

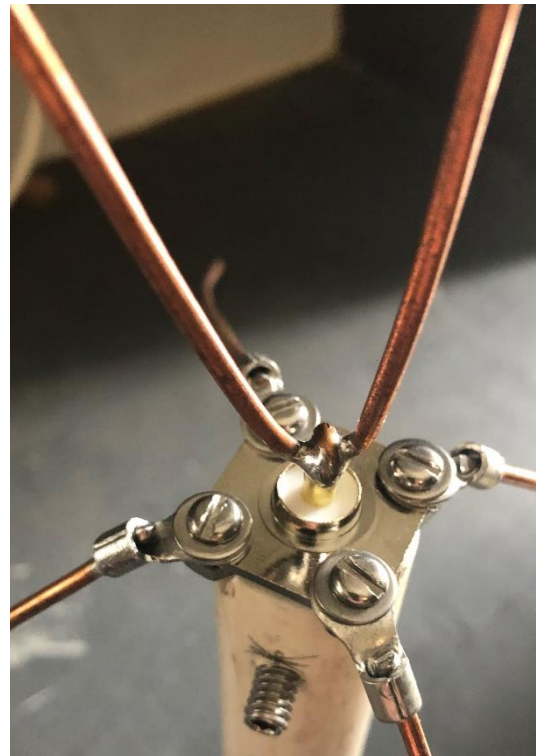
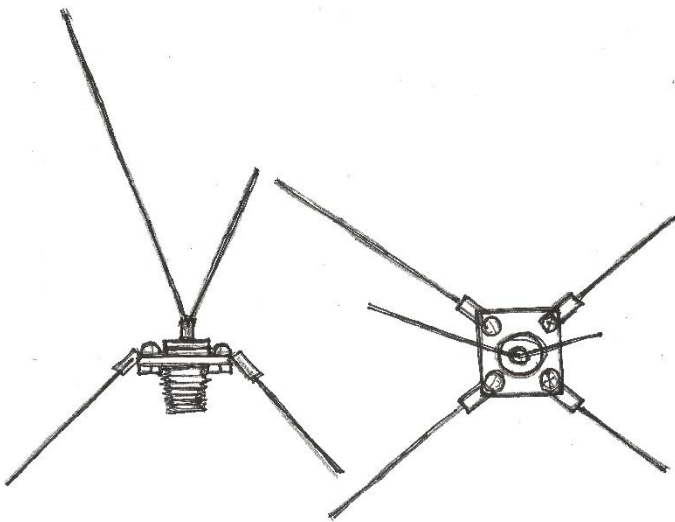
## DIY Build instructions

### Dual Band 2m/70 cm Vertical Ground Plane Antenna

#### Coastal and SLV ARES Amateur Radio Emergency Service

The operational frequencies for this antenna are within the VHF/UHF amateur radio bands; 2-meter band including frequencies from 144 MHz to 148 MHz, and the 70-centimeter band including frequencies from 430 to 440MHz. Because of the dual band capability, this antenna could become your primary antenna for field use, mounted under the eaves of your house, from a tree in your yard, on your deck, or even in the house attic.

The completed antenna will look like the skech below.



#### Materials and Tools

Parts List	
Part Description	Quantity
SO-239 4-hole chassis mount connector for PL-259 Male Plug	1 each
3/32-inch Ring Terminals #14 12-10-awg	4 each
Solid Coper Wire 10-awg	6 ¾ feet
Machine Screws 6-32 x 3/8	4 each
Machine Nut 6-32	4 each
Flat Washer 6-32	4 each
Lock washer 6-32	4 each

## DIY Build instructions

### Dual Band 2m/70 cm Vertical Ground Plane Antenna

#### Coastal and SLV ARES Amateur Radio Emergency Service

Tools	
Tool Description	Quantity
Soldering Iron 60 watt / 440 degrees C	1 each
Side cutting pliers / Wire Cutters	1 each
Needle Nose pliers	1 each

Consumables	
Consumables Description	Quantity
Solder	AR
Silicone Caulk	AR

#### Making Vertical Element

The vertical element is formed from a single length of wire. The element is formed into a "V" shape at a 60-degree as illustrated in Figure 1.

