

B.Y.O.C Large Beaver Kit Instructions

Version 2.0 with EQ Voicing Switch

Parts Checklist	page 2 - 3
Populating the Circuit Board (Triangle specs)	page 5 - 8
Populating the Circuit Board (Ram's Head specs)	page 9 - 13
Populating the Circuit Board (Pickled Beaver specs)	page 14 - 18
Installing the Rotary Switch, Potimeters, & LED	page 19 - 21
Assembly	page 22 - 23
Wiring	page 24
Installing the Transistors, Finishing up & Troubleshooting	page 25 - 26
Schematic	page 27 -30

B.Y.O.C. Large Beaver Parts Checklist

Resistors:

- 2 x 100ohm (brown/black/black/black/brown)
- 1 x 120ohm (brown/red/black/black/brown) don't confuse this one with the 10K!!!!
- 2 x 150ohm (brown/green/black/black/brown)
- 2 x 820ohm (gray/red/black/black/brown) **NOT INCLUDED IN KITS PURCHASED AFTER 6/1/08**
- 1 x 1k (brown/black/black/brown/brown)
- 1 x 2.7k (red/purple/black/brown/brown)
- 1 x 3.3k (orange/orange/black/brown/brown)
- 1 x 4.7k (yellow/purple/black/brown/brown)
- 2 x 8.2k (gray/red/black/brown/brown)
- 4 x 10k (brown/black/black/red/brown) don't confuse these with the 120ohm!!!!
- 2 x 12k (brown/red/black/red/brown)
- 2 x 15k (brown/green/black/red/brown)
- 2 x 22k (red/red/black/red/brown)
- 1 x 33k (orange/orange/black/red/brown)
- 2 x 39k (orange/white/black/red/brown)
- 1 x 47k (yellow/purple/black/red/brown)
- 3 x 82k (gray/red/black/red/brown)
- 3 x 100k (brown/black/black/orange/brown)
- 4 x 390k (orange/white/black/orange/brown)
- 1 x 430k (yellow/orange/black/orange/brown)
- 3 x 470k (yellow/purple/black/orange/brown)
- 1 x 1M (brown/black/black/yellow/brown)

Capacitors:

- 3 x 560pf ceramic disc (561 small orange)
- 2 x .0039uf (392 or 3n9)
- 2 x .01uf film (103 or 10n)
- 2 x .05 ceramic disc (OR .047 film caps 473 or 47n)
- 6 x 0.1uf film (104 or 100n)
- 3 x 1uf aluminum electrolytic
- 1 x 10uf aluminum electrolytic

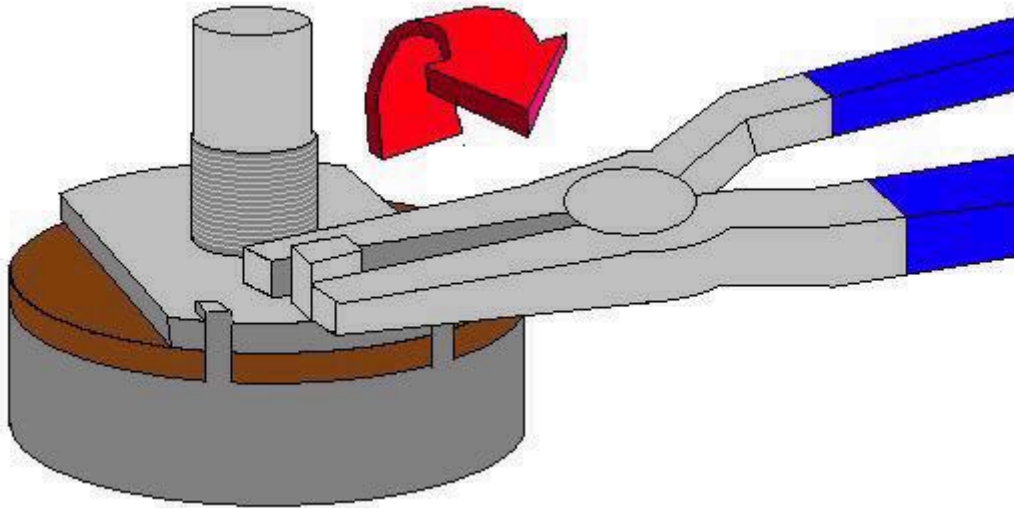
transistors:

- 4 x 2N5133 **NOT INCLUDED IN KITS PURCHASED AFTER 6/1/08**
- 4 x BC239C
- 4 x transistor sockets **NOT INCLUDED IN KITS PURCHASED AFTER 6/1/08**

Diodes:

- 4 x 1N4148 or 1N914

potentiometers: **(be sure to snap off the small post on the top side of the pot with a pair of needle nose pliers)**



- 1 - A100k “volume”
- 1 x A100k “sustain”
- 1 x B100k “tone”
- 3 x extra pot washers and nuts to be used as spacers (only with PCB mounted pots)

Hardware:

- 1 - b.y.o.c. ready to solder Large Beaver PCB
- 1 - predrilled enclosure w/screws
- 1 x 3pole 4position rotary switch
- 4 x knobs
- 1 x 1/4” mono jack
- 1 x 1/4” stereo jack
- 1 x 3PDT footswitch
- 1 x red LED
- 1 x battery snap
- 1 x AC adaptor jack
- 4 x rubber bumpers
- hookup wire

Pickle Pack Mod kit Parts Checklist:

NOT INCLUDED WITH STANDARD KIT

Resistors:

- 2 x 100 ohm (brown/black/black/black/brown)
- 1 x 1.5k (brown/green/black/brown/brown)
- 1 x 15k (brown/green/black/red/brown)
- 1 x 33k (orange/orange/black/red/brown)
- 1 x 100k (brown/black/black/orange/brown)
- 1 x 470k (yellow/purple/black/orange/brown)

Capacitors:

- 3 x 470p ceramic disc (471 round orange)

2 x .0033uf film (332 or 3n3)
2 x .047uf fim (473 or 47n) (OR .05 Ceramic disc)
2 x 1uf aluminum electrolytic
1 x 330uf aluminum electrolytic

Semi-conductors:

1 x 1N4001 diode (black with silver stripe)
1 x 14 pin Quad transistor array chip (THAT300, MPQ3904, ect)
1 x DIP14 IC socket

©2008 B.Y.O.C., LLC

Populating the Circuit board

(Triangle Versions 1 & 2)

KITS PURCHASED AFTER 6/1/08 NO LONGER COME WITH PARTS TO BUILD TO TRIANLGE VERSION 2 SPECS

Q1 - Q4: BC239C (2N5133 version2)

R1: 100 ohms (820 ohms version 2)

R2: 22k

R3: 82k

R4: 1M

R5: 33k

R6: 390k

R7: 8.2k

R8: 150 ohms

R9: 390k

R10: 12k

R11: 82k

R12: 1k

R13: 39k

R14: 39k

R15: 100 ohms (820 ohms version 2)

R16: 8.2k

R17: 390k

R18: 82k

R19: 22k

R20: 3.3k

R21: 100k

R22: 390k

R23: 12k

R24: 4.7k

C1: .1

C2: 560p

C3: .1

C4: .1

C5: 560p

C6: .05 (OR .047 film)

C7: .0039

C8: .01

C9: .0039

C10: .01

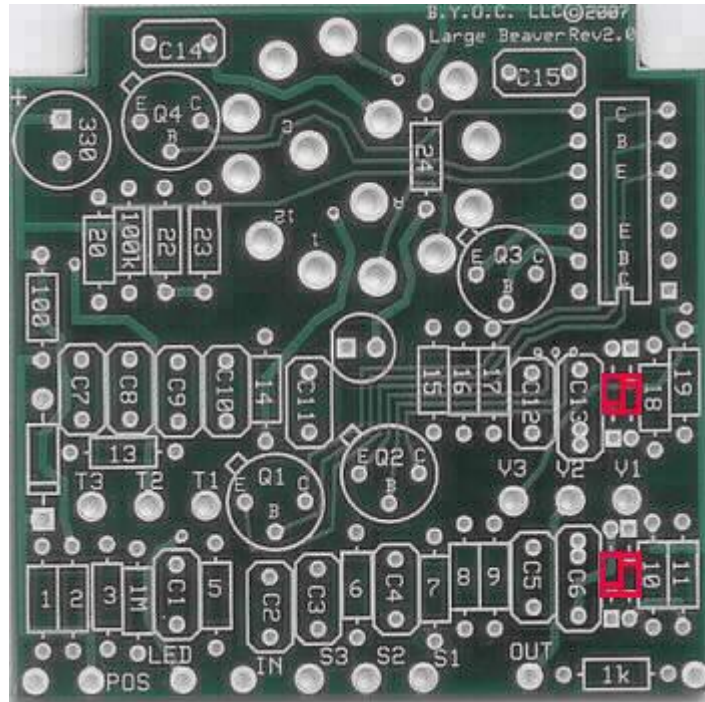
C11: .1

C12: 560p

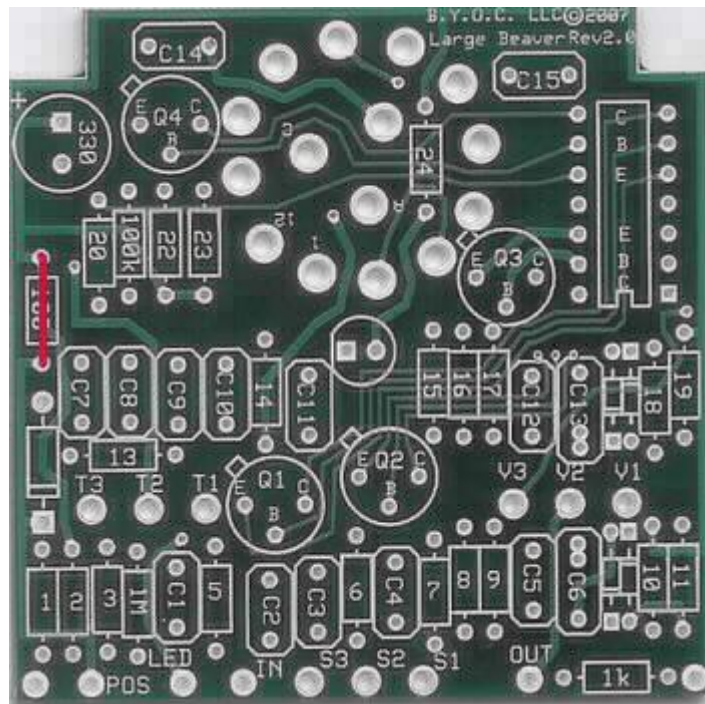
C13: .05 (OR .047 film)

