

I got introduced to DIY electronics three and a half years ago. The first project was a poweramp. It blows up whenever I try to push it a little. Kind of frustrating.

My second project was a variation of the Bosoz (Twisted pear kit). Wonderful amp.

After that I built more poweramps, a zen lite (balanced) and a small variation of the F5.

All these amps have replaced parts of my main system, except for the first amp which is now only used to drive the TV speakers. The sound quality have improved with every finished project.

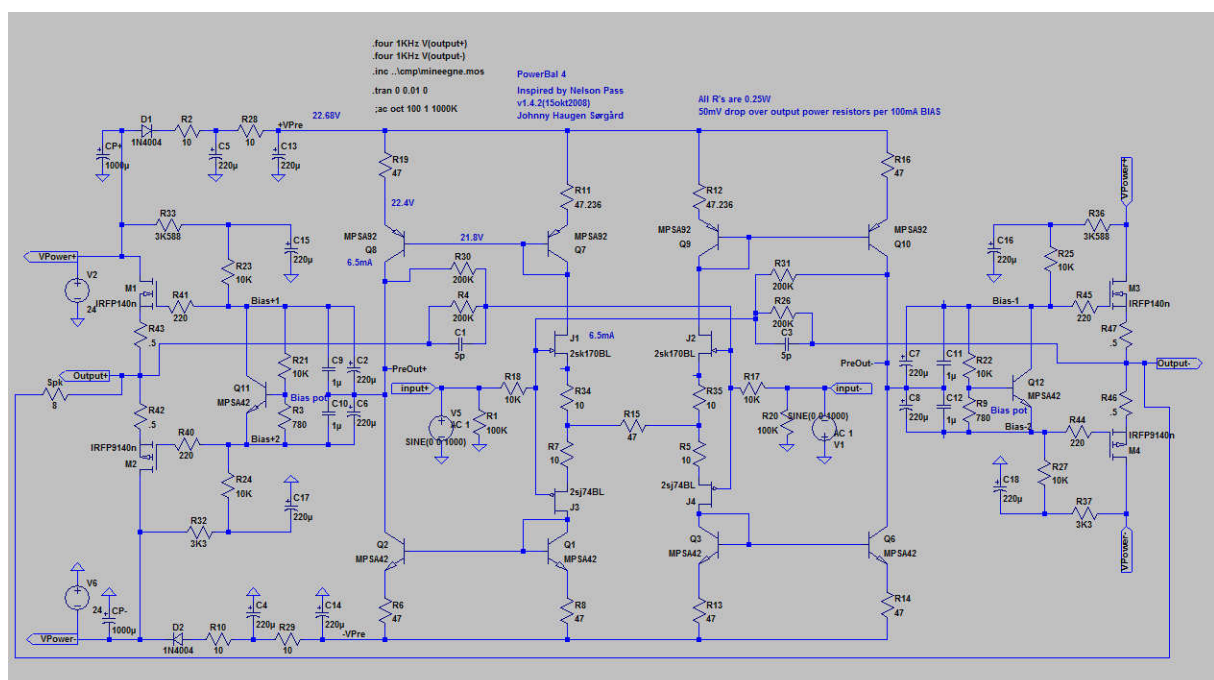
The funny thing is that the small F5 variation is without the currency protection circuit but continues to work flawlessly. I have been running it on my woofers, so while the sound was good I wanted more power.

I have been reading all the Zen articles and following some of the threads on the Pass Labs forum at diyaudio.com. While reading the articles I drew and simulated the circuits with LTSpice. So almost everything I know about electronics are from Nelson Pass's articles. Thank you!

Anyway I needed more power than any of the designs published by Nelson Pass. I wanted somewhere around 100W to drive the woofers. So I have played with many designs. Both single ended and balanced.

