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& Record Review

156p ISSUE

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IsoTek EVO3 Genesis *(£12,995)*

Well known for its mains conditioners, IsoTek has now gone the whole hog and introduced a mains regenerator. The ultimate power source for audiophile electronics? Review & Lab: **Keith Howard**

Conventional engineering wisdom has it that audiophile tweaking of mains supply provisions is self-delusional. Even the use of regulated power supplies is often pointless, the argument goes, on the basis that good amplifier circuits have a high power supply rejection ratio – which means that little of the fluctuation in unregulated voltage rails ever reaches the signal output.

Balderdash. As anyone with open mind and ear who has experimented with mains cables, mains conditioners, *etc*, knows, they *do* make a difference to sound quality. Not always an improvement, granted, but certainly a difference – and sometimes a profound one.

As explained in the box-out, products that claim to improve the mains supply come in various guises. Ultimate of these is the mains regenerator, which rectifies and smoothes the incoming mains supply to provide high-voltage DC rails that feed a high-voltage power amplifier, whose input is driven by a low-distortion oscillator operating at the nominal mains frequency for the territory concerned. The amplifier, in effect, generates a clean mains waveform from scratch, its output either being connected directly to the regenerator's output sockets or to an output transformer that may provide voltage step-up.

Although the history of mains regenerators in audio is quite a long one, stretching back to when Linn Products introduced the Valhalla motor supply for the LP12 turntable in 1982, general purpose examples have been few and far between. Best known are the successive generations of Power Plant from PS Audio in the US, the first of which – the P300 – was introduced in 1997. We reported favourably on the Power Plant Premier [*HFN* Feb '08], since when PS has released its latest P3/P5/P10 range, the last with 1500W power capability.

NO, IT'S NOT A POWER AMP

At first sight, the EVO3 Genesis, to give it its full title, could easily be mistaken for a high-end power amp, only there are four 13A three-pin mains sockets on the back panel rather than the familiar mix of signal inputs and outputs. The aluminium box of the Genesis has a brushed bright anodised finish on the top and side panels, which are generously perforated with ventilation slots (something which always makes me nervous with high-voltage electronics, given the ease with which spilt liquids or dropped metal items might find their way inside). The slots on the side panels have thermostatically controlled cooling fans behind them, noisy enough to be a distraction when they're working.

On the sculpted fascia a proud central panel carries three push-buttons and a blue fluorescent display. The larger of the three buttons switches the whole unit on or off (there is a residual-current circuit breaker with overload protection, on the back panel, that has to be turned on too), the smaller buttons turning on or off the two power generation cells within, each of which serves two of the rear panel mains sockets. Each socket can deliver a maximum output of 150VA, so the Genesis is intended to power front-end components (CD players, DACs, preamps, *etc*) only – the instruction manual says in capital letters that power amplifiers should *not* be connected. An IsoTek Extreme power cable is provided for hooking the Genesis up to a wall socket.

Internally, output from the two regeneration amplifiers doesn't go

RIGHT: Interior of the Genesis is dominated by the large heatsinks to which the two amplifier boards are bolted, and the twin toroidal transformers attached to the front panel. A pair of fans provide for forced ventilation

LEFT: The Genesis comes, in effect, with its own isolation rack comprising spiked aluminium uprights and X-shaped sandwich-construction 'shelves' top and bottom. The display provides voltage, distortion and power data and indicates which pairs of output sockets are energised

straight to the three-pin output sockets but to a pair of output transformers incorporating a Faraday shield to ensure enhanced electrical isolation of the primary and secondary windings. These output transformers are not connected to earth at either side or at a centre tap, so the output is floating.

Enveloping the Genesis enclosure is a spiked frame claimed to isolate it from microphony, comprising aluminium uprights at the four corners and X-shaped 'shelves' top and bottom. Each of the latter has a sandwich construction, with 8mm-thick outer layers of a material that looks like plastic, formed from highly compressed thin paper sheets and a 5mm core of a cork/neoprene damping material.

