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Omnidirectional 6-Meter Loop

Here is an antenna that I have used horizontally on an RV. I have also used it both horizontally and vertically at my home. It's simple to make easy to travel with. You may also see this type of design referred to as a *halo* antenna.

Antenna Construction

First we need to gather what we need. **Table 15.1** lists the needed

Table 15.1
Materials for the Omnidirectional 6-Meter Loop

Quantity	Description
1	10-foot piece of $\frac{3}{8}$ inch aluminum tubing (or two 6-foot pieces) for the loop elements and gamma match.
1	$\frac{1}{16}$ or $\frac{1}{8}$ inch thick aluminum plate, approximately 3 × 5 inches
1	Tube of aluminum epoxy or other adhesive.
2	1½ inch long bolts the diameter needed to fit as snugly as possible inside your tubing (probably $\frac{1}{4}$ or $\frac{5}{16}$ inch for $\frac{3}{8}$ inch tubing).
6 inches	Flexible rubber or plastic tubing to join the $\frac{3}{8}$ inch tubing ends (the aluminum tubing slips inside the flexible piece). If your hardware store doesn't have anything that works, try an auto parts store.
2	U-bolts get the size you need to match your mast
1	SO-239 connector and mounting screws.
1	6-inch-long by 1-inch-wide aluminum sheet for the gamma match shorting strap (thin so you can bend it).
10 inches	RG-8 coaxial cable center conductor (braid and jacket removed), stripped on one end.
2	Stainless-steel machine screws, lock washers and nuts to secure the shorting strap.

materials, and **Figure 15.1** shows how it all goes together.

Now we can get started. First, cut your tubing into two 54-inch lengths. Now comes the fun part — bending each of these into a half-circle without kinking the tubing. I used the spare tire from my car as a form. I started slowly and worked it until I got to the right shape. Then I did the other side and laid them out to see if they were both the same shape. I had to tweak them a bit, and then I was good to go.

The antenna is supported with an aluminum plate about 3 × 5 inches (see **Figure 15.2**). Add your SO-239 to the aluminum plate. Do this by drilling the needed size for the center portion to go though the plate without touching

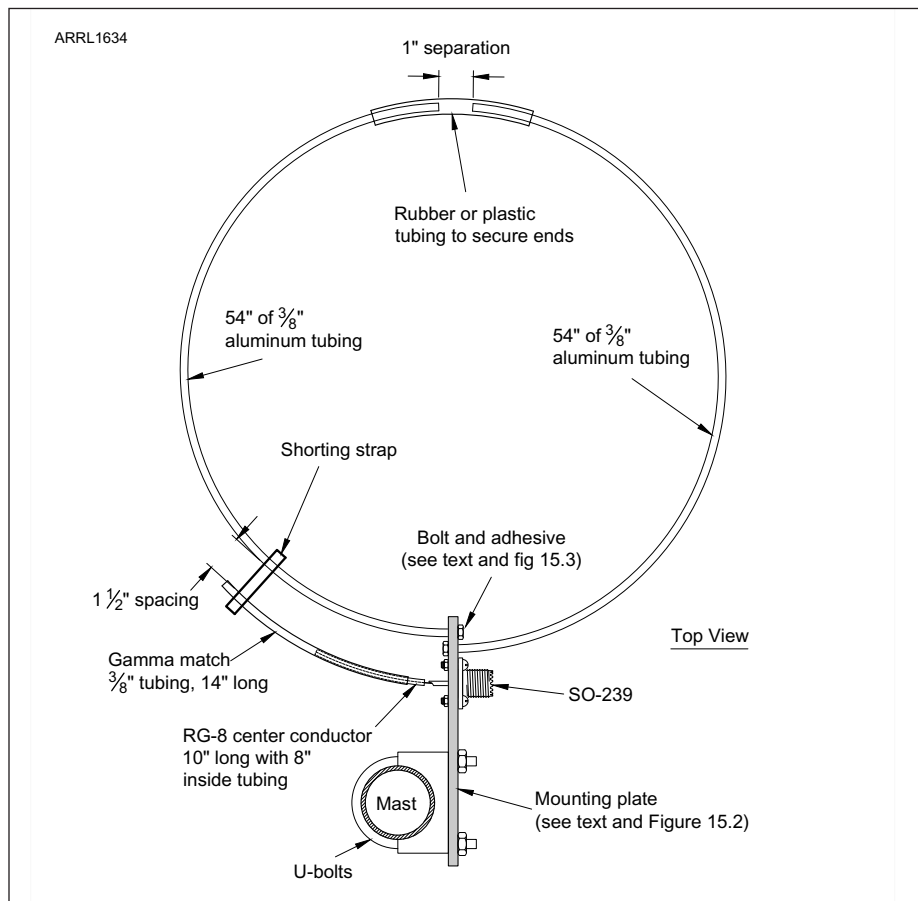


Figure 15.1 — Dimensions of the Omnidirectional 6-Meter Loop.

