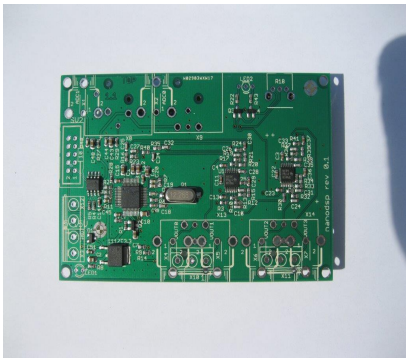
Nanodsp Manual

Introduction

The nanodsp is a flexible audio DSP board with 2 inputs and 4 outputs. By adding connectors of choice the user can customize the board to its liking. I can be used for stereo 2 in, 4 out signal processing or mono , balanced in signal processing. Outputs can be configured as 4 unbalanced or 2 balanced out. The boards are tested and have a test program that outputs 1 and 3 khz on 2 channels.



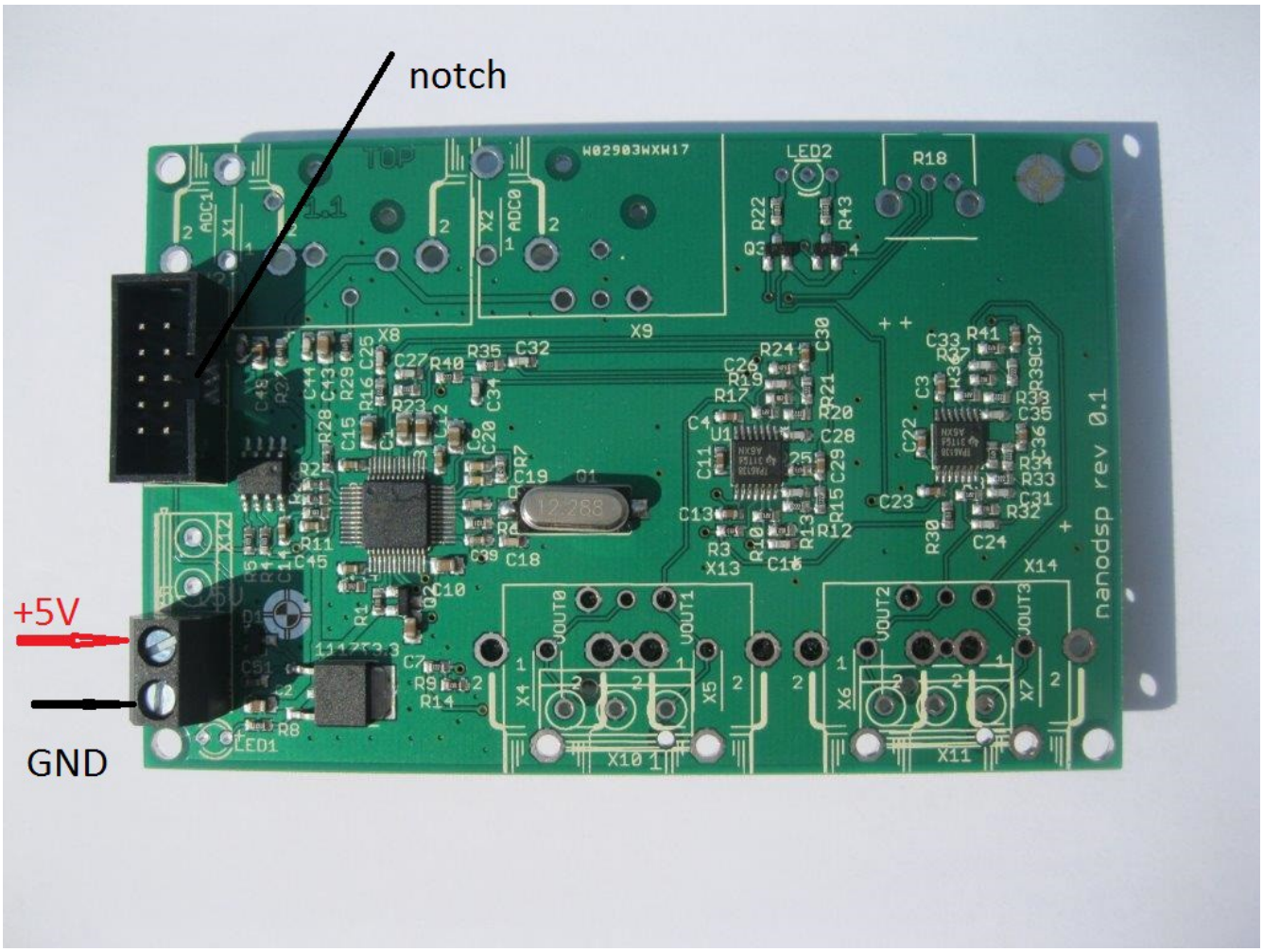
Technical data

Input sensitivity	2V rms
Output level	2V rms
