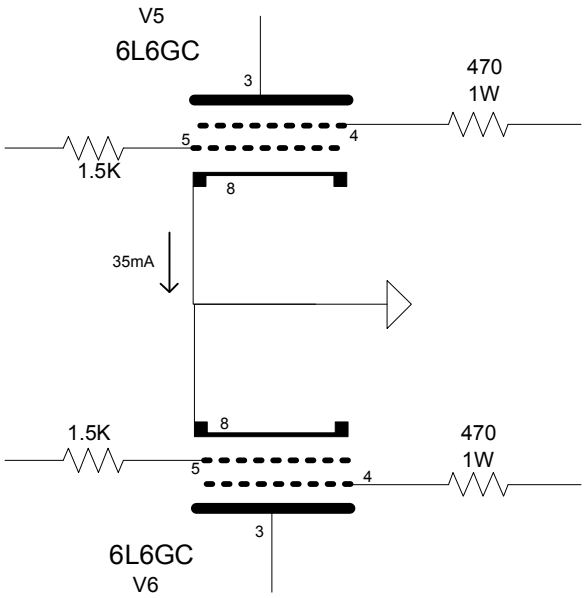
6L6GC TO EL34 CONVERSION KIT (K-701)

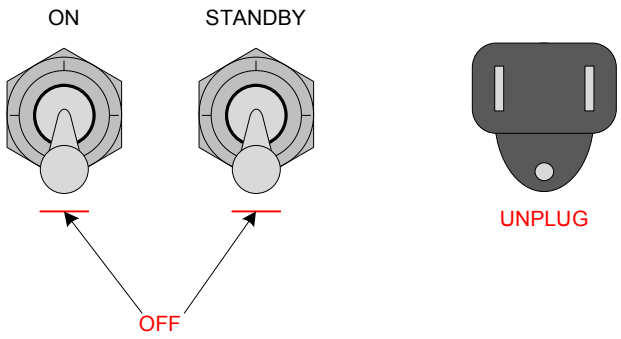


Use these instructions and your vintage Fender guitar amplifier to learn:

- How to convert a power amp using two 6L6GC's into one using two EL34's
- How to convert the Silver Face bias/balance pot into a Black Face style bias pot for increased control of power tube operation
- How to set the bias for 6L6GC's or EL34's

www.modkitsdiy.com

Table of Contents



Safety

"Caution: to prevent electrical shock,
do not remove chassis or metal cover attached to chassis.
No user serviceable parts inside.
Refer servicing to qualified personnel only."

-the back of an amp

We have quoted the back of an amp to stress the importance of putting safety first when working on this type of equipment. Tube amps operate at high voltages which have the potential to kill. Only work on an amp when you are wide awake and sober.

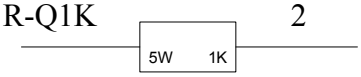
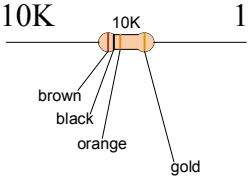
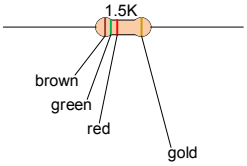
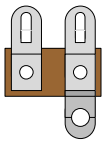
Please make sure you do the following before opening your amp:

- Turn the power switch off.
- Turn the standby switch off (down position).
- Unplug the power cord.
- Give the power tubes 10 minutes to cool down.

When the amp is open:

- Use a volt meter with alligator clips to measure for high voltage at several test points. (*see the "Preliminaries" section for details*)
- Use the one-hand rule. (*see the "Preliminaries" section for details*)

Parts List

Part Number	Quantity	Description
R-Q1K 	2	1 kΩ, 5W resistor
R-A10K 	1	10 kΩ, ½W resistor
R-A1D5K *backup replacement resistors 	2	1.5 kΩ, ½W resistor - supplied as extras in case the leads on the original 1.5kΩ resistors break.
P-0201H 	3	Terminal Strip (2 lugs, 2nd lug common)
S-W22G	2 feet	22 AWG hook-up wire (green)
T-EL34-JJ	2	EL34 Power Tubes (matched pair)

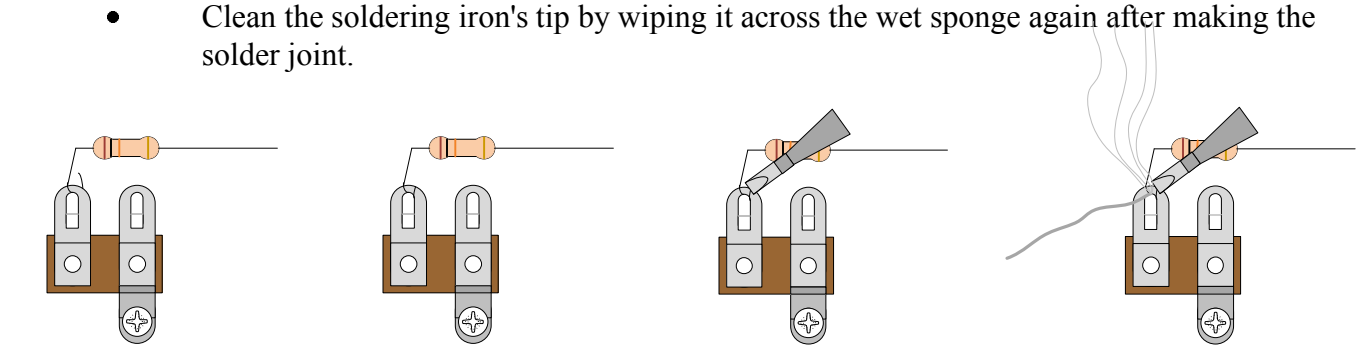
Tools

1. **Digital Multi-Meter** (DMM) – a meter for measuring voltage, current, resistance, and sometimes capacitance.
2. **Alligator Clip Test Leads** – connect to your DMM for hands free measurements. These are useful when setting the power tube bias and for safety when taking electrical measurements.
3. **Soldering Station** – soldering iron with a 1/8" screwdriver tip and a variable control capable of producing 25-40Watts. This will allow you to do some precise soldering of circuit components and wires (do not use a soldering gun for soldering of electronic circuits).
4. **Solder** – 60/40 rosin core solder.
5. **De-soldering Pump or Bulb** – this will assist you in removing solder for circuit modifications and correcting connection errors.
6. **Wire Strippers**
7. **Cutting Pliers** – These are great for cutting leads on resistors, capacitors, etc. before and after soldering.
8. **Needle Nose Pliers** – 6" long are good for bending component leads and holding components leads while de-soldering.
9. **Screwdrivers** – Phillips

