

Antenna System Model 1017 CA

6.2 to 30.0 MHz Log Periodic Antenna Installation and Maintenance Manual



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Chapter 1 – General Information

1.1 General Description

The USAP Model 1017CA is a reduced-sized, lightweight, high frequency log periodic antenna.

This antenna operates over the frequency range of 6.2 to 30 MHz in an extremely small mechanical configuration. By using foreshortening design techniques, the physical size has been reduced to nearly half that of a standard log periodic antenna. As a rotatable antenna, it provides ideal follow-the-fleet or aircraft communications by allowing azimuth adjustment and frequency change without changing or retuning the antenna.

The antenna has been constructed in accordance with the principles of a logarithmically periodic antenna structure. The structure consists of a series of dipole elements tapered in length and arranged in the proper spacing in accordance with the design principles of a logarithmically period structure. The rear element is foreshortened inductively, and mounting brackets are either heavy gauge aluminum or stainless steel.

The RF feedline is a balanced two-wire line system extending the full length of the boom. A matching balun is used to efficiently couple all the energy from the coaxial transmission line into the antenna.

CAUTIONS and **WARNINGS** – Serious issues that could cause major injury or death along with potential system damage are written in **RED BOLD** letters.

NOTES – Notes of importance are written in blue.

Chapter 1 – General Information (Continued)

1.2 Views of 1017CA Antenna



Figure 1-1
Upper and Lower View of 1017CA Antenna

Chapter 1 – General Information (Continued)

1.3 Radiation Warning

WARNING - Radiation Hazard

To Minimize the risk of adverse health effects, radio frequency (RF) fields as well as induced and contact currents must be in compliance with applicable guidelines (e.g., ANSI, OSHA, FCC, etc.). Reduction in RF exposures can be accomplished through the implementation of customer appropriate administrative, work practice, and engineering controls. These various controls are the elements of an RF Protection Program and part of an employer's comprehensive safety and health program. All personnel working around or on the antenna system should have electromagnetic energy (EME) awareness training and utilize lockout/tag out procedures for personal protection.

1.4 List of Tables and Illustrations

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1.5 Specifications

SPECIFICATIONS	
Mechanical	
Longest Element	49 ft. 4 in. (15.04m)
Boom Length	37 ft. 9-1/2 in. (11.519 m)
Turning Radius	31 ft. 6 in. (9.601m)
Number of Elements	17
Transportability	Can be shipped by any mode of transportation in factory cartons
Storage Conditions	No special requirements
Installation Area Required	60 ft. wide x 113 ft (18.3m x 34.4m) for 60-foot tower
Electrical	
Frequency Range	6.2 to 30 MHz continuous
Power Handling Capability	
Average	2 kW
Peak	4 kW
VSWR	2.5:1 nominal relative to 50 ohms
Gain	8 to 12 dBi
Polarization	horizontal
Front-to-Back Ratio	10 dB average
Cross Polarization	greater than 20 dB down
Input Connector	Type N
Recommended Coaxial Feedline	RG-213/u (not supplied)

Chapter 2 - Installation

2.1 Introduction

This chapter contains the information needed to assemble and erect the Model 1017CA antenna. This chapter will be covering the following: Logistics, Installation Planning, and Installation Procedures.

CAUTION

Proper results can be obtained only by following the step-by-step procedures outlined in this section. Special notes and precautionary measures must be adhered to.

2.2 Tools Suggested but Not Supplied

Tools Suggested but Not Supplied	
QTY	Item
1	Claw Hammer
1	14" Pry Bar
A/R	Standard Screwdriver (medium size)
1 Set	Socket Wrench Set
1 Set	Nut Drivers
1	Adjustable Wrench or a set of open-end wrenches
1	Round Nose Shovel
3	Sawhorse, 4' wide, 3' high
1	50' Steel measuring tape
1	Grease Pencil or Permanent Marker
1	3/8" Drill

2.3 Logistics

A. Receiving Data

Model 1017CA is packed in two (2) shipping assemblies. Inspect for physical damage and check the contents of each crate against the Master Packing List.

B. Material Handling

Use standard warehouse equipment for handling antenna.

Chapter 2 – Installation

2.3 Logistics (Continued)

C. Interconnecting Cables

The input impedance of the antenna is 50 ohms and terminates at the front end of the antenna with a standard Type N female coaxial connector.

A length of RG-213/u coaxial cable (not supplied) is recommended to connect the antenna to the receiver and transmitter.

2.4 Installation Planning

A. General

This section contains the instruction procedures for installing the USAP Model 1017CA antenna.

The assembly will follow these basic steps found in section 2.5 Installation Procedures.

