

# ADL

HiFi World (UK) – ADL X1  
March 2014



## X1 is Go

**ADL's battery powered X1 portable headphone amplifier is great on the go, says Noel Keywood.**

**A**lpha Design Labs, based in Tokyo, like to produce hi-tech products that have just that little bit extra. For example, we use their tiny Esprit preamplifier to record LPs to digital (24/96), because they've fitted it with an Analogue-to-Digital convertor. The only downside is it adds complexity, and that's what you meet with the intriguing X1 headphone amplifier: it's technologically advanced and it performs numerous functions, but it is a tad complicated.

So let's get straight to the core of what it does. The X1 is a portable, battery driven headphone amplifier that works from USB. You charge it, plug in your portable digital doo-dah using a USB cable then listen to music that's passed through its top quality ESS ES9023 DAC chip that works right up to 192kHz sample rate. It's asynchronous, meaning its on-board clock takes control of ops. to reduce jitter, eliminating the player from this role. The idea is to provide very high quality output for headphones of all sorts, including high quality types that need power.

For those that don't or can't use the USB digital input there's also an analogue input, that'll accept the headphone output of a portable player and amplify it. It has a little gain (+3dB), so will make headphones go a tad louder, but not much our measurements showed. One of the two analogue 3.5mm jack inputs accepts four-ring plugs, and the headphone output is four-ring, to transfer in-line mic signals from Apple and Sony devices.

And finally there is a 'DDC', or Digital-to-Digital Converter – a new term to me. This converts packetised USB digital to continuous (contiguous?) S/PDIF digital so that X1 can accept digital from a portable device and send it to a traditional hi-fi DAC, or perhaps a 'digital amplifier' (one with an on-board DAC) or an

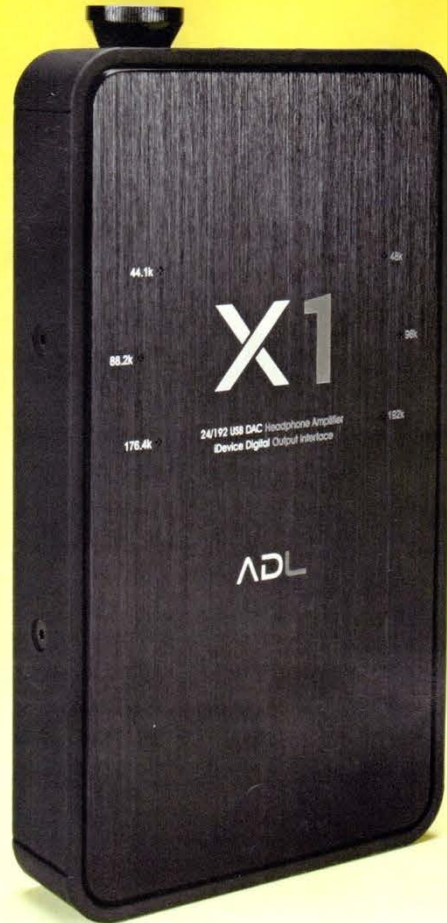
AV receiver, that has only S/PDIF inputs.

The X1 comes in a small box together with User Manual (available on-line) and numerous leads. There's a USB A to USB mini-B for charging and connection of a computer. There's a short four-ring 3.5mm jack terminated analogue lead for connection to a player's headphone output. There's a 19pin Apple connector (old style) to USB A for connection of an iPhone (etc), a rubber band to hold an accompanying player, and belt clip. There's no Apple Lightning lead, but the USB A-to-Lightning charging lead with my iPad Mini worked, so an adaptor is not needed it seems.

Measuring 123mm high overall, including the volume knob, 67mm wide and 17mm deep the X1 is pocketable. Weighing 150gms on our scales it is light, but overall being bigger than an iPhone it isn't small, but it isn't large either!

The internal Li-ion 2600mAh rechargeable battery takes 4-5 hours to charge from a dedicated charger, or 7 hours from the 0.5A available from a USB outlet. Playing time is quoted as 7.5 hours and that is what I got, although I also used the X1 connected to power whilst in use, so as to not run down the battery. So it can be used as a desk based high quality headphone amp as well as a portable one and at this very minute, whilst writing this, the X1 is linked to mains power through an iPad charger whilst the iPad Mini is feeding it and I am listening on lightweight Jays V-Jays, to the Doors 'Cars Hiss by My Window'. There's plenty of volume on V-Jays, as there will be on most 'phones, and the ADL X1 (1.7V out) could drive my insensitive Philips Fidelio X1s to unbearable level, whereas the iPad Mini (1V out) could only manage 'very loud', so the X1 provides extra oomph.

And that is one point of



headphone amplifiers like the X1. Most portables deliver 0.3V from a low current consumption, noisy headphone chip. Add in dreaded MP3 or even poorly ripped AAC like my Within Temptation 'The Unforgiving' iTunes download, and you end up with grotty portable sound.

It need not be like this. Better headphone drive amps are available and this is what ADL are offering with the X1, together with a top quality DAC of course.

