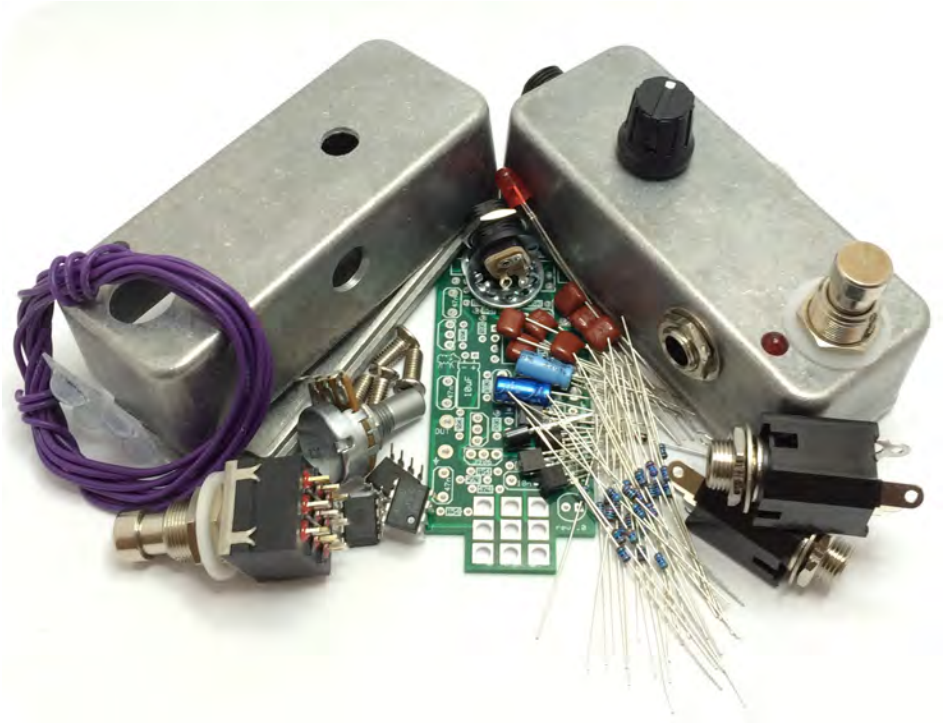
Build Your Own Clone
Li'l Orange Phaser
Kit Instructions



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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.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. 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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Parts Checklist for the Li'l Orange Phaser Kit

Resistors:

2 - 4k7/472 (Yellow/Purple/Black/Brown/Brown)
10 - 10k/103 (Brown/Black/Black/Red/Brown)
4 - 22k/223 (Red/Red/Black/Red/Brown)
1 - 56k/563 (Green/Blue/Black/Red/Brown)
6 - 150k/154 (Brown/Green/Black/Orange/Brown)
3 - 470k/474 (Yellow/Purple/Black/Orange/Brown)
1 - 1M/105 (Brown/Black/Black/Yellow/Brown)
1 - 3M3/353 (Orange/Orange/Black/Yellow/Brown)

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

Capacitors:

2 – 10n/ .01uF film cap (may say "103" on the body)
6 - 47n/ .047uF film cap (may say "473" on the body)
1 - 10uf Aluminum Electrolytic
1 - 15uf Aluminum Electrolytic

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

Diodes:

1 – 5.1v Zener

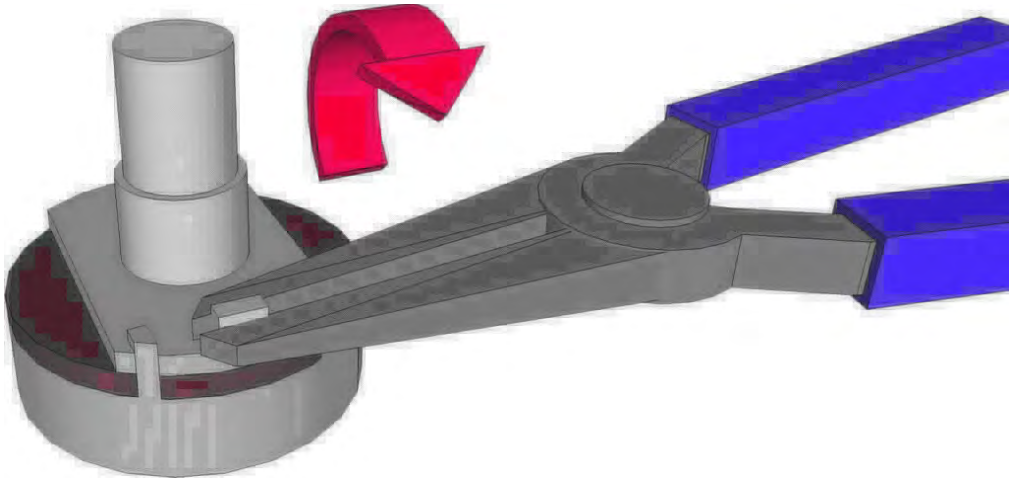
Transistor:

1 - 2N3906, or similar transistor.
4 – 2N5952

IC:

3 - 4558

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



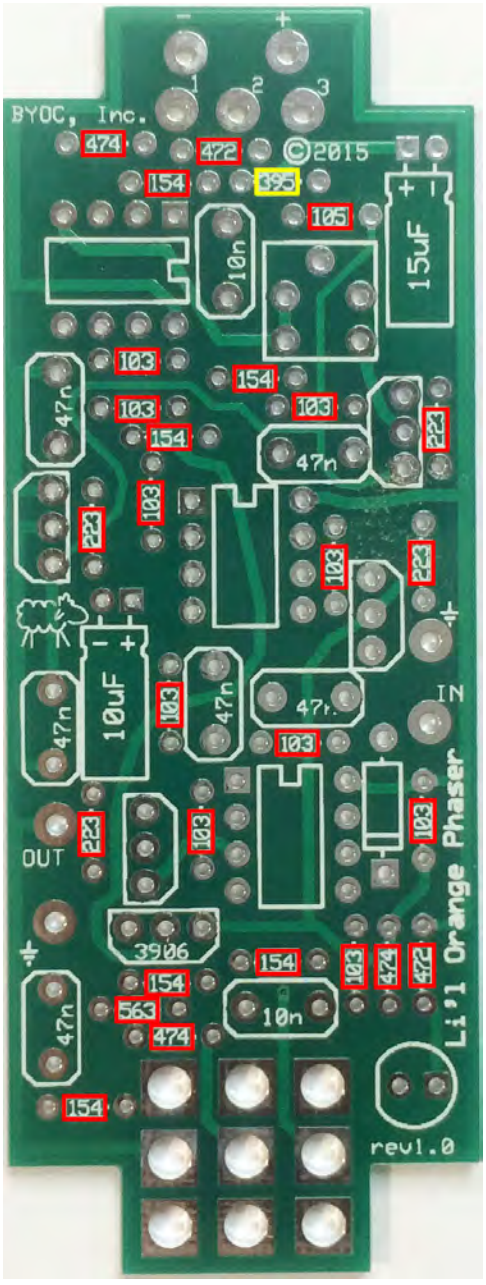
1 - C500K (SPEED)
1 - 100K trimpot

Hardware:
1 - predrilled enclosure w/ 4 screws
1 – Li'l Orange Phaser circuit board
1 - 3pdt footswitch
1 - LED
1 – External Nut AC Jack
2 – Enclosed Audio Jacks
4 - rubber bumpers
2 - lock washers (for in and out jacks)
hook-up wire

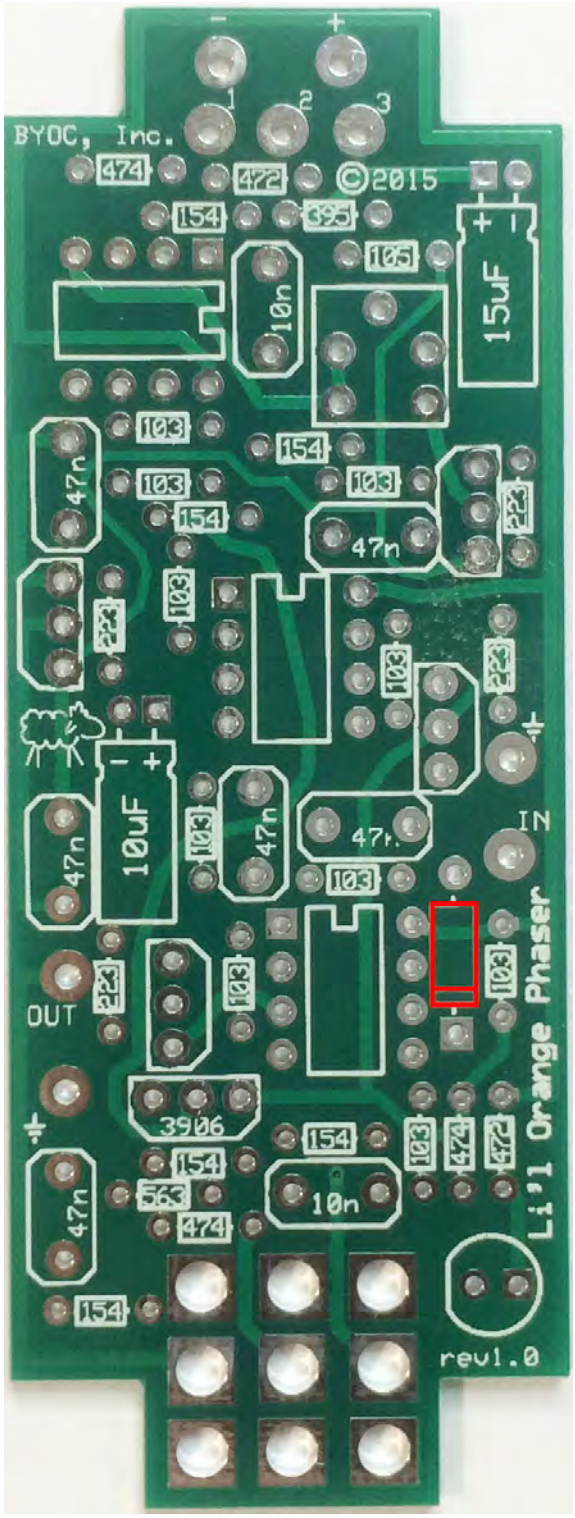
Your build should look similar to this when you're finished.

