



Ferrofisch Pulse 16 DX

A-D/D-A & Digital Format Converter

With ADAT, MADI and Dante connectivity on board, this affordable converter can add 16 channels of analogue I/O to almost any setup.

HUGH ROBJOHNS

The German manufacturers Ferrofisch have, in less than a decade, acquired an enviable reputation for their cost-effective range of analogue-digital and format converters, several of which have been featured in the pages of *SOS* over the years, including my own reviews of the (discontinued) A16 Ultra MkII (*SOS* October 2012) and the A32 (*SOS* March 2017).

These devices have become very popular as analogue I/O expanders for DAW interfaces hooked up via ADAT, but also serve as excellent integrators of MADI and, more recently, Dante interfacing in more complex systems. The company also manufacture the Verto range, which omits the analogue I/O and converts directly between Dante and ADAT, or between Dante, ADAT, and MADI.

First shown at the Prolight + Sound ('Messe') exhibition in 2017, the Pulse 16 range is effectively the replacement for the old A16 series, but it has recently gained a new sibling in the form of the Dante-equipped Pulse 16 DX model. The range line-up starts with the basic Pulse 16 version, which accommodates 16 channels in and out, converting in both directions between line-level balanced analogue and

ADAT at sample rates up to 96kHz (using S/MUX2). Two colour TFT screens display input and output metering for all channels, as well as the various configuration and operating menus — it's all controlled from the front panel via a couple of buttons and an encoder knob, very much like the A32, actually. The unit can also be controlled remotely via MIDI.

Next up is the Pulse 16 MX, which adds optical MADI interfacing. The base model can be user-upgraded to the MX version if desired, simply by installing a plug-in optical interface module and a firmware upgrade. In addition to the MADI connectivity, the MX model can also operate at sample rates up to 192kHz, although only eight channels can be passed over the ADAT connections at this rate (using S/MUX4). The MADI interface also supports MIDI-over-MADI, both for remote control of the Pulse 16 MX itself, and to pass control information to other connected devices.

Audio channels can be routed between the MADI, ADAT, and analogue I/O ports as desired, but always in eight-channel blocks. Since MADI can carry up to 64 channels, a MADI signal can be daisy-chained through four Pulse 16 MX units to create a complete A-D/D-A MADI solution. Cleverly, the

inherent propagation delay through this daisy-chain configuration is compensated for automatically by informing each unit of its position in the chain (through its setup menu), thus ensuring that all 64 audio streams remain accurately synchronised.

The new flagship Pulse variant is the Pulse 16 DX, which supplements the 16 MX feature set with dual Ethernet ports to provide Audio-over-IP capability using the increasingly ubiquitous Audinate Dante

Ferrofisch Pulse 16 DX

£1729

PROS

- 16 channels in 1U of rack space, with analogue, ADAT, MADI and Dante interfacing options.
- Clear TFT screens and simple configuration menus.
- Four Pulse 16 MXs can be daisy-chained to convert 64 MADI channels to/from analogue.
- Remote controllable via MIDI.

CONS

- Channel routing only in blocks of eight.
- Line-lump power supply.

SUMMARY

The Pulse 16 is a worthy replacement for the popular A16 Ultra, with improved specifications and more flexibility in model choices. The MADI and Dante variants provide enormous versatility without impacting on the cost of the simple analogue/ADAT base model.



format. However, whereas the base model is user-upgradeable to become the MX variant, this new Dante feature is not a user-upgradeable option and is only available in the dedicated Pulse 16 DX model — as provided for this review.

Open The Box

Upon unpacking the Pulse 16 DX, it is clear that its outward design intentionally mirrors that of the A32 range, featuring an elegant brushed-silver front panel with recessed dark-blue panels and a pair of TFT displays. A quarter-inch headphone socket is provided on the extreme left-hand side, while a pair of buttons (labelled Power and Menu) sits on the right, along with the encoder knob which — unusually, these days — doesn't double up as a button. The encoder serves as the headphone volume control as well as for menu navigation and parameter selection.

