Build Your Own Clone
Stereo Analog Flanger
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 majors 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 customers responsiblity. This responsibility not only includes the cost of shipping, but accountability of deliver as well. Please contact sales@buildyourownclone.com to receieve a return authorization before mailing.

Tech Support:

BYOC, LLC makes no promises or guarantees that you will sucessfully complete your kit in a satisfactory mannor. 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 discription 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.

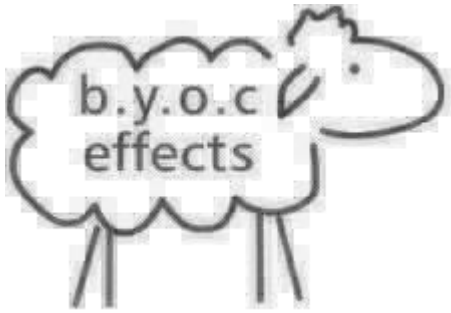
Revision Notes:

Rev 1.0: The first 200 Rev1.0 units will say "BETA" on the PCB, but it is not a beta PCB.

Rev 1.0A: There is a resistor space labelled 47k that should be a 1k. The PCB will say "Rev1.0". The Rev1.0A can be differentiated from the Rev1.0 by the word "BETA" printed on the Rev1.0. The word "BETA" is located right next to the 1N4001 diode near the offboard wiring eyelets for the DC power adaptor jack. If the word "BETA" is not printed on the PCB, then it is from the second run of Rev1.0 PCBs with the incorrectly labelled resistor space.

REV1.1: Current. No known errors.

Copyrights:

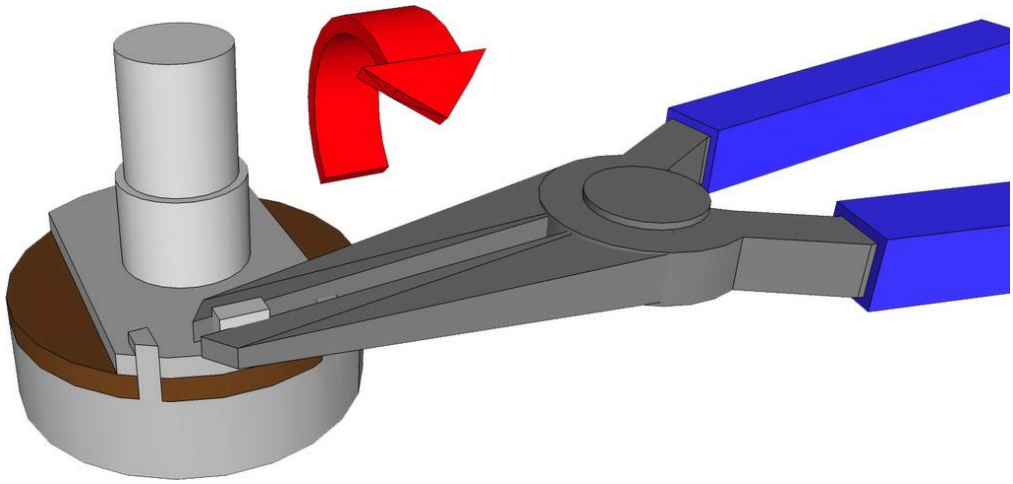


STEREO ANALOG FLANGER
KIT
INSTRUCTION INDEX

Parts Checklist for BYOC Stereo Analog Flanger

Resistors:
1 - 22ohm (red/red/black/gold/brown)
7 - 1k (brown/black/black/brown/brown)
1 - 2k2 (red/red/black/brown/brown)
5 - 4k7 (yellow/purple/black/brown/brown)
18 - 10k (brown/black/black/red/brown)
3 - 22k (red/red/black/red/brown)
1 - 27k (red/purple/black/red/brown)
3 - 33k (orange/orange/black/red/brown)
2 - 56k (green/blue/black/red/brown)
1 - 68k (blue/gray/black/red/brown)
6 - 100k (brown/black/black/orange/brown)
1 - 150k (brown/green/black/orange/brown)
2 - 220k (red/red/black/orange/brown)
3 - 330k (orange/orange/black/orange/brown)
4 - 470k (yellow/purple/black/orange/brown)
Capacitors:
1 - 4.7pf ceramic disc (4.7)
1 - 47pf ceramic disc (47 or may say 470)
2 - 100pf ceramic disc (101)
1 - 470pf ceramic disc (471)
1 - .001µ/1.0n film (102)
1 - .0022µ/2.2n film (222)
2 - .0033µ/3.3n film (332)
1 - .0047µ/4.7n film (472)
2 - .01µ/10n film (103)
3 - 0.033µ/33n film (333)
4 - 0.1µ/100n film (104)
4 - 1µ aluminum electrolytic
5 - 10µ aluminum electrolytic
2 - 22µ aluminum electrolytic
1 - 100µ aluminum electrolytic
1 - 220µ aluminum electrolytic
Diodes:
4 - 1N914 or 1N4148 (small orange glass with black stripe)
1 - 1N4001 (larger black plastic with silver stripe)
Trimpots:
1 - 100k (104)

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



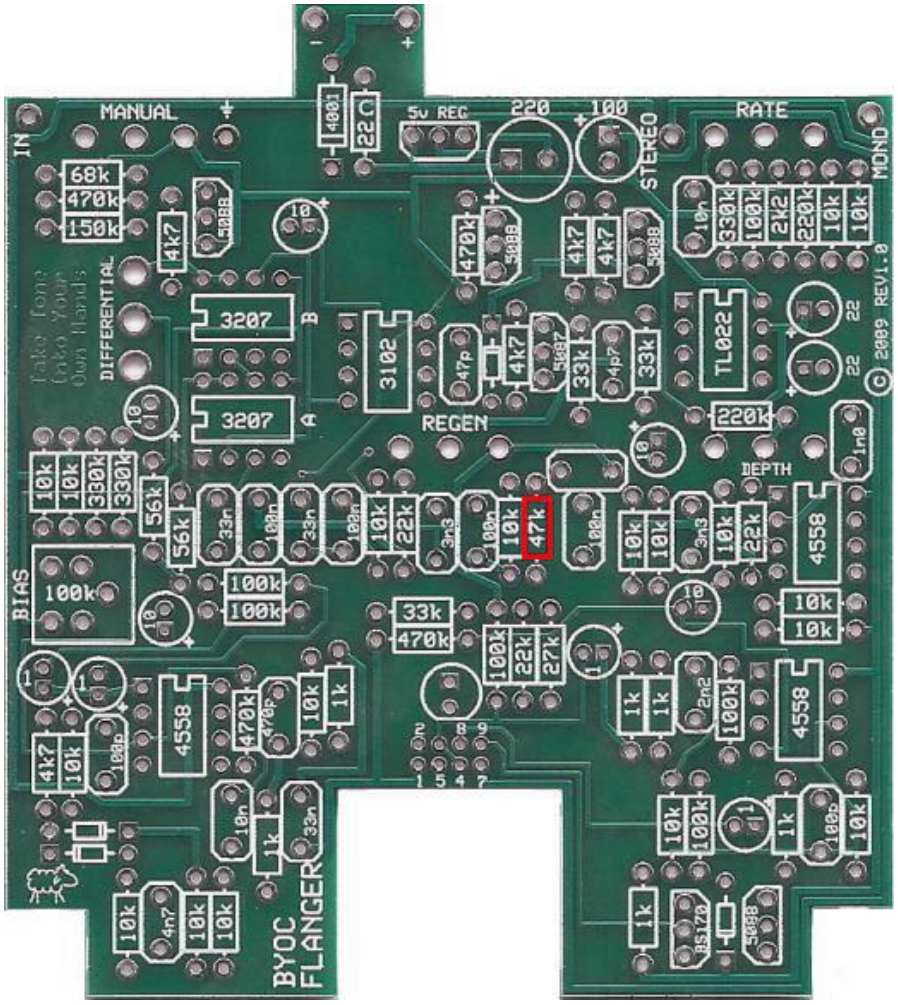
3 - B50k linear (depth, regeneration, & manual knobs)
1 - C500k linear (rate knob)

IC's:
1 - 78L05 5V regulator (looks like a transistor)
3 - 4558
1 - 3102
2 - 3207
1 - TL022
7 - DIP 8 socket