Soldering Tips

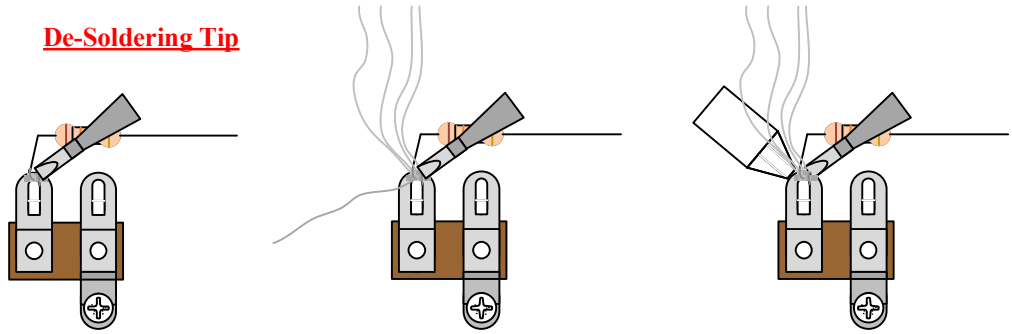
- Work in a ventilated area with a fan to blow the smoke away from your face.
- Allow the soldering iron to heat up to the point where the solder melts quickly when touched to the iron's tip.
- Clean the soldering iron's tip by wiping it across a wet sponge before applying solder to it.
- Be very careful not to unintentionally burn any wires in the vicinity of the soldering iron.

1. Bend the component lead or wire ending and wrap it around the connection point.
   - Make sure it is not too close to a neighboring component which could cause an unintended connection.
2. Wrap the component lead so that it can hold itself to the connection point.
3. Touch the soldering iron to both the component lead and the connection point allowing both to warm up just before applying the solder to them.
4. Be sure to adequately cover both component lead and connection point with melted solder.
   - Remove the soldering iron from your work and allow the solder joint to cool. (The solder joint should be shiny and smooth after solidifying.)
   - Cut off any excess wire or component leads with cutting pliers.
   - Clean the soldering iron's tip by wiping it across the wet sponge again after making the solder joint.



1. Bend the component lead and wrap it around the connection point.
2. Wrap the component lead so that it can hold itself to the connection point.
3. Heat up both component lead and connection point with the soldering iron.
4. Apply solder to both component lead and connection point.

De-Soldering Tip

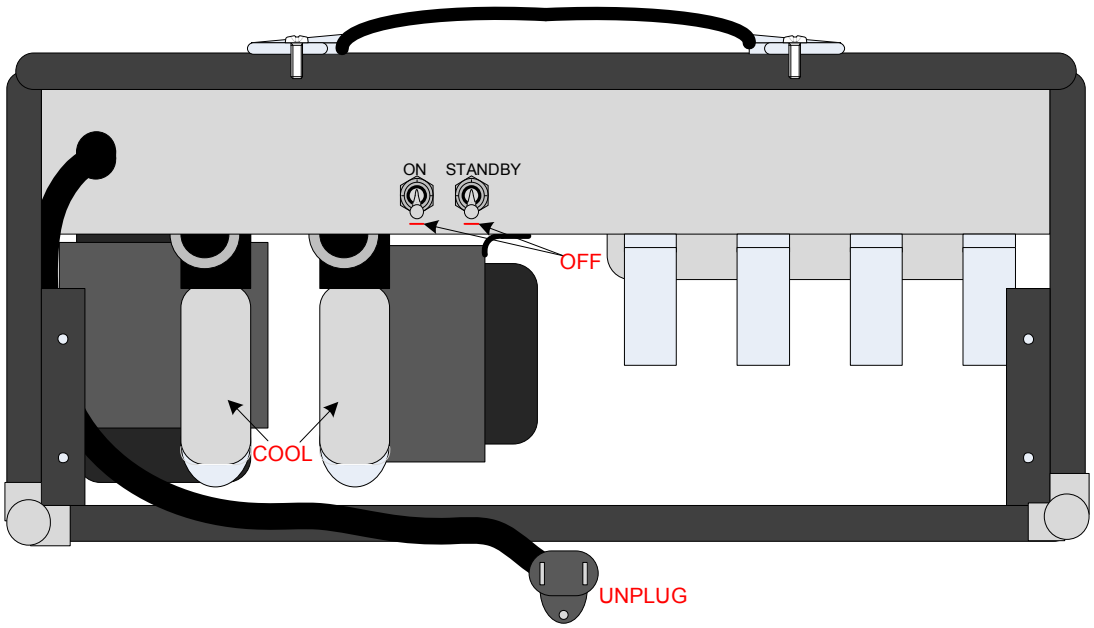


1. Heat up old solder joint with the soldering iron.
2. Apply fresh solder to mix in with old solder joint
3. Use a de-soldering tool to remove the old solder joint while it is heated.

Preliminaries

Please make sure you do the following before opening your amp:

- Unplug the power cord.
- Turn the power switch off.
- Turn the standby switch off (down position).
- Give the power tubes 10 minutes to cool down.