The rear panel is dominated from just left of the centre out to the right-hand edge by two long rows of quarter-inch TRS sockets for the 16 analogue balanced line-level inputs and outputs. Although the previous A16 Ultra models also featured individual TRS sockets, most products employ AES59 (Tascam) D-sub connectors these days (as the A32 does, in fact), but apparently customer feedback persuaded Ferrofish to retain individual TRS sockets for the Pulse range, which I suppose has the advantage of not requiring expensive breakout looms.

To the left of these analogue I/O sockets is a pair of 5-pin DINs for MIDI input and output, and then two sets of four ADAT lightpipe connectors. The

left-most set carries all 16 channels in and out at base sample rates, or channels 1-8 at double rates, with the right-hand group providing channels 9-16 in and out when using the S/MUX2 format. At quad sample rates (which are only available on the MX and DX models), the full gamut of sockets carry up to eight channels in and out using S/MUX4.

Sat between these two groups of ADAT ports is a dual-port optical MADI-SFP module. In case you were wondering, SFP is an abbreviation of 'Small Form-factor Pluggable' and refers to a plug-in optical transceiver module which, in this case, uses the half-size 'Lucent' or LC type of dual-fibre connection. A two-metre 'multimode' LC-SC dual fibre cable is shipped with the MX and DX units for interfacing with MADI devices using the larger and more common 'Subscriber' or SC optical ports.

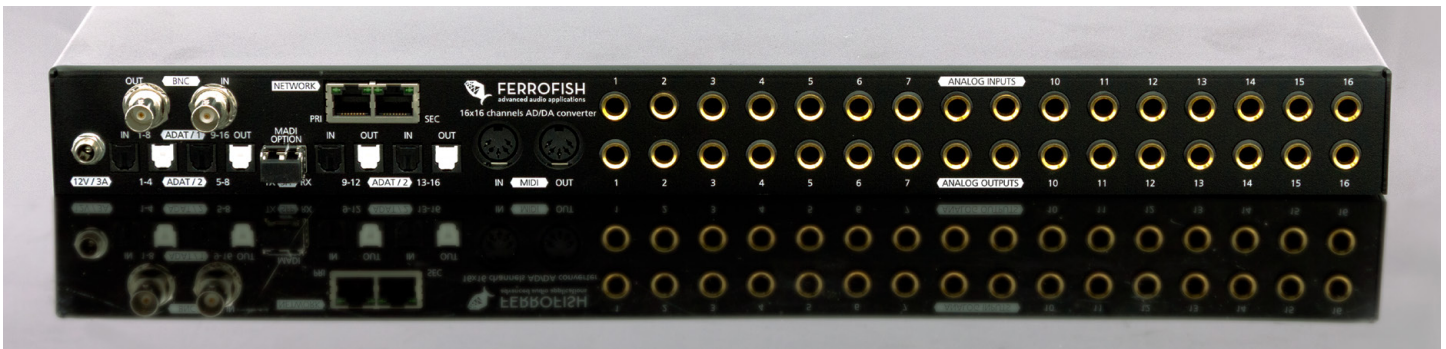
Mounted in a row above the ADAT and MADI sockets is a pair of BNC connectors for word-clock in and out (with menu-switchable 75 input termination), and — exclusively to the DX model — a pair of RJ45 Ethernet sockets labelled Pri(mary) and Sec(ondary) to cater for main and redundant Dante network connections. A screw-locking coaxial socket receives 12V DC from the supplied line-lump power supply, which is a Class-2, double-insulated or ground-free type (to avoid ground loops).

Operation

The default displays show bar-graph meters with the 16 analogue inputs on the left and outputs on the right. The word-clock source and sample rate are indicated at the bottom of the left-hand display, while the right has an array of icons to show activity on the MADI, ADAT (x4), Dante, word-clock, MIDI, and MIDI-over-MADI ports. If the current configuration is a stored preset, the preset number (1-6) is also shown here. Grey icons mean there's no activity, whereas yellow indicates signal present, and green is a locked or synchronous clock source.

When the display is in this default condition, rotating the encoder adjusts the headphone volume and causes the right-hand TFT to show the current headphone level and source settings. Pressing the Menu button highlights





The Pulse 16 DX boasts extensive digital connectivity, including ADAT, MADI and Dante, and can convert between these formats, as well as to and from analogue.