1. Remove the insulation for the solid copper 10-awg wire.
2. Flatten the wire into a straight (as possible) 28-inch length.
3. Measure at least 8 inches from one end. Bend the wire into a "V" shape to a 60-degree arc. The remaining wire length will be approximately 20 inches.

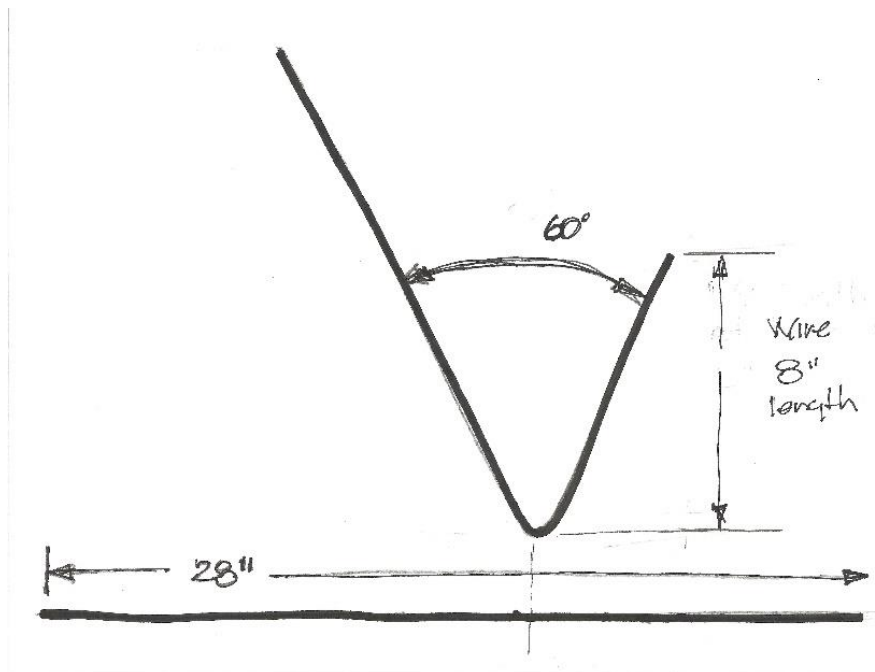


Figure 1

## DIY Build instructions

### Dual Band 2m/70 cm Vertical Ground Plane Antenna

#### Coastal and SLV ARES Amateur Radio Emergency Service

##### Vertical Element Termination

1. Cut a piece of Solid copper 10-awg wire to a length if 2-inches. Using pliers form the copper wire into a loop and place the wire loop around the element wire at the bottom of the "V". Solder the loop in place at the bottom of the "V" section as illustrated in Figure 2.

