Build Your Own Clone Royal Flush 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.byocelectronics.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.

Copyrights:

Royal Flush Kit Instruction Index

Parts Checklist for BYOC Royal Flush Kit

Resistors:
2 – 1K (brown/black/black/brown/brown)
2 - 4k7 (yellow/purple/black/brown/brown)
4 – 6k8 (blue/gray/black/brown)
4 - 10k (brown/black/black/red/brown)
2 – 27k (red/purple/black/red/brown)
2 – 33k (orange/orange/black/red/brown)
2 – 47k (yellow/purple/black/red/brown)
2 – 220k (red/red/black/orange/brown)
2 – 680k (blue/gray/black/orange/brown) **
6 – 1M (brown/black/black/yellow/brown)

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

Capacitors:
2 – 100pF Ceramic Disc (101 printed on body of capacitor)
10 - 10n or .01μF film (103 printed on body of capacitor)
4 - 100n or 0.1μF film (104 printed on body of capacitor) **
2 – 1μF film (105 printed on body of capacitor)
2 – 1μF aluminum electrolytic
2 - 100μF aluminum electrolytic

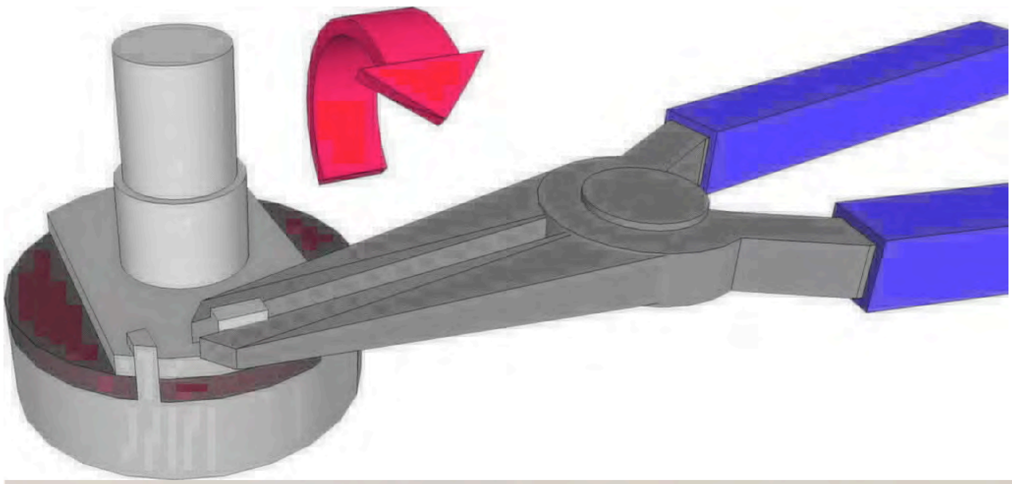
Visit www.byocelectronics.com/capcodes.pdf for more info on how to differentiate capacitors.

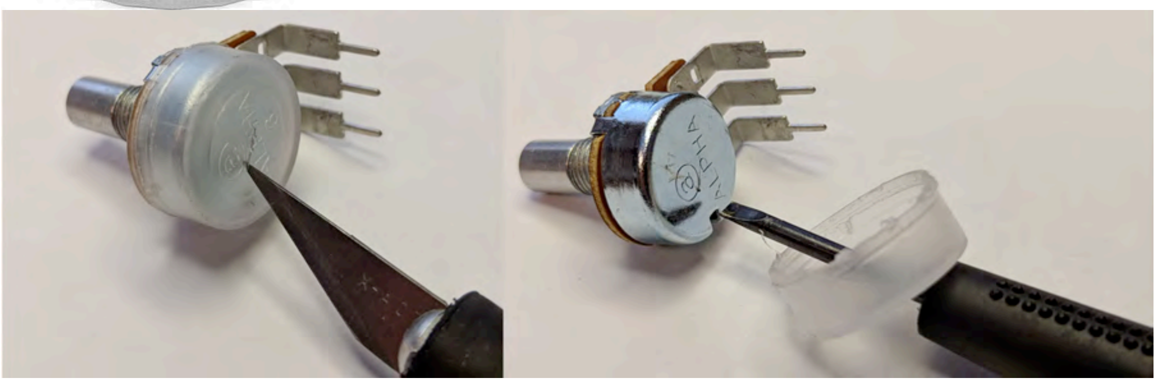
Diodes:
8 - 1N4148 (small orange glass with black stripe) **
4 – 1N60P (will look very similar to 1N4148. You'll probably need a magnifying glass or the zoom on your phone camera to read the markings)
4 – 1N4001 (larger black diode with silver stripe)
4 – Red LED **

IC's:
2 – 4580 or similar DIP8 dual op amp
2 - 8 pin sockets

** You will have extras of these parts. These are included for modifications. So don't be alarmed when you have extra parts left over at the end.

Potentiometers: Be sure to snap off the small tab on the side of each panel mounted pot. If your potentiometers have a dust cover attached to them, you will need to remove it. Make a cut in the dust cover to release the vacuum. Pry off with a small screwdriver.



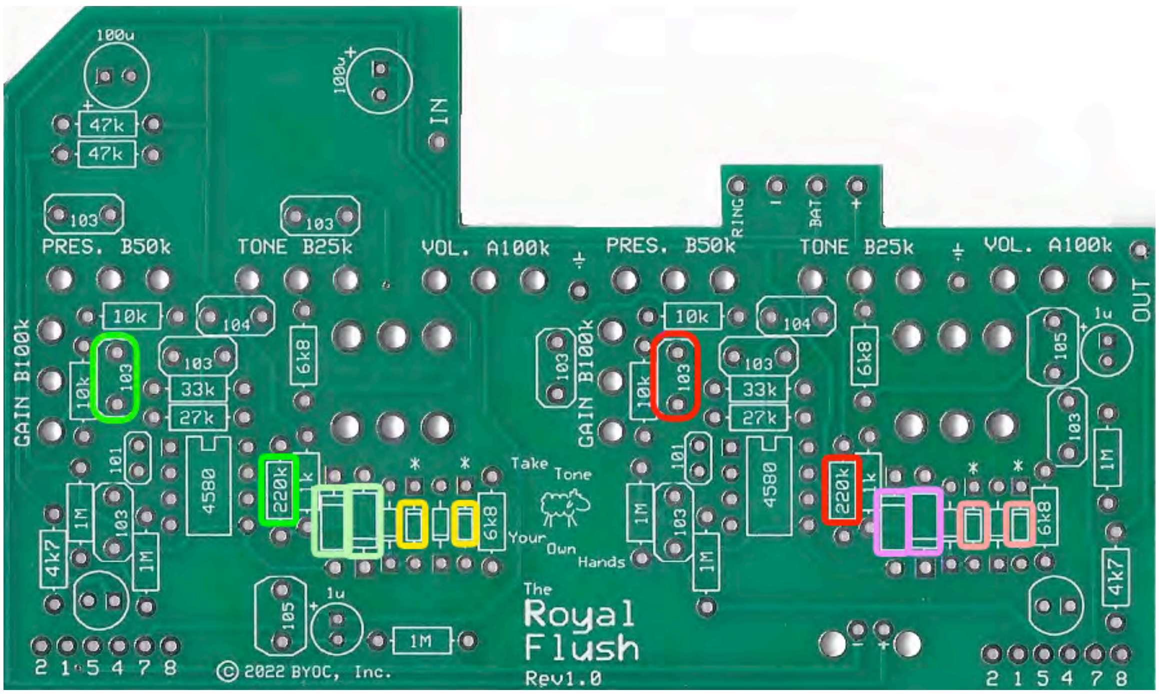


2- B25k (TONE)
2 – B50k (PRESENCE)
2 - A100k (LEVEL)
2 – B100k (DRIVE)

Hardware:
1 - drilled enclosure w/ 4 screws (optional)
1 - BYOC Royal Flush PCB
2 - 3PDT footswitch
4 – SPDT on-on toggle switch
8 - knobs (optional)
1 - AC adaptor jack (optional)
2 – ¼" jacks
2 - LED (optional)
1 - battery snap
4 - bumpers
hook-up wire

MODIFICATIONS

Before you begin building your Royal Flush kit, let's discuss some of the modifications that are possible with the parts that are included in your kit. These mods pertain to the "high gain" mod that is an option on The King of Tone. Some specifically affect the clipping (the texture of the distortion), or the bass response, or the actual gain. You can do one, none, or all of these. It's up to you. So let's go over them, and you can decide if you want to do them or not. And also keep in mind that you don't have to do any of them now. You can always go back later and swap out parts.



The first thing you should understand is that the Royal Flush is two separate (but identical) circuits, i.e., two Marshall Bluesbreaker-based overdrives in one box. If you look at the PCB, you should notice that the topography of the components on the left is very similar to the topography on the right. The two overdrives are independent of one another, but placed in series. This means that the circuit on the left side of the PCB comes first in your signal chain. The circuit on the right comes second. So this is something you'll want to consider if you're only going to modify one of the overdrive circuits. You don't have to modify both sides. You could have one "high gain" channel and one "low gain" channel. In fact, that's probably what most people would do. If you are only going to modify one side, it will probably be most practical to modify the left side (the second overdrive in the signal path) as this will most likely be the "lead" channel.

So, we will only be referencing these various mods via the colors highlighted on the second overdrive circuit (red, pink, purple), but you should easily be able to extrapolate them to the first overdrive circuit (green, mint, yellow) if you want to modify both channels.

1. **Increased Gain Mod:** Swap the 220k resistor (R17) highlighted in red with a 680k resistor. IC2b is where the actual "distortion" happens, and increasing this resistor increases the maximum gain of the operation amplifier.
2. **Increased Bass Response Mod:** Swap the 103 capacitor (C13) highlighted in red with a 104 capacitor. This mod isn't necessary to get more gain, but with more gain, also comes more treble. So this mod will help to balance that out. Also, the Marshall Bluesbreaker just naturally sounds somewhat thin as most lower gain overdrives tend to. So even if you don't do the increased gain mod, you may still want to do this mod if you want a fuller sounding overdrive.
3. **Less Compressed Soft Clipping Mod:** Swap the 1N60P diodes (D8 and D9) highlighted in pink with 1N4148 diodes. You would only want to do this mod if you are doing the increased gain mod. Otherwise, you shouldn't do this mod. As gain increases, the amount of signal that gets clipped increases as well. Swapping these diodes will increase the overall forward voltage of the clipping devices and therefore, reduce the amount of clipping. Doing this mod along with the increased gain mod will still provide you with a light, open soft clipping. If you did this mod without the increased gain mod, the overall forward voltage will be too much to really even notice the clipping at all, and therefore defeat the purpose of even having an on/off soft clipping toggle switch.
4. **Crunchy Hard Clipping Mod:** If you perform the increased gain mod and the increased bass response mod, you will essentially have turned your Marshall Bluesbreaker clone into a Marshall Guv'nor clone, but with a high-cut tone control rather than a "marshall 3-band" tone control. The last thing you need to do to make this transformation complete is swap out the 1N4001 diodes (D11 and D12) highlighted in mint with Red LEDs. The longer lead of the LED goes in the square solder pad and the shorter lead of the LED goes in the round solder pad. Again, as with the less compressed soft clipping mod, you only want to do this modification if you are also doing the increased gain mod. Without that modification, you really won't notice a difference when you turn the hard clipping toggle switch on and off.

