

# Build Your Own Clone Analog Vibrato Kit Instructions



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[www.byoelectronics.com/board](http://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. 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 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.

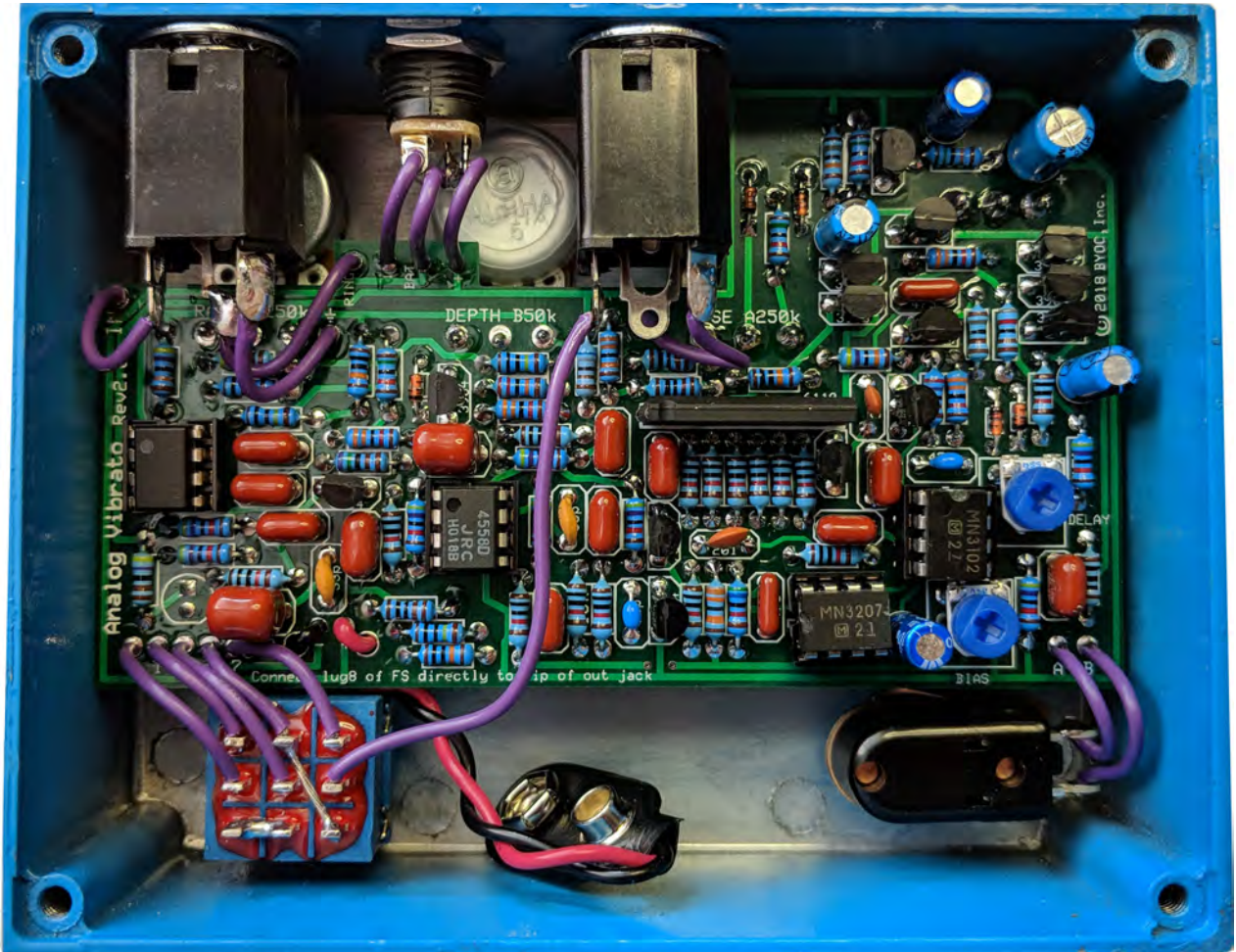
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**This is what your kit should look like when it's complete. Your kit may come with different color capacitors, switches ect. Don't be alarmed by this. They all still do the exact same thing.**



## Parts Checklist for the Analog Vibrato Kit

### Resistors: (Metal Film (5 Bands) / Carbon Film (4 Bands))

1 - 100R	(Brown/Black/Black/Black/Brown) / (Brown/Black/Brown/Gold)
3 - 1k	(Brown/Black/Black/Brown/Brown) / (Brown/Black/Red/Gold)
1 - 1k8	(Brown/Gray/Black/Brown/Brown) / (Brown/Gray/Red/Gold)
1 - 2k7	(Red/Purple/Black/Brown/Brown) / (Red/Purple/Red/Gold)
2 - 4k7	(Yellow/Purple/Black/Brown/Brown) / (Yellow/Purple/Red/Gold)
1 - 6k8	(Blue/Gray/Black/Brown/Brown) / (Blue/Gray/Red/Gold)
1 - 7k5	(Purple/Green/Black/Brown/Brown) / (Purple/Green/Red/Gold)
1 - 8k2	(Gray/Red/Black/Brown/Brown) / (Gray/Red/Red/Gold)
15 - 10k	(Brown/Black/Black/Red/Brown) / (Brown/Black/Orange/Gold)
3 - 15k	(Brown/Green/Black/Red/Brown) / (Brown/Green/Orange/Gold)
4 - 33k	(Orange/Orange/Black/Red/Brown) / (Orange/Orange/Orange/Gold)
8 - 47k	(Yellow/Purple/Black/Red/Brown) / (Yellow/Purple/Orange/Gold)
1 - 56k	(Green/Blue/Black/Red/Brown) / (Green/Blue/Orange/Gold)
3 - 100k	(Brown/Black/Black/Orange/Brown) / (Brown/Black/Yellow/Gold)
1 - 150k	(Brown/Green/Black/Orange/Brown) / (Brown/Green/Yellow/Gold)
1 - 180k	(Brown/Gray/Black/Orange/Brown) / (Brown/Gray/Yellow/Gold)
1 - 220k	(Red/Red/Black/Orange/Brown) / (Red/Red/Yellow/Gold)
2 - 330k	(Orange/Orange/Black/Orange/Brown) / (Orange/Orange/Yellow/Gold)
2 - 470k	(Yellow/Purple/Black/Orange/Brown) / (Yellow/Purple/Yellow/Gold)
4 - 1M	(Brown/Black/Black/Yellow/Brown) / (Brown/Black/Green/Gold)

Visit [www.byocoelectronics.com/resistorcodes.pdf](http://www.byocoelectronics.com/resistorcodes.pdf) for more information on how to differentiate resistors.

