FENDER BANDMASTER REVERB TFL5005D RESTORATION

February 2025

Fender Bandmaster Reverb TFL5005D

Chassis number A36911:

Power transformer:

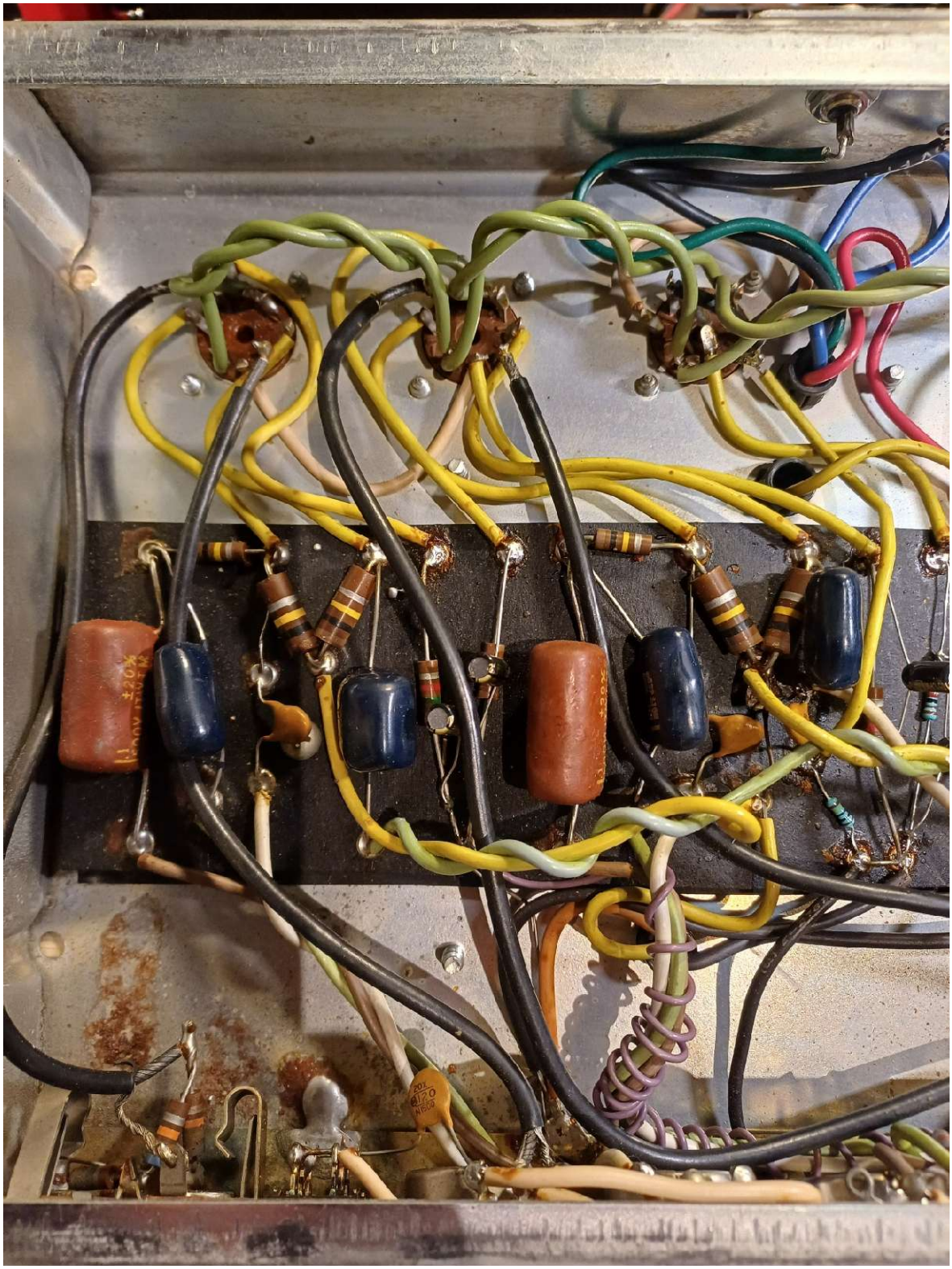
Output transformer:

Choke:

The date codes on the transformers and choke:

- Power transformer: Schumacher EIA 606 3-20 ⇨ 20th week of 1973.
- Output transformer: Schumacher EIA 606 1973 ⇨ 19th week of 1973
- Choke: Schumacher EIA 606 0173 ⇨ 1st week of 1973

