HALO 6™

Assembly Instructions

A Division of Tempo Research Corporation

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Part No. 5020-3000 Rev. A

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AEA HALO-6™

Assembly Instructions

Congratulations on your purchase of the AEA Halo-6 omni-directional portable or base station antenna for the Amateur Radio six meter band. The Halo-6 is a very efficient antenna that is small in size and very durable. It will resonate over the entire 50 to 54 MHz range, with approximately 200 Khz bandwidth, each side of the resonant frequency.

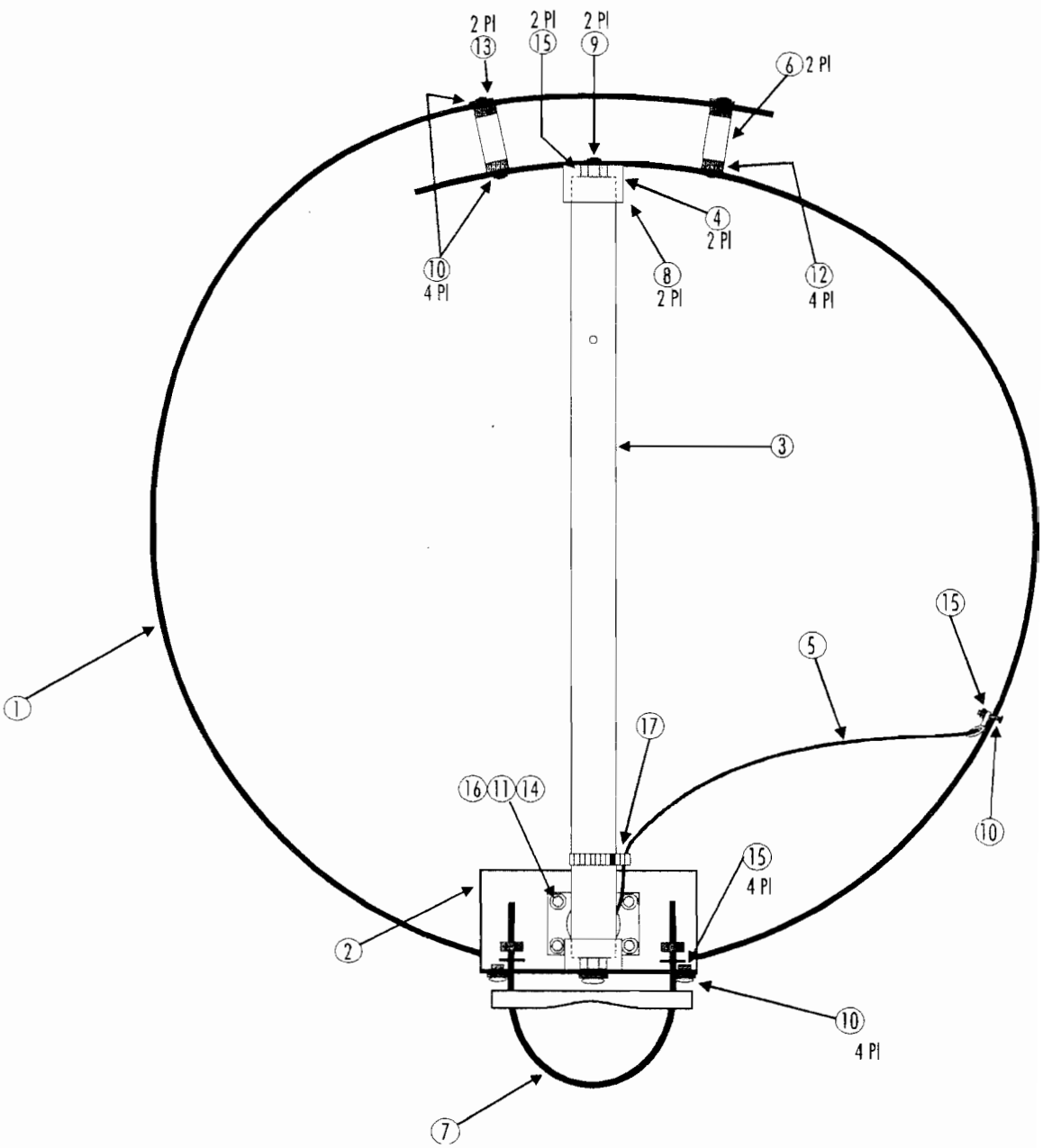
Assembly of the antenna can be accomplished within about half an hour using a simple Phillips screwdriver and a pair of pliers; a set of spin-tight nut drivers will help decrease your assembly time. To begin, unpack the antenna and compare your parts against the parts list to ensure that all the parts are present and accounted for. This procedure will also familiarize you with the names of all the parts for easy identification during the assembly process.

