

Ayre AX-5

Under the bonnet of this luxuriously appointed, fully balanced integrated amplifier lie some novel design features. Its sound quality is something special as well

Review: **John Bamford** Lab: **Paul Miller**

Is there something in the Colorado air that caused Boulder, situated in the foothills of the Rocky Mountain National Park, to become such a hotbed of America's high-end audio scene? It's home to PS Audio, Jeff Nelson's Boulder Amplifiers (of course), Avalon Acoustics, Ayre Acoustics – and YG Acoustics is barely 20 miles away too. Boulder, it seems, is something of a hi-fi haven.

Audio observers may recall that Ayre Acoustics' owner Charles Hanson was the founder of loudspeaker specialist Avalon Acoustics before selling that company, and setting up Ayre Acoustics in 1994, in order to focus on the design of high-end electronics. While I've never met Hansen I've long considered him a thoughtful and creative designer never afraid to push boundaries and think outside the box.

A SIMPLE SIGNAL PATH

If not the first, Ayre Acoustics was certainly *one* of the first high-end specialists to embrace the new dawn of higher resolution digital audio around the turn of the century by producing a universal DVD-Audio/SACD player. It was based on a Pioneer 'engine'. Today Ayre is one of only a handful of specialists with a universal Blu-ray disc player in its product portfolio – based on an Oppo engine that uses a MediaTek platform.

Ayre's A-to-D and D-to-A converters are legendary in many high-end circles. And it is Hansen and his colleagues who have designed the innards of Neil Young's forthcoming Pono portable hi-res audio player [www.ponomusic.com]. I'm told Hansen was chuffed to secure the design contract as he's been a Neil Young fan since his teenage years!

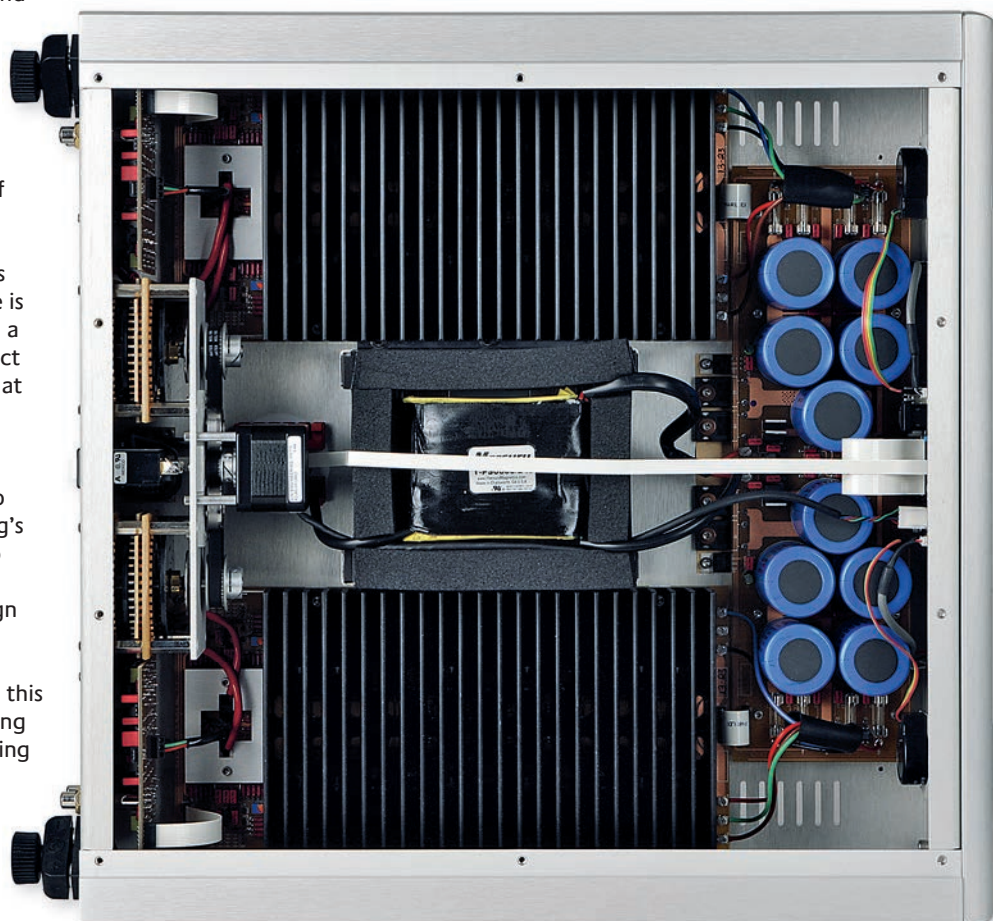
I've been looking forward to hearing this brand new AX-5 integrated since listening to an assembly of its larger siblings driving a Wisdom Audio loudspeaker system

