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SIRIUS G2
Upsampling Processor

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A Digital Signal Optimizer Without Peer

What is SIRIUS G2?

SIRIUS G2 is an ultra-powerful upsampling processor offering a variety of signal processing features. It supports all PCM and DSD sampling rates and is capable of working with any DAC.

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What does SIRIUS G2 do?

Its Primary job is to Handle Processing and Upsampling of the Digital Signal Before it arrives at the DAC.

- **Jitter Elimination**
- **Upsampling**
- **Room Acoustic Correction**

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Inputs and outputs onboard SIRIUS G2 are varied, plentiful, and more than capable.

Input Channel

- **AES/EBU**
- **COAX**
- **TOSLINK**
- **USB (USB Audio 2.0)**
- **Lightning Link (from ARIES G2)**

Output Channel

- **AES/EBU**
- **COAX**
- **TOSLINK**
- **USB Host (isolated and non-isolated)**
- **Lightning Link (to VEGA G2)**

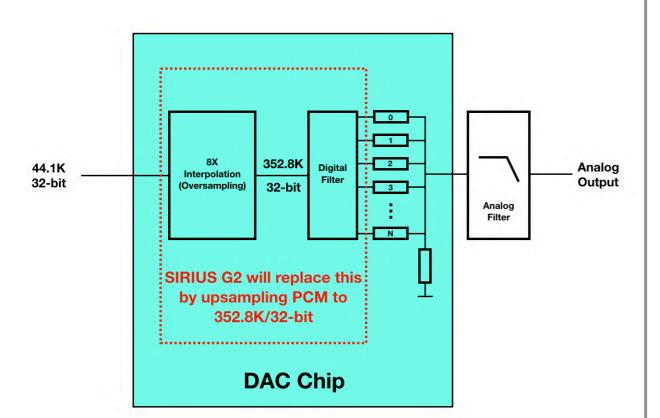# AURALiC

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"SIRIUS G2's most unique feature is its ability to upsample an input signal to high bitrate DSD, like DSD512, then output that signal via galvanically isolated USB to a compatible DAC, transforming a chip-based DAC into an FPGA DAC.

- Xuanqian Wang

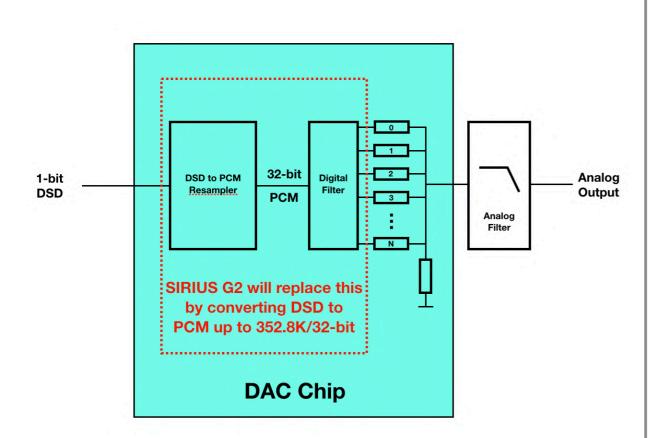![AURALiC - Sound of Innovation]

R-2R DAC plays PCM

SIRIUS G2 can upsample an input signal to the highest PCM sampling rate that an R-2R DAC can support, bypassing both the internal interpolation (oversampling) and the digital filter stage inside the DAC chip.

SIRIUS G2's oversampling and digital filtering algorithm is far superior to what's onboard a DAC chip, and easily improves that DAC's performance.
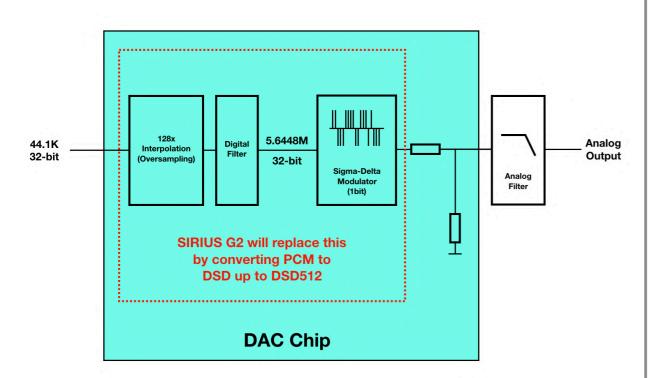
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R-2R DAC plays DSD

R-2R DACs were not born to play DSD, and resamples 1-bit DSD into 24- or 32-bit PCM in order to perform the conversion.

