

Build Your Own Clone Phase Royal Kit Instructions



Warranty:

BYOC, LLC 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, LLC 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, LLC does not warranty the completed pedal 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, LLC 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 deliver as well. Please contact sales@buildyourownclone.com to receive a return authorization before mailing.

Tech Support:

BYOC, LLC makes no promises or guarantees that you will successfully complete your kit in a satisfactory manner. Nor does BYOC, LLC promise or guarantee that you will receive any technical support. Purchasing a product from BYOC, LLC does not entitle you to any amount of technical support. BYOC, LLC 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

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 are 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 of the top side of your PCB.
3. Pic of the underside of your PCB.
4. Pic that clearly shows your footswitch/jack wiring and the wires going to the PCB
5. A pic that clearly shows your wiring going from the PCB to the pots and any other switches(only if your kit has non-PC mounted pots and switches)
6. Is bypass working?
7. Does the LED come on?
8. If you answer yes to 6 and 7, what does the pedal do when it is "on"?
9. Battery or adapter. (if battery, is it good? If adapter, what type?)

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.

Rev 1.1: Replaced 2 '47n' capacitors with electrolytic capacitors.

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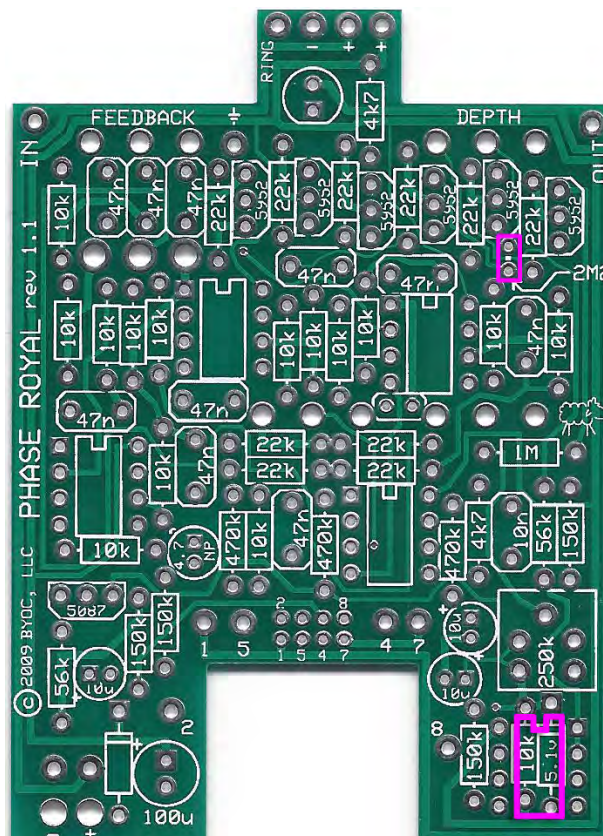
PHASE ROYAL KIT INSTRUCTION INDEX

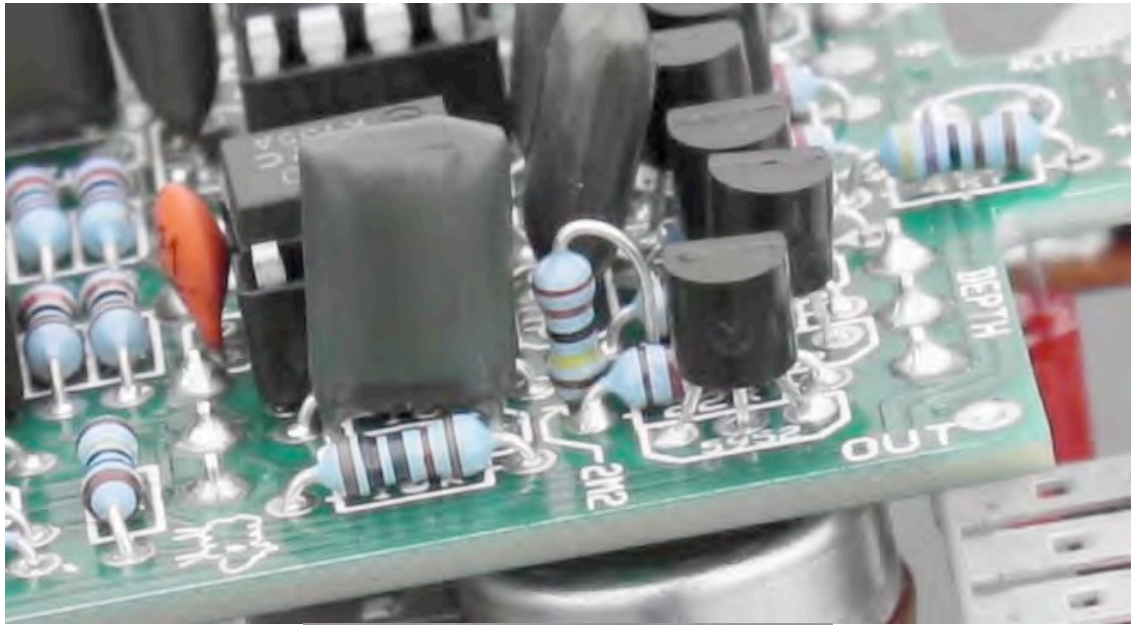
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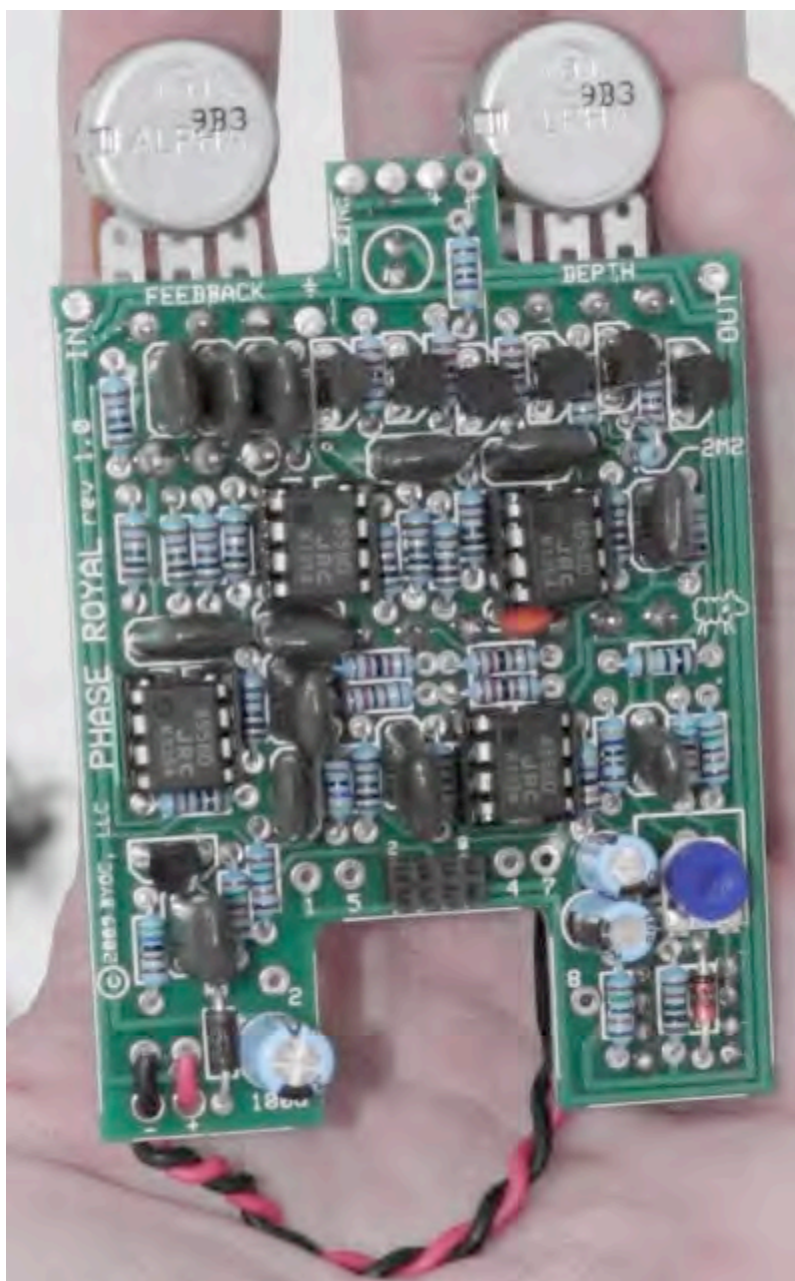
Before you get started....

There are a two things about this particular build that you should be aware of so that you don't get confused when you compare the parts list to the layout on the PCB.

1. There is a 2.2M resistor that will be inserted into the PCB so that it is standing on end rather than laying flat like all the other resistors. The PCB will have a “2M2” printed on it with an arrow pointing to the eyelets on the PCB where this resistor will go. (see page 10 - 11 for instructions)
2. There is an 8 pin dual op amp that goes on the bottom of the PCB.







This is a picture of the top side of the completed PCB assembly to be used as a reference throughout the build. NOTE: There is a footswitch socket between eyelets “5” and “4” that is not part of the standard kit.