Populating the Circuit Board

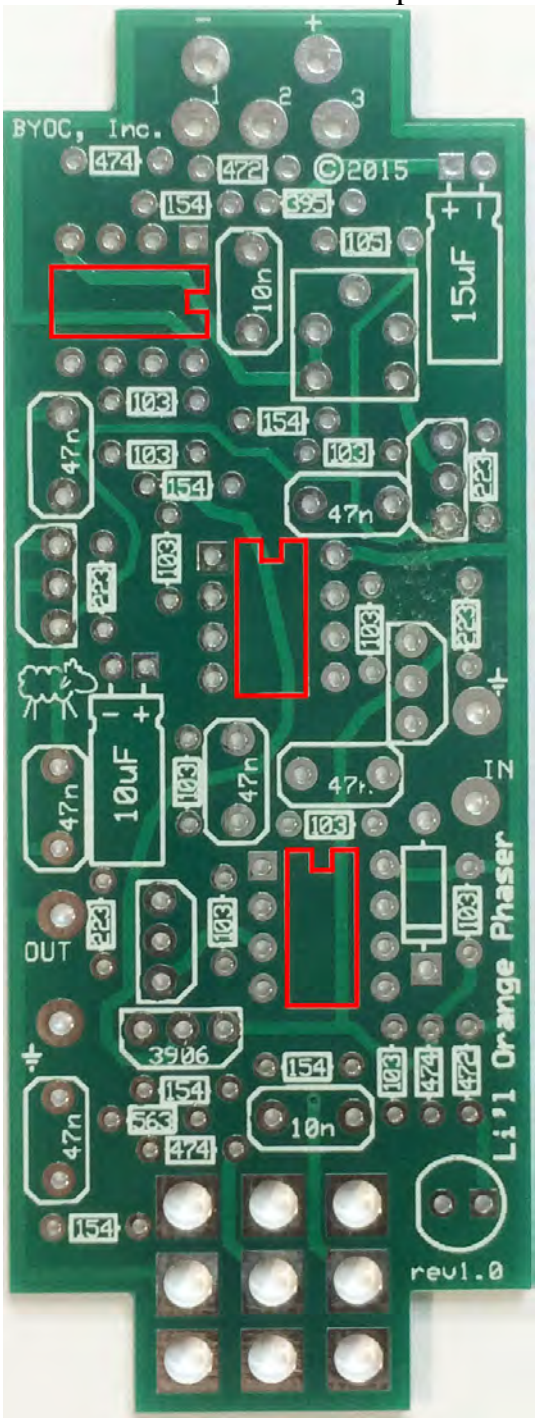
Step 1: Add all the resistors. Resistors are not polarized and can be inserted in either direction. **Note: use the 3M3 resistor for the resistor highlighted in yellow.**



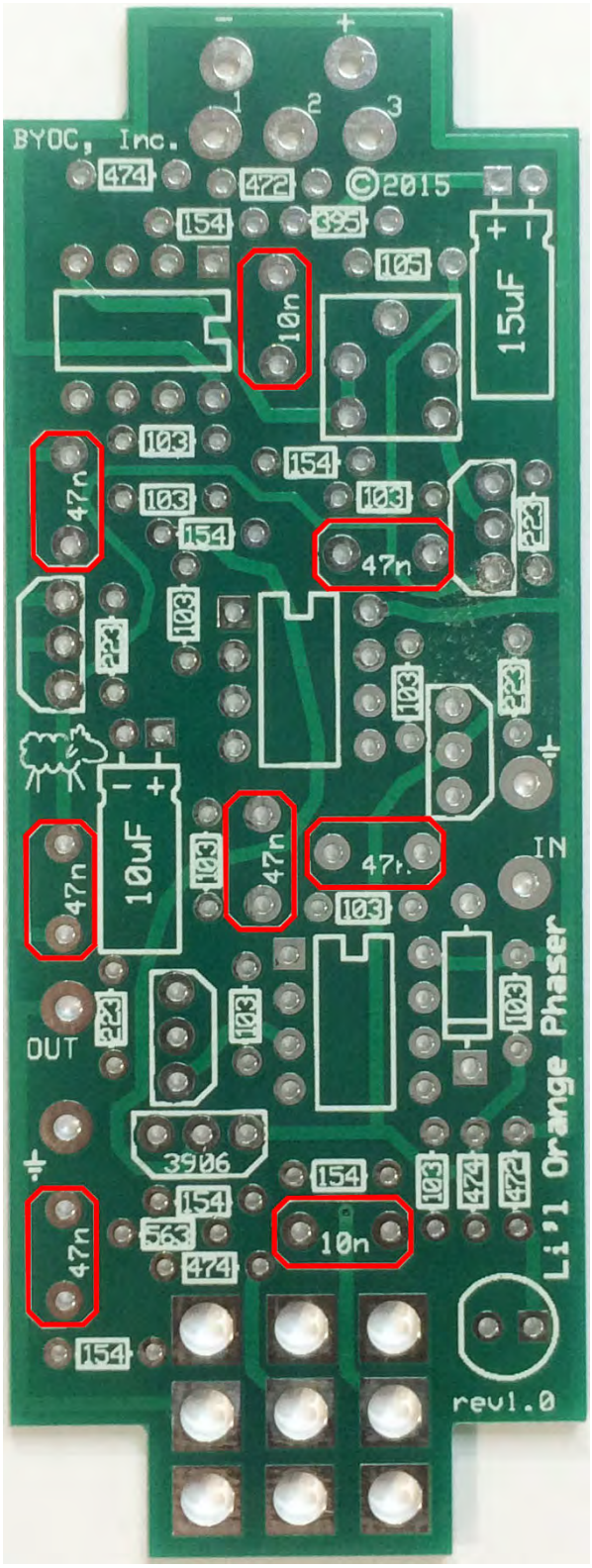
Step 2: Add the diodes. Be sure to match the end of the diodes with the stripe to the layout on the PCB. The striped end should go in the square solder pad.



