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HiFI+ (UK) – ADL X1 Review

June 2014

ADL X1 Portable DAC and Headphone Amplifier

by Steven Stone

Someday in the future we will be able to carry round and play our entire musical collection, on a device smaller than credit card. And while the hardware isn't that miniaturised yet, the £395 ADL X1 portable DAC/headphone amplifier is certainly a big step in the right direction.

In a 6.8 by 11.8 by 1.65 cm enclosure that weighs only 147 grams, the ADL X1 houses a DAC with inputs for USB B, mini USB, iPod (both 30-pin and lightning connector via adapter cables), and analogue via a mini-stereo plug. The ADL X1 has two analogue outputs plus a Toslink digital output which doubles as one of the analogue outputs via an adapter (the same kind used on many Apple computers.) The ADL X1 supports PCM formats from 44.1/16 to 192/24. Currently it does not support DSD. It also has six small LEDs on its front panel that indicate the current sample rate.

The whole point of the X1 is to deliver optimal sonics for portable and computer audio devices. To do this you'll need several specialised cables. A USB type A to mini B cable will allow you to charge the X1 and connect to your computer to gain access to digital music files and streaming sources from your computer. Next, if you have an iPod or iPhone you will need an iPod dock output to USB input cable. Depending on whether you have an iPod Touch, iPhone 4, or iPhone 5 the dock type will be either the 15-pin for older iDevices or the newer mini dock connector for the iPhone 5. ADL makes both kinds and includes one iDevice to USB cable as well as a type A to mini B USB cable with the X1. ADL also includes a mini-stereo to stereo single-ended RCA cable so you can attach the X1 to an analogue preamp when you are using it as an iDevice or USB DAC/PRE.

And what doesn't the ADL X1 connect with? Well, if you had visions of using the X1 with the digital output of the Astell & Kern AK100 or AK120 or the new AK240, I'm sorry to say that since the X1 lacks a Toslink digital input, you can't do that. You can connect the analogue output of the AK100, and any other player with an analogue output, to the analogue input of the X1. But if you want to use it as a DAC with your portable player, unless the player has a USB digital output

or conforms to the Apple dock standards, you can't use the X1 as a DAC for your portable player. Obviously you can still take advantage of the X1's excellent headphone output and analogue line level outputs, but not its DAC section.

The ADL X1 has a Toslink digital output, which can be connected to any DAC that has a Toslink input. For owners of high quality 'legacy' digital to analogue convertors, using the X1 as a S/PDIF could be a very cost-effective way to add computer audio and streaming inputs to your current DAC.

The X1 has a built-in battery that must be charged via its USB mini B input connection. For extended listening sessions you can power the X1 directly from this input. If you prefer traveling light, *sans* computer, you may need to acquire an AC to USB charging device to reenergise the X1's battery. Any charging unit that puts out a 5-volt signal should work. I found that even the cheap chargers supplied with e-cigarette vaporisers successfully charged the X1.

When you connect the X1 to a computer you will need to select it as the audio output device from your settings menu. My MacPro desktop and MacBook Pro portable units recognized the X1 immediately after it was plugged into their USB bus. According to ADL, "No drivers are needed with Mac computers, while a single standard driver is required for Windows computers." That driver is available from ADL on the X1 product page at www.adl-av.com.

Since most potential users will be purchasing the ADL X1 because it can work with more than one audio set-up, I spent a lot more time working my way through its multiple functions than I would with a single-use component. And as you might expect, the ADL X1 performs better in some applications than others. If your principle need is a USB to S/PDIF convertor, there are more versatile options than the X1, which only has a single Toslink digital output. But the X1's Toslink does support and pass through 192/24 files with no problems. When I compared the X1's USB to Toslink feed with a direct USB connection to the new Rotel RD-1580 USB DAC I couldn't hear any drastic differences in the sound when I listened to 320 Kbs MP3 files. On 192/24 files I found that the Rotel's direct USB connection had a slightly larger soundstage, but ▶

▶ the X1's Toslink feed matched the Rotel in image specificity, depth, and low-level detail.

One of the X1's primary functions is as an outboard DAC/soundcard in a computer audio system. The X1 has a single mini-stereo analogue output. Depending on whether you are using headphones or attaching the X1 to a preamp or powered speakers, you will very likely be spending time connecting and disconnecting cables from this single analogue output, so the X1's physical placement may require some thought. You need the X1 within arm's reach so you can adjust its volume when using headphones, but you also need it within a metre or two of your computer so you can connect it to the computer's USB for power and signal. Obviously with a portable computer this won't be an issue. But, if your desktop computer has its CPU buried beneath the desk or if your stereo preamp is located in a separate room from your computer system, distances could be an problem. In theory, the X1 should be able to drive a longer than standard one-metre analogue cable with no issues, but if you are expecting to connect it via anything longer than a 10-metre cable you might want to try it out at home before consummating your purchase.

When used as a USB DAC, the X1 proved to be a stellar performer. It had no ergonomic issues or delays when switching formats from 44.1/16 to 192/24 files. On high-resolution music, the X1 was most impressive, preserving all the subtle spatial cues on my own live concert recordings. The X1's lateral imaging was especially precise, allowing two adjacent instruments to retain their image specificity with no homogenization or blending of their edges. The X1's ability to define the edges of a voice or instrument was exemplary, rivaling far pricier DACs that I've had in my computer desktop system. The X1's harmonic balance was also excellent, with enough bass extension, drive and power to keep all but the most bass-centric listeners happy. The X1's midrange was very smooth yet detailed with a relaxed and natural presentation that outdistanced the Fiio Alpen E-17 entry-level outboard USB DAC. In comparison the E-17 sounded slightly mechanical and lacked the X1's dynamic drive, especially when I listened through my Audeze LCD-2 headphones.