For this project I made the following choices:

- balanced design
- follower output and biasing from F4
- UGS front end like Cheff DeGaar uses in both his pre-amp and power-amp AC coupled to the output
- use parts in stock if possible
- design the amp in modules



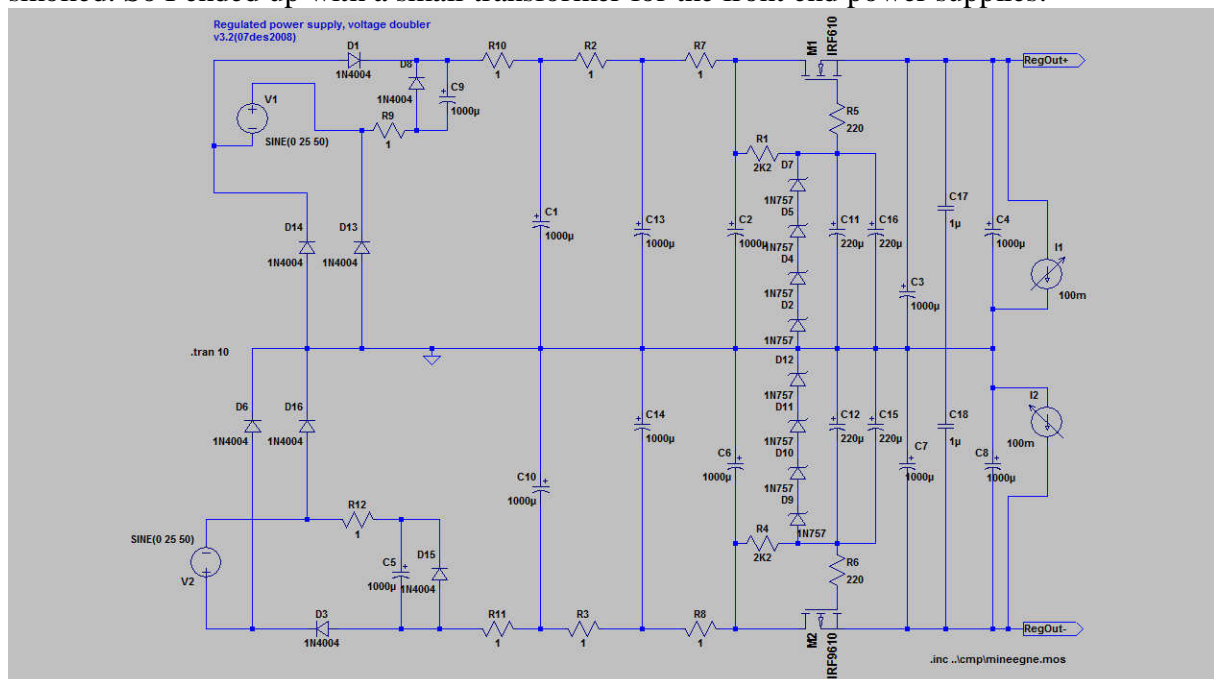
The amp ended up with the following modules:

