

Power house

Paul Rigby looks at the Isotek Genesis dual cell mains generator.

DIAGRAM KEY

1. After passing through a sophisticated filter network, mains electricity is converted into DC, which is subsequently delivered to a high-voltage generation engine (300W amplifier). All of the mechanical noise caused by a low-quality mains supply is entirely avoided, as there is no input transformer to vibrate.

2. A high-quality synchronous sine wave generator feeds the generation engine at the same frequency and exact phase as the incoming mains supply. This ensures that no unwanted phase shifts are created between components connected directly to the mains and components connected directly to the Genesis. The phase shift between the mains input and output is zero – it is entirely synchronised with the mains.

3. Current positive feedback in the design allows the Genesis to deliver constant voltage, low distortion and zero phase shift to all connected loads.

4. The output from the generation engine is a pure sine wave with exceptionally low distortion.

5. An extremely high-grade isolation transformer brings the voltage back up to 230V AC.

6. Bright, clear OLED display shows snap-shot measurements for THD, voltage and power consumption. The advantage of this system is to avoid any pollution to output signals via the display circuit through continuous measuring.

7. Sophisticated protection systems include input protection, overvoltage protection and intelligent temperature protection, the latter incorporating a variable-speed, super-quiet fan that only comes into operation if needed.

Isotek treats mains-related problems with a seriousness that has to be seen (and heard) to be believed. New to the top of their wide range of mains conditioning products is the extraordinary Genesis power generator that I had for review. This is a statement product that comes at a lofty £12,995, no less!

Isotek's boss, Keith Martin, told me the Genesis is, "...the world's first dual-cell power generation system." So, rather than scrubbing your mains clean, as a power conditioner does, the Genesis creates a new, clean, sine wave, synchronised to the incoming mains. This is then amplified by two 300W amplifiers and stepped up through transformers to a precise 230V output.

For mains power, such a signal is a sort of Holy Grail. "An industrial electricity generator will give you a THD (Total Harmonic Distortion) of around 2-3% which is not good. To get a THD down to a preferred 0.3% is very difficult. Others have claimed such figures but we have independent tests that prove it. In fact our THD is always less than 0.2%, in general terms, and in the critical fifth harmonic it's down to 0.06% which is extremely low. Rebuilding the mains is not a new concept, but to do it with a low distortion figure is hard."

Whenever you play music through your hi-fi, your system has to cope with noise in the power line such as: common and differential mode noise, power surges and spikes and asymmetry.

Whatever rubbish you throw at the Genesis, it will take that garbage, turn it into DC and rebuild from new a complete, full 230V sine wave

with incredibly low distortion. As such, your equipment will be working in the most optimal way. It will be receiving the best possible power with 600W headroom; CD players and DACs, for example, only draw between 35W and 50W.

"We didn't want to do what some companies do which is to rebuild half of the main sine wave or create a perfect sine wave template to match to and call the product a 'generator'. We wanted to rebuild a sine wave completely from scratch.

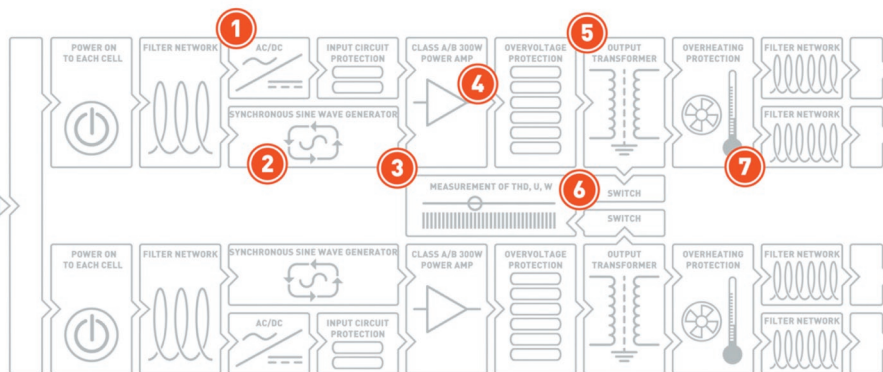
Yes, it costs a lot of money but it is an incredible solution that no-one else has done. Looking at the specs of the competition, no-one is doing it like us or with such low distortion."

Ah, the price. Well, you have

four sockets, intended primarily for front-end source items, although low power amplifiers and electrostatic loudspeakers that consume less than 600 Watts are suitable.

