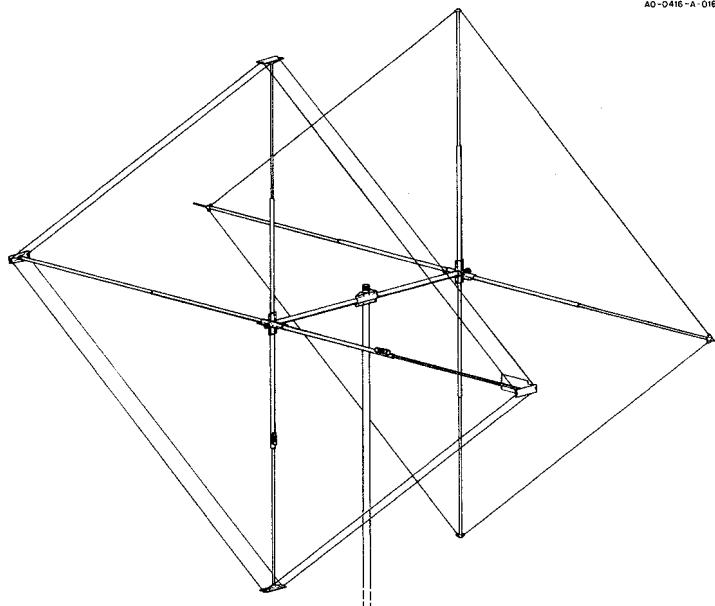


**INSTRUCTION  
MANUAL****ORDER NO. 416****"Eliminator II"**

PN 801289



A0-0416-A-016

**Figure 1****General Description**

The Hy-Gain "Eliminator II" is a two element Citizen's Band Quad with selectable polarization. Selectable polarization is a control over receiving and transmitting capabilities which provides base-to-base and base-to-mobile communications while eliminating unwanted signals. The all aluminum construction, with isolation insulators at strategic points eliminates the problems previously encountered with all aluminum construction.

**Installation Notes**

This antenna must operate independently of other antenna systems, but can be stacked as shown in Figure 13. You cannot extend the support mast between the driven element and reflector and erect an omnidirectional ground plane. This would deteriorate the performance of both the ground plane and the quad. The most detrimental effect would be to the quad.

The minimum mounting height for reasonable performance from directional Citizen's Band antennas is 36 feet to the bottom tips of the elements. Additional height, where legal, will lower the angle of radiation and improve the performance of the system.

If the tower or mast support utilizes guy wires, they should be broken up with egg insulators every three feet for the first 40 feet. The antenna is capable of shock exciting (inducing voltages) the guy wires and existing structures nearby up to a distance of 75 feet.

There should be no object closer than 30 feet to the quad at any time or deterioration of performance will result. The total effect of metal roofs, rain gutters, roof caps, and house wiring cannot be overemphasized. The antenna should be installed away from any metallic objects of large mass.

**Specifications**

*Electrical*

Power multiplication factor .....	7.9
Gain .....	9 dB
Front-to-back rejection, maximum vertical .....	30 dB
Vertical to horizontal separation .....	15 dB
SWR at resonance .....	less than 1.5:1
Coaxial feedline .....	52 ohms
Lightning protection .....	DC ground provided

*Mechanical*

Spreader length overall:

Driven element .....	12'8" (3.86 m)
Reflector element .....	12'10" (3.91 m)
Boom diameter .....	1 1/4" (3.17 cm)
Boom length .....	5' (1.5 m)
Accommodates mast .....	1 1/4" to 1 5/8" (3.17 cm to 4.12 cm)
Turning radius .....	9'2" (2.79 m)
Wind survival .....	90 mph (144.81 kmph)
Weight .....	13.7 lbs. (6.16 kg)
Surface area .....	3.0 sq. ft. (.278 sq. m)
Wind load at 80 mph .....	49.5 lbs. (22.27 kg)

**Installation**

The "Eliminator II" is designed to fit a 1 5/8" O.D. mast. A 1 5/8" plumbers pipe has a 1 5/8" O.D. and makes a good mast. The antenna should be mounted in the clear, free from power lines or metallic objects of great mass or length. The detrimental effects of surrounding objects are often underestimated in the average antenna installation.

The light weight and low surface area of the Eliminator allows the use of medium duty television rotators.

**Assembly**

Unpack the antenna and check the parts against the Parts List. Use the drawings to help you identify all parts.

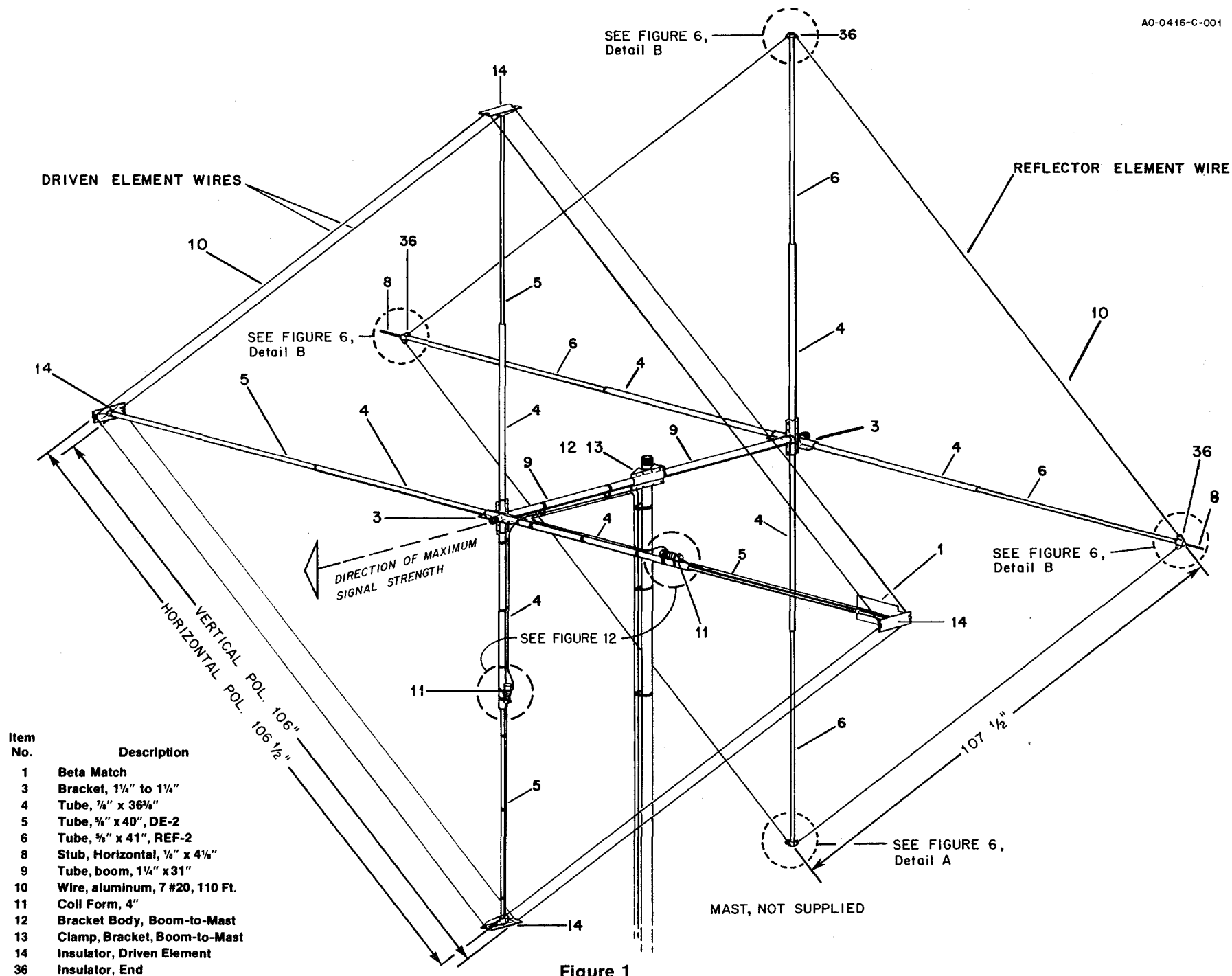
The antenna can be assembled on the ground with the boom across the platform of a tall stepladder. The small size and light weight of the antenna allows it to be mounted completely assembled.

