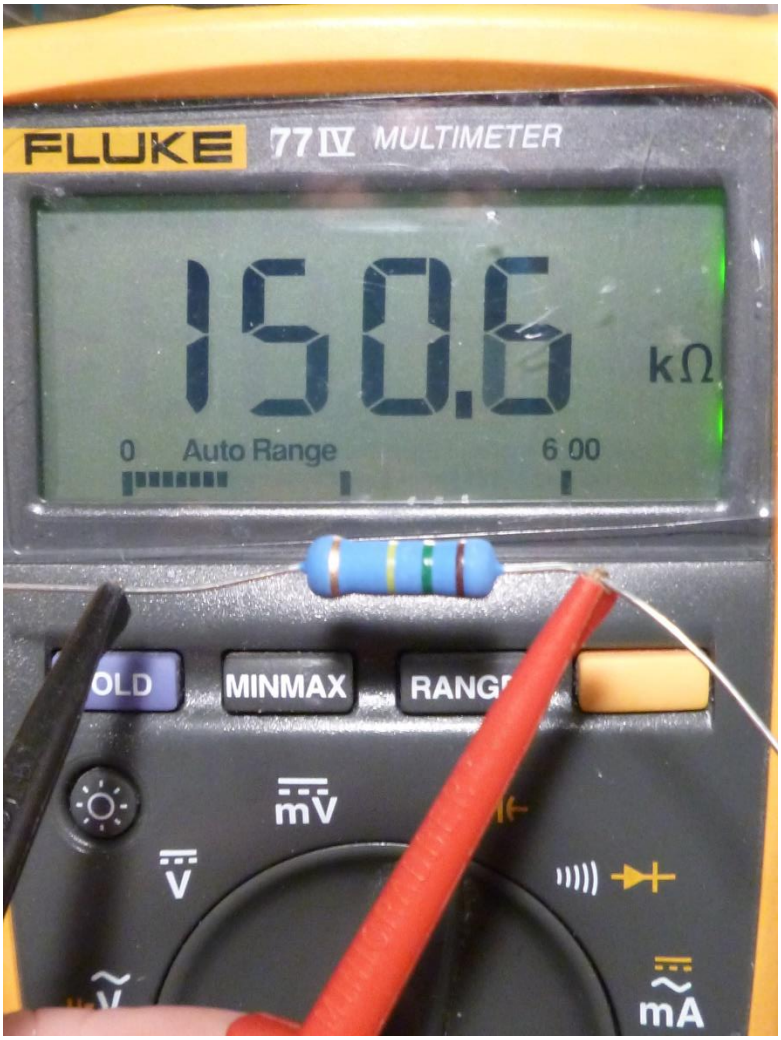
Part 3, Attachment 2. <u>Resistor Assembly</u>

Wall of Sound.ca Tubelab DIY EL84 Amp

Tools Required:

-Same as previous attachment.

-Multimeter, auto-ranging type preferred.



One assembly procedure I can't recommend highly enough is the measurement of **each** resistor before it is assembled to the board.

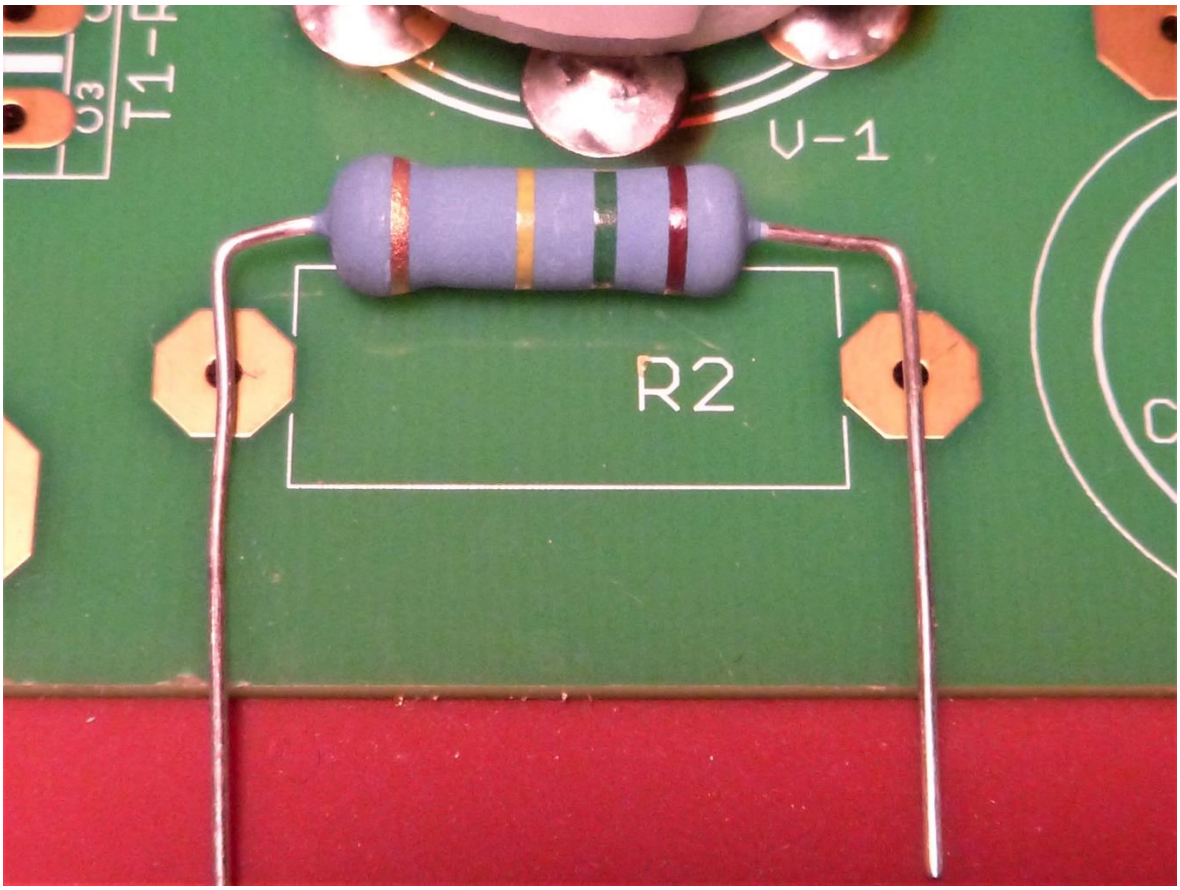
It only takes a few seconds for each one but can catch potential errors.