supply	5-12V DC
undervoltage mute	4.3V
DSP	ADAU1701 50 MIPS

Connectors

The board comes without connectors to ease shipping. It needs minimally a 10p connector for programming and a connector for the 5V supply. Th 10p connnector is a standard 0.1” pitch 2row 5pin boxed or shrouded connector.

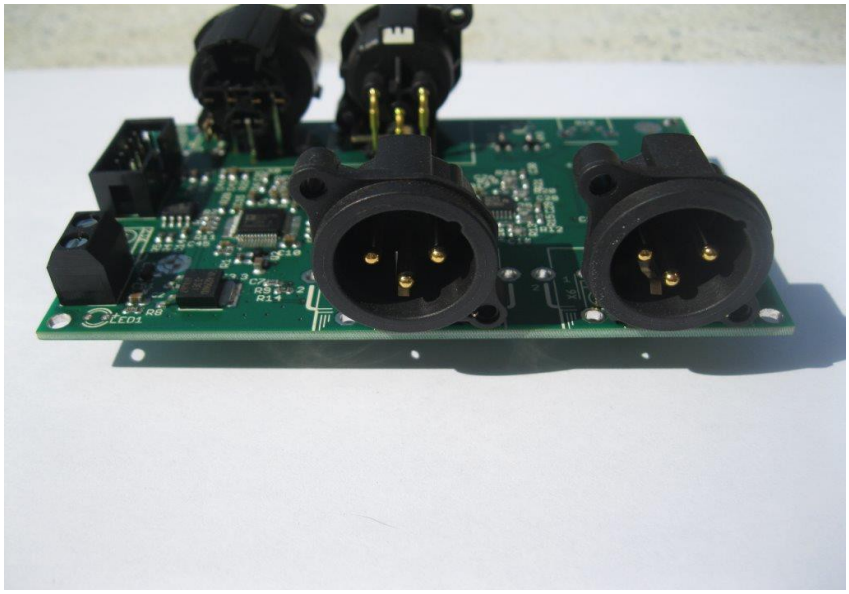
The power supply terminal is a 5.08mm 0.2” screwterminal. The picture below shows the placement and connections of the board. There is an unused connection between the programming socket and the supply terminal, intended for future use.



