Antelope Audio
Zen Studio USB 2 Audio Interface

SAM INGLIS

If small is beautiful, then Antelope Audio's latest product is the Mona Lisa of multi-channel audio interfaces.

There are quite a few audio interfaces on the market that pack a lot of I/O into a small box. If you're happy to connect everything via MADI, you can get 64 channels in and out on one pair of connectors, while products such as RME's Fireface 802 cram a truly comprehensive array of analogue and digital socketry into a 1U rack unit. Antelope Audio's new Zen Studio USB interface, however, raises the bar even further. It boasts 12 mic preamps on combi XLR/jack sockets. There are a further eight analogue line inputs and outputs on D-Subs. You get 16 channels of digital I/O via ADAT sockets. It also has word clock and coaxial digital I/O, plus a pair of independently addressable headphone outputs. And it doesn't even occupy a full rack space!

Inevitably, this marvel of miniaturisation is accomplished by the extensive use of digital control. So, for instance, none of the preamps has an analogue gain potentiometer or a phantom power switch. In fact, the only physical controls on the Zen Studio are a power/standby button, an infinite rotary control that can be assigned to various combinations of the headphone outputs and rear-panel Monitor outs, and a pair of up/down increment buttons. Inbetween these and the volume control is a small but detailed colour display. By default, this is configured to show bargraph meters for two rows of 16 channels, but you can use the option buttons to make it display parameters such as clock source, sample rate, preamp gain and headphone volume instead. However, it's not possible to make adjustments to preamp gain using these physical controls.

The smallness of the Zen Studio also entails a few compromises in terms of physical design. So, for instance, the ADAT sockets are located not on the rear panel but on one end of the unit,

Unusually, the Zen Studio's ADAT-format digital I/O is located on one end of the unit.

which could be awkward if you wanted to rackmount it (for which, incidentally, you'll need a separate rackmounting kit), and power is delivered through an external wall-wart rather than an IEC cable. The supplied transformer is rather lightweight, but does the job and has a locking connector to prevent accidents.

Gone To Launch

Assuming you want to do more with the Zen Studio than enjoy a bonsai light

Latency & The Zen Studio

All the recording I did with the Zen Studio was to an 'early 2014' Apple MacBook Air, with a 1.4GHz Intel Core i5 CPU and 8GB RAM, running Mac OS 10.9.4 'Mavericks'. Under Mac OS, buffer sizes can only be set by an audio application that is using the Zen Studio, and not from the control panel. The lowest available buffer setting is 32 samples, and I had no problems running at this setting; PreSonus's Studio One stated the input and output latencies as 157 and 83 samples respectively, making a total reported round-trip latency of 5.44ms at 44.1kHz. When I performed a loopback test, an audio source sent from Studio One and routed back into the Zen Studio's input was recorded about 80 samples late compared with the source, suggesting that these figures are accurate (Studio One compensates for the input latency in this situation).

The Windows control panel, by contrast, offers both a range of buffer sizes (this time starting from 64 samples) and a six-position 'ASIO USB Streaming Mode' pop-up. The options on the latter range from 'Min Latency' to 'Extra Safe', and presumably introduce progressively larger safety buffers as you go up the scale. On my Windows 7 machine, I was unable to play back audio cleanly at all with buffer sizes of 64 or 128 samples, no matter what the Streaming Mode was set to. At a buffer size of 256 samples, Oblique Audio's RTL utility recorded round-trip latency figures of 700 samples (15.9ms at 44.1kHz) at Min Latency, rising to 2199 samples (50ms) in Extra Safe mode. The former figure is comparable to what I've measured with other interfaces such as Presonus's Audiobox 1818VSL. In Vin Curigliano's DAWbench test, I was able to run 74 instances of Tube-Tech's Classic Channel at this setting, a figure which compares pretty well with most of the other interfaces I've tested.

show, you'll need to turn your attention to its software control panel. However, double-clicking its icon in the Finder or the Windows Explorer activates not the control panel itself, but a separate 'launcher' application which checks to see whether a newer version is available on the Antelope web site. A good idea in principle, perhaps, and it ensures that everyone is always running the latest software, but it does mean that you need to connect to the Internet before using the Zen Studio the first time. Also, on one occasion, a server problem meant that the update process failed, and for 12 hours or so I wasn't able to use the Zen Studio. If I'd had a session planned, I'd have been pretty cross.