Note: George Anderson, aka Mr. Tubelab, prefers to mount components spaced slightly clear of the board. We shall honour that preference for most of the components with a cheap and easy trick I've discovered.

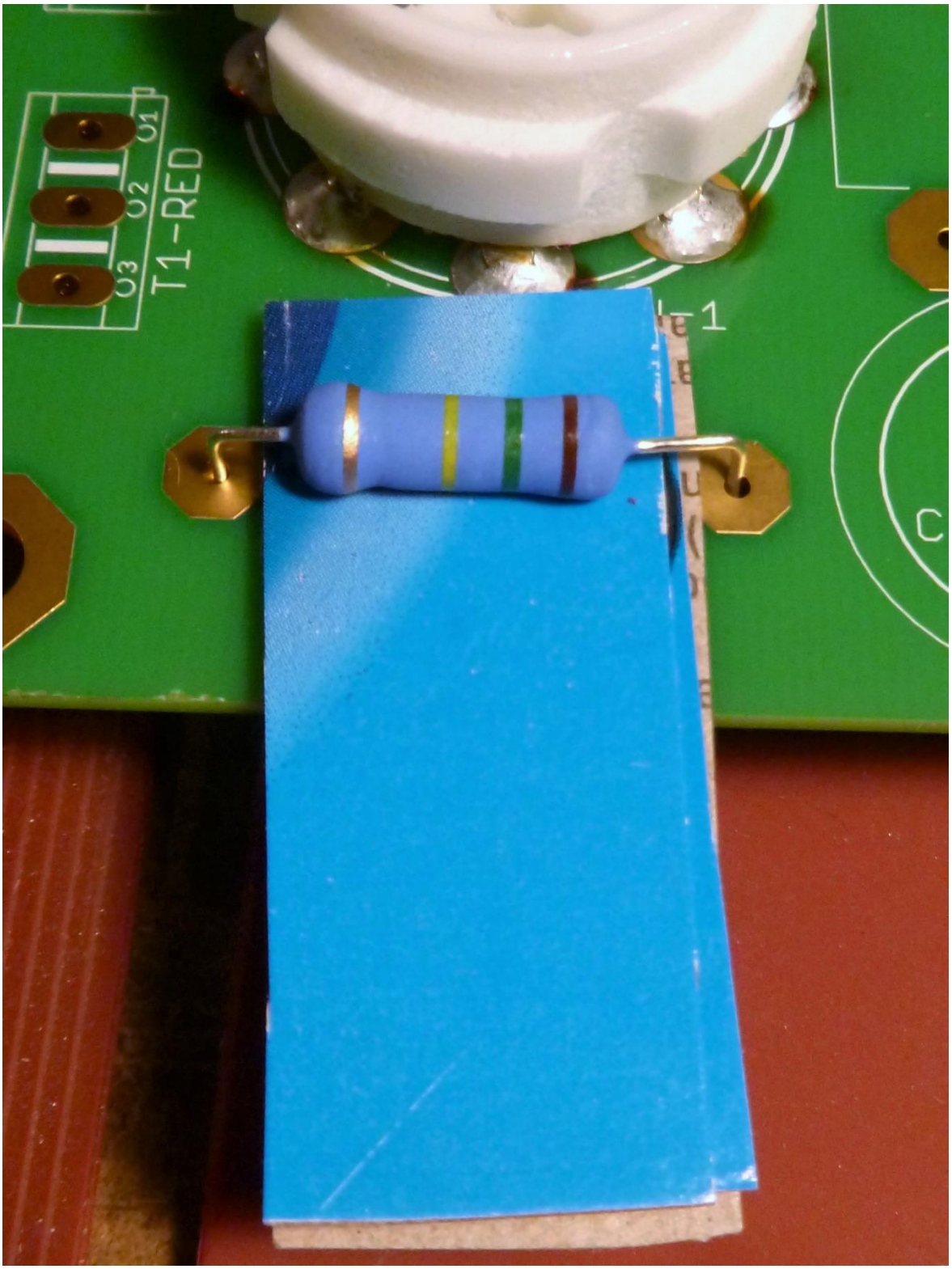
See the last page of this attachment for a schematic of the circuit I found on the Tube Lab forum on DIYAudio.com. https://www.diyaudio.com/forums/tubelab/ There is a drawing of the board that I found some time ago in an obscure place on the Tubelab.com site, but haven't been able to find again. You may wish to follow or printout either or both as the board is assembled.