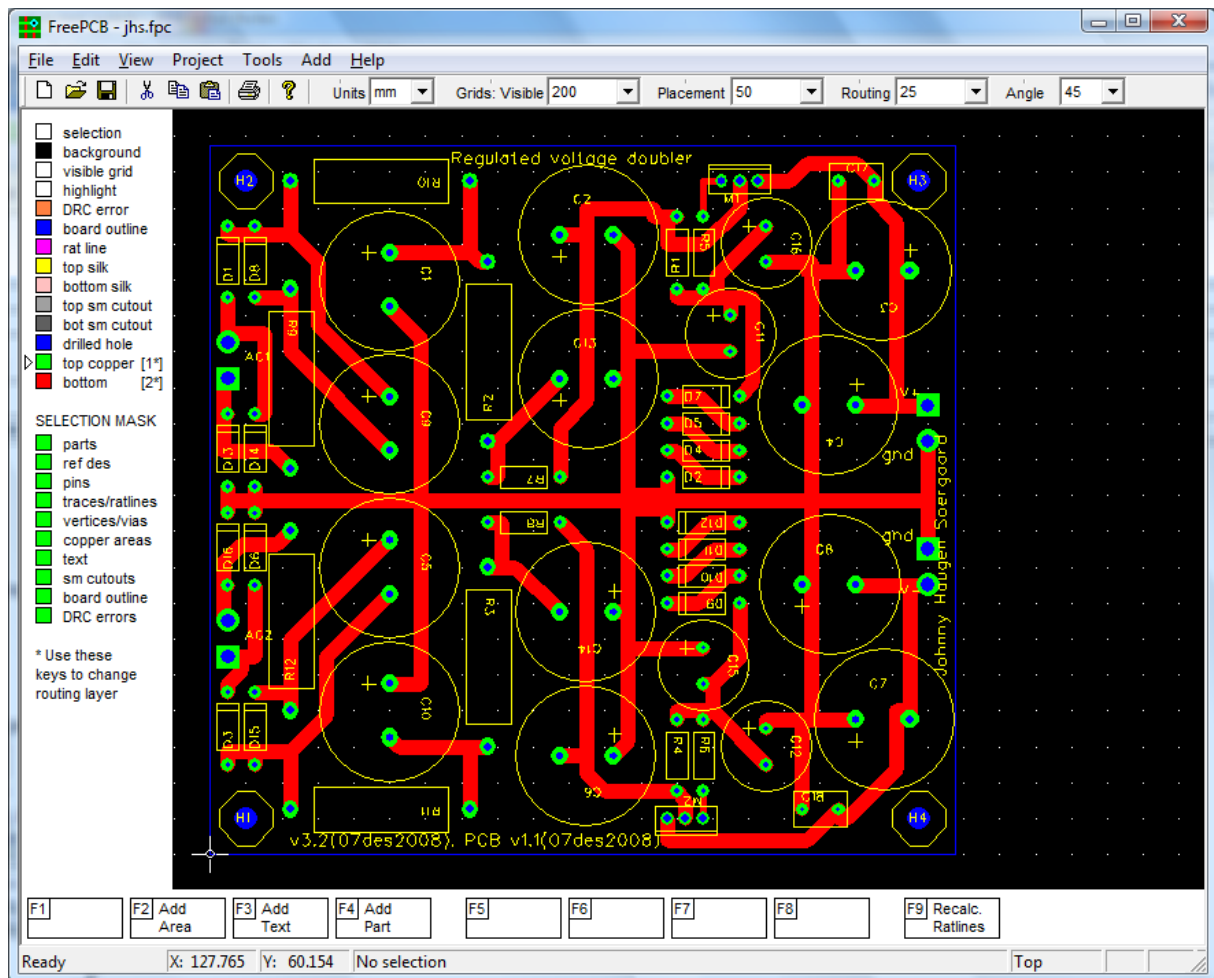
1. Output power supply
2. Front end power supply
3. Output follower module
4. Biasing module with I/O connections
5. Front end module

The initial design was split into the modules, and PCB's drawn.

