

BYOC Gray Overdrive Kit Instructions



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 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, 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 deliver 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 manor. 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. If you clearly put very little effort into building your kit, and made a big mess because you were lazy and impatient, we're not going to feel very inclined to help you. But if it's clear that you put a lot of effort into your build, took your time, and follow our tech support guidelines, we will do our very best to make sure your pedal works. We have a wonderful and friendly DIY discussion forum with an entire section devoted to the technical support and modifications of BYOC kits.

www.byoelectronics.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. 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. (more than, "It doesn't work, help")

2. Pic of the topside 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 answered yes to 6 and 7, what does the pedal do when it is in the "on" position?
9. Battery or adapter (if battery, is it good? If adapter, what type?)

Also, please only post photos that are in focus.

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Parts Checklist for BYOC Gray Overdrive Kit

Resistors:

- 1 - 100ohm (brown/black/black/black/brown)
- 2 - 4k7 (yellow/purple/black/brown/brown)
- 2 - 10k (brown/black/black/red/brown)
- 2 - 22k (red/red/black/red/brown)
- 2 - 470k (yellow/purple/black/orange/brown)
- 1 - 1M (brown/black/black/yellow/brown)

Visit www.byocelectronics.com/resistorcodes.pdf for more information on how to differentiate resistors.

Capacitors:

- 1 - 1n or .001 μ film (102 on the PCB)
- 1 - 10n or .01 μ film (103 on the PCB)
- 1 - 47n or 0.047 μ film (473 on the PCB)
- 1 - 4.7 μ f aluminum electrolytic
- 1 - 10 μ f aluminum electrolytic

Visit www.byocelectronics.com/capcodes.pdf for more info on how to differentiate capacitors.

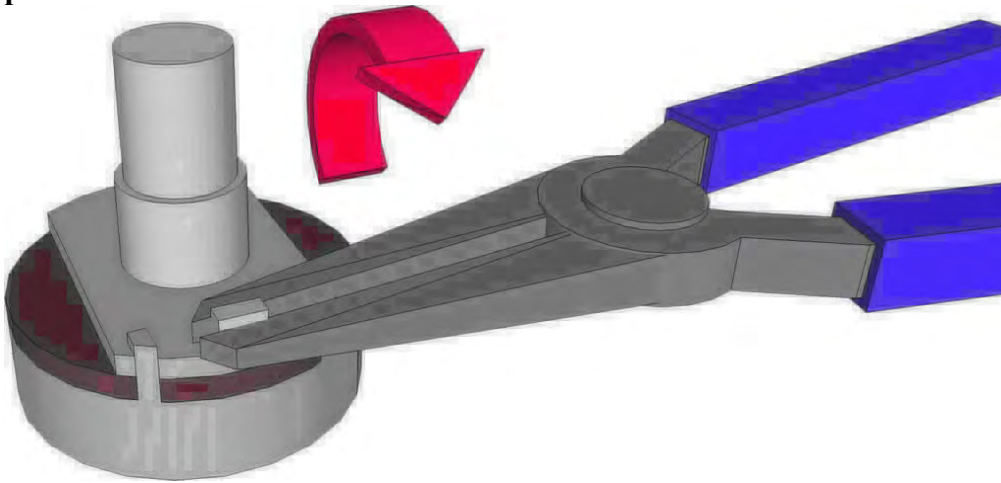
Diodes:

- 2 - 1N4148 (small orange glass with black stripe)

IC's:

- 1 - 741 op amp
- 1 - 8 pin socket

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



- 1 - A100k (LEVEL)
- 1 - C500k (DRIVE)

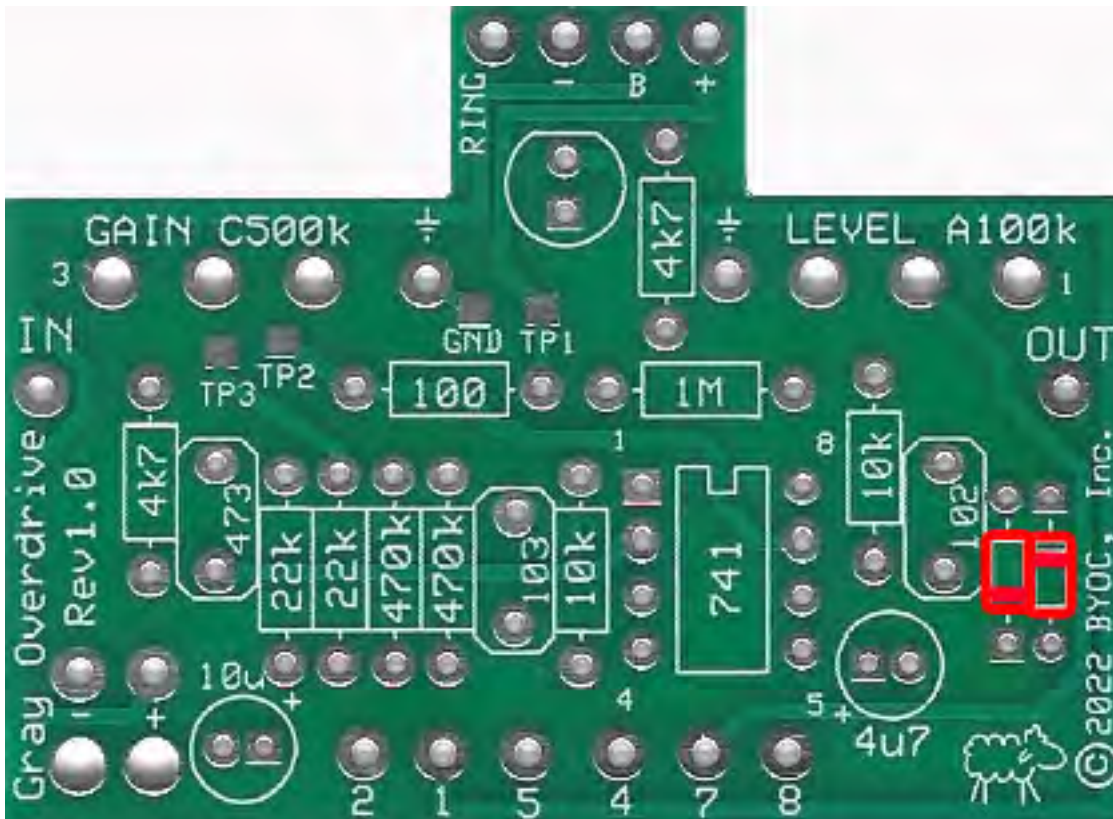
Hardware:

- 1 - drilled enclosure w/ 4 screws (optional)
- 1 - BYOC Gray Overdrive PCB
- 1 - 3PDT footswitch
- 2 - knobs (optional)
- 1 - AC adaptor jack (optional)
- 2 - ¼" jacks
- 1 - red LED (optional)
- 1 - battery snap
- 4 - bumpers
- hook-up wire



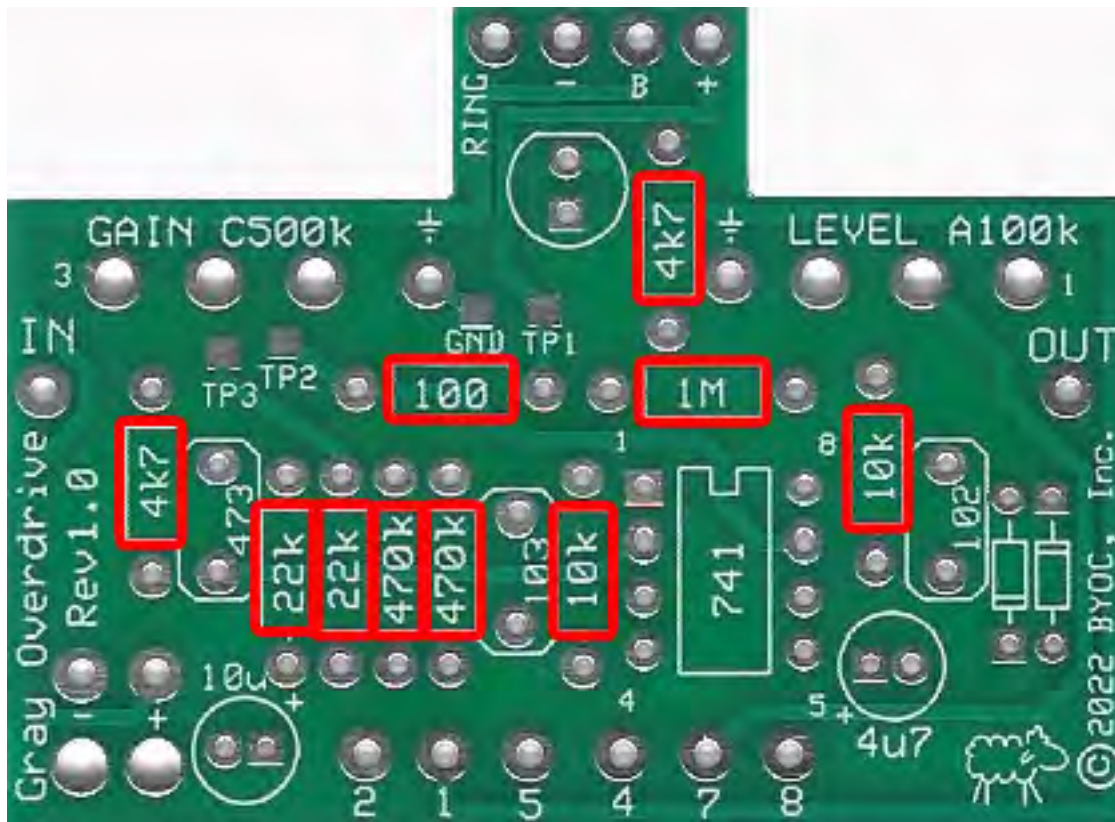
This is what your Gray Overdrive should look like when you are finished.

