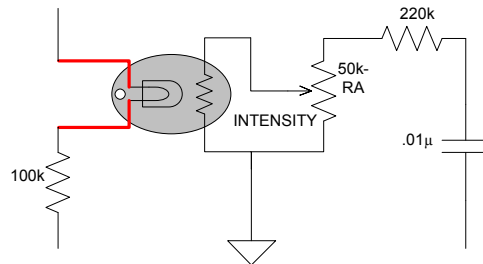


BASS TO TREMOLO CONVERSION KIT (K-700)



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

- How to convert the “Bass Instrument” channel of a Bassman amp into a tremolo effect for the “Normal Channel”.

Table of Contents

Safety3

Parts List4, 5

Tools6

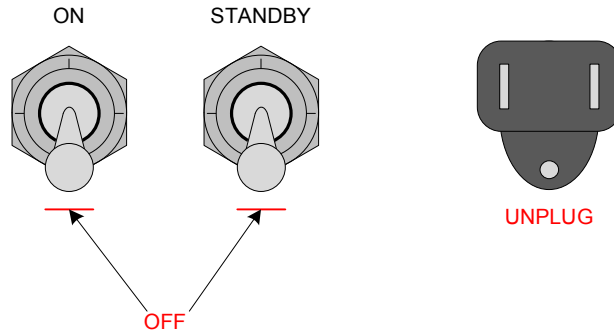
Soldering Tips7, 8

Preliminaries9

Test Points10

Bass to Tremolo Modification11 – 24

Style A12 – 17
Style B18 – 23
Schematics12, 18
Terminal Strip Mounting Tips24



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.





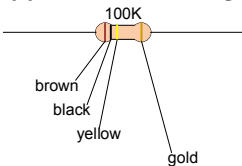
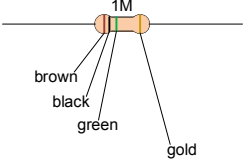
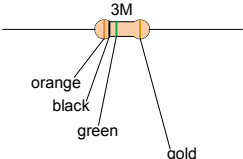
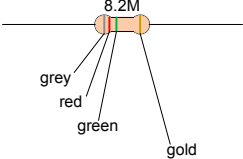
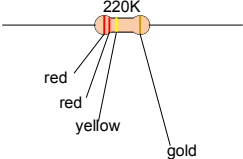
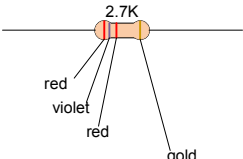
Please make sure you do the following before opening your amp:

- 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.

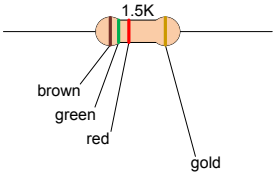
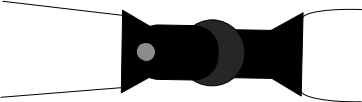
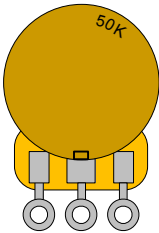
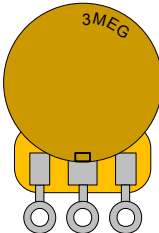
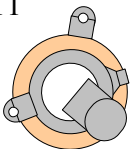
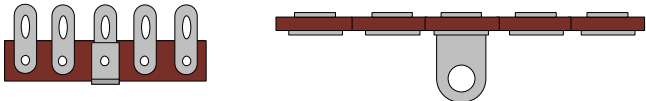

When the amp is open:

- 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

<u>Part Number</u>	<u>Quantity</u>	<u>Description</u>
C-MD1-630	1	0.1 μ F capacitor
		
C-MD01-630	2	0.01 μ F capacitor
		
C-MD022-630	1	0.022 μ F capacitor
		
C-ET22-50	2	22 μ F polarized capacitor
		
R-A100K	3	100k Ω , 1/2W resistor
		
R-A1M	2	1M Ω , 1/2W resistor
		
R-A3M	1	3M Ω , 1/2W resistor
		
R-A8D2M	1	8.2M Ω , 1/2W resistor
		
R-A220K	1	220k Ω , 1/2W resistor
		
R-A2D7K	1	2.7k Ω , 1/2W resistor
		

Parts List (continued)

<u>Part Number</u>	<u>Quantity</u>	<u>Description</u>
R-B1D5K	1	1.5k Ω , 1W resistor (This value is used in amps with shared preamp tube cathodes only – Like Bassman 100)
		
R-VOP1020	1	Optocoupler
		
R-VC50K-RA	1	50k Ω potentiometer (reverse audio taper)
		
R-VC3M-RA	1	3M Ω potentiometer (reverse audio taper)
		
W-SC-11	1	1/4" input jack
		
P-0501H	3	5 lug terminal strip (3 rd lug common)
		
P-H35-242	1	DPDT slide switch
		
S-W809L	15 ft	20 AWG solid core hook-up wire (white)

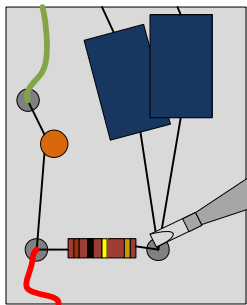
Tools

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

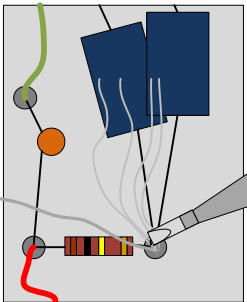
Soldering Tips (circuit boards)

- Work in a ventilated area with a fan to blow the smoke 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.

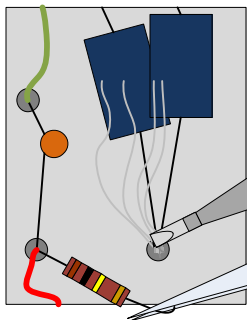
De-soldering Tip



1. Heat up the connection point until it starts smoking and becomes a liquid.

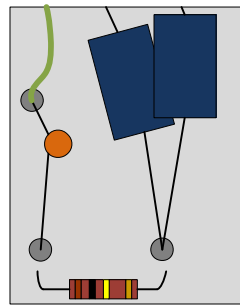


2. If necessary, add new solder to the connection point to help it become a liquid.

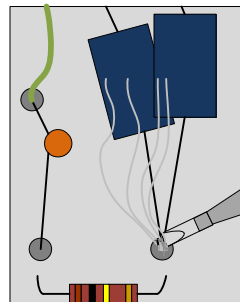


3. Remove the component lead from the connection point with needle nose pliers.

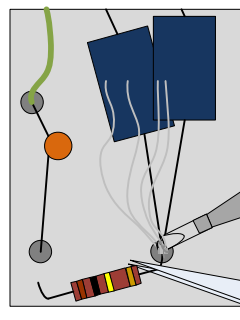
Soldering Tip



1. Cut and bend the component leads for a neat fit to their connection points.



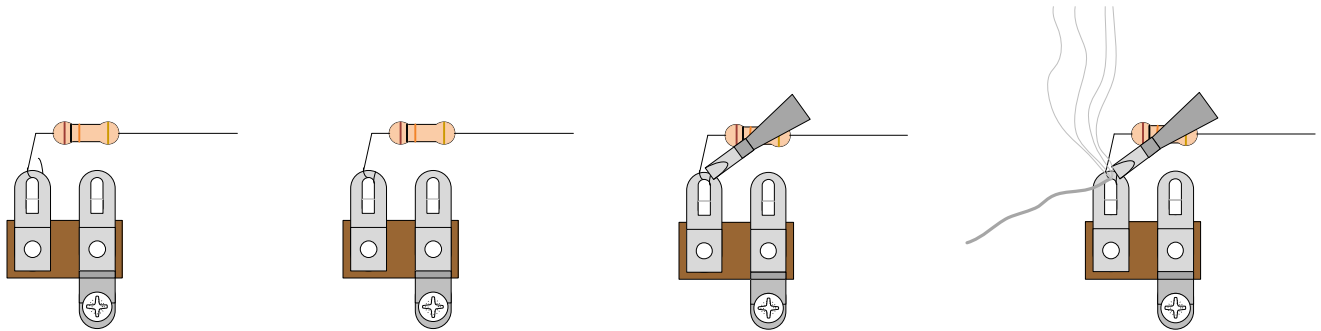
2. Heat up the connection point until it becomes a liquid.



2. Insert the appropriate component lead with needle nose pliers.

Soldering Tips (solder lugs)

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.

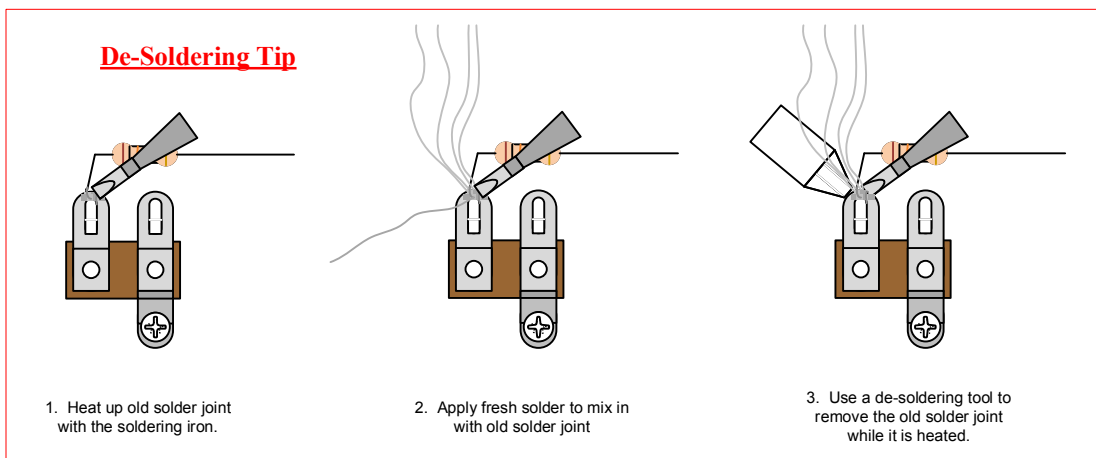


1. Bend the component lead and wrap it around the connection point.

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.



1. Heat up old solder joint with the soldering iron.

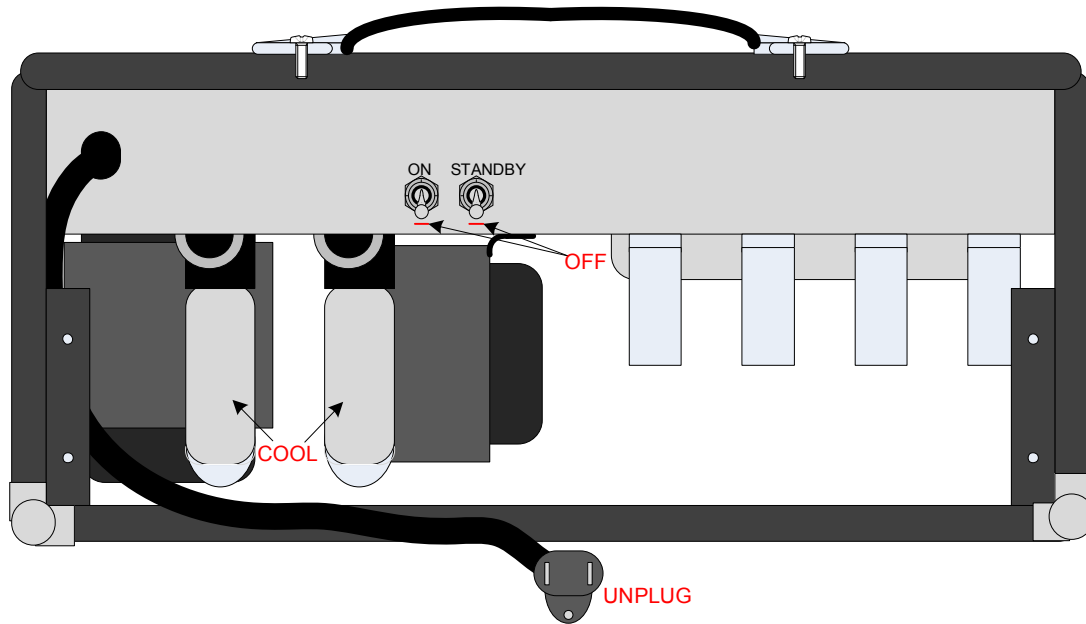
2. Apply fresh solder to mix in with old solder joint

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.