The Genesis is not meant to be used with high-power power amplifiers. That's what the Super Titan is for. Ideally, you sit the Genesis on top of the Super Titan and use both as a complete mains supply for the hi-fi.

On the front of the Genesis sits a bright clear OLED display that shows input/output voltage, input/output THD, power consumption of the connected audio equipment and the power status of the generation engines. It all looks very technical and impressive.



to keep the price of the Genesis in perspective. It's not designed for your iPod, after all. It has been made for high specification equipment and for those people who want the best that can possibly be achieved. It's an aspirational product like a Ferrari or an Aston Martin. That's how you need to look at the Isotek Genesis (and its sister, the £6,000 Super Titan, for that matter). It demonstrates what can be done.

There is a main power switch plus two other power switches to start each half of the Genesis in order to save energy if only half of the Genesis is required. On the rear you have a C20 power socket (to take the high load of 16A) plus

Protection and monitoring circuits are fitted, plus fans that switch in if necessary. There's even an output filter network, Isotek's block diagram shows.

SOUND QUALITY

I initially hooked up my reference system to a basic electrical distribution block of the type you might pick up from a hardware shop for a few pounds. Playing the vinyl version of Frank Zappa's 'Bamboozled By Love', the music sounded a tad disorganised through the block. The upper mids were strident, guitar was piercing while vocals could shriek on crescendos. The sound stage was incohesive and displayed midrange



bloom while the bass and midrange were not clearly delineated.

The Genesis cured these ills. The soundstage filled with space, and both calm and discipline reigned. That didn't mean the music lost fluidity or flair, far from it. Guitars sounded aggressive, but detailed too. A widened dynamic spectrum provided the instrument with more character. Vocals found their place within the mix, stopped blaring and started informing.

I then plugged my Icon power monoblocks and Quad electrostatics in to a Super Titan mains conditioner and connected that to the Genesis. This firmed up bass. The stereo image also became firmer and more clearly centred, while cymbals now displayed lightness and a layered metallic sheen.

I then compared the Genesis with Isotek's last, best front-end solution, their excellent Aquarius. While the sound was very good indeed, a testament to the Aquarius' design, the Aquarius is very much a power conditioner. When compared to the Genesis, the sound was a little flat in the midrange and a touch plump in the upper bass regions.

The Genesis' ability to remove 'distortion' from the playback also meant that the Aquarius wasn't as clean in its sonic representation. Of course, you would expect – nay demand – such results considering the vast difference in price, but it was reassuring to hear the difference, nevertheless.

I have to emphasise the Super Titan's part in the Genesis' success,

however. Using Genesis or Super Titan alone adds greatly to a system's sound quality I have found from my experience with them, but music benefits when both boxes are hooked together.

Playing Yehudi Menuhin's 'Mendelssohn and Bruch Concertos' on vinyl, it was evident just how much silence there was behind the solo violin with the Genesis in place and how much Menuhin was compromised by the noise floor without it; the delicacy and fragility of his violin was more evident.

Compared with the Aquarius, the backing orchestra was truly involved via the Genesis, acting as a partner to Menuhin, not just sonic wallpaper behind him, while the Genesis was revealing of individual instruments within the orchestra, especially during high tempo sequences.

Turning to Horace Silver's 'Cape Verdean Blues', via my B-475 Densen CD, this jazz LP provided far more coherence via the Genesis, when compared to the basic power block, with a dramatic reduction in the noise floor. All of the musicians played at ease it seemed, free from background noise and distortion. Instrumental separation was impressive while individual instruments exhibited character and poise.

Similarly, against the Aquarius, the Genesis showed improved transparency, the edges of each instrument exhibiting better delineation, separating it from the silence surrounding it and from other instruments.

CONCLUSION

The Genesis shows you how important the mains electricity is in determining sound quality. In the hands of the Genesis, the mains electricity becomes a force for good. It provides a vibrant, exciting listen that shines a light on all aspects of a music mix. Here is a statement product that shows what is possible, setting standards in mains synthesis.

"You sit the Genesis on top of the Super Titan" says reviewer Paul Rigby, for the ultimate in mains conditioning and generation. The Super Titan feeds large power amplifiers; the Genesis handles all else.



ISOTEK GENESIS £12,995



VERDICT

The Isotek Genesis enables you to hear – really hear – your hi-fi system, possibly for the very first time.

