



Tuna Tunah

Switched Inductor Antenna Tuner

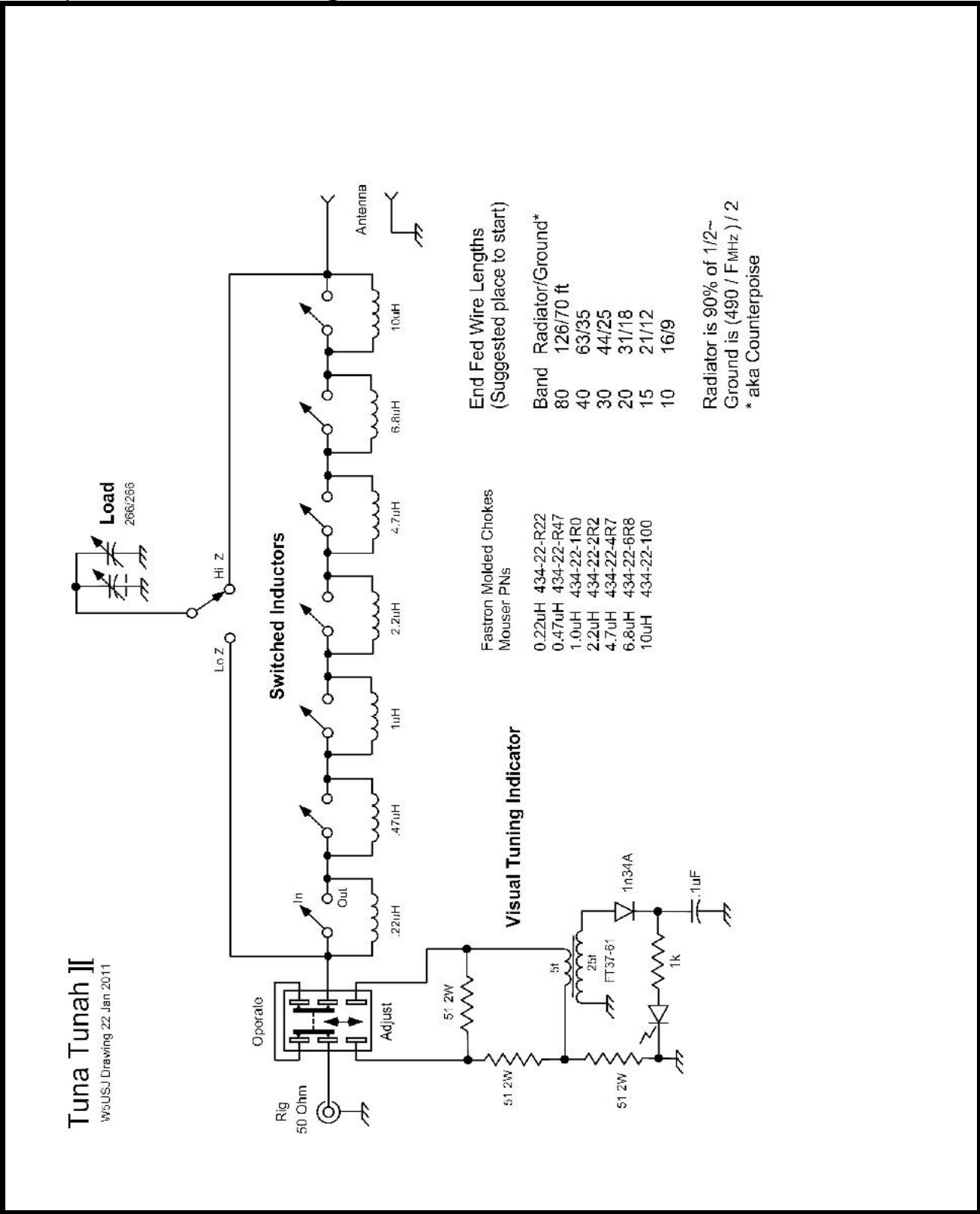
Builder's Guide by
Kevin Gilot NZ1I
&
Rex Harper W1REX

