

Tuna Helper List of Materials:

Diodes: D1, D2 & D3 = 1n4148

D4 = 1N5711

Resistors: R1 = 51 ohms (green-brown-black)

R2 = 1K ohms (brown-black-red)

R3 = 47K ohms (yellow-violet-orange)

R4 = 100 ohms (brown-black-brown)

R5 = 100 ohms (brown-black-brown)

R6 = 100 ohms (brown-black-brown)

Capacitors: C1, C6 = .01uf (103)

C2, C4 = .1uf (104)

C3, C5 = 2.2uf

Transistor: Q1 = 2N2222A

SW : 1 - Single Pole Switch (3-pin)

Relay: RELAY = DPDT

Connectors: ANT, RX, TX, MUTE, RF PWR, 12V = RCA

(+12vV , RF PWR and Mute = RCA OR OPTIONAL 2 pos. screw terminal)

J1 = 3 pin (3x1x.1") Molex single row header with jumper

J2 = 4 pin (2x2x.1") Molex dual row header with jumper

Misc: 6x32 nut & 6-32x1.5" bolt, circuit board, can & label

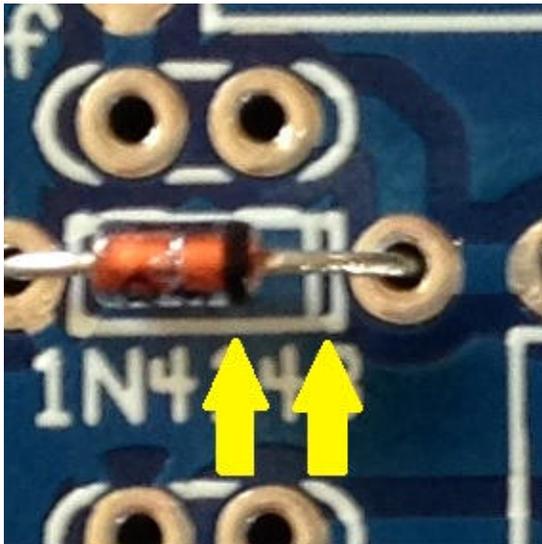
***** TIP *****

You can batch solder parts for quicker assembly. Insert 3 or 4 parts, spreading the leads apart to keep them in place when the board is flipped over. Place the board on the can for stability. Solder and clip off the excess leads...

OK let's get to the building part.....

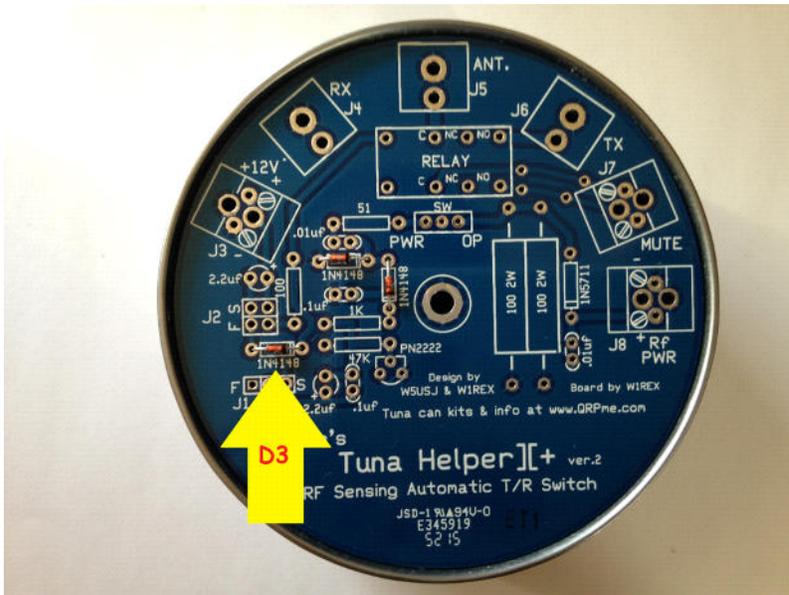
Install Diodes: D1, D2 & D3 = 1n4148

***** INSTALL THE DIODE WITH THE BLACK STRIPE , (CATHODE) TO MATCH THE STRIPE ON THE PCB *****

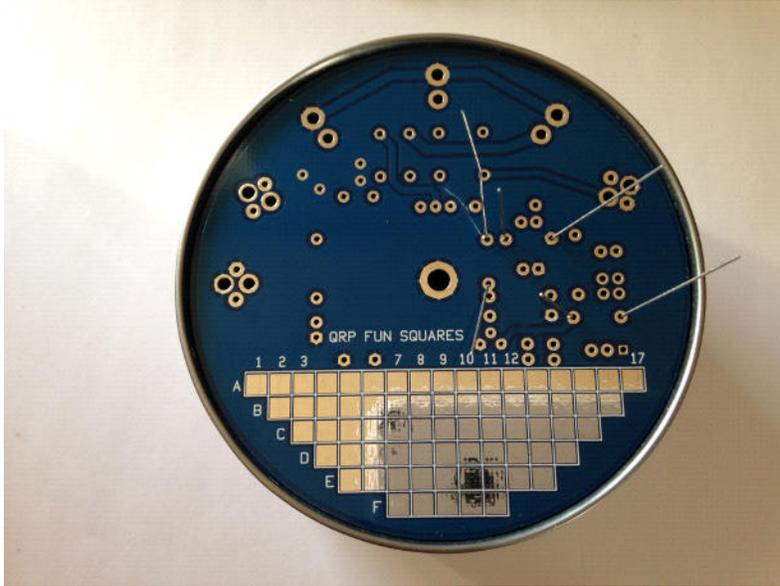


Install D1 = 1n4148

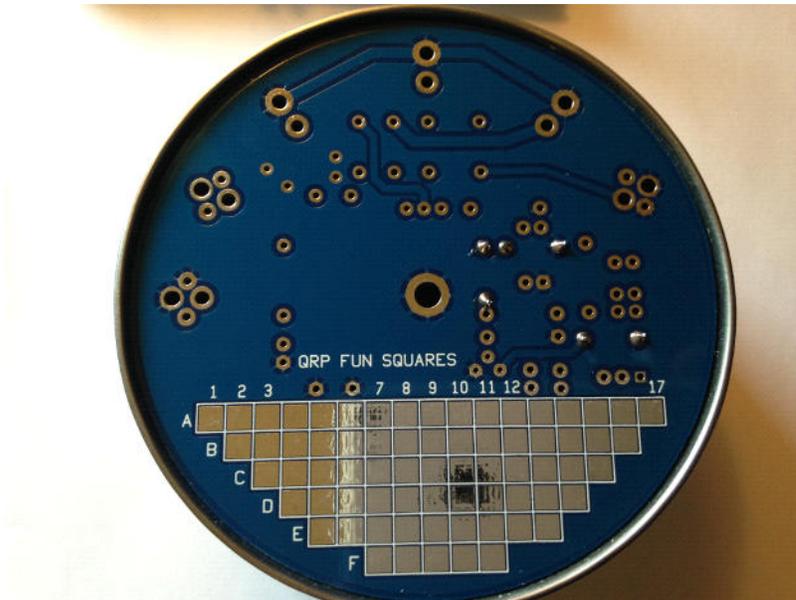
Install D3 = 1n4148



Spread the leads slightly and turn over the PCB



Solder D1, D2 , D3 and clip off the excess leads...



