

# Power Up!

Quad's distinctive PA-One headphone amplifier harnesses the power and poise of valves to make a big, bold sound, says Noel Keywood.

**T**he contrast between old and new is made vividly by Quad's PA-One headphone amplifier sitting beside the tiny Epiphany E-Dac that I use to drive computer headphones at my work desk. Since it's a battle to keep the desktop clear, the E-Dac's tiny footprint suits my purposes; it nestles in a dark corner, behind the monitor and alongside

the USB hub that powers it. Then along comes thermionic power in the PA-One, glowing valves a serious on-board power supply requiring mains connection – no USB here – and the looming presence of Bankside power station. Or so it seems.

But Bankside in its heyday probably produced a lot of decibels from banks of generators and Quad's PA-One sort-of provides a similar

step up in proportion: it's massively powerful and dynamic, I found, bringing industrial scale to headphone sound. But you do need a home for it.

Luckily, I use an almost-industrial scale workbench from Ikea, the unfortunately named and now discontinued Jerker, and the PA-One sat easily at one end of a 35cm (14in) deep shelf, although







**The rear panel has balanced, line level and digital inputs as well as a Pre-out so the Quad can be used as a valve-equipped DAC.**

a 30cm (12in) will do fine and I'd guess it has been designed to suit this common shelf depth. The main chassis is actually 26cms deep but rear cable protrusion consumes more centimetres. So the PA-One is big as headphone amps go, if not massively so; it can be squeezed in I found. A width of 18cms and height of 16.5cm help and although a mains transformer and output transformer contribute to a substantial weight of 7.5kgs a shelf able to take the weight of books will cope.

Why put it on a workbench? Well, it might be thermionic, but it is also digital: there's a USB B (printer style) socket on the rear that connects up to any computer, and plugged into my USB hub, to which is also attached a Mac. Yep, this is a thermionic computer headphone amp! Definitely not of the portable variety I'll note but it has other charms and strengths. One is that of glowing valves; the protective cover unscrews using a screwdriver supplied, to reveal two 6SL7 pre-amp valves, two 6SN7 output double-triodes, one per channel, driving an output transformer, probably in push-pull. Quad also use a valve rectifier, an EZ81, and these always help smooth the sound I've found from experiment with World Audio Design amplifiers, since they soft-switch and are high impedance, so are easy to silence with capacitive filtering – you get very quiet d.c. power lines from valve rectifiers.

This brace of valves reflects the latest preference for pre-war triodes, especially 6SN7s, rather than smaller

post-war types like ECC83s or TV audio ECL86s. The early triodes are bigger but they have a silky smooth and wonderfully neutral sound – and that is why Quad use them in the PA-One. They run just-warm, by the way, producing very little heat.

But don't worry! Early triodes they might be but they have the bandwidth to do justice to hi-res digital audio and Quad have ensured, in their usual thorough approach, that the PA-One processes 192kHz PCM (but not DSD) through all inputs, including its Toslink optical input. This means it played a 192kHz sample rate file from my Astell&Kern AK100 digital player that has only an optical digital output; many optical inputs cannot manage this. The PA-One has both electrical and optical S/PDIF inputs in addition to USB, I should add, so you can connect up a computer, CD player with digital output, or portable hi-res player. Since there's also an analogue output (Pre out) you can also use it as a valve equipped DAC for a CD player.

There's an analogue Line input too, so the analogue output of any player can be sent to headphones via the PA-One. Gain here was very high so the unit will accept very low inputs, right down to 46mV and still go loud with headphones. And that is very loud, because it can swing massive output volts, way more than even the most insensitive headphones need (see Measured Performance).

There are two headphone outputs, both 1/4in jacks, and a switch for high (above 100 Ohms) or low impedance phones. You get a big volume control, but no remote control – a surprise. It's not

uncommon to use an Alps motor driven volume control in this role, together with remote receiver and small, cheapo plastic remote. I guess the thinking is that headphone listeners will be within headphone lead range of the unit, not far enough away to need a remote. Just don't use a long headphone lead!