Parts List

Item #	Quantity	Part Description	AEA Part #
1	1	Metal loop	060-154
2	1	L-bracket	060-153
3	1	Stabilizing rod, white PVC	053-068
4	2	End cap, white PVC	053-067
5	1	SO-239 connector, lug, and cable assembly	070-100
6	2	Ceramic spacer	740-101
7	1	U-bolt assembly (U-bolt, saddle, 2 nuts, 2 flat washers, & 2 split washers)	704-400
8	2	Screw, PHP Self-tap, 8 x 1/2"	702-142
9	2	Screw, pan-head-Phillips, 8-32 x 3/4"	702-167-2
10	9	Screw, pan-head-Phillips, 8-32 x 3/8"	702-137-2
11	4	Screw, pan-head-Phillips, 4-40 x 3/8"	701-152
12	4	Washer, rubber, flat, #8	720-010
13	2	Washer, stainless, flat, #8	719-088-4
14	4	Washer, stainless, star, #4	720-004-2
15	7	Nut, stainless, kep, 8-32	710-008-2
16	4	Nut, stainless, hex, 4-40	710-004-1
17	1	Nylon cable tie wrap	760-156
18	6'	Stabilizing line	780-903

See assembly drawing on next page.

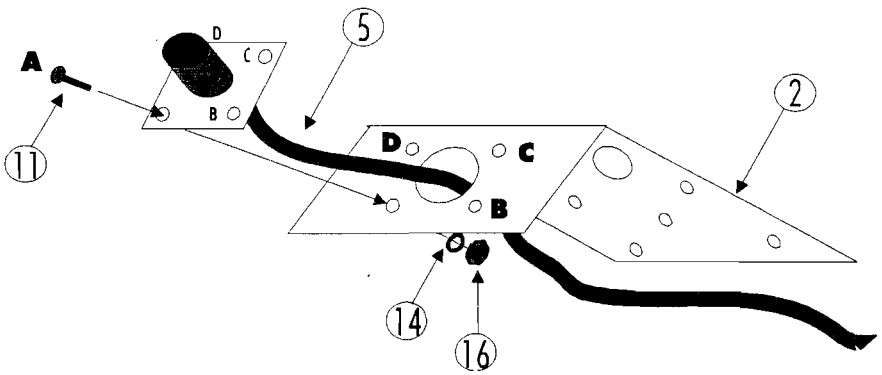
Assembly drawing:



Step 1.

Locate the matching section with an SO-239 connector soldered to one end and an electrical crimp connector attached to the other end. Feed the crimped connector end of the matching section through the hole in the L-clamp bracket shown in Figure 1. Attach the SO-239 connector to the bracket using the four screws, four washers, and four nuts as shown.

Figure 1: Perform procedure A and repeat for each hole, labeled B, C, and D.

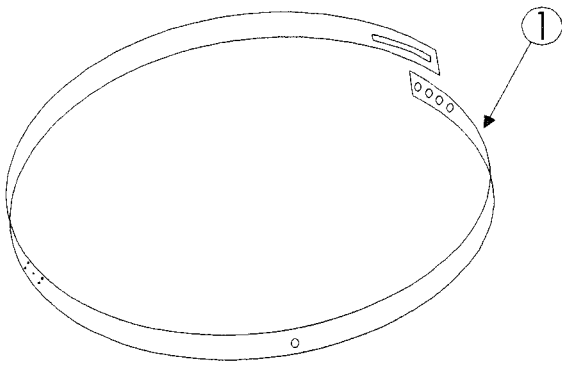


Step 2.

Locate the radiating loop band and lay it out as shown in Figure 2. Attach the L-bolt bracket to the outside of the band using the appropriate hardware as shown in Figure 3. Note: you may want to apply Vasoline™ petroleum jelly between the loop and the L-bracket to prevent possible corrosion.

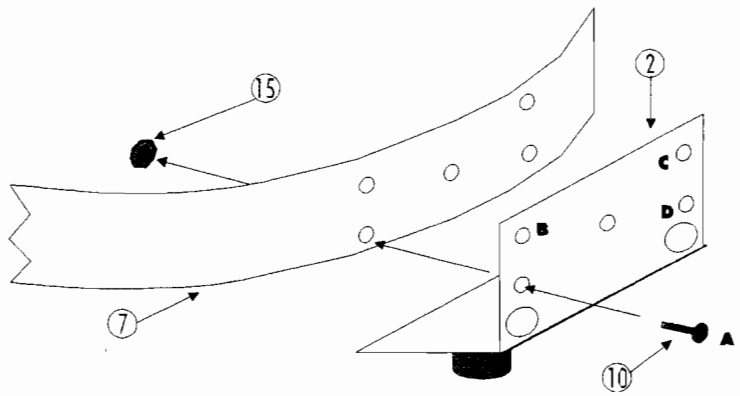
Figure 2.

