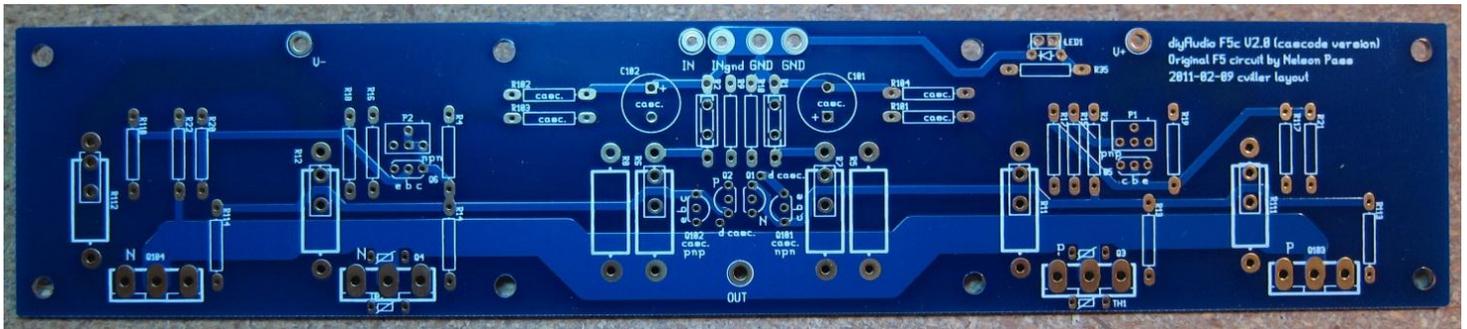


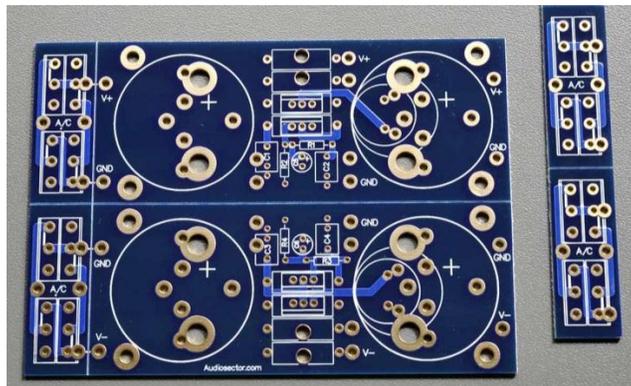
I thought I would post some comments and photos on the construction of an F5 turbo my son and I completed about a month ago. The amp currently is up and running. We had built the F5 previously and had many components remaining, just waiting to be used in a project. When the F5 turbo discussions began, we decided to go for it, mainly to be able to power 4 ohm speaker columns. We certainly are NOT experts, but had greatly appreciated the photos documenting previous F5 builds for our first project, especially the work of 6L6. Thus, we hope these notes *that show our mistakes, misconceptions* and successes might assist a beginner in building their first amp or, at least, first F5turbo. This record was made as we went along during the build, and has been assembled and edited for this thread.

We chose the F5c V2.0 (cascode version), cviller (Christian Viller) layout boards from the DIYaudio store for the amp with 4 MOSFETs per channel, cascoded JFETs, with plans for about 34 VDC rails. We chose not to incorporate diodes that would bypass MOSFET source resistors at high power, as are described on various versions of the F5 turbo, and such diodes are not included on these boards, regardless.



The board is made for several options, and the parts list on the DIYaudio store (at the time we purchased the boards) was not completely accurate, but I understand has since been fixed. DIYaudio and Christian were both very responsive and helpful in getting things sorted out. We also received helpful advice on threads.

We had used Peter Daniel's universal power supply PCB previously (Peter's photo, below) and had extra boards left over along with some extra 4-pole Jensen 33,000 uF 40 V caps. While Peter's board was designed for 3 pin rectifiers like the MUR3060, we chose to use bridge rectifiers we already had (GBPC3502, 200 V, 35A), which we had used with the F5. BTW, Peter had been extremely responsive and helpful on our F5 build.



For an enclosure, we picked up a black anodized aluminum case from johnango on ebay. 5.25 X 11.5 X 17 inches with 2-inch fins on the heat sinks. We had built our own case around some purchased heat sinks when we built the original F5, but decided to splurge a bit and buy a pre-made case for the turbo.

<http://is.gd/EK07yp>



The top, bottom, front, and back easily come off with a few machine screws to allow easy fabrication. While it arrived anodized, it was not a high quality anodization, containing light areas and a few missing areas of oxidation, and it was clear that we would want to re-anodize the sinks after working on them and probably powder coat the rest of the case before final assembly.