- A. Boom-to-Plate Assembly
- B. Boom Assembly
- C. Boom Support Assembly
- D. Boom Support Assembly to Mast Assembly
- E. Balun Support Plate
- F. Balun Assembly
- G. Boom Shorting Strap
- H. Center Insulator Assembly
- I. Feedline Assembly
- J. Feedwire Assembly
- K. Element Assembly
- L. Beta Tube Assembly
- M. T-Bar Assembly
- N. Securing Element 17 to Boom
- O. Feedline Attachment
- P. Rotator
- Q. Erection Procedures

B. Recommended Manpower Requirements

Approximately 45 hours are required to completely assemble and check out the Model 1017CA antenna. (This is assuming the tower has already been installed.) For safe and efficient assembly, four (4) people should be used during assembly and installation.

Chapter 2 - Installation

2.5 Installation Procedures

A. Boom-to-Plate Assembly

NOTE

Three sawhorses, oil drums, or some similar objects should be handy to simplify assembly of the antenna.

Using a hammer and pry bar, open all crates and accessory boxes carefully. Lay all components and hardware packages out on the lids of the crate just opened.

Become familiar with these parts and their names. Review the manual carefully. Read through the assembly instructions several times and make sure you understand the basic assembly procedures.

Remove from the crate one mast assembly (Item 29) and two 10" long x 2" boom-to-plate clamps (Item 26). See Figure 2-1.

Referring to Figure 2-1, loosely assemble the two boom-to-plate clamps (Item 26) using the 1/4" hardware. Allow enough room to insert the middle, swaged sections of the 2" boom (Item 48) into the clamps. See Figure 2-2.

In some mounting applications, these bolts (inner two item 64 and four item 57) may have to be inverted.

If the Model 3501 rotator is adapted to this system, insert the four 1/2" bolts (Item 57) into each of the 1/2" holes in the mast plate as shown in Figure 2-1. Tighten using the 1/2" lockwasher, flatwasher, and nut (Items 59, 60, & 61), as shown in Figure 2-1.

Remove the six 2" boom sections from their crate. Insert the two middle boom sections, swaged on both ends (Item 48) into and through the clamps.

