Step-By-Step Construction of a 4:1 Current-Type (Guanella) Balun

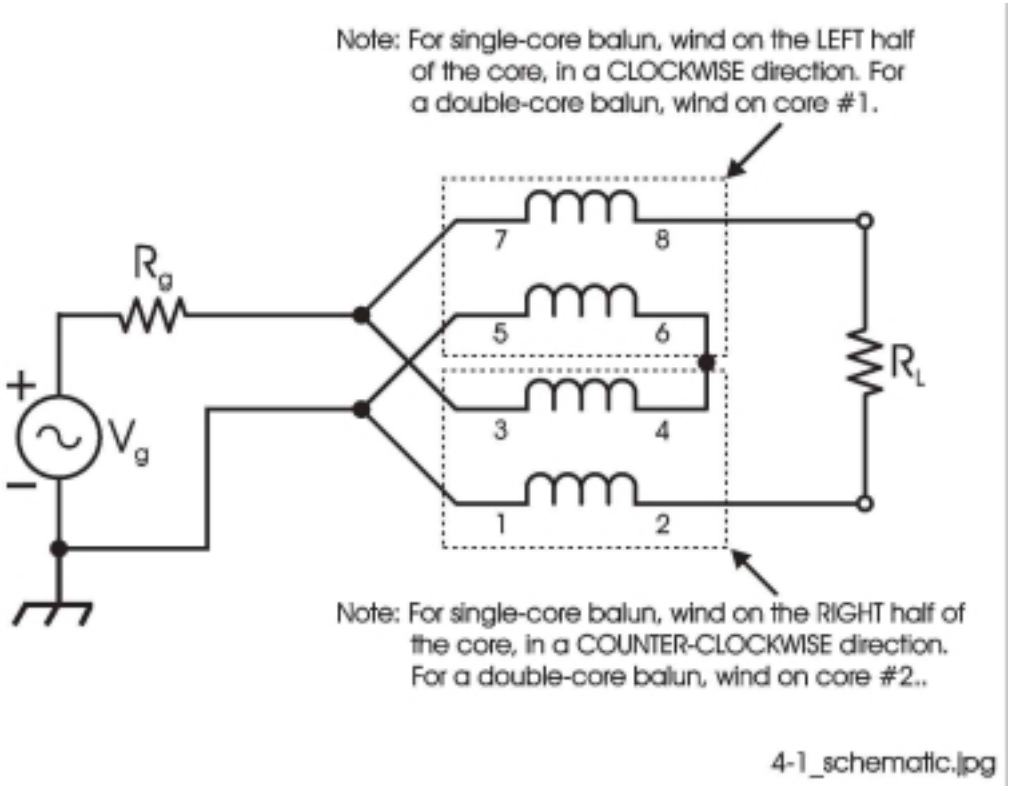
Courtesy of Charles Greene, W1CG<cgreene7@juno.com>

