

# Build Your Own Clone Champlifier Kit Instructions 240V Version



## **WARNING!!! HIGH VOLTAGE!!!!**

Tube amplifiers contain high voltage that can cause injury and even death. Please use extreme caution and common sense when building this kit. Do not attempt to do anything to your amp while it is plugged in other than take voltage readings as necessary or actually playing an instrument through it as it was intended.

Don't just turn the power off!!! Always unplug the power cord from the socket before working on your amp!!! **The mains supply can still electrocute you AND the power filter capacitors can still retain a charge powerful enough to kill you. Always unplug the power cord from the socket before working on your amp.**

## **DISCLAIMER**

Build at your own risk!!! BYOC, Inc. is not liable or responsible for any damages, injuries, or deaths that may incur from or while building this kit. It is your own responsibility to follow proper safety precautions. Never attempt to build, modify, repair, or perform any sort of maintenance on your amplifier while the power cord is plugged into an AC power source.

This kit contains only the amplifier chassis. It is intended to be housed in a non-conductive, electrically insulated cabinet or enclosure. This kit does not come with any such cabinet or enclosure and is not intended to be used without one. It is your responsibility to house this amplifier kit in a proper cabinet or enclosure before attempting to use it.

## **Warranty:**

**BYOC, Inc. guarantees that your kit will be complete and that all parts and components will arrive as described, functioning and free of defect. Soldering, clipping, cutting, stripping, or using any of the components in any way voids this guarantee. BYOC, Inc. Guarantees that the instructions for your kit will be free of any major errors that would cause you to permanently damage any components in your kit, but does not guarantee that the instructions will be free of typos or minor errors. BYOC, Inc. does not warranty the completed kit as a whole functioning unit nor do we warranty any of the individual parts once they have been used. If you have a component that is used, but feel it was defective prior to you using it, we reserve the right to determine whether or not the component was faulty upon arrival. Please direct all warranty issues to:**

**Sales@buildyourownclone.com** this would include any missing parts issues.

## **Return:**

BYOC, Inc. accepts returns and exchanges on all products for any reason, as long as they are unused. We do not accept partial kit returns. Returns and exchanges are for the full purchase price less the cost of shipping and/or any promotional pricing. Return shipping is the customer's responsibility. This responsibility not only includes the cost of shipping, but accountability of delivery as well. Please contact sales@buildyourownclone.com to receive a return authorization before mailing.

## **Tech Support:**

BYOC, Inc. makes no promises or guarantees that you will successfully complete your kit in a satisfactory manner. Nor does BYOC, Inc. promise or guarantee that you will receive any technical support. Purchasing a product from BYOC, Inc. does not entitle you to any amount of technical support. BYOC, Inc. does not promise or guarantee that any technical support you may receive will be able to resolve any or all issues you may be experiencing.

That being said, we will do our best to help you as much as we can. Our philosophy at BYOC is that we will help you only as much as you are willing to help yourself. We have a wonderful and friendly DIY discussion forum with an entire section devoted to the technical support and modifications of BYOC kits.

[www.buildyourownclone.com/board](http://www.buildyourownclone.com/board)

When posting a tech support thread on the BYOC forum, please post it in the correct lounge, and please title your thread appropriately. If everyone titles their threads "HELP!" then it makes it impossible for the people who are helping you to keep track of your progress. A very brief description of your specific problem will do. It will also make it easier to see if someone else is having or has had the same problem as you. The question you are about to ask may already be answered. Here is a list of things that you should include in the body of your tech support thread:

1. A detailed explanation of what the problem is. (Not just, “It doesn’t work, help”)
2. Pic that clearly shows your circuit board.
3. Pic that clearly shows the tube-side of inside of the chassis.
4. Pic that clearly shows the inside of the front of the chassis.
5. A pic that clearly shows your wiring going from the circuit board to the pots and any other switches(only if your kit has non-PC mounted pots and switches)
6. Does the indicator light come on?

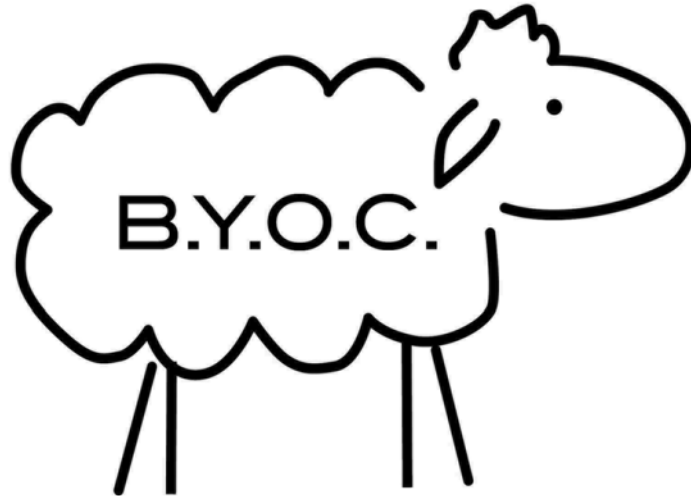
Also, please only post pics that are in focus. You're only wasting both parties' time if you post out of focus, low-res pics from your cell phone.

### **Revision Notes:**

Rev 1.0 There are no known errors.

### **Copyrights:**

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## Parts Checklist for Champlifier Kit

### Resistors:

#### 1/2watt carbon composition:

- 2 - 1k5 (brown/green/red/gold)
- 1 - 22k (red/red/orange/gold)
- 2 - 68k (blue/gray/orange/gold)
- 2 - 100k (brown/black/yellow/gold)
- 1 - 220k (red/red/yellow/gold)
- 1 - 1M (brown/black/green/gold)

#### 2watt metal oxide:

- 1 - 10k (brown/black/orange/gold or it will just say "10k")
- 1 - 22k (red/red/orange/gold or it will just say "22k")

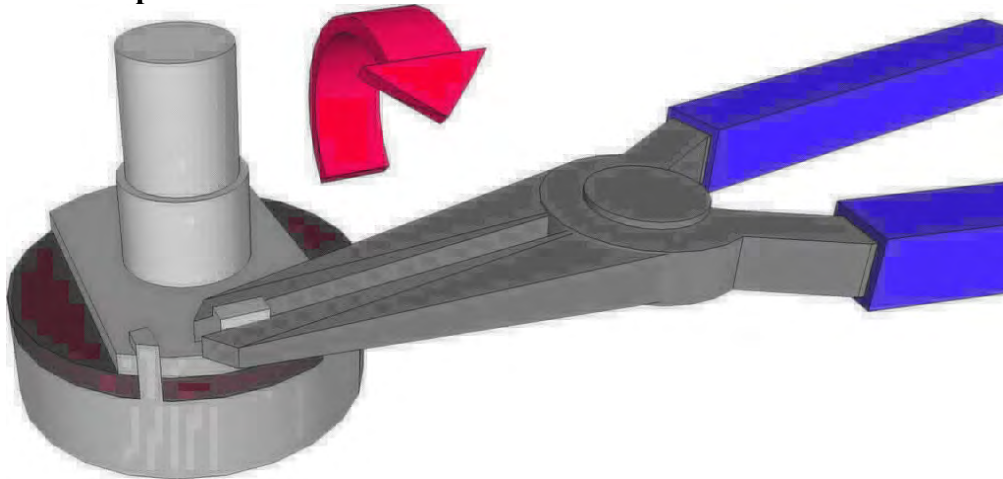
#### 5watt wire wound:

- 1 - 470ohm (large white block says "470" on it)

### Capacitors:

- 2 - .022uf axial leaded film
- 2 - 8uf/450v axial leaded aluminum electrolytic
- 1 - 16uf/475v axial leaded aluminum electrolytic
- 2 - 25uf/25v axial leaded aluminum electrolytic

**Potentiometers:** Be sure to snap off the small tab on the side of each panel mounted pot.



- 1 - A1M w/SPST switch
- 1 - Black chicken head knob

### Hardware:

- 1 - Chassis
- 1 - Circuit board
- 2 - Circuit board standoffs w/matching screws and nuts

- 2 - 8 pin tube sockets w/retainer
- 1 - 9 pin tube socket w/shield
- 3 - 1/4" mono shorting jacks (switchcraft 12A) w/ nut, flat washer and lock washer
- 1 - Lamp (bayonet style #47 6.3v)
- 1 - Lamp holder
- 1 - Lamp jewel
- 1 - 6' 3-conductor power cord
- 1 - Power cord strain relief
- 1 - Panel mounted fuse holder
- 1 - Fuse (3AG 2amp slow-blow)
- 2 - Rubber Grommets
- 8 - 4/40 x 3/8" screw
- 8 - 4/40 nut
- 8 - #4 internal lock washer
- 6 - Wire nuts
- 2 - Internal lock washer/Solder terminals

**Wire:**

- 2' - Green 20AWG
- 2' - White 20AWG
- 1' - Black 20AWG
- 1' - Yellow 20AWG
- 1.25' - Brown 20AWG
- 1' - Red 20AWG
- 1' - Bare Bus

**Tubes (optional):**

- 1 - 12AX7/ECC83 (JJ/Tesla)
- 1 - 6V6 (JJ/Tesla)
- 1 - 5Y3 (Sovtek)

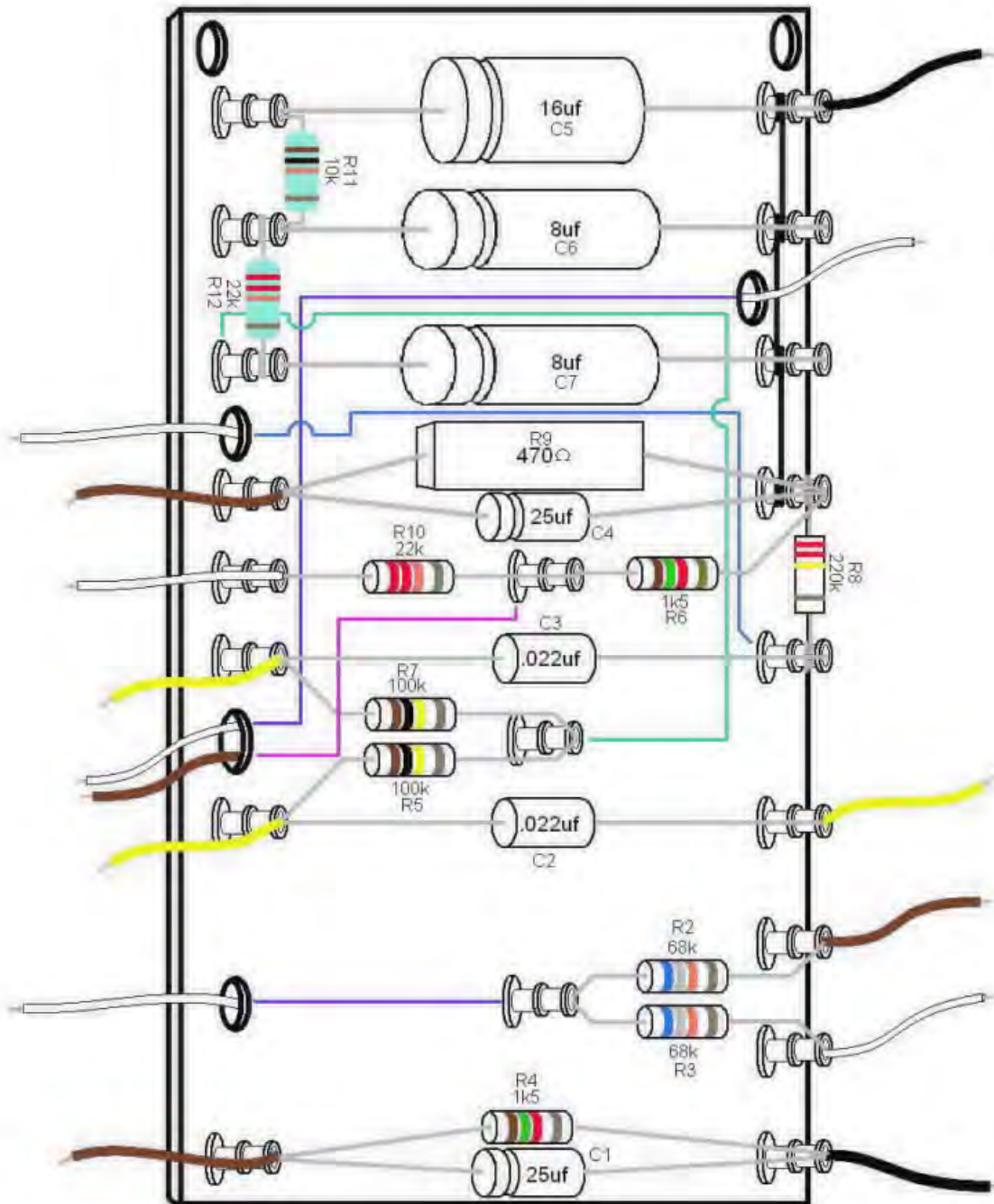
**Transformers (optional):**

- 1 - Power Transformer (dual primary 120v/240v)
- 1 - Output Transformer (5watt 4/ 8 ohm Champ Style)

**OR**

- 1 - Output Transformer (15watt 4/8/16 ohm Champ Style)

## Populating the Circuit Board



**A Green Arrow means  
action is required at this  
point, and you will need  
to solder**



**A Red Arrow means  
action is required at this  
point, but DO NOT!!!  
solder**



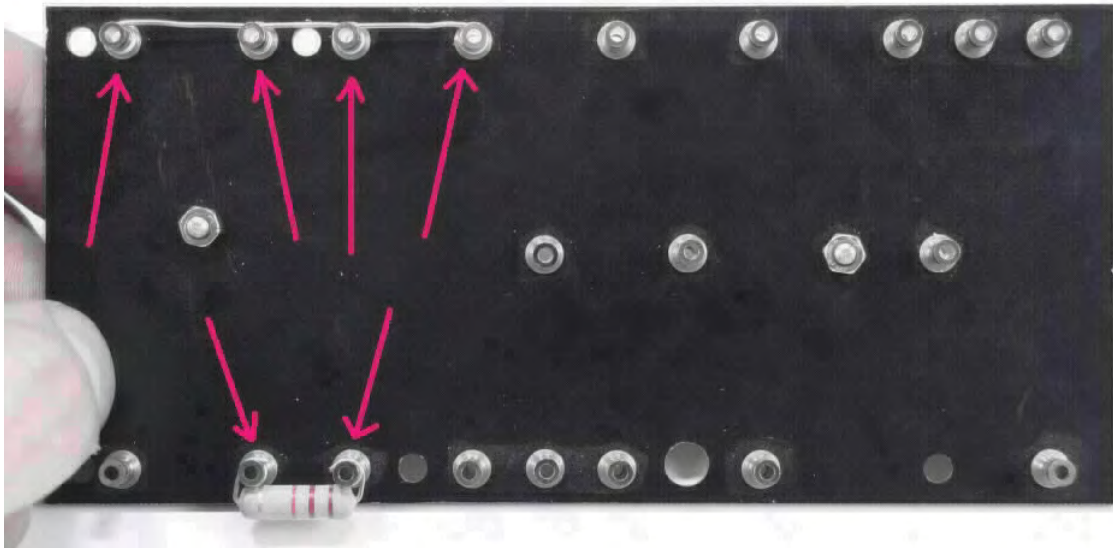
**A  
note before you get started: Follow the order of these  
instructions. Some of the components need to be "layered" in a  
certain order.**

**Step 1:** Add the brass standoffs. Do not solder anything yet.



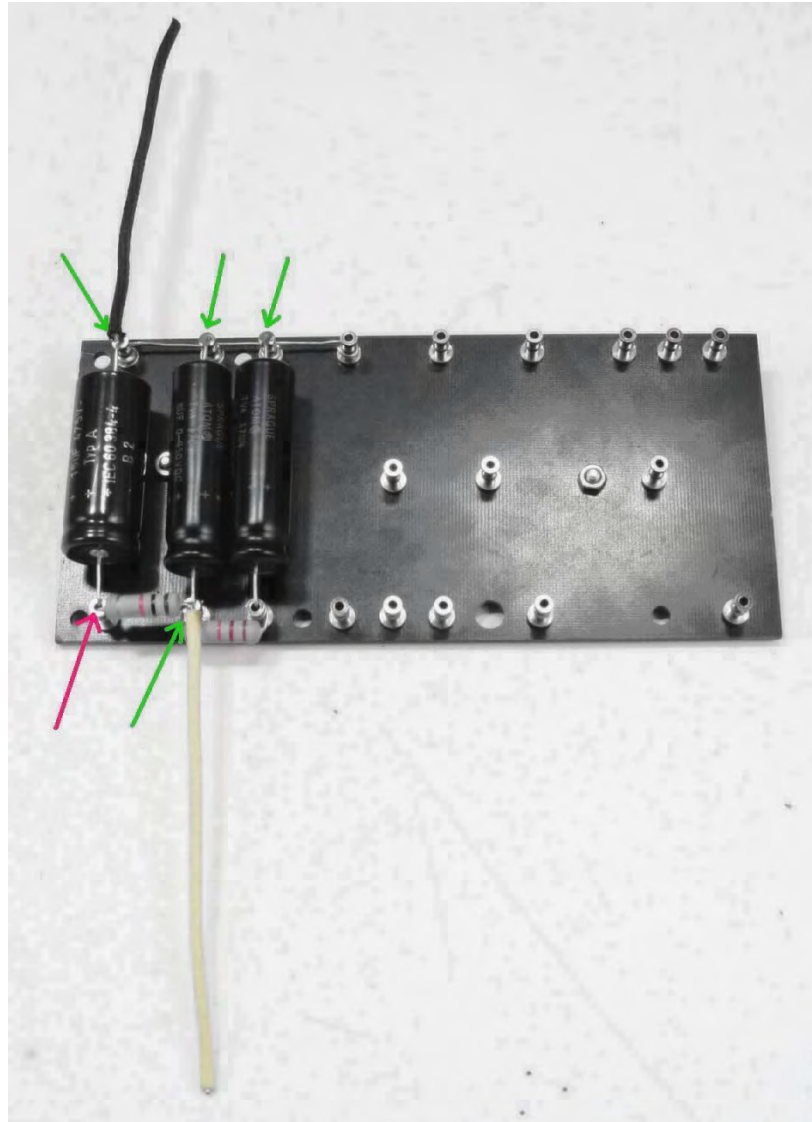


**Step 2:** Add the bare bus wire and 22k/2w resistor. The resistor is not polarized and can go on the board in either direction. Be sure to wrap these around the bottom tier of the turret lugs. Do not insert either directly into the turret lugs' shaft. Do not solder anything yet.

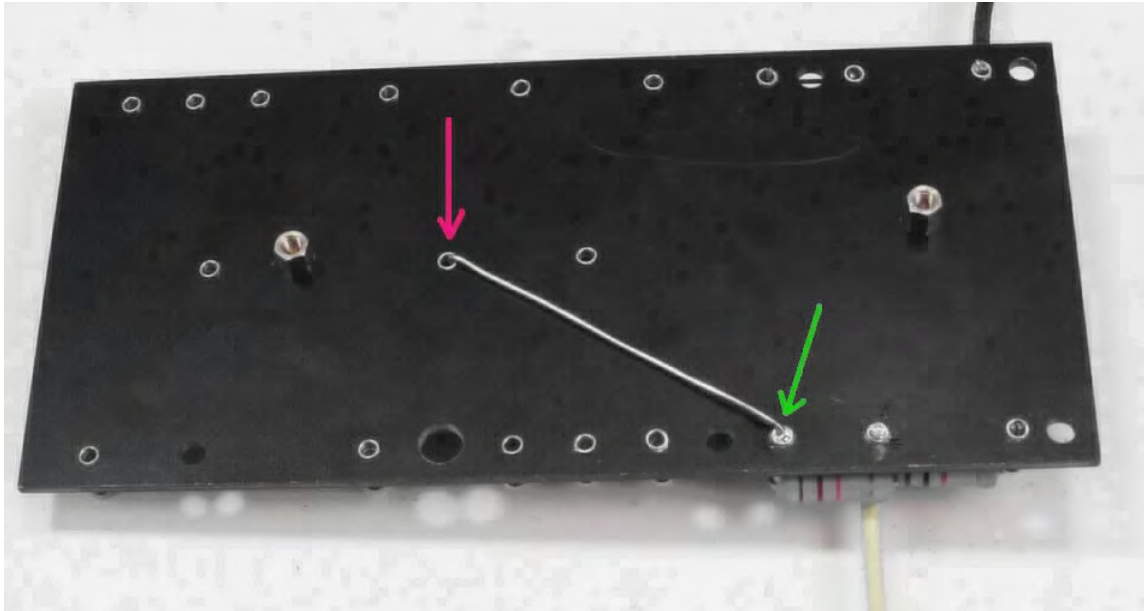


**Step 3:** Add the 16uf; 2 x 8uf; and 10k/2w resistor. The resistor is not polarized and can be oriented in either direction. The capacitors are polarized. **It is EXTREMELY important that you orient these correctly.** The positive end will be labeled with a “+” symbol. The positive end will also have an indentation around it. This end should be facing the end of the board that has the resistors. The negative end of the capacitors should be facing the end of the board that has the bare bus wire.

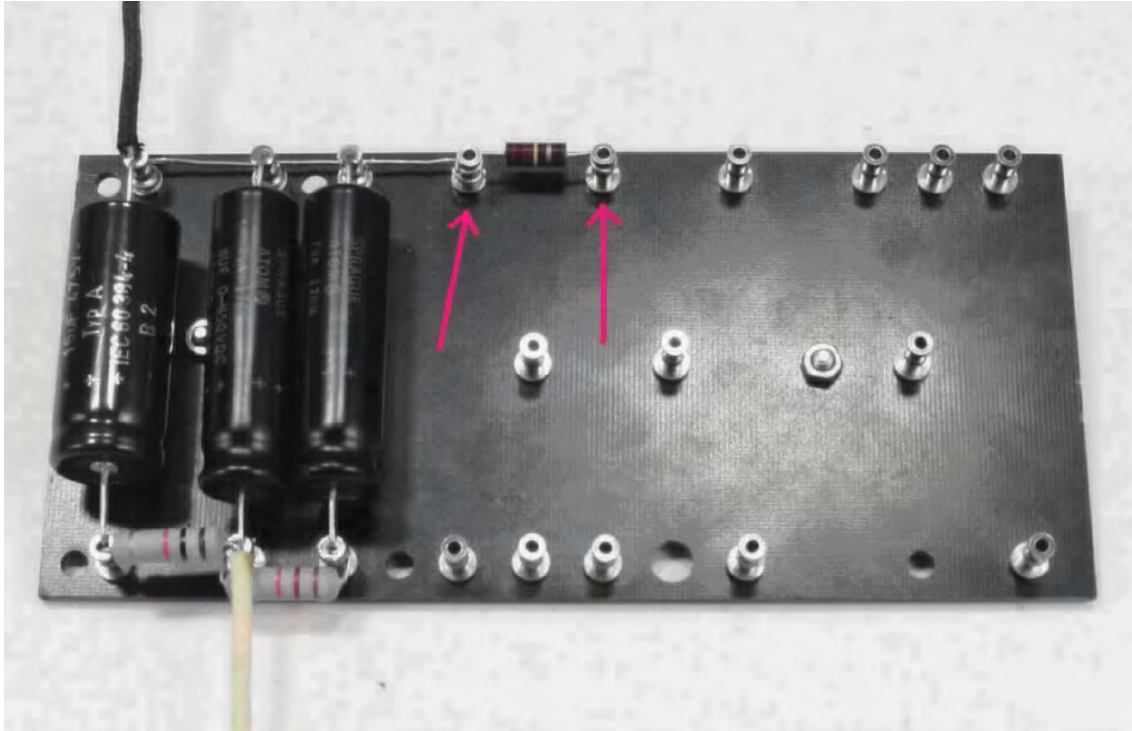
Insert 3” of yellow wire and 3” of black wire. Solder only at the green arrows. When you solder, be sure to solder not only the components going into the turret lugs, but also the bare bus and resistor on the outside of the lugs as well. Do not solder anywhere there isn't a green arrow. Other components still need to go into those turret lugs.



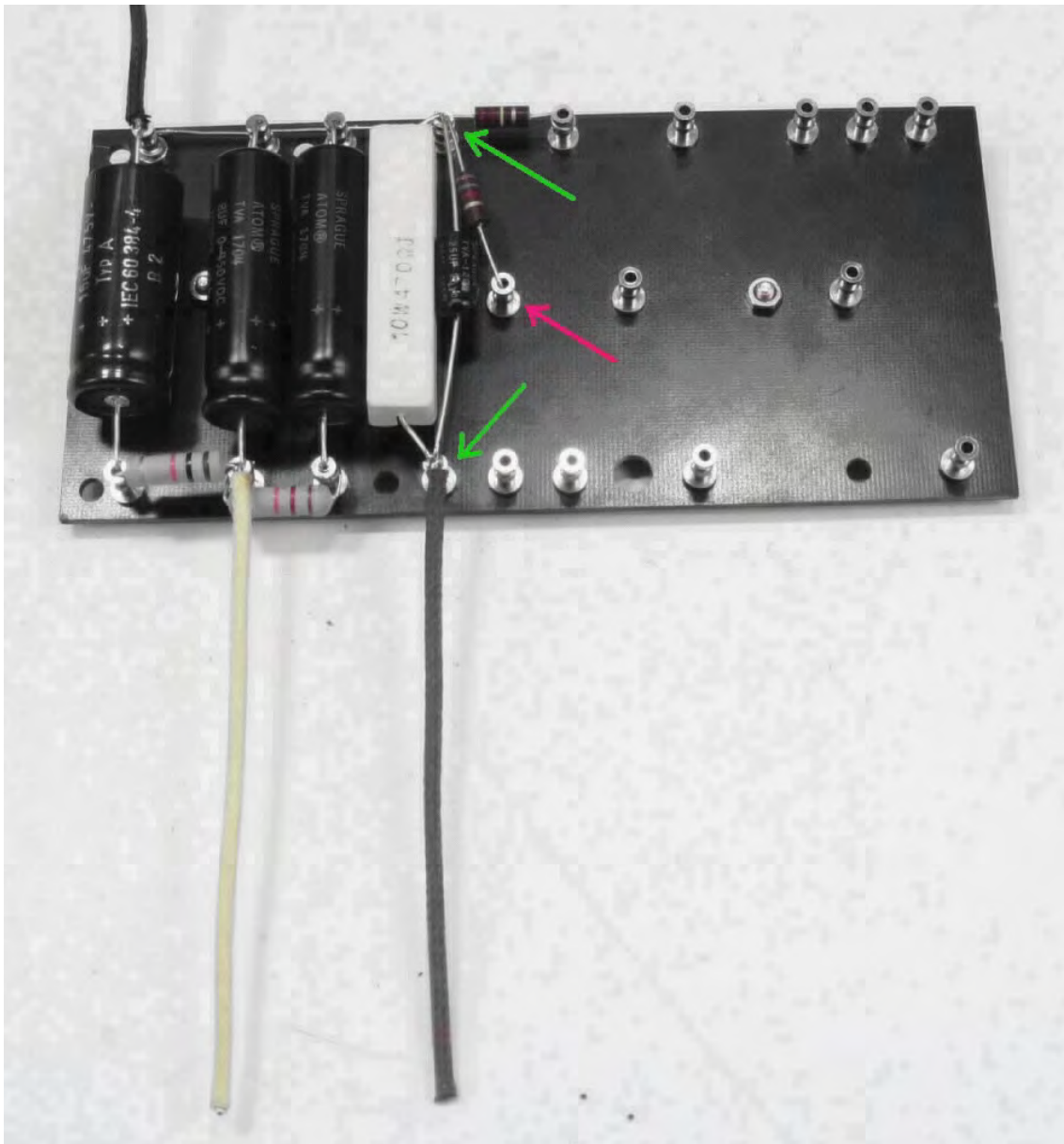
**Step 4:** Add bare bus wire on the underside of the board between the two eyelets shown below. Only solder at the green arrow. Be sure to flip the board over and solder the side of that same turret lug where the other end of the 22k resistor is wrapped around.



**Step 5:** Add the 220k resistor. Do not insert the ends of this resistor into the turret lug. Wrap the ends around the upper tier of the turret lugs. Do not solder yet.