What is clipping and what's the difference between "hard" and "soft" clipping? The most basic explanation is that clipping is the texture of your distortion. Distortion occurs at the op amp when its gain is pushed beyond the limits of its headroom. The shape of the signal wave it produces begins to transform from a nice sinusoidal (round) wave to more of a triangular wave. If you've ever done any recording, you've probably seen the "clipping" warning light that lets you know you're overloading your mic input. In general, triangular wave distortion is unpleasant…even in an overdrive pedal where we are intentionally trying to create distortion. So we use clipping devices such as diodes to shape the distortion into something that is more pleasant to the ear. A diode will clip off the peaks of the signal wave at a certain voltage level, creating a slightly more square signal wave. Different diodes have different forward voltages. Germanium diodes have a relatively very low forward voltage, whereas LEDs tend to have a relatively high forward voltage (relative to the world of 9V guitar effects). The lower the forward voltage, the more signal that is going to get clipped. The more signal that is clipped, the more square-wave the signal becomes. The more square the signal wave becomes, the more "fuzzy" and "compressed" the sound and texture of the distortion becomes. This is why Germanium diodes are often (but not always) associated with fuzzy distortions and LEDs are often associated with crunchy distortions.

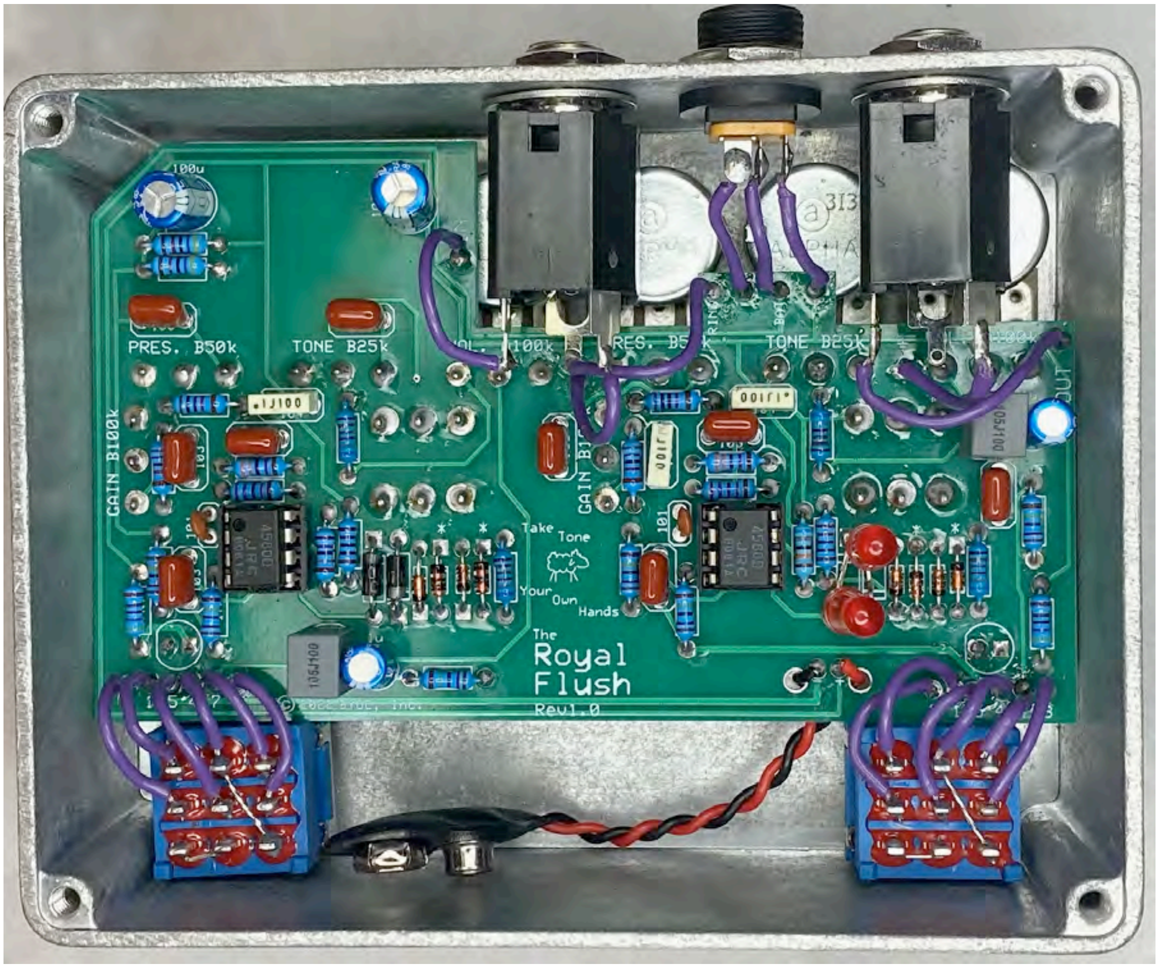
So know that you understand what clipping is, let's discuss hard clipping vs. soft clipping. Hard vs. soft is less about the sound and texture and more about where the clipping diodes are placed in the circuit. Soft clipping occurs inside the negative feedback loop of the op amp where the actual distortion occurs. We won't get into op amp gain structuress, but just understand that because the diodes are inside the negative feedback loop, this reduces the overall gain of the op amp. So this is why you will usually find "soft clipping" in lower gain overdrive circuits such as the Marshall Bluesbreaker and the Tubescreamer. Hard clipping occurs at the output of the op amp where the distortion occurs. Because it occurs after, it has no affect on the gain of the op amp. So this is why you will usually find hard clipping in higher gain overdrives and distortions such as the Marshall Guv'nor, Marshall Shredmaster, and ProCo RAT.

There are, of course, exceptions to this rule of soft clipping being in lower gain overdrives and hard clipping being in high gain distortions. The Klon Centaur for example uses Germanium diodes in a hard clipping configuration. So according to everything we've said so far, the Klon Centaur should be a high gain fuzzy distortion. Which it isn't, but that's due mostly to the fact that its distortion op amp simply isn't configured to produce as much gain as most "distortion" circuits. Anyhow…we're digressing. Ultimately, while hard clipping and soft clipping produce the same end result, soft clipping reduces the distortion op amp's overall gain, even if by only a small factor. And this has an effect on compression and input sensitivity. In summation, soft clipping is usually characterized as being less compressed and pick sensitive, while hard clipping is less more compressed and sustaining.

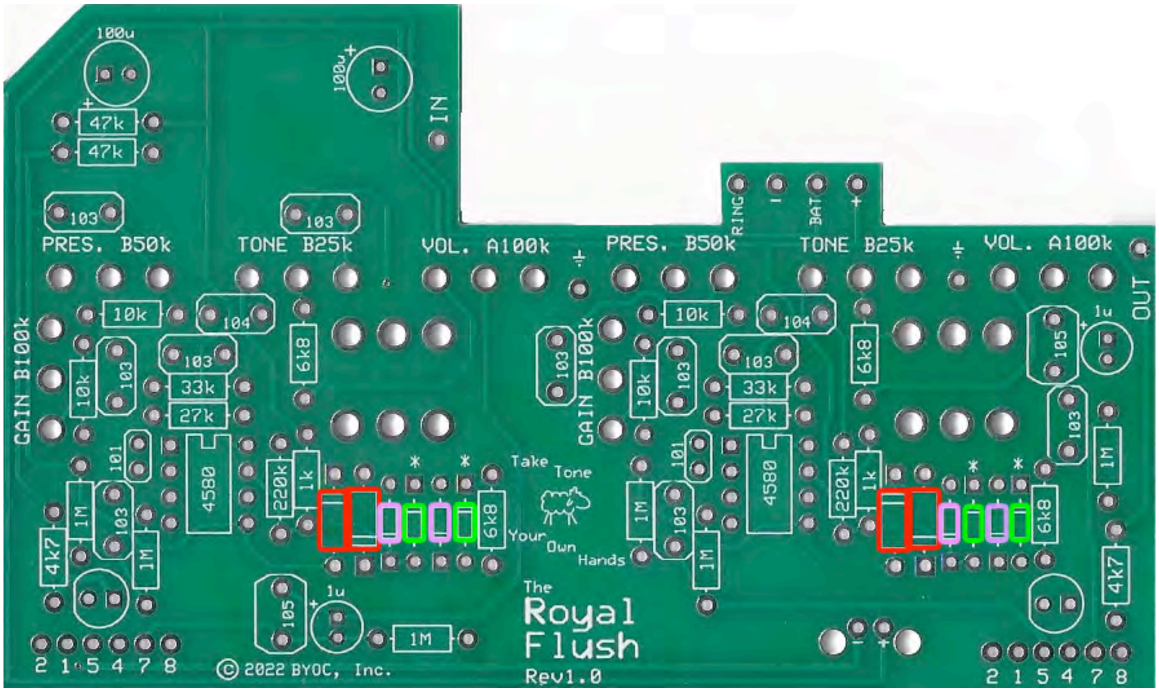
It is important to keep in mind that these differences between hard and soft, and Germanium and Silicon are frequently EXTREMELY subtle. Often times, the difference is less something you can hear and more of something you feel. And more often than not, it's a difference that only experienced guitar players are capable of appreciating. Okay. Enough pontificating. Let's start soldering!

Example of Completed Build

This is an example of the completed Royal Flush build with gain, bass, and clipping mods done to channel #2.