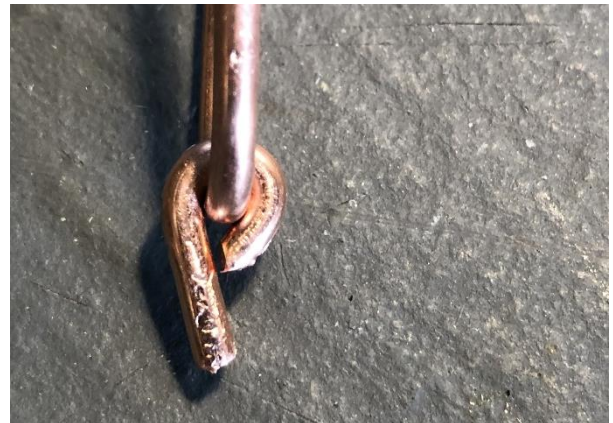
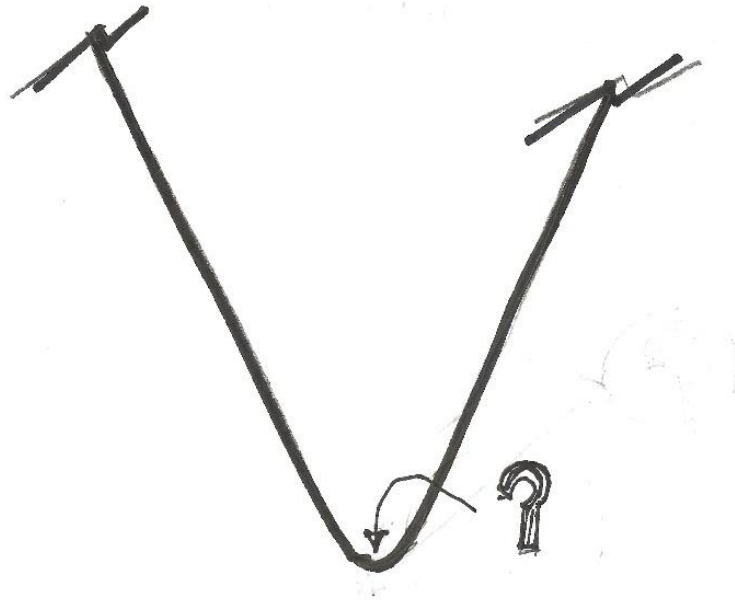


Figure 2

## DIY Build instructions

### Dual Band 2m/70 cm Vertical Ground Plane Antenna

#### Coastal and SLV ARES Amateur Radio Emergency Service

##### Solder Vertical Element to the SO-239 Solder Cup.

1. After the termination loop is soldered to the vertical element. Dry fit the vertical element into the SO-239 solder cup. If needed trim the lead of the termination loop so that the bottom of the loop makes contact with the top of the solder cup on the SO-239 connector as illustrated in Figure 3.
2. After dry fit and verification that the terminal loop top touched the top of the SO-239 solder cup solder the vertical element to the SO-239 solder cup as illustrated in Figure 4.