Position open end of loop away from you.



Closed end of loop toward you.

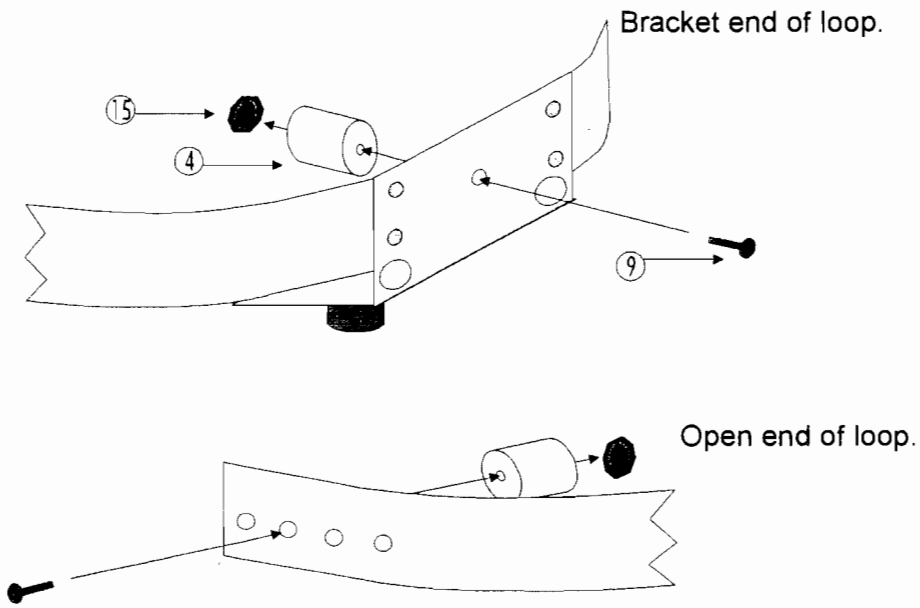
Figure 3: Perform procedure A and repeat for each hole, labeled B, C, and D.



Step 3.

Locate the two white pipe caps with holes drilled in the ends and attach using appropriate hardware to the radiating loop band as shown in Figure 4.

Figure 4.

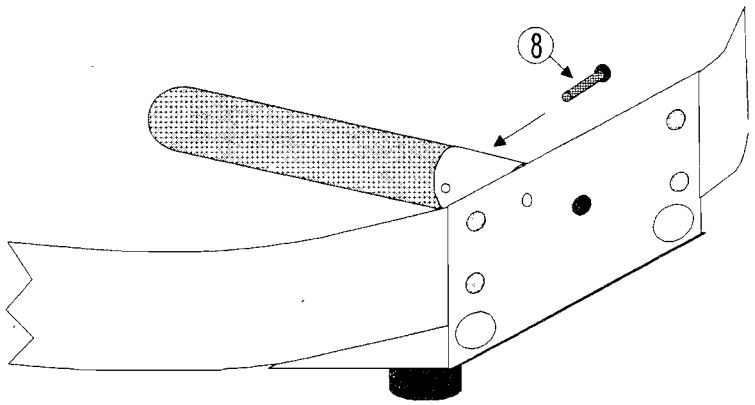


Step 4.

Place the white PVC pipe in the white cap closest to the L-bracket. The small holes drilled near the center of the white PVC pipe must be positioned correctly. Make sure the holes drilled in the center of the length of pipe are oriented vertically (up & down) and are positioned more toward the open end of the loop than the L-bracket end. If your white PVC pipe has black lettering on it, make sure the black lettering on the PVC pipe is facing up, toward the sky. Now bend the end of the radiating loop (that does not have the long slot in the end) into the free end of the white PVC pipe.

We've included self-tapping screws with your Halo-6. If you live in a high wind area, we suggest you drill the necessary holes and secure the PVC end caps to the PVC stabilizing rod as shown in Figure 5. (*Note: Make sure the screw does not short out on the electrical connector on the L-bracket end of the loop! The screws should slide in the side of the end cap and stabilizing bar, NOT from the top down!)