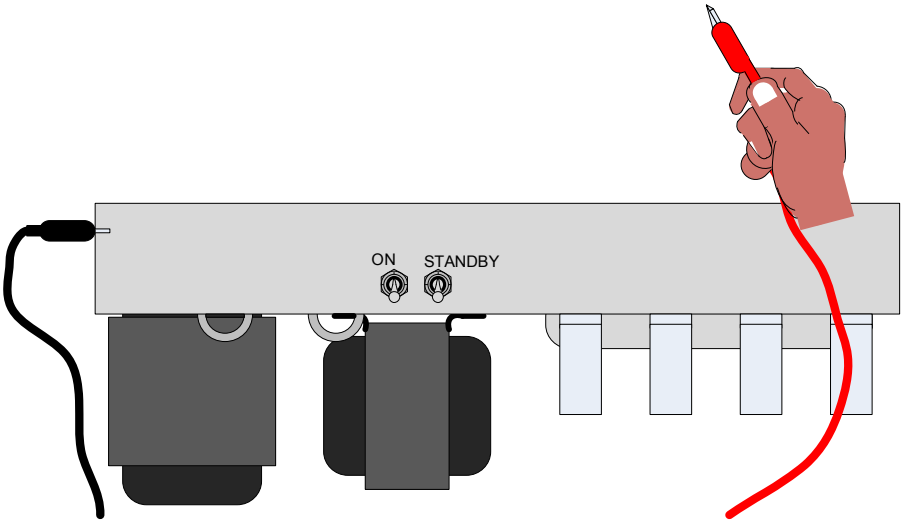


- Make sure the power tubes have cooled down enough to touch.
- Remove the power tubes from the amp and store them someplace safe.
- Remove the amplifier chassis from its cabinet and set it on a safe workplace.

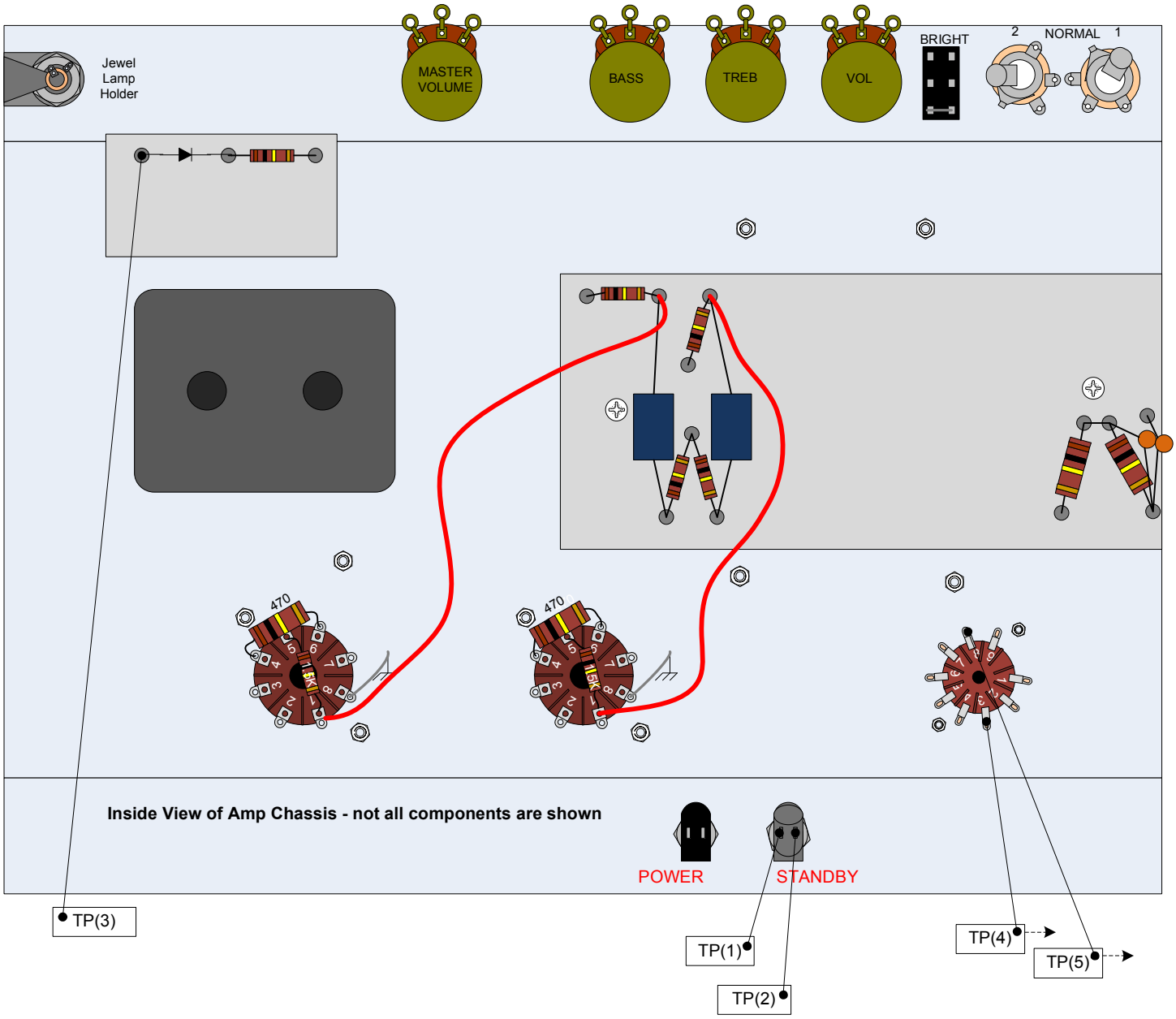
When the amp is open:

- Follow the one hand rule and use a volt meter with alligator clips to measure for high voltage at several test points.

(test points are on the next page)



The one hand rule (pictured above): is a safety precaution for working on an amp that is plugged in or could potentially have high voltages present. Using alligator clips with your DMM, clip the ground side to the chassis and use the other side to probe at various test points with one hand. *This prevents a fatal shock which can result from current passing through the heart. (Many people even put their other hand in their pocket or behind their back).*



Test Points

If there is a high voltage present at any of these test points, there may be something wrong with your amp. Please have it checked by a qualified repair shop.

TP(1), TP(2): These test points are both on the standby switch. When the amp is in operation, these two points have a very high voltage present. By 10 minutes after turning off the standby and power switches, all the voltage should have been drained.