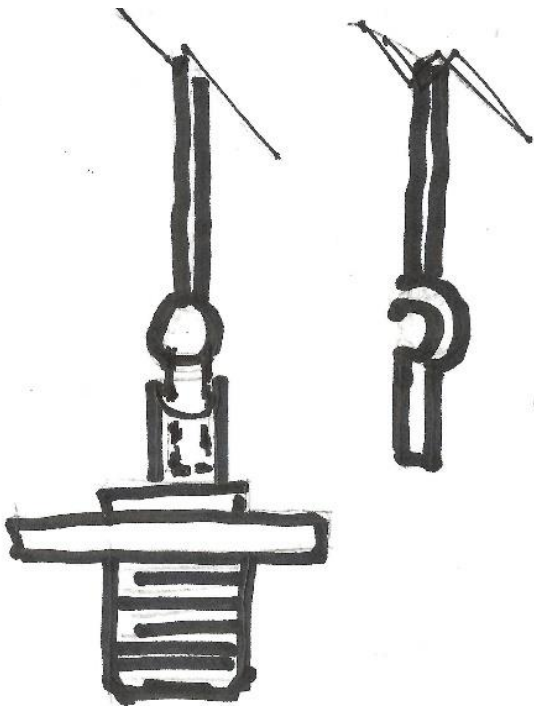


Figure 3

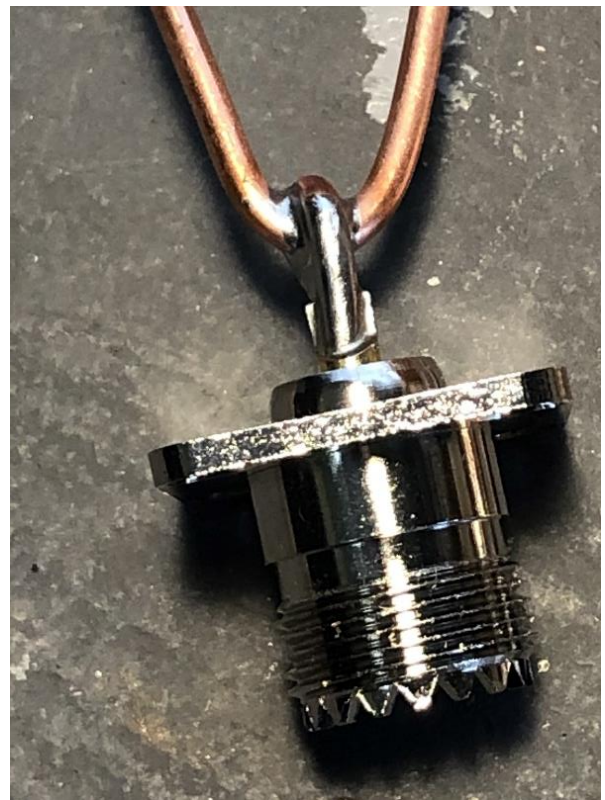


Figure 4

## DIY Build instructions

### Dual Band 2m/70 cm Vertical Ground Plane Antenna

#### Coastal and SLV ARES Amateur Radio Emergency Service

##### Solder Ring Lugs to the Radial Elements

1. Cut 2 each solid copper 10-awg wire at 8-inches in length. Remove the insulation for the solid copper 10-awg wire. Flatten the wire into a straight (as possible).
2. Cut 2 each solid copper 10-awg wire at 20-inches in length. Remove the insulation for the solid copper 10-awg wire. Flatten the wire into a straight (as possible).
3. Remove the insulation from the Ring Terminals #14 12-10-awg, as illustrated in Figure 5.
4. Solder 1 each Ring Terminal to each Radial element, 2 each Radial @ 20-inched in length, 2 each Radial @ 8 inches in length, as illustrated in Figure 6.



Figure 5



Figure 6

##### Dual Band Vertical Ground Plane Assembly

Collect the antenna sub-assemblies, and hardware.

1. SO-239 chassis connection with the vertical element solder to the connector solder cup
2. 2 each 20-inch radial element
3. 2 each 8-inch radial element
4. Machine Screws 6-32 x 3/8
5. Machine Nut 6-32
6. Flat Washer 6-32
7. Lock washer 6-32

## DIY Build instructions

### Dual Band 2m/70 cm Vertical Ground Plane Antenna

#### Coastal and SLV ARES Amateur Radio Emergency Service

Assemble the radials to the SO-239 chassis connector with the vertical element pointing up from the work surface (vertical).

1. Assemble the 20-inch and 8-inch radials in pairs on the same side of the SO-239 chassis connector flange using the hardware as illustrated in Figure 8.
2. Tighten the hardware to secure the radial elements in position as illustrated in Figure 7.
3. Re-check the position of each radial and securely tighten the hardware.
4. Trim the radial elements to length as illustrated in Figure 7.
5. Carefully bend each radial element at a 45-degree angle downward from the SO-239 connector as illustrated in Figure 7.