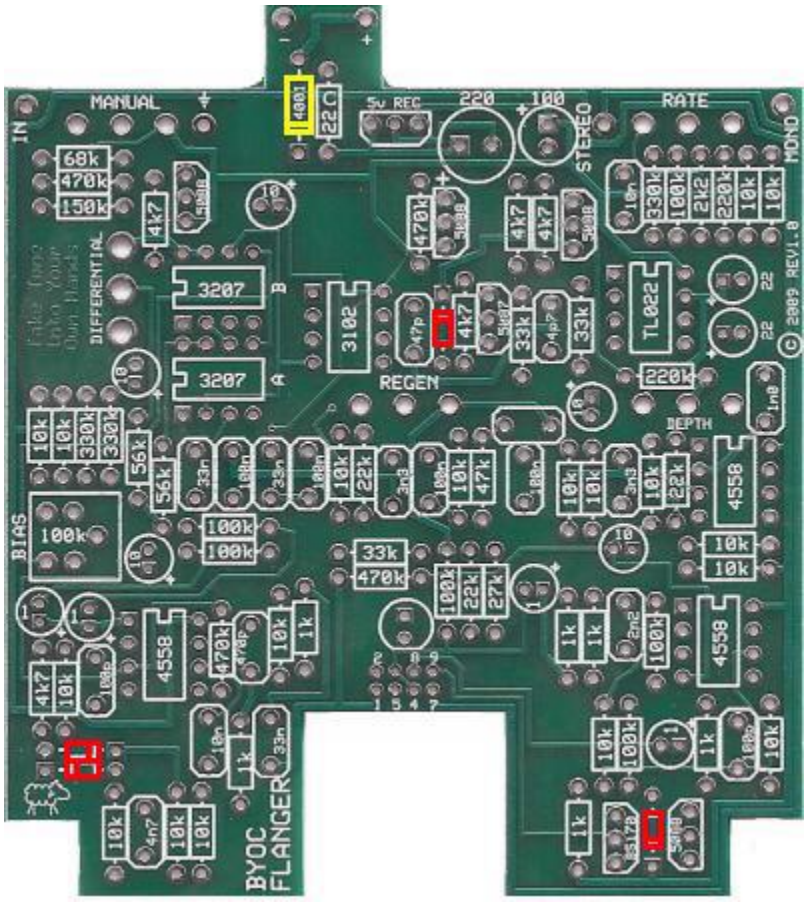
Transistors:
4 - 2N5088
1 - 2N5087
1 - BS170

Hardware:
1 - drilled enclosure w/ 4 screws
1 - byoc Stereo Analog Flanger PCB
1 - Stereo Footswitch PCB
1 - 2 x 4 pin header
1 - 2 x 4 pin header socket
1 - 3PDT footswitch
1 - SPDT on-on toggle switch
4 - knobs
1 - AC adaptor jack
2 - ¼”mono jack
1 - ¼”stereo jack
1 - red LED
hook-up wire

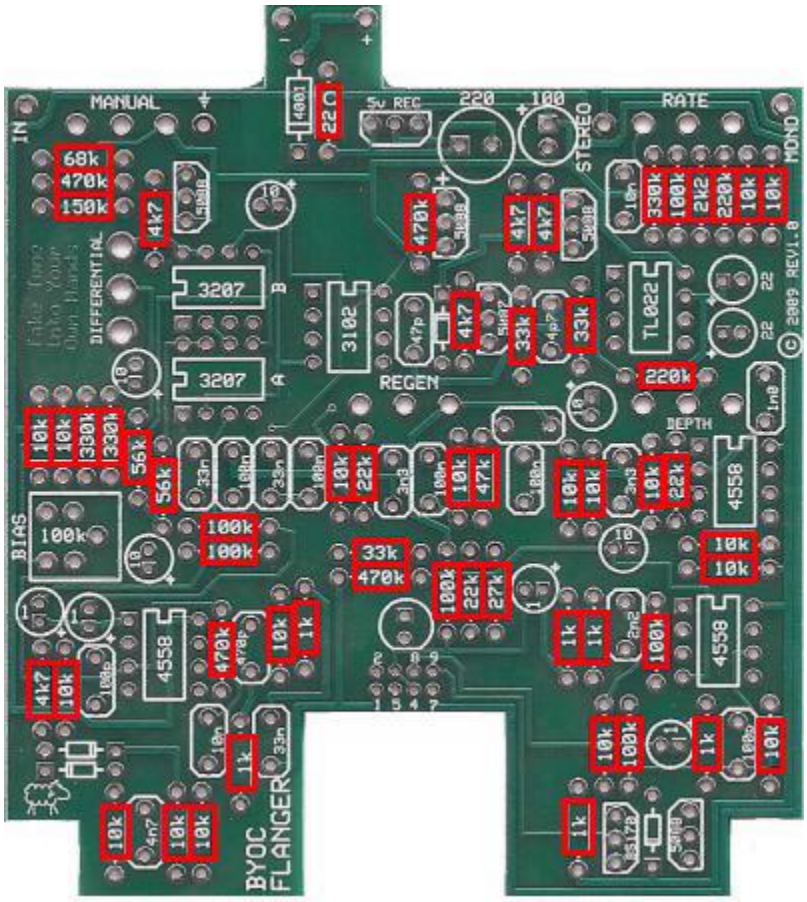
Populating the Circuit Board



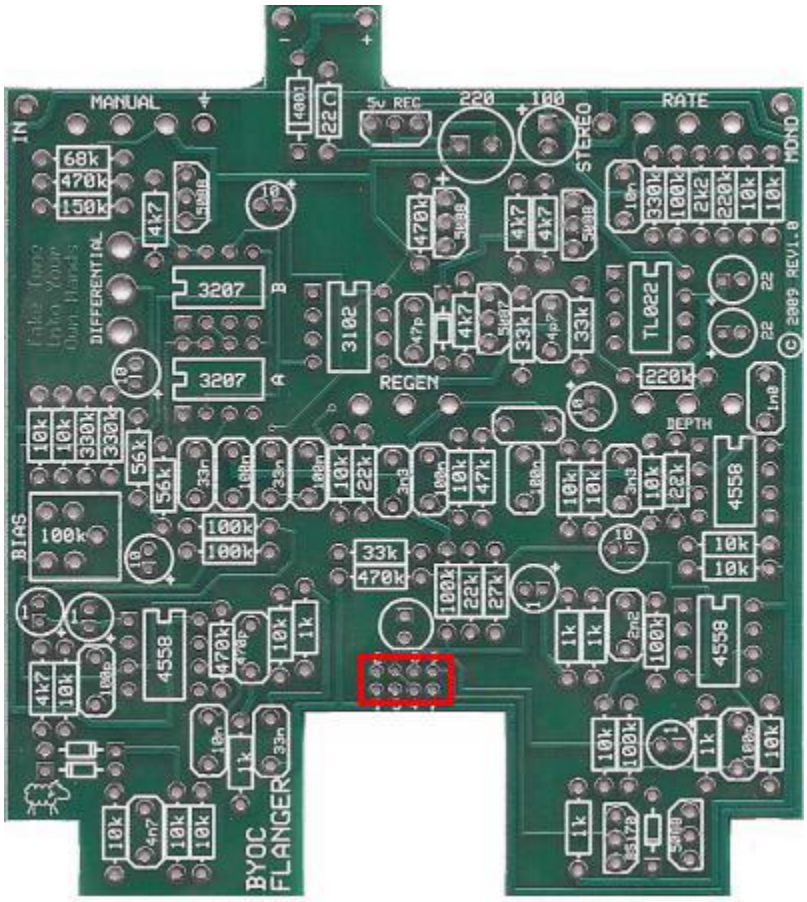
Before you get started! If you have a Rev1.0A PCB, there is a resistor space that is incorrectly labelled. The Rev1.0A will look just like the PCB pictured above. It will say REV1.0 (not REV1.0A), but it will not say "BETA" anywhere on the PCB. If your PCB is REV1.1 or higher, or is a REV1.0 and has the word "BETA" printed vertically along side the space for the 1N4001 diode, then you can ignore this. If your PCB is a REV1.0A, there is a resistor space that is labelled incorrectly. The space above highlighted in red is labelled 47k. The actual resistor value that should go in this space is a 1k. This is the feedback limit resistor. A 47k resistor is too high and will make the REGEN knob have little to no effect. If you're flanger is working well as a "chorus" effect, but has weak flanging regeneration or feedback, this is likely your problem.



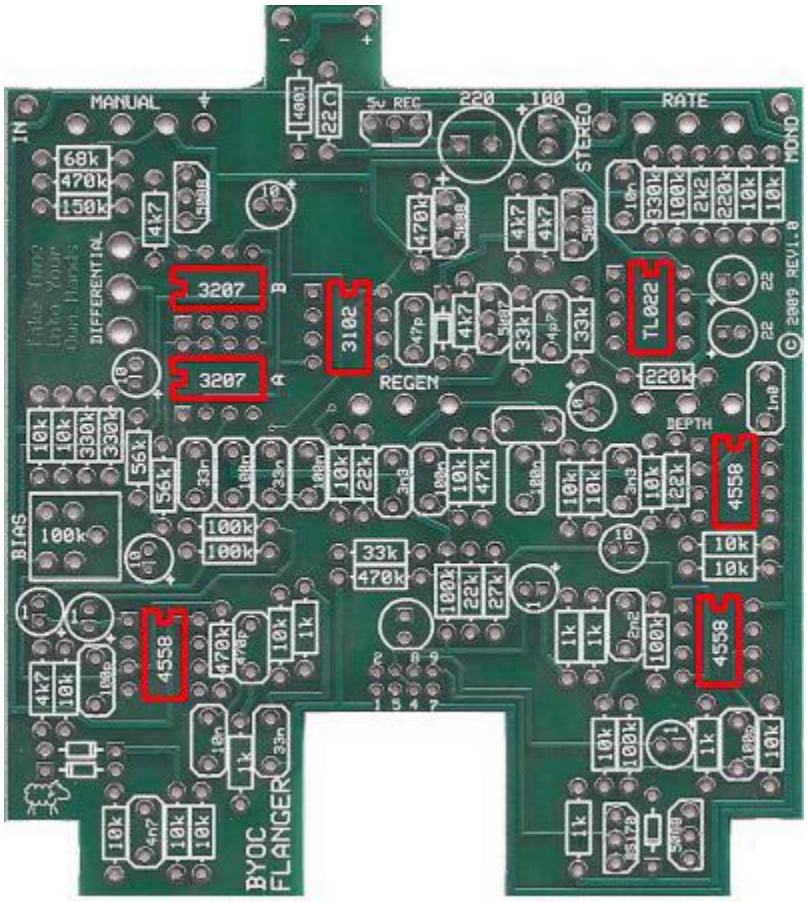
STEP 1: Add the diodes. Be sure to matched the end of the diode with the stripe to the layout on the PCB. The stripped end should go in the square solder pad. Note that the 1N4001 diode goes in the space highlighted in yellow. The four small orange 1N4148 diodes go in the space highlighted in red.



