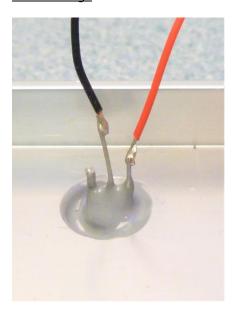
Part 4, Attachment 2. Wiring Part 1

Wall of Sound.ca Tubelab DIY EL84 Amp

Tools Required:

- -Soldering Iron, temperature-controlled type preferred.
- -Side-cutting, needle-nosed and regular pliers
- -Wire strippers (I bought a set of two of Greenlee strippers on Amazon that will strip from 10- to 30-gauge wire.)
- -Screw drivers
- -Hex keys
- -Heat gun. (I have an ancient Weller that works well (har). Inexpensive alternatives are available on Amazon. Search: SMT rework stations.)
- -Clear nail polish

LED Wiring:



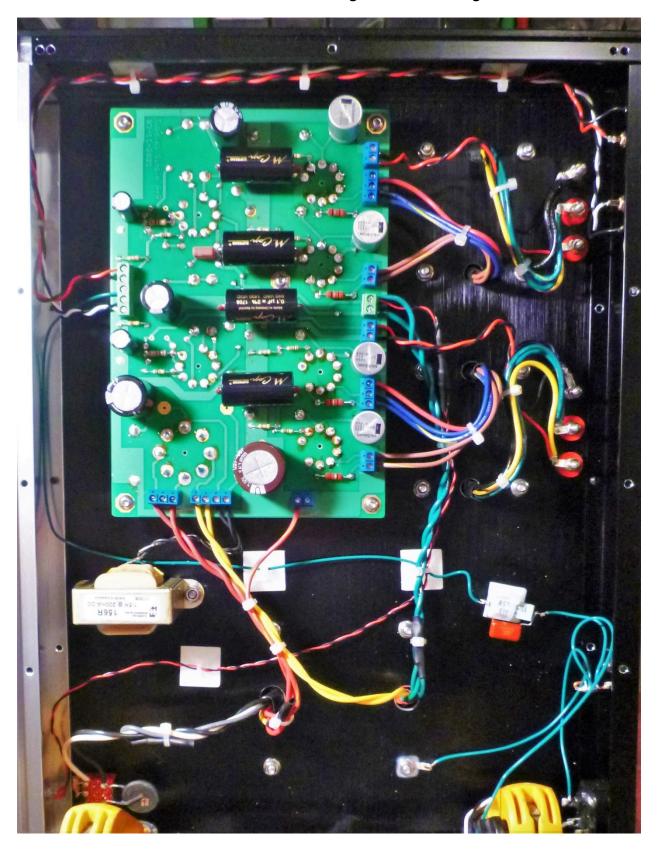
Cut 450mm (18") of 26- or 28-gauge wire one red and one black and strip the ends.

Cut the LED leads as shown above. The centre lead is negative, connect the black to it. The shorter of the two remaining leads is the green LED, the longer is the red. Connect the red wire to whichever colour you prefer. Solder the connections. Fold over the unused one.



Place heat shrink over the connections. Twist the wires together. Set the front panel aside.

Overview Picture. Refer to for lead lengths and routing.



Output Transformer-Speaker Terminal Wiring:

Orient the top panel so that the speaker terminals are facing you.



Using a nail to prevent twisting of the speaker terminals, re-tighten the nuts securing the terminals to the top panel.



Twist 1m (40") of 18 or 20 gauge, red and black wire together.

Twist 1m (40") of 18 or 20 gauge, white and black wire together.

Clamping the ends in a vise makes it easier.

NOTE: When transformer wire lengths are referenced, it is measured from where they protrude on the <u>underside</u> of the top panel.

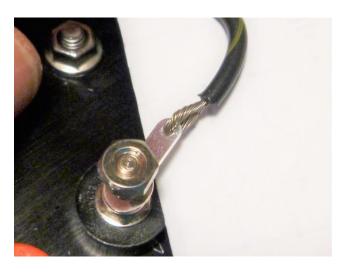
Refer to the overview picture. Form the **blacks, greens** and **yellow** (secondary) leads from the transformer on your **right** as shown and cut to length. The **yellow** should be about 140mm (5½") long. Strip 9mm (3/8") of insulation from all wires.

