AudioNet

User's manual

Digital to Analogue Converter

DAC

The Audionet DAC - Digital to Analogue Converter - is a high-performance system for converting digital audio signals, which improves the quality of sound reproduction of your whole music equipment to a much higher level. Further you can individually choose between different oversampling-filters.

Central elements of the DAC are the digital signal-processing system (DSP), the temperature-regulation circuit, decoupling the converter from the clock of the signal source, a 20-bit D/A-converter as well as the completely discrete built up analogue section.

Before the first use please read this manual carefully. So you will get optimized results from your DAC. Nevertheless, in case of any problem, please refer to your local dealer or ourselves.

Connecting the system

Power supply

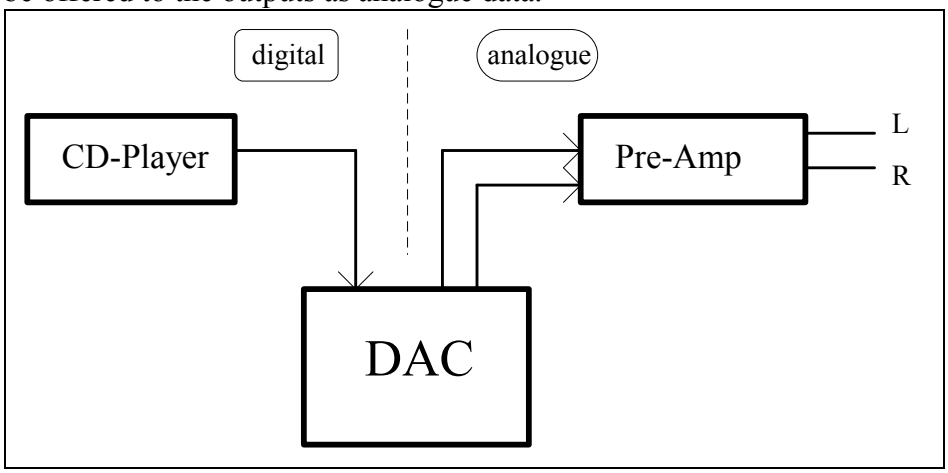
Please connect the power jack at the rear with your wall outlet. Use the provided powercord or another one allowed for your homecountry specifications.

Note:

The power specifications on the rear must meet to your homecountry specifications.

Integration

If the DAC is connected with a digital signal-source (input) , e.g. DAT, CD-Player, and a (pre-) amplifier (output), the converted digital data will be offered to the outputs as analogue data.



Inputs

The DAC offers inputs for up to six digital signal-sources (CD-Player, DAT …)

- 2 * RCA (gold-plated)
- 2 * BNC
- 1 * XLR AES/EBU (symmetric)
- 1 * TOSLINK or optional 1 * AT&T

Please connect at least one digital input with the digital output of your signal source.

Outputs

The DAC offers Coaxial-/RCA-outputs for the connection to a (pre-) amplifier. Please connect left and right output to the corresponding inputs of your amplifier.

Monitor

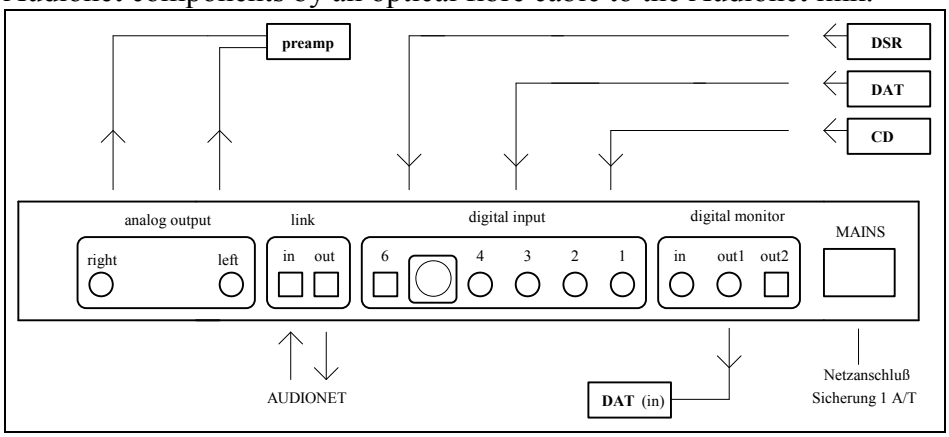
Further a monitor circuit is available, which enables e.g. the use of digital effect equipment. The following in- and outputs are available:

- 1 * RCA out
- 1 * Toslink out
- 1 * RCA in

Please connect the analogue output of the DAC has to a (pre-) amplifier by two RCA wires (left and right channel). The monitor input detects by itself, if a signal is coming in and switches it into the processing circuit.

Audionet-link

The DAC can be switched on and off automatically, if connected to other Audionet components by an optical fibre cable to the Audionet link.



Operating the system

Switching on and off

Please push the **power** button on the front panel. The DAC is operational after about five seconds. In order to switch off, please push again the **power** button.

Input selection

Please turn the **input** switch (left knob) on the front panel to choose the wanted input. The numbers one to six belong to the input number on the rear panel.

The DAC uses a smooth input selection. In case of switching over the input, first the outputs are turned off (muting), then the new input is switched on and finally the outputs are activated.

Choosing a filter

Please turn the **filter** switch (right knob) on the front panel to choose the wanted filter. The numbers one to six belong to the six different filters. For details please refer to the next chapter.