Parts Checklist for BYOC Phase Royal

Resistors:

- 2 - 4k7 (yellow/purple/black/brown/brown)
- 15 - 10k (brown/black/black/red/brown)
- 10 - 22k (red/red/black/red/brown)
- 2 - 56k (green/blue/black/red/brown)
- 4 - 150k (brown/green/black/orange/brown)
- 3 - 470k (yellow/purple/black/orange/brown)
- 1 - 1M (brown/black/black/yellow/brown)
- 1 - 2.2M (red/red/black/yellow/brown)

Capacitors:

- 1 - 220pf ceramic disc (small orange labelled 221)
- 1 - 10n or .01 μ film (103)
- 10 - 47n or .047 μ film (473)
- 1 - 4.7u aluminum electrolytic Non Polarized
- 3 - 10 μ f aluminum electrolytic
- 1 - 100 μ f aluminum electrolytic

Diodes:

- 1 - 1N4001 (black plastic with silver stripe)
- 1 - 1N4733 5.1v Zener (orange glass with black stripe)

Transistors:

- 1 - 2N5087
- 6 - 2N5952

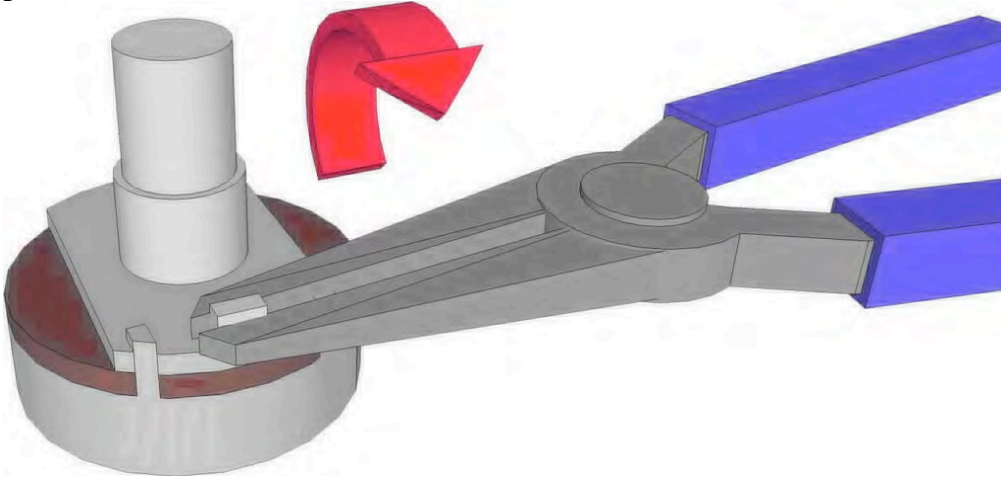
IC's:

- 5 - 4558, TL072 or other dual op amp
- 5 - 8 pin socket

Trimpots:

- 1 - 250k

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



1 - B100k

linear (Depth knob)

1 - B100k linear (Depth knob)

1 - C500k reverse audio (Speed knob)

2 - B10k audio (Mix & Resonance knobs)

Hardware:

1 - drilled enclosure w/ 4 screws

1 - byoc phase royalPCB

1 - SPDT toggle switch

1 - 3PDT footswitch

4 - knobs

1 - AC adaptor jack

1 - 1/4" mono jack

1 - 1/4" stereo jack

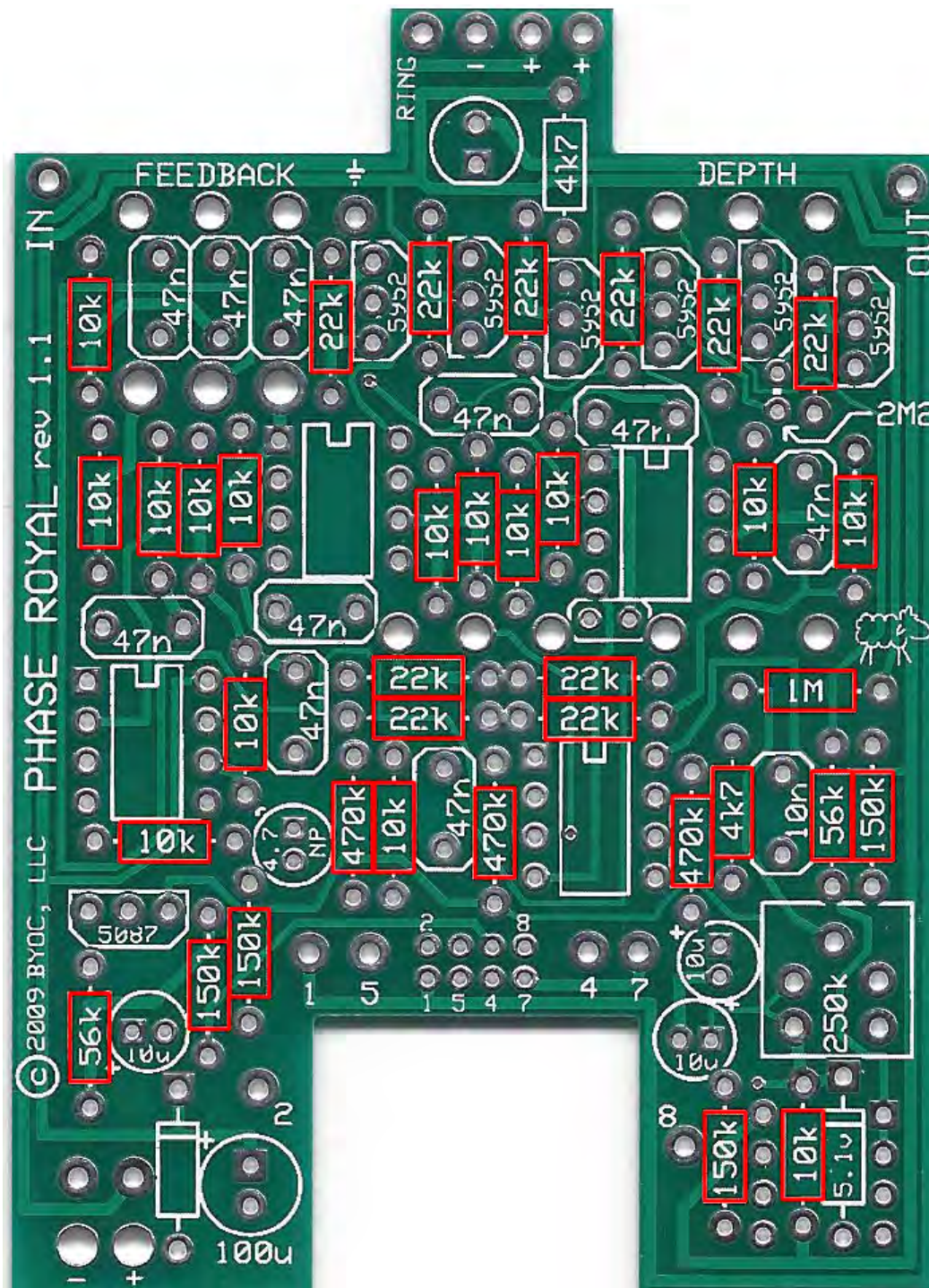
1 - red LED

1 - battery snap

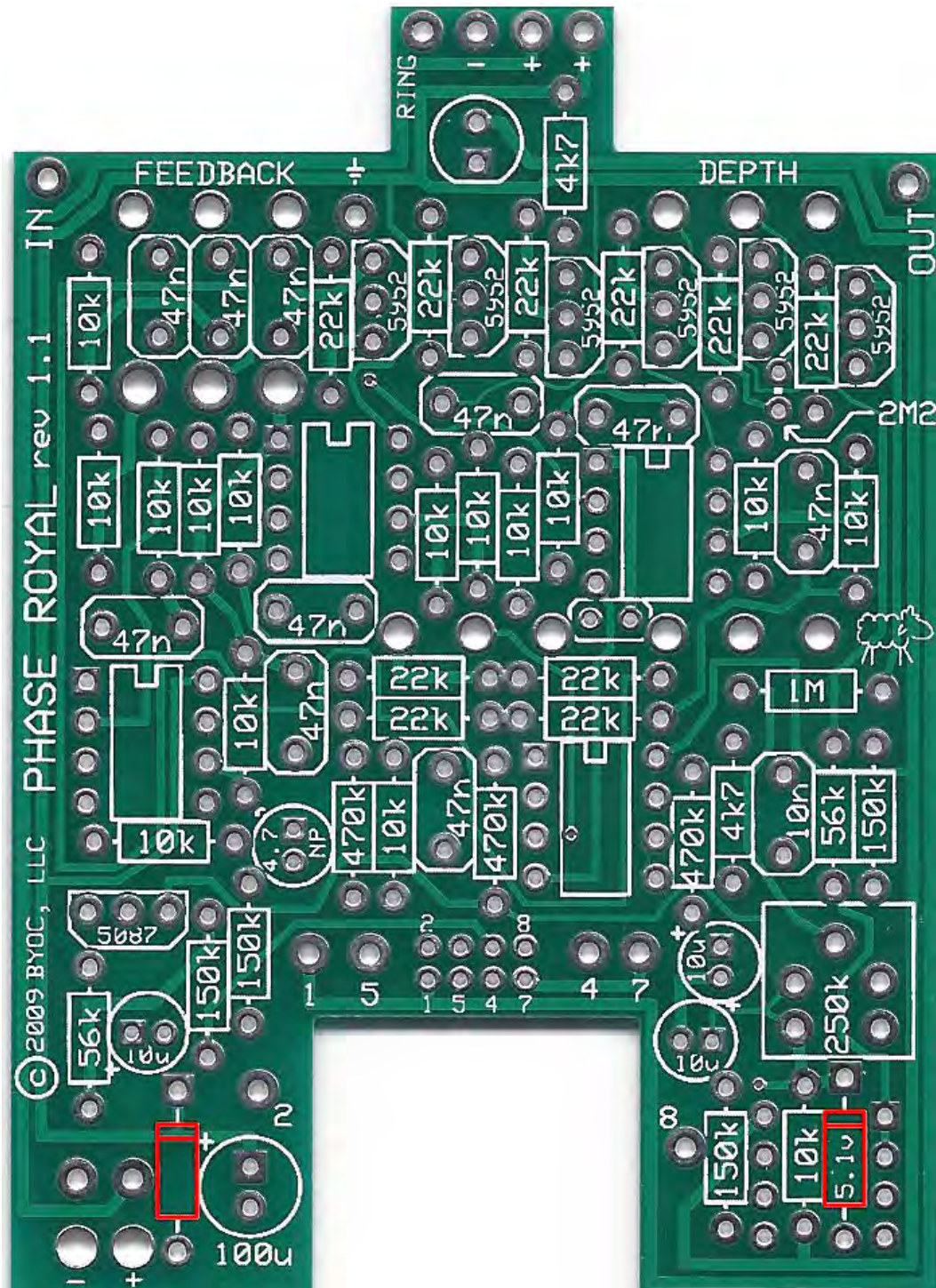
4 - bumpers

hook-up wire

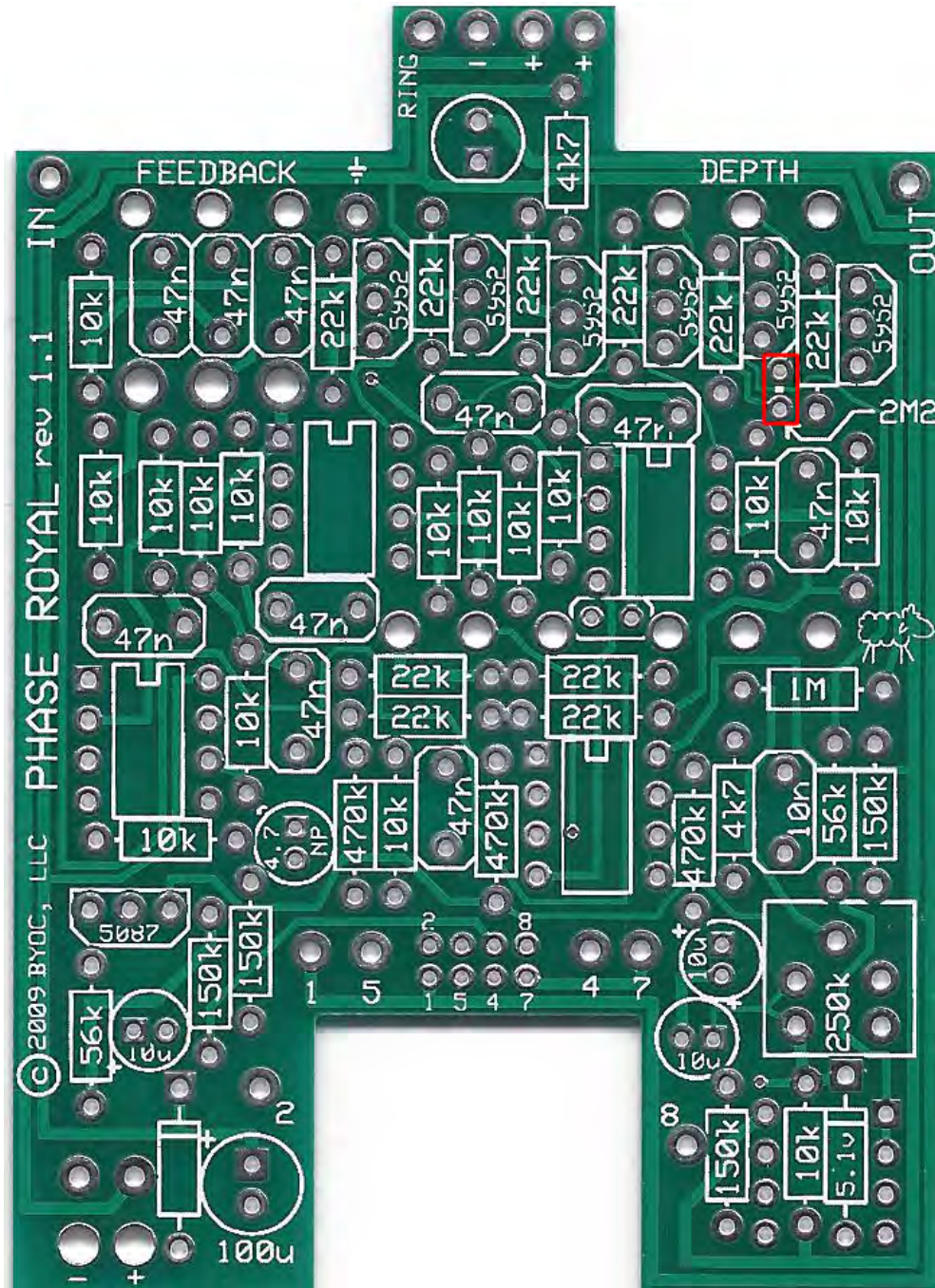
Populating the Circuit Board



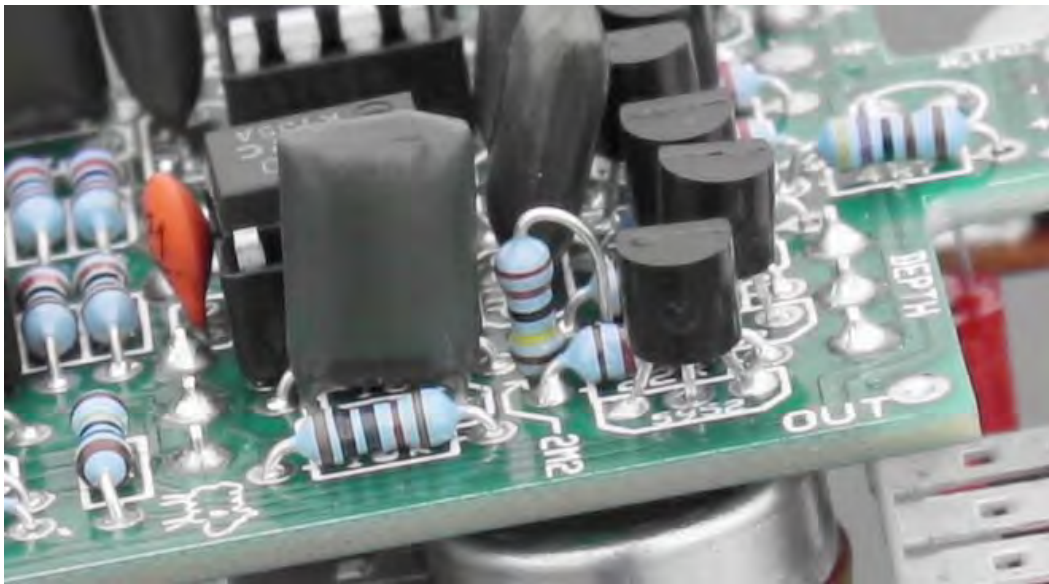
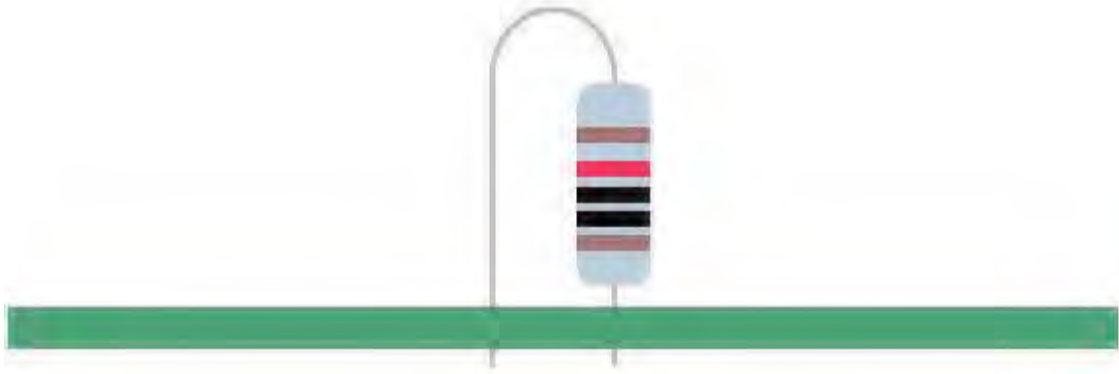
STEP 1: Add the resistors. Resistors are not polarized, so it does not matter which end goes in which solder pad. Do not add the 2.2M (2M2) resistor yet.