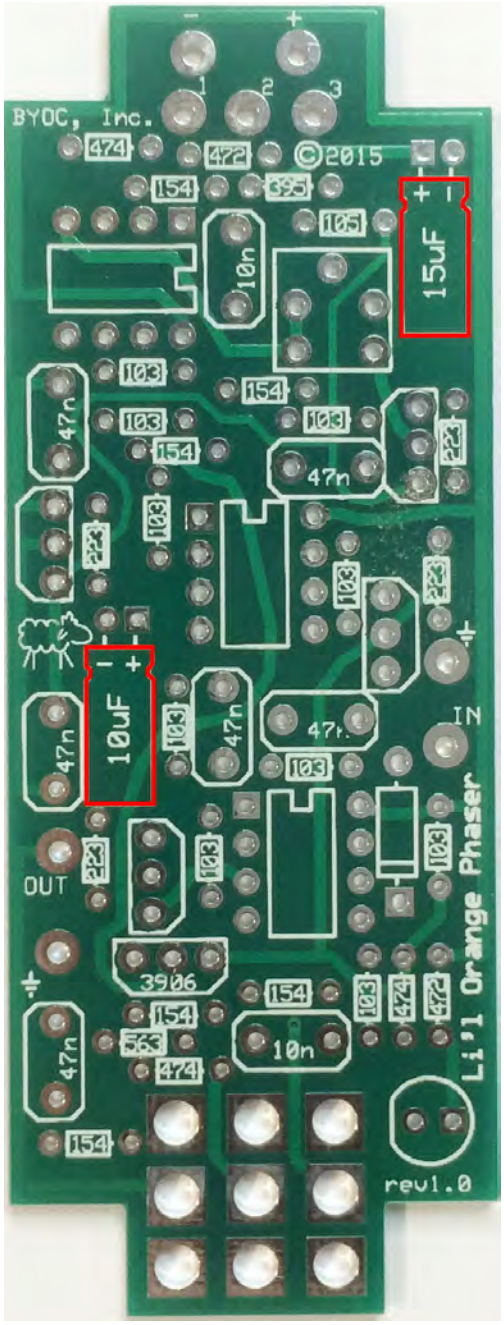
Step 3: Add the ICs. Be sure to orient them correctly. There may be a notch on the IC between pins 1 and 8. Line that up with the screenprint on the PCB. If your IC does not have a notch, look for a dot to indicate pin 1. Pin one on the PCB will be a square hole.



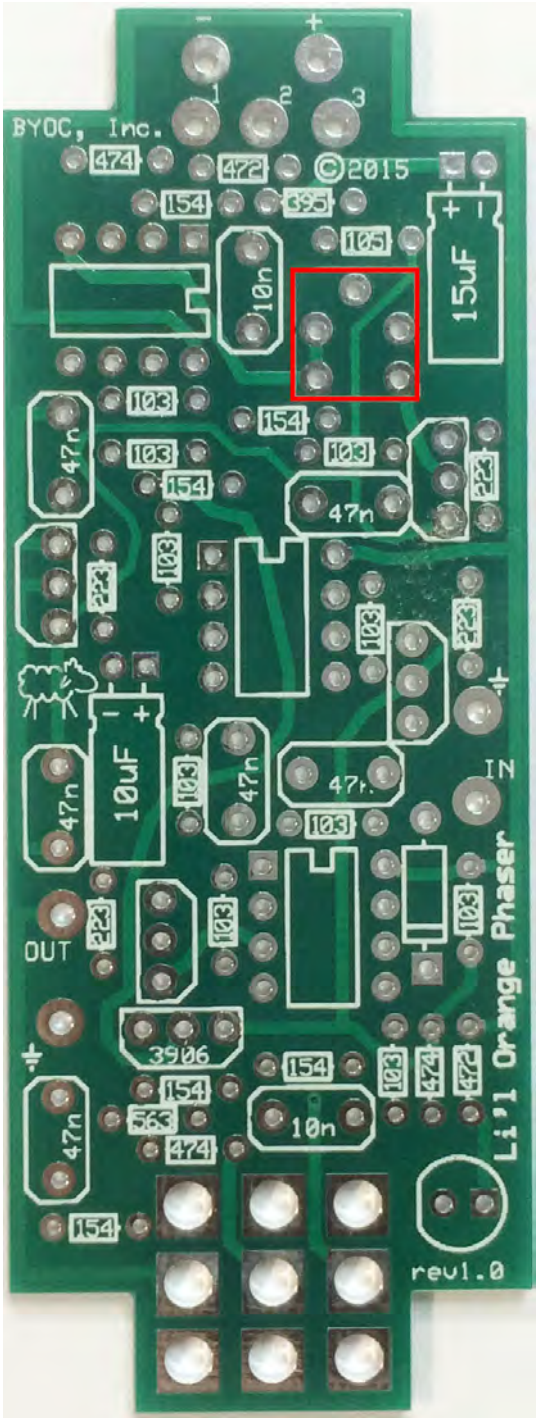
Step 4: Add the film capacitors. These are non-polarized and can go in either direction.



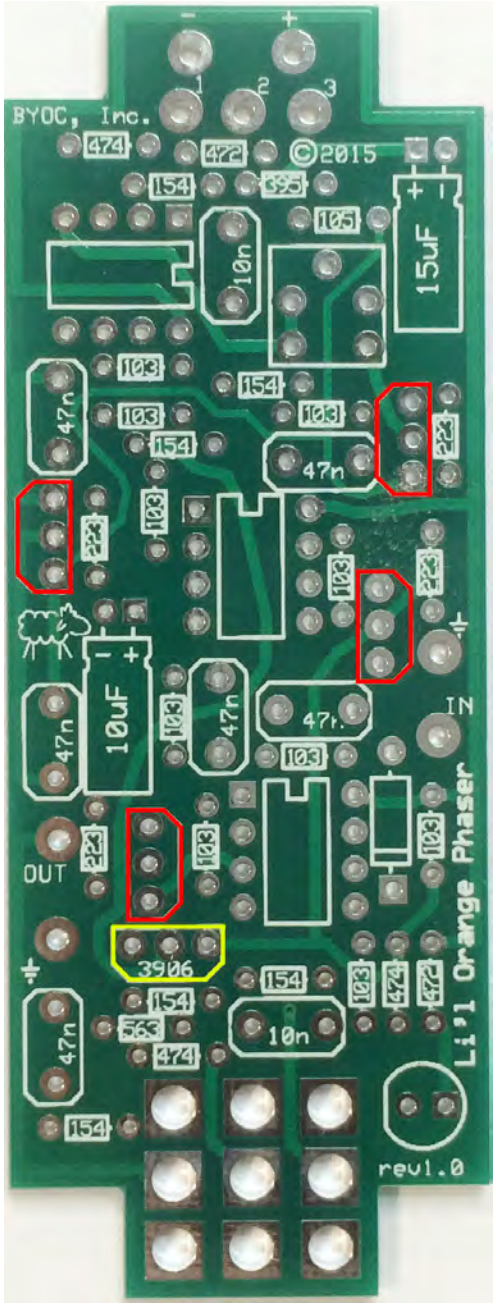
Step 5: Add the aluminum electrolytic capacitors. These ARE polarized, meaning there is a positive and negative end. The positive side will have a longer lead and goes in the square solder pad. The negative side will have a shorter lead and a stripe running along the body of the cap, and goes in the round solder pad. Before soldering, bend the capacitor so it is laying down like below



