

Winding the 40M SDR Toroidal Transformer

There are two windings, a 31 turn bifilar pair, and a 4 turn single wire. Wire for both is included.

There are many ways to make a bifilar pair, here's one way:

Carefully unwind the red wire, it's approximately 1200mm long.

Evenly spread the wire so you end up with two parallel wires approximately 600mm long, one end has the ends, the other end is a bend.

Put the two ends in a battery drill chuck (see picture) and pass a paperclip through the bend at the other end (see picture).

One hand on the drill trigger, the other hand holding the paper clip. Keep tension on the wire but not so much to dislodge the wire.

Let the drill twist the wires together, there's no magic number, not too many turns per inch, not too few. Just what looks / feels about right. See picture for an idea.



Next is winding the transformer, but before that, have a look at the PC board. Note the numbers 1-6 (with circles around the numbers). See how "ends" 3 & 5 are on the outside of the toroid and 4 & 6 are on the inside. We want to replicate this when we wind.

For right-handed people, place the two ends on the outside of the toroid, ends facing down, hold in place with your left hand. Next, with your right hand, pass the looped end through the toroid from the top side, out the bottom, then back up the outside so it's next to the two wires. Right-handed

people tend to wind anticlockwise. So wind away in an anticlockwise direction until the looped end has passed through the middle 31 times.

When you have finished winding, the starting pair will be able to slip into holes 3 & 5 and the looped end, when cut, will slip into holes 4 & 6.

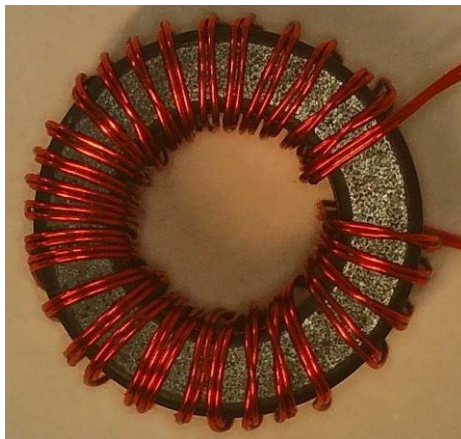
Read the above a few times!

Winding the first few turns requires more than two hands so take your time and don't get too frustrated. After a few turns things bind up a little and the winding becomes easier.

Passing the wire through the toroid tends to twist things up. Take your time and relax any twists before they get messy. A kink in the wire is a disaster. Take your time.

Use your fingers to form the wire around the edges of the toroid. Do not be tempted to pull the wire. If you pull the wire there's every chance the enamel will get scrapped off against the toroid edge. Scrapped enamel renders the transformer useless. Take your time.

That's the hard part done. Take a rest.



Now you have something resembling the picture.

Next is the 4 turn winding. Same as before, look at the board, locate holes 1 & 2 and wind the four turns so they line up with the holes. The four turns are wound over the top or between the other winding, it's not critical.

Now, time to remove the enamel off the wire so it can be soldered. Before that, cut the loop that was created back at the beginning. You now have three wires (six ends).

There are many ways to remove the enamel. My preference is a sharp knife (box cutter). One at a time lay each wire on a flat surface and draw the knife along the wire. It's critical to keep the wire flat ... if it bends it'll almost certainly break, and that'll annoy you.

Be mindful of how much wire is against the toroid and how much is going through the holes. Ideally you want enamel to the board surface ... that's an impossible target but you get the idea.

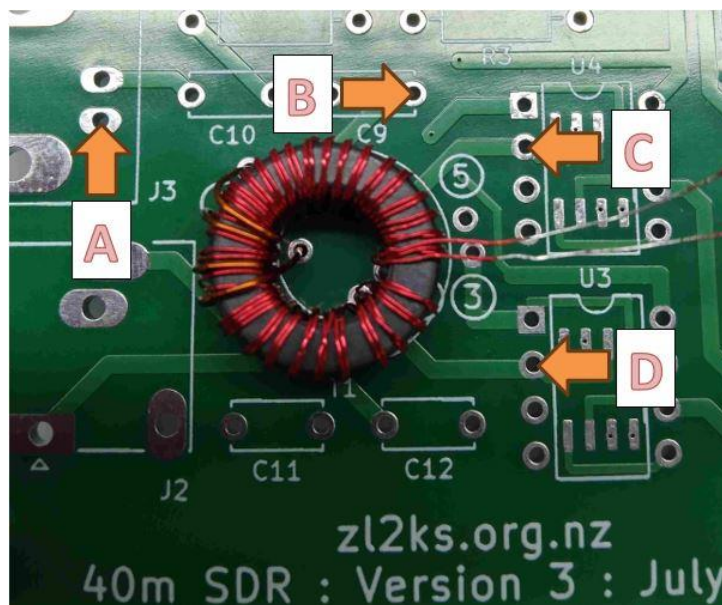
After getting enough enamel off each end, tin each end with your iron and a blob of solder. You'll get bits of crud (residual enamel) so a light scratch with the knife and a bit more solder will tidy things up nicely.

Bugger, you broke the wire! Don't panic. Take a turn off ... 29 or 30 turns will be fine. Take your time.

Take a breather.

Now it's time to install the transformer. You want to get wires in holes 1, 2, 4, & 6. It doesn't matter which of the pair goes in to 4 and 6, just what looks right when you line things up. Keep an eye on the scraping and tinning ... you don't want the tinned wires touching near holes 4 & 6. It should be obvious what goes where for holes 1 & 2.

Happy? Solder in holes 1, 2, 4, & 6. Job well done. You should have something looking like this ...



[To stop things rocking around you might want to fit the four nylon standoffs (feet).]

The final challenge is to get the two remaining wires into the correct holes (3 & 5). This is critical, get it wrong and the radio won't work.

Using a multimeter, first check for continuity between the two tinned wires. There should be none. If there is continuity check the wires that went into holes 4 & 6 ... are they touching on either side of the board? Has the enamel on the windings been compromised anywhere?

Next, find the tinned wire that gives continuity to point C ... that wire goes in hole 5. Same again, the other wire should give continuity to point D ... that wire goes in hole 3.

Solder wires in holes 3 & 5. Now you have all wires through holes 1-6 soldered in place.

Last test. There should be continuity between points A & B, C and the hole above C, and D and the hole above D. Any other combination eg point A to point C should be open circuit. Have a probe around.

Well done, that's the most challenging part of the build complete!