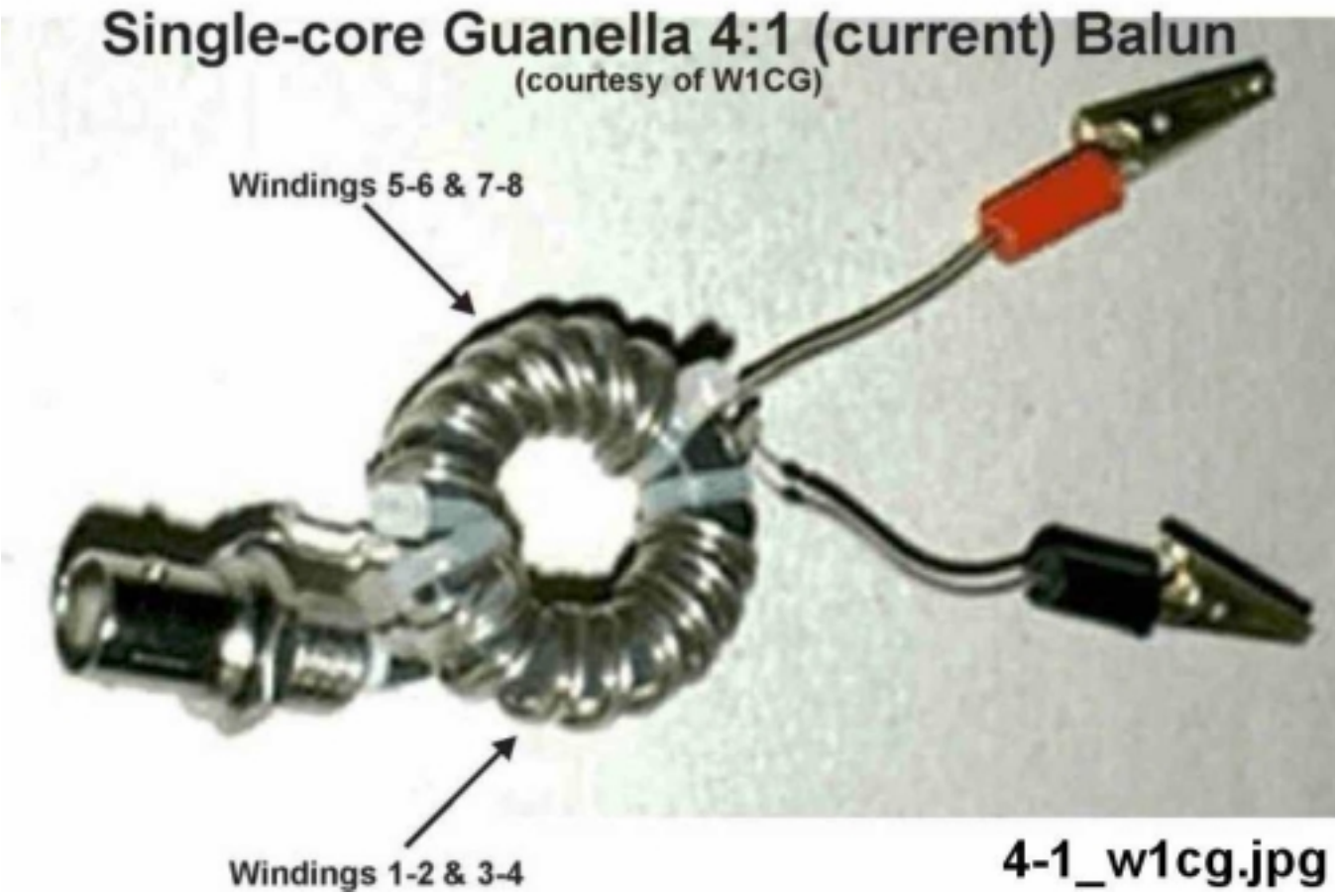
My 4:1 current-type balun is wound on a FT-114-43 core. The FT-140-43 is a little easier to work with, and maybe the FT-140-77 would cover 160-10. This one is reasonably flat from 4.5 to 35 MHz but drops off a little at 3.5, 40-ohms with a 200 ohm resistor on the high side instead of the 50-ohms I get on the higher bands.

The reason I used the R/S speaker wire is that last summer Wayne (N6KR) reported his double Zepp with a R/S speaker wire feed line, and someone at ARRL lab measured the impedance and came up with around 120 ohms. You are supposed to use something that has an impedance of approximately 2X the input impedance, and this was close.

Now, to the construction instructions:

Refer to the schematic (or figure 2-1A on page 18 of Jerry Sevick's book "Building and Using Baluns and Ununs").





Label the 7-8 lead as RED (colors correspond to the approximate colors of the wires used in the R/S #24 speaker wire (278-1509), label the 5-6 lead as White, 3-3 as RED and 1-2 as WHITE.

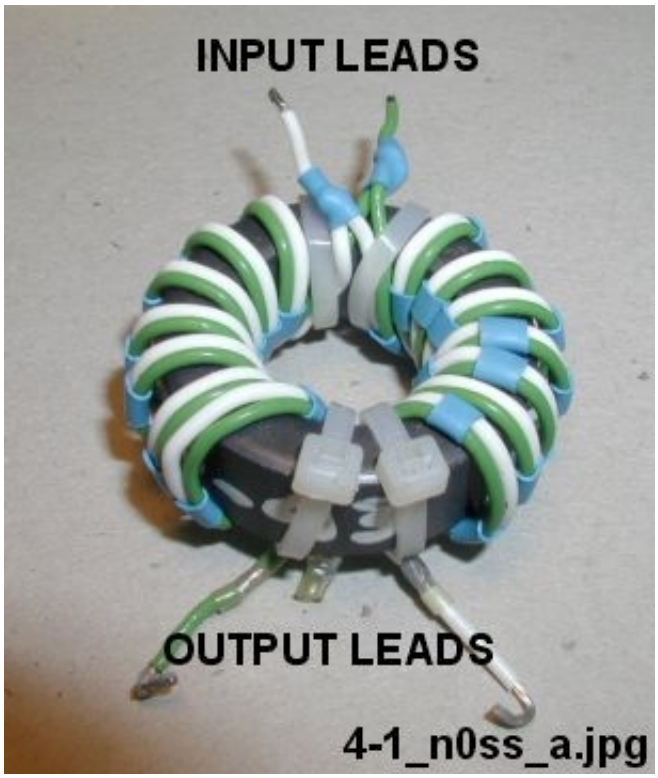
Cut off around a 18" of the paired wire.

