

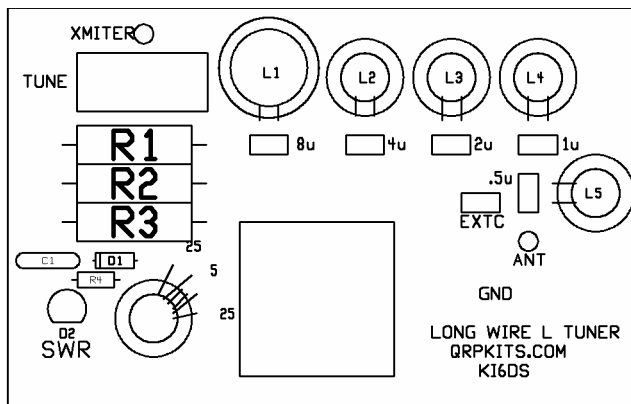
Altoids Longwire Tuner Manual

Thank you for purchasing the A.L.T. kit from Hendricks QRP Kits. I hope that you enjoy building and using your kit. The secret to successful kit building is to follow the directions, select the correct parts, and to check your work very carefully. Good Luck with your kit.

The first step is to check to make sure that you have all of your parts. Use the list below to make sure that you have all of your parts. If you find that you are missing a part, please contact me at ki6ds@dospalos.org, and I will ship a replacement part to you as soon as possible. Or, if you do not access to the internet, please send a letter to:

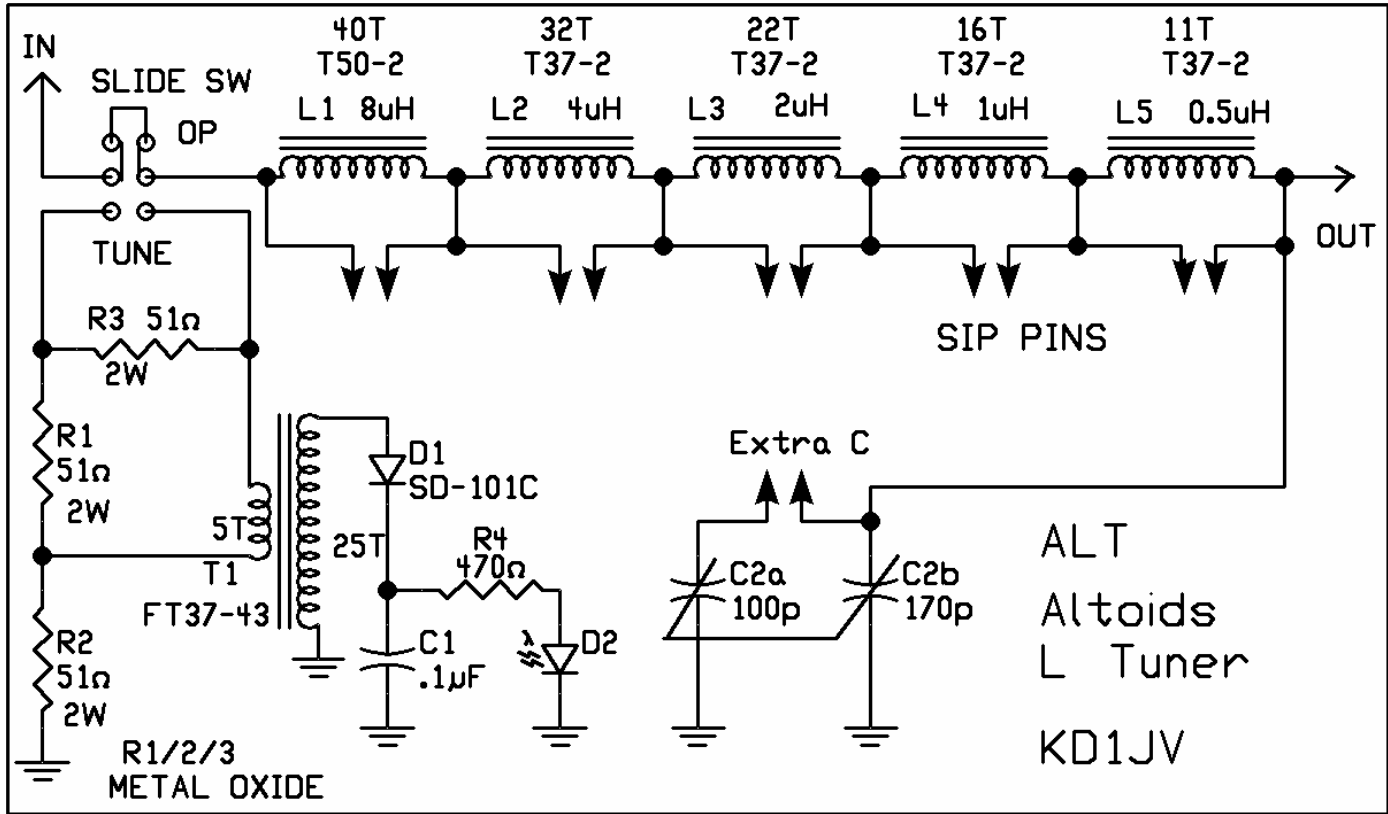
Hendricks QRP Kits
862 Frank Ave.
Dos Palos, CA 93620