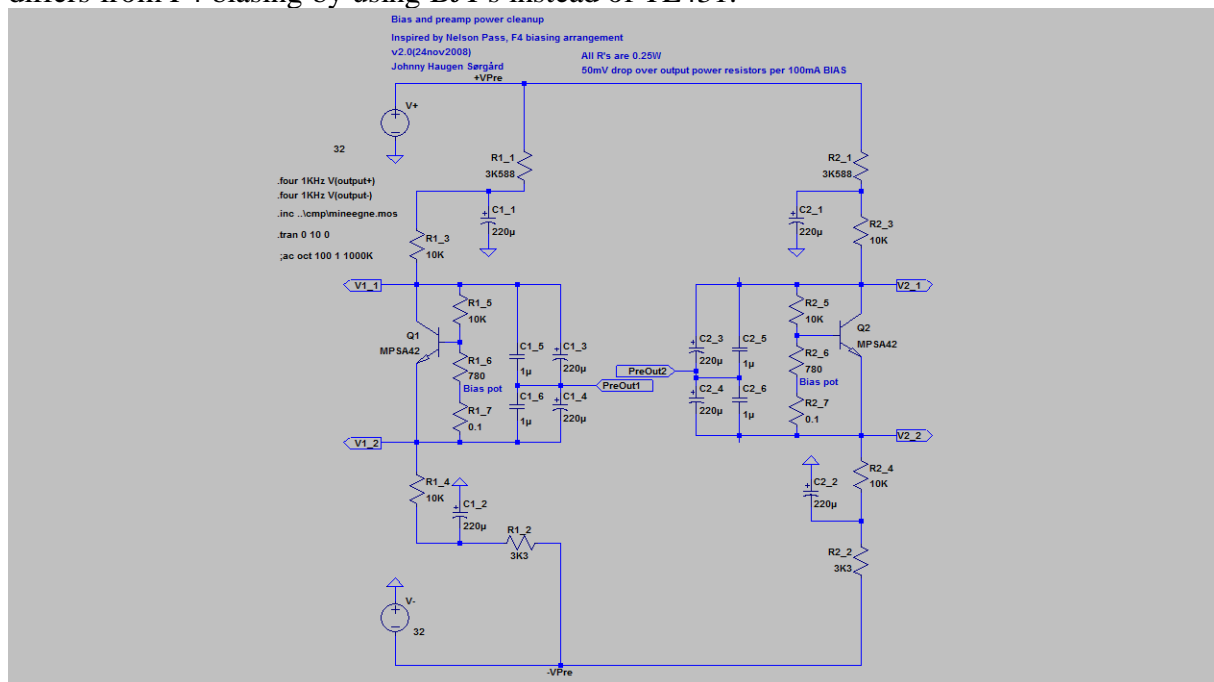
I planned to use the same transformer for both power supplies, so the front end power supply needed a voltage doubler in order to deliver the desired voltage.

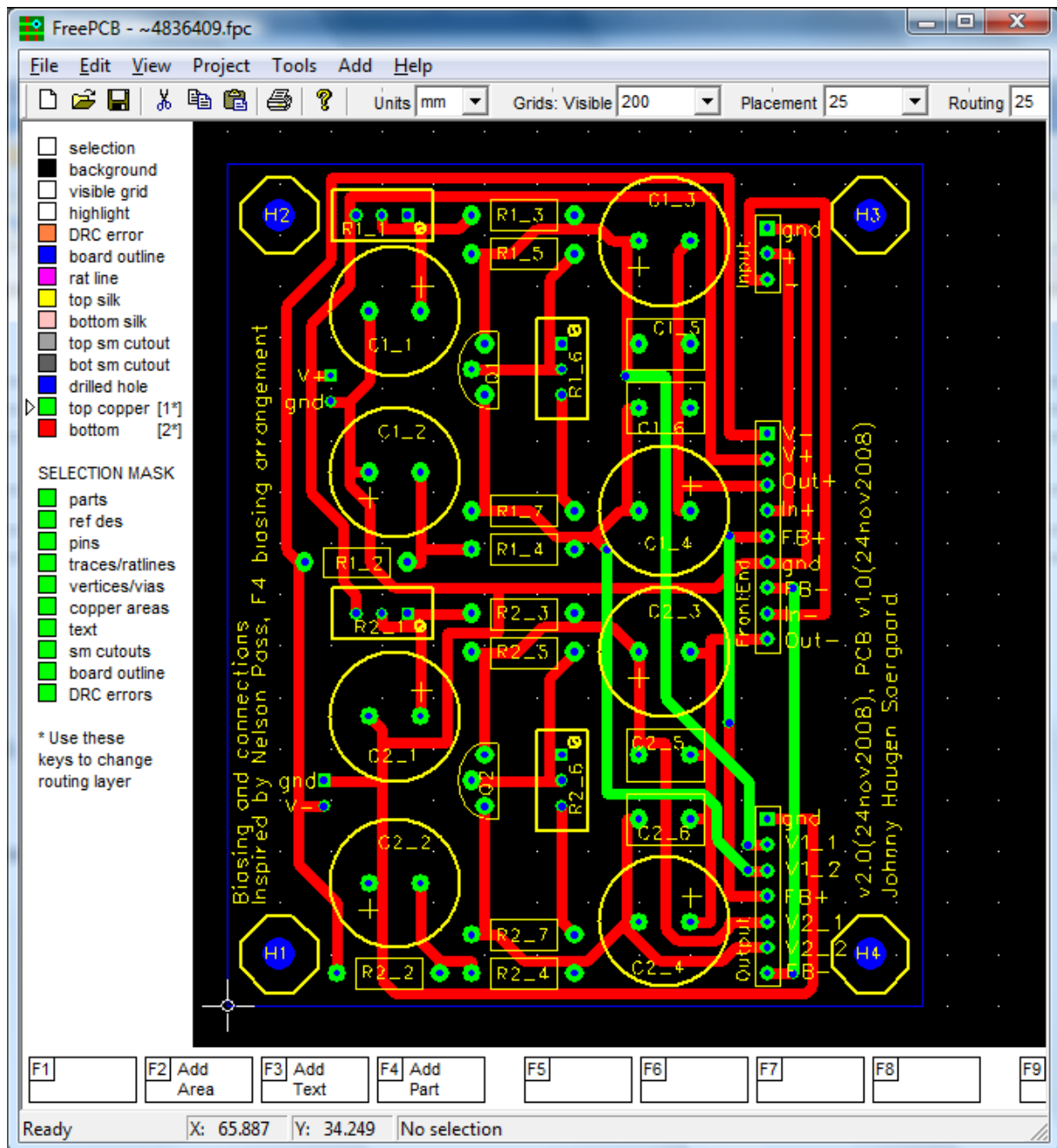
First I built the front end power supply. There was no problems until I hooked up both power supplies and the output follower module. At that time R9/R12 in the voltage doubler section smoked. So I ended up with a small transformer for the front end power supplies.