Step 6: Add the Trimpot. There are 5 holes in the PCB but only 3 leads on your trim pot. Don't let this confuse you. The extra holes are there to accommodate a variety of different brands/models. There should only be one way that your trimpot will fit into the PCB.



Step 7: Add the Transistors. Be sure to orient them according to the screenprint on the PCB. The 2N5952's are highlighted in red. The 2N3906 is highlighted in yellow. Do not insert them into the PCB as far as you can. Let them stick out just a little bit so that you can bend them down. See pic of finished pedal on page 6.

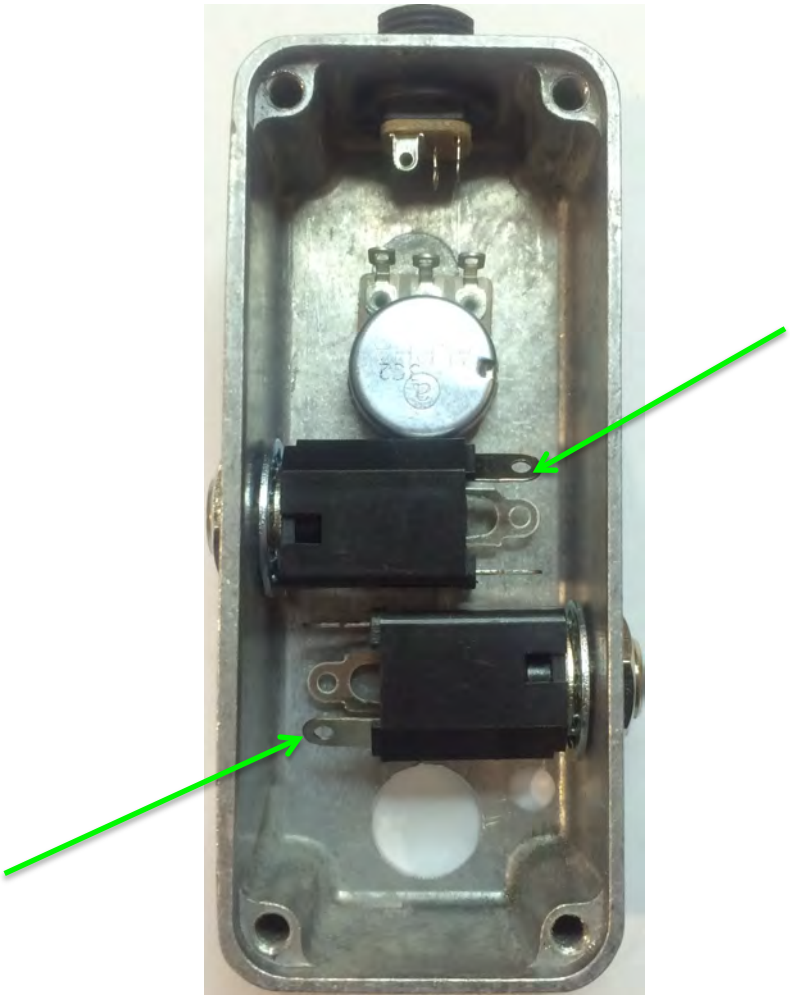


Enclosure Hardware Assembly

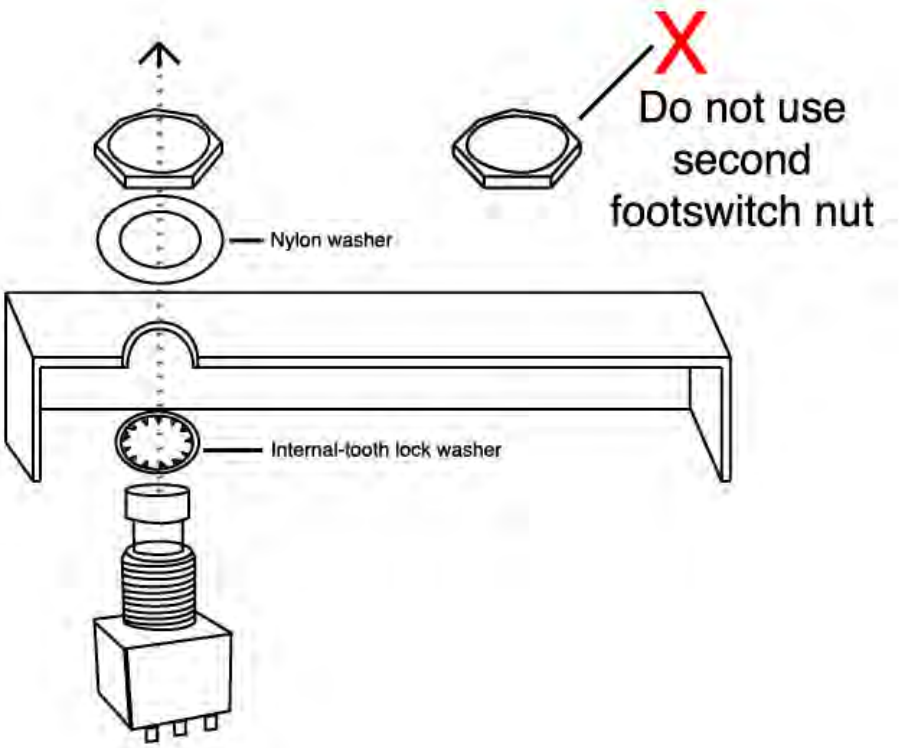
Step 1: Mount the DC adapter jack.