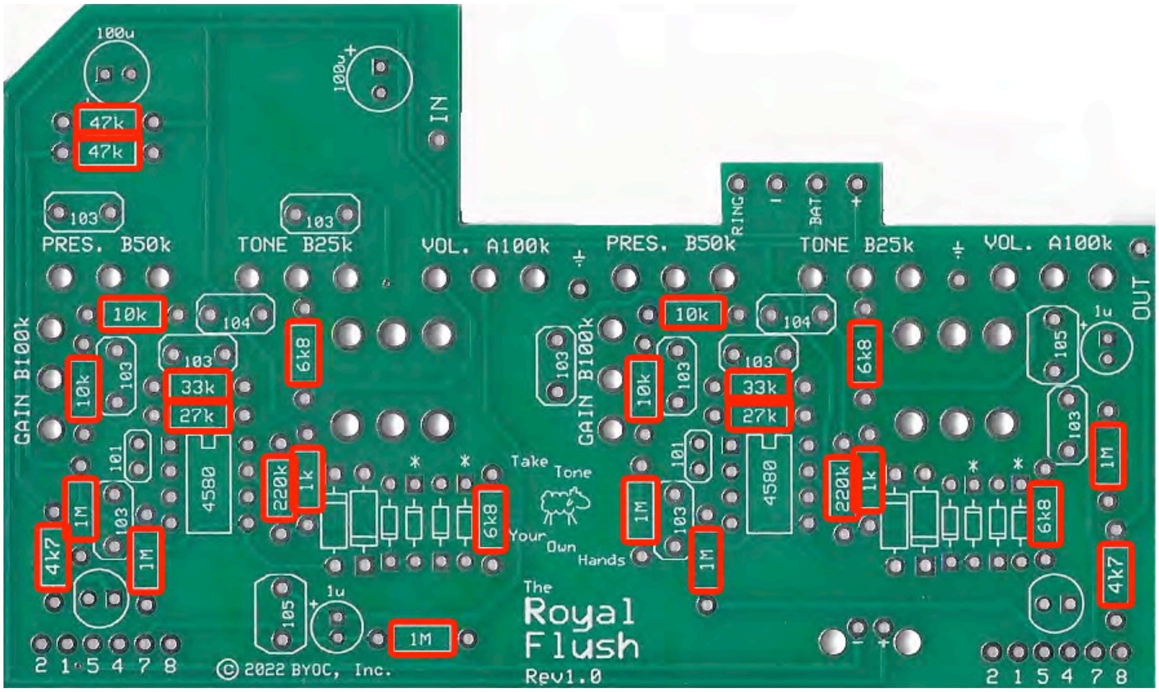
Populating the Circuit Board



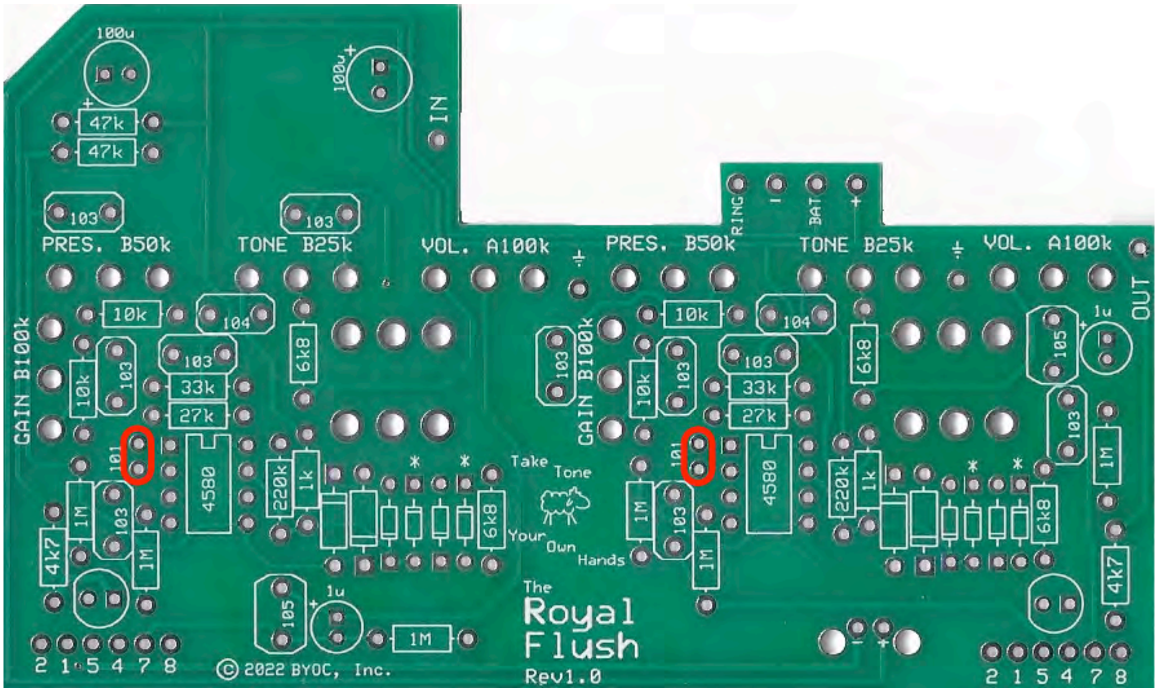
Step 1: Add the diodes. Most diodes will have a strip on one end denoting the anode end (the other end being the cathode). The striped end of the diodes go in the square solder pad. The PCB layout will also have a striped printed on the cathode end of the diode space.

Be very careful not to mix up the 1N60P and 1N4148 diodes. They will look very similar. You will likely need a magnifying glass or the zoom on your phone camera to read the markings.

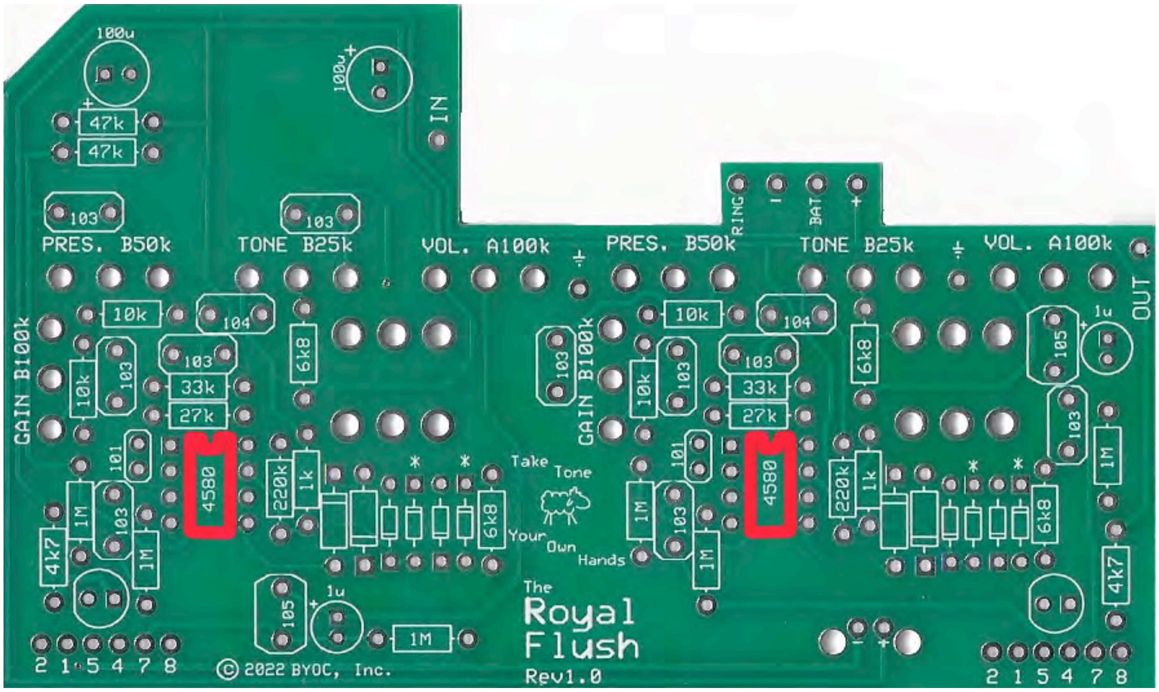
The 1N4001 go in the spaces highlighted in red. The 1N4148 go in the spaces highlighted in purple. And the 1N60P go in the spaces highlighted in green. However, if you are doing any of the clipping mods, then refer to page 7 for diode placement.



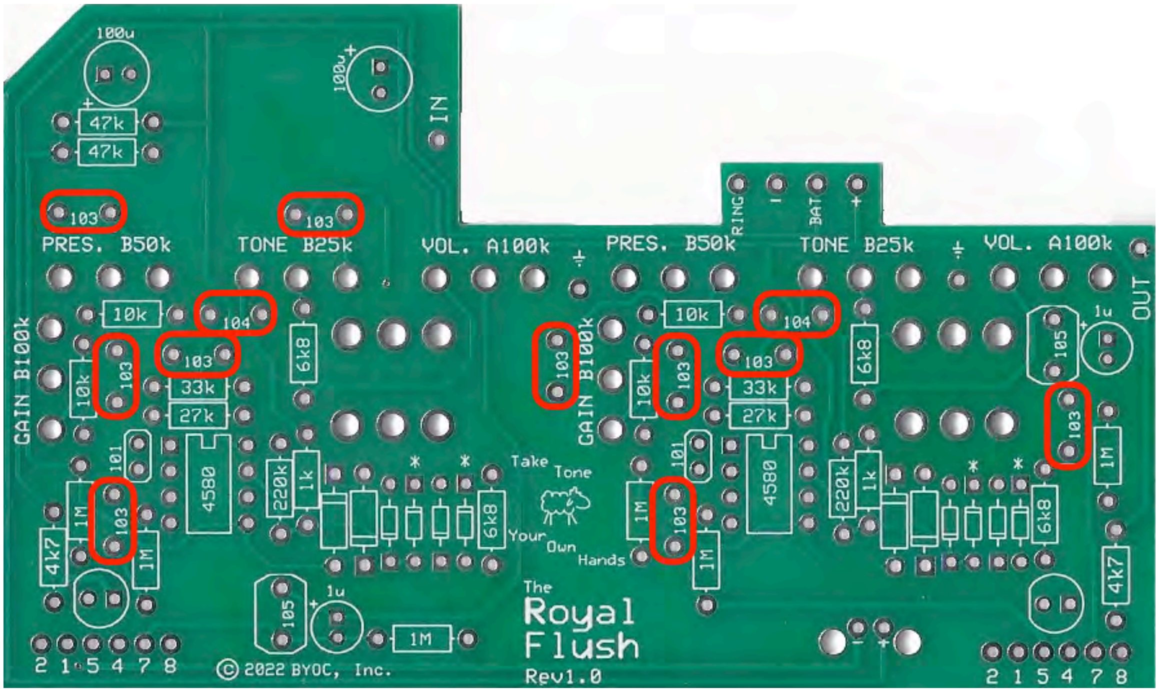
Step 2: Add the resistors. Resistors are not polarized and can be inserted into the PCB in either directions. Be careful not to mix up resistors that have similar values. For example, the 4K7 and 47k will be differentiated by either a red or brown stripe.



Step 3: Add the ceramic disc capacitors. These will be very small and disc-shaped. Most likely orange and have a marking on the side that says “101”. Ceramic disc capacitors are not polarized and can go into the PCB in either direction.

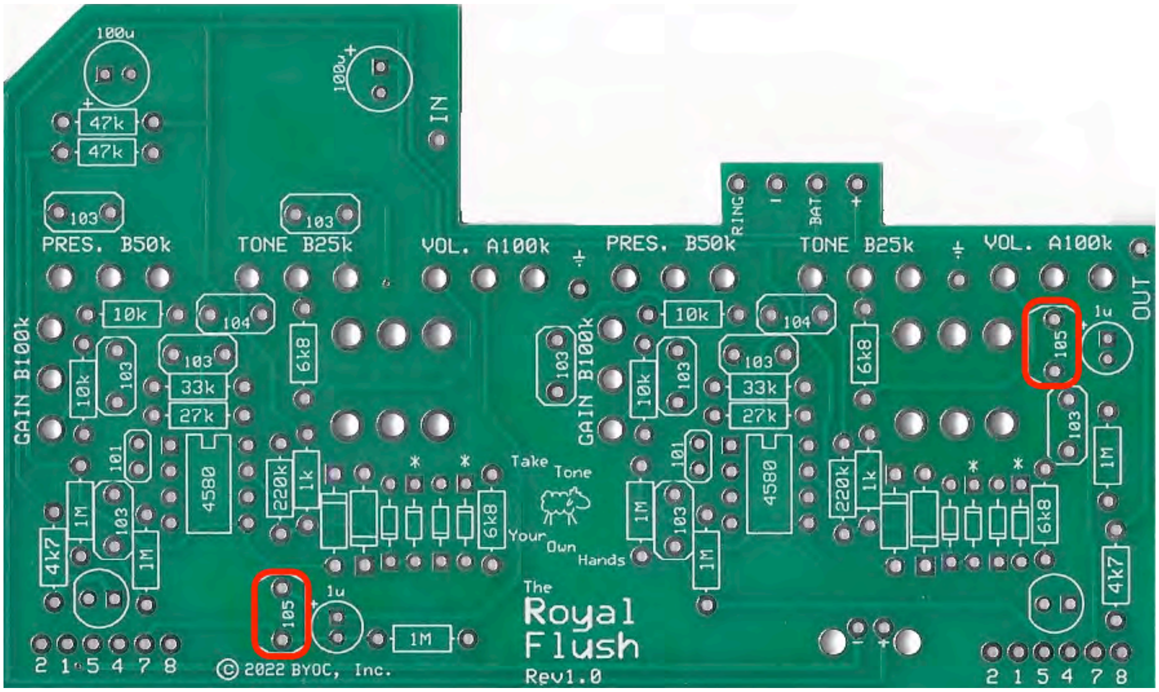


Step 4: Add the IC sockets. ONLY ADD THE SOCKETS!!!! DO NOT SOLDER THE ACTUAL CHIP TO THE PCB!!!!! You will notice a notch in one end of the socket. Orient the socket so that the notch lines up with the notch in the printed PCB space. If you accidentally put these in backward, do not attempt to desolder them. Just leave them as they are. You will just need to make sure you orient the actual IC correctly when you install it into the socket later on. We will explain how to install the ICs in the Finishing up and installing the IC section.