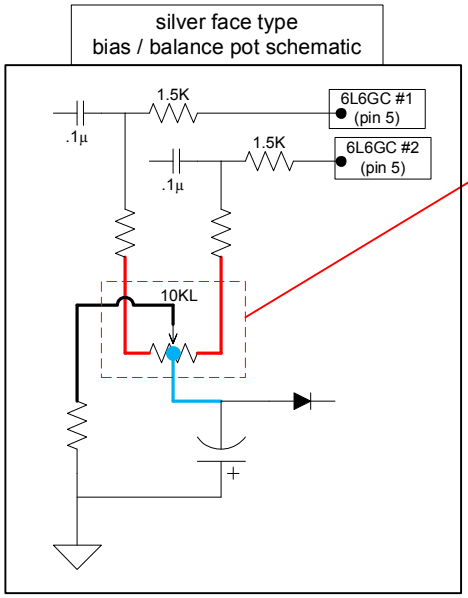
TP(3): This is the anode side of a solid state diode.

TP(4), TP(5): These test points are the cathode pins of the preamp tubes. It is not a bad idea to check these two pins on each one of the preamp tubes.

(**Tube Rectifier TP:** If your amp has a GZ34/5AR4 tube and no standby switch, then check the GZ34 pins 2 and 8 for voltage.)

Bias Pot Conversion

If you have a silver face amp, you might have to convert the bias/balance pot into a black face style bias pot for increased control of power tube operation.



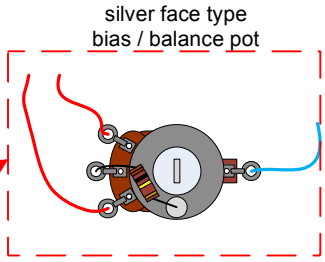
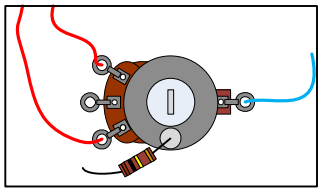
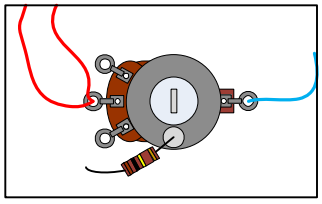


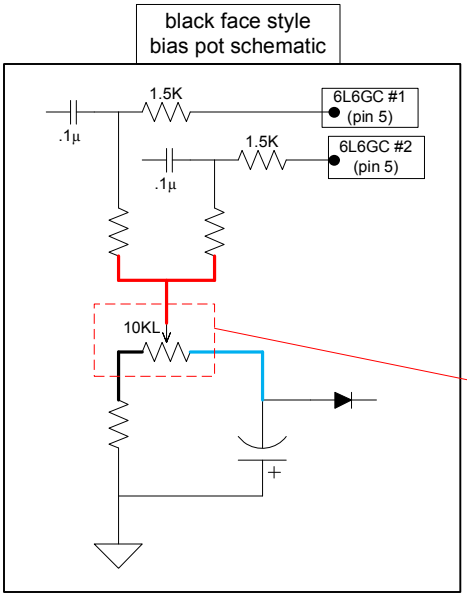
Exhibit A: If the bias pot in your amp looks like this, then follow the steps below to convert it.

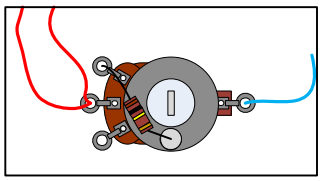


Step 1: De-solder the end of the resister mounted to the wiper (middle) lug of the bias pot and leave it hanging temporarily.

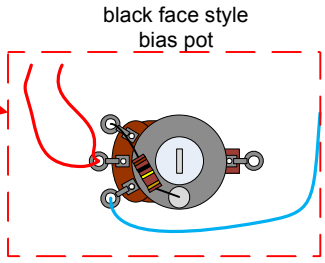


Step 2: De-solder both wires going to the outside lugs of the bias pot. Solder both wires to the wiper lug of the bias pot.

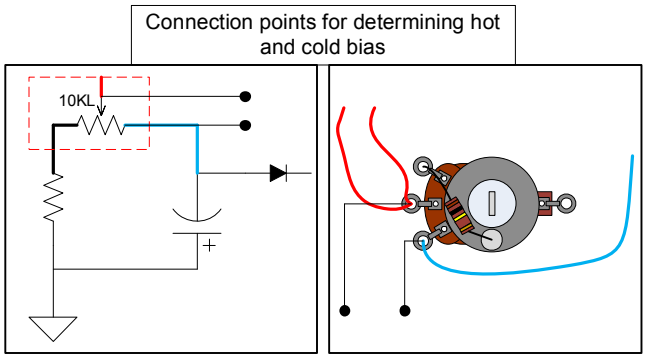




Step 3: Solder the disconnected end of the resistor to an outside lug of the bias pot.



Step 4: De-solder the wire connected to the center-tap lug of the bias pot. Solder that wire to the other outside lug of the bias pot.



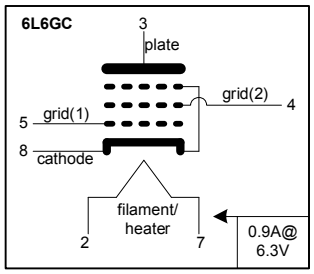
Determine your hot and cold bias directions:

- Set your DMM to measure resistance and use the alligator clip leads.
- Clip one lead of the meter to the wiper lug of the bias pot and the other lead to the outer lug with the wire connected.
- Turn the bias pot control all the way in the direction of 0 Ω and leave it there.

