

# Benchmark AHB2

An ultra-compact power amplifier from a company until now best-known for its DACs. Is this a miniaturisation step too far, or proof of good things coming in small packages?

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

**W**hat's the common image of an audiophile power amplifier? Something massive, American and extremely heavy? A unit capable of heating a room with its excess energy, and almost impossible to move without enlisting the help of a couple of friends? Or a big, glow-in-the-dark forest of valves, complete with hefty transformers, usually delivered on a pallet?

In all of those descriptions there are common threads: size, impossible weight and the ability to save on your central heating bills. It seems that with great power comes not responsibility, but the ability to tolerate electronics that are unwilling to make any concession to domestic acceptability.

Benchmark's £2895 AHB2 power amplifier doesn't conform to any of those stereotypes: it's very small, light and designed to be cool-running without any recourse to forced air-flow, only warming up when working really hard.

## XLR INPUTS ONLY

And I mean small: this may be a stereo amplifier claiming 100W/8ohm, and up to 480W/6ohm as a bridged monoblock, but it weighs less than 6kg, stands just 9.75cm tall complete with feet, and is not much more than half the width of usual hi-fi components, at 28cm including its substantial side-mounted heatsinks.

In fact it's so small that with an eye to the professional applications for which it's also been designed, it can be bought with a standard 485mm (19in) wide rack-mount faceplate, but this looks almost comical with the little amplifier attached to its rear, at least until you slot it into the rack and the effect of the amp's diminutive dimensions is lost.

And this clearly is an amplifier designed with dual functionality in mind: the inputs are only on XLR sockets, so

**RIGHT:** Incredibly compact for the rated power output, thanks to Benchmark's combination of THX's AAA feed-forward Class H amplifier technology with a switchmode power supply

suitably terminated cables or adapters will be required if you're using it with a preamplifier or source only having RCA phono outputs. Similarly the speaker outputs are provided on both combination binding posts and Neutrik SpeakON terminals, these extending to separate L/R outputs, plus a single central connector for use when the amplifier is bridged.

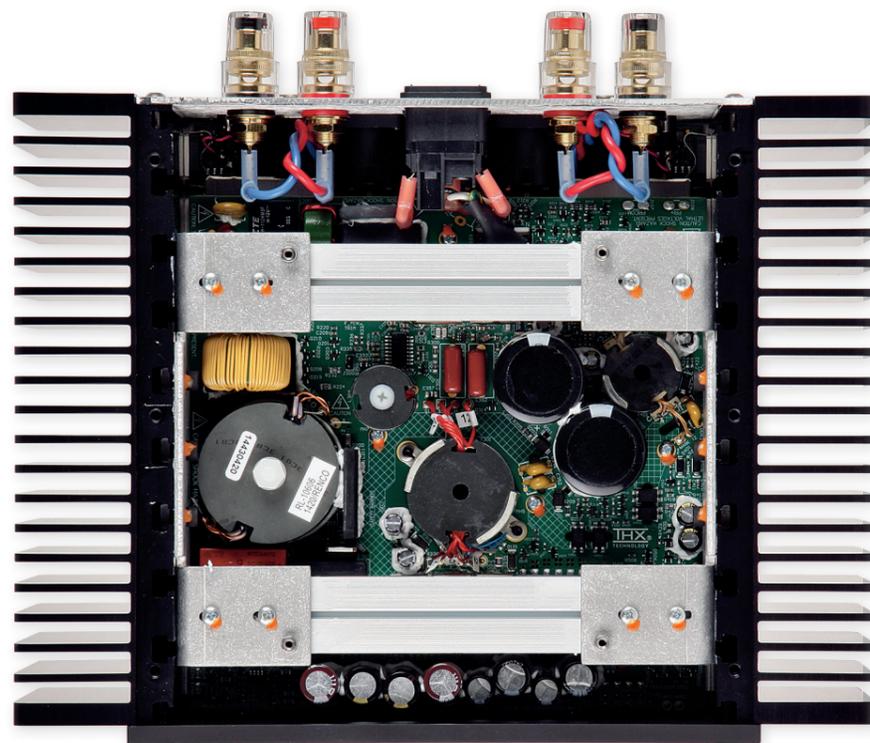
That bridging is set using a simple stereo/mono switch on the fairly tightly packed rear panel, which also carries a three-position sensitivity selector and 12V trigger sockets – for example allowing multiple AHB2 amplifiers to be switched on and off together, or controlled by one of Benchmark's DACs, which have variable-level outputs and can thus be used straight into the power amp.