C14: .1

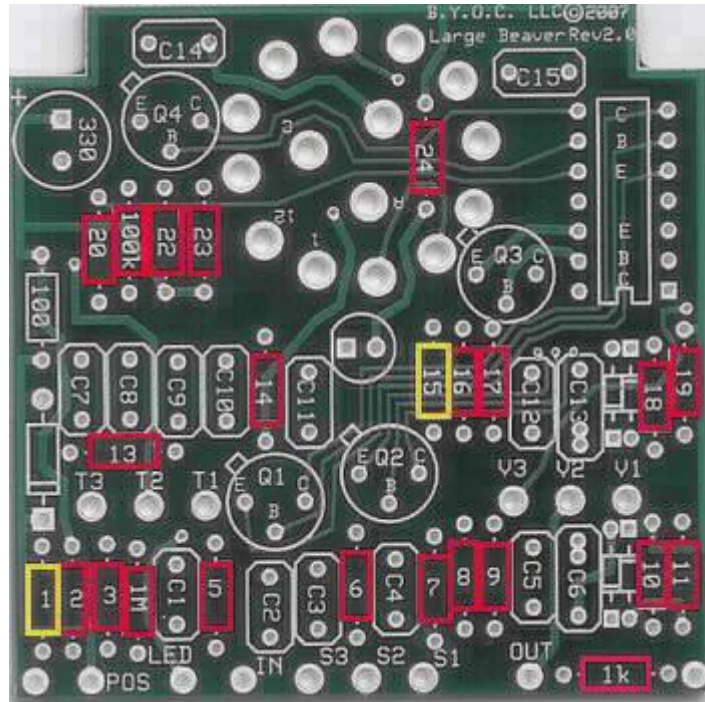
C15: .1



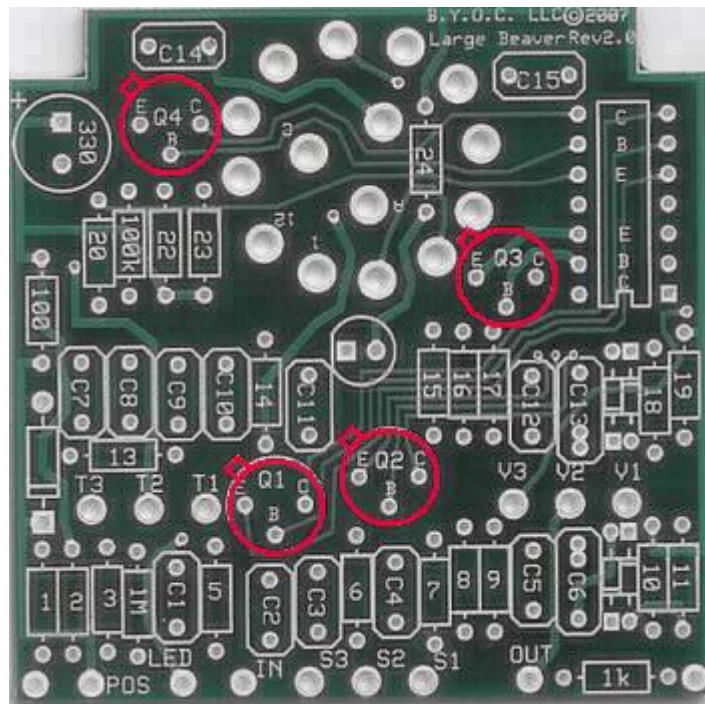
Step 1: Install the 1N914 (small orange glass) diodes. Make sure the end with the black stripe (cathode) lines up with the striped side on the PCB layout. Save the left over lead clippings for the next step.



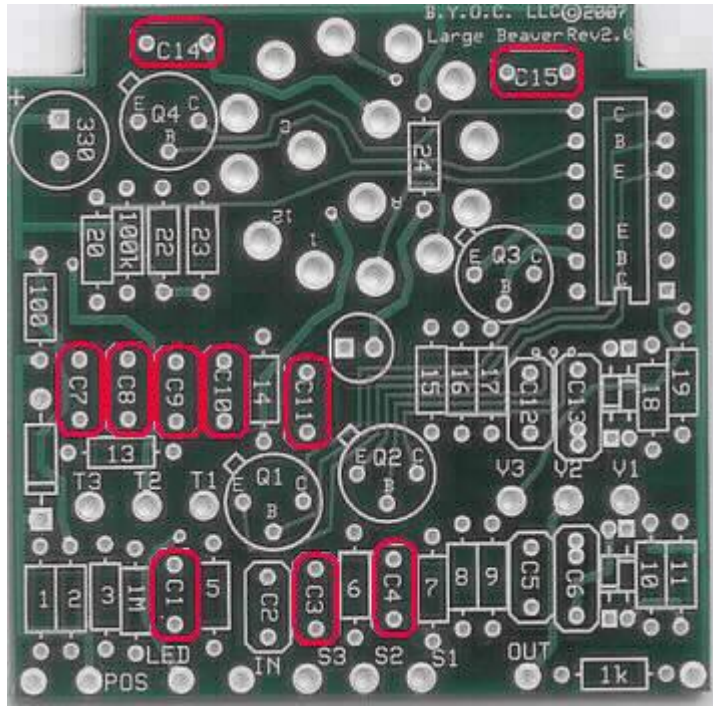
Step 2: Jumper the 100ohm resistor space with a left over piece of lead clippings from the diodes you just installed.



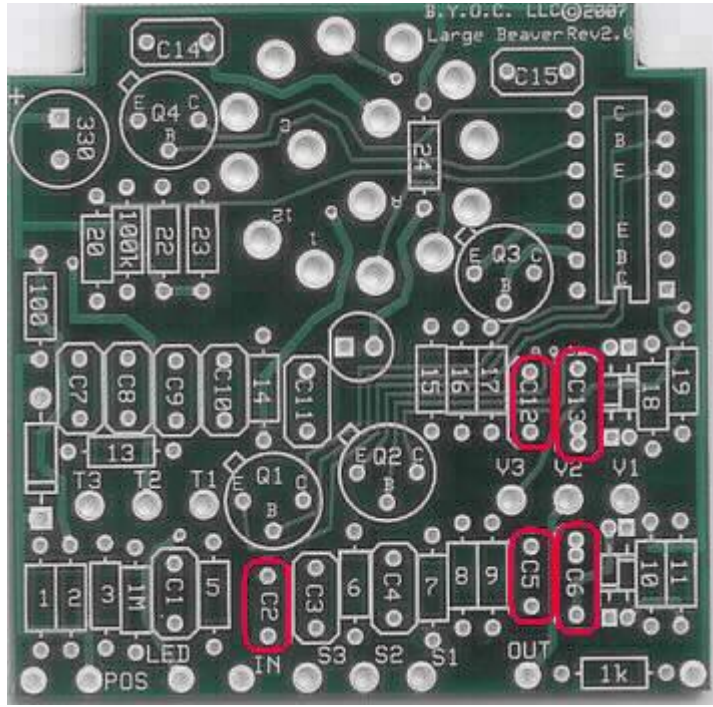
Step 3: Install the resistors. Resistors are not polarized and can be inserted into the PCB in either direction. If you are building to Triangle Version 2 specs, use the 820ohm resistors in the R1 and R15 positions.



Step 4: Install the transistor sockets. Be sure to line the tabs on the sides of the sockets up with the outline of the sockets on the PCB layout. **KIT PURCHASED AFTER 6/1/08 WILL NOT HAVE TRANSISTOR SOCKETS. YOU SHOULD SOLDER THE BC239C TRANSISTORS DIRECTLY TO THE BOARD. SEE PAGE 25 ON HOW TO ORIENTE THE TRANSISTORS**



Step 5: Add all the metal film capacitors. Metal film capacitors are not polarized and can be inserted into the PCB in either direction.



Step 6: Add all the ceramic disc capacitors. Ceramic disc capacitors are not polarized and can be inserted into the PCB in either direction.

Populating the Circuit board

(Ram's Head Specs)

Q1 - Q4: BC239C

R1: 120 ohms (make sure this isn't a 10k resistors!!!)