Most resistors are assembled to the TOP SIDE of the board.

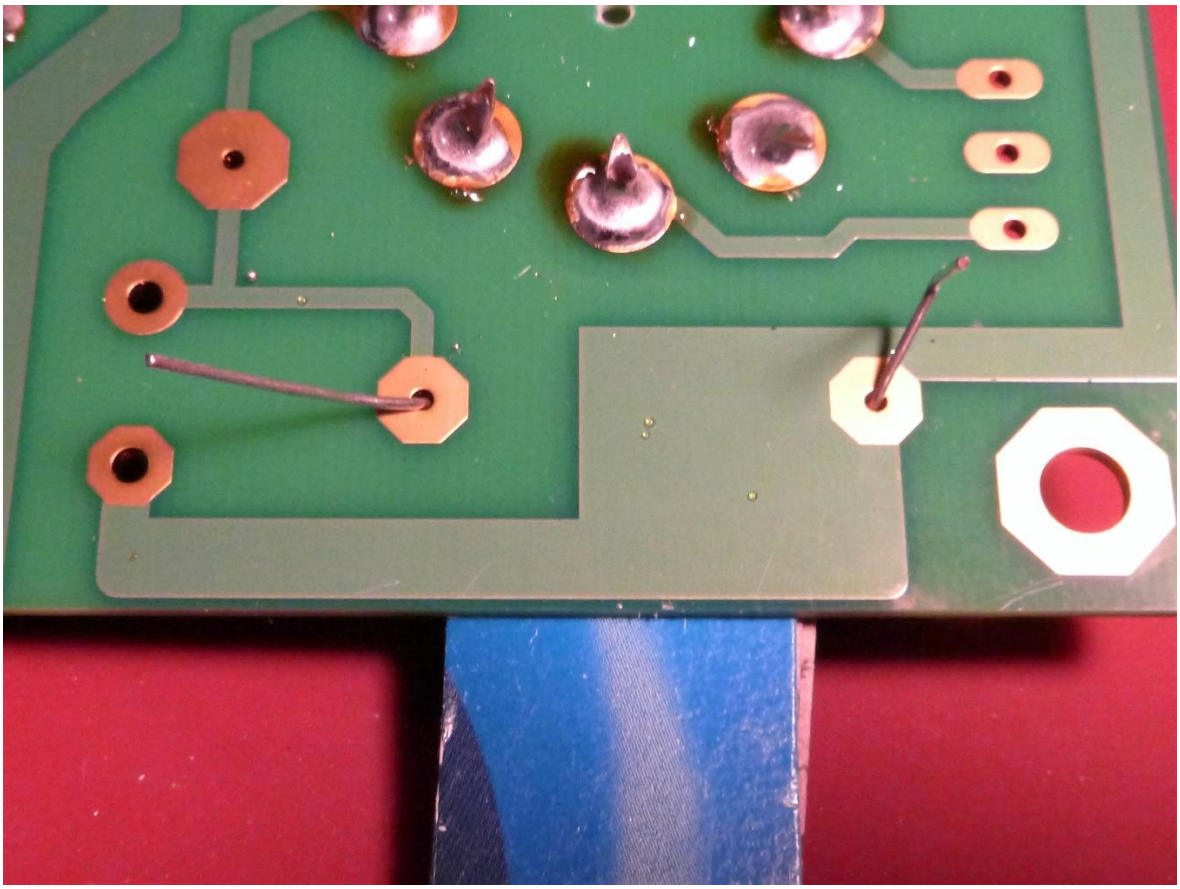
Measure R2, 150K 3W, as seen in the picture above.



