

Micro 80/D

Minimalist 80m Transceiver

Original Design By: Oleg Borodin RV3GM

Updated and Kitted By: Rex Harper W1REX

Schematic By: Chuck Carpenter W5USJ

Manual Assistance By: Kevin Gilot NZ1I



Ver. 1-3

August 13, 2012

Parts List:

Resistors:

- () R1 - 51K (grn-brn-org)
- () R2 - 1.5K (brn-grn-red)
- () R3 - 33K (org-org-org)
- () R4 - 10K (brn-blk-org)
- () R5 - 1M (brn-blk-grn)
- () R6 - 2.7K (red-vio-red)
- () R7 - 100K (brn-blk-yel)

Transistors:

- () Q1 - PN2222A
- () Q2 - 2N3866 (Marked CG0001)
- () Q3 & Q4 - Russian KT3102 Qty.2
- () Q5 - 2N3906

Crystal

- () Xtal - 3.560 MHz (80 Mtrs)

Inductors/ Coils/ Toroids:

- () L1 - 3uH - Builder to wind toroid. **See building instructions. **
- () L2 & L3 - 2.2uH (red-red-gold) Qty. 2
- () Lx - 22uH (red-red-blk)
- () RFC1 - 150uH (brn-grn-brn)

Parts List Continued:

Capacitors:

C1, C2, & C 12 - 100pF (Marked 101) Qty. 3

C3 - 82pF (820)

C4, C11, & C15 - 680pF (681) Qty. 3

C5 & C10 - 0.1uF (104) [Mod # 1 Mod # 2] Qty. 4

C6 - .15uF (154)

C7 & C8-1 - .0068uF (682) Qty. 2

C8-2 - 0.22uF (224)

C13 - 1200pF (122)

C14 - 220pF (221)

VC1 - 60/140 polyvaricon

Hardware / Miscellaneous:

$\frac{1}{4}$ " x $\frac{1}{4}$ " spacer, $\frac{1}{4}$ " shaft knob

2.6mm x 10mm bolt

2.6mm x 3mm bolt & washers Qty. 2

RCA jack Qty. 2

stereo jack Qty. 2

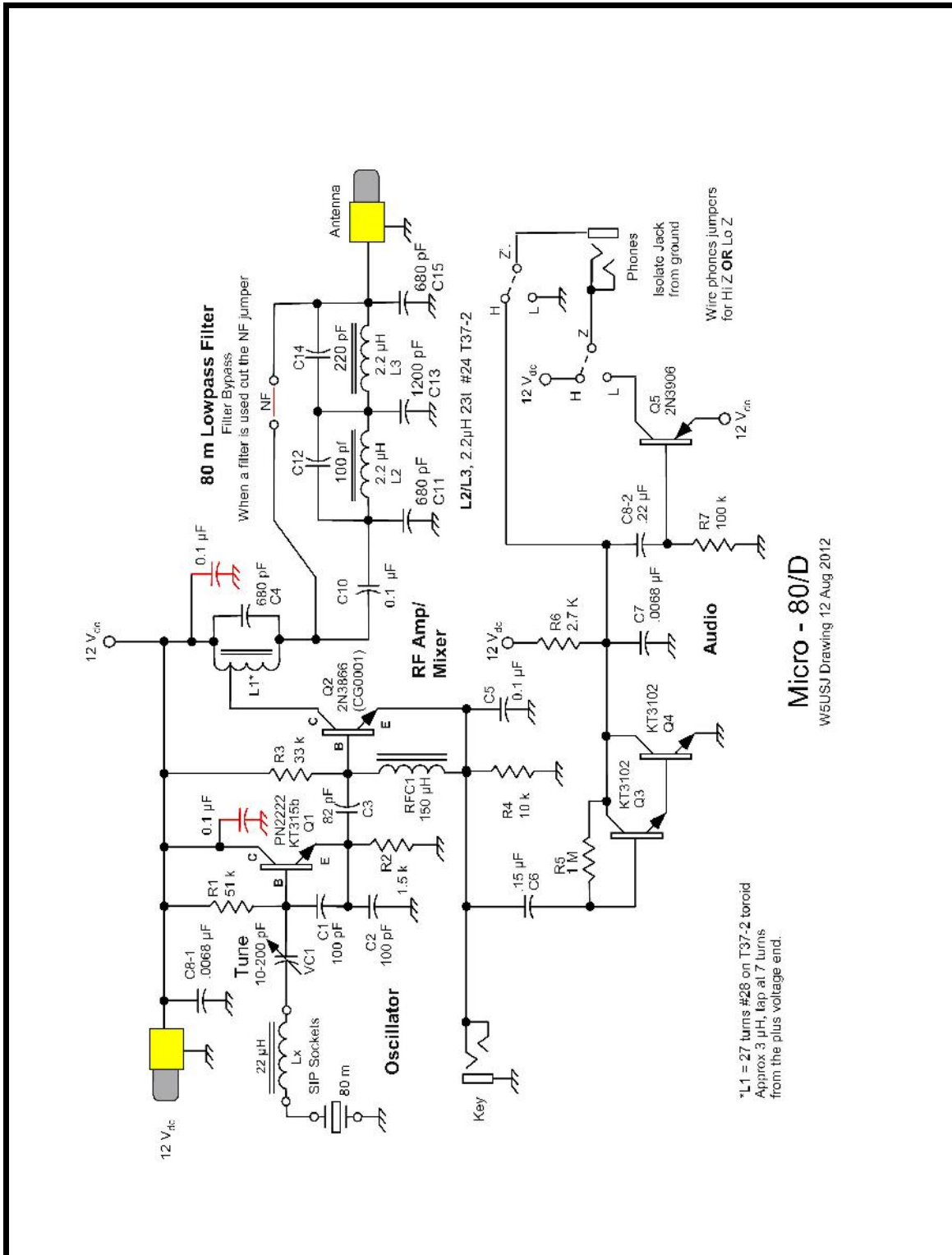
3 pin SIP socket

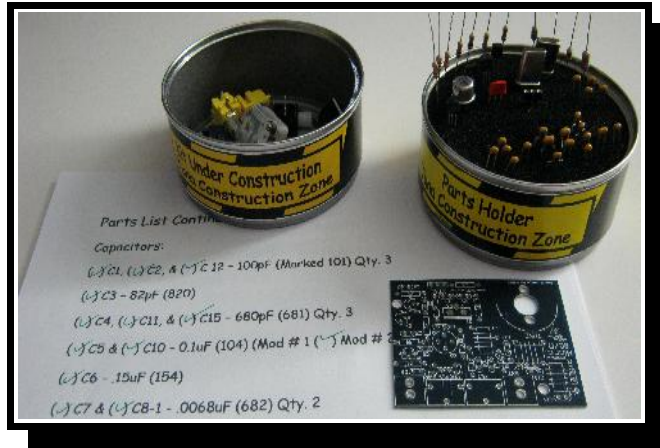
T37-2 toroid Qty. 3

48" magnet wire

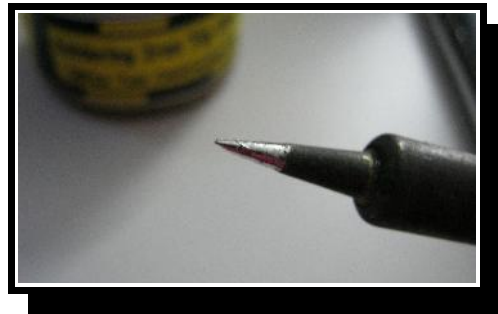
printed circuit board

You should study the schematic below to become familiar with the Micro80 design and the kit that you will be building.

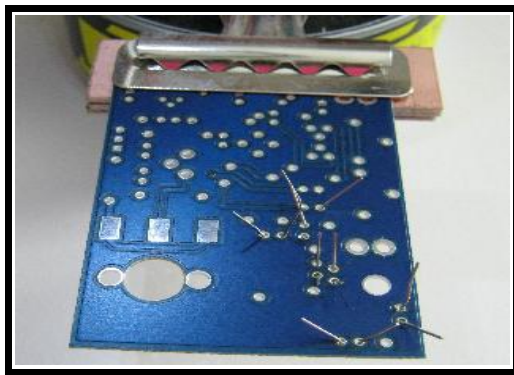




Sort all the parts and check them off the parts list to insure that you received the entire kit.