Refer to the overview picture. Form the **blacks, greens** and **yellow** leads from the transformer on your **left** as shown and cut to length. The **black** and **black-yellow** should be about 115mm $(4\frac{1}{2})$ long. Strip 9mm (3/8) of insulation from all wires.

Cut two lengths of the red and black twisted pair each 150mm (6") long. Strip 9mm (3/8") of insulation from one end of each pair.



Wipe all six terminal lugs supplied with the speaker terminals with alcohol.



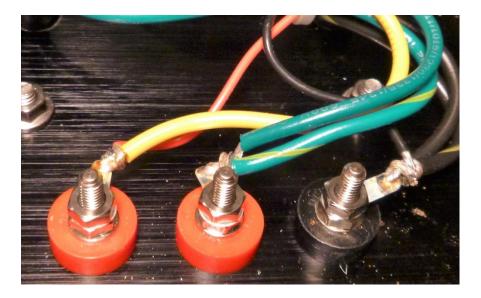


Place solder lugs over the BLACK connector posts on both channels and start a nut to keep it on. The nut will be tightened later after soldering.

Put the **black** leads (one for each channel's black post) through the eyes of the lugs.

Wrap the **black with yellow stripe** lead and the **black** lead from the twisted pair around as shown above.

Solder the wires to the lugs.



In a similar manner to above, place lugs and nuts on the **red** terminals, <u>leaving the nuts</u> <u>loose.</u>

Connect the **green** and **green with yellow stripe** to the middle (**red**) terminal (both channels) and solder.

Attach the **yellow** and the **red** lead from the twisted pair to the remaining **red** terminal (both channels) and solder.



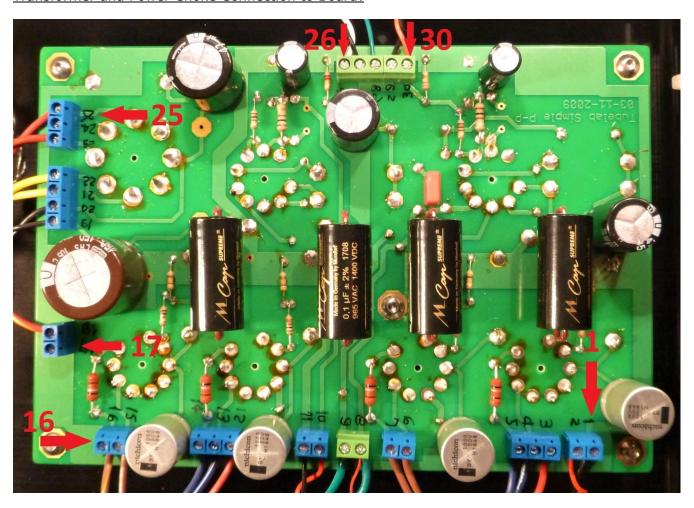


Spin the nuts down to press the lugs against the first nut.

Using the trick with the nail again to protect the post from twisting, tighten the top nut.

Apply a little clear nail polish to lock the nut in place.

Transformer and Power Choke Connection to Board:



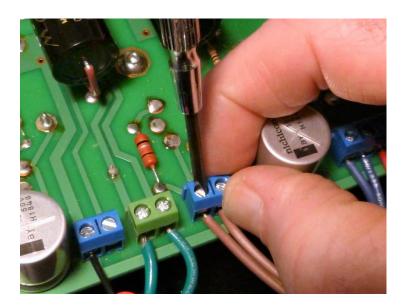
The transformer and other connections to the board can be a bit difficult to decipher even when the screened side of the board is visible. Don't worry, old tube-guy Steve to the rescue. As seen above, I've numbered all of the terminal connections starting with **Number 1** where shown.