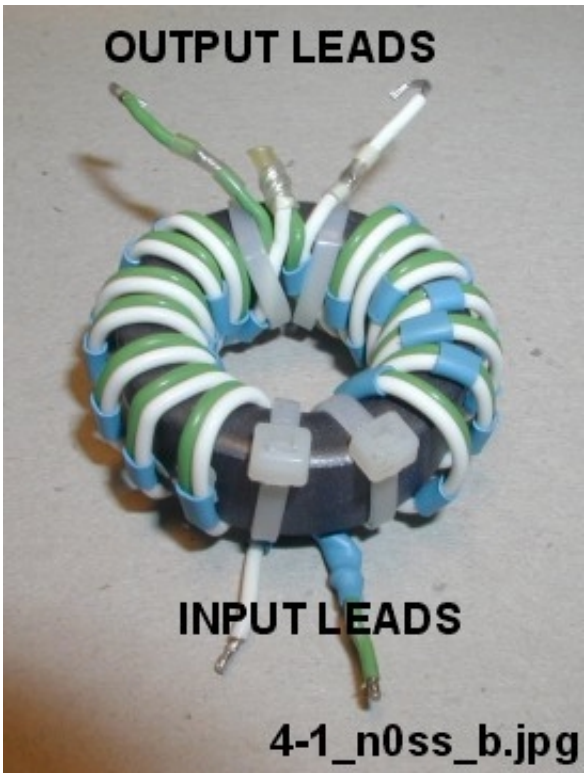
Refer to Sevick's photo 2-E (or the 4-1a_n0ss.jpg file accompanying this write-up), left side of the photo. Insert the wires over the TOP of the toroid core, and, using a CLOCKWISE winding sense, start winding the wire on the left side of the core. After one turn, secure the turn with a real small cable tie (I used one 3/32" wide).

Continue winding for 7 turns total spread out over 180 degrees. Secure with another cable tie.

Cut off another 18" of the paired wires. Go back to the bottom and start winding a second pair, again going from the top of the toroid, but this time winding in a COUNTER-CLOCKWISE direction. After 1 turn, clamp the wire to the core with another cable tie. Finish with 7 total turns and secure with a cable tie.

Refer to Sevick's photo 2-E (or 4-1a_nøss.jpg, next page). Back at the start of the windings, you have TWO RED wires and TWO WHITE wires. Connect the two RED wires together and the TWO WHITE wires together, leaving an inch or so protruding from each.





Trim the TWO RED wires to about 1/4" and solder them to the center conductor of a female BNC. Solder the TWO WHITE wires to the ground side of the BNC. I tightened the BNC mounting nut on a turn of wire around the barrel, and soldered to the wire.

Refer to Sevick's photo 2-E (or 4-1b_nøss.jpg, above). At the other end of the windings, connect the RIGHT HAND RED WIRE to the LEFT HAND WHITE WIRE and solder. The 200 ohm load goes BETWEEN THE RIGHT HAND WHITE WIRE AND THE LEFT HAND RED WIRE. I soldered these two wires to two small alligator clips which I clip on to a portable antenna. You can pretty it up by putting it in a plastic box. I put a third cable tie between the two pairs at the BNC connector to give it more rigidity.

I have no idea how much power it is good for, but it worked fine for the K2. I connected the alligator clips to the feed ends of my W3EDP antenna, and connected the BNC to a 6' length of RG-8X. The other end went to a MFJ-900 antenna tuner 50 ohm output and the input of the antenna tuner went to the K2 through a W2DU balun made of a foot of RG316 (Teflon RG-174) with 12 FB-43-801 beads around the coax. I had to strip the outer cover of the coax off so that the beads would fit over the coax. The antenna tuned fine.

The 4-1c_nøss.jpg file (next page) shows the balun mounted in a R/S plastic project box. Epoxy was used to secure the 5-way binding posts because the plastic threads on the posts were neither deep nor strong enough to permit the mounting nuts to be tightened.

Completed 4:1 Guanella QRP Balun