Step 2: Mount the potentiometer. You will mount it with the solder lugs facing towards the DC Jack.

Step 3: Mount the Audio Jacks. You want to orient them so that the SLEEVE terminals (beveled corner of the jack) are facing away from each other. If looking at the inside of the enclosure, the OUTPUT jack will have its sleeve terminal facing towards the AC jack. The INPUT jack will have its sleeve terminal facing towards the footswitch hole. The green arrows are pointing at the sleeves.



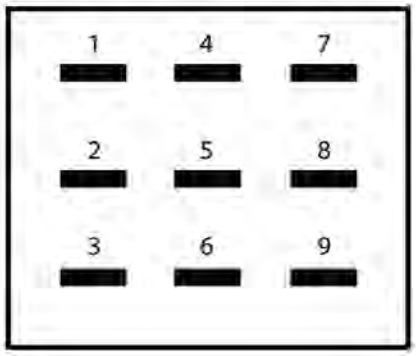
Step 4: Remove both nuts from the footswitch and mount the footswitch.

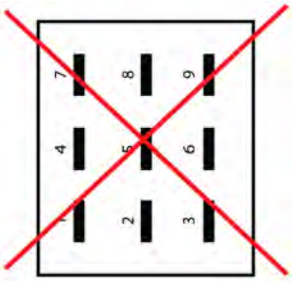


Orient the footswitch so that the flat sides of the solder lugs are like the diagram below.