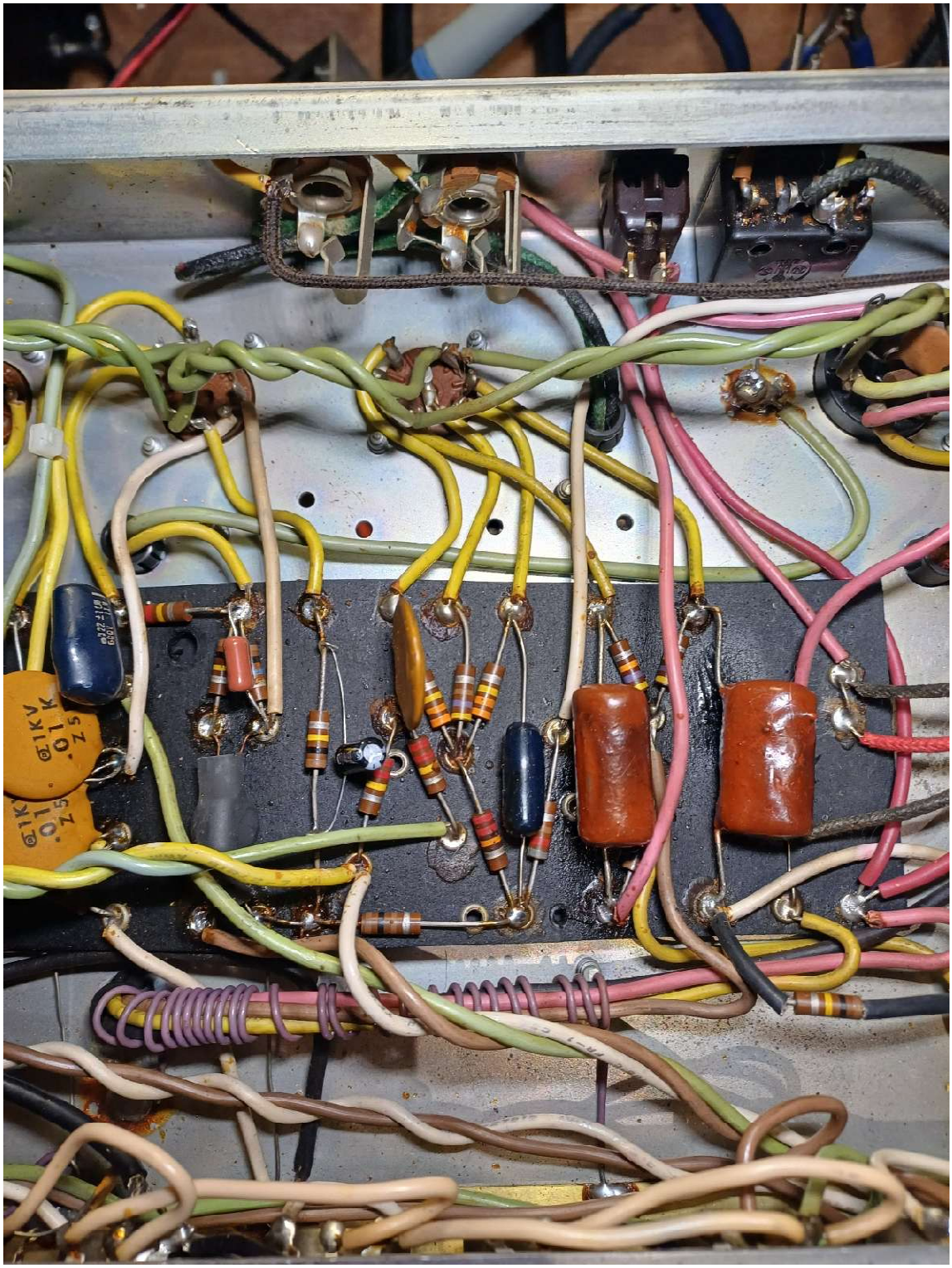
Before the work. Input side:



This is the inside of the chassis at the input side (normal channel inputs on the bottom left). A couple of things to note:

- Superficial rust near the input jacks. Probably the result of fluid spillage at some point in the amp's life. There is also significant rust build-up between the brass plate and the inside of the chassis front (pictures below).
- Sloppy heater wiring, excess lead length.
- Lots of dirt on the eyelet board: flux residue, dirt accumulation in the wax on the board and the components.
- Some components have been replaced before: the cathode decoupling capacitors, the reverb transformer, two resistors (2k2 cathode resistor and 1M grid leak resistor on the reverb driver).

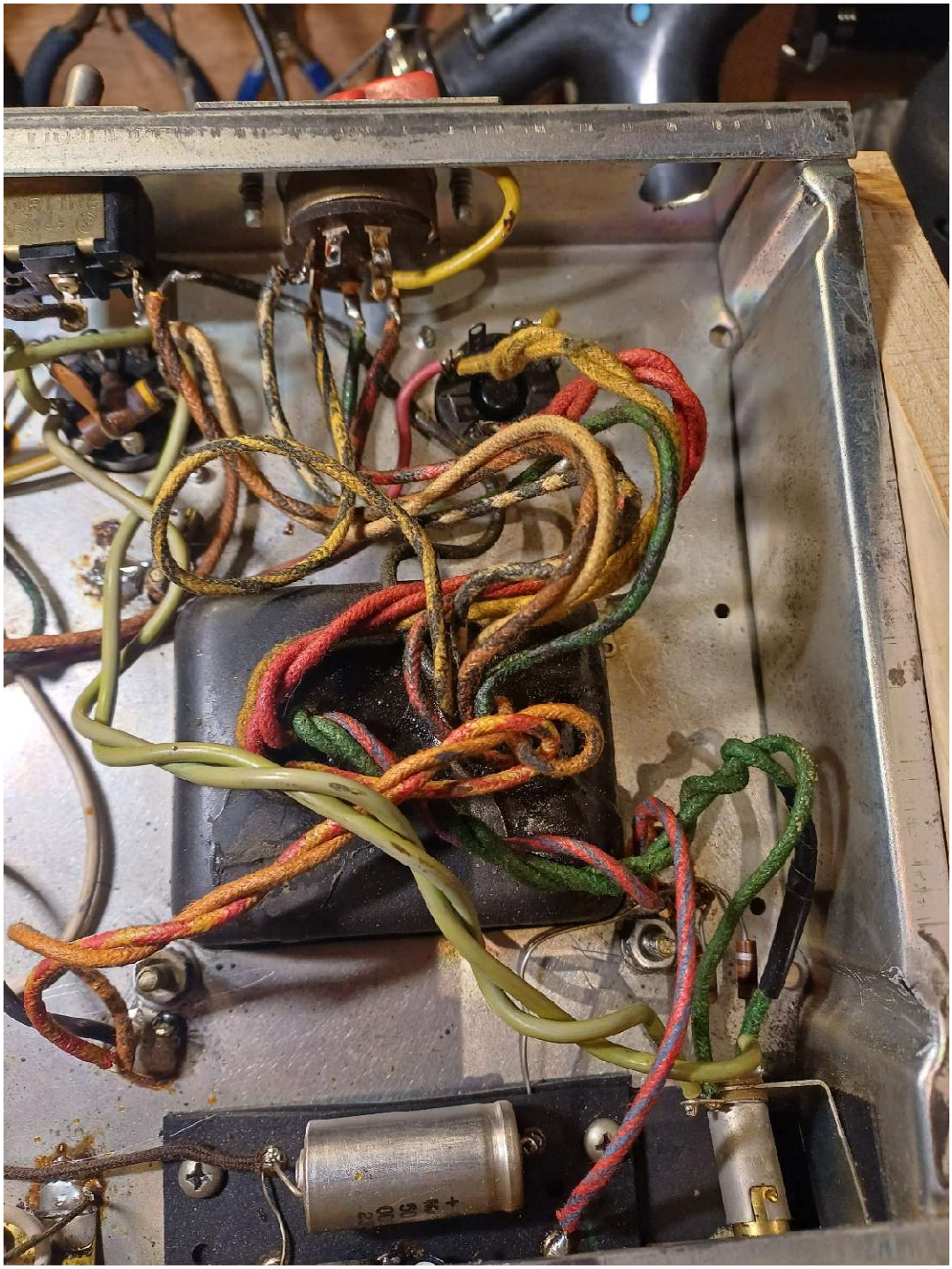
Phase inverter:



Again note:

- The sloppy wiring and dirty board and components.
- The rather silly purple ‘shielding’ wire, connected to ground at both ends…
- The phase inverter’s 330k grid leaks and 10nF ceramic coupling caps, which are a variation on the earlier AB763 design (1M and 1nF values)

The power supply:

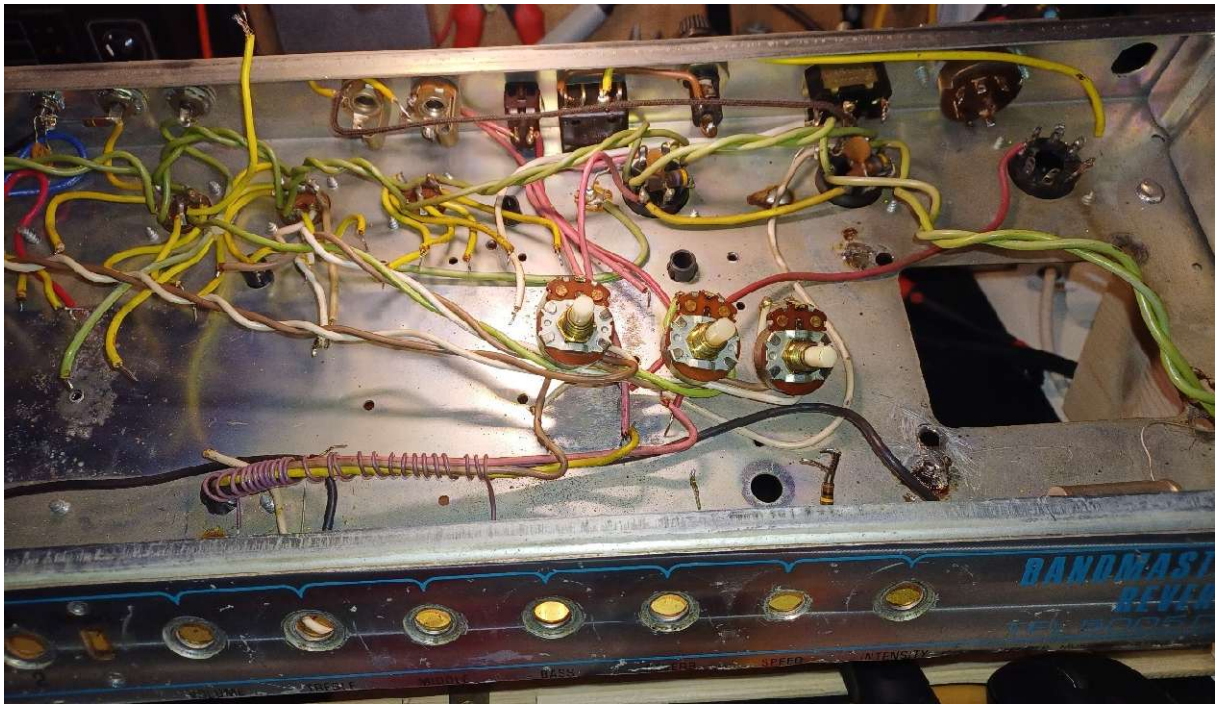


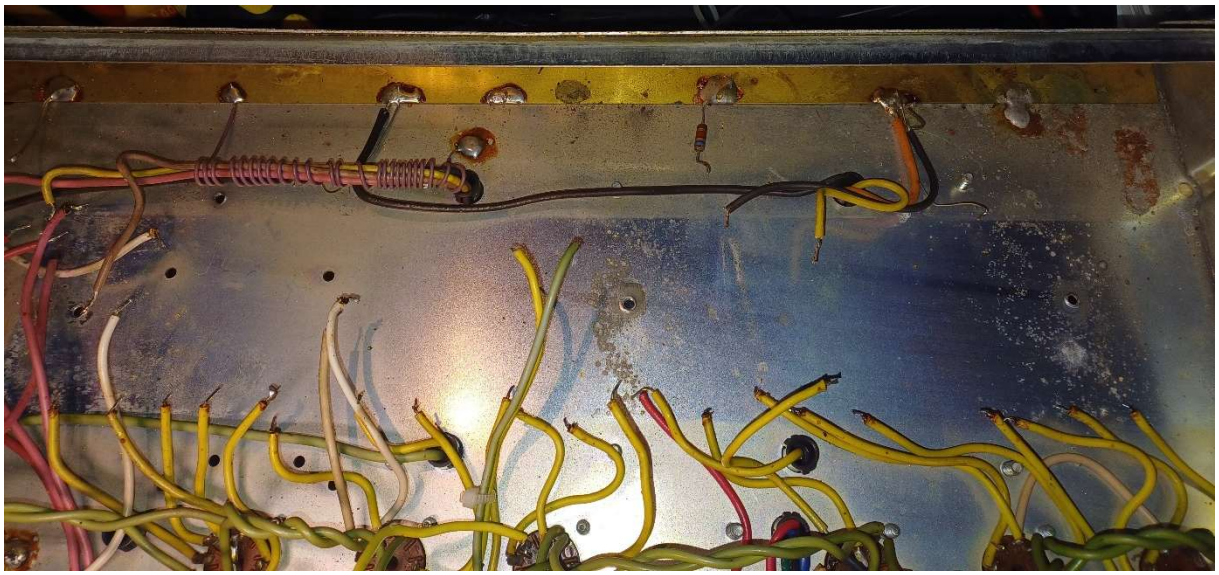
Someone loved wire chaos. The loose wire on the transformer primary tap is my doing (forgot to take a picture first). Other things to note:

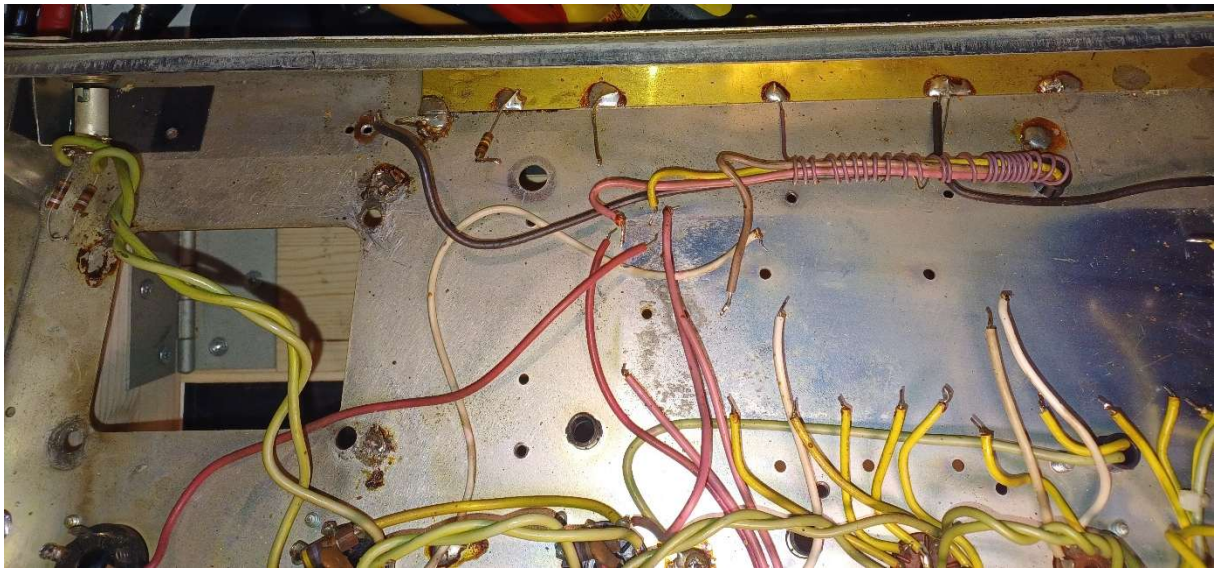
- The input voltage selector switch is still in circuit, which it shouldn't be. The switch, like most in amps that old, looks retired. Since mains voltage is present on this switch, I will desolder the unnecessary primary taps, effectively taking the switch out of circuit, isolate and bundle the unused wires, and connect the 240V tap into fixed position. The switch can stay for cosmetic reasons.

- The PT's heater wires go to the pilot light first. That is not very sensible, because now you need an extra length of cable to direct the full heater current across the chassis to the tube sockets. A better option would be to connect the PT heater wires straight to the 6L6 sockets and have a lighter gauge wire go from there to the pilot light. I won't send this wire over the top of the PT, but rather along the side of the chassis.
- The transformer mounting nuts/bolts double as a chassis ground. They come loose. They *were* loose in this case as well.
- I've already removed the power cord in this picture, but the earth connection was not solid at all. It was tack-soldered to the upper left PT mounting bolt and ground lug.
- One of the transformer heater wires is taped. Probably burnt isolation. I will remove the tape and put some heat shrink on it.
- The negative raw bias capacitor is still original. It has to go.
- The carbon comp 470Ω 1W screen stoppers are still ok, but I will replace them with modern 3W resistors.
- Cracked solder joint from brass plate to chassis (lower left corner)

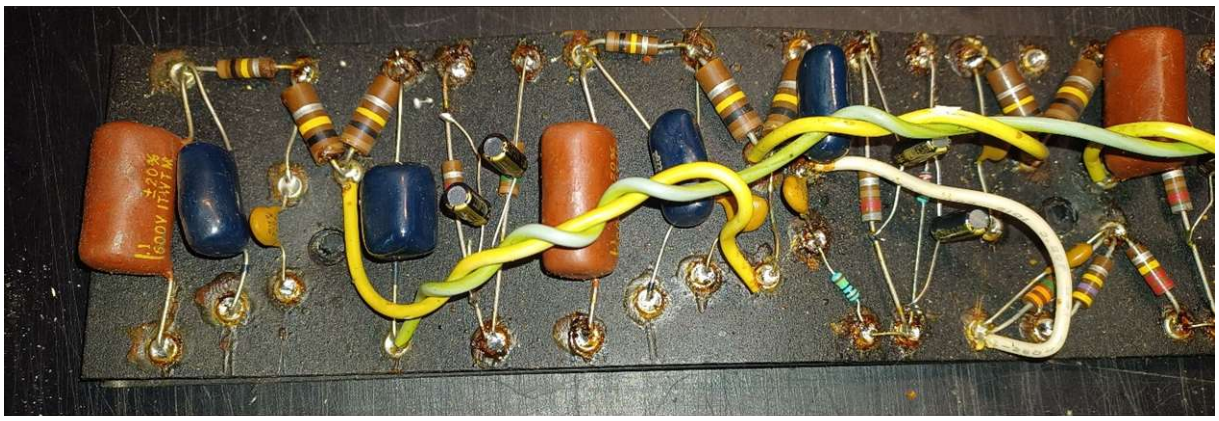
Taking it apart:

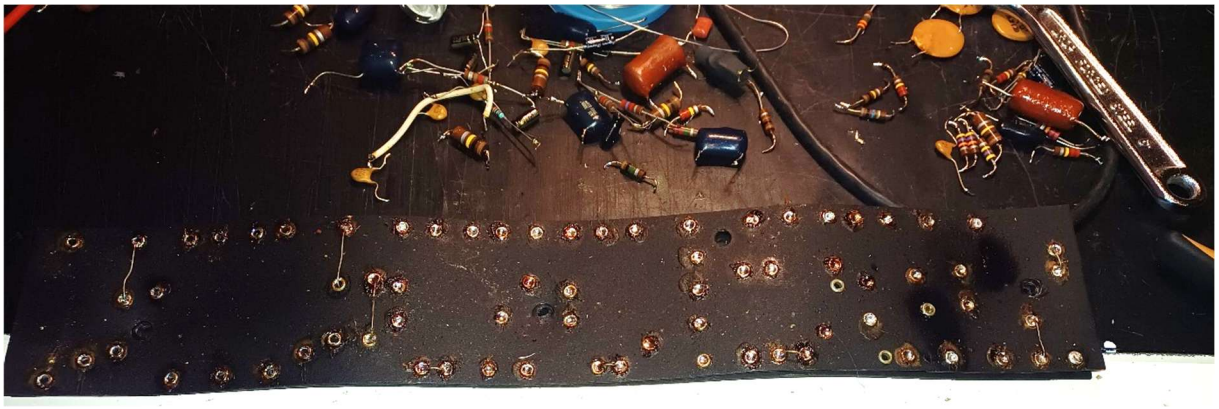






The board:





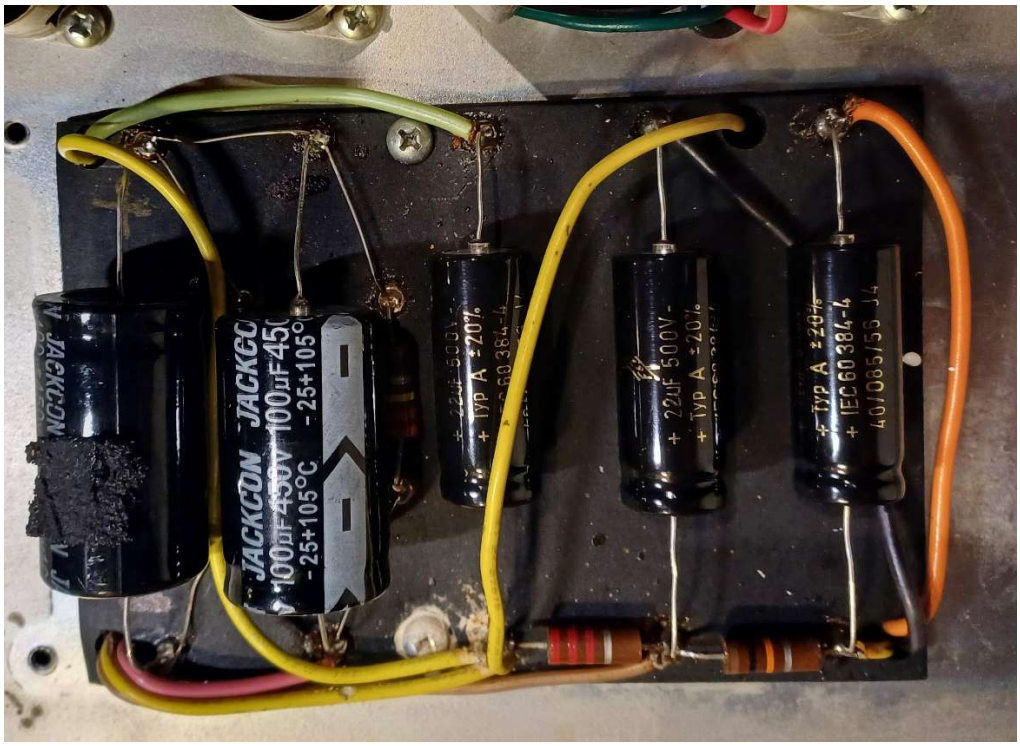
Now you can really see how dirty the board is…

I removed all components and wiring from the board carefully. I removed all solder from the eyelets. I then used a heat gun to heat up the board and backing board and soak up dirty wax and flux with a paper towel repetitively, and cleaned it all thoroughly with IPA.

I cleaned all the components with IPA, and used some mild heat to get the wax off the coupling caps.

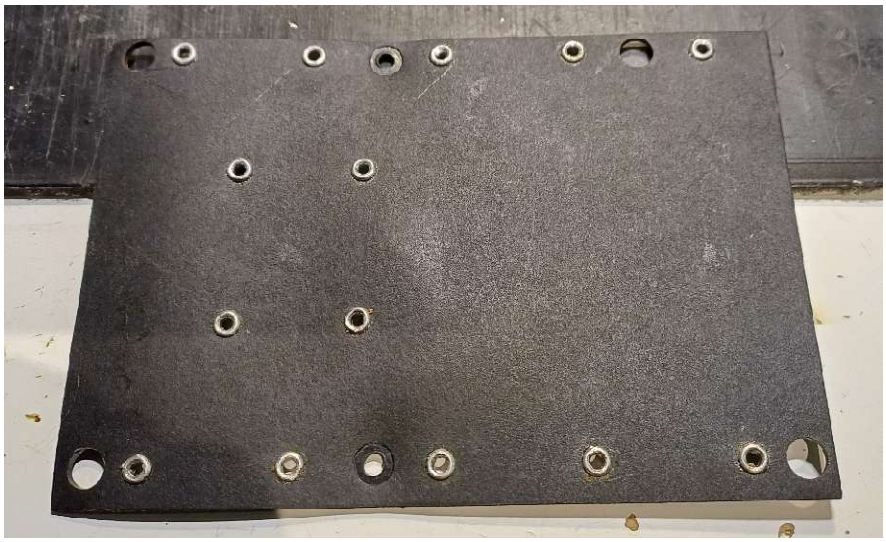
All the resistors and capacitors checked out fine in terms of their values. I will replace the two metal film resistors with carbon film 1/2W, and the radial cathode decoupling caps with Vishay axial caps. Everything else can stay.

The power supply capacitors:



All caps have been replaced before. A piece of foam tore off because it was stuck on the reservoir cap while I tried to removed the cover. Again, dirty board. The F&T caps are fairly new and can be reused, but I will replace the Jackcon capacitors with TAD 70uF 350V caps (physically smaller). I will also change out the dropping resistors with heavy duty 5W resistors.

This is how this board looks when cleaned. The backing board is cleaned as well.



The chassis:

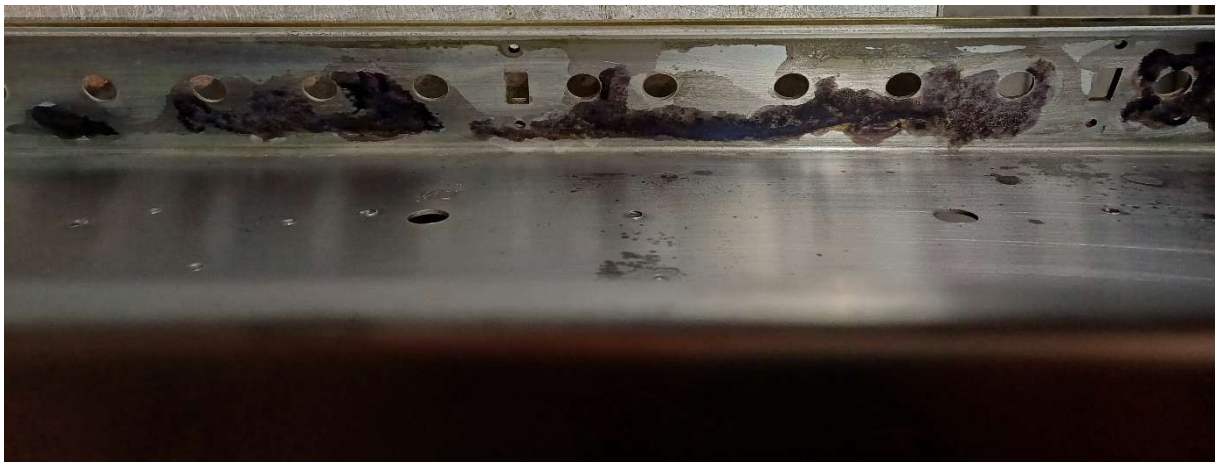
See the amount of rust around the pots and input jack holes with the brass plate removed! I will have to remove the rust entirely and treat it with 'rust-stop', a chemical that reacts with the iron oxide and turns into an inert compound, so it will not rust any further.

