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# OPAMP based balanced pre-amp

## Power Amplifiers

- 300W 6x 3886 Power Amp
- 100W 2x 3886 Power Amp
- Gainclone Power Amp
- Jeff Rowland w/3886

## Pre Amplifiers

- 6922 Tube Pre-amp
- 12AU7 Tube Pre-amp
- 12AX7 Tube Pre-amp
- Balanced Opamp Pre-amp
- Passive Pre-amp

## Speakers

- AAD 7001 by Phil Jones
- Vifa MTM Speaker
- OrCad Speaker / Crossover Simulation

## Digital Sources

- AW-D2 AD1955 DAC
- Marantz SA8400
- Marantz SA-11S1

## DIY components

- PA150 3x 3886 PCB Guide
- Lundahl 1545a Audio Transformer

## More Audio Links

## Other DIY

- DIY Aquarium Chiller



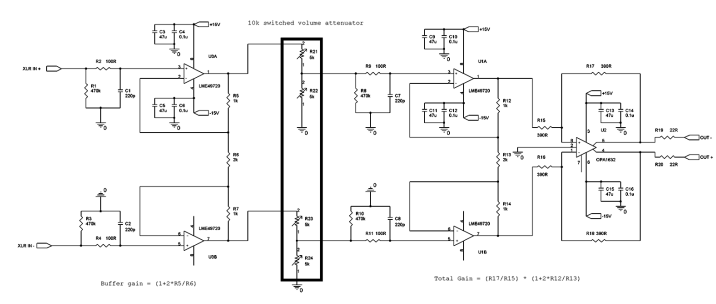
This pre amp is a simple opamp preamp that consists of a buffer stage, a resistor ladder as volume attenuation, another buffer, then a balanced line driver. The buffer used are LME49720, a high performance dual opamp from National. The balanced line driver is Burr Brown OPA1632.

The input impedance is setup via R1 and R3, which is 470k. The buffer gain is determined by R5, R6 and R7 . Buffer gain =  $(1+2 \cdot R5/R6)$ . (note : R12,R13 and R14 for the second buffer). The gain of the fully differential opamp OPA1632 is  $R17/R15$ .

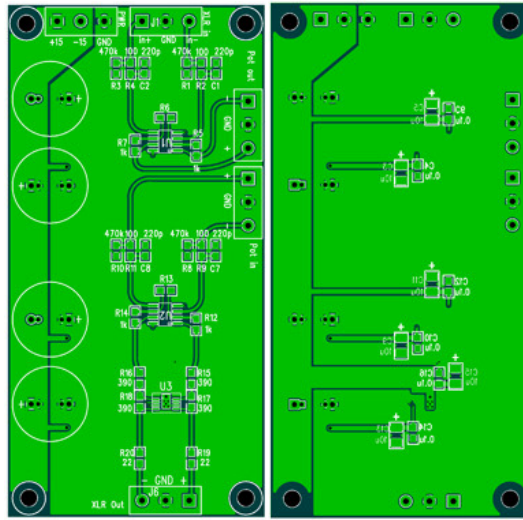
In my setup, each buffer gain is set to 2, while the differential opamp gain is set to 1. So the total gain of this preamp is 4. (+12db)

This preamp board can be used for single ended input/output. When used for single ended input, only connect the single + signal to the in+. The in- should be grounded. For single ended output, only use the out+ signal.

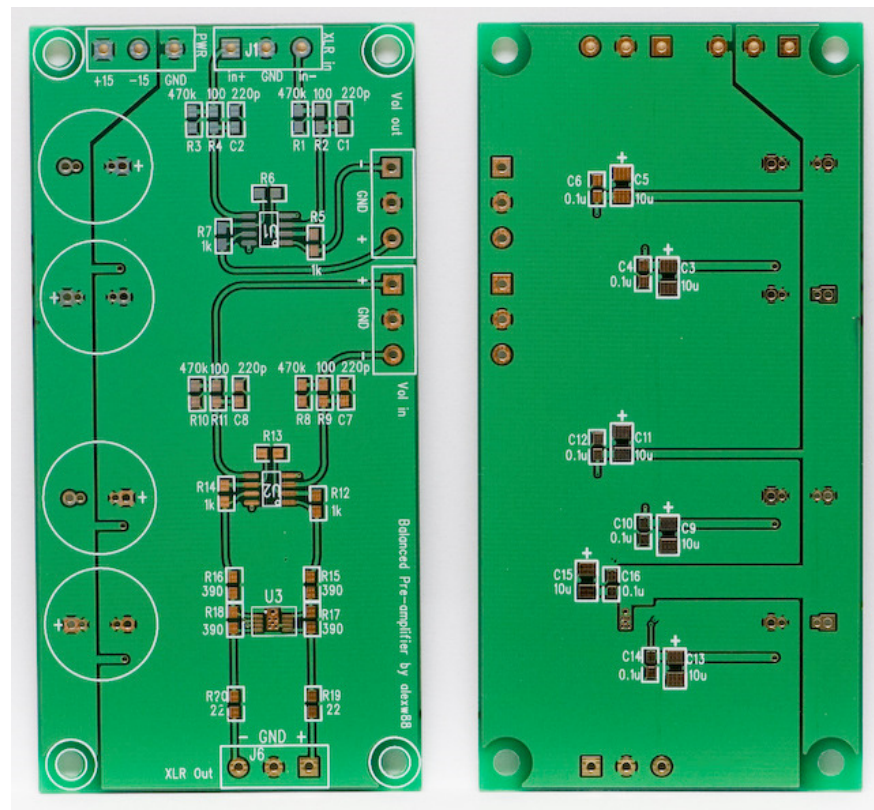
Below is the OPAMP board schematics (click to enlarge):