**Boom Assembly**

Select the boom-to-mast bracket body (Item 12) and the boom-to-mast bracket clamp (Item 13) and loosely assemble using four (4) 1/4" screws (Item 17), lockwashers, nuts, and two (2) U-bolts with lockwashers and nuts (Items 21, 31 & 25) as shown in Figure 2.

Insert the boom tubes (Item 9) into the boom-to-mast clamp (Item 13) and body (Item 12). Now tighten the four (4) corner screws (Item 17) in the boom-to-mast bracket securely.

Select two (2) spreader element brackets (Item 3) and install an anchor screw (Item 24) and square nut (Item 29) in each of the center holes as shown in Figure 5. *Do not* tighten at this time. Loosely assemble the spreader element brackets on the reflector end of the boom using eight (8) 1/4" hex head screws (Item 17), lockwasher and nuts.



Item No.	Description
1	Beta Match
3	Bracket, 1 1/4" to 1 1/4"
4	Tube, 7/8" x 36 3/4"
5	Tube, 3/4" x 40", DE-2
6	Tube, 3/4" x 41", REF-2
8	Stub, Horizontal, 1/2" x 4 1/4"
9	Tube, boom, 1 1/4" x 31"
10	Wire, aluminum, 7 #20, 110 Ft.
11	Coil Form, 4"
12	Bracket Body, Boom-to-Mast
13	Clamp, Bracket, Boom-to-Mast
14	Insulator, Driven Element
36	Insulator, End

Figure 1

Continue to assemble the remaining element brackets and place them on the boom. Horizontal elements go at the boom ends as in Figures 3 and 5. *Do not* tighten at this time.

Set the boom and bracket assembly aside for use after the spreader arms have been completed.