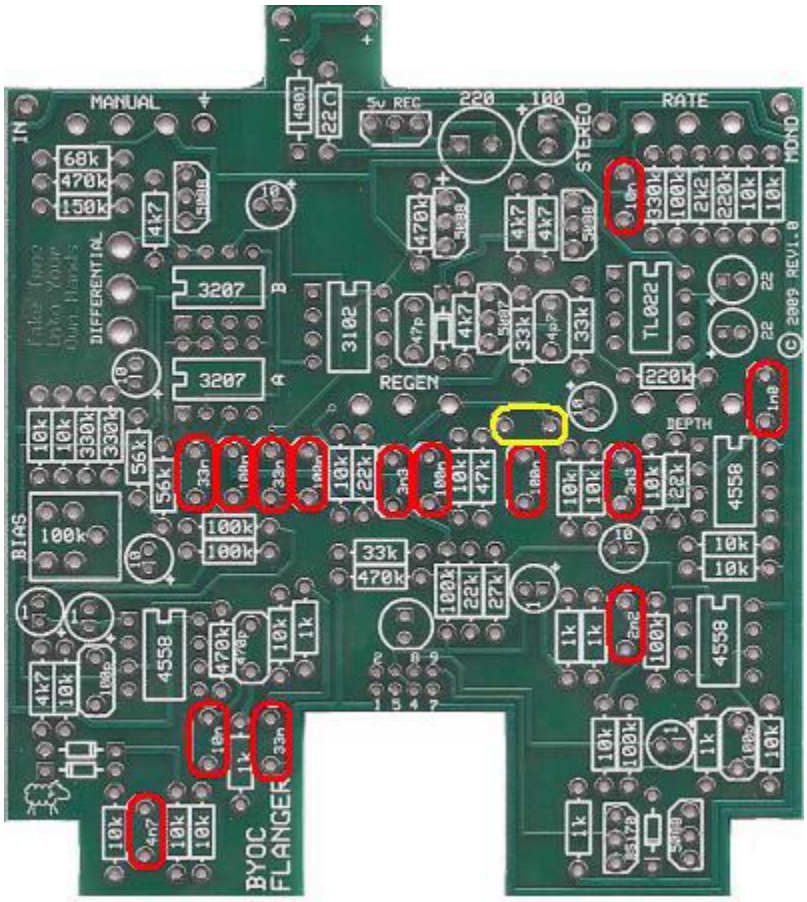
STEP 2: Add the resistors . Resistors are not polarized, so it does not matter which end goes in which solder pad.



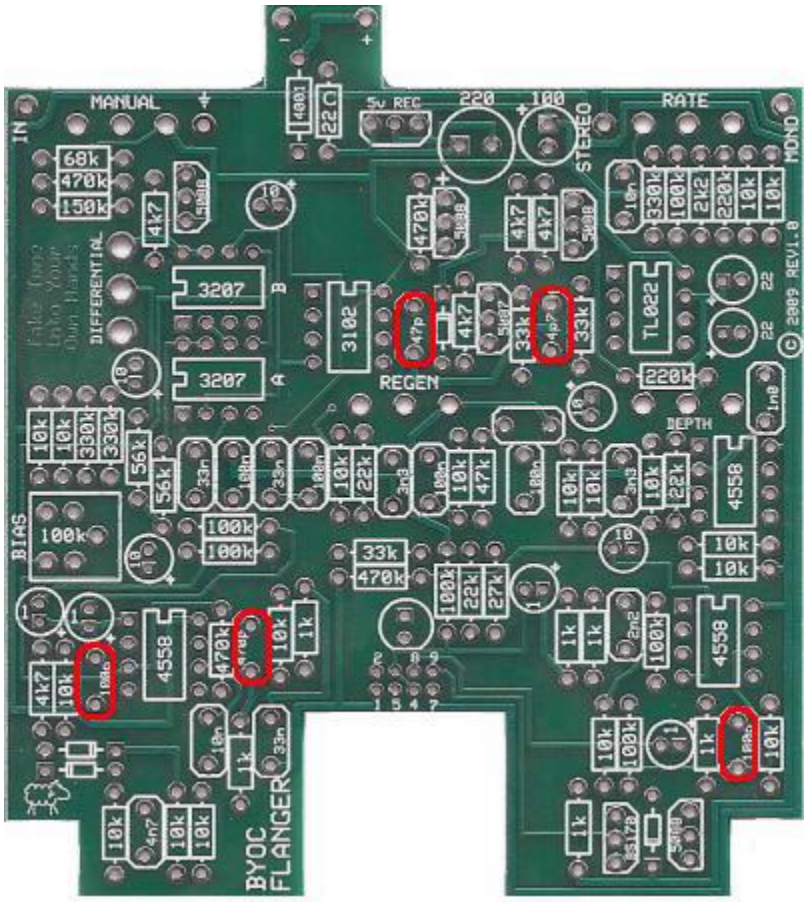
Step 3: Add the 4 x 2 pin header socket.



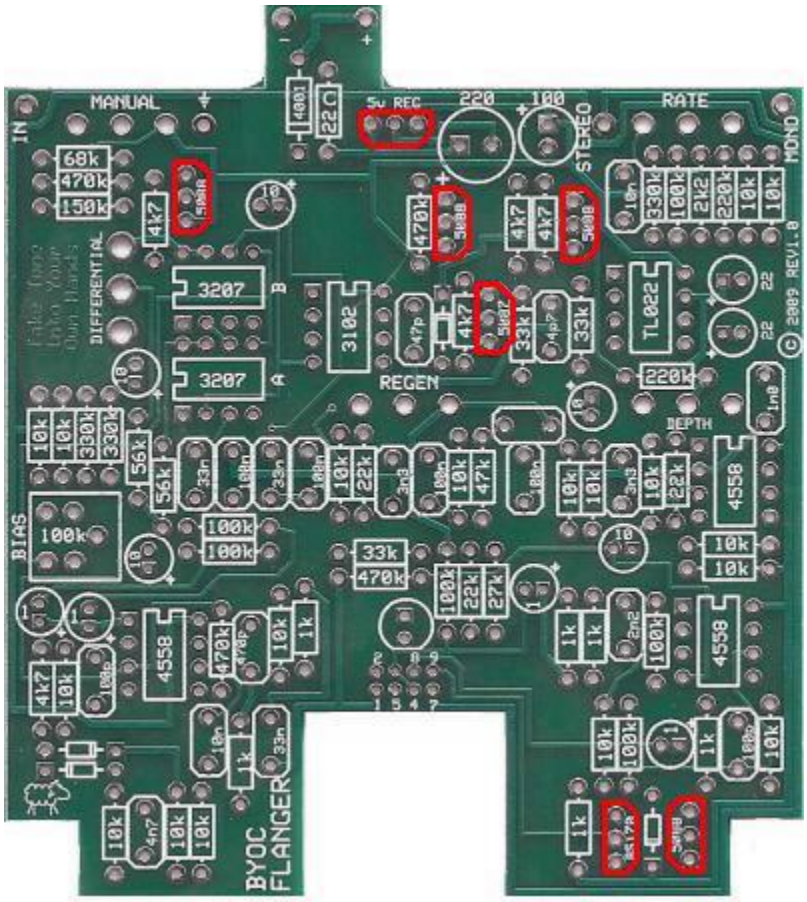
Step4: Add the 8 pin sockets. Line up each socket so that the "u-shaped" notch matches up with the end that has a notch on the layout. Only add the socket. DO NOT solder the actual chip to the PCB. DO NOT solder the chip to the socket. Only the socket gets soldered. You will never solder the chips. Installing the chips or IC's into the socket will be explained in the Installing the ICs portion of the instructions.



