



# Hot Reference

**Audio Research turn up the heat with their new Reference 80S valve power amplifier. Noel Keywood warms to it.**

**V**alve amplifiers – you have to admit – are wacky and gorgeous. That’s in appearance and in sound. Here’s one that meets both criteria – the new Audio Research Reference 80S (70W) power amplifier, price £14,998. Built in Minneapolis, USA and aimed at a market more receptive to such esoterica than the UK, the 80S is certainly gorgeous, and also wacky too I think – although I’m sure Audio Research would contest that.

Importers Absolute Sounds wanted us to run it with a suitable preamp – so it’s reviewed here with the Audio Research Reference

6SE preamplifier, price £16,998. There’s good reason for this as I’ll explain later.

You won’t find many reviews of the Reference 80S power amplifier because at 28.2kgs (62lbs) it’s difficult to handle: a two-person lift. Measuring 483mm (19in) wide, 470mm (18.5in) deep and 260mm (10.5in) high we were challenged getting it photographed, tested, then into a hi-fi system. Because of size, weight and internal complexity this is very much a dealer installed and maintained item I’d suggest, something I’ll also go into further later.

Because the rear casework measures 18.5in (47cm) wide it

will fit a 19in rack but the fascia of both units measures exactly 19in and is likely to protrude – and even appears to be chamfered to do so. Just think ‘big’ here. “Suitable for the larger home” an estate agent might say. Much of the casework is alloy, most weight being in the single mains and dual output transformers at chassis rear, beneath a black screening cover. The front panel, with its handles, is firmly attached to the chassis by cast alloy brackets in order to withstand the load of being used to lift the entire amplifier but we didn’t try this: it was a man at rear and one at front to move it. There are plenty of transistor amplifiers

around that match or exceed this weight – the Musical Fidelity M8xi at 46kgs for example (Dec20 issue) – but they usually offer more power.

To develop 70 Watts per channel Audio Research use the rugged and reliable KT150 valve that is to my mind undoubtedly the most practical proposition available nowadays, since it offers a consistently smooth sound, unlike the higher powered KT90 and KT120 valve that I never got along with and were, I'm told, not especially reliable. All the same, I noted straight away Audio Research say on their website the output valves have fuses to guard against catastrophic failure, as can happen if run past their suggested (handbook) life span of 3000 hours, due to physical distortion of the electrode structure from thermal cycling. This phenomenon applies to all valve amplifiers.

The valves are run in before the amplifier is shipped, necessary to catch early valve failures caused by manufacturing defects. We once had to return an entire batch of new KT88s at World Audio Design because none worked properly; QC in East European factories was somewhat lacking in the 1990s. Audio Research use Russian Tung-Sols, linked to New York's New Sensor Corporation



**Behind, a KT150 power output valve. In front a 6H30 double-triode with damping rings.**



**The Reference 80S can be run with cover removed. Then the "ghost meters" become ethereal. At rear the black case screens mains and output transformers.**

whose founder Mike Mathews financed Hendrix into the UK no less. A nugget of important useless information! KT150s are known for being consistent and reliable but Audio Research play safe by running them in first.

The Reference 80S is a fully-balanced design, Audio Research say, for best sound quality. This makes it quite a lot different to most valve amplifiers that are single-ended (unbalanced) up to the phase splitter stage. There are however standard unbalanced inputs via phono sockets as per usual, the handbook noting that both cannot be used at the same time. Ideally the amplifier should be run from a balanced preamplifier via XLR cables, explaining why Absolute Sounds wanted it paired with the Reference 6SE preamplifier. I used Chord Company Epic balanced cables between them.

Biasing is automatic – in effect fixed bias that does not need to be user-adjusted. It compensates for changes in valve characteristics over time, running the KT150s at 65mA. There is a small elapsed time meter on the rear panel to show how many hours are on the valves and is user-resettable to zero when a new set are installed. The handbook states 6550s, KT88s and KT120s will run in the amplifier

but give less power, whilst EL34, KT77 and 6L6 types are unsuitable.

The perforated top cover is user removable for a clear view of the valves and to improve ventilation. It's suggested 8in is needed above the amplifier to allow hot air to escape but four KT150s don't run super-hot, unlike the Russian 6C33C double-triode 'trawler tube', even though the heaters draw a few more Watts than usual. A 'quiet' fan is fitted to the bottom plate to draw cool air in from below and help expel it above, but it can be heard to gently whir from close up, if not at a distance.