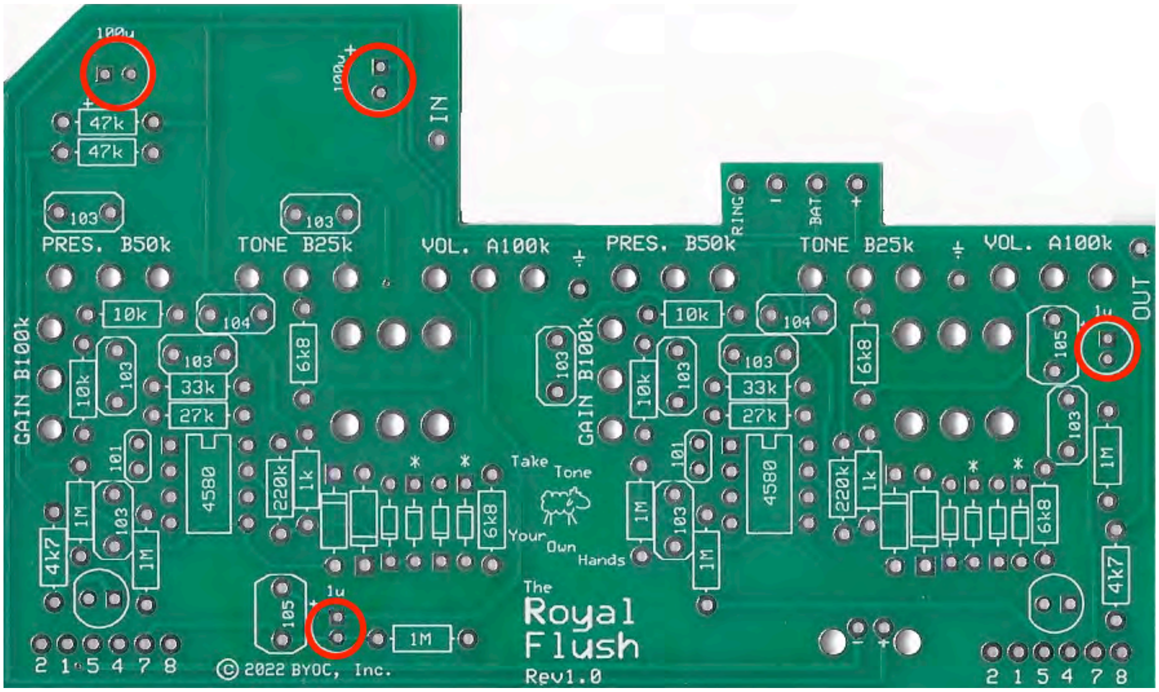


Step 5: Add the shorter film caps. We're working in order of shortest to tallest because if you put in the tallest first, all the short components would fall out when you flipped the PCB over to solder. Some of the larger value film caps at quite a bit taller, so we'll add the shorter film caps first. So here we are only adding the 103 and 104 film caps.

Film caps are not polarized and can go in the PCB in either direction. If your kit came with dipped caps, they will like have 103 or 104 printed on the side. If your kit came with box film caps, it will likely have .01 or .1 printed on the top.



Step 6: Add the taller film caps. These will have “105” or 1u printed on them. Film caps are not polarized and can go into the PCB in either direction.

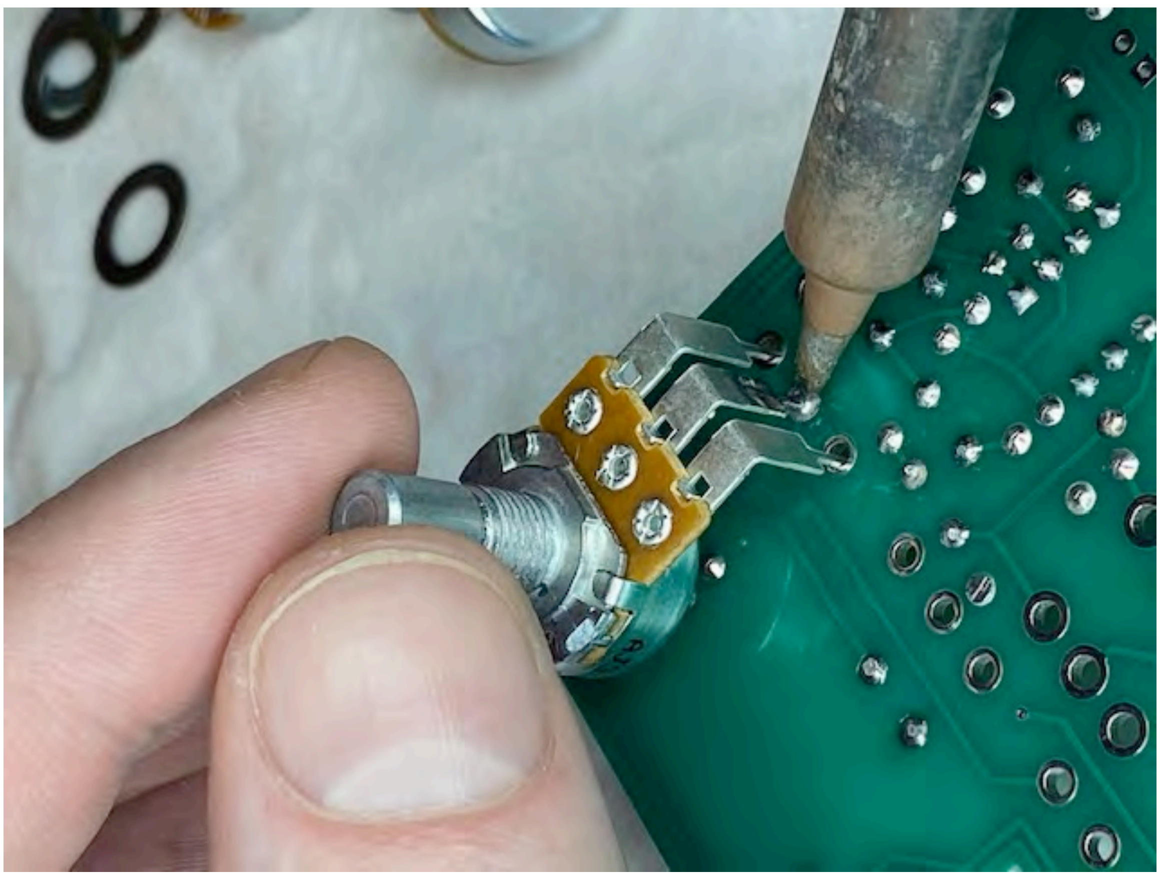


Step 7: Add the aluminum electrolytic capacitors. These are polarized and need to be oriented correctly. The positive end will have a longer lead and goes in the square solder pad. The negative end will have a shorter lead and goes in the round solder pad. Most electrolytic caps will also have a stripe running the length of its body on negative side.

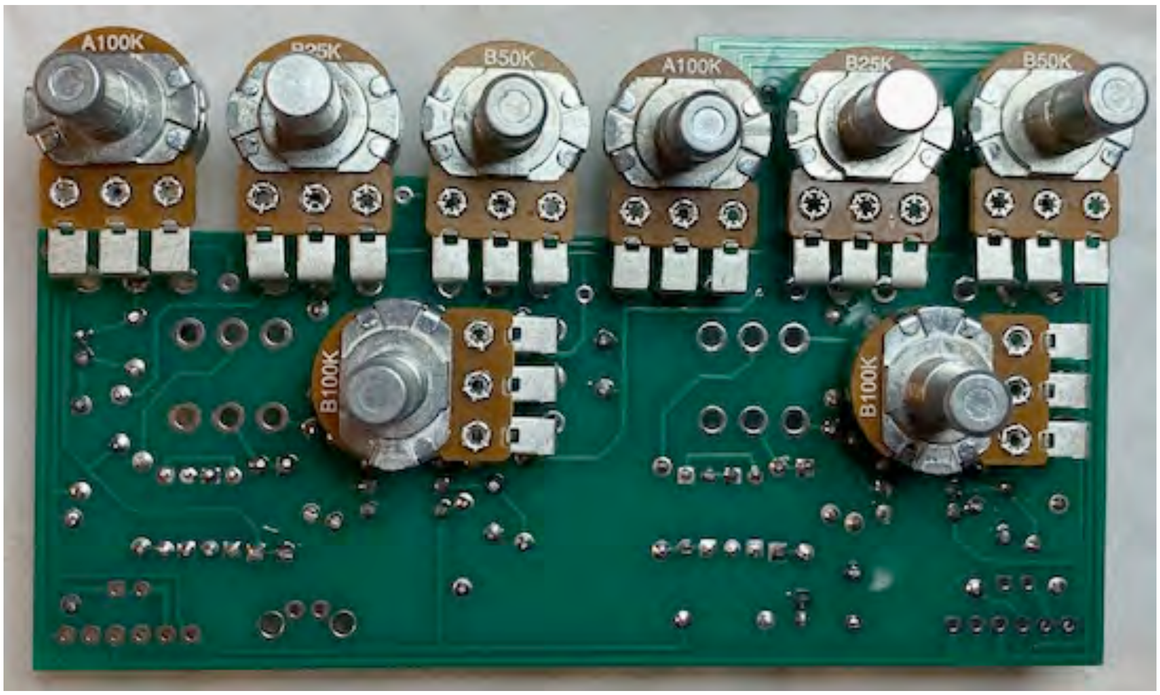
Adding the Potentiometers and Toggle switches

This part can be a little tricky. And it will require a bit of effort. Just take your time and follow the instructions.

Step1: Mounting 8 pots all at the same time can be a bit difficult, so we will only solder one leg of each pot at a time. This will allow us to bend them into position if need be. The pots go on the back of the PCB. Only solder the center leg of each pot. After you apply solder to the center leg, continue holding the soldering iron to that solder joint so that the pot can move freely. Position the pot as best you can so that its solder pins are inserted about half way into the PCB and the body of the pot is perfectly parallel (or its legs are perpendicular) to the PCB. Then remove the soldering iron and hold the pot in this position till the solder joint cools and the pot no longer moves.