Cold = the direction of 0 Ω between these two points
Hot = the direction of 10 kΩ between these two points

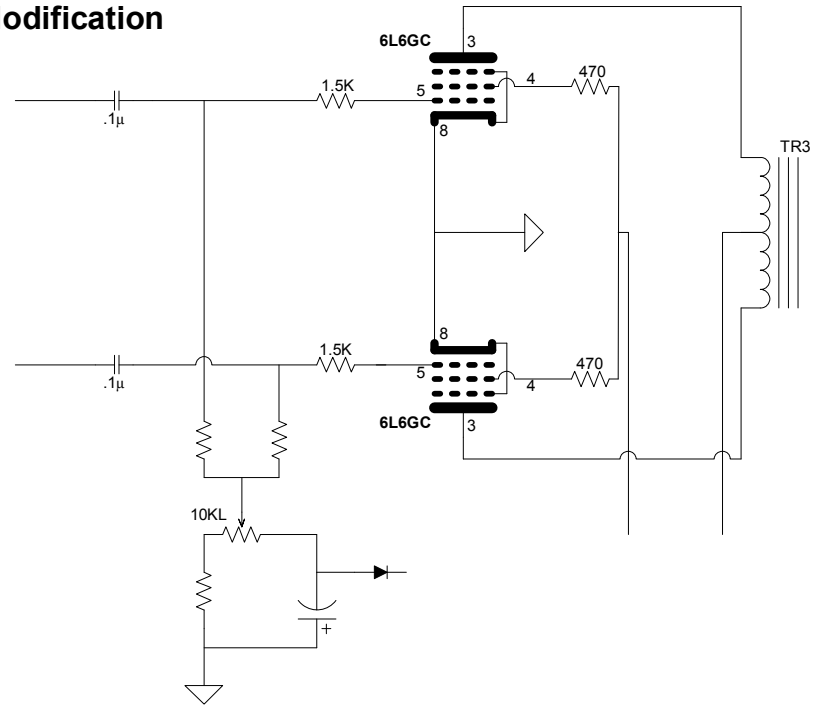
Power Tube Conversion

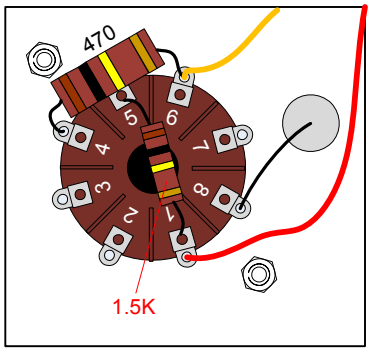
Here is a schematic representation of this mod. It is not necessary to be able to read the schematic in order complete the mod.



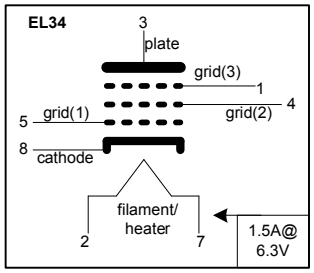
Pins 1 and 6 are not used by the tube

Before Modification



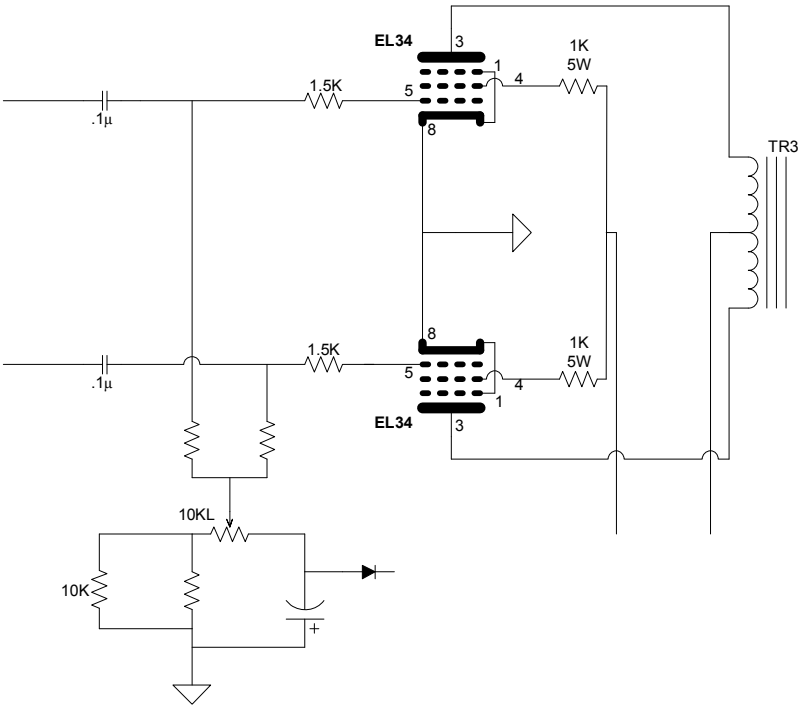


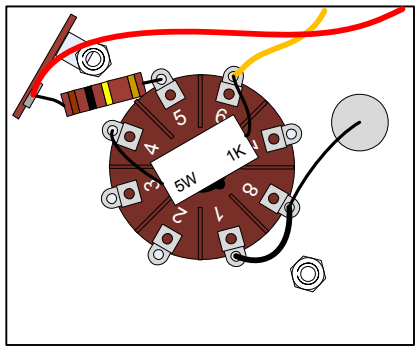
Because the EL34 draws more filament current than the 6L6GC, it is not recommended to do this mod on amps with more than two power tubes.