at *HFN's* The Hi-Fi Show in Windsor last October, in UK distributor Symmetry Systems' demonstration room. In some ways the AX-5 represents a distillation of Ayre's 'purist' philosophies, as it employs both the company's 'Diamond output circuit' [see boxout] and the elaborately-designed volume control trickled down from its flagship KX-R preamplifier (£13,995) introduced in 2008 and recently upgraded to the KX-R Twenty in celebration of Ayre's 20th anniversary this year.

Says Charles Hansen: 'With the KX-R we threw 55 years of preamplifier history out the window and created a new topology. In 99.9% of preamplifiers the signal comes in at a lower level than a power amplifier

requires; a gain circuit boosts the signal, and a volume control in front of the [fixed] gain circuitry attenuates the signal. The drawback of this is that noise in the circuit remains fixed and ultimate signal/noise ratio is only achieved at maximum, unattenuated, volume.

'In the KX-R the gain of the circuit is variable by changing its transconductance, though we use the name 'VGT' for Variable Gain Transimpedance. For our latest AX-5 integrated we eliminated the preamp stage altogether and simply made the gain of the power amplifier variable using VGT – and added an input selector. This is the simplest possible signal path in any audio amplifier ever made.'



RIGHT: The amplifier modules are embedded under heatsinks but the most remarkable feature is surely the belt-driven stepped attenuator – one for each channel!



In the fully-discrete, fully-balanced, zero loop feedback AX-5, Ayre's VGT circuit governs how much gain is generated by the amplifier's input stage, four complementary differential JFETs. The volume knob on the right of the fascia acts as an encoder to control a pair of motor-driven Shallco silver contact rotary switches (one for each channel, conjoined using toothed belts), each of which contains dozens of hand-selected, low-noise resistors.

Volume level can be adjusted over a range of 69dB in 46 steps of 1.5dB. A single resistor mounted in a terminal block governs the AX-5's overall gain range and can easily be changed should the need arise, to accommodate overly-sensitive or insensitive partnering loudspeakers.

ULTRA-PURIST AIMS

Ayre's VGT methodology certainly imbues the AX-5 with peerless S/N performance, although it's not entirely without consequence [see Lab Report]. And while it works flawlessly, the amplifier's elaborate stepper motor system results in a Heath Robinson-esque 'clunk' each time the volume is adjusted – not that you'll really notice when playing music at enthusiastic listening levels. I soon came to ignore it, although there were occasions when

I yearned for finer volume adjustment, finding the 1.5dB steps just a bit too coarse. I'd prefer 1dB steps for sure, as provided in the aforementioned KX-R flagship preamp.

Coarse volume adjustment aside, clearly the design of the AX-5 has been carefully considered. It might be an integrated amplifier with ultra-purist intentions, however it's far removed from the old-fashioned concept of utilitarian 'hair shirt' hi-fi components. Befitting its price its sculpted aluminium chassis is reassuringly robust and beautifully finished; it sports a large, easy-to-read status display; and microprocessor control allows its six line inputs (four balanced, two single-ended) to be individually enabled and named to match source components.

Gain offset for each input can be adjusted via the setup menu; one of the inputs can be assigned as a processor pass-through; and the amplifier ships with one of Ayre's lovely RC30 multi-component IR remote control handsets whose large keys are backlit with a fibre optic array that distributes light from a blue LED inside. It's a joy to operate.

ABOVE: Rotary encoders are for source selection and volume, plus navigation of the setup menu when in standby. Push buttons are for tape output on/off and mute/standby

Naturally the AX-5's front panel display can be dimmed (three intensity levels) or disabled via the handset. However, some enthusiasts might bemoan the absence of a balance control, phase inversion or a mono switch. And if your pride-and-joy speaker cables are terminated with 4mm banana plugs you might not care for the amplifier's Cardas binding posts, which are designed

for spade connectors.