When converting DSD to PCM, SIRIUS G2 will upsample 1-bit DSD to 64-bit PCM at the same DSD sampling frequency (i.e., 64-bit 2.8224MHz), creating 64 times more data during the conversion. Then SIRIUS G2 will carefully downstream that data to the highest sampling rate an R-2R DAC can support.

An R-2R DAC works best if fed high sample-rate PCM.

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44.1K
32-bit

128x Interpolation (Oversampling)

Digital Filter

5.6448M

32-bit

Sigma-Delta Modulator (1bit)

Analog Filter

Analog Output

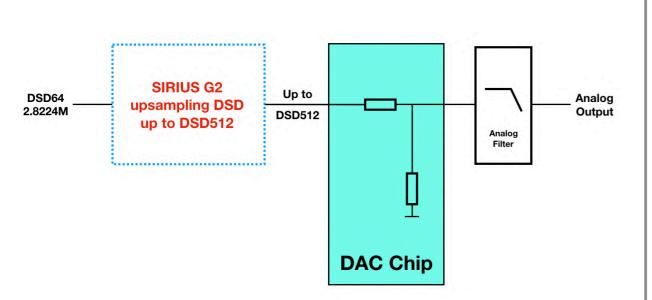**SIRIUS G2 will replace this by converting PCM to DSD up to DSD512**

DAC Chip

1-bit Sigma-Delta DAC plays PCM

Sigma-Delta DACs (1-bit and multi-bit) function like R-2R DACs but in reverse. They will oversample PCM into very high sample rates (44.1K -> 2.8224M) then use a sigma-delta modulator (SDM) to decimate the data into 1-bit or multi-bit (normally 6-, 7- or 8-bit).

SIRIUS G2's unique 8th order noise-shaping SDM creates extremely low distortion and noise levels, beyond the industry's current capabilities.

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DSD64
2.8224M

SIRIUS G2
upsampling DSD
up to DSD512

Up to
DSD512

Analog
Filter

Analog
Output

DAC Chip

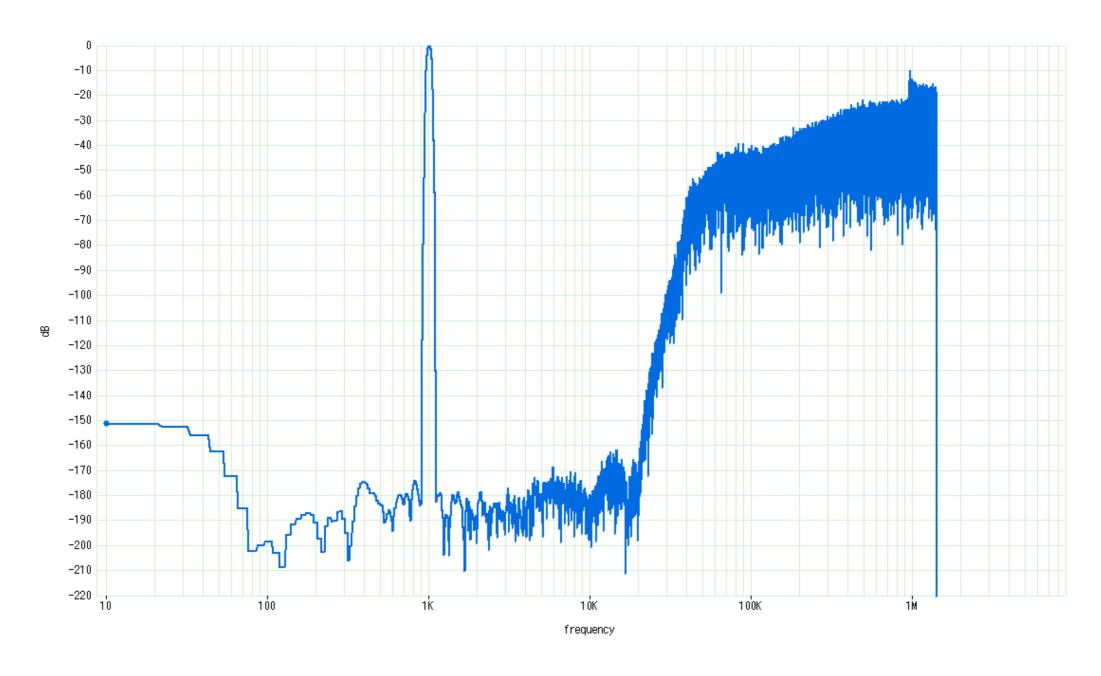**1-bit Sigma-Delta DAC plays DSD**

SIRIUS G2 can upsample low bitrate DSD streams into higher bitrates with extremely low distortion and low noise floor.