Audio Research state the bottom panel should not be removed of course, since it exposes lethally high voltages. We did so for photographic purposes and to check out the fuses but they run up to F15 and are not clearly identified on the circuit board for rating or function; a service manual is needed here – best left to a dealer.

The front panel carries what the company describe as "illuminated ghost meters" that show power output. Surprisingly, they are traditional analogue meters with white needles, lit from below by white LEDs. The scales are white too, printed onto clear acrylic background. Behind



*At left the 80S power amplifier with perforated grille behind the meters. At right the grille has been removed to show valves at rear. Two different views, easily set at home.*

this clear panel lies a removable perforated cage panel that gives a visually peculiar background I thought, but it can be removed to show the valves behind; I preferred it removed.

The amplifier can be switched from Ultralinear mode to Triode mode just by pressing a front panel button. A relay clatters in the background and the power warning light turns from green to blue. Triode mode always gives less power, in the Reference 80S 36 Watts per channel, but many prefer the slightly easier sound on offer, unless that is the loudspeakers need pepping up.

The Reference 6SE preamplifier is specifically suited because it too uses balanced circuitry in a single

gain stage that employs six 6H30 tubes – a Sovtek double-triode that's unlike anything else (so no alternatives available) and preferred by Audio Research (as they once only used 6550s). Talking of which, they use a 6550 and 6H30 in this preamp within a regulated power supply.

As you might guess then, the Reference 6SE focuses on balanced inputs, no fewer than four of them. There are two sets of balanced outputs, plus fixed-gain Record balanced outputs. All balanced inputs and outputs are duplicated by unbalanced phono-socket inputs and outputs for convenience, but the preamp, like the power amp, majors on being a balanced design. This is its *raison d'être*. Not fitted

are digital inputs, nor a Phono stage.

The amount of gain available is also limited to x4 or 12dB from XLR in/out, or phono in/XLR out. If only the phono sockets are used then gain falls to x2 or 6dB. This gives an input sensitivity value of 350mV for the preamplifier in conjunction with the power amplifier – not high, if sufficient for digital sources. Low gain external phono stages may need volume to be turned right up.

Warm up after switch on takes about 45 seconds, after which Mute releases. Alongside the right hand volume control lies a massive green dot-matrix fluorescent display that runs from 0 to 103 (don't ask) and a remote control is supplied for this purpose too. The remote also switches inputs, alters balance, has mute, can select mono or phase invert and even display-brightness. The preamp has a 12V trigger to the power amplifier so they can be switched on together and there's an input for an external remote control sensor for enclosed use, although with valves always best not to enclose to avoid overheating. There are many side functions such as auto shut-off, tube hours, volume re-set, input naming – all aids to use.

The Reference 6SE preamplifier is as wide as the Reference 80S power amplifier, measuring 483mm (19in) across the front panel, 419mm (16.5in) deep and 198mm (7.8in) high. Behind the front panel the case is 465mm wide so will fit into a 19in (483mm) rack. A weight of 17kg (37.5lbs) makes the unit liftable, but it is still weighty. Inside sits a large C core mains transformer as part of its linear power supply, all visible through the clear acrylic top panel.



*From below the Reference 80S power amplifier board is packed with smoothing capacitors (centre), safety fuses and special parts. At right is the mains transformer (yellow) and – above and below – output transformers with connection boards.*



*At rear the 80S power amplifier has three loudspeaker impedance options: 4, 8 and 16 Ohms. A small window showing hours of use sits at left of the central power input. There are balanced XLR sockets at left and right, as well as unbalanced phono sockets.*

**SOUND QUALITY**

The Reference 80S power amplifier was connected to our Martin Logan ESL-X hybrid electrostatic loudspeakers through Chord Company Signature Reference cables. I also hooked it up to the Fink Team KIM loudspeaker as a more conventional but sufficiently revealing alternative.

Sources were an Oppo UDP-205D spinning CD through its ESS ES9038Pro DAC, connected balanced through Chord Company Epic cables. Hi-res and DSD were fed into the Oppo over USB, from a MacBook Pro running the

Audirvana+ software player.

Being a balanced analogue amplifier I had to feed it balanced analogue from LP. To this end I used our Timestep Evo Technics SL-1210 Direct Drive turntable, its SME309 arm with Audio Technica OC9X MC connected up balanced to a Pro-Ject RS2 phono stage whose balanced output was fed into the Reference 6SE preamplifier.