Populating the Circuit Board

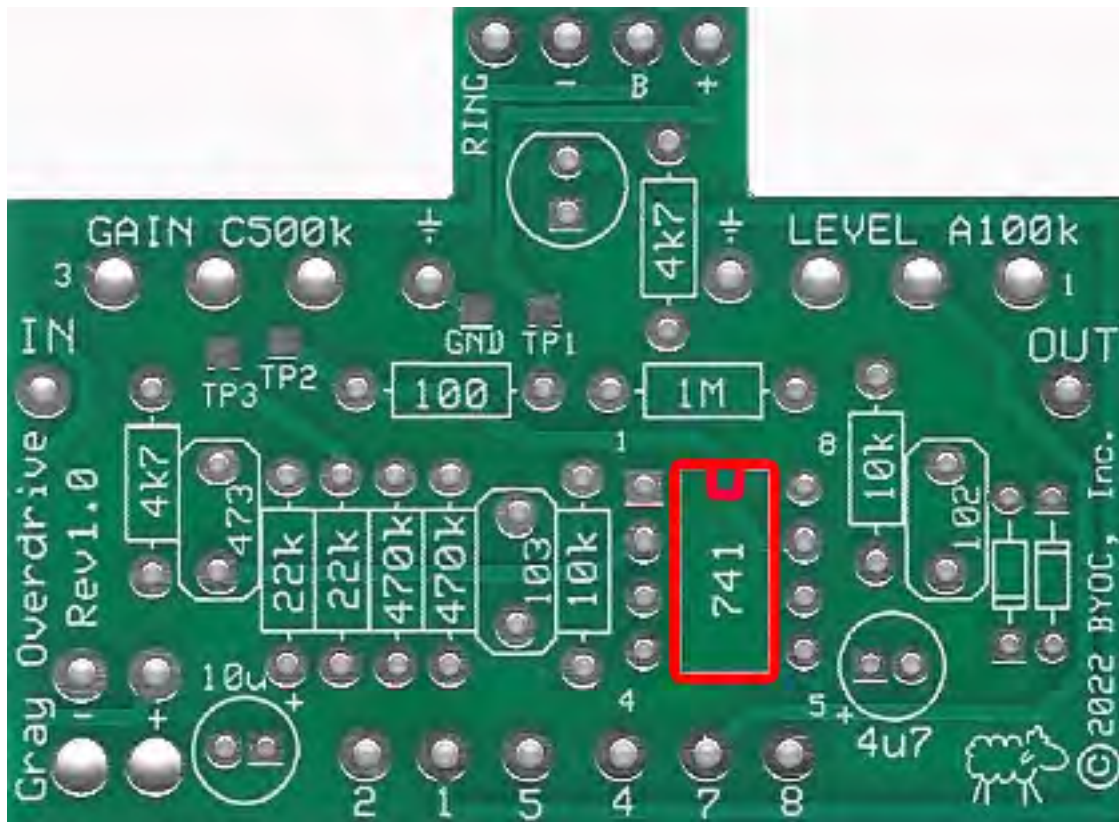


STEP 1: Add the diodes. Be sure to match the end of the diode with the stripe to the layout on the PCB. The stripped end should go in the square solder pad.

FYI, the order in which these instructions tell you to populate the PCB is based on the profile height of the components. You start with the shortest profile and work up to the tallest. This is done so that when you flip the PCB over to solder, the components do not fall out.

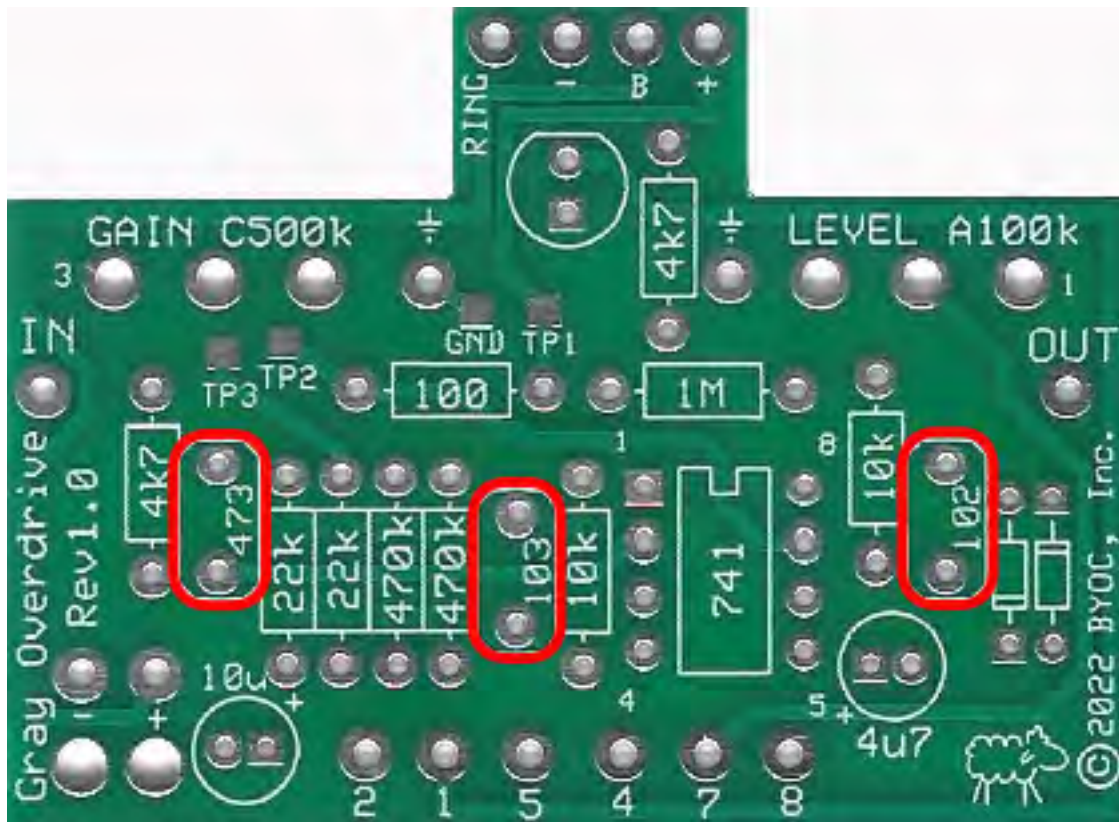


STEP 2: Add the resistors. Resistors are not polarized, so it does not matter which end goes in which solder pad. Take your time and be sure not to confuse similarly banded resistors such as the 4k7 with the 470k . Sometimes, certain colors can be very difficult to distinguish from batch to batch. For example, sometimes the red bands in one batch may look very similar to brown. If you are having trouble differentiating color bands, sometimes it's easier to measure the resistance using a digital multimeter.

