AURALIC SIRIUS G2.1 Upsampling Processor

by Alan Sircom

AURALiC's SIRIUS G2.1 is the fourth product in the company's excellent G2.1 product line. It's an upsampling processor that will take your streamed signal fed from a streaming device, boostify (it's a technical term, from the people who brought you 'sciency') the quality of that datastream before it gets transferred to a DAC. So, technically speaking, it doesn't have its own intrinsic sound, it acts as an intermediary stage to enhance the performance of streamer/transport and DAC. And, although it's built in AURALiCs muscular aluminium clamshell case work with front panel display, it's not wedded to an AURALiC system. In fact, this is probably one of the products most likely to act as an introduction to AURALiC, because there will be many who already have the other components in the chain.

Having played around with the SIRIUS G2.1 both within and outside of an AURALiC-based system, I'm pretty convinced that the upsampling processor is actually something of a gateway drug into AURALiC's complete digital infrastructure. Here's how it works. Let's say you try the SIRIUS G2.1 between your streamer and – for the sake of the argument – not every track you listen to is some perfectly massaged audiophile hi-res recording; perhaps you like to listen to some less than Master quality music on TIDAL or similar, or have a few low-res skeletons in your closet. You feed them to your DAC, then add in the SIRIUS G2.1 and try them again. You come away immediately impressed by the overall improvement to the sound. So much in fact that you cannot part with the SIRIUS G2.1. Three guesses who will make your next DAC or streamer? Clever move AURALiC.

Of course, were it just a digital improver for a shade under £6,000 there would be those who reject it out of hand, no matter how good. But it's so much more than that. SIRIUS G2.1 also offers a speaker placement function (in the digital domain) to compensate for real-world problems, allowing you to deal with barriers to perfect sound in the digital domain. While it's necessary to place your speakers as best you can in the room first, AURALiC's speaker placement function could mean the difference between poor and great sound in a less-than pristine environment. We've encountered similar systems, such as Linn's Space Optimisation DSP. The difference there is that demands some additional input from Linn itself, providing mapping for specific loudspeakers, and "if your name's not on the list, you're not getting in!" – or at least, you lose a lot of the functionality of the system.

Alongside the loudspeaker placement adjustment, the SIRIUS G2.1 can compensate for the room itself with its eight-band parametric equaliser feature (also in the digital domain). AURALiC claims this allows you "to optimise for your environment without spending tens of thousands on a complete room build or renovation." In reality, while the parametric EQ can compensate for many room nasties, it's no substitute for more intermediary room acoustics treatment, or even a more acoustically-driven DSP treatment, such as that from Dirac Live compatible processors. That's not to play down the performance and potential of the SIRIUS G2.1's parametric EQ, especially when used in combination with broadband room treatment, as the parametric EQ's ability to rid the room of troublesome narrow-band problems coupled to general bass and reflection control is excellent. ▶

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But, I suspect most will opt for the AURALiC SIRIUS G2.1 because of its potential to improve the lot of compressed, lossy, and poor recordings that we no longer have control over when we stream our music from the Internet. All of these tracks have the potential to be improved, thereby upgrading your overall listening experience at a stroke. Moreover, if you do have a large collection of ripped CDs stored on a server, and you perceive them as being not up to snuff next to your recent hi-res purchases, the SIRIUS G2.1 can give 16/44.1 LPCM files a leg up too. Because SIRIUS G2.1 utilises an open standard protocol, it can also be connected to any brand of DAC, delivering a global variety of sample rates and formats among other functions and features. We exist in a musical landscape of different formats, resolutions, DAC chip topologies, and algorithm types today. SIRIUS G2.1 acts as 'one-stop-shop', balancing all of them, extracting the best out of them your DAC can cope with automatically (once set up). Poorly made recordings and even early digital recordings can benefit from SIRIUS G2.1 by resampling the signal in a manner that potentially improves upon the experience of listening to an inferior recording.

Perhaps even more importantly on a day-to-day listening level, all DACs are built with a 'sweet-spot' where that circuit excels at a resolution or format. For example, DAC circuits built for DSD playback sound better when playing DSD and PCM DACs perform better when fed PCM. By resampling all incoming formats to deliver a digital signal within the DAC's optimum working parameters, the chip is allowed to play to its strengths, by lessening the processing requirement of the DAC. In other words, "Hey Mr DAC! Let SIRIUS G2.1 do the heavy lifting so you don't have to!"

Depending on the music you routinely send to your DAC and your level of built-in cynicism, this could be your magic audio bullet, effortlessly dragging poorly lit recordings into the light and making them sound better, or an automated way of putting lipstick on a pig. As I don't listen to complete garbage, but sometimes listen to lo-fi Americana and some unsigned material with extremely dubious mastering quality, a useful 'tickling' up of the sound helps a lot, so I guess I'm more aligned to the 'magic bullet' school of thought.