### Capacitors:

2 - 33p ceramic disc cap	(May say "33" on the body)
2 - 47p ceramic disc cap	(May say "47" on the body)
1 - 200p ceramic disc cap	(May say "201" on the body)
1 - 220p ceramic disc cap	(May say "221" on the body)
1 - .0027uF/2n7 film cap	(May say "272" on the body)
1 - .0039uF/3n9 film cap	(May say "392" on the body)
1 - .0047uF/4n7 film cap	(May say "472" on the body)
2 - .0068uF/6n8 film cap	(May say "682" on the body)
2 - .01uF/10n film cap	(May say "103" on the body)
1 - .022uF/22n film cap	(May say "223" on the body)
4 - .047uF/47n film cap	(May say "473" on the body)
1 - .1uF/100n film cap	(May say "104" on the body)
2 - 1uF film cap	(May say "105" on the body)
2 - 1uF Aluminum Electrolytic	
1 - 10uf Aluminum Electrolytic	
1 - 47uf Aluminum Electrolytic	
1 - 100uf Aluminum Electrolytic	

Visit [www.byocoelectronics.com/capcodes.pdf](http://www.byocoelectronics.com/capcodes.pdf) for more info on how to differentiate capacitors.



**Diodes:**

5 - 1N4148 diode

**IC's:**

1 - TL022

1 - 4558

1 - 3102

1 - 3207

1 - BA6110

1 - SIP9 socket

**Transistors:**

11 - 2N3904 (or similar NPN silicon transistor)

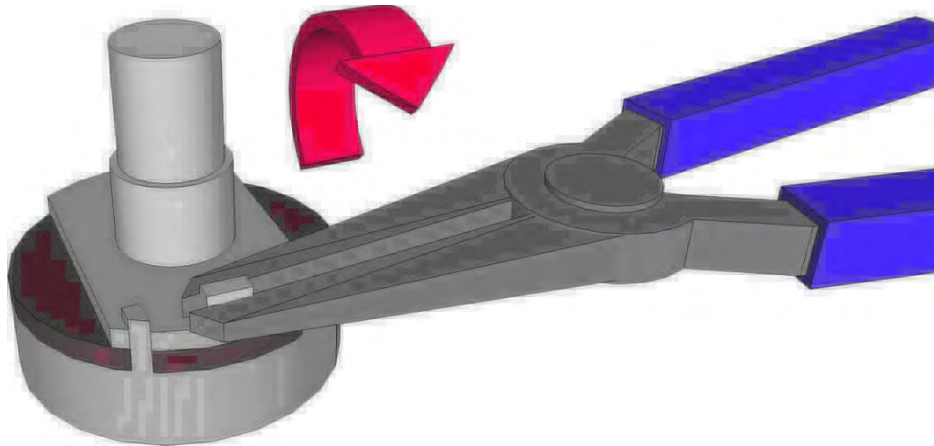
3 - 2N3906 (or similar PNP silicon transistor)

**Trimpots:**

1 - 20k or 25k

1 - 470k or 500k

**Potentiometers: SNAP OFF THE SMALL TABS ON THE TOP OF THE POTS  
OFF WITH A PAIR OF NEEDLE NOSE PLIERS**



1 - A250k (RISE)

1 - B50k (DEPTH)

1 - C250k (RATE)

**Hardware:**

1 - predrilled enclosure w/ 4 screws

1 - Analog Vibrato Printed Circuit Board

1 - Momentary SPST footswitch

1 - 3PDT Footswitch

1 - SPDT On-On Toggle Switch

2 - Enclosed Jacks

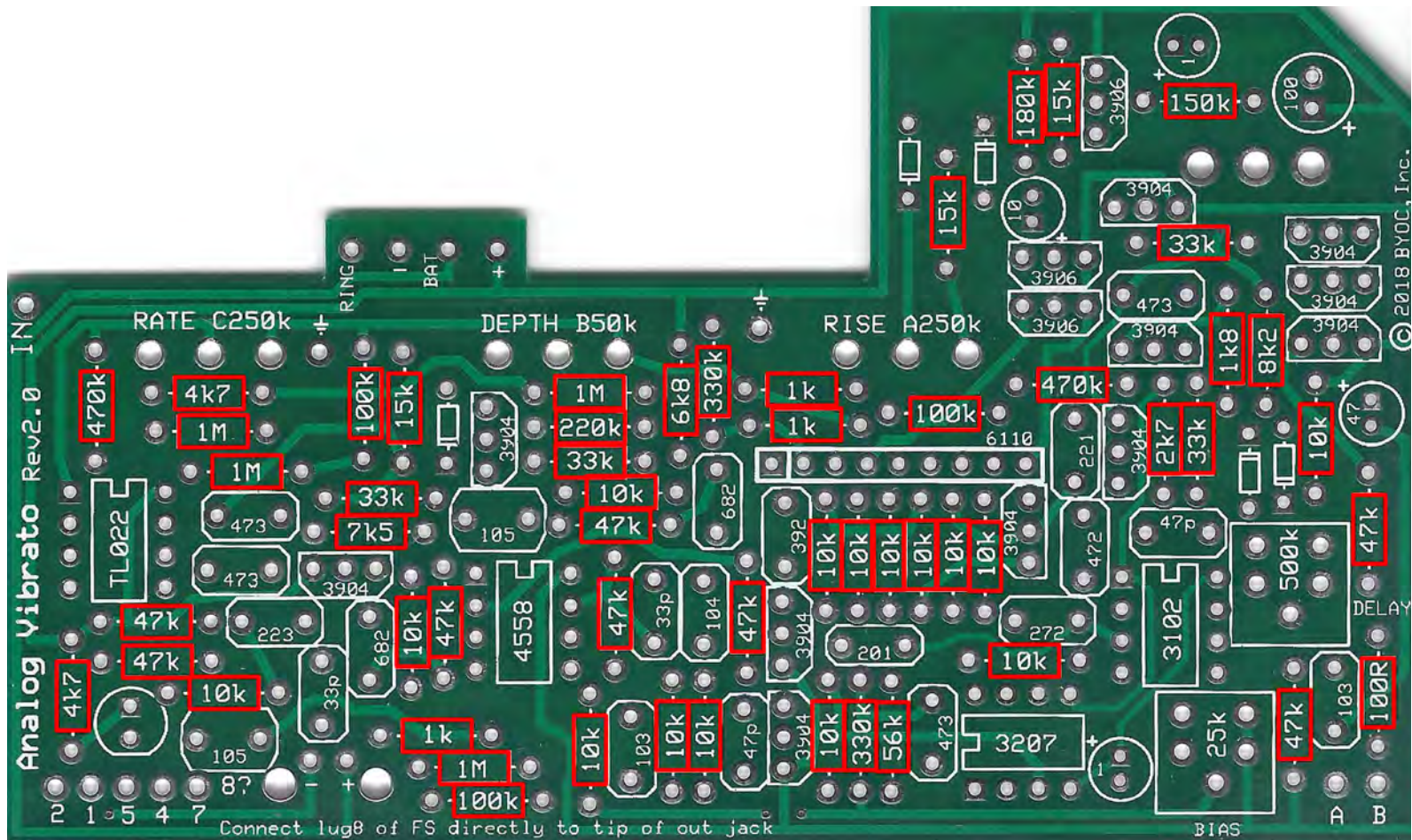
4 - rubber bumpers

2 - lock washers (for in and out jacks)

hook-up wire

## Populating the Circuit Board

**Step 1:** Add all the resistors. Resistors are not polarized and can be inserted into the PCB in either direction, meaning you don't have to worry about orienting them.

