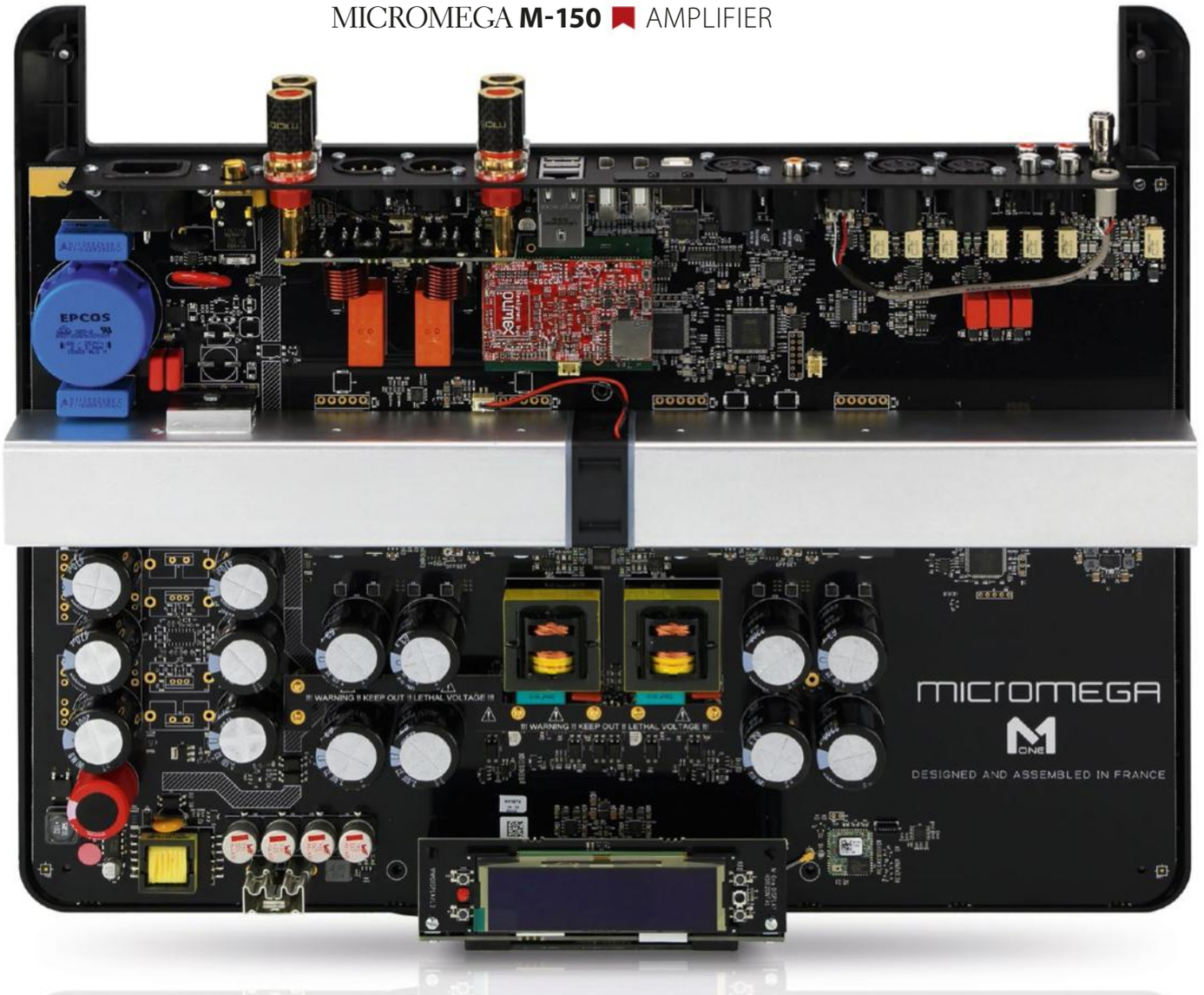


△ A COOLING TUNNEL RUNS CENTRALLY THROUGH THE WHOLE AMPLIFIER CHASSIS TO DISSIPATE HEAT GENERATED BY THE CLASS-AB AMPLIFICATION.


It was making the USB connection that delivered our first moments of listening to the M-150, as we directed a newly released version of Queen's *We Will Rock You* (an alternate, from the 40th anniversary box set, 16/44.1) to the M-150 and on to our JBL Studio Monitors. From the pre-take speech to the stomping backing track, it was gigantically scaled against an utterly inaudible noise-floor, startlingly real in clarity and accuracy, in another league to how we had first heard it the previous week through a $3500 CD/streaming amplifier.