OK	Part	Designator	Number
	.1 cap	C1	1
	Tuning Cap	C2	1
	SD-101A	D1	1
	LED	D2	1
	2pole Sip Pins	J1,2,3,4,5,6	6
	2pin Jumper		6
	T50-2 Red	L1	1
	T37-2 Red	L2,3,4,5	4
	51 Ohm	R1,2,3	3
	470 Ohm	R4	1
	Switch	S1	1
	FT37-61	T1	1
	4-40 x 3/8" Screw	Hardware	4
	4-40 nut	Hardware	4
	2.6mm x 6mm Screw	Hardware	1
	4-40 Star Washer	Hardware	1
	Alligator Clip		
	Leads	Connectors	2
	BNC Lead	Connector	1
	PC Board	PCB-ALT	1



Now that you have confirmed that you have all of the parts, let's take a look at the parts layout and schematic. Please turn to page 2 of this manual.

Schematic for ALT



Lets start with the fun part, winding the toroids. There are 3 different toroids in your kit, one T-50-2 which is the larger red one, four T37-2 which are the smaller red cores, and one Ft37-43, which is the small all black one. Winding a toroid is very easy and I find it quite relaxing. Let's wind the big one first. You will need to put 40 turns of wire on this one, and leave about 1 inch for the leads to be soldered into the board. Cut a piece of the red wire 24 inches long. Then, take the core in your left hand, the wire in your right hand, and put the wire up through the core and extend it about 1 inch. Hold the wire against the core with your left thumb. Now you have put 1 turn on the core, because every time that the wire passes through the core counts as 1 turn. Next, grab the other end of the wire and wrap around the core and put it through the middle from above. Now you have two turns, and the core should look like Fig. 1. Continue winding until you have 40 turns on the toroid. Trim the lead to about 1 inch, and you should have a toroid that looks like the one in figure 2.



Fig. 1

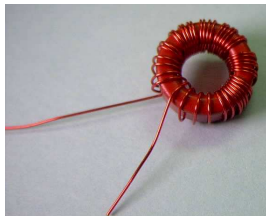


Fig. 2



Fig. 3

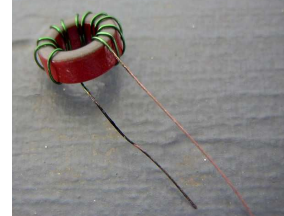


Fig. 4

The next step is very important. Take a match and burn back the insulation to the edge of the core on both leads. Then use a piece of fine sandpaper, I like to use 220 grit, and clean the leads until they are bright and shiny. Fig. 3 shows the leads after burning, Fig. 4 shows 1 lead cleaned. Be sure to clean both leads. Set it aside for now.