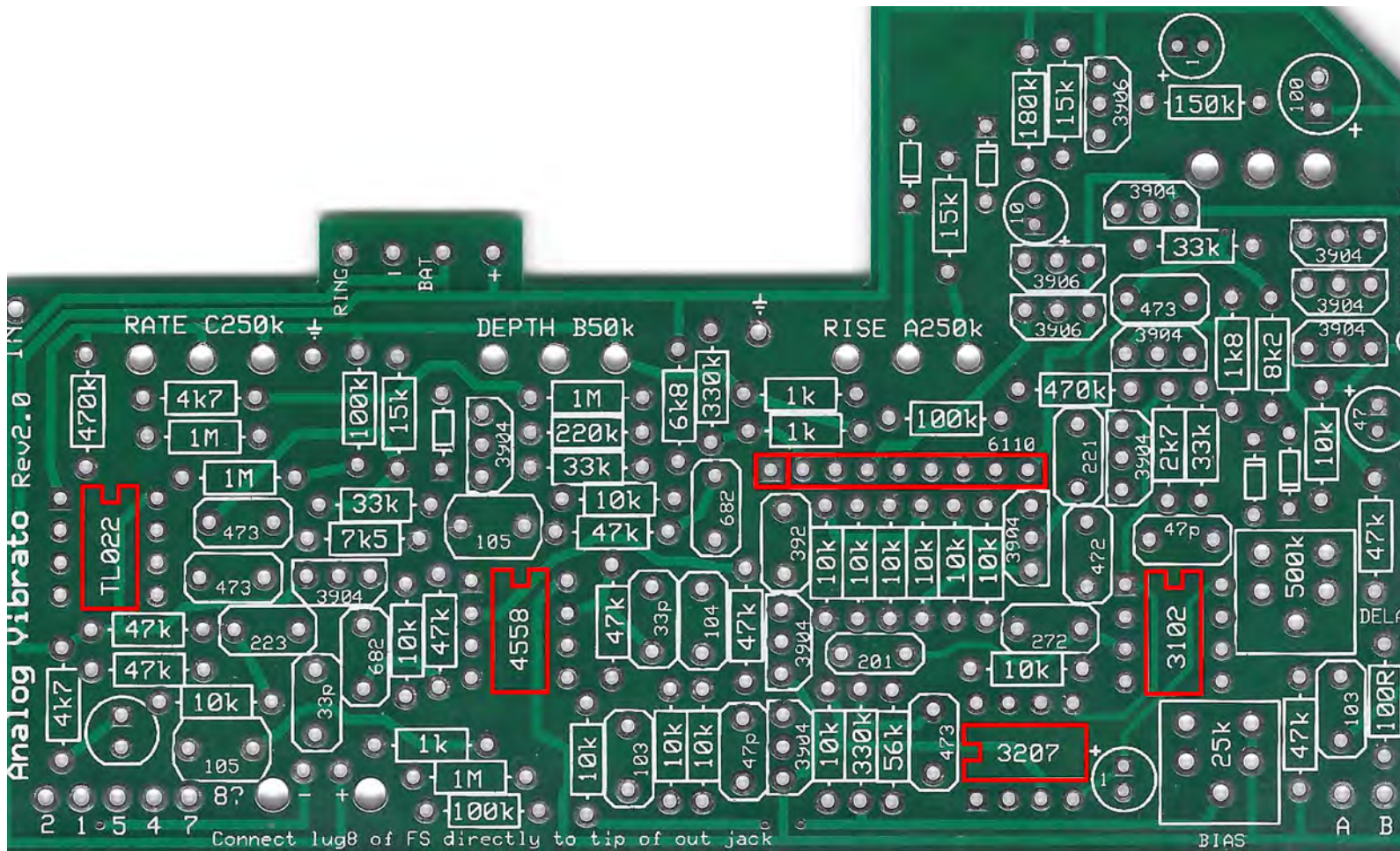




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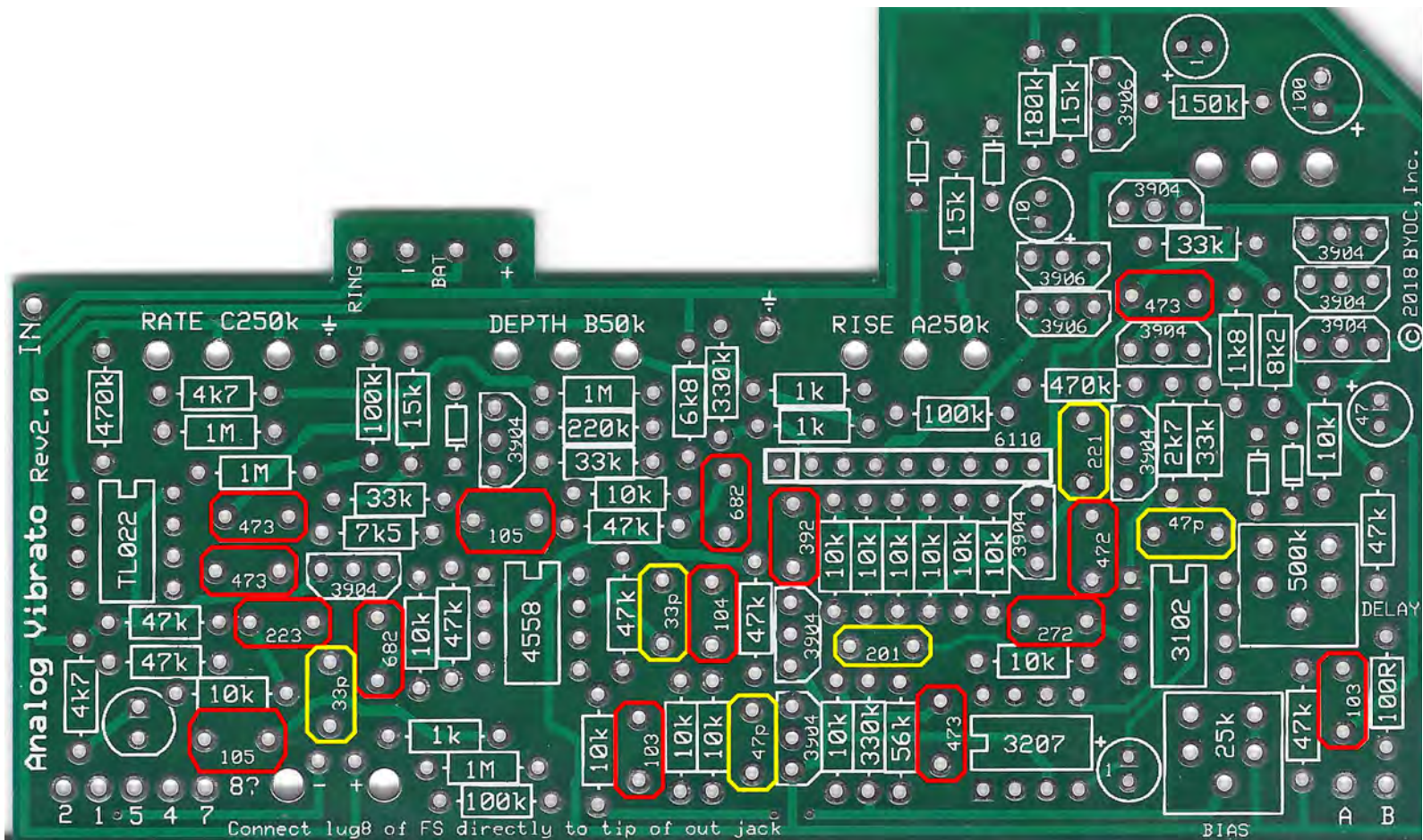
**Step 3:** Add the IC sockets. Be sure to align the notch on the IC sockets with the notch on the PCB screenprint. The SIP-9 socket won't have any indicator, so the orientation of the BA6110 is important. Pin 1 of the BA6110 will go in the square hole which also has a screenprinted square around it.