I powered up the AX-5, configured one of its inputs to interface with the balanced outputs of my resident T+A DAC 8 [HFN Oct '12], hooked up with Signal Projects' Hydra

interconnects, and left the amplifier to gently simmer for a couple of days before settling down to critical listening.

'Perhaps it's the absence of any over-bright glare that's so refreshing'

HOOKED BY DETAIL

From the outset I was struck by its refreshingly clear and open sound quality. Despite appearing quite luscious and smooth in tonality, easy-going and warmly-balanced, the sound was incredibly detailed: I was hooked.

It proved wonderful at peeling away the layers of heavily multi-tracked rock albums, the AX-5 bringing out low-level details in exhilarating fashion. I was captivated listening to *Beneath The Waves* by Kompedium, the darkly romantic concept album penned by Rob Reed, founder of Welsh progressive rock band Magenta [96kHz/24-bit DVD-A; 7 Stones/Tigermoth Tmpcd1012], the amplifier providing a sparkingly clean window through which to observe individual elements of the music's arrangements and myriad production effects. Percussion details were beautifully rendered and natural-sounding, while

DIAMOND CIRCUIT

Developed in the 1960s by Professor Richard Baker of MIT and patented as 'A Gateable Bridge Network Having Power Gain', the Diamond Circuit describes two pairs of bi-polar transistors with their respective emitters and bases tied together. It is commonly used in the output stage of buffer ICs that have unity voltage gain but boost current to drive a load – and in many of today's DAC chips. Ayre's Charles Hansen believes that when employed in an amplifier's output section it simply sounds better than other solid-state push-pull topologies where two phases of a signal are recombined to form a full wave, possibly because the diamond circuit is the only one in which the two half-signals are joined at a single point, with no intervening circuitry. Ayre biases its diamond output section to operate in Class A/B. Says Hansen: 'I don't really know why it sounds better... but that is the beauty, the mystery, and the art of audio circuit design. If we knew all of the answers then everything would sound perfect.'

INTEGRATED AMPLIFIER



ABOVE: Cardas speaker terminals are joined by four balanced and two single-ended line inputs, plus tape out XLRs. The RJ-11 sockets provide 'AyreLink' system comms

further down the frequency scale the intense vocals of Steve Balsamo were particularly well projected beyond the plane of my monitors.

I can't listen to the guitar break and chord progression in *Beneath The Waves*' title track without hearing Don Henley's 'Boys Of Summer' circling in the back of my head, so Henley's *Building The Perfect Beast* album came next – Mo-Fi's 'Ultradisc II' remaster [UDCD 705], which is a little more full-bodied and has appreciably sweeter and more pure-sounding highs than the 1984 Geffen issue.

This contains a busy assemblage of electric percussion bouncing between the channels to make up its joyous beat, the song soon deteriorating into a cacophony if not kept in check by a 'sympathetic' replay system.

MEETING THE CHALLENGE

The AX-5 didn't fully pull its punches to conceal the recording's shortcomings, leaving me craving a little more upper bass 'bloom' to flesh out the track's stridency. But I was left convinced of the Ayre's transparency as a consequence.

Meanwhile it proved adept at serving up infectious rhythms and delivered a beguiling musical fluidity, with a fine sense of 'body' and definition to instruments, fast and detailed bass lines, a well projected and enticingly warm midrange and high frequencies free of grain or splashiness.

I've observed in the past that when I use my Levinson No383 amp to listen to Reference Recordings' *Testament* album with the Dallas Wind Symphony and Turtle Creek

Chorale [RR-49CD], the amplifier's mellow warmth and 'tubbiness' tends to congeal the massed voices. The AX-5 proved far better at separating the voices in this challenging recording. Yes, the sound appeared leaner, nonetheless the tonal qualities of the orchestra were more clearly defined and the depth of the image enhanced.

Thanks to the amplifier's supreme clarity, stereo imaging was exceptional when auditioning audiophile-quality recordings containing realistic spatial elements, with outstanding inner detailing.

Moreover the AX-5's neutral honesty rendered brass in an appropriately aggressive manner: for example, the first movement of Stravinsky's *Rite of Spring* [Telarc CD-80054]. Quite how it manages to sound so vivid and highly detailed yet 'sweet' at the same time is difficult to put into words. Perhaps it's the absence of any over-bright glare, a condition that often plagues highly revealing solid-state electronics, that's so refreshing.

