



# Denafrip delights

THE CHINESE-MADE DENAFRIPS BRAND HAS DEVELOPED QUITE A BUZZ FOR ITSELF ON SOCIAL MEDIA: LISTENING TO ITS TERMINATOR PLUS DAC, KEVIN FISKE CONSIDERS THE EVIDENCE

**The Terminator Plus is a FPGA controlled – field-programmable gate array – discrete resistor ladder, digital audio convertor. Designed and manufactured by the Chinese company Denafrips, it is supplied by the company’s global distributor, Vinshine, based in Singapore, and is priced at £5,547 based on time-of-writing exchange rates.**

Its chassis is thick aluminium, weighs 19kg, measures 430x380x105mm and is available either in a plain brushed plain or black anodised finish, within which is conversion for 24bit/192 PCM and DSD1024, while 44.1kHz/48kHz PCM can be switched between upsampled and non-oversampled working.

Input are optical, USB, coax, dual AES/EBU and three I<sup>2</sup>S sockets – HDMI and RJ45 LVDS, and RJ45 LVCMOS – while two BNC sockets provide 45.1584MHz and 49.152MHz clock-out signals.

The T+ layout is two-storey: under a mu-metal screen lies a pair of discrete regulator power supplies, centred around top quality ‘o-core’ transformers wound with OCC copper wire, while above are three separate circuitboards. The DAC board is populated with four banks of selected thin-film resistors, two per channel for true balanced D/A conversion, and direct coupled to the outputs, with voltage switching for the resistor banks handled by a CPLD – a complex programmable logic device.

And the Denafrips coders work the FPGA hard: not only does the device handle the oversampling but it is also responsible for the way S/PDIF inputs are treated. There’s no receiver chip to colour the sound or lengthen signal paths; the conversion is done directly in code on the gate array.

The T+ contains a veritable forest of selected Elna Silmic II electrolytic capacitors and Wima film filter capacitors – a massive 30,000 µF in total – Denafrips

favouring multiple capacitors in parallel for the lowest supply impedance. The DAC has a claimed signal to noise ratio of -122dB via single-ended and -127dB on its XLR balanced outputs. Dynamic range is claimed >132dB and crosstalk -110 dB.

Bridging the analogue and digital boards is the clock section boasting temperature-controlled dual quartz reference oscillators, while the digital board also hosts a proprietary USB interface built around an ARM-based microcontroller. Powered up only when the USB input is selected, it uses the well-regarded Thesycon driver for Windows, while Mac computers require no driver. S/PDIF decoding via coax, optical or AES/EBU inputs is handled by code resident on the FPGA, with data read out from an adaptive FIFO buffer, frequency locked to the oven-controlled oscillators – themselves controlled by a further dedicated CPLD. The DSD format is handled by a 32 step FIR analogue filter as a hardware decoder.

On the front panel is a horizontal line of tiny red LED indicators, six selector buttons and a central on/off button. The LEDs and buttons on our plain brushed review sample were annotated in black print. The black chassis alternative gets white print. Those buttons allow selection of NOS/OS; mute and phase; inputs to be selected; a sharp/gentle filter for the oversampling option to be switched; and pin-allocation for the three I<sup>2</sup>S inputs to be chosen.