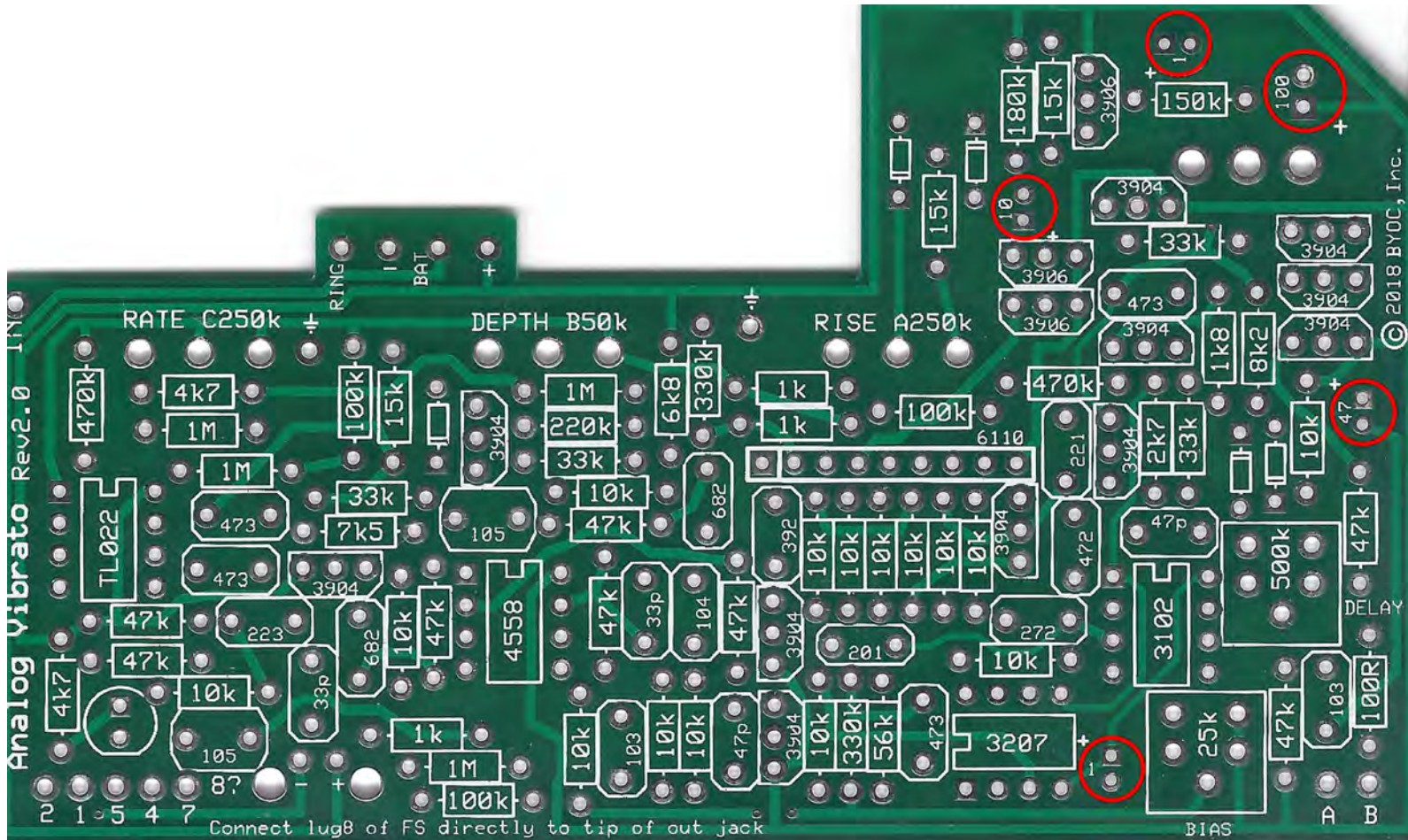


**Step 5:** Add the film and ceramic disc capacitors. These are non-polarized so they can go in either direction. The ceramic disc capacitors are highlighted in yellow, and are also non-polarized.





**Step 6:** Add the aluminum electrolytic capacitors. These ARE polarized, meaning there is a positive and negative end. The positive side will have a longer lead and goes in the square solder pad. The negative side will have a shorter lead and a stripe running along the body of the cap, and goes in the round solder pad.





