

ADI

Grimm | **AUDIO**

www.grimmaudio.com

info@grimmaudio.com

Grimm Audio's AD1 is a modular 2 to 8 channels analogue to 1-bit digital converter targeted at the most demanding mastering and recording applications. The 1-bit output signal is the highest fidelity DSD-compatible representation of the analogue input available anywhere. As the mastering ADC in an analogue SACD mastering room, the AD1 makes DSD shine exactly where it was conceived for: getting the sound of an analogue original onto a digital disc. Paired with the UC1 format converter, the AD1 forms the front-end of an equally ground-breaking PCM ADC.

In order to get past the limitations posed by commercially available converter chips, the AD1's converters are made with discrete parts. The input circuitry before the modulator consists of only two resistors. This strategy pays off with unparalleled low noise and distortion. Maximising the converter's capability are a plethora of design techniques. An ultra-low jitter clock source delivers the same precision irrespective of whether it is operated in locked or free-running mode. Extensive use of wideband shunt voltage regulators effectively keeps AC currents associated with the operation of analogue or digital circuits local. Audiophile construction details, such as selected capacitor types, 'melf' resistors and DC coupling, deliver the finishing touch.

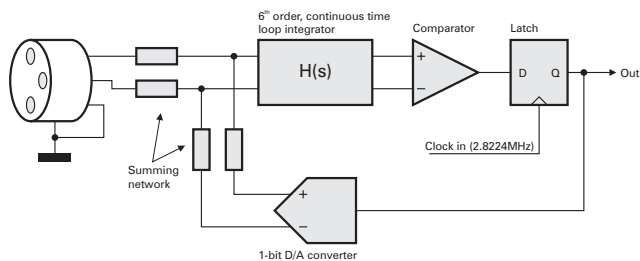


The Rebirth of Purity

The AD1 embodies an unusually rich mix of technical insights and listening experience.

Converter circuit

The converters themselves are 6th order continuous-time deltasigma modulators built from the ground up with discrete parts. This allows much greater control over performance and system architecture than IC converters will ever permit. It also results in extreme simplicity of the analogue input stage. As shown in the block diagram, only four resistors separate the audio signal from the feedback DAC. Everything else is inside the feedback loop. Buffers, filtering or other signal conditioning are wholly obsolete in this design.



The resulting distortion performance far outstrips that of any other known converter, IC or otherwise.

Clock

The clock PLL, based on a custom ultra-low-noise crystal oscillator, is engineered around a single requirement: that there be no sonic difference between operation in master and slave modes. To achieve this, the “ultra” lock mode has 90dB of jitter rejection at 10Hz, rolling off further at a rate of 60dB/decade.

Power supply

After rectification, the incoming power is CLC filtered. Compared to more common C only energy storage, the resulting “raw DC” is orders of magnitude cleaner and power factor is significantly better. Each channel has local regulation by shunt regulators. Unlike traditional pass (series) regulators, shunt regulators keep all variations in load current local to the circuit. The power bus and ground carry only DC current. The shunt regulators provide excellent noise rejection up to 1GHz and have a noise level more commonly associated with good microphone preamps.

EMC

EMC has been a principal design consideration made from the very beginning. With the AD1, Grimm Audio

shows that in doing so, perfect EMC can and must coexist fully with the best sonic performance and practicality.

Audiophile construction details

Grimm Audio’s audiophile background is borne out by the judicial use of components known by experience for their lack of colouration and veiling in the particular circuit configuration where they figure. Even the chassis was subjected to this scrutiny, leading to the selection of copper clad iron.

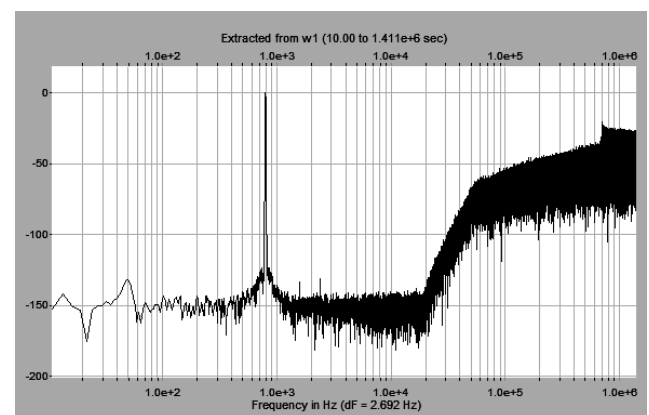
About Grimm Audio

Grimm Audio is a newly formed collaboration between four of the Netherlands’ best known audio engineers: Bruno Putzeys, Guido Tent, Peter van Willenswaard and Eelco Grimm, with the explicit aim of consolidating their collective competences into the most transparent recording and reproduction equipment possible.

Specifications

Conditions: 20kHz noise bandwidth. Input gain set for 0dB(DSD) = 18dBu.

# of Channels	2 to 8	Per chassis
Gain Range	0dB(DSD) = 12dBu to 24dBu in 2dB steps	
Input Impedance	10kΩ	Balanced
SNR	116dB	Unweighted
THD	-129dB	Excluding noise. Full-scale input.
Output format	SDIF3	BNC
Sync I/O	44.1kHz	I/O Termination Switchable
Static sync error	<20ns	Sync in to Sync out and SDIF3 out
Oscillator jitter	<2.5ps	RMS integrated down to 10Hz
PLL corner, Ultra mode	140mHz	2 nd order slope, 3 rd from 2Hz upward.
PLL corner, Tight mode	1.4Hz	2 nd order slope, 3 rd from 140Hz upward.



Output spectrum of the AD1 with full-scale input.