FOR

- clarity
- low distortion
- detail
- dynamics

AGAINST

- size
- weight

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Isotek EVO3 Genesis

By Jason Kennedy

Power conditioning has got itself something of a bad rap in the UK. It seems to be big in the US, because they only have 110 volts to work with and the flimsiest looking plugs and sockets to connect to it. The mains grid in the UK delivers 230 volts of rock solid power (say the naysayers), and you connect to it with a fairly beefy three pin plug that can cope with rather more than the 13 amps it's rated for. So why do we need anything to improve the power that goes into our kit? The answer is that the increasing amounts of pollution that the computer, wi-fi and general electronica that fills our homes all produces noise that feeds back into the mains. Unless you live up a mountain with 300 solar panels and as many batteries to store the energy, your mains supply is a carrier for alarming amounts of RFI and EMI, detritus, which if the results I got with the Genesis are anything to go by, have a marked negative effect on the potential of hi-fi components.

The Genesis is not a filter, a lot of mains conditioners are just that and this is not a bad thing if it's done well, in fact it's just about the only way to get enough juice to a big

power amp without cramping its style. Instead Genesis is a re-generator, a device that takes the power coming out of the wall and uses it to build an 'optimised' mains sine wave which is fed to the output sockets. Genesis can deliver up to 600 watts, which is enough to run four source components and/or a preamp; possibly some low power amps as well, but it's designed for front end stuff first and foremost.

Inside the substantial and elaborately isolated case, which many mistook for a power amplifier, lies about as much copper and heatsinking as you find in a power amp. This is a substantial device because it runs two independent generation cells as Isotek likes to call them. These create a cleaned up version of the incoming sine wave, which is then amplified by a 300 watt 'generation engine', effectively a class A/B amplifier. Isotek is keen to point out that Genesis works in a different way to most AC regenerators, because it doesn't synthesise the



► mains by imposing a template frequency on it (50Hz in the UK) as that approach doesn't remove distortion. Instead it builds a completely new sine wave at the desired frequency, which is then amplified and delivered via transformers with copper foil between primary and secondary outputs to stop any noise and distortion getting through. It's designed to dramatically cut harmonic distortion (THD) on the mains.

I put it to Isotek founder and chief proselytiser Keith Martin that the makers of serious audio equipment go to great lengths to design and build regulated power supplies that deal with the problems inherent in the mains supply, and asked him why Genesis should be able to do a better job. His response was: "We specialise in understanding power and what's going on and that makes a big difference. If you're designing an audio component there are always compromises and it's usually the areas that most people won't notice that are compromised rather than the features or casework, and power conditioning is one of those areas." He went on to say that he spends a great deal of time demonstrating his equipment to audiophiles around the world and has never found a system that doesn't benefit. But he would say that; the irritating thing is that results I got back this up.

Build quality is extremely high on the Genesis. The case is made from aluminium extrusions with an anodised finish that ensures resistance to knocks and looks great. It's a substantial beast too, thanks to the massive output transformers, extensive heatsinking and ISIS or independent system isolation support frame that sits like an exoskeleton around the body of the unit. It consists of aluminium uprights that are spanned by damped acrylic plates top and bottom which are shaped to minimise vibration. It's an elaborate arrangement that increases the units footprint and height quite considerably but does allow it to be stacked atop Isotek's conditioner for power amps the Super Titan.

On the connection front Genesis has a single input for the IEC input cable, an Isotek Extreme power cable is supplied to make the connection to the wall, and four independently connected output sockets, in this case 13A three pin types. The sockets themselves are silver (24k gold in the US) and internal cabling is silver plated, six nines OFC with PTFE dielectric. A proper job in other words which is probably why it works so well.

The improvements that can be wrought with Genesis vary from component to component but there are a few underlying qualities that are always apparent when switching from a decent extension block. The key one is an obvious drop in noise floor which makes low level resolution significantly better. Indistinct sounds are now fully formed, quieter instruments are far easier to identify and follow and reverb and decay extend

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for considerably longer. This brings significant amounts of the recording's character with it, acoustic spaces are precisely defined and soundstages expand in all directions, it's not at all subtle and very moreish. You have to play familiar albums again just to hear what's been hidden in the noise, it really does revitalise your record collection and I use the term in the broadest sense.