Front-panel controls are – well, actually just one control, to turn the amp on and off, while indicators for muting, clipping

and over-temperature are provided for each channel.

So, small, light and powerful – and another way in which the Benchmark differs from its more monstrous brethren is that there are no warnings in the manual about extended run-in or warm-up for optimal performance. Instead you read: 'Unlike most power amplifiers, the AHB2 reaches its full rated performance very quickly. Full rated performance is reached in less than one minute. For this reason, there is absolutely no reason to keep the AHB2 powered on when not in use.'

Clearly something unusual is going on here... And there is: this is an amplifier using elements of Class A/B and Class H design as part of its implementation of THX-AAA, the Achromatic Audio Amplifier technology developed by the company best-known to most for its work in movie sound [see Investigation, *HFN* Feb '15]. The



result is said to be an amplifier with Class A-like characteristics, including freedom from crossover distortion, and the ability to run the output devices with very low bias, thus reducing waste heat and power consumption. Key to all this is the THX-patented 'AAA' technique that employs a feed-forward error correction amplifier running in parallel with a higher-power main amplifier.

Furthermore, a switching power supply is used in the AHB2, with tight active regulation rather than banks of electrolytics. Benchmark claims that the peak power output of the amplifier is unaffected by mains input voltage or the speaker load [see Lab Report, p53], the power supply rails maintaining constant voltage, and also that the very high-speed switching used means any effects it may have are well out of the audio band.

Indeed, Benchmark claims its power supply is quieter and cleaner than a conventional linear supply, and says the high-frequency transformers and coils used are much smaller than a conventional power supply set-up, helping keep the

size of the amplifier down. And why AHB2? Well, Benchmark says it indicates the combination of Class A/B working with Class H tracking power supply rails, but also that the model designation remembers company founder Allen H Burdick, who died in 2013.

## BIGGER THAN IT LOOKS

As already noted, the AHB2 is both small and light, and that combined with its very modest heat output makes it an ideal amplifier for use in applications where it's tucked away – for example, you could use a pair of them in monoblock mode, one behind each speaker, in the classic 'long interconnect, short speaker cables' configuration.

If you wanted to get really hilarious, you could use the amp with a DAC with variable output and a suitable pair of speakers to build a seriously overkill desktop system. OK, I admit I did consider doing just that!

*'I was struck by just how much focus and clarity was on offer with the AHB2'*

**ABOVE:** Just over 11in in width, the AHB2 is available with either a silver or black fascia (a 19in face plate is optional). A row of LEDs shows muting, clipping and over-temp fault conditions

Eventually I settled on some more conventional set-ups, using an adapter cable to hang the Benchmark off my Naim Supernait 2 integrated, as well as experimenting with a range of preamps from the little Trends Audio PA-10 tube pre/headphone amp to the much heftier

Marantz HD-DAC1 DAC/headphone amp/preamp. I also pressed into service the excellent, if slightly, elderly Marantz SC-22 line preamplifier from the company's celebrated Music

Link Series of the 1990s. Why? Well, its jewel-like qualities seemed to suit the AHB2 rather well, and it's still one of the sweetest-sounding preamps I've encountered for sensible money – although now they're getting rather collectible, and the prices of the Music Link components seem to be on the up.

Anyway, the SC-22 was mainly used with my Naim NDS/555PS as a source, while the HD-DAC1 was used straight into the power amp using its variable outputs, all cabling from The Chord Company, and speakers including my usual PMCs, the Sonus faber Olympica 1s also reviewed in this issue [see p58] and – just to see what would happen – my desktop pair of Neat Iotas. Umm yes, I did eventually try the Benchmark in a desktop/nearfield system, after all...