Since the analogue output level is variable, it can be connected directly to a power amplifier or powered speakers that lack their own volume controls. When the X1 was directly connected via its analogue outputs to an amplifier I was impressed by both its transparency and its ability to deliver a full-frequency signal with no low bass attenuation. Unlike some headphone amplifiers which have some hiss or low-level noise when used as a preamp, the X1 amp section was silent when used for preamp duties. My only complaint

when using the X1 directly connected to an amplifier was the volume control knob doesn't offer fine enough graduations, so it's hard to match levels critically. It's also too easy to turn up the volume accidentally to a level above your original intent.

If you own an iPod Classic, iPod Touch, or iPhone, the X1 will noticeably raise their sonic performance several levels. When you connect an iDevice to the X1 via a dedicated dock cable, turning on the X1 will default the iDevice to a fixed-level digital output via its digital connection in the dock cable. The digital stream is sent to the X1, which will now do the D/A conversion. Instead of listening to the iDevice's internal digital to analogue convertor you will be hearing the X1's DAC section. By using the X1 you will also be bypassing your iDevice's headphone amplifier, which may not be up to the task of driving a number of the higher-performance headphones and earphones currently on the market.

If you use an iDevice with the Audeze LCD-2 headphones and then switch over to the X1, the sonic reasons you would want to own an X1 become almost painfully obvious. The X1 delivers an all-around higher level of fidelity – the soundstage is larger, the bass is better defined and more extended, the midrange is more natural and detailed, and the top end is smoother with more air. And with EU-derived iDevices, you'll get more gain too, because they are volume limited. There are certainly more expensive desktop DAC/headphone combinations, but this rig's combination of ergonomics and fidelity makes it a benchmark combo.

With the ultra-sensitive 120dB Westone ES-5 custom-fit in-ear monitors, the X1 generates a noticeable low-level hiss background noise regardless of the signal's volume level. At ▶

▶ normal listening levels you won't be aware of it, except during pauses in the music or extremely quiet sections. But if you already own and love the Westone ES-5 custom in-ears, the X1 won't, unfortunately, make an ideal pairing.

Owners of the Ultimate Ears IERMs (In Ear Reference Monitors) will be happier with the X1. With its lower sensitivity the IERMs proved to be a better mating, the X1 providing an almost silent background with only the very slightest trace of hiss or noise. Even during quiet passages in classical music, the room or concert hall background noise completely masked any base-level noise from the X1.

One earphone that was absolutely silent when plugged into the X1 was the Etymotic ER-4p. The harmonic balance, midrange clarity, pace, and bass resolution through this combo was uniformly excellent. If you are assembling a high-quality, ultra-compact travel rig, especially for on-airplane use, the X-1/ER-4p pairing is hard to beat for the price.

With less sensitive headphones, such as the PSB M4U 1, the X1 had enough gain to drive them way past maximum head-banger levels. And as you might expect with a less sensitive can, the X1's amplifier section was dead quiet. Bass extension, detail, weight, and warmth was especially compelling with this pairing. If you don't mind carrying a pair of full-sized headphones when you travel, this combination has great appeal.

If I were an urban always-on-the-go audiophile in search of an all-in-one small-footprint DAC solution that could serve for travel, desktop, and even preamp duties, the X1 would be on my short-list of possibilities. It is flexible, easy to use, un-fussy to set-up, and will silently drive any medium-sensitivity headphone. Some combinations, such as the X1/Audeze LCD-2 pairing, are especially synergistic.

The X1's primary drawback is that its amplifier section isn't suited to high-sensitivity in-ear monitors, because of its some low-level hiss and noise. Fortunately, if you want to use the X1 as a preamp to drive an amplifier or active speakers, it is absolutely silent.

While £395 isn't inexpensive, when you consider the X1's capabilities, both sonic and ergonomic, it must be ranked as an excellent value that can serve a multiple of useful functions in a variety of situations. As a travelin' man's go-to DAC the X1 should be at the top of your must-try and most-likely-to-buy list. ✛

TECHNICAL SPECIFICATIONS

Max headphone output at 1%THD @ 1KHz: 34mW(12 ohm), 60mW(16 ohm), 82mW(32 ohm), 86mW(56 ohm), 36mW(300 ohm), 19mW(600 ohm)

Channel separation: 60-64dB (1KHz) 33ohms -50dB/<=±3dB

Frequency characteristics: 20Hz-20kHz (±0.5dB)

Total Harmonic Distortion: 0.033% (33ohms), <0.02% (300ohms), 0.0085% (600ohms)/1mW

S/N Ratio: 95.5dB/32ohms, 98.1dB / 56ohms, 101.6dB/300ohms, 102.1dB/600ohms

Charge time approximately: 4-5 hours (AC/DC 5V, 1.0-2.0A switching adaptor – sold separately)

Charge time: approximately 7 hours (DC 5V, 0.5A USB bus power)

Music playback time: up to 7.5 hours when fully charged

Dimensions (WxHxD): 68x 16.5 x 118 mm

Weight: 147g Approx.

Price: £395

Manufactured by: Alpha Design Labs
URL: www.adl-av.com

Distributed by: Sound Fowndations
URL: www.soundfowndations.co.uk
Tel: +44(0)1276 501392