When I first installed my Hustler 5BTV, a 5 - band vertical antenna, I didn't pay as much attention as I should have, to the manufacturer's advice about adding a coaxial choke balun near the base of the antenna. The balun, provides the dual function of an RF choke and a 1:1 balun. The idea is to prevent the shield of the coax feed line from acting like a radial, and to isolate stray RF currents from being coupled into your shack.

Instead of neatly winding 10 turns of coax in a single layer, 6" diameter, as suggested by the manufacturer, I had just haphazardly coiled up a half-dozen turns and taped them to a nearby pole. Eventually, I realized that some things weren't as they should be, and as part of a clean-up of this installation I decided to install a properly made, coaxial choke balun.

Fig 1 shows the end result, with the finished balun mounted in a crude weather shelter made of scrap fence-board, and connected to the base of the 5BTV. (note the bracket seen coming from the driven end of the 5BTV, supports a vertical copper wire resonant on 17M)



Fig 2 shows the Balun before mounting into the weather enclosure. I used ¼" stainless hardware to bring the coax ends out of the coil form and allow easy wiring into the antenna feed line.



The coil form I used is a 12" piece of 4" I.D. white PVC sewer pipe, with a 4" PVC end cap on each end. The end caps are not glued, but I have put a film of silicone grease on the joints to keep water out and make removal easy if needed.

The coaxial coil consists of 21 turns of RG8X, gray low-loss coaxial cable, hand wound in the center of the PVC pipe. I found it useful to trial-wind the coil, in order to judge placement of the 2 holes (each 9/32° dia) used to hold and feed the coax into the pipe, and to locate the $\frac{1}{4}$ ° holes for the $\frac{1}{4}$ ° bolts used for terminals.

<u>Note:</u> the 9/32" holes for the coax, should first be drilled through vertically, and then the drill is carefully moved to near parallel to the surface of the PVC. This bevels the edges of the hole so as to not nick or cut into the coax when it is bent to the form.

Here is the procedure I used to wind the coax:

- 1. Un-coil and lay out 25 ft of coax in a straight line, so-as to avoid kinks when winding on the form
- 2. Prepare the <u>start</u> end by slitting and removing the insulation on 2.5" of one end of the coax. Separate the shield braid and the center conductor in order to later allow crimping and soldering of ring terminals.(twist the strands of the braid together)
- 3. Insert the <u>start</u> end shield braid and center conductor of the winding into one of the 9/32" holes, about 1" beyond where the coax insulation begins. If necessary, tape on the inside temporarily until winding complete.
- 4. I put the pvc pipe on my lap and used one hand to guide the coax, and the other to rotate the pipe and begin the winding. I am sure there are several ways to do this.
- 5. When all the turns are in place, prepare the <u>finish</u> end shield braid and center conductor, similar to what was done in 2 above. (You may find it convenient to temporarily secure the wound turns with several wraps of electrical tape while doing this)
- 6. Insert the <u>finish</u> end shield braid and center conductor of the winding into the last 9/32" hole, about 1" beyond where the coax insulation begins. If necessary, tape temporarily until the winding is secured.
- 7. Straighten the winding and use hot glue to secure the first and last turn in place, to prevent unravelling.
- 8. Coat the windings with a good quality electronic varnish, or if preferred, wind neatly with electrical tape. This just fixes all the windings in place.
- 9. Strip the pig-tail ends and crimp and solder ¼" ring terminals to both start and finish wire ends, and terminate to the ¼' stainless steel bolts from the inside with the ring terminals under the bolt heads.
- 10. On the outside of the coil form, add a lock-washer and a nut to each of the 4 bolts and tighten firmly. Hold the bolt hex head with a wrench on the inside while tightening.

Mounting the balun (optional)

 If you do decide to mount the balun as I did, the easiest way I found was to use 2 - 4" dia. plastic end caps, which serve to seal the coil assembly and keep critters out.

- 2. The center of each end cap had a nice manufacturer's logo, which served as a guide to drill perfectly centered mounting holes for self tapping screws.
- 3. Be sure to drill weeping holes at the bottom of the end caps, in order to drain off any moisture that gets in.
- 4. You can glue the end caps on, or as I did just apply a film of silicone grease which will act as a moisture sealant and make removal easier.
- 5. 2 pieces of 6" fence board cut to 12" long, and cut to a 90 degree point on one end, are screwed to the end caps as shown.
- 6. 2 pieces of 6" fence board, 14" long, are nailed together on one edge to provide the roof of the 'enclosure'.

Parts List:

25 ft of RG-8X coaxial cable. (.242" dia, nominal, not the larger diameterr RG-8)

- 12" of white 4" I.D. PVC sewer pipe (sold at Home Depot, only in 12 ft lengths)
- $4 \frac{1}{4}$ " x 1" hex head stainless steel bolts
- $4 \frac{1}{4}$ " ID stainless steel flat washer
- $8 \frac{1}{4}$ " stainless steel lock-washer
- $8 \frac{1}{4}$ "stainless steel hex nut
- $4 \frac{1}{4}$ " ID crimp-on ring terminal
- hot melt glue

- strip-caulk Tape to weatherproof the exposed pigtails when connected to your antenna (one brand is Coax-seal, there is also a 3M brand sometimes found at Home Depot)

Optional if mounting as shown

- 2 white 4" PVC end caps
- 1 5' length of pressure-treated 6" wide fence-board
- 4 1 ¹/₂' long stainless wood screws (to mount end caps to fence board)
- nails or screws as required for wood assembly

- silicone grease (often found in auto parts stores as "Dielectric Tune-up Grease", example: Permatex #22064)

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