R2: 10k

R3: 47k

R4: 1M

R5: 39k

R6: 470k

R7: 10k

R8: 150 ohms

R9: 470k

R10: 10k

R11: 100k

R12: 1k

R13: 22k

R14: 39k

R15: 150

R16: 10k

R17: 470k

R18: 100k

R19: 15k

R20: 3.3k

R21: 100k

R22: 430k

R23: 12k

R24: 4.7k

C1: 10u

C2: 560p

C3: .1

C4: .1

C5: 560p

C6: 1u

C7: .0039

C8: .01

C9: .0039

C10: .01

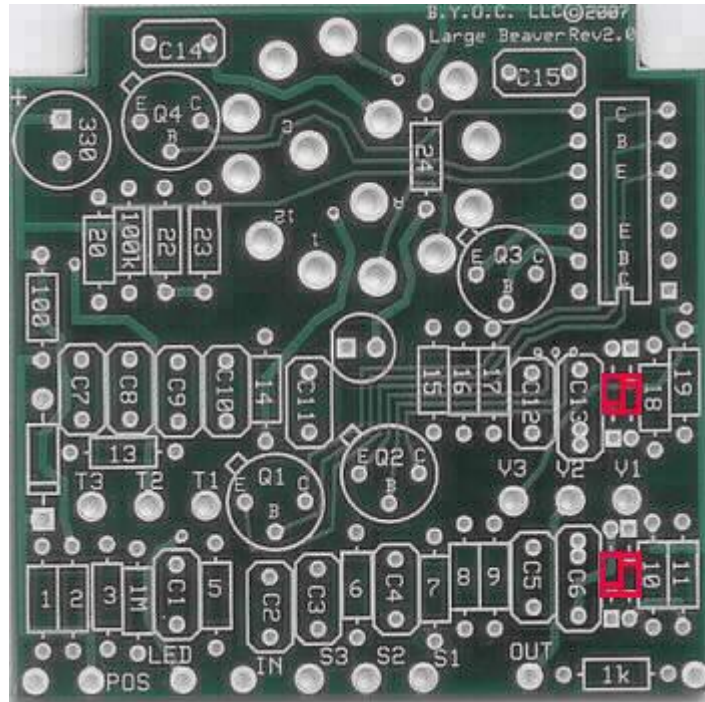
C11: .1

C12: 560p

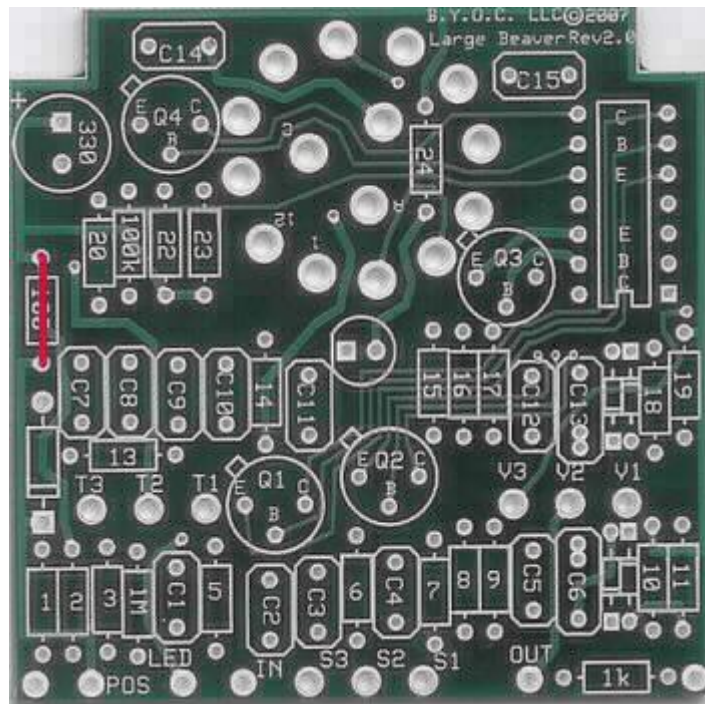
C13: 1u

C14: .1

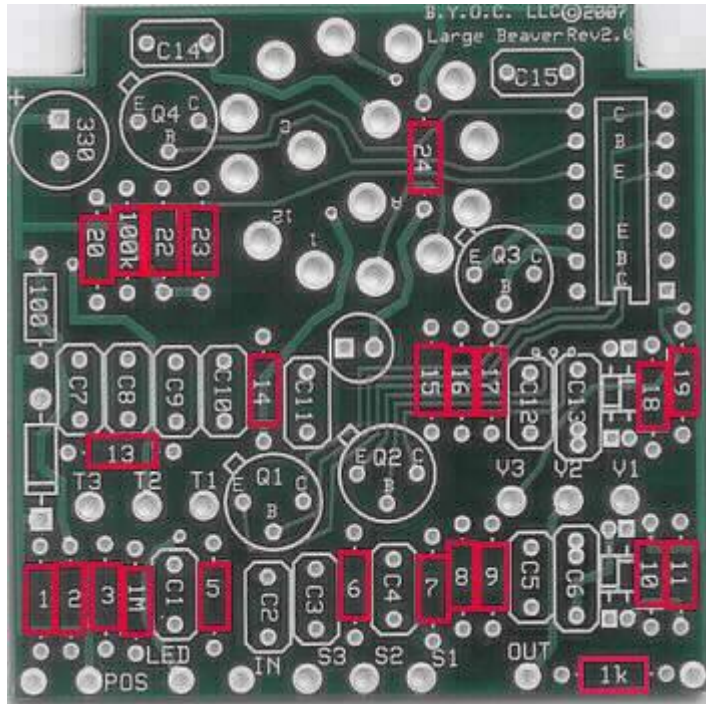
C15: 1u



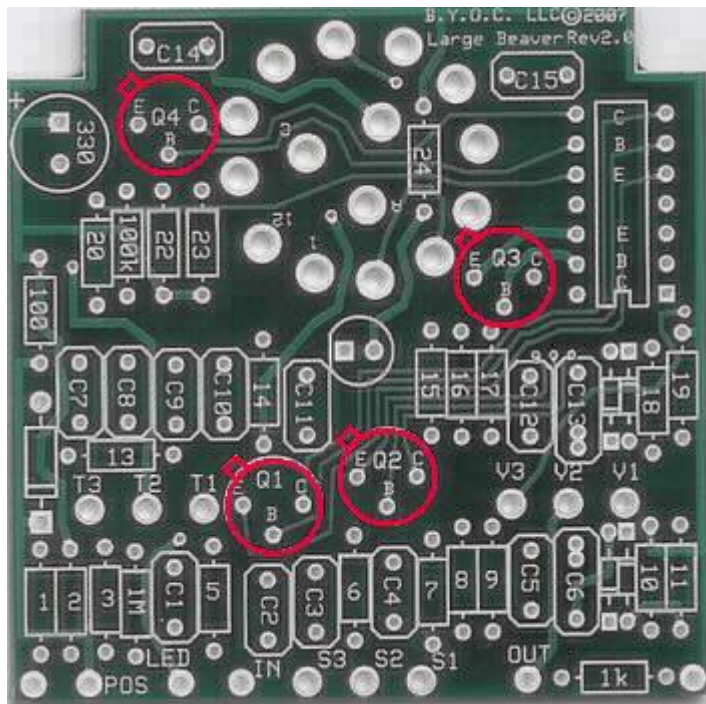
Step 1: Install the 1N914 (small orange glass) diodes. Make sure the end with the black stripe (cathode) lines up with the striped side on the PCB layout. Save the left over lead clippings for the next step.



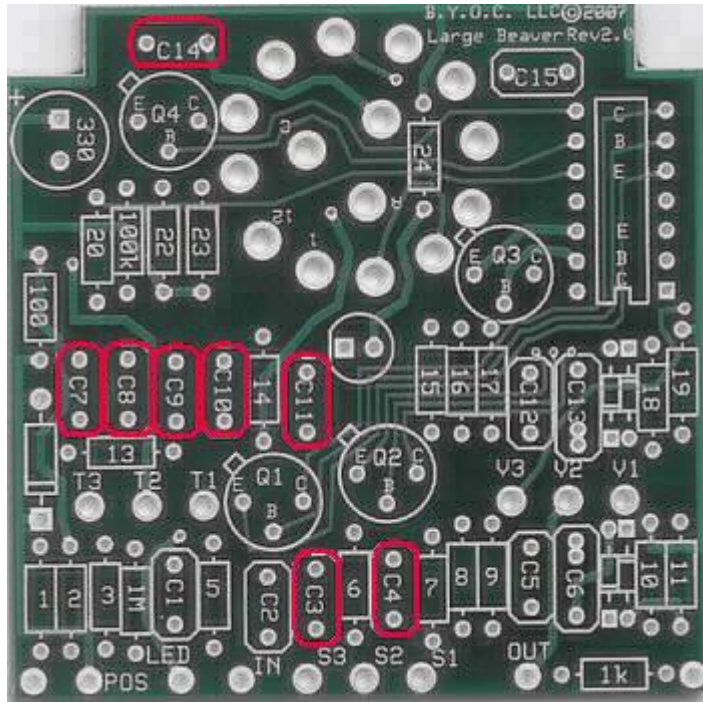
Step 2: Jumper the 100ohm resistor space with a left over piece of lead clippings from the diodes you just installed.



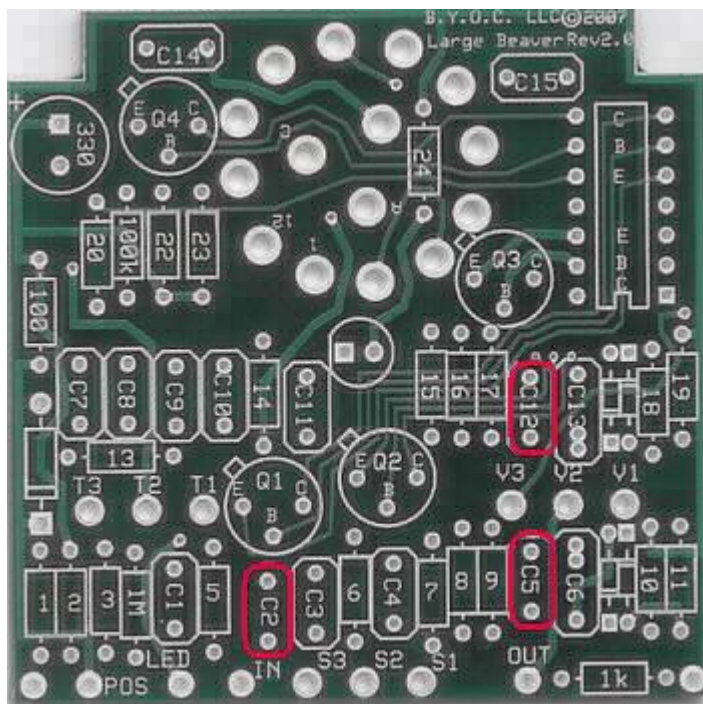
Step 3: Install the resistors. Resistors are not polarized and can be inserted into the PCB in either direction.