Pin 6 is not used by the tube

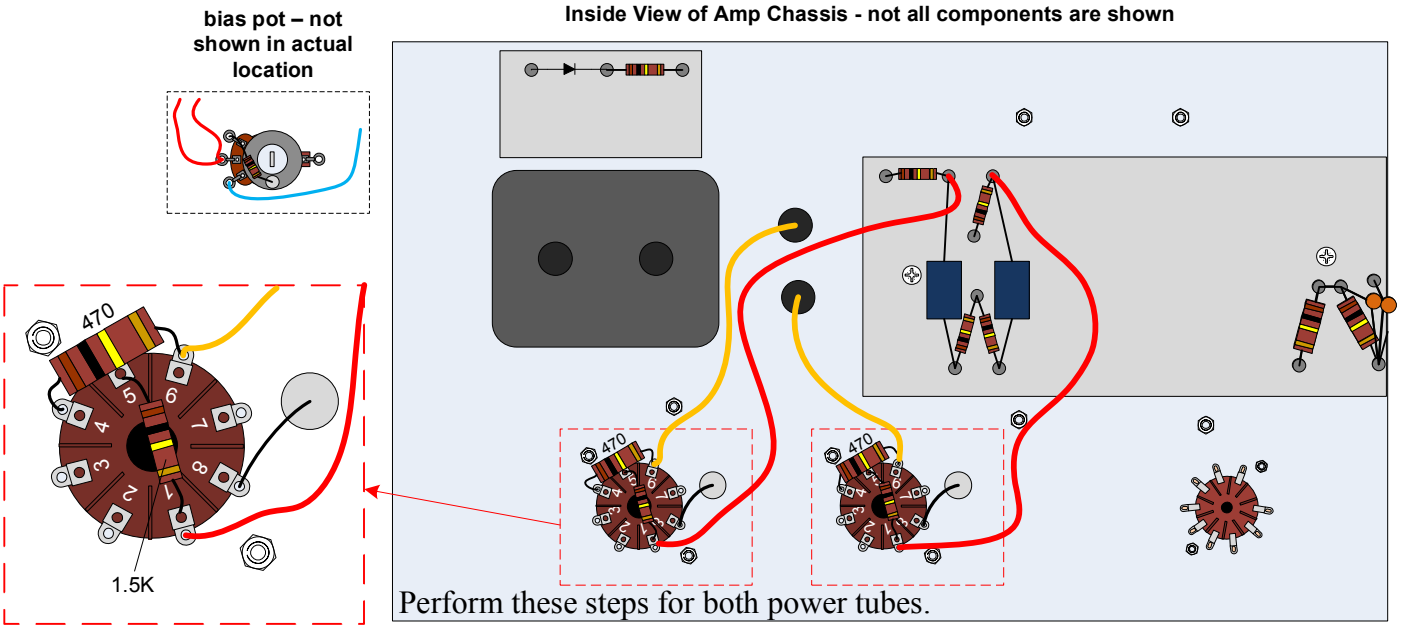
After Modification

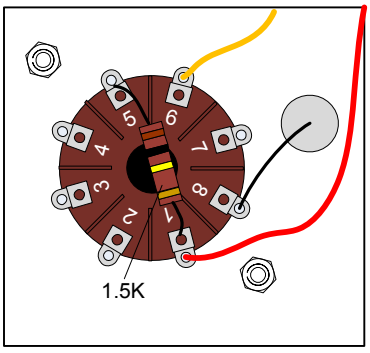




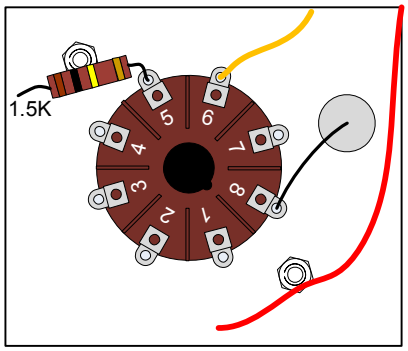
Power Tube Conversion

Depending on your amp model, you may not need to make all of these modifications and some of the components may be located in different places. Pay attention mainly to the connections.

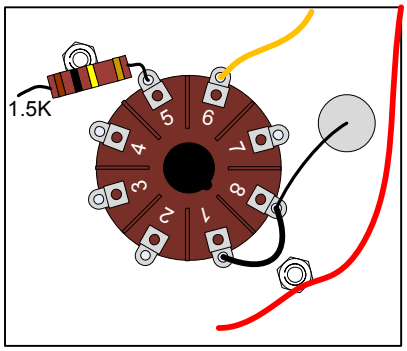




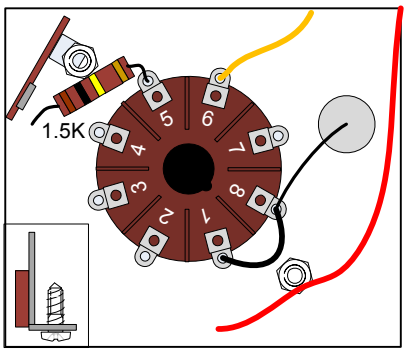
Step 1: De-solder and remove the 470Ω resistor.

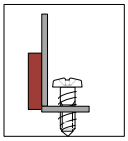


Step 2: De-solder and remove the wire and resistor connections at pin 1.

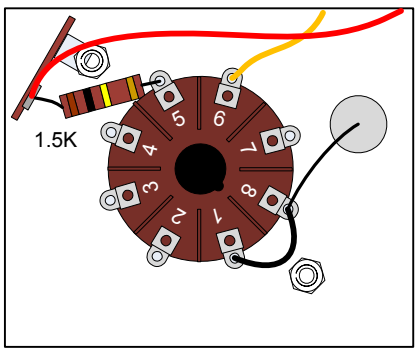


Step 3: Solder a connection between pins 1 and 8 with a small piece of wire.

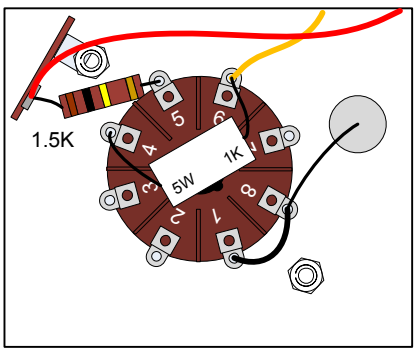




Step 4: Fasten a terminal strip to the mounting screw of the tube socket.