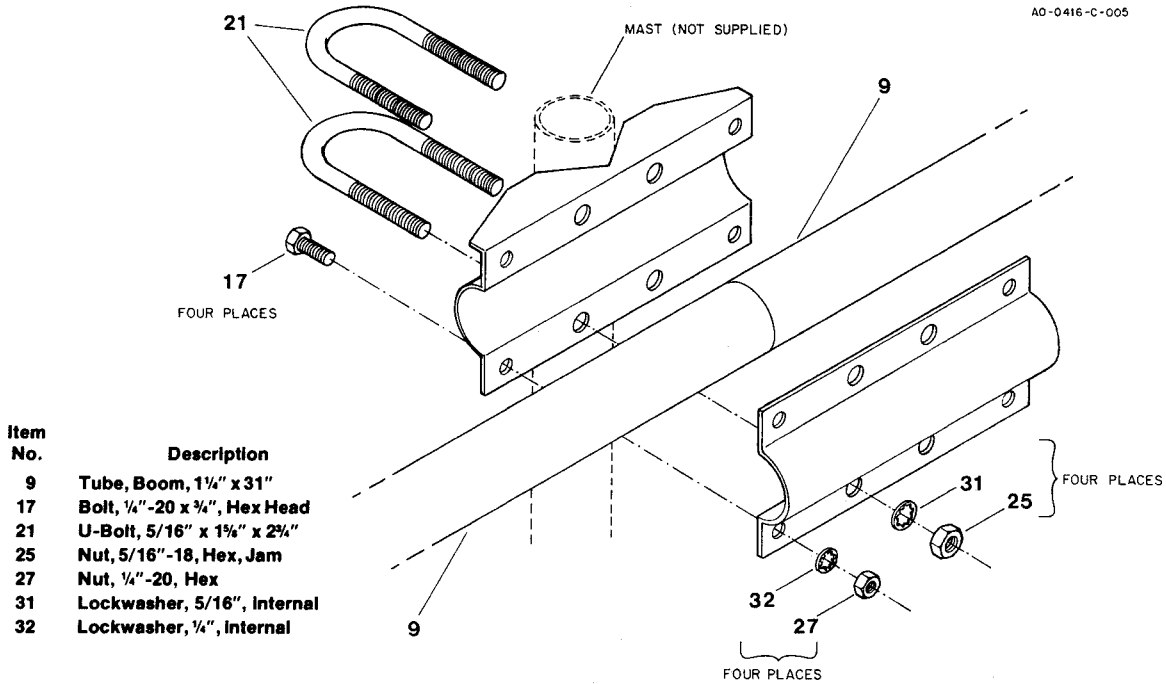


Figure 2

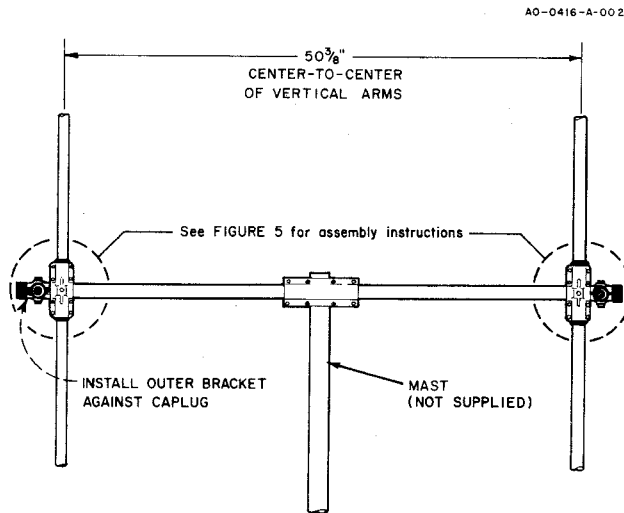


Figure 3

### Reflector and Driven Element Spreader Arm Assembly

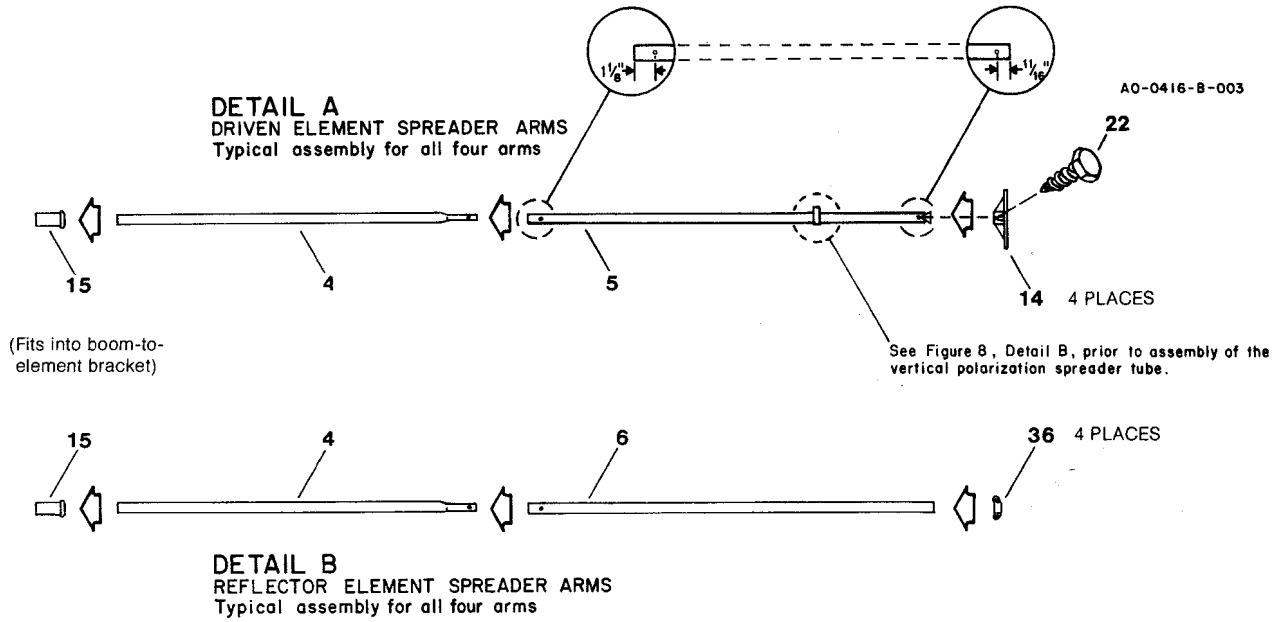
Select the eight (8) 7/8" x 36 3/8" tubes (Item 4) and insert the unwaged end into the spreader arm insulators (Item 15), Figures 4 and 5.

Select the four (4) REF-2 sections (Item 6) and slip the drilled end into the 7/8" tubes (Item 4) as shown in Figure 4, Detail B. Align the holes and secure using #8 x 3/8" self-tapping hex head screws (Item 23).

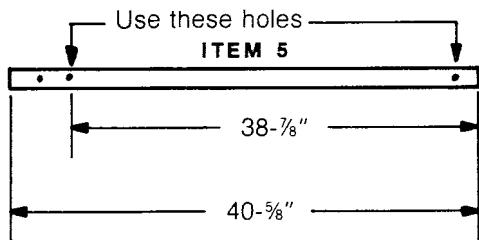
Select the four (4) DE-2 sections (Item 5) and slip the correct end into the 7/8" tubes (Item 4) as shown in Figure 4, Detail A. Align the holes and secure using the #8 x 3/8" self-tapping hex head screws (Item 23).

Select the end insulators (Item 36) and loosely assemble them using the screws and hardware. Tighten the insulators on the reflector spreader element ends. See Figure 6, Details A and B.

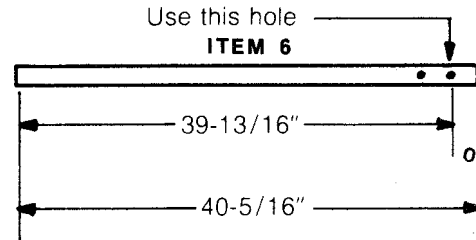
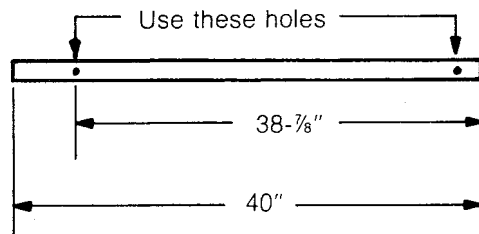
Select the four (4) Driven Element insulators (Item 14) and assemble them on the end of the four (4)  $\frac{5}{8}$ " Driven Element Spreader Arms (Item 5) using the four (4) hex head screws (Item 22). Refer to Figure 4, Detail A.



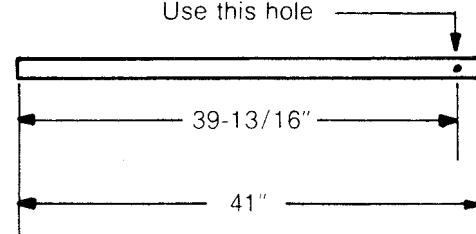
**NOTE:** Items 5 and 6 may be supplied in either of two configurations. The following illustrations will aid in correct identification of the parts and holes to be used for construction of the antenna:



**OR**



**OR**



Item No.	Description
4	Tube, $\frac{7}{8}$ " x $36\frac{3}{4}$ "
5	Tube, $\frac{5}{8}$ " x 40", DE-2
6	Tube, $\frac{5}{8}$ " x 41", REF-2
14	Insulator, Driven Element
15	Insulator, Spreader Arm
22	Screw, #8 x $\frac{5}{8}$ ", Hex Head, Type A
36	Insulator, End

**Figure 4**

NOTE : THE HARDWARE USED TO ASSEMBLE THE BRACKET BELOW IS IDENTICAL TO THE BRACKET ASSEMBLY AT THE RIGHT.