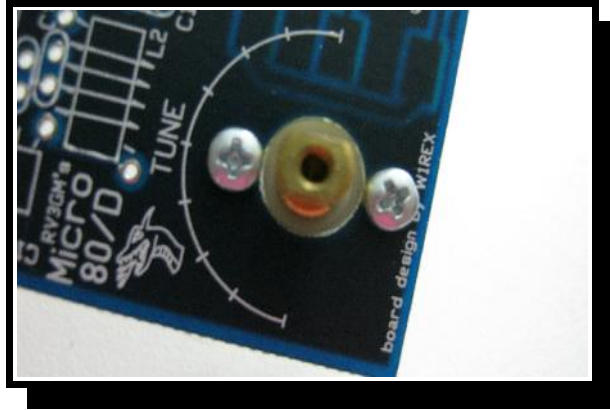


Here I have a soldering iron tip cleaner and a soldering iron with a nice sharply pointed CLEAN tip. Clean your tip after every joint!



I also have a Solderman board holder to aid in holding the pcb for soldering.

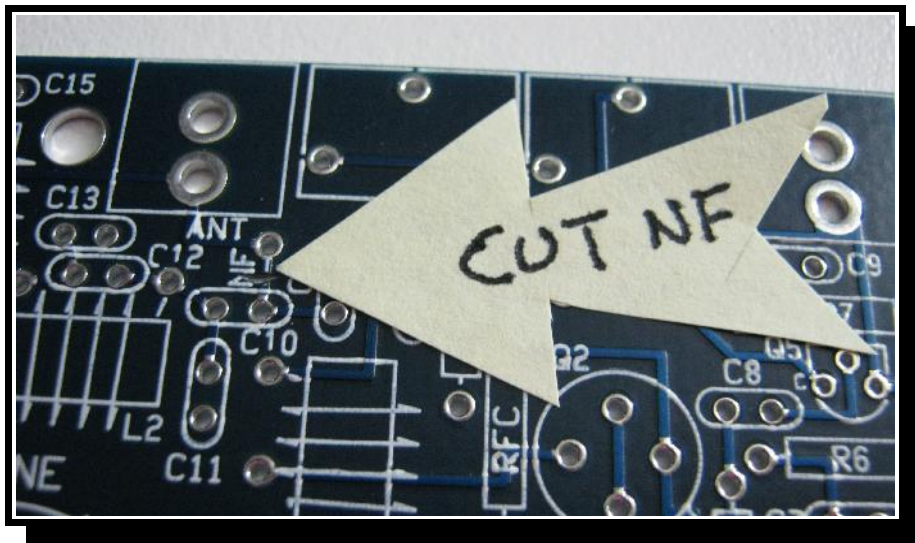
Let's build the kit!



The first thing you need to do is check that the polyvaricon cap mounting screws line up with the holes as you might have to drill out the holes a little oversized in order to mount the capacitor. I normally do this back in the shop but occasionally a board might slip through without being checked. So just try to mount the polyvaricon tuning cap with the 2 tiny 2.6mm screws to see if it fits. Once you verify that the cap and screws all line up with the mounting holes, remove them from the board and return them to your parts holder for use in a later step.

The Micro80D kit was designed in collaboration with Oleg, RV3GM, over in Russia. Over there, little transmitters do not need the extensive harmonic filters that we need here in the US. Furthermore, cost is a prime factor in whether or not a ham can even afford to purchase a kit. So there is a small

trace, marked NF, on the top side of the board near the antenna connector. For US builders, this trace must be cut in order to allow the output signal to pass through the harmonic filter. For cost purposes, Russian kits won't contain the components to construct the harmonic filter.... They will bypass the filter section by leaving the NF jumper intact.



Starting with the capacitors - Install, solder and clip off the excess leads:

- | | | | |
|---------|--------------|----------|----------------|
| () C15 | 680pf (681) | () C14 | 220pf (221) |
| () C13 | 1200pf (122) | () C12 | 100pf (101) |
| () C10 | .1uf (104) | () C11 | 680pf (681) |
| () C4 | 680pf (681) | () C8-1 | .0068uf (682) |
| () C1 | 100pf (101) | () C2 | 100pf (101) |
| () C3 | 82pf (820) | () C8-2 | .22uf (224) |
| () C6 | .15uf (154) | () C7 | .0068uf (682) |
| () C5 | .1uf (104) | () C9 | ** Not Used ** |