I'll kick off, as I prefer to, by outlining basic properties – what to expect. As with Audio Research amplifiers I have reviewed in the past, this pre and power were far from many people's expectations

of valve sound – not warm, not languorous, instead speedy and revealing. There was clean, solid bass free from wallow, because of the way Audio Research handle feedback around their output transformers, explaining our very low bass distortion figures. But you get the aural benefits of valves all the same – the smoothness and the sense of air and space around images.

As I played through a selection of high quality modern LPs, plus older not-so-high-quality ones, certain traits emerged. Running all-balanced sets up a manicured



*The Audio Research Reference 6SE preamplifier has a very large green dot-matrix display of volume level, plus input in use at left. Below are push-buttons for Ultralinear/Triode mode. Mono, Phase invert, Mute, option Select and Power – all available by remote control also.*

sound stage and that's what I heard from our audiophile LPs, such as 2L's superb recording of Marianne Thorsen playing Mozart violin concertos, backed by the Trondheim Soloists. The sound stage was wide and open, backing violins separated from each other and with distinct lateral position. Marianne Thorsen's violin floated out with sublime ease, smooth, natural in tone and perfectly rendered. I could hear the strings suffering under the bow, appreciate her ability and effort. Funny how a communicative amplifier draws you in and this the Reference 6SE preamplifier and Reference 80S power amplifier did, staring right into what was happening in this recording.

The sheer clarity and separation of threads within a performance was an outstanding feature and, curiously – perhaps bizarrely you might think – I got to hear it in a strange place, my old 12in 45rpm disco singles. These things from the 1980s were cut at huge levels, as you can do with a track that lasts 10 minutes on 12in of vinyl. With Billy Ocean's Get Outta My Dreams, Get Into My Car the manic mix was better sorted – less confused – than I have heard it before. Similarly, Carol Kenyon's Dance With Me was clinically clean yet stabbingly powerful – not what you might expect from a 1984 cut.

Moving on to digital, Josefine Cronholm was put up in clear but almost barren form singing In Your Wild Garden (CD) and here the balanced nature of this combo

became even more apparent. Balancing subjectively strips the sound to its bare bones, or so it seems. Gone is something you don't consciously hear, a subliminal mush I speculate

**Most preamplifier functions are available on the remote control.**



**A top view of the 6SE preamplifier with clear acrylic cover removed. At right a C-core mains transformer, and at top centre 6550 and 6H30 valves to provide power regulation. Six 6H30s provide balanced amplification.**

– and this is what faced me with the Audio Research combo: less! Singers and instruments came over as starkly defined and less hazy, for want of a better explanation. This isn't about dynamic drama so much as insight and stage composition. In photographic terms, losing haze and gaining better image focus.

In terms of dynamics this Audio Research pair were strengthy if tight and controlled. The Reference 80S delivers fast and clean bass but it is free of wallow or bloat. This took me by surprise a few times, tracks like Loreena McKennitt's Gates of Istanbul suddenly shaking the room low down with its introductory bass line after a seeming absence of subsonic bass from preceding tracks. I did however notice that with LP the Reference 80S was driving big bass into both our Martin Logans and the Fink Team KIMS, so was aware the Reference 80S packs a punch lower down.

With preened hi-res recordings such as Cyndee Peter's House of the Rising

Sun (DSD64) fine cymbal taps rang out clearly whilst plucked bass laid down a firm backing. Her vocals hung in a clear open space it seemed, the whole performance having that strong sense of live



**The 6SE has a valve regulated power supply for better sound quality. It comprises a 6550 power valve (rear) and smaller 6H30 double triode.**



Four sets of XLR balanced input sockets (left) take up space on the preamplifier's rear panel. They are accompanied by matching phono sockets. Two sets of balanced and unbalanced outputs sit at right, plus a fixed-level Record output.

presence valves bring.

I found the mono function on the remote control useful with John Coltrane's Easy to Remember (24/96) as his saxophone is placed in one channel, backing quartet in the other, which comes across as a trifle odd – bit like The Beatles early stereo! But the Audio Research combination brought a magnifying glass to Coltrane's sax, every small breath and keystroke made obvious. Again there was a washed-clean sense of clarity from balanced working.