This speaks to the DACs as well as the amplification. The M-One range uses AKM's 'Velvet Sound' 120dB AK4490EQ DAC, with an Analog Devices SHARC processor controlling volume at 32-bit accuracy as well as other functions, including binaural headphone processing. From the DAC the whole analogue distribution is carried out in fully balanced mode, with the conversion to unbalanced immediately prior to the amplification.

Two sockets which look like HDMI are reserved for future use with I2S data streams (as are already used internally prior to the DAC), and as a final digital bonus the M-Ones offer Bluetooth streaming, with the aptX codec available for "near-CD" quality lossy compression if your sending device also supports aptX.

We also noticed the M-150 appeared on our Apple devices as an AirPlay target, though AirPlay is nowhere mentioned in literature other than one mention of 'AirDream", which seems to be AirPlay without the licence fee... however we couldn't get this to work, the M-One apparently accepting the stream, but not playing it, regardless of input selection.

You also get balanced XLR pre-outputs, a subwoofer output, and a pair of control triggers. On the front is a minijack headphone socket, which on the tested M-150 offers three levels of binaural delivery. This — like the room EQ — proved both high quality and impressive non-destructive, slightly softening edges and bringing


THROUGH A TIE-IN WITH FRENCH LOUDSPEAKER COMPANY FOCAL, THE M-ONE CAN PERFECTLY MATCH THE PAINT OPTIONS OFFERED ON FOCAL MODELS, FROM ELECTRIC ORANGE TO BLEU NOGARO.

widely-panned elements in towards the centre. Oddly the medium setting made things pretty much mono, the light and strong settings less so. As with the room EQ, comparing or switching off binaural modes requires interacting physically with the unit's own buttons, these options not being available yet through Micromega's app, which is a neat iPhone-size control app which found the M-150 immediately and offered easy access to a number of settings — including balance, individual input sensitivity for balancing of levels across sources, and easy renaming of all inputs. For music it accesses internet radio, which includes a good search option and accesses podcasts as well as live stations, and you can go to 'Audio Server' to play from UPnP and DLNA shares on the network. All worked fine, including high-res playback, with the interesting side note that you could have the radio playing or DLNA music streaming even when listening to a different input — it only emerges when you select 'LAN' as the input.

> Micromega uses tried-and-tested Class-AB, a white paper detailing why it considers Class D to be a *cul-de-sac* of amplifier development...

As an often more convenient alternative to the app you have the tablet-shaped physical remote control (pictured opposite), which requires two-handed pointing since it is infra-red, not RF.

The speaker output binding posts are rock-solid terminal blocks compatible with bare cable, banana plugs or spade connectors.

## DITCHING THE D

We imagined that such a slim design would necessitate the use of low-heat Class D amplification, or at least some hybrid form of it, as Devialet implements in its own slim amplifiers. But no, Micromega uses tried-and-tested Class-AB, a white paper detailing why Micromega considers Class D to be a *cul-de-sac* of amplifier development — low rejection of power, HF switching residues creating intermodulation distortion, and an output filter never completely adapted to the different loads of the speakers: *"If it is optimised for 8Ω, then it is of no use for 4Ω because a compromise will have to be reached. What is more, the speakers are a complex load and not pure resistance. The bandwidth of a class D amplifier is less stretched and consequently,*

*the phase turns faster on the useful audio band, which gives a less effective impulse response. Finally, we cannot totally eliminate odd order (harmonics 3 and 5, Total Harmonic Distortion) that is inherent in down time and obligatorily introduced between phases of switching between power devices, which always gives a harder sound."*

The corollary of sticking with Class-AB is the heat issue, and the need for effective thermal dissipation. The M-Ones use forced convection through vents in the sides to a "cooling tunnel" coupled thermally to the aluminium casing, and using an ultra-quiet fan (not entirely silent, mind) which uses magnetic levitation of the fan axis rather than ball bearings.

Of course there's still the issue of how to fit your transformers and capacitor banks into such a slim casing — there's simply no room for toroidals and Micromega's solution is to use twin LLC resonance power supplies with high frequency conversion between 90kHz and 120kHz, able to quickly recharge the filtration capacitors 2000 times faster than normal using the low residual ripple of the power supply. A large energy storage capacity simply isn't needed.