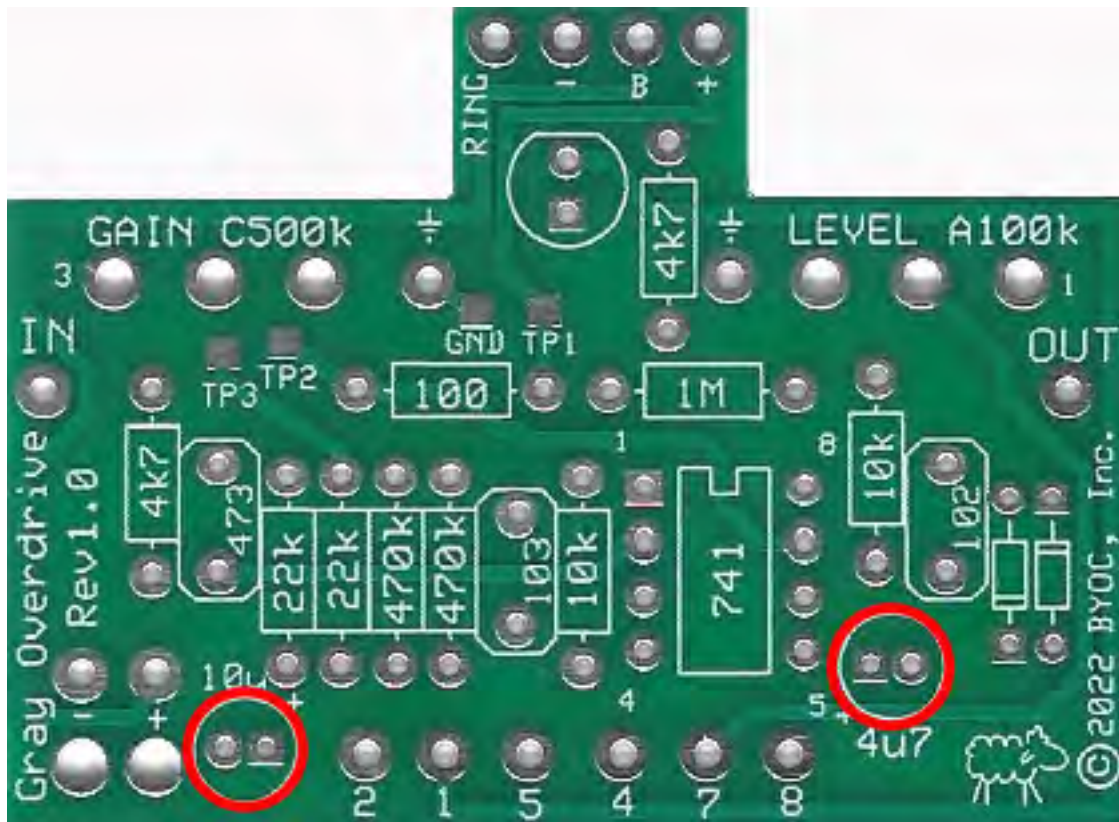


STEP 3: Add the 8 pin IC socket. **ONLY SOLDER THE SOCKET! NOT THE ACTUAL IC!** This is a socket. The sockets get soldered to the PCB. The ICs get inserted into the sockets. The actual IC chip itself, never gets soldered. You will insert the IC into the socket after the entire pedal has been built.

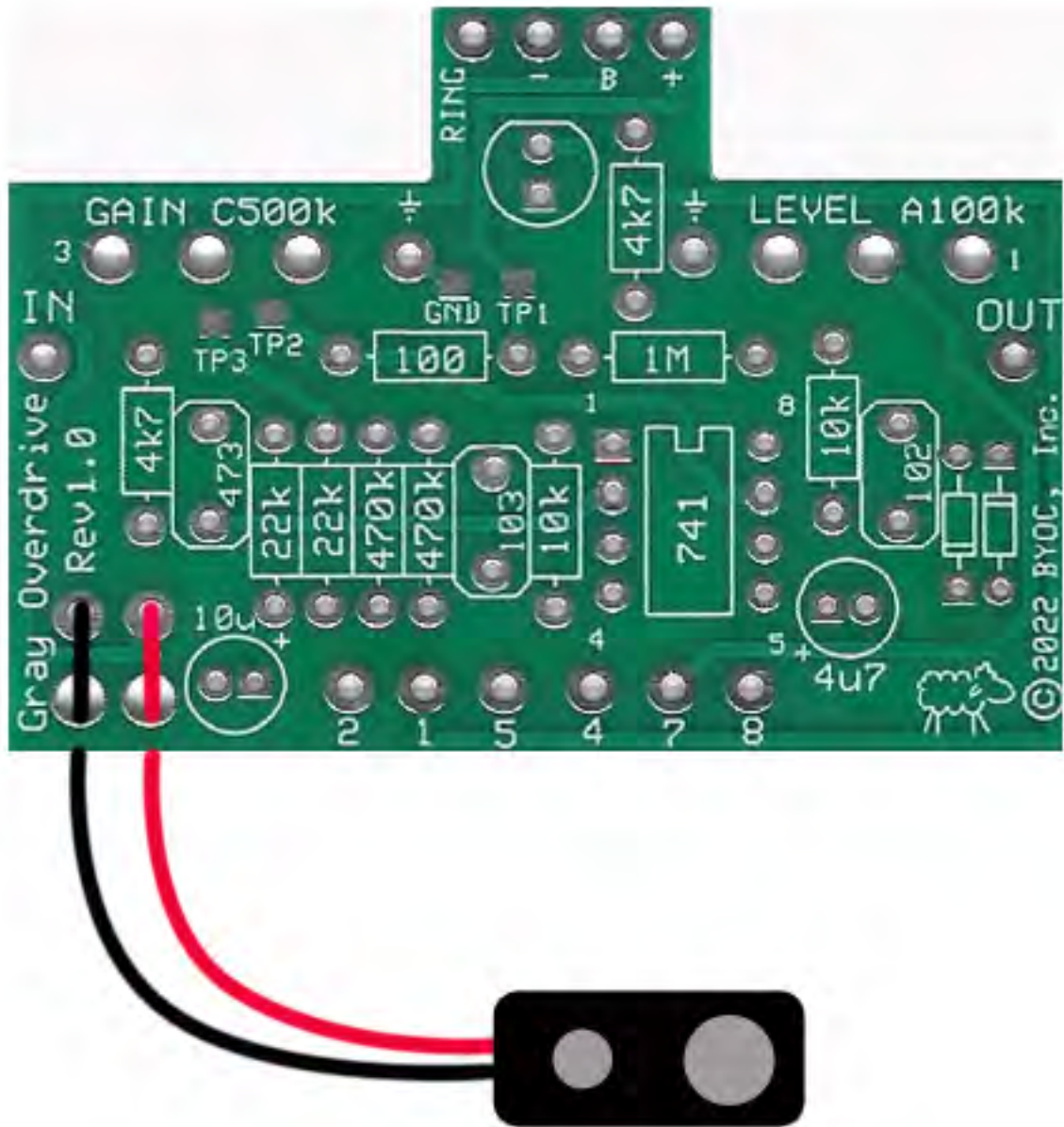
See page 25 for instructions on how to install the IC into the socket.



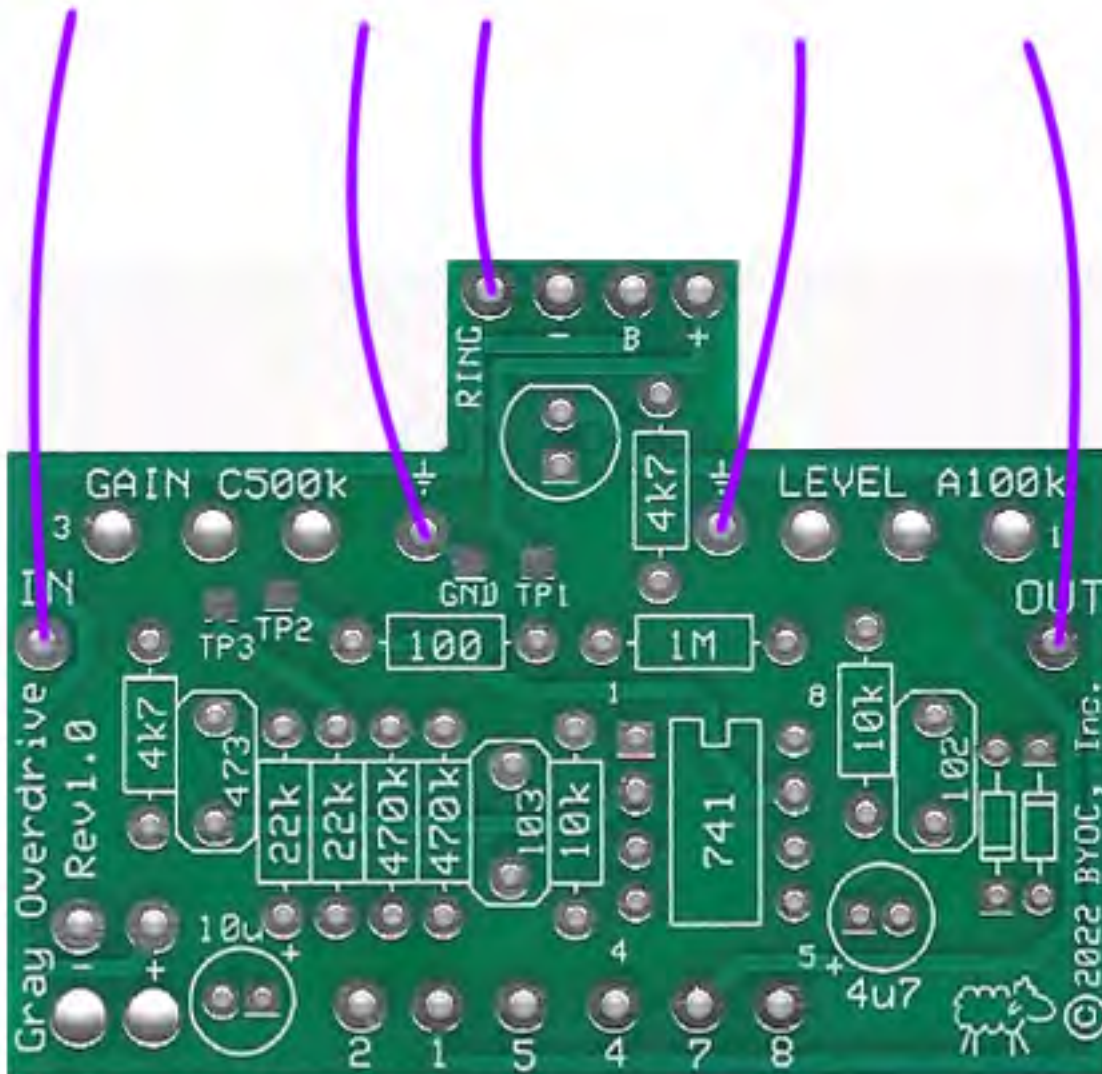
Step 5: Add the film capacitors. These are not polarized and can be inserted into the PCB either way.



