

Soulution 560 DAC Release



April 17, 2014 - At Highend 2014 in Munich we will launch the new soulution 560 D/A-Converter. Top class digital-to-analog converters followed by preamplifier grade output stages transform every detail of the digital source material in to the analog world.

Five different digital inputs (AES/EBU, SPDIF, optical, USB and LAN) ensure a versatile use of the 560 D/A-Converter. The USB interface is an asynchronous design based on a high performance DSP. It is clocked by the 560s high precision master clock and gets powered by its ultra stable power supplies (not USB bus powered!). For the LAN connection the 560 is equipped with a separate dedicated DSP that manages the communication to the local area network and does buffer and decode the incoming music signals.

All common digital formats can be received:

- PCM (16bit/ 32kHz up until 24Bit/192kHz)
- DXD (24bit/352.8kHz)
- DSD (1bit/2.82 MHz) and double DSD (1bit/5.62 MHz).

The upsampling module of the 560 D/A-Converter has been further developed and is now based on a much more powerful DSP (32bit floating point) than was used for the 745 and 540. The additional power allows for much higher precision of the polynomial upsampling calculation process, the integration of a state of the art apodizing digital filter and has still enough computation headroom for soulution's innovative Zero-Phase-Technology.

zero ϕ tech (Zero-Phase-Technology)

Every D/A converter requires an analog low-pass-filter in its output in order to suppress high frequency noise and aliasing signals. The 560's 3rd order bessel filter, with a cut-off frequency of 120kHz, would show a phase shift of up to 15° in the audio band. Due to the Zero-Phase-Technology the phase error of the analog output signal remains below 1°, 20Hz - 100kHz! The sonic impact of these seemingly small changes is tremendous.

The Zero-Phase-Technology does resolve one of the biggest problems related to digital-to-analog conversion. With the introduction of the upsampling technology low-pass-filters could be less steep

than it was required with a sampling rate of 44.1kHz. But still the cut-off frequency is by far too low for not having any impact on the phase response in the audio band. Upsampling was a great step forward but did not resolve the issue completely. The Zero-Phase-Technology does overcome these short comings for the very first time.



Description

Philosophy

In many areas the 560 D/A-Converter is based on the same proven technical solutions used in the 745 SACD-Player. It also embodies the same principles in its design: top grade digital interfaces for optimal reception of the music data, a super-precise master clock generator to avoid jitter, intelligent digital signal processing with oversampling technology, and analogue output stages of top end pre-amplifier quality.

Design

As with its Series 7 sibling the 560 D/A-Converter is packed with cutting-edge technology with one objective - the love of music. The parallels include a consistent dual mono design in the output stages and separate power supplies for digital electronics and the analogue stages. The 560 D/A-Converter adds a digital volume control that allows direct connection to a power amplifier.

Upsampling

Audio data is buffered then upsampled to 24Bit/384kHz. We believe precision of interpolation is more important than high clock rates. Our players and D/A converters use an algorithm from the highly regarded Anagram Technologies followed by Burr Brown D/A converters in a digital symmetric configuration. As we consider the PCM conversion technology as superior, the DSD signals get converted before its final D/A conversion.



The Zero-Phase-Technology eliminates potential timing/phase errors in the analog output signal. Every D/A converter requires an analog low pass filter in its output in order to suppress high frequency noise and aliasing signals. The 560's 3rd order Bessel filter, with a cut-off frequency of 120kHz, does show a phase shift of up to 15° in the audio band. Due to the Zero-Phase-Technology the phase error of the analog music signal remains below 1°, 20Hz - 100kHz! The Zero-Phase-Technology brings you even closer to the beauty of the source material! No detail gets lost.

D/A-conversion

Burr-Brown devices perform D/A conversion only. Their internal upsampling and filter stages are not used. The output currents are converted to voltage and then filtered. With an internal bandwidth of 40 MHz, this current/voltage conversion stage allows best signal-to-noise performance and maximum dynamics in the analogue domain.

Output stage

The wideband output stage of the 560 D/A-Converter has a bandwidth of 20MHz (-3dB). With such speed of response all musical details are reproduced true to life creating a three-dimensional, spatial sound to bring real listening pleasure.

Operation

The 560 D/A-Converter is operated from front-panel buttons and a rotary control. Further functions can be used to optimise and match an entire audio system around different components.

Connections

Analog outputs:

- 1 x balanced output (XLR)
- 1 x unbalanced output (RCA)

Digital outputs:

- 1 x SPDIF (RCA)
- 1 x AES/EBU (XLR)
- 1 x Optical (Toslink)

Digital inputs:

- 1 x SPDIF (RCA)
- 1 x AES/EBU (XLR)
- 1 x Optical (Toslink)
- 1 x USB
- 1 x Ethernet

LINK-System - 2 x RJ45

Technical data: 560

Nominal voltage

Model 220 – 240 V / 50 – 60 Hz	220 – 240 V
Model 100 – 120 V / 50 - 60 Hz	100 – 120 V

Power consumption

OFF (standby)	<0.5 W
ON	50 W

Main-Out

Output voltage	balanced	4 Vrms
	unbalanced	2 Vrms
Peak Output Current		0.2 A
Output impedance	balanced	10 Ω
	unbalanced	10 Ω
Frequency response	(depending on data format)	DC-100 kHz
Distortion (THD+N)		<0.002 %
Noise floor		140 dB
Volume range		0...-80 dB
Balance range		<- 9...0...9 -> dB

Digital-Out

Output voltage	SPDIF	500 mV p-p
	AES/EBU	5 V p-p
Output impedance	SPDIF	75 Ω
	AES/EBU	110 Ω

Digital-In

Sensitivity		0.3 - 5 V p-p
Input impedance	SPDIF	75 Ω
	AES/EBU	110 Ω

PLL – range		+/- 100 ppm
USB Input		
Sensitivity		0.5 – 3.6 V p-p
PCM	Input resolution	16 - 24 Bit
	Input frequency	32 - 192 kHz
Audio Class 2.0	Native support for OSX, driver for Windows required	USB Driver 1.22
LAN Input		
PCM	Input resolution	16 - 24 Bit
	Input frequency	32 - 192 kHz
DSD	Input frequency	2.82 MHz
DXD	Input resolution	16 - 24 Bit
	Input frequency	352.8 kHz
File Formats	FLAC (Free Losless Audio Codec) MP3 (Mpeg Audio Layer 3) AAC (Advanced Audio Coding) DSF and DFF (DSD stream file)	WAV (Waveform Audio File Format) ALAC (Apple Lossless Audio Codec) AIFF (Audio Interchange File Format)
LINK-System		+12 V

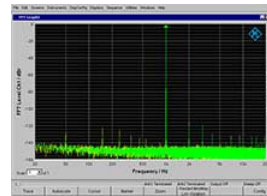
Measurements

FFT analysis (96kHz, 24 bit)

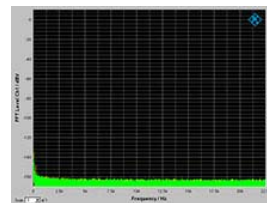
All distortion components are below the -120dBr mark and thus clearly below the resolution of 16bit CD data. Only when measuring with high-resolution 24bit data, distortion components can be proven in the 560 D/A-Converter

Noisefloor

The inherent noise of the 560 D/A-Converter is at about -160dBr, measured with maximum output signal for both low and high frequencies. This provides the basis for a detailed and precise sound image.



FFT analysis in DAC-mode(96kHz,24 Bit)



Noisefloor

Dimensions