Feeding the DAC a higher bitrate DSD signal allows the sigma-delta DAC to work at a higher frequency. This will reduce the DAC's internal SDM modulator noise, especially those parts nearest the audio band.

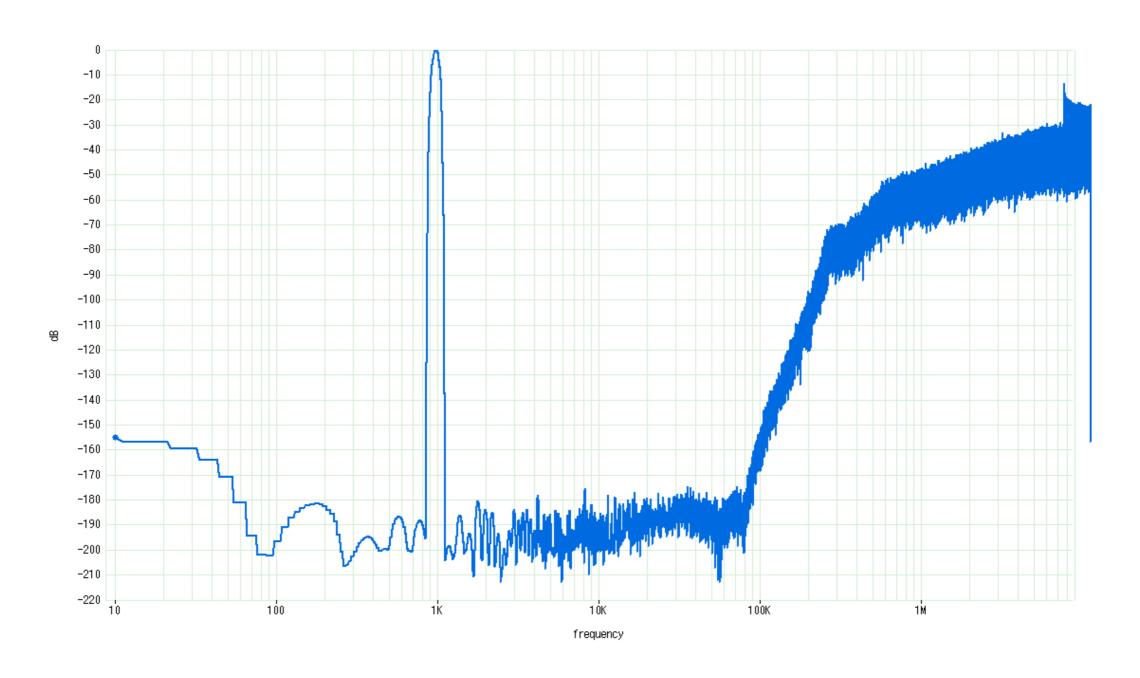**Sigma-Delta DACs work best when fed DSD but not necessarily at the highest rate.**

SIRIUS G2 upsampling PCM to DSD64

THD+N: -151dB (unweighted)

SIRIUS G2 upsampling PCM to DSD512

THD+N: -158dB (unweighted)

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**AURALiC Proteus G2
Co-Processing Platform**