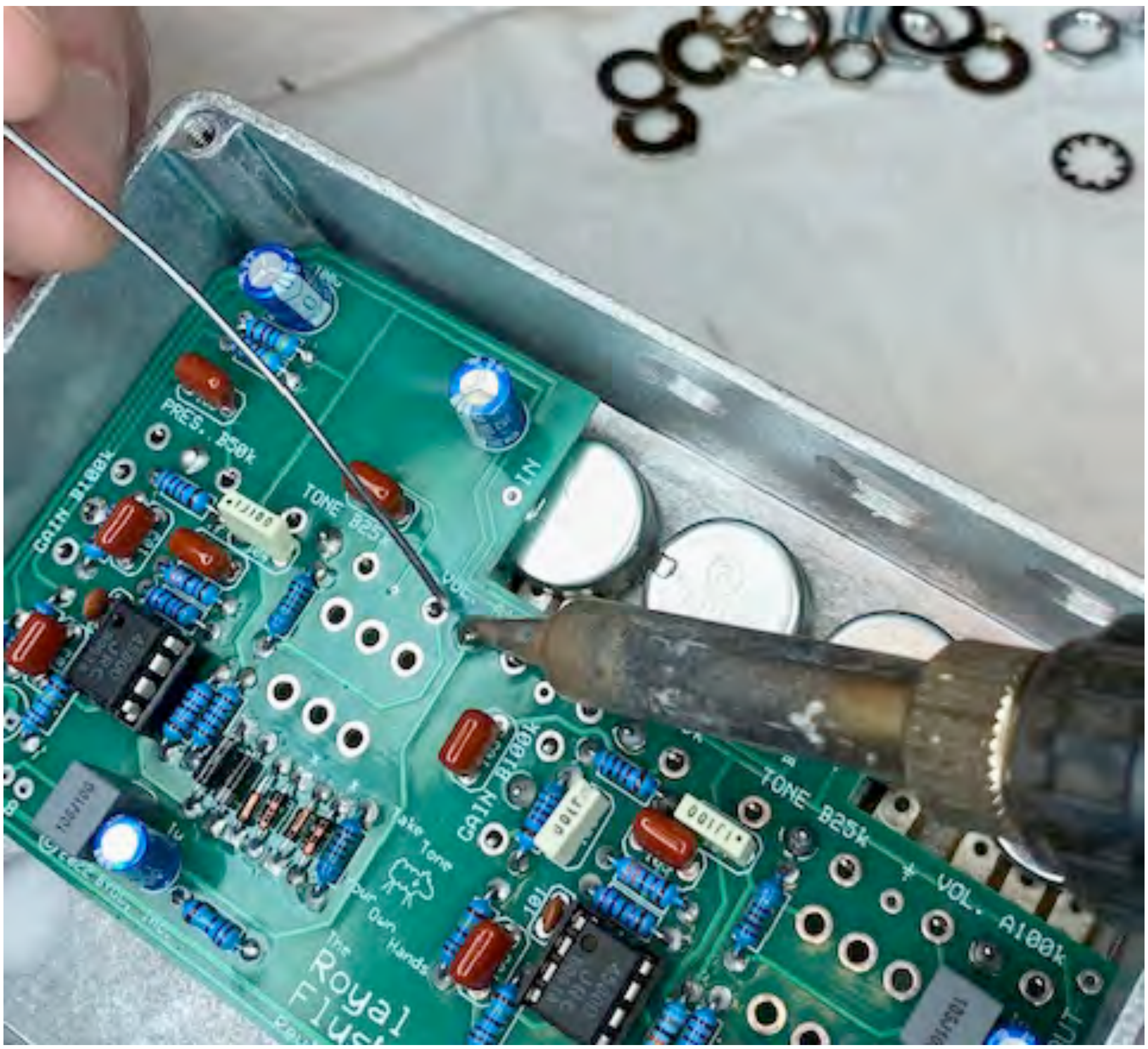
Step2: Repeat this process for all 8 pots. Be sure to pay attention to the pot values labeled on the front (and sometimes on the back) of the pot. The values of the pot spaces will be printed on the front of the PCB. Also keep in mind that the Volume, Tone, and Presence pots will be oriented vertically, while the Gain pots will be oriented horizontally. Your PCB and pots assembly should look like the picture below when you're done.



Step 3: Mount the PCB assembly to the enclosure. DO NOT OVERTIGHTEN the pot nuts. You only want to gently snug the pot nuts with your fingers. Some of the pot shafts might not be perfectly perpendicular to the enclosure and if you over tighten the nuts, you can break the pot's shaft. Keep in mind that you may need to bend some of the pots into place so that the assembly will fit into the enclosure holes. This is okay. It's perfectly fine to bend the pot legs a little. If you find that one or more of the pots are "really off", then go back and repeat step 1 for that pot.

Step 4: Reflow all of the pot solder joints. You do this by reheating the pot solder joints and adding just a very small amount of fresh solder. This will allow the pots to shift into a position that is more perfectly perpendicular to the enclosure.

You may need to repeat this step several times depending on how crooked your pots were initially. After the first reflow, go back and tighten up all the pot nuts again. If you are able to screw down all the nuts so that they are flush against the enclosure, then you do not need to repeat the process. If one or more of the nuts still do not rest flush against the enclosure after re-tightening them, repeat the reflow process till they do.



Step 5: Once you have all 8 of the pots positioned perfectly and mounted in the enclosure, and their respective nuts are tightened, finish soldering the rest of the pot legs to the PCB.

Step 6: Remove the PCB assembly from the enclosure (yes again) and insert (but do NOT solder) the toggle switches into their respective spaces on the PCB.

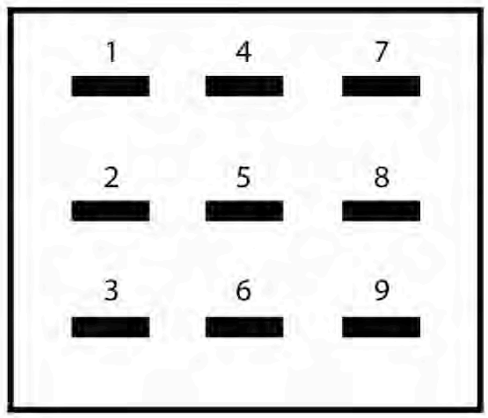
It doesn't matter which way you orient the toggle switches. There are only two ways the switches will fit in the PCB and either way is fine. You do not need any of the washers that are supplied with the toggle switches. You can discard them.

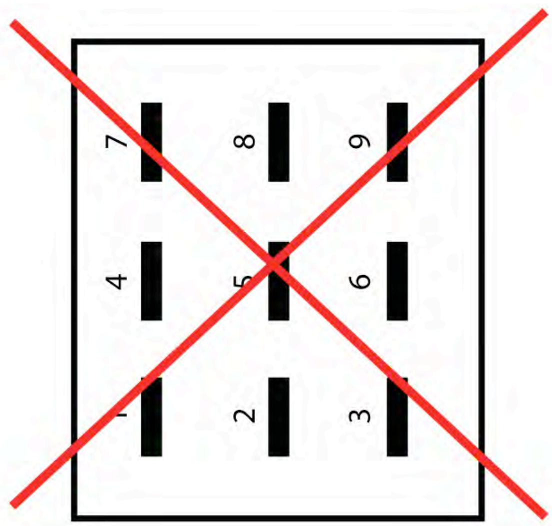
Step 7: Mount the PCB assembly back into the enclosure. It will be easier if you have the bats on the toggle switches all pointing in the same direction.   This time you only need to put nuts on the two most outer pots just to hold the PCB in place. Once the PCB assembly is secure, screw on the toggle switch nuts. Once the toggle switches are secure, solder the toggle switches to the PCB.

Step 8: Remove the PCB assembly from the enclosure. Unless you need to do some trouble shooting later, this should be the last time you have to remove the assembly from the enclosure. Now the pots and toggle switches should be mounted so that they mate perfectly with the enclosure.

Wiring (Phase 1)

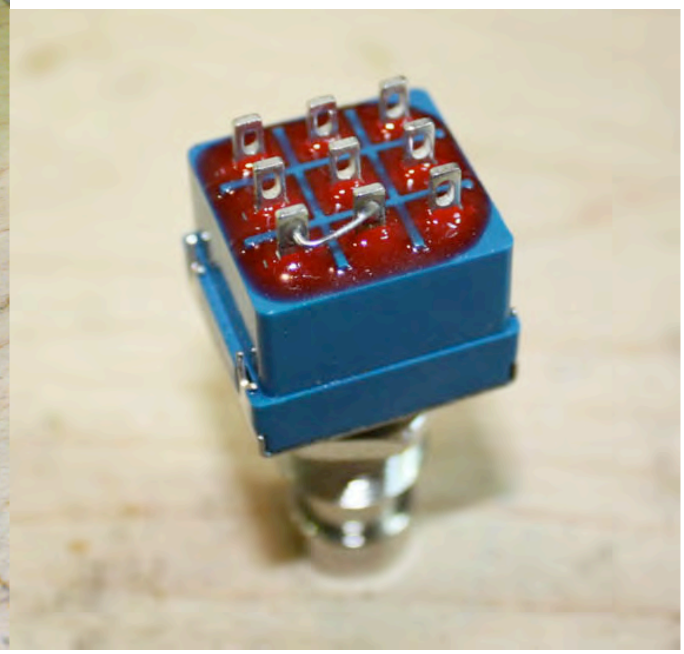
We'll begin by doing the jumper wiring on the foot switches. A "jumper" is a wire, or bus, or sometime they make specific jumper components that simply connects two points. We need to connect lugs 3 and 6 via a jumper, and lugs 4 and 9 as well.



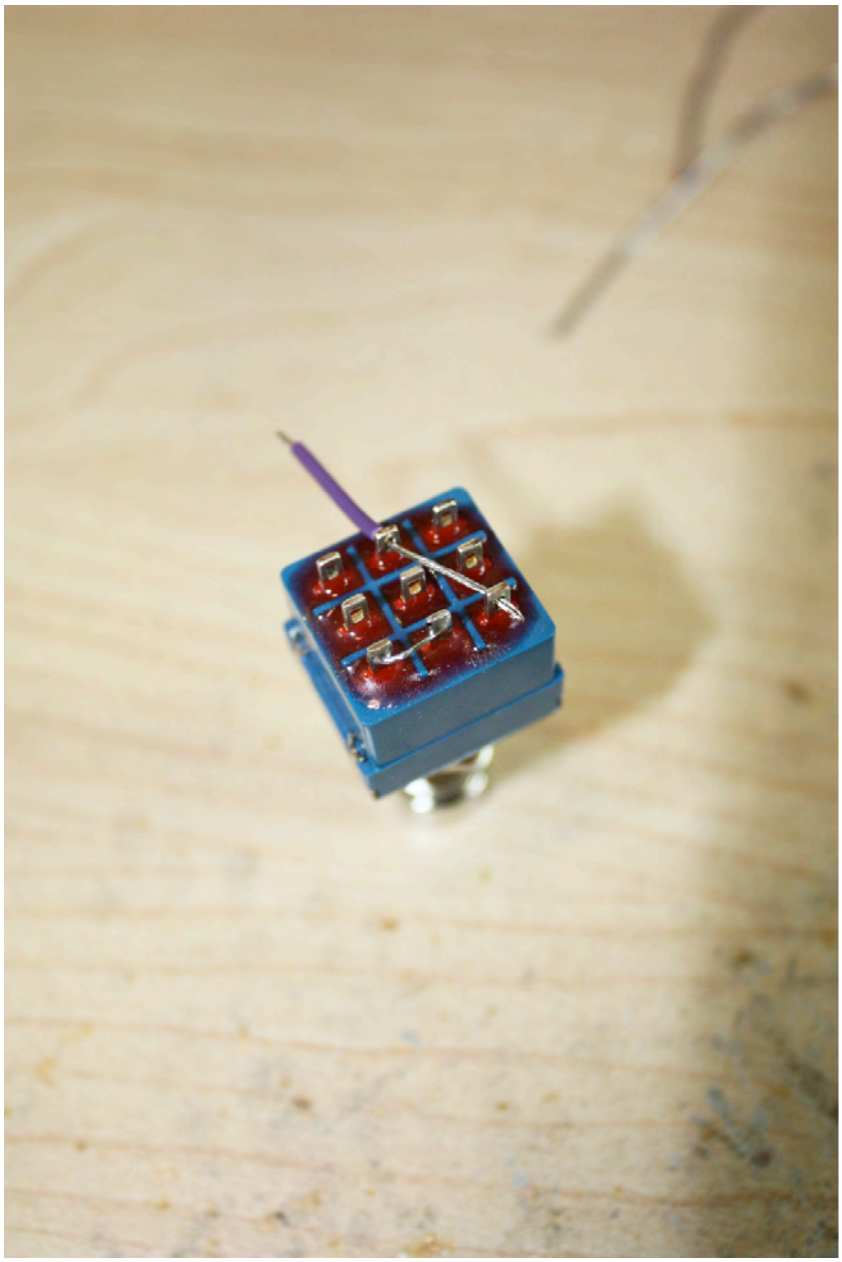


Orient your foot switch so that the solder lugs are running more "horizontal" than vertical. You spin it around 180 degrees and it is still correct. Either way is fine. Don't overthink it. Just pick one and go with it.