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Analog Vibrato Rev2.0

RATE C250k

DEPTH B50k

RISE A250k

BIAS

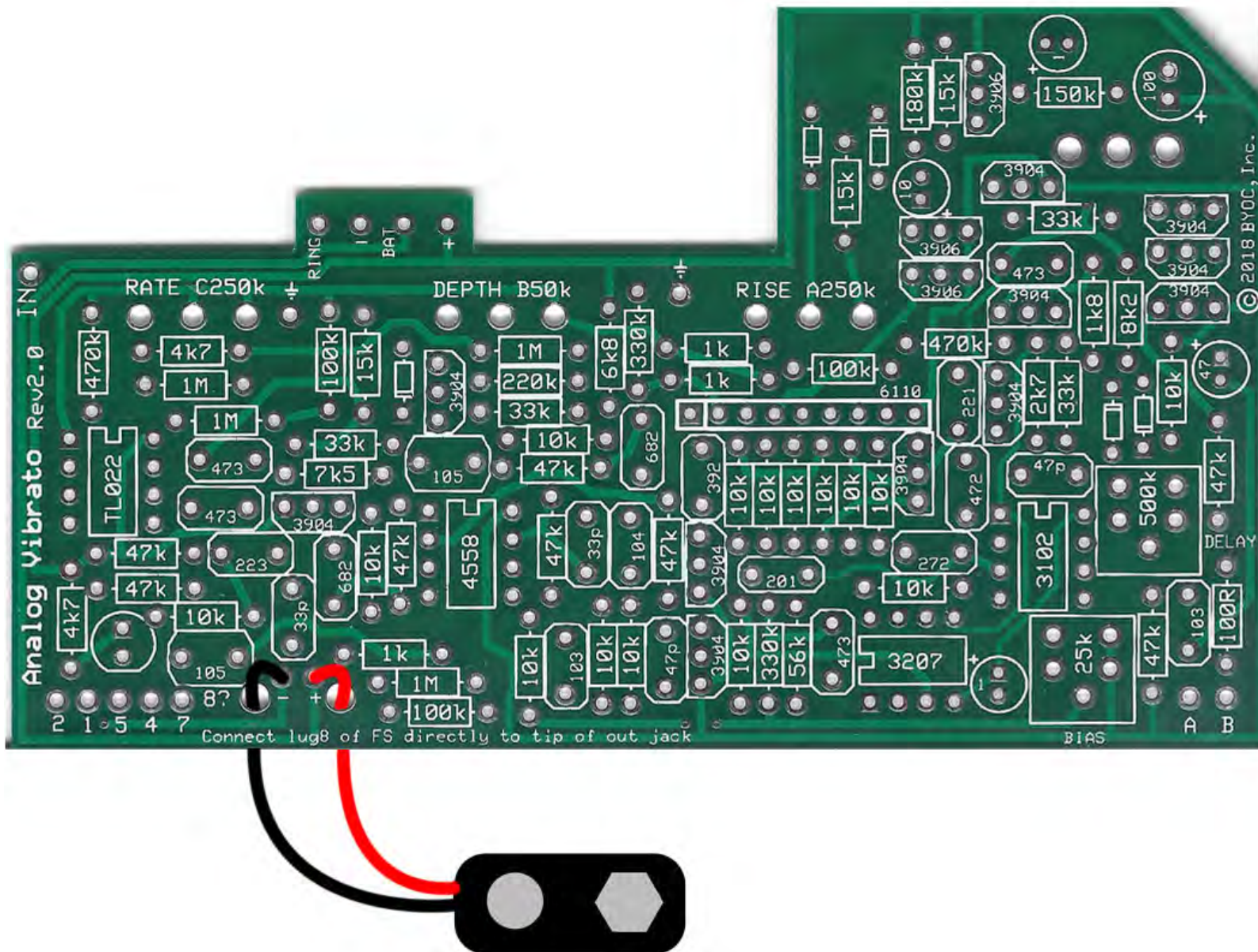
P1 P2 P3 P4 P5 P6 P7

Connect lug8 of FS directly to tip of out jack

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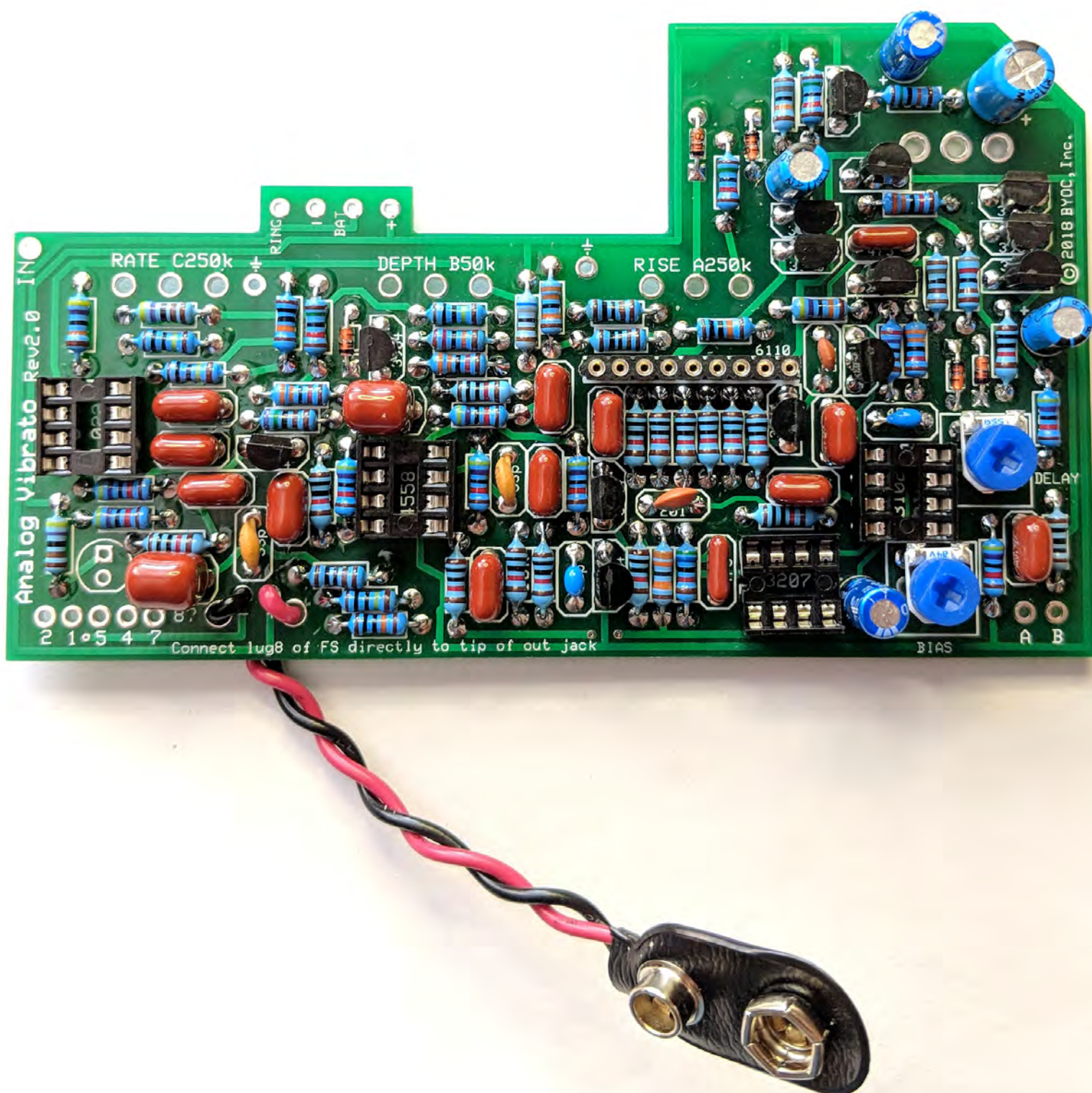


**Step 8:** Add the battery snap. Thread the wires into the strain relief holes first through the bottom side of the PCB. Then insert the leads into their respective solder pad hole on the top-side of the PCB. The red lead goes in the + hole and the black lead goes in the – hole