Given the 150VA limitation on each of the outputs, I tried four disparate items of front-end equipment to see if all, or only some, benefited from the Genesis's presence. These including a Lehmann Black Cube headphone amplifier [driving Sony MDR-MA900s – see p61] and Chord Electronics QuteHD DAC [*HFN* Sept '12]. Although IsoTek specifically recommends other of its conditioners for Naim gear, I still hooked-up the SuperCap power supply (not the latest DR version) that feeds the NAC252/NAP250 I use for day-to-day speaker listening.

> 'The piano sounds now became even more muscular and luminous'

Finally, as a bit of a wildcard, I tried the previous-generation Apple Mac mini that I use as my computer audio source (running Windows XP and JRiver Media Center v17).

HORSES FOR COURSES

With the QuteHD plugged into the EVO3 Genesis I tried adding the mains feed to the SuperCap, with the Naim amplifier combination driving my resident Thiel CS1.6 loudspeakers.

Playing Bob Dylan's 'Don't Think Twice' (from Columbia 512348 2) my overriding reaction was that, whatever the Genesis did for tonal warmth, it detracted slightly from the Naim combination's characteristic openness and honesty of sound. Whatever its cosmetic benefits, it diluted the directness of the musical communication.

I reached the same conclusion on Jeff Beck's live and scintillating 'Brush With The Blues' [Epic 493041 2], a track that had belatedly alerted me to Beck's genius. For whatever reason, and as IsoTek itself had broadly suggested, the Genesis and SuperCap is no marriage made in heaven.

Needless to say, comparing sound quality with the Mac mini powered from the Genesis (or not) required repeated reboots, but the experiment was worth making in that there *was* an effect, albeit small. Using the Dylan track again, another fine oldie in the form of Peggy Lee's 'Fever' and Tony Faulkner's fine recording of Antony Michaelson playing Mozart's Clarinet Quintet, I formed a slight but consistent preference for the normal mains feed, which sounded a tad more vital and involving. Of course, with an alternative ⇨

FILTER FORUM

Mains cleaners, for want of a better all-embracing term, come in various different forms. Some, like the discontinued PS Audio Ultimate Outlet and Ben Duncan's Pure-Balance, are transformers that convert the unbalanced mains supply from a wall socket – in which the live conductor carries most of the AC voltage while the neutral conductor remains close to earth voltage – into a balanced supply where live and neutral carry half the AC voltage each, in antiphase to one another. Others, like IsoTek products other than the Genesis, are mains filters, aka conditioners, which act to remove high frequency noise from the supply. Ideally such filters should remove both common-mode noise (present in equal amplitude and phase on live and neutral) and differential mode noise (in antiphase on live and neutral) while maintaining low output impedance at the mains supply frequency. Neither of these types of product is able to do much to reduce harmonic distortion on the mains. Only mains regenerators – which are, in effect, high voltage power amplifiers driven by a low-distortion oscillator – are able to create a truly 'clean', low-distortion supply.

ABOVE: Four output sockets are provided, divided into two pairs which can be separately energised or disabled. Each pair is able to deliver a maximum of 300VA, which is sufficient for front-end components only – not power amplifiers

computer-based media player the result may just as easily swing the other way.

Things were certainly very different with the Black Cube and the Sonys. If I thought the pair sounded good using the domestic mains supply (and I did) I was blown away with how much better they were with the Lehmann powered via the Genesis. I've been using two 24-bit/96kHz classical downloads from 2L for a lot of my listening recently – part of Beethoven's Piano Sonata No 32 played by Tor Espen Aspaas and a movement of a Haydn string quartet played by Engegårdkvartetten – and both relished the IsoTek's ministrations.

The outstanding piano sound in the Beethoven *Maestoso* opening became even more muscular at low frequencies and still more luminous higher up the keyboard, and the cleanliness and stability of every element of the stereo image was markedly improved.

IRONIC AUDIO

Likewise in the Haydn: the sound was so much better controlled and organised, but with no hint of a dead hand being placed on dynamics or timbral variety. The irony of using a £600 headphone amplifier on the end of a £13k mains regenerator wasn't lost on me, but the improvement in sound quality was unarguable!