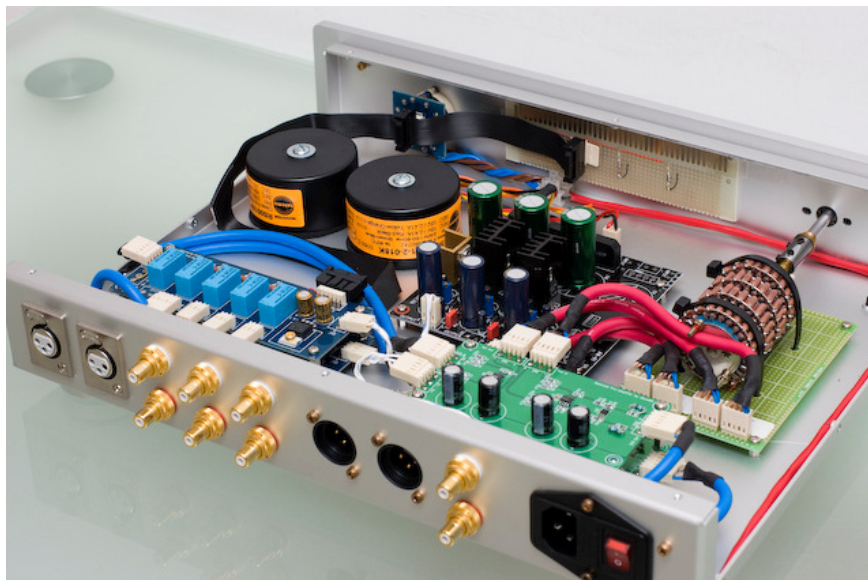
PCB drawing, each PCB is for one channel (click to enlarge):



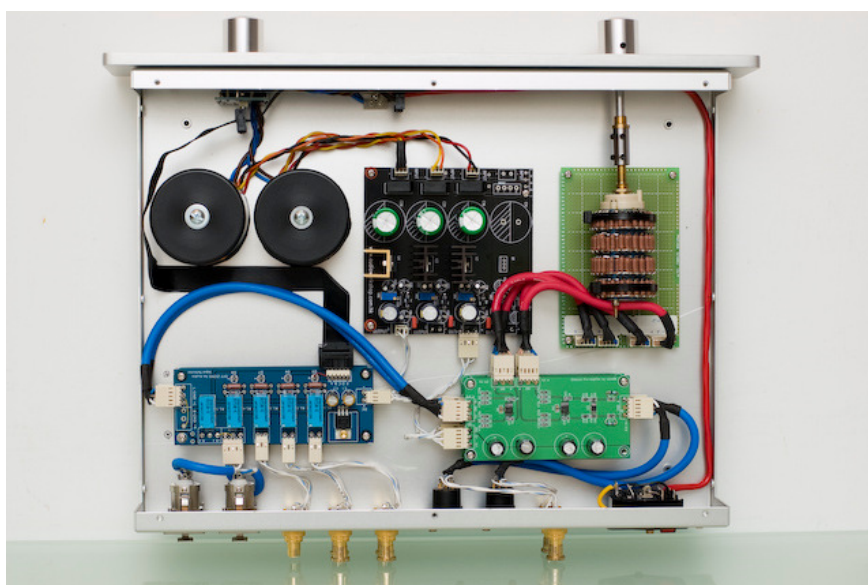
Finished PCB:



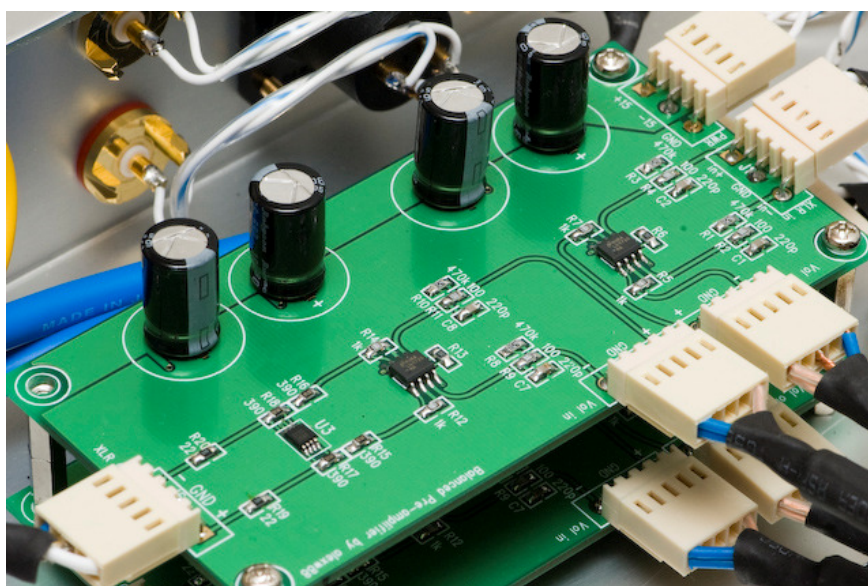
Back View :



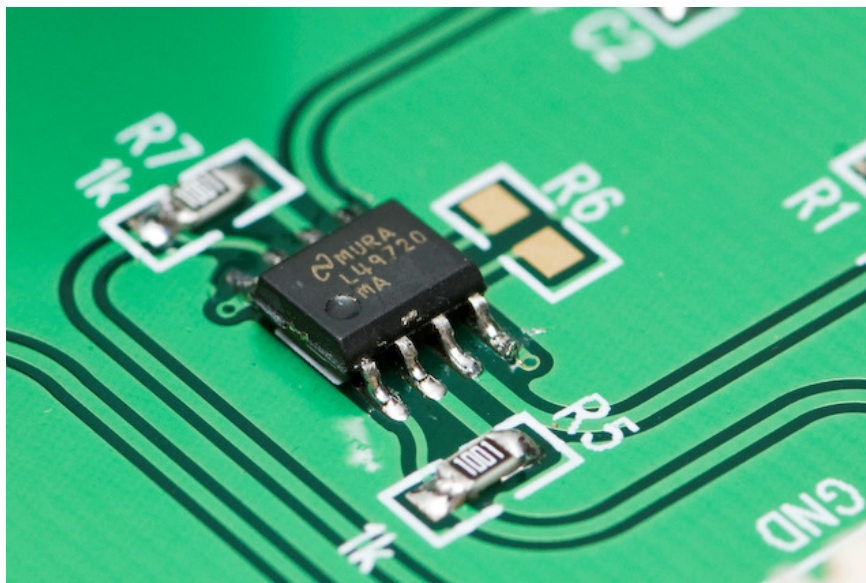
Top View :



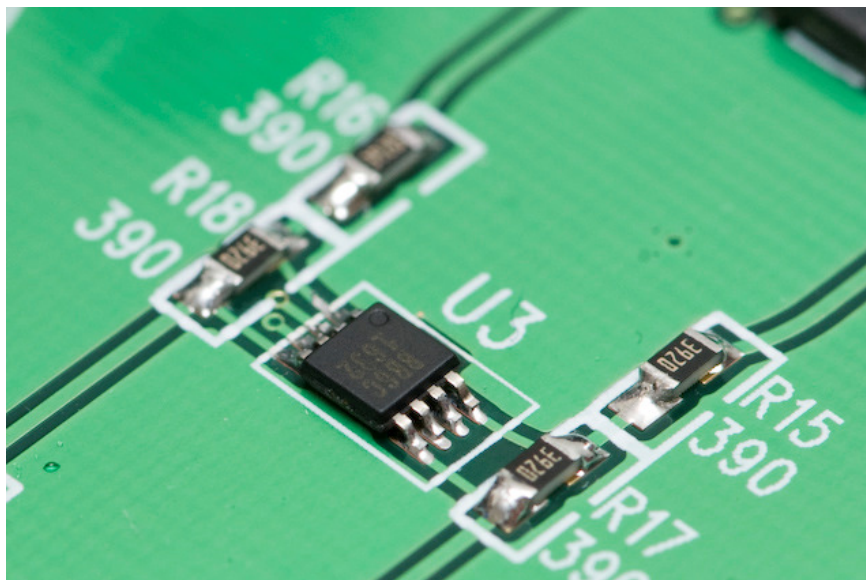
Main amplification board, with gain set to 4 (12dB), i.e. R6 and R13 = 2k