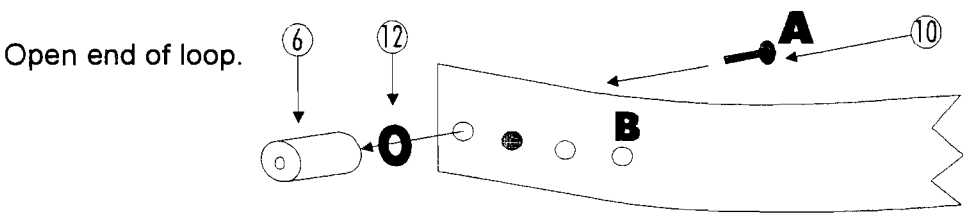
Figure 5.



Step 5.

Attach the two ceramic standoff insulators to the end of the band you just secured to the pipe (as shown in Figure 6). Use the appropriate washers and hardware as shown. Note: take care in working with the ceramic stand-offs (Part #6). Tighten the screws firmly, but do not over tighten. These insulators provide much higher stand-off voltages for the Halo-6 than any other material, however care must be taken when working with them.

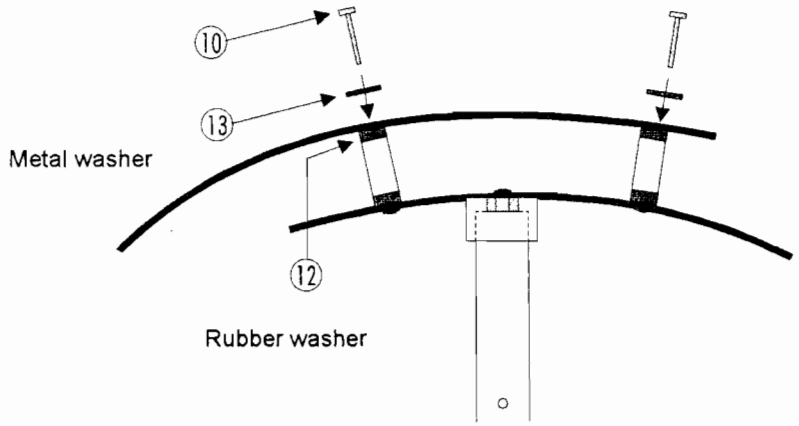
Figure 6: Perform procedure A and repeat for the hole labeled B.



Step 6.

Pull the end of the radiating band that is still free around so that it lays over the free ends of the standoff insulators. Use the appropriate hardware to pass through the elongated slot and secure the band to the insulators. See Figure 7.

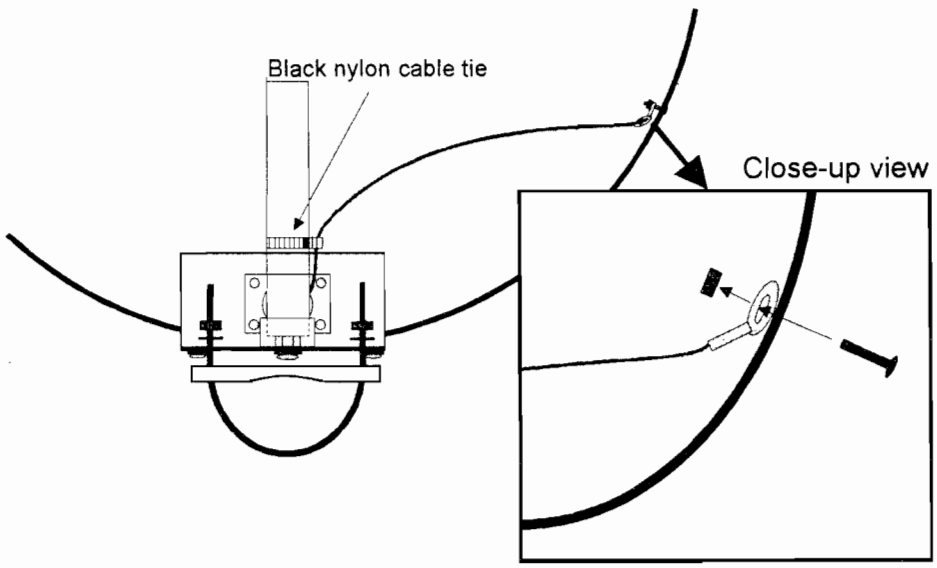
Figure 7.



Step 7.

Attach the free end of the matching section to the hole in the band as shown in Figure 8. Be sure to use the appropriate hardware as shown. Use the black nylon cable tie provided to secure the opposite end of the matching section to the white pipe as shown.