What emerged almost from the off – well, as long as it took the AHB2 to fire up, extinguish its muting indication (a matter of a few seconds), and be ready to play – was that this is both an amplifier capable of delivering a much bigger sound than

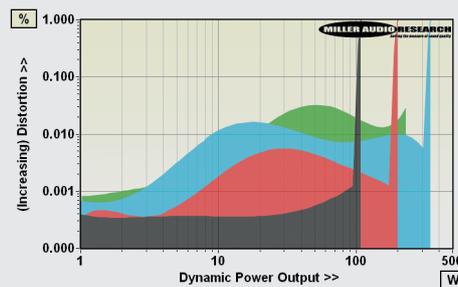
## SETTING THE BENCHMARK

To date best-known in the professional field, where it supplies A-to-D and D-to-A converters – the latter running up to 16 channels – as well as microphone preamplifiers, cables and the SMS1 speakers, Benchmark has of late been discovered by hi-fi enthusiasts. It's all part of a process of the blurring of lines between pro and enthusiast equipment. That the AHB2 is principally designed as a piece of pro studio equipment is entirely in line with the roots of the company: founded in 1985 by Allen H Burdick, it was all about making products for the pro sector, and specifically television studios and broadcast facilities. Before long Benchmark was making recording studio equipment, including headphone and mic amplifiers and metering systems. In the mid-'90s Burdick had decided to expand from making purely analogue products to adding digital products, and brought on board John Siau. His first design for the company was a 20-bit four-channel ADC. He took over the running of the company's operations when Burdick retired in 2006, and remains its chief designer. All the company's products continue to be built in New York, USA.

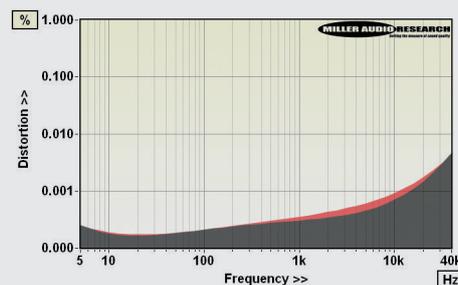
## BENCHMARK AHB2

This is not an exact implementation of THX's Class H Achromatic Audio Amplifier which eschews switching operation in either the amplifier or the power supply, for the AHB2 employs a 'tightly regulated resonant switching PSU'. (Incidentally, Class H is the US designation of what we, in Europe, call Class G.) Either way, Benchmark has avoided any obvious ingress of switching noise into the audioband as its AHB2 has quite the widest A-wtd S/N ratio of any amplifier I've measured in some 30 years – 106dB re. 0dBW and 126dB re. 100W/8ohm. These are exceptional figures. Power output is also bang-on specification at 106W/200W into 8/4ohm with, as expected, almost no further headroom under dynamic conditions where 108W, 200W and 346W are achieved into 8, 4 and 2ohm with protection at 230W/1ohm [see Graph 1, below]. This suggests a current limit of 15A rather than 18A.

This graph also very clearly illustrates an increase in THD into lower impedances under *dynamic* conditions – Benchmark claims a greater tolerance into sub-8ohm loads albeit under *continuous* conditions. Nevertheless, THD remains extremely low at 0.001% (1kHz/10W/8ohm), increasing to just 0.01% at 20kHz [see Graph 2, below]. This is lower than achieved by any conventional Class D design although the AHB2 does share the latter's occasional response vs. load sensitivity. Again, bang-on specification, the AHB2 drops to –0.18dB/20kHz (–0.96dB/100kHz) into 8ohm, –0.32dB/20kHz (–1.4dB/100kHz) into 4ohm and –0.62dB/–1.1dB at 20kHz into 2/1ohm. Readers may view an in-depth Qc Suite report for Benchmark's AHB2 power amplifier by navigating to [www.hifinews.co.uk](http://www.hifinews.co.uk) and clicking on the red 'download' button. PM



