dac1101 Users Manual

Discrete R-2R USB DAC / HeadAmp

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Introduction

The Soekris dac1101 is a small R-2R DAC, with USB input and output to either the built in headphones amplifier on a front mounted 6.3mm Jack, or to line level output on rear mounted RCA Phono connectors. The dac1101 is not just any regular DAC, the sound quality is the absolute best available, thanks to the ultra high end design with a discrete R-2R sign magnitude DAC using a total of 224 small and very precise resistors, and a discrete headphones amplifier with zero negative feedback, delivering high power to almost any headphones. The dac1101 R-2R DAC circuit is fully isolated from the noisy computer USB interface. It supports input signals on the USB interface up to 24 bit / 384 Khz PCM audio, and up to DoP-128 (x2) and DSD-256 (x4) audio. It has a fully digital volume control and four sets of digital anti-aliasing filters to fit any taste. The dac1101 is designed and built in Denmark, using advanced surface mount technology and parts from only the highest quality suppliers.

Quick Start

Plug in the supplied USB Cable to the dac1101 and connect it to your computer, plug in your headphones, set the rear left switch to “PHONES”, set the rear right switch to “USB1”, select “soekris dac1101” as output in your computer settings and start playing music. The default power up settings for volume and anti-aliasing filters are stored in flash memory and can be changed, see rear view description for details.

Specifications

THD @ -1db	<0.01%
THD @ -60dB	<0.04%
S/N Ratio 20 Khz Bandwidth	>118 dB
Frequency Range @ 44.1 Khz PCM	20hz - 20Khz, +0.1dB -1.0dB
Frequency Range @ 384 Khz PCM	20hz - 80Khz, +0.1dB -1.0dB
USB Input	Type B, Fully Isolated, Full or High Speed
USB Input Mode Selectable	Audio Class 1.0 or Audio Class 2.0
USB Input PCM	Up to 24 Bit / 384 Khz
USB Input DSD	Up to DoP-128 (x2) and DSD-256 (x4)
Digital volume control	-80 dB to +10 dB
Output Line	RCA Phono, 2.0V RMS, Zout 50R
Output Headphones	6.3mm Jack, 3.5V RMS into min. 16 ohm, Zout 3 ohm
Power Consumptation	From USB max 3.5W
Size	108 x 160 x 20 mm
Weight	0.3 Kg
Warranty	3 Years

Dac1101 front view

The LED's indicates input sample rate, volume level and anti-aliasing filters selected.

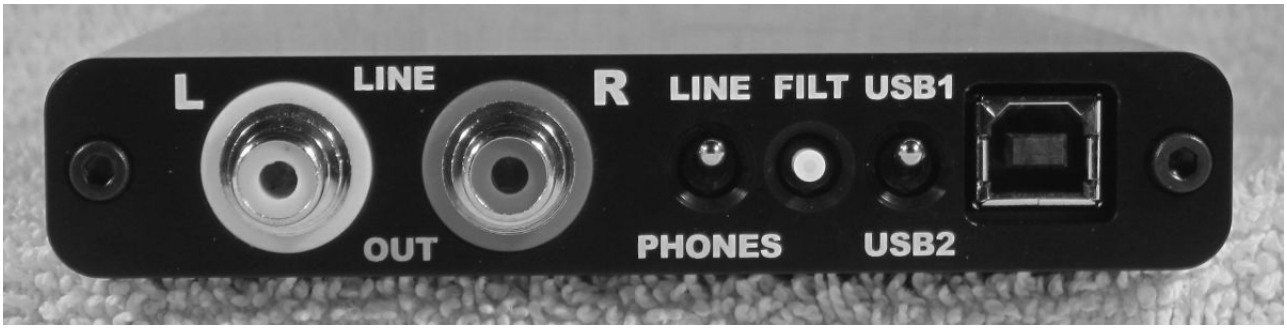
When input is Linear PCM audio		When input is DSD or DoP audio	
PCM 44 Khz	"44" LED on	DoP/DSD-64	"DSD" on
PCM 48 Khz	"48" LED on	DoP/DSD-128	"DSD" and "X2" on
PCM 88/96 Khz	"X2" LED on	DoP/DSD-256	"DSD" and "X4" on
PCM 176/192 Khz	"X4" LED on		
PCM 352/384 Khz	"X8" LED on		

"FILT" LED color shows the current anti-aliasing filter selected	
Red	Linear Phase filter, also called brickwall filter
Orange	Mix between Linear and Minimum Phase filter
Green	Minimum Phase filter, also called butterworth filter
Off	Soft Minimum Phase filter, a soft butterworth filter

The "VOL" LED indicates current volume, from off when at -80 dB to full on when +10 dB. The volume knob is using a digital encoder to set the volume from -80 dB to +10 dB in 1 dB steps.

6.3 mm Jack: is for connecting to a set of headphones, almost any type can be used, the loading impedance should be minimum 16 ohm, high impedance types work very well. The dac1101 is able to output minimum 3.5V RMS into 32 ohm or higher, in power that is 400 mW into 32 ohm, 120 mW into 100 ohm or 40 mW into 300 ohm.

Dac1101 rear view



The two RCA Phone sockets are for line out signal, the white one marked “L” is for the left channel, the red one marked “R” is for the right channel.

There are three switches for various functions.

Left switch: Selects where the audio will go, when up or “LINE” it will go to the Line Out on the RCA Phone sockets, when down or “PHONES” it will go to Headphones Jack. The output not selected will be muted.

Middle switch: Push to select between the four sets of anti-aliasing filters, hold for minimum four seconds to store the current volume level and anti-aliasing filter selection, one setting for Line Out and one setting for Headphones Out, the filter setting is common for both.

Right switch: Select between USB Audio Mode 1 and USB Audio Mode 2. The Windows Operating System for some reason still doesn’t have direct support for USB Audio Mode 2 but requires drivers. If you don’t want to load the drivers, or just want to do some testing, set the dac1101 to USB Audio Mode 1 and the DAC should work on any Windows System without drivers, but it will be limited to no more than 96 Khz PCM sample rate. To use higher than 96 Khz sample rate or to use DoP or DSD, you need to set the switch to USB Audio Mode 2 and install the Windows drivers for the dac1101.

USB type B socket: For connection to the USB interface on your computer or other audio source device. Please note that the dac1101 is a relatively high USB load, so you need to use a high quality high current USB cable, like the USB cable included with the dac1101. Please also note that the dac1101 is actually able to draw a little higher current than USB 1.1 or 2.0 can deliver according to the USB specifications. If you experience any issue when playing loud into low impedance headphones you should try a different USB port or connect to a USB 3.x port as USB 3.x can deliver higher current.

Windows Drivers: For using USB Audio Mode 2 are available for downloading on http://www.soekris.dk/download.html. Please note that most newer versions of Apple OS X or Linux don’t require drivers but will support USB Audio Mode 2 directly, see manual for your operating systems as needed.

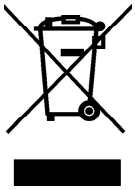
Conformity Declarations

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that of the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

In order to maintain compliance with FCC regulations shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio & television reception.

Application for Council Directives 2011/65/EU, 2014/30/EU
Conformity declared for EN55022 Class B, EN55024



This marking indicates that this product should not be disposed with other household waste throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal and to conserve material resources, this product should be recycled responsibly. To dispose of your product, please use your local return and collection systems.

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