I put the Metrum Acoustics Hex DAC on first and revelled in the clarity of leading edges, this meant that timing improved – which it seems to with a lot of components. Subtleties of phrasing and character came out in John Lurie's voice (*The Legendary Marvin Pontiac – Greatest Hits*) which sounds richer and at the same time cooler than usual, and it always sounds cool. I also tried it with a Canary Audio CD300, a big tube powered CD player that already sounded pretty special but suddenly unearthed loads more space and delivered a far wider image. This was pretty dramatic. It sounded like the noise floor had literally disappeared below the threshold of audibility.

Going back to the Hex and then moving the Naim UnitiServe from standard to Genesis supply was also pretty dramatic, I didn't expect that the server would benefit as much as devices that process analogue signals but I was wrong. Again there was acres more space and far more depth of tone, high notes had real shine and vibrancy because so much grunge had been removed. Now there was a radiance to the sound of Michael Hedges 'Aerial Boundaries' that you usually have to spend a fortune on a vinyl front end to achieve.

Which reminds me, when you switch on Genesis its display tells you how many volts its receiving and how much THD is coming in and how much going to the output. The display turns off after about 10 seconds because it needs to connect in and outputs in order to display the information. It runs quite hot, much as you would expect of a 300 watt amp ►

TECHNICAL SPECIFICATIONS

Number of outlets: 4

Type of outlets: UK, EU, US, CH, AU, ZA

Mains inlet: C20 IEC High Current

Mains voltage: 230V 50Hz

Maximum current: 16Amps

Total power: 600W continuous

THD: between 0.05% and 0.17% (typical).

RFI reduction: +85dB extending down to zero Hz

Voltage stabilisation: 230V +/- 1%

Dimensions (WxHxD): 500 x 300 x 500mm

Weight: 45Kg

Price: £12,950

Manufacturer: Isotek Systems

URL: www.isoteksystems.com

Tel: 01276 501392

and has a near quiet onboard fan that comes on when a lot of power is required. I can't say that I heard them once.

Back with the music I dropped Fleetwood Mac's 'Never Going Back' (the highlight of *Rumours* in my opinion) and discovered the way that echo and reverb was used to create the impression of a wall of acoustic guitars from only two. It sounded superb that was for sure. There is always a danger with extra transparency that detail can take centre stage and usurp the music but because the Genesis merely improves the hardware you have its musical capabilities remain as strong if not more so than ever. There were a number of occasions when timing became clearly stronger. Power and dynamics are likewise reinforced, there is less hash so the power is cleaner and this had an unexpected side effect. I started playing at higher levels than usual, not significantly nor deliberately but it became clear at the end of the session that the volume was quite a bit higher than usual. Of course the source material needs to be clean enough to encourage this but with a hi-res file of Samuel Yirga's superb new release Guzo (24/48 on Society of Sound) that is very much the case and I revelled in the sound of his piano and a great sounding rendition of Black Gold of the Sun at pretty serious levels without discomfort.

I tried the Genesis on all the source products that came through the listening room and in every instance it allowed them

to produce significantly superior results. If

I had an active preamp rather than the Townshend Allegri I have no doubt that it would have benefited to the same extent if not more.

Genesis is extremely expensive for a power conditioner but the fact

that it can do so much for a system means that you really don't know what any component is capable of if you are just plugging it into the wall.

It's also a lot cheaper than a self powered mountain top listening room, and easier to install. +



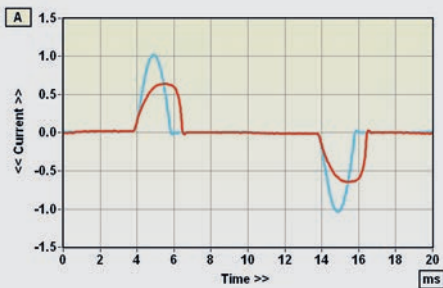
LAB REPORT

ISOTEK EVO3 GENESIS (£12,995)

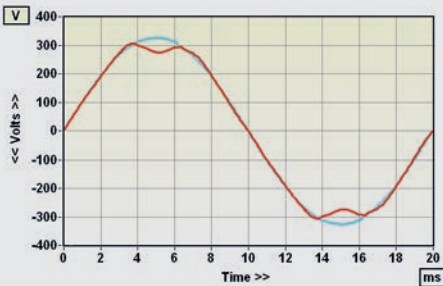
Testing mains regenerators requires some special, custom-built equipment. The first measurement, of charging current waveform, I made using an inline Hall-effect current transducer from LEM Components that can record currents of up to 80A at slew rates of greater than $60\text{A}/\mu\text{s}$ over a 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%