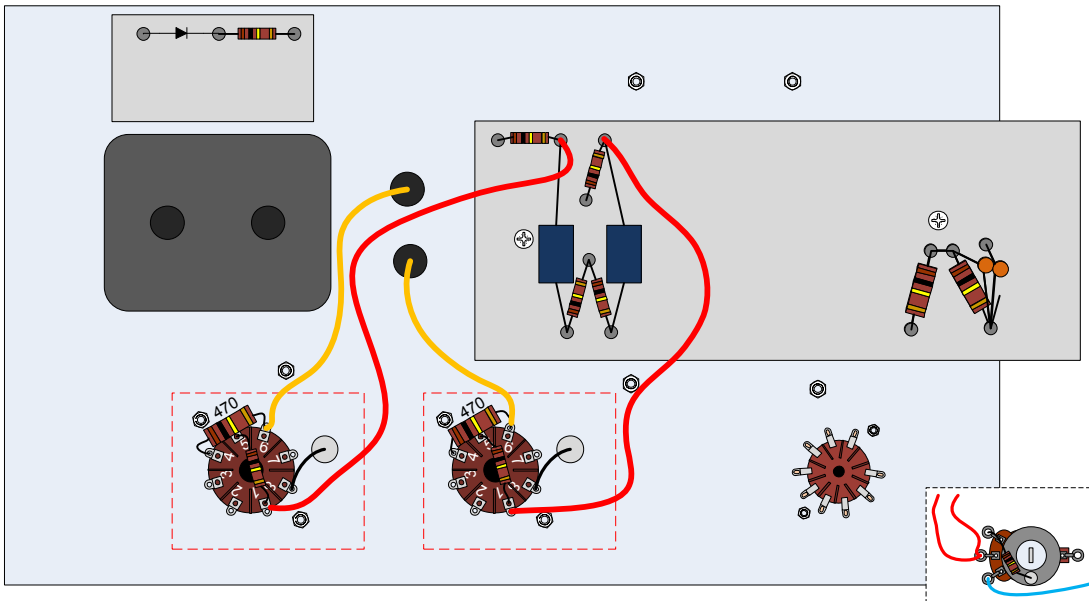


Step 5: Solder and connect the wire and resistor to the ungrounded lug of the terminal strip.

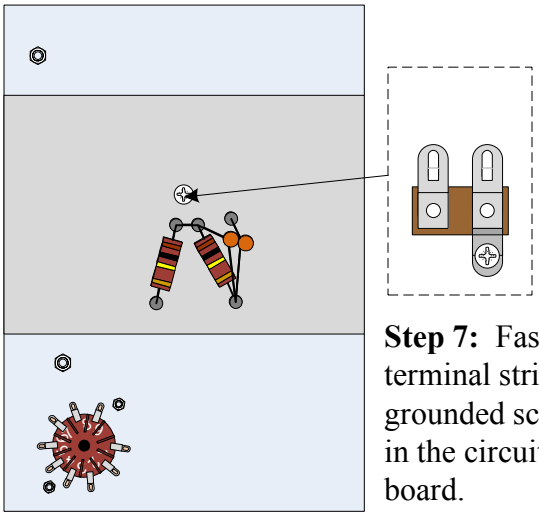


Step 6: Solder and connect the 1kΩ (5W) resistor between pins 4 and 6.

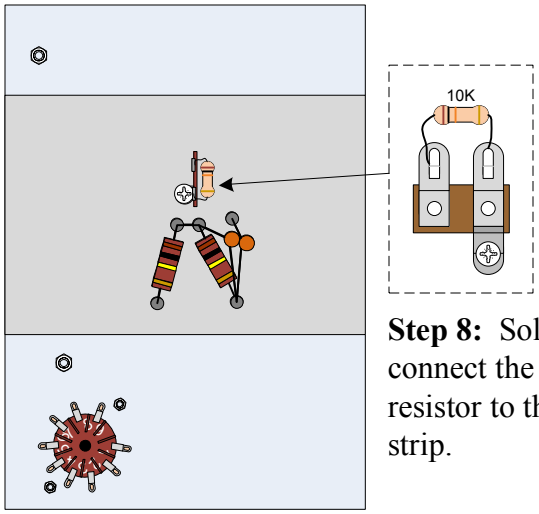
Inside View of Amp Chassis - not all components are shown



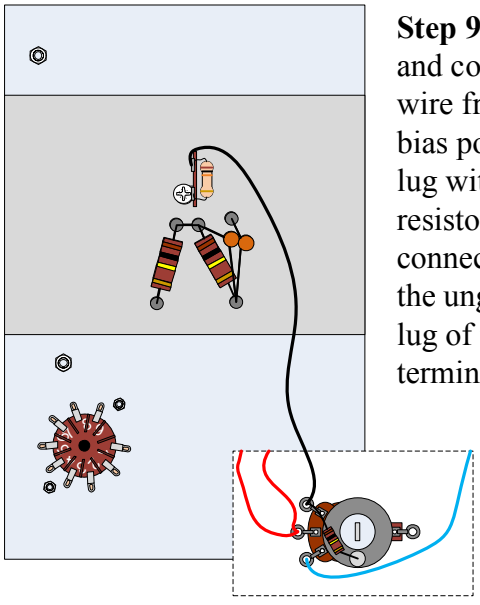
bias pot – not shown in actual location



Step 7: Fasten a terminal strip to a grounded screw in the circuit board.



Step 8: Solder and connect the 10kΩ resistor to the terminal strip.



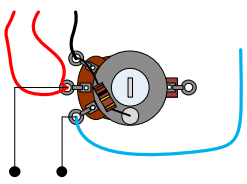
Step 9: Solder and connect a wire from the bias pot (outer lug with the resistor connected) to the ungrounded lug of the terminal strip.

Step 10: Set the bias all the way to cold.

Determine your hot and cold bias directions:

- Set your DMM to measure resistance and use the alligator clip leads.
- Clip one lead of the meter to the wiper (middle) lug of the bias pot and the other lead to the outer lug with only a wire connected.
- Turn the bias pot control all the way in the direction of 0 Ω and leave it there.