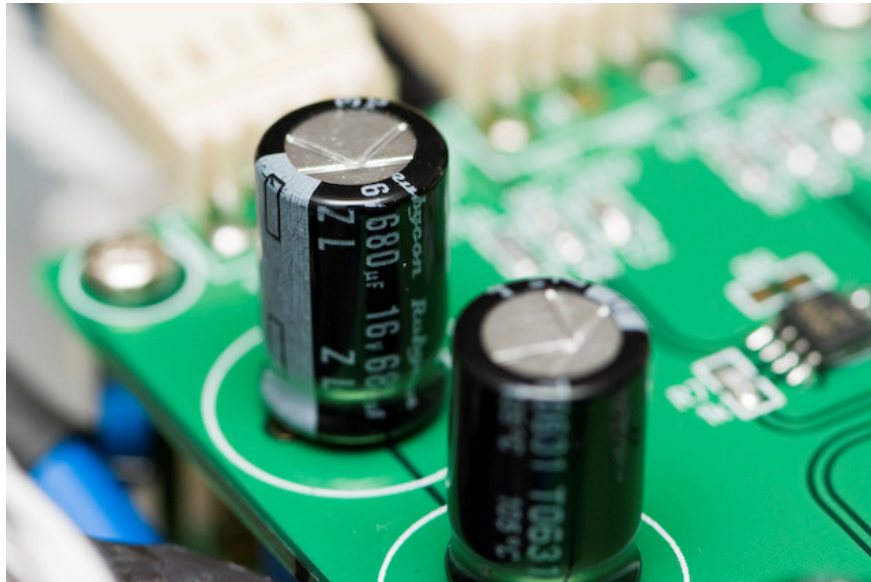
LME49720 high performance dual opamp from National, featuring a low THD of 0.00003% :



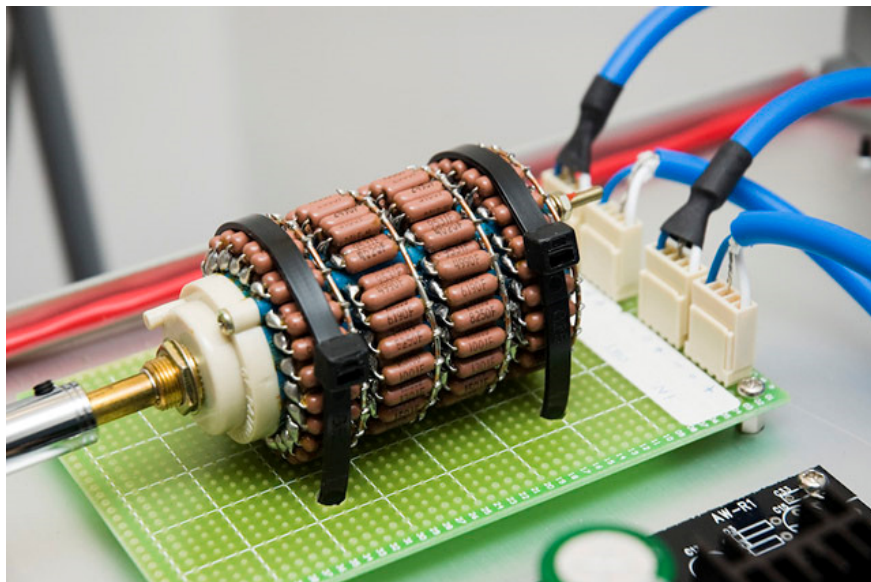
OPA1632 Balanced line driver, features include low distortion of 0.000022%, and low output impedance of 0.3 ohm :