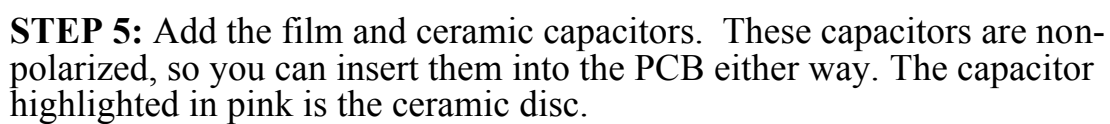
Step 2: Add the diodes. Be sure to match the end of the diode with the stripes to the layout on the PCB. The striped end should go in the square solder pad. The Black Silicon 1n4001 diode goes in the space with no markings. The orange glass 1n4733 5.1v Zener diode goes in the spot marked '5.1v'.

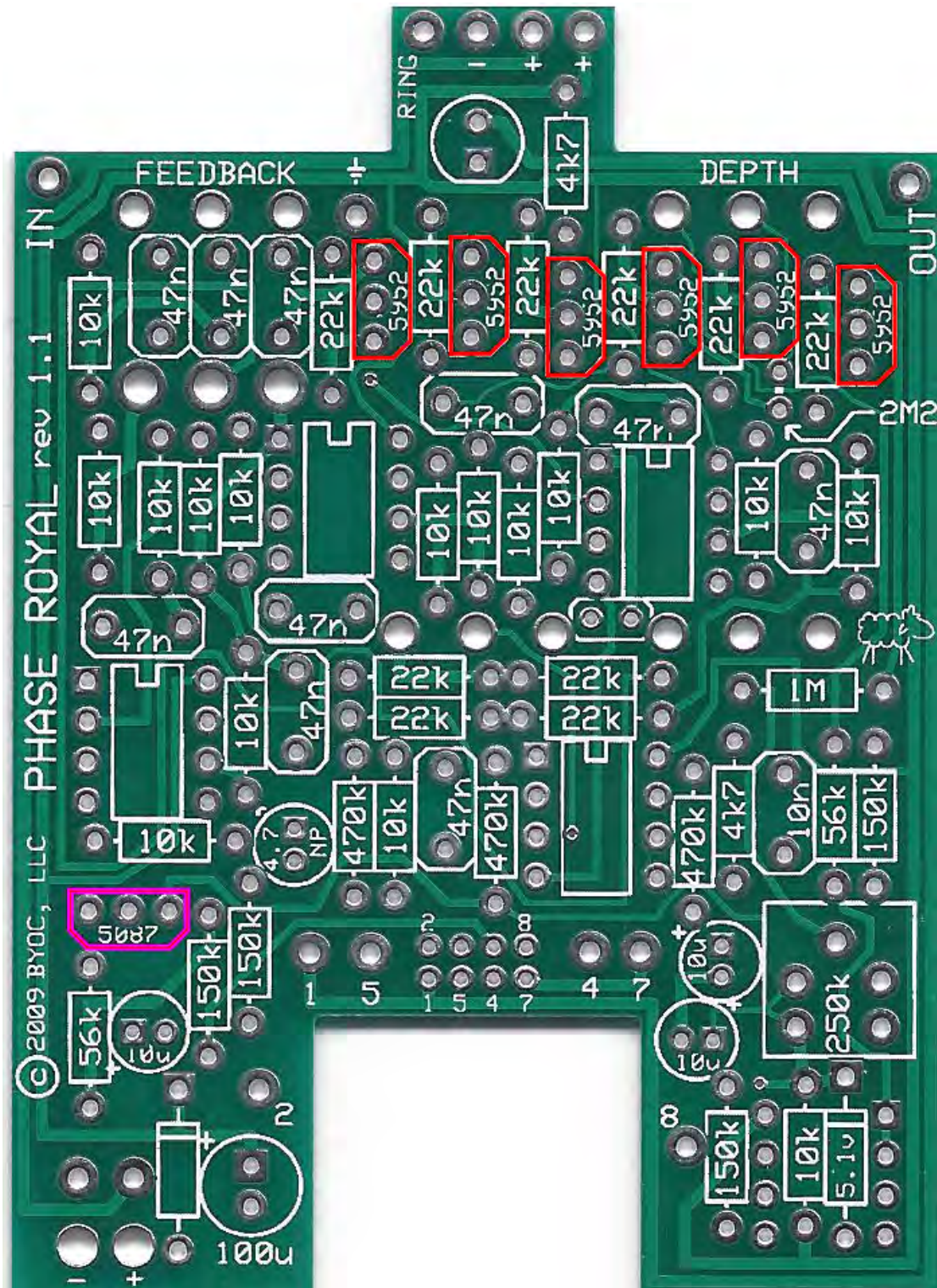


Step 3: Add the 2.2M (2M2) resistor. Stand it on end. Insert one end into one of the eyelets highlighted in red. Bend the other end and insert it into the other eyelet highlighted in red. See pictures below for examples.

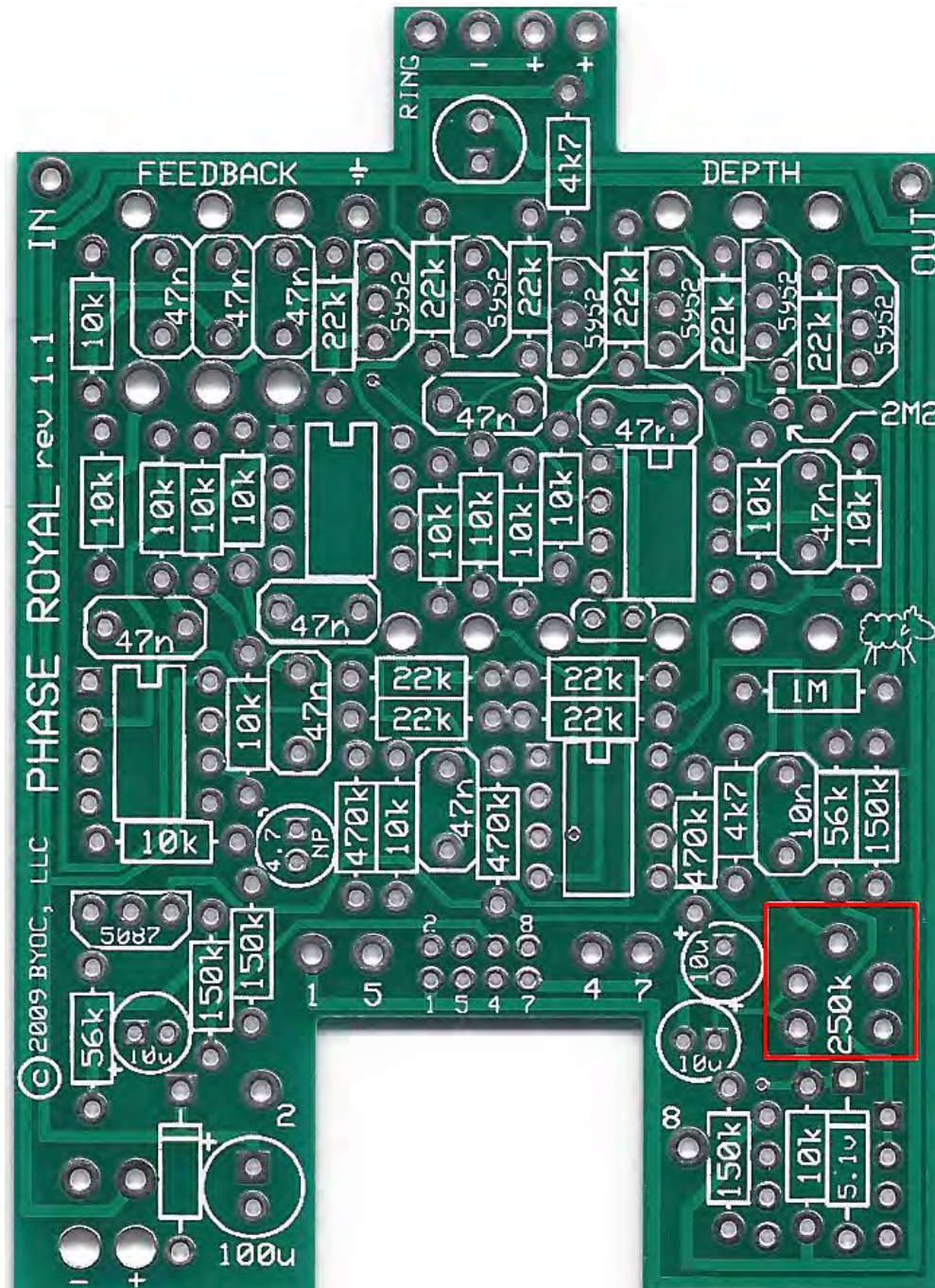


Only add the 4 sockets that go on the top of the PCB. Do not add the 5th socket that goes on the bottom yet. Orient the sockets so that the side with the notch matches up with the notch on the PCB layout.





Step 6: Add the Transistors. The six 2N5952 JFETs go in the spots highlighted in red. The 2N5087 goes in the spot highlighted in pink. Be sure to orient the transistors so that the flat side of the transistor body matches up with the flat side on the PCB layout.