Step 1: 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.

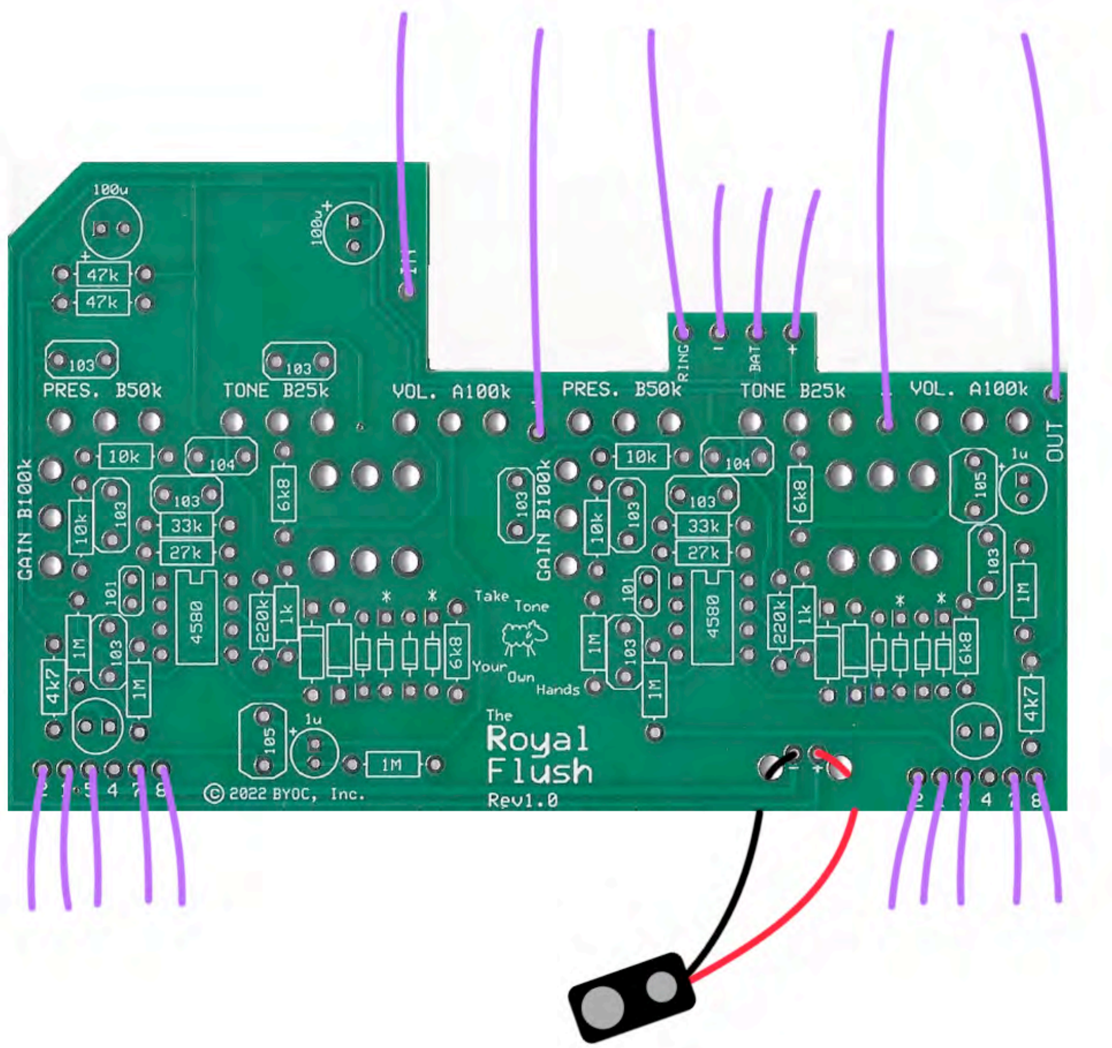


Step 2: Cut a 1.5" piece of wire. Strip 1/8" of one end. Strip 1/2" off the other end. Tin both ends. This will be used to connect lugs 4 and 9. Slide the longer end into lug 4 and pass it through till it goes into lug 9. You really need to tin the stripped wire first or this will not work. Tinning simply means applying a small amount of solder to the exposed wire. This prevents the wire from untwisting while working with it. It may also be easier to "pull" the wire through lug 4 with a pair of pliers rather than pushing it through.



Step 3: Add the battery snap. Unless you want a very long battery snap, you should cut the length in half. Strip and tin 1/8" off each end. Thread the battery snap wires in the strain relief hole first from the back side of the PCB. Then insert into their respective solder pads from the top of the PCB. The red wire goes in the "+" eyelet and the black wire goes in the "-" eyelet.

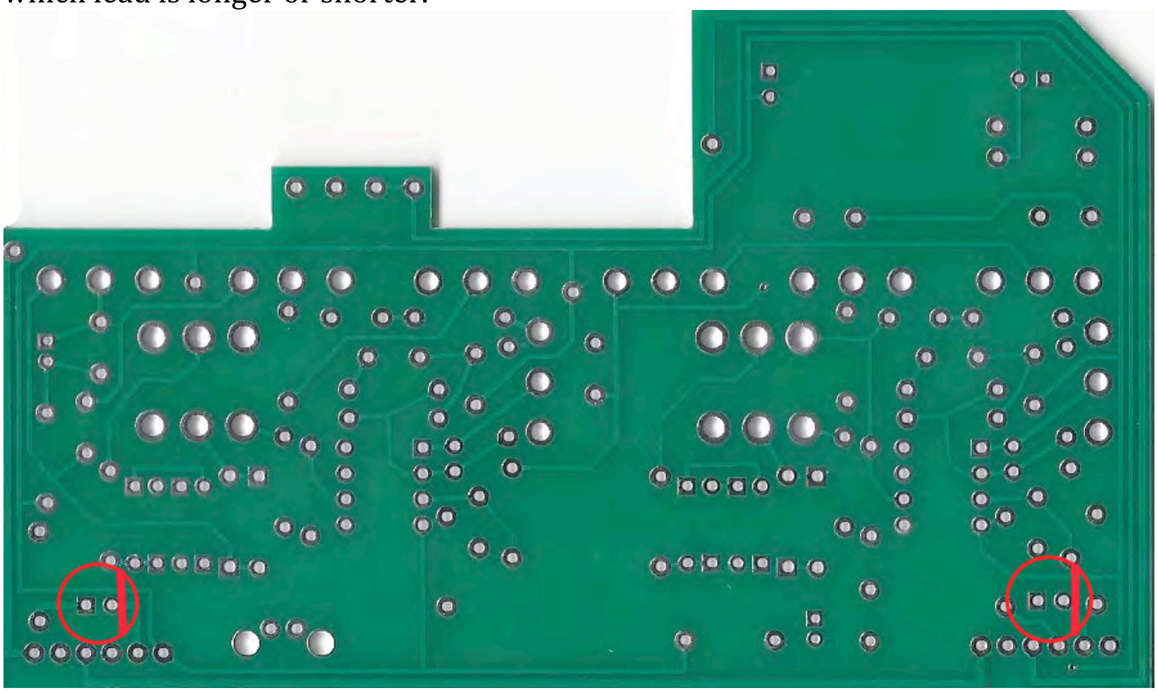
Step 4: Add the rest of the off board wiring. Strip and tin 1/8" from one end of each wire. The IN, OUT, RING and Ground wires should all be about 2.5" long. The rest of the wires only need to be about 1.5" long. The wire lengths do not need to be precise because you will be trimming them more precisely later.

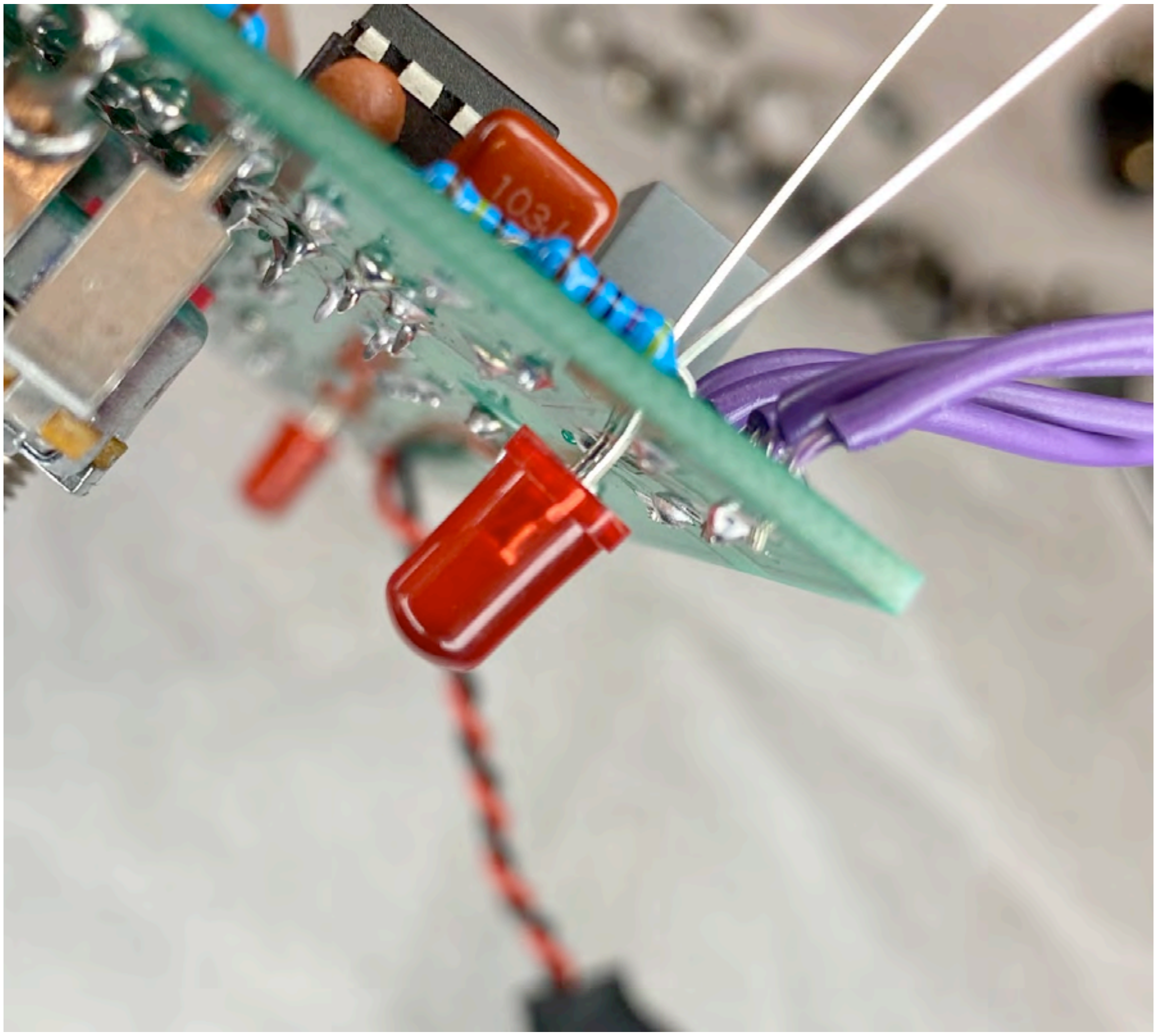


Adding the Status LEDs and Mounting PCB Assembly

Step 1: Insert the status LEDs into the PCB, but **do not solder yet**. Note that there is a space printed on the top side of the PCB, but **the status LEDs go in the back side of the PCB.**

LEDs are polarized and need to be oriented correctly. The longer lead needs to go into the square solder pad hole. The shorter lead goes in the round solder pad hole. The body of the LED also has a flat side. The flat side is always oriented towards the round hole. This is good to know in case you clip the leads and can no longer tell which lead is longer or shorter.