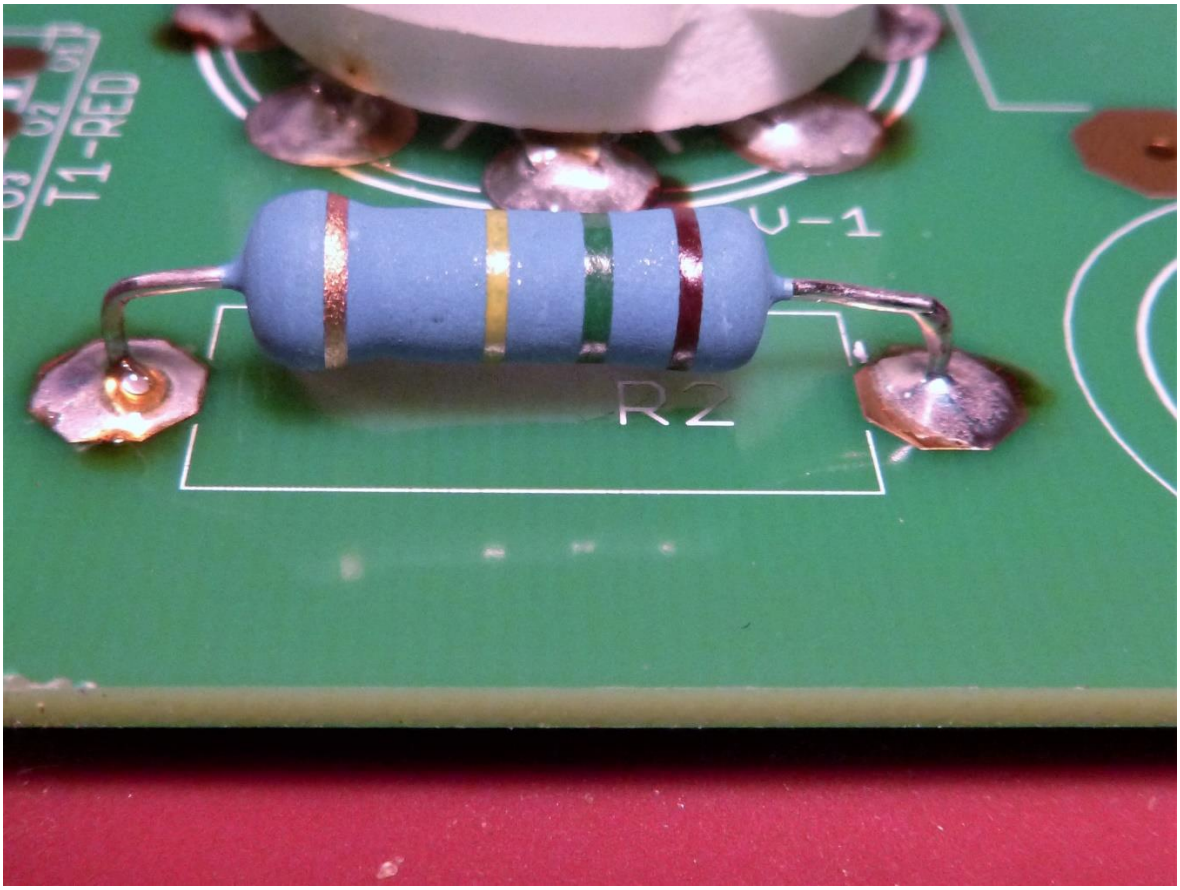
Using the board as a guide, bend the resistor leads as shown above.



Cut some narrow strips of single wall cardboard, breakfast cereal box or the like, to fashion temporary shims for use between components and the board. Insert at least two shims (using only one shim will make removal difficult) between the resistor and the board.



While holding the resistor and shims in place, flip the board over and bend the leads.

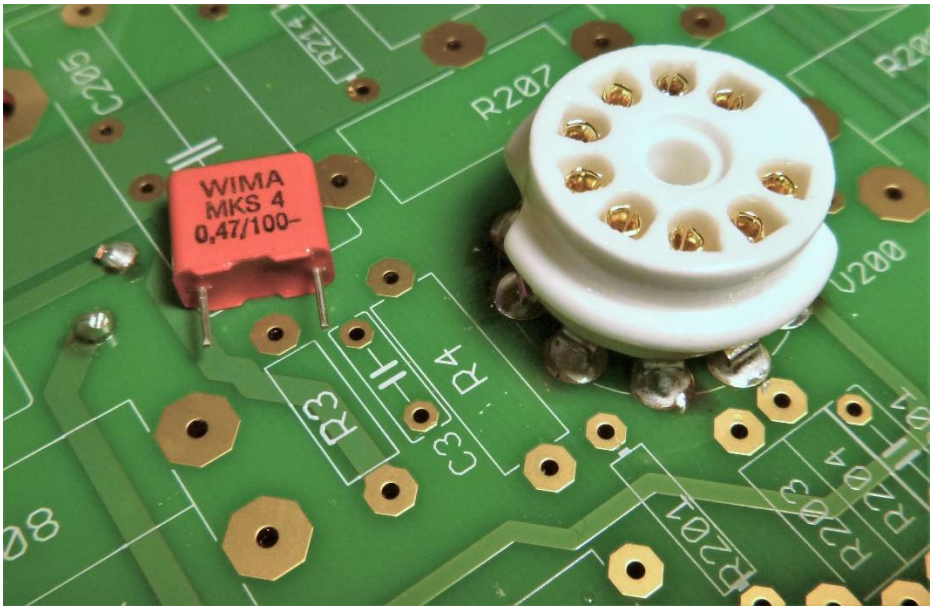


Solder the resistor on **BOTH** sides of the board, trim the leads and remove the cardboard shims.