STEP 6: 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, usually with a black or white stripe running down the body of the capacitor.

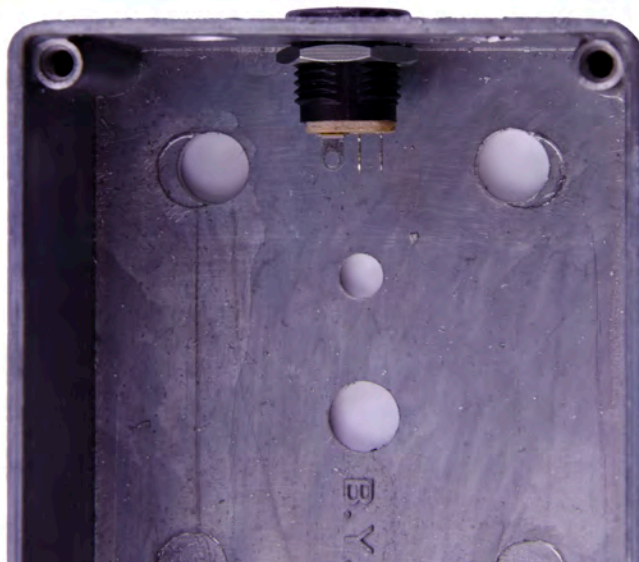


Step 7: Add the battery snap. Thread the solder ends of the battery snap into the strain relief holes from the bottom solder-side of the PCB and out through the top. Insert the solder ends of the battery snap wires into the topside of their respective solder pads. Solder on the bottom side of the PCB. Remember the red wire goes in the “+” hole and the black wire goes in the “-” hole.

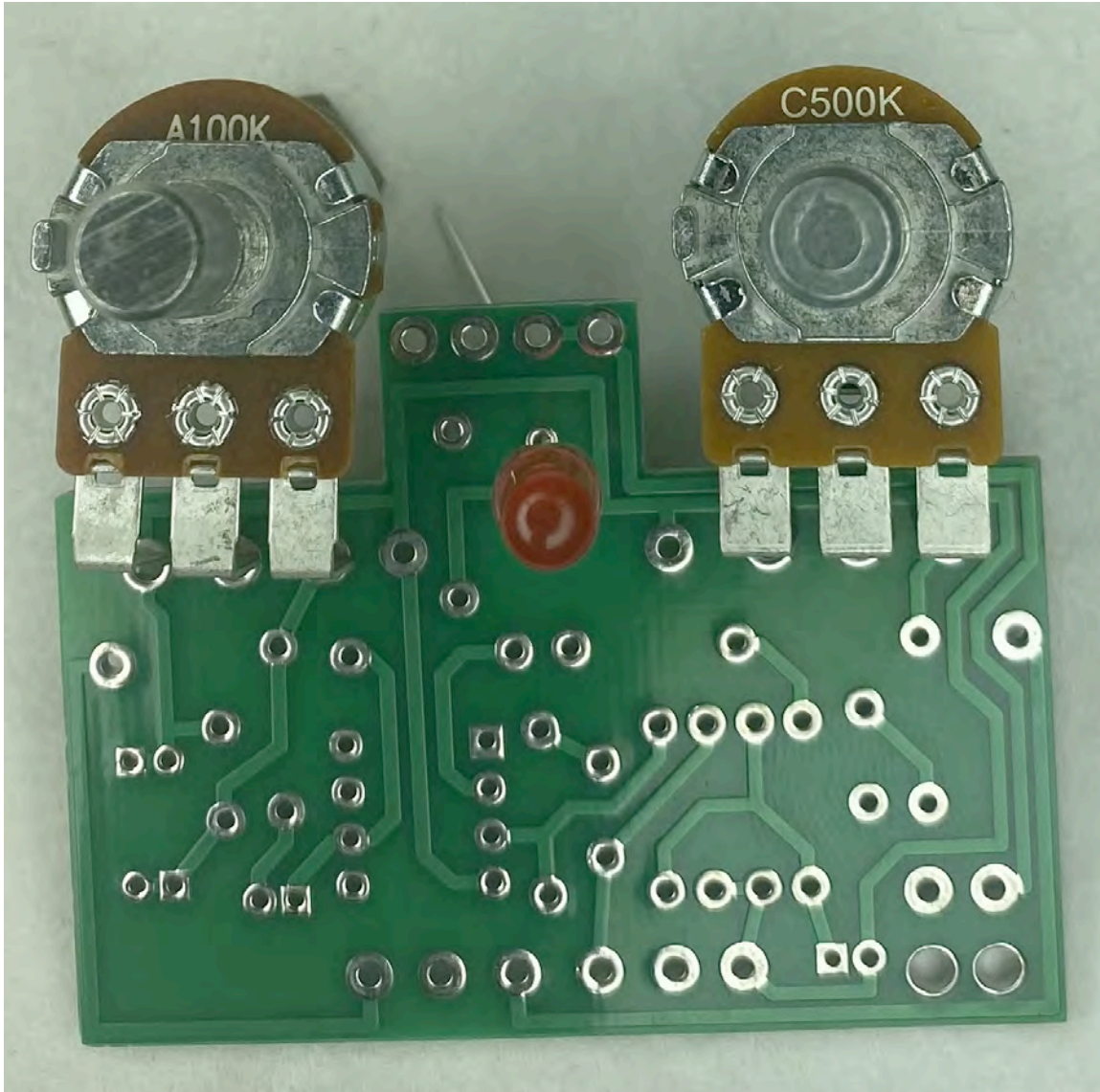


Step 8: Add wire to the IN, OUT, RING, and two Ground eyelets. Use about 2 inches for each wire. This doesn't need to be exact at this point. You will trim the wire to length later.

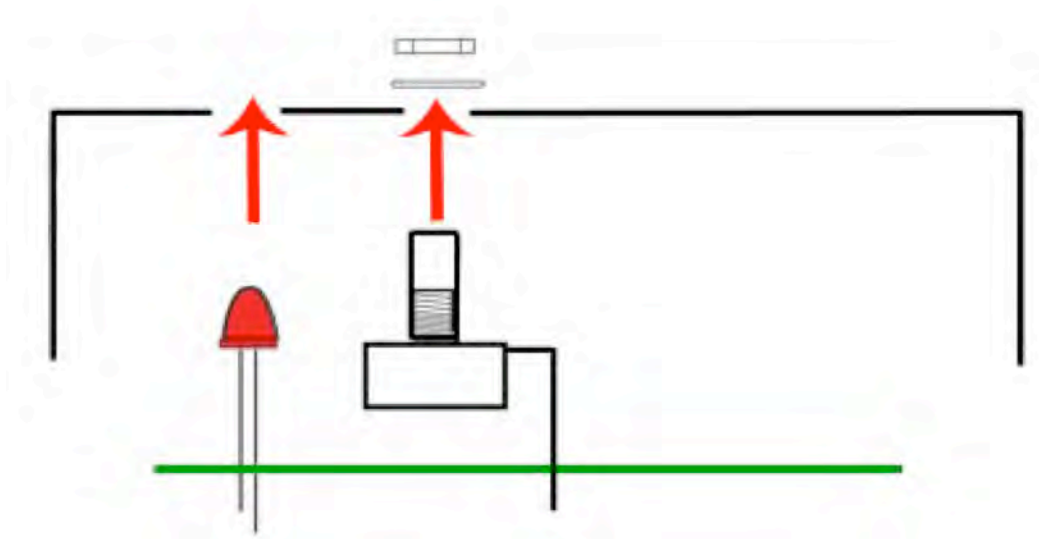
Mounting the PCB Assembly and Connecting the DC Adapter Jack



Step 1: Mount the DC 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 and their solder terminals will appear exactly the same. You just thread the external nut on the outside and the internal nut on the inside. The picture above is of an internal nut DC adapter jack.