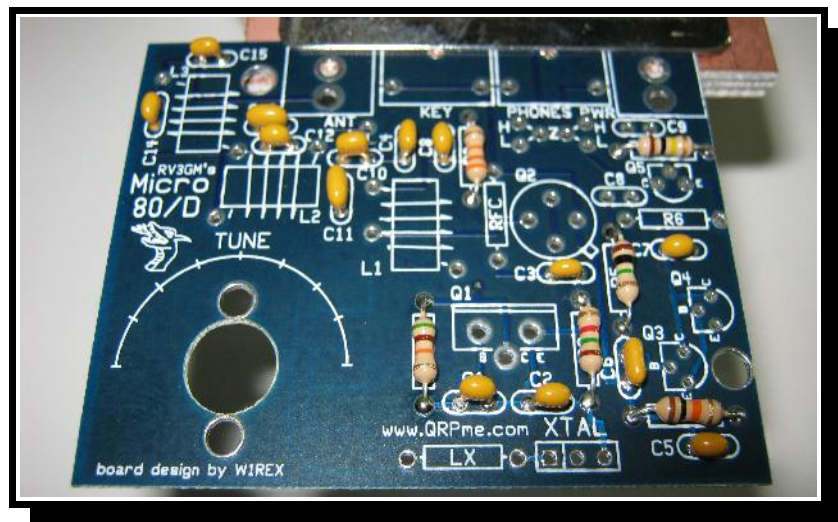


Resistors are next- Install, solder and clip off the excess leads:

- | | | | |
|--------|--------------------|--------|-------------------|
| () R1 | 51K (grn-brn-org) | () R3 | 33K (org-org-org) |
| () R2 | 1.5K (brn-grn-red) | () R5 | 1M (brn-blk-grn) |
| () R7 | 100K (brn-blk-yel) | () R4 | 10K (brn-blk-org) |
| () R6 | 2.7K (red-vio-red) | | |

NOTE: Builders wanting to use Hi-Z phones need to remove R6 (2.7K), R7 (100K), C8-2 (.22uf) and Q5 (2N3906) from circuit.

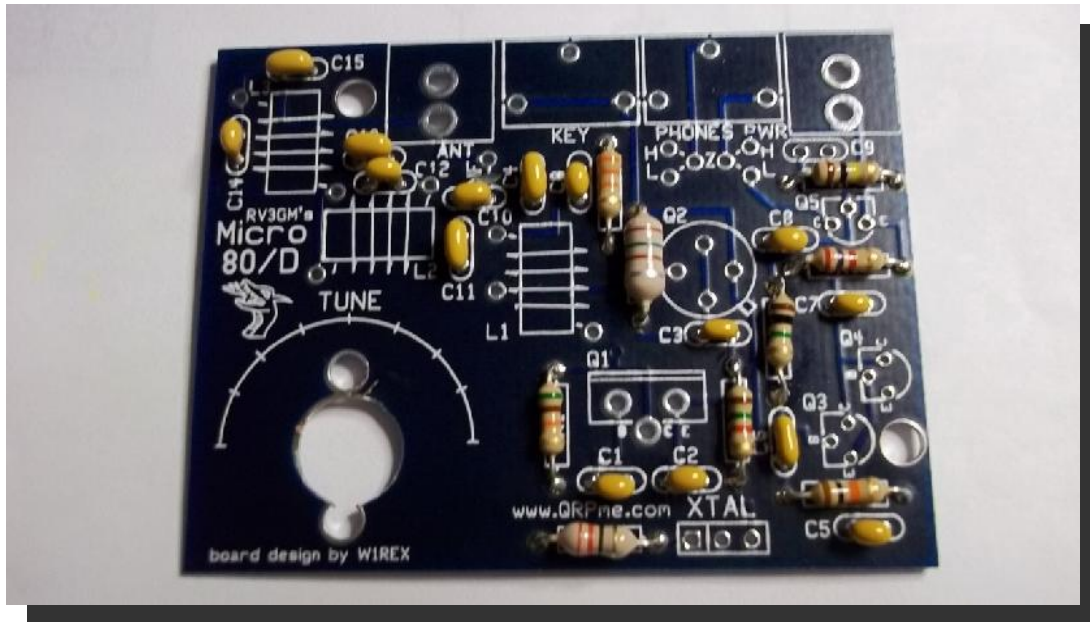
NOTE- Save 2 cut off resistor leads for later use in the build for the headphone impedance selection jumpers.