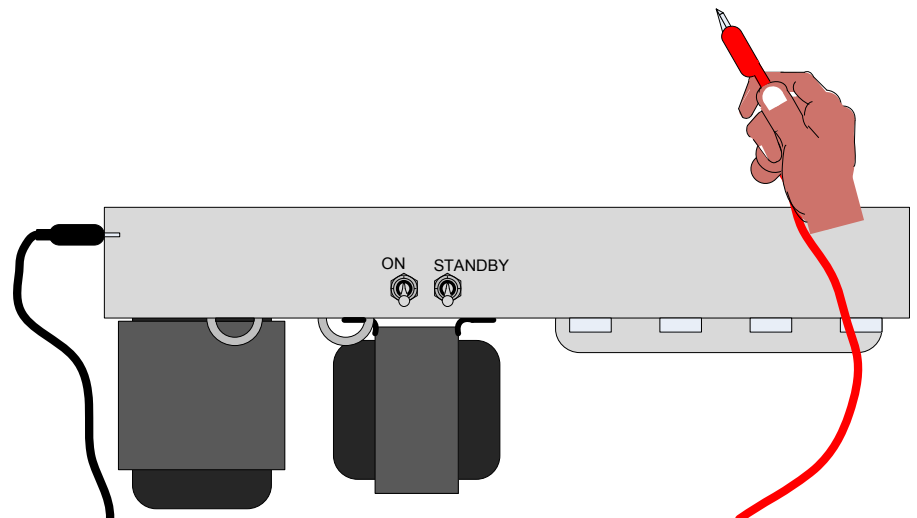


- Make sure the power tubes have cooled down enough to touch.
- Remove all of the tubes from the amp and store them someplace safe.
- Remove the amplifier chassis from its cabinet and set it on a safe workplace.

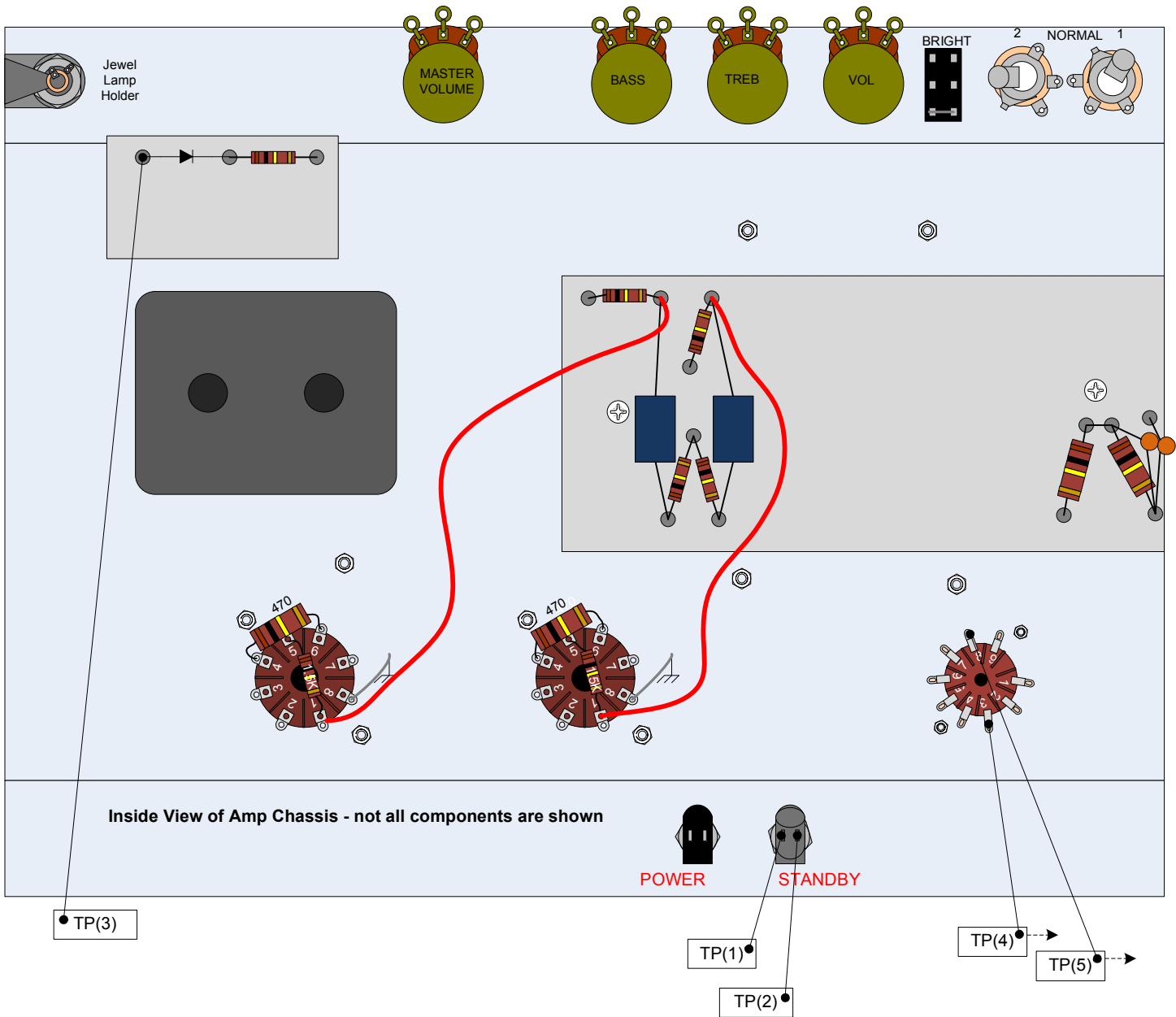
When the amp is open:

- 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.

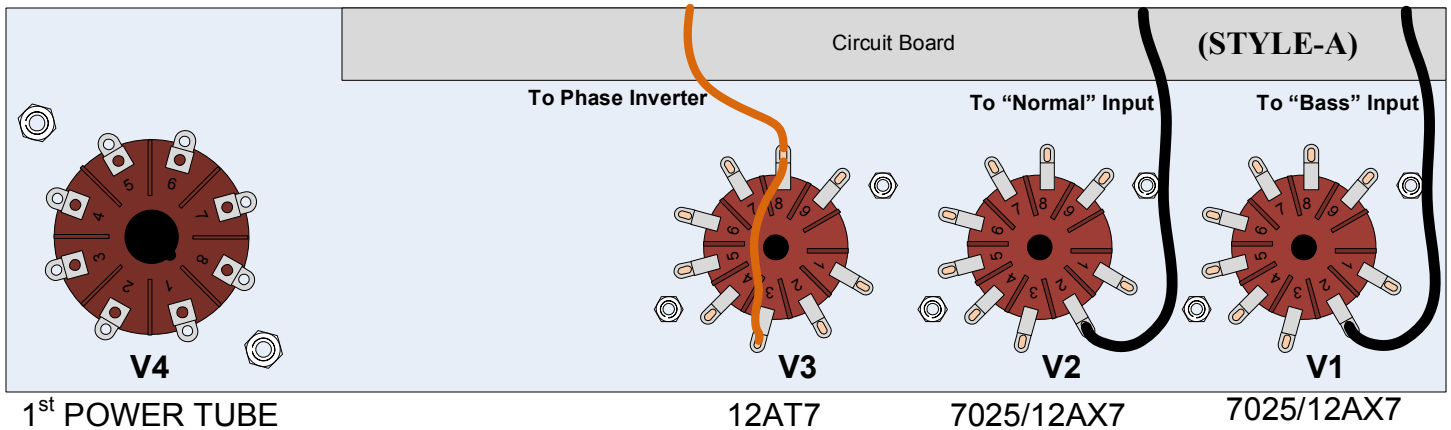
TP(3): This is the anode side of a solid state diode.

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.)

Bass to Tremolo Modification

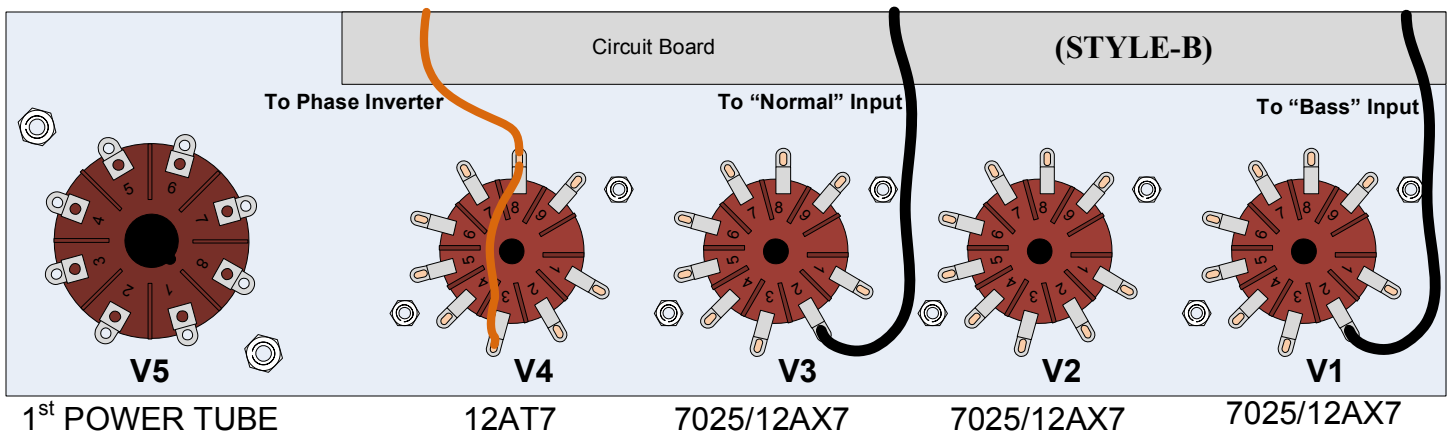
Step 1: Determine which style of Bassman you have.



STYLE A (follow pages 12 – 17)

We define this style of amp as having the following characteristics:

- The amp has 3 preamp tubes including two 7025/12AX7 tubes and one 12AT7 tube.
- The first tube is connected to the "Bass" channel input.
- The second tube is connected to the "Normal" input.
- The third tube is the 12AT7 (phase inverter).