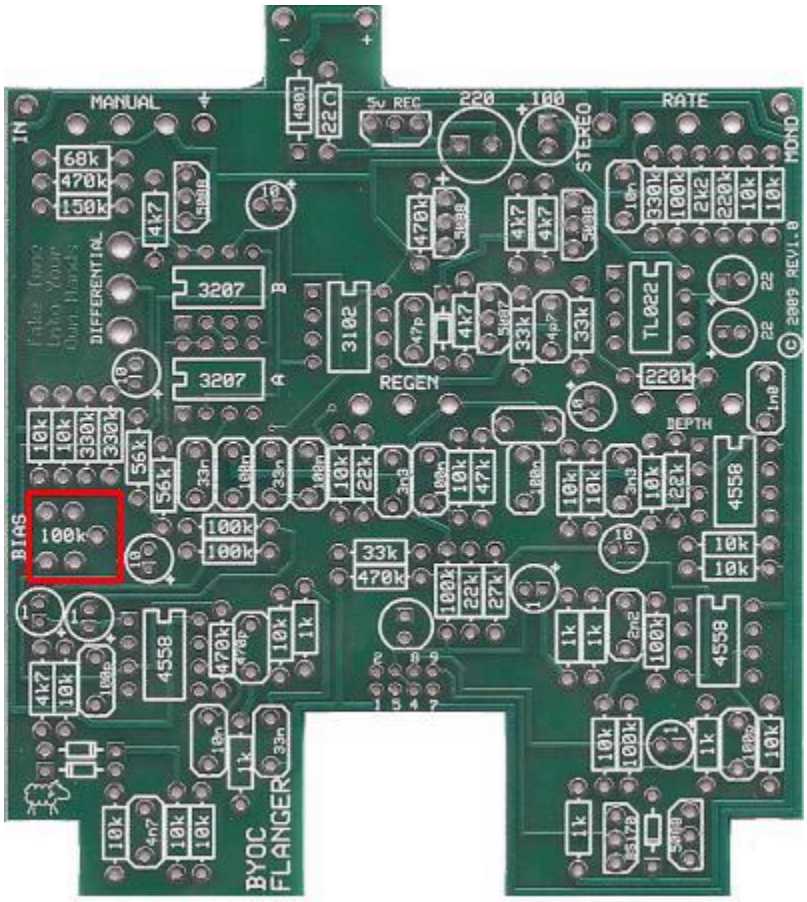
STEP 5: Add the film capacitors. These are not polarized so they can be inserted into the PCB in either direction. The space highlighted in yellow should be left empty. This is for a modification and will be explained in the Modifications portion of the instructions.



Step 6: Add the ceramic disc capacitors. These will be the small round orange caps. These are not polarized and can be inserted into the PCB in either direction.

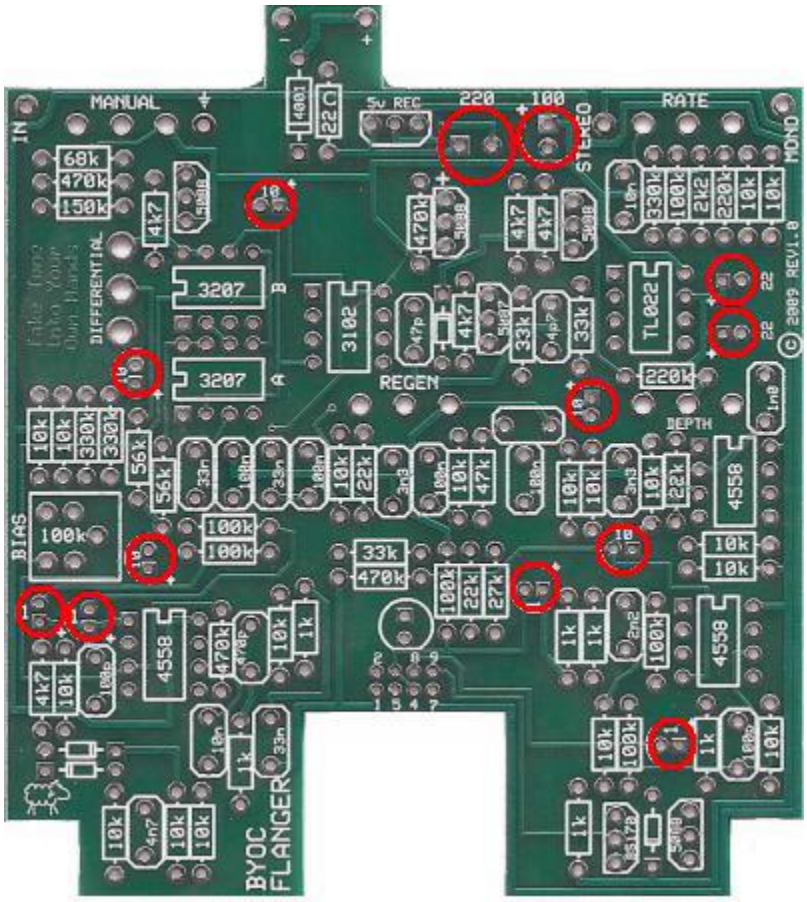


Step 7: Add the transistors and voltage regulator. Insert these components into the PCB so that the flat side of the component matches up with the flat side of the PCB layout. Be sure not to mix up the 2N5088's with the 2N5087.

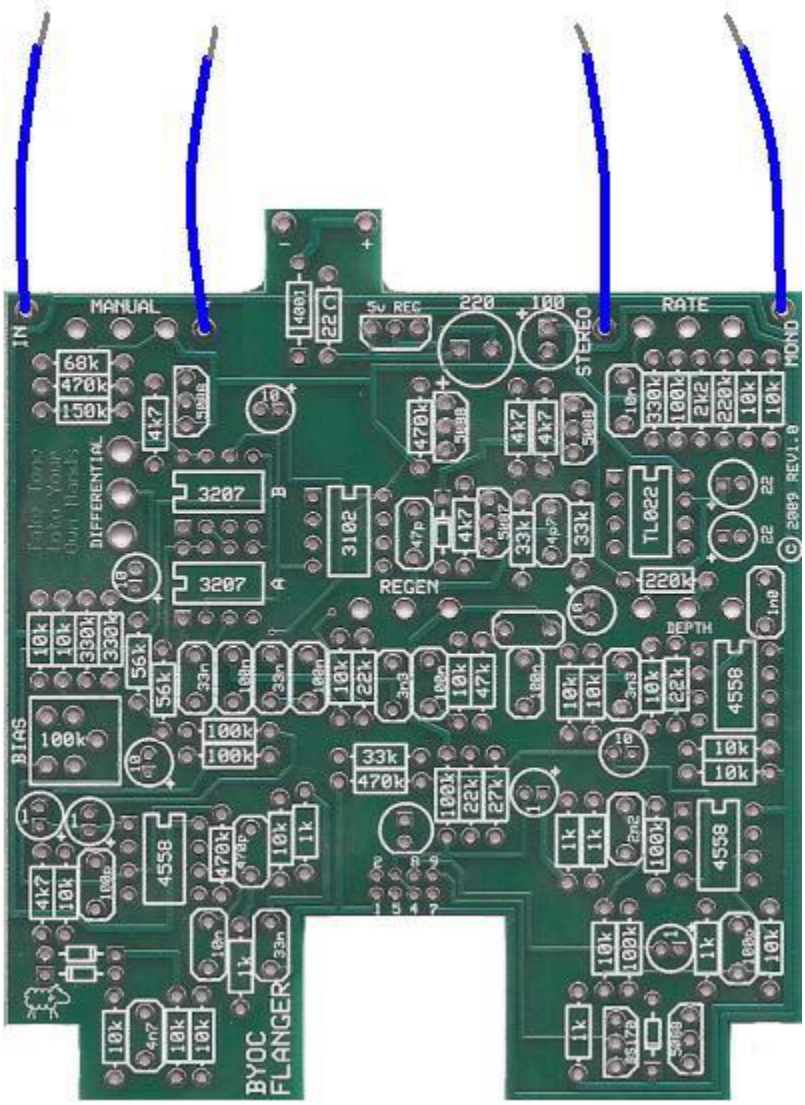


Step 8: Add the trimpot. The trimpot only has 3 leads. The PCB has spaces for 5. This is so that the PCB can accept a variety of trimpot brands and models. There is only one way your trimpot will be able to fit into the PCB so do not let this confuse you.

SETTING THE TRIMPOT: After you complete your flanger build, you will need to set the internal trimpot. While the pedal is engaged and plugged into an amplifier, turn the trimpot until you hear the flanging effect turn on. Usually this will be at noon or the middle of the rotation.