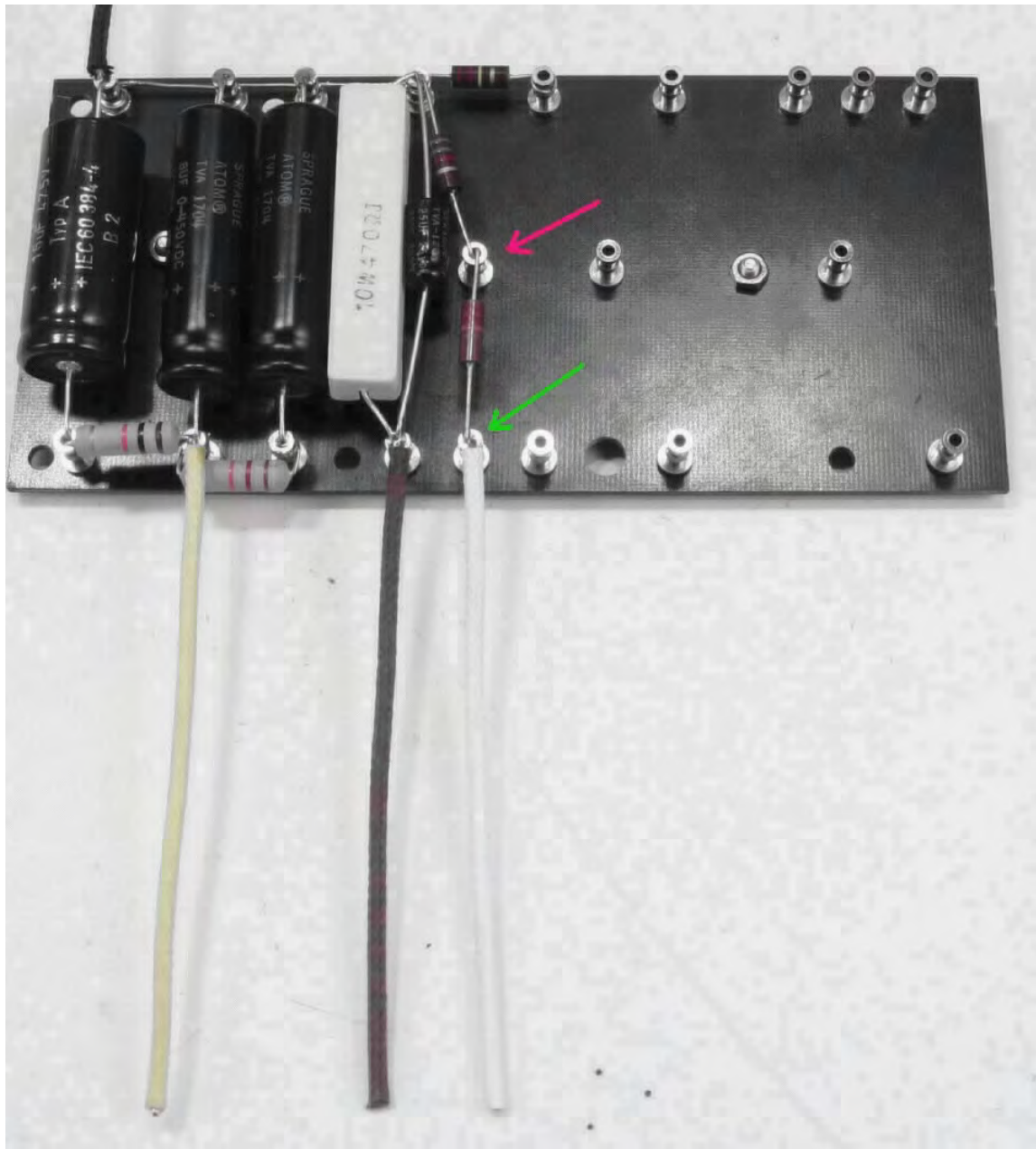


**Step 6:** Add the 470ohm/5w (10w shown in picture); 25uf capacitor; and 1k5 resistor. These components will be inserted into the tops of the turret lugs. The resistors are not polarized and can go in either direction. The capacitor is polarized and should be oriented just as the previous capacitors were. Insert 3" of brown wire into its turret lug. Now solder at the two green arrows. Be sure to solder the side of the turret lug where one end of the 220k resistor is wrapped around it.

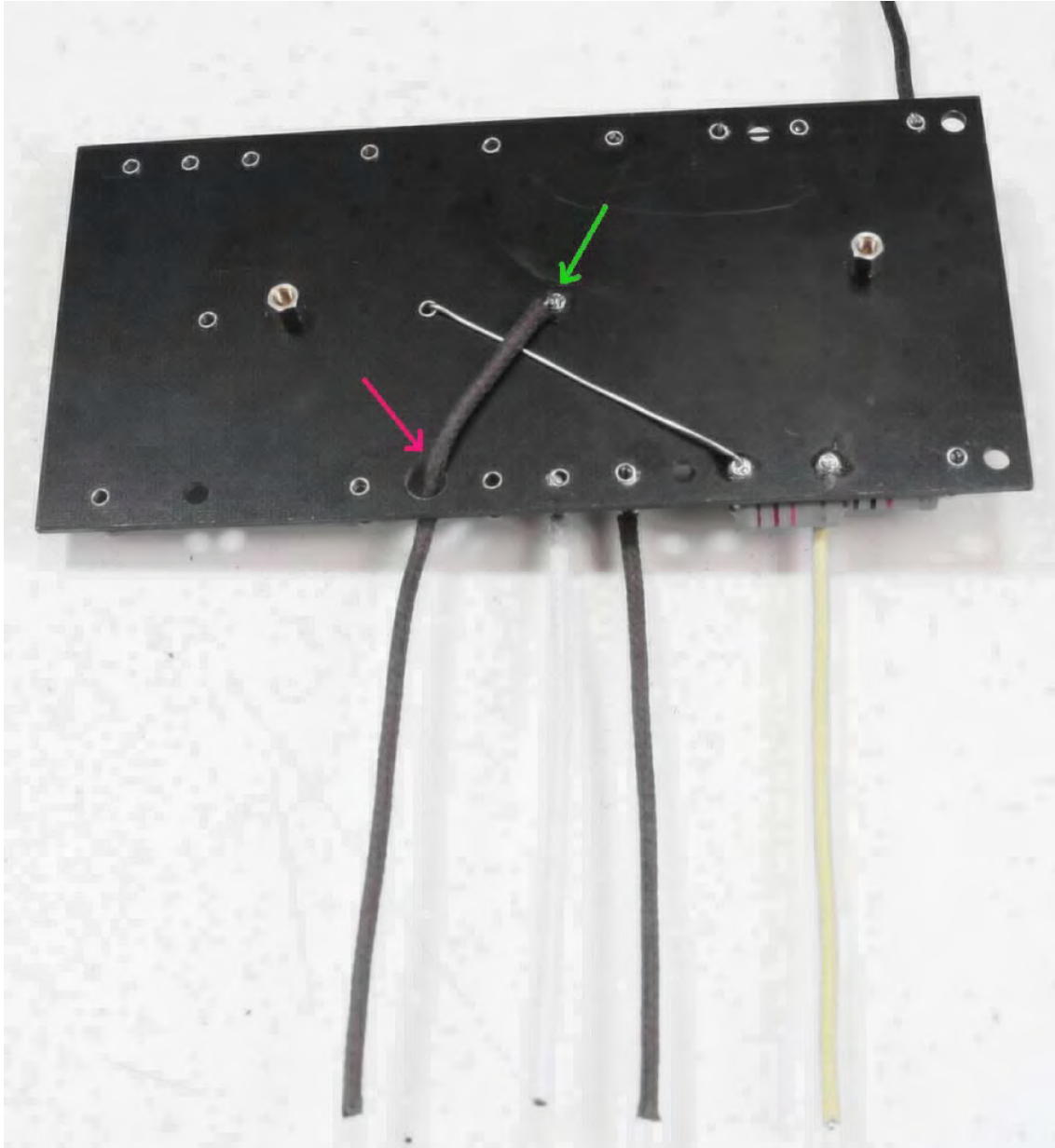




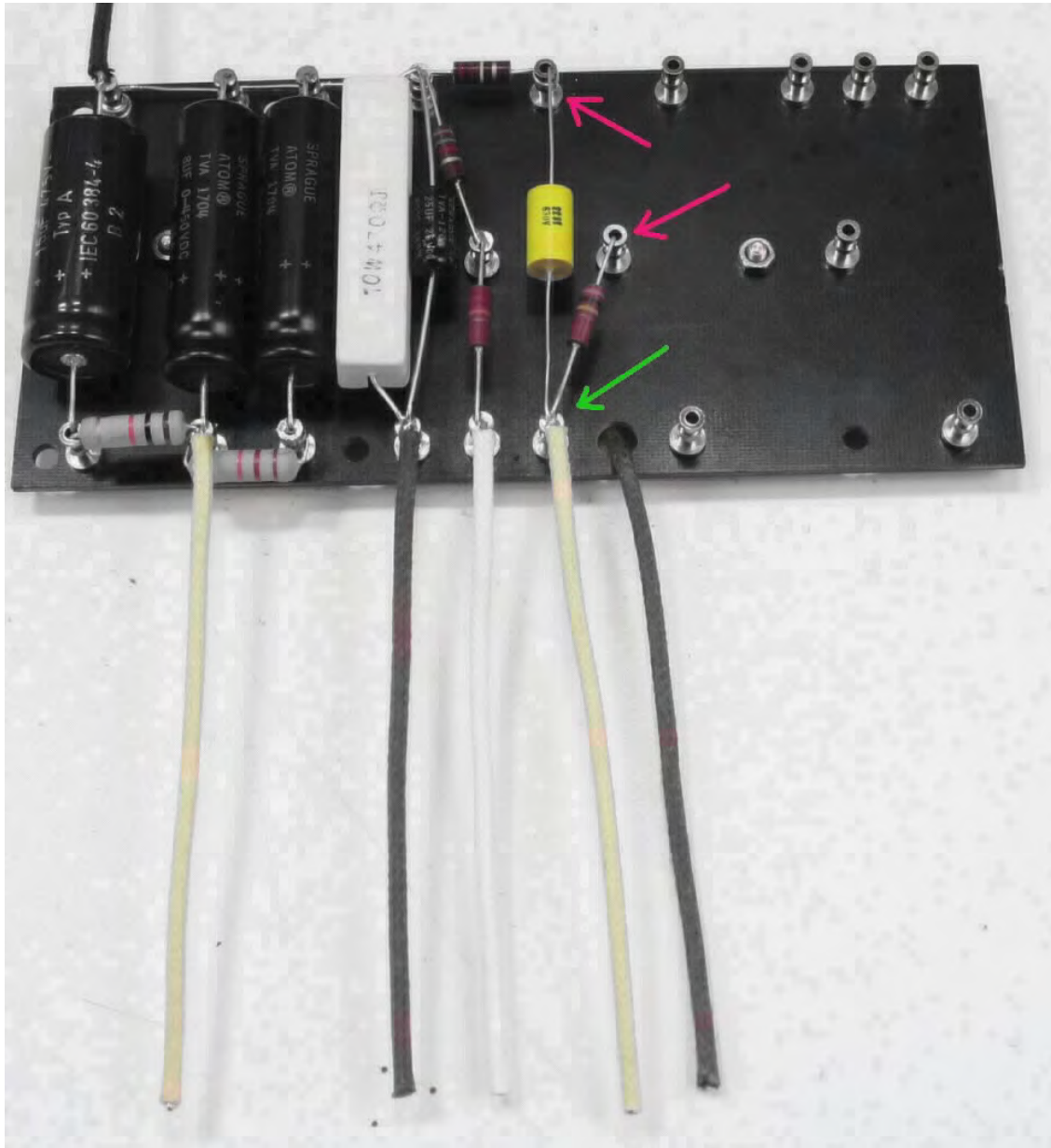
**Step 7:** Add the 1/2watt - 22k resistor and 3" of white wire. Solder only at the green arrow.



**Step 8:** Add 4" of brown wire on the underside of the board. Solder at the green arrow. Slide the other end of the brown wire through the hole in the board.

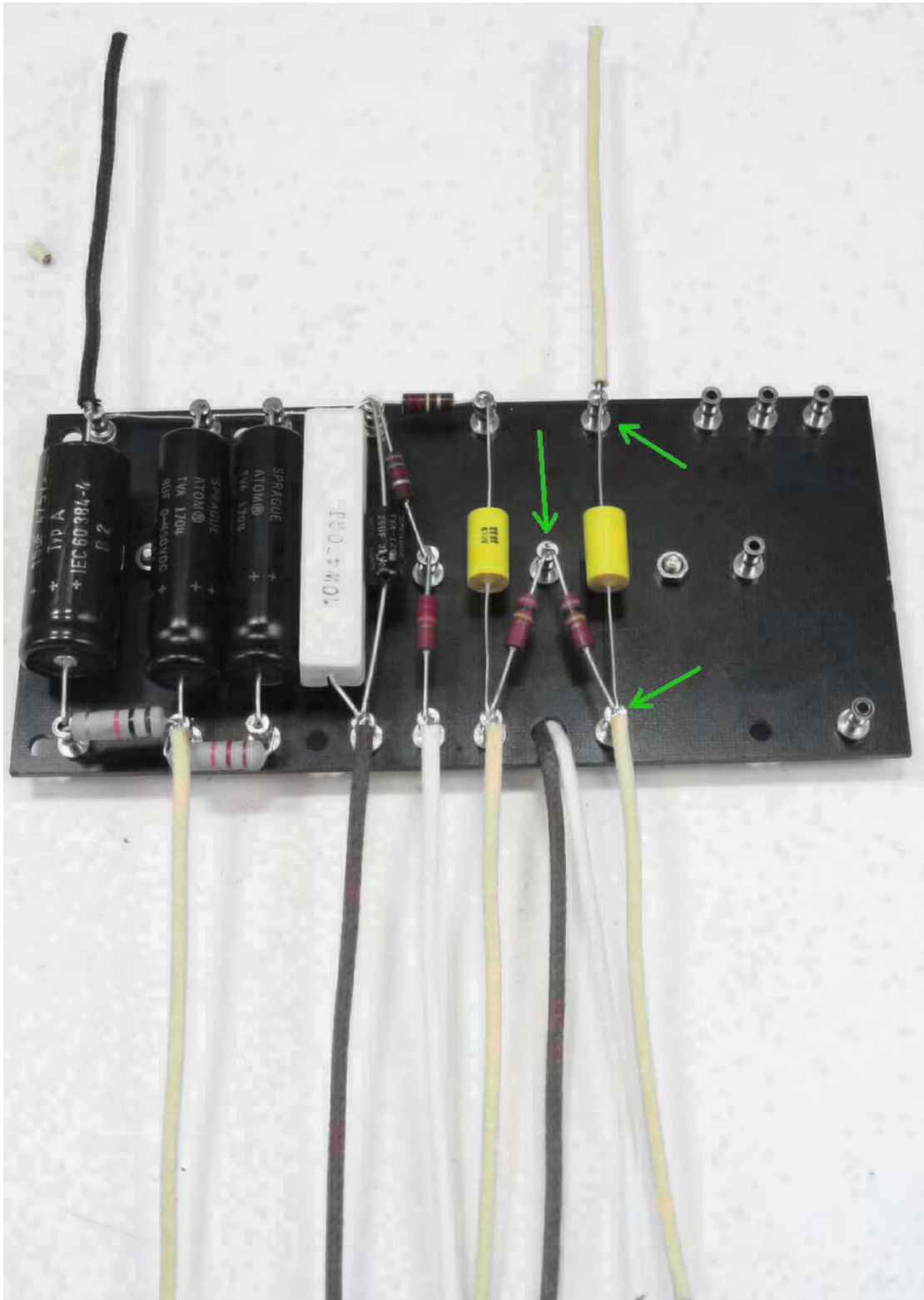


**Step 9:** Add one .022uf film capacitor and one 100k resistor. Neither of these are polarized and can be oriented in either direction. Also add 3" of yellow wire. Solder at the green arrow.

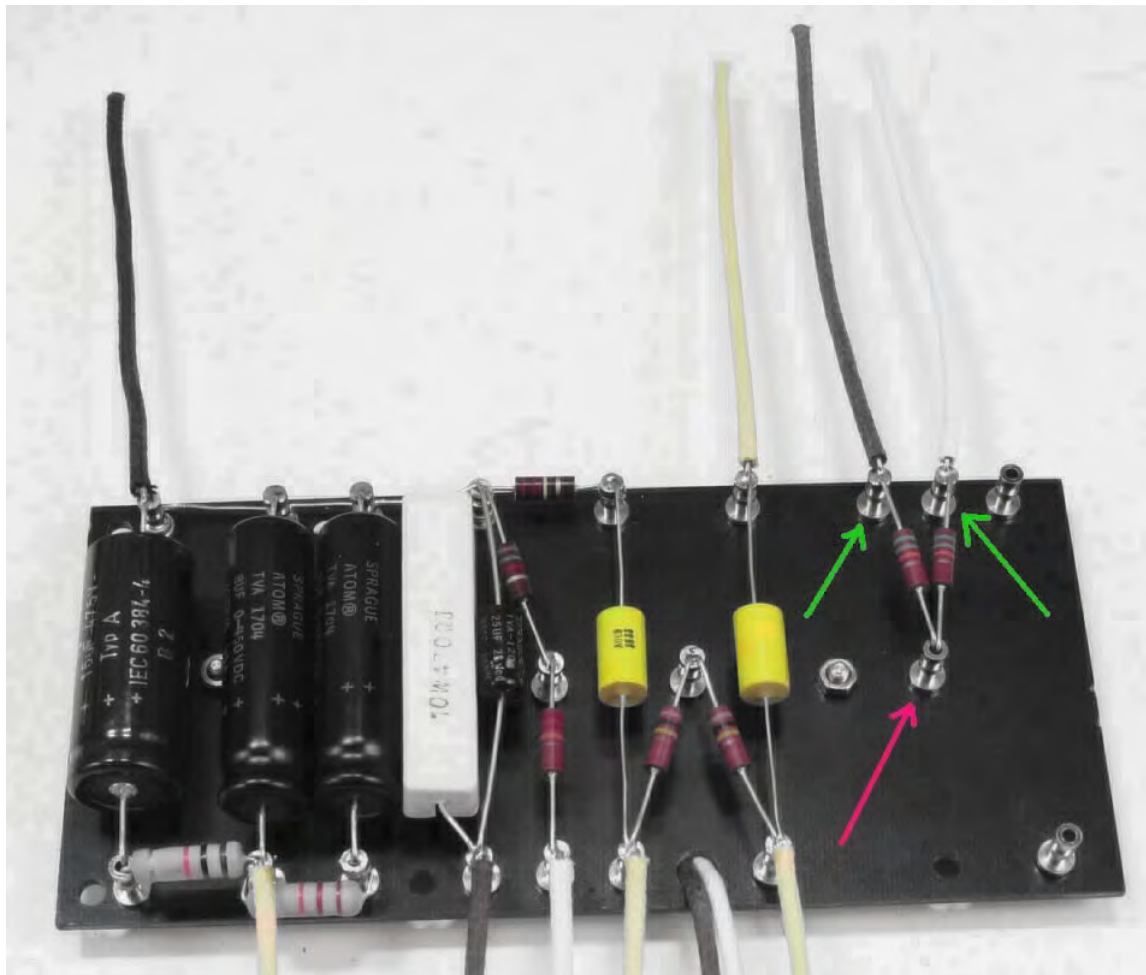




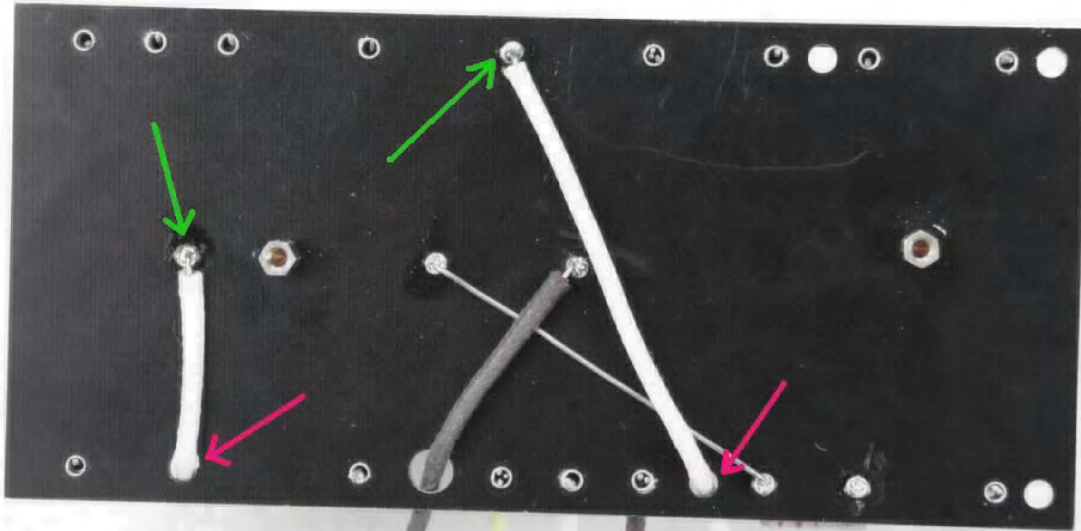
**Step 10:** Add the remaining .022uf film cap and 100k resistor. Add 2 pieces of 3" yellow wire and solder at the green arrows.



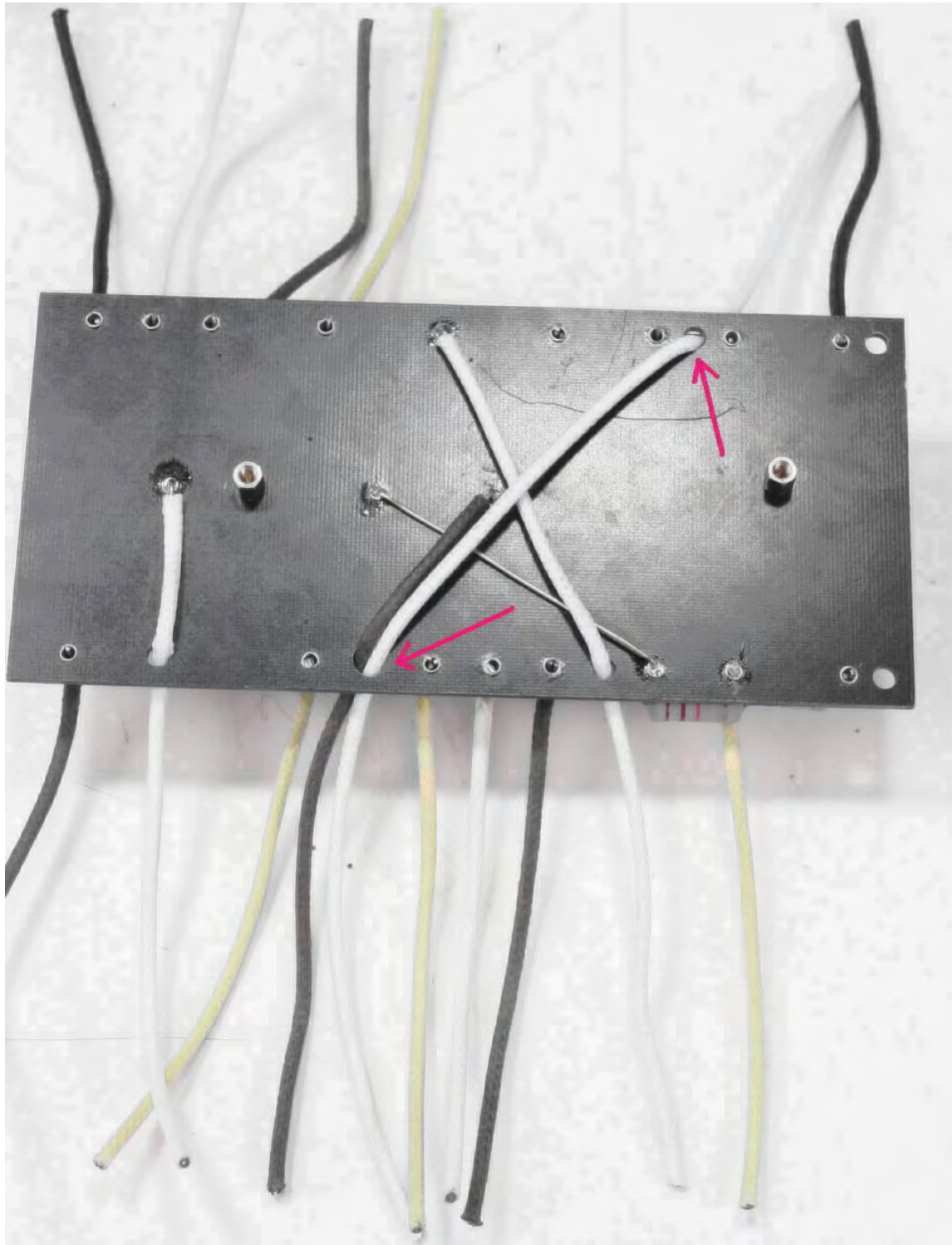
**Step 11:** Add the two 68k resistors. Insert 3" of brown wire and 3" of white wire. Solder at the green arrows.



**Step 12:** Insert 4" of white wire into the underside of the turret where the two 68k resistors meet and solder. Slide the other end of the wire through the hole in the board. Insert 5" of white wire into the underside of the turret lug where the 220k resistor meets with the .022uf film cap and solder. Slide the other end of the wire through the hole in the board. Make sure that the topsides of the solder lugs get soldered as well. Don't forget to solder the side of the turret lug where the 220k resistor wraps around it.

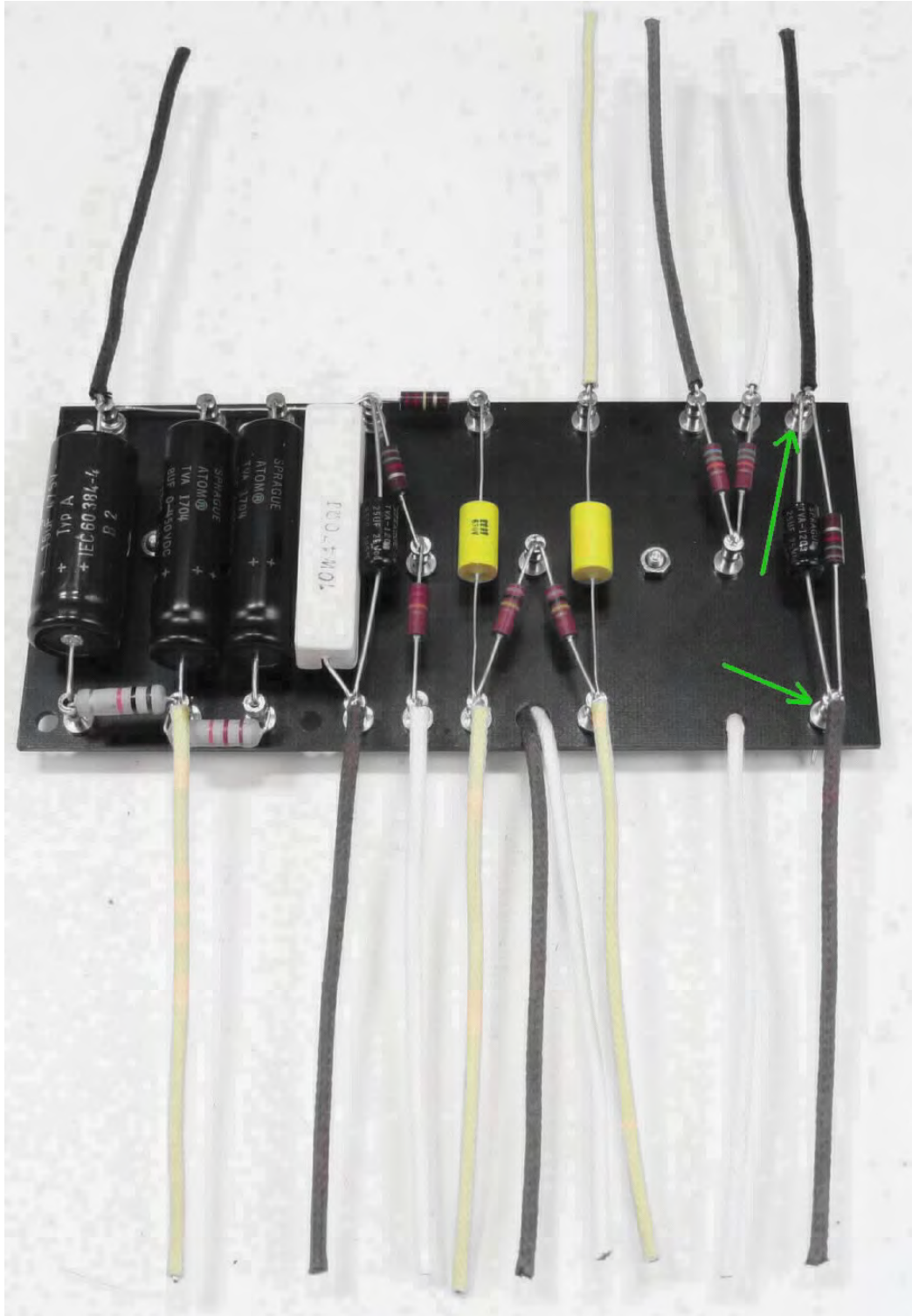


**Step 13:** Slide 8" of white wire through the two holes in the board. This wire doesn't get soldered to anything on the board, but it will get soldered to off-board components a little later.