Then there was the biasing module. No problems there either (at least not for the moment). It differs from F4 biasing by using BJT's instead of TL431.



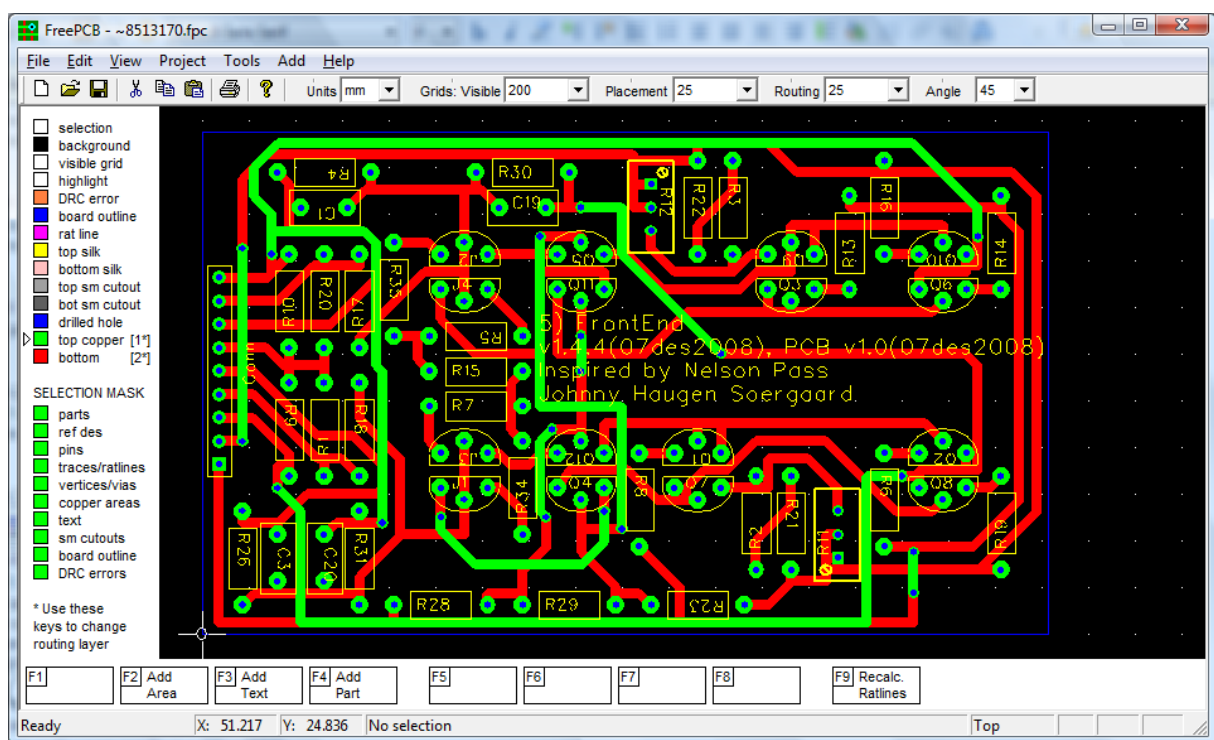
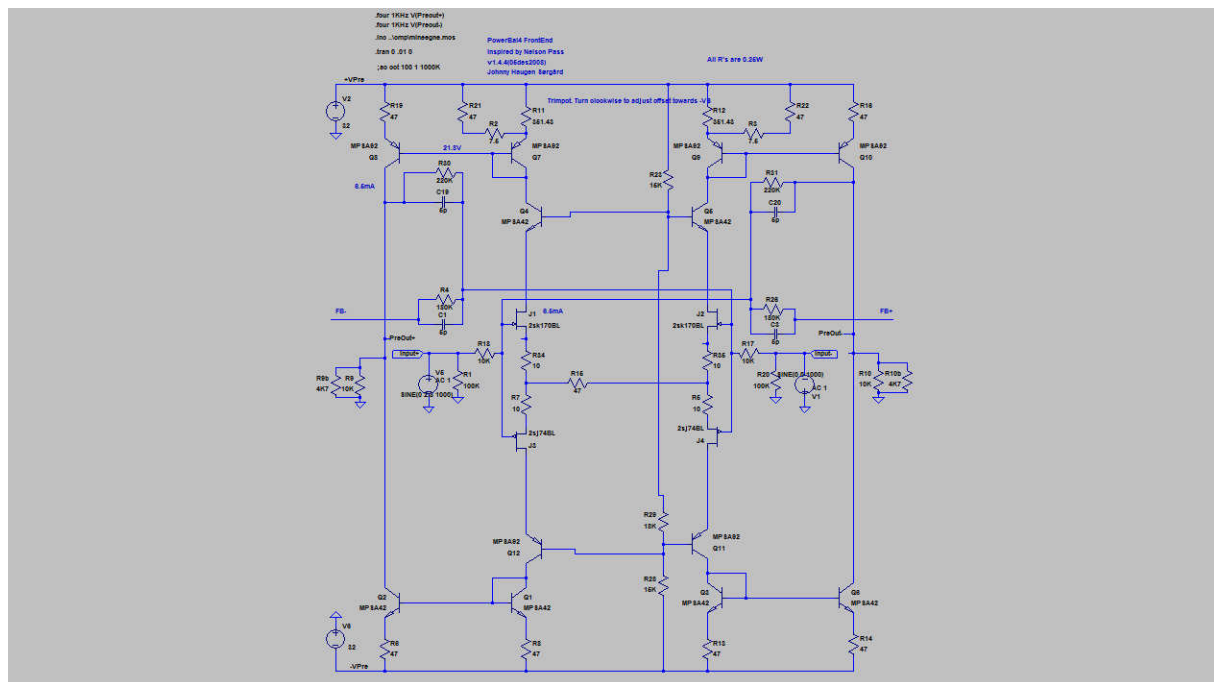


Then there was time to build the front end modules. I had raised the rail voltages on the front end to make sure it would be able to create enough voltage swing.