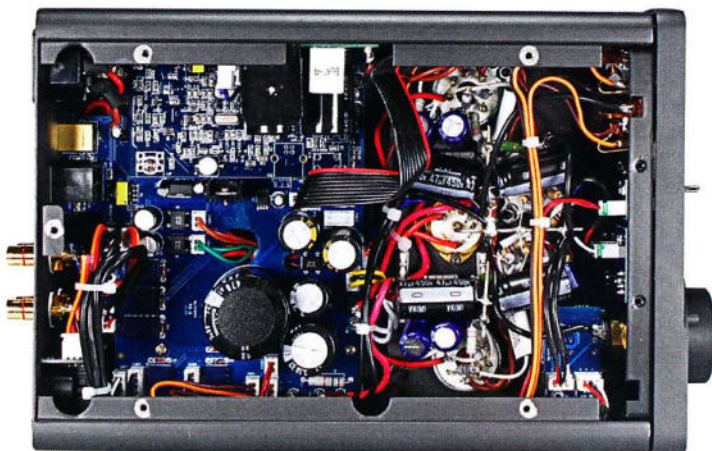
The PA-One is well built and finished – solid and very Quad. However, its dark-all-over finish is very sombre; Quad have better used light gold and grey metallic paint finishes in the past, with ochre graphics, to provide a lighter and cheerier tone. Grey text on chocolate brown background was unreadable in low light too, I found. Orange LEDs in the selector buttons were a nice touch though.

## SOUND QUALITY

Much like any good valve amplifier, the PA-One brings the dynamism of the valve sound, as well as its smoothness, to headphone listening. With my Fidelio X1s synergy was almost perfect: their low sensitivity was of no consequence at all.

With my classic-Rock test track of the Eagles careering through 'Somebody' (ripped from CD to 24/96) the PA-One kicked them hard, putting muscle behind Schmit's strenuous bass line that seemed faster than I usually hear it.

Commonly this track sounds as flat as I – perhaps cynically – expect from CD, and from a track that has been compressed upward to sound loud; it doesn't have much dynamic range measurement shows. Yet through the PA-One it seemingly had huge dynamics – and not only was the bass line made obvious but cymbals too jumped out of the mix, all the while the Hammond organ



**The PA-One is well-built and finished with neat internal layout, in typical Quad fashion.**





Quad uses pairs of 6SL7 and 6SN7 valves alongside an EZ81 rectifier.

swirled away behind.

Moving onto real hi-res, namely Fleetwood Mac (24/96) playing out of memory via Audacity, the PA-One was lightning fast and incisive, and punchy too, showing what hi-res can do on a good hi-fi playback chain.

Mick Fleetwood's opening drum sequence on 'Dreams' was beautifully rendered: fast, clean and tightly defined in the time domain, vocals stretching across a wide and airily open sound stage. Stevie

Nicks's voice hung centre stage with convincing realism, with backing vocals layered behind and offset left. The PA-One even brought some extra life to mp4 downloads from iTunes, like 'Angels' from Within Temptation where Sharon den Adele's impressively high mezzo-soprano range was made very obvious, even if mp4 compression grunge affected the band somewhat.

Swapping over to Oppo PM-1 planar magnetic headphones showed the PA-One is relatively unaffected by headphone balance. The Oppos usually sound quite warm up top but the PA-One imposed its own will and dynamism, lessening this quality.