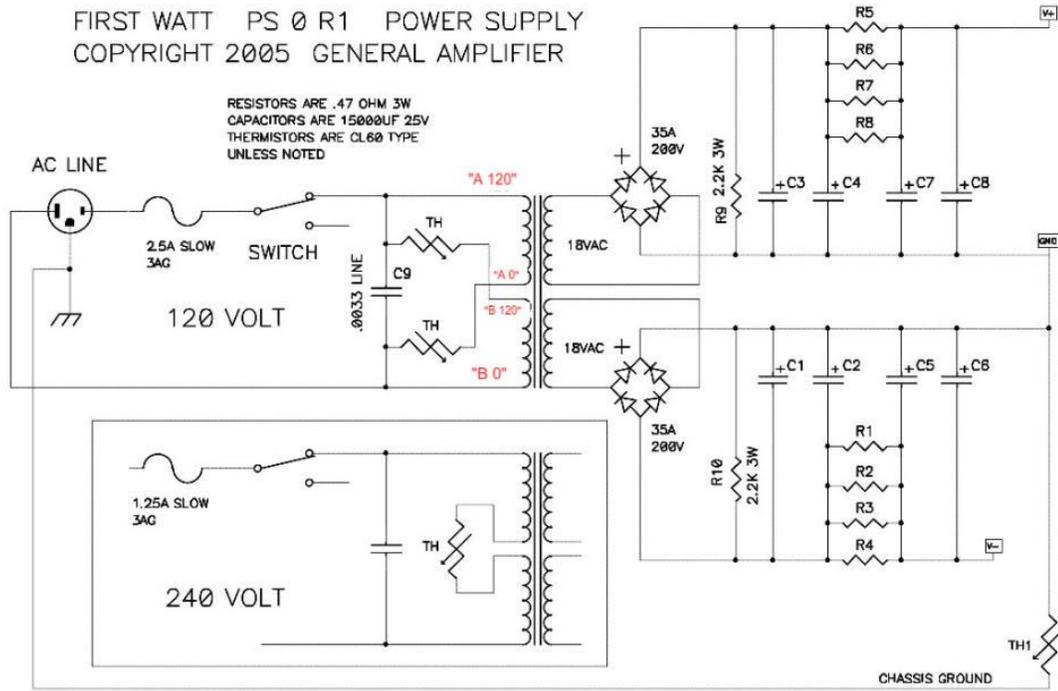
Finally, we had a 400 VA toroidal power transformer with 2 X 24VAC outputs we had purchased from PLITRON Manufacturing Inc in Toronto.

<http://www.plitron.com/>

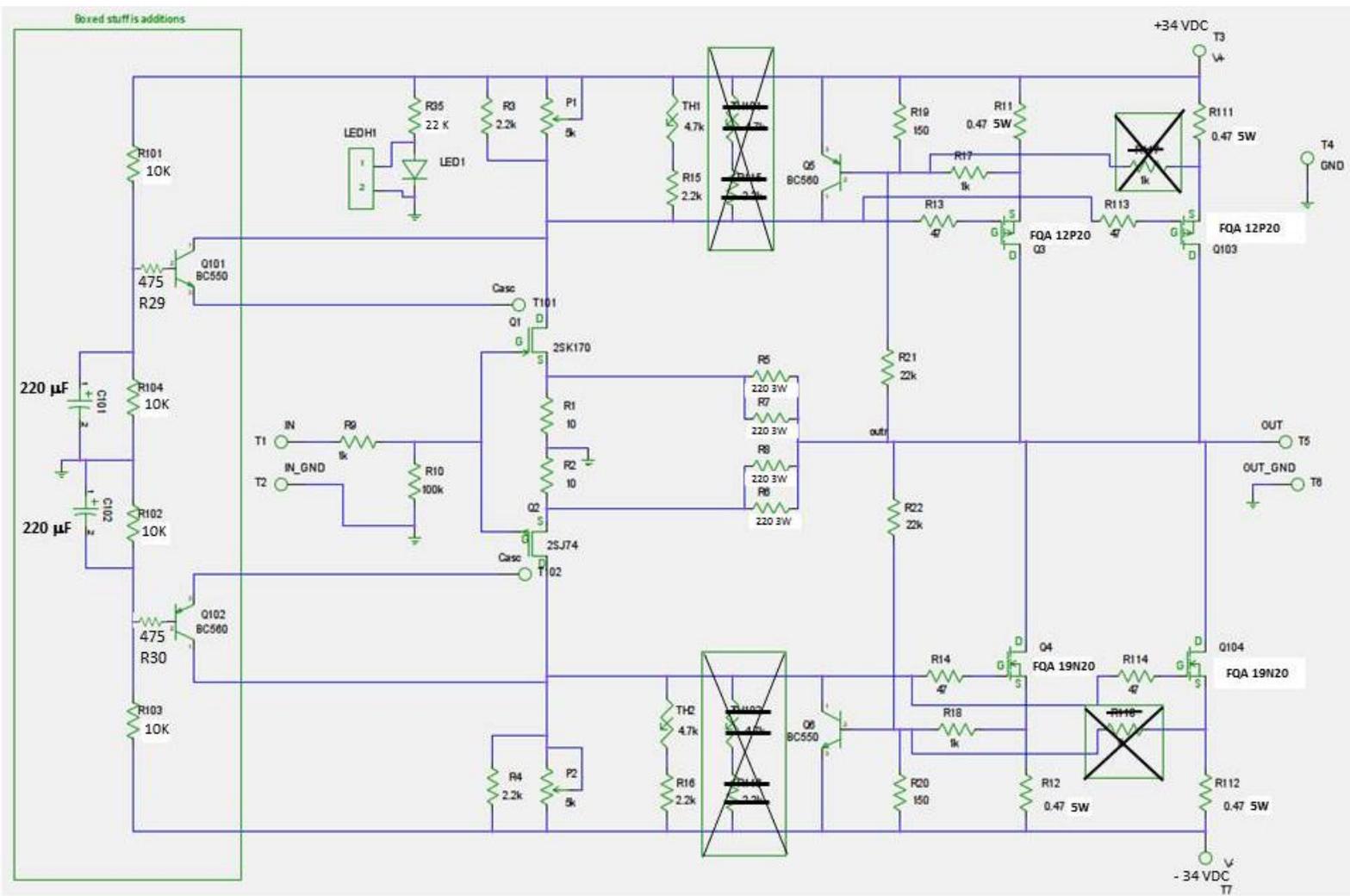
Nelson Pass' generic PS schematic, below, reflects the general layout we used with Peter Daniel's boards, with some modifications. That is, we are using a 400 VA transformer with 24 VAC secondaries (not 18 VAC as shown in the schematic); R1-R8 are 0.47 ohm 5W; we are using 4 of the Jensen 33,000 uF 40 V caps rather than the 8 caps shown on the schematic; the 2K2 bleeder resistors are 5W, but don't need to be (it's what we had around); and the fuse will be 3 amp slow-blow (rather than 2.5A as shown). CL-60 inrush current limiters are used on both sides of the primary as shown in the schematic (TH). Again, we used 200V, 35A bridge rectifiers. We also use a CL-60 between the case ground and the PS ground.