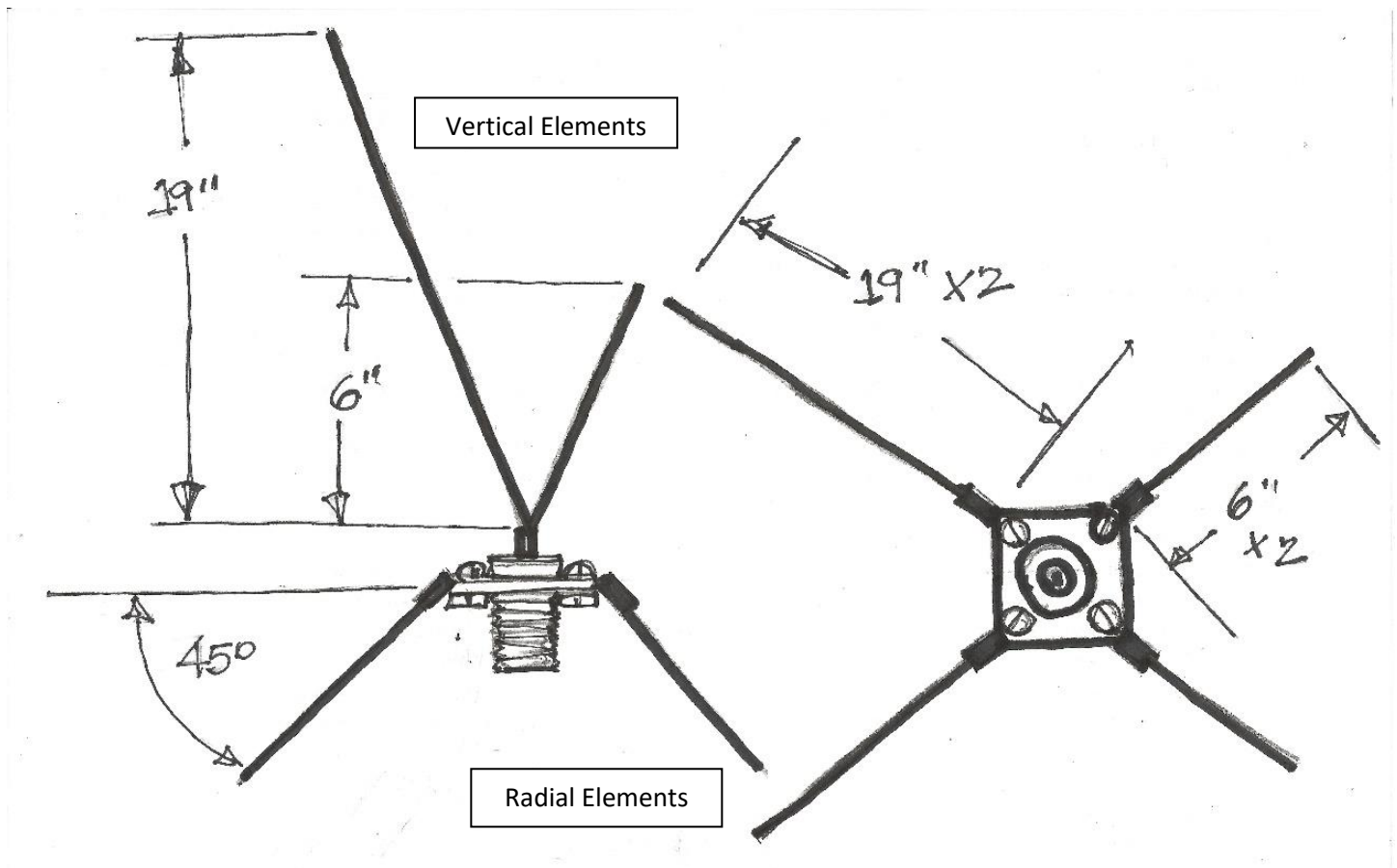


Figure 7

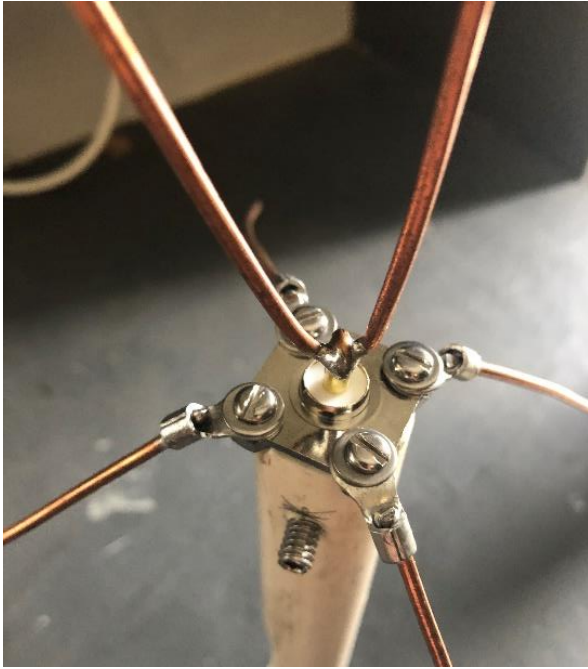
## DIY Build instructions

### Dual Band 2m/70 cm Vertical Ground Plane Antenna

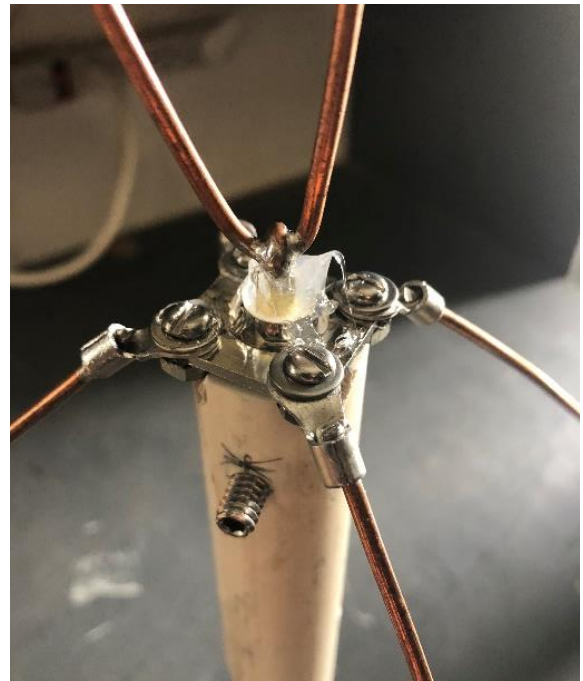
#### Coastal and SLV ARES Amateur Radio Emergency Service

##### Waterproofing SO-239 Center Conductor

Apply silicone calk to the center conductor of the SO-239 chassis connector as illustrated in Figure 8.



Bare center conductor



Clear silicone calk applied to center conductor

Figure 8

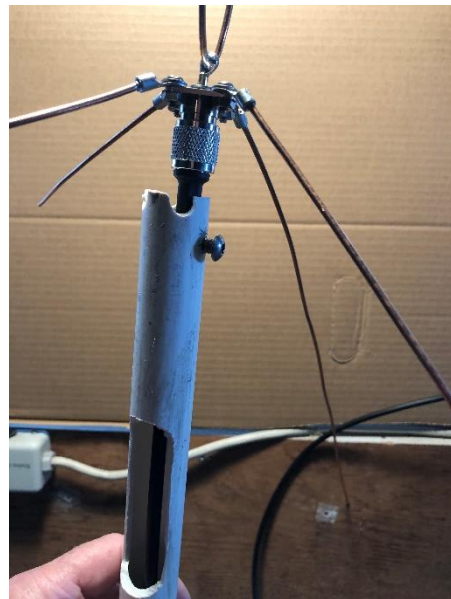
## DIY Build instructions

### Dual Band 2m/70 cm Vertical Ground Plane Antenna

#### Coastal and SLV ARES Amateur Radio Emergency Service

##### Mounting the antenna to a mast

A  $\frac{3}{4}$ -inch conduit or PVC plastic pipe can be used to support the antenna and mount on a mast. Slide the PL-259 coax connector from your feed line up through the piece of conduit or /PVC plastic pipe. Connect the PL-259 connector to the antenna SO-239 connector, and let the antenna sit on top of the mast tubing. A pipe clamp can be to secure the antenna connector to the conduit or /PVC plastic pipe. An example of antenna mounting on a length of  $\frac{3}{4}$ -inch PCV plastic pipe held in place with a set screw and placed on a mast attached to a backyard fence.





DIY Build instructions

Dual Band 2m/70 cm Vertical Ground Plane Antenna

Coastal and SLV ARES Amateur Radio Emergency Service