**Step 14:** Add the remaining 25uf cap and 1k5 resistor. Be sure to orient the cap just as you have oriented the other electrolytic caps. Insert 3" of brown wire and 3" of black wire. Solder at the green arrows.



# WIRING

**A Green Arrow means  
action is required at this  
point, and you will need  
to solder**

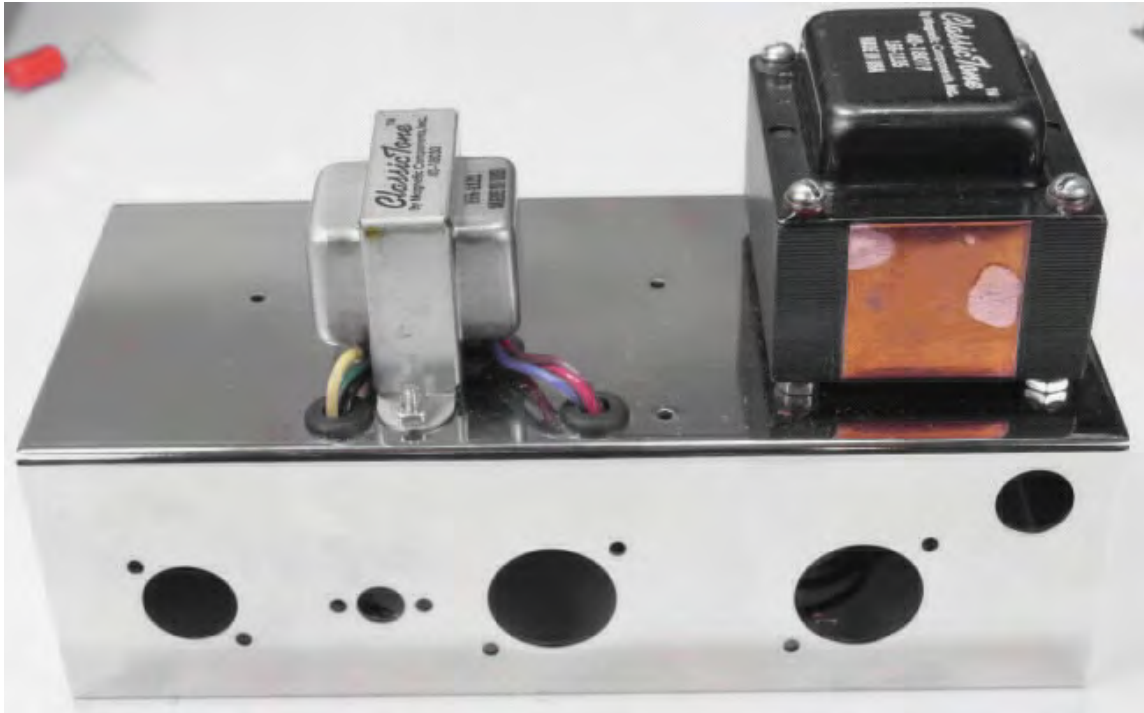


**A Red Arrow means  
action is required at this  
point, but DO NOT!!!  
solder**

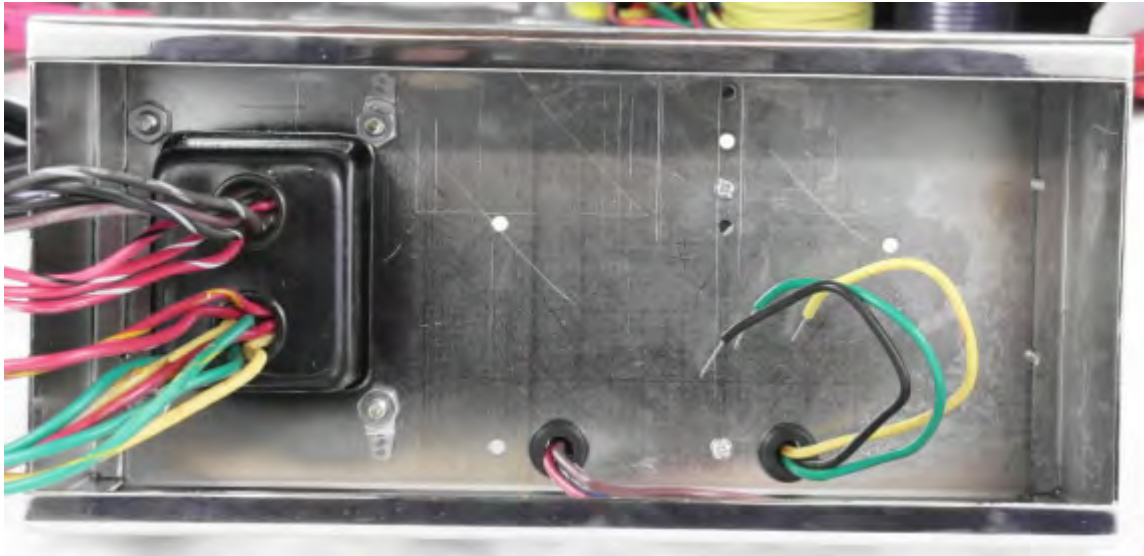


**Step 1:** Install the rubber grommets into the chassis where the output transformer wires go. Then install the power and output transformers.

Orient the output transformer so that the red/blue/brown wires go into the hole closest to the power transformer. Use two 4/40 screws and nuts and two #4 internal lock washer to secure the output transformer. Install the screws so that the nut and washer go on the outside of the chassis.

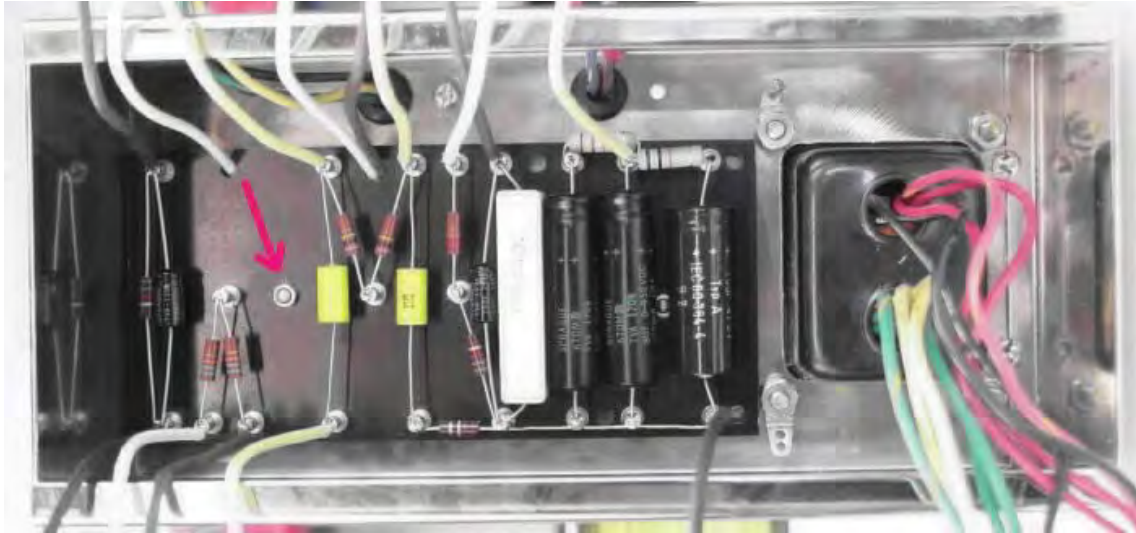


**Step 1 continued:** remove four of the 8/32 nuts from the power transformer (one from each mounting screw). Install the power transformer into the chassis. Orient the power transformer so that the brown and black wires are closest to the “tube side” of the chassis. Be sure to add the two Solder Terminal/lock washers to the two inside mounting screws before securing the power transformer with the 8/32 nuts.

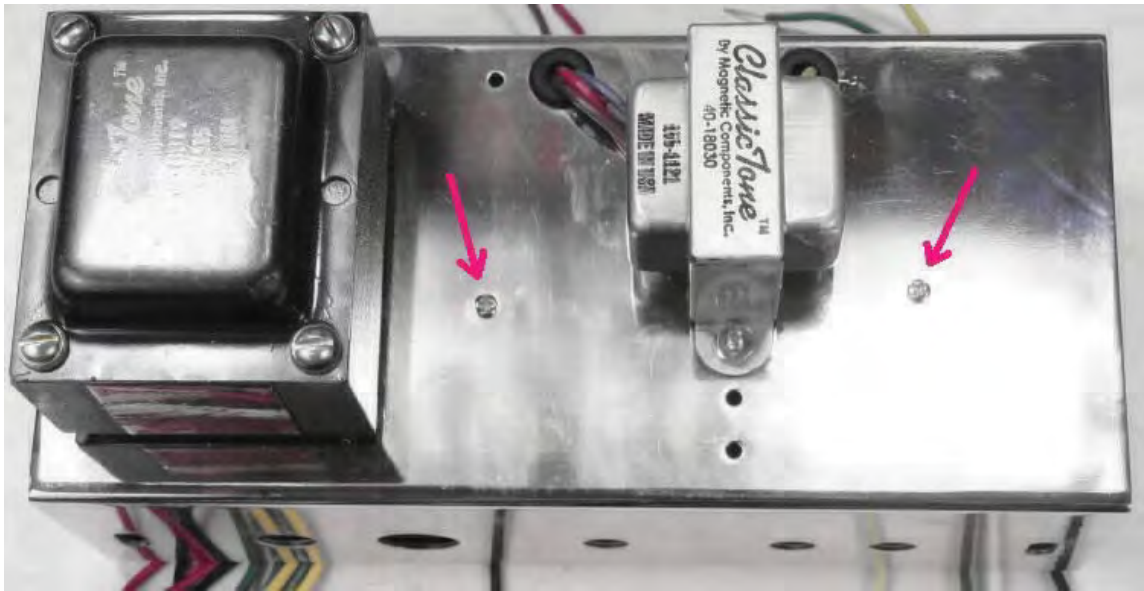




**Step 2:** Install the circuit board. This can be a little tricky. First loosen the nut that holds the standoff with the red arrow pointing to it, but do not remove it completely.

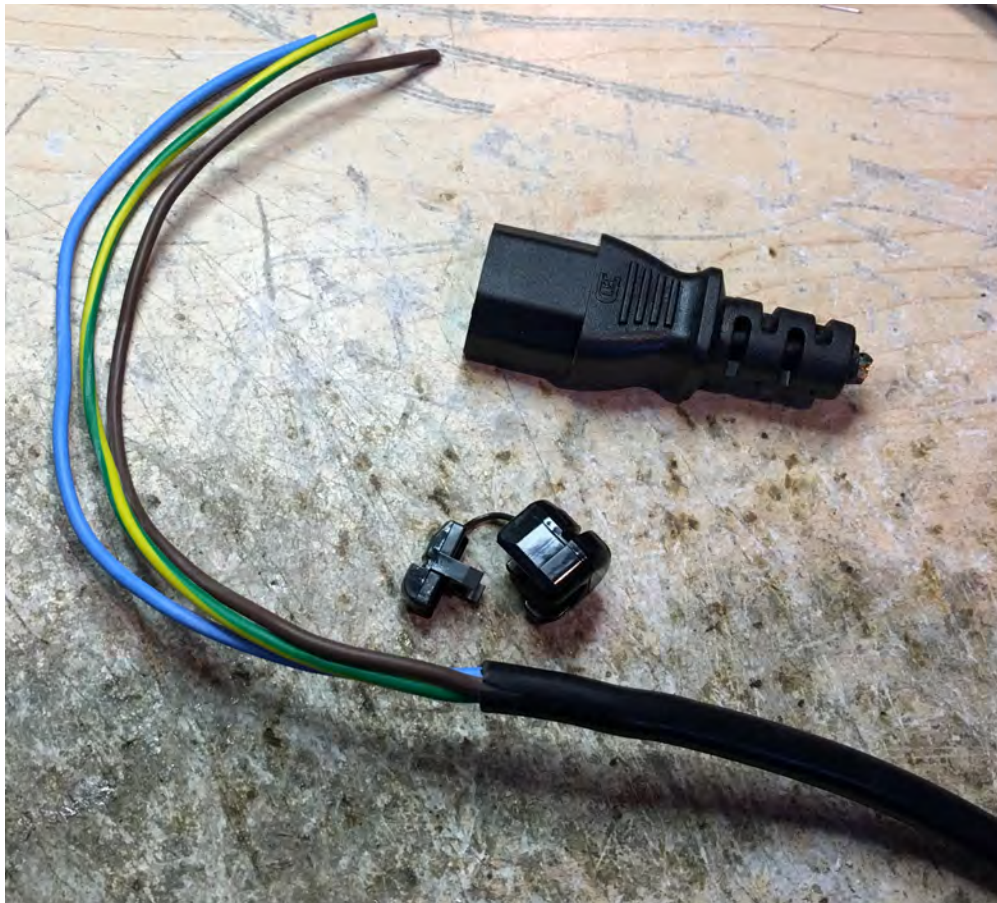


**Step 2 continued:** Next, very loosely screw the standoff screw into the female end of the standoff to the left between the two transformers. Then line up the holes on the right and thread the second standoff screw into the female end of the other standoff. Once you have both screws threaded into the standoffs, tighten them. Then tighten the nut that holds the standoff to the circuit board again.



**Step 3:** Cut off the female plug end of the power cord. Then strip the outer plastic layer to expose 12" of the 3 conductors. Be very careful not to cut the insulation of the 3 conductor wires. The best way to remove the outer plastic layer is not by cutting through the layer completely, but by scoring it first and then peeling it off...similar to the way you'd peel an orange.

**Note:** Depending on your plug, your ground wire may be a different color. Use a multimeter and find the ground wire using the continuity setting. In this case, the green/yellow wire is ground.

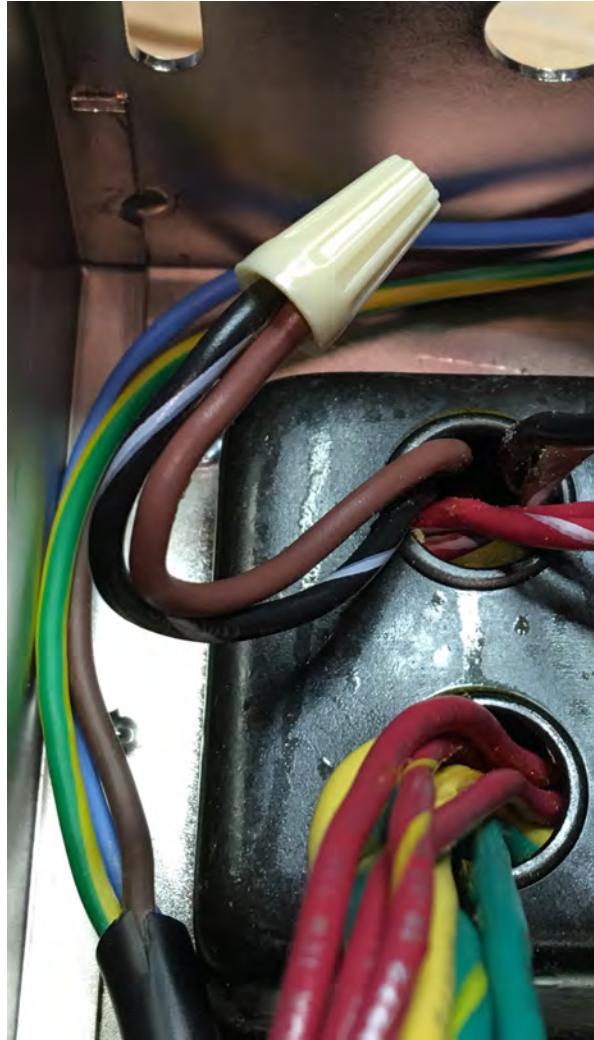


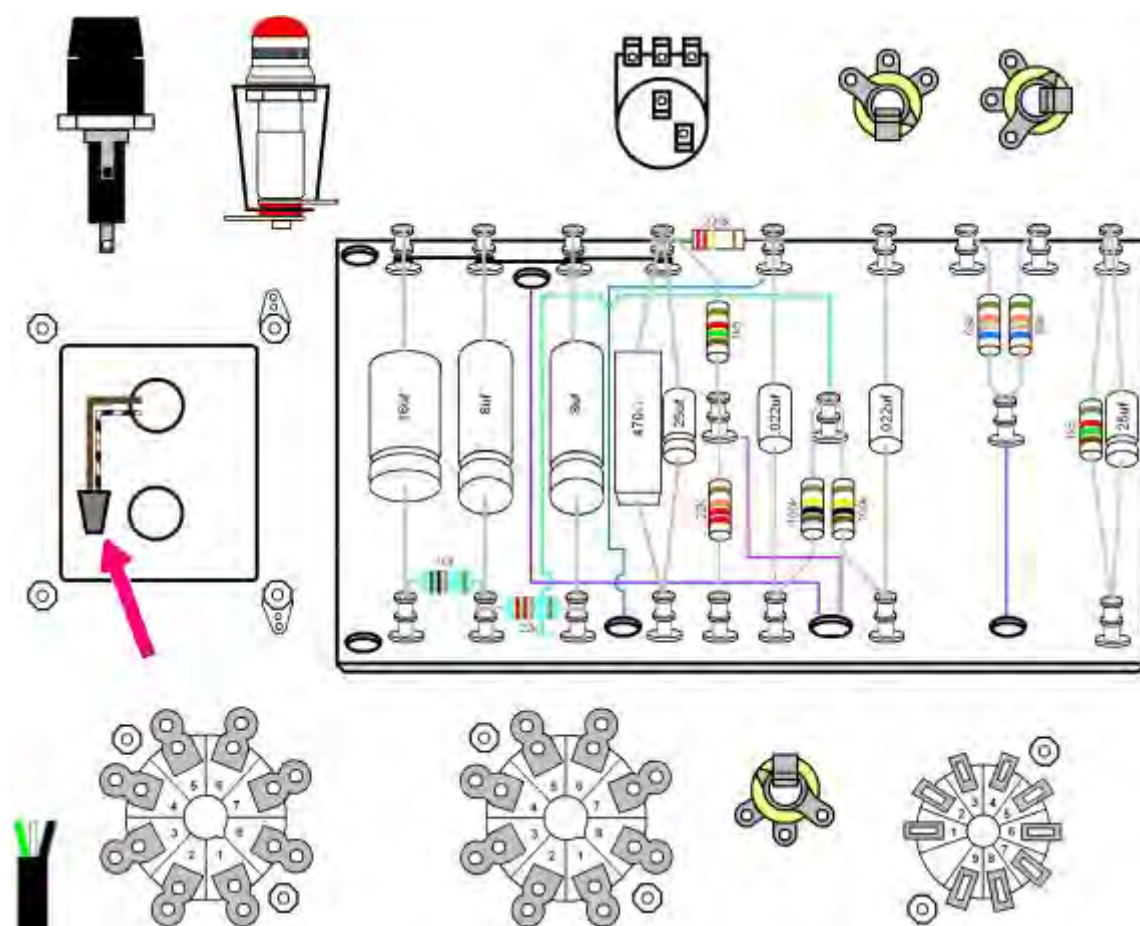
**Step 4:** Install the power cord and power cord strain relief. You will probably need a pair of pliers to do this. Vice grips are especially handy. Use the pliers to squeeze the strain relief closed and then push it into the chassis. Note that the strain relief/power cord will still be able to spin around, so once you've soldered the power cord, be careful not to let it get twisted too much. Remember that the chassis is ultimately supposed to be mounted in a cabinet of some sort and that a cable mount should be used to further secure the power cord.



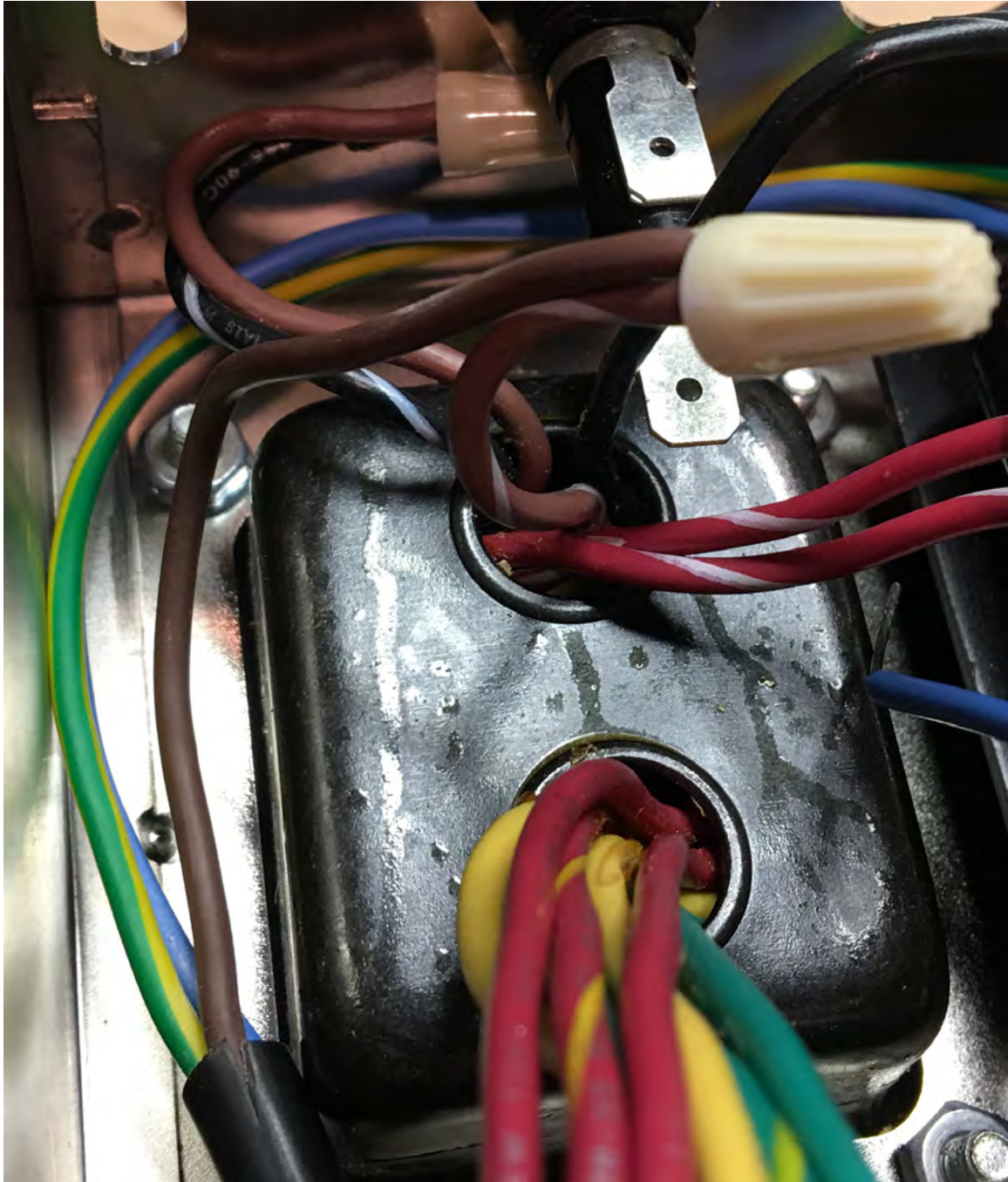


**Step 5:** Use a wire nut to connect the black/white AND brown power transformer wires. Do not confuse these wires with the brown/white and solid black wires. You will want to cut these wires to an appropriate length and then strip about 1/2" off each end. Twist the wires together and then screw the wire nut on.

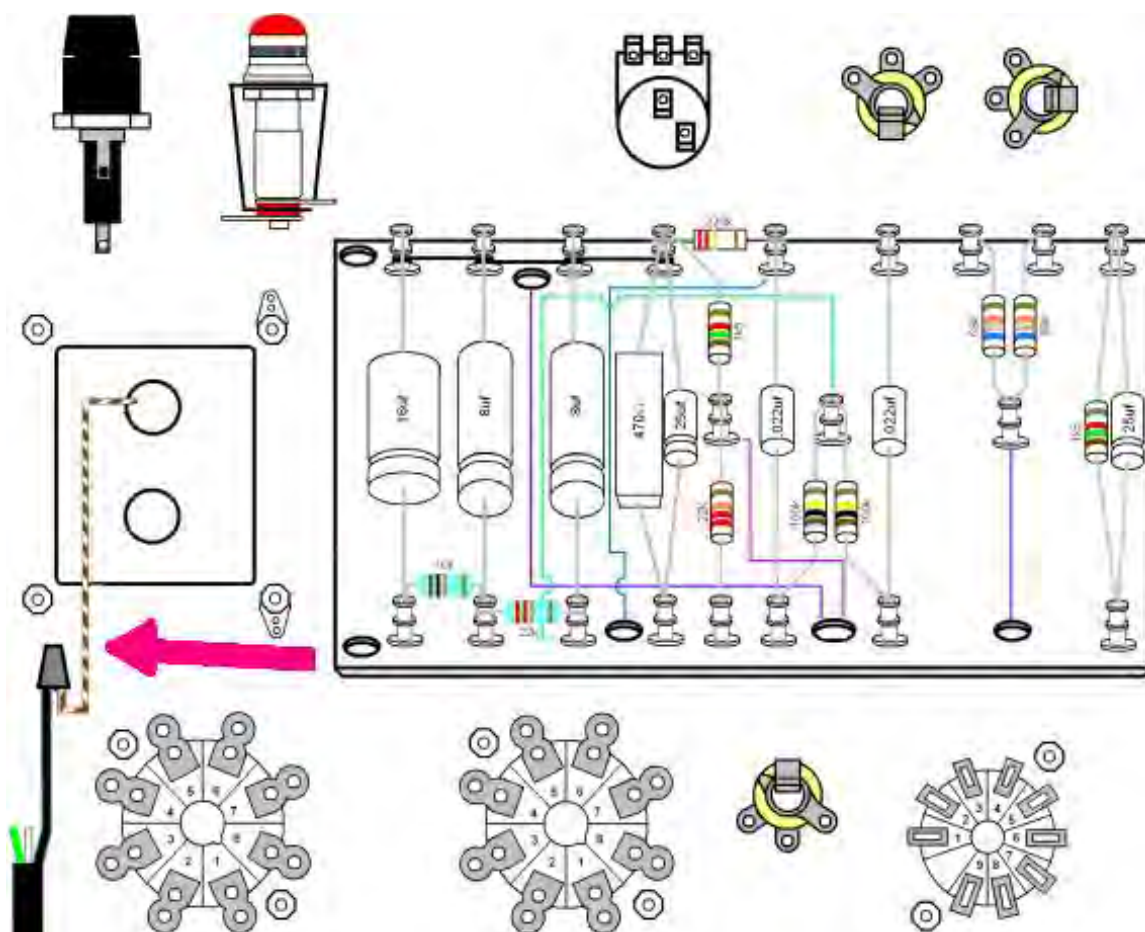




**Step 6:** use a wire nut to connect the brown/white wire from the power transformer to a hot wire from the power cord. We are using the brown power cord wire for this.



