



Chord Electronics Ltd.

Chord Electronics' Hugo M Scaler redefines digital sound quality with the world's most advanced filter technology

Powerful custom-coded FPGA upscales 44.1kHz digital audio to 705.6kHz; 16x CD's 44.1kHz native resolution!



21st July 2018, Kent, UK: Chord Electronics has unveiled the Hugo M Scaler, a highly advanced standalone upscaler capable of redefining sound quality from digital audio. Hugo M Scaler uses the world's most advanced filter technology to upscale standard 44.1kHz digital audio up to 705.6kHz (**16x CD's 44.1kHz native resolution**), ready to be passed to a suitable DAC; Hugo M Scaler extends its upscaling performance to 768kHz (from 96kHz input data) for dual-BNC-input Chord Electronics DACs: DAVE, Qutest and the new Hugo TT 2.

35 years in the making, the Hugo M Scaler brings the unrivalled advantages of Rob Watts' (Chord Electronics' Digital Design Consultant) ground-breaking FPGA-based WTA (Watts Transient Alignment) filtering technology to digitally connected audio devices, dramatically improving sound quality. Benefitting equipment includes: streamers; smartphones and smart devices; laptops and computers; CD/DVD players/ transports and much more.

Although optimised for use with selected Chord Electronics DACs (for the maximum 768kHz upscaling/decoding benefit), the new Hugo M Scaler can be used with other DACs with suitable inputs, subject to their decoding capability. Hugo M Scaler's advanced upscaling technology can improve the sound quality of all (digital-source) set-ups, whether headphone or desktop-based or within conventional hi-fi systems.

Hugo M Scaler features five digital inputs (2x BNC, 2x optical, plus a galvanically isolated USB Type-B) offering wide-ranging digital connectivity; the USB-B input is compatible with DSD

and PCM data (up to DSD 256), with DSD upsampled to PCM using proprietary filtering, which has much better attenuation of DSD noise and distortion.

Hugo M Scaler's outputs include optical, S/PDIF and galvanically isolated dual BNC, the latter of which enable upscaling to the maximum resolution (768kHz from 96kHz data) for direct connection to the 768kHz-capable dual BNC digital inputs featured on the DAVE DAC/pre/headphone amp, the recently announced (High End 2018, Munich) Hugo TT 2 DAC/pre/head amp and the new Qutest standalone DAC.



The Hugo M Scaler's compact form factor aligns with the TT (Table Top) series and has been designed to be stackable with other units in the range, including the TToby stereo power amp and the aforementioned Hugo TT 2, to form a highly advanced yet space-saving system.

In line with other models in the Hugo and Hugo TT series, the device features a number of illuminable fascia-mounted spherical controls, governing input selection, output sample rate and video mode for lower latency. As with previous Chord Electronics digital devices, the control spheres display data visually including input source and the incoming sample rate, using a polychromatic scale. The Hugo M Scaler also features front-panel 'DX' controls which have been included for use with future products.

The upscaler benefits from an adjustable sample rate output (with pass-thru mode) enabling user-defined control, subject to the technical limitations of the output type: 192kHz optical; 384kHz BNC and 768kHz dual BNC), plus a video mode for lower latency, bringing useful

flexibility with a wide range of partnering components. Further extending its functionality is auto video and source selection.

Featuring technology previously exclusive to the BLU MKII upscaling digital/CD transport (£7,995), the extraordinary upscaling ability of the Hugo M Scaler brings the benefits of Rob Watts' proprietary FPGA-based tech to a much wider audience, given its £3,495 price point.

When partnered with either of Chord Electronics' 768kHz-capable dual-BNC-input DACs, the Hugo M Scaler sets an astonishing technical benchmark for digital audio performance at its price point, redefining sound quality from digital audio.



Chord Electronics Hugo M Scaler notes for Editors

- Redefines sound quality from digital audio
- The most advanced digital filtering technology in the world
- Upscales digital audio up to 705.6kHz (16x CD's 44.1kHz native resolution)
- Upscaling to 768kHz (from 96kHz files) with selected Chord Electronics DACs
- Rob Watts' 35-year goal of >1M taps achieved: M Scaler has 1,015,808 WTA taps
- Improves *all* digital: streamers; smart devices/computers; CD/DVD players and more
- Transient accuracy is taken to a completely unprecedented level
- Use with a DAC in headphone, desktop and conventional hi-fi systems
- Compact TT chassis stackable with Hugo TT 2 DAC/pre and TToby power amp
- Multiple inputs for a range of devices: galvanically isolated USB-B; 2x BNC; 2x optical

- Galvanically isolated dual BNC outputs (to 768kHz) for use with DAVE, Qutest, Hugo TT 2 and future products; single BNC to 384kHz output, optical to 192kHz
- Adjustable sample rate output with pass-thru mode, plus low latency video mode
- Automatic modes for video and source selection plus remote control
- 'DX' mode for connection to future Chord Electronics products
- Designed, engineered and entirely made in the United Kingdom
- Dimensions (WxHxD): 235 x 40.5 x 236mm; Weight 2.55kg
- Three-year warranty



Hugo M Scaler technology

The world's most advanced filter: WTA — a lifetime goal of >1,000,000 taps reached!

The Hugo M Scaler is based around the powerful new Xilinx XC7A200T FPGA, which benefits from 740 DSP cores. The enormous processing power of the device has enabled a key breakthrough in tap-length (the technical indicator of how complex the interpolation filter is). Rob Watts has eclipsed a lifetime goal of >1M taps (Hugo M Scaler has 1,015,808 WTA taps or coefficients) in the latest version of the WTA (Watts Transient Alignment) filter.

The ground-breaking figure of over 1M taps, first conceived by Watts back in 1981 to be, “essential for digital to sound good, as this allows 16-bit interpolation accuracy”, has enabled the development of sophisticated WTA filtering and upscaling algorithms allowing digital data to be output at up to 768kHz.

Perfect construction of the analogue waveform: an infinite tap-length filter

To perfectly reconstruct an analogue signal, an infinite tap-length filter is required. The original Chord Electronics DAC 64 (1999) had 1,024 taps; Hugo (2013) 26,000 and DAVE

(2015) 164,000. Each successive increase in tap-length, together with continuous improvements to the WTA algorithm, has given significantly better sound quality. This ground-breaking tap-length capability enables CD-quality audio to be reproduced where the interpolated output is guaranteed to be better than 16 bits; conventional filters are no better than 2- or 3-bit-accurate in recovering transient timing information.

This technical milestone takes transient accuracy to a completely unprecedented level: it becomes simpler to perceive the leading edge of transient notes, creating a life-like sound-field. Bass definition is massively improved, with greater ability to follow the tune. Sound-staging, instrument separation and focus are also noticeably better, along with vastly improved variation in instrument

Like all Chord Electronics' products, the Hugo M Scaler is designed, engineered and entirely made in the UK. It features a precision-milled chassis, crafted from aircraft-grade aluminium and comes with a three-year warranty.

Price and availability

Hugo M Scaler will be available in the **autumn**, priced at **£3,495**