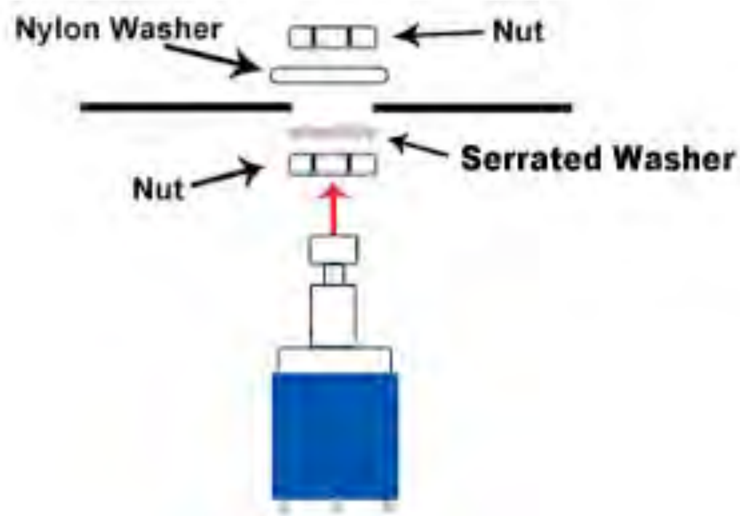
Push the LED all the way into the PCB and bend the leads so that it won't fall out when you flip it over.

Step 2: Mount the PCB assembly into the enclosure. This should be the last time you need to do this, so go ahead an put all the nuts on all the pots and toggle switches.

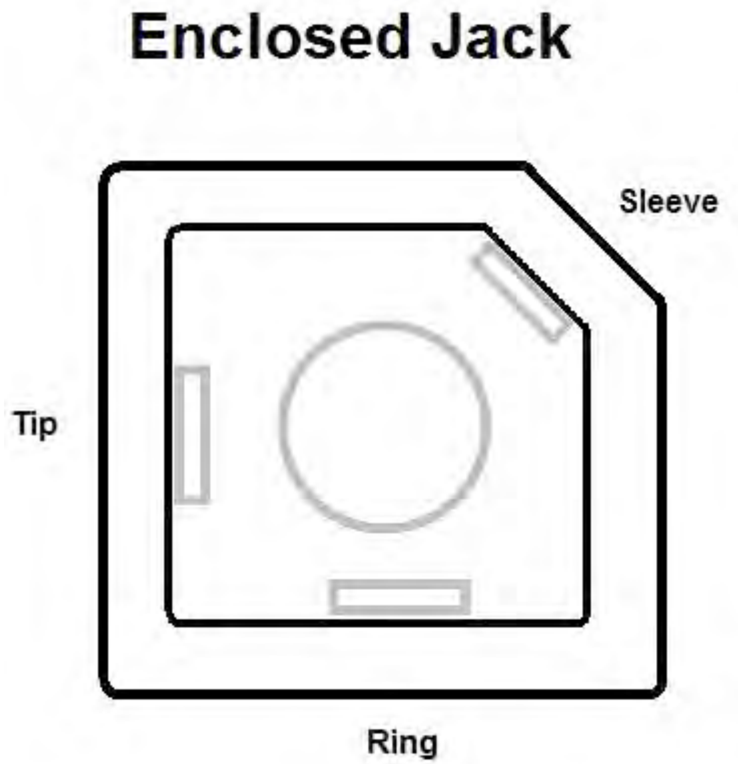
Step 3: Position the status LEDs into there respective enclosure holes. You do this by grabbing the leads that are sticking out of the top of the enclosure.

Step 4: Once you have the LEDs positioned in their holes, solder them and clip the excess leads.

Mounting Hardware



Step 1: Mount the foot switches in the enclosure. Orient them so that lugs 1, 4, and 7 are closest to the PCB. Make sure the serrated lock washer is on the inside of the enclosure and the nylon washer is on the outside.

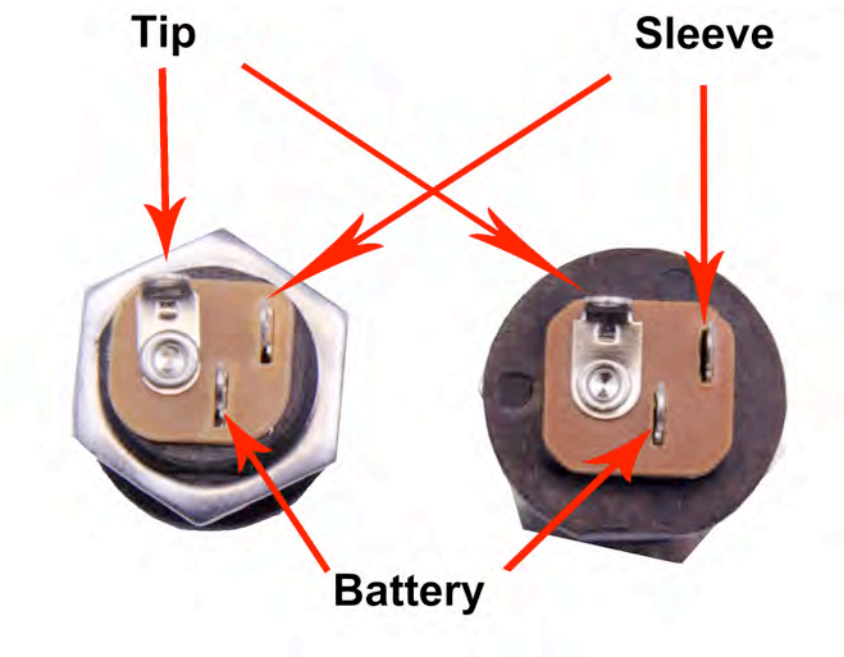


Step 2: Mount the ¼" Enclosed jacks in the enclosure. Orient the jacks so that the RING is closest to the PCB. The internal tooth lock washer goes on the inside of the enclosure. The flat washer goes on the outside of the enclosure.

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.

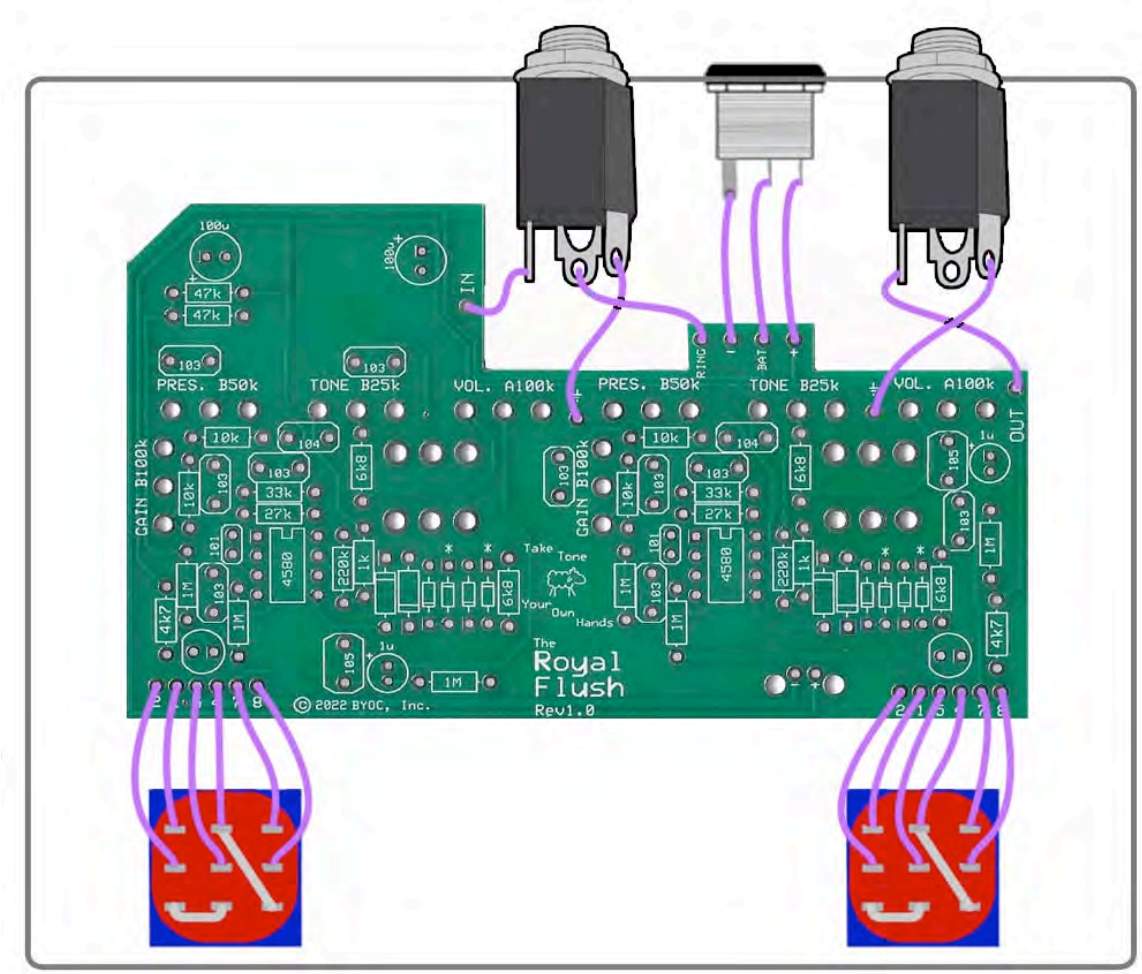
You might be asking, "Why use a stereo jack for the output?" In the case of enclosed jacks, it's cheaper to just buy all stereo jacks and simply not use the ring terminal. This isn't the case with open frame jacks, so in the kits where we use open frame jacks, we will use a mono jack for the output jack.



Step 3: Mount the DC adapter jack in the enclosure. Whether your kit came with an internal nut jack or external jack depends on which option you selected when you purchased your kit. If you have an internal nut jack, mount the jack on the outside of the enclosure and screw the nut on from the inside. If you have an external nut jack, mount the jack from the inside of the enclosure and screw the nut on from the outside of the enclosure. The difference between the two is purely aesthetic. The solder terminals will be exactly the same for both.

The battery terminal of the DC adapter jack will connect to the eyelet on the PCB labeled "BAT". The tip will connect to the eyelet labeled "-". And the sleeve will connect to the eyelet labeled "+". As with the numbering on the foot switch lugs, the polarity of the tip and the sleeve are somewhat arbitrary. What they are designated as simply depends on how you wire them. The standard guitar effects power adapter has a negative tip, so were are wiring the DC adapter jack with a negative tip.