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

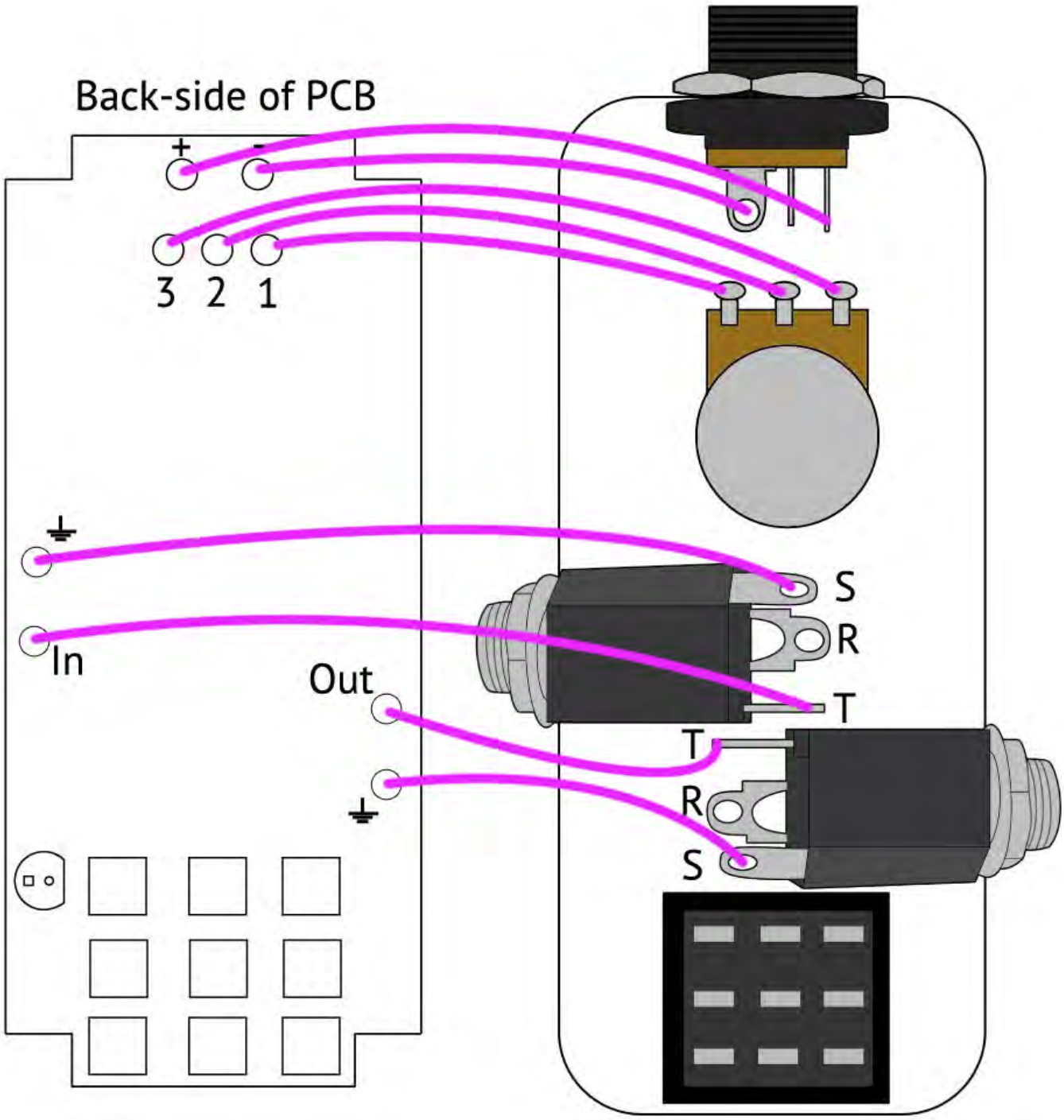




Wiring

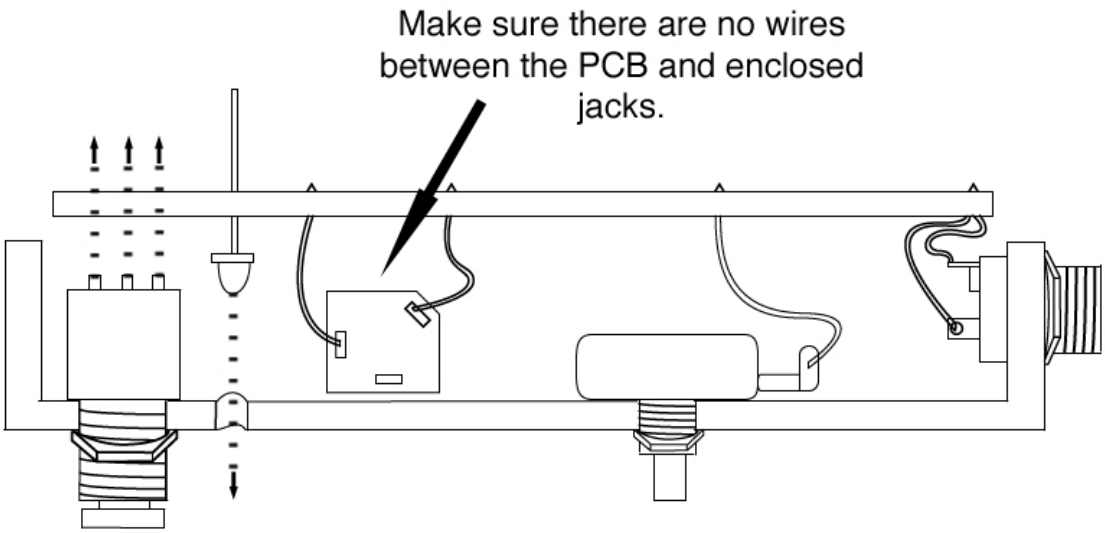
FLIP PCB OVER!!!

STEP 1: Wire the PCB as shown in the diagram below. Make all connections to the back side of the PCB and solder on the top (screen printed) side of the PCB. Make the wires as short as possible but allow enough length so that if you need to do any trouble shooting later, you will be able to do so without having to remove all the enclosure mounted components.



Step 2: Once the AC jack, potentiometer, and IN/OUT jacks are wired, insert the LED in its hole. **Insert the long lead into the square hole!!!** You might want to slightly bend the leads away from each other to keep them in the holes for now. DO NOT SOLDER YET

Step 3: Flip the PCB right-side-up, tuck the wires into the enclosure, and place the PCB onto the footswitch. DO NOT SOLDER YET!!!!!



Buffalo Bill says, “Be sure to tuck really well!”

It is extremely important that when you place the PCB on the footswitch, you make sure to tuck all the wires out of the way so that that PCB can rest flush against the enclosed jacks and footswitch.

Step 4: Solder ONLY 1 of the footswitch lugs.

Your PCB should be recessed inside the enclosure about 1cm. It should be level.

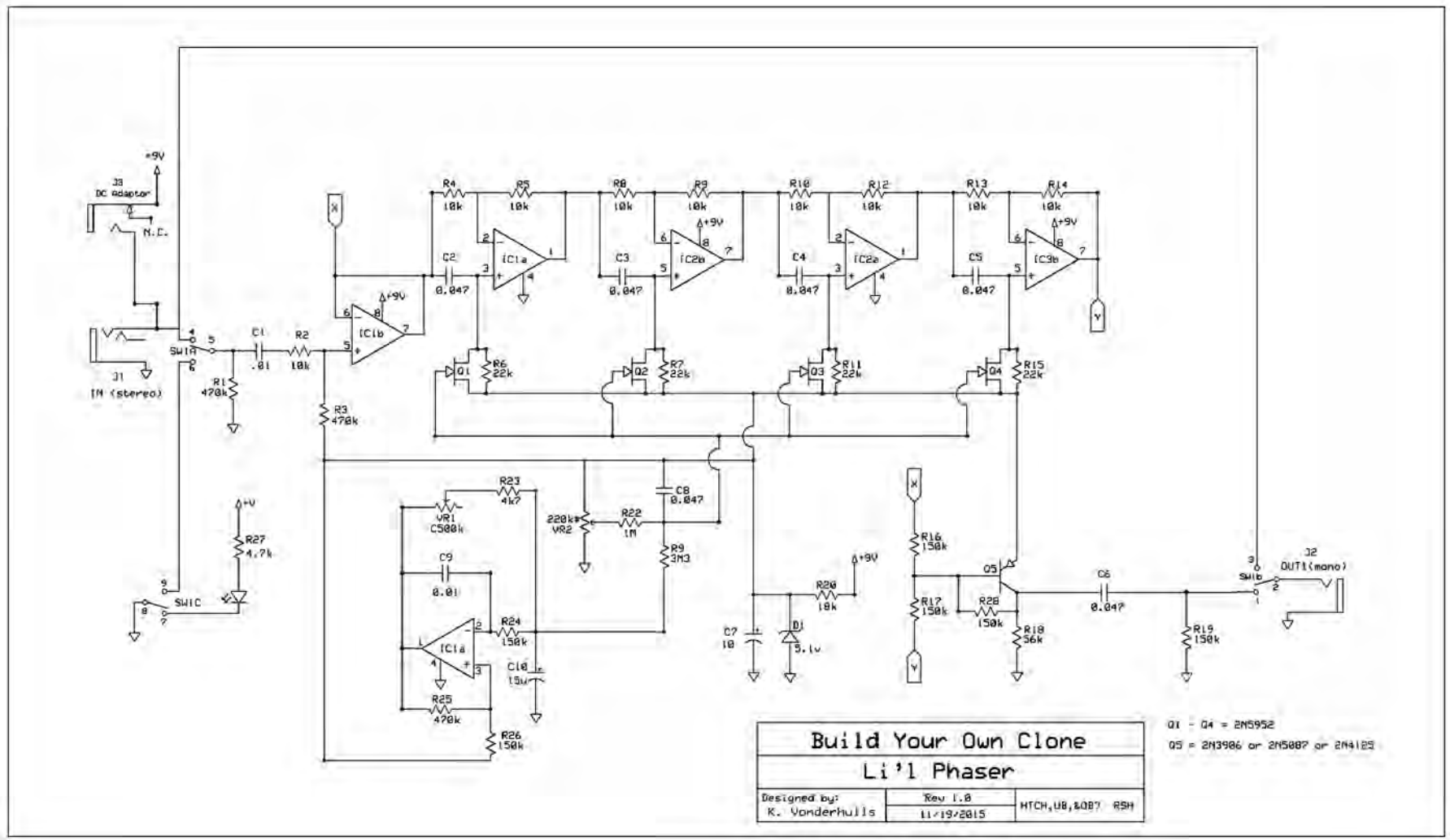
Some of your components may be sticking up out of the enclosure just a bit, particularly the film capacitors. This is to be expected. This is OK. The lid has a deep recess.