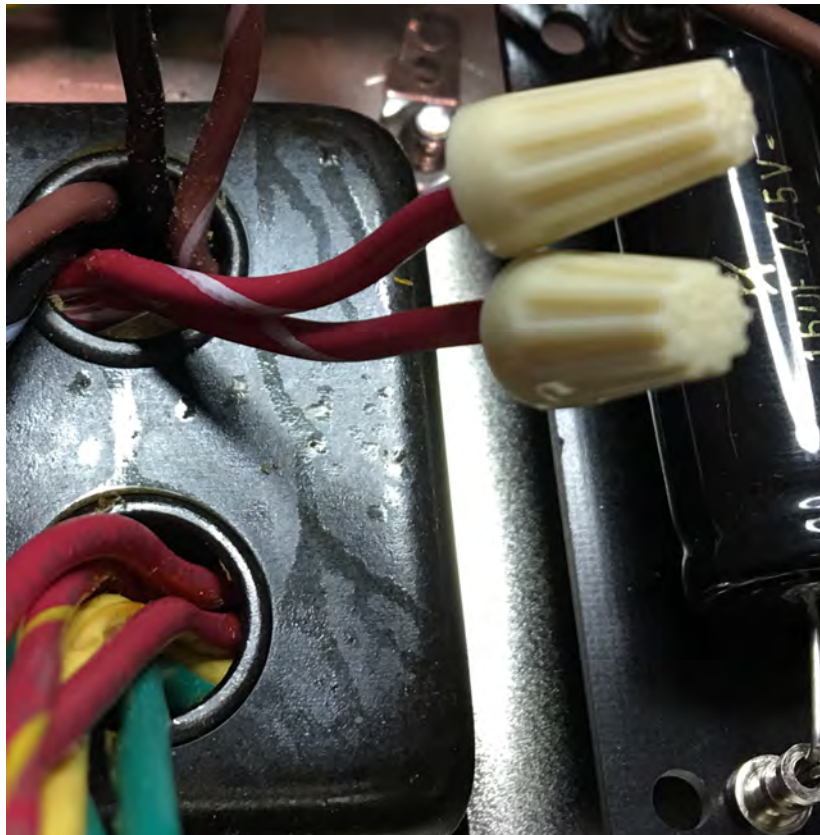


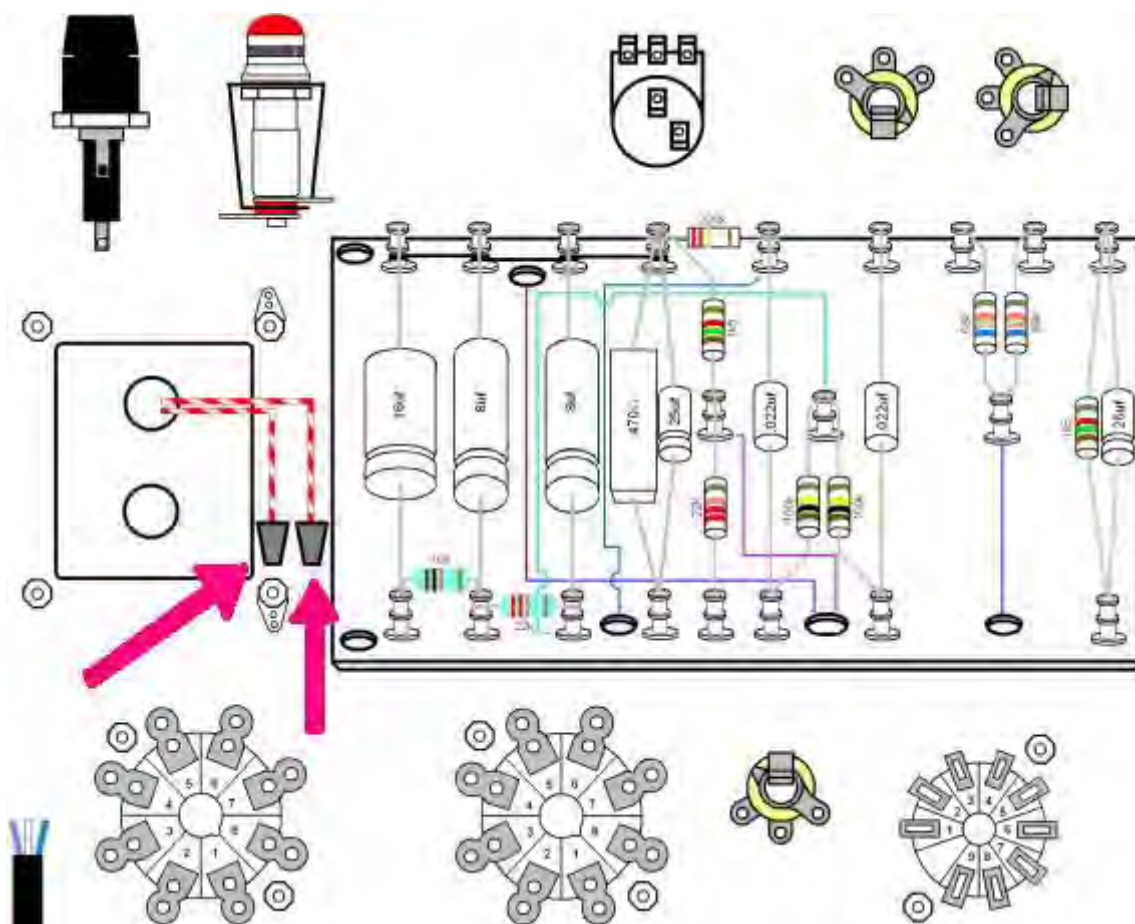




**Step 7:** Cap off the red and white striped wires of the power transformer.

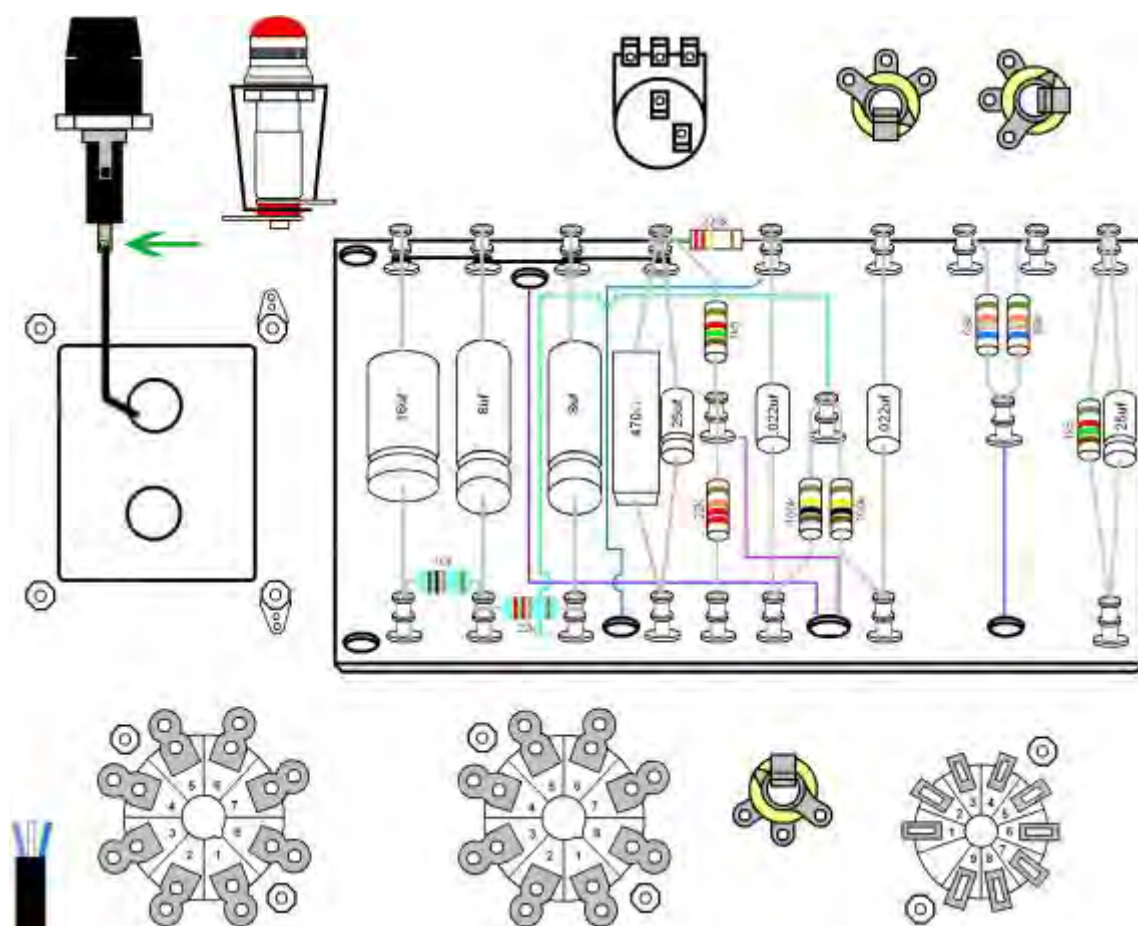
Do not confuse these with the red/black wire; the red/yellow wire; or the solid red wires. The red/white wires are the 550VAC secondary taps. They have a lower voltage output than the solid red secondary taps. We do not need the red/white wires. They do not get connected to anything. **DO NOT CAP THEM TOGETHER!!! Be sure to use separate caps for each.**





**Step 8:** Install the fuse holder into the chassis. Connect the black power transformer primary wires to the solder terminal of the fuse holder that is closest to the transformer.





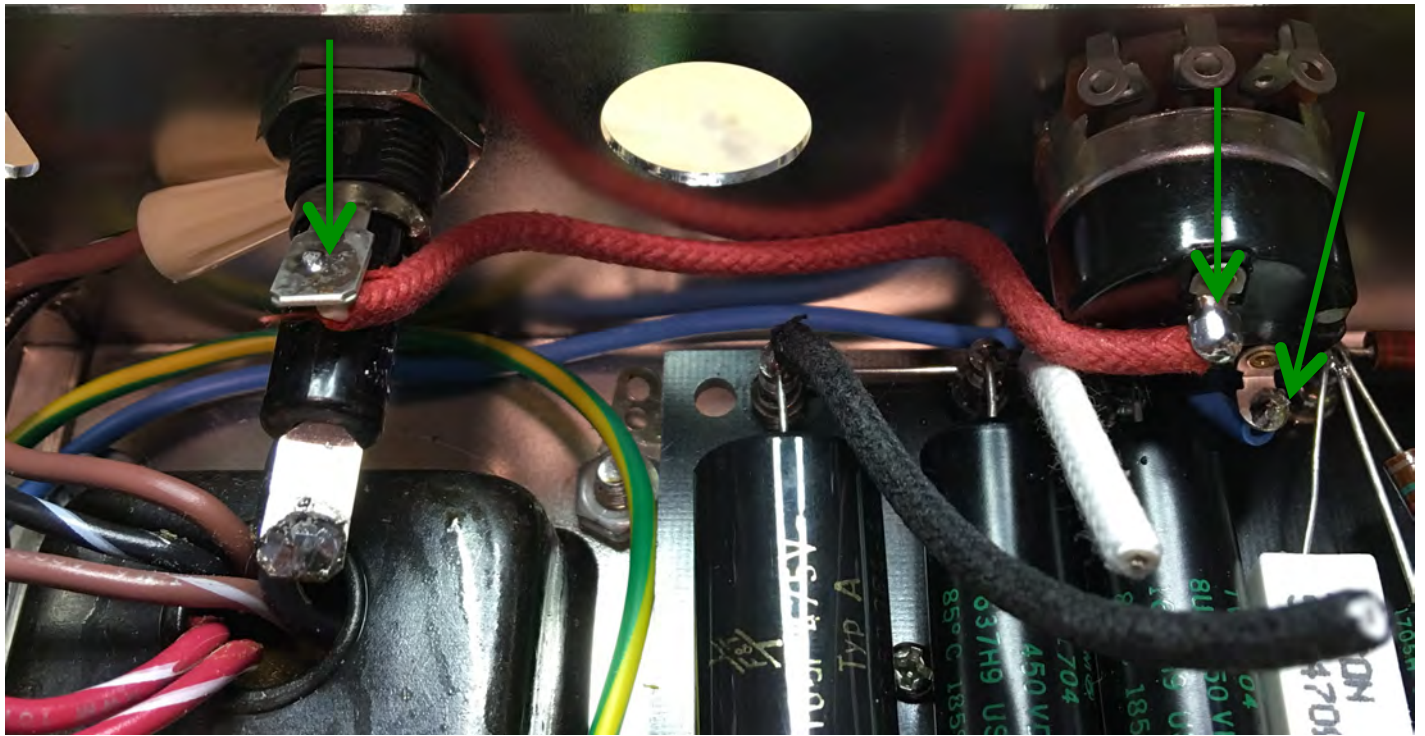


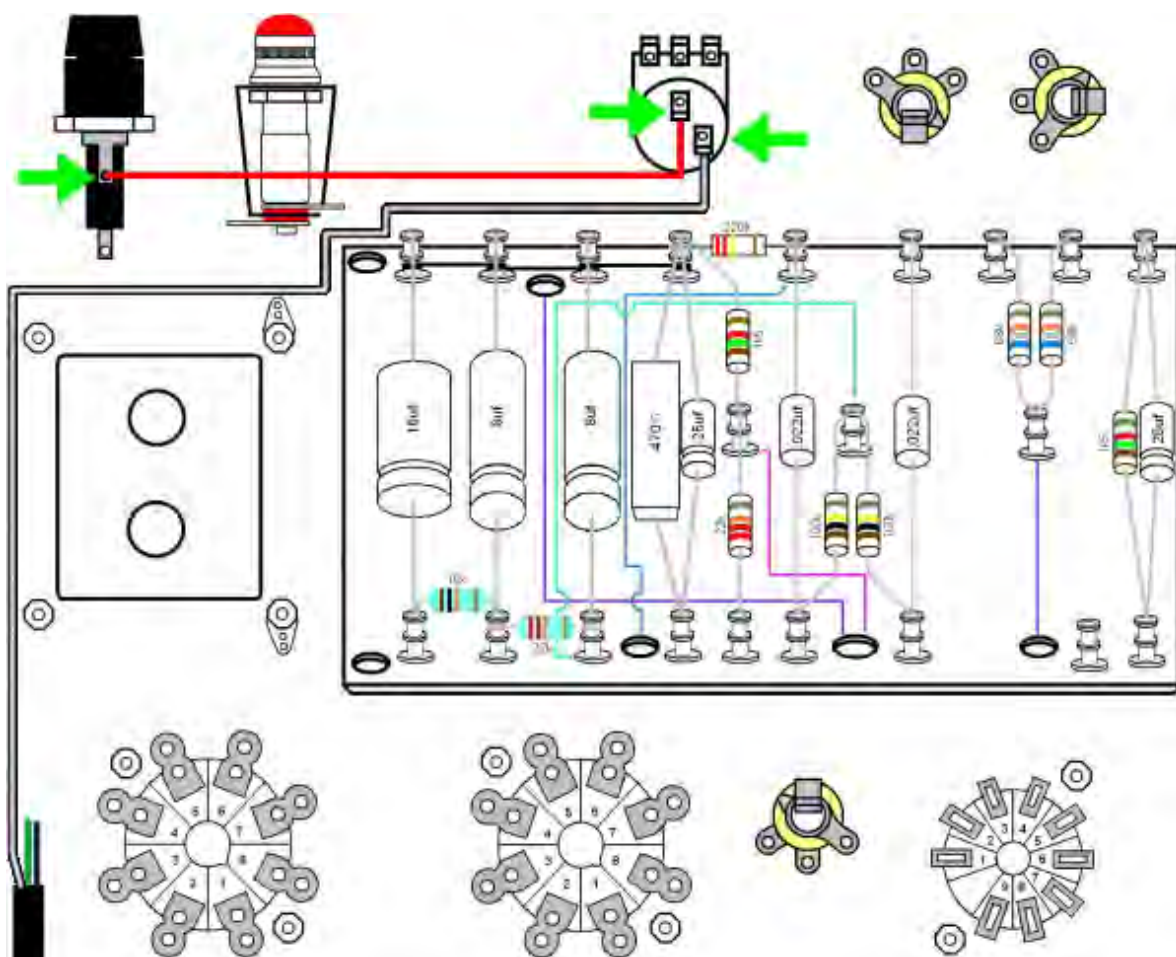
**Step 9:** Install the Volume potentiometer/ on-off switch. Snap the little node off the face of the pot first. Place the 3/8 internal lock washer between the pot and the chassis to keep it from spinning when you turn the knob.

The flat washer and nut go on the outside of the chassis.

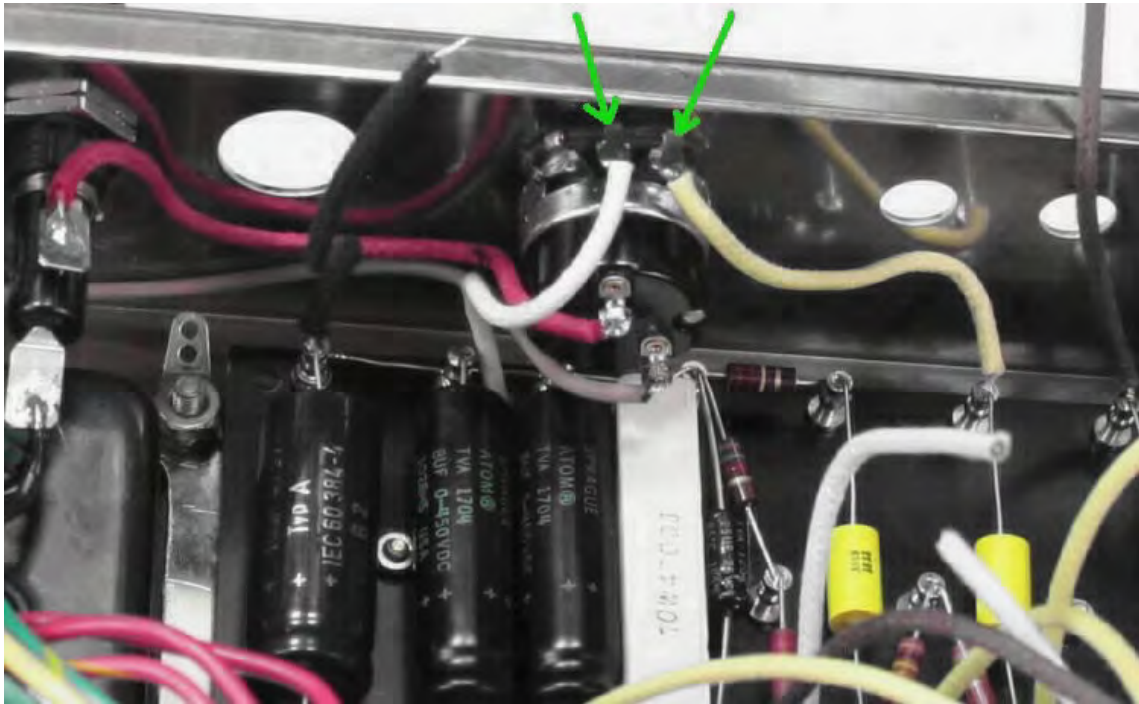


**Step 10:** Connect the other hot wire to one of the switch terminals of the Volume Potentiometer/on-off switch. This is an SPST switch, so it doesn't particularly matter which terminal you connect it to, but to avoid confusion, connect it to the terminal that is slightly more towards the right. Then use about 4" of the red cloth covered wire to connect the other switch terminal to the remaining terminal on the fuse holder.

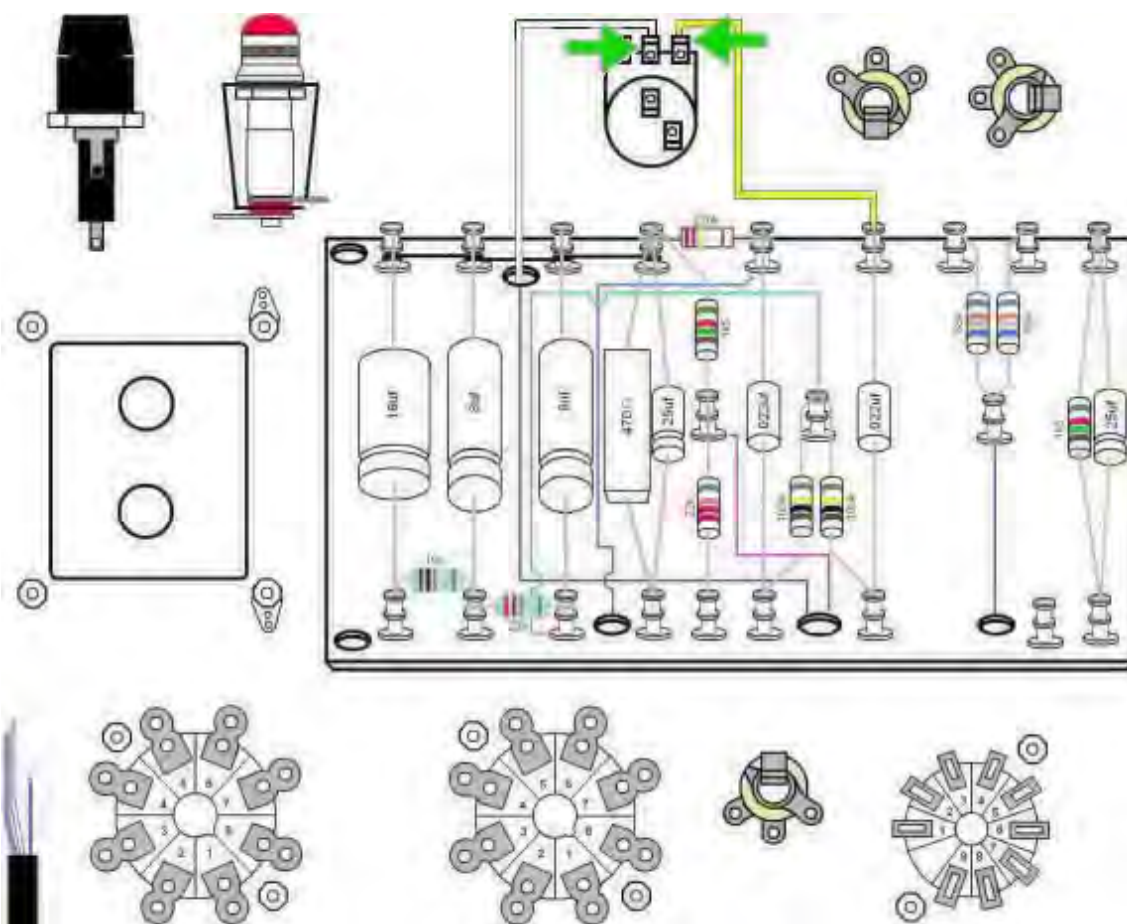




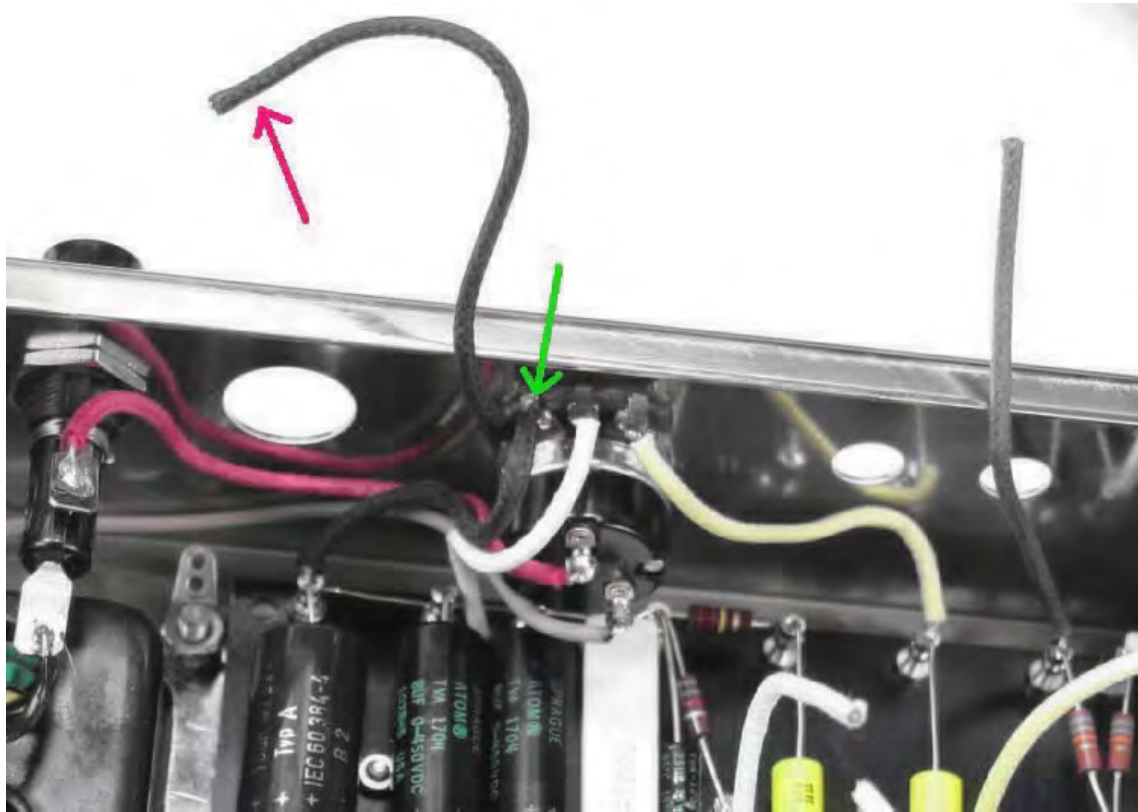
**Step 11:** Connect the white wire to the center lug of the pot. Connect the yellow wire to the lug on the right.

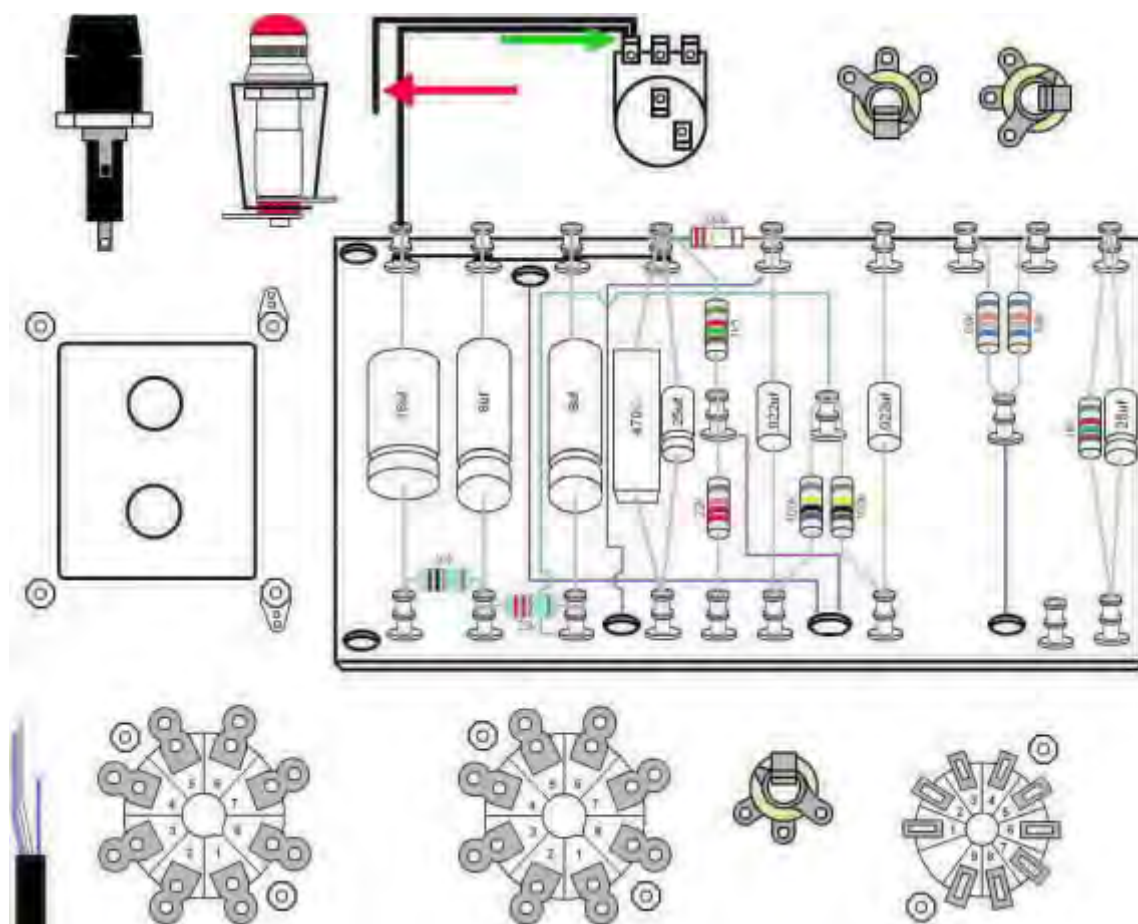






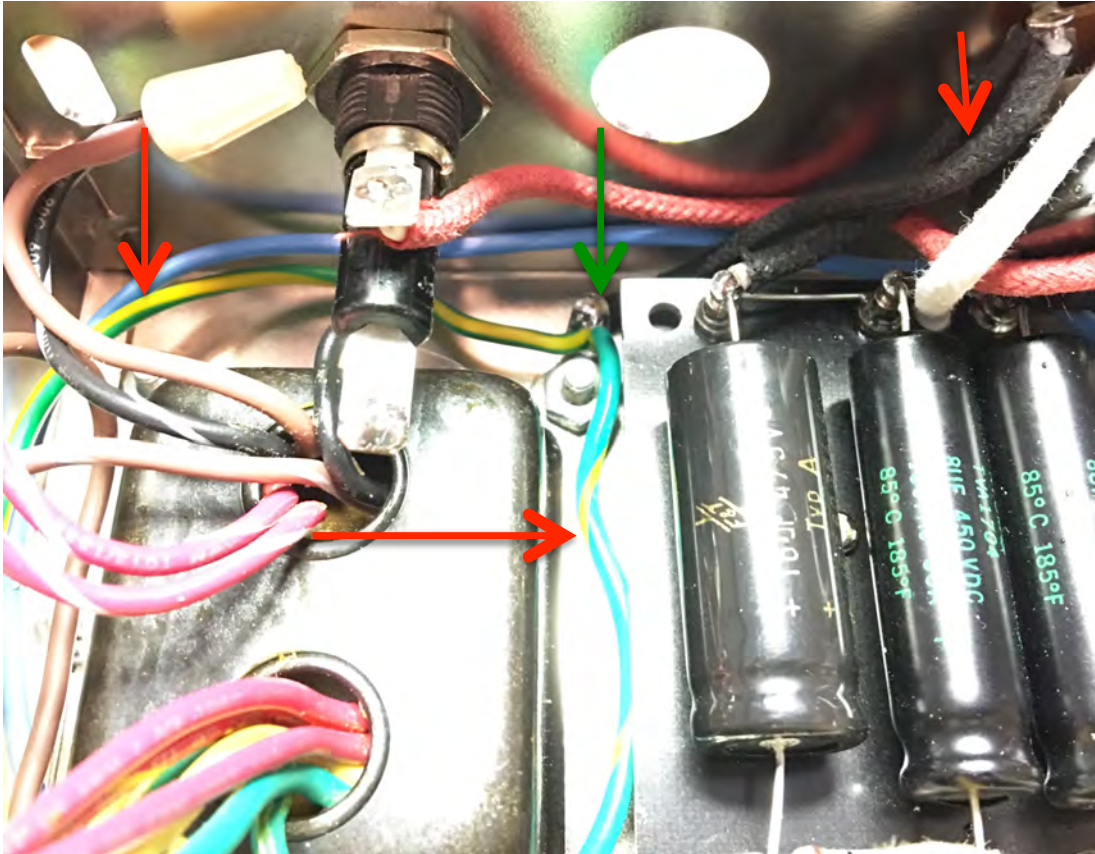
**Step 12:** Insert the black wire from the circuit board into the lug on the left. Insert a second piece of 4" black cloth covered wire into that same lug and solder both wires.