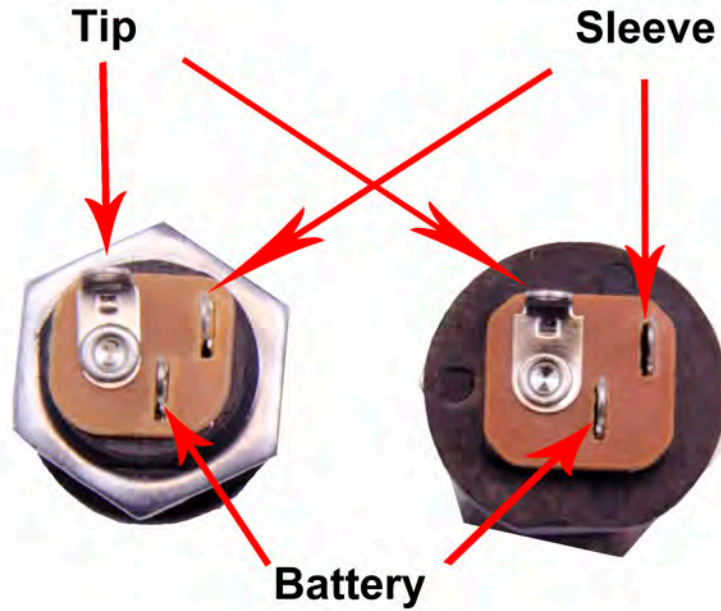
Step 2: Flip the PCB over so that the bottom or solder side is up. Insert the A100k (LEVEL) and C500k (GAIN) potentiometers, and the LED into the bottom side of the PCB. **DO NOT SOLDER ANYTHING YET!!!** The LED will have one lead that is longer than the other. **MAKE SURE THE LONGER LEAD GOES IN THE SQUARE HOLE.**



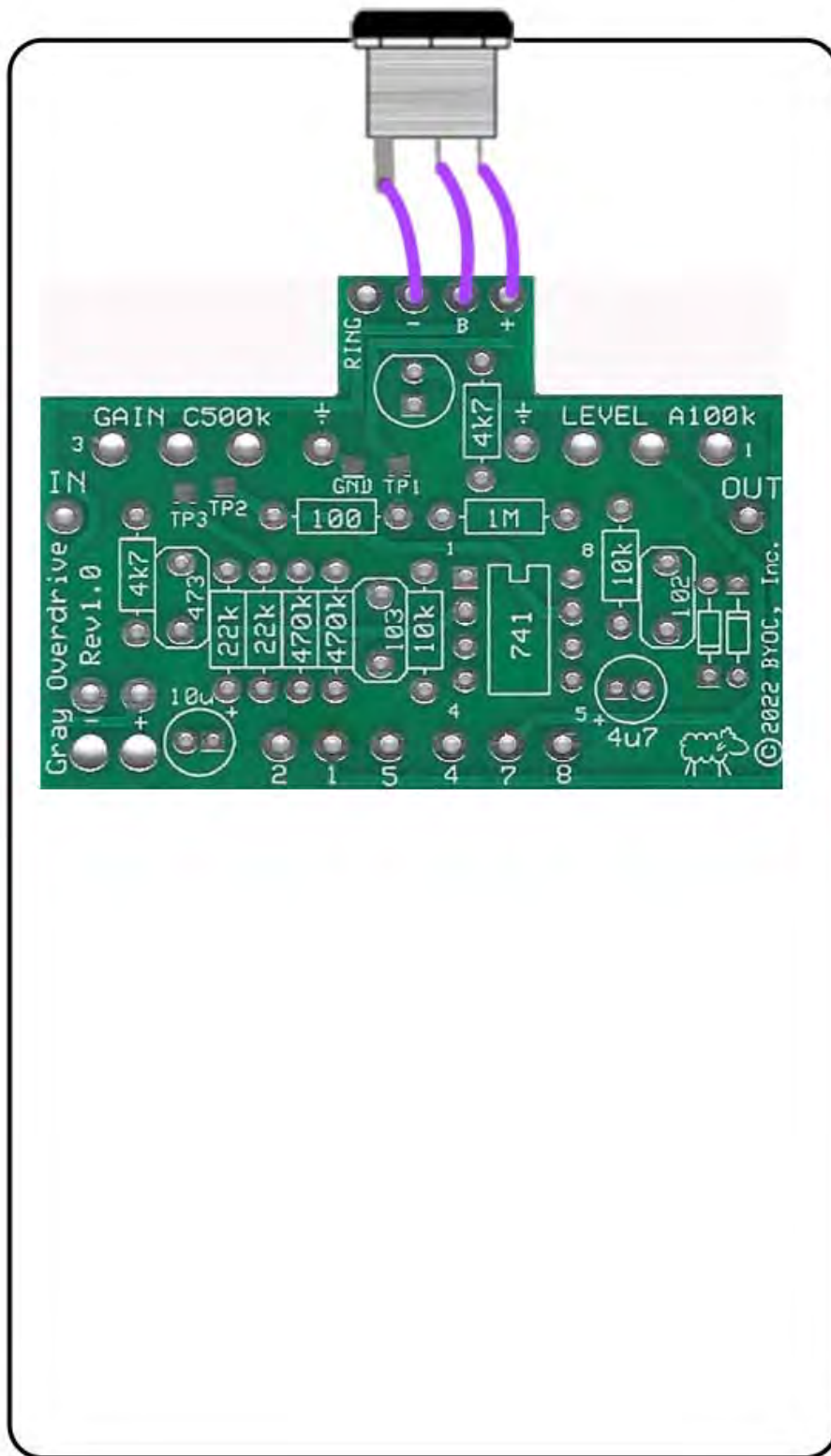
Step 3: Hold the PCB in one hand so that the component side of the PCB is in the palm of your hand and the bottom side with the pots, toggle switch and LED is facing up. Now use your other hand to guide the predrilled enclosure onto the PCB assembly so that the pots and LED all go into their respective 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.**

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, switch, and LED. You will solder these parts on the component side of the PCB. After you have soldered them in place, be sure to tighten up their nuts.

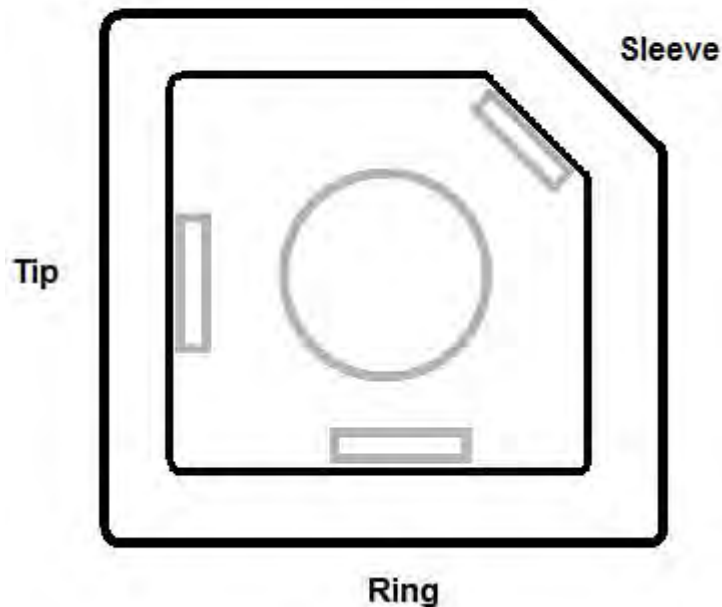


Step 6: Connect the TIP (negative) terminal of the DC adapter jack to the eyelet on the PCB labeled “-“. Connect the SLEEVE of the DC adapter jack to the eyelet on the PCB labeled “+”. Connect the battery disconnect terminal of the DC adapter jack to the eyelet on the PCB labeled “B”. See diagram on the next page.



WIRING

Enclosed Jack



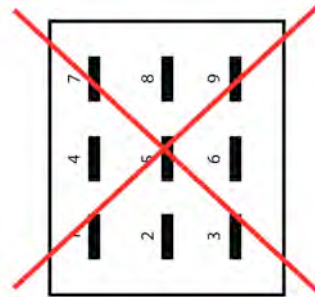
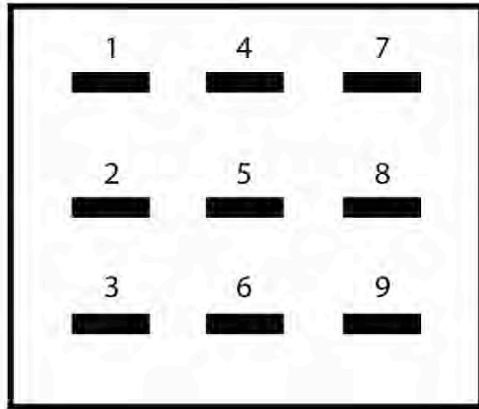
Step 1: Install the ¼" Enclosed jacks. The internal tooth lock washer goes on the inside of the enclosure. The flat washer goes on the outside of the enclosure.

