

**Homebrew and Experimenters Group  
HF 1:1 (Choke) Balun Kit (2007-02-28)**



Here is the kit of parts supplied, although not shown, an “N” type connector is also supplied. While this connector may be more expensive we have found it more reliable and weatherproof than most others. It is worth purchasing the matching plug for your coax lead be it RG58 or RG213.

**Parts.**

Balun Core and length of RG58 Coax

Weatherproof Box (with “o” ring and screws)

“U” Bracket (stainless steel) with S/S nuts and bolts (to hang the box)

Large Hex S/S Setbolts, washers and nuts (to connect dipole wires to the balun)

Crimp Terminals to terminate the coax leads within the box

Small S/S Setscrews to secure the “N” connector to the box

**Extras which may be needed**

Small cable ties or electrical tape to secure the coax to the balun core.

**Instructions**

1. Check that you have all the components
2. Locate and drill holes in the box for the hardware , as indicated in the text the mounting centers should relate to the box as a whole NOT just the back part of the box.

Note. Most constructors also drill a small hole in the bottom edge of the box (adjacent to the “N” connector) to allow the box to breath and any condensation in the box to escape.

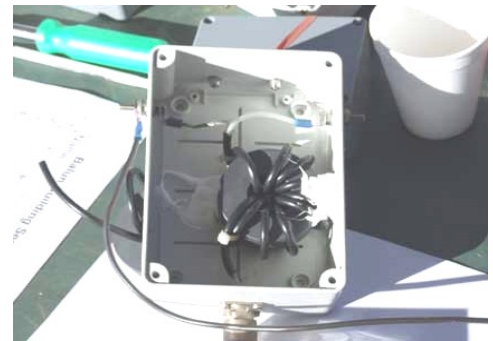
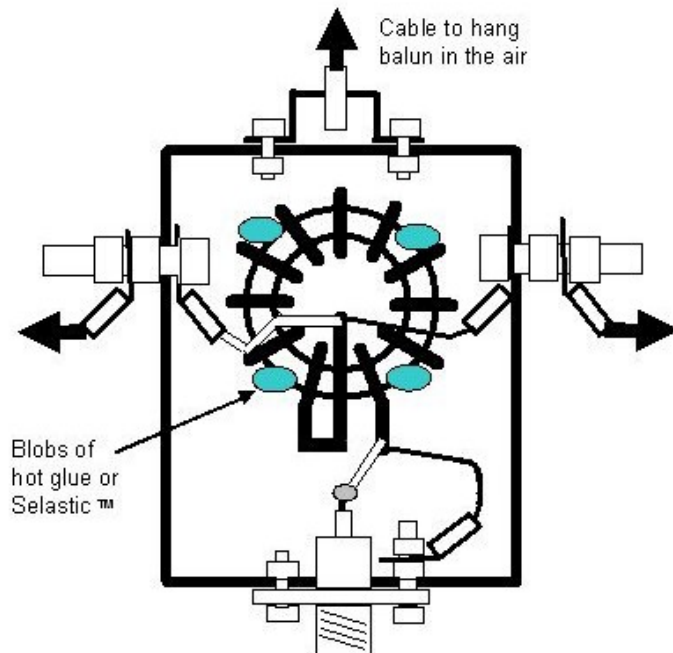
3. Mount the “U” Bracket and the “N” connector, on the “N” connector leave one of the front bolts loose so that coax shield can be secured later in construction.
4. Wind the coax onto the balun in a single layer and with turns evenly spaced around the core. Ten turns is standard for the HF bands, but you can add a couple more turns if most of your operation is in the lower frequency bands. The core has actually been tested up to 6m, perhaps