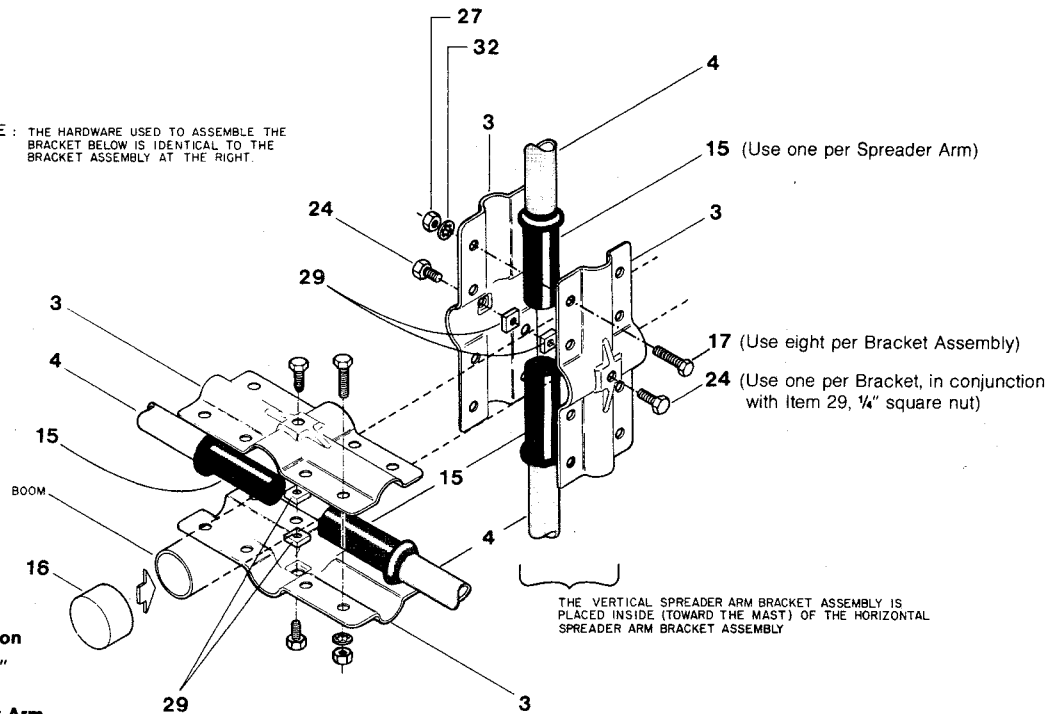


Figure 5

Item No.	Description
3	Bracket, 1 1/4" to 1 1/2"
4	Tube, 7/8" x 3 6/8"
15	Insulator, Spreader Arm
16	Caplug, 1 1/4", Black
17	Bolt, 1/4"-20 x 3/4", Hex Head
24	Bolt, 1/4"-20 x 3/8", Hex Head
27	Nut, 1/4"-20, Hex
29	Nut, 1/4"-20, Square
32	Lockwasher, 1/4", Internal

**Spreader Arm-to-Boom Assembly**

Place the previously assembled boom across a tall stepladder platform. If a platform is not available, assembly can be completed with the boom vertical, setting the antenna on the Driven Element arms.

Insert the completed spreader arms into the brackets on the boom. All of the horizontal spreader arms should be on the outside of the boom, see Figure 5. Tighten all hardware securely.

**Element Wire Hookup**

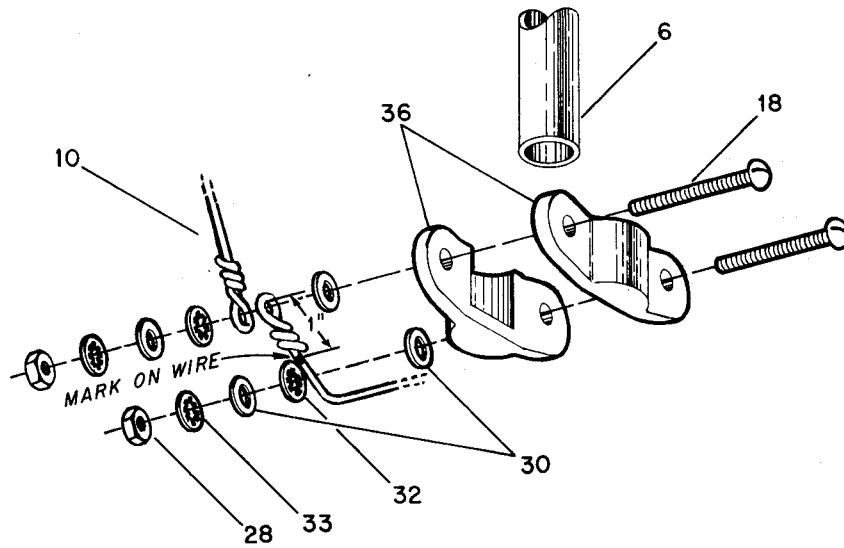
**NOTE:** Extreme care should be taken to insure the element wire does not kink. If this occurs and the wire is allowed to be pulled tight, damage to the wire can result. To facilitate element wire hookup, the element wires should be marked as shown in Figures 7 and 9. Refer to Figure 7, Detail A, for construction of element wire loops. Refer to Figure 6 for wire attachments on the Reflector Arm Insulators.

The Reflector wire is measured as shown in Figure 7.

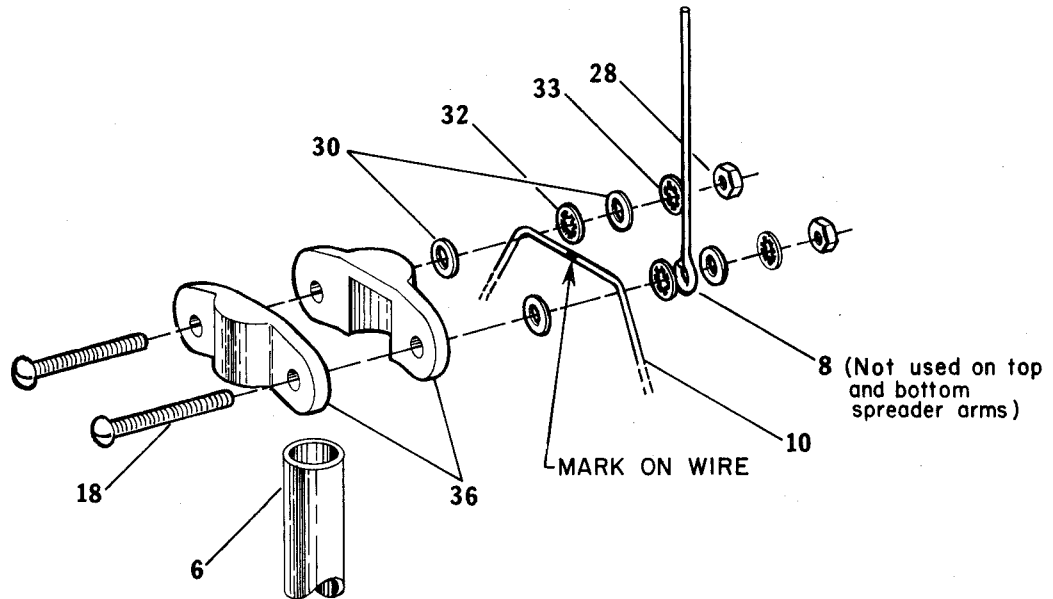
Referring to Figure 6, install the Reflector wire on the ends of the spreader arms. The marks on the wire should be centered on the horizontal insulators (Item 36). Refer to Figure 1 for the approximate distance between the insulators.

