There are no translations available.

Introduction

Four years ago, I designed the pcb's for a 20W amplifier based on the LM1875 chip. At the time, I wanted to use them in active speakers, but now found a nice cabinet and decided to build a small and cute amplifier for my PC. It took some evenings of drilling and mounting, but now it is finished: my first chipamp!

Design

As the amp was intended for use in an active speaker, the stereo version has dual transformer, dual supply board and dual amplifier pcb. A schematic of the amplifier pcb is shown next, which is quite straightforward and has only some minor differences from the datasheet, i.e. slightly less gain (24dB) and an extra low pass filter (crossover at 100 kHz) at the input. The supply board is quite conventional with a bridge rectifier, 2x4700uF capacitors and delivers 2x27.4 Volt, slightly more than the 2x25V that is specified in the datasheet (but below max 2x30V)

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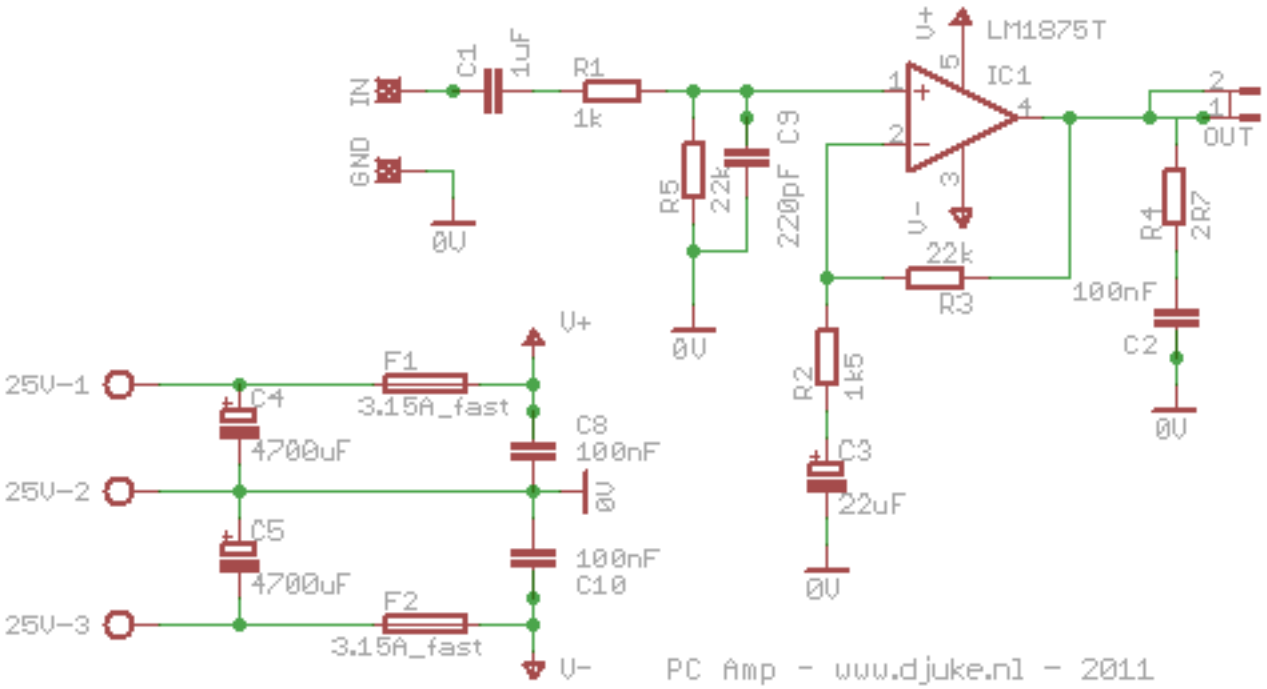

I added a stereo 10k logarithmic potmeter at the input to control the volume.

Layout

A photo shows the physical layout.