Now Let's Install Resistors

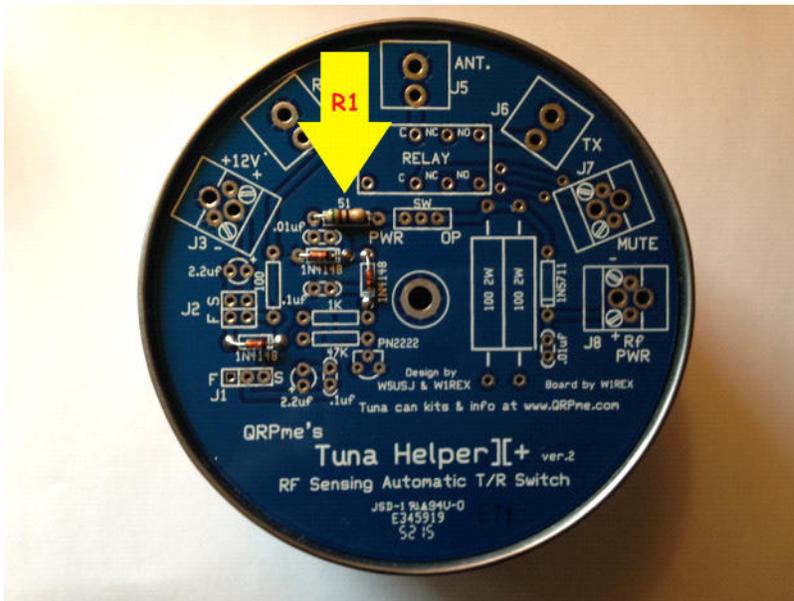
R1: 51 ohms (GRN BRN BLK)

R2: 1K ohms (BRN BLK RED)

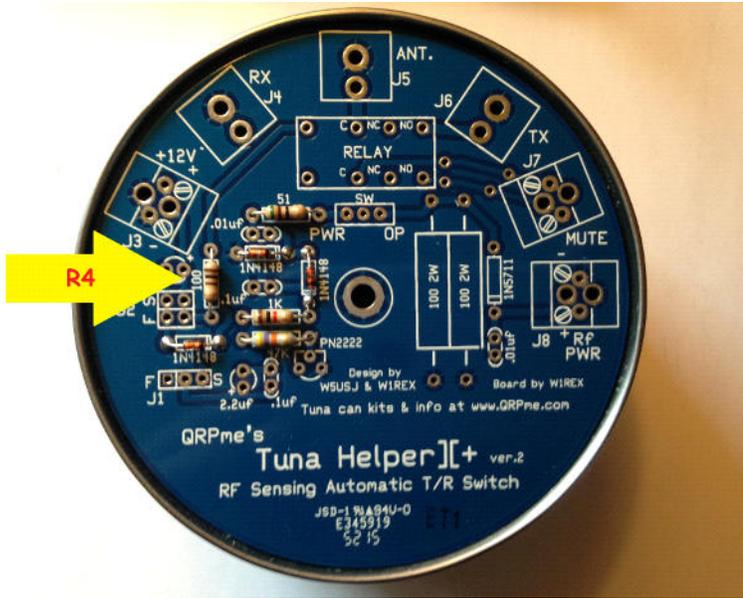
R3: 47K ohms (YEL VIO ORG)

R4: 100 ohms (BRN BLK BRN)

Install R1: 51 ohms (GRN BRN BLK)

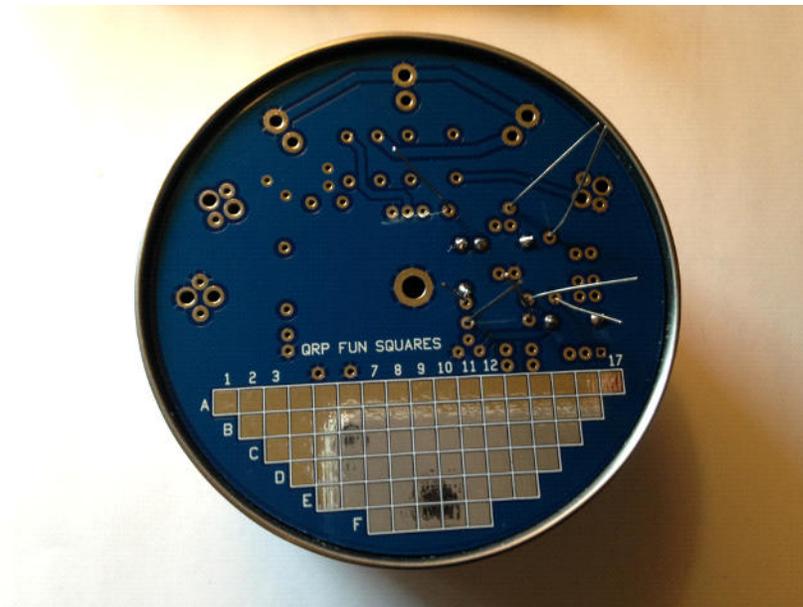


Install R2: 1K ohms (BRN BLK RED)

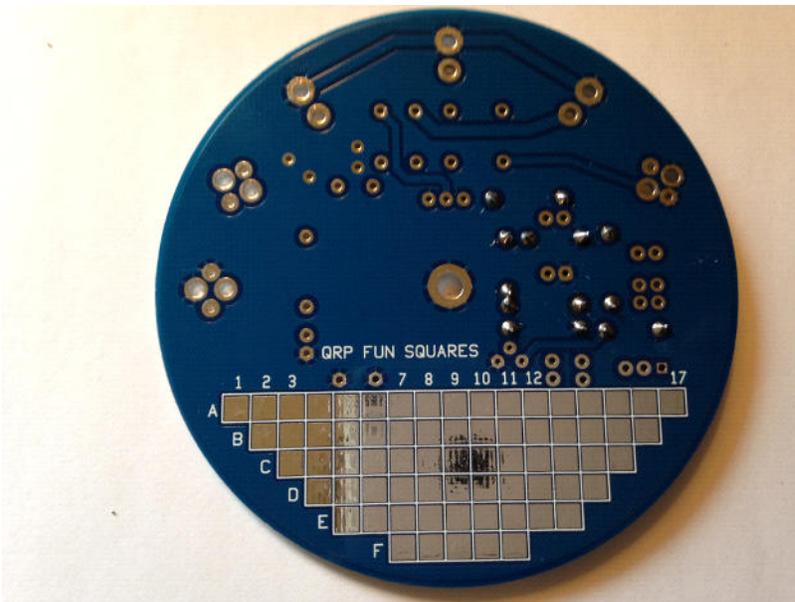


Spread the leads slightly and turn over the PCB.

R1, R2, R3 and R4 ready for soldering!