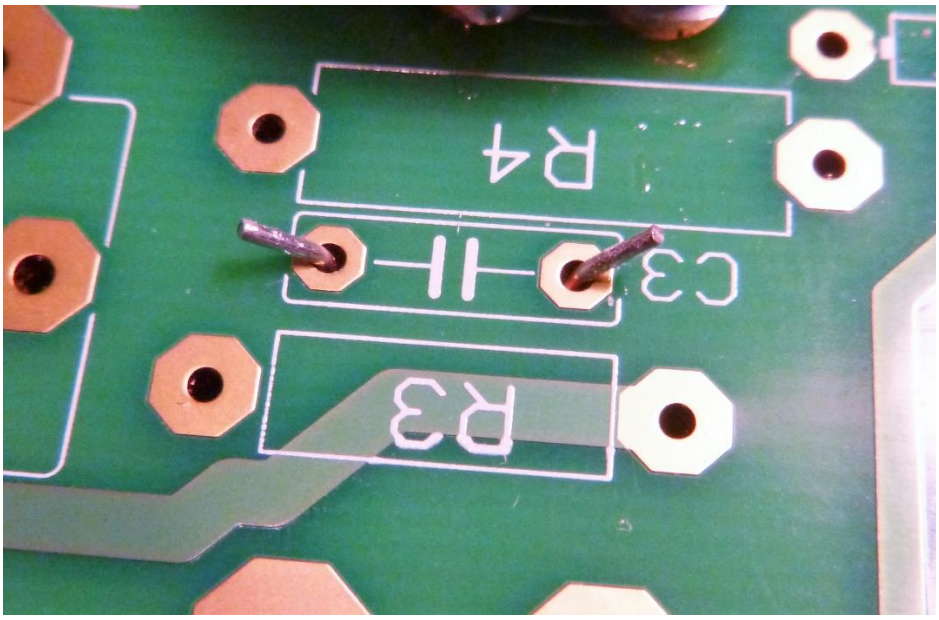
Solder all components, whenever possible, to both sides of the board for maximum strength and conductivity.

Note: Resistor R1 is not needed if using a filter choke.

Install R1, 150Ω 5W, if a choke is NOT used.



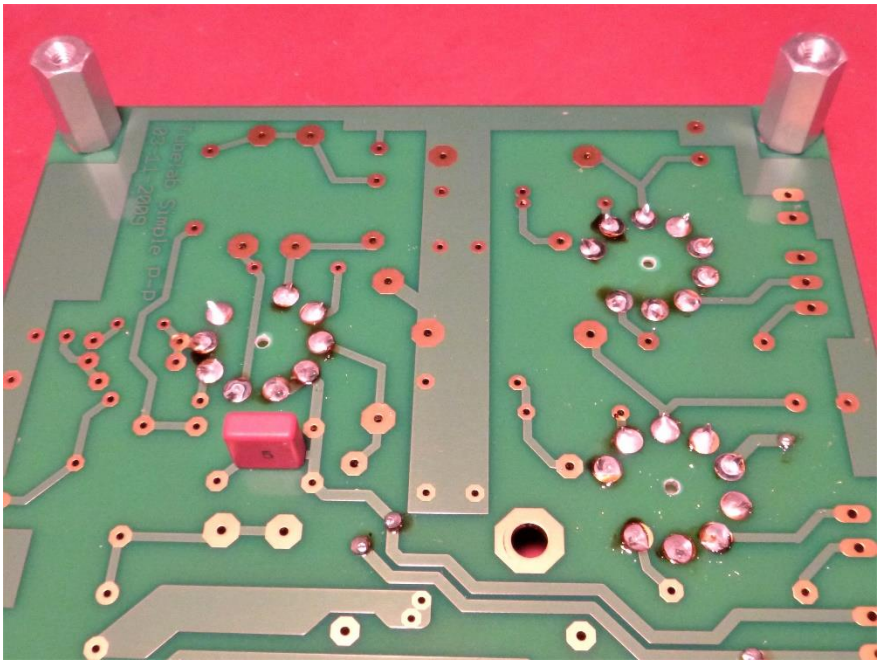
Capacitor C3, 0.47uF 100V, can get cramped between resistors R3 and R4 so install it now on the **UNDER SIDE** of the board.



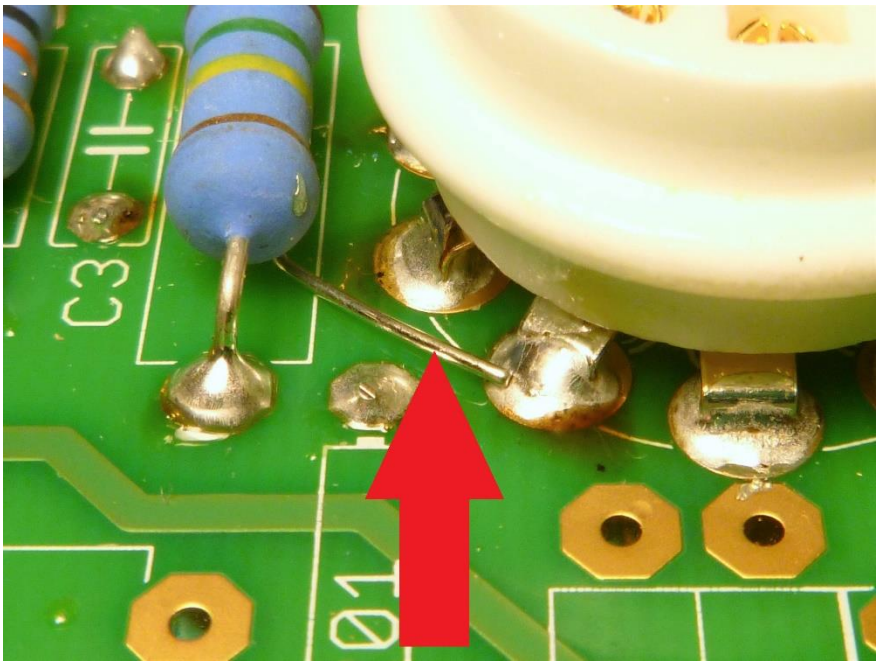
The under side of the board is not labeled but by looking at the top side you can determine if component leads are in the correct holes.