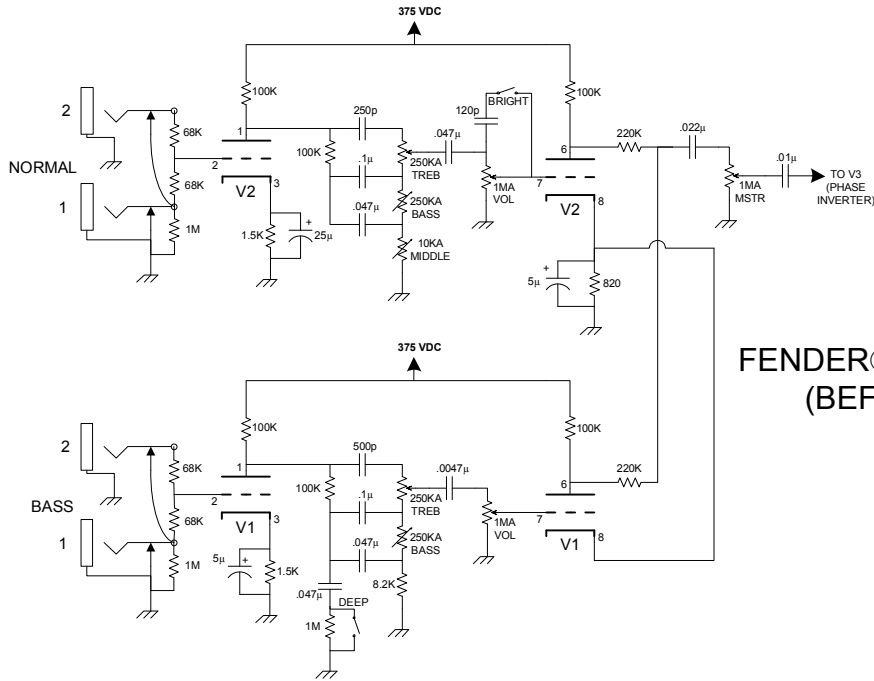
STYLE B (follow pages 18 – 23)

We define this style of amp as having the following characteristics:

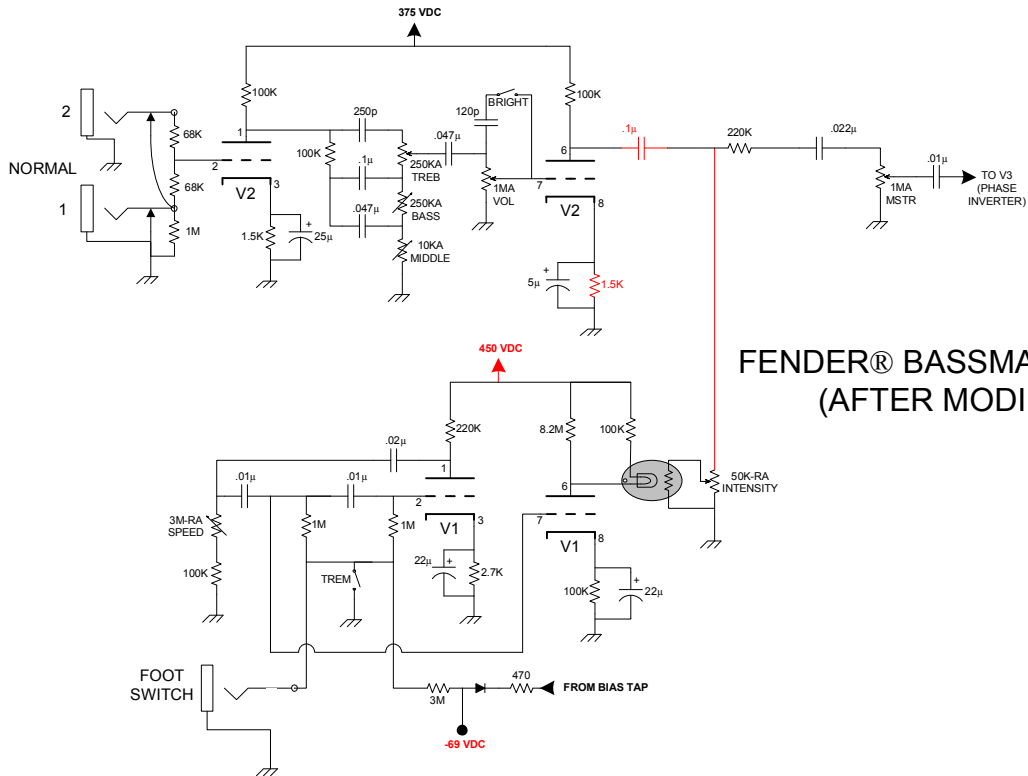
- The amp has 4 preamp tubes including three 7025/12AX7 tubes and one 12AT7 tube.
- The first tube is connected to the "Bass" channel input.
- The third tube is connected to the "Normal" channel input.
- The fourth tube is the 12AT7 (phase inverter).

Bass to Tremolo Modification Schematic (STYLE-A)

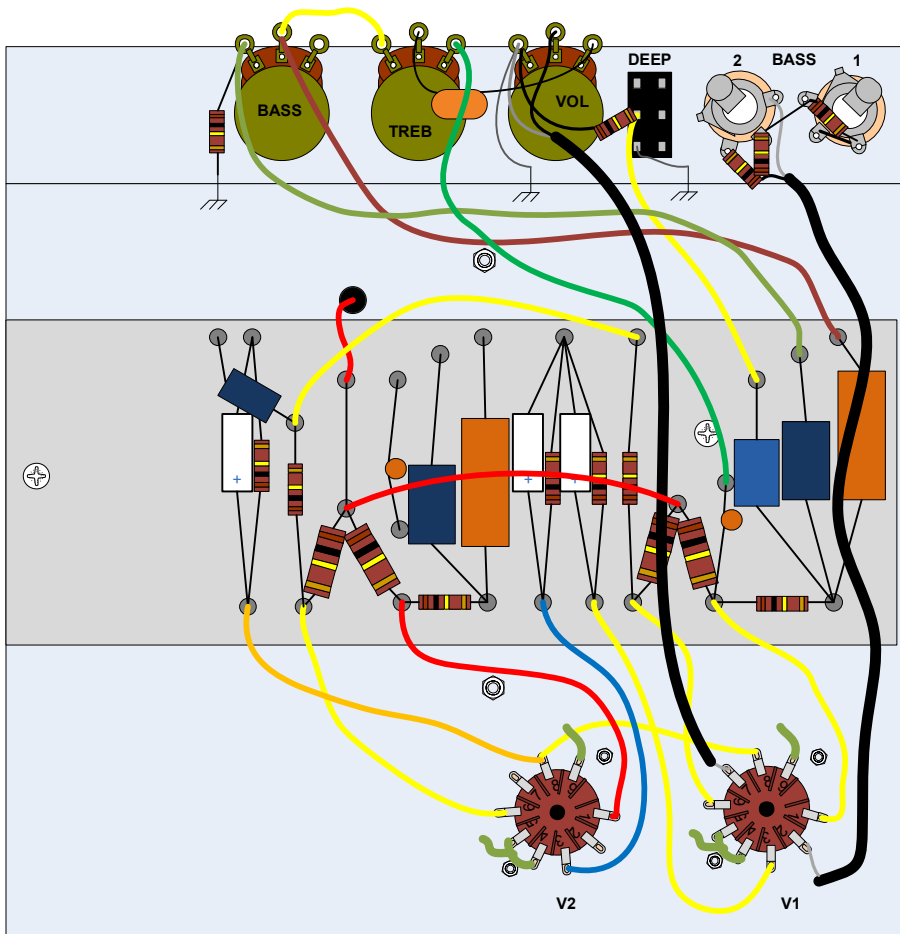
Here is a schematic representation of this mod for style A amps. It is not necessary to be able to read the schematic in order to complete the mod.



FENDER® BASSMAN 100 PREAMP (BEFORE MODIFICATION)



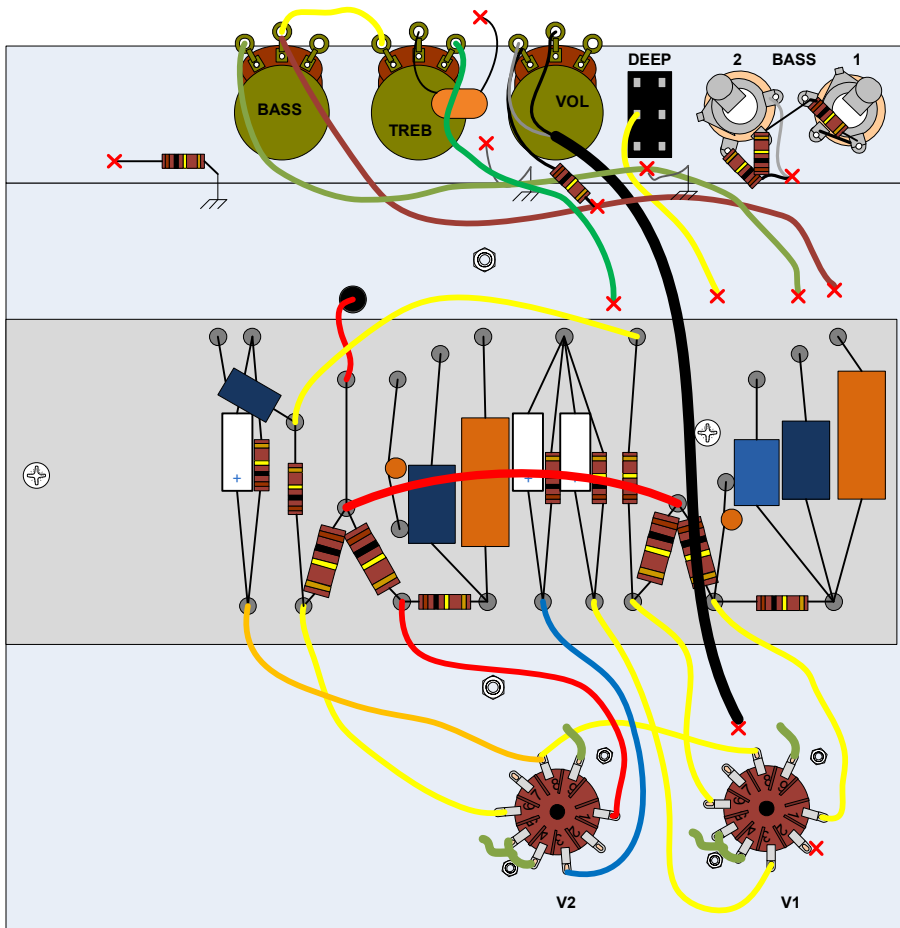
FENDER® BASSMAN 100 PREAMP (AFTER MODIFICATION)



Step 2: Disconnect the “Bass” channel front panel controls and wires.

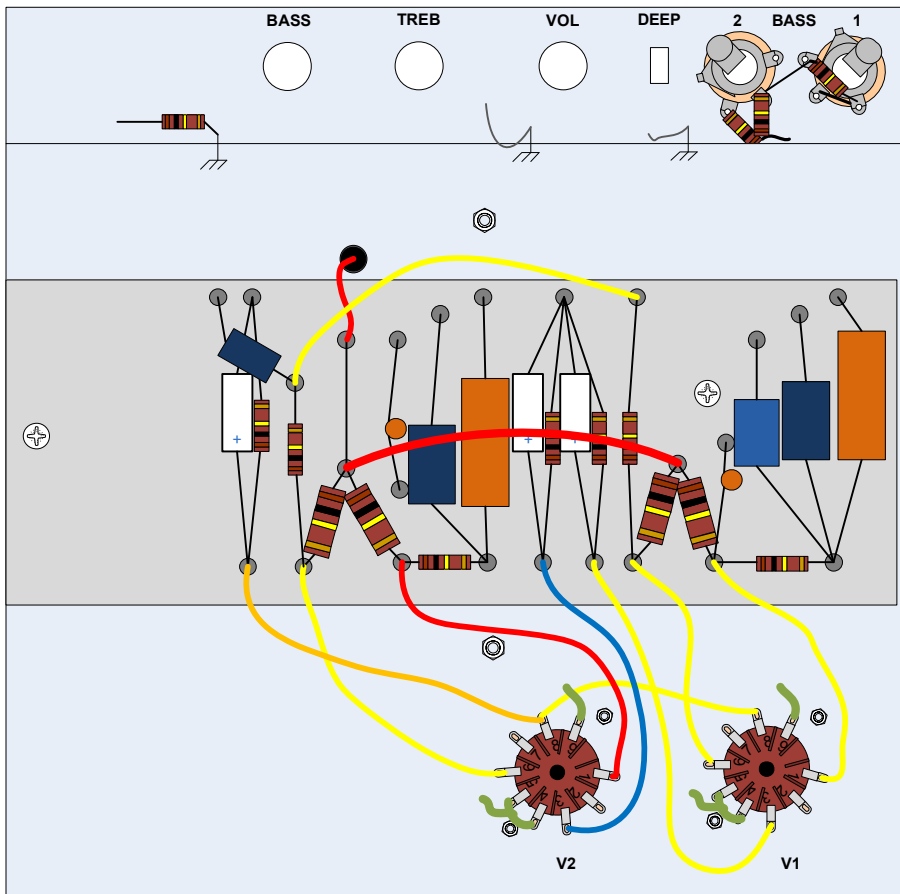
Depending upon which amp model you have, the layout of components may vary slightly. The main idea of this step is to remove the bass channel controls so that we can mount the tremolo controls.

(Save the components and wire that you remove, in case you want to revert back to a bass channel in the future).