Chapter 2 – Installation

2.5 Installation Procedures

A. Boom-to-Plate Assembly (Continued)

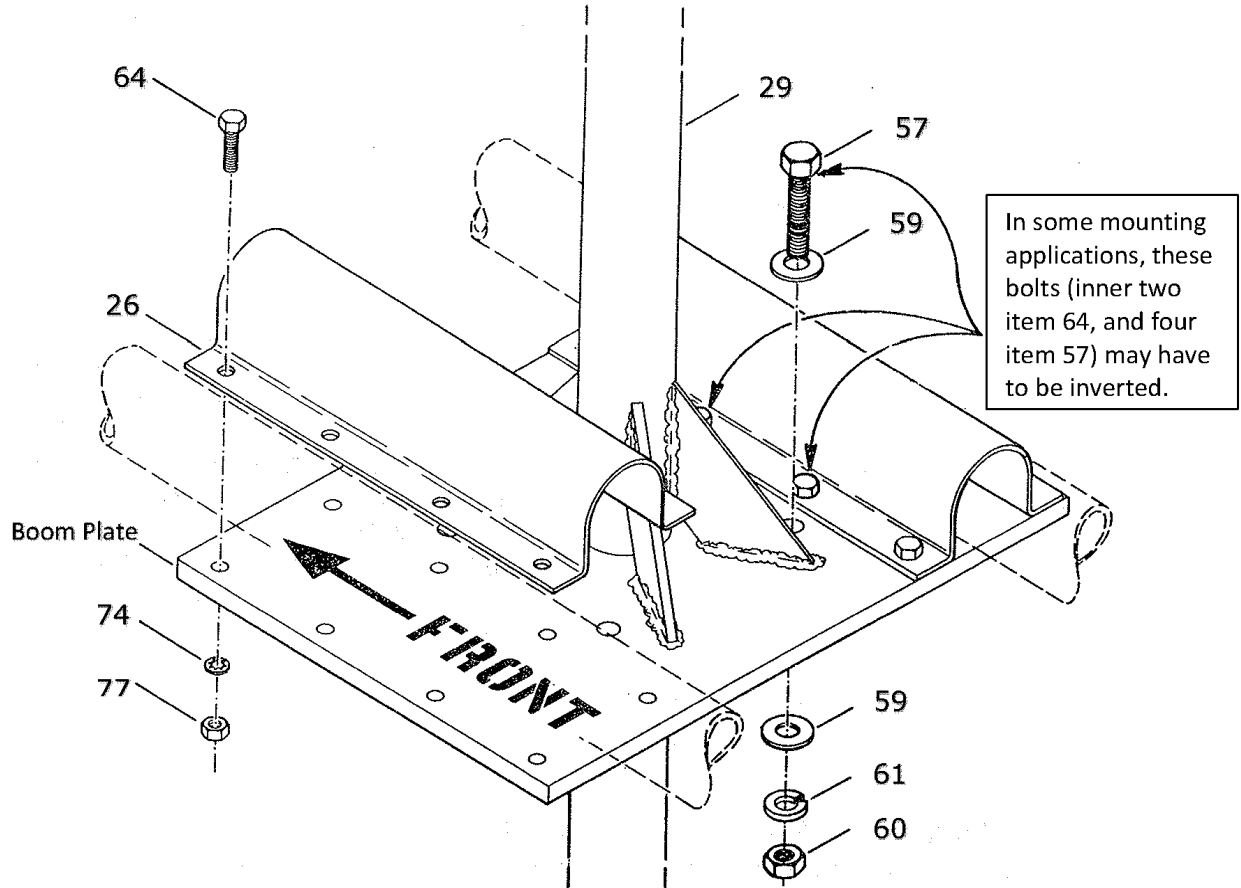


Figure 2-1
Boom-to-Mast Assembly

Item No.	Part No.	Description
26	172732	Clamp Boom-to-Plate
29	880038	Mast Assembly
57	506977	Bolt 1/2" x 2", hex head
59	561481	Flatwasher, 1/2"
60	559715	Nut 1/2", hex
61	569714	Lockwasher 1/2", split
64	502958	Bolt 1/4" x 1", hex head
74	562961	Lockwasher 1/4", internal
77	554099	Nut 1/4", hex

Chapter 2 - Installation

2.6 Installation Procedures (Continued)

B. Boom Assembly

Assemble the drilled end of the two sections of 2" boom (Item 47) on the *front* end of the middle section (Item 48) as illustrated in Figure 2-2.

Align the holes and fasten securely using 1/4" x 2-1/2" bolts (Item 63), nuts (Item 77), and internal lockwashers (Item 74).

Attach the drilled end of the remaining 2" boom sections (Item 47) on the *rear* end of the middle section.

Align holes and fasten securely with 1/4" x 2-1/2" bolts (Item 63), nuts (Item 77) and internal lockwashers (Item 74).

Using the 50' tape, carefully measure along the boom from the front end 20' 11-3/4" as shown in Figure 2-2. Place a mark at this point. **IT IS VERY IMPORTANT THAT THIS MEASUREMENT BE ACCURATE.**

Adjust the boom so the front of the boom-to-mast plate is at this mark. **Align all holes in the boom in a vertical position. Tighten the 1/4" x 1" screws securely.**

Follow this same procedure with the other boom section; again, make sure the measurement is accurate. The ends of the boom sections must be even with each other.

Set the boom assembly on the three sawhorses as shown in Figure 2-2.

NOTE

Your mast may or may not let the boom lay level.
Dig a hole at this point to allow the boom to set level.

Starting at the front of the boom, measure 8' 3/16" and 32' 7-1/4". These are the locations where the boom support extrusions (Item 30) will be attached to the booms.