version 1.2

Tuna Tunah List of Materials

Qty	Description	PCB Location
() 1-	.22uH Inductor (Red-Red-Silver)	.22
() 1-	.47uH Inductor (Yellow-Violet-Silver)	.47
() 1-	1uH Inductor (Brown-Black-Gold)	1
() 1-	2.2uH Inductor (Red-Red-Gold)	2.2
() 1-	4.7uH Inductor (Yellow-Violet-Gold)	4.7
() 1-	6.8uH Inductor (Blue-Gray-Gold)	6.8
() 1-	10uH Inductor (Brown-Black-Black)	10
() 8-	Single Pole Switches (3-pin) (includes 1 for Hi Z/Lo Z)	
() 1-	Double Pole Switch (6-pin)	Tune/Op
() 1-	1N34A Diode	D-1
() 1-	LED	D-2
() 1-	.1uF Capacitor (104)	C-1
() 1-	1K Ohm Resistor (Brown-Black-Red)	R-7
() 2-	RCA Connectors	Rig/Ant
() 1-	Variable Capacitor	Load
() 3-	51 Ohm 2 Watt Resistors (Green-Brown-Black) A,B,C	
() 1-	FT37-61 Toroid	
()	Length of Magnet Wire	
() 2 -	2.6mm x 3mm	
() 1 -	2.6mm x 10mm	
() 1 -	1/4" x 1/4" nylon spacer	for Load Cap knob
() 1 -	6-32 x 1.5"	
() 1 -	6-32 Nut	
() 1 -	Knob	for Load Cap

Study the schematic below to get a good overview of the circuit that you will be building...



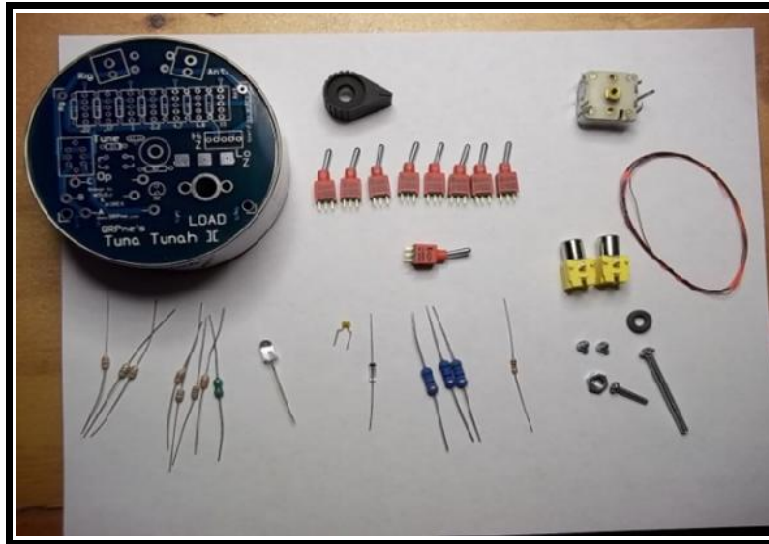
End Fed Wire Lengths
(Suggested place to start)

Band	Radiator/Ground*
80	126/70 ft
40	63/35
30	44/25
20	31/18
15	21/12
10	16/9

Fastron Molded Chokes
Mouser PNs

0.22uH	434-22-R22
0.47uH	434-22-R47
1.0uH	434-22-1R0
2.2uH	434-22-2R2
4.7uH	434-22-4R7
6.8uH	434-22-6R8
10uH	434-22-100

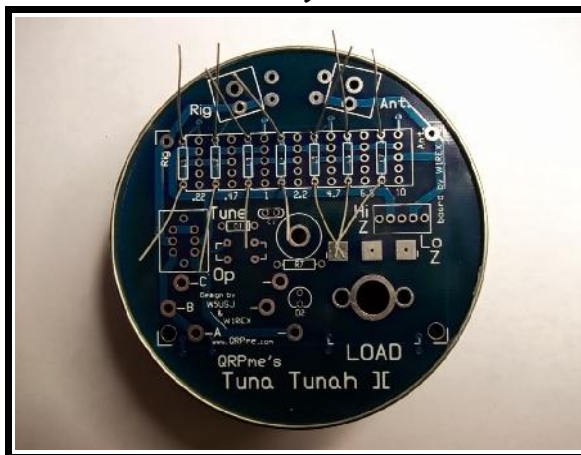
Radiator is 90% of 1/2~
Ground is (490 / F MHz) / 2
* aka Counterpoise



Let the Build Begin!