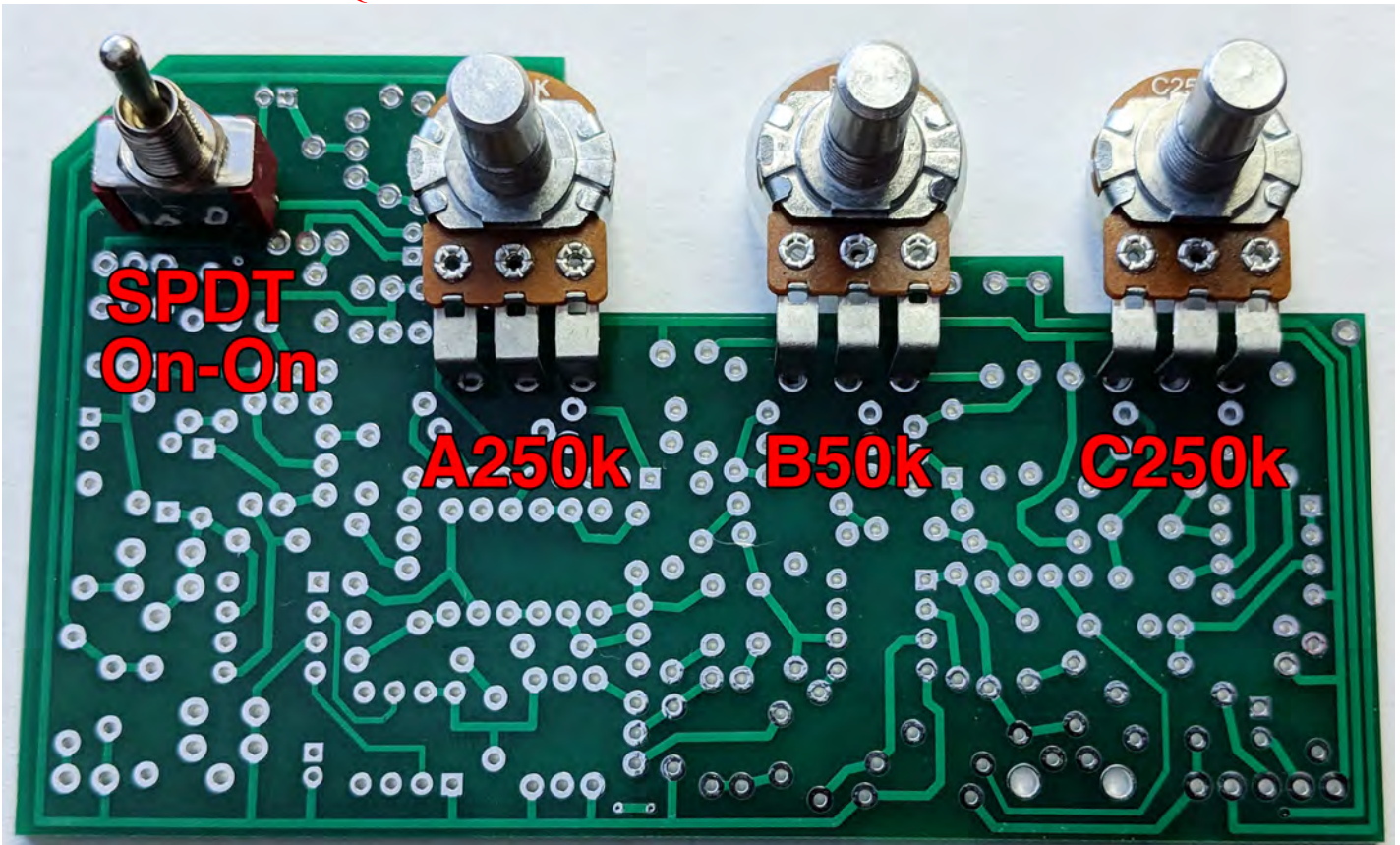
At this point, your build will look like this:



# Main PCB Assembly

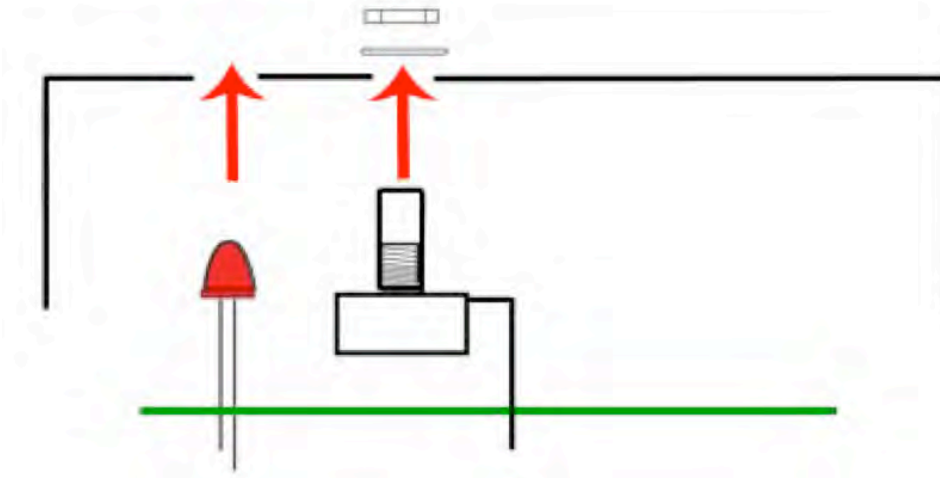
**Step 1:** Flip the PCB over so that the bottom or solder side is up. Insert the potentiometers, toggle switches, and the LEDs into the bottom side of the PCB. **DO NOT SOLDER ANYTHING YET!!!** (See below for advanced tip)

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



When placing the potentiometers for enclosure installment, it sometimes helps to solder the middle lug of the pots, allowing about a 1mm gap between the PCB and thick part of the potentiometer lug. This allows rigidity of the pots, as well as giving a little “wiggle room”. After you have your board installed, hand tighten the potentiometers and switches, and **carefully** reflow the middle lugs of the pots to allow the board to settle. After the board has settled, you can solder the rest of the pot and switch lugs.





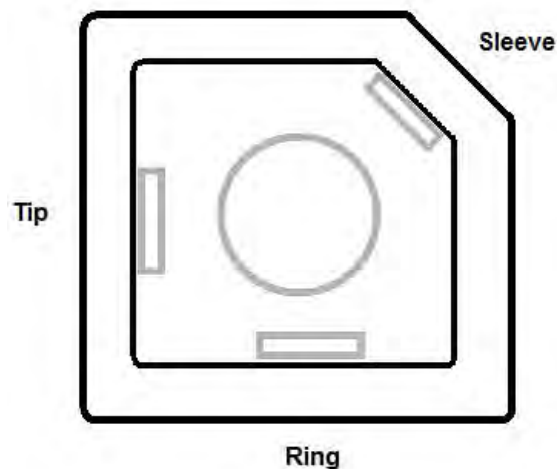
**Step 2:** Hold the PCB in one hand so that the component side of the PCB is in the palm of your hand and the bottom side with the pots, toggle switch and LED is facing up. Now use your other hand to guide the predrilled enclosure onto the PCB assembly so that the pots, toggle switch and LED all go 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 3:** 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.