A further twist to the Class-AB is the use of power transistors with a diode at their heart to 'copy' temperature-induced voltage variations and thereby cancel the usual polarisation drift in the power stage. Result: lower distortion.

## FIX YOUR SOUND

Having already had a fine hi-fi experience with the M-150's USB mode, we weren't entirely sure we wanted to invoke the EQ system, which is called 'm.a.r.s.' — Micromega Acoustic Room System. We've never liked room EQ as other than a final tweak, it being no substitute for a good room. And one of our particular points of cynicism here has always been the quality of microphone used in such systems. Great kudos, then, to Micromega for supplying a nice mini-tripod and microphone holder, a long XLR cable and a 19cm-long Dayton Audio EMM-6 precision electret condenser, my goodness, these things individually hand-calibrated (with mike-specific calibration data online: avhub.com.au/dayton).

So we let the M-150 whoop away for each of three positions (20cm either side of our listening position) and rather upsettingly, given we consider our room fairly well adjusted, there was a significant difference between the Auto result and the non-EQd sound, though the 'flat' option not so much (from the explanation, we'd expected the other way around). The EQ seemed to add a tiny volume gain, and some presence, which could fool you into a preference in the short-term, but in fact we left it in circuit through most of our further listening, despite our philosophy, because, darn, it worked.

We played several days' worth of vinyl through the phono input, loving the performance despite its subsequent digitisation, its tonal accuracy and speed rendering a divine delivery of the 10-minute *The Long Road* (from the 'Dead Man Walking' LP boxset), the tabla tight and tappy over Ry Cooder's bottleneck (his son's deep dumbeck marks the bars), while the soaring vocals from both Nusrat and Rahat lift to heaven between Eddie Vedder's more grounded verses.

We were hard-pressed to pick a preference between the line-level unbalanced output of a $5000 Marantz CD player and Micromega's own DAC and preamp fed from the USB feed on our Mac Mini via USB; this is computer sound *par excellence* and also *sans accentuation,* so that overly edgy recordings (Dion's *Rolling Stone* for one) emerged true to their attacking nature, while fine recordings sounded simply thrilling, supported by the speed, detail and slam-in-reserve of the M-150. Chick Corea's *Australia* piano concerto (DG, 2011) was a delight, from its impeccable piano tone and metallic cymbal taps to the impact of the dynamic ensemble entries. The absence of toroidals was missed not one jot, even with the most dynamically demanding of rock and classical test tracks.

Any downsides? The digital sampling of analogue inputs may deter some purists, though we'd suggest they take a listen before they criticise. Heat and fan noise might be an issue on hot Australian days — despite that clever cooling tunnel, the M-150 most definitely ran very warm, across its entire body, and hotter still underneath, perhaps not the ideal longterm environment for the electronics within, and at times that ultra-quiet fan could be heard running from both side vents (bearing in mind our review set-up leaves us only 1.5 metres from the unit under review, so from a more distant seating position the noise would be proportionately reduced).

## CONCLUSION

Otherwise there are no audible compromises in performance terms from Micromega's remarkable reinvention of the Class-AB amplifier, and that's confirmation of their assertion that the decisions made in creating a fit for a slim design pay off in both aesthetics and in sound quality. With a price either side of $10k depending on your choice of finish, clearly you could go higher to reach the *crème de la crème* of amplification audiophilia, but at this level the French company has managed to deliver an *objet d'art* which is also, in performance terms, a real *tour de force*. We are delighted to have made its acquaintance.


## SPECIFICATIONS

**MICROMEGA M-150 AMPLIFIER**

**POWER OUTPUT:**
2 × 150W into 8 ohms,
2 × 300W into 4 ohms
**THD UNDER 8-OHM LOAD:**
<0.001% @ 63Hz,
<0.005% THD at 1kHz,
<0.05% @ 10kHz
**INPUTS:** 1 × RCA analogue, 1 x MM/MC phono, 1 × XLR balanced, 1 × room EQ mic input, 1 × USB-B, 1 × coaxial digital, 1 × optical digital, 1 × AES-EBU digital, 2 x I²S, Ethernet, Bluetooth with aptX, 2 × USB (not yet active on sample), 1 x 12V trigger
**OUTPUTS:** loudspeakers, 1 × sub out, 1 x XLR pre-out, 1 × 12V
**DIMENSIONS (WHD):**
430 × 56 × 350mm
**WEIGHT:** 9.3kg
**PRICE:** $9800 black/silver, $11,500 in 'Focal' colours, $11,900 in RAL colours

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