Step 7: Add the 250k trimpot. Note that the PCB has 5 holes, but the actual trimpot itself will only have 3 leads. This is so that the PCB can accommodate a variety of different makes and model of trimpots. There should only be one way in which the trim pot provided with your kit fits easily into the PCB.

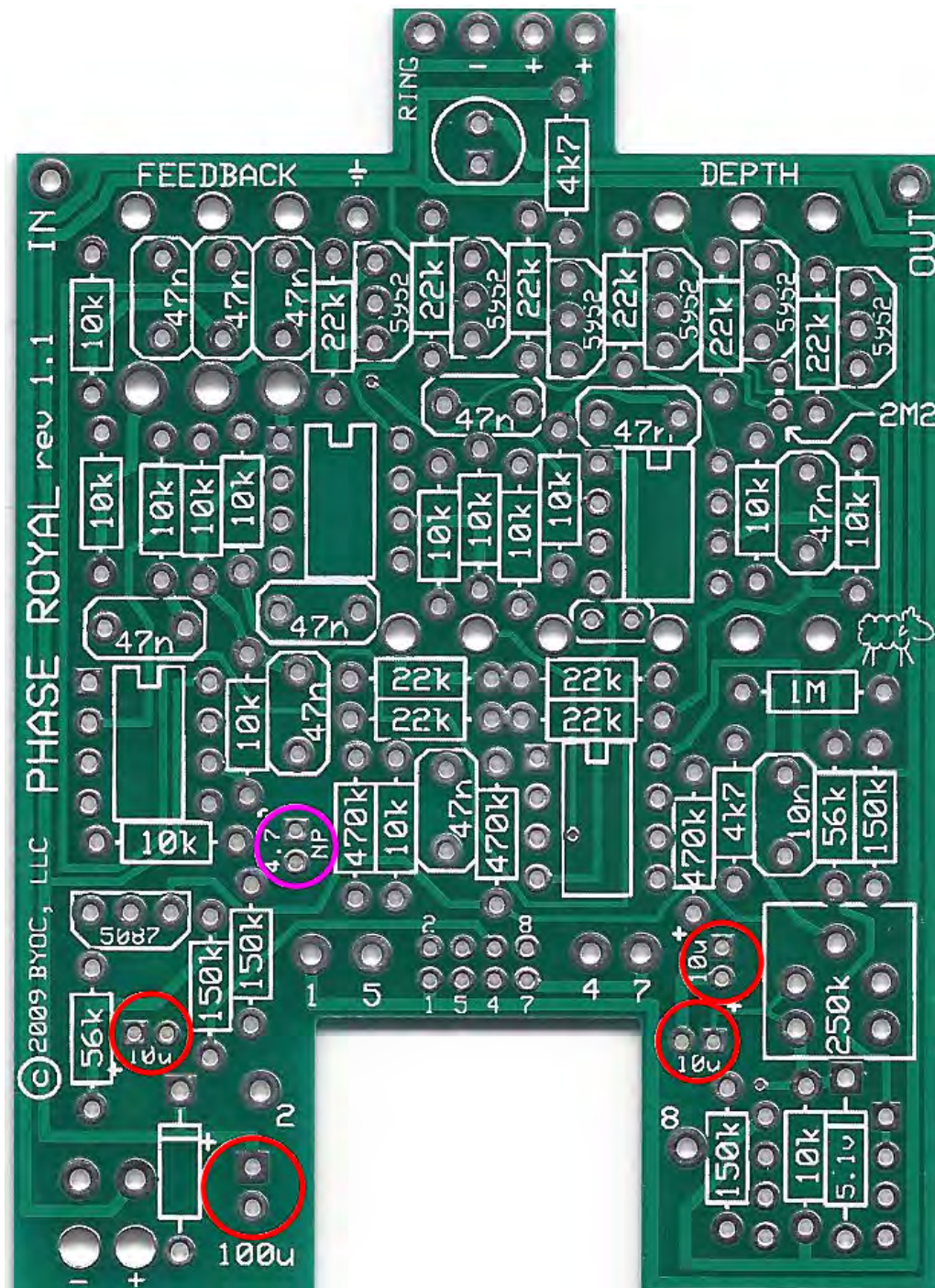
ADJUSTING THE TRIMPOT:

Once you have completed your build(not before), you will need to adjust the trimpot before the phaser will actually work. There is no specific voltage that you should try to set it for. Simply use your ears! You are setting it so that the phaser has the fullest sweep that sounds as close to the way you want it to sound. There is actually a relatively large range on the trimpot that will give you working phase shifting, and much of it will sound very good. But you'll have to use your ears if you want to dial in the “script” tone. If that doesn't make sense to you, just adjust the trimpot till you get the deepest, lushest phase tone.

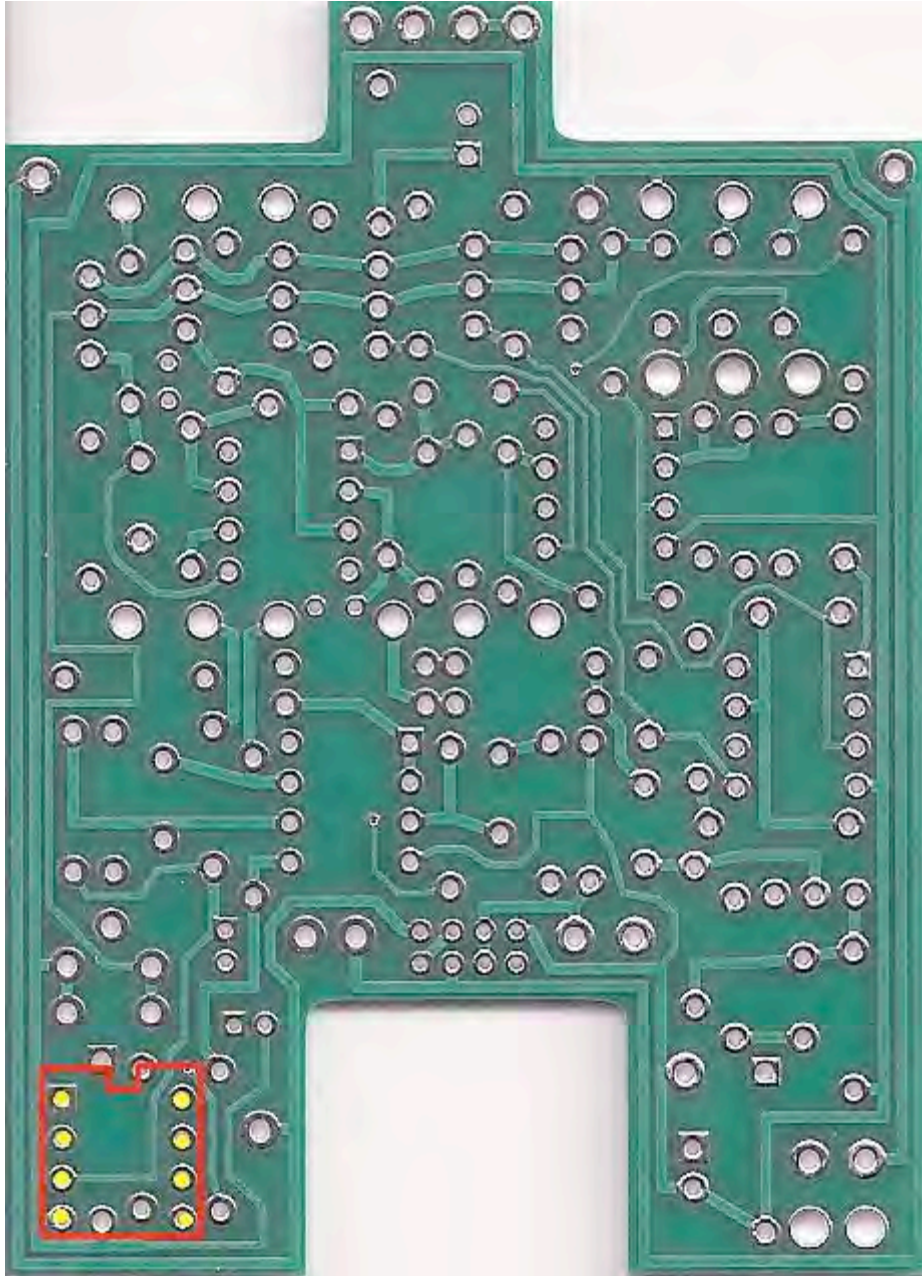
Start by setting the knobs as follows:

1. Depth- full turn clockwise
2. Resonance - full turn counter clockwise
3. Rate - 2 o'clock
4. Mix - noon
5. Phase Stage Switch - 4 (to the right)

Plug into your guitar and amp. Make sure bypass works. Make sure you have power to the pedal and the LED comes on. You should hear a clean unaffected guitar signal. Now turn the trimpot until you hear the phase kick in. Fine tune to taste.



STEP 8: Add the aluminum electrolytic capacitors. These are polarized. The positive end will have a longer lead and should go in the square solder pad. The negative end will have a shorter lead with a black strip running down the body of the capacitor. The 4.7µF highlighted in pink is non-polarized which means you can insert it in any direction.