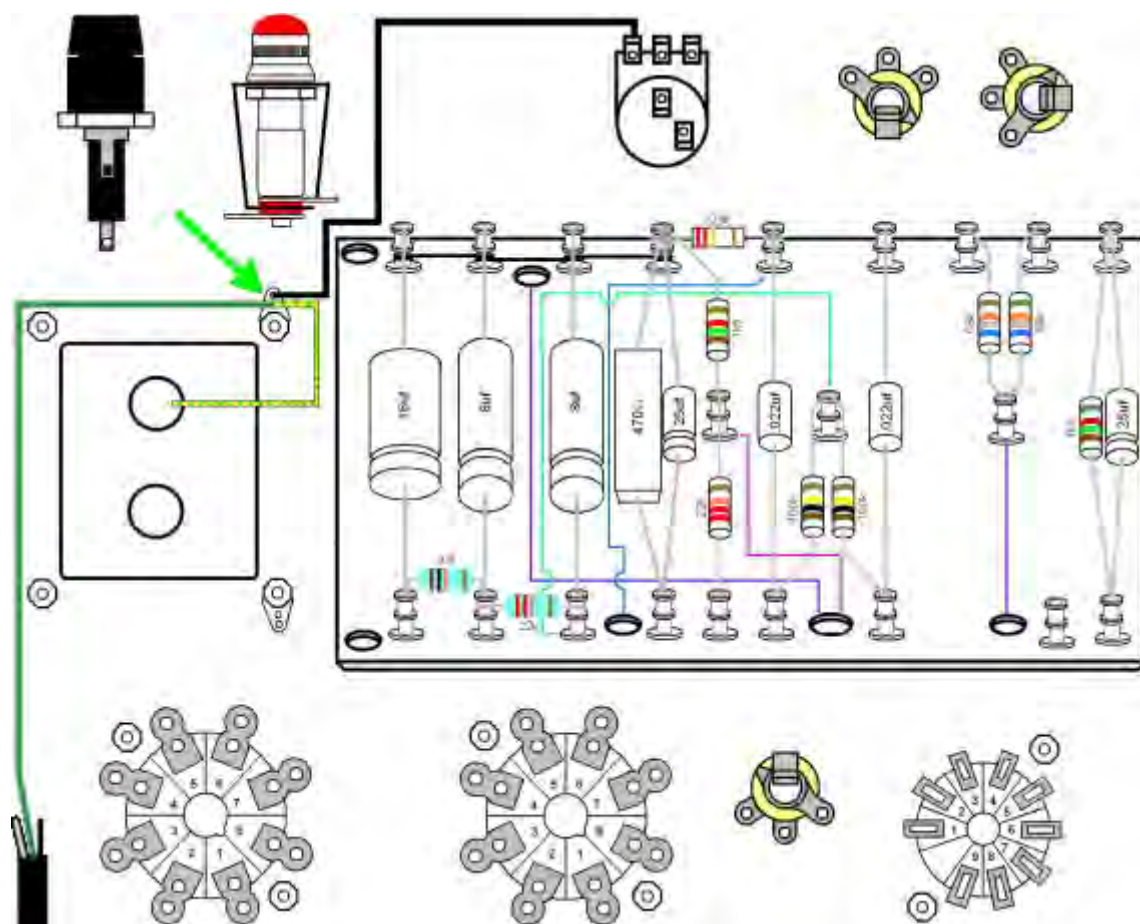


**Step 13:** Insert the other end of the black wire you just connected to the pot into the solder terminal/lock washer closest to the control side of the chassis.

Insert the green/yellow striped heater ground wire and the green/yellow power cord ground wire to the solder terminal/lock washer as well. Solder all three wires to the solder terminal/lock washer.

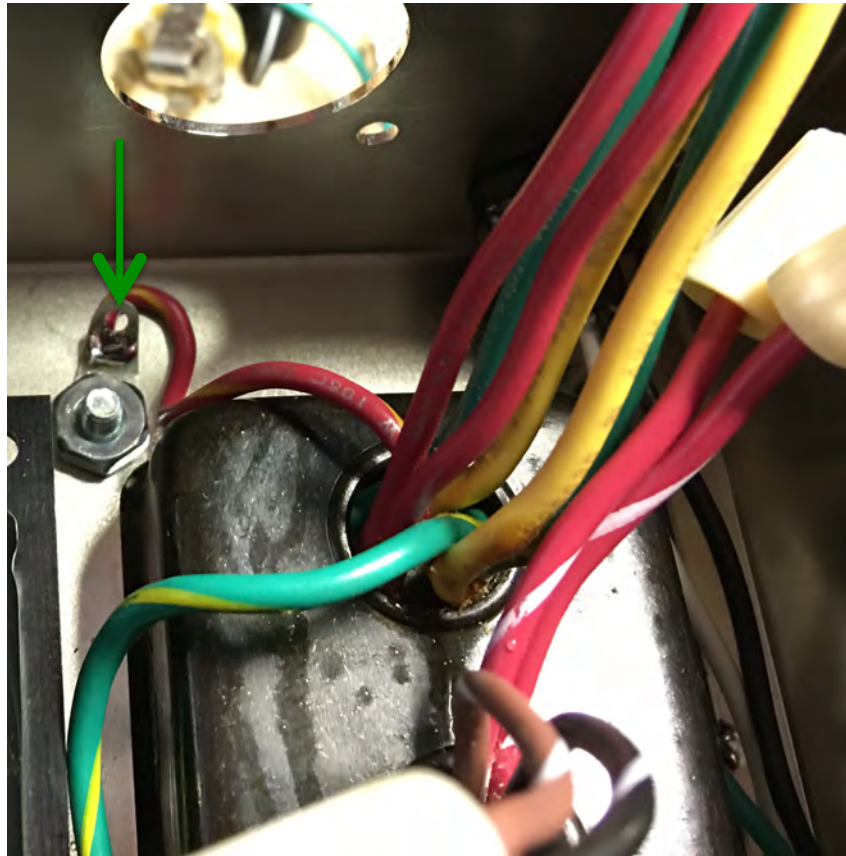


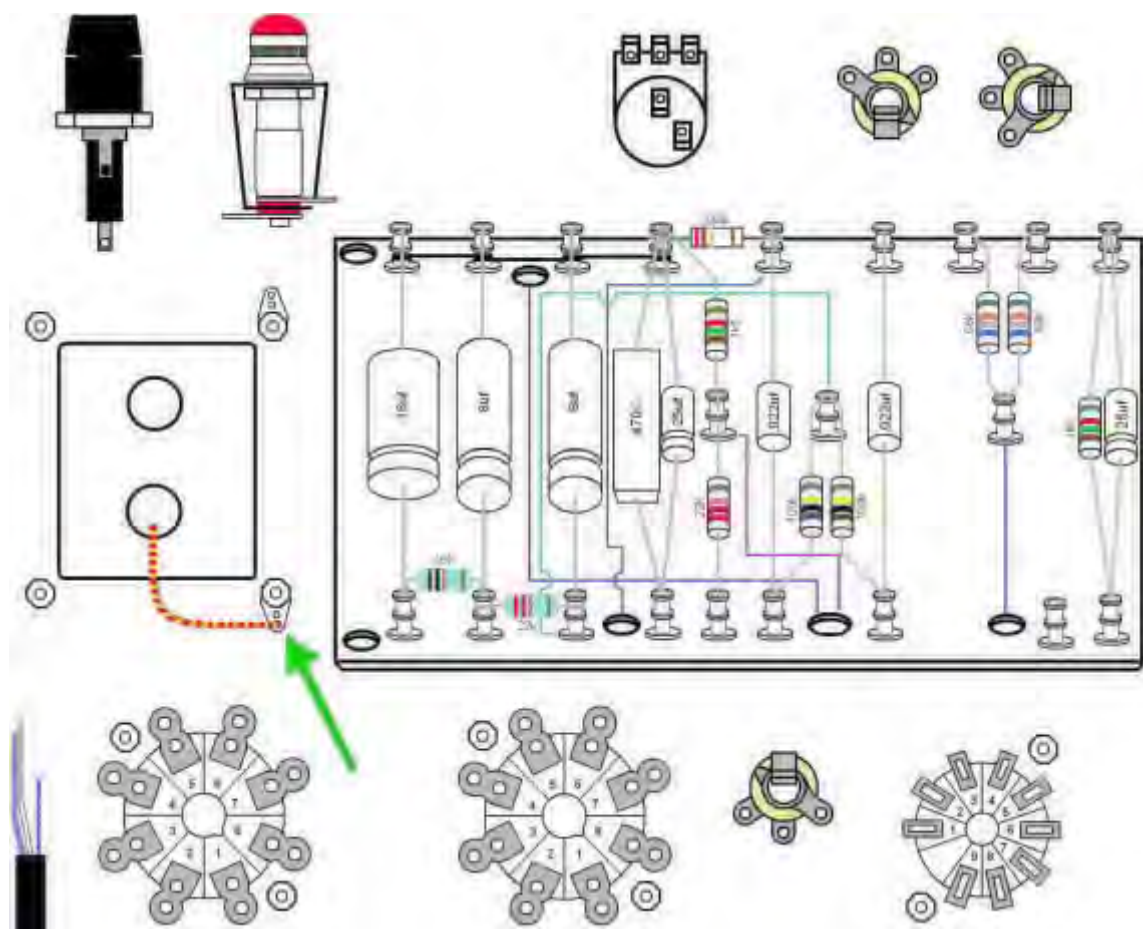




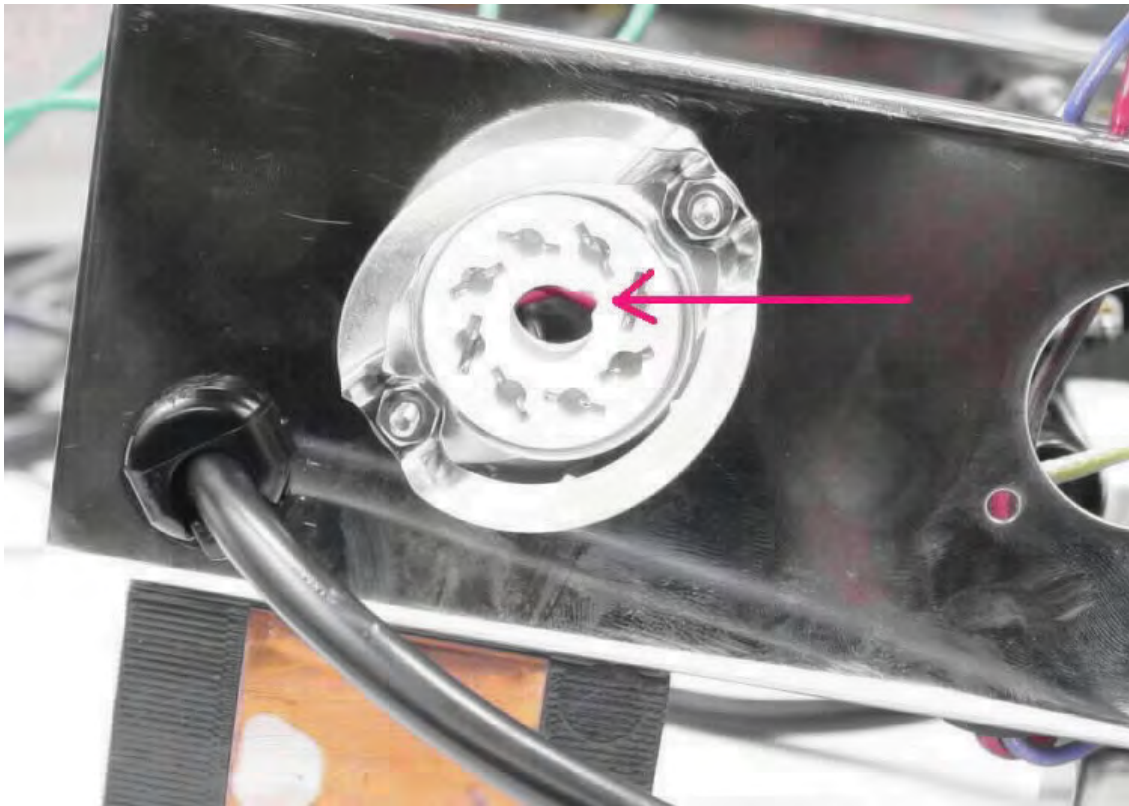


**Step 14:** Insert the red/yellow striped secondary center tap wire into the other solder terminal/lock washer and solder.

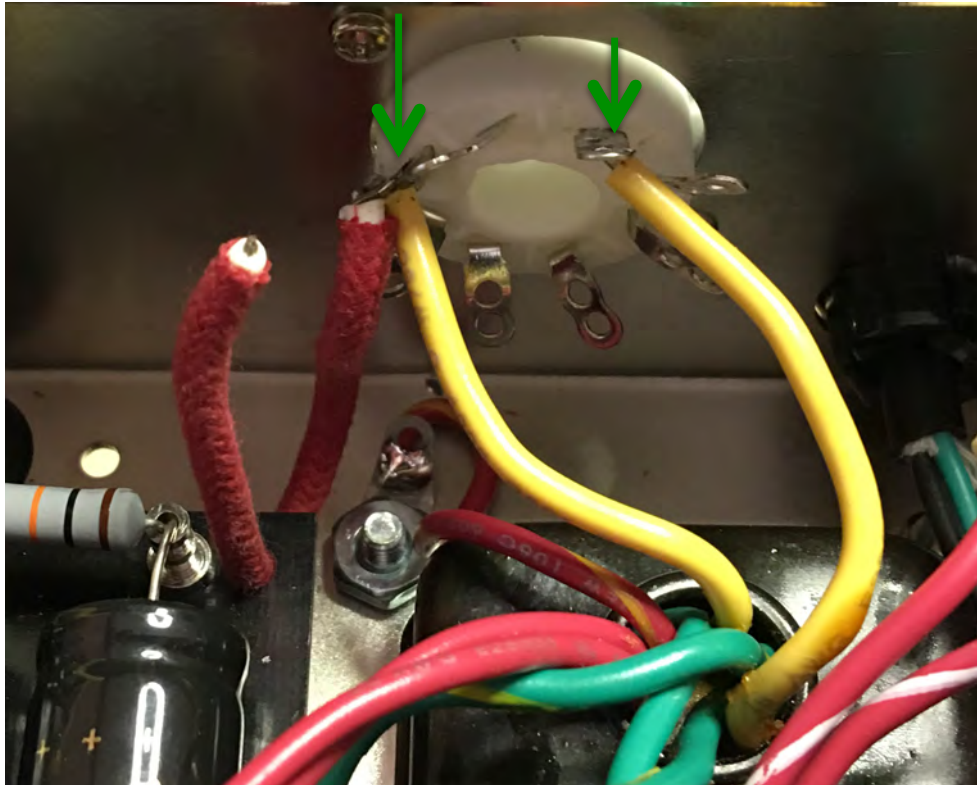




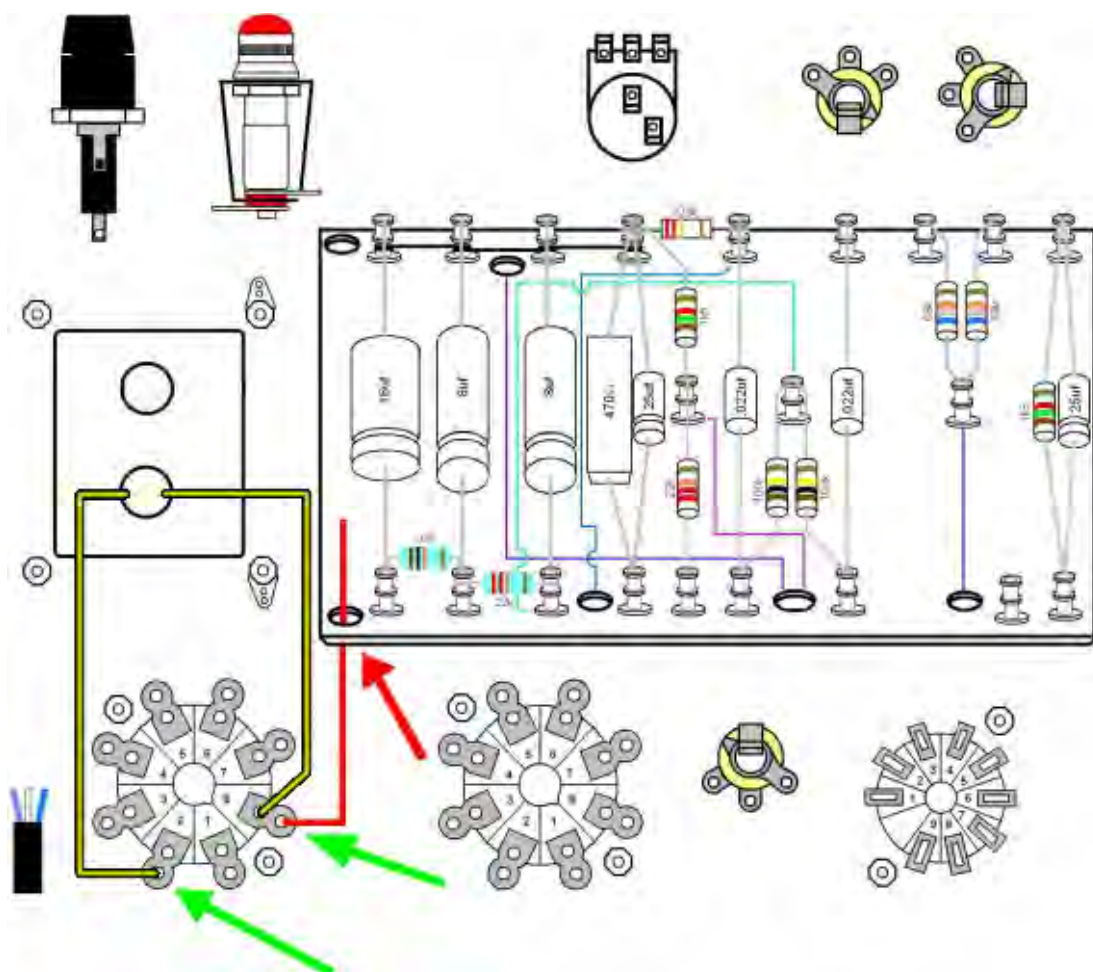
**Step 15:** Install the first 8 pin tube socket and retainer clip closest to the power cord. This is the socket for the 5Y3 rectifier tube. Be sure to orient the socket so that the center pin notch is pointing more towards the open side of the chassis and not towards the transformer side. Use two 4/40 screws, two 4/40 nuts, and two #4 lock washers. With the 8 pin sockets, it is a matter of preference as to whether you want the nuts/washers on the inside of the chassis or outside of the chassis. It's easier to install with the nuts on the outside, but if you prefer the look of the screw heads on the outside, then you can certainly do it that way.



**Step 16:** Insert one of the yellow rectifier heater wires from the power transformer into solder terminal # 2 of the rectifier socket. It does not matter which yellow wire you choose. Insert the other yellow wire into terminal #8. Insert a 4" piece of red cloth covered wire into the other solder hole of terminal #8. Solder terminals #2 and #8, then thread the other end of the red wire through the hole in the circuit board.

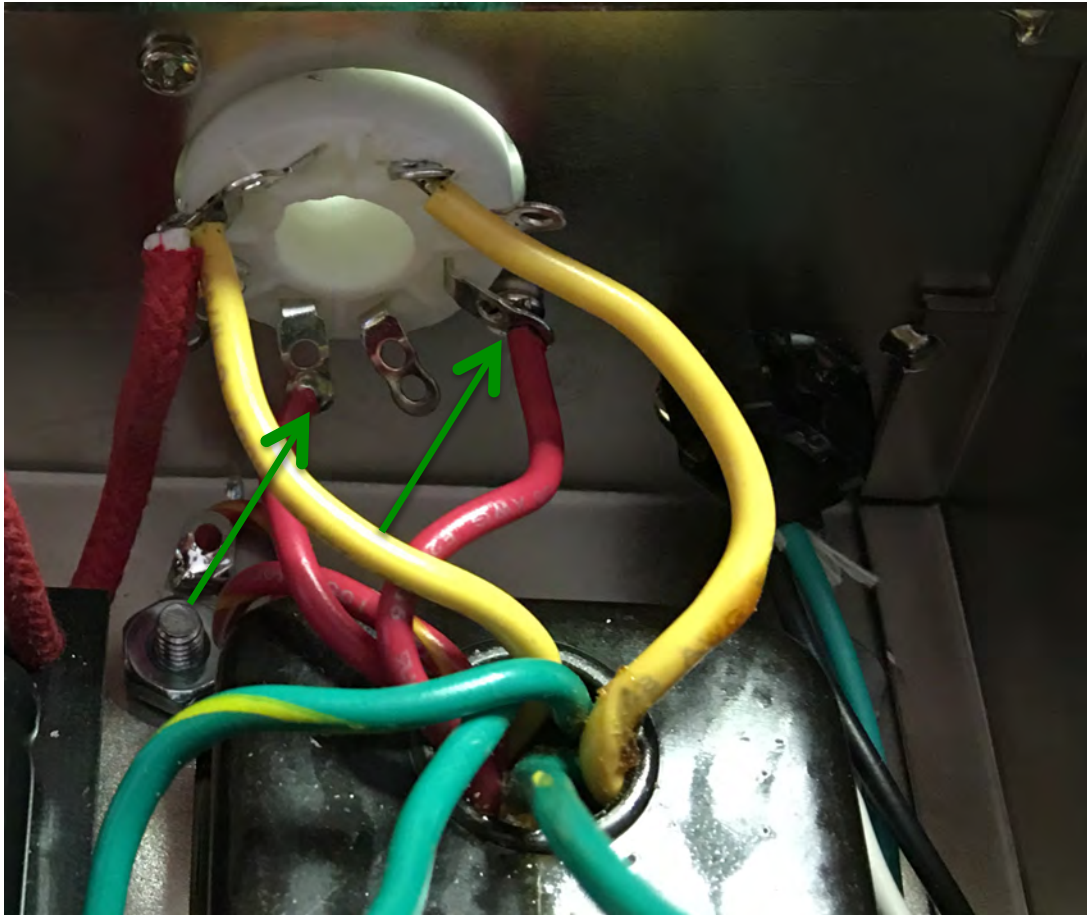


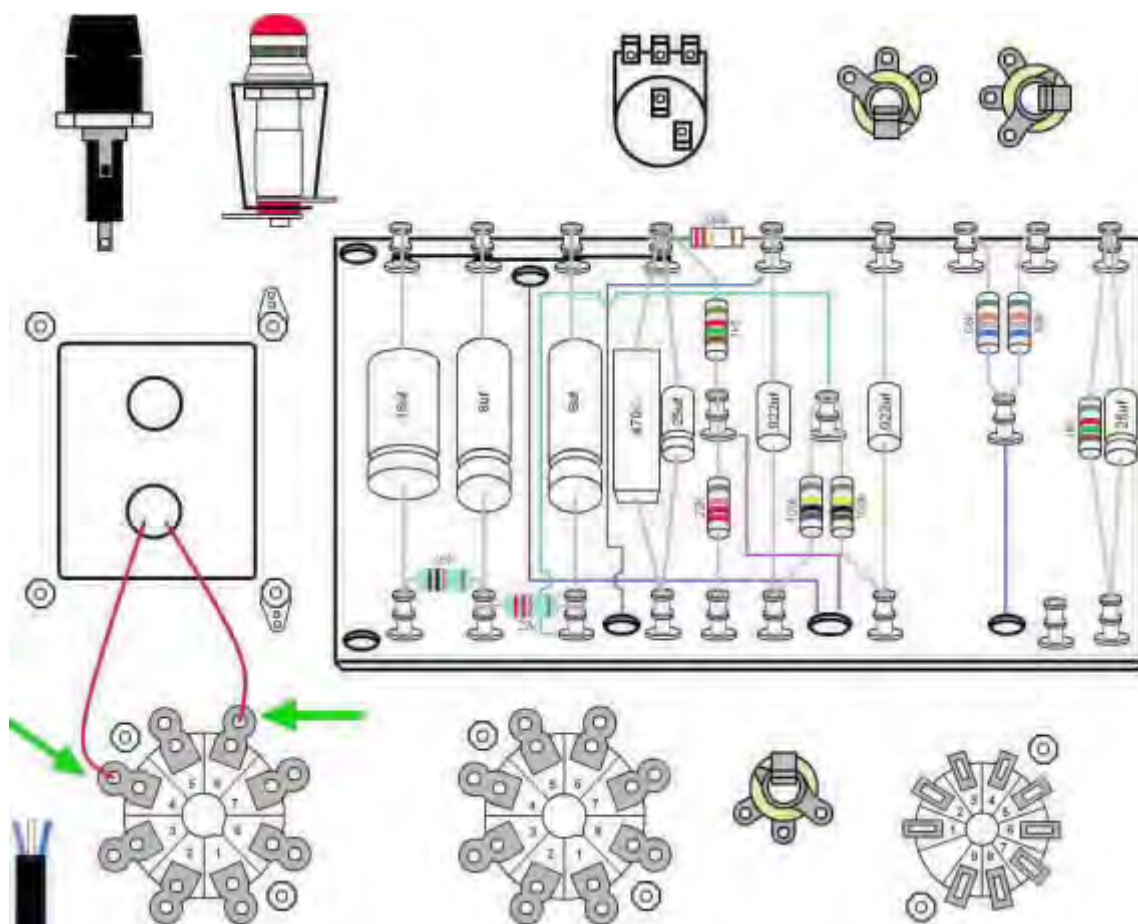




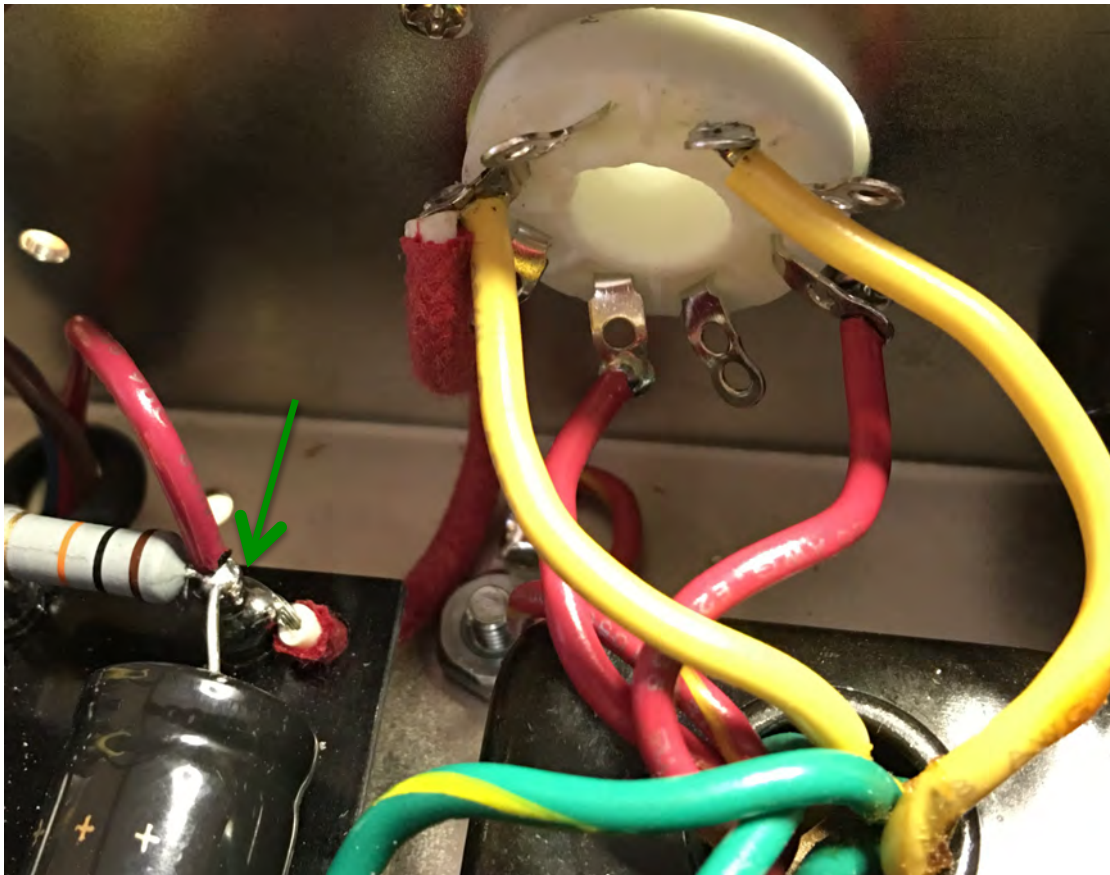


**Step 17:** Connect the secondary wires of the power transformer to the rectifier socket. One solid red wire connects to terminal #4. The other solid red wire connects to terminal #6. It does not matter which red wire goes to which terminal.