Front Panel Controls to Remove

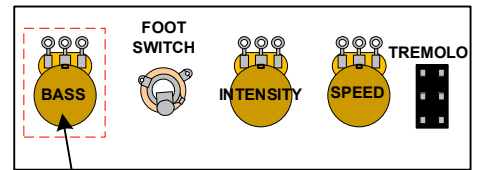
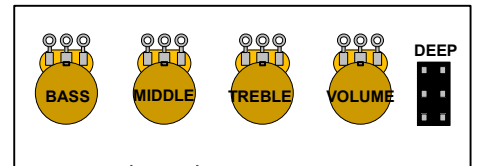
- 1) Disconnect and remove the wire connecting the bass input to V1 pin 2.
- 2) Disconnect the deep switch connections to the circuit board and ground.
- 3) Disconnect the resistor from the deep switch.
- 4) Disconnect the volume pot connection at V1 pin 7.
- 5) Disconnect the volume pot ground connection.
- 6) Disconnect the capacitor from the volume pot.
- 7) Disconnect the treble pot connection to the board.
- 8) Disconnect the bass pot connections to the board.
- 9) Disconnect the resistor from the bass pot.



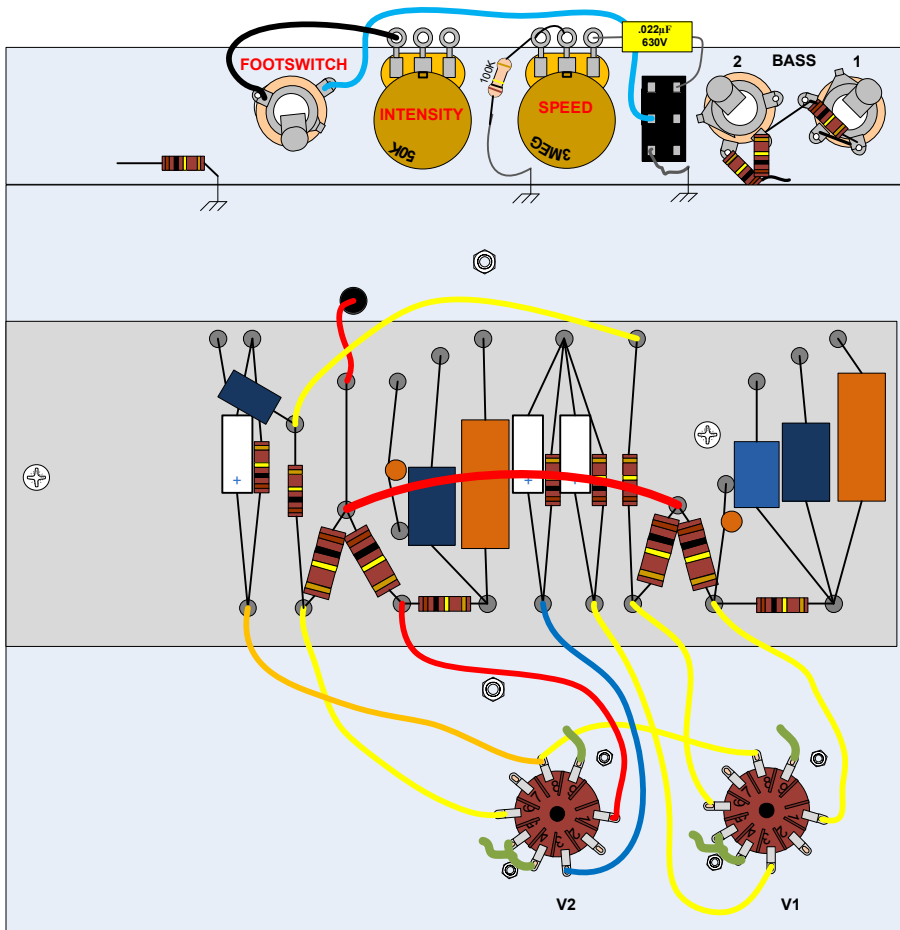
Step 3: Remove the bass channel controls from the front panel.

- 1) Deep switch
- 2) Volume pot
- 3) Treble pot
- 4) Bass pot

Step 3 (MID version): If your bass channel has a mid control, leave the last of the four pots mounted, but completely disconnect it from the circuit.



Disconnected

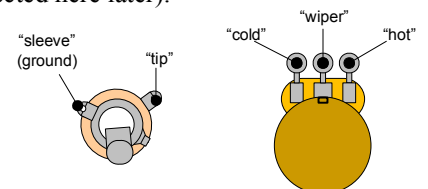


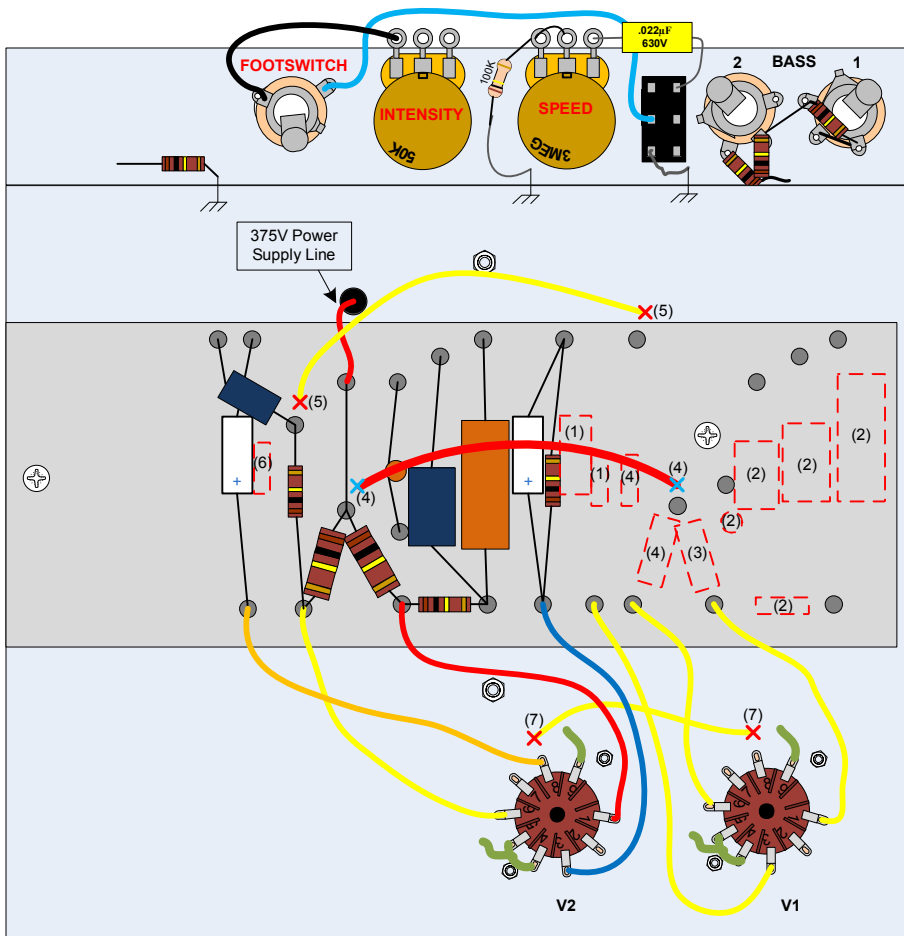
Step 4: Mount new front panel controls for tremolo circuit

- 1) DPDT slide switch
- 2) 3MΩ pot in place of the volume pot
- 3) 50kΩ pot in place of the treble pot
- 4) ¼" input jack in place of the bass pot

Step 5: Make preliminary front panel control connections.

- 5) Connect the Tremolo switch ground as shown.
- 6) Connect a 100K resistor from ground to the 3M pot "cold" and "wiper" lugs.
- 7) Connect the footswitch jack "tip" lug to the tremolo switch as shown.
- 8) Connect the footswitch jack "sleeve" lug to the 50K pot "cold" lug.
- 9) Connect a .022µF cap from Tremolo switch to 3M pot "hot" lug as shown (leave the switch lug unsoldered for now – there will be a wire connected here later).

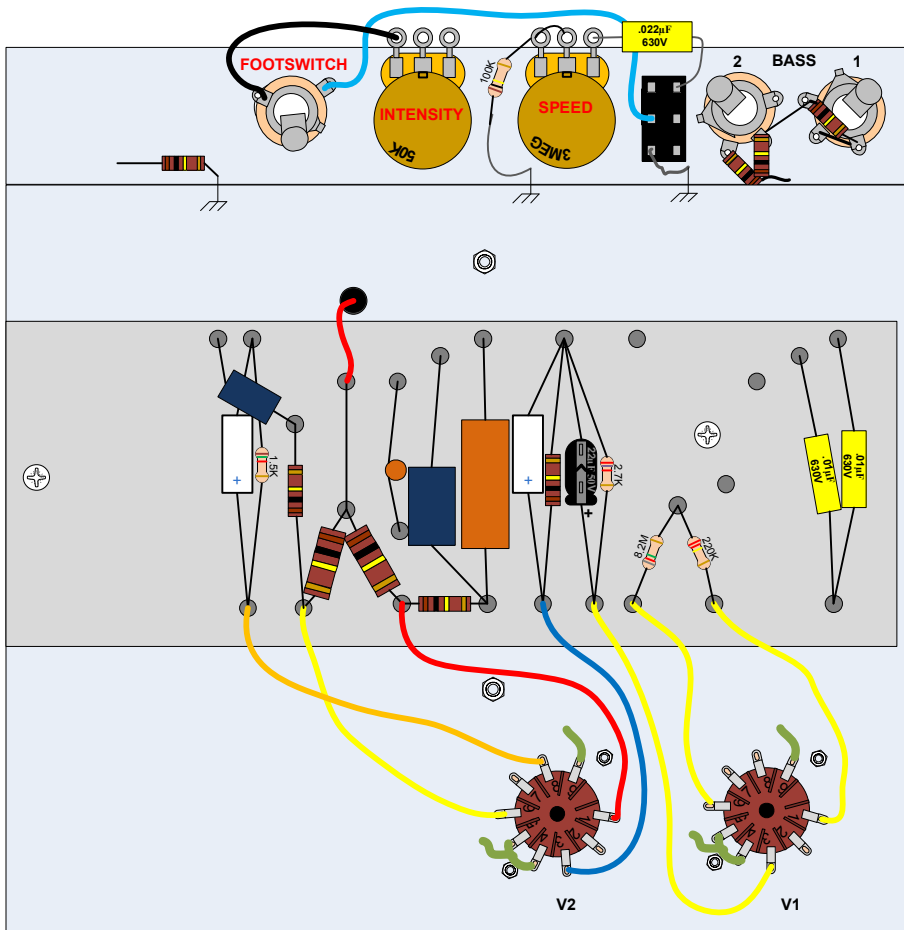




Step 6: Remove unnecessary circuit board components.

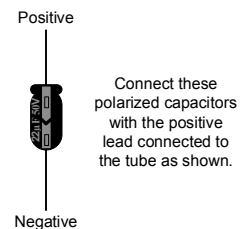
Each instruction line number here corresponds to the numbers on the drawing where missing components are outlined.