R1, R2, R3 and R4 soldered on PCB

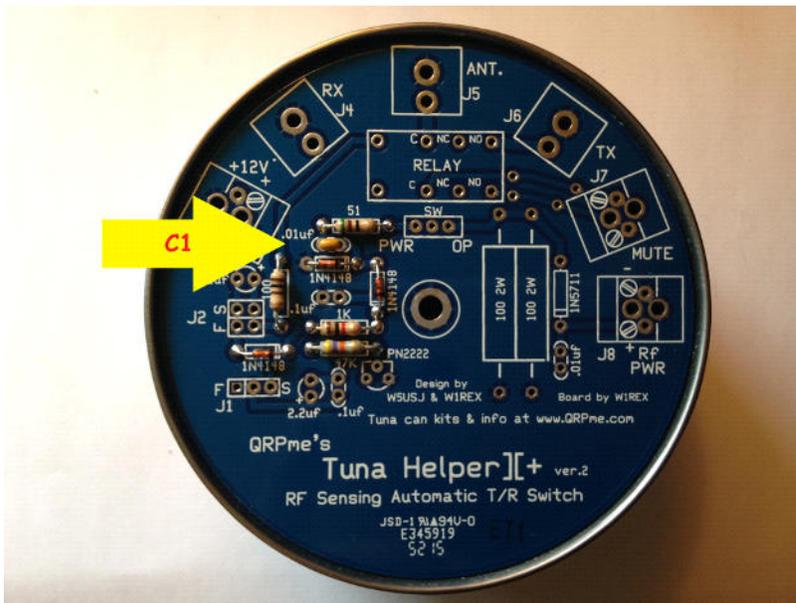


Now Let's Install The Following Capacitors

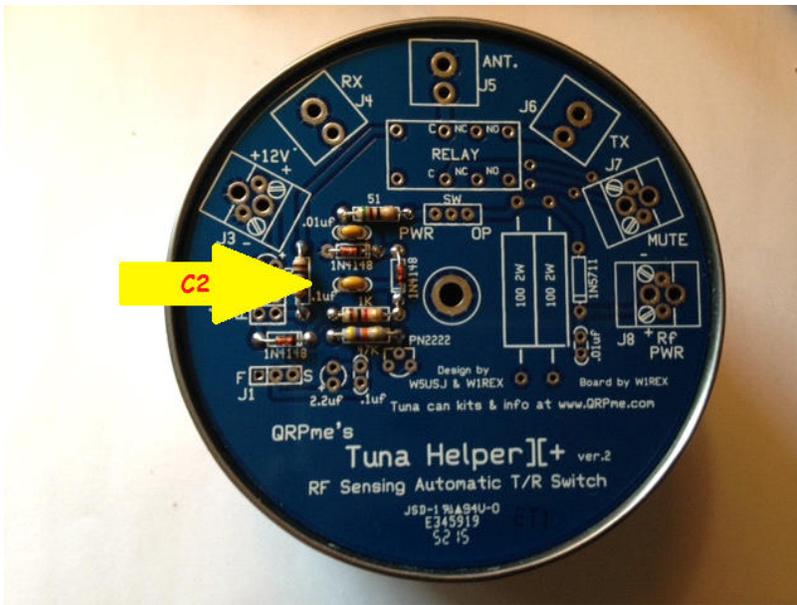
C1: .01uf (103)

C2,C4: .1uf (104)

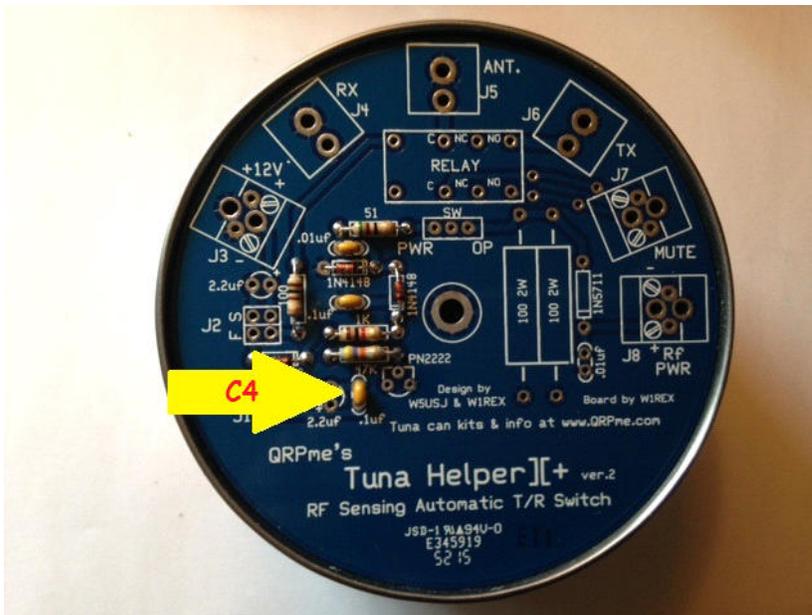
Install C1: .01uf (103)



Install C2: .1uf (104)

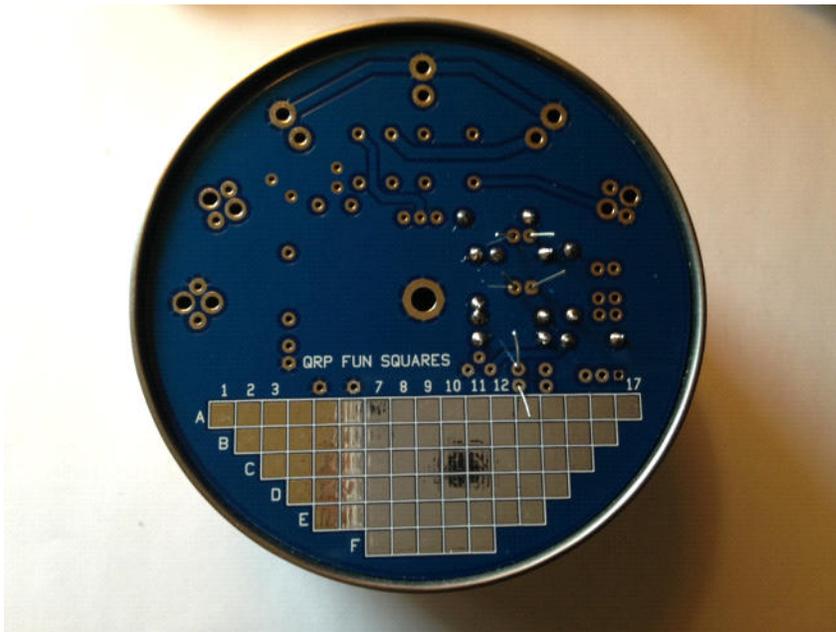


Install C4: .1uf (104)

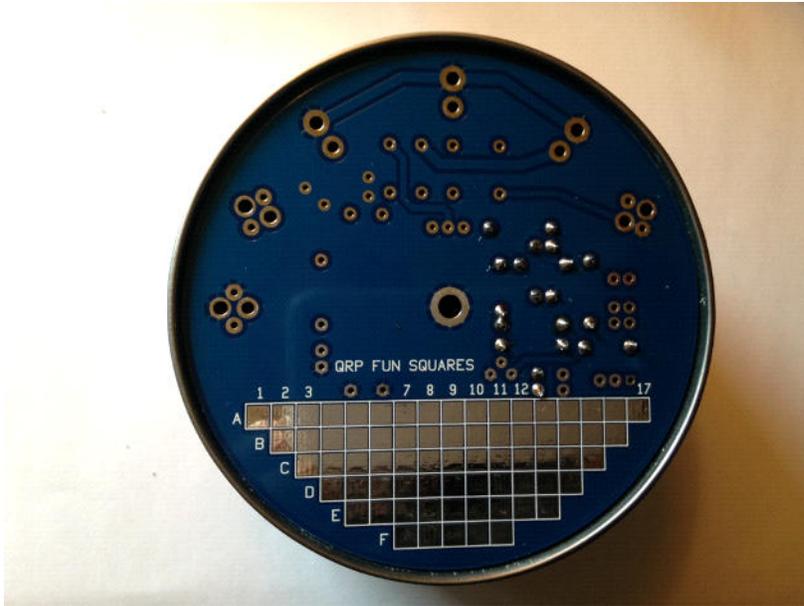


Spread the leads slightly and turn over the PCB.

C1,C2, and C4 ready for soldering!