Even here, we've barely scratched the surface of what the SIRIUS G2.1 can do. In fact, it's a deceptively complex Digital Swiss Army Knife of a product. The SIRIUS G2.1 sports four distinct digital filters in what AURALiC calls a Flexible Filter Mode Technology. And perceive the SIRIUS G2.1 doing some really heavy digital lifting here, it upsamples and runs its filters at extremely low distortion levels, potentially down to -170dB, meaning that it's almost completely unobtrusive in use.

SIRIUS G2.1 provides multiple inputs and outputs, allowing you to connect to a variety of digital sources and DACs. AURALiC's spirit of innovation continues to put forth market-first features, as exemplified by SIRIUS G2.1's unique ability to deliver an upsampled DSD signal to any compatible USB DAC, the first product in the world to do so.

The SIRIUS G2.1 is powered by AURALiC's own Proteus G2 co-processing platform, with a Xilinx XC7A200T FPGA chip and 512 MB of DDR3 memory. This FPGA chip contains more than 200,000 logic cells and 740 DSP slices. SIRIUS G2.1's computational power and efficiency are achieved in part because of the design decision to employ a dual-processing platform structure, which doubles capacity. While an AURALiC Tesla G1 handles hardware control, the Proteus G2 focuses its efforts on music data processing.

If you are staying in the AURALiC ecosystem, Lightning Link is a boon. Audio signal, clocking and control signals are easily handled by Lightning Link. Every G2 and G2.1 product boasts a Lightning Link connection port, allowing them to be connected together as a stack. The HDMI-type, 18Gbps high-speed connection provides ultra-fast two-way communication and is said to be the only real jitter-free link in domestic audio. As an added bonus, G2 and G2.1 products can be linked to work as one contiguous digital source.

Then, a trio of Femto Clocks, cycling on the order of quadrillionth of a second, reduce jitter significantly. First clock takes care of digital outputs, the second regulates USB output and the last clock feeds the Proteus G2 processing platform. You can be sure your musical signal is always rock-steady.

SIRIUS G2.1 is equipped with two sets of high-speed galvanic isolators, between the processing platform and its audio circuits. Data can flow across the isolator, even while it physically separates and shields the audio circuits from interference. Precise re-clocking reduces jitter, and brand-new galvanic isolation provides even more protection against EMI noise. The result is a claimed 80% reduction in noise levels.

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Rear connections are comprehensive. It features a RJ45 connector for network connections, then there are S/PDIF over coaxial and TOSlink optical and AES/EBU inputs and outputs. These are joined by a USB input and two USB outputs and finally a pair of the aforementioned Lightning Link connectors. This is essentially all anyone is going to need to connect any device from a a start-of-the-art streamer and DAC to an out-of-the-ark CD player and converter, the only omission being I^2S.

AURALiC's SIRIUS G2.1 shares the Purer-Power linear power supply system used across the G2 and G2.1 products reduces DC current noise by as much as 90dB with its power purification module. Using a specially designed transformer and unique wiring that minimises vibration, noise from Purer-Power is kept below 1µV across the audible spectrum.

Finally (or at least, I'm calling a stop to the specification roll-out of the AURALiC SIRIUS G2.1... in reality 'finally' is about 50 pages away) the SIRIUS G2.1 chassis has been designed as a double enclosure, where an outer case made from high-grade aluminium is supplemented with an inner layer of copper. A high-mass base and enhanced four-foot multi-spring suspension system complete the quiet, noise defeating performance of the SIRIUS G2.1's Unity Chassis II.