Wiring (Phase 2)



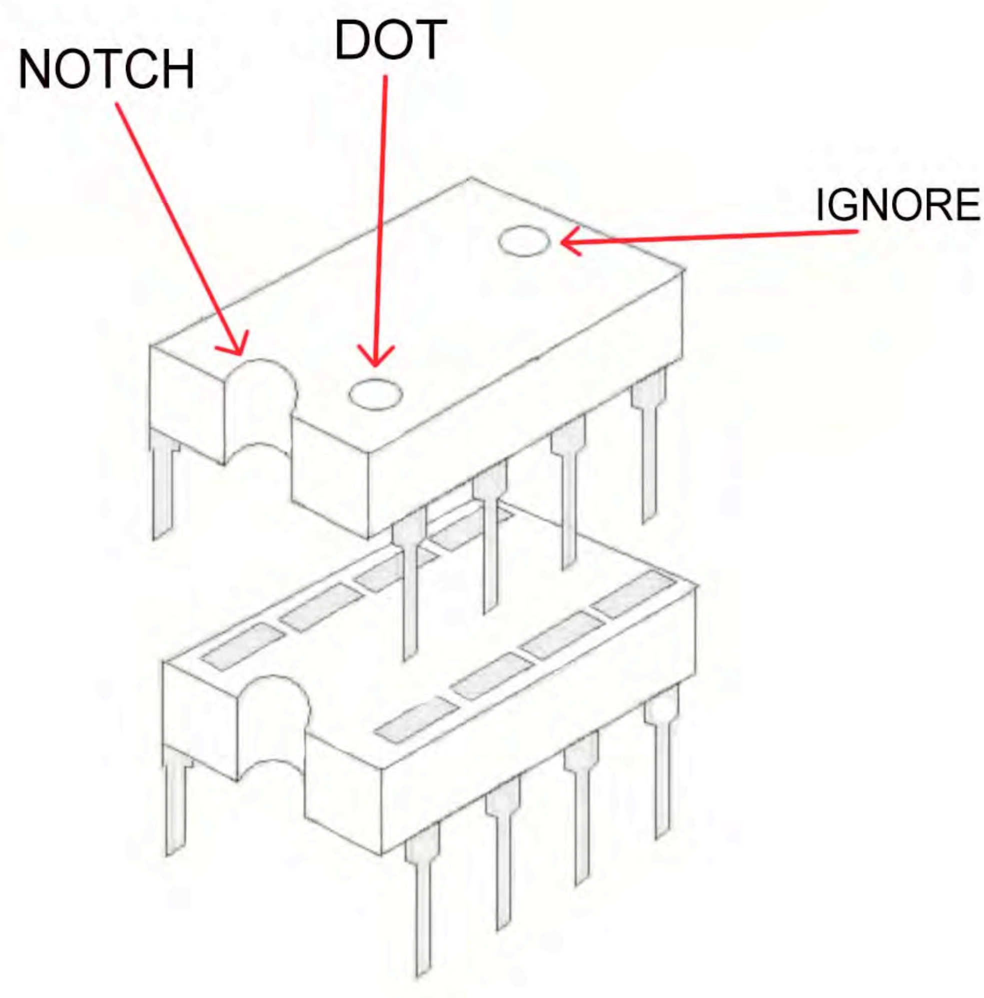
Connect and solder all the wires. None of your wires have been trimmed to length, so carefully measure out how long each wire will need to be to make its connection and then trim it. Be sure to leave enough extra length for the stripped part of the wire that will be inserted into the PCB or its respective component. Strip about a ¼" off the wires connecting to the ¼" jacks. You will only need to strip about 1/8" for all the other wires.

That's pretty much it! All the soldering is done.

Finishing Up and Installing the ICs

Step 1: Insert the ICs into their sockets. It is extremely important that you orient them correctly. Most ICs will have a dot in one corner. This indicates pin # 1. Orient the IC so that the dot is pointing in the same direction as the notch on the socket (and the printed layout on the PCB). Sometimes an IC will have an actual notch in one end of its body. This isn't as common as the dot in the corner. If your IC has a notch on one end, orient the IC so that the notch matches the notch in the socket. Sometimes there will be a second dot on one end. This is a remnant of the injection molding manufacturing process. If your IC has this second dot, just ignore it.

If you accidentally put your IC socket in backwards, that's okay. Do not try to desolder and correct this mistake. Just make sure that you orient your IC according to the layout printed on the PCB, or in other words, insert the IC backwards into the socket.



Step 2: Put the knobs on the potentiometer shafts. You will need a very small flat head screw driver for this.

Step 3: If you are going to use a 9V battery to power your pedal, install it now.

Step 4: Screw the lid on the enclosure.

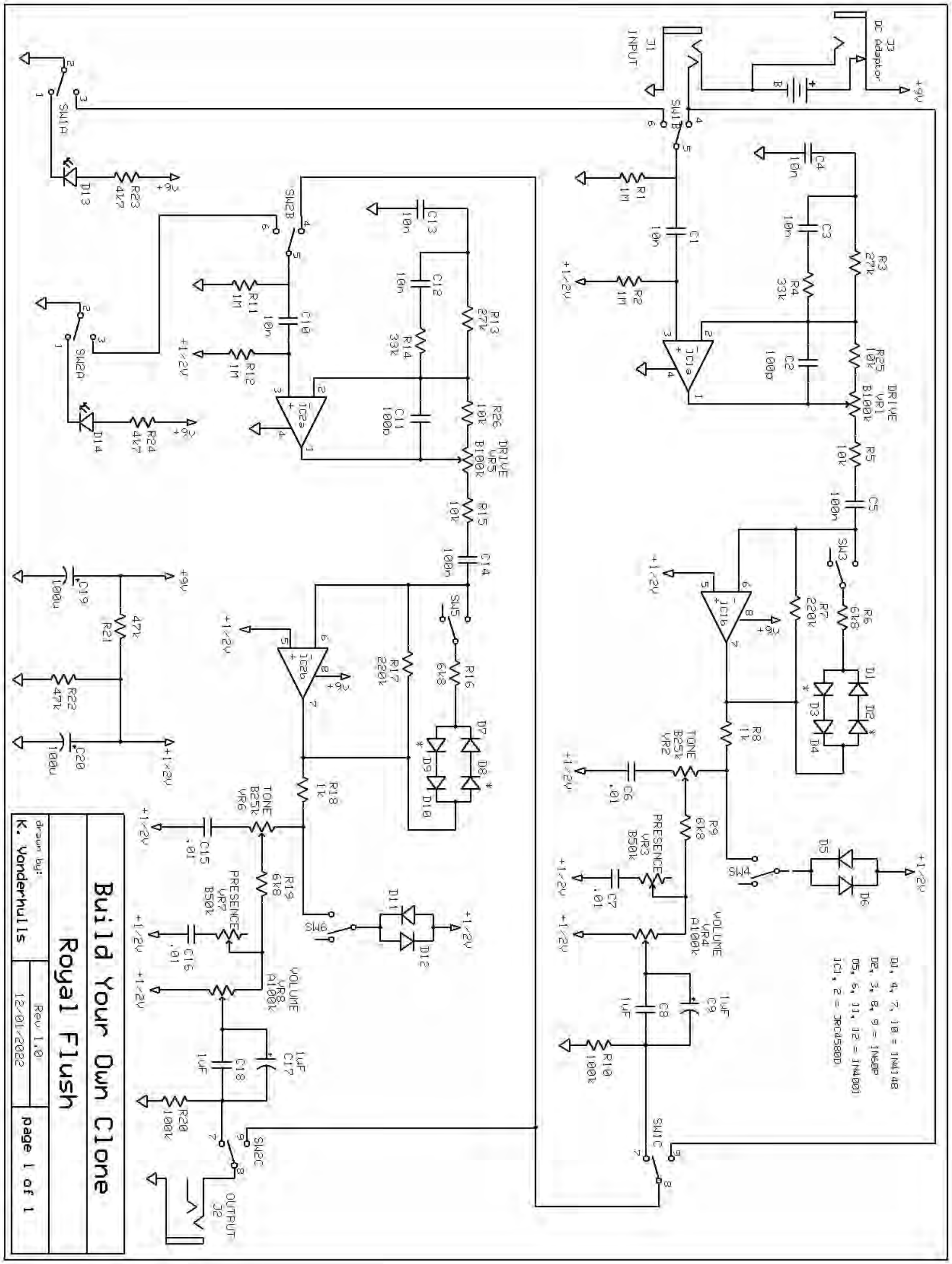
Step 5: Apply the 4 x self-adhesive feet (bumpers) to the lid. Place one bumper in each corner.

Operating Overview

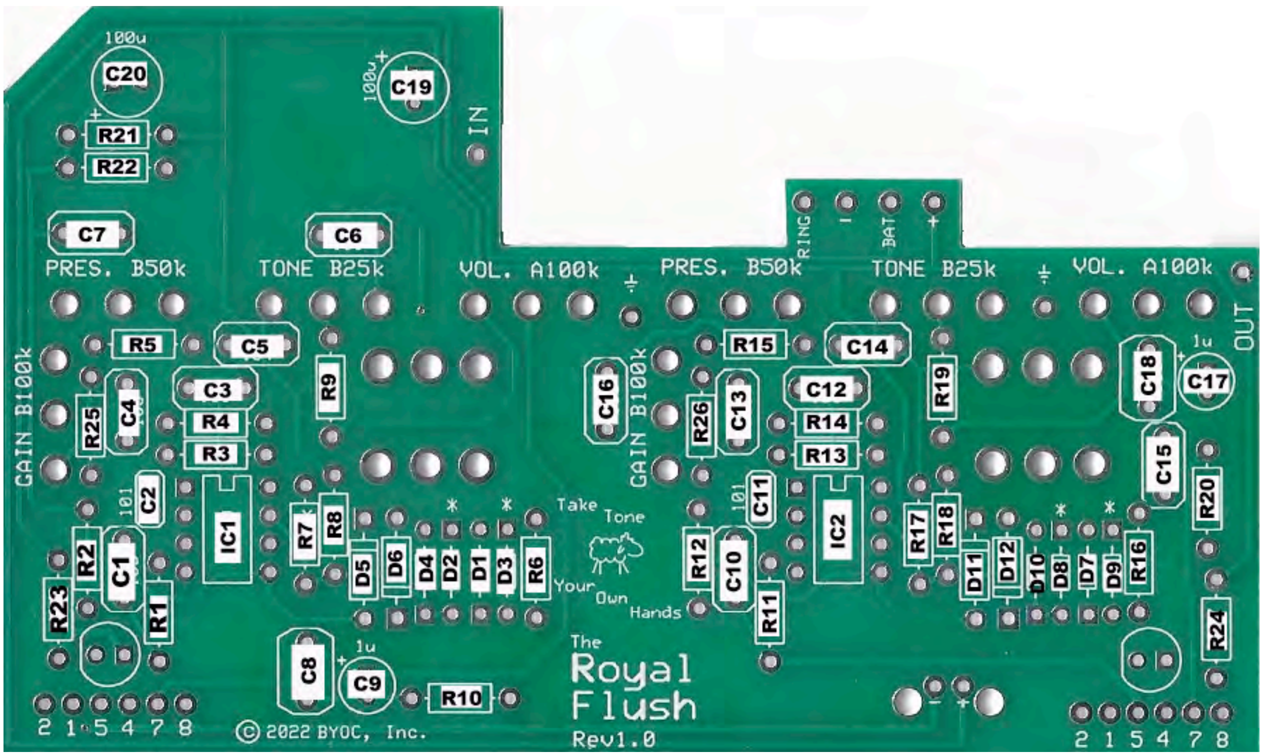
Input impedance: 1M ohm
Output impedance: 1M ohm
Current Draw: < 50mA
DC input: 2.1mm NEGATIVE tip 9 ~ 18VDC. You can use any voltage between 9 and 18. Higher voltage will provide higher headroom and output, i.e., more clean boost
#1 and #2 Foot switches: Turns on or bypass each respective overdrive channel
Soft 1 and Soft 2: Turns soft clipping on or off
Hard 1 and Hard 2: Turns hard clipping on or off.

We really hope you don't need an explanation of what the knobs do.

Schematic



PCB Map



PRES. B50k
TONE B25k
VOL. A100k
GAIN B100k
IN
OUT
RING
BAT
Take Tone Your Own Hands
The Royal Flush
Rev1.0
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