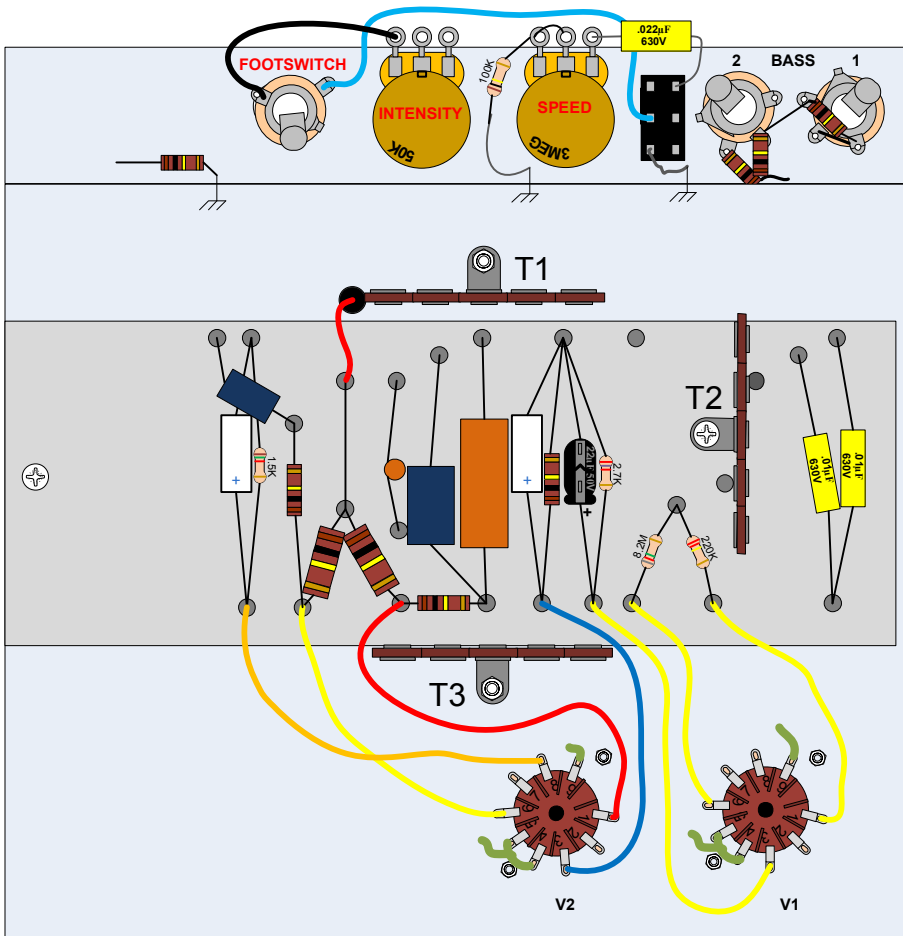
- 1) Remove the cathode bias components connected to V1 pin 3.
- 2) Remove the bass channel tone-stack components.
- 3) Remove the plate resistor connected to V1 pin 1.
- 4) Remove the plate resistors connected to V1 pin 6 and their connection to the 375V power supply.
- 5) Remove the jumper wire that was connect the V1 pin 6 plate resistor to the V2 pin 6 plate resistor.
- 6) Remove the shared cathode resistor connected to V2 pin 8.
- 7) Remove the common cathode jumper wire connected from V1 pin 8 to V2 pin 8.



Step 7: Add new circuit board components.

- 1) Connect new cathode bias components (22µF cap and 2.7K resistor) to V1 pin 3.
- 2) Connect a new cathode resistor (1.5K) to V2 pin 8.
- 3) Connect a new plate resistor (220K) to V1 pin 1.
- 4) Connect a new plate resistor (8.2M) to V1 pin 6.
- 5) Add the two .01µF feedback capacitors as shown.



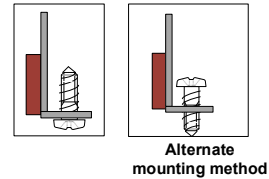


Step 8: Mount the three terminal strips.

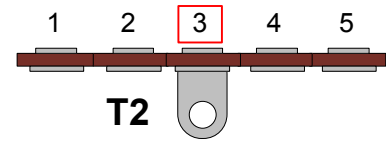
See **Terminal Strip Mounting Section (p. 24)**

Fasten the three terminal strips to existing screws in the chassis as shown and in similar locations.

- 1) Mount T1 on a screw near the footswitch jack.
- 2) Mount T2 using the fiber board screw.
- 3) Mount T3 on a screw near V2.



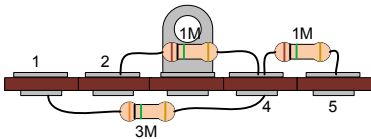
Note: Terminal strip terminals will be referred to in a shortened notation where T2(3) means terminal number 3 on "T2".



Step 9: Add the components to each terminal strip.

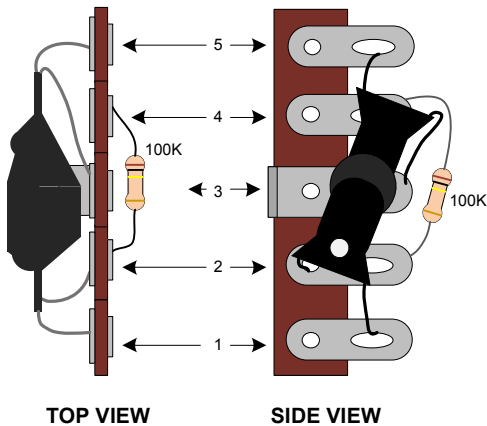
Be careful not to burn nearby components or wires with your soldering iron.

T1



- 1) Connect the 3M resistor from terminal #1 to #4.
- 2) Connect a 1M resistor from terminal #2 to #4.
- 3) Connect a 1M resistor from terminal #4 to #5.

T2

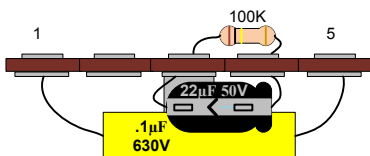


- 4) Connect the opto-coupler as shown. Make sure the two leads coming out of the end marked with the dot are connected to terminals #1 and #2. The two leads coming out of the unmarked end should be connected to terminals #3 and #5.
- 5) Connect a 100K resistor from terminal #2 to #4.

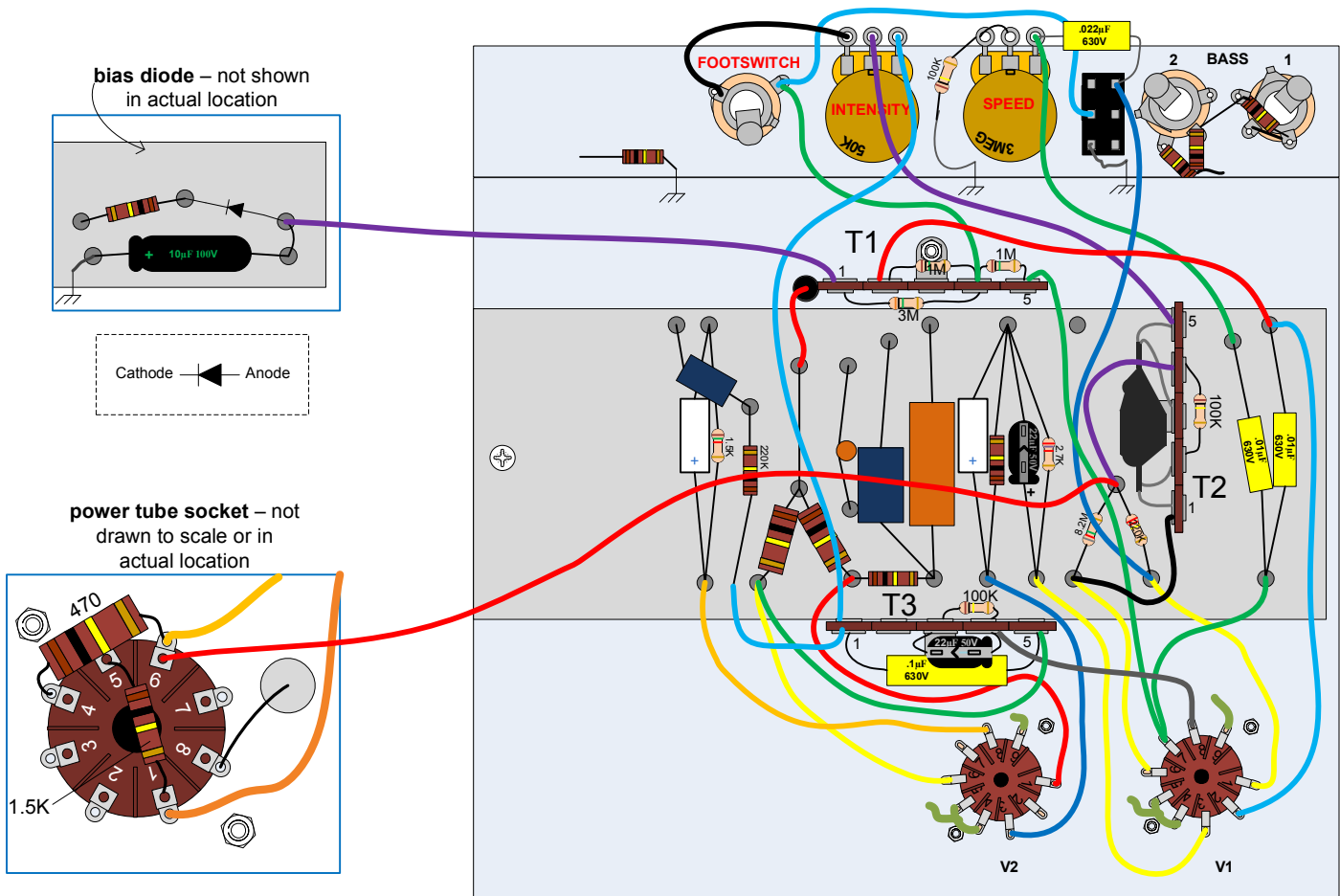
NON-POLARIZED OPTICAL SIDE IS INDICATED BY SILVER DOT AND SLIGHTLY LONGER LEADS

RESISTIVE SIDE IS INDICATED ONLY BY SLIGHTLY SHORTER LEADS

T3



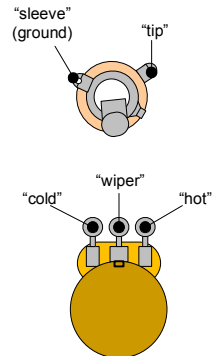
- 6) Connect a .1µF capacitor from terminal #1 to #5.
- 7) Connect a 22 F 50V capacitor with (-) side to terminal #3 and (+) side to terminal #4.
- 8) Connect a 100K resistor from terminal #3 to terminal #4.



Step 10: Wire it up.

Front Panel Controls

- 1) Connect the footswitch Jack “tip” lug to T1(4).
- 2) Connect the 50K pot “wiper” lug to T2(5).
- 3) Connect the 50K pot “hot” lug to T3(1).
- 4) Connect the 3M pot “hot” lug to one of the .01µF feedback capacitors as shown.
- 5) Connect the switch side of the .022µF front panel capacitor to the circuit board where V1 pin 1 is connected. *In some amps, it is important to run the path of this wire very close to the chassis and circuit board.*



V1 Connections

- 1) Connect V1 pin 2 to the other .01µF feedback capacitor on the circuit board.
- 2) Connect that V1 pin 2 connection on the circuit board to T1(2).
- 3) Connect V1 pin 7 with two wires to T1(5) and the circuit board where the two .01µF feedback capacitors are connected together.
- 4) Connect V1 pin 8 to T3(4).

Circuit Board Connections

- 1) Connect T2(1) to the 8.2M resistor where it connects to V1 pin 6 on the board as shown.
- 2) Connect T2(4) to the circuit board where the 8.2M and 220K resistors connect.
- 3) Remove the one end of the 220K resistor from its board connection with V2 pin 6 and connect a wire from this end to T3(1).
- 4) Connect a wire from the circuit board connection with V2 pin 6 to T3(5).

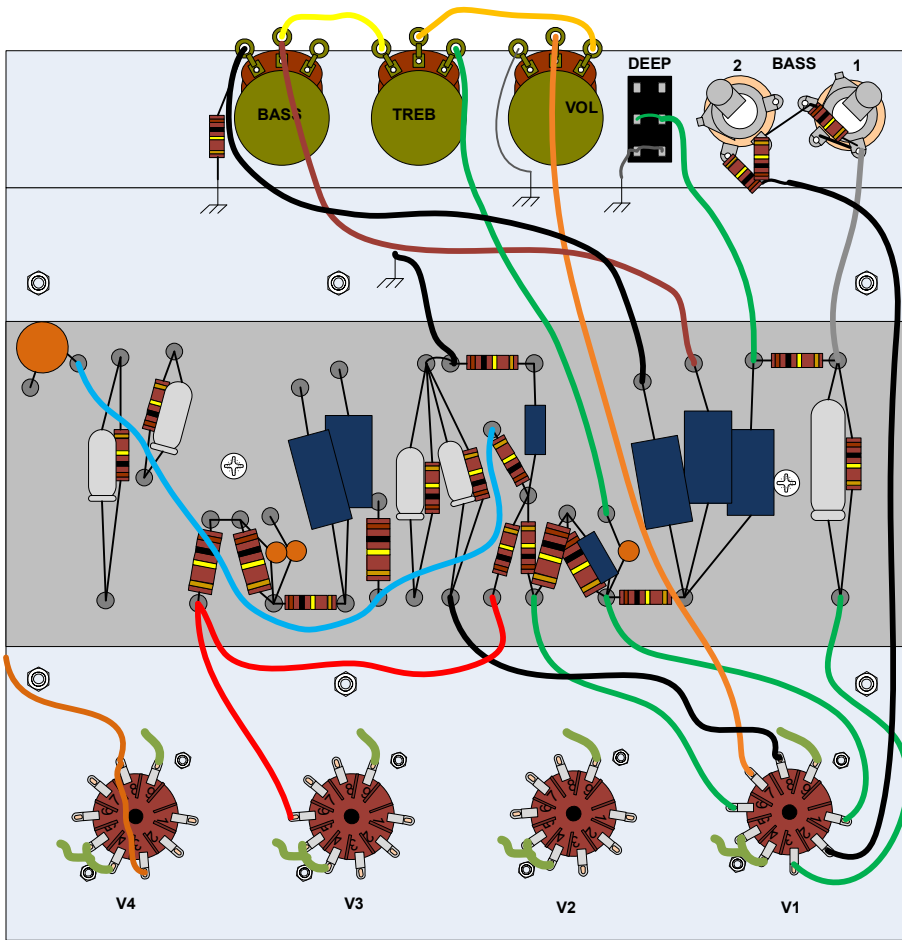
Power Supply Connections

- 1) Connect the anode side of the solid state bias supply diode to T1(1).
- 2) Connect pin 6 from the closest octal power tube socket to the circuit board where the 8.2M and 220K resistors connect.