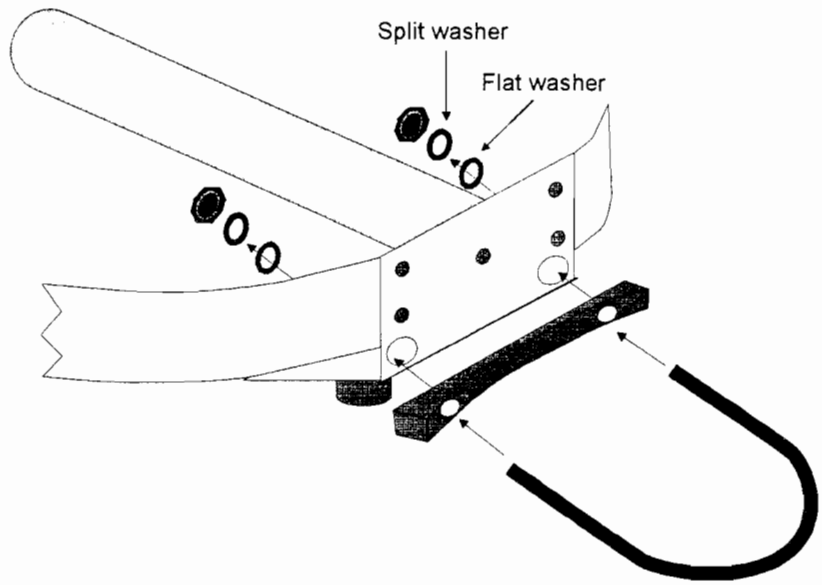
Figure 8.



Step 8.

Temporarily attach the U-bolt and respective hardware into the L-bracket as shown in Figure 9.

Figure 9.



Tuning the Halo-6

The antenna is now ready for installation and tuning. It is usually more convenient to attach the antenna temporarily to a mast that is about six feet high and in the clear, away from other metallic objects. The antenna is tuned by using a low power transmitter and SWR bridge. The best way, if you have access to one, is to use the AEA SWR Antenna Analyst model 30-150 for fast and accurate tuning. If possible, use 8 ft, 4 in. of RG-213 coax for your temporary feedline.

Attach one end of the feedline to the Halo-6 and the other end to your SWR Analyst or your SWR meter. Adjust the antenna for lowest SWR at the frequency you will most commonly be operating. If you plan to operate in the SSB portion of the band for working DX, you should consider tuning for about 50.125 MHz. This will allow you to work from 50.000 to 50.300 MHz between 2:1 SWR points. See Figure 11 on the next page for correct placement of the ceramic insulators. Place the insulator next to the white PVC pipe for operation at or above 52 MHz and away from the PVC pipe for operation below 52 MHz.

To tune for the low end of the band, start by having the ends of the radiating band overlap almost as much as possible and tighten the tuning screws in the insulators temporarily and check where the antenna is tuned, see Figure 10. Be sure to stand well away from the antenna when you check the resonant point. If the resonant frequency is lower than the target frequency, then pull the end of the band with the slot back so you have less overlap and then recheck the resonant frequency.

The HALO-6 was designed to be the lowest cost - highest quality 6 meter antenna available. It was also designed to accept the highest possible power - 750 Watts. (There have even been reports from the field that the HALO-6 accepts 1,500 Watts!) As a result of being able to handle this amount of power while keeping costs to a reasonable level, the HALO-6 may not provide less than 1.6:1 SWR. Do not be alarmed, as anything less than 2:1 SWR will generally not cause any problems in your VHF system.

NOTE: Be careful in the first few minutes of operation! Watch for arc-over and high SWR. If arc-over occurs, clean carbon off the ceramic insulators and begin operating again below the arc-over power point. This should not be a concern below 500 Watts, unless you are out of resonance.

Figure 10: Top view.