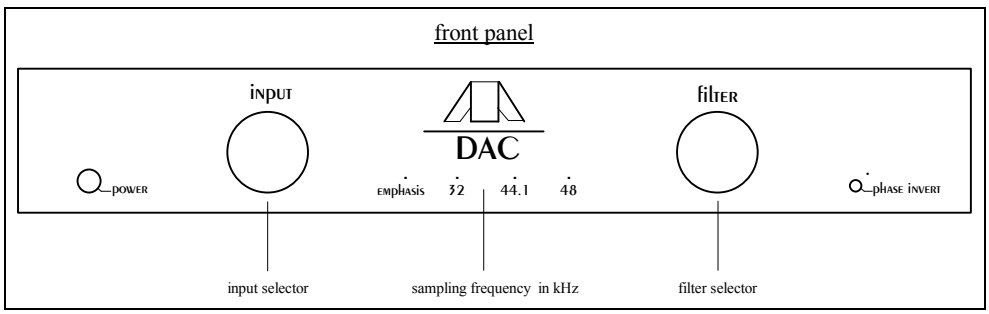
The DAC uses a smooth filter selection. In case of switching over the filter, first the outputs are turned off (muting), then the new filter program is loaded and finally the outputs are activated.

phase inversion

Please push the **phase invert** button on the front panel to invert the phase of the output signal. This may be necessary for some compact discs. The activated phase inversion is indicated by the green LED next to the button.

Sampling frequency / Emphasis

The LEDs (Light emitting diodes) in the middle of the front panel show the sampling frequency of the chosen signal-source and, if necessary, the activated de-emphasis. The DAC automatically detects the sampling frequency and necessary de-emphasis.



Features

Conception

The block diagram on the following page shows the DAC in principle.

Main features are the signal processing system DSP56004 for software-controlled digital-filtering, the 20 bit noise-shaping/converting-combination SAA7350 and TDA1547, the decoupling of the converter clock from the signal source clock by a temperature regulation circuit, the complete (electrically and galvanic) separation of digital and analogue section, the discrete built up Audionet operational amplifiers and the lavish power supply with a wealth of pre- and main regulators.

clock decoupling

The Audionet DAC eliminates clock-jitter perfectly with an unique temperature regulated clock-generation. The clock of the converter is completely separated from the source clock. The incoming data are loaded into a buffer, which can store up to 0.7 seconds of music.
The stored data are read with an internally generated clock and converted. The internal clock is generated with highest precision by two temperature-regulated quartzes. The clock generator is located next to the converter part in order to prevent electrical interference.
The temperature regulation circuit ensures, that the internal clock is adjusted with highest accuracy to the original clock frequency of the signal source. For this the signal processor permanently checks the state of the buffer memory and calculates from this the value for the heating of the internal clock generator.
All data are transmitted on opto-electrically paths to eliminate any interference.

Because of the necessary sluggishness of the temperature regulation circuit, the DAC needs about two hours warming-up time, before you can enjoy the highest fidelity.

Digital filtering

The Audionet DAC has a software-controlled digital-filtering unit. The calculating is done by a signal processing system. The tonal differences between the filters allow you to adapt the sound to your individual requests. Further the filters can be exchanged.
Following you have a list of the available digital filters.
The diagrams (appendix) show you the attenuation characteristics as well as the impulse response of each filter.

Filter 1	A long standard filter according to Kaiser with high stop-band attenuation (>20 kHz) and linear frequency response, therefore long transient and ringing time.
Filter 2	A short filter according to Kaiser with lower stop band attenuation and light attenuation for high frequency (above about 17 kHz), therefore shorter transient and ringing time.
Filter 3	Combined Audionet filter with adequate stop band attenuation and linear amplitude response (<22 kHz). Short transient time above 20 kHz because of renunciation of linear phase response.
Filter 4	Short filter according to the principle of the Lagrange polynoms, therefore other weighting of the stop band attenuation. Has a very direct impulse response.
Filter 5	Equiripple filter of medium length according to Remez with constant stop band attenuation and linear amplitude response up to 20 kHz.
Filter 6	Standard filter according to Blackman with useful stop band attenuation (high attenuation for signal frequencies with statistically high amplitude). Same length as filter 5, but minor different transient and ringing time.

Technical information

Fundamentals

All circuits are constructed with the shortest possible signal paths to ensure best high frequency characteristics. Because of using SMD techniques and both side component equipping, all circuits have a high functional density.
In order to prevent electrical interference, digital and analogue section are completely separated and work together by lighting wire. The voltages for each unit are prepared and regulated separate.
Altogether five integrated, 14 discrete built up main regulators and further eight pre regulators are in use.

digital filtering

The filtering of the digital data is performed by a program-controlled signal processing system. It is equipped with six filter types. The six filters represent the latest state of filter technology. The asymmetric filter developed by Audionet combines the merits of all filter types without accepting their disadvantages for the first time.

clock decoupling

The DAC is completely decoupled from the clock of the signal source. The internal clock is generated by two temperature regulated quartz oscillators. The digital data is read out of a dynamic 2 megabit buffer memory. A fast signal processing system checks and controls buffer and temperature regulation circuit.
A 1 bit D/A-chip converts the data with 20 bit accuracy and 196 times oversampling.

analogue section

The reproduction of the analogue data is effected separate for each channel by six especially developed and optimized discrete SMD operational amplifiers. Tonal distortions are reduced to a level, that can hardly be measured and quite even not hear.