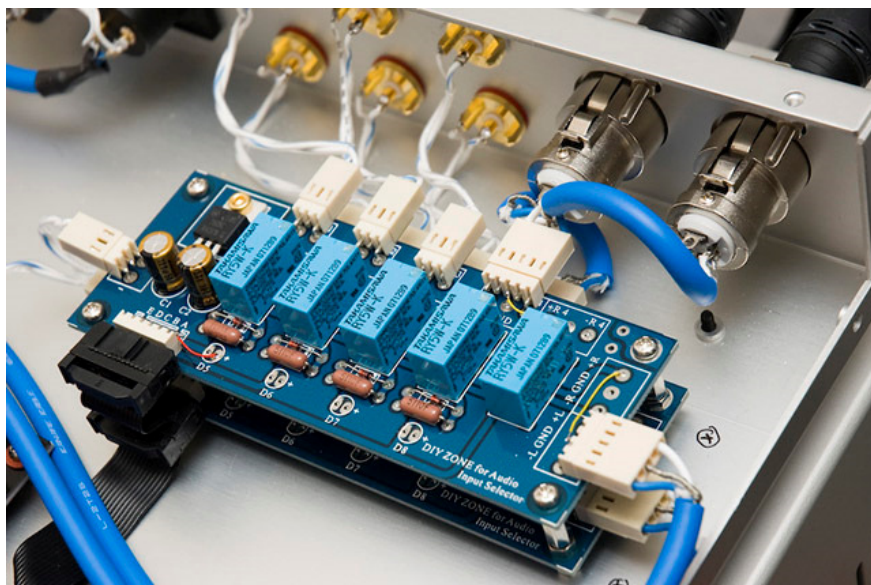
Rubycon ZL 680uF is used for its high ripple current :



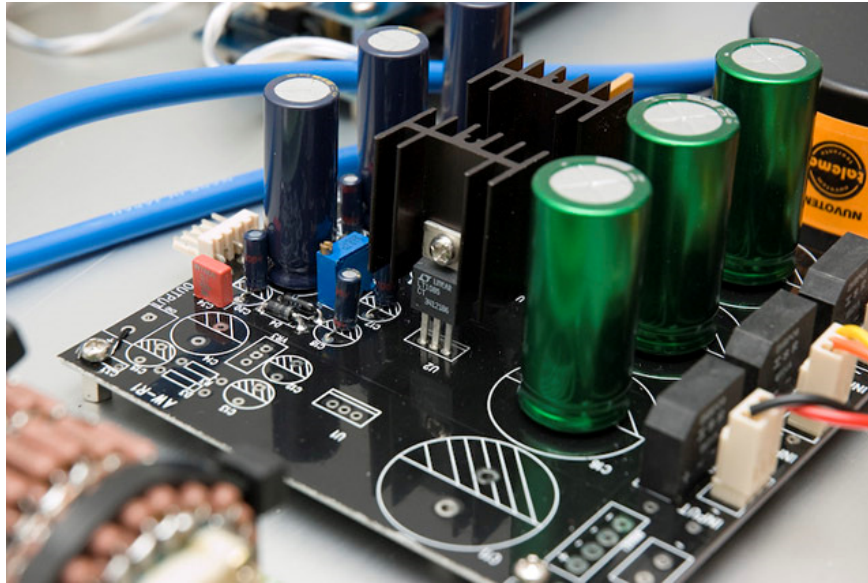
23-steps balanced volume switch with 1% dale resistors :



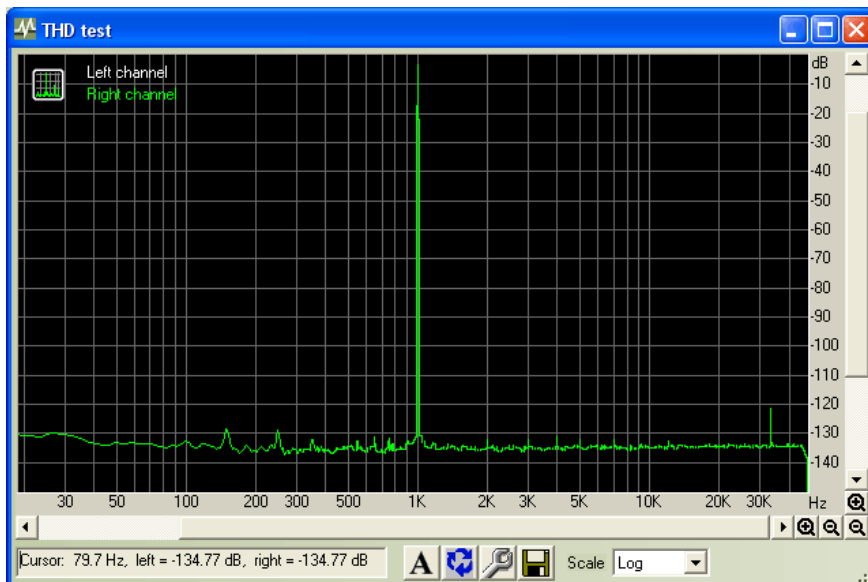
Input selector board, one for each channel, grounds are also switched.



Voltage regulator board, high performance LT1085s are used.



The 1kHz THD measured result are shown below, preamp output is 1.7V peak to peak into 10k ohm. The THD is very low at 0.0002%, 2nd harmonic distortion is at 132dB below the fundamental.



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