If the following descriptions seem not to agree with the order of operations seen in the pictures, there's a reason. As I built the amp, I took pictures. There was a narrative running in my head of how I'd later write the text. For the *most* part this works. When I come to piece the pictures and text together later, some things don't make sense or as happens most times, I think of a clearer method of illustration and description.

The picture above is the finished amplifier. I've done the engineering equivalent of lipsyncing to *hopefully* make it easier for other amp builders.

Important:

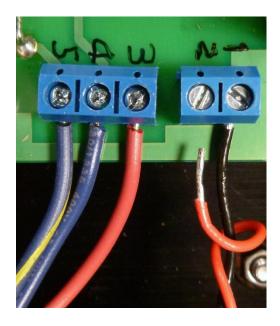
- -In the next several steps transformer and filter choke wires will be stripped for connection to the board.
- -The insulation removed is 6mm (1/4").
- -Once stripped, the strands are fused together with a small amount of solder.
- -However, it is vital that all strands from each wire are twisted together.
- -No loose strands are permissible.
- -The tight spacing of the terminals on the board could lead to **inadvertent arc welding** if free "hairs" of wires come in contact with their neighbours or the circuit board.



When tightening the connector block screws it's a good idea to grip it securely to prevent stress on the soldered connection between it and the board.

Output Transformer Wiring:

Referring to the overview picture cut the other sets of (primary) leads, both output transformers, to the approximate lengths shown. Roughly 125mm (5") long.



All wires connecting to the terminal blocks have 6mm (1/4") of their insulation removed and a small amount of solder applied to keep the strands together.

Position the top panel such that the speaker terminals are facing you.

From the output transformer on your **right**:

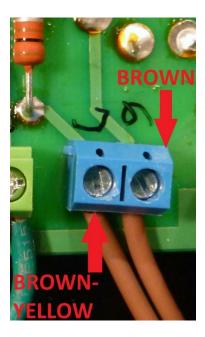
Connect the **black** wire from the twisted pair to terminal **1**.

Connect the **red** wire from the **twisted pair** to terminal **2**. **If you are using anything other than Hammond transformers don't connect the red wire. Leave it loose as shown above.** I'll explain the reason for this in Part 5.

Connect the **red** wire **from the transformer** to terminal **3**.

Connect the **blue** wire to terminal **4**.

Connect the **blue-yellow** wire to terminal **5**.



Connect the **brown** wire to terminal **6**.

Connect the **brown-yellow** wire to terminal **7**.



From the output transformer on your **left**:

Connect the **red** wire from the **twisted pair** to terminal **10**. **If you are using anything other than Hammond transformers don't connect the red wire. Leave it loose as shown above.** I'll explain the reason for this in Part 5.

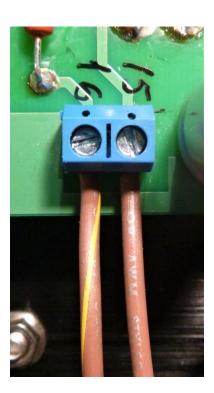
Connect the **black** wire from the twisted pair to terminal **11**.



Connect the **red** wire **from the transformer** to terminal **12**.

Connect the **blue** wire to terminal **13**.

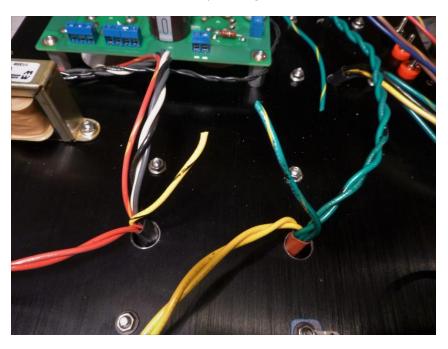
Connect the **blue-yellow** wire to terminal **14**.



Connect the **brown** wire to terminal **15**.

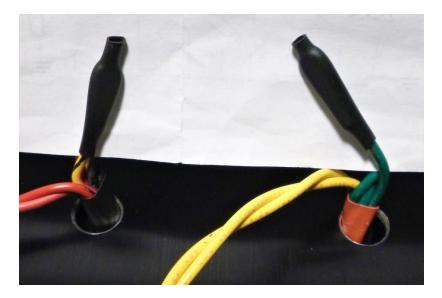
Connect the **brown-yellow** wire to terminal **16**.