Note that these are “stereo” or “TRS” jacks. This is a mono effect, but we use a stereo jack for the INPUT JACK as the power on/off switch. It is a common misunderstanding that the foot switch turns the pedal on and off. The foot switch is a signal send/return that either sends guitar signal to the circuit’s input and returns signal from the circuit’s output or bypasses the circuit, but it has nothing to do with whether or not power to the circuit is on or off.

When you insert a mono guitar cable into the stereo input jack, the sleeve of the cable connects the ring and sleeve of the jack. The ring is connected to the negative end of the power supply and the sleeve is connected to ground. When the sleeve of the guitar cable shorts these two terminals together, it completes power to the circuit. So this is why we use a stereo jack for the input of a mono effect. AND! This is why you need to unplug the cable from the input jack to turn the power off.

You might be asking, “Why use a stereo jack for the output?” In the case of enclosed jacks, it’s cheaper to just buy all stereo jacks and simply not use the ring terminal. This isn’t the case with open frame jacks, so in the kits where we use open frame jacks, we will use a mono jack for the output ja

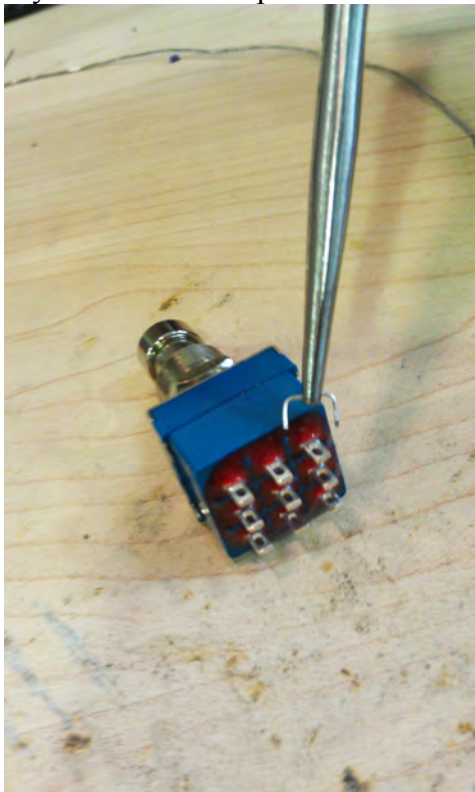
FOOT SWITCH SOLDER LUG DESIGNATIONS

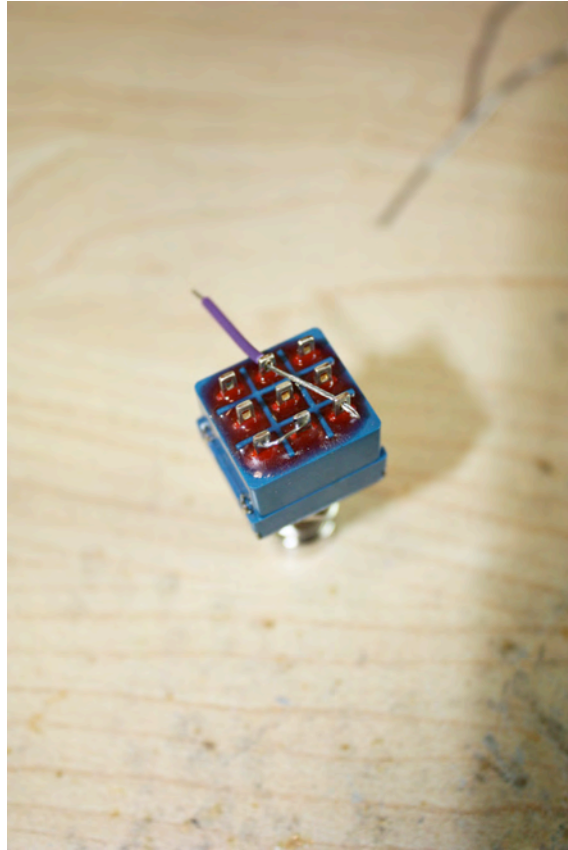


Step 2: Begin wiring the foot switch. Orient the footswitch so that the flat sides of the solder lugs are like the diagram above.

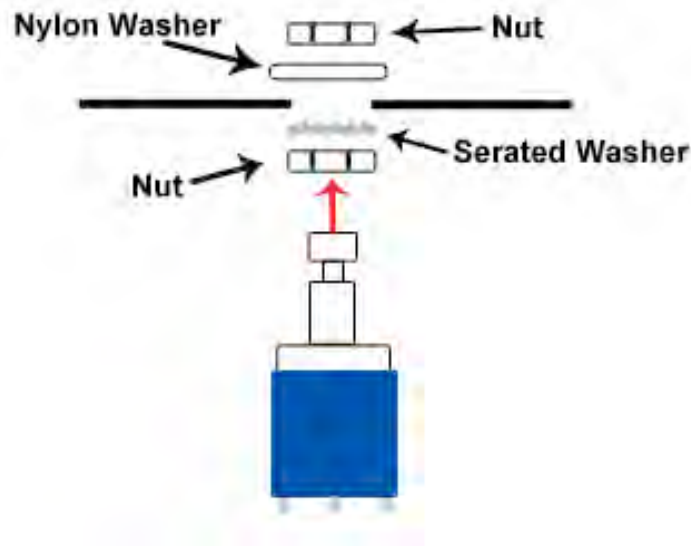
NOTE: There are no actual number markings on the footswitch. There are two correct ways you can orient the footswitch. They are both 180 degrees of each other. Either way is fine. It does not matter as long as the flat sides of the solder lugs are running horizontal, not vertical.

Step 2a: Make a jumper between lugs 3 & 6 from clippings from the resistors. Simply use your needle nose pliers to make a U shape & insert into lugs 3 & 6, then solder.