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



ABOVE: Distortion vs. frequency from 5Hz-40kHz at 10W/8ohm (left = black; right = red)

## HI-FI NEWS SPECIFICATIONS

Power output (<1% THD, 8/4ohm)	106W / 200W
Dynamic power (<1% THD, 8/4/2/1ohm)	108W / 200W / 346W / 230W
Output impedance (20Hz–20kHz)	0.034–0.17ohm
Frequency response (20Hz–100kHz)	+0.01dB to –0.93dB
Input sensitivity (for 0dBW/100W)	204mV / 2035mV (Balanced in)
A-wtd S/N ratio (re. 0dBW/100W)	106.0dB / 126.0dB
Distortion (20Hz-20kHz re. 10W/8ohm)	0.0001–0.0014%
Power consumption (Idle/Rated o/p)	19W / 305W
Dimensions (WHD) / Weight	280x98x237mm / 5.7kg



ABOVE: Symmetrical rear panel has binding posts each side of its IEC mains input; below are sensitivity/mode switches, 12V trigger and outputs for bridging, etc

the unimaginative might expect, given the compact dimensions, and one capable of serious level, speed and dynamic attack.

Opening up listening with some classic Police tracks, from the hi-res release of *Ghost In The Machine* [A&M 606949364625], the Benchmark immediately impresses with the punch with which the bass and drums are delivered on 'Spirits In The Material World'. This is an amplifier with very serious slam, and – even better for those with less sensitive speakers, big rooms or just a hankering for 'just in front of the PA stack' listening levels – it keeps it all together however loud you decide to play things.

### ALWAYS IN CONTROL

Yes, it's one of those classic 'just gets louder' amplifiers as full control and definition is maintained even at the kind of listening levels I'd never normally try, and this little powerhouse just keeps on motoring.

That's not just something for the rockers: it also allows the Benchmark to make clear every syllable and nuance of Billy Bragg's 'Handyman Blues' [from *Tooth & Nail*, Cooking Vinyl COOKCD580] to striking effect, and with the atmospheric Sun Studios recording of The Dodge Brothers' *The Sun Set* [Weeping Angel Records DB1003] it does a superb job with the pounding, foot-stamping, hand-clapping percussion of 'Mr Jones' while keeping the laconic lyrics, Mike Hammond's banjo and Mark Kermod's plaintive harmonica very much to the fore.

The track really slams into action with its sparse instrumentation, gradually picking up guitars and bass along the way, and with the Benchmark in the driving seat every instrument is clear and vibrant, as is the warm, rich studio ambience.

What's more, when I loaded up some hi-res tracks from one of the many re-releases of Bowie's *The Rise*

*And Fall Of Ziggy Stardust...* [RCA LSP-4702] I was struck by just how much focus and clarity was on offer. It's not one of those 'oh, I never heard that before' things: instead it's just a delicious sense of the music having more presence and vitality about it, 40+ years falling away to make it sound as good as memory suggests it did all that time ago (but of course it didn't).

Bowie's voice is close-focused and packed with character, the music has real weight and substance, especially in the title track, and that ability to listen in to the elements of the mix is as appealing as ever.

Mind you, that speed and dynamic ability is also deployed to good effect when playing classical music, its handling of microdynamics keeping the elements of a small string ensemble beautifully tight and well-realised, while the amp still has all that power in reserve for those big orchestral works to burst forth when required.

This is an amplifier seemingly impossible to wrongfoot, and capable of delivering a quite remarkable sound from a seemingly impossibly small package. If that doesn't make you smile every time you listen, I don't know what will. ☺

## HI-FI NEWS VERDICT

This is a rather extraordinary amplifier, not just in the way it sounds, but because it is so compact and user-friendly. It hits its stride straight from the box, and is ready for immediate use, delivering an entirely involving and seductive sound seemingly designed to grab the attention and hold it for many hours of listening. And it does all this while remaining cool and unflustered, adding to its considerable appeal.

Sound Quality: 86%