Although the iPad Mini, which has quite a good DAC and headphone output amplifiers, sounded crisp and clear, the X1 brought extra punch to bass

**Headphone output, line (headphone) input and volume control.**



in particular. I should mention here that iOS ((Apple's operating system for portables) devices can process and play 24 bit files, but only up to 48kHz sample rate. I got identical



Mini-B USB input (left), for computer connection, and iDevice USB A input (centre), plus a headphone and optical digital output.

noise and distortion levels from the iPad Mini headphone output and X1 headphone output under measurement, suggesting the iPad generates this because the X1 is fundamentally quieter, but X1 went louder.

Both sounded very clean and at times I was just very impressed that well transcribed old analogue recordings like my Otis Redding albums (24/192) and Doors download (AAC+) could sound so clean and punchy. Note that if you play 24 bit files on IOS devices they will give a tad less noise and distortion than 16 bit files, so anyone with a high res collection can down-sample for their portable to good effect.

Moving on from iOS to Mavericks, Apple's operating system for laptops and desk tops, and the X1 plugged into my MacBook Pro's USB socket using the USB A-to-miniB lead and, as expected, was seen by Mavericks. Output sample rate was settable from 44.1 up to 192kHz (Macs having a fixed output rate in the 'Audio MIDI SETUP' panel, in utilities). With PCs a software driver is needed, available from ADL's website.

I have ALAC'd a lot of high res material and play it out of iTunes, which with Mavericks delivers 24 bit linearity and extended analogue bandwidth. With the Philips Fidelio X1 headphones the ADL X1 delivered a sound that has a light hue to it, is very clean edged (i.e. fast)

and forensically accurate. Bass comes over as tight, fast and punchy. What the X1 is not, is warm or full bodied. There's no syrup or gloop, nor any image imprecision, it is all martially correct and under complete control. This sort of cool but deep insight is a feature of the Esprit, so there is family resemblance.

The Trondheim Soloists stretched in a wide stage between my ears, strings having a cool but vivid quality about them, whilst cellos had convincing body. With Rock and Antonio Forcione and Sabina Scuba (24/192), plucked acoustic guitar was superbly outlined and clear, strings almost having a cutting edge they were so fast, whilst acoustic bass was

firm, note to note and Sabina Scuba was positioned sharply centre stage, with no imprecision. This suggested to me low jitter, since jitter adds a slight sense of fuzz to an image, whilst the X1 was pin sharp with whatever I played. The X1 sounded nothing other than utterly concise, grippy and in control at all times.

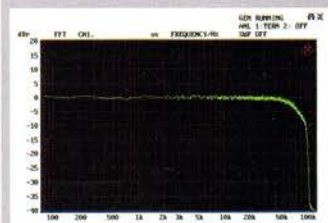
**CONCLUSION**

With USB up to 192kHz sample rate, a high quality DAC and a powerful headphone amplifier able to drive even insensitive high quality headphones loud, the X1 is a great product. ADL have made it very flexible, so it can handle most situations. Our measurements show fine technical performance and listening backed this up. If you want a thoroughly modern battery powered headphone amplifier with plenty of volume, then this is the one. Literally, a top rate product!

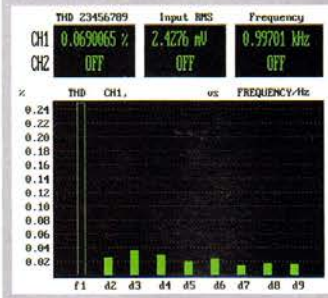
**MEASURED PERFORMANCE**

The X1 will accept 192kHz over USB, whereas currently many USB DACs manage 96kHz maximum. There isn't a major difference in sound quality but good headphones with modern recordings may detect slightly improved sound staging in particular. Interestingly the X1 played a 192k file but went no higher than 20kHz with iTunes 11.1.4 on Snow Leopard, even though its 192k lock light was on. However, it delivered the quoted performance from iTunes 11.1.3 on Mavericks, playing an Apple ALAC 24/192 compressed white noise test file, so latest Mac OS and iTunes are needed for 55kHz analogue bandwidth

**FREQUENCY RESPONSE**



**DISTORTION**



(-1dB). Output reached 1.7V maximum before clipping occurred, so there's plenty of volume for insensitive headphones. Distortion was low at -60dB, measuring 0.07% with 24bit, a little higher than possible because of a little noise. EIAJ Dynamic Range was a healthy 106dB, but again not quite the best possible, around 110dB being hoped for.

The analogue input had x1.4 (3dB) gain, which was insufficient to take a 0.3V headphone output up to 1.7V, which requires x5.6 (~15dB) gain, so this appears to be a buffer stage rather than a gain stage. Maximum output was 1.7V. Bandwidth exceeded v.

The USB input ran through to the optical S/PDIF output, but the analogue input did not; ADL have not included an ADC. The S/PDIF output is a feed for an external DAC.

The X1 measured well, although absence of gain in the analogue stages is a missed opportunity to match insensitive headphones into a low output player. NK

Frequency response (-1dB)	4Hz - 55kHz
Distortion (%)	
0dB	0.007
-60dB	0.07
Separation (1kHz)	111dB
Noise (IEC A)	-105dB
Dynamic range	106dB
Output	1.7V

**ADL X1 £395**



**OUTSTANDING - amongst the best**

**VERDICT**

High volume and great sound quality from a battery powered headphone amp that gives exciting sound on the move.

**FOR**

- high volume
- pin sharp sound
- firm bass

**AGAINST**

- not small
- fiddly controls

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