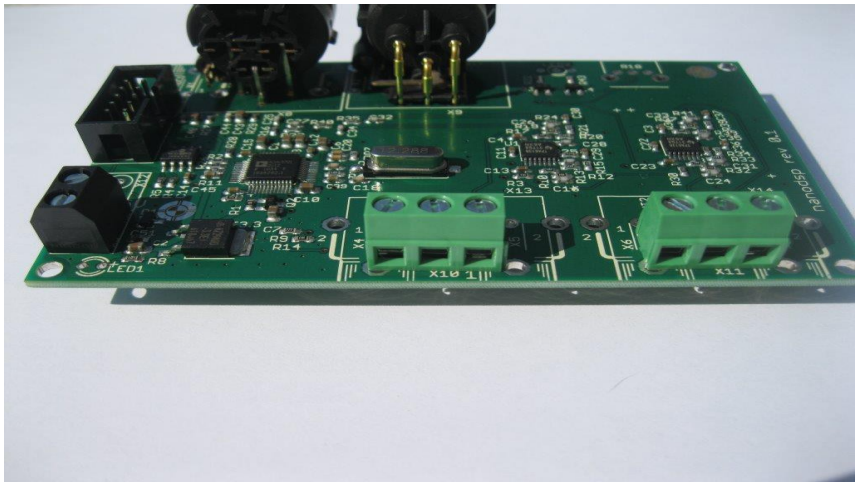
Customizing Audio connections

Balanced formats

XLR in and loopthrough XLR out

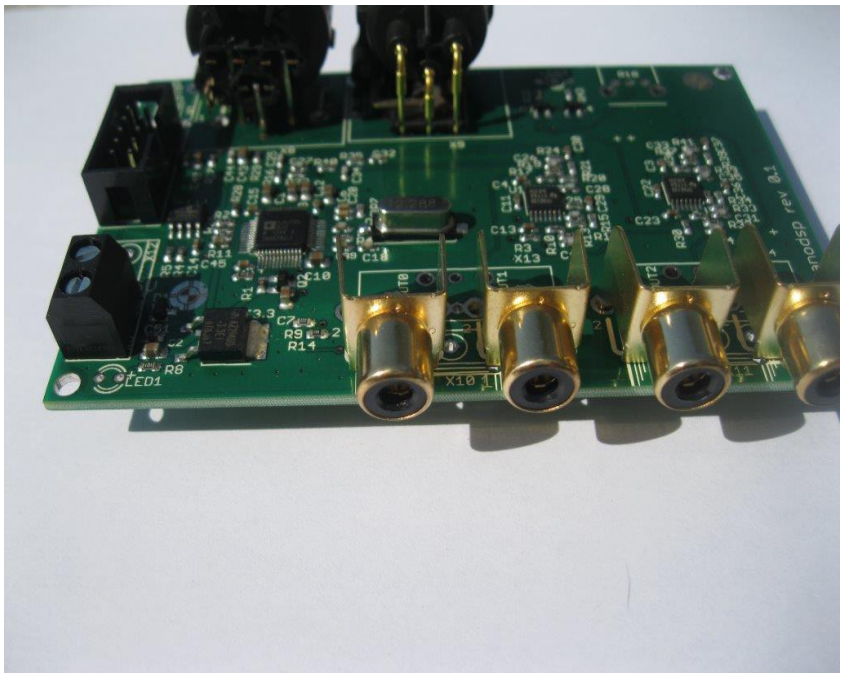


There are basically 2 balanced output connections options: XLR and screw terminal

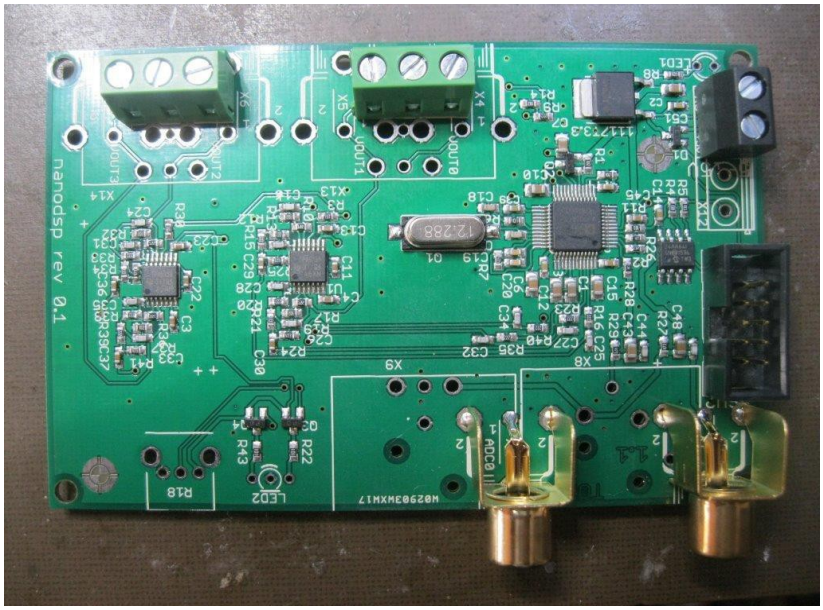


Unbalanced formats

The picture below shows the board with 4 cinch/RCA outputs.