- only 8 turns to bias it's operation in the higher frequency HF bands and 6m. Use electrical tape or small cable ties to secure the coax to the balun.
5. Place wound balun core temporarily into the box and orientate the coax ends so that one end goes to the "N" connector and the other will go to the Dipole Terminals (not fitted yet).
  6. Mark and/or cut to length the coax ends, make sure you leave enough length so that :
    - a. The "N" connector end is long enough so that when the core and shield are separated, the shield is long enough to reach the loose connector mounting bolt.
    - b. The Dipole Terminal end is long enough so that when core and shield are separated the core AND the shield are long enough to reach the terminals in the side of the case.
  7. Terminate the coax (remove balun from box as necessary) :
    - a. At the "N" connector end remove the unwanted cable sheath (careful so that you don't nick the core of the shield), trim core to length and strip a short length of insulation off so that it fits into the "N" connector center spigot. Carefully twist the shield wire together to form a single wire, check it's fit to the connector mounting bolt, trim to length and fit a crimp connector to the shield wire (short ends)
    - b. At the Dipole Terminal end of the coax, remove sufficient cable sheath so that the core and the shield are the same length and reach the terminals easily. Strip a short length of insulation from the core and fit a crimp connector to it. Carefully twist the shield wire together to form a single wire, check it's fit to the terminal bolt, trim to length and fit a crimp connector to the shield wire (long ends).
  8. Check electrical continuity of core (one end to the other) and shield (one terminal to the other) and check that there are no shorts between the core and the shield. This can happen where you cut off the coax sheath, if you cut too deep the strands of the shield can find their way down to the centre wire of the core. You definatly don't want an intermittent connection in your balun when it is hung up in the air.
  9. Place the wound balun core back into the box and orient it so that the ends of the coax reach their appropriate terminations.
  10. Put one of the Dipole Terminal bolts through one of the terminated long ends, then through it's hole in the side of the box, then a washer and a spring/star washer, then a nut and tighten with your fingers.
  11. Repeat this process for the other long end of the coax to the other side of the box.

Note. It does not matter which terminal the core or shield goes to so long as each terminal has a wire on it.

12. Now go to the short end of the coax and secure the terminated shield to the loose bolt on the "N" connector, again just hand tight for the time being.
13. Now before tightening everything up, we do a continuity check again

- a. Should be ZERO ohms between the center of the "N" connector and the terminated core lead going to one of the Dipole Terminals
  - b. Should be ZERO ohms between the "N" connector body and the terminated shield wire going to the other Dipole Terminal.
  - c. Should be OPEN CIRCUIT between the center spigot and the body of the "N" connector, also between the two Dipole Terminals.
14. Now tighten all the bolts and terminals up, nice and tight but don't squash the plastic box and be careful not to "pull" the terminated ends of the coax.
15. Center up the balun core in the bottom section of the box and secure it with a few blobs of hot glue or Selastic™, when it has cooled/dried fit the "O" ring in the groove and fit the lid with it's screws.



Balun Choke Kit (some dimensions are exaggerated for clarity)  
 "N" connector has four bolts, two only shown in drawing

Above is a diagramic view of the kit when assembled and also a picture of a completed unit.

## **Using the Balun**

### **Into an existing dipole antenna:**

Simply drop the center of the antenna, remove the center insulator and terminate the dipole ends to the baluns Dipole Terminals. Terminate a length of coax (RG58 or RG213) with an "N" plug and fit it to the balun "N" connector. Using some heavy tape, plastic rope or a couple of cable ties around the box, secure the dipole wires to the box, this takes the strain off the Dipole Terminals. Raise the antenna again, terminate the other end of the coax and check the antennas operation (see tuning the antenna in the following section).

### **A new dipole antenna:**

Basically an antenna should be as high in the air as you can practically get it. For a dipole you will need at least one high point to haul the balun box up to. The ends of the dipole sections should be just as high if you can. The box and the dipole ends should of course be spaced away from and insulated from any structure or pole/tree. Sorry the subject of designing an antenna and it's placement is well beyond these simple instructions, do the best you can with the space and structures available. There is plenty of information in books, manuals and on the WEB.

### **Tuning the antenna:**

For the band you wish to use determine the length of each section of the dipole and add a bit more length, say 5% or 10% more. Most use what is generally called insulated "building wire", this is usually strong enough for at least an 80m dipole. Terminate and secure the dipole sections to the balun Dipole Terminals. Terminate a length of coax (RG58 or RG213) with an "N" plug and fit it to the balun "N" connector. Using some heavy tape, plastic rope or a couple of cable ties around the box, secure the dipole wires to the box, this takes the strain off the Dipole Terminals. Raise the antenna, terminate the other end of the coax and check the antennas operation (see tuning the antenna in the following section). Then using either an Antenna Bridge or a Transmitter (on low power) and a SWR meter check the operation of the antenna. You will most likely find it is too long, simply drop the ends and chop off a small section of each end (same length both ends), raise the ends again and test the antenna. Keep doing this and chopping off shorter and shorter lengths until the antenna is the correct length. If it is a permanent installation perhaps leave it a bit long and come back a few days later when the wire has settled in (stretched) and re-check it's operation, adjusting if necessary. Don't worry about the loose ends, just leave them hang there, so long as they are well up in the air.

**Happy Homebrewing, please contact us if you have any problems.**