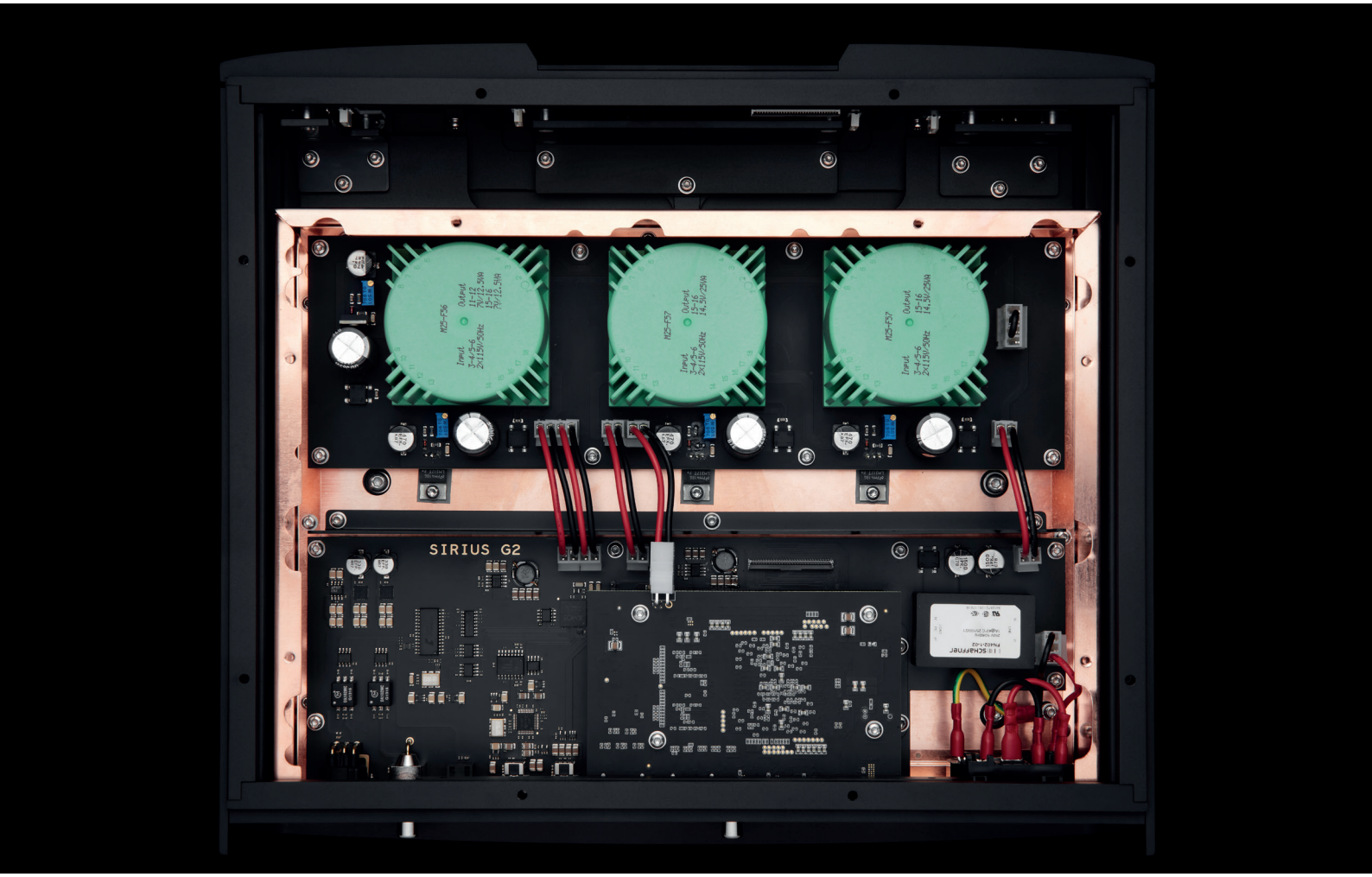
SIRIUS G2.1 internal circuits are physically distributed to enhance overall balance. And with specially designed foot spikes that dampen and absorb vibrations, the SIRIUS G2.1 is always rock-steady, for ultra-smooth signal delivery.

Naturally, I sandwiched the AURALIC SIRIUS G2.1 between two of its stablemates; the ARIES G2.1 Wireless Streaming Transporter and VEGA G2.1 DAC, both of which have been covered extensively by *Hi-Fi+* (issue 191 and 193 respectively). I also went really high, inserting the upsampler between a Gryphon Ethos CD player and an Ideon DAC intended for next issue.

This is a tough review to write in a way because the product itself has no intrinsic sound quality. Instead, it bestows its advantages on others. This is not reflected glory, but the application of some very good upsampling methodology. It doesn't just sit within the AURALiC architecture, either; any high-end streamer/disc transport and digital converter system can take advantage of the upsampler's benefits.

But in another way, it has one hell of a sound. It improves what it touches whichever way it touches it. The SIRIUS G2.1 is a far more precise way of synchronizing the musical flow through the AURALiC components.

A lot of what the SIRIUS G2.1's does so well can be summed up in a single track: 'Spill The Wine' by Eric Burdon [*Raw In Holland '14*, ABKCO Records] on Tidal. There are better recordings of Eric Burdon singing this track he recorded with War back in 1970, but this one lives up to the title; it's raw and he's on form. It's up there with his awesome live recording of 'Tobacco Road,' but the quality of the recording is a little... Meh! The SIRIUS G2.1 makes the best of a bad job. This track is almost perfect upsampler fare because it



can sound good on other mastering processes, but it seems as if someone went with a poor remaster intended for MP3, and the SIRIUS G2.1 just wakes the track up. Actually, the track is pretty damn awake anyway thanks to Burdon on good form; what the SIRIUS G2.1 does is take out the sludge, and it does it well.