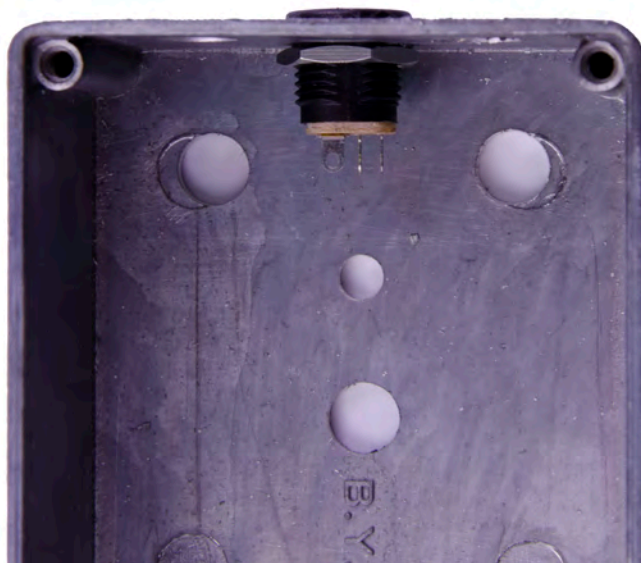


Step 9: Add the remaining IC socket to the bottom solder side of the PCB.
Be sure to orient the socket so that the notch matches the outline in the diagram above.

Main PCB Assembly

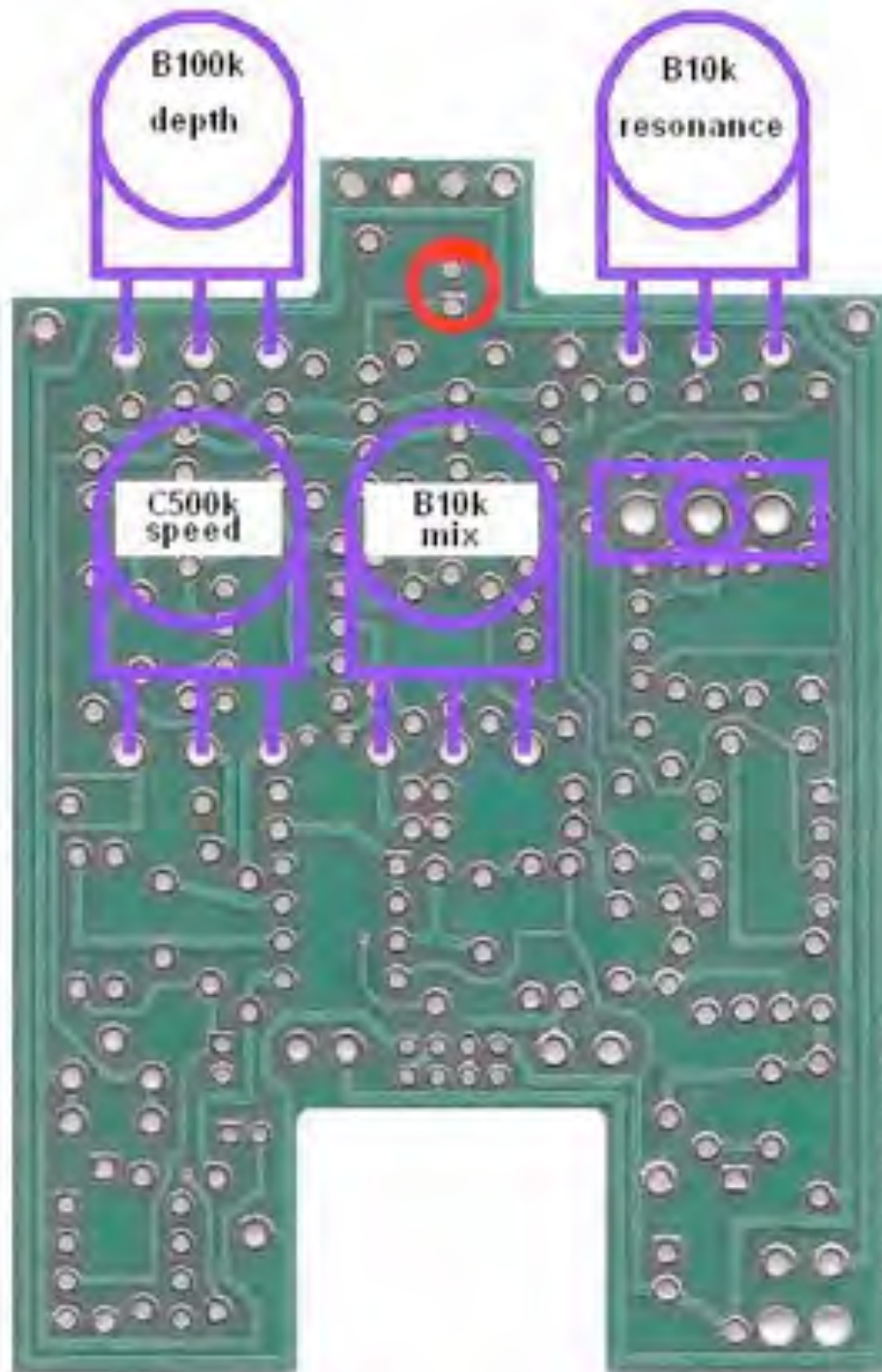


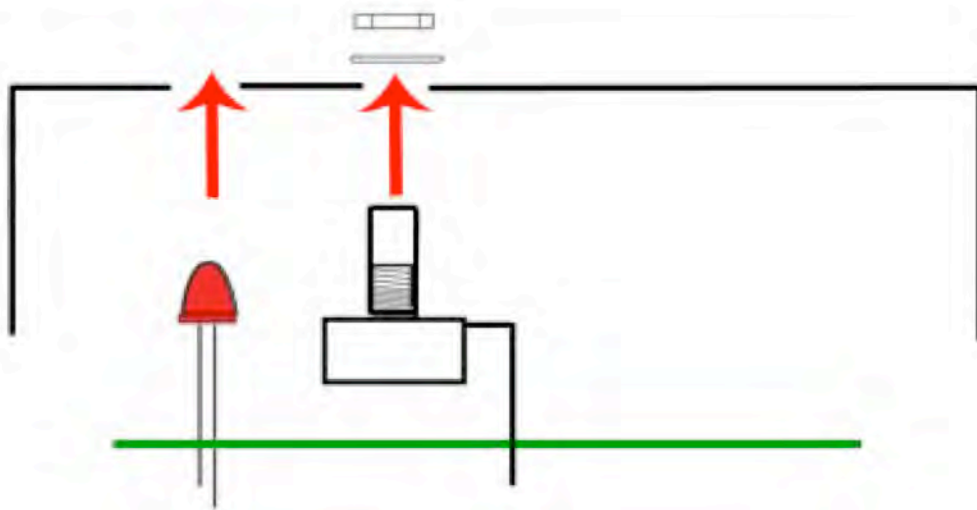
Step 1: Mount the AC adapter jack to the enclosure. Your kit may come with either an external thread or internal thread. Don't get confused by this. They still function exactly the same. You just thread the external nut on the outside and the internal nut on the inside. The picture below is of an internal nut jack.



Step 2: Flip the PCB over so that the bottom or solder side is up. Insert the four potentiometers, one switch, and the LED into the bottom side of the PCB. **DO NOT SOLDER ANYTHING YET!!!**

The LED will have one lead that is longer than the other. **THIS WILL GO INTO THE SQUARE SOLDER HOLE.**



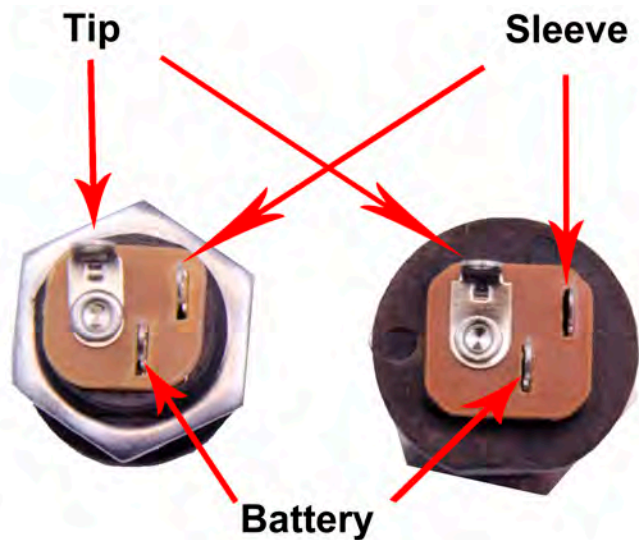


Step 3: Hold the PCB in one hand so that the component side of the PCB is in the palm of your hand and the bottom side with the pots, toggle switch and LED is facing up. Now use your other hand to guide the predrilled enclosure onto the PCB assembly so that the pots, toggle switch and LED all go into their respective holes. Once the PCB assembly is in place, secure it by screwing on the washers and nuts for the pots. Only tighten them with your fingers. **You do not want them very tight yet.** Make sure you've removed the nuts and washers from the pots and that you've also snapped the tabs off the pots as well before installing.