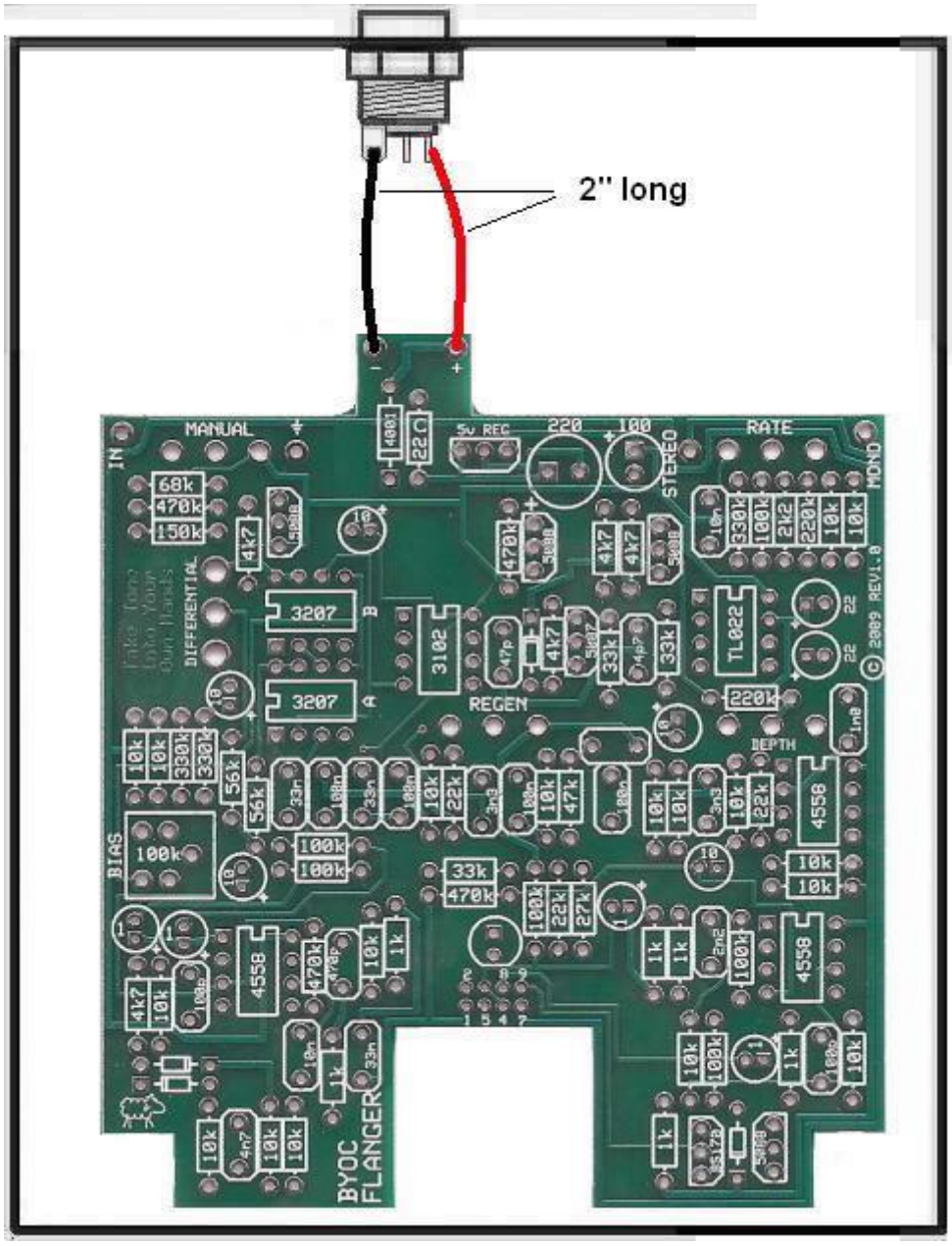
STEP 9: Add the aluminum electrolytic capacitors. These are polarized. The positive end will have a longer lead and should go in the square solder pad. The negative end will have a shorter lead with a black strip running down the body of the capacitor.



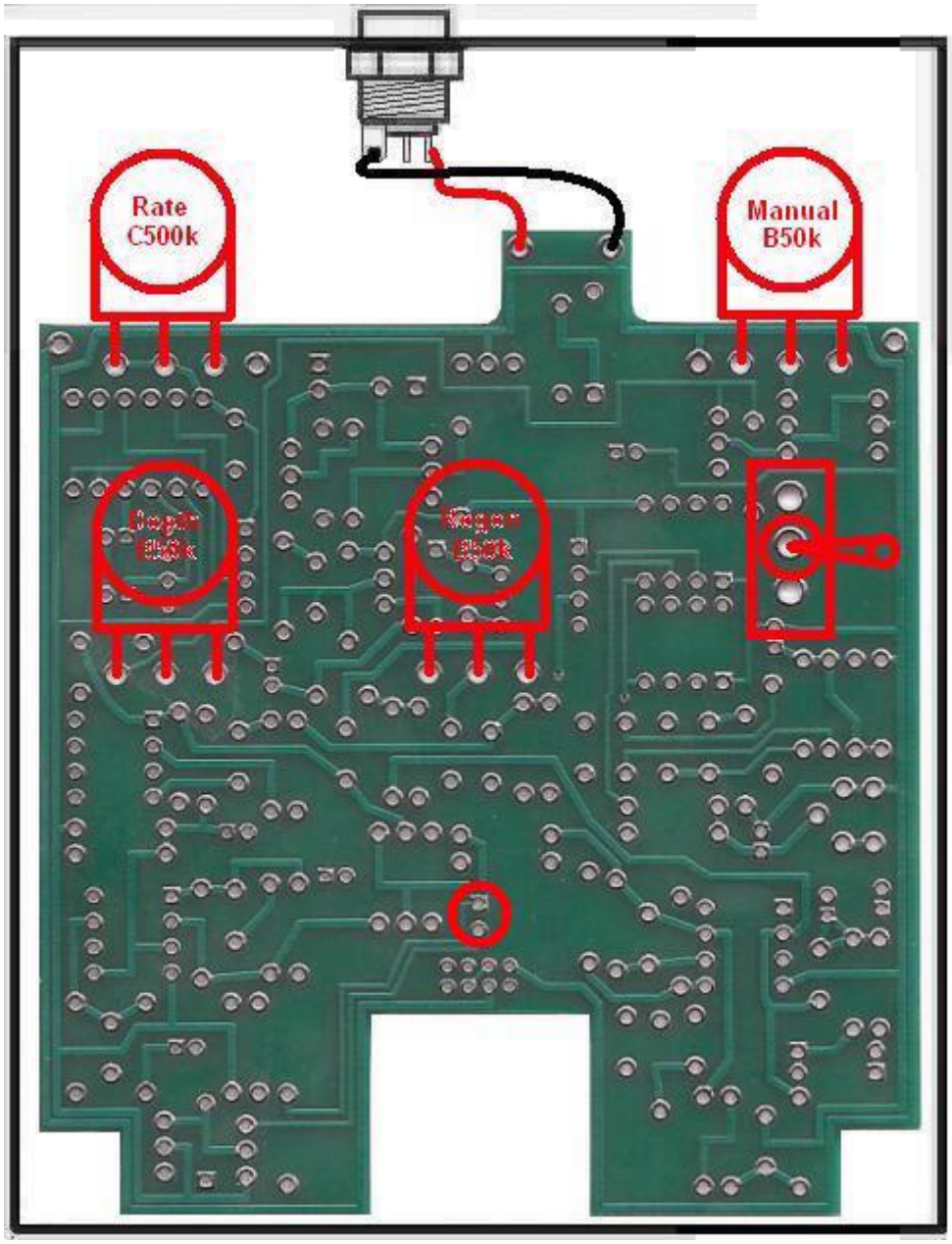
Step 10: Add wires to the IN, Ground, STEREO, and MONO eyelets. Start by cutting four 2.5" pieces of wire. Strip 1/4" off each end and tin the ends. Tinning means to apply some solder to the stripped ends of the wires. This keeps the strands from fraying and primes the wire for soldering. Solder a piece of wire to each of the eyelets on the PCB. Load the wires in from the top and solder on the bottom of the PCB.

Assembly

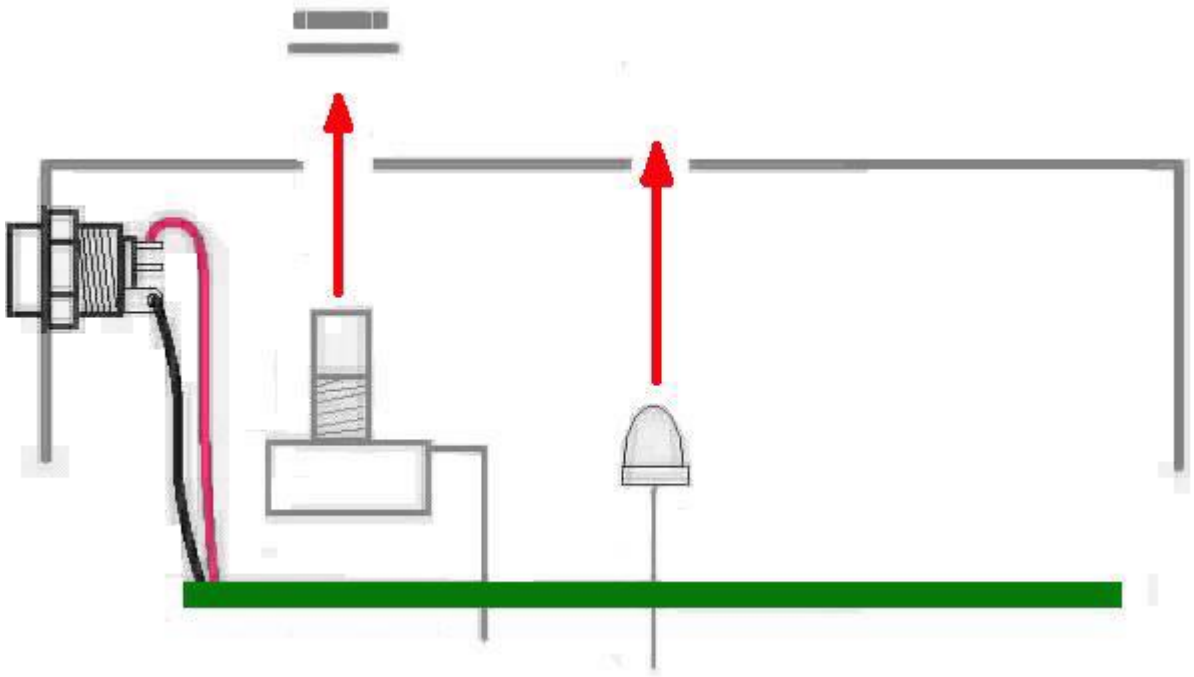
Step 1: Mount the DC adaptor jack to the enclosure.