Lightly pull on the leads as you bend them over to pull the capacitor tight to the board.

Solder and trim the excess lead length.



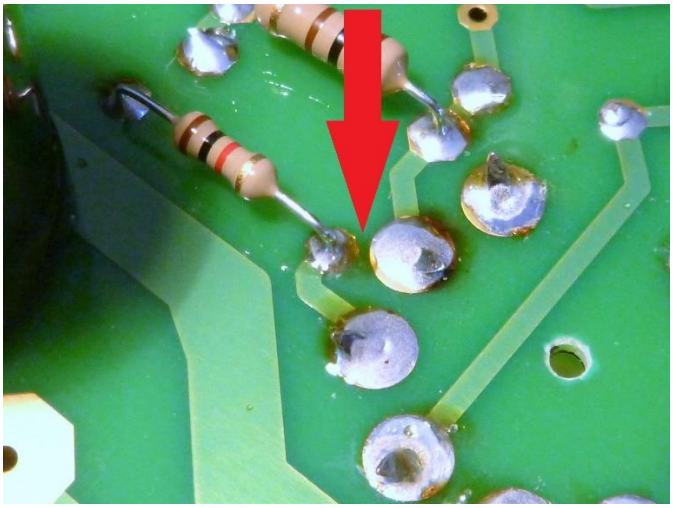
At this point it's a good idea to temporarily install four of the board spacers on the UNDER SIDE at the corners, as shown above. This protects the components once assembled.



As you work your way through assembling components to the board be mindful of where the cut-off bits of component leads are going. See above. A bit in inadvertent arc welding is not a good thing to have a first start-up.

Assemble R4, 150K 2W, to the **TOP SIDE** of the board using cardboard spacers. Solder both sides and trim the leads.

Assemble R3, 10K 1W, to the **TOP SIDE** of the oard using cardboard spacers. Solder both sides and trim the leads.



Assemble R101, 1K ¼W, to the **<u>UNDER SIDE</u>** of the board using cardboard spacers. Solder both sides and trim the leads. Be careful to **not** get a solder bridge between R101 and the tube socket pin, **both sides of the board**.

Assemble R201, 1K ¼W, to the **<u>UNDER SIDE</u>** of the board using cardboard spacers. Solder both sides and trim the leads.

Assemble R111, R115, R211 and R215, all 1K ¼W, to the **<u>UNDER SIDE</u>** of the board using cardboard spacers. Solder both sides and trim the leads.

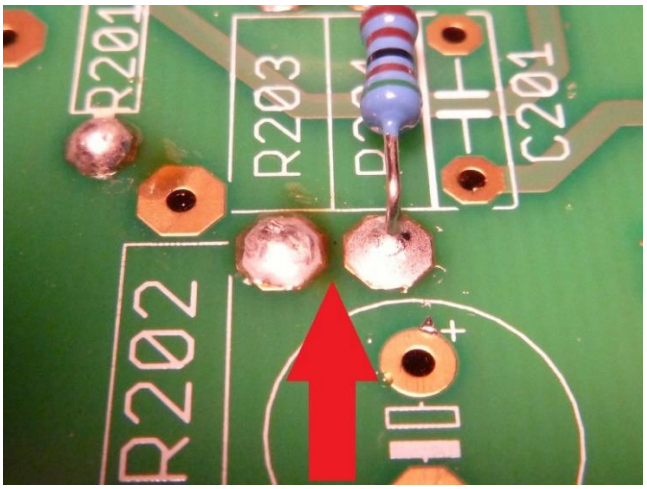
Assemble R110, R114, R210 and R214, all 470K ¼W, to the **<u>UNDER SIDE</u>** of the board using cardboard spacers. Solder both sides and trim the leads.

Assemble R105 and R205, both 100Ω ½W, to the **TOP SIDE** of the board using cardboard spacers. Solder both sides and trim the leads.

Assemble R103, 100Ω ½W, to the **<u>UNDER SIDE</u>** of the board using cardboard spacers. Solder both sides and trim the leads.

Assemble R203, 100Ω ½W, to the **<u>UNDER SIDE</u>** of the board using cardboard spacers. Solder both sides and trim the leads.

Assemble R104, 5.1K ¼W, to the **TOP SIDE** of the board using cardboard spacers. Solder both sides and trim the leads. Be careful to **not** get a solder bridge between R104 and R103, **both sides of the board**.