The brass plate and some serious oxidation:

The rust sits on the brass, but it has not corroded the plate itself. I rubbed it off with a non-metallic rubbing sponge and some naphtha. I then treated it with copper polish.

After cleaning it looks like this:

Cleaning the chassis:

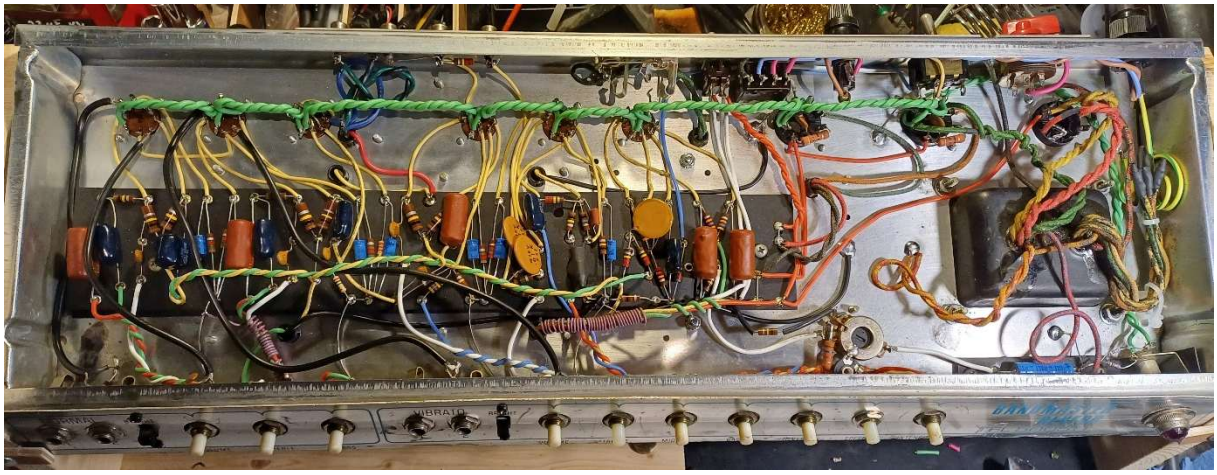


I removed the rust and treated it. The rust-stop product does stain the metal, but it will sit behind the brass plate, so it's visually harmless anyway.

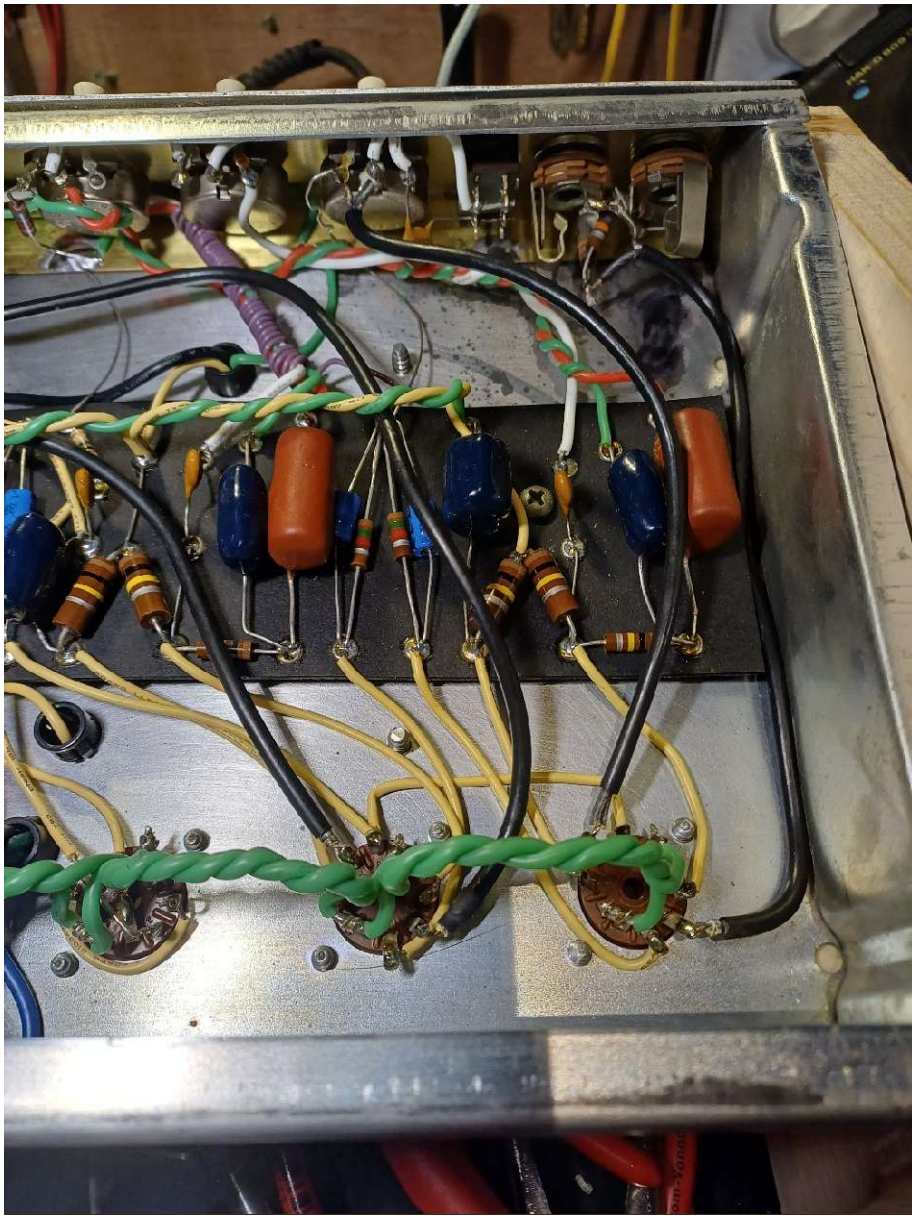
There was a lot of dirt on the inside and outside of the chassis (mostly tar from cigarette smoke, I guess). I managed to clean it all off with naphtha and a sponge.