Step 2: Connect the TIP (negative terminal) of the DC adaptor jack to the "-" eyelet on the PCB with 2 inches of hook up wire. Connect the SLEEVE (positive terminal) of the DC adaptor jack to the "+" eyelet on the far right side of the PCB with 2 inches of hook up wire.



Step 3: Flip the PCB over so that the bottom or solder side is up. Insert the three B50k(manual, regen, depth) and C500K(rate) potentiometers, SPDT on-on toggle switch, and the LED into the bottom side of the PCB. DO NOT SOLDER YET!!! The LED will have one lead that is longer than the other. The longer lead goes in the hole of the square solder pad.

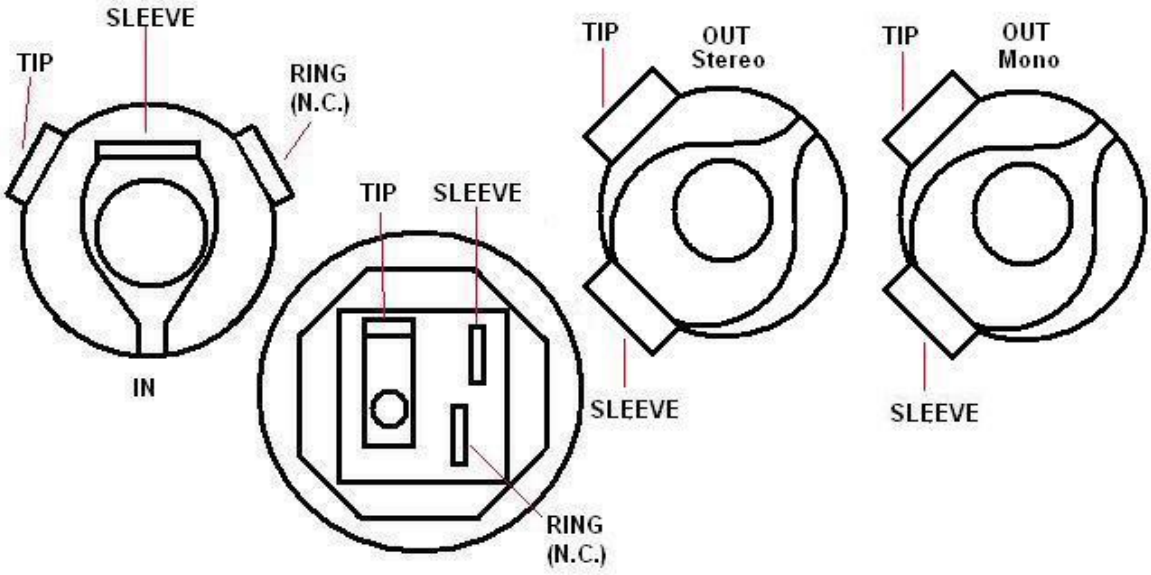


Step 4: Hold the PCB in one hand so that the component side of the PCB is in the palm of your hand and the bottom side with the pots, toggle switch and LED is facing up. Now use your other hand to guide the predrilled enclosure onto the PCB assembly so that the pots and LED all go into their respective holes. Once the PCB assembly is in place, secure it by screwing on the washers and nuts for the pots and toggle switch. Only tighten them with your fingers. You do not want them very tight yet. Be sure to keep your hand on the PCB so that it does not fall off the PC mounting posts of the pots and toggle switch.

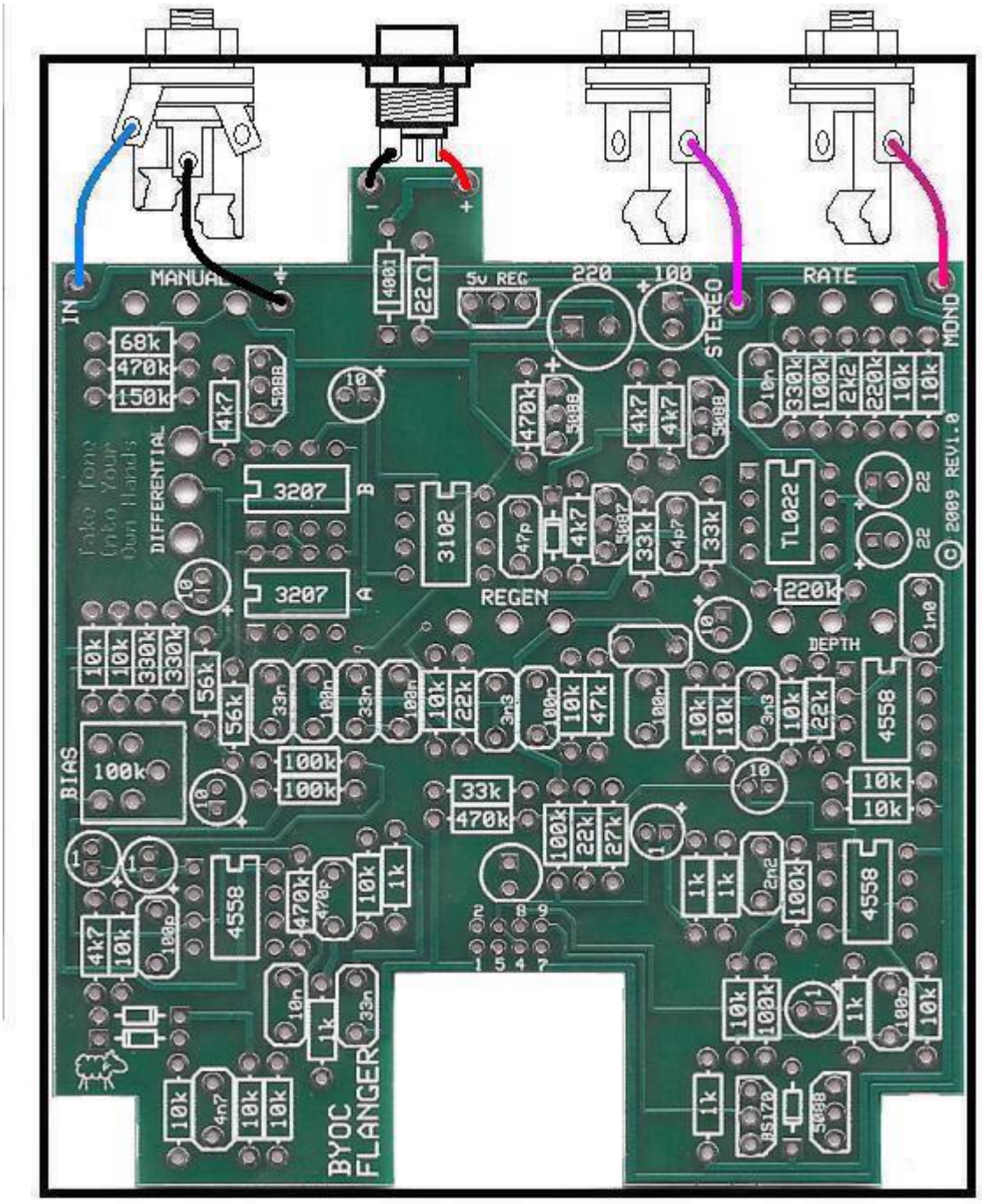
Step 5: Turn the entire pedal over so that the component side of the PCB if facing up. Lift the PCB up off the pots and toggle switch about 2mm just to make sure that the back of the PCB does not short out against that pots. Make sure the PCB is level and symetrically seated inside the enclosure.

Step 6: Solder the pots and LEDs. 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.

Wiring the jacks

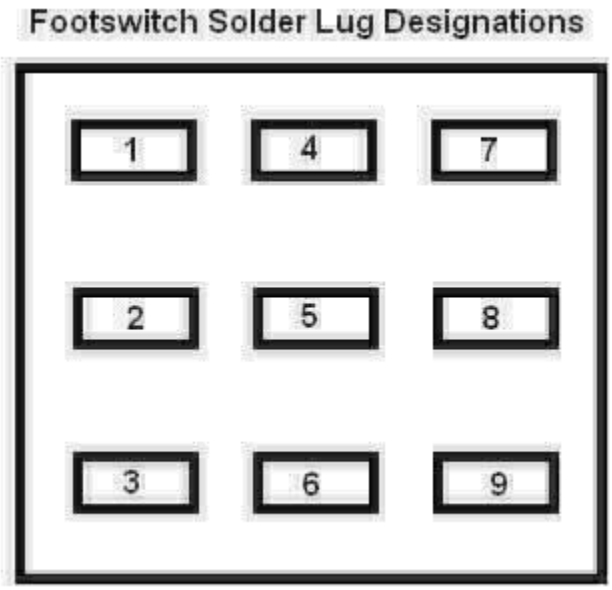


Step 1: Install the 1/4" jacks to the enclosure. Be sure to turn the OUT jacks a 1/4 turn counter clockwise so that contact prong is at 3 o'clock and nothing is shorting out against anything else. Although the sleeve of the jacks is a ground connection so if that is touching the enclosure or the back of a potentiometer, that is OK.