Chapter 2 - Installation

2.5 Installation Procedures
B. Boom Assembly (Continued)

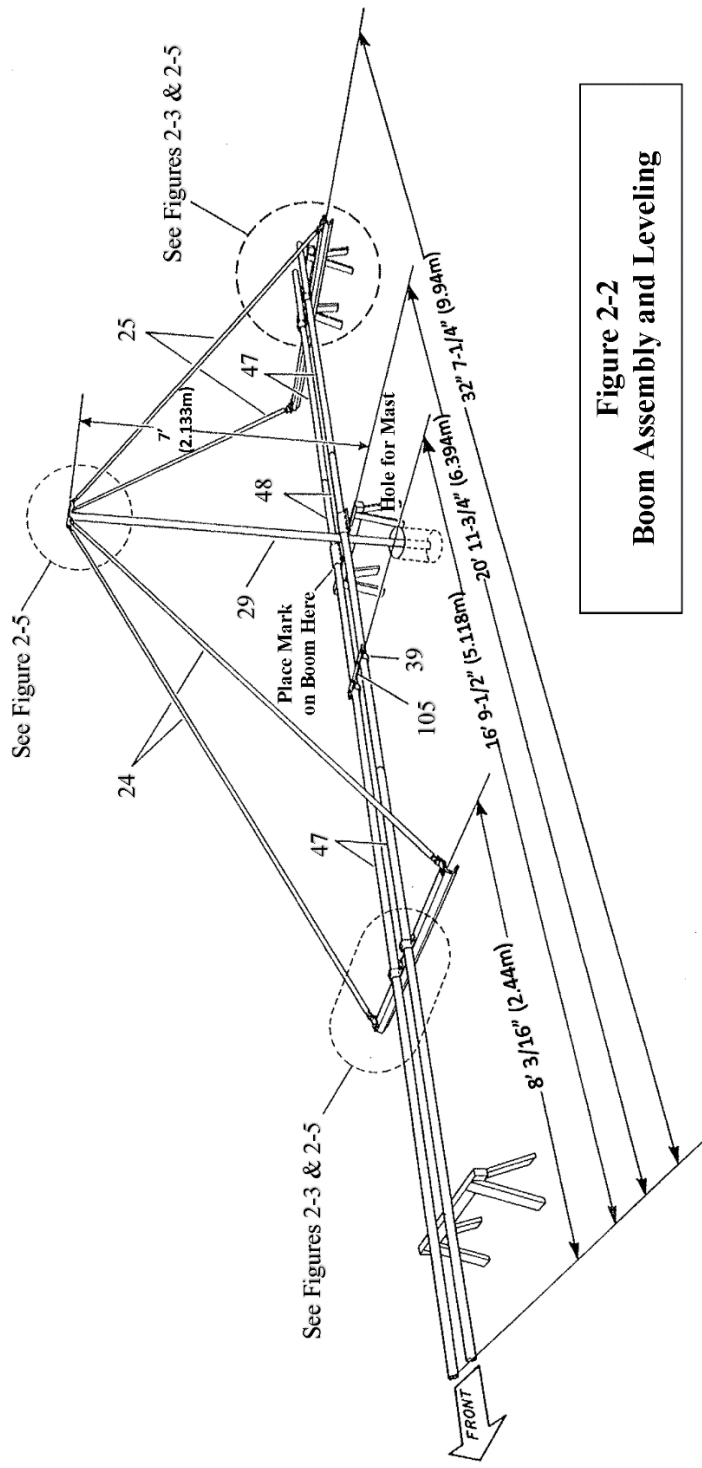


Figure 2-2
Boom Assembly and Leveling

Item No.	Part No.	Description
24	878190	Front Boom Brace Assembly, Long
25	870389	Rear Boom Brace Assembly Short
29	880038	Mast Assembly
39	170663	Clamp Element 2" to 2" Narrow
47	170414	Boom 2" Rear to Front
48	170184	Boom 2" Middle Swaged
105	170311	Strap, Boom Shorting

Chapter 2 - Installation

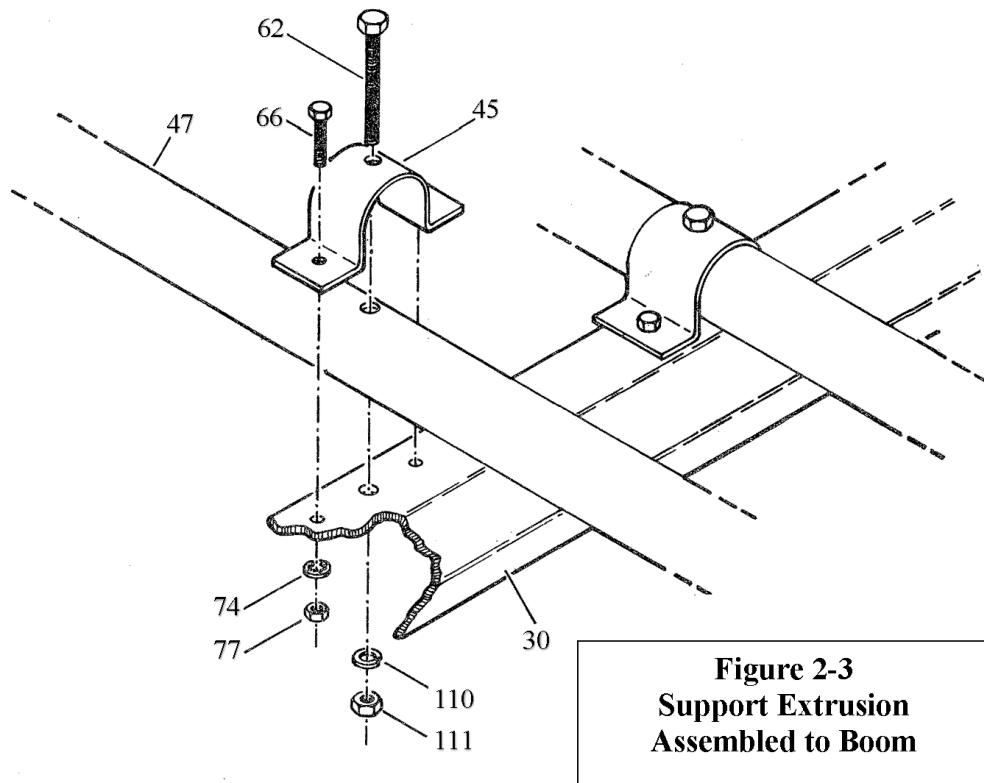
2.5 Installation Procedures (Continued)

C. Boom Support Assembly

Attach the boom support extrusions (Item 30) to the booms using 1/4" x 1-1/4" hardware, the 2" clamp (Item 45) and 5/16" hardware, as shown in Figure 2-3.

Fasten the four boom support angles (Item 44) to the extrusions (Item 30) as shown in Figure 2-5 using the 3/8" x 1-1/2" hardware (Items 65, 109, 108, & 107).

Attach the braces to their respective boom support angles using the 3/8" x 1-1/2" hardware.