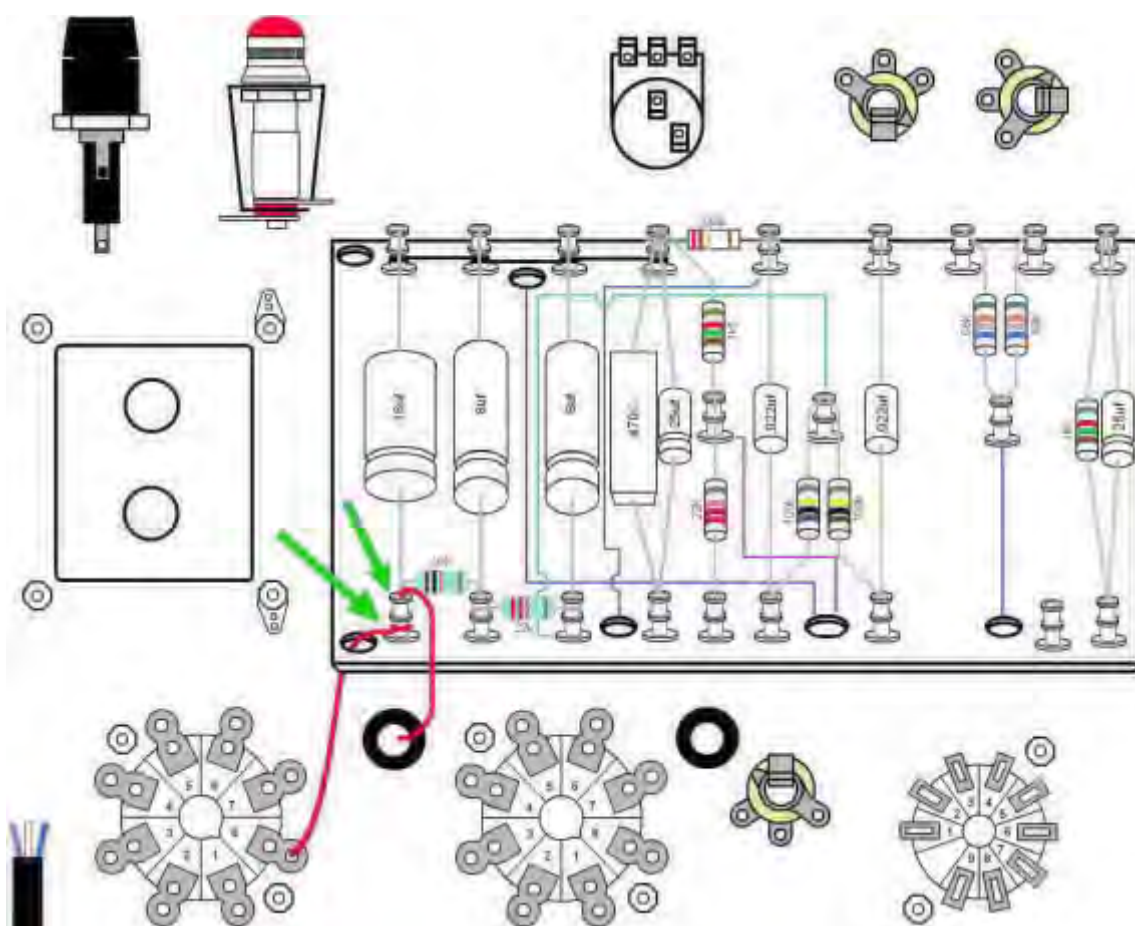


**Step 18:** Insert the red output transformer wire into the last remaining unsoldered turret lug. Strip about 1/2" off the end of the red cloth covered wire that is connected to terminal #8 of the rectifier socket and threaded through the circuit board. Wrap the stripped end of the red cloth covered wire around the bottom tier of that same turret lug. Solder the top and side of the turret lug.



**IMPORTANT**

**Note:** If you are using the 15watt output transformer, use the BLUE wire instead of the red wire.



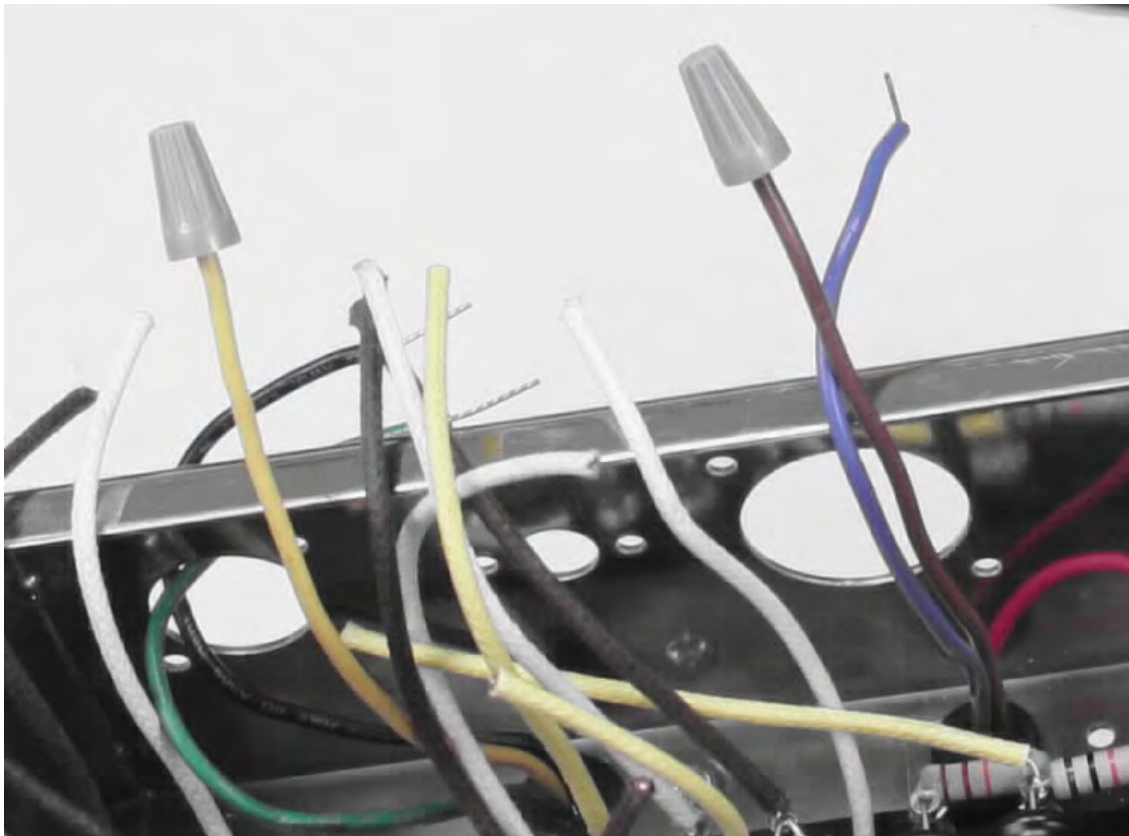


**Step 19:** Cap off the brown and yellow wires from the output transformer with the wire nuts. Fold the stripped ends of the wire over to double up the thickness of the wire so that the wire nut will catch. The brown wire is the 5K Ohm input tap. You will probably never have a need for this wire. The yellow wire is the 4 Ohm output wire.

**IMPORTANT!!!!**

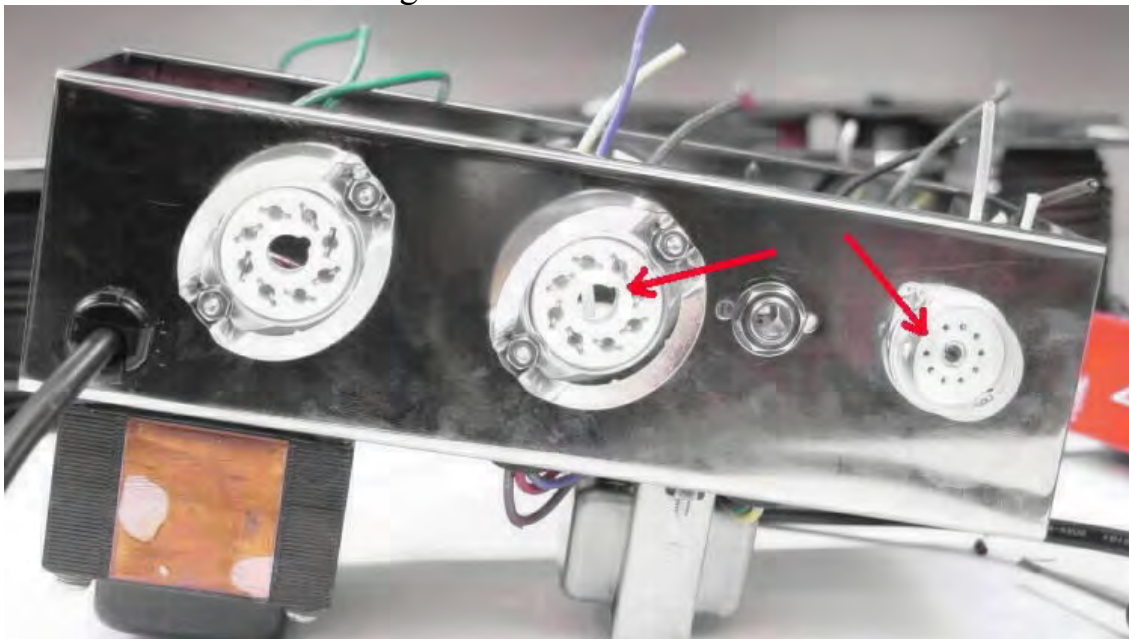
This wire is very important if you are going to use this amp with a 4 Ohm speaker. Many of the standard champ speakers are 4 Ohm, so if your speaker is 4 Ohm, cap off the green wire and use the yellow wire instead. However, since this kit does not come with a specific speaker, and 8 Ohm speakers tend to be more common, we are using the green 8 Ohm output.

**NOTE: IF YOU ARE USING THE 15watt OUTPUT TRANSFORMER, ALSO CAP THE GRAY WIRE.**

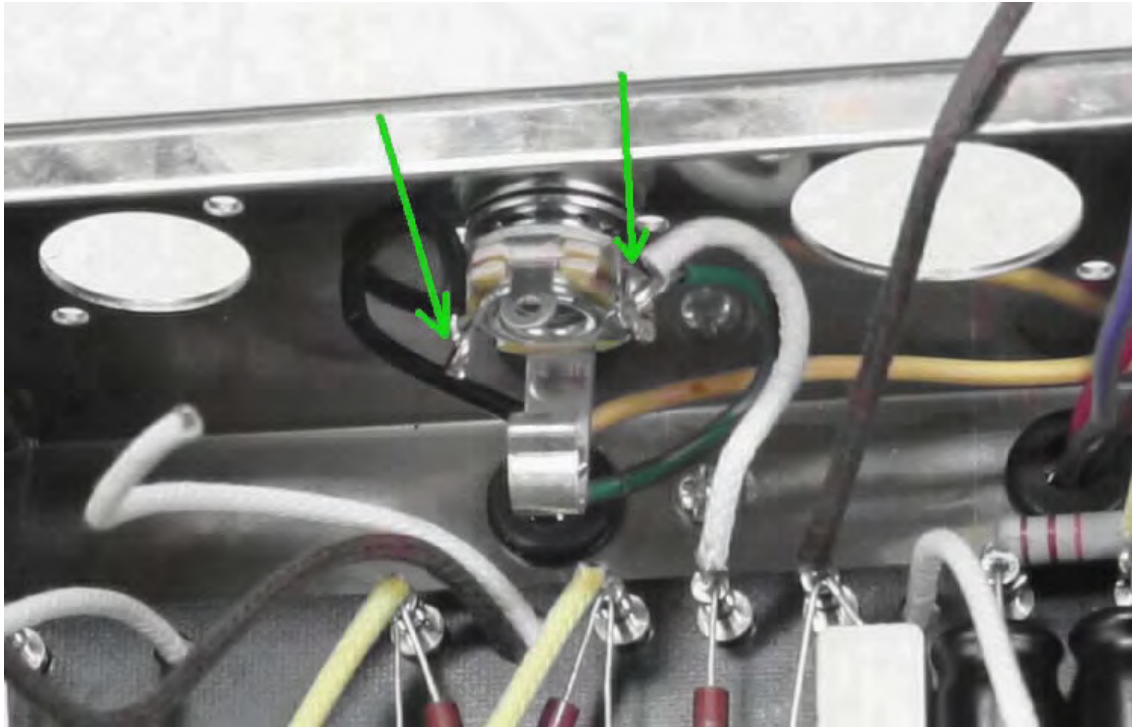


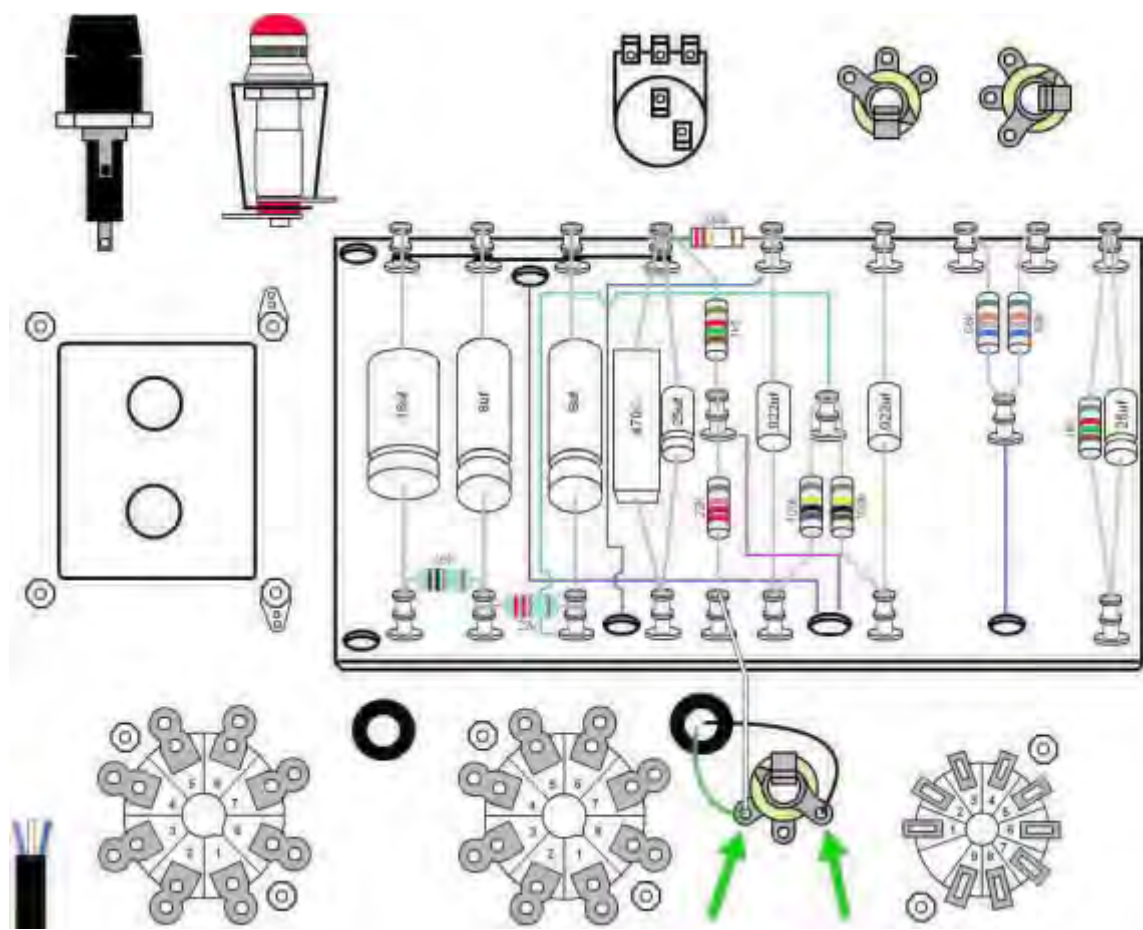


**Step 20:** Install the remaining sockets and one of the 1/4" jacks. This is the speaker jack, although it is the exact same type of jack used for the input jacks. The 3/8 internal lock washer connects to the 1/4" jack and goes on the inside of the chassis. The flat washer and nut go on the outside. Install the 8 pin socket for the 6V6 tube just like you did with the 8 pin socket for the 5Y3 tube in step 12. Be sure to orient the center pin notch correctly. The 9 pin socket for the 12AX7 tube needs to be oriented as well, but it does not have a center pin notch. It will have a space between pins 1 and 9. This space should be oriented more towards the open side of the chassis and not towards the transformer side. Secure the 9 pin socket with two 4/40 screws, two 4/40 nuts, and two #4 internal lock washers. The nut and washer will need to go on the inside of the chassis.

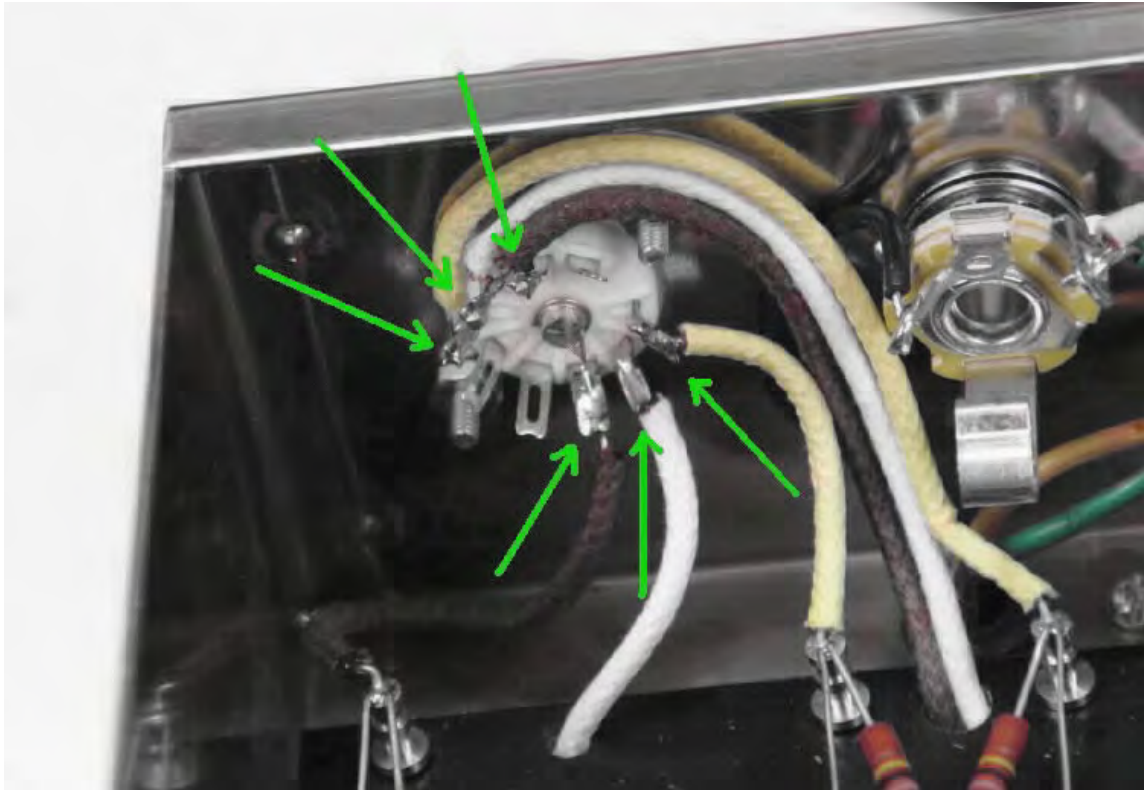


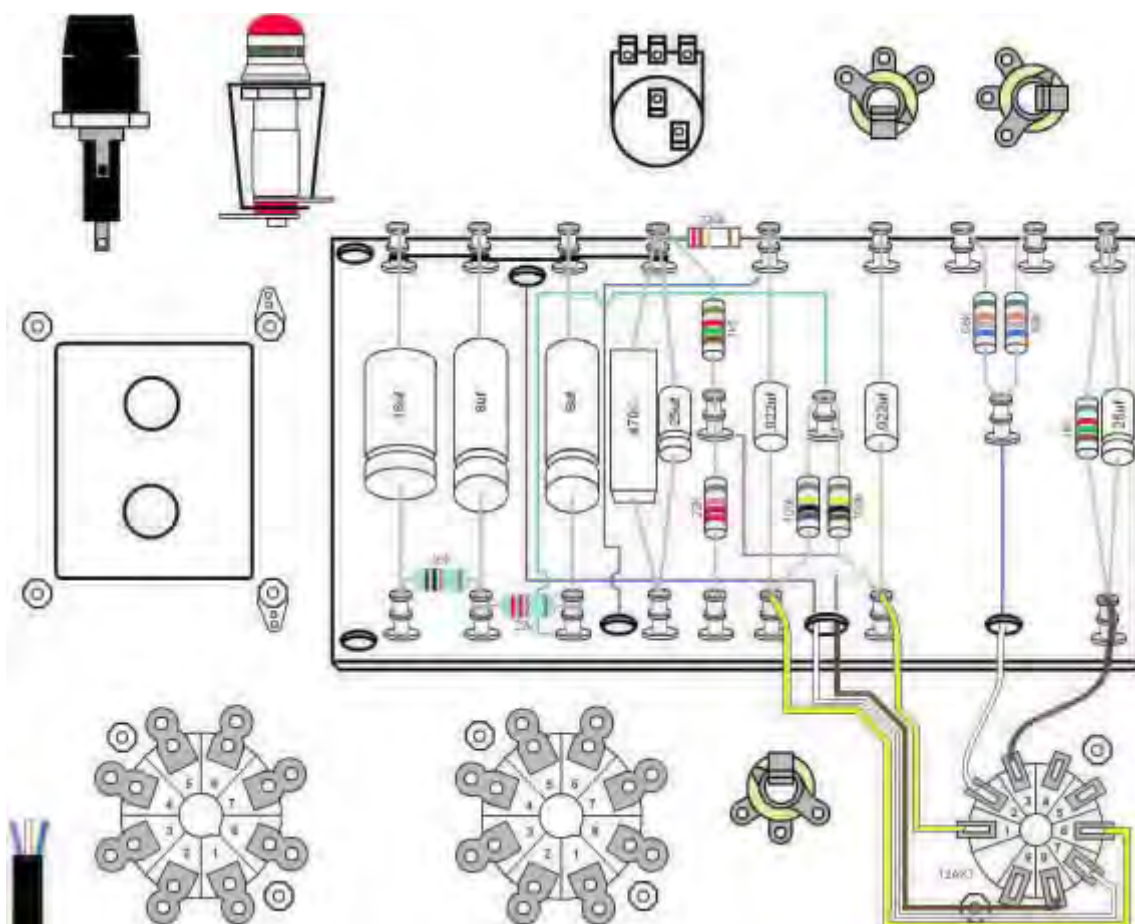
**Step 21:** Connect the speaker jack to its respective wires. The black wire from the output transformer connects to the sleeve of the jack. The green and white wires connect to the tip of the jack. The disconnect terminal of the jack is not used.





**Step 22:** Connect all but the heater wires to the 9 pin socket. You will be able to make your wiring look neater if you start with the brown wire connected to terminal #3 and work your way around the socket counter clockwise so that the last wire you connect is the yellow wire at terminal #6.