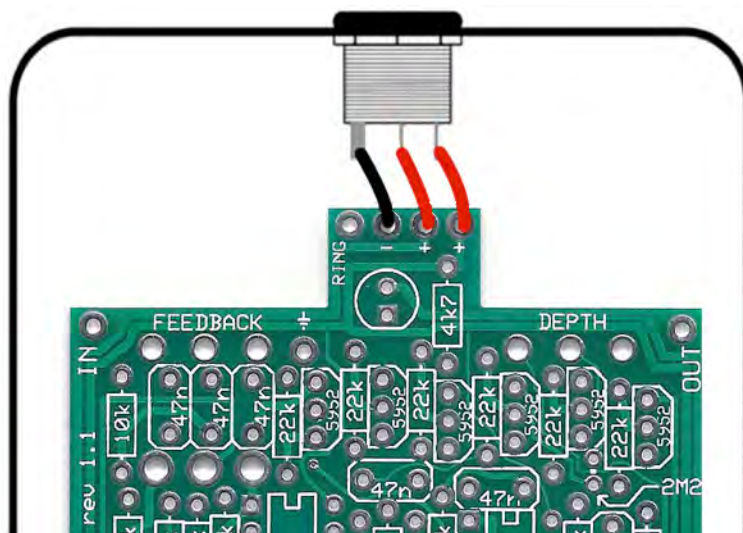
Step 4: Turn the entire pedal over so that the component side of the PCB is facing up. Lift the PCB up off the pots about 2mm just to make sure that the back of the PCB does not short out against the pots. Make sure the PCB is level and symmetrically seated inside the enclosure.

Step 5: Solder the pots, toggle switch and LED. You will be soldering on the component side (top) of the PCB. After you have soldered them in place, be sure to tighten up their nuts. **TIP:** only solder one lug of each component at first. This will secure everything in place and still allow you to wiggle things around if you need to adjust the fit of anything. Once you have everything perfect, go ahead and solder everything else.

WIRING



Step 6: Connect the TIP (negative) terminal of the DC adapter jack to the eyelet on the PCB labeled “-“. Connect the SLEEVE of the DC adapter jack to the eyelet on the PCB labeled “+” farthest to the right. Connect the battery disconnect terminal of the DC adapter jack to the second eyelet on the PCB labeled “+” located in the middle of the other two eyelets .



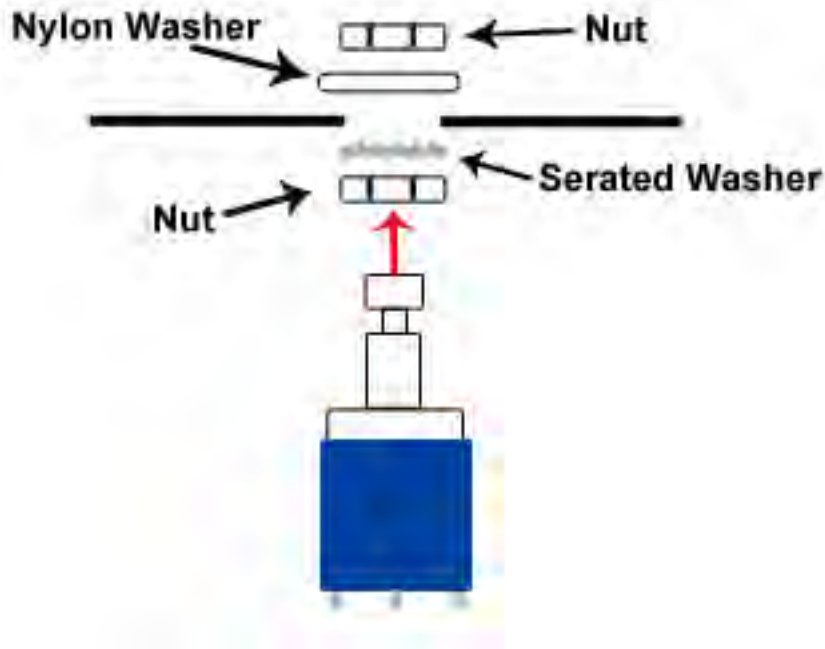
Stereo (input) Jack



Mono (output) Jack



Step 1: Install the 1/4" jacks to the enclosure.

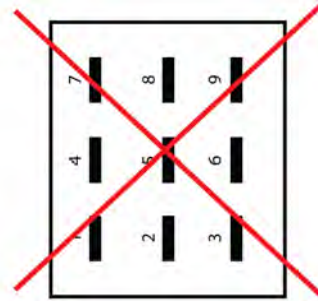
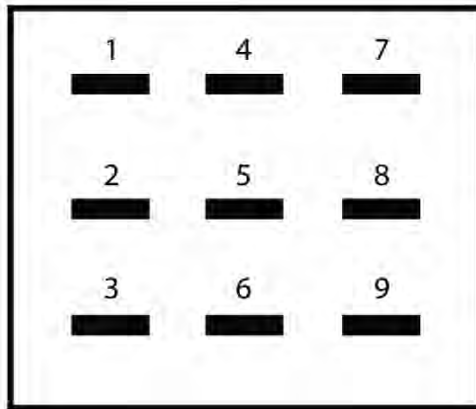


Step 2: Install the footswitch. Orient the footswitch so that the flat sides of the solder lugs are like the diagram below.

NOTE: There are no actual number markings on the footswitch. There are two correct ways you can orient the footswitch. They are both 180 degrees of each other. Either way is fine. It does not matter as long as the flat sides of the solder lugs are running horizontal, not vertical.

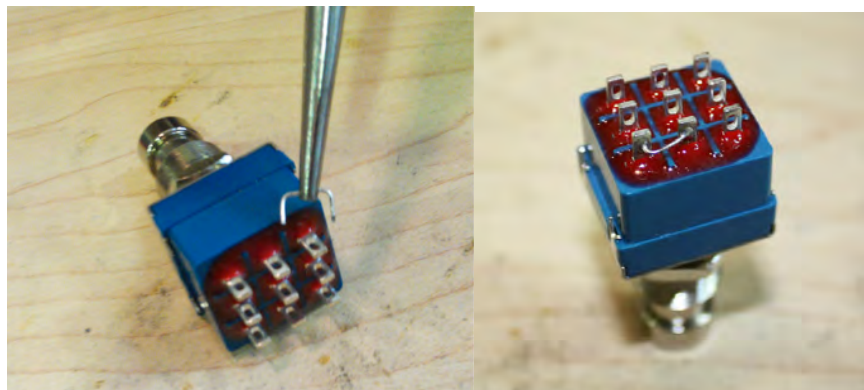
NOTE: It may be easier to wire up part of the foot switch before installing it into the pedal. There will be more room to work & it will be much easier to thread the lug 4 to lug 9 jumper.

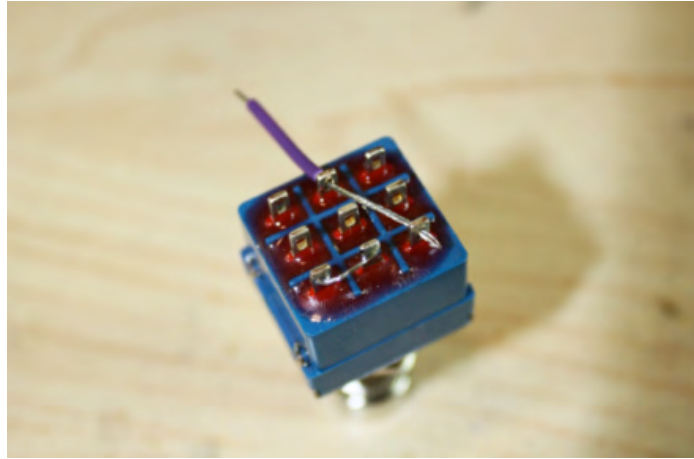
FOOT SWITCH SOLDER LUG DESIGNATIONS



Step 3: Wiring the foot switch.