C1,C2, and C4 soldered on PCB



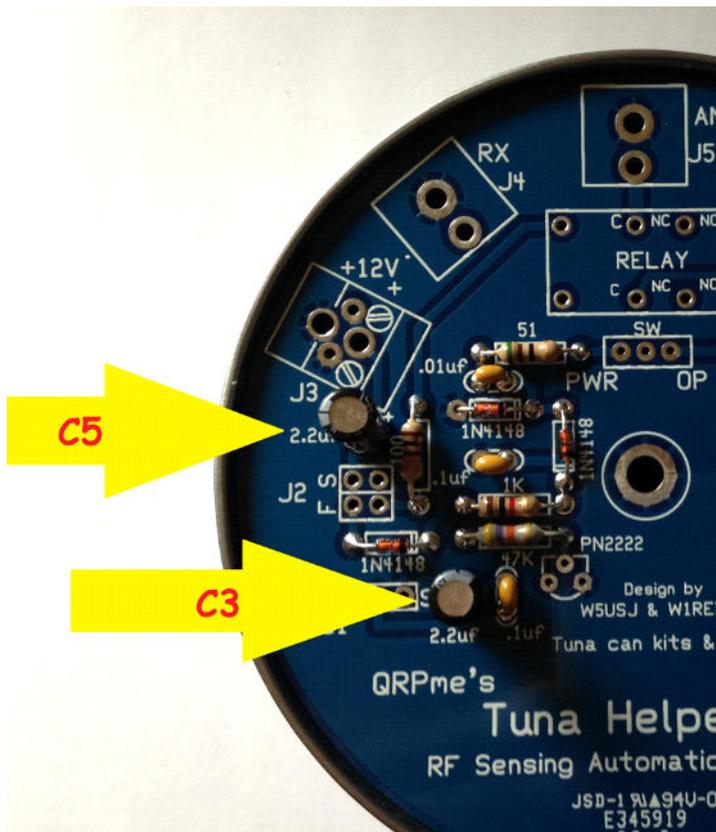
Install C3 and C5: 2.2uf (Electrolytic Capacitor)

*** Observe To Install With The Correct Polarity Orientation.

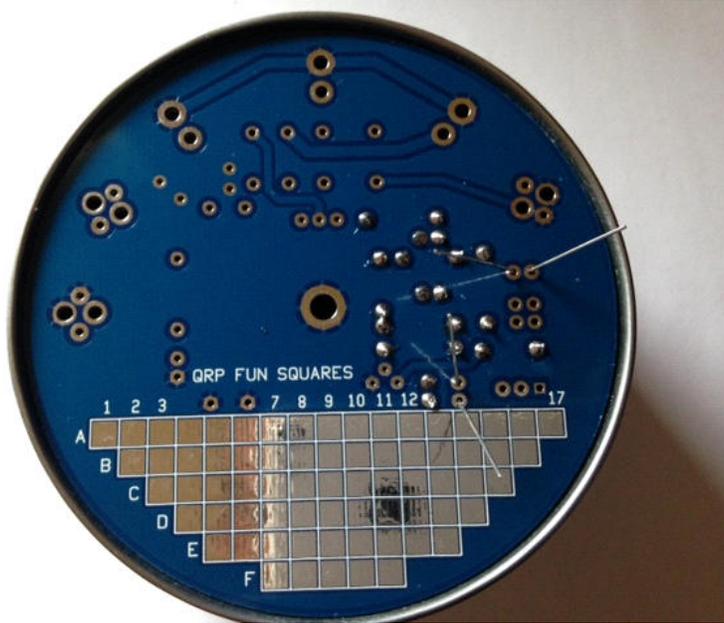
Longer Lead Is POSITIVE ***



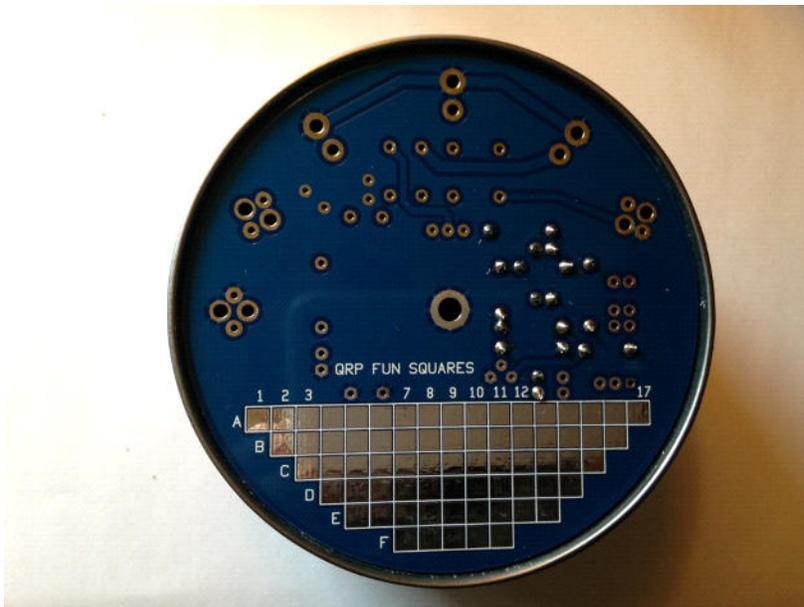
Install C3 and C5: 2.2uf (Electrolytic Capacitor)



Spread the leads slightly and turn over the PCB.



C3 and C5 soldered on PCB

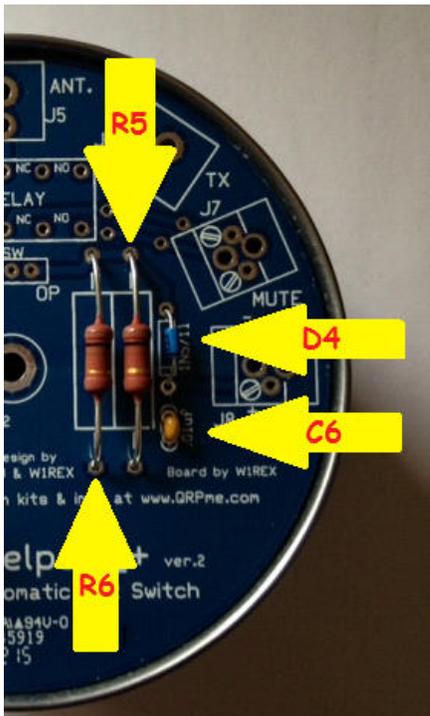


Now Install The Following Components:

D4 = 1N5711 , R5 = 100 ohms (brown-black-brown) , R6 = 100 ohms (brown-black-brown) and

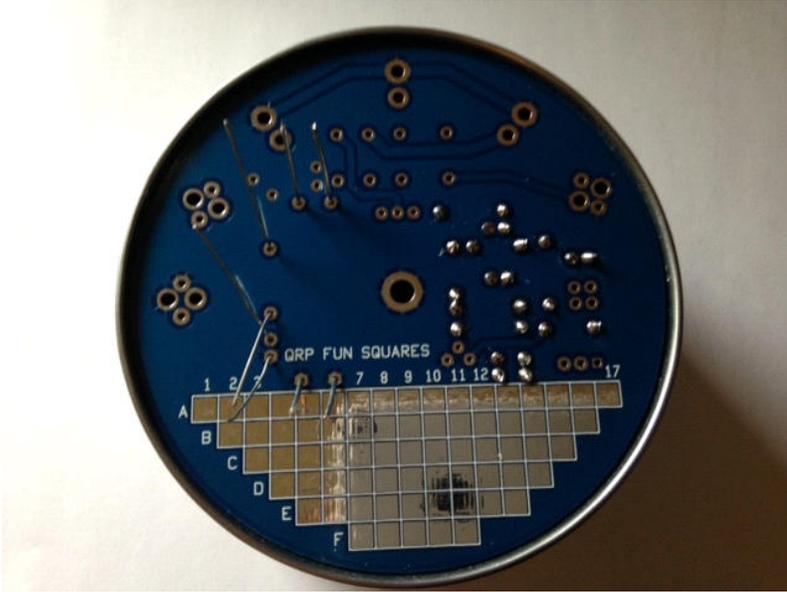
C6 = .01uf (103)

*** These Components Form the RF output power probe ***

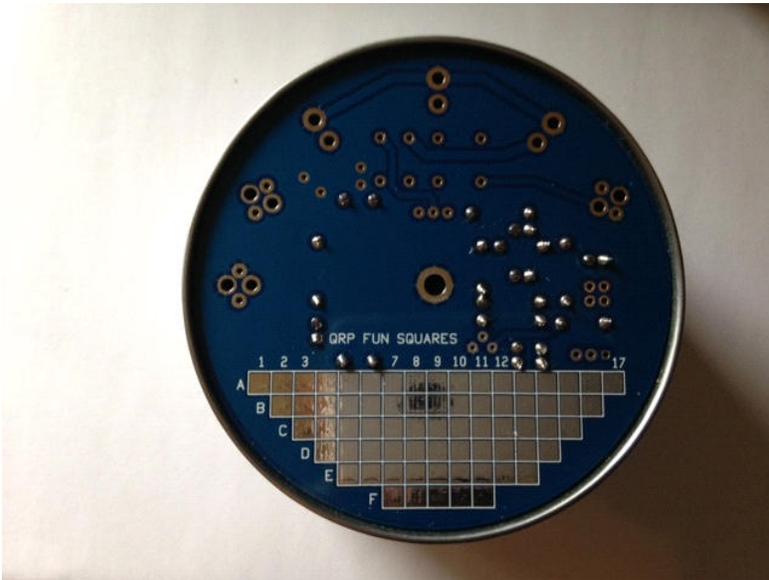


Spread the leads slightly and turn over the PCB

D4, R5, R6 and C6 ready for soldering!