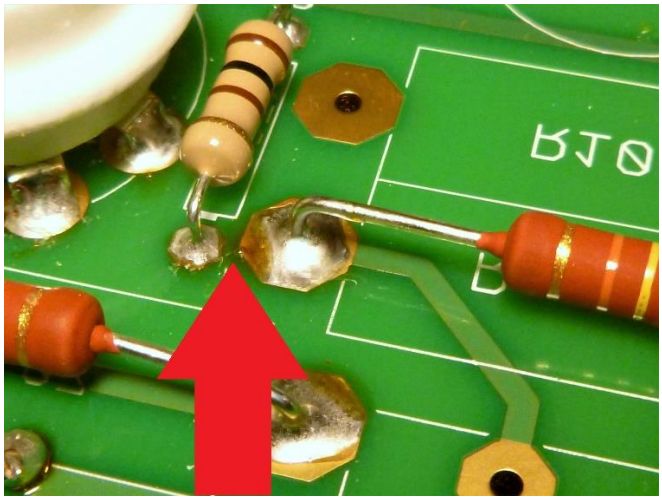
Assemble R204, 5.1K ¼W, to the **TOP SIDE** of the board using cardboard spacers. Solder both sides and trim the leads. Be careful to **not** get a solder bridge between R204 and R203, **both sides of the board**.

Assemble R102 and R202, both 220Ω ½W, to the **TOP SIDE** of the board using cardboard spacers. Solder both sides and trim the leads.

Assemble R100 and R200, both 220K ¼W, to the **<u>UNDER SIDE</u>** of the board using cardboard spacers. Solder both sides and trim the leads.

Assemble R107, R108, R207 and R207, all 24K 2W, to the **TOP SIDE** of the board using cardboard spacers. Solder both sides and trim the leads.

Be careful to **not** get a solder bridge between R108 and R105, **both sides of the board**, see picture below.



Assemble R106 and R206, both 75K 3W, to the **TOP SIDE** of the board using cardboard spacers. Solder both sides and trim the leads.

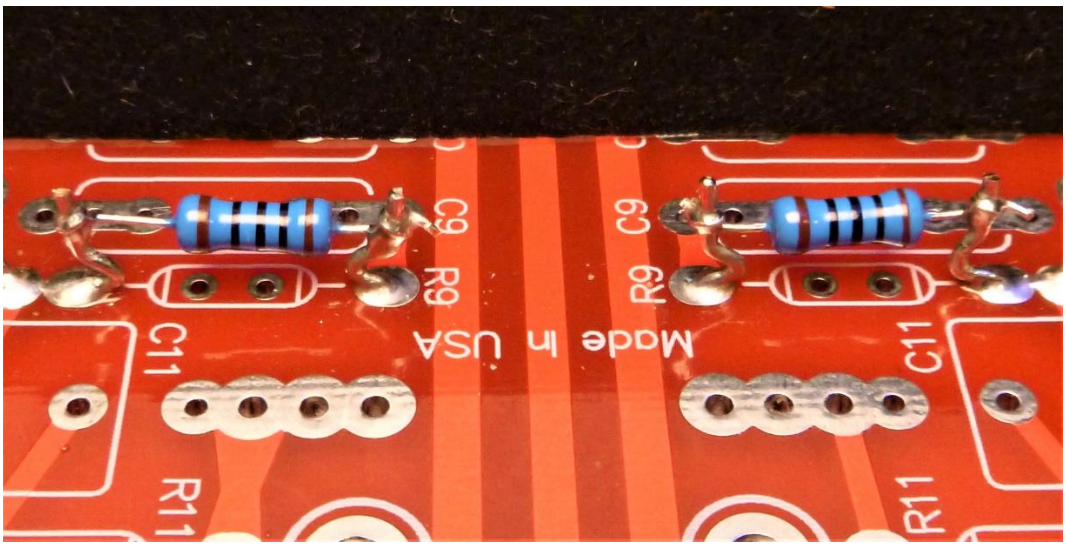
Assemble R113, R117, R213 and R217, all 100Ω 2W, to the **<u>UNDER SIDE</u>** of the board using cardboard spacers. Solder both sides and trim the leads.

Assemble R109 and R209, both 1.5K 1W, to the **TOP SIDE** of the board using cardboard spacers. Solder both sides and trim the leads.

Revision:

It was found during initial testing that the output tubes were running a bit too close to their maximum dissipation. The parts lists have been updated to offer alternate resistors that will mitigate this situation.

If a builder wishes to have the option of an easier resistor change then the following trick can be employed:



Short lengths of off-cut leads may be soldered to the board as shown above. The resistors then soldered to the leads as shown will allow easier change-out later. If this method is used the off-cut leads must not protrude more than **13mm (1/2")** above the board.

Measuring and calculating tube power dissipation will be covered in Part 5.

Assemble R112, R116, R212 and R216, to the **TOP SIDE** of the board (or use the method shown above) using cardboard spacers. Only solder the leads on the <u>TOP SIDE</u> of the board.