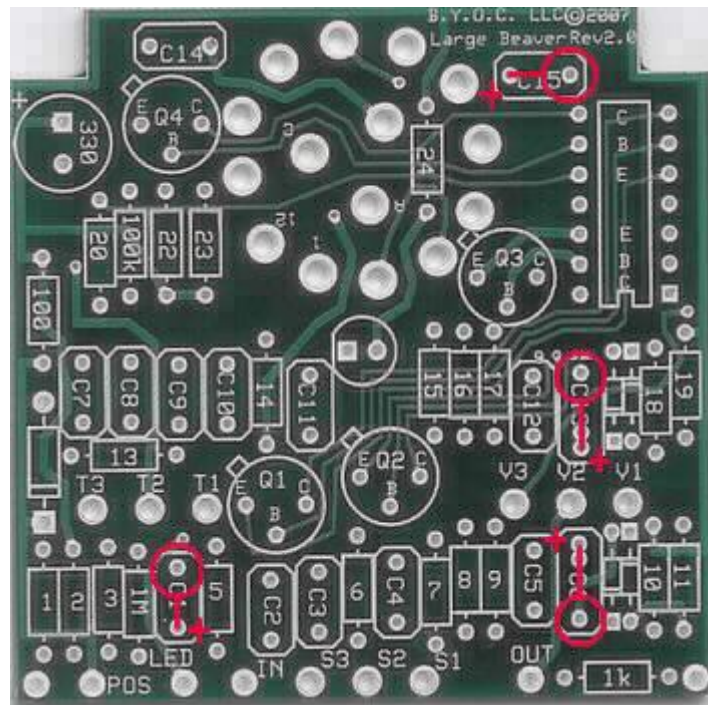
Step 4: Install the transistor sockets. Be sure to line the tabs on the sides of the sockets up with the outline of the sockets on the PCB layout. **KIT PURCHASED AFTER 6/1/08 WILL NOT HAVE TRANSISTOR SOCKETS. YOU SHOULD SOLDER THE BC239C TRANSISTORS DIRECTLY TO THE BOARD. SEE PAGE 25 ON HOW TO ORIENTE THE TRANSISTORS**



Step 5: Add all the metal film capacitors. Metal film capacitors are not polarized and can be inserted into the PCB in either direction.



Step 6: Add all the ceramic disc capacitors. Ceramic disc capacitors are not polarized and can be inserted into the PCB in either direction.



Step 7: Add all the aluminum electrolytic capacitors. These are polarized and it is very important that you have the positive and negative ends correctly oriented. Follow the diagram above. The negative end of your aluminum electrolytic capacitors will have a black stripe down one side and the lead will be the shorter of the two. The positive end will have the longer lead. In positions C1, C6, C13, and C15, be sure to insert the positive end of the electrolytic capacitors into the eyelets marked with a “+” symbol in the diagram above. Note that C6 and C13 each have an extra eyelet. This is to accommodate a variety of capacitor sizes. The “double eyelets” on C6 and C13 are also the “+” eyelets.

Populating the Circuit board

(Pickled Beaver Specs)

IC1: 14 pin NPN Quad Transistor Array

R1: 100 ohms

R2: 15k

R3: 100k

R4: 1M

R5: 33k

R6: 470k

R7: 10k

R8: 100 ohms

R9: 470k

R10: 15k

R11: 100k

R12: 1k

R13: 22k

R14: 33k

R15: 100

R16: 10k

R17: 470k

R18: 100k

R19: 15k

R20: 1.5k

R21: 100k

R22: 470k

R23: 10k

R24: 4.7k

C1: 1u

C2: 470p

C3: 1u

C4: 1u

C5: 470p

C6: .1

C7: .0033

C8: .047

C9: .0033

C10: .047

C11: 1u

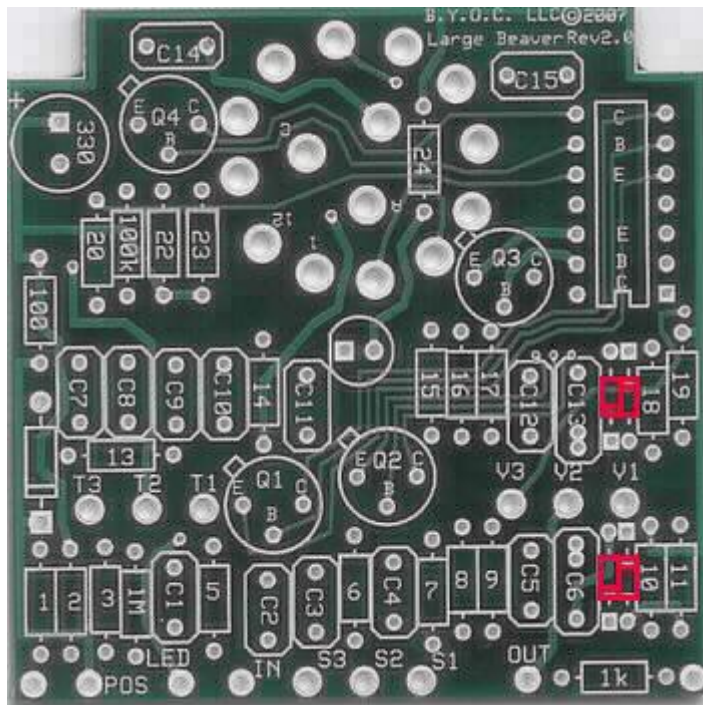
C12: 470p

C13: .1

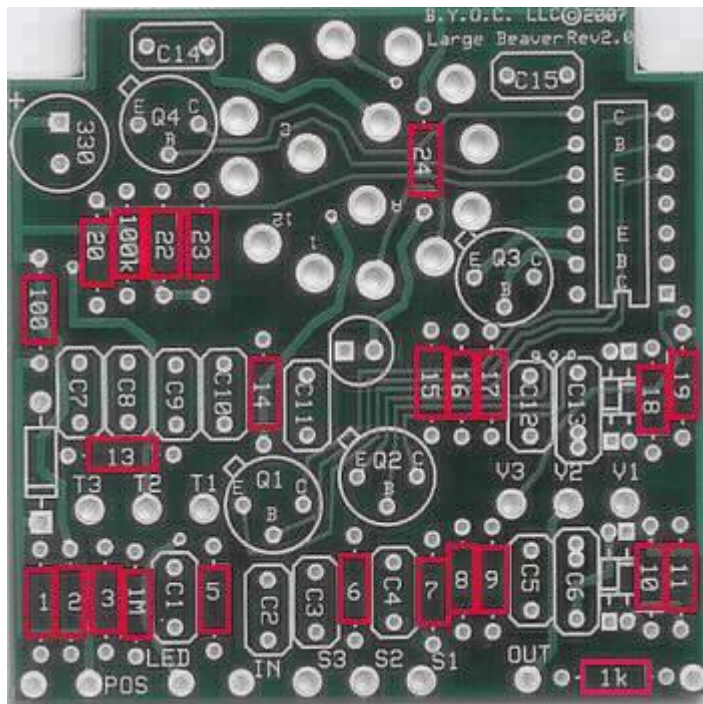
C14: .1

C15: 1u

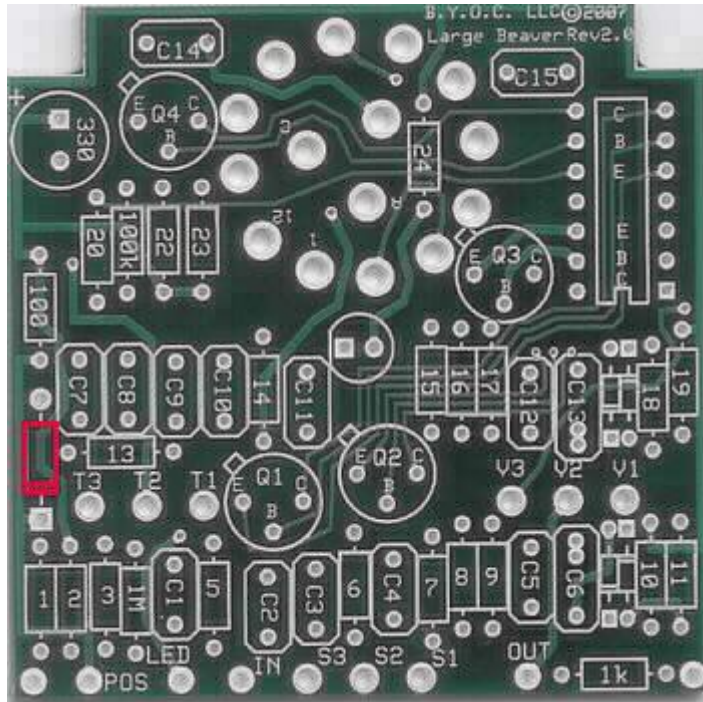
C16: 330u



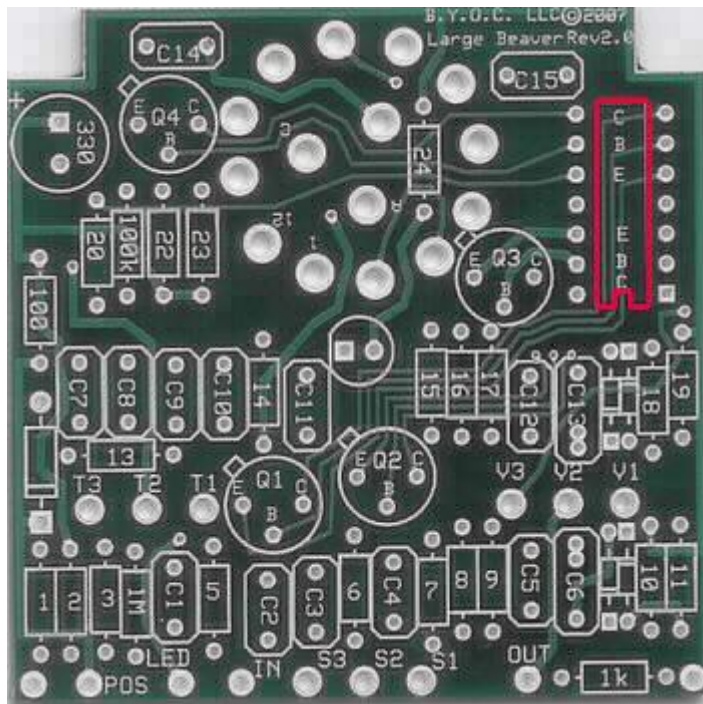
Step 1: Install the 1N914 (small orange glass) diodes. Make sure the end with the black stripe (cathode) lines up with the striped side on the PCB layout. Save the left over lead clippings for the next step.