**Figure 2-3
Support Extrusion
Assembled to Boom**

Item No.	Part No.	Description
30	170415	Boom Support Extrusions
45	380142	Clamp 2" to 2"
47	170414	Boom 2" Rear and Front
62	506969	Bolt 5/16"-18 x 3", hex head
66	506518	Bolt 1/4"-20 x 1-1/4", hex head
74	562961	Lockwasher 1/4", internal
77	554099	Nut 1/4"-20, hex
110	564792	Lockwasher 5/16", split
111	555747	Nuts 5/16", hex

Chapter 2 - Installation

2.5 Installation Procedures C. Boom Support Assembly (Continued)

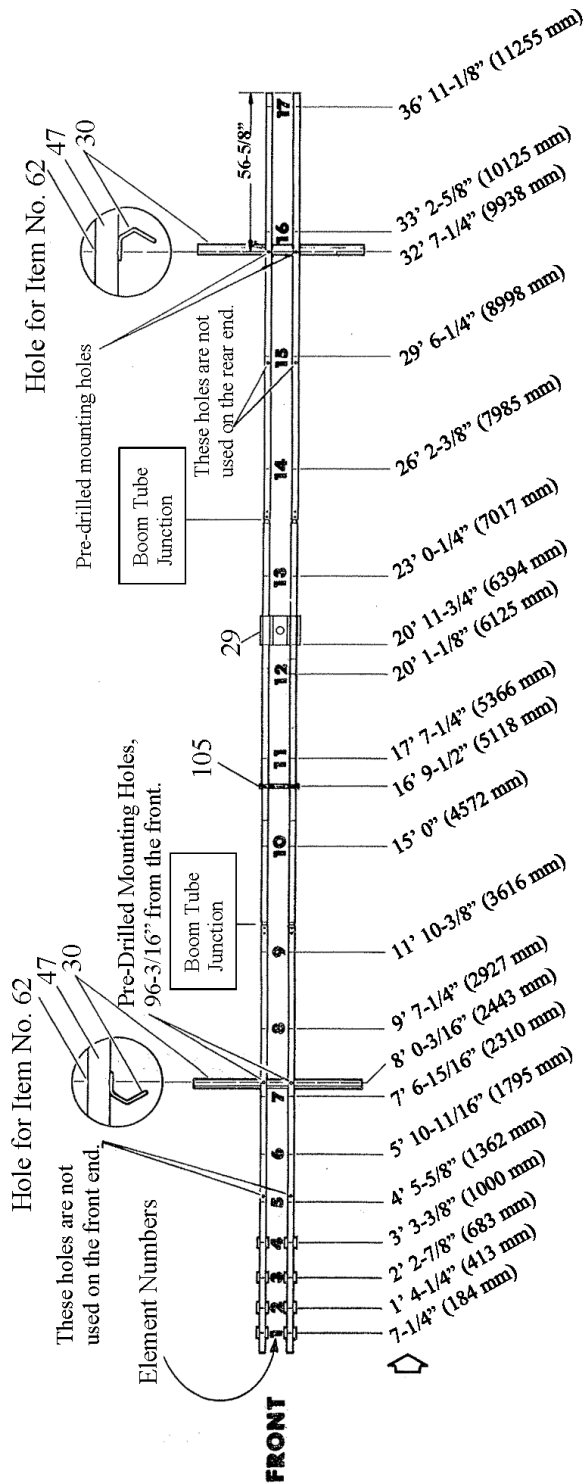


Figure 2-4
Element Clamp Measurements on Boom

Item No.	Part No.	Description
29	880038	Mast Assembly
30	170415	Boom Support Extrusions
47	170414	Boom 2" rear and front
62	506969	Bolt 5/16"-18 x 3", hex head
105	170311	Strap, boom shorting

Chapter 2 - Installation

2.5 Installation Procedures (Continued)

D. Boom Support Assembly to Mast Assembly

Refer to Figure 2-5 for attachment of the boom braces (Items 24 & 25) to the boom support and the mast assembly using the 3/8" hardware (Items 65, 108, 107, 109). The two longest braces (Item 24) will go towards the front while two shorter braces (Item 25) will go to the rear of the boom. Refer to the stencil marking on the boom plate.

The boom ends may need to be adjusted down to allow the boom braces to attach to the support angles. This can be done easily by raising the middle sawhorses slightly.

After the connections have been made, tighten all hardware securely.

Starting from the front of the boom, measure along one boom section and place a mark at each measurement called out in Figure 2-4.

After all the measurements have been made along one boom tube, place the tape on the other boom tube and duplicate the measurements.