Let's start with the inductors: They are mounted to the **Underside** of the circuit board.

- () .22uH (Red-Red-Silver)
- () .47uH (Yellow-Violet-Silver)
- () 1uH (Brown-Black-Gold)
- () 2.2uH (Red-Red-Gold)
- () 4.7uH (Yellow-Violet-Gold)
- () 6.8uH (Blue-Gray-Gold)
- () 10uH (Brown-Black-Black)



NOTE: When you are building a tuna can kit, the open can makes

an excellent circuit board holder while soldering....

As viewed from the underside of the circuit board...from left to right....

() 10uH (Brown-Black-Black)

() 6.8uH (Blue-Gray-Gold)

() 4.7uH (Yellow-Violet-Gold)

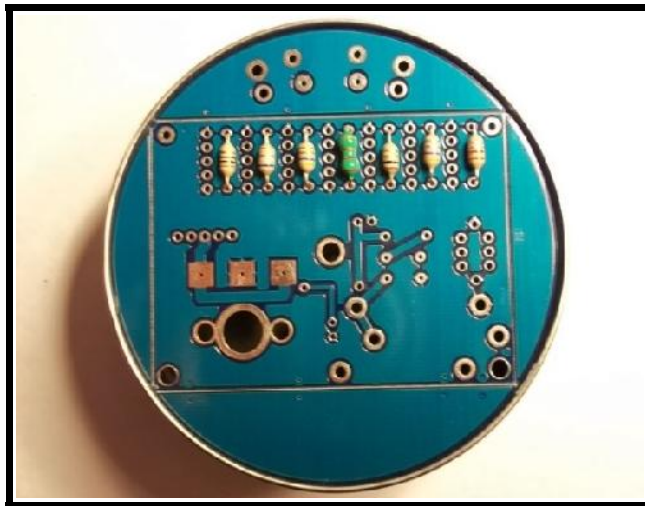
() 2.2uH (Red-Red-Gold)

NOTE possible green body color for 2.2uh

() 1uH (Brown-Black-Gold)

() .47uH (Yellow-Violet-Silver)

() .22uH (Red-Red-Silver)



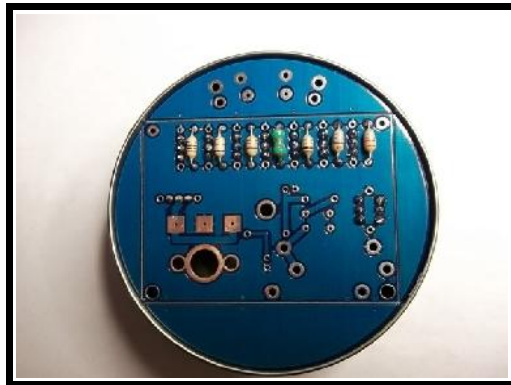
Finished view of installed inductors.

Next are the switches. Notice the board has 5 vertical holes for each switch position.

Place the switches in the center 3 holes back on the **topside** of the circuit board. Leave an open hole above and below the switch.

Pinch the switch against the board using your fingernail and then solder a SINGLE pin on the bottom side to hold the switch in place. Repeat for the remaining switches... soldering only one pin. You can re-check whether the switches are aligned vertically. Now go through and solder a second pin on each switch. And do this one more time to solder the third pin on each.

Switch installation done using this method, keeps the switches



from heating up too much and possibly causing the switch bodies to melt and distort the switch contacts out of position. By re-checking each switch before soldering the second pin, you can re-align it to make sure it is vertical to the board and aligned with all the other switches..



() Place the last Single Pole Switch (3-pin) in the holes outlined

Hi Z and Lo Z located to the right of center on the board. As in the previous step, mount the switch in the center three holes.