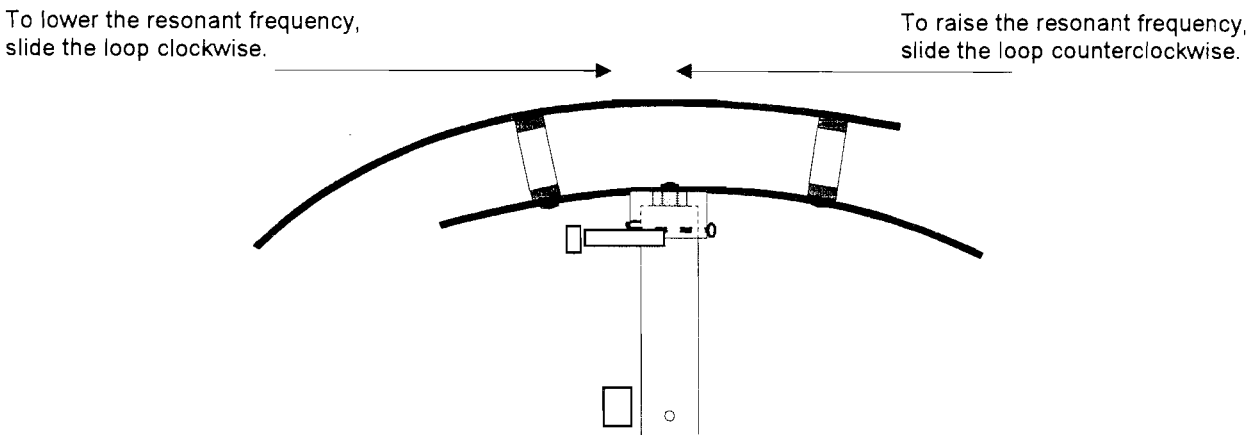
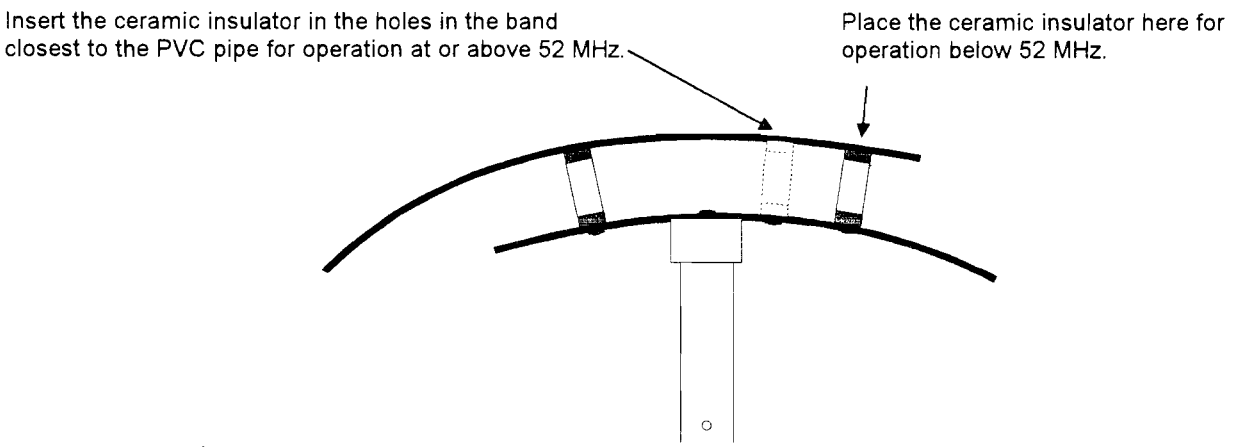


Figure: 11

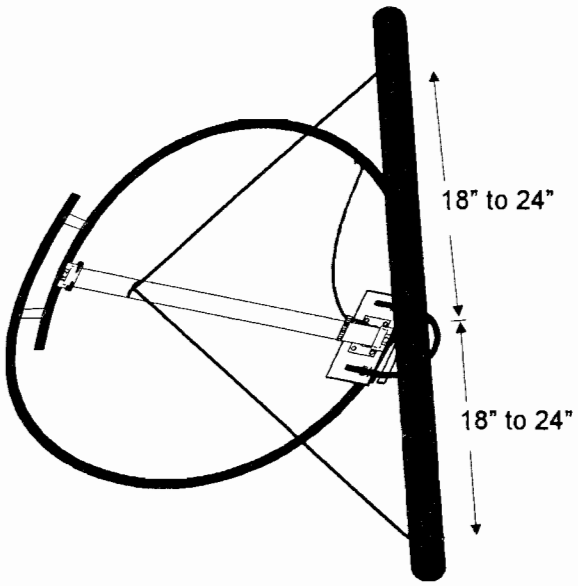


Installation

After tuning the antenna and tightening the tuning screws, you are ready to install the antenna on its proper mast or tower. The antenna can easily be side mounted on one of the legs of a tower. You can also stack the Halo-6 with other Halo-6 antennas for additional gain. You may construct your own low-cost stacking harness by following the directions provided on page 11 of this manual.

To install the Halo-6, simply attach the antenna to a mast or tower leg using the U-bolt. For additional wind load strength, you should attach the 6' stabilizing line provided. The stabilizing line is intended to be threaded through the holes in the white PVC stabilizing rod. Once threaded, make sure there are equal lengths of line on each side of the stabilizing rod. Wrap the line around the stabilizing rod once and tie in a knot, then tie one end of the line to the mast above the Halo-6 and the other end of the line to the section of mast below the Halo-6 as shown in Figure 12. It is a good idea to use black electrical tape over the point where the line attaches to the mast. This will keep the line from creeping up or down the mast and becoming loose.