Install the 1/8" x 4" wire stubs (Item 8) on the horizontal insulators as shown in Figure 6, Detail B and Figure 1.

Refer to Figure 8 for Driven Element wire attachments.



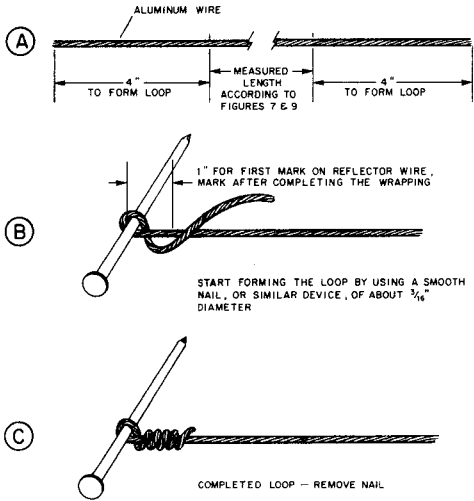
**DETAIL A**  
**Bottom Vertical**



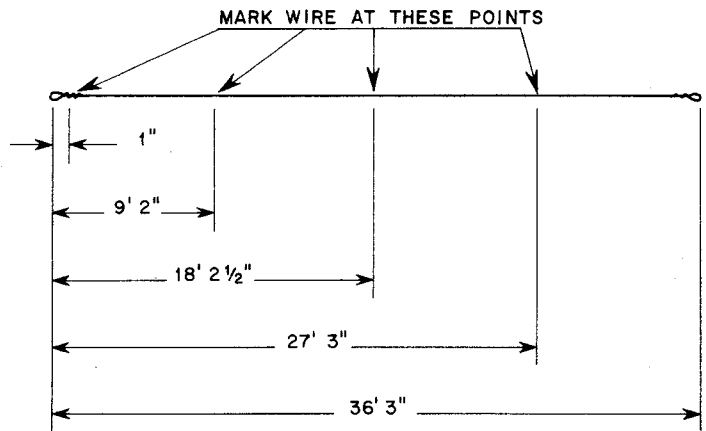
**DETAIL B**  
**Horizontal and Top Vertical**

Item No.	Description
6	Tube, 3/8" x 41", REF-2
8	Stub, Horizontal, 1/8" x 4 1/8"
10	Wire, Aluminum, 7 #20, 110 Ft.
18	Bolt, #10-24 x 1 1/4", Round Head
28	Nut, #10-24, Hex
30	Flatwasher, #10
32	Lockwasher, 1/4", Internal
33	Lockwasher, #10, Internal
36	Insulator, End

**Figure 6**

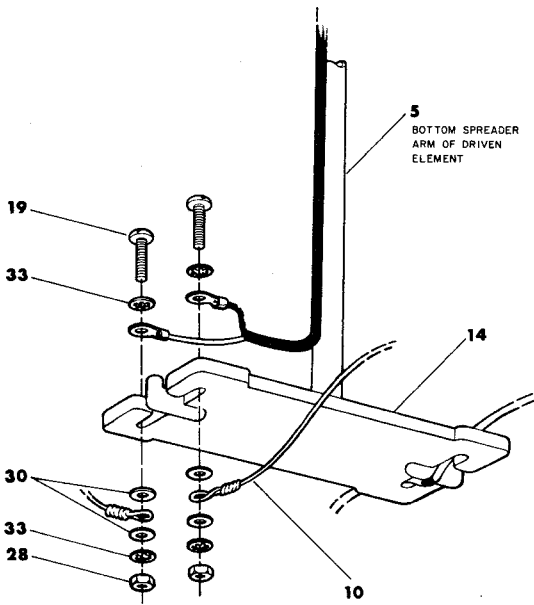


**DETAIL A**  
Formation of Wire Loops

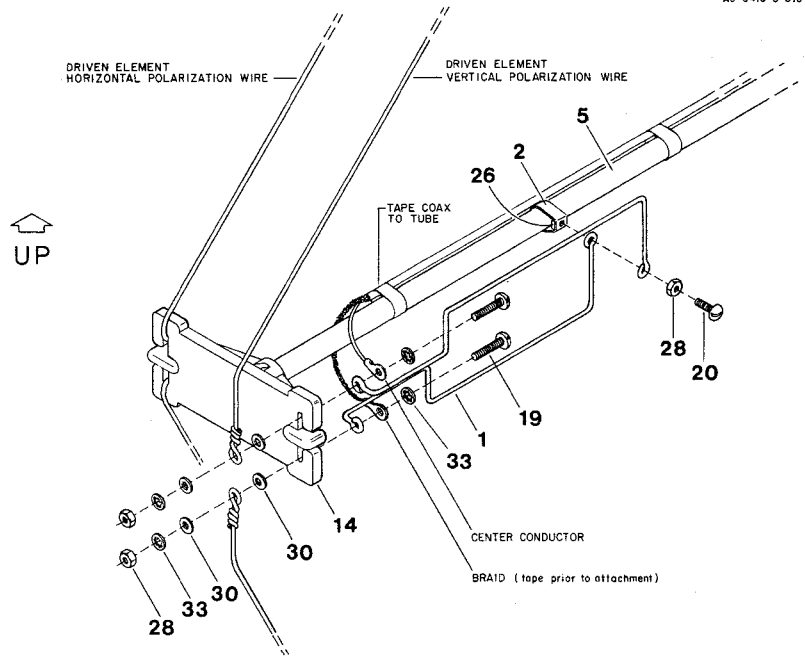


**DETAIL B**

**Figure 7**



**DETAIL A**  
Horizontal Polarization Connection



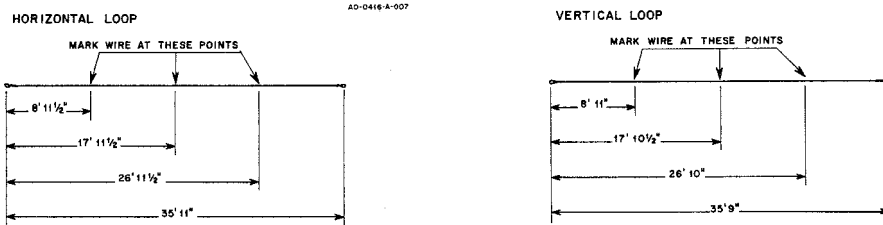
**DETAIL B**  
Vertical Polarization Connection