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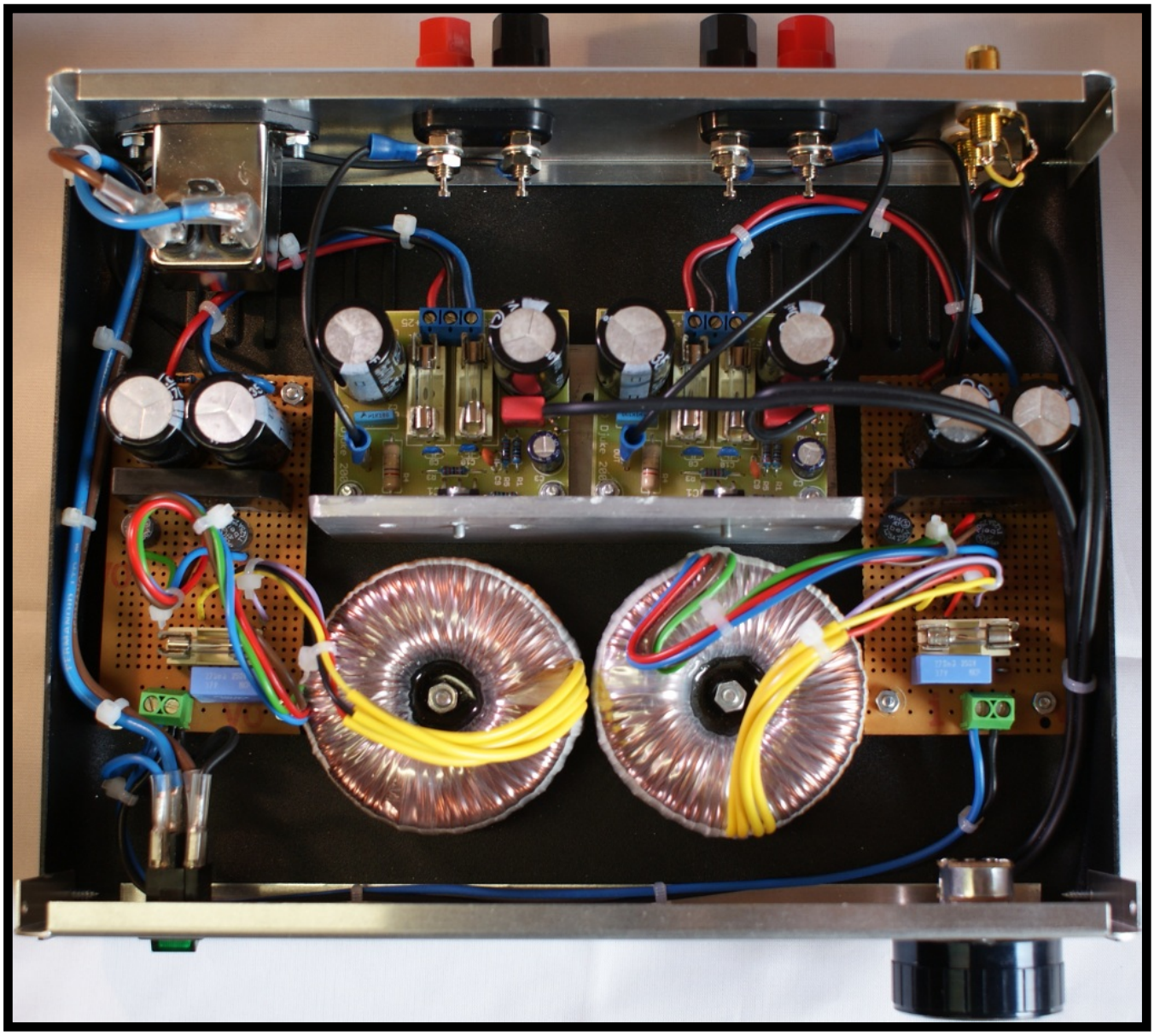

Measurements

Now, the following question remains: how close to the datasheet can we get if we measure the distortion of the LM1875. Measurements are done with my EMU1212m sound card. To reduce the high output levels of the amp, a -18dB voltage divider was used at the output of the amplifier.

The following measurements are performed:

- Without load
- With 8 ohm load

A comparison of the measurements is also done, which shows:

Test	PCAmp - No load	PCAmp - 8 ohm
Frequency response (from 40 Hz to 15 kHz), dB:	+0.04, -0.27	+0.06, -0.42
Noise level, dB (A):	-93.5	-94.2
Dynamic range, dB (A):	93.2	94.0
THD, %:	0.0026	0.100
IMD + Noise, %:	0.023	0.144
Stereo crosstalk, dB:	-92.3	-93.0

Preliminary conclusions:

- Without load, THD is very low at 0.0026%
- With 8 ohm load, THD is (much) higher than the typical 0.015% mentioned in the datasheet
- There is a considerable THD difference between left (0.0773%) and right (0.1230%). As the other components in the two channels are almost identical, the deviations are expected to be caused by the chipamp itself.

Well, this is definitely not as good as hoped for, so to make sure the supply is not causing the distortion, a number of different tests were done with a regulated supply at different voltages (all with 8 ohm load):

- Left channel comparison
- Right channel comparison

Results indeed improved somewhat with lower voltage, but THD remains quite a bit higher than the typical values in the datasheet.

Discussion

A lot of suggestions for improvement were already discussed in the dutch DIY Audio forum, but

until now I expect the chipamp itself to be the source of the distortion. Feel free to add comments if you have further suggestions.

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