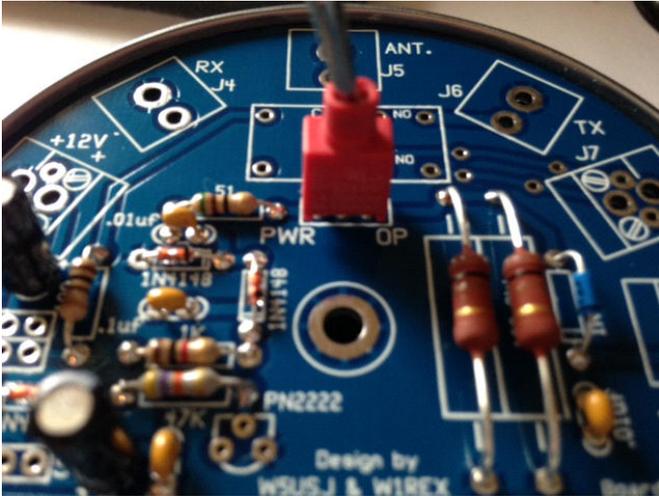


D4, R5, R6 and C6 soldered on PCB

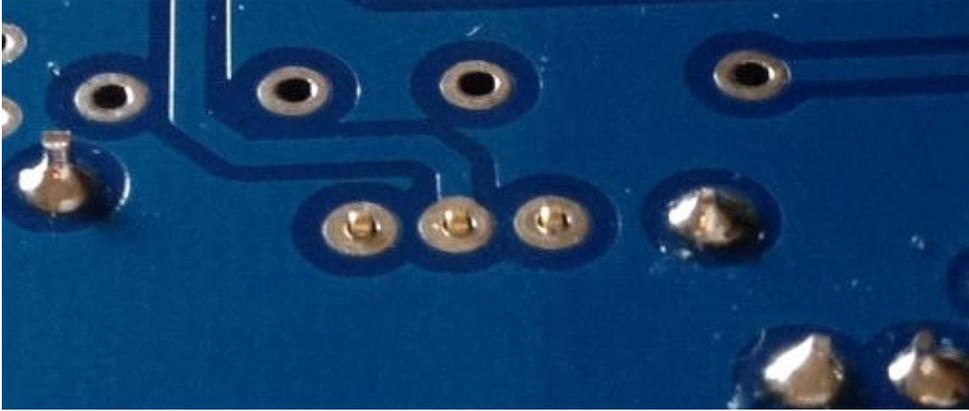


Install SW

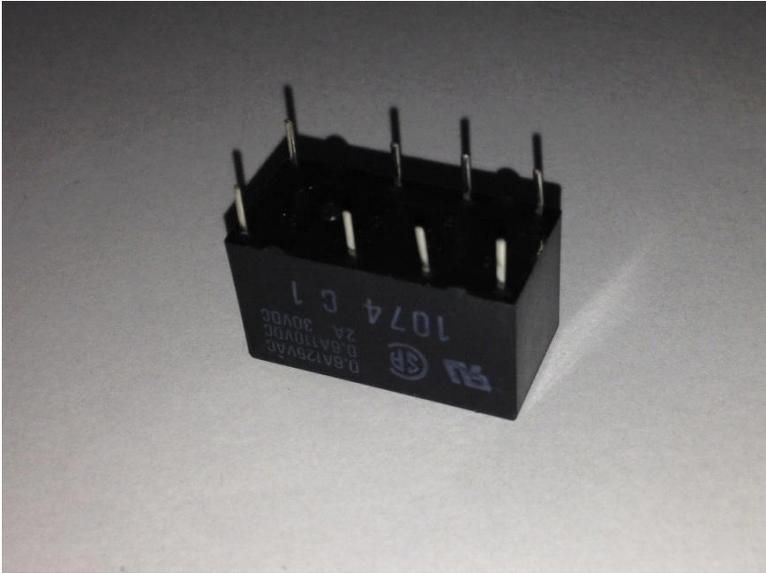
TIP: * Hold the PCB with one hand and GENTLY! push the Switch in. Use a GENTLE rocking motion until you see the leads come out on the bottom side of the PCB. THESE LEADS CAN BEND EASILY SO BE CAREFUL. Insert just enough so they can be soldered. The switch leads do not have to go all the way through! JUST ENOUGH! *****



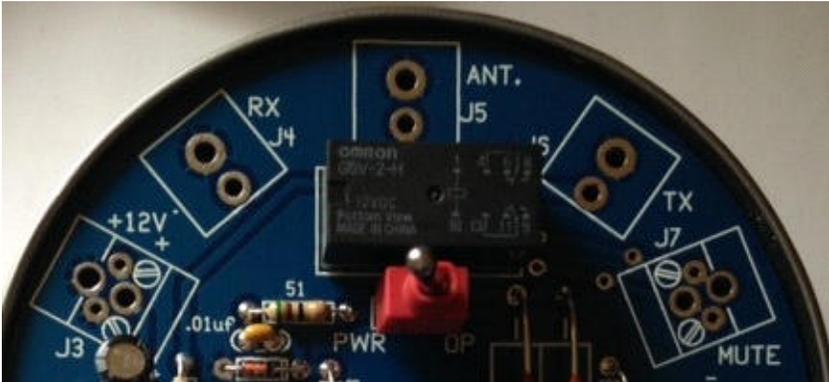
SW Inserted * Just ENOUGH *****



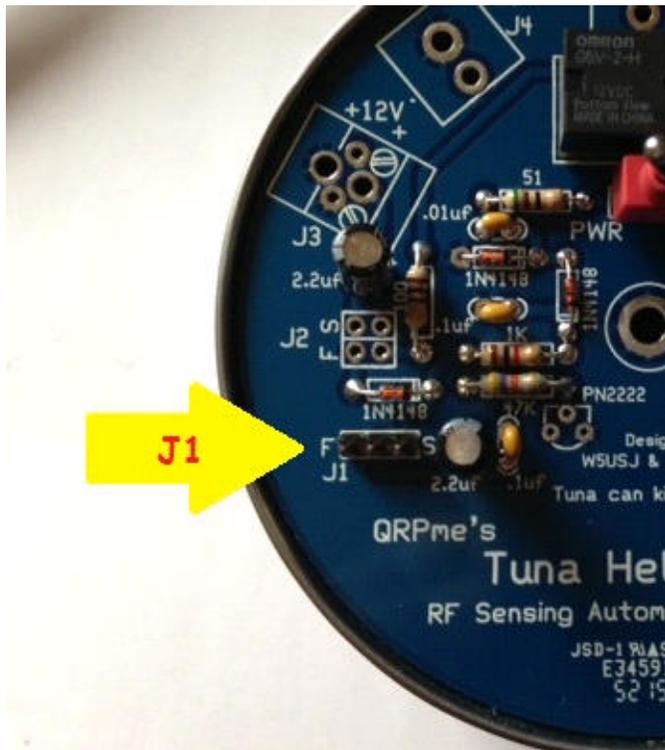
Insert Relay. * The Relay Leads Are EXTREMELY DELICATE ! BE CAREFUL NOT TO BEND THEM WHEN YOU ARE INSERTING THE RELAY IN THE PCB! *****



SW and Relay Inserted.