Still listening via headphones, I tried plugging the wall wart supply of the QuteHD into the Genesis too, with the DAC connected via S/PDIF to a TC Electronic Digital Konnekt x32 FireWire digital audio interface. I listened to the Beethoven and Haydn tracks again, and this time the choice wasn't so clear-cut. Yes, there were yet further gains to the weight of the piano's lower octaves in the Beethoven, and the cello's in the Haydn, with the Genesis supplying power; and the pervading sense of order and control was heightened further. The sound was also tonally warmer and less grainy, but there was just a hint that some of the light and shade was lost.

To decide the issue I returned to the Bob Dylan 'Don't Think Twice' (which, incidentally, I was hearing for the first time in years recently and which immediately made me realise represented a gaping hole in my collection).

If I had to describe in a single word what the Genesis brought to the sound of this simple track, in which the lyrics provide the power rather than Marshall stacks or any studio trickery, I'd settle on 'intimacy'. There was significantly more warmth to Dylan's voice, and this vintage recording didn't sound so obviously old as it did with the QuteHD powered from the normal mains supply.

HI-FI NEWS VERDICT

In the right circumstances there's no doubt that the Genesis can elicit a marked improvement in sound quality, with gains in weight, warmth and control. But on other occasions the change in sound is, to my ears, as much a step sideways as forwards. So the inevitable conclusion is that this costly mains regenerator should be judged carefully on a case by case basis, and not treated as a catch-all panacea.

Sound Quality: 80%

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LAB REPORT

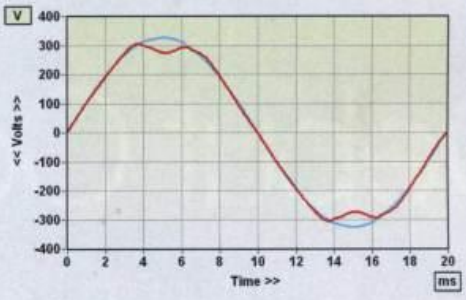
ISOTEK EVO3 GENESIS *(£12,995)*

Testing mains regenerators requires some special, custom-built equipment. The first measurement, of charging current waveform, I made using an inline Hall-effect current transducer from LEM Components that can record currents of up to 80A at slew rates of greater than 60A/µs over a bandwidth exceeding 100kHz, while inserting a series resistance of only 0.18mohm. This is built into a box with flying leads terminated in a mains plug at one side and a mains socket at the other, allowing its insertion into the mains feed to any component.

Comparison of charging current waveforms from the wall socket (red trace) and from the Genesis (blue trace) is shown in below [see Graph 1]. The Genesis current pulses are textbook whereas those from the wall socket have a lower peak value and longer duration due to the distorted mains waveform. The distortion measurement itself was complicated by the output of the Genesis being floating – the secondaries of its output transformers are not connected to earth at either end, nor at a centre tap. IsoTek insists that a balanced test circuit must be used, with earth referred to the measurement computer, to achieve the best THD figures, so a balanced attenuator was built especially for the task, feeding a battery-powered INA217 low-noise, low-distortion instrumentation amplifier. Its output was recorded to hard disk as a WAV file via an M-Audio Audiophile 192 sound card for subsequent spectral analysis.

Voltage waveforms from the wall socket (red trace) and Genesis (blue trace) are also shown below [see Graph 2], while the test table lists individual amplitudes of the first four odd harmonics (each referenced to the amplitude of the 50Hz fundamental) plus a THD figure calculated from the first 20 harmonics. As the results show, overall distortion from the EVO3 Genesis is less than a twentieth of that from the mains supply and very close to IsoTek's claim of <0.3%. This, by any measure, is an excellent result. **KH**

ABOVE: Distorted mains (charging) current waveform (red) versus significantly more linear waveform delivered by the IsoTek EVO3 Genesis (blue)



ABOVE: Mains voltage waveform, from wall socket (red) versus IsoTek EVO3 Genesis (blue)

HI-FI NEWS SPECIFICATIONS

Harmonic	Mains	EVO3 Genesis
3rd	4.35%	0.12%
5th	5.05%	0.06%
7th	2.09%	0.15%
9th	0.92%	0.17%
THD (2nd-20th)	7.05%	0.32%