The launch process also checks to see whether new firmware is available, and if so, lets you install it. This didn't always work successfully for me, but I'm not sure whether that was a problem with the installer, or something I'd done wrong! There was a worrying half-hour where I was left with an unresponsive Zen Studio and a message saying 'Failed', but once

I'd tried a few more times, things got back on track.

Panel Games

The control panel itself displays hardware settings in a bar along the top, with the main body of the screen showing parameters relating to the Zen Studio's internal DSP mixer and effects. The way everything's organised makes sense, but its usability is hampered by the fact a lot of the graphics are needlessly tiny. For instance, you adjust preamp gain by dragging a minuscule blue dot around a grey circle with a microscopic numeric display in the middle. Both the numbers and the blue dot are so small that you have to squint very hard to see what's going on, yet there's plenty of space around them — could Antelope not simply have made them bigger?

The hardware settings section at the top of the screen is sensibly divided into four banks. The first of these shows settings for the 12 mic preamps. Phantom power is individually switchable on a per-input basis (hooray!), as is the ability to switch between mic, line and (for inputs 1-4) instrument sources that need to see a high impedance. Gain is adjustable in all three modes, and each setting is remembered, so that if, for instance, you switch back and forth between mic and

instrument modes, the last gain setting used is recalled. The digital gain controls are stepped at 1dB intervals throughout the gain range, which is great, and adjacent pairs can also be ganged for stereo recording.

I personally am a big fan of digitally controlled mic preamps, as they take the guesswork out of matching gains across channels. And I have no complaints either about the sound of these ones — clean, clear and free from any coloration or noise that I could detect — or the precision with which they can be controlled.

»

As well as eight additional mic preamps, the Zen Studio's rear panel houses eight line-level ins and outs on D-Subs, along with the insert points for inputs 1/2, the stereo Monitor outs, word clock and coaxial S/PDIF I/O.

Antelope Audio
Zen Studio **$2495**

PROS
- Packs a massive amount of I/O into a tiny, portable box.
- Sounds very good.
- Flexible signal routing and low-latency monitoring.
- You get a lot for your money!

CONS
- Despite there being 38 physical inputs, only 24 channels can be recorded simultaneously.
- With no pads on the mic or instrument inputs, it's easy to clip the A-D converters when recording loud sources such as drums.
- Control panel graphics are rather small.
- Sketchy, online-only documentation.

SUMMARY
The Zen Studio delivers a huge amount of interface for the money, in a very small package.

» However, I should mention that the aforementioned gain range runs from +10 to +65 dB, and there are no pads on any of the mic inputs. On one of the sessions where I used the Zen Studio, I was recording an averagely hard-hitting rock drummer. Even with every channel's preamp gain at its minimum setting, my kick drum mic occasionally went into clipping, and the snare and overheads came closer than I'd like. Had I been using modern high-output capacitor mics, I'd have had no chance of recording a clean signal. The minimum gain is +10dB on the instrument setting, too, and I also found it possible to clip the A-D converters playing bass guitar (which didn't even have active pickups) with a plectrum. By contrast, the sensitivity of the line inputs can be freely adjusted to cope with the vagaries of whatever they're being fed from. Antelope told me that it might be possible to add pads to the mic inputs through a future firmware update.

A Quart Into A Pint Pot

The main area of the Zen Studio control panel can display one of five pages, selected using tabs along the top. The first of these is a colourful and very flexible routing matrix. Connections are made by dragging coloured blocks from the upper section, which represents all the incoming signals available, to the lower section, where all possible destinations appear. These banks include not only the Zen Studio's physical inputs and outputs, but also the inputs and outputs to its four cue mixes, its 16 channel strip dynamics/EQ blocks, and the 24 channels that travel to and from your DAW software over USB. That figure, sadly, is immutable: although, by my arithmetic, it

has a total of 38 physical inputs at base sample rates, the Zen Studio will only ever pass 24 of the signals arriving at them to your audio software, and will only accept 24 separate outputs from software for distribution among its 32 physical outputs. Antelope Audio say this is a consequence of the bandwidth limitations of USB 2, which makes one wonder why they didn't use USB 3 or Thunderbolt. It's possible that a future version of the control panel might at least let you rebalance the number of inputs against outputs, for those situations where you are running out of inputs but not using more than a couple of outs.