Item No.	Description
1	Beta Match
2	Clamp, Compression, 11/16"
5	Tube, 5/8" x 40", DE-2
10	Wire, Aluminum, 7 #20, 110 Ft.
14	Insulator, Driven Element
19	Bolt, #10-24 x 1", Round Head
20	Bolt, #10-24 x 3/4", Round Head
26	Nut, #10-24, Square
28	Nut, #10-24, Hex
30	Flatwasher, #10
33	Lockwasher, #10, Internal

**Figure 8**



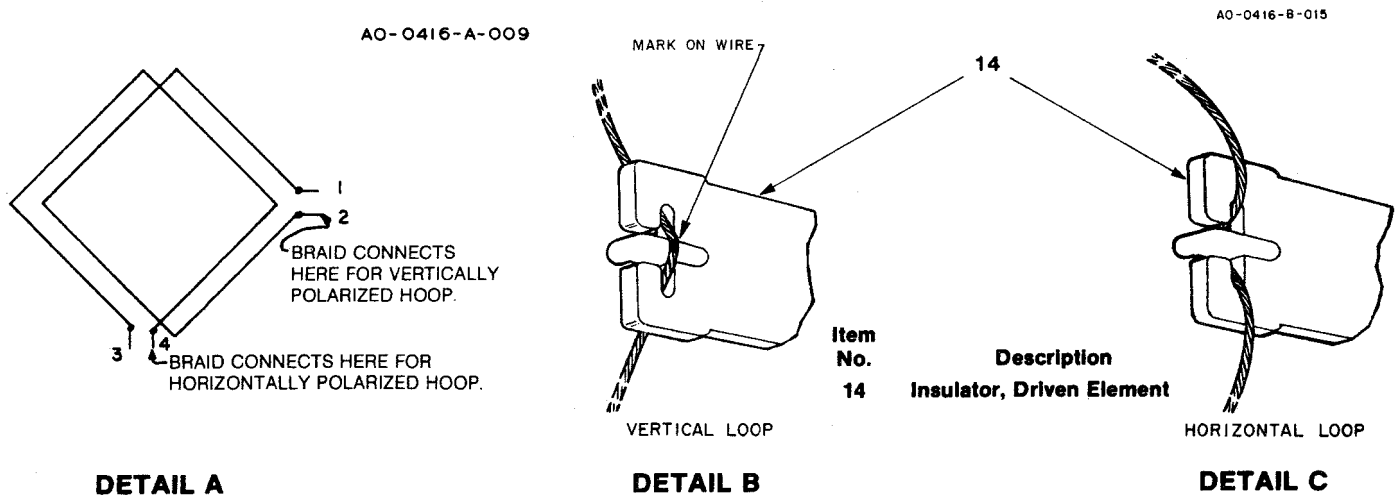
The Driven Element wire is measured as shown below.



**Figure 9**

Loosely assemble the beta match (Items 1, 2, 20, 26, and 28) on the left (left when looking at the Driven element from the Reflector end) horizontal spreader arm. Refer to Figure 8 and Figure 1, Vertical Polarization Connection.

Install the wire on the Driven Element Spreader Arm as shown in Figures 8 and 10. The marks on the wire should be centered on the Driven Element Insulators (Item 14).



**Figure 10**

The longer wire for the horizontal loop should be threaded through the Insulator (Item 14) as shown to take up the slack.

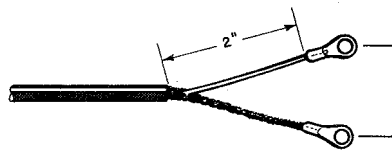
The distance between insulators should be approximately the same as in Figure 1.

Adjustment for loose elements can be accomplished by loosening the brackets of the spreader arms affected one at a time, see Figure 5. Then move each spreader arm out in 1/4" increments and retighten all screws securely. Repeat this process until the element wires are tensioned.

If the wire is too tight (bowed spreader arms) remove the screws (Item 23) and let tube 5 (on Driven Element) or tube 6 (on Reflector) slide into tube 4 until the wire is tight and the tubes are not bowed. Drill a new hole in the smaller tube and reinsert the screw.

**NOTE:** To wind the coil shown in Figure 12, RG58/U coax must be used (except when stacking two antennas). If RG8/U coax is used as feedline, it must be spliced to RG58/U before winding the coil and attaching to the elements.

Prepare one end of two pieces of RG58/U as shown in Figure 11.



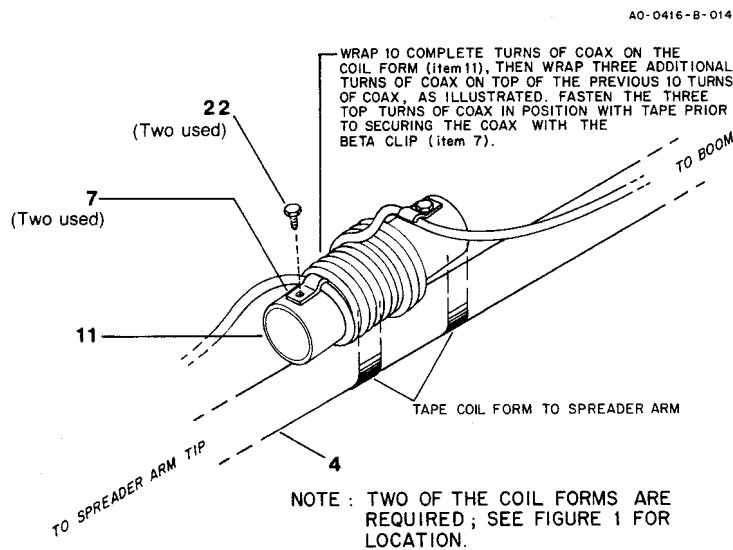
Item No.	Description
34	Lug 22, 18-Wire, #10 Ring
35	Lug 16, 14-Wire, #10 Ring

**Figure 11**

Attach the coax to the Driven Element wires as shown in Figure 8 using solder lugs supplied (Items 34 and 35). Securely tighten all hardware at this time.

Wrap the coax around the coil form (Item 11) as shown in Figure 12. Make sure to space the coax so that the coil form is approximately midway between the boom-to-element bracket and the tip of the element, see Figure 1.

Tape the coil form and coax to the spreaders and boom and prepare to install the antenna.



Item No.	Description
4	Tube, $\frac{1}{8}$ " x $36\frac{1}{2}$ "
7	Clip, Beta
11	Coil Form, 4"
22	Screw, #8 x $\frac{1}{2}$ ", Hex Head, Type A

**Figure 12**

Mount the antenna on a mast using the U-bolts provided, see Figure 2. The antenna can be rotated with any medium duty T.V. rotator. For best results on a tower mounted antenna, the tip of the lower vertical element should be above the top of the tower.