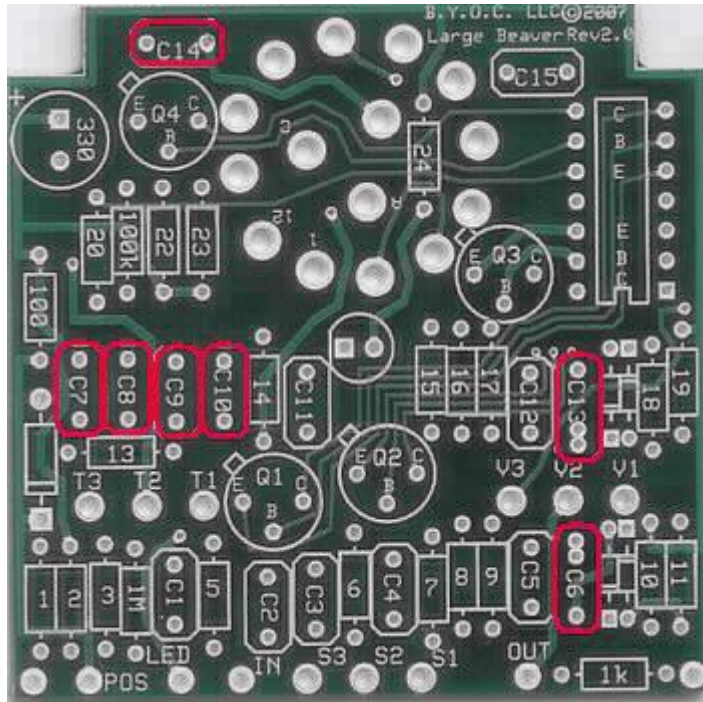
Step 2: Install the resistors. Resistors are not polarized and can be inserted into the PCB in either direction.



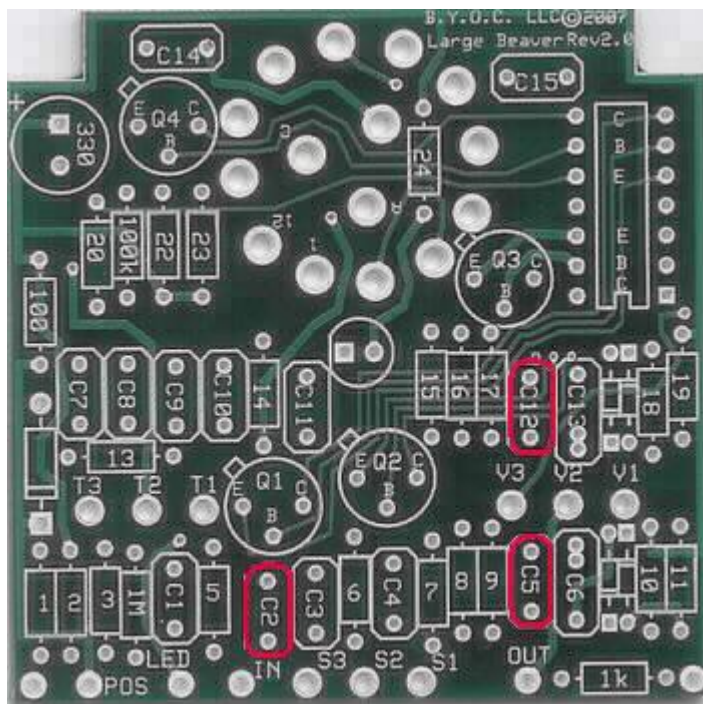
Step 3: Install the 1N4001 (larger black diode with white stripe). Make sure the end with the white stripe (cathode) matches up with the striped side on the PCB layout.



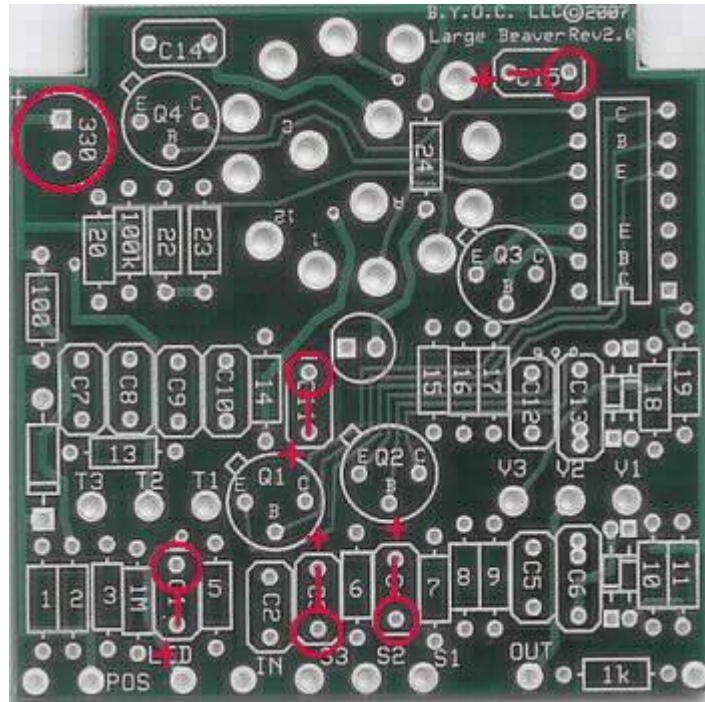
Step 4: Install the IC socket. Be sure to line notched end of the socket with the notched end of the layout on the PCB.



Step 5: Add all the metal film capacitors. Metal film capacitors are not polarized and can be inserted into the PCB in either direction.



Step 6: Add all the ceramic disc capacitors. Ceramic disc capacitors are not polarized and can be inserted into the PCB in either direction.

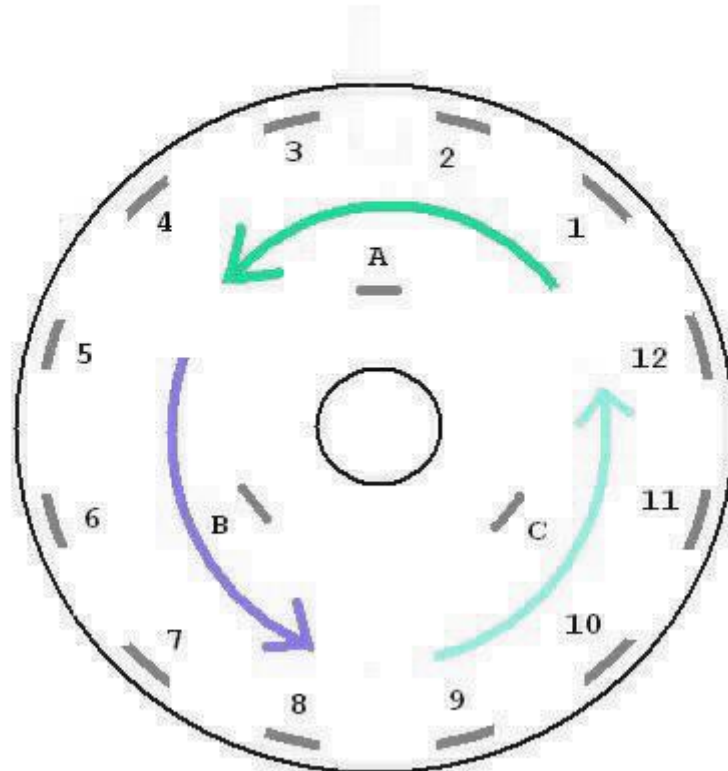


Step 7: Add all the aluminum electrolytic capacitors. These are polarized and it is very important that you have the positive and negative ends correctly oriented. Follow the diagram above. The negative end of your aluminum electrolytic capacitors will have a black stripe down one side and the lead will be the shorter of the two. The positive end will have the longer lead. In positions C1, C6, C13, and C15, be sure to insert the positive end of the electrolytic capacitors into the eyelets marked with a “+” symbol in the diagram above. Note that C6 and C13 each have an extra eyelet. This is to accommodate a variety of capacitor sizes. The “double eyelets” on C6 and C13 are also the “+” eyelets. The longer lead of the 330uf capacitor goes in the square solder pad.

Installing the Rotary Switch, Pots, and LED

Instructions are the same for all versions from this point on!

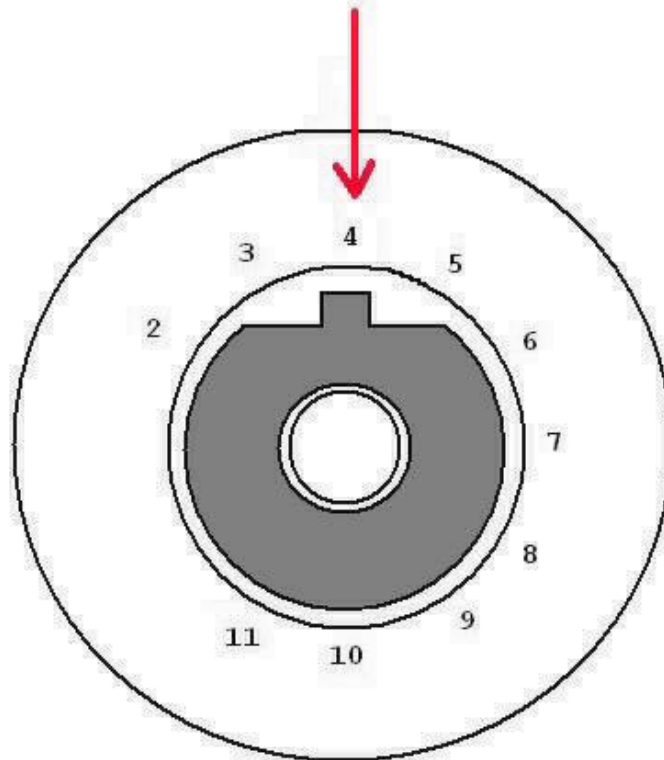
Back of Rotary Switch



The rotary switch that comes with your Large Beaver kit is a 3 pole 4 position rotary switch. The 3 poles are labelled A, B, and C. The 12 throws (4 x 3) are labelled 1 - 12. Throws 1 - 4 belong to pole A. Throws 5 - 8 belong to pole B. And throws 9 - 12 belong to pole C. When your switch is in position 1, pole A is connected to throw 1, pole B is connected to throw 5, and pole C is connected to throw 9. When your switch is in position 2, pole A is connected to throw 2, pole B is connected to throw 6, and pole C is connected to throw 10. When your switch is in position 3, pole A is connected to throw 3, pole B is connected to throw 7, and pole C is connected to throw 11. And when your switch is in position 4, pole A is connected to throw 4, pole B is connected to throw 8, and pole C is connected to throw 12.