In case you're curious I used Triode mode for the most part, rarely getting past a few Watts on the meters even when playing loud in a large room; 40 Watts

"The Reference 80S delivers fast, clean bass free from wallow or bloat"

is enough for me and most loudspeakers. Volume hovered around 30 on the display for the most part (103 is maximum).

### CONCLUSION

Fully balanced amplifiers are rare beasts at present; many now have balanced inputs – but they are unbalanced internally. The Reference 6SE preamplifier and Reference 80S power amplifier are fully balanced throughout – and

that makes them unusual. Run from balanced sources – as I did for this review – they offer almost unique cleanliness, deep insight and pin sharp stereo imaging across a wide sound stage. With a good range of facilities, these all-analogue amplifiers are highly specialised and well worth hearing if you want to know where the world is going in terms of sonic direction. A fabulous duo from one of America's top manufacturers.

## MEASURED PERFORMANCE

The Audio Research Reference 80S power amplifier delivered 72 Watts into 8 Ohms and 64 Watts into 4 Ohms, just before clipping (Ultralinear mode). It is rated at 70 Watts into 8 Ohm in the published spec. Switched to Triode mode power fell to 36 Watts. For full output, an input of 0.7V is required via the phono input sockets and 1.4V via the XLR input sockets.

Frequency response ran flat from 3Hz to 80kHz (-1dB limits) and distortion measured 0.25% in the mid-band (3rd harmonic) but just 0.1% at 10kHz and 0.06% at 40kHz (all 1W). Just below full output the result was 0.5% at all frequencies, all fairly typical for a valve amplifier using fixed bias. Bass distortion was very low as valve amps go.

The accompanying Audio Research Reference 6SE preamplifier had a modest gain of x2 (6dB) from phono socket inputs to phono socket outputs and x4 (12dB) from XLR in-XLR out, or phono in to XLR out. Useful but not large gain values. If the two units are coupled through balanced XLR cables, as they should be, input sensitivity is 350mV for both phono and

XLR sockets.

Frequency response ran flat from 3Hz to 100kHz at full volume (103) but fell to 25kHz (-1dB) at 80 then rose to 35kHz at 50 and 80kHz at 20. So bandwidth depends upon volume control position – not ideal. At normal control positions of below 50 the upper limit was acceptably above 35kHz. There was minimal noise at -100dB and distortion was negligible too, measuring 0.01%.

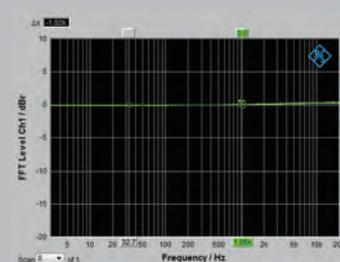
The Reference 80S measures well. The Reference 6SE preamplifier turns in a satisfactory if not impressive measured result due to low gain and bandwidth varying with volume position. NK

**REFERENCE 80S POWER AMPLIFIER**  
**Power** 72W  
**Frequency response (-1dB)** 3Hz-80kHz  
**Distortion (10kHz, 1W)** 0.1%  
**Separation (1kHz)** 94dB  
**Noise (IEC A)** -114dB  
**Sensitivity (phono/XLR)** 0.7V / 1.4V

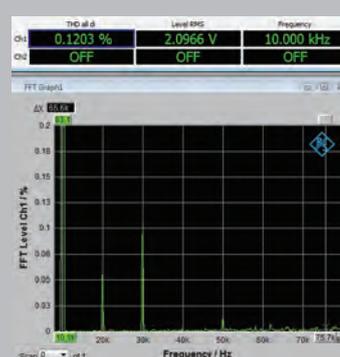
**REFERENCE 6SE PREAMPLIFIER**  
**Frequency response (+/-1dB)** 3Hz-30kHz  
**Gain / overload** x4 (12dB) / 72V

**Noise** -100dB  
**Distortion (10kHz, 1W)** 0.01%

### FREQUENCY RESPONSE



### DISTORTION



**AUDIO RESEARCH  
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REFERENCE 6SE  
PREAMPLIFIER**  
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**OUTSTANDING - amongst  
the best.**

### VERDICT

Washed clean sound with great composure. Clear and open too. Breathtaking.

### FOR

- clean, clear sound
- spacious sound stage
- facilities

### AGAINST

- large and very heavy
- no digital
- no phono stage

Absolute Sounds  
+44 (0) 20 8971 3909  
www.absolutesounds.com