NOTE: the holes are on a horizontal plane rather than a vertical plane like the previous step. Leave an open hole on either side of the switch. Use the same solder method as in the previous step.

() Place the double pole switch (6-pin) in the holes outlined Tune and Op located to left of center on the board. Position the switch in the 6 holes in the center of the outlined block. Again leave an open hole above and below the switch. Solder as in the previous steps.

Be sure to check for any solder bridges between each pin connection before proceeding to the next step.

() Solder the metal pins on the connectors to the board.





RCA connectors shown in their proper place.

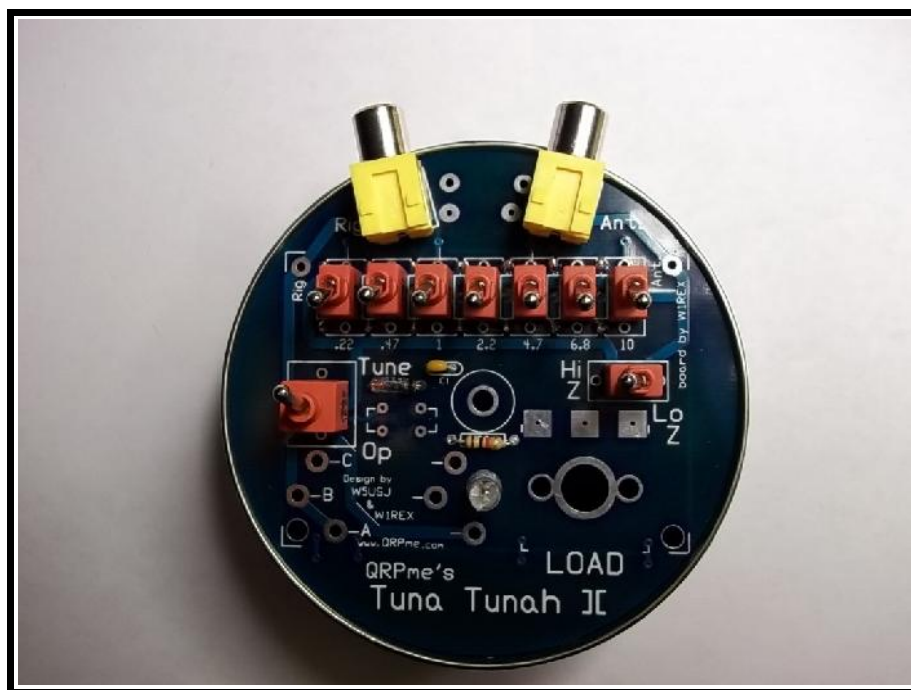
Install and Solder the following components onto the board:

() 1- .1uF Capacitor (104) into C-1.

() 1- 1N34A Diode into D-1. NOTE: You will need to Carefully Bend the Leads Under the Diode Body to fit them into the holes on the board. Also the BLACK STRIPE goes to RIGHT.

() 1- 1K Ohm Resistor (Brown-Black-Red) into R-7.

() 1- LED into D-2. NOTE: SHORT LEAD goes into BOTTOM HOLE.



View of circuit board so far...

It's Toroid Time!

Here is the toughest part of the kit... and it really isn't that tough!

() First, wind 5 primary turns on the little toroid. Cut the excess magnet wire leaving the leads about 1 inch long. These are the Primary Leads.

() Second, wind 25 turns around the toroid starting from the same position and winding in the same direction. You should end up with a toroid transformer like the one pictured above, where 2 leads enter the toroid the same way (A), wind around the toroid and exit the same way (B).

You can always identify the primary leads as they are the short ones, while the long ones are the secondary leads.

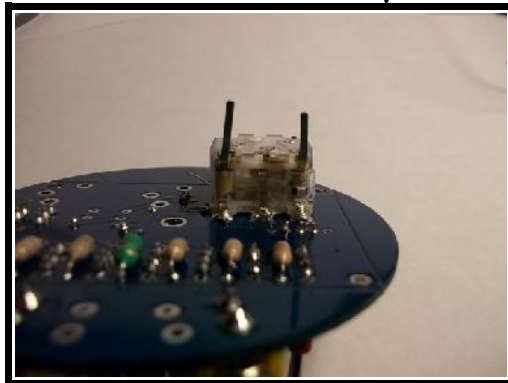
Prior to mounting, you will need to scrape off the coating of the magnet wire and then tin the leads...while keeping the long/short ID lengths.