Insert J1 = 3 pin (3x1x.1") Molex single row header with jumper.



J2 is 2 separate sets of 2 pins. Gently cut the 4 pin (2x2x.1") Molex dual row header in half.



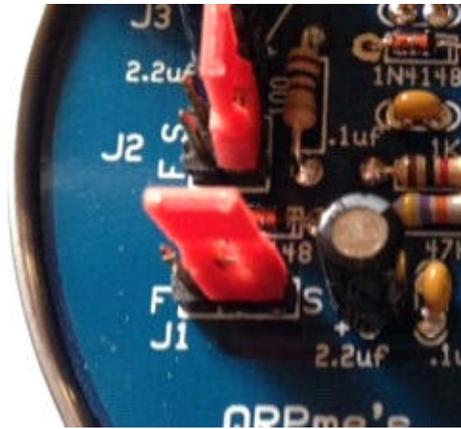
Hold it carefully and use 2 hands when you cut it so that it does not FLY AWAY!



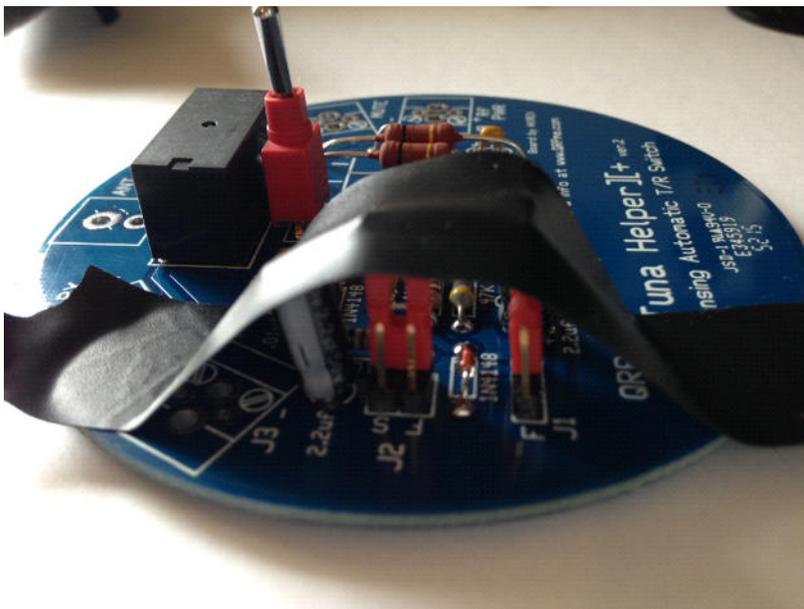
4 pin (2x2x.1") Molex dual row header cut in half and inserted.



Place the Headers on J1 and J2. *** This is so to aid in securing the pins in place while you place a piece of tape on them so they will not fall out when you are soldering them ***

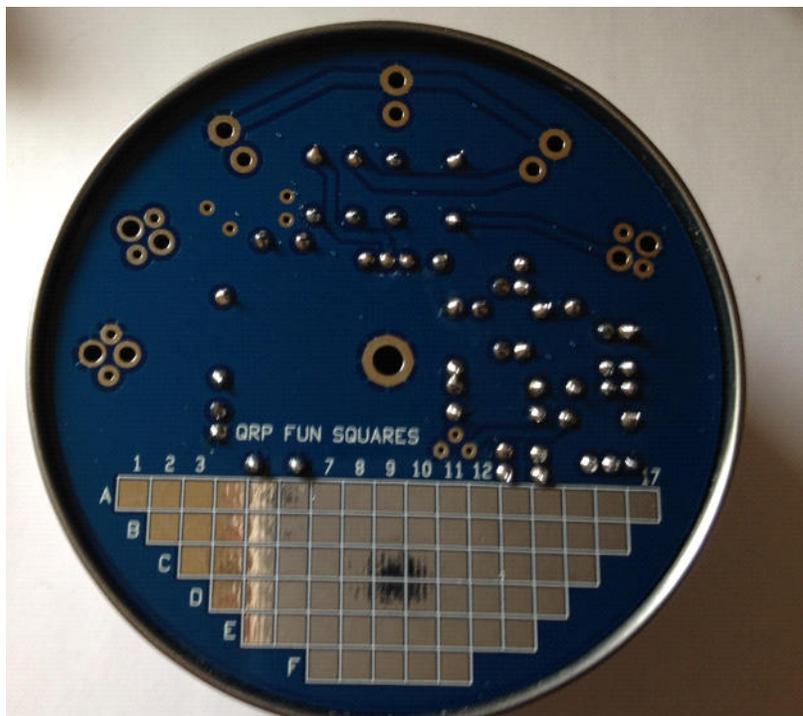


J1 and J2 pins temporarily secured with tape.



Turn the PCB over and solder SW , Relay , J1 and J2 pins.

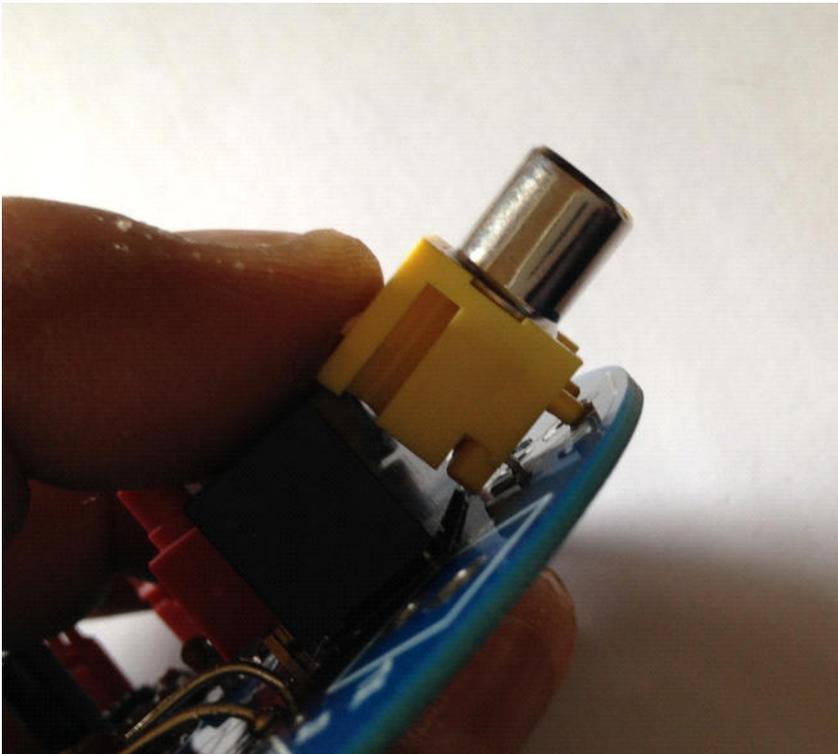
SW , Relay , J1 and J2 pins soldered on PCB.



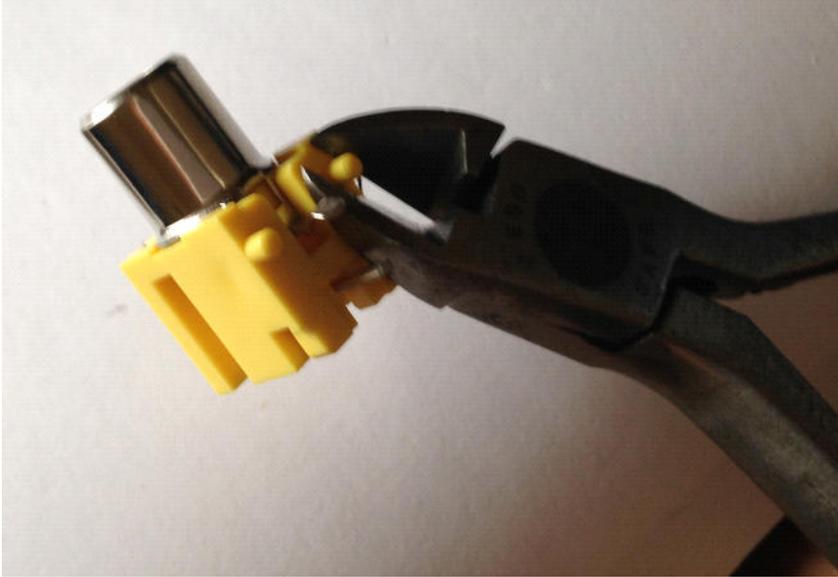
ALMOST DONE. Just a few more Steps!