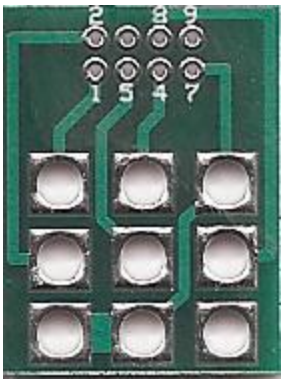


Step 2: Connect the pre stripped and tinned wires to the 1/4" jacks.

Footswitch Assembly

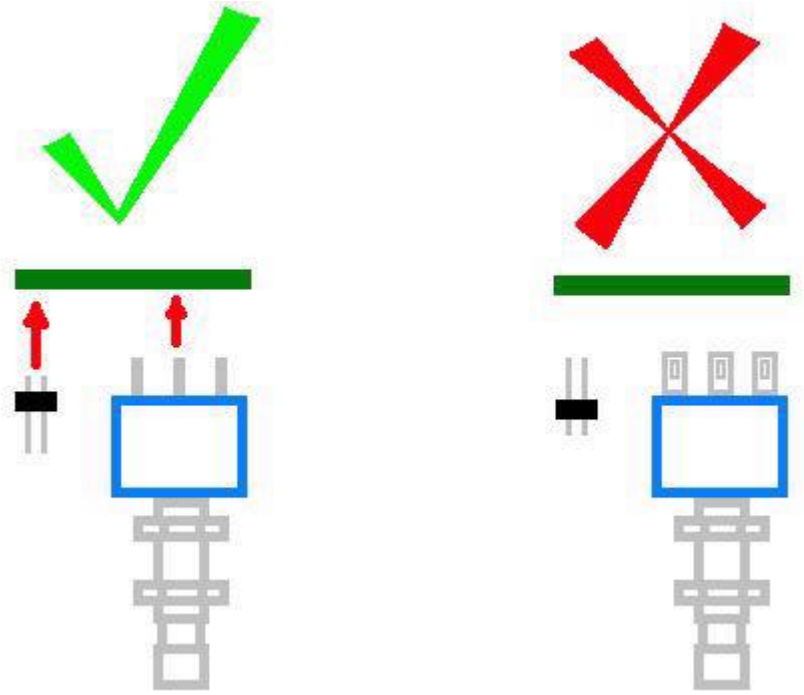


There are no actual number markings on the footswitch. Orient the footswitch so that the flat sides of the solder lugs are running horizontally, not vertically. There is no “top side” or “bottom side” of the switch until you actually solder something to it and designate it as such.

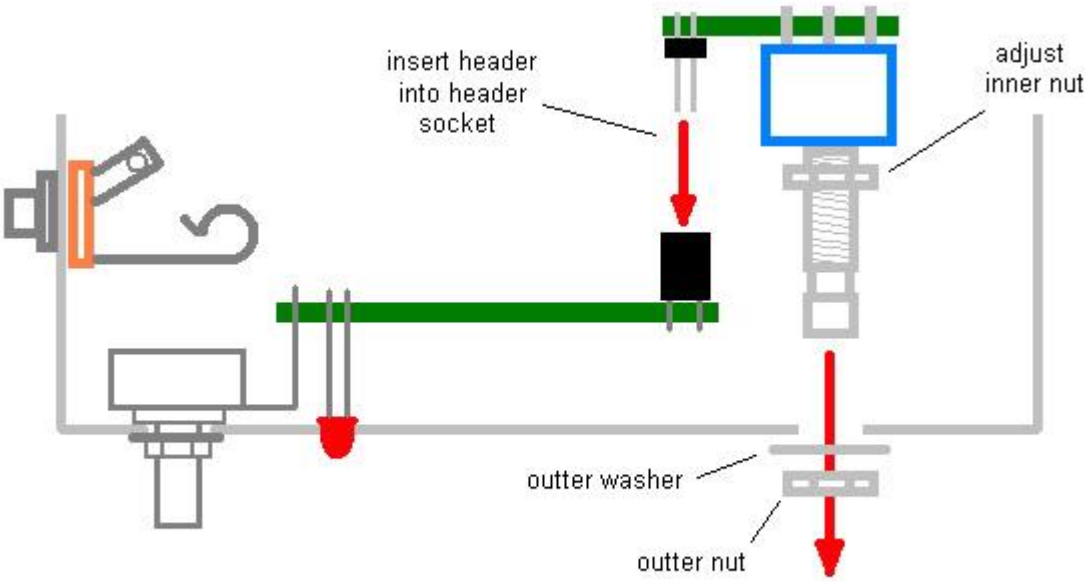


Top Side of Stereo Footswitch PCB

Make sure that the footswitch and 2 x 4 header go into the underside of the footswitch PCB. Not the topside. You will solder on the topside of the PCB. But do not solder anything yet.



Also make sure that the shorter pins of the 2 x 4 header go into the PCB. The longer pins of the header get inserted into the header socket mounted to the main PCB. But do not solder anything yet.



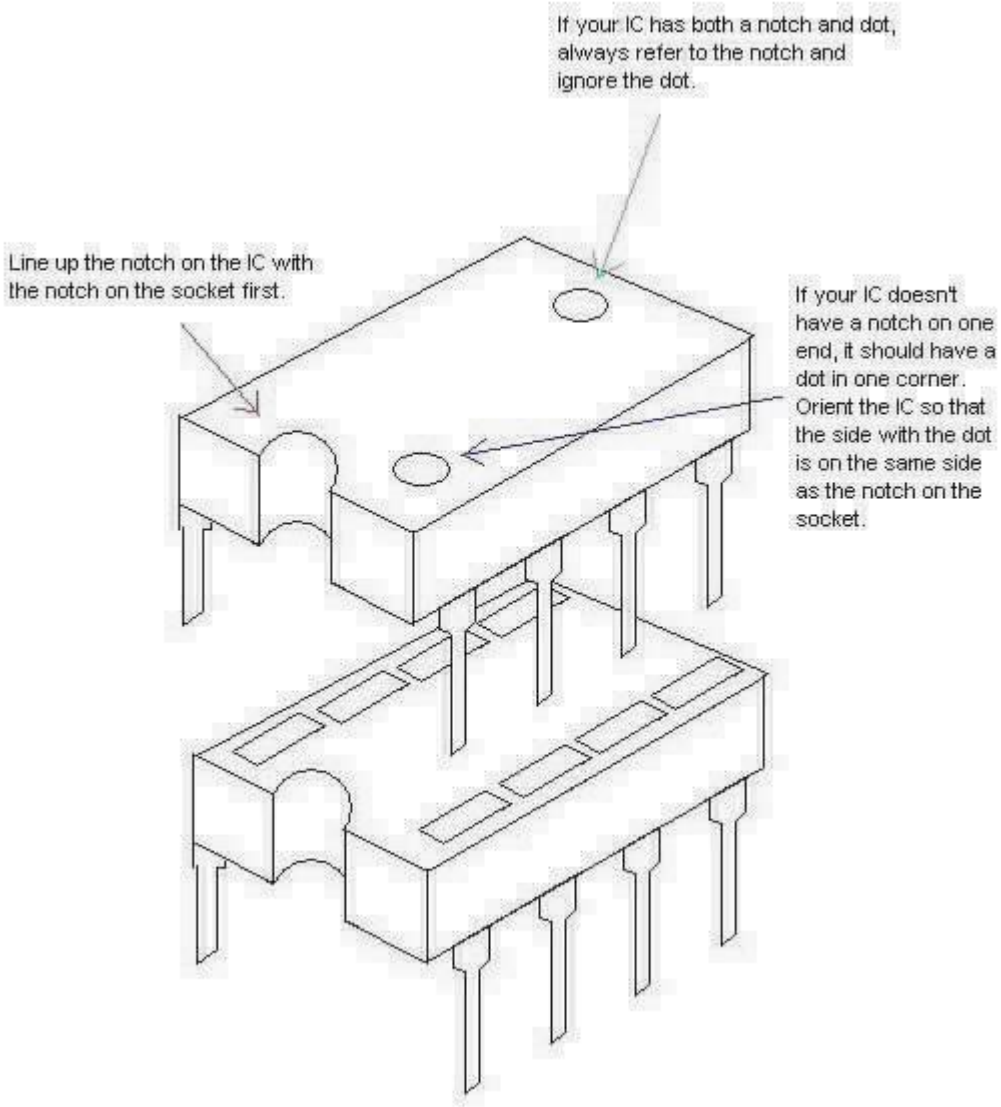
Step 4: Insert the header all the way into the header socket and mount the footswitch to the enclosure. Adjust the height of the inner footswitch nut so that the footswitch pcb lies flat on both the footswitch and header and is parallel to the main PCB, i.e., adjust the inner footswitch nut so that everything fits nice. Now solder the header and footswitch to the footswitch PCB.