Next we will wind L2. Use a small red toroid as your coil form, and repeat the procedure above, but this time only put 32 turns on the coil. You will need to cut the wire to 20" to start. Don't forget to clean the insulation off the leads, it is very important. When it is finished set it aside.

Wind coil L3. Use a small red toroid, and cut your wire to 15". Be sure to clean the insulation off the leads.

Wind coil L4. Use a small red toroid and cut your wire to 12". Be sure to clean the insulation off the leads.

Wind coil L5. Use a small red toroid and cut your wire to 10". Be sure to clean the insulation off the leads.

Now we are ready to wind our last toroid. This will be a transformer, and is T1 on your parts list. You will need two pieces of wire, one red one that is 16" long, and green one that is pre-cut to 9" for you. Start with the red wire. Wind 25 turns onto the all black toroid. Prepare the leads as before. Now in you will wind the second part of the transformer. Use the green wire to put 5 turns on the core between the leads of the red wire as shown in Fig. 5. Be sure to prepare the leads. Set the core aside for now.

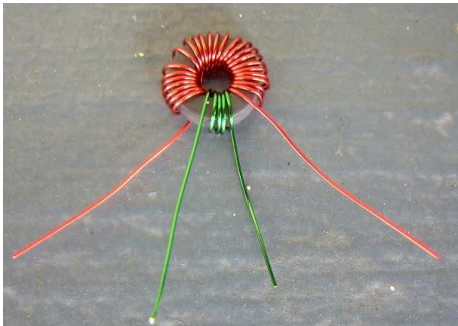


Fig. 5

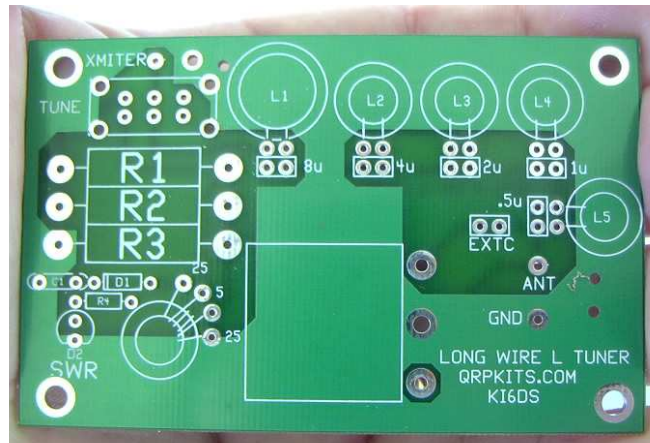


Fig. 6

The board needs to have 3 holes drilled in it with a 1/16" drill bit. These are for the strain relief wires so the leads won't break. Look at Fig. 6 for the placement of the holes. One needs to be just above the top right corner of Switch 1 and just to the left of L1. The other two need to be just to the right of the Ant and GND connections on the lower right corner of the board.

Your kit came with a special unpainted altdoids tin that will need to be drilled so you can mount the board. Take the board, and use it as a template to mark the holes in the tin for drilling. Use a 1/8" bit to drill the holes. Next find an old credit card. You will use this for insulation between the board and the case. You will need to use the board to mark the holes on the credit card. Use a 1/8" bit to drill the holes. If you don't have an old credit card, use some cardboard. It is very important to use some type of insulation here. You can't use standoffs because there is not enough clearance for the lid to close if you do.

Ok, turn on the soldering iron. The first step is to install the Sip Pins. Install them all at this time. Use an ohm meter to verify a good soldering job.

Next install D1, be sure to check the orientation of the diode.

Now install D4, a 470 ohm, yellow, purple, brown striped 1/4 ohm resistor.

Install C1, a brown or blue .1 capacitor, marked 104.

Solder in D2, the LED next. Be sure to pay attention to the orientation of the flat side of the LED. Make sure it matches the silk screen.