With an AK100 connected I initially bumped into silence with 192kHz files, quite unlike what happened on the test bench. Swapping to a short lead put me into business, underlining how close to borderline Toslink is with high data rates; it was never designed to carry hi-res and the connectors and cables affect viability. 24/96 will always work via Toslink but 24/192 has double the data rate and therefore needs a higher analogue transmission bandwidth (digital being analogue remember). Was it better sounding than USB? It was a tad smoother and

svelte on balance but the PA-One so dominates sound quality, imposing its own will, it hardly seemed consequential. With opening drum strikes in my right ear beating my aural bits hard at the start of 'Tramp' and the Muscle Shoal horns blaring across the full width of the stage I wasn't inclined to be too worried about this and I did notice that Carla Thomas seemed to be singing in a bathroom and tape hiss at the end of the glorious 1967 track was dreadful! Never noticed that before. But the PA-One did Otis proud, putting real kick into proceedings; all of a sudden music was sounding funky.

**CONCLUSION**

If you really value headphone listening then the PA-One is a must-have. It suits all headphones and really kicks them into life. With superb dynamics and easy-on-the-ear smoothness it exists in a realm above current silicon chip, 5V USB power line driven alternatives, riddled with charge-pump dc convertors. The PA-One has 250 honestly generated Volts inside and it's audible! This unit is easily the best headphone amp out there, providing you don't want to carry it around in your back pocket!

**MEASURED PERFORMANCE**

The Quad PA-One has high gain of x21.6 (27dB), so just 46mV via Line In will give 1V into headphones (Low impedance setting) and that is loud. Switching to High impedance gain doubles. So any source, including a low gain phono stage, will deliver enough signal to drive any headphone to high volume. Maximum output was beyond 10V, a maximum of 19V being delivered with headphone impedance set high. Since even insensitive headphones need no more than 2V, this is more than enough.

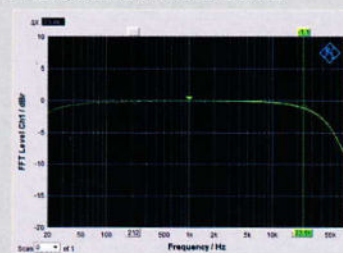
Distortion measured a low 0.03% at 1V output to headphones and frequency response was flat from 20Hz to 23.6kHz, at both impedance settings and at all positions of the volume control. The XLR input gave the same result as the phono socket input.

Both S/PDIF electrical and optical digital inputs worked to 192kHz and frequency response was flat from 20Hz to 30kHz (-1dB). EIAJ Dynamic range was inevitably limited by low level noise from the valves but was still a respectable 105dB with 24bit. That's higher than CD (102dB) – if not by much. I noticed

distortion and noise were lowest at 44.1kHz sample rate, so the PA-One best suits CD.

Unfortunately, the USB input was noisier, managing 97dB EIAJ Dynamic Range – unimpressive. Distortion was

**FREQUENCY RESPONSE**



**DISTORTION**



high at 0.8%, due to noise, against 0.1% from S/PDIF (at -60dB).

The Pre-out had much less gain than Headphone out, just x4 at High and x2 at Low (impedance headphones). Maximum output was limited to 2V (0.3% thd); it must be tapped off before the output transformer.

The PA-One works well across the board, if in measurement being a tad limited by thermal noise from the valves. USB performance was mediocre though. **NK**

Line in (analogue)  
**Frequency response (-1dB)**  
 20Hz-23.6kHz  
**Distortion (1V out)** 0.03%  
**Gain (headphones)** x21.6 (27dB)  
**Overload** 10V out  
**Gain (Pre Out)** x4 (12dB)

**Digital in**  
**Frequency response** 20Hz-30kHz  
**Distortion** 24bit  
**0dB** 0.003%  
**-60dB** 0.08%  
**Separation (1kHz)** 89dB  
**Noise (IEC A)** -103dB  
**Dynamic range** 105dB

**QUAD PA-ONE HEADPHONE AMPLIFIER £1200**



**OUTSTANDING - amongst the best.**

**VERDICT**

One of the best sounding headphone amplifiers available, a wide range of inputs offering unrestricted hi-res PCM playback.

**FOR**

- USB & S/PDIF digital
- powerful, dynamic sound
- can drive a hi-fi

**AGAINST**

- large
- heavy
- sombre appearance

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