Step 11: After wiring any circuit, it is a good idea to double check your work.

If you have double checked your connections and are still having problems getting the tremolo effect to work, send an e-mail to info@modkitsdiy.com.

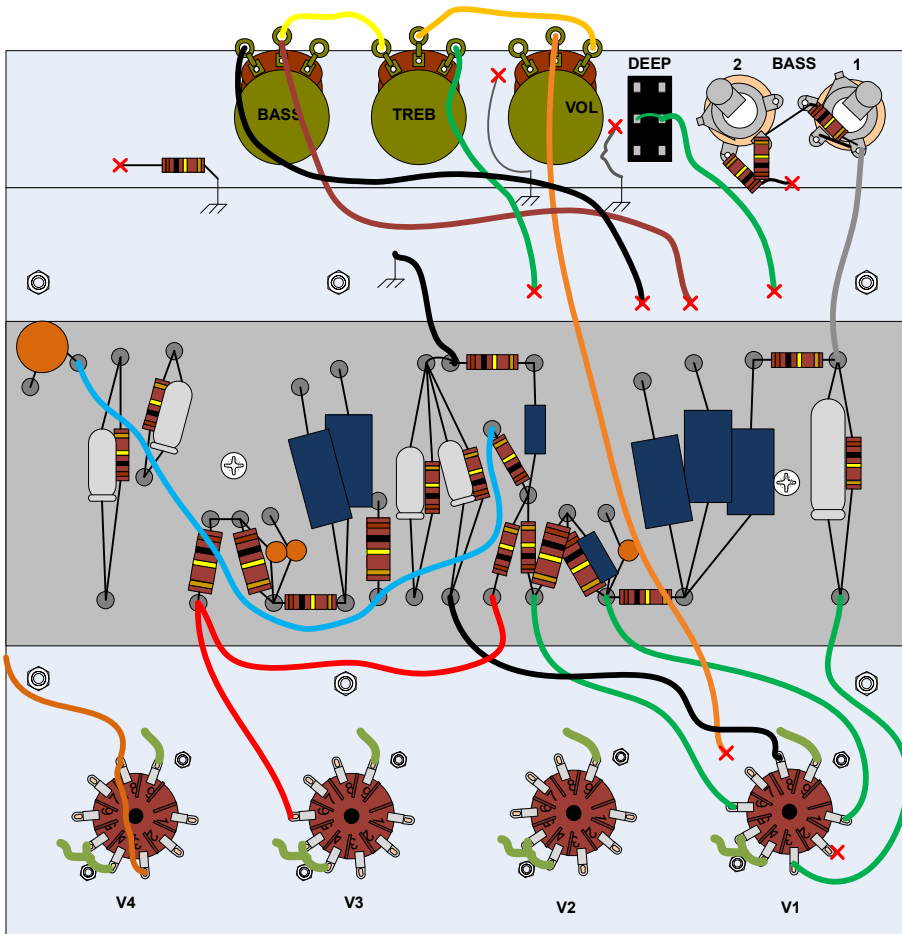
Due to the nature of this circuit, there may be some audible clocking noise present.



Step 2: Disconnect the “Bass” channel front panel controls and wires.

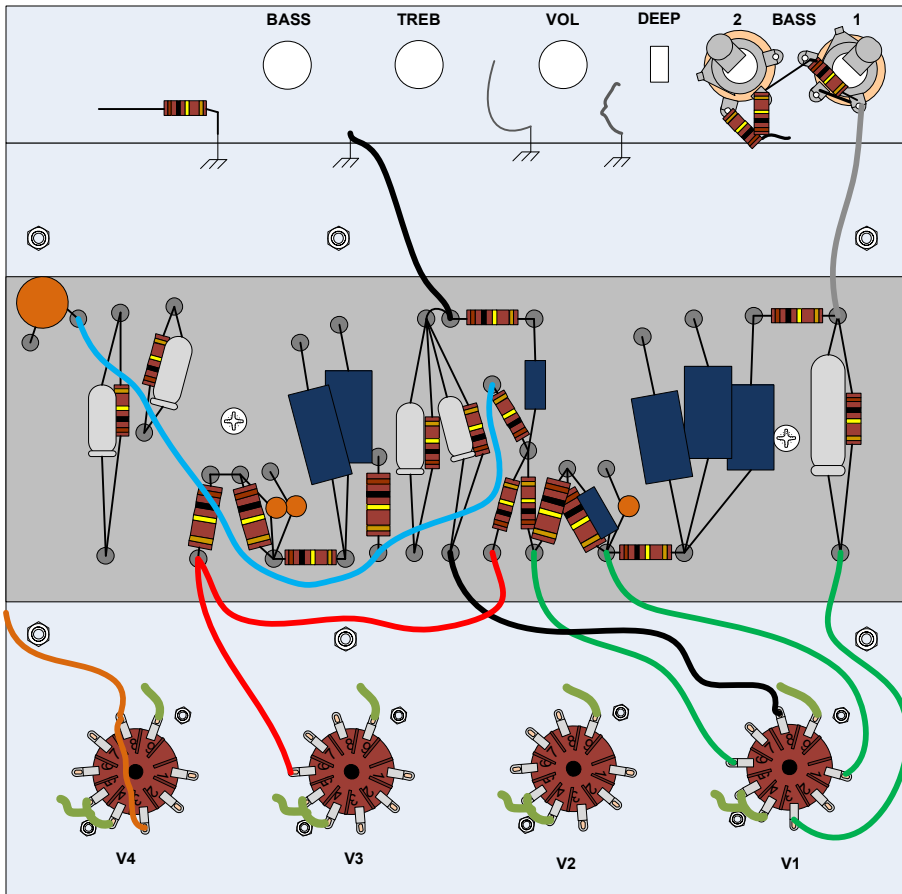
Depending upon which amp model you have, the layout of components may vary slightly. The main idea of this step is to remove the bass channel controls so that we can mount the tremolo controls.

(Save the components and wire that you remove, in case you want to revert back to a bass channel in the future).



Front Panel Controls to Remove

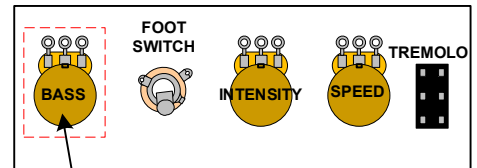
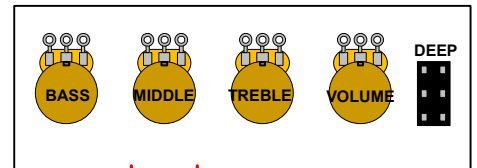
- 1) Disconnect and remove the wire connecting the bass input to V1 pin 2.
- 2) Disconnect the deep switch connections to the circuit board and ground.
- 3) Disconnect the volume pot connection at V1 pin 7.
- 4) Disconnect the volume pot ground connection.
- 5) Disconnect the treble pot connection to the board.
- 6) Disconnect the bass pot connections to the board.
- 7) Disconnect the resistor from the bass pot.



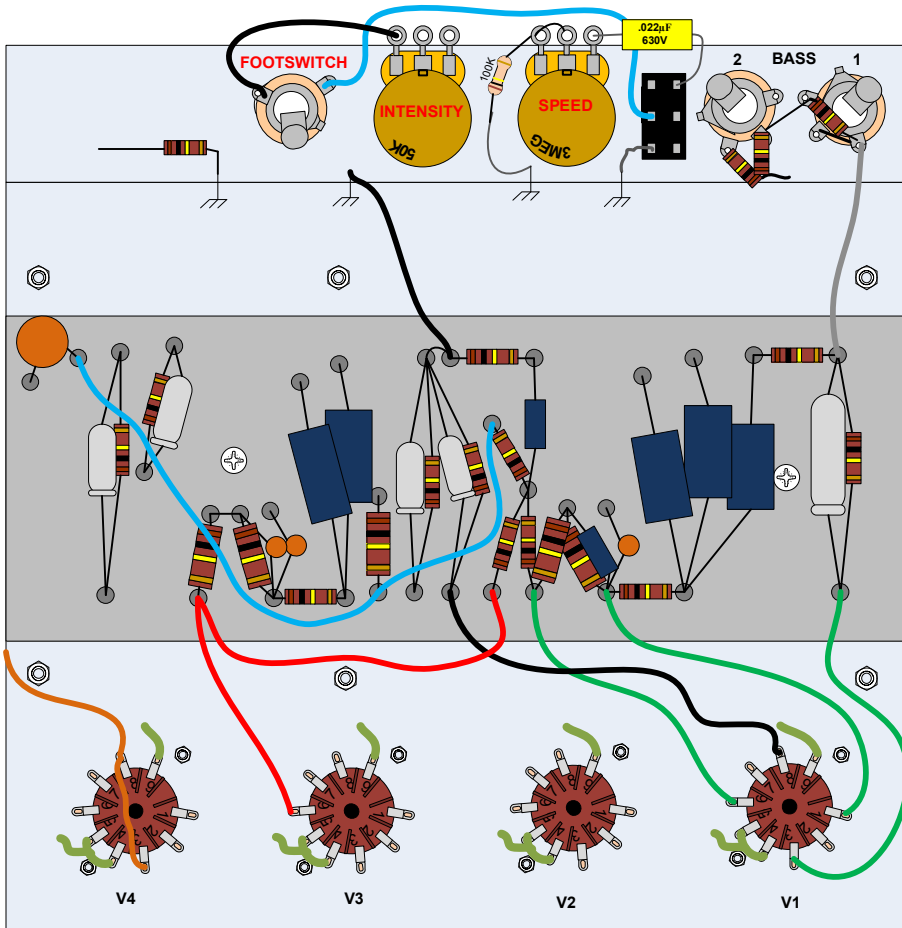
Step 3: Remove the bass channel controls from the front panel.

- 1) Deep switch
- 2) Volume pot
- 3) Treble pot
- 4) Bass pot

Step 3 (MID version): If your bass channel has a mid control, leave the last of the four pots mounted, but completely disconnect it from the circuit.



