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# The Analog Domain DAC1


## High performance Digital to Analog Converter

Owners' manual

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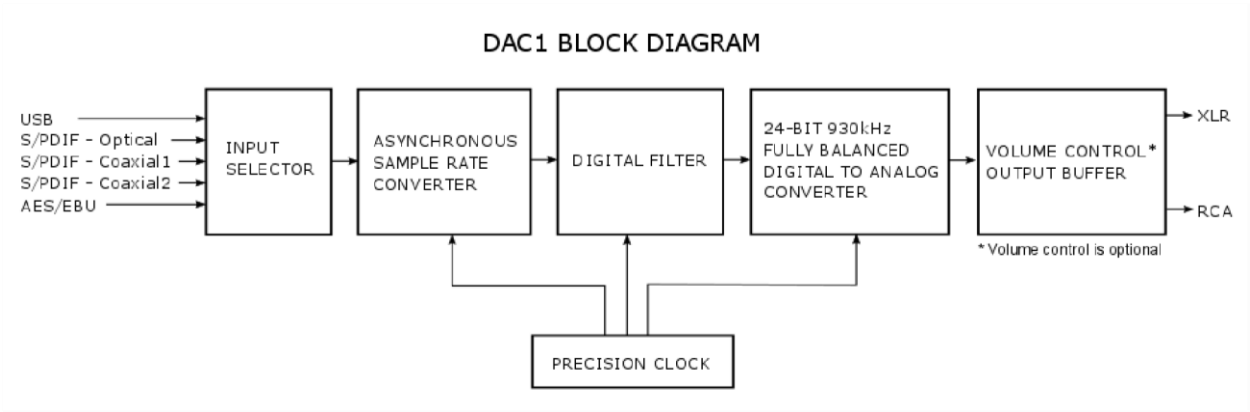
## General description

The Analog Domain DAC1 represents the pinnacle of performance in digital PCM to analog audio conversion. It will accept all current and future digital formats up to 192k/24bits over S/PDIF and AES/EBU, and from 44.1k/16 up to 768k/32bits, DSD64 (1x), DSD128 (2x) and DSD256 (4x), over USB.

Our focus has been on maximizing the DAC1's performance with existing recordings while ensuring compatibility with existing and upcoming high resolution formats. The DAC1 provides the maximum achievable performance of the respective format.

The block diagram of the DAC1 shows how it differs significantly from mainstream designs, and for a reason.




Input data, regardless of its format, is converted to 24 bits and asynchronously resampled at a very high, constant data rate. The resampled data enters a Digital Filter, configured optimally for the output format of the Sample Rate Converter, therefore there are no user-selectable filter options. Data from the digital filter then enters the DAC stage where it is converted into an analog signal by a state of the art, precision 24-bit D/A converter with third order sigma delta noise shaper and 31 level quantizer, ensuring extremely low noise and distortion.

The input data rate is not displayed on the front panel as it is practically irrelevant. The display will illuminate briefly on input data format change (PCM/DSD), which is helpful for verification that the player is sending data in the desired format.

Jitter is essentially a meaningless parameter for the DAC1. The Asynchronous Sample Rate Converter takes care of proper word alignment and timing during conversion. The three digital blocks are synchronized to a single, high precision clock to ensure perfect timing. Any CD transport with RCA, optical or AES/EBU outputs can be used with the DAC1, not requiring external re-clocking from the DAC1. Performance is nominal, regardless which output format is used.

The actual DAC stage is a differential design. Its residual distortion is approximately 0.00035% at full scale output, consistent for all input formats. Distortion falls off to 0.0001% (-120dB) at typical output levels of -10dBFS and becomes essentially zero at levels below -20dBFS, "lost in the grass" as we say, at -130dB. *This matters!* It's during the quiet passages that a DACs' distortion becomes most noticeable. One bit is lost with every 6dB reduction in level, therefore a 16-bit DAC will be working effectively at 14-bit resolution or less.

The DAC1 is available with or without volume control, and yes, it's analog! We have applied the same proven design as in our M75 series amplifiers. With remote control, of course.

## Operation

The DAC1 is designed to be a plug and play device. The user interface and layout of the DAC1 have been carefully considered for ease of use. We'd like you to relax while listening to your favorite music instead of fumbling around with complicated and often meaningless settings, or worrying about numbers. We've done it for you while designing the DAC1. Our goal is to bring back the enjoyment of music from digital sources.

Hook up your players, switch on the power, select the desired input and enjoy!


Front view of the DAC1, without volume control


The rear panel

Inputs: 2x RCA, 1x AES/EBU, 1x TOSLINK for linear PCM audio up to 192k/24; 1x USB type B.

The USB input is powered internally and does not draw power from the players' port.