RCA Connectors J3, J4, J5, J6, J7 and J8 might have 2 small feet.

You can prep the connectors so that they are flush to the PCB when inserted,



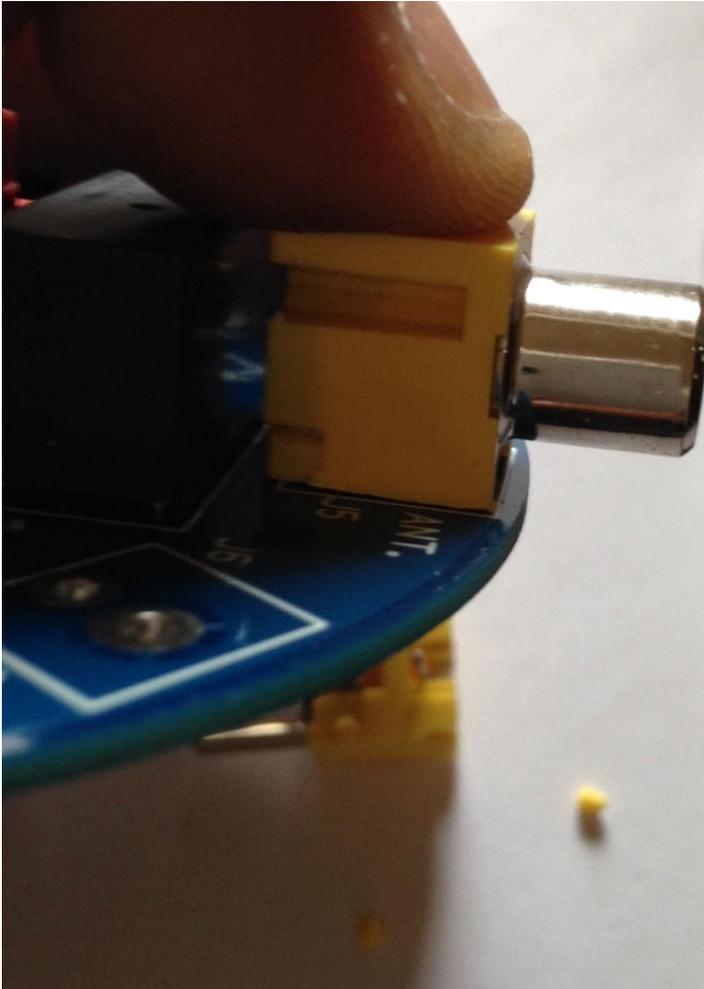
Gently cut the small feet.



Sand them down with a nail file.