() Primary goes to upper left and lower right.

() Secondary goes to lower left and upper right.

Next is the Load Cap:

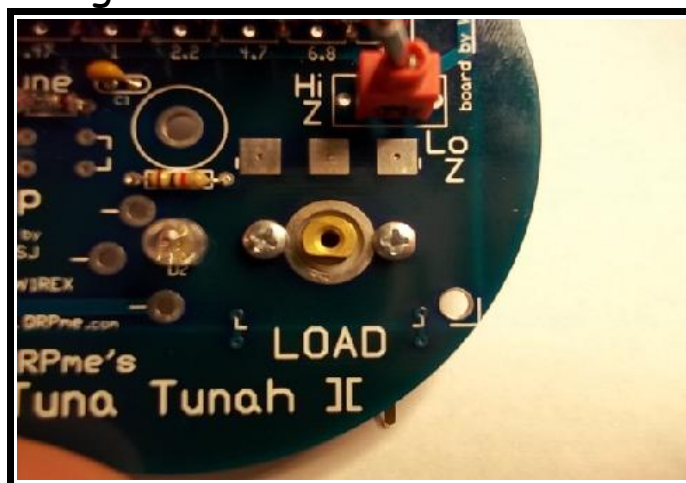
() Pre-bend the leads after dry fitting the capacitor to the board and noting the necessary lead positions and lengths required to reach the solder pads.



() Use the small 2.6mm x 3mm screws to hold the cap to the board.

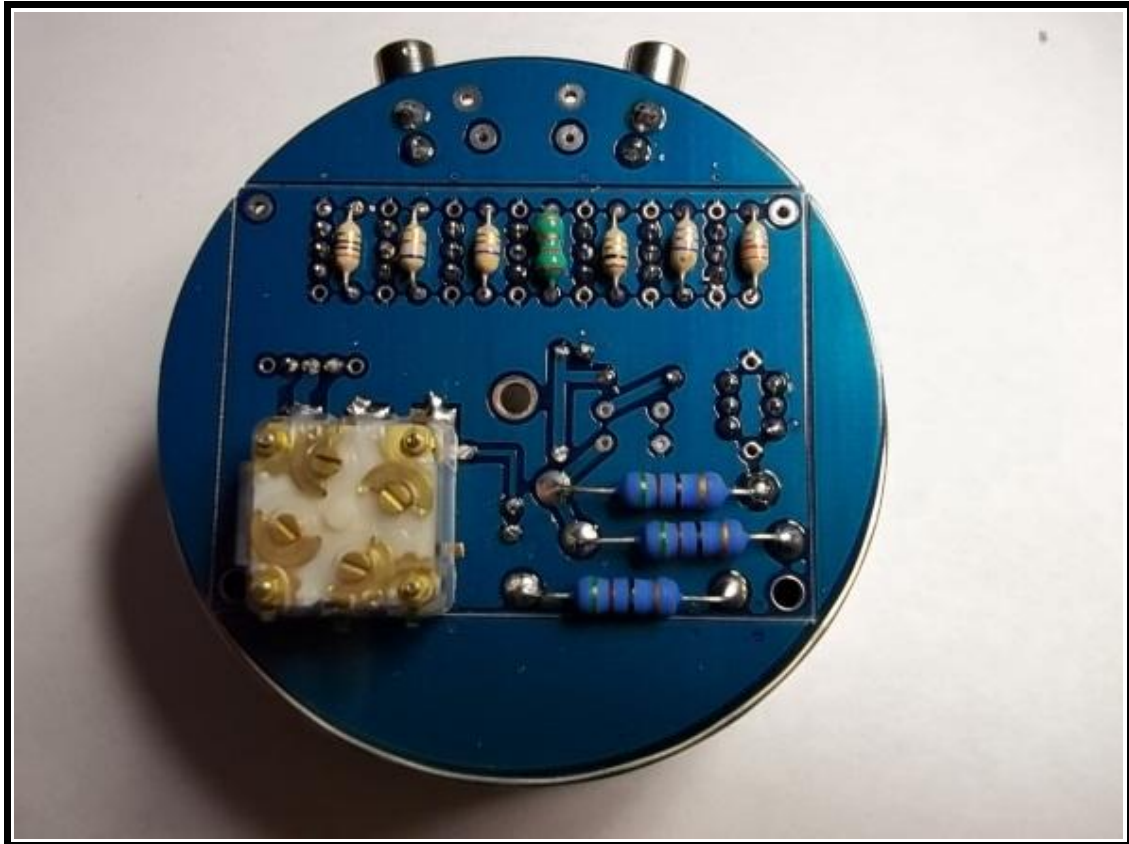
() Then clip off the excess leads and solder the leads to the pads.