In the meantime, the Zen Studio's DSP routing matrix is flexible enough that, at a pinch, you could use the four DSP mixers to record stereo bounces from multiple physical inputs in situations where you're running out of USB channels. However, their main purpose is presumably to create cue mixes for musicians. Each can accept 32 input sources, which can include their own outputs, as well as the outputs of the other mixers — the flip side of versatile routing is that it won't save you from yourself if you do something daft and create a horrible feedback loop! The routing matrix can be a bit daunting to start with, and it would be helpful if it were documented more fully, perhaps
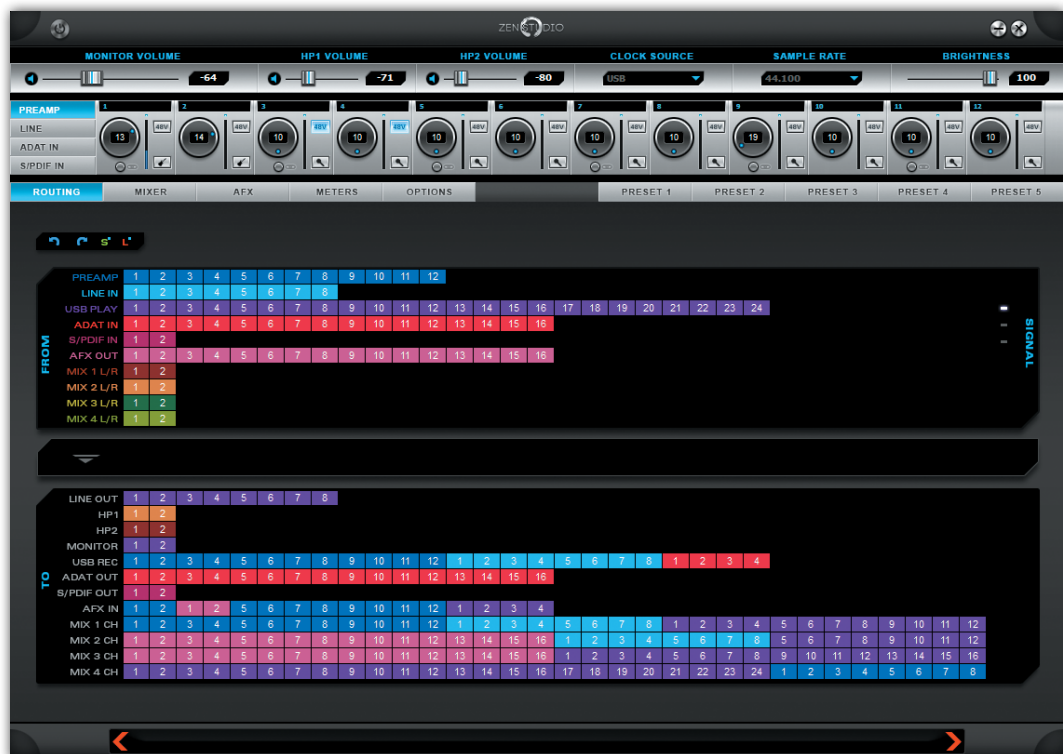
with some example setups. Unfortunately, there's no paper documentation at all, and the only 'manual' is a page on the Antelope web site which, while clear enough, is pretty lightweight.

The mixer layout is logical enough, with each channel having a (typically small) pan control at the top, a numerical readout of fader level followed by the fader itself, and mute and solo buttons. Each pair of adjacent odd/even channels can be stereo-linked by clicking the relevant button, but unfortunately, doing so doesn't shift their pan controls from the default centre position. To pan the halves of a stereo pair hard left and right you need to click and drag on their fiddly pan controls, which is tedious and annoying. (Again, Antelope told me they hope to improve this in future versions.)
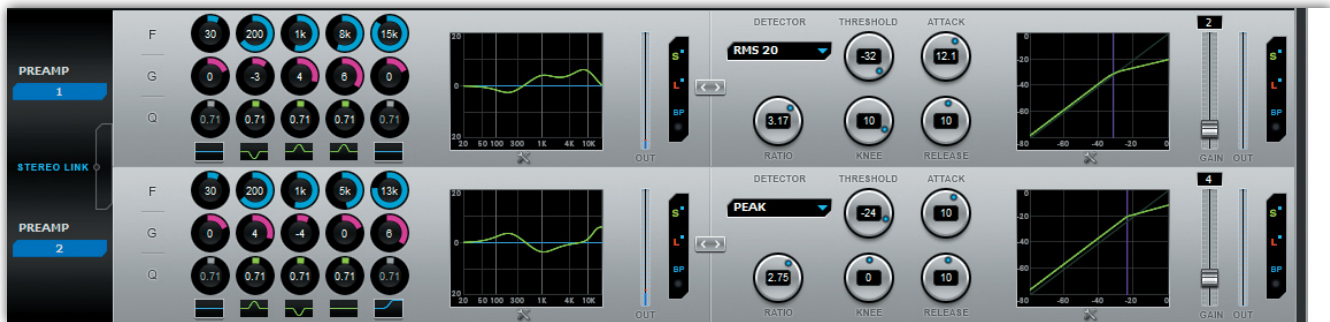
Return To Sender