If you need to adjust the position of the PCB so that it fits correctly, reheat the single solder joint you just made on the footswitch. Adjust the position of the PCB while the keeping the solder joint hot. Remove the heat and hold the PCB in position while allowing the solder joint to cool completely. Now solder the rest of the footswitch lugs.

Step 5: Once you have your PCB positioned and soldered, guide the LED into its enclosure hole using the leads that are sticking up through the PCB. Once the LED is in position, solder and trim the excess leads.

Operating Overview

SPEED: controls the rate at which the phase shifting modulates.
Power supply: 2.1mm negative tip.
Current Draw: 7.5mA
Input Impedance: 470k ohms
Output Impedance: 150k ohms

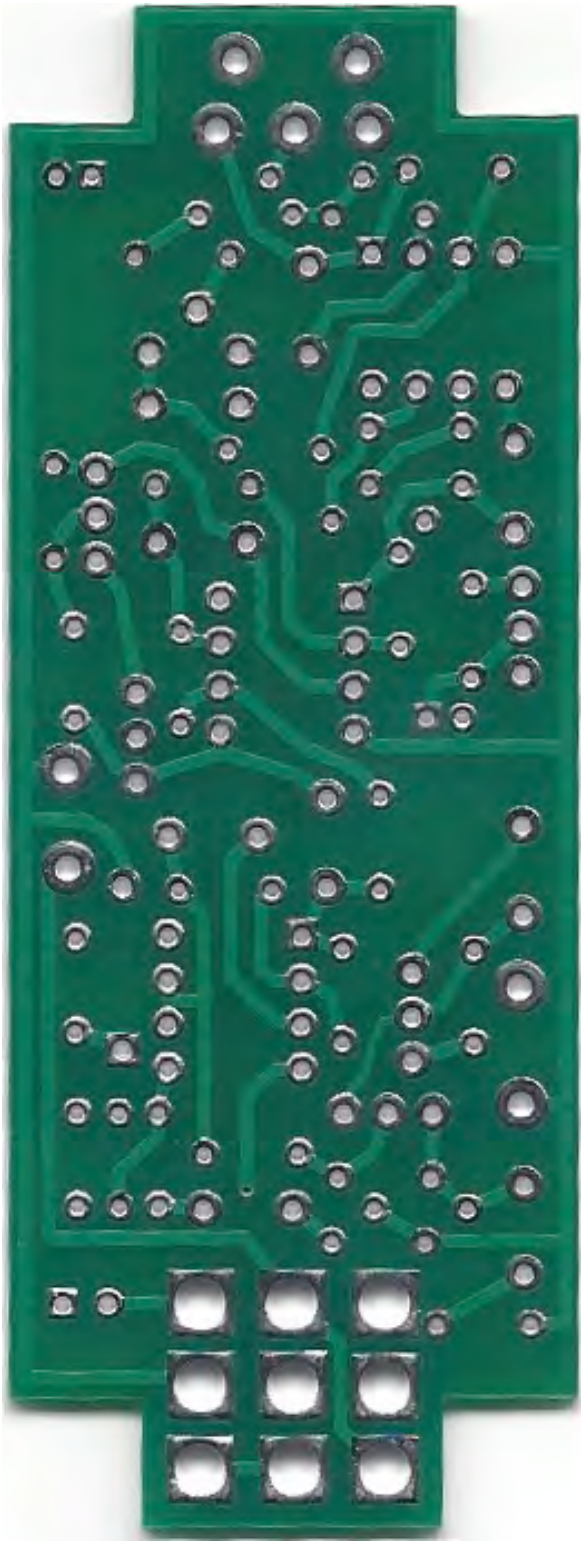


Build Your Own Clone		
Li'l Phaser		
Designed by: K. Vanderhulls	Rev 1.0 11/19/2015	HTCH,U8,&087 RSH

Q1 - Q4 = 2N5952

Q5 = 2N3906 or 2N5087 or 2N4125

PCB Back Trace Photo



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