Now it's time for the inductors/coils/toroids:

Install and solder:

() RFC1 150uh (brn-grn-brn) () Lx 22uh (red-red-blk)



Next up are the transistors: Install and solder:

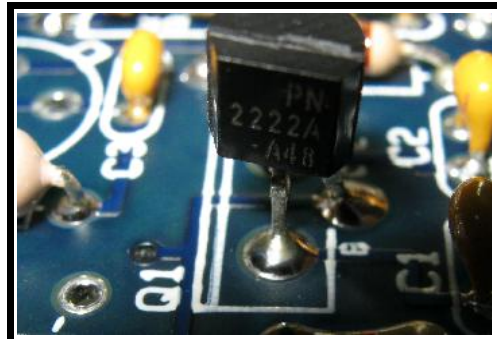
() Q1 PN2222A

Hold the transistor with the flat side pointing up towards the left of the board and round side pointing to the right. **

Note - the transistor leads are from right to left - Collector, Base, Emitter.

The Holes on the board are labeled from left to right - B, C, E. You will need to

bend and angle the proper leads to the proper holes for B and C to match correctly. There is plenty of length to the wire leads on the transistor to do this. Go slow and be sure the leads are not touching each other upon soldering into place.



() Q2 2N3866 (or equivalent marked CG0001)

Place the transistor leads into 3 of the 4 holes on the board at Q2.



Wrong!



Right!

Note the tab to be oriented at about the 5 o'clock position and NOT down on the surface of the board. The leads should fit easily into the

holes at 9 o'clock, 12 o'clock, and 3 o'clock positions. Solder in place or use some SIP socket pins as a transistor socket for easily changing the final transistor Q2.

() Q5 2N3906

Hold transistor with flat side facing up and rounded side facing down over the Q5 spot on the board. The two end leads will fit naturally into the corresponding holes on the board, but you will need to bend the middle lead to make it fit properly. Once fitted, solder in place.

() Q3 & () Q4 Russian KT3102

Place each transistor with the flat side facing left and round side facing right over their respective positions. Again the 2 end leads will naturally fit into the corresponding holes on the board, but you will need to bend the middle lead to make it fit properly. Once fitted, solder each in place.



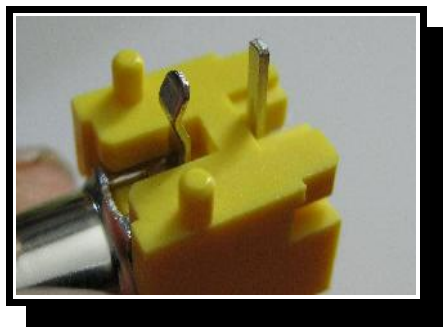
Note Transistor Orientation and Placement.

Connections to the outside world are next.

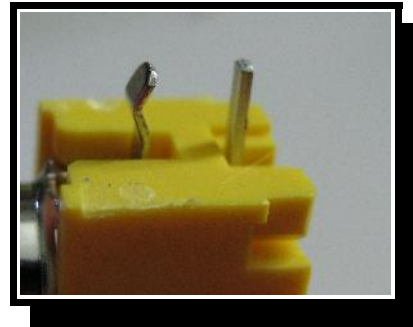
() Antenna

() Power Jacks - Yellow RCA Jacks

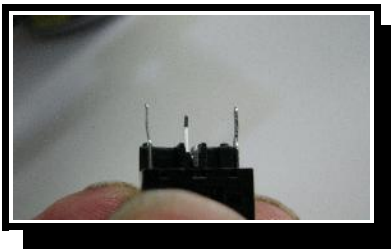
Notice the 2 small yellow pins on the RCA jack? You will need to snip these off with a pair of side cutters before mounting the jack to the board. This will allow the jacks to fit flush with the board. Once that is done to both of the RCA jacks, you can mount them over their respective positions with the round metal tips pointing away from the board and the leads in their respective holes. Solder in place.