This is a musically engrossing, gorgeous sounding amplifier that should be high on any hi-fi enthusiast's wish list. ☺

HI-FI NEWS VERDICT

Once you're accustomed to the mechanical clunking of the volume control's stepper motor, the AX-5 is a lovely amplifier to use thanks to its large display, customisable input naming and illuminated handset. It delivers fabulous detail and musical insight without sounding in the least bit analytical, its sweet tonality and subjective warmth adding charm and innate listenability. It really is a class act.

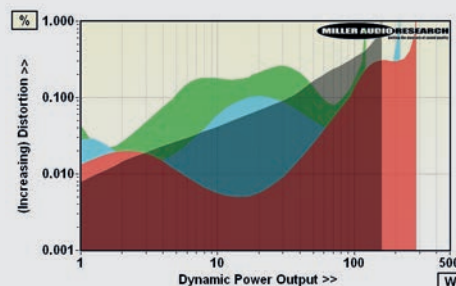
Sound Quality: 88%



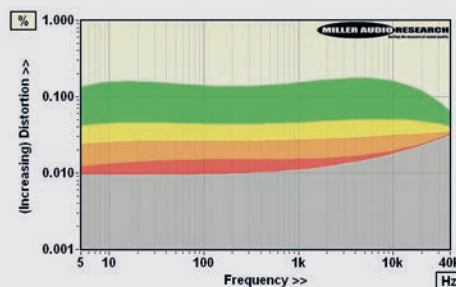
AYRE AX-5

This is the first Ayre amplifier to be comprehensively tested in *Hi-Fi News* and the results are intriguing. The AX-5 has a couple of exceptional measurement 'features' and others that may well account for the AX-5's 'character'. The frequency response, for example, is as ruler flat from near-DC to 100kHz as makes no difference ($\pm 0.04\text{dB}$) while the A-wtd S/N ratio is possibly the widest I've ever encountered for an integrated amp at a massive 102.4dB (re. 0dBW). Many amplifiers are still 20dB behind this figure these days. The power output meets Ayre's 125W/8ohm specification at 2x130W/8ohm but the 250W/4ohm rating is not, at least with a 1% THD criteria, at 2x225W/4ohm. There's more available under dynamic conditions at 160W/280W into 8/4ohm but limited current restricts power to 215W/125W into 2/1ohm loads.

There's also a marked difference in distortion versus level into 8, 4, 2 and 1ohm loads [see Graph 1, below]. While the trend into 8ohm is fairly uniform (0.008% at 1W, 0.045% at 10W and 0.35% at 100W), those into lower impedances are evidently more undulating. How the AX-5 performs will clearly be speaker-load dependent, at least to a degree. Perhaps because of its VGT topology, the volume position, or overall gain, also impacts on the AX-5's distortion trend. For a fixed 10W power output, the lowest distortion is achieved at the maximum volume position (46), with THD increasing as the volume control is reduced [see Graph 2 where the power output remains constant at 10W/8ohm]. Readers may view an in-depth QC Suite report for Ayre's AX-5 amplifier by navigating to www.hifinews.co.uk and clicking on the red 'download' button. PM



ABOVE: Dynamic power versus distortion into 8ohm (shaded black trace), 4ohm (red), 2ohm (cyan) and 1ohm (green) speaker loads



ABOVE: Distortion versus frequency from 5Hz-40kHz, all at 10W/8ohm (grey, Vol '46'; red, '43'; orange, '40'; yellow, '38'; green, '34')

HI-FI NEWS SPECIFICATIONS

Power output (<1% THD, 8/4ohm)	130W / 225W
Dynamic power (<1% THD, 8/4/2/1ohm)	159W / 280W / 215W / 125W
Output impedance (20Hz-20kHz)	0.164-0.170ohm
Frequency response (20Hz-100kHz)	-0.01dB to +0.04dB
Input sensitivity (for 0dBW/125W)	70mV / 815mV (Balanced in)
A-wtd S/N ratio (re. 0dBW/125W)	102.4dB / 123.4dB
Distortion (20Hz-20kHz re. 10W/8ohm)	0.0095-0.023% (max vol, '46')
Power consumption (Idle/Rated o/p)	160W/480W
Dimensions (WHD) / Weight	440x120x480mm / 21kg