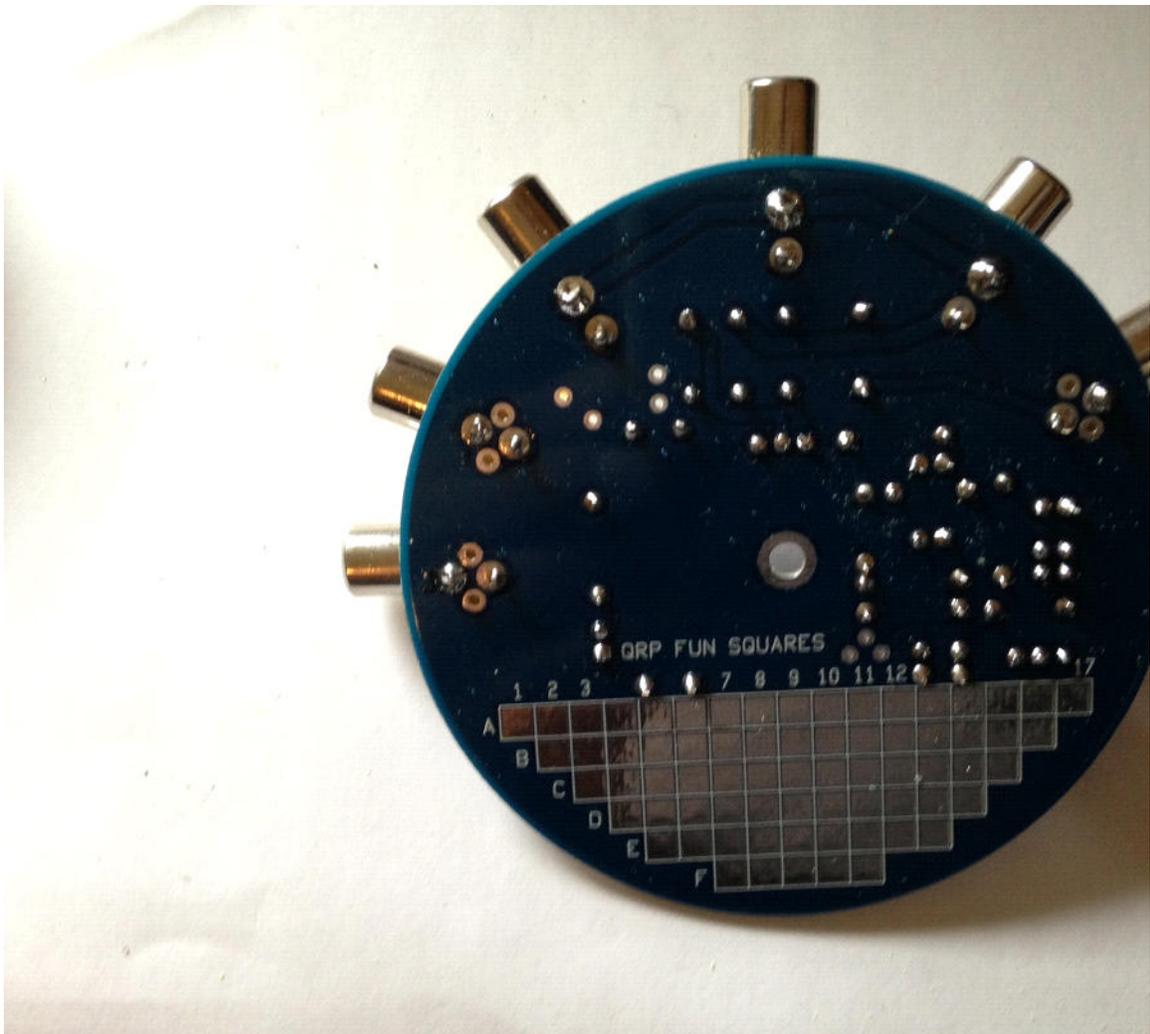


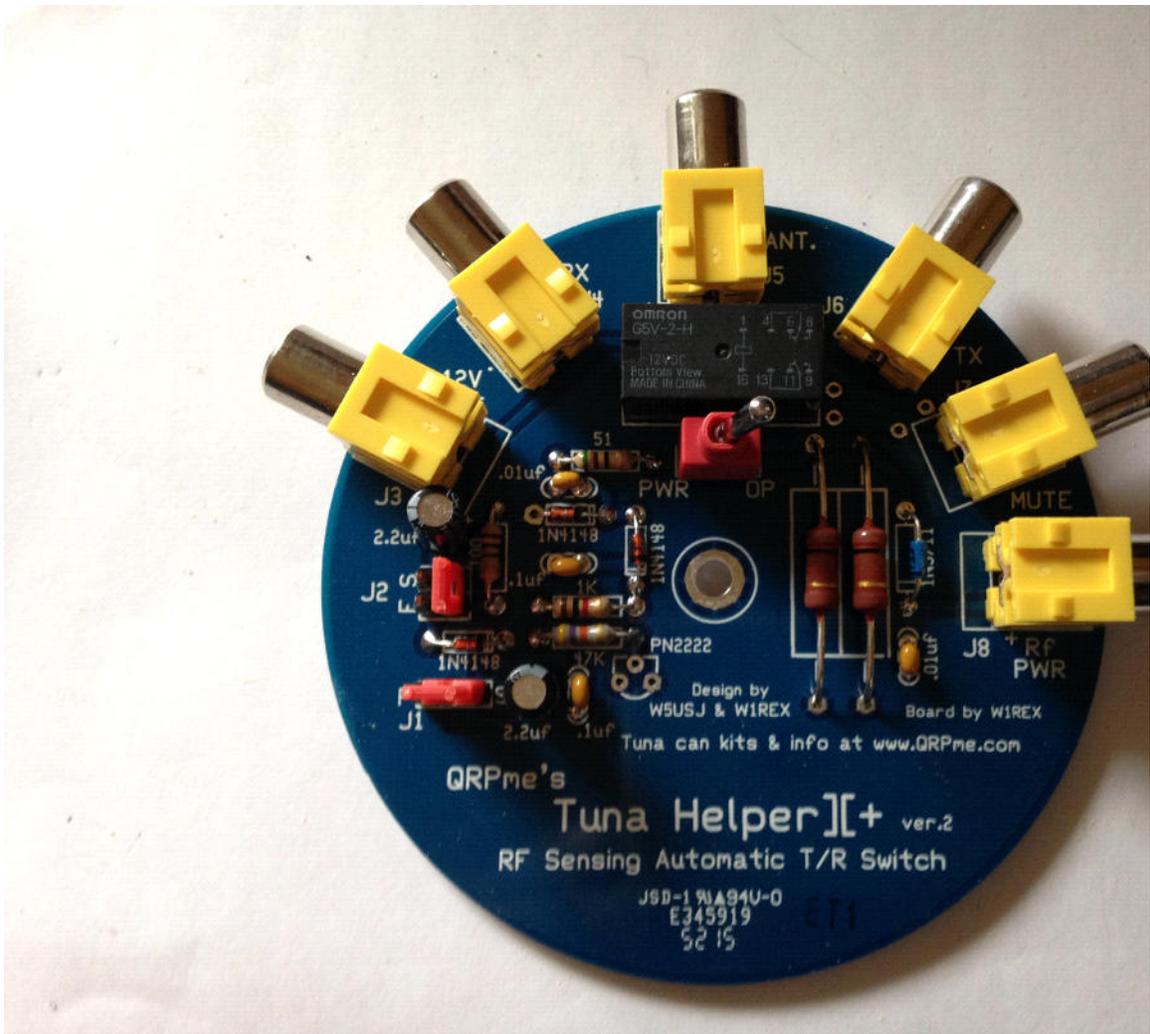
Now they fit flush with the PCB



After prepping all the RCA connectors, insert them in the PCB.

Solder SW, Relay, J1, J2, J3, J4, J5, J6, J7 and J8.





Almost THERE!

NOW ... THE VERY LAST YET

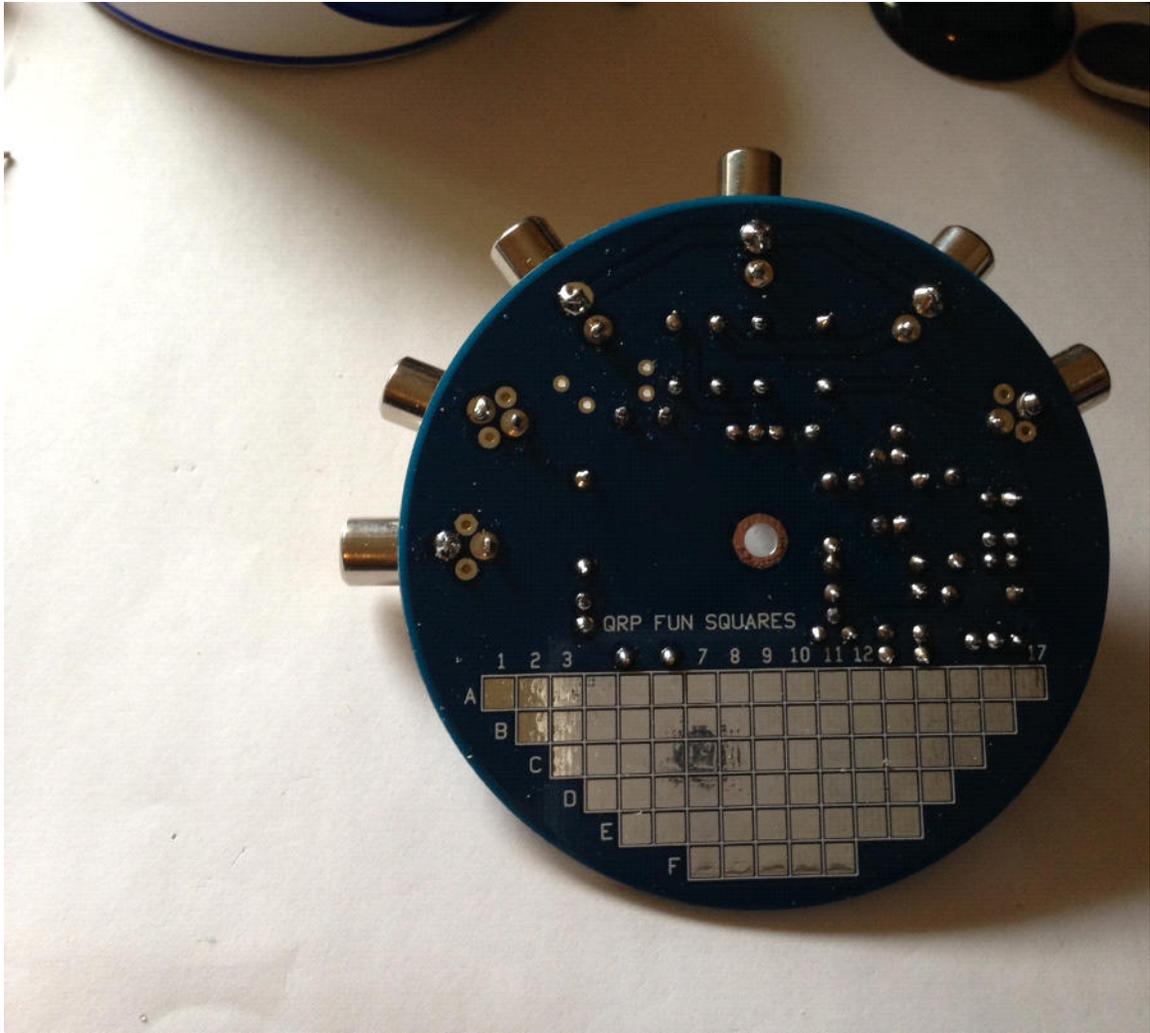
MOST IMPORTANT COMPONENT !

Transistor: Q1 = 2N2222

Install Q1 into the PCB and use the outline of Q1 on the PCB as a guide.



**Solder Q1 and YOUR DONE
SOLDERING !**



I use all RCAs in my Tuna Helper, but supply a 2 pin screw terminal connector for the power connector if you want to run wires.... The board is now finished and is mounted on the can and secured with the bolt & nut. Your Tuna Helper is now ready to automatically switch your antenna between the transmitter and receiver! Position the Switch to OP for normal operation. Position The switch to PWR to measure your Power Output. Connect a Voltmeter to RF PWR Jack and measure the DC Voltage.

The Formula to calculate your Power is:

Output I use RGB component video cables to hook it up in my station. ENJOY!