CAUTION

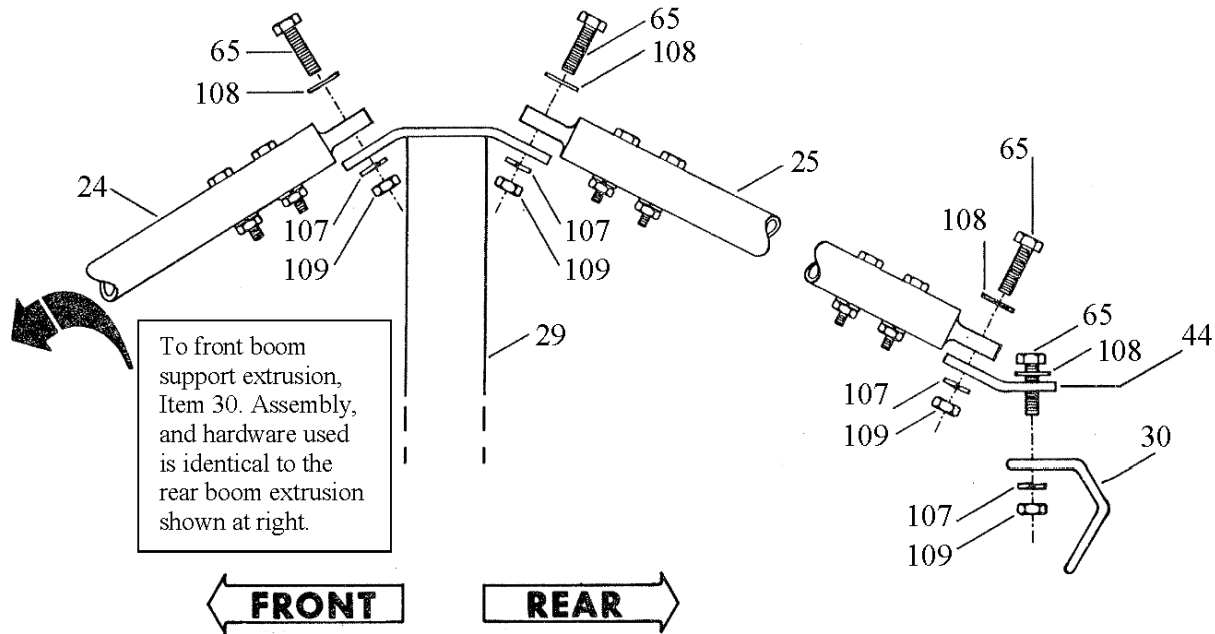
All measurements must be taken accurately and precisely. Any error from one boom to the other will cause the elements to not lie perpendicular to the boom when the antenna elements are completely assembled.

Refer to Figure 2-6 and accurately center a 2" x 2" clamp (Item 35) at each mark.

Chapter 2 - Installation

2.5 Installation Procedures

D. Boom Support Assembly to Mast Assembly (Continued)



Item No.	Part No.	Description
24	878190	Front Boom Brace Assembly - long
25	870389	Rear Boom Brace Assembly - short
29	880038	Mast Assembly
30	170415	Boom Support Extrusions
44	170875	Boom Support Angle
65	507873	Bolt 3/8" x 1-1/2", hex head
107	561016	Lockwasher 3/8", split
108	567180	Flatwasher 3/8"
109	550070	Nut 3/8 - 16", Hex