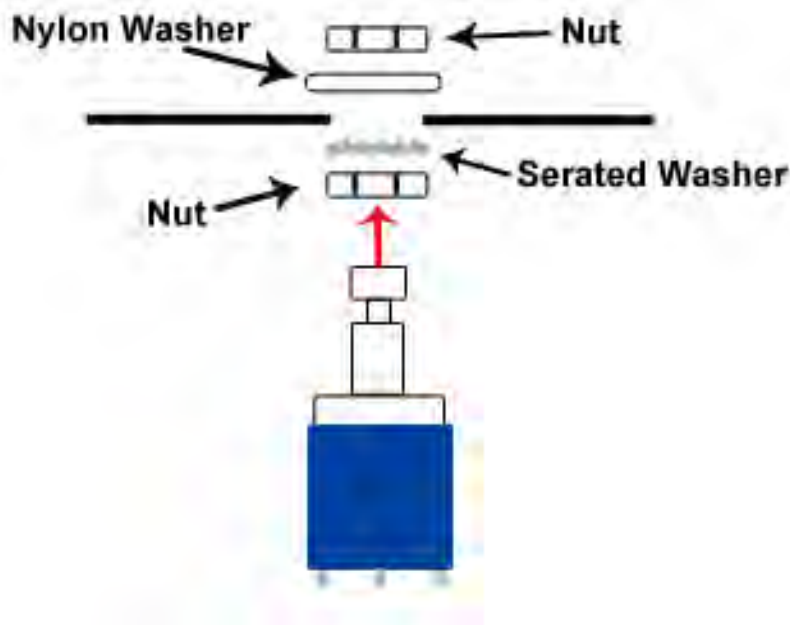
**Step 4:** Solder the pots, toggle switch and LEDs. You will be soldering on the component side (top) of the PCB. After you have soldered them in place, be sure to tighten up their nuts. **TIP:** only solder one lug of each component at first. This will secure everything in place and still allow you to wiggle things around if you need to adjust the fit of anything. Once you have everything perfect, go ahead and solder everything else.



## Enclosed Jack



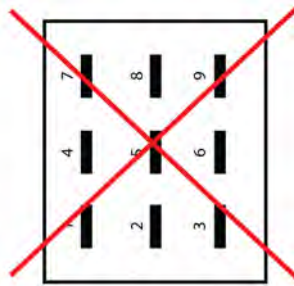
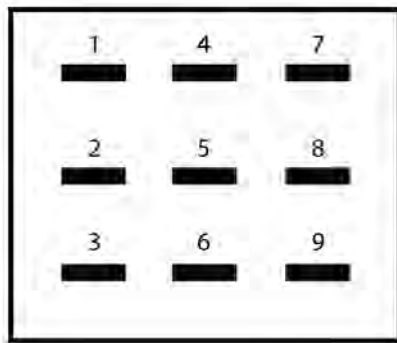
You will want to place the jacks into the enclosure so the sleeve terminal is facing the right like the picture above. Be sure to remember the lock washers so the jacks don't spin on their own.



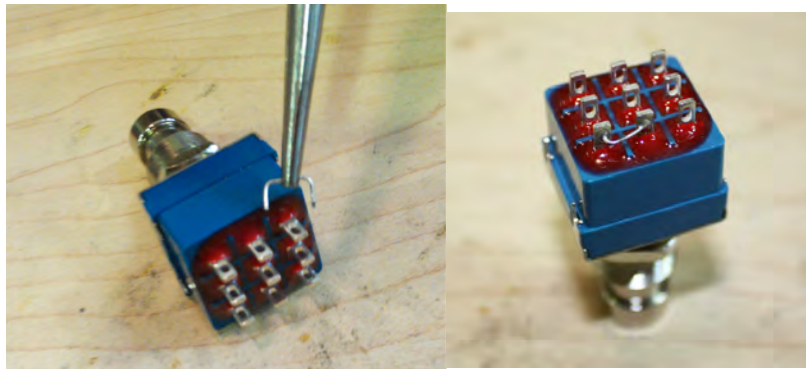
**Step 5:** Install the footswitch. Orient the footswitch so that the flat sides of the solder lugs are like the diagram below.

**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.

## FOOT SWITCH SOLDER LUG DESIGNATIONS



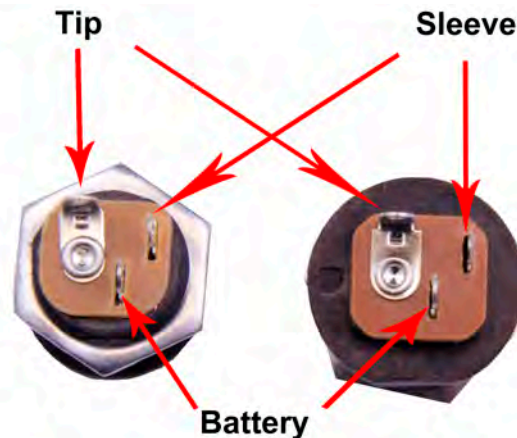
**Step 5a:** Make a jumper between lugs 3 & 6 from clippings from the resistors. Simply use your needle nose pliers to make a U shape & insert into lugs 3 & 6, then solder.



**Step 5b:** Connect a wire to LUG 4 that also jumpers to LUG9. Strip about 1" off one end. Make sure there is enough insulated wire to make the connection to the TIP of the in jack. Carefully tin the stripped end. You may want to twist the wire strands together tightly before tinning. Thread the stripped end through LUGs 4 and 9. This can be a little tricky. If this part is too frustrating for you, you can just run a separate wire to connect LUGs 4 and 9. Just be sure to solder the two wires at LUG 4 at the same time so you only need to make one solder joint.



# 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 lug to the eyelet in-between the “-“ and “+” eyelets.

## Finishing Up

1. Add all the IC's to their sockets. The DIP8 ICs may have a 'u-shaped' notch. If they do, match them up with the notch in the socket that should also be matched up with the layout. If there is no notch, then there should be a small dot in the corner of the IC that denotes pin 1. Pin 1 on the circuit board will always be denoted by a square solder pad. The SIP9 IC will have a notch between Pin1 and Pin2 and should be matched up with the line on the layout.
2. Adjust the trim pots as describe earlier.
3. Put the lid on the enclosure, screw it down, and then apply the self adhesive rubber bumpers.





## Finished Wiring.

# Operating Overview



**RAMP TOGGLE:** Turns the ramp feature on or off. When the ramp is ON, use the ramp footswitch to activate the effect. When the ramp is OFF, the pedal acts as a normal vibrato.