Disconnected

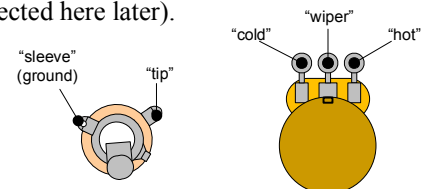


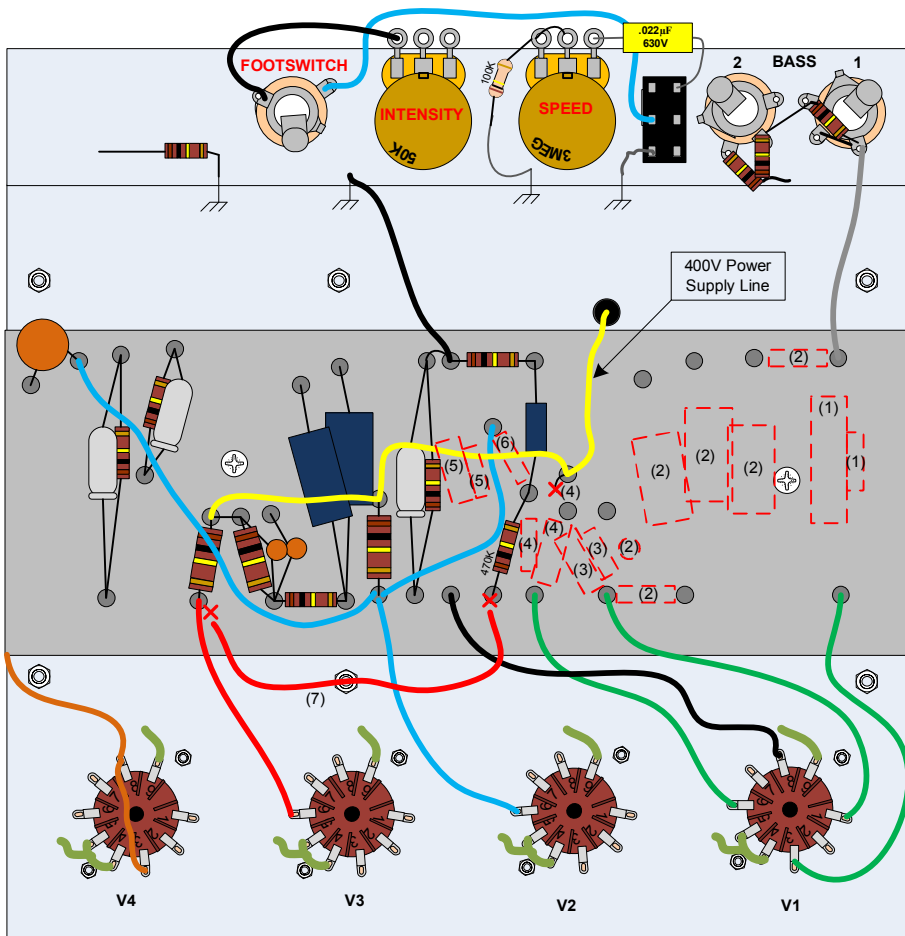
Step 4: Mount new front panel controls for tremolo circuit

- 1) DPDT slide switch
- 2) 3MΩ pot in place of the volume pot
- 3) 50kΩ pot in place of the treble pot
- 4) ¼" input jack in place of the bass pot

Step 5: Make preliminary front panel control connections.

- 5) Connect the Tremolo switch ground as shown.
- 6) Connect a 100K resistor from ground to the 3M pot "cold" and "wiper" lugs.
- 7) Connect the footswitch jack "tip" lug to the tremolo switch as shown.
- 8) Connect the footswitch jack "sleeve" lug to the 50K pot "cold" lug.
- 9) 9) Connect a .022µF cap from Tremolo switch to 3M pot "hot" lug as shown (leave the switch lug unsoldered for now – there will be a wire connected here later).

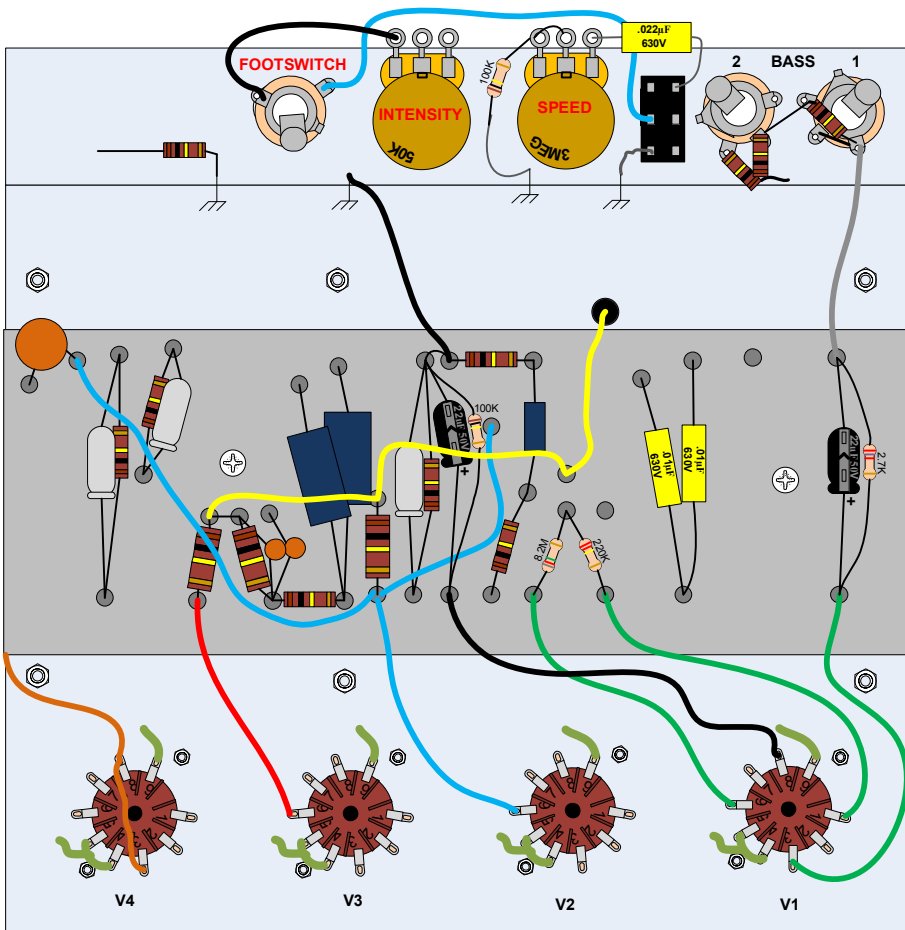




Step 6: Remove unnecessary circuit board components.

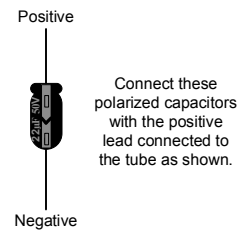
Each instruction line number here corresponds to the numbers on the drawing where missing components are outlined.

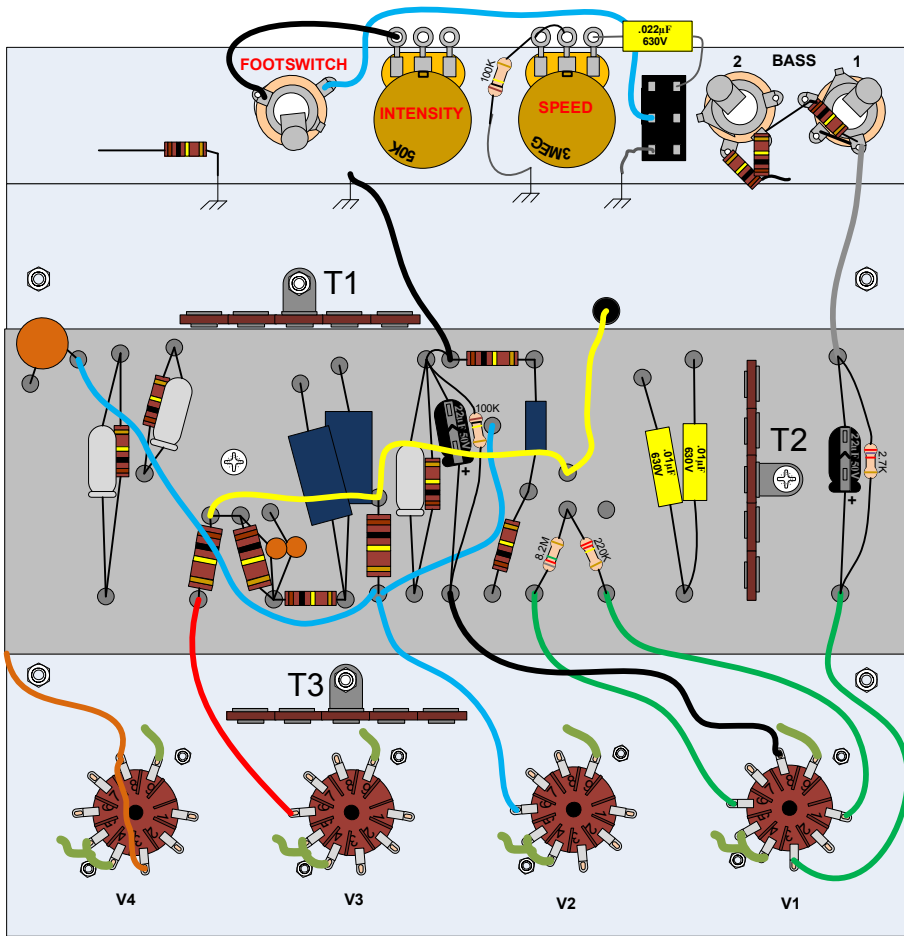
- 1) Remove the cathode bias components connected to V1 pin 3.
- 2) Remove the bass channel tone-stack components.
- 3) Remove the plate resistor and capacitor connected to V1 pin 1.
- 4) Remove the plate resistors connected to V1 pin 6 and their connection to the 400V power supply wire.
- 5) Remove the cathode bias components connected to V1 pin 8.
- 6) Remove the 220K feedback resistor connected to V2 pin 6.
- 7) Remove the wire connecting V3 pin 6 to 470K resistor.



Step 7: Add new circuit board components.

- 1) Connect new cathode bias components (22µF cap and 2.7K resistor) to V1 pin 3.
- 2) Connect new cathode bias components (22µF cap and 100K resistor) to V1 pin 8.
- 3) Connect a new plate resistor (220K) to V1 pin 1.
- 4) Connect a new plate resistor (8.2M) to V1 pin 6.
- 5) Add the two .01µF feedback capacitors as shown.



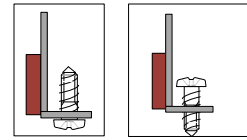


Step 8: Mount the three terminal strips.

See Terminal Strip Mounting Section (p. 24)

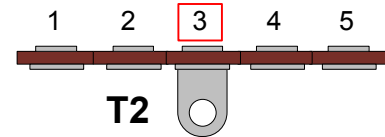
Fasten the three terminal strips to existing screws in the chassis as shown and in similar locations.

- 1) Mount T1 on a screw near the footswitch jack.
- 2) Mount T2 using the fiber board screw.
- 3) Mount T3 on a screw near V3.



Alternate mounting method

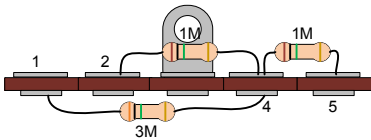
Note: Terminal strip terminals will be referred to in a shortened notation where T2(3) means terminal number 3 on "T2".



Step 9: Add the components to each terminal strip.

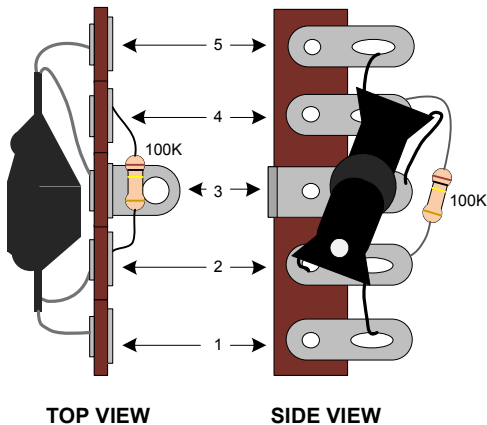
Be careful not to burn nearby components or wires with your soldering iron.

T1



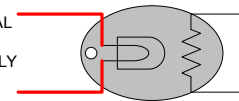
- 1) Connect the 3M resistor from terminal #1 to #4.
- 2) Connect a 1M resistor from terminal #2 to #4.
- 3) Connect a 1M resistor from terminal #4 to #5.

T2



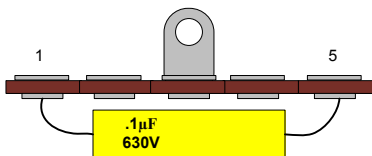
- 4) Connect the opto-coupler as shown. Make sure the two leads coming out of the end marked with the dot are connected to terminals #1 and #2. The two leads coming out of the unmarked end should be connected to terminals #3 and #5.
- 5) Connect a 100K resistor from terminal #2 to #4.