**Figure 2-5
Boom Braces**

Chapter 2 - Installation

2.5 Installation Procedures

D. Boom Support Assembly to Mast Assembly (Continued)

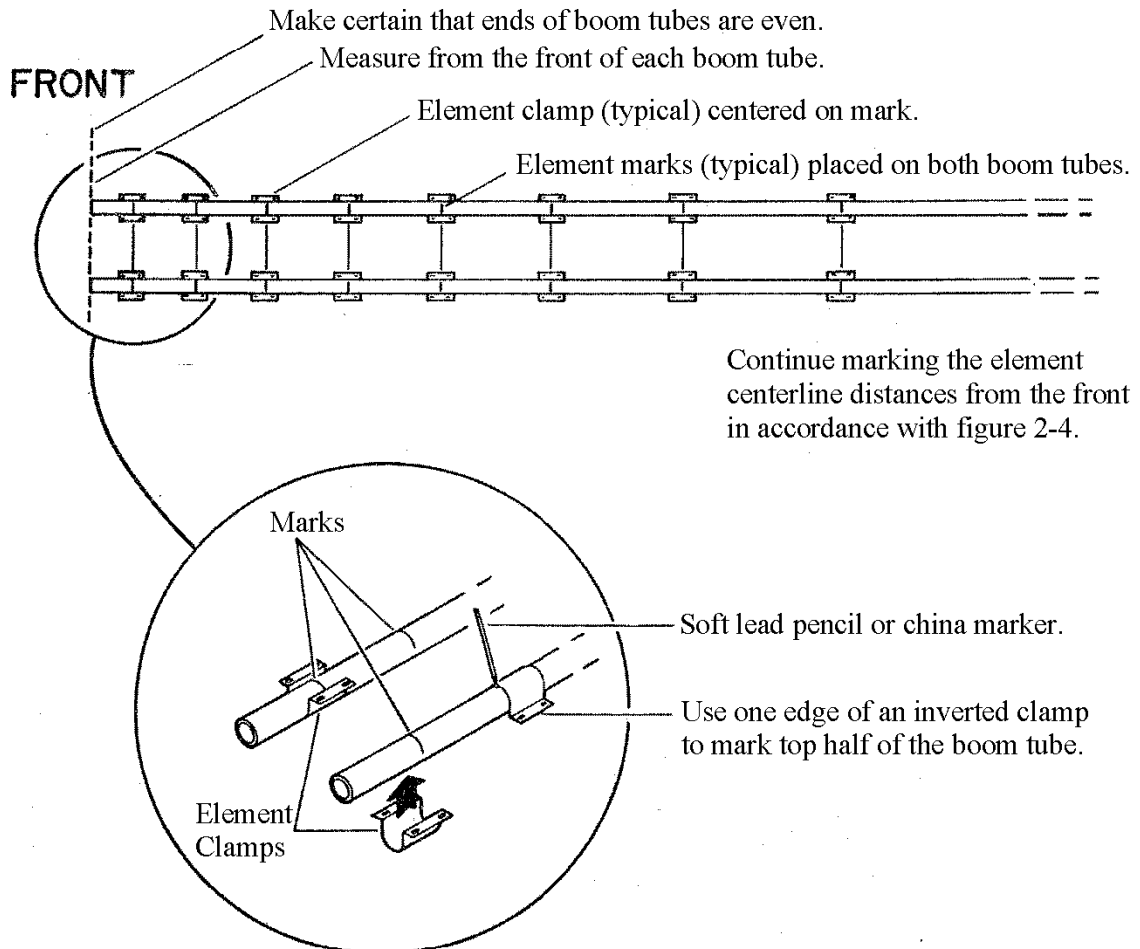


Figure 2-6
Element Clamp Placement on Boom

E. Balun Support Plate

Attach the balun support plate (Item 32) and balun (Item 31) to the front end of the boom. Refer to Figure 2-7.

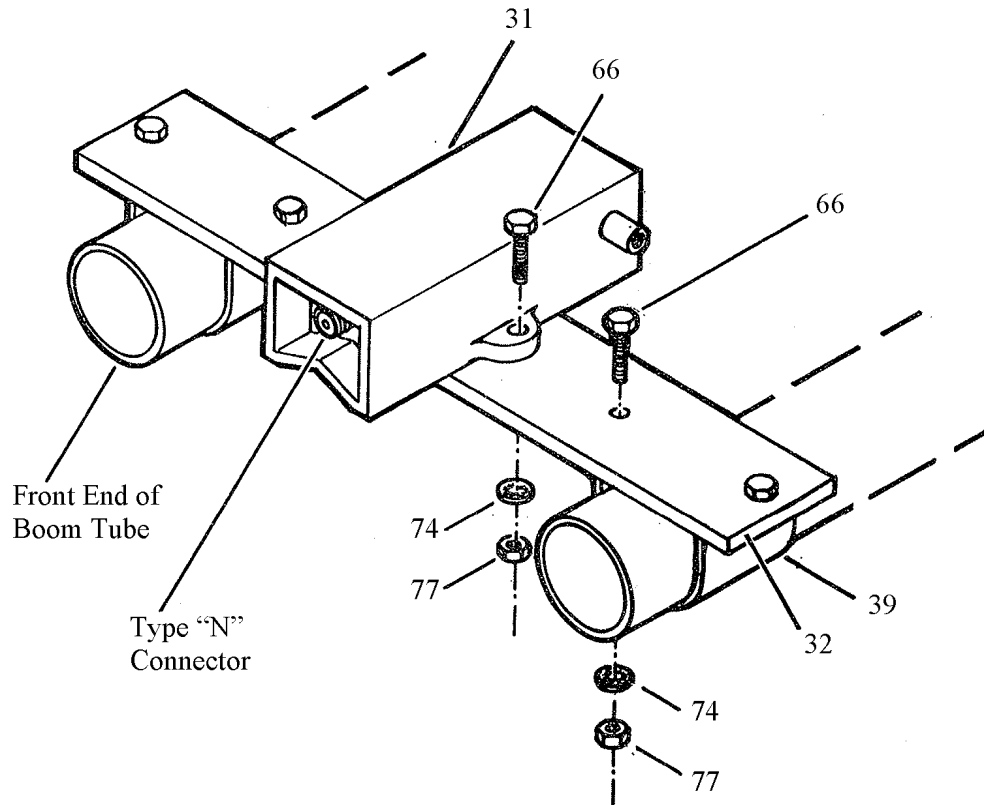
Chapter 2 - Installation

2.5 Installation Procedures

E. Balun Support Plate (Continued)

Assemble the balun support plate (Item 32) to the antenna boom using two narrow 2" boom clamps (Item 39), 1/4" x 1-1/4" bolts and associated lockwashers and nuts (Items 66, 74, & 77).

CAUTION
Do not tighten these bolts too tightly!