**RISE TIME:** Controls the speed in which the effect turns on when in RAMP ON mode. CCW = Faster onset of vibrato effect. CW = Slower onset of vibrato effect.

**DEPTH:** Typical depth control for the vibrato effect. Controls the 'warble' CW = More depth, and more modulation. CCW = Less depth, and less modulation.

**RATE:** Controls how fast the vibrato effect is. CW = Fast vibrato effect. CCW = slow vibrato effect.

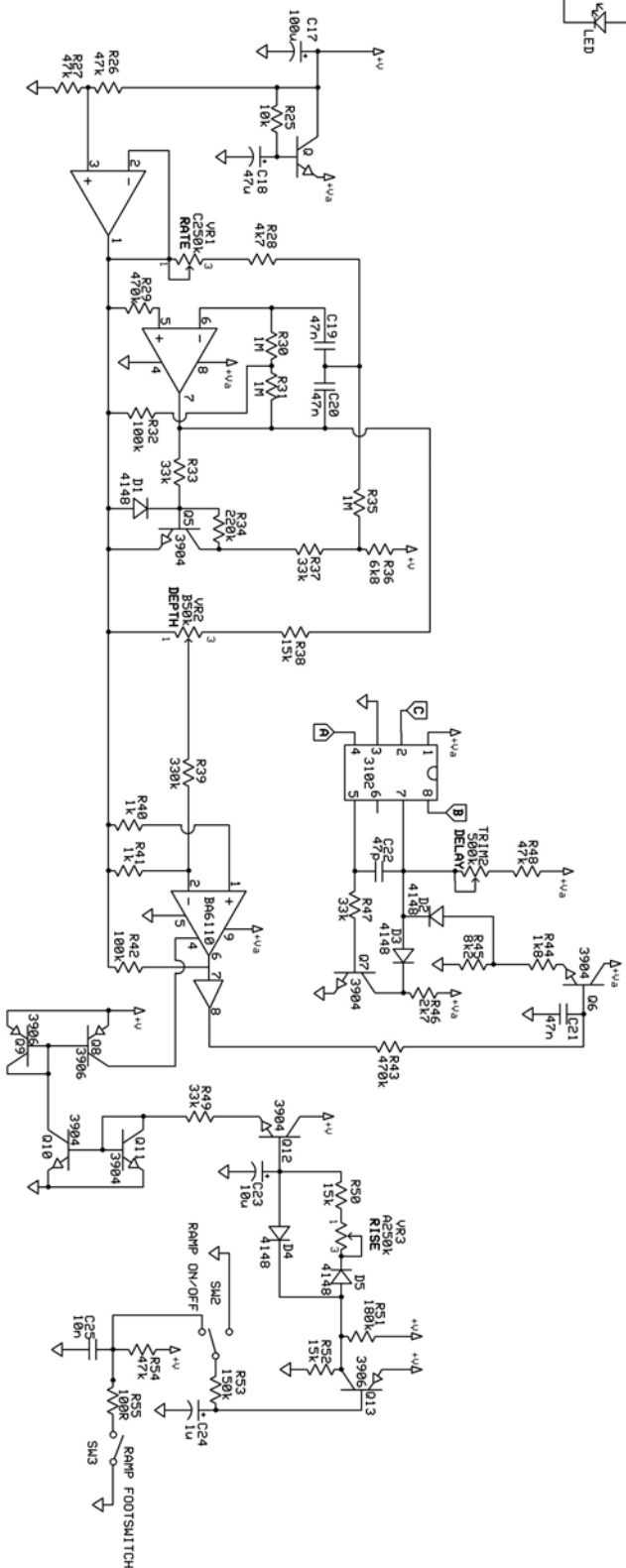
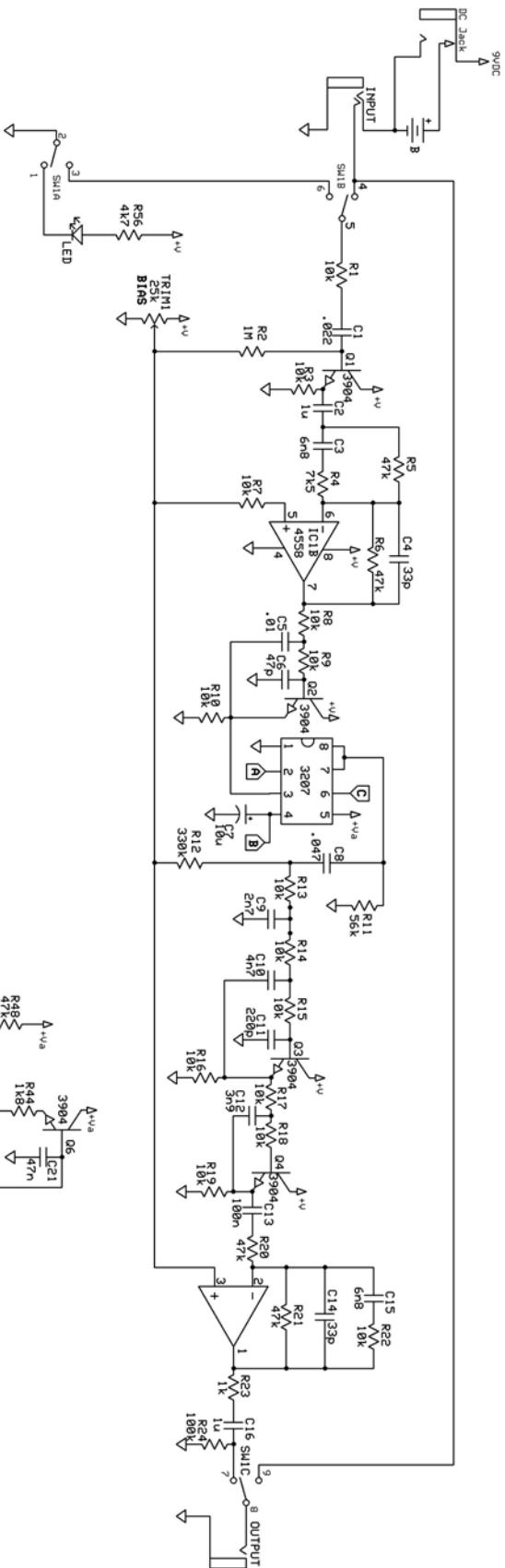
**IN:** Guitar input.

**OUT:** Output jack to amplifier.

**Power supply:** 9v 2.1mm negative tip or 9v battery

**Current Draw:** 35mA

**Input Impedance:** 1M Ohm



## Build Your Own Clone

### Analog Vibrato

Designed By: Dave G. Vanderhulst  
Rev 2.0  
8/16/2018  
Page # or name



For hi-res schematic visit:  
<http://byocelelectronics.com/analogvibratoschematic.pdf>

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