Below the board is shown using cinch inputs.

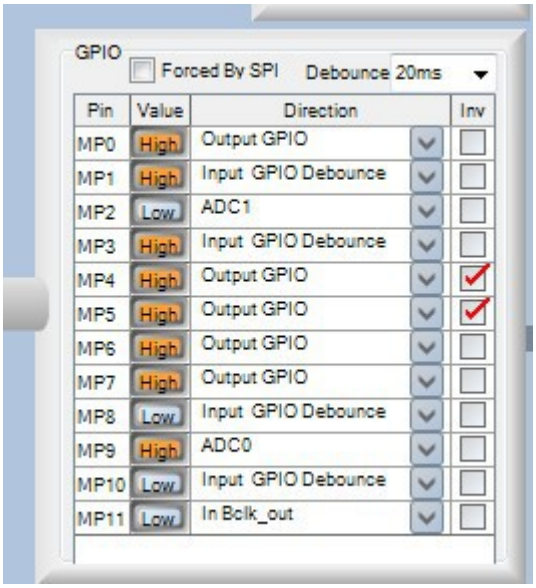


Volume control

On location R18 there is a provision for a volume potmeter. A linear 10K pot can be used and is connected to the DSP input AUX_ADC_0.

LED drive

A bicolor LED has been provisioned next to the potmeter. It is a common cathode LED and can be used as signal and overload indicator. The LED is controlled from by the DSP from GPIO_4 and GPIO_5. The LEDs have a Pfet buffer, so to activate the led, the line needs to be pulled low. IN the DSP hardware register configuration it is convenient to invert the polarity, such that the leds are activated when a signal is high.



Audio Mute

There are 2 mute mechanisms in place.

1. The postfilter and output amplifiers have a supply voltage dependent mute active. When the supply voltage drops below 4.3V the mute is activated.
2. A separate mute line controlled from the DSP . This line at GPIO_6 is normally driven by a startup delay when the DSP initiates its program. **This startup timer must be part of the DSP program, otherwise the board will default into mute, (see the section on programming).**

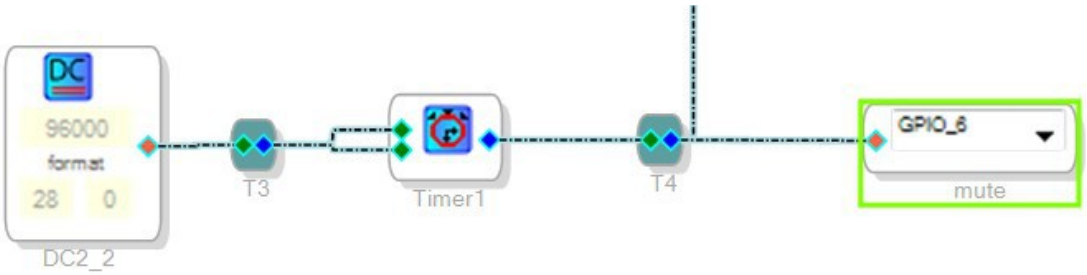
Connecting the board

Below the power input a indicator LED1 can be placed. This LED lights up as soon as logic supply is present. The outputs VOUT2 and VOUT3 carry a 1.5V rms testsigsnal, one at 1Khz and one at 3Khz. **WARNING** Do not connect an amplifier yet to these outputs, check the signals with a multimeter or oscilloscope, first write a program with the intended application.

Programming

Programming is done using a program called sigmastudio by Analog Devices. A programming interface is need called USBi. On www.freedsp.cc a cheaper alternative can be found. Also many programming hints and tutorials are available through that website.