NON-POLARIZED OPTICAL SIDE IS INDICATED BY SILVER DOT AND SLIGHTLY LONGER LEADS

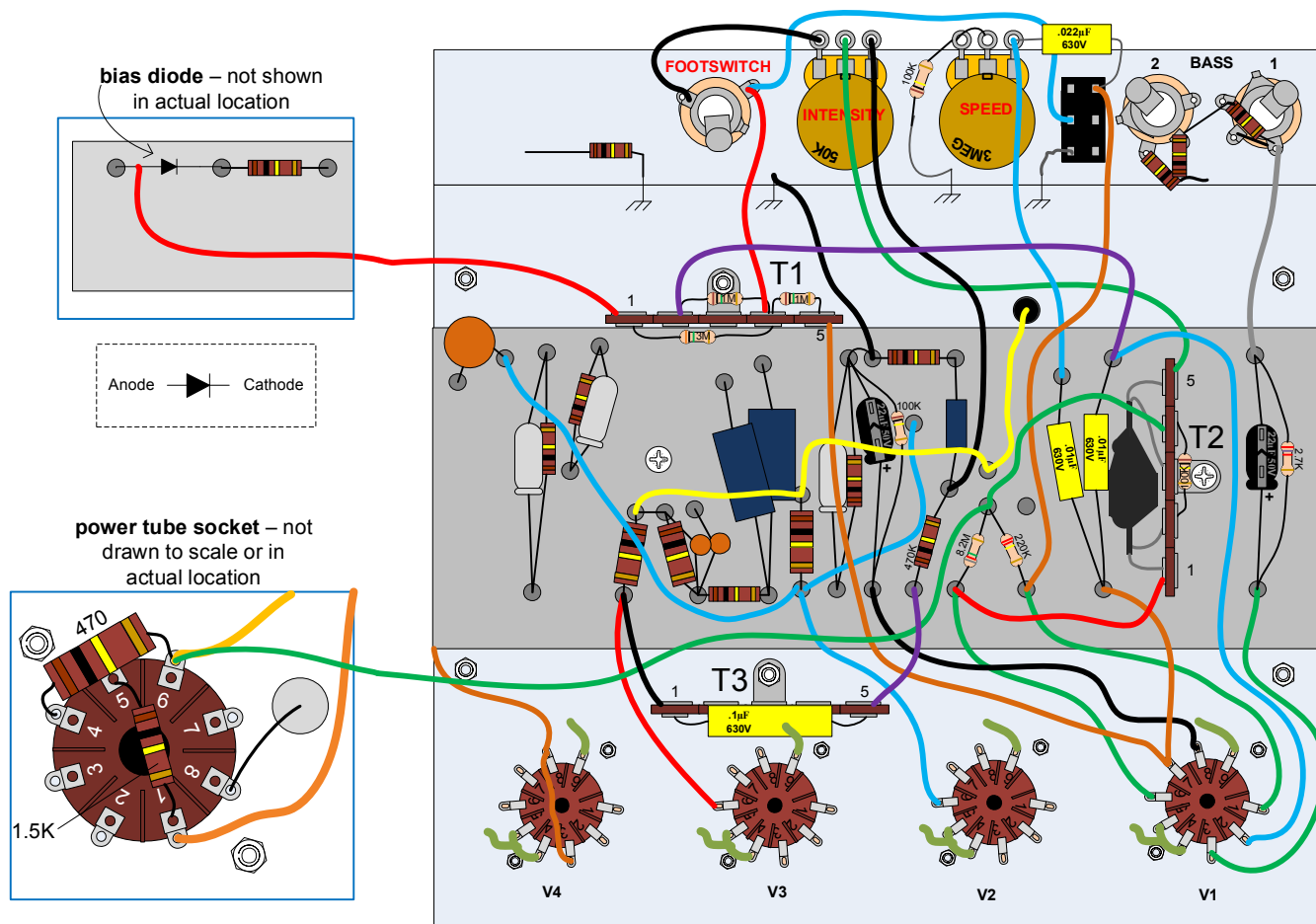


RESISTIVE SIDE IS INDICATED ONLY BY SLIGHTLY SHORTER LEADS

T3



- 6) Connect a .1µF capacitor from terminal #1 to #5.



Step 10: Wire it up.

Front Panel Controls

- 1) Connect the footswitch Jack “tip” lug to T1(4).
- 2) Connect the 50K pot “wiper” lug to T2(5).
- 3) Connect the 50K pot “hot” lug to the circuit board connection between the 470K resistor and .01µF capacitor (where we removed the 220K feedback resistor from Step 6).
- 4) Connect the 3M pot “hot” lug to one of the .01µF feedback capacitors as shown.
- 5) Connect the switch side of the .022µF front panel capacitor to the circuit board where V1 pin 1 is connected.

V1 Connections

- 1) Connect V1 pin 2 to the other .01µF feedback capacitor on the circuit board.
- 2) Connect that V1 pin 2 connection on the circuit board to T1(2).
- 3) Connect V1 pin 7 with two wires to T1(5) and the circuit board where the two .01µF feedback capacitors are connected together.

Circuit Board Connections

- 1) Connect T2(1) to the 8.2M resistor where it connects to V1 pin 6 on the board as shown.
- 2) Connect T2(4) to the circuit board where the 8.2M and 220K resistors connect.
- 3) Connect a wire from the circuit board connection with V3 pin 6 to T3(1).
- 4) Connect a wire from the circuit board connection with 470K resistor to T3(5) as shown.

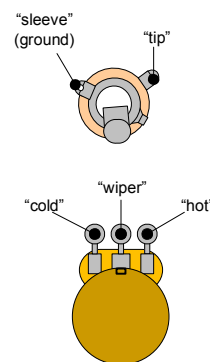
Power Supply Connections

- 1) Connect the anode side of the solid state bias supply diode to T1(1).
- 2) Connect pin 6 from the closest octal power tube socket to the circuit board where the 8.2M and 220K resistors connect.

Step 11: After wiring any circuit, it is a good idea to double check your work.

If you have double checked your connections and are still having problems getting the tremolo effect to work, send an e-mail to info@modkitsdiy.com.

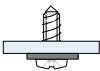
Due to the nature of this circuit, there may be some audible clocking noise present.

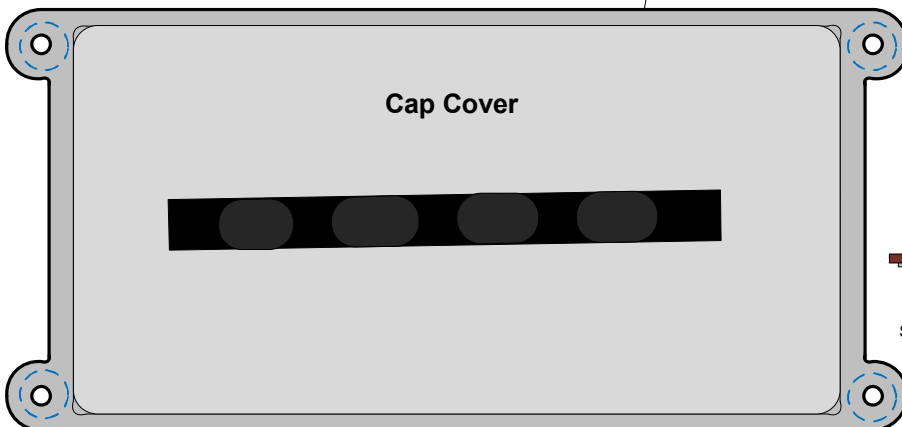
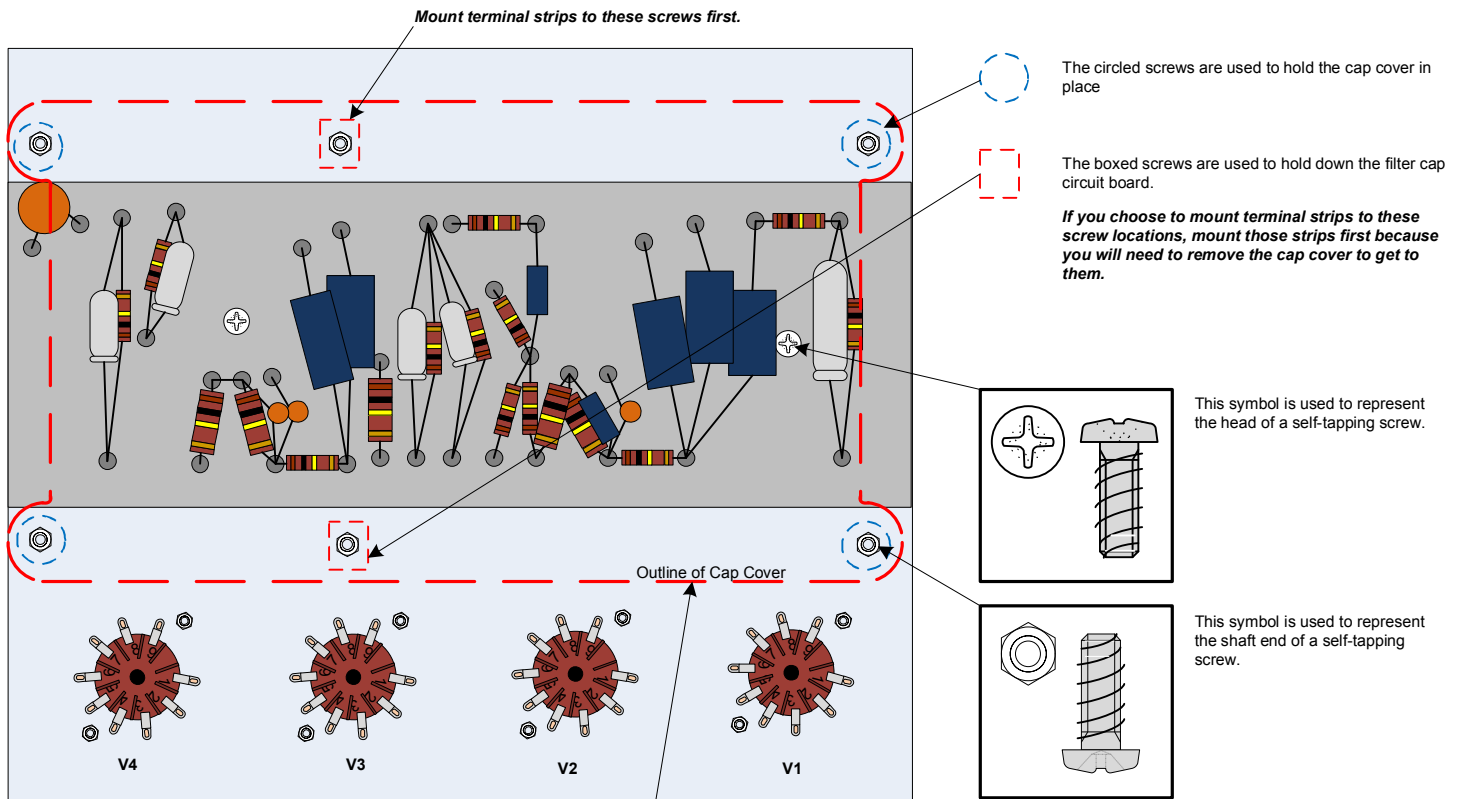


Terminal Strip Mounting Tips

We will be adding extra circuit components by mounting them on three terminal strips. The cap cover and circuit boards are held in to place by several self-tapping screws which give us a way to mount the terminal strips without drilling new holes in the chassis.

- Determine the best screws to use for mounting each terminal strip.
- Mount the terminal strips before soldering the circuit components to them.

Steps for mounting terminal strips to self-tap screw ends			
	A) Unfasten the screw, but not quite to the point of removal.	B) Set the terminal strip over the screw and hold it down.	C) Re-insert the screw while holding down the terminal strip.



You may find it easier to mount certain terminal strips with the mounting hole facing the opposite direction from those shown in the drawings. *That is why it is important to mount the strips before soldering components to them.* (It allows you to use the same terminal strip connection drawings).