Tape the coaxial feedlines to the support mast. Run them around the rotator, then down the support structure. Allow a large enough loop around the rotator so the antenna can be rotated without undue strain on the coaxial feedline.

**NOTE:** To prolong the life of this product in or around coastal areas, all hardware should be coated with a silicone rubber compound, such as DOW-CORNING silastic rubber or G.E. silicone seal to prevent atmospheric deterioration.

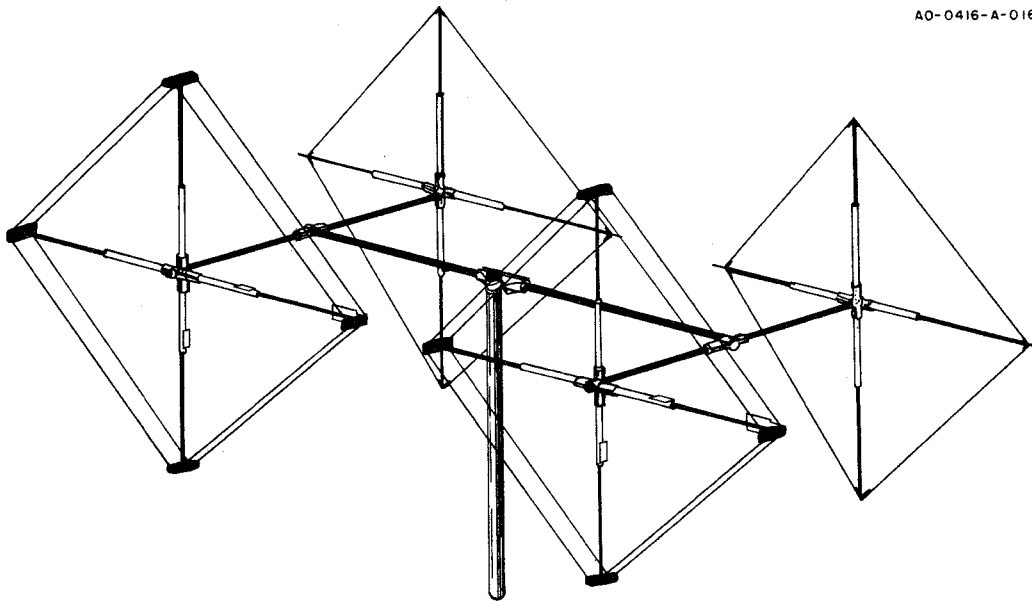
### Stacking Two Hy-Gain Eliminator II Antennas

**NOTE:** Two Eliminator II's can be stacked for even better performance. This will provide an increase in gain of 3 dB effectively doubling power output. The fittings necessary are available in nearly every locality.

Build four RG59/U (72 ohm) phasing lines as in Figure 14.

Make a cross support boom 20' (640.1 cm) long and  $1\frac{5}{8}$ " maximum diameter. Make arrangements to attach it to the mast.

Finish the assembly of both antennas.

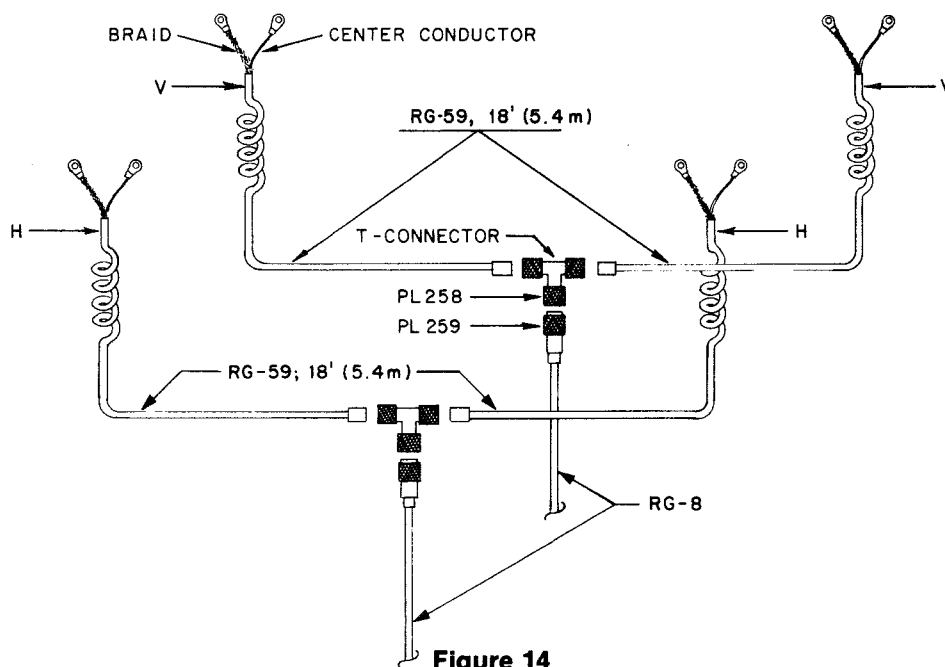
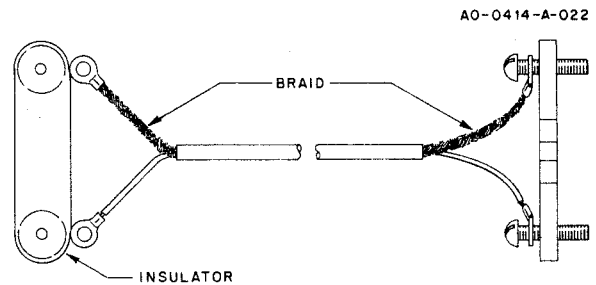
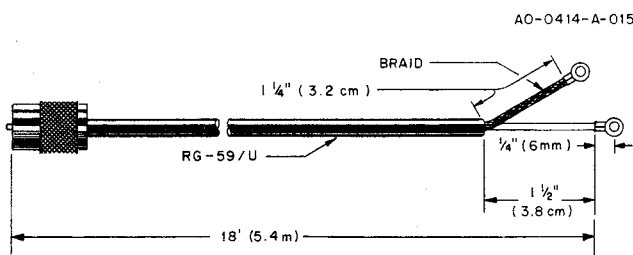


**Figure 13**

**Stacking Array**

Mount the antennas on the cross arm.

Attach phasing lines to the antenna feed points as illustrated. They must be wound on the coil form exactly the same as the RG58/U is wound for a single antenna (see Figure 12). Check antenna feed system carefully to be certain it is as illustrated in the manual. This will insure proper phasing and operation of your stacked "Eliminator II's".



**Figure 14**

**NOTE:** Be sure the feedlines and  $\frac{1}{4}$ -wave matching transformers are similarly placed on the booms of both antennas so they will be properly connected in phase.