At this moment I realised that the connector had been turned 180 degrees and the biasing with I/O connector had to be turned.

On the first module I smoked a few resistors when starting the module for the first time. After changing the resistors I started the module very slowly with a variac. The offset was drifting quite much before installing heat sinking to thermally link all the BJT's and JFET's. After that it was just a couple of mV drift.

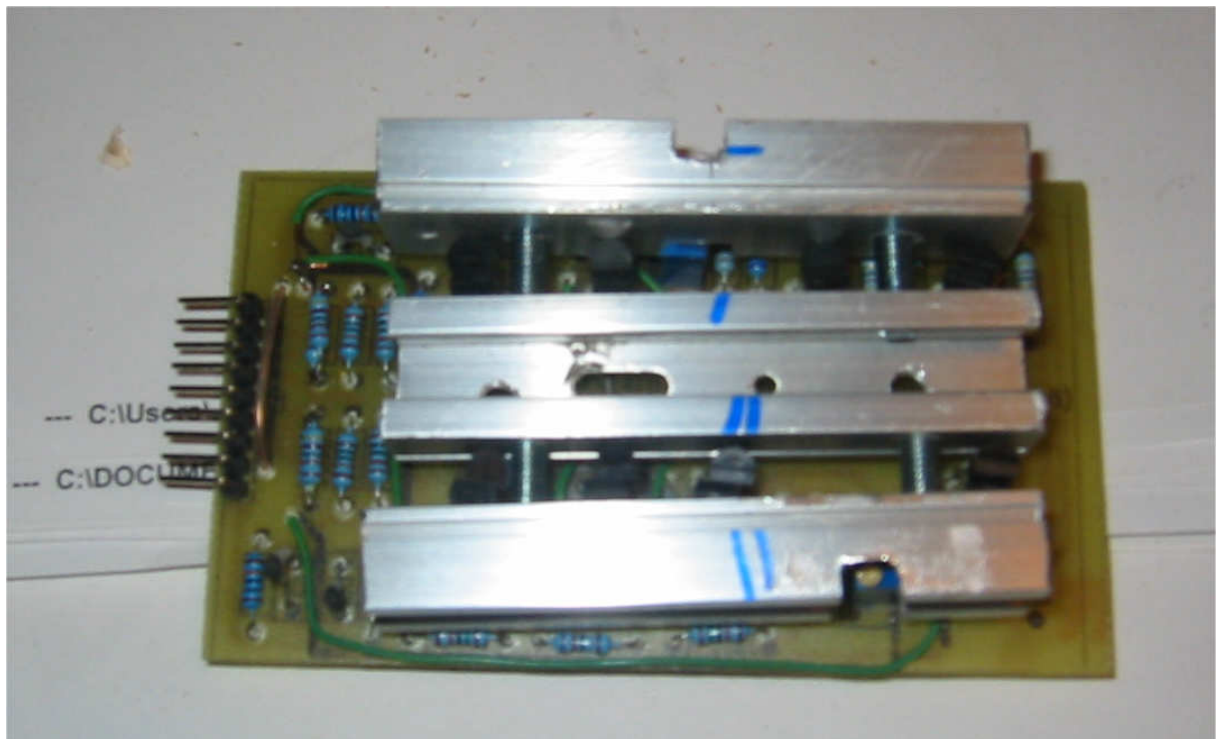
The JFET's used was matched at 8.8mA IdSS.