FIRST WATT PS 0 R1 POWER SUPPLY  
 COPYRIGHT 2005 GENERAL AMPLIFIER

RESISTORS ARE .47 OHM 3W  
 CAPACITORS ARE 15000UF 25V  
 THERMISTORS ARE CL60 TYPE  
 UNLESS NOTED



Below is the cviller board schematic available for the boards we purchased at the time that we modified to reflect our build.



R6-9 have been changed from 100 ohms to 220 ohms (3W) in order to increase gain over the standard F5.

The 0.47 ohm resistors on the sources of the MOSFETs (R11, R111, R12, & R112) have been increased from 3W to 5W. If need be, we could have gone parallel 1 ohm, 3W resistors, but we didn't need to. Nelson Pass has noted that if there is difficulty in maintaining a steady offset on speaker terminals with a shorted input signal, that these can be upped to 0.68 ohms without significant loss in performance.

R35 was dropped to 22K ohms to provide for brighter LEDs that we mounted in the front of the case.

Q101 and Q102 are the cascoding transistors that control voltage from the rails to the JFETs (Q1 and Q2). The voltage to the bases of Q101 & Q102 should be about 17 volts, which is about ½ rail voltage. Thus, the voltage divider circuits on the left uses two 10K resistors for each transistor, providing about 17 volts to the base. We simply used 10K rather than the 4.7 K found in the original schematic simply because we had them. Either would work fine, of course, as long as all four were 10K or all four were 4.7 K. Without cascoding, we would exceed the recommended voltage tolerance of the JFETs, and while they could probably tolerate it, they could become warm enough to require heat-sinking. Thus, cascoding removes this problem. The amp board has been made so that the source of Q1 and Q2 can be placed in two different holes, depending on whether cascoding is being used. Close-ups of this later. We had extra matched Q1 and Q2 remaining from our build of the F5. From what I have been reading, these may be difficult to find now, but I may not remember correctly.

R29 and R30 were added to the circuit between the voltage dividers and the base of the cascoders since this has been stated by Nelson to prevent oscillations that can affect output quality of the amplifier. Adding them involved scoring the amp boards and soldering them to the underside, as shown later.

The size of C101 and C102 (10 or 220 uF) is not important, and both have been used without problems. They simply filter any fluctuations in rail voltage to ground. We had 220 uF and so chose those.

Various output MOSFETs can be used. We used FQA19N20 and FQA12P20s that we had purchased and had matched previously.

This continues in Part 2.