» the source box, allowing the monitored source to be selected from any of the inputs or outputs. A second press of the Menu button switches attention to the source's channel number, with the encoder scrolling through channels singly first, and then in linked adjacent (stereo) pairs.

Pressing the Menu button from the default meter display calls up the menu carousel, with sub-menus for the clock source settings, input gains, output levels, routing, MADI SFP module data, setup configuration options, and the six user presets. It's all very logical and straightforward, and very similar to the A32's menu system.

A brief press of the Power button serves as a menu Home or Back function, while a long press of more than 3 seconds switches the unit off — accompanied by a bright yellow count-down screen, so there's no risk of accidentally turning the unit off when navigating the menus. A white LED next to the button indicates when the device is powered... but then the TFT screens will also be illuminated so it's quite obvious! If the unit is switched off, pressing the Power button boots it up very quickly, the unit being fully functional within a couple of seconds.

I mentioned the input gain and output level menus above, which allow the analogue input sensitivity and output level to be adjusted in 1dB increments such that the peak digital level (0dBFS) can be aligned anywhere between +20 and -8 dBu. The low end of the scale allows interfacing with semi-pro equipment operating at the -10dBV standard and, while the +20dBu end doesn't allow direct use with SMPTE-aligned equipment topping out at +24dBu, it works perfectly with EBU-aligned devices at +18dBu — which obviously makes sense for a German manufacturer.

In practice, +20dBu is adequate for the majority of practical applications.

Technology

Not only does the Pulse 16 look very similar to the A32, it also shares much of the same internal technology. The converter chips are the same as those used in the A32, with Cirrus Logic CS5368 A-Ds and the complementary CS4385 D-As — both being eight-channel devices, and both specified with a 114dB dynamic range. Also, the supporting analogue circuitry is very similar, based upon Texas Instruments RC4580 dual op-amps. The Dante interface in the DX model uses Audinate's familiar Brooklyn-II module (as do all of Ferrofish's Dante products), ensuring reliable compatibility with other manufacturers' Dante equipment. A Sharc micro-controller takes care of all the signal routing, levels, and configuration settings.

Running my standard AES17 dynamic range test using an Audio Precision test set, I obtained a measurement of 112.2dB (A-weighted) for the A-D, which is roughly 6dB better than the figure I achieved with the A32, and 3dB better than the old A16 Ultra. For the D-A the AES17 figure came out as 111.5dB (A), which is about the same as both the A32 and A16 Ultra results. Although the state of the art achieves dynamic range figures in the low 120s, these are quite reasonable and acceptable results for a device of this type and cost, and very unlikely to have any negative practical impact in typical applications.

All of my other bench tests came out very well, with IMD measuring 0.004 percent (D-A) and 0.003 percent (A-D), THD+N measured 0.003 percent (both D-A and A-D), crosstalk at both 1 and 10 kHz was -107dB (D-A) and -109dB (A-D), and the frequency response is ruler flat from below 5Hz to 23kHz when operating with a 48kHz sample rate. Attenuation at the Nyquist frequency measured around -15dB, which, although not strictly adhering to the

Nyquist requirements, is better than many converters which provide only -6dB! The practical impact of this filter response is a modest potential for aliasing distortions if recording very loud signals with very strong harmonics... which isn't that common a requirement.

Impressions

The Pulse 16 is an elegant update on the previous A16 Ultra converter, with slightly improved technical performance. The model range provide useful variants for those that want MADI and/or Dante interfacing, while keeping the price as low as possible for those that just want a simple cost-effective ADAT expander for line-level analogue equipment. Its physical styling also sits well with the A32, giving a more homogenous look to the entire Ferrofish product portfolio.

Adding Dante capability is a smart move since this is rapidly becoming the *de facto* audio-over-IP format in studio, broadcast, and live-sound applications. However, until Dante completely replaces MADI as the preferred multichannel audio distribution network, being able to exchange audio between the two formats via the Pulse 16 DX is a very useful facility.

The Pulse 16/MX/DX converters should do extremely well as they are not only very well-engineered products providing highly cost-effective and capable multichannel ADAT/analogue converters, but they also offer access to the MADI and Dante formats at a price which is significantly below that of the competition. And while the converter performance may be a few decibels below that of the leading high-end products, I doubt anyone would notice or care in most real-world applications. ■■■

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