Makes sense? If it doesn't, that's OK. You don't need to know how the switch works. Any way you can fit it into the PCB will work....as long as you don't forcibly make the switch fit.

Front of rotary switch



On the front of your rotary switch is a washer. And this washer has a notch on it. This washer limits the number of positions you can turn your rotary switch to by placing the washer's notch in the appropriately numbered hole. We want to set our switch for 4 positions so we want to put the washer's notch into hole #4.

Step 1: Install and solder the rotary switch **ON THE BACK SIDE OF THE PCB!!!!**

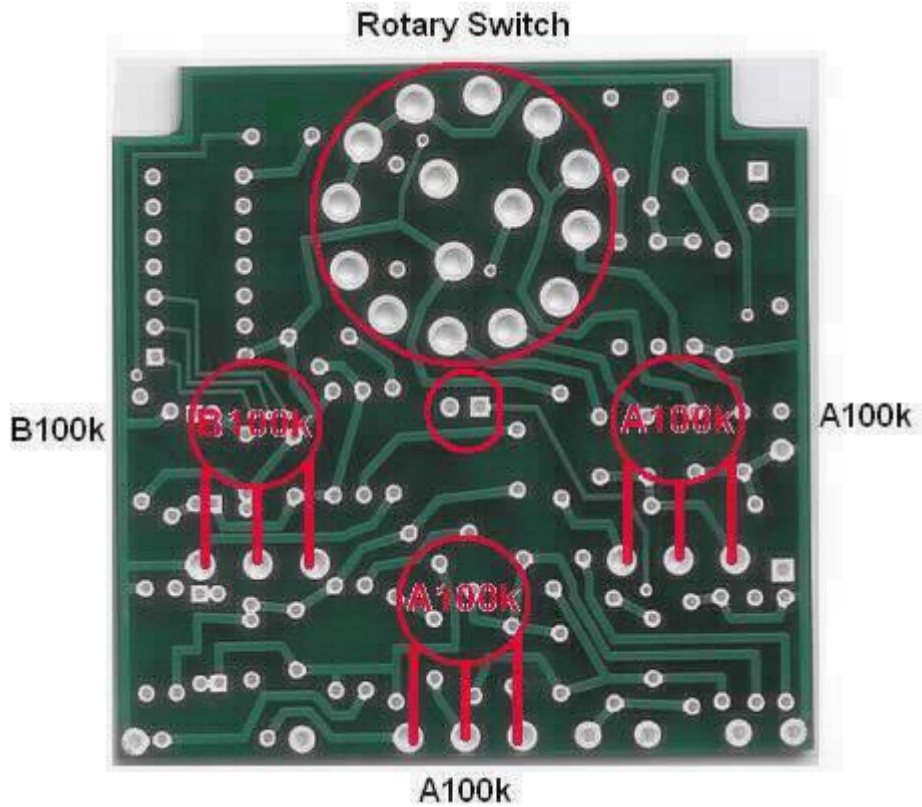
Step 2: Install and solder the pots **ON THE BACKSIDE OF THE PCB!!!** If your kit came with solder lugged pots, skip this step and go complete the “assembly” and “wiring” portions of the instructions. Then continue here with Step 3.

Step 3: Insert the LED into its place, but do not solder it yet. Make sure the longer lead goes in the round solder pad and the shorter lead goes in the square solder pad. No....this is not a typo.

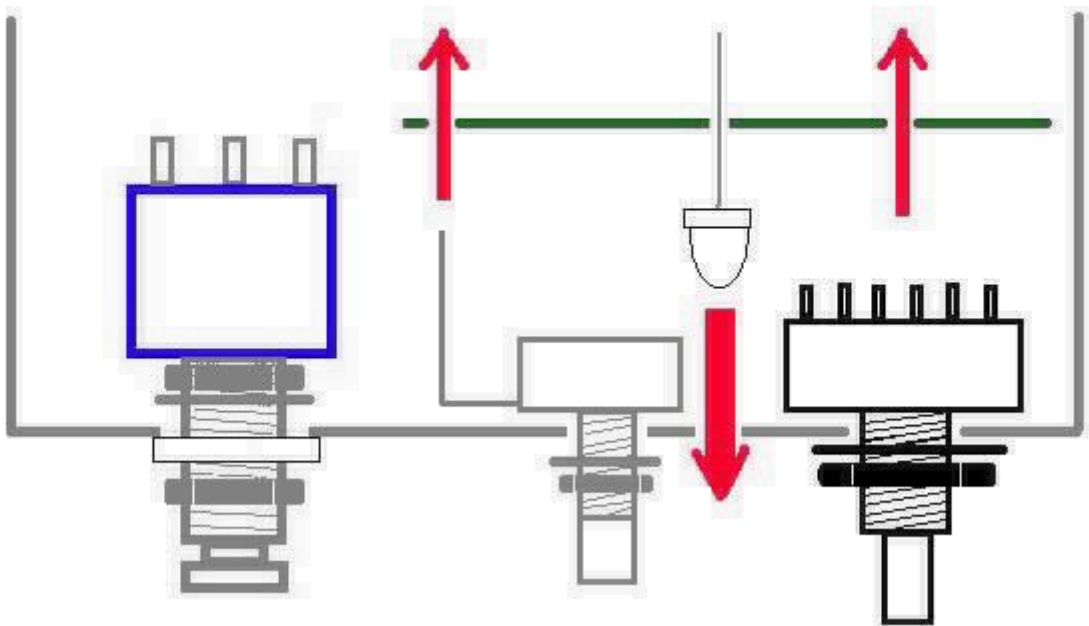
Step 4: Mount the entire circuit board assembly inside the enclosure. Make sure you have the spacer nuts on your PC mounted pots (no spacers required for solder lug pots), and make sure that the Rotary switch limit washer hasn't fallen out of place. Then secure the pots and rotary switch with their nuts and washers.

Step 5: Move the LED into place by guiding it with the leads that are sticking out of the top side of the PCB.

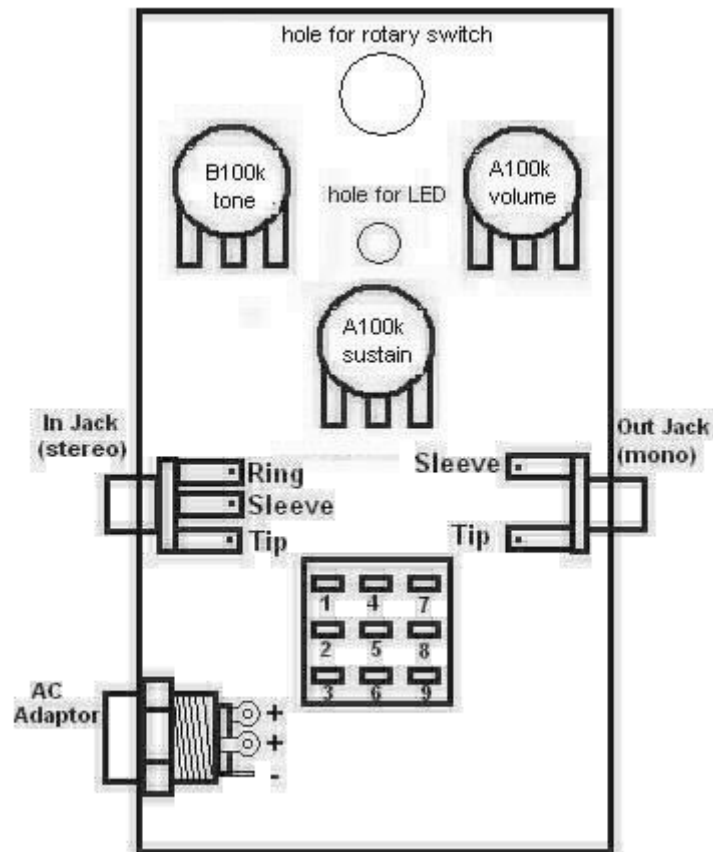
Step 6. Once you have the LED in place, solder it and clip the excess leads.



This diagram is an exploded view. It would imply that you should mount the pots and switch first and then install and solder the PCB, but it is actually easier if you solder the pots and switch to the PCB first and then mount the assembly to the enclosure.



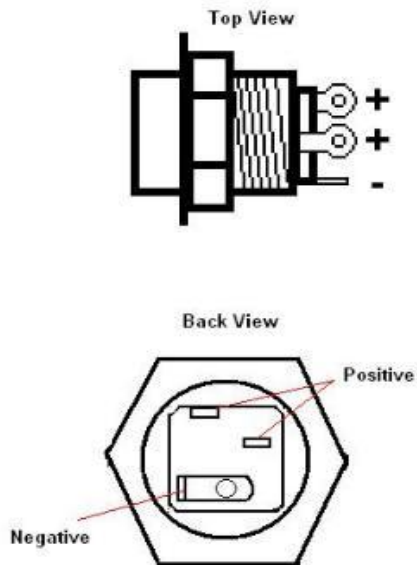
Assembly



NOTE: If you have already mounted/soldered your PC mounted pots, ignore the parts of the assembly portion of the instructions. This is only for kits that have solder lug pots.

1. Install the jacks first. If you are looking down inside the enclosure, the mono jack goes on the right side and the stereo jack goes on the left. Place the washer on the outside of the enclosure. Use a 1/2" wrench to tighten.
2. Install the AC adaptor jack. The bolt goes on the inside. Use a 3/4" or 14mm wrench to tighten. You may think your AC adaptor jack is missing the nut, but it is not. It just blends in very well. The "hex" portion of the jack is the nut. Turn it counter clock wise with a pair of pliers and you can be assured it will come off.