When attaching the coax to the stacked antennas, the braid should be connected to the right side of the lower vertical spreader and to the bottom side of the right horizontal spreader. See Figure 15.

Join the horizontal phasing lines in a "T" connection.

Attach and join the vertical phasing lines as was done with the horizontal lines above.

Attach RG8/U feedlines.

Raise the complete assembly into position and attach to mast.

Secure the phasing lines and feedlines to the mast. Leave slack around the rotator if antennas will be rotated.

AO-0414-A-014

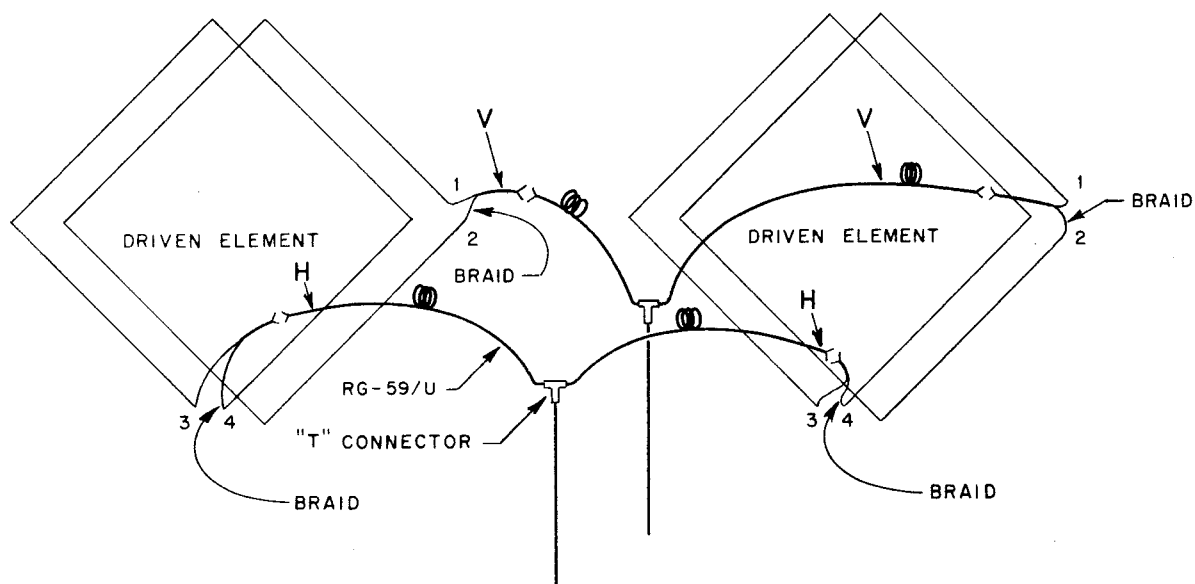


Figure 15

## PARTS LIST

**NOTE:** Item numbers may not be in numerical sequence.

Item No.	Part No.	Description	Qty
1	170579	Beta match .....	2
	870092	Parts Pack 416 .....	1
2	165763	Clamp, compression, 1 <sup>1</sup> / <sub>16</sub> " .....	1
7	163266	Clip, beta .....	4
8	170581	Stub, horizontal, 1 <sup>1</sup> / <sub>8</sub> " x 4 <sup>1</sup> / <sub>8</sub> " .....	2
16	455630	Caplug, 1 <sup>1</sup> / <sub>4</sub> ", black .....	2
17	506325	Bolt, 1 <sup>1</sup> / <sub>4</sub> "-20 x 3 <sup>3</sup> / <sub>4</sub> ", hex head .....	36
18	506450	Bolt, #10-24 x 1 <sup>1</sup> / <sub>4</sub> ", round head .....	8
19	506455	Bolt, #10-24 x 1", round head .....	4
20	506460	Bolt, #10-24 x 3 <sup>3</sup> / <sub>4</sub> ", round head .....	1
21	545146	U-bolt, 5 <sup>1</sup> / <sub>16</sub> " x 1 <sup>5</sup> / <sub>8</sub> " x 2 <sup>3</sup> / <sub>4</sub> " .....	2
22	513023	Screw, #8 x 5 <sup>1</sup> / <sub>8</sub> ", hex head, Type A .....	8
23	510654	Screw, #8 x 3 <sup>3</sup> / <sub>8</sub> ", hex head, Type A .....	8
24	505540	Bolt, 1 <sup>1</sup> / <sub>4</sub> "-20 x 3 <sup>3</sup> / <sub>4</sub> ", hex head .....	8
25	556945	Nut, 5 <sup>1</sup> / <sub>16</sub> "-18, hex, jam .....	4
26	555362	Nut, #10-24, square .....	1
27	556960	Nut, 1 <sup>1</sup> / <sub>4</sub> "-20, hex .....	36
28	556970	Nut, #10-24, hex .....	27
29	558685	Nut, 1 <sup>1</sup> / <sub>4</sub> "-20, square .....	8
30	567130	Flatwasher, #10 .....	24
31	567075	Lockwasher, 5 <sup>1</sup> / <sub>16</sub> ", internal .....	4
32	567110	Lockwasher, 1 <sup>1</sup> / <sub>4</sub> ", internal .....	48
33	567125	Lockwasher, #10, internal .....	21
34	677610	Lug 22, 18-wire, #10 ring .....	2
35	677620	Lug 16, 14-wire, #10 ring .....	2
36	463242	Insulator, end .....	8
3	165138	Bracket, 1 <sup>1</sup> / <sub>4</sub> " to 1 <sup>1</sup> / <sub>4</sub> " .....	8
4	175779	Tube, 7 <sup>1</sup> / <sub>8</sub> " x 36 <sup>3</sup> / <sub>8</sub> " .....	8
5	170370	Tube, 5 <sup>1</sup> / <sub>8</sub> " x 40", DE-2 .....	4
6	170369	Tube, 5 <sup>1</sup> / <sub>8</sub> " x 41", REF-2 .....	4
9	175780	Tube, boom, 1 <sup>1</sup> / <sub>4</sub> " x 31" .....	2
10	690005	Wire, aluminum, 7 #20, 110 ft. ....	1
11	470023	Coil form, 4" .....	2
12	385142	Bracket body, boom-to-mast .....	1
13	385144	Clamp, bracket, boom-to-mast .....	1
14	460001	Insulator, driven element .....	4
15	463767	Insulator, spreader arm .....	8

### Converting English Measurements to Metric

Use this scale to identify lengths of bolts, diameters of tubes, etc.. The English inch (") and foot (') can be converted to centimeters in this way.

$$1 \text{ inch (1")} = 2.54 \text{ cm}$$

$$1 \text{ foot (1')} = 30.48 \text{ cm}$$

Example:

$$42" \times 2.54 = 106.7 \text{ cm}$$