The Zen Studio's 16 'AFX' channel strips are not hard-wired into the mixer, but »

Routing in the Zen Studio control panel utility is handled using this colourful matrix: you simply drag coloured blocks from the top to the bottom half to make connections. The top panel here is showing (in very small writing!) input type and gain for the 12 mic/line inputs.

The control panel features four 32-input DSP mixers, each with its own master fader (right).

There are 16 'AFX' processors, each containing comprehensive EQ and dynamics functionality, which can be freely assigned within the routing matrix.

can be freely routed almost anywhere. If one bank of five-band parametric EQ isn't enough for you, for instance, you could route its output directly into the input of another channel strip to apply a further five bands to the same signal. Alternatively, if you want to equalise and compress the same input in different ways for different cue mixes, you can simply assign more than one AFX processor to the same source. And, if you want to record the processed signal, you simply drag the relevant salmon-coloured 'from' block to one of the USB Rec blocks in the 'to' page of the routing matrix. The possibilities are limitless.

The AFX processors are displayed in groups of two, which can be stereo-linked. Though cursed like much of the control panel with graphics so small as to be barely legible, they are certainly powerful, and on the whole, easy to use. The five EQ bands are fully parametric, and the outer two can be switched to filter or shelving mode, while the dynamics section offers a Knee control and various RMS and peak sensing options as well as the standard time constants, threshold, ratio and make-up gain. It can't presently be set up for gating or expansion, but I'm told this is another possibility for future updates.

In my own work I very rarely use the DSP effects built into interface control panel utilities, but assuming your requirements are limited to compression and EQ, these AFX processors should do everything you need for cue mixing and the like. And if they don't, there are physical insert points which can be used to apply hardware outboard processors to analogue inputs 1 and 2. What you don't get, though, is any sort of built-in delay or reverb processor that could be used to give 'comfort reverb' to a performer. Personally, I've never found reverb very comforting, and in any case it's easy to set up in your DAW, but it might be important to some.

Analoguer Than Thou

Antelope Audio set great store by the sound of their equipment, listing impressive specifications and promising "the most authentic analogue-sounding A-D and D-A conversion on the market", as well as invoking buzz-phrases such as Acoustically Focused Clocking. I confess to having no idea what it means to say that one analogue-to-digital converter is more 'analogue' than another. If the implication is that the process adds no harshness and remains smooth-sounding, that's certainly true of the Zen Studio — but then I'd say it was true of all well-designed digital gear these days. At any rate, it's safe to say that at no point was the Zen Studio in danger of becoming a sonic weak link in any of my signal chains, and I had no complaints about the sound of anything I recorded and played back on it. The mic preamps sound good, and on the monitoring side, the headphone amps are clear and loud.

As someone who does a lot of location recording, I'm always keen to discover ways of fitting more power into a smaller rig, and with the Zen Studio, I feel Antelope Audio have got things very right. Despite being little bigger than most 'desktop' interfaces, it can handle all but the largest location projects, in many cases without any need for additional hardware. And in situations where you do need more than the 12 mic inputs built in — or your signals are too hot for them! — it's child's play to attach a multi-channel preamp via D-Sub or ADAT. The limitation to 24 simultaneous inputs over USB is a shame, but it'd be a big location session that needed more, and let's not lose sight of the fact that there's not much else out there that can give you 20 analogue inputs and more in a box this size. The Zen Studio gives you more I/O and takes up less space than almost anything else, and for that reason alone is aptly named! ▬▬▬