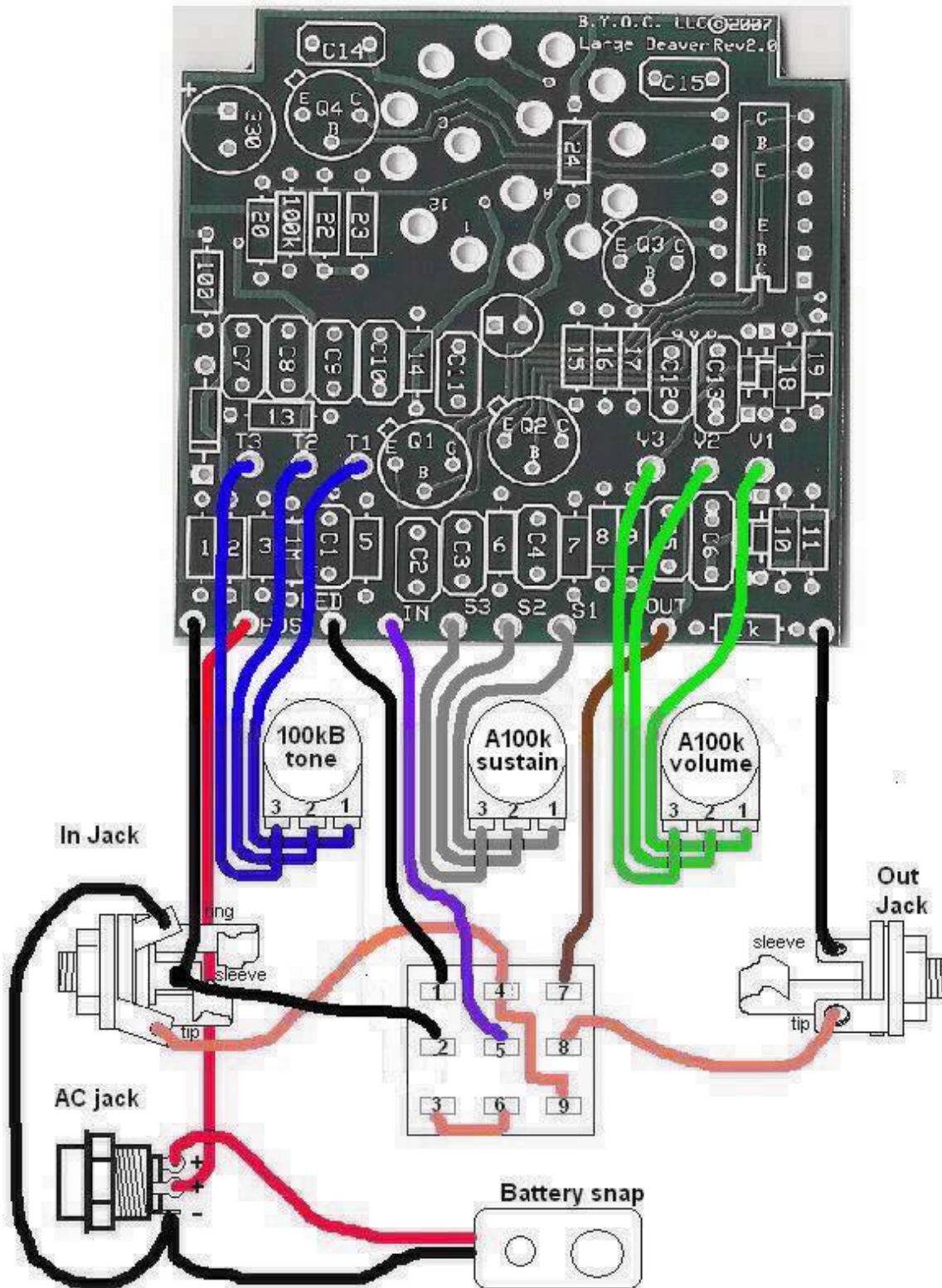
AC Adaptor



This is a “disconnect” ac adaptor jack. That means that when you have a battery connected and you plug in the adaptor, it will disconnect the battery. That is why there are 2 positive terminals. They are both connected when there is no plug in the jack, but when the plug is inserted only one of the terminals (the uppermost terminal in the “back view”) is connected to the sleeve of the adaptor. The advantage of this is that you can leave batteries in your pedals as a back up power source if you are a “working” musician and they will stay fresh even when you have the input jack plugged in as long as you keep the adaptor plugged in.

3. Install the potentiometers so that the solder lugs are pointing down towards the footswitch side of the enclosure. Use a 10mm wrench to tighten but only snug. Do not over tighten the pots.
4. Install the footswitch. The first bolt and metal washer go inside. The plastic washer and second bolt go on the outside. It does not matter which side you designate as the "leading edge" of the footswitch as long as you orientate it so that the flat sides of the solder lugs are aligned in horizontal rows, not vertical columns. Use a 14mm wrench to tighten.

Wiring



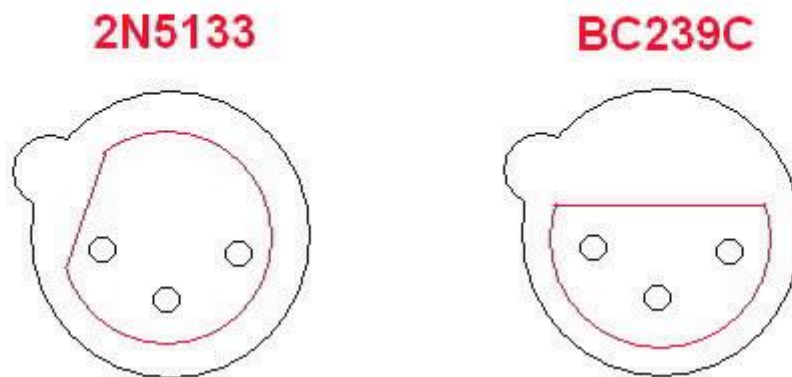
NOTE: You do not need to wire the PC mounted pots like this. Only if you have solder lugged pots. Finish this step and go back to Step 3: Installing the Rotary switch, Pots, and LED.

Installing the Transistors, Finishing up & Troubleshooting

A note about our component selections: We determined what component values to use in this kit by dissecting many original vintage Muffs. The overwhelming majority of Ram's Head era muffs had BC239C NPN transistors. But some had PNP 2N5087 and people have reported Ram's Head era muffs with 2N5133's and FS36999's in them. The general distinguishing factor between Triangle era version 1 and version 2 are the transistors. Version 2 seemed to use NPN 2N5133 exclusively and Version 1 used PNP FS36999 exclusively. But the FS36999 never really existed!. The most logical explanation would be that FS36999's were an in house reprint done for Electro-Harmonix. This means, EH took some other PNP transistor and stamped "FS36999" on it. We cannot say for certain what the FS36999 really was. Likely, it was not always the same model transistor being reprinted, but rather what ever was close enough, cheap enough, and readily available at the time.

This is the opinion of BYOC. We do not claim this to be a verified truth. But we did pull some FS36999's from actual vintage Triangle version 1 muffs and their gain and tonal characteristics are nearly identical to the BC239C. And since the BYOC Large Beaver has a negative ground and accepts only NPN transistors, use the BC239C when building to Triangle Version1 specs.

Transistors Placement



Install the set of 4 transistors into their sockets. **DO NOT SOLDER THE TRANSISTORS!!!!!!!!!!!!!!**

If you are building to Pickled Beaver Specs, install the 14pin transistor array. match up the notch on the IC with the notch on the socket. **DO NOT SOLDER THE IC!!!! DO NOT USE THE TRANSISTOR ARRAY CHIP SIMULTANEOUSLY WITH THE DISCRETE TRANSISTORS!!!!!!**

Screw on the base of the enclosure and add the bumpers (unless you don't like bumpers on your pedals). Use a fresh battery or appropriate negative tip power supply

Trouble shooting

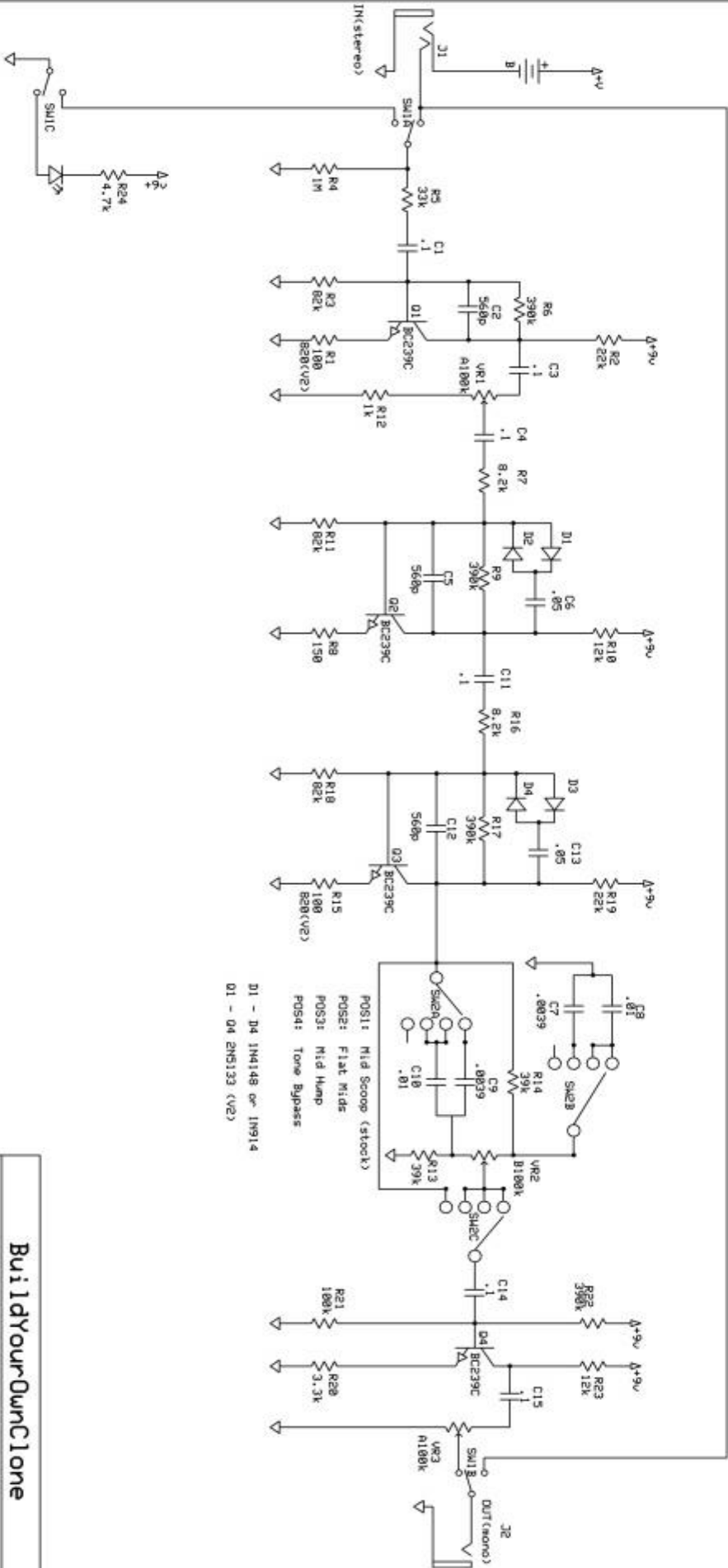
Is your pedal working? Here's a few common mistakes:

1. **No sound at all in either the bypass or on position.** If you aren't getting sound in bypass then you did not wire your footswitch correctly. Getting the bypass to work is the first thing you need to worry about.
2. **Bypass works and the LED lights up when "on", but there's no sound.** You either have a problem with the wiring from the in to the out of the circuit board and foot switch. . Or you have a problem with something on the circuit board.
3. **Bypass works, but there's sound when on and the LED does not come on.** You probably aren't getting any power to the circuit. .

If none of this helps, and you can't seem to figure out the problem, I always find that it is best to just set the pedal aside for a day or 2 and then come back to it with a fresh pair of eyes. Then the problem usually jumps right out at you....usually.

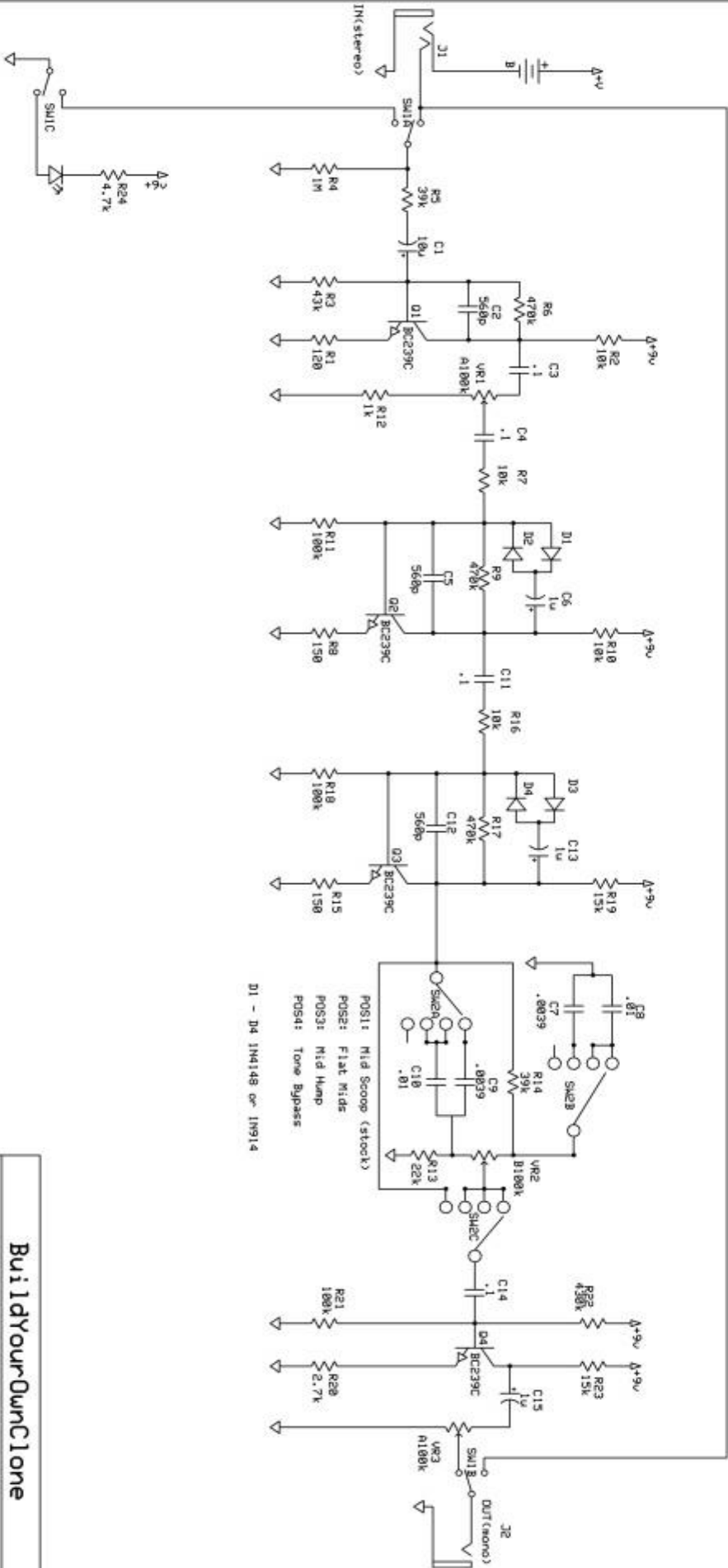
If you still can't get it working, start a thread on the BYOC forum and ask for help.
board.buildyourownclone.com

Copyright ©2008. Build Your Own Clone, LLC



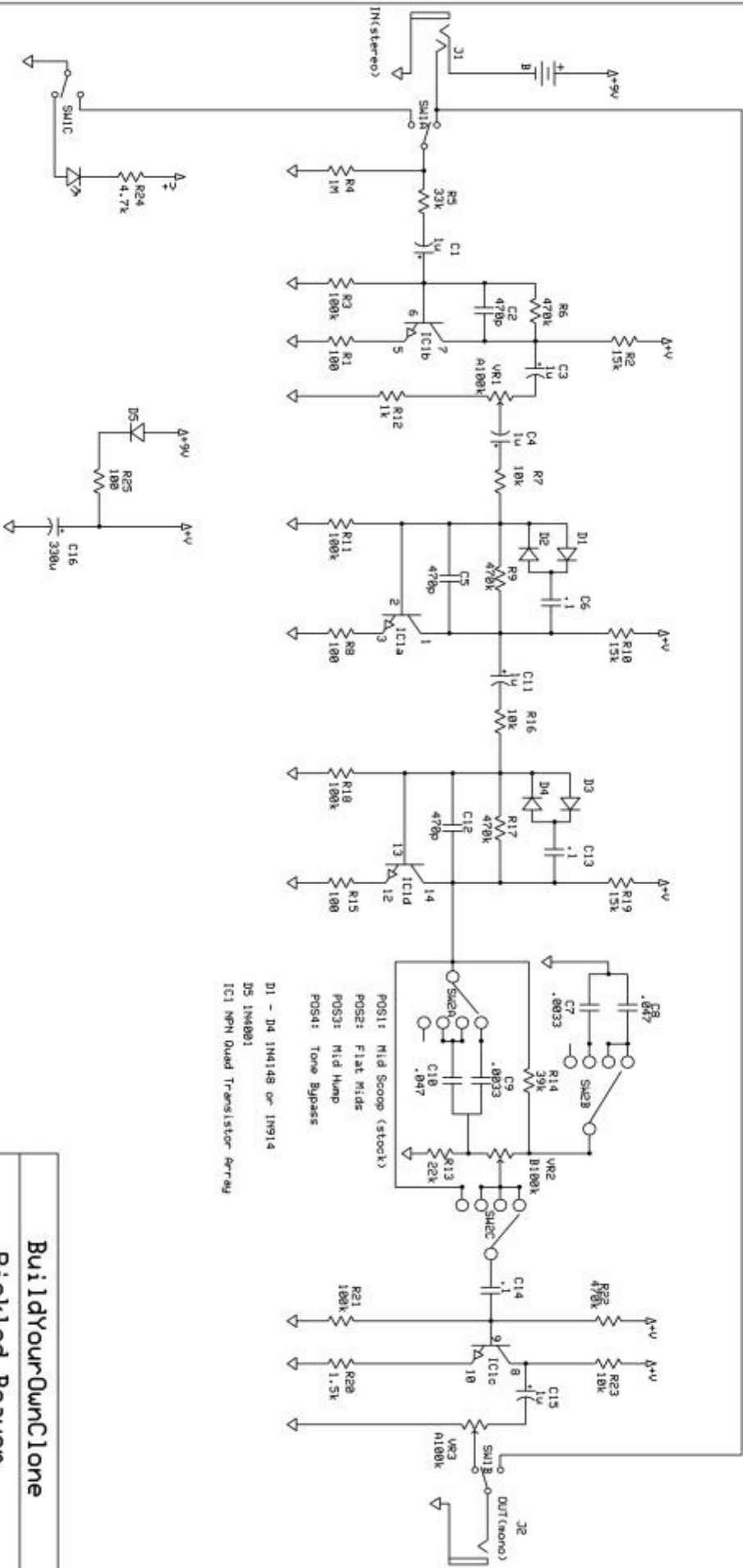
- POT1: Mid Sweep (stock)
- POT2: Flat Mids
- POT3: Mid Hump
- POT4: Tone Bypass
- D1 - D4 1N4148 or 1N914
- O1 - O4 2N5133 (V2)

BuildYourOwnClone	
Large Beaver Triangle V1	
K. vanderhulst	Rev 2.0
1/1/2000	© 2000



POS1: Mid Sweep (stock)
 POS2: Flat mids
 POS3: Mid Hump
 POS4: Tone Bypass
 D1 - D4 1N4148 or 1N914

BuildYourOwnClone	
Large Beaver Ram's	
K. vanderhulst	Rev 2.0
	1/1/2000
© 2000	



- D1 - D4 1N4148 or 1N914
- D5 1N4881
- IC1 NPN Quad Transistor Array

BuildYourOwnClone		
Pickled Beaver		
K. vanderhulst	Rev 2.0	
	1/1/2008	© 2008