The chassis was also bent in one place near the power transformer. It was easily bent back straight.

Reassembly:



Input side:

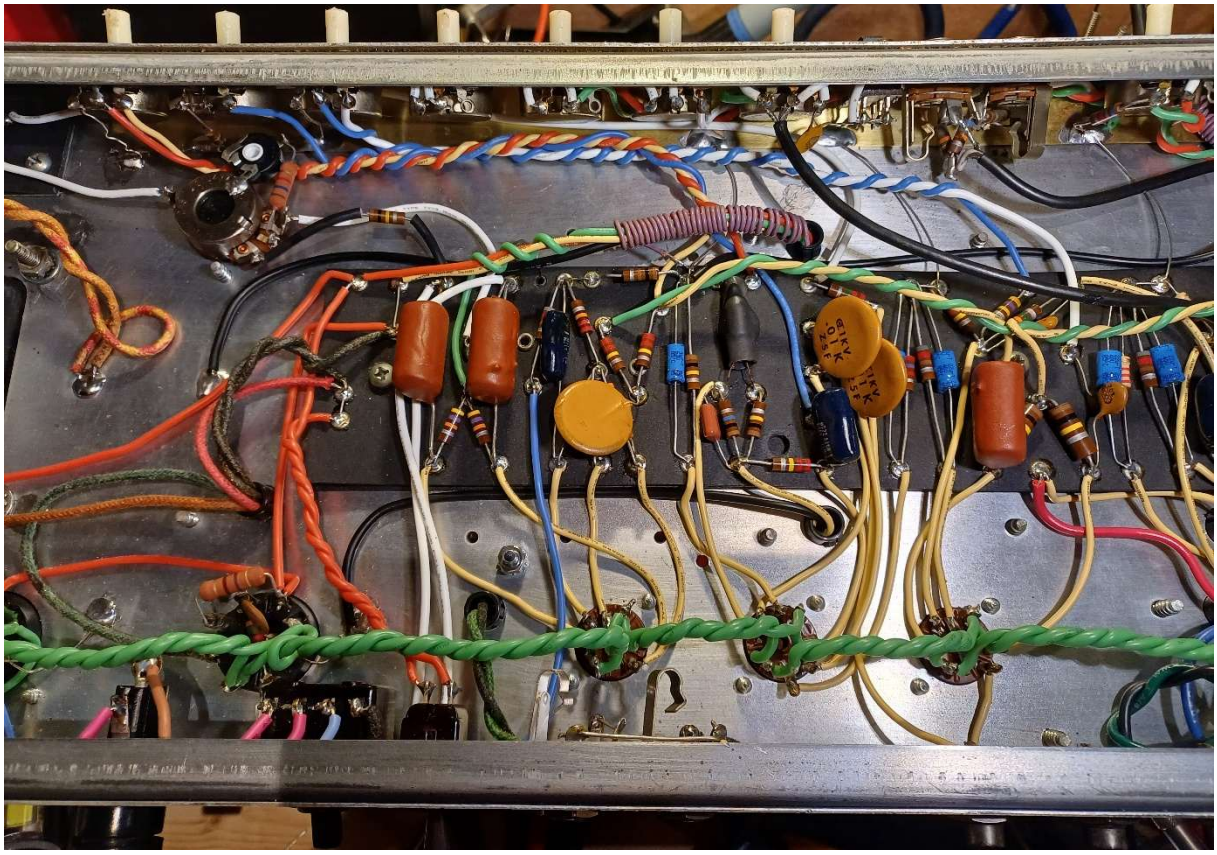


Things to note:

- I ended up replacing all the wiring. Numerous wires had melted insulation due to solder iron contact. The insulation on these wires is also rather stiff, and since wire is just wire and doesn't do anything in terms of sound (except with poor lay-out and excess lengths, which may cause oscillation and noise), it seemed more work and lacking consistency if only some wires were replaced, and others had to be trimmed and cleaned.
- The wire I used has a silicon insulation, rated for 3kV and 150°C, very resistant to chemicals. This insulation does not melt, even when you touch it directly with a hot solder iron. It can be desoldered and soldered back without any problems. In most of the amp I use stranded 22AWG, except for the heater wires stranded 18AWG.
- The long stretches of wire and the heater wires are twisted tightly to maximize electric field cancellation. Wires to the valve sockets are not longer than necessary and kept close to the earthed chassis.
- I kept the purple 'shielding' wire, but twisted it more tightly around the wires and connected it to ground at one end only.
- I also kept the shielded wiring to the control grids of V1 and V2, but trimmed some excess.
- The bare tinned copper wires are the board ground connections to the brass plate. I gave them a curve to allow some slack in case changes in temperature as the chassis heats up cause the metal to expand slightly and stress solder joints.