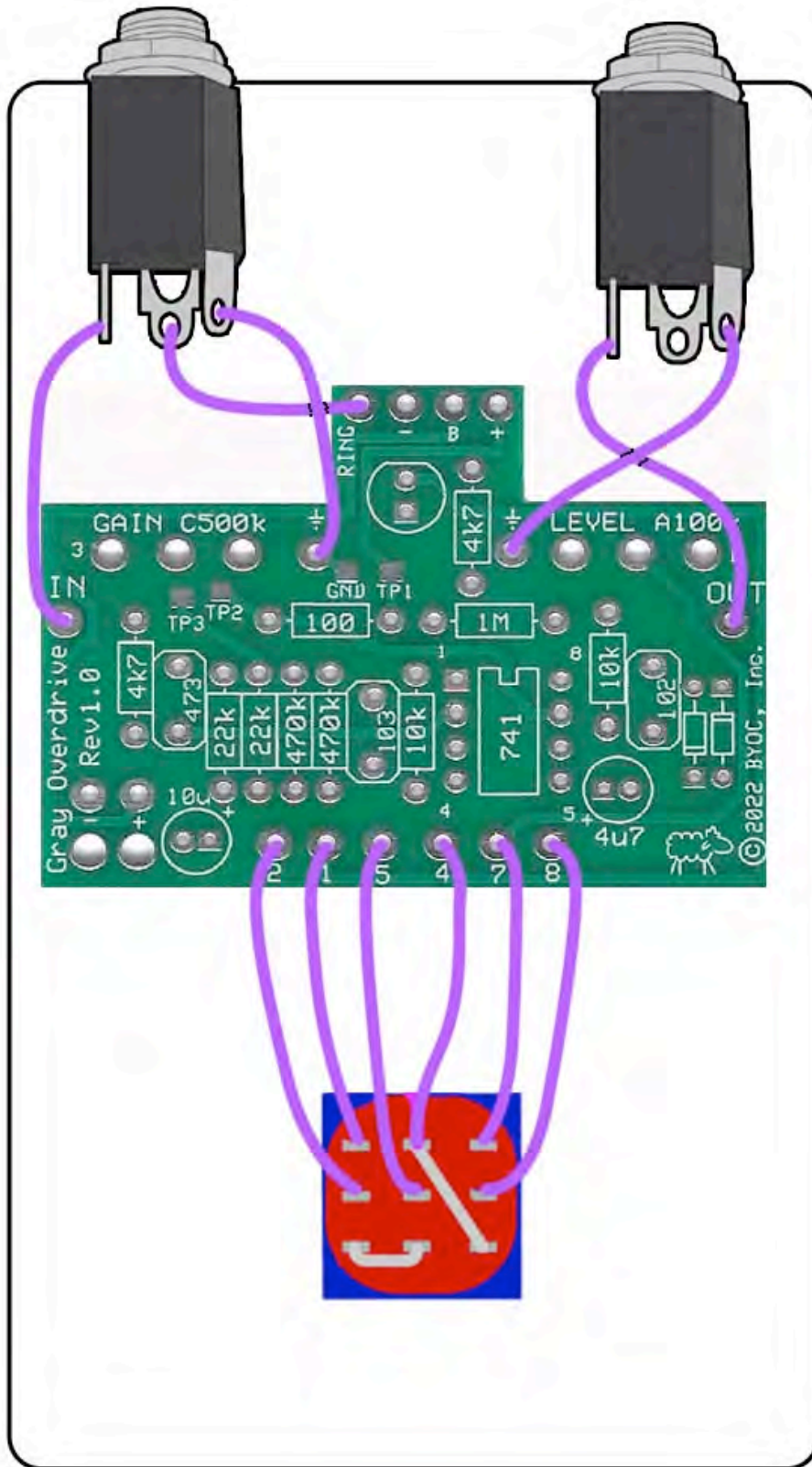


Step 2b: Cut a 3” piece of wire. Strip 1/2” off one end. Twist the stripped wire so that the strands are tight and then lightly tinned the exposed wire with solder. Don’t use too much or it will be too thick to pass through the solder lug holes. Pass the stripped and tinned end through lug 4 and into lug 9, and then solder.

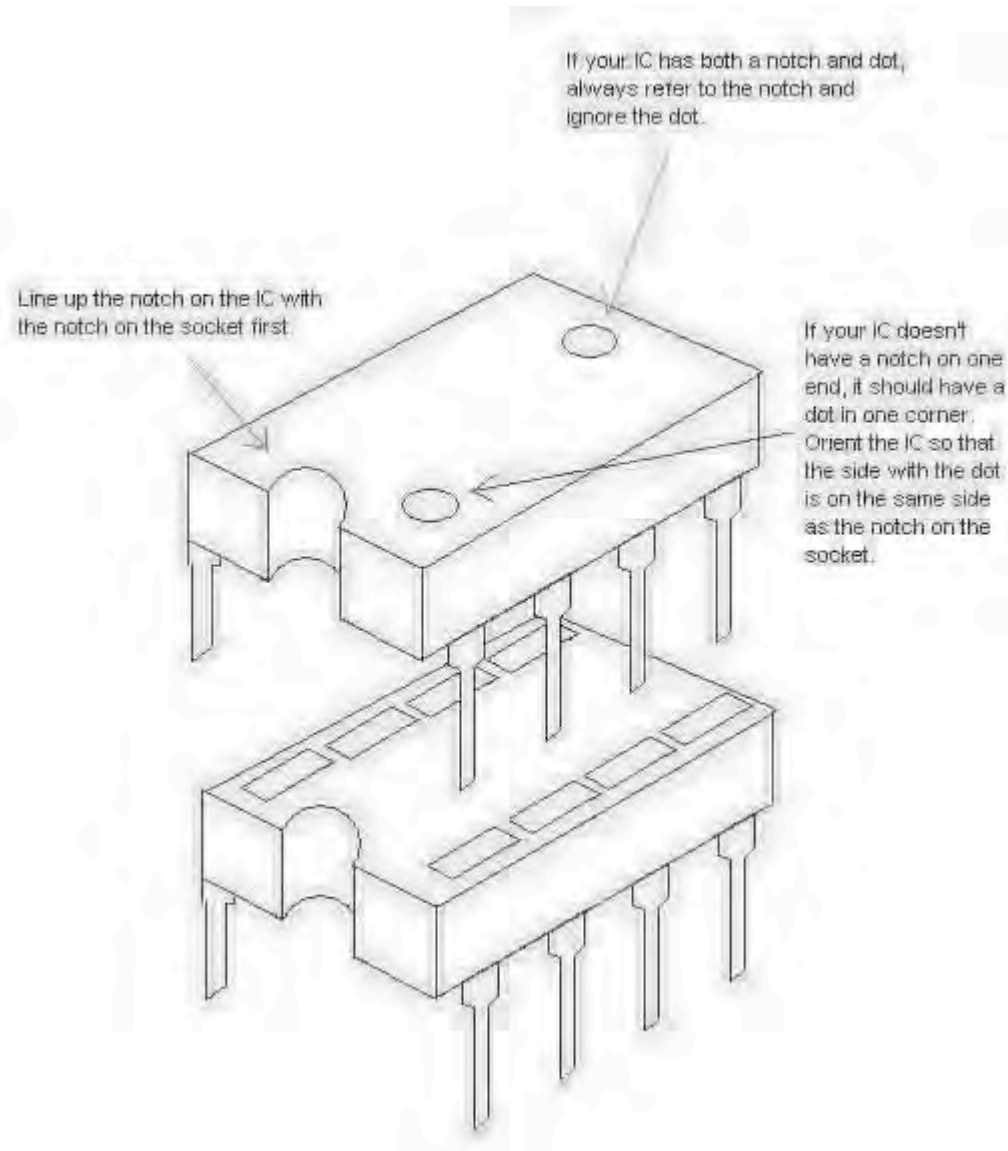


Step 3: Install the foot switch into the enclosure.

Step 4: Make all the wire connections between the foot switch and the jacks and the PCB as shown in the wiring diagram on the next page. The PCB has double-sided and plated through-hole eyelets, so it is okay to solder from the top side of the PCB. Try to make your wiring as short and tidy as possible. Refer to the picture on page 7. When you're done wiring, give the bodies of both jacks a $\frac{1}{4}$ turn counter clockwise so that the sleeves of each jack are facing upwards. This will give the solder terminals a little more clearance from the PCB.



Installing the ICs and Finishing Up



Operating Overview



Level: This controls the overall output volume.

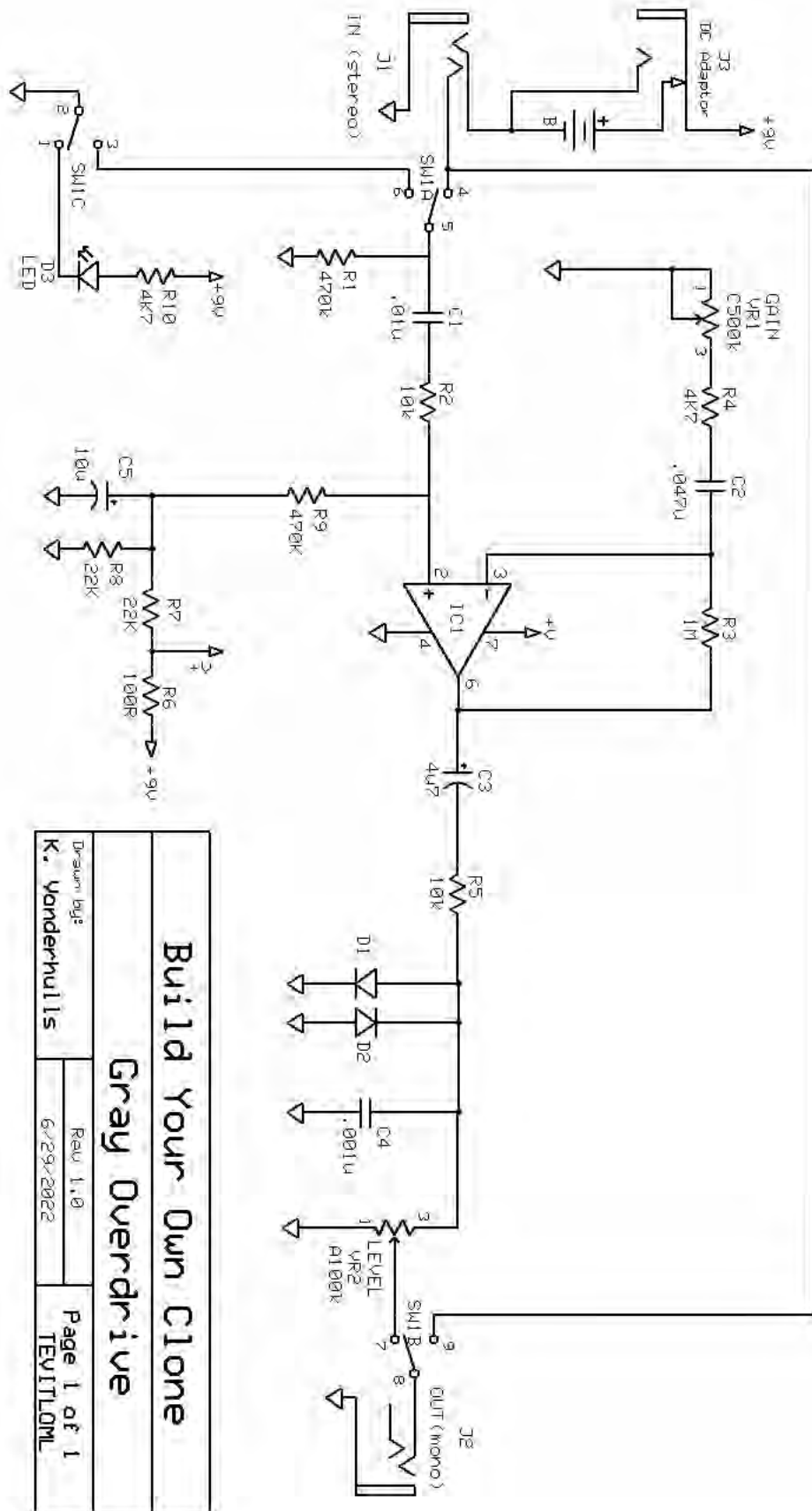
Gain: This controls the amount of distortion

Power Supply: 9V battery or 2.1mm negative-tip 9VDC adapter.