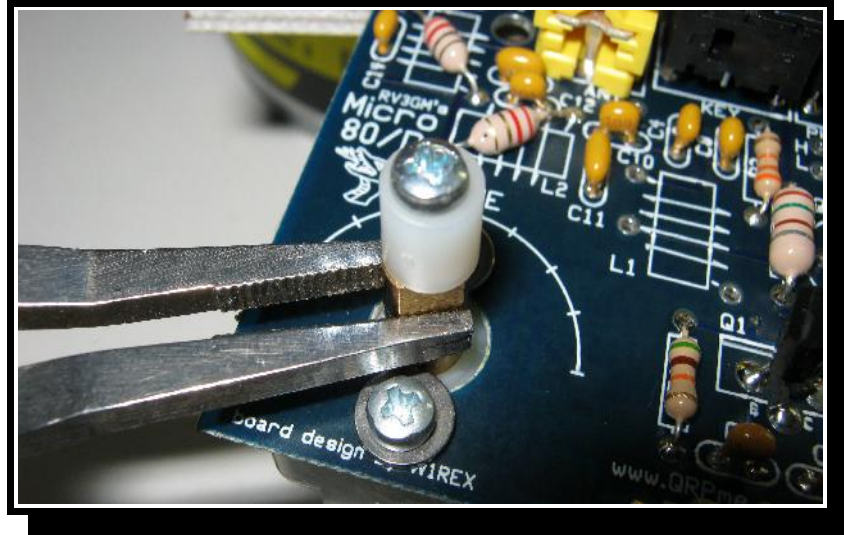
RCA jack with 'feet'



'feet' removed



() Key & () Phones Jacks - Mount the stereo jacks over their respective positions on the board. The round hole will point away from the board in the same direction as the RCA connectors. Be sure to fit the 3 leads of the jacks properly and solder in place. I find it a bit easier to straighten the 2 back legs to get them into their holes easier.



Next mount VC1 through rear side of board. Secure with 2 small screws and the small washers on the top side of the board. Hold the shaft tight with a small pair of pliers gripping across the flats. Mount the shaft extension spacer using the 2.6mm x 10mm screw. Holding the shaft from turning by using the pliers will allow you to screw that 10mm screw in TIGHT. Now bend and fold the solder tabs on the back side of the pcd to place them on the rectangular solder pads and then solder them in place..

Headphone PCB Connection:

Determine which type of headphones you will use: Lo-Z (Walkman style) or Hi-Z (old military style)? Now you will need to place 2 wire jumpers that correspond with either Lo-Z or Hi-Z onto the board. Use some pieces of component leads that you cut off earlier in the build as the jumpers.

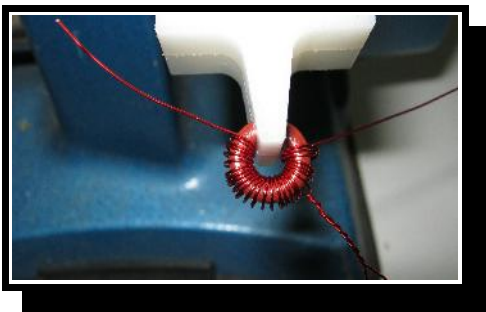
() Place one end of the lead in the Z hole and the other end in the corresponding hole: Lo-Z or Hi-Z. Solder in place.

() Do the same as above for the 2nd side of the connection.

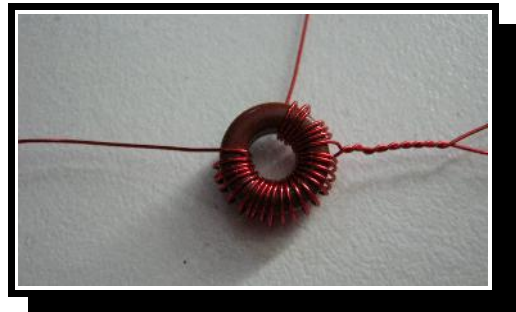
NOTE: Builders wanting to use Hi-Z phones need to remove R6 (2.7K), R7 (100K), C8-2 (.22uf) and Q5 (2N3906) from circuit.

Wind the Toroid! And just solder in the other two...

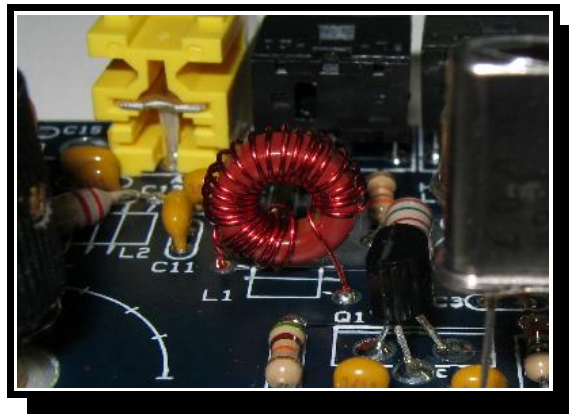
() L1 - You will need to wind L1 using a T37-2 toroid and some magnet wire. Wind 27 turns of magnet wire around the toroid. And solder a tap at 7 turns from the plus voltage end. Looking at the pcb, the toroid is mounted vertically, up and down. The tap is toward the bottom of the toroid.