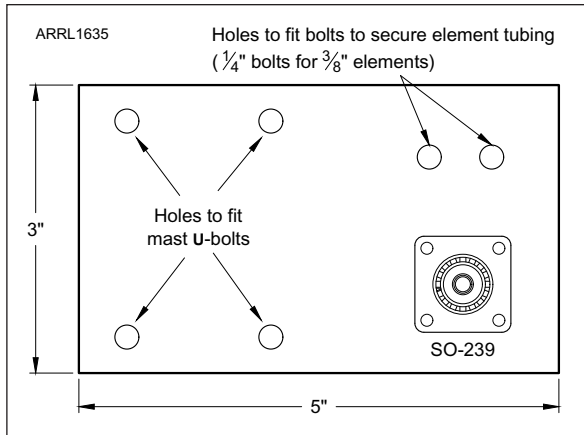


Figure 15.2 — Mounting plate details.

it. Drill holes for the four mounting screws and secure the connector with the screws. Drill holes in the plate to match the size of the U-bolts needed for your mast and attach your U-bolts.

Next I drilled two holes in my aluminum piece about 2 inches apart, which will be used to secure the ends of the element tubing. The ends of the tubing will be secured to the plate with bolts that fit inside the tubing, so pick a bolt diameter that fits as snugly as possible inside your tubing and drill holes in the plate to match.

For $\frac{3}{8}$ inch tubing, that will probably be $\frac{1}{4}$ inch or $\frac{5}{16}$ inch bolts. Take a piece of tubing to the hardware store and try different sizes and thread types.

As shown in **Figure 15.3**, place bolts through holes in the plate, one in each direction. Fill the end of the aluminum tubing with a bit of aluminum epoxy (JB Weld, Loctite Epoxy Weld or a similar adhesive). Now thread the bolt through a lock washer into the tubing. Don't over tighten. Now do the same to the other tubing, except directly in the opposite direction so as to make a loop.

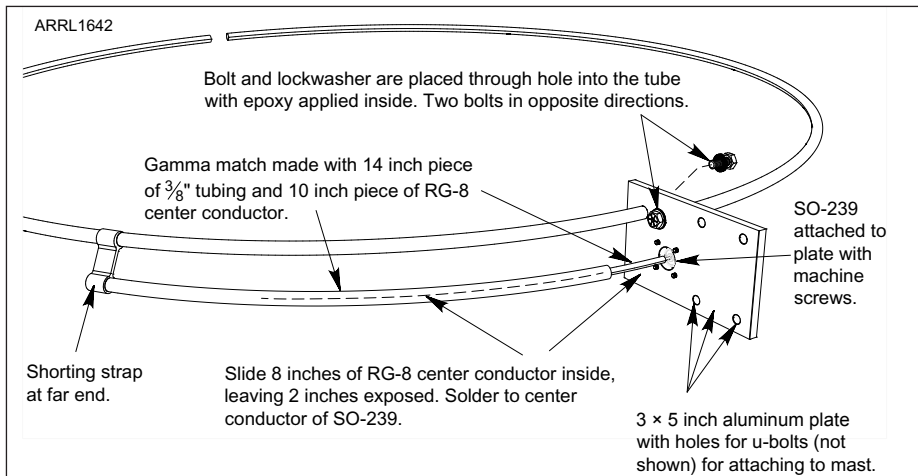


Figure 15.3 — Matching section details.

Bring the other ends of the tubing together and insert them in the short piece of rubber or flexible plastic tubing, leaving about 1 inch to separate the ends. Now go back to the bolts and liberally apply the adhesive to the bolt area on both sides. Then let it dry sufficiently.

Once the adhesive is dry, see if you have electrical conductivity between the center plate and the two elements. If not, use thick wire or aluminum sheet to connect everything together. An alternative is to use a welding product such as Alupalloy aluminum repair rod to secure the tubing ends to the plate.

Matching Section

While your loop adhesive is drying, you can make your gamma match and shorting strap as shown in Figure 15.3. Cut a 14-inch piece from the $\frac{3}{8}$ inch aluminum tubing that was left when you cut the elements and bend it slightly to match the curve of the element tubing. Take your 1-inch wide strap and wrap it around the gamma match tubing, making a loop around the tubing and bending the end back over the center piece. The gamma match rod will be spaced $1\frac{1}{2}$ inches from the element tubing, so now measure $1\frac{1}{2}$ inches from the inside of the first loop and bend around the tubing again using the same method. Drill holes through the center of the shorting strap to be able to secure the strap to the tubing with small machine screws, lock washers and nuts. Cut off any excess strap. When the adhesive is dry, wrap one end of the shorting strap around the gamma match rod and the other end around the antenna element. Position the strap near the end of the gamma rod and then lightly snug the screws.

Slide the piece of RG-8 center conductor into the gamma match tubing, with 8 inches inside and 2 inches exposed. Now solder the center conductor of the RG-8 to center of the SO-239. Adjust the position of the gamma match rod and shorting strap. Don't over tighten the screws at this point because you may need to move the position of the shorting strap to adjust antenna SWR.

Mount your antenna to the mast and add your coax. Secure the coax to the mast and raise your antenna. Connect your SWR meter and see what you have. My first try was 1.5:1 for 50.125 MHz. A minor adjustment later and I was at 1.2:1. I had coverage now over nearly 250 kHz of the 6-meter band at 1.5:1 or less — *super*. Up goes the antenna. Now let's hope for a band opening.

Again last but not least — *enjoy!*