Power Transformer Secondary Wiring:

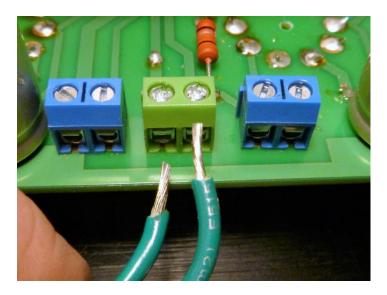


Cut the **yellow with black stripe** wire 75mm (3") long.

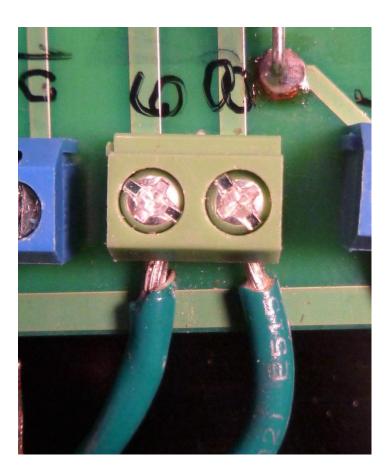
Cut the **green with yellow stripe** wire 75mm (3") long.



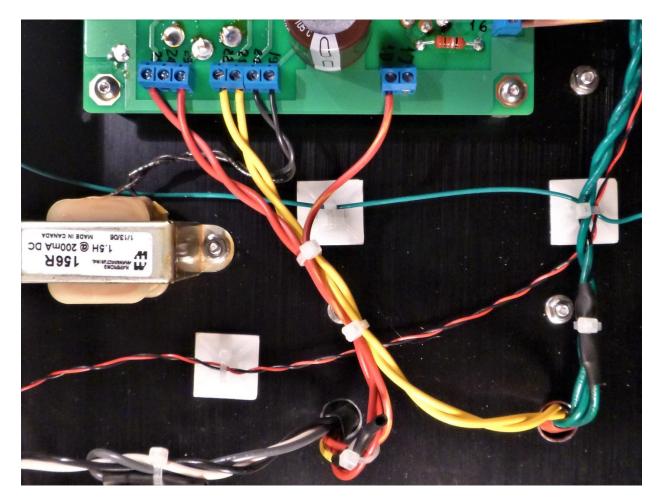
Neither of these will be used but must be insulated. Fold back about 25mm and cover with heat shrink.



Leave the green wires from the power transformer the stock length, trim the strands to 6mm (1/4") and melt a little solder on them to keep the strands together.



Insert the wires into terminals **8** and **9**. Tighten the screws lightly. The wires from the LED will be added to these connections later.



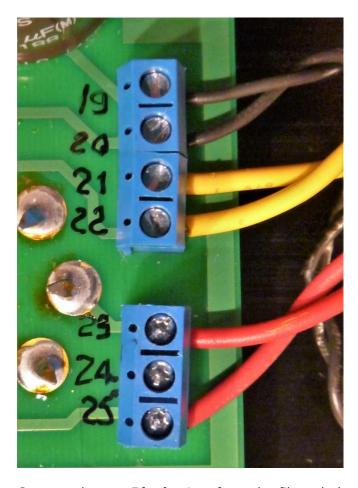
Cut all of the remaining power transformer leads to 180mm (7").

Cut the filter choke leads to 100mm (4") long.

As per usual, strip 6mm and fuse the strands with solder.



Connect the **Red-Yellow** wire to terminal **18**. 17 might be used later.



Connect the two **Black** wires from the filter choke to terminals **19** and **20**. If a choke isn't used leave the terminals empty.

Connect the two **Yellow** wires from the transformer to terminals **21** and **22**.

Connect the two **Red** wires from the transformer to terminals **23** and **25**. Terminal 24 isn't used.

This attachment is big enough and my head hurts from writing it. For the remainder of the wiring proceed with Part 4, Attachment 3.