The mains switch is illuminated. It will glow in the ON position if the mains plug is properly oriented in the wall outlet, thus switching the live wire. If the mains switch glows in the OFF position, turn the plug.

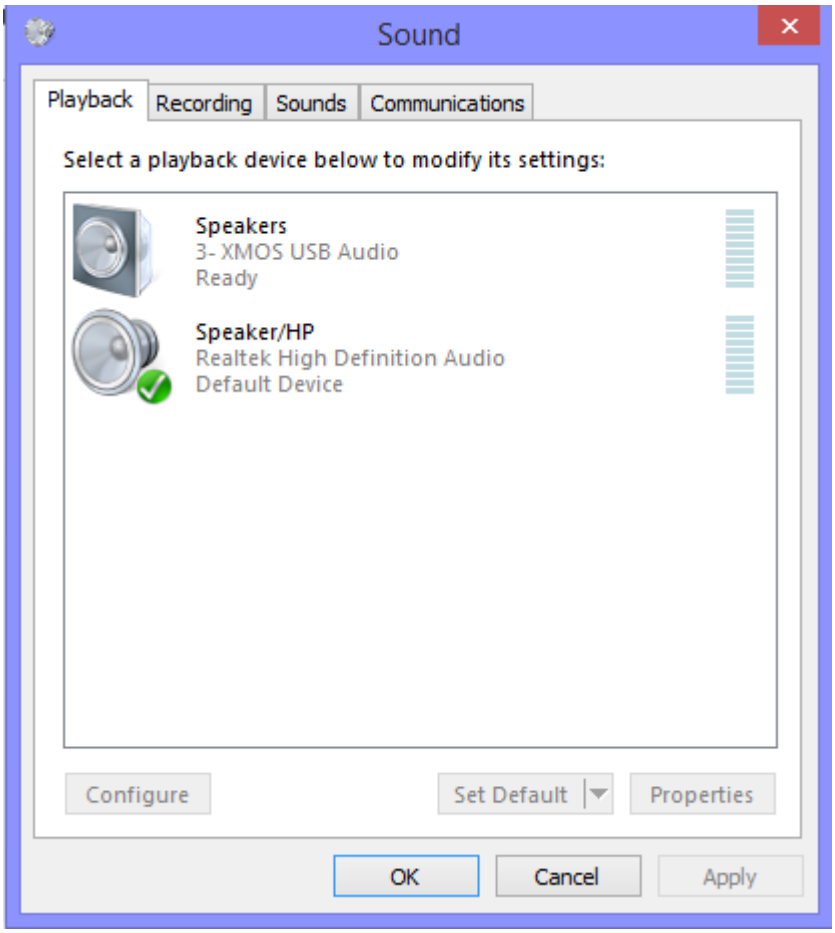
## Windows driver installation

The USB input uses an XMOS chip and requires a driver ONLY for Windows-based players. IOS and Linux will recognize the XMOS chip automatically and do not require drivers.

The provided USB driver requires Windows 8.1 or higher. Installing:

1. Unplug the USB cable to the DAC1.
2. Run the .exe file provided with the DAC1 and follow on-screen instructions. It will install the driver and create the XMOS program group and folders.
3. Reconnect the USB cable and verify that the DAC1 is available as a playback device:

   > right click on the loudspeaker icon in the taskbar
   > Select “Playback devices”
   > a window will pop up. You should see something similar to this:




The DAC1 is now set up. No further actions are required.

Next: run the player and select the output device from its settings menu. We recommend using ASIO.

If you are curious as to the actual data rate sent to the DAC1, then run the USB Driver Control Panel:

Start > Programs > XMOS > USB Audio 2.0 Stereo Driver > XMOS USB Audio 2.0 Control Panel

## Volume control

The DAC1 is available with volume control, if desired. The output volume is adjusted via an analog stepped logarithmic resistor ladder in steps of 0.75dB. Position 127 corresponds to full output, position 0 is -96dB.


The volume control may be installed in a DAC1 that was purchased without, however this can only be done in the factory as it requires a new front panel and system firmware.

The DAC1 has the same footprint as the M75 range of amplifiers (440w x 400d, mm) and is available in matching finishing options. Height: approx. 90mm. Weight – approx. 12kg. 115/230V user-selectable.

## Technical specifications

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|---|---|
| Supported formats[i]: | Linear PCM up to 384k (MK1) and 768kHz, DSD up to 2x (MK1) and 4x |
| Output level: | 2Vrms (RCA), 4Vrms (XLR) |
| Dynamic range: | 120dB |
| Distortion: | < 0.00035% |
| Mains voltage: | 115/230VAC, user selectable, 50/60Hz |
| Power consumption: | < 10W |

[i] MK1 refers to USB capabilities for units delivered before 12’18. Should you require an upgrade, the MK2 USB module is available. The unit has to be returned to the factory for the upgrade.