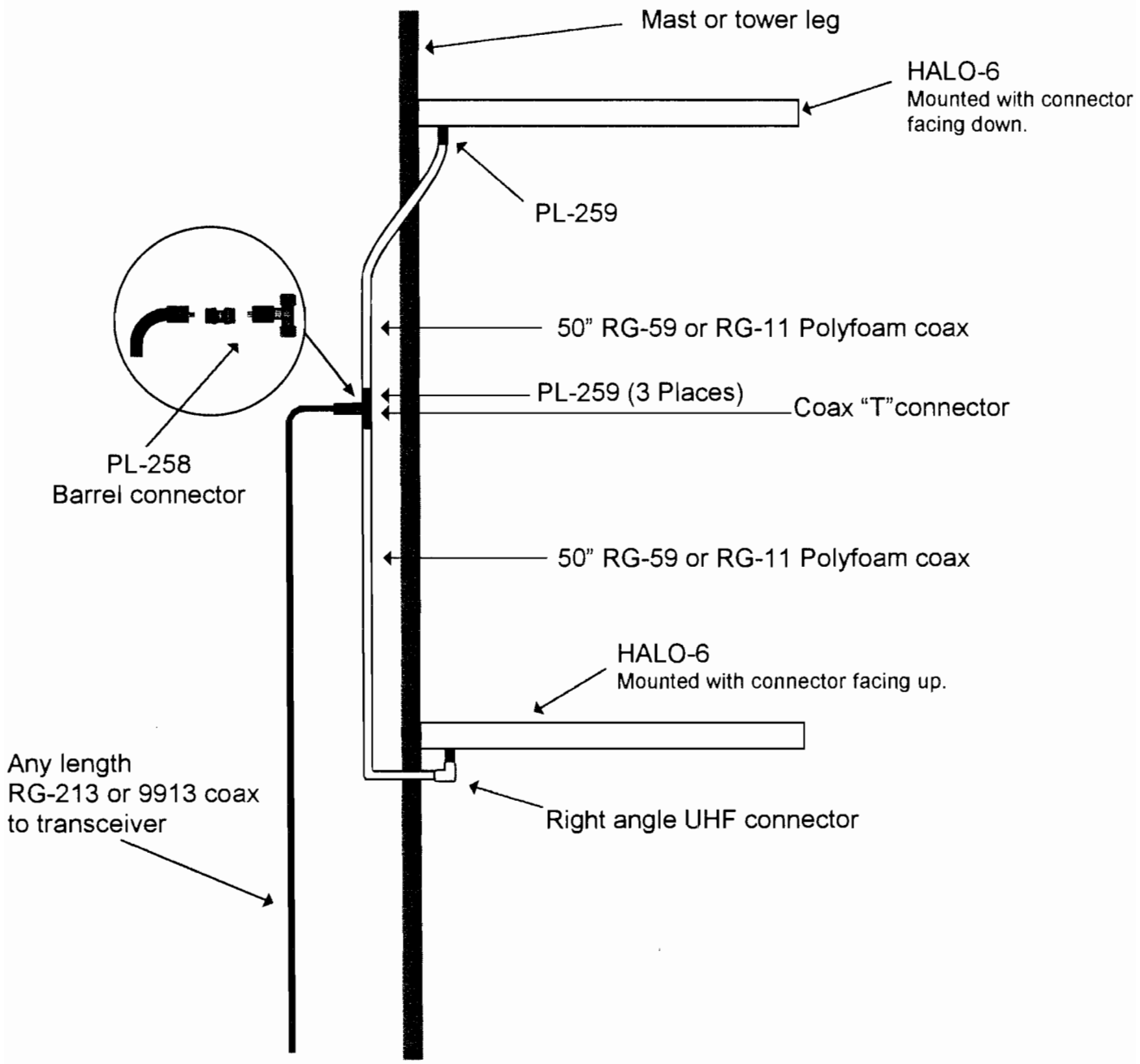
Figure: 12



At this point it is a good idea to attach your short temporary coax to the antenna and do a quick resonant frequency check to assure that the antenna is still tuned to the proper frequency. Depending upon the environment, the tuned frequency may have changed. If it is within 50 kHz, do not bother to re-tune. Attach your permanent coaxial cable (be sure to use a good low loss cable and seal it properly so that rain water cannot penetrate the connector) and use electrical tape or black nylon tie wraps to fasten the cable to the mast or tower leg to relieve any mechanical strain from the connector.

You are now ready to enjoy the fruits of your labor. Six meters is a very different band, in that you can experience many types of propagation. The Halo-6 is an excellent DX spotting antenna as it is omni-directional with its main lobe aimed at the horizon. The most popular mode for six meter operation is Sporadic E skip operation. As its name implies, the band opens up only sporadically, usually in the months of May, June, and July. You should easily be able to work out to 1200 miles during Sporadic E openings using very low power (even 10 watts or less). For more information on six meter operating, consult the ARRL Operating Manual or other publications covering VHF operation.