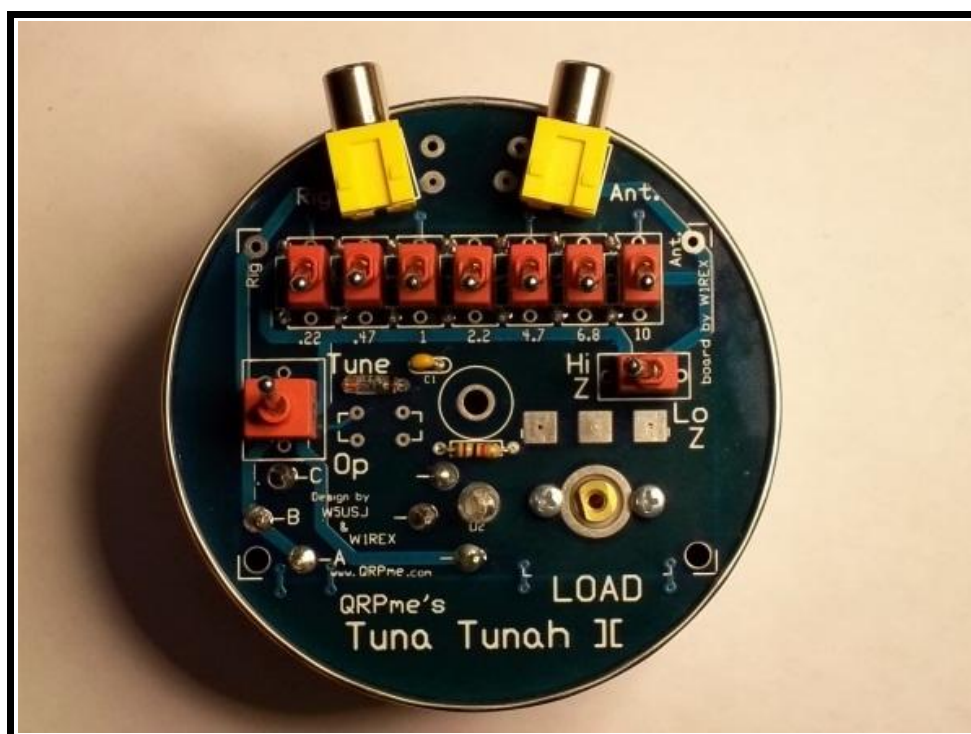
() Use the 2.6mm x 10mm screw & nylon 1/4" spacer through the center of the shaft to hold the knob. Hold the shaft with a pair of pliers while tightening the shaft extension screw.



And last but not least....

() 3- 51 Ohm Resistors (Green-Brown-Black) Solder the resistors on the back of the board in the holes marked A-B-C.





() Mount the finished circuit board to the tuna can using the 6-32 x 1.5" bolt and nut.

You should NOW be good to go!

Operating Tip By: Eric WD6DBM

Attach your TX. Attach your antenna. Set TUNE/OP switch to TUNE. Set HI Z/ LOW Z switch to HIGH Z. Apply power and vary Load Cap and Inductor Switches for Minimum LED. Try switching Z switch if you don't get a dim KED. Then change Tune/Op switch to OP and you are good to go!