I have an instinctual worry about upsampling in that it could be just very posh noise. For example, when the jitter of a signal is folded into the data itself in order to make an upsampled file. I've always been a bit of a 'keep it pure, keep it original' man. The AURALiC SIRIUS G2.1 is the exception to the rule (or at least, the exception that isn't part of a dCS Vivaldi stack, which on its own costs as much as a new car). The SIRIUS G2.1 takes on that purist's argument and beats the living snot out of it. You don't end up taking a perfectly decent 16/44 rip from a CD and make it big, lush and watery; you take that track and make it sit alongside higher res formats without sounding a little out-of-place. That argument holds doubly so for those recordings for which there will never be a hi-res file; early digital recordings like Ry Cooder's *Bop Till You Drop* [Warner]. By expanding such files to hi-res levels, there seems to be less of that jangly hard edge to the sound. Tracks like 'Little Sister' are always going to sound forward; it was recorded bright, as well as being the first commercially available digital rock album ever produced. But the shrill 'digital' sound is lessened by the upsampling and that makes it more listenable.

The more time and energy you spend matching the SIRIUS G2.1 to its bedfellows, the better. Simply inserting it between digital devices and hoping for the best will likely give you a reasonably good performance, but drilling deeper into matching the SIRIUS G2.1 to the DAC, setting the right filters and even some gentle EQ all benefit the listener. Taken one at a time they might be incremental improvements – if you have

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good music content – but they quickly add up. Taken together with a less than perfect recording and it's the difference between wanting to play the recording and wanting to play something else; that isn't audiophile snobbery rearing its ugly head, but there are some really trashy recordings that just happen to be the only way to hear that piece of music, and, frankly, I don't care if it's making a silk purse out of a sow's ear if it's that or nothing... I'll take the pig-silk purse.

It also stands somewhere between 'EQ' and 'DSP' in its parametric equaliser and speaker placement options. It's more thorough than just an EQ (or an EQ setting in a media player), but not quite as substantial an improvement to in-room performance that something like Linn's Space Optimisation and especially Dirac Live room correction. However, to many more traditionalist audiophiles who view such systems with suspicion, AURALiC's EQ and speaker placement systems are close to the sweet spot; not too intrusive, not too weak... just right.

Some will never see that side, though. I'm going to invent an informal fallacy here that I've dubbed 'Argumentum ad Smugum'; argument from smugness. There will be those who will dismiss the SIRIUS G2.1 because all their recordings are well-manicured audiophile tracks, played in the perfect room and through the perfect system. They won't need the SIRIUS G2.1 because they don't get down from their ivory tower often enough to use it. 'Lucky' them!

The rest of us might want to enjoy our less than wonderful recordings alongside those good 'uns. We might want to optimise the output of our sources to perfectly match our DACs. Hell, we might even want to improve the sound of our systems with some careful filtering, equalisation and room treatment in the digital domain. And if we want to do that without undermining the sound quality in the process, this is the least-expensive option around.

So, I guess you could say I like the SIRIUS G2.1, full AURALiC stack or not. There's not much to fault here, although as with many AURALiC products, the front panel menu screen is written in 'microscopic'. It's not illegible, but reminded me that I need to get my eyes tested. The golden eared need to be eagle-eyed with AURALiCs products, but in great fairness this is very much a fit and forget product, so the embarrassing magnifying glass only comes out once.

TECHNICAL SPECIFICATIONS

Audio Inputs

Lightning Link: (Up to 384K/32bit, DSD512)
USB Audio: (Up to 384K/32bit, DSD512)
AES/EBU: (Up to 192K/24bit, DSD64 via DoP)
Coaxial: (Up to 192K/24bit, DSD64 via DoP)
TOSLINK: (Up to 192K/24bit, DSD64 via DoP)

Audio Outputs

Lightning Link: (Up to 384K/32bit, DSD512)
USB Audio: (Up to 384K/32bit, DSD512)
AES/EBU: (Up to 192K/24bit, DSD64 via DoP)
Coaxial: (Up to 192K/24bit, DSD64 via DoP)
TOSLINK: (Up to 192K/24bit, DSD64 via DoP)

Network: Gigabit Ethernet (For firmware upgrade use)
THD+N: <-165dB (Resample to PCM 44.1K – 384K)
THD+N: <-155dB (Resample to DSD128 – DSD512)
THD+N: <-150dB (Resample to DSD64)
Dimensions – W×D×H: 34cm × 32cm × 9.6cm
Weight: 9.5kg
Price: £5,999

Manufacturer: Auralic
URL: auralic.com

Distributor: Auralic Europe
Tel: +44(0) 7590 106105
URL: auralic.com

I expected AURALiC's SIRIUS G2.1 to be a comparatively simple little thing, just upsampling digital output signals to match the input of a DAC, and in fairness you can run it exactly like that. But it also offers so much more. It's an extremely configurable digital nerve centre, something that will scale with your digital front end no matter where that takes you. And of course, where that probably takes you is to yet more AURALiC equipment! +