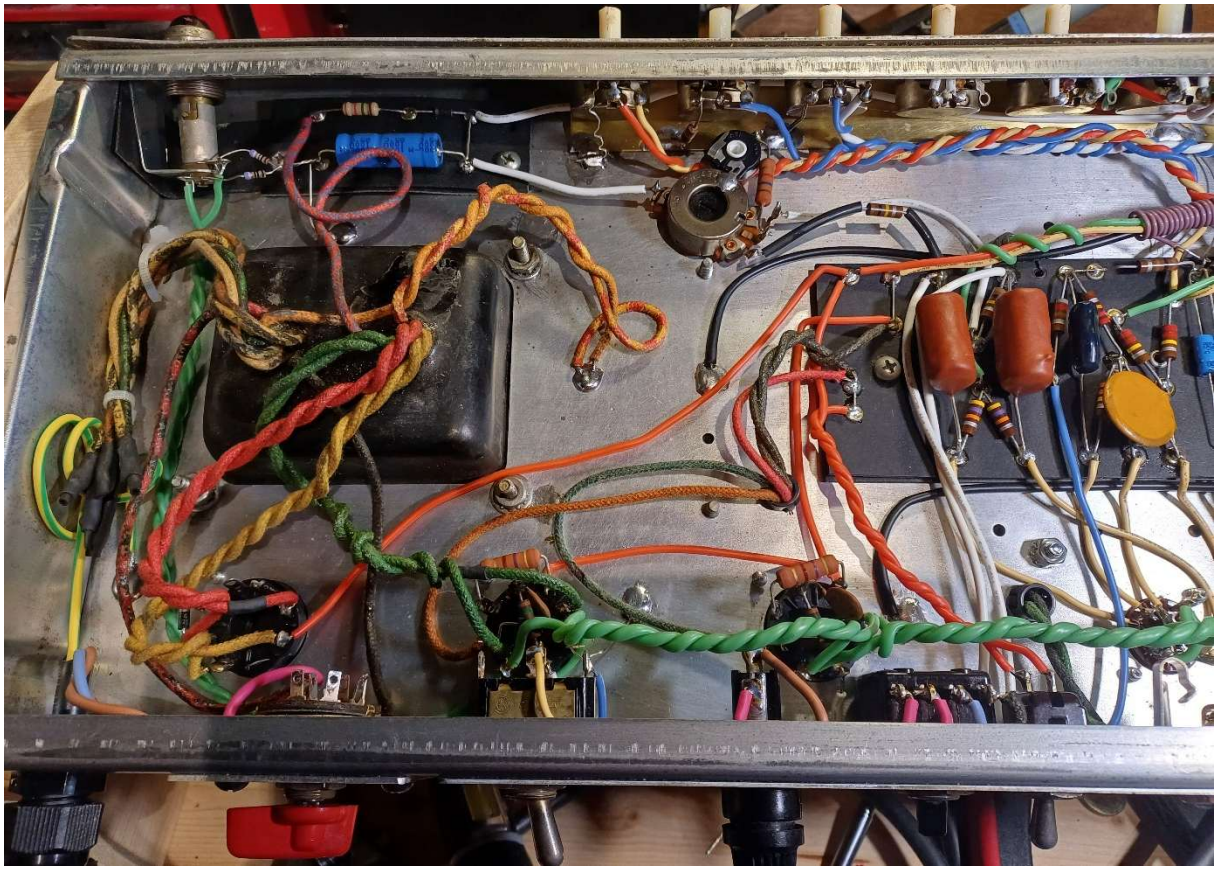
In the process of assembling I cleaned all the pots, cleaned all the valve sockets with IPA, cleaned the bright switches and jack sockets and knobs. I took apart the mains and standby switches and cleaned the contacts. All too often these switches, especially the mains switch, suffer from corrosion, which then causes poor continuity and arcing. In some switches entire chunks of metal are missing from the contacts, by the welding action of electrical arcs. In this case the switch was still ok:

Phase inverter:



Not much to note here. I tried to keep the wiring as tidy as I could. The wires coming from the doghouse should be kept away from the sensitive wires at the vibrato channel input and the volume pot. If not, they do couple 100Hz noise into the control grids of V2. The purple shielding wire helps a little.

Power supply side:



Things to note:

Ground connections:

- I redid all the chassis solder connections: at the 6L6 cathodes, on the brass plate.
- I removed the solder connections at the power transformer mounting bolts. The bolts and nuts do only one thing now: hold the transformer.
- I soldered the HT center tap and the grounding wire of the transformer's internal shield to the chassis (to the right of the transformer). This is a noisy ground because the ugly rectified DC current pulses flow through here. Close to it I soldered the reservoir caps' ground to chassis (black wire).
- The bias supply also has its own dedicated ground to chassis.
- In the lower left corner I soldered the mains earth wire to chassis with a dedicated chassis connection. The earth wire is kept long on purpose.
- The bias pot connection to chassis is essential, so I cleaned the pot and washer well, firmly tightened the hardware so there is a solid mechanical connection to chassis.

Wiring:

- I twisted the transformer' secondary wire pairs for neatness.
- Unused primary wires bundled and held in place with tie wraps.
- Mains power cable wires are lightly twisted and tucked away, making sure there is no mechanical stress on them.
- The PT 6.3Vac heater wires are connected straight to the valve sockets. A lighter gauge wire is used to power the pilot light.

- The brown live wire goes to the fuse tip, fuse sleeve to the DPST mains switch. Neutral goes to the other pole on the switch.

Bias supply:

- Resistor, diode 1N4007 and Vishay 100uF 100V installed and board cleaned.
- The resistor is a 1k5 ½W. I added a 5K trimpot, combined with a 5k6 resistor to set the bias. Originally these components were a 1k ½ W carbon comp and a 15k ½ W carbon comp.

Heater balance:

- I replaced the 100Ω carbon comps with metal film fusible resistors, connected to ground at the bias supply. They do not carry much current in normal operation, so that is ok.

Rectifier and power valves:

- I added back-up diodes 1N4007 in series with the 5UG4's anodes
- I changed out the screen stoppers to 470Ω 3W resistors.
- I added 5000V flyback diodes from 6L6's anodes to ground.

Ground switch:

- The unused ground switch is now a negative feedback switch: negative feedback is standard in these amps, but now it can be switched out of circuit, giving the amp some more gain and clarity at the high end.

Output jacks:

- I replaced the main output jack because the old one had an unnecessary long bushing that stuck out at the back of the amp. The new one is a Switchcraft normal bushing switched jack socket.

Mounting hardware:

- I kept all the sheet metal screws that Fender used to mount the valve sockets, boards, etc., except the ones that hold the output transformer in place. I replaced them with bolts, nuts and washers. It is the heaviest component in the amp held by sheet metal screws and the bolt/nut/washer combination is more secure.

The amp is now biased correctly and sounds excellent. All voltages checked, all connections checked and firm, very low noise. It took about a whole week's work to complete the job.


1.5 AMP.
117 VOLTS
60 CYCLES
ON
STANDBY
GROUND
FUSE
2 AMP. SLO-BLO
SPEAKER
EXT. SPKR.
TOTAL LOAD 4 OHMS
45 WATTS
VIBRATO
PEDAL
REVERB
PEDAL
REVERB
OUTPUT