Dual platform structure

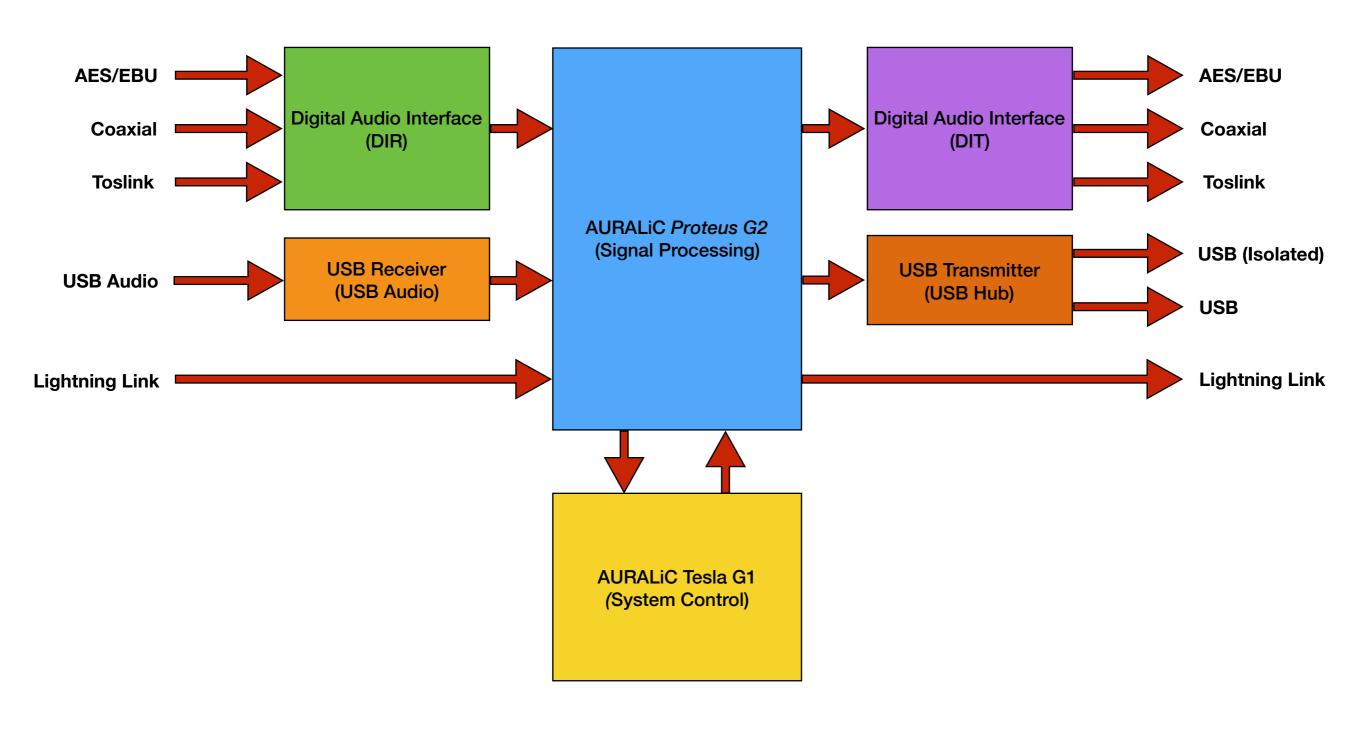*AURALiC's Proteus G2 Co-Processing Platform functions as the audio signal processing engine, while a Tesla G1 platform handles all hardware control. SIRIUS G2's state-of-the-art Proteus G2 is made up of:*

- **Xilinx XC7A200T FPGA chip**

- **512 MB of DDR3 memory**

- **740 DSP slices**

- **More than 200,000 logic blocks**
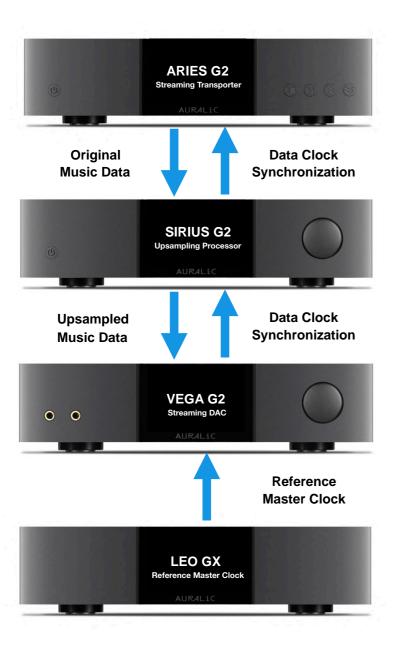
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Built for the Best Performance

In designing SIRIUS G2, we knew that taking a DAC to the next level of performance would not be as simple as adding an FPGA platform. Additional features would be needed to improve musical performance beyond expectations. Below are just a few of these refinements.

- **Flexible Filter Mode**

- **Triple-Channel Purer-Power Supply**

- **Dual Galvanic Isolation**

- **Dual Femto Clock**

- **Unity Chassis**

A Link to Perfection

Different from other HDMI-based I2S connections, the bi-directional Lightning Link opens the door to jitter-free operation of all the devices in your system connected via Lightning Link.

Lightning Link *also carries system control data for everything from volume control to processor engine setup, allowing all linked AURALiC devices to appear in a single, unified control interface.*

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Get In Touch

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