Foot Switch Soldering Tip:

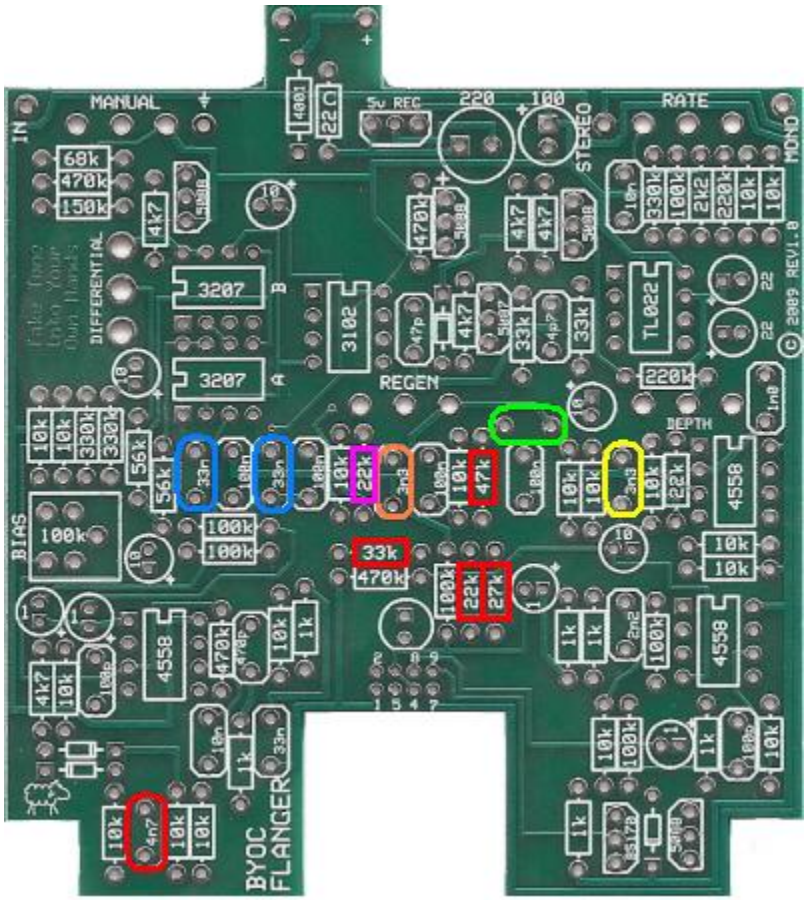
Solder the foot switch lugs to the foot switch PCB in the order numbered above. When the poles of the switch are connected to the throws it can transfer heat. So by soldering in this patern, it will help disperse heat. Of course the best thing to do is just taking your time and allowing each solder joint and solder lug to completely cool off before making the next joint.

Remember to insert the footswitch and header into the bottom side of the PCB and solder on the top side.

Installing the IC



Modifications



1. **Adjusting the low pass filters** - There are 4 low pass filters in the circuit that affect the wet signal. The first is the 4n7 highlighted in red. The second is the 3n3 highlighted in orange. The third is the 3n3 highlighted in yellow. And the fourth is the blank space highlighted in green. Increasing the values of these caps will give you a darker wet signal. Decreasing the values will give you a brighter wet signal. The extra cap space is a low pass filter located in the feedback loop which is somewhat unique and can create some interesting tones. The first lowpass filter highlighted in red is located in the delay line input buffer. Many flangers don't even have any sort of filtering in the delay line input buffer, so you could remove it completely. If you don't want to use any of the buffers, DO NOT jumper them. Just simply don't add them.

2. **Adjusting the high pass filters** - The 33n caps highlighted in blue control the high pass filters. Increasing the value will let more bass through. Decreasing the value will let less bass through. Keep in mind that cap on the left is for BBD line A and the cap on the right is for BBD line B. So you would only hear changes made to BBD line B when the flanger is in differential mode. So you could make the two modes more noticeably different by only modifying the high pass filter for delay line B.
3. **Adjusting the WET SIGNAL level** - The 22k resistor highlighted in red controls the

wet signal level. Increase the value to reduce signal level. Reduce the value to increase signal level.

4. **Adjusting the DRY SIGNAL level** - The 33k resistor highlighted in red controls the dry signal level. Increase the value to reduce signal level. Reduce the value to increase signal level.

5. **Adjusting the REGENERATION SENSITIVITY** - The 47k resistor highlighted in red limits the feedback level. Increase the value to reduce signal level. Reduce the value to increase signal level.

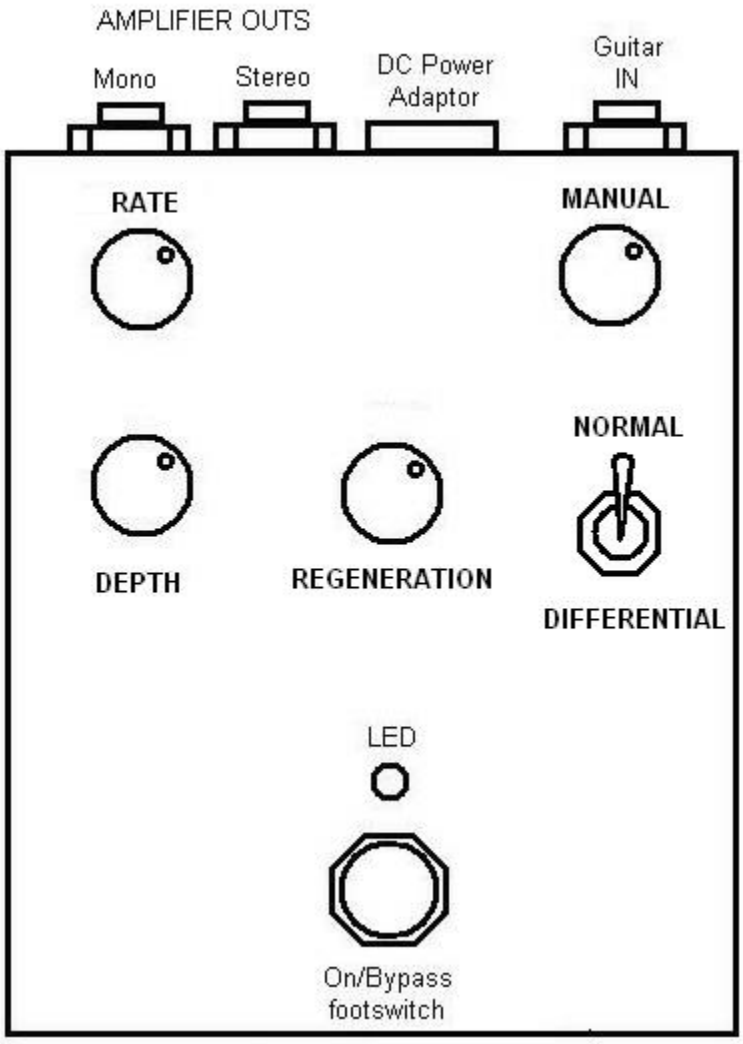
6. **Adjusting the OVERALL VOLUME level** - The 27k resistor highlighted in red controls the overall volume level. Increase the value to reduce signal level. Reduce the value to increase signal level.

7. **Adjusting the DIFFERENTIAL VOLUME level** - There will be a slight volume boost and the regeneration control will become more sensitive when in differential mode. You can adjust the level of BBD line B by changing the value of the 22k resistor highlighted in pink.

8. **MODIFYING FOR BASS** - Bass modulation FX typically differ from guitar modulation FX in two ways. 1. They usually have less wet signal and more dry signal. 2. The wet signal is usually filtered so that it affects more of the high frequencies and less of the low frequencies. So to modify your flanger for bass, you would want to follow the mods already described above and 1. reduce wet signal, 2. increase dry signal, 3. adjust the high pass filters to let less bass through (try a .01uf/10n cap), and 4. adjust the overall volume level if need be.

9. **DUAL PITCH CHORUSING** - Because the BYOC flanger is using two independant BBDs in parallel, it is possible to use a mismatched set of BBDs so that you get a second wet signal that is at a slightly different pitch than the first. If you put an MN3208 (normal DIP8 package not Special DIL8 package, i.e., V3208 or BL3208a) in the BBD B position, you can add a slightly lower pitch to the chorusing because it has a longer delay time than the MN3207. This gives the pedal a much lusher and swirly tone, but may be a little too over the top with distortion.

Operating Overview



Rate - controls the speed of the LFO (low frequency oscillator) sweep

Depth - controls the intensity of the LFO sweep

Regeneration - a.k.a. Feedback. Controls the amount of signal send back into the delay line.

Manual - This knob is allows you to manually controll the sweep when the depth knob is all the way counter clockwise. It can also act as the "center" or "delay time" knob when the depth knob is not full turn clockwise. NOTE: The manual knob is extremely

interactive with the depth knob. The more you turn the depth knob counter clockwise, the more control you have with the manual knob. Inversely, the more you turn the depth knob clockwise, the less control you have with the manual knob, so that if you were to turn the depth knob full turn clockwise, the manual knob would do nothing at all.

Think of the depth knob as the blend between LFO and manual control. The more you turn it clockwise, the more it is controlled by the LFO. The more you turn it counterclockwise, the more it is controlled manually.

Normal/Differential Toggle switch - This switch adds or removes a second Bucket Brigade Delay chip that is in parallel and out of phase with the primary BBD chip.

DC power supply - Use a 2.5mm negative tip adaptor (this is your standard guitar fx style adaptor). This unit can run on 9 - 18VDC.

Current Draw - 30mA

Input Impedance - 470k ohms

Output Impedance - 100k ohms

For a schematic, click here to download PDF
http://buildyourownclone.com/flangerscheme.pdf

Please visit
http://buildyourownclone.com/board
for any technical support