Current Draw: < 10mA

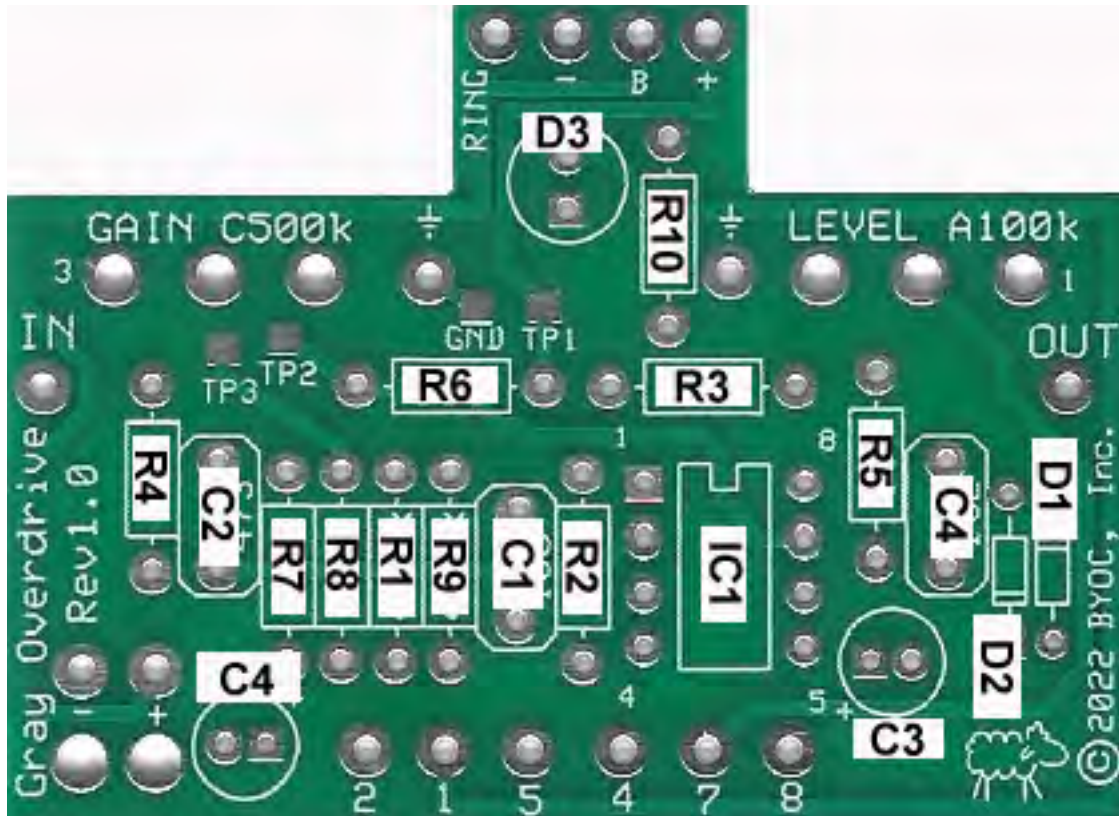
Input Impedance: 470k ohms

Output Impedance: 100k ohms



Build Your Own Clone	
Gray Overdrive	
Drawn by:	Rev 1.0
K. Vanderhulst	6/29/2022
Page 1 of 1	
TEVITLOML	

PCB Map



The numbers above correspond to the component numbers on the schematic on the previous page.

Trouble Shooting

The overwhelming majority of our tech support issues are due to poor soldering...lazy, sloppy, impatient soldering. But even careful experienced pedal builders still make bad solder joints on occasion. If your pedal doesn't fire up right out of the gate, you should reflow all your solder joints. You do this by reheating the solder joint with your iron and applying a tiny bit of fresh solder. **This is the first thing you should do**, even if you are certain your soldering is perfect. Here are some other common issues.

1. Problem: Your pedal just makes a bunch of noise and/or high pitched squealing. Reason: It's probably your power adapter. Unfortunately, there are several companies that make inferior DC adapters that are marketed as power supplies for guitar pedals and they are not suitable for this application. We don't want to name any names, but the most popular brand rhymes with Fun Pot. In recent years several other brands and started selling similar inexpensive "daisy chain" style adapters. If you spent less than \$30USD on your power supply, it's likely that this is your problem. If you are having this problem, try a fresh battery. If the noise goes away, then you can assume that the problem is your power supply. We recommend the BOSS PSA-120S as an economical power supply solution.
2. Problem: The pedal works in every way, but the LED doesn't come on. Reason: You probably oriented your LED backwards or you have loose wiring at lugs 1 or 2.
3. Problem: The pedal works, but it is extremely quiet and/or has low distortion. Reason: You probably have one or more of your resistors mixed up. The R3, R5, and R6 all have similar color bands and if you mixed up any of those, that would cause low output. Or you mixed up your LEVEL and GAIN pots.
4. Problem: Bypass works, but the effect doesn't work and the LED doesn't come on. Reason: You probably didn't wire your DC adapter jack and or foot switch correctly. Or you are using a dead battery. If the LED is faint and the effect is weak, you probably have a dying battery.
5. Problem: Bypass works, the LED comes on, but the effect doesn't work. Reason: You might have your input and output cables mixed up, or you have a problem on the PCB and you should take voltage readings.
6. Problem: All I get is a loud hum. Reason: You probably don't have a proper ground connection to the sleeves of your input and/or output jack(s).
7. Problem: The op amp is getting very hot. Reason: You either put the op amp in backwards or you used a positive tip power supply. The op amp is ruined and you will need to replace it.

Taking Voltage Readings. Before you even bother taking voltage readings, YOU MUST have bypass working correctly and the LED status light working correctly. The LED and bypass are indicators that you have proper power and ground to your circuit and that your jacks and footswitch are wired correctly. If these aren't working correctly, nothing else will work correctly. So don't bother taking voltage readings till you get those working first.

1. Make sure your pedal has power. This not only means connecting a fresh 9V battery or 9VDC 2.1mm negative tip power supply. This also means plugging in a cable into the input jack. Don't forget that the input jack acts as the power on/off switch.
2. Set your DMM (digital multimeter) to read DC Voltage for at least 9 volts.
3. Connect the black probe plug to the COM terminal of the DMM and the red probe plug to the to the Volts/ohms terminal of the DMM. Here's a link to a YouTube video on how to use a DMM <https://youtu.be/XRFtlUn4eBg>
4. Now you are ready to take voltage readings. Touch the black probe to ground. The sleeve or either jack is a good ground point. Touch the red probe to the various test points show in the following diagram.

The following voltages are based on 9.0VDC supply voltage. Your voltages may vary by a few mV depending on your exact supply voltage. There is a ground pad just to the right of TP1. This is also a good place to put your black probe

TP1: 9VDC

TP2: 8.9VDC or just slightly less than TP1

TP3: 4.5VDC or about half of TP2

You'll notice that there are numbers around the op amp. Pin 1 is in the upper left corner. The numbers go around counter clockwise to pin 8 in the upper right corner.

Pin 1: N.C. (no connection)

Pin 2: 4.5VDC approximately

Pin 3: 4.5VDC approximately

Pin 4: 0V (ground)

Pin 5: N.C.

Pin 6: 4.5VDC approximately

Pin 7: 9VDC

Pin 8: N.C.

If you're LED is lighting, then you should be reading 9VDC at test point 1. If not, then you are probably doing something wrong with your DMM.

If you are not getting 9VDC at TP2, then you likely have a cold solder joint at the R6/100ohm resistor, or you have the wrong value resistor in that space.

If you are not getting 4.5VDC at TP3, then you likely have a cold solder joint at R7/22k and/or R8/22k or you have the wrong value in one or more of these spaces.

If you are not getting approximately 4.5VDC at Pin 3, but you are getting 4.5VDC at TP3, you've likely got a cold solder joint at the R9/470k resistor.

If you need further technical support, please visit
www.byoelectronics.com/board

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