Install the transformer, T1. It is the only toroid with 4 leads. Solder the red leads into the holes marked 25, and the green leads into the holes marked 5.

Install R1, 2, 3, the 3 large blue resistors.

Install Switch 1. Be sure that it seats onto the board.

Put the shorting blocks on all of the pins of J1, 2, 3, 4, 5, 6. This will insure that they will fit after you install the toroids.

Install L1, 2, 3, 4, 5. Make sure that they lay flat against the board. Use some hot glue to hold them in place. Just a dab in the middle will work. When you finish with L1 – L5, take an ohm meter and make sure that you have continuity between the ANT and the left pin of the shorting block of L1. If you don't, check your soldering joints.

Take the tuning cap C2, and turn it over so the shaft faces away from you. You will see two adjusting screws that will turn small half circle brass plates. Adjust those so they are fully meshed. Next, assemble the knob on the tuning cap as shown in

Fig. 7. Don't over tighten the screw, but make sure it is tight. Solder in the cap, making sure it fits flat on the board. After soldering, attach the body of the cap to the board with super glue. The last thing to do is to attach the leads. Use one of the alligator clip leads for the antenna, and one for the ground. Next, prepare the bare end of the RG174 so that you can solder it into the Transmitter output and ground. The center lead goes to the left hole, the ground to its right. After attaching the leads, take some of the left over magnet wire, and make strain reliefs as shown in Fig. 7. Mount the board in the case using the 4-40 hardware, and you are in business.

Operation: I use a piece of wire 51 feet long for my long wire, and a piece 16 feet long for the counter poise. You want to use as little inductance as possible to get a match. So start out with the shorting block on L1,2,3&4. This will bypass those coils, eliminating them from the circuit. Take the shorting block on L5 and pull it off. Put it sideways on 1 pin, this is a great way to store the block so you won't lose it. Now, L5 is in the circuit with .5uH of inductance. Tune for a match which will be indicated by the LED going out or getting very dim. If you don't get a match, then add L4 by pulling off the shorting block, and retuning. This will put L4 1uH and L5 .5uH in the circuit. Keep trying adding inductance until you get a match. The LED will dim or go out when you have a good match. Also, remember that you can lower the capacitance of C2 by pulling the shorting block. Try that if you can't get a match. Have fun and enjoy.

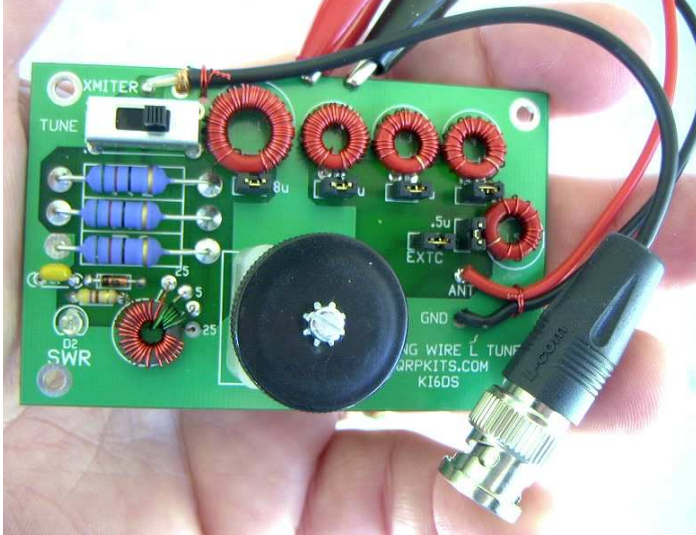


Fig. 7



Fig. 8 Completed Kit

This manual will be on my website, www.qrpkits.com soon. The web site is not up as I write this manual on April 25, 2005, but I hope to have it up soon. Please check the website first. If it is not up and you would like a copy of this manual, please send an email to: ki6ds@dospalos.org with ALT Manual Request in the subject line and I will send you a pdf file.