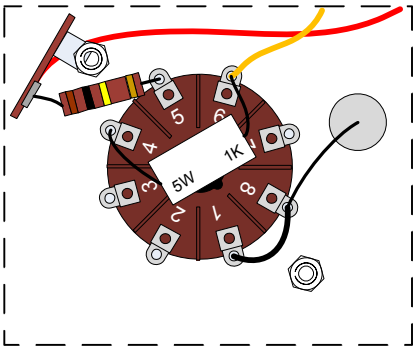
Cold = the direction of 0 Ω between these two points
Hot = the direction of 10 kΩ between these two points

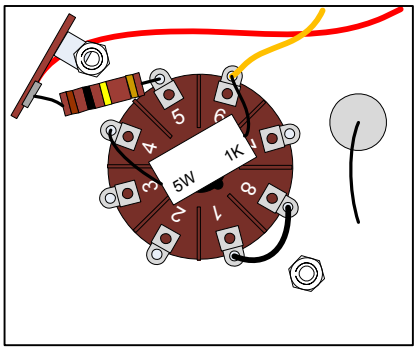


Setting the Bias

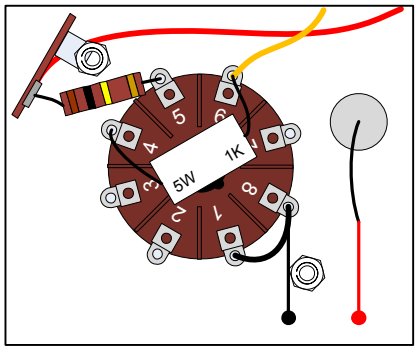
You should re-bias your power tubes after changing them. It is a good idea to begin with the bias pot set all the way to cold (i.e. with maximum negative voltage applied to the power tube control grids) to avoid damaging the tube from too hot of a bias setting.

Make sure and get matched power tubes. This way the current measured from both power tubes should be close to the same value.

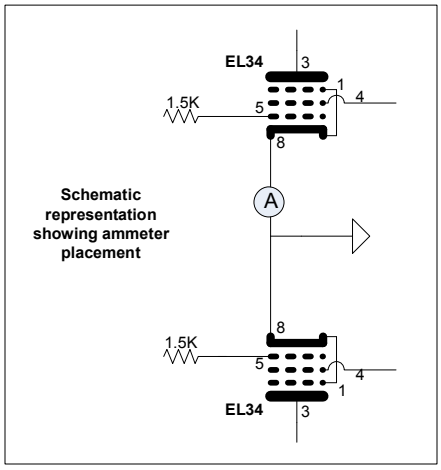




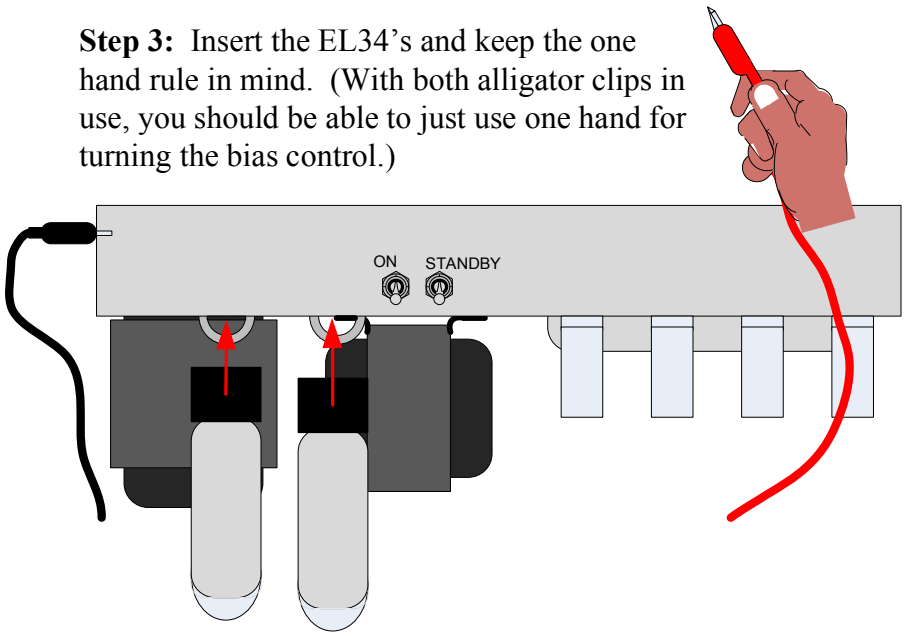
Step 1: De-solder the ground wire connection from pin 8.



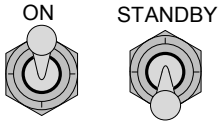
Step 2: Set your DMM to measure DC current and use the alligator clips. Clip one lead of the meter to pin 8 and the other lead to the ground wire.



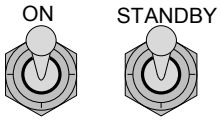
Step 3: Insert the EL34's and keep the one hand rule in mind. (With both alligator clips in use, you should be able to just use one hand for turning the bias control.)



Step 4: Plug the amp in and turn the power switch on. Let the tubes heat up for about 2 minutes before turning the standby switch on.

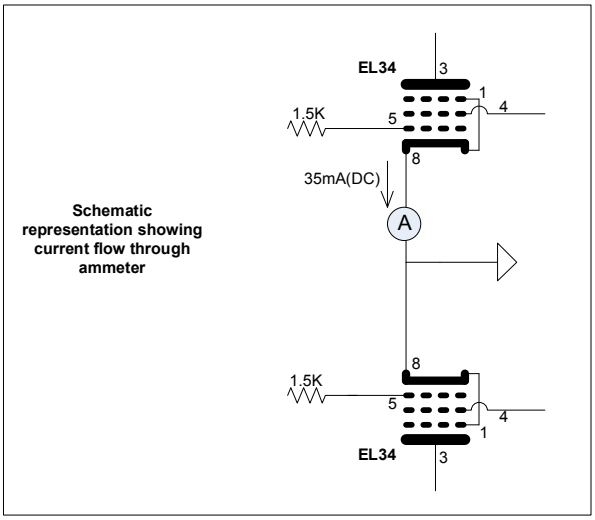


Step 5: Turn the standby switch on (upward position).

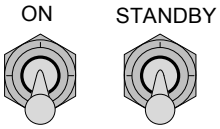


Step 6: Slowly turn the bias pot towards hot until you get a reading of about 35mA (ideal bias point for 6L6GC).

Step 7: Use your ears to determine the best sounding bias point for the EL34's (e.g. 42mA), but do not exceed 70mA. If you see the outer tube plates begin to glow, it probably means you have the tube biased too hot.



Step 8: Unplug the amp and turn off both power and standby switches. Allow the tubes to cool.



Step 9: Re-solder and connect the ground wire to pin 8. Close the amp back up and you're done.