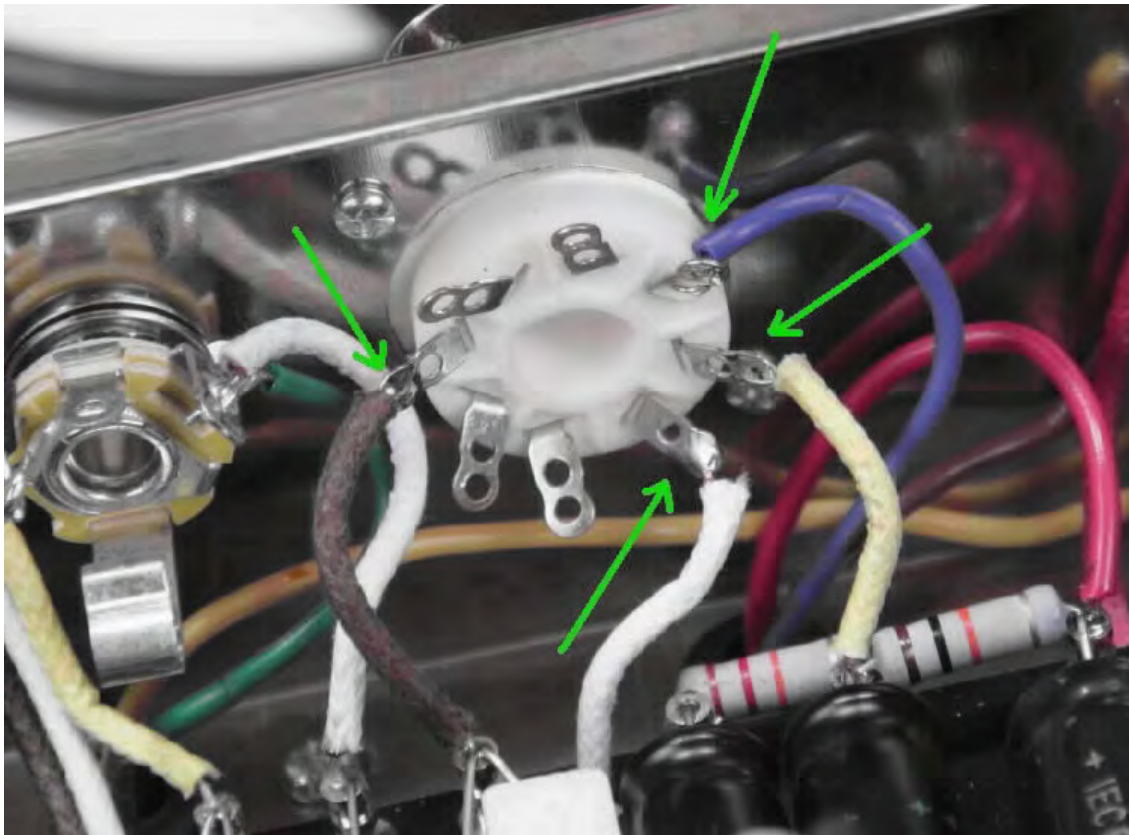


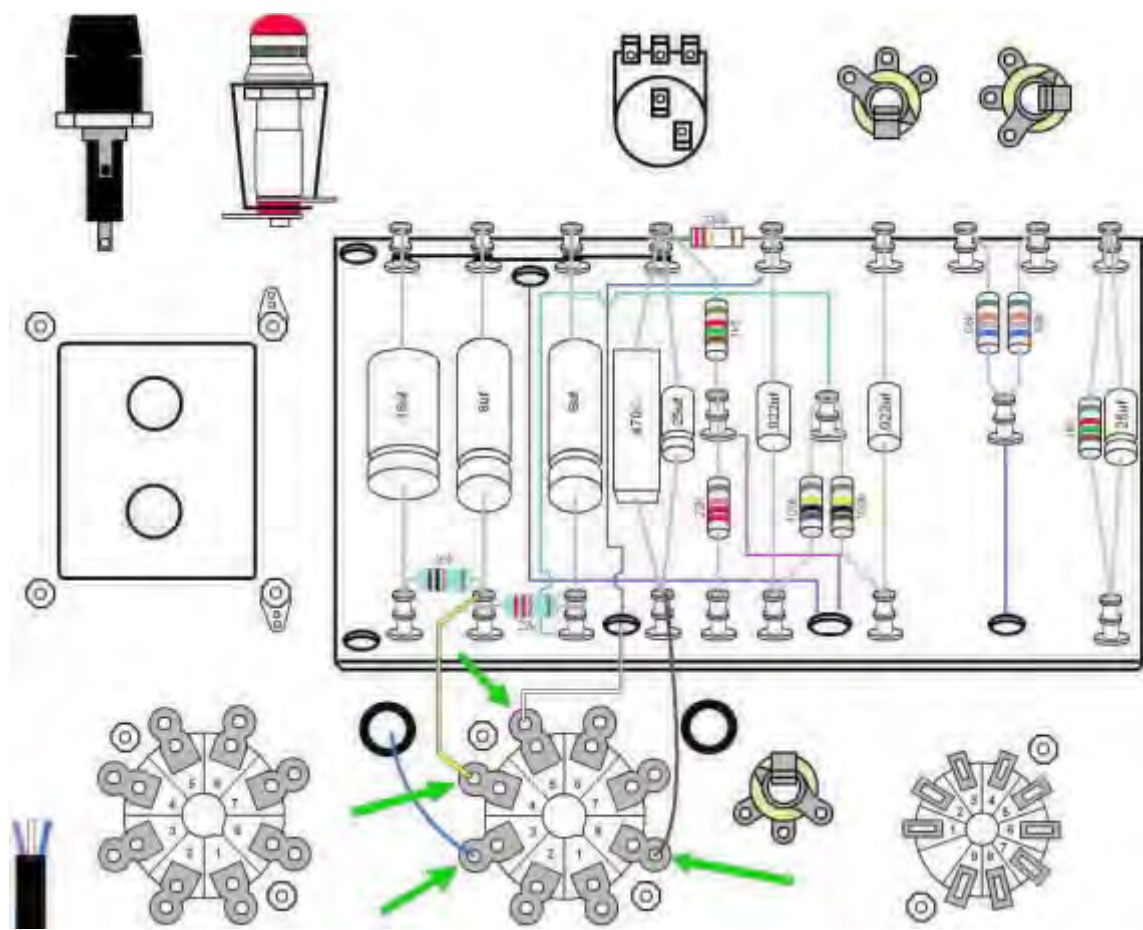




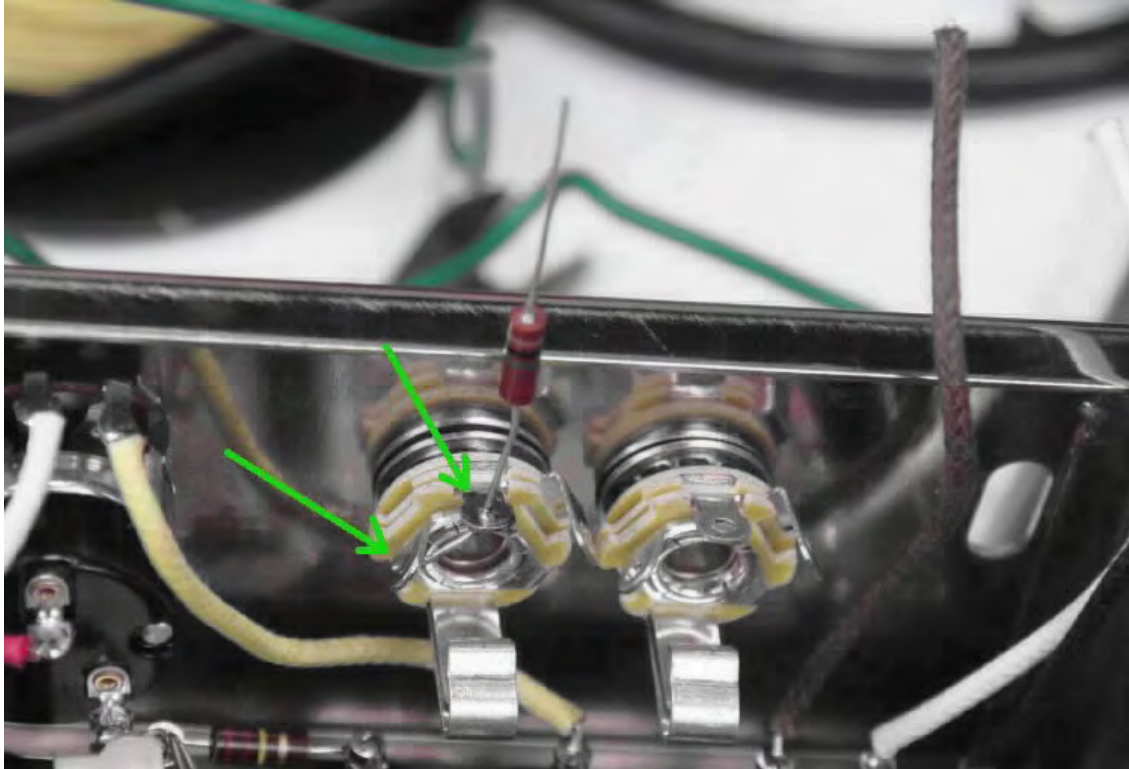
**Step 23:** Connect all but the heater wires to the 8 pin 6V6 socket. The brown wire connects to pin 8. The white wire connects to pin 5. The yellow wire connects to pin 4. The blue wire from the output transformer connects to pin 3.

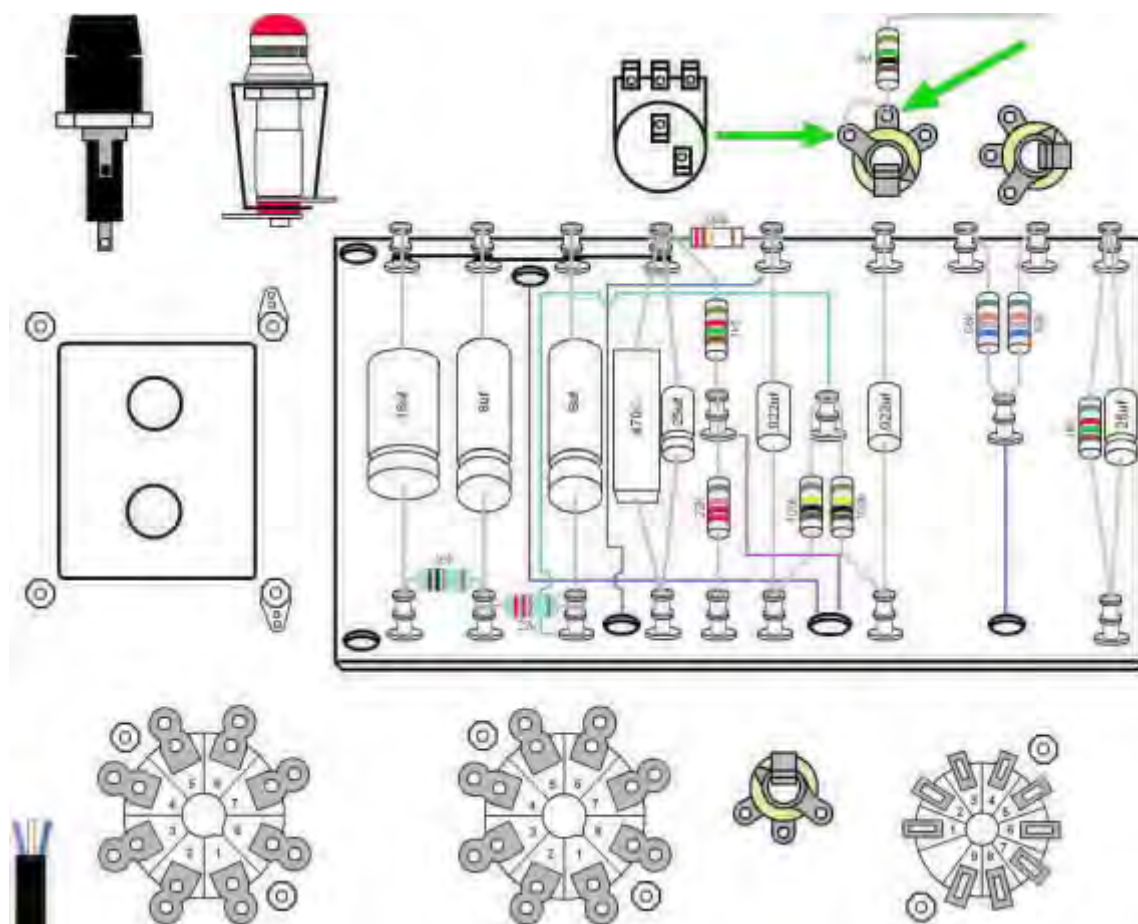
**NOTE:** If you are using the 15watt output transformer, instead of connecting the blue wire, you will connect the red wire to pin 3.





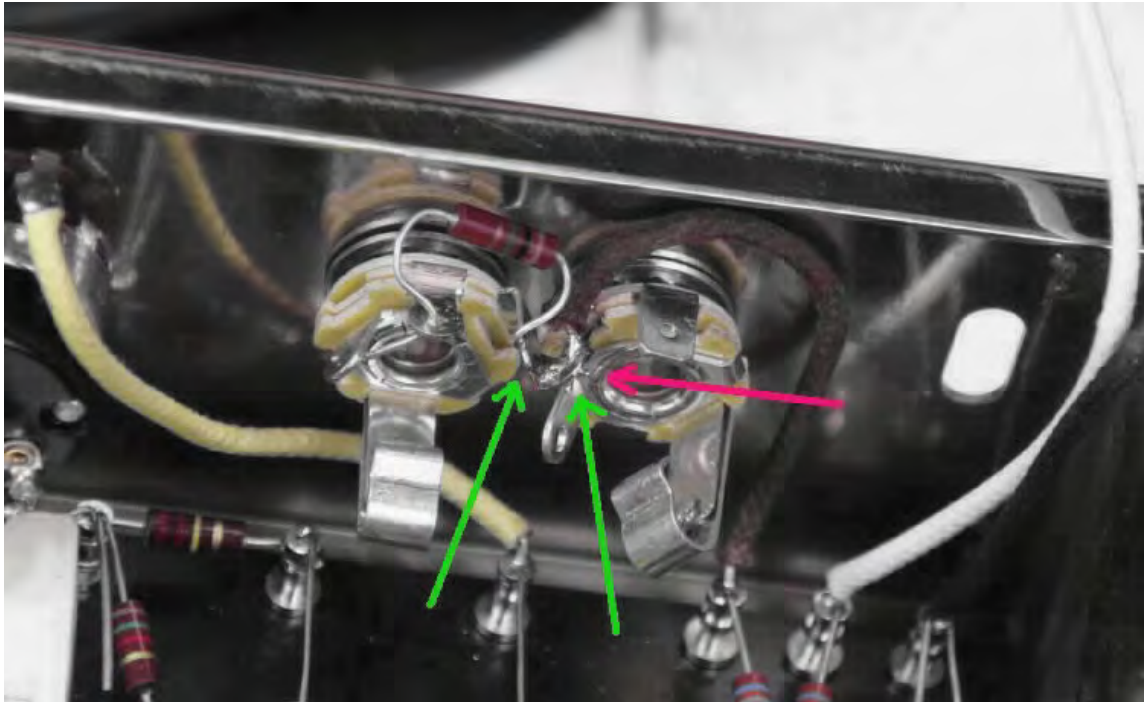
**Step 24:** Install the 1/4" input jacks on the chassis. The internal lock washer goes on the inside, the flat washer and nut go on the outside, just like the speaker jack. Then insert one end of the R1/1M resistor into the center disconnect terminal of input jack #1. Thread the resistor lead though so that you can also insert it into the sleeve terminal of input jack #1, but be sure to leave enough length between the resistor and the disconnect terminal so that you will be able to bend the resistor. Solder both the sleeve and disconnect terminals.



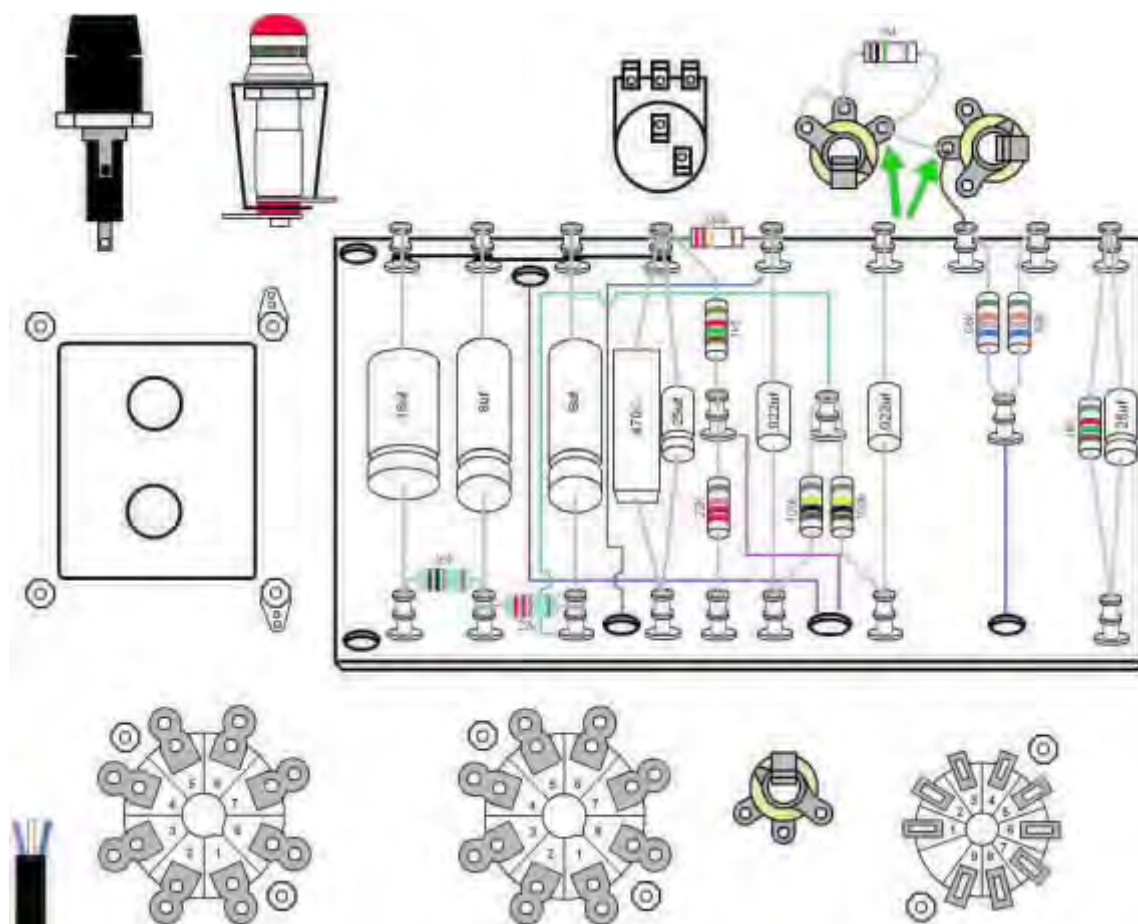




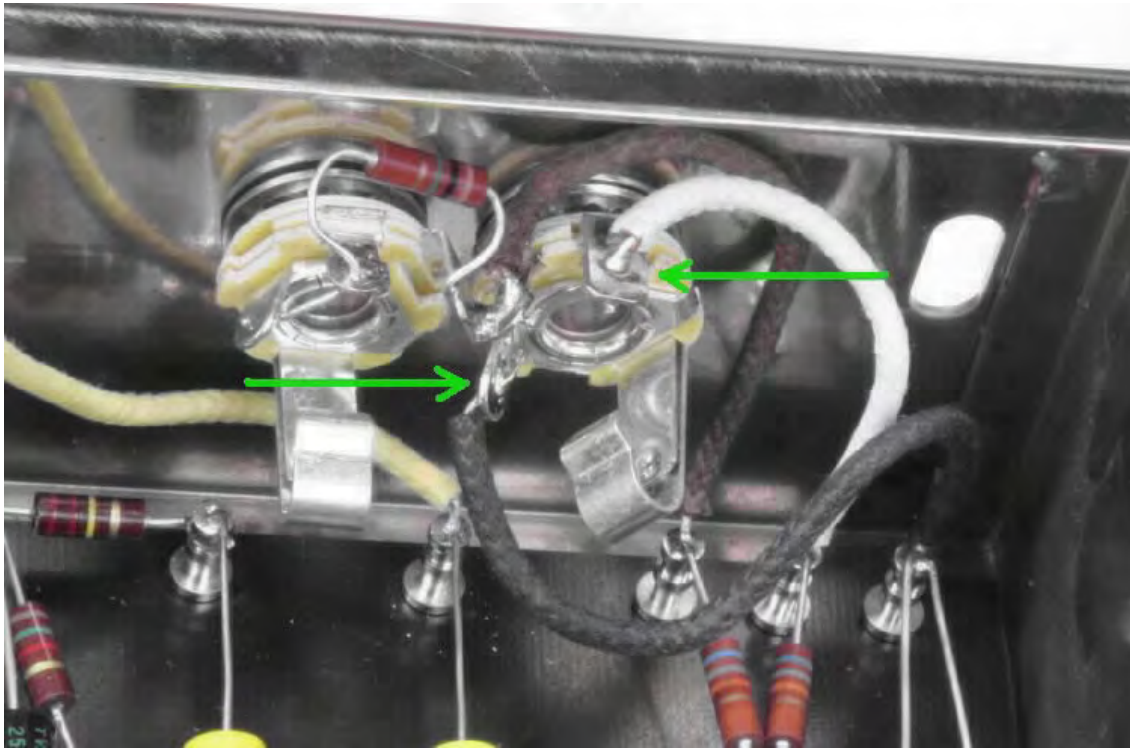
**Step 25:** Rotate the two input jacks so that the tip terminal of input jack #1 touches the disconnect terminal of input jack #2. This is what the red arrow is telling you to do before you solder anything. Thread the unsoldered end of the 1M resistor in through both these terminals. Insert the brown wire into either one of these terminals and solder them all together. It's perfectly fine if your solder forms a bridge here.

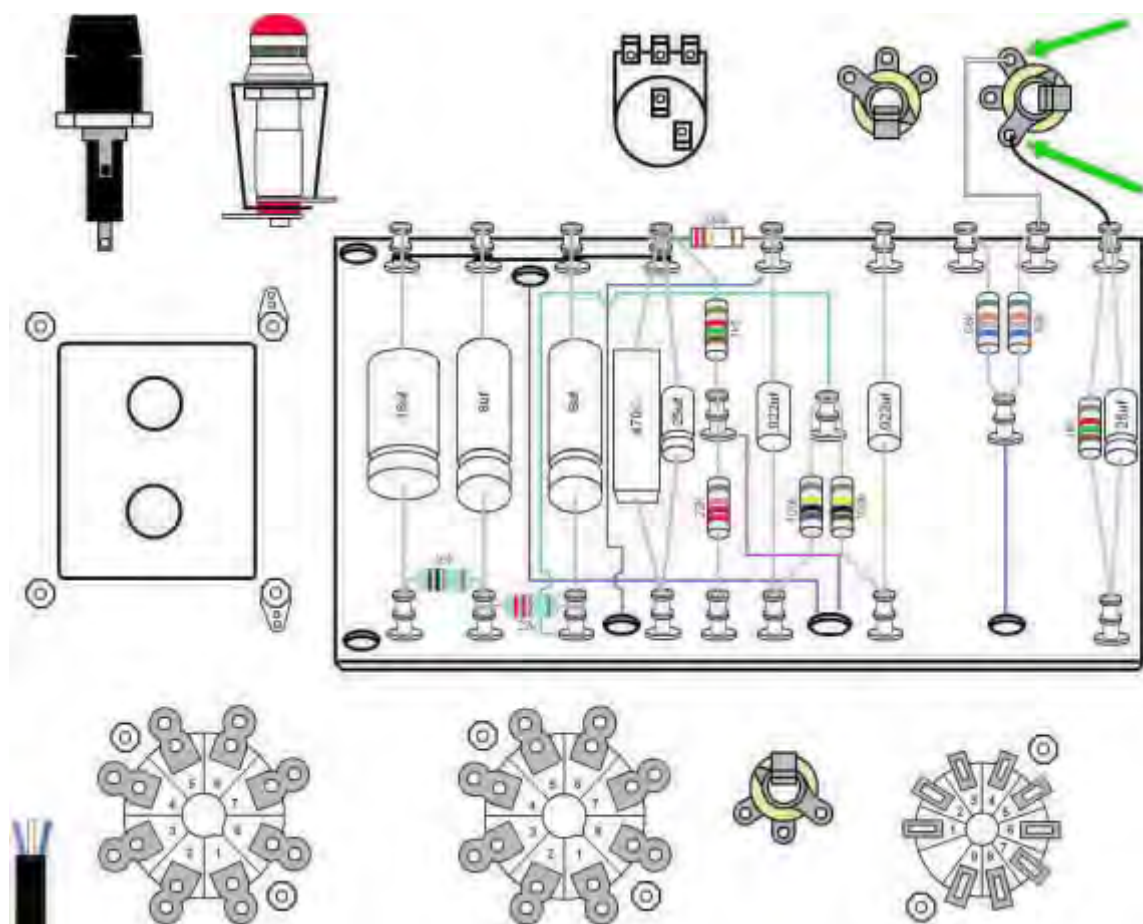




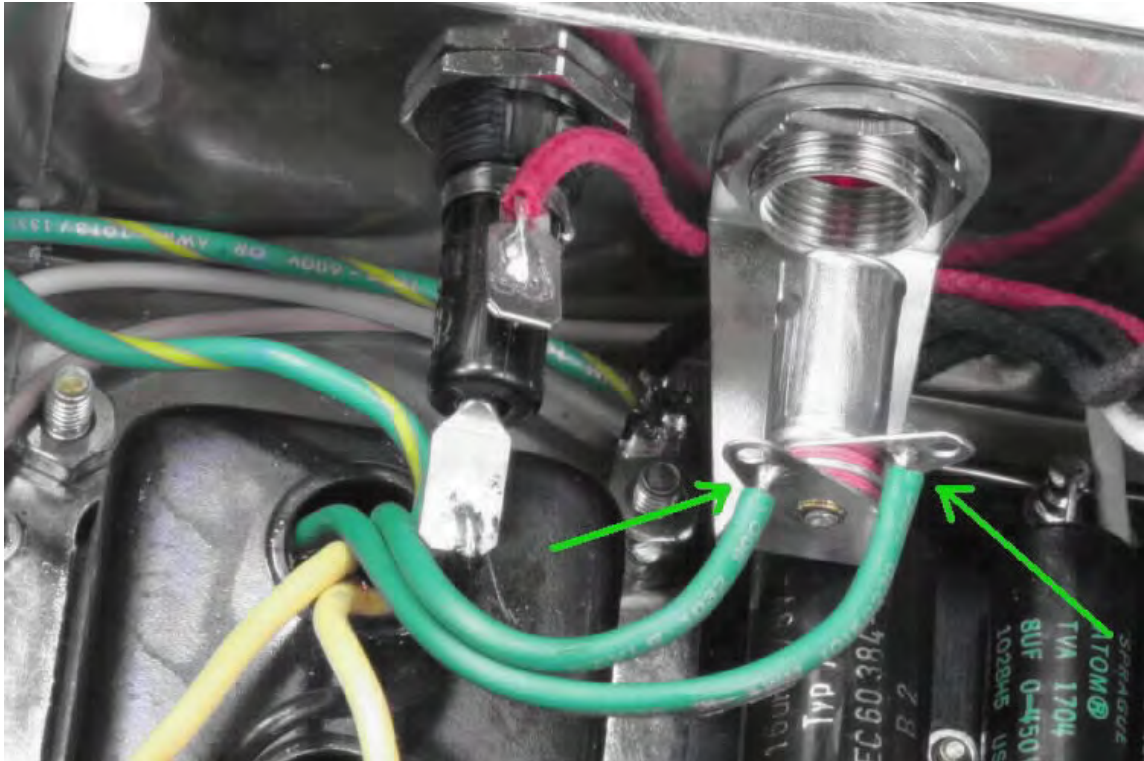


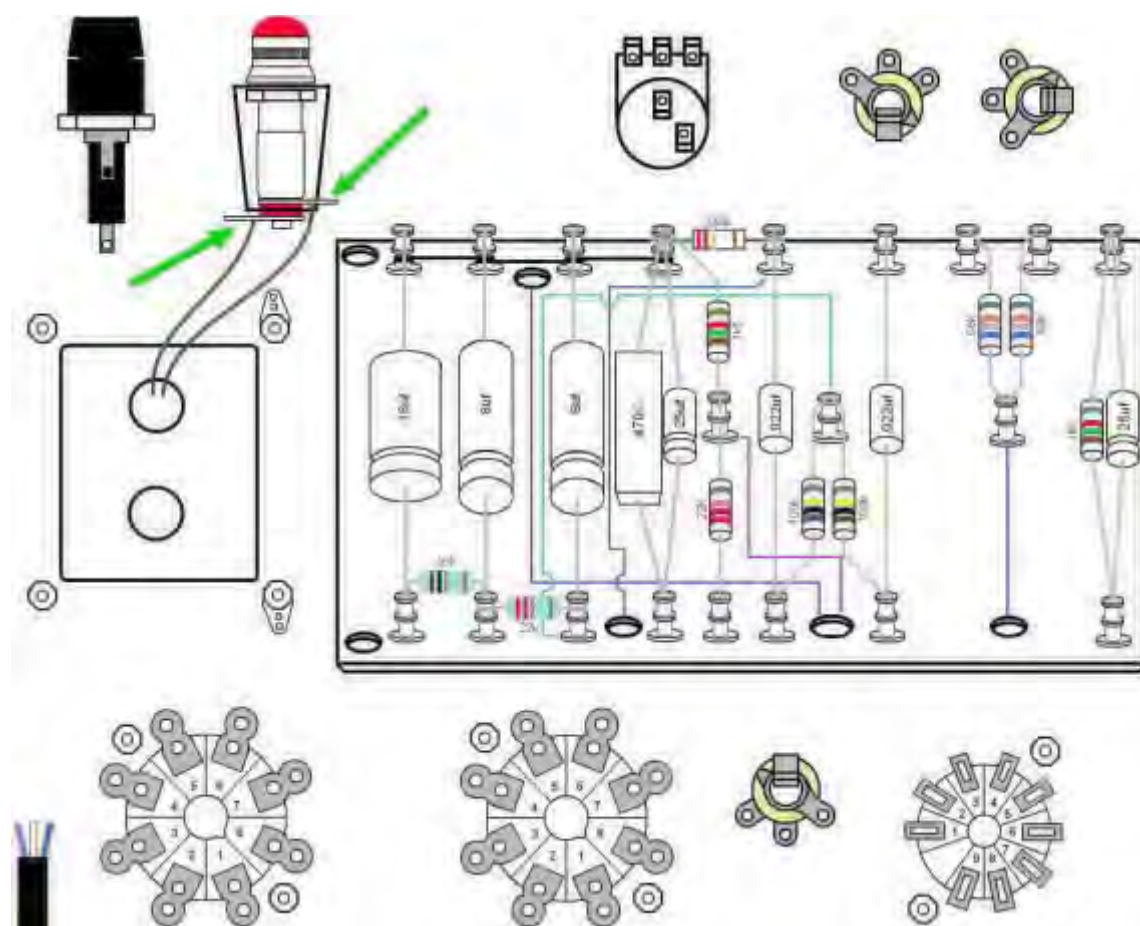
**Step 26:** Connect the black wire to the sleeve of input jack #2. Connect the white wire to the tip of input jack #2.