Stacking Harness Diagram for 2 HALO-6 antennas



Halo-6 Stacking Instructions

The Halo-6 antennas may be stacked for additional omnidirectional gain. To stack two Halo-6 antennas, you will need a stacking distance of about eight feet. It is very easy to make your own stacking harness using RG-59 75 ohm coax that is available from most suppliers of RF cable. The instructions that follow are for making what is commonly referred to as a Power Divider.

You will need the following materials for this installation:

- 2 each assembled Halo-6 antennas.
- 2 each 50 inch (1/4 electrical wavelength) RG-59 FOAM dielectric cables with PL-259 "UHF" cable connectors installed on each end.
- 1 only "UHF" "T" connector.
- 1 only right angle "UHF" connector.
- 1 only PL-258 "UHF" barrel connector.

To install the antennas, start with the highest antenna and mount it according to the master instruction sheet for the Halo-6 antenna. After the upper antenna is mechanically mounted and TUNED according to the master instruction sheet, attach one end of a 50 inch RG-59 cable to the feedpoint. At the other end of this cable attach the "T" connector. (It will fit in any one of two positions of this connector). Attach one end of the remaining RG-59 coax cable to the other end of the "T" connector and let the cable hang straight down the mast (or tower leg).

Mount the second Halo-6 below the first antenna at a distance that is about two inches above the end of the cable that is hanging about 100 inches below the upper antenna. After mechanically securing the lower antenna and TUNING it according to the master instruction sheet, connect the lower RG-59 cable connector to the antenna using a **right angle coax connector**.

Attaching the feedline and coaxial choke baluns:

You are now ready to attach your 50 ohm cable that leads to your transceiver. Attach the 50 ohm cable to the remaining position of the "T" connector using a PL-258 "barrel" connector. At this position, wind the 50 ohm cable into a three turn coil with about a three inch inner diameter. Hold the coil in shape with several wraps of black electrical tape and then tape one side of the coil to the tower leg or mast with the other side of the coil sticking straight out.

At a point 100 inches below the first balun and about 50 inches below the bottom Halo-6 make another three turn coil with about a three inch inner diameter. Tape the coil again in a similar fashion to the first and attach it to the mast or coil if possible.

Now is a good time to ensure that all coax connectors are tightened and then properly taped with black electrical tape to ensure that no water is able to penetrate them. It is good practice to spiral wrap the tape over the connector from a position about 2 inches onto the coax and then back in the opposite direction to the point where you started. Stretch the tape as you apply it to insure there are no voids that water can penetrate. Alternatively, you may choose to use Coax Seal available from radio supply stores.

You are now ready to use your new stacked array. The SWR should be less than 2:1. If not, you will want to re-check the SWR of each antenna independently by attaching a 50 ohm cable directly to the antenna under test and tuning for minimum SWR. If you are still not getting an SWR below 2:1, you will need to check to make sure your 1/4 wave RG-59 cables are indeed 1/4 wave long electrically and that the coax is FOAM dielectric! Please consult the Radio Amateurs' Handbook for further information.

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In Case of Trouble

For assistance, please call AEA between 8:00 AM and 4:00 PM, Pacific Time. The Customer Service phone number is (760) 598-9677. You can also fax your technical questions to (760) 598-5634. You may wish to attempt to solve problems locally by using other HAMs or an AEA dealer. A helpful amateur with a setup similar to your own may be just around the corner. Please read this manual carefully and make sure you have correctly configured your system before you call.

Warranty

ADVANCED ELECTRONIC APPLICATIONS, INC., A DIVISION OF TEMPO RESEARCH, warrants to the original purchaser that this product shall be free from defects in material or workmanship for a period of one year from the date of shipment to the original purchaser. All units returned to the Tempo factory, delivery charges prepaid, and deemed defective under this warranty, will be replaced or repaired at Tempo's option. No other warranties are implied, nor will responsibility for operation of this instrument be assumed by Tempo Research Corporation.

Service

To assist in the rapid repair of the unit, the user is requested to call (760) 598-9677 for a Return Material Authorization (RMA) number. The user is requested to include a statement giving a complete description of the problem, including the conditions under which it occurred. Complete return information (name, company, address and daytime phone number) should be included with each returned unit.

Units should be sent to:
AEA, A Division of Tempo Research Corporation
Repair Department, RMA #_____
1221 Liberty Way
Vista, California 92083

Replacement Parts

Requests for replacement parts or accessories should be made to:
AEA, A Division of Tempo Research Corporation
Customer Service
1221 Liberty Way
Vista, California 92083
TEL (760) 598-9677