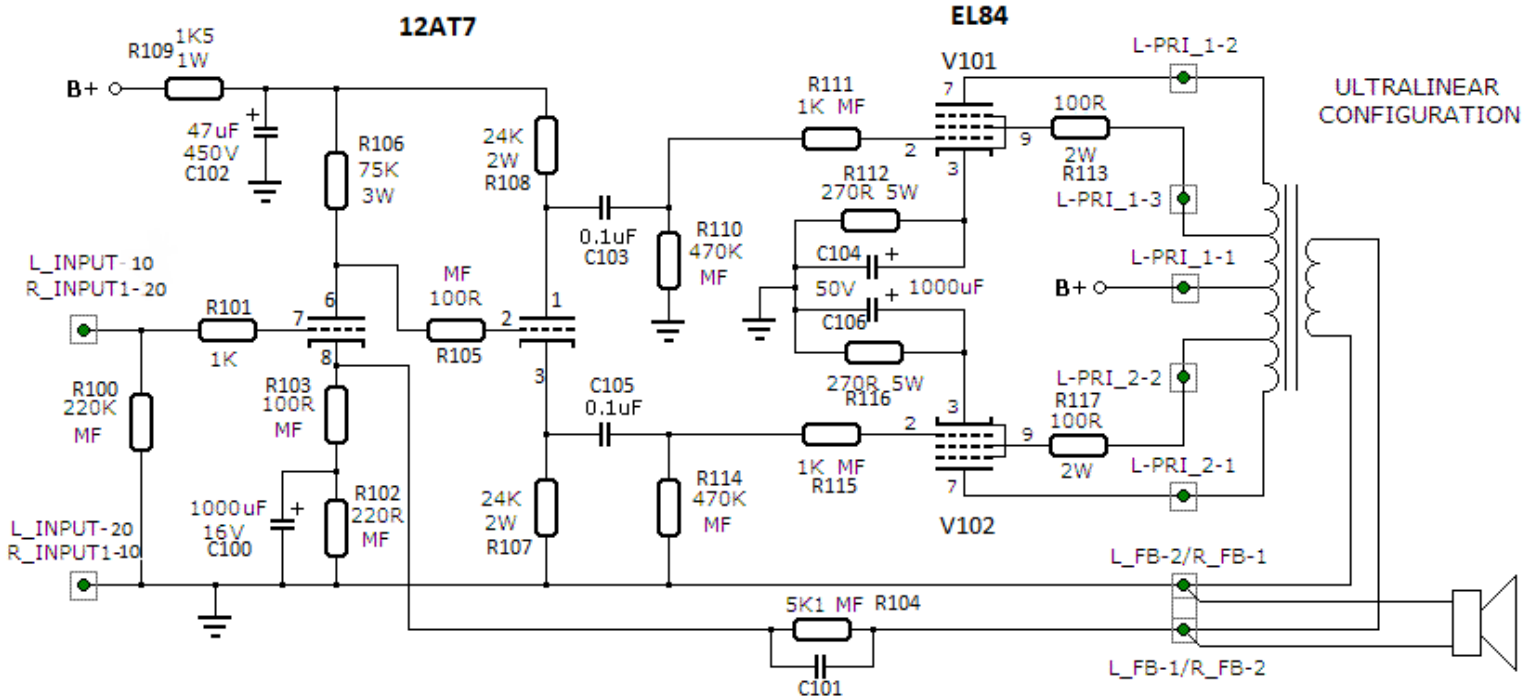
Flip the board over so that the UNDER SIDE faces you.

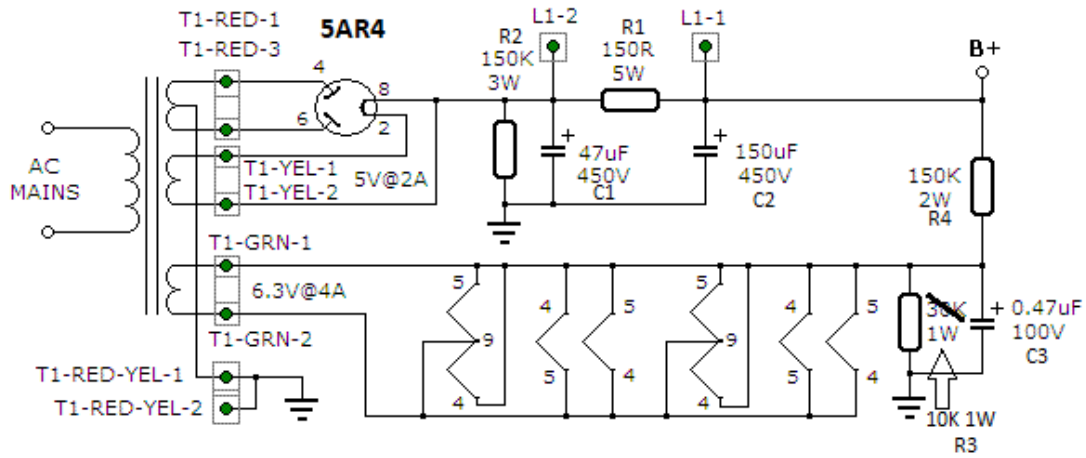
On the FOUR leads closest to the row of **FOUR** tube sockets bend them into loops as shown below and solder. These will be measurement points. Solder the remaining FOUR leads as per normal and trim.

Proceed to Part 3, Attachment 3 for capacitor assembly.

See next page for schematic.

TUBELAB SIMPLE PP





Designed by Tubelab.com
www.tubelab.com

Schematic drawn by Ian444
April 2010

Board designation numbers and tube pin numbers added by Steve Morley October 2019