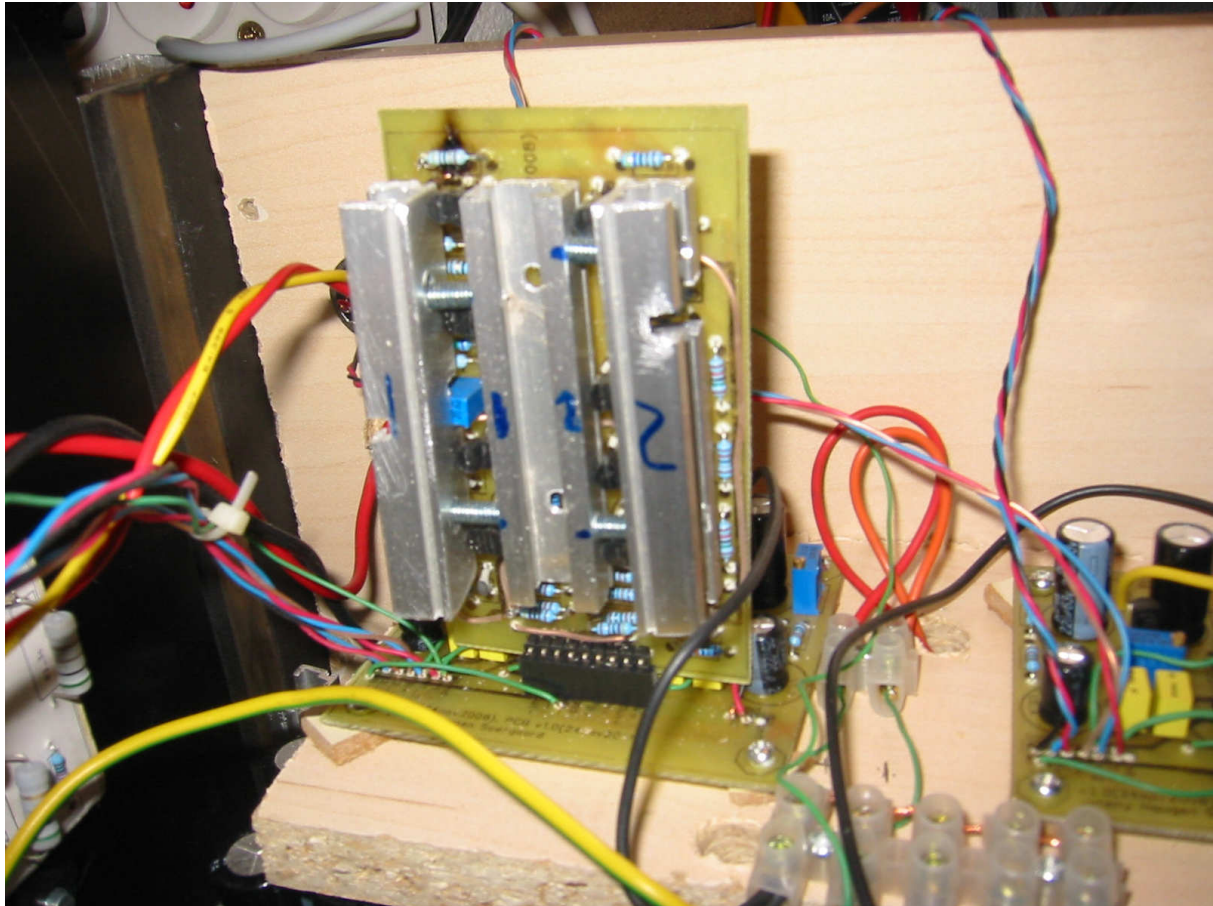
It was time to test the front end. I hooked up my DIY signal generator, which I use together with a computer and Soundblaster USB sound card. The signal generator has both single ended and balanced output and I have built a balanced to single ended converter so that I can feed the computer soundcard with a signal it likes. I also had to install a potentiometer at the input of the balanced to single ended converter. The sine wave generator is far from perfect and gives something like 0.01% THD at best.

I measured the AC voltage at the output of the front end:

AC volt RMS	Right channel THD	Left channel THD
8	0,03%	0,03%
16	0,07%	0,06%
20	0,11%	0,09%
24	0,15%	0,14%
28	0,22%	0,18%
32	0,29%	0,24%
36	0,41%	0,32%
40	0,59%	0,44%
44	1%	0,83%



Illustrasjon 1: One channel front end module with heat sinks installed.



Illustrasjon 2: Front end module installed into the biasing module.

The output power supply was straight forward, almost identical to the FirstWatt supplies.