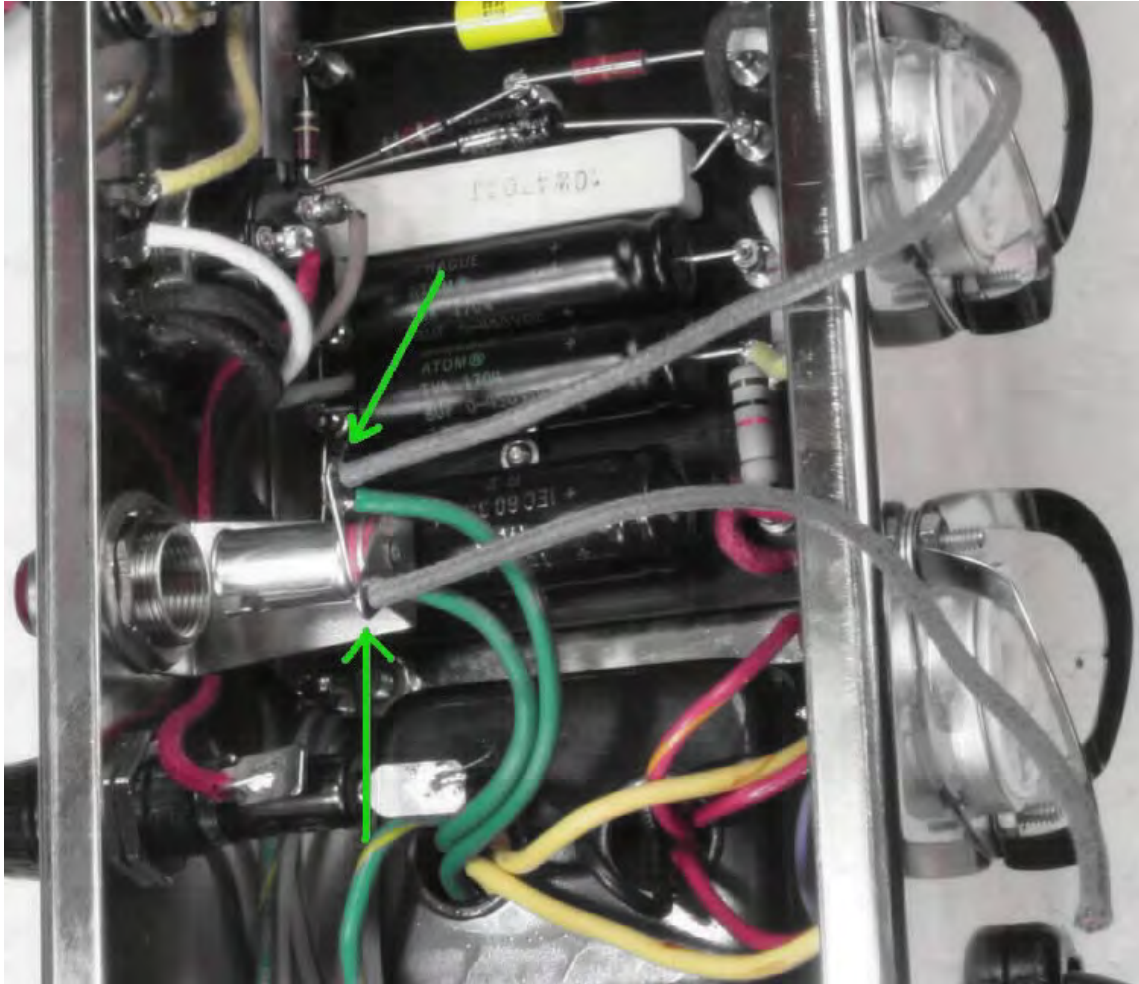
**Step 27:** Connect the solid green 6.3 VAC heater wires from the power transformer to the lamp holder. Connect one green wire to one lamp holder solder terminal and connect the other green wire to the other lamp holder solder terminal. Each terminal has two solder holes. Connect the wires to the solder holes that are closest to the center of the lamp holder. It does not matter which green wire goes to which solder terminal.

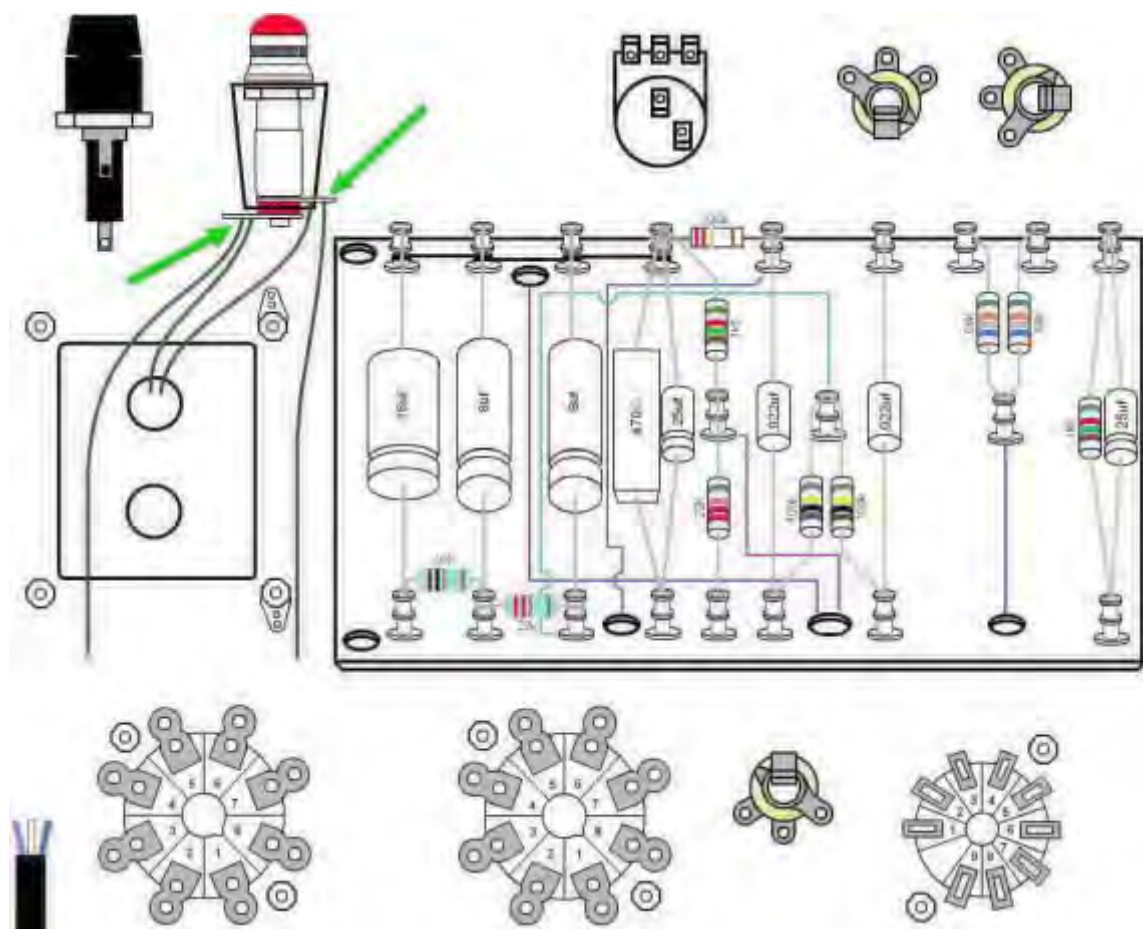




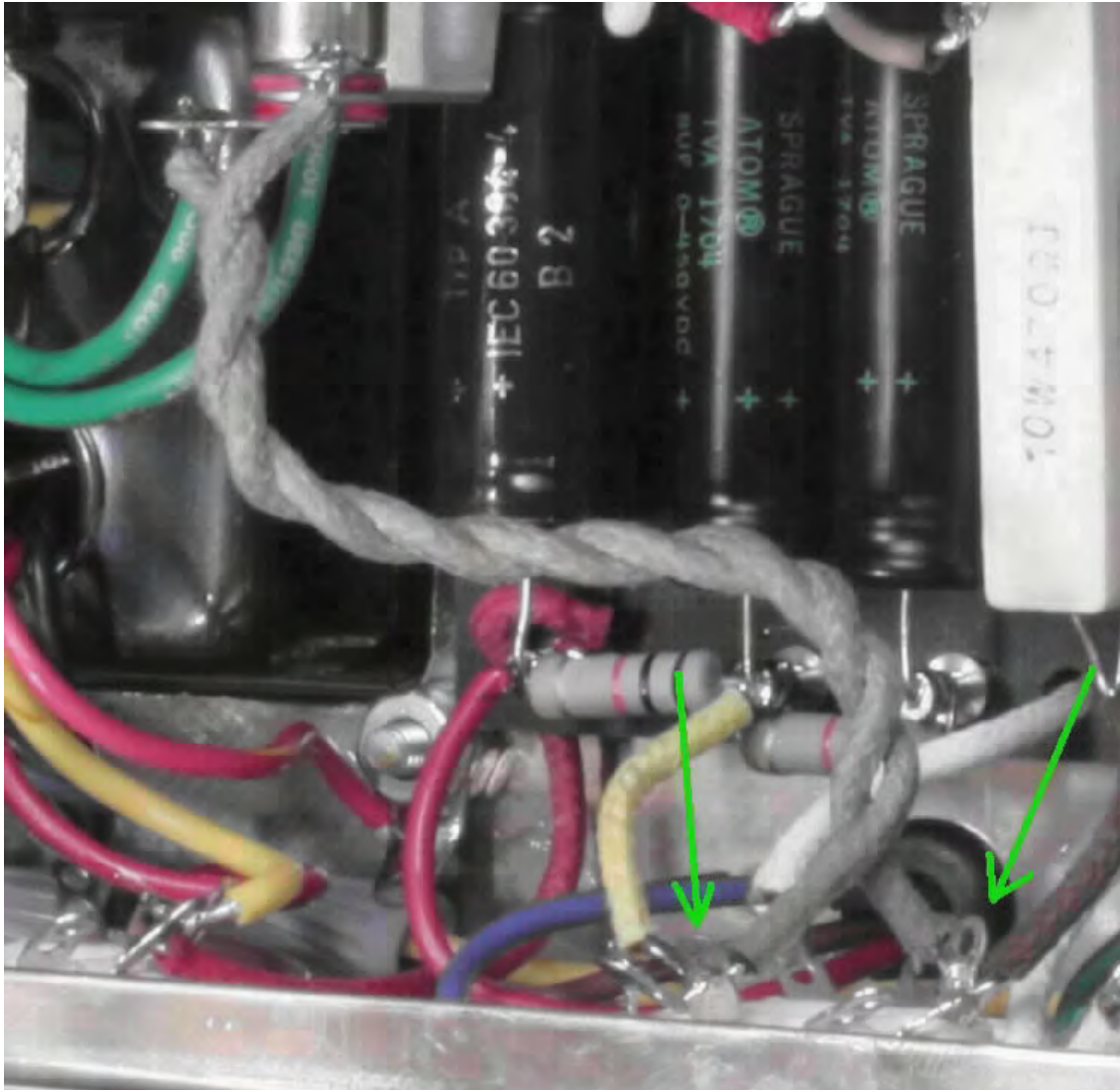


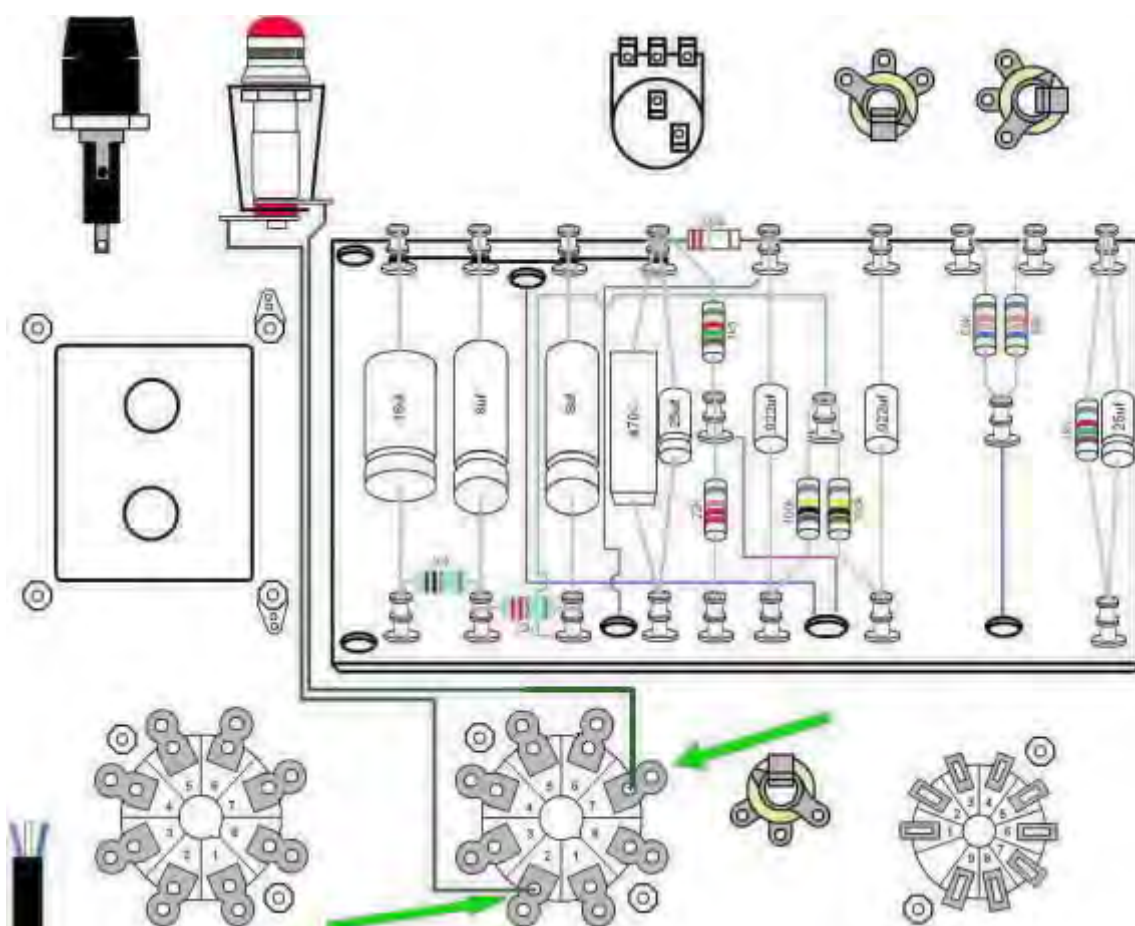
**Step 28:** Connect two 6" pieces of green cloth covered wire to the solder terminals of the lamp holder. Connect one piece to one terminal and the other piece to the other terminal. Use the outer solder holes of the terminals.





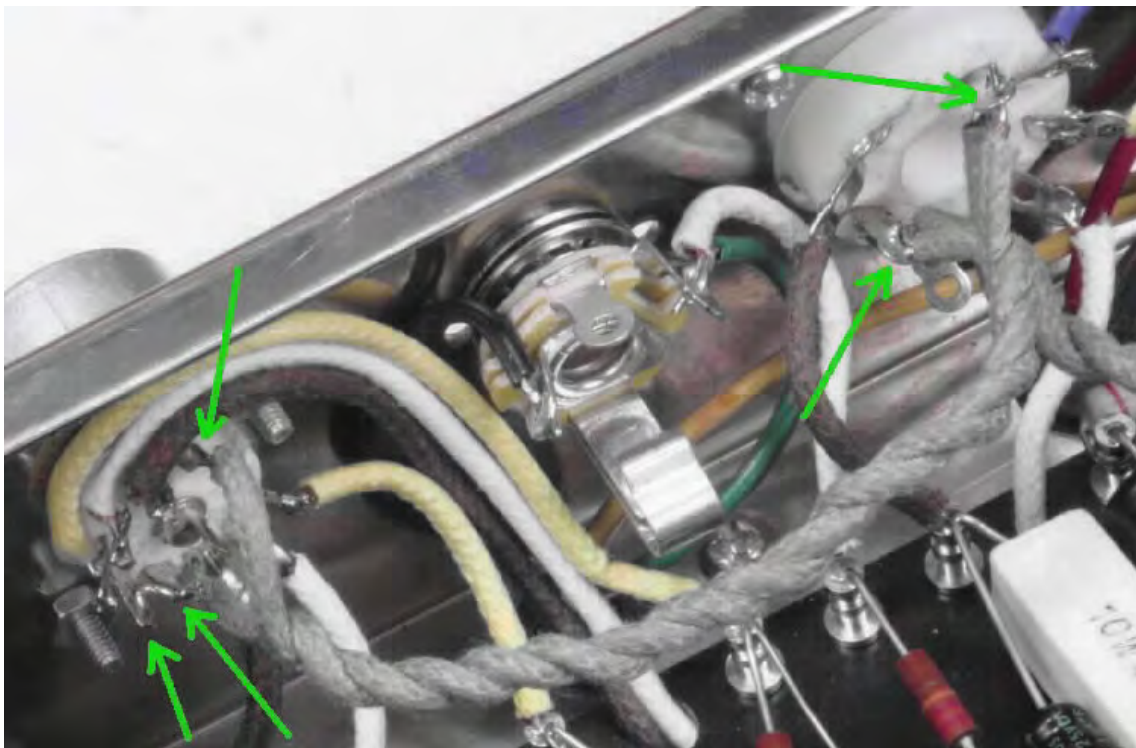
**Step 29:** Twist the two green cloth covered wires from the lamp holder together and connect them to the 8 pin 6V6 socket. Connect one wire to the inner solder hole of terminal #2 and the other wire to the inner solder hole of terminal #7. It does not matter which wire you connect to which terminal.



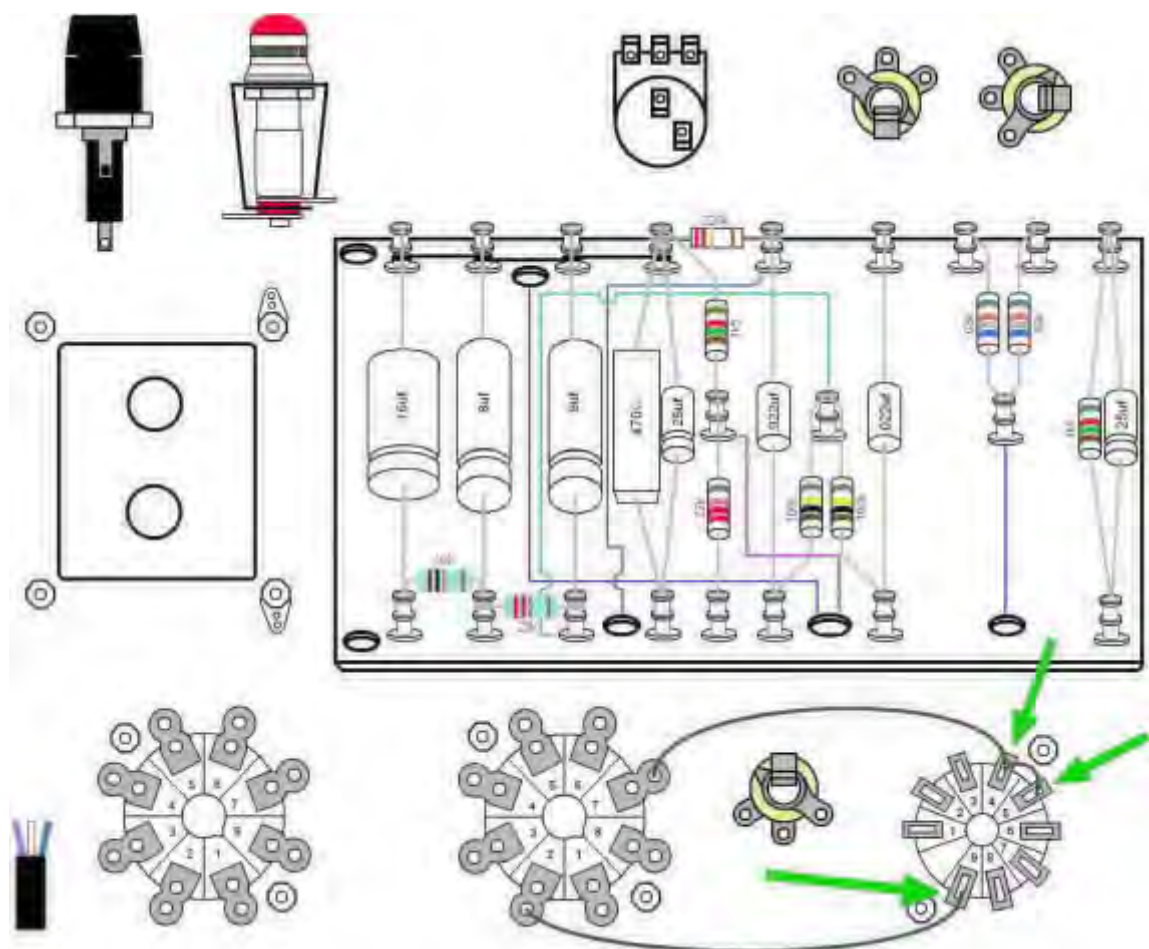




**Step 30:** Connect the outer solder holes of terminals 2 and 7 of the 8 pin 6V6 socket to terminals 4/5 and 9 of the 9 pin 12AX7 socket. Use two 6" pieces of green cloth covered wire. Twist the wire together. It does not matter which wire of the 6V6 heater terminals connects which heater terminal of the 12AX7. Note that terminal 4 and 5 of the 12AX7 are joined together. Some people prefer to bend the terminals together so that it is easier to thread the wire through just one hole. You can do it that way or you can strip a little extra off the end of that wire and thread it through two holes as is shown in the picture below.







# INSTALLING TUBES AND TESTING

**Follow these instructions very carefully!**

**A note about voltage readings before we begin: There are many original Fender factory schematics available on the internet that have voltage pinouts. Be aware that Fender was notorious for publishing inaccurate voltages. If you see an original Fender schematic for the 5F1 circuit, it will tell you that the B+ voltage should be 340VDC. This is about 85 volts less than what it should be. So do not be alarmed if your voltages do not match the Fender schematic.**

**Now, for the moment of truth. Firing up your amp for the first time is always an exhilarating and nerve racking experience, no matter how many amps you've built, but don't be scared. As long as you follow proper safety precautions, you won't have anything to worry about. And if you did something wrong while building your amp, the most likely outcome is that you'll just blow the fuse.**

**Step 1: Make sure your AC power cord is NOT plugged in. Do NOT install any of the tubes yet. Do not plug a speaker into the speaker jack. Do not plug any instruments into the input jacks.**

**Step 2: Do not test your amp on a metal table or any surface that can conduct electricity. Situate yourself and your amp so that the AC power outlet you will be using is within arm's length.**

**Step 3: Install your amplifier chassis into the cabinet or enclosure that you have provided. You should never apply power to the amplifier while it is not inside its cabinet or enclosure. If you insist on supplying power to the amplifier while it is not inside its cabinet or enclosure, the safest way to do so is with the chassis laying on a non-conductive, flame retardant surface with the transformer side facing down and the open side of the chassis facing up, making sure that no foreign objects (especially any of your body parts) are touching any part of the amp.**

**Step 4: Install the light bulb or bayonet lamp into the bulb holder.**

**Step 5: Install the 2 amp fuse into the fuse holder. If you ever need to change the fuse, never ever do so while the power cord is plugged into an AC power source. Always unplug the power cord before ever doing anything, even something as simple as changing a fuse. The fuse is connected to the mains wire and touching the fuse or fuse holder is the same as sticking your finger in a wall socket. When installing a fuse, always insert the fuse into the fuse holder cap first. Then use the fuse holder cap to insert the fuse into the fuse holder.**

**Step 6: Turn the amplifier's power switch on, but still do not plug the power cord in yet. In this case, you do so by turning the volume knob clockwise (you should install the knob on the volume pot at this point too). You should hear and feel a click when the switch turns on. You turn it off by turning the knob counter clockwise till you feel and hear the same click.**

**Step 7: Orient the amp so that you can see the indicator light. When you plug the power cord into the AC power supply, you should be able to see the indicator light come on immediately.**

**Step 8: Double check - the amp is not plugged in; none of the tubes are installed; there are no instruments plugged into the input jacks; there is no speaker plugged into the speaker jack; and the on/off switch is in the on position.**

**Step 9: Now it is time to plug the amp in. Do not touch the amp itself. Grab only the insulated 3-prong AC power cord and plug it into the AC power supply socket. You should see the indicator light come on immediately. If it does not come on, remove the plug and figure out what you did wrong. If the light does come on, observe the amp for a few moments to make sure there's no sparks, smoke, heat, or burning smells. If you notice anything other than just the indicator light coming on, unplug the power cord immediately.**

**Step 10: Unplug the AC power cord. Ok....so now you know your power transformer is working properly.**

**Step 11: With the AC power cord unplugged, the on/off switch in the on position, and no speaker or instruments plugged in, install the 5Y3**

**rectifier tube. Do NOT install the 12AX7 or 6V6 yet.**

**Step 12: Plug the AC power cord back in exactly as you did in step 9. Once again, you should see the indicator light come on immediately. Once again, if you notice any sparks, smoke, heat, or burning smells, unplug the power cord immediately and figure out what you did wrong. Take a moment to observe the rectifier tube. You should see that it is beginning to warm up and glow. If it's doing this and the fuse hasn't blown, you can assume that it is working properly. As the tube starts to get hot, you will probably get a faint smell of something burning. If you'd like to test voltage before proceeding to the next step, you may.**

**When testing your amp voltages, always keep one hand in your pocket and wear shoes with rubber soles. This doesn't reduce the risk of electrocution, but it will reduce the amount of damage that will be done if you get do electrocuted. It won't make you impervious to electrocution, but the less “grounded” you are, the less the amount of current that will be able to flow through your body. Doing things like going barefoot or holding onto a metal drain pipe with your free hand while working with electricity won't increase the risk of electrocution, but they will increase how well you conduct current to ground, and that increases the amount of damage you can do to yourself if you are electrocuted.**

**To test the rectified DC voltage, first set your meter to test DC voltage 500V or greater. Then connect the black probe to chassis ground. Then touch the red probe to the turret lug that connects to the positive end of the 16uf aluminum electrolytic capacitor. You should see somewhere around 475VDC. This voltage can vary by as much as 20volts over or under depending on the actual voltage of your AC power supply. Also keep in mind, that this voltage will drop significantly when the other tubes are added.**

**Step 13: Unplug the AC power cord again.**

**Step 14: Install the 12AX7 preamp tube, but do not install the 6V6 tube yet.**

**Step 15: Plug the AC power cord back in, just as you did in step 9. You should see the 12AX7 start to glow. If you see this, and there's no**

smoke and a fuse hasn't blown, you can assume that everything is working properly. Preamp tubes do not get very hot. They just get warm, so it should not produce any sort of burning smell. If you'd like to test for voltage, you should see approximately 2VDC on the turret lug where the 1.5k resistor; 25uf aluminum electrolytic capacitor; and brown wire that connects to pin 3 of the 12AX7 all meet. This voltage can vary by 1/2 a volt.

**Step 16: Unplug the AC power cord.**

**Step 17: VERY IMPORTANT BEFORE YOU ADD THE 6V6 TUBE!!!**

Be sure to plug a speaker into the speaker jack. You should never turn your amp on when the power tube is installed without the proper speaker load. Doing so will damage your output transformer. Plug a speaker into the speaker jack. Make sure the impedance of the speaker is 8 ohms. This is very important too. If you are using a 4 ohm speaker, make sure you have the yellow wire from the output transformer connected and not the green wire (see Wiring steps 19 - 21 again).

**Step 18: Install the 6V6 power tube into its socket and turn the volume knob counter clockwise to its minimum volume level, but do not turn it off.**

**Step 19: Plug the AC power cord back into the power socket and repeat all the instructions in step 9 again. You should see the tube start to glow and it should begin to heat up. As the tube starts to get hot, it will probably produce a faint smell.**

**Step 20: Slowly turn the volume knob up and listen for sound coming out of the speaker. You should hear the normal amount of white noise you'd expect to hear coming out of an amp with no input signal.**

**Step 21: Turn the on/off switch to the off position.**

**Step 22: Plug your guitar (or instrument of choice) into input 1. Turn the amp back on and play.**



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