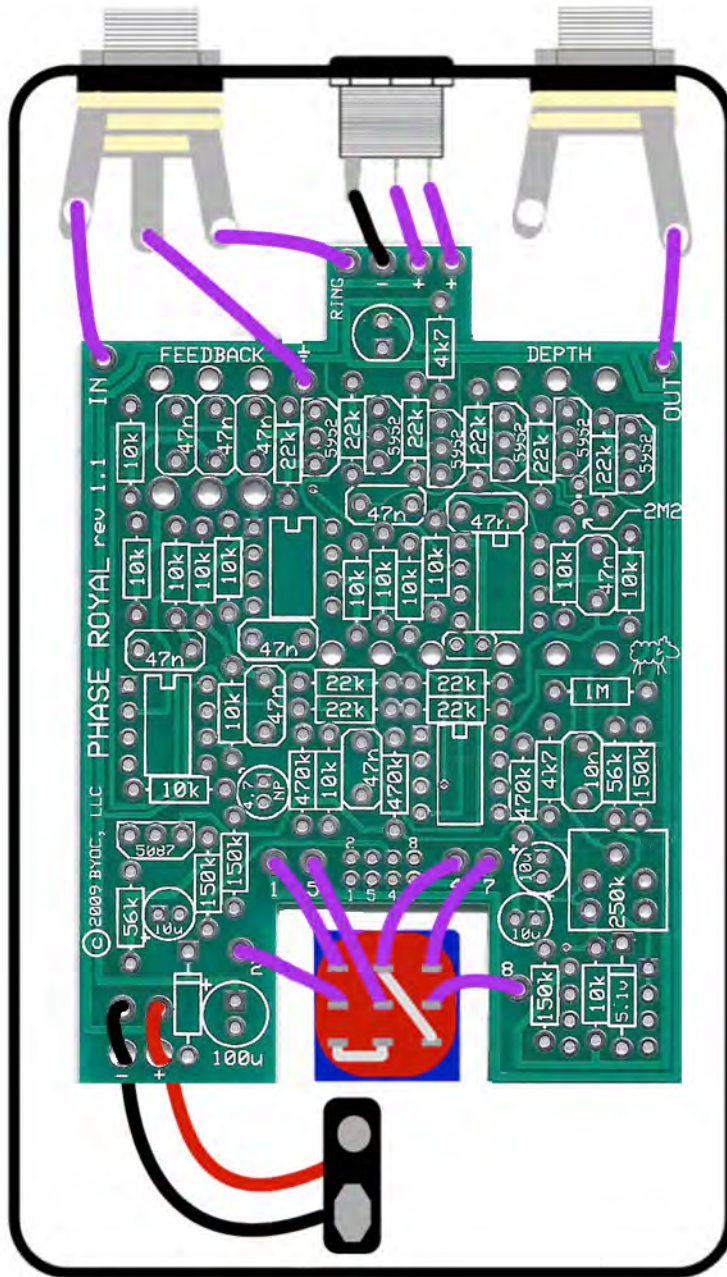
- Make a jumper between lugs 3 & 6 from clippings from the resistors. Simply use your needle nose pliers to bend a piece of clipping into a U shape & insert into lugs 3 & 6, then solder.





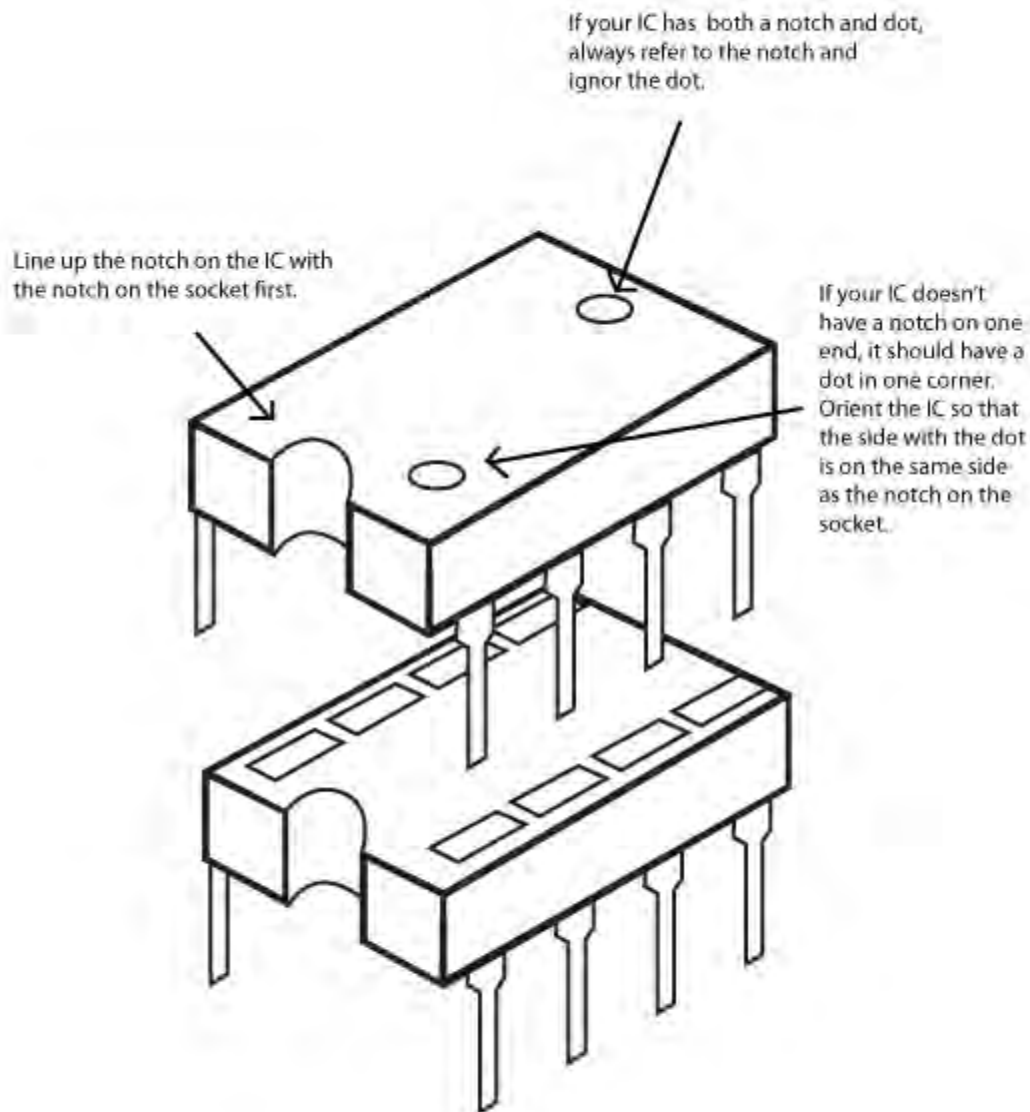
- Cut a two 2" piece of wire. Strip 1/8" off each end and tin.
- Strip 3/4" off the other end and very carefully tin. You do not want too much solder on this end.
- Thread the longer stripped end into LUG4 and through to LUG9.
- Solder both lugs 4 and 9.
- This step can be tricky. If it is too difficult or frustrating for you, you can simply insert two pieces of wire into LUG4 and solder. Then connect the other end of one of the wires to LUG9. It won't look as pretty, but it will accomplish the exact same thing.

Step 4: Install the foot switch into the enclosure if it isn't already. Insert the foot switch wires into their respective eyelets on the PCB. You can insert them into the top side and solder on the top side as well. The solder pads should be large enough (if you are using a soldering iron that isn't too big) to allow you to do this without burning the PVC coating on the wires if you are careful. If you do singe the plastic on the wires, it's OK. It's not going to hurt anything. It's purely aesthetic. See diagram below.



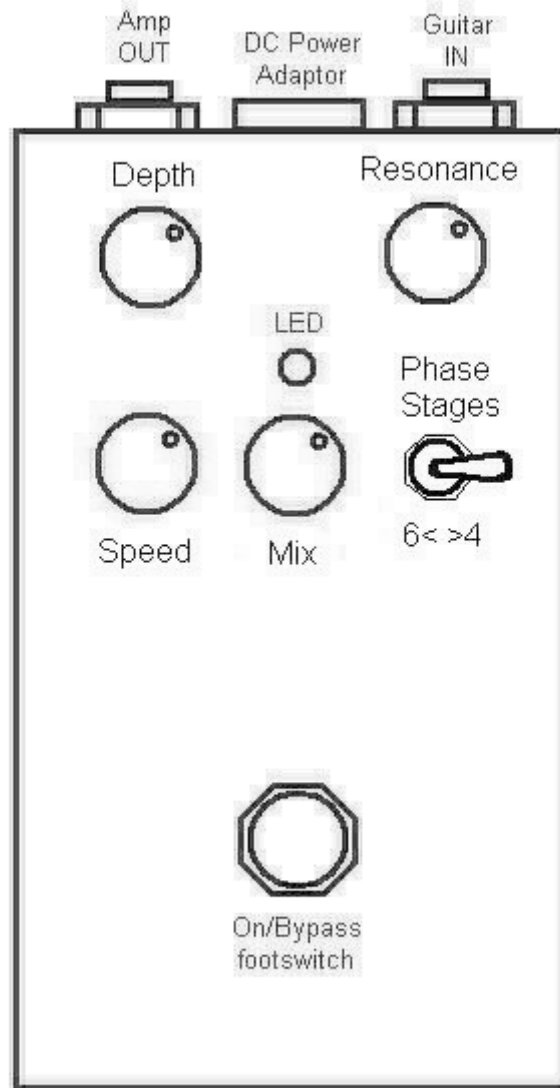
Installing IC/Finish up

Don't forget to add the knobs, put the cover on the enclosure, and apply the bumpers to the cover.



Don't forget to adjust your trimpot. Then put the cover on the enclosure and apply the bumpers to the cover if you like to use them.

Operating Overview



DEPTH: Sometimes called Width or Intensity. Controls intensity of the actual phase shifting.

MIX: Sometimes called Ratio or Blend. Controls the mix of dry & phase shifted signal.

Clockwise = more clean signal. Counter Clockwise = more phase shifting

SPEED: Sometimes called Rate or Frequency. Controls how fast the phase shifting moves.

RESONANCE: Sometimes called Feedback. Controls how much phase shifted signal is looped back into the phase stages.

4/6 PHASE STAGES SWITCH: Toggle right = 4 phase stages. Toggle left = 6 phase stages

DC power supply - Use a 2.5mm negative tip 9VDC adaptor (this is your standard guitar fx style adaptor). If using battery power, only use a single 9V battery.

Current Draw - 5.5mA

Input Impedance - 470k ohms

Output Impedance - 150k ohms

Please visit
<http://byoelectronics.com/board>
for any technical support

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