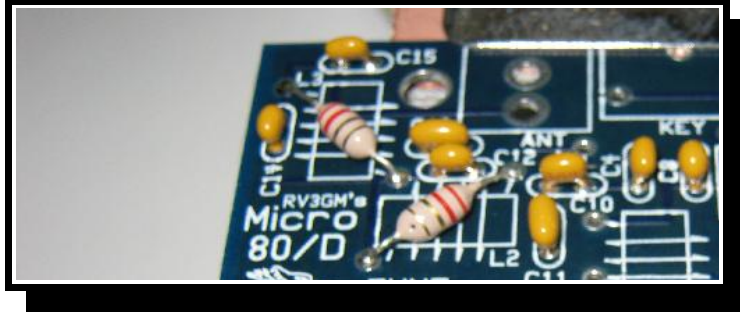
Using the EZ Tool to hold it..



finished transformer



Installed on the circuit board



() L3 & () L2- 2.2uh (red-red-gold)

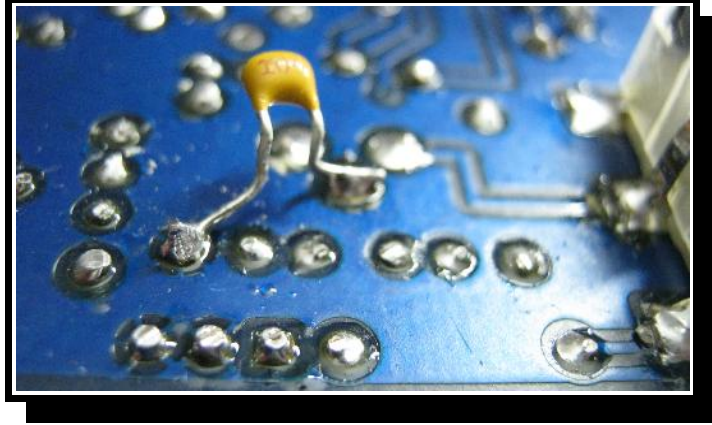
Install and solder in place. Clip off the excess leads.

You should be pretty well finished with your kit.

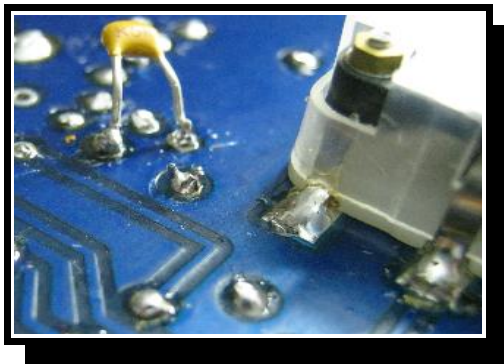
.....except.....

now a couple of modest modifications...

You will need the two (2) 0.1uF (marked 104) capacitors that are included in the kit.



Mod # 1- Install one lead of a 0.1uF capacitor to the center pad of Q1 (collector) and the grounded lead of R2. You will not see the little rays connecting the pad to the ground plane. Add a LITTLE dollop of solder to the pad and then tack the PRE-TINNED connector lead to the pad. Make sure you have the cap angled in the right direction because you can't put very much mechanical stress to this solder joint. It is a good electrical connection but VERY poor mechanical connection. Dry fit and pre-bend and pre-cut the cap leads to make the MOD easy.



Mod # 2 - Install one lead of a 0.1uF capacitor at the connection of the transformer near the marking C10 and the second lead at the lower connection of C11 which, again, has little rays going to the ground plane.



Here is a picture of Oleg's Heavily modded Micro80D rig. Not absence of harmonic filter components in upper left part of picture, relocation of toroid transformer and crazy little red Russian transistor in the Q1 location.



Here is Oleg in the field with a table full of fun kits. Micro80/4, a 4 band version of the Micro80 in the red pcb case, is the main rig Oleg is using this year.

You should NOW be ready to try yours out on the bench and then once you have ascertained that everything works FB, get it on the air. Enjoy!