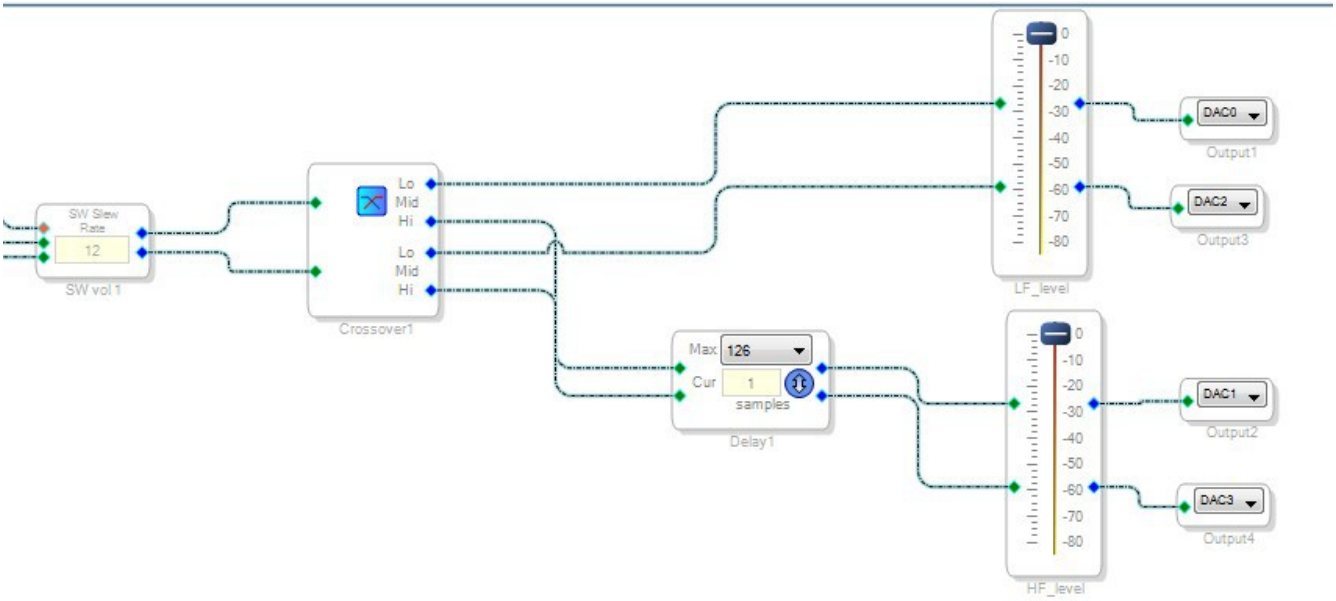
Mute programming



The programming of the mute control signal at GPIO_6 is done using timer1 preset set by a value of 96000. this means that after the startup of the DSP 96000 words have to be counted until the timer pin goes high. This measn a delay of 1 sec when a word clock of 96khz has been chosed, or 2sec delay when a 48Khz wordclock has been chosen. The elements T3 and T4 are signal split elements used in sigmastudio . These elements can be found the sigmastudio library.

A simple cross-over program

Below is a simple 2-way stereo crossover depicted. The crossover module from the filter library is used. By rightclicking (grow algorithm) more channels can be added to the module. A delay is added for the highpassed channels and an adjustable level setting has been placed.



An input volume control module is driven from the AUX_ADC0 line connected the optional potmeter.

Through-hole component parts list

TH parts	mouser	reichelt	TME
10k pot Threaded	667-EVU-E2JFK4B14		
10k pot			R9011-2-10k
10p programmer socket		WSL 10G	
2p supply connector		AKL101-02	EB21A-02-D
XLR male PCB	NC3MBH		
XLR female PCB	NC3FBH2		
bicolor LED 3mm red/ green Common cathode			L-115WEGW
LED 3mm red			
3p screwterminal		AKL101-03	EB21A-03-D
cinch connector gold		CBP-G	