Item No.	Part No.	Description
31	879959	Balun
32	470074	Balun Support Plate
39	170663	Clamp Element 2" to 2" narrow
66	506518	Bolt 1/4"-20 x 1-1/4", hex head
74	562961	Lockwasher 1/4", internal
77	554099	Nut 1/4"-20, hex

Figure 2-7
Balun Support Plate & Balun Assembly to Boom

Chapter 2 - Installation

2.5 Installation Procedures (Continued)

F. Balun Assembly

Attach the balun (Item 31) to the balun support plate (Item 32) with the 1/4" x 1-1/4" hardware, with the Type N connector protruding toward the front end of the boom.

G. Boom Shorting Strap

Remove the boom shorting strap (Item 105) from the parts pack, measure from the front of the boom 16' 9-1/2" and attach it to the boom as shown in Figures 2-2 and 2-4 using two narrow 2" boom clamps (Item 39), 1/4" x 3/4" bolts, internal lockwashers, and nuts.

H. Center Insulator Assembly

Remove all the center insulators (Items 1 through 15) and all element-to-boom clamps (Items 35 through 38) from their crate.

Refer to Figure 2-4, "Element Clamp Measurements on Boom," and the Parts List of this manual for proper part number designation of these assemblies. Place the center insulator assemblies on the boom tubes at the locations shown in Figure 2-4. Loosely assemble the center insulators at the locations marked on Figure 2-4. Always measure from the front of the boom to the center of each insulator.

Figure 2-8 and Table 2-1 show the size of element clamps used to fasten each element to the boom.

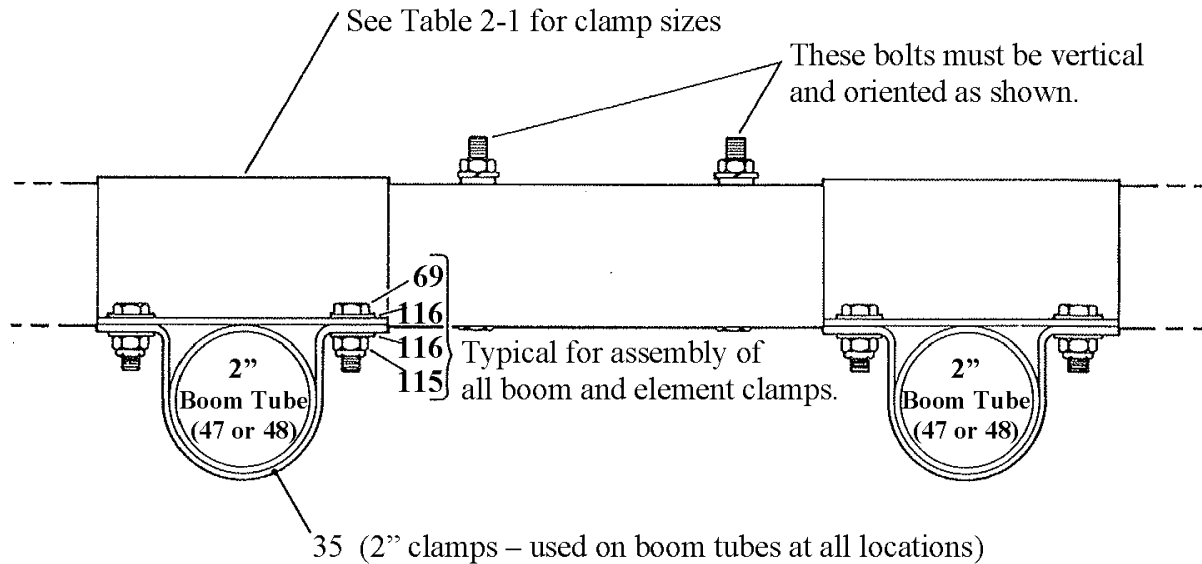
NOTE

Make sure that the bolts in all of the center insulators, which connect the Feedwire assemblies to the feedline, are vertical as shown in Figure 2-8.

Chapter 2 - Installation

2.5 Installation Procedures

H. Center Insulator Assembly (Continued)



Item No.	Part No.	Description
35	170643	Clamp, element 2" x 2"
69	505266	Bolt, 1/4"-20 x 3/4", hex head
115	550065	Locknut, 1/4"-20, hex
116	566344	Flatwasher, 1/4"

Figure 2-8
Center Insulator
Clamp Assembly

Table 2-1 - Center Insulator Clamp Assembly			
Item No.	Elements	Clamp Size	Hardware Used
36	Not Used	Not Used	Not Used
37	Not Used	Not Used	Not Used
38	Not Used	Not Used	Not Used
35	1-17	2" I.D. Clamp	1/4" x 3/4" Bolts
35	Boom	2" I.D. Clamp	1/4" x 3/4" Bolts (at all locations)

ELEMENTS 1 - 3

Center insulators 1 thru 3 will require the 2" I.D. element-to-boom (Item 35). Loosely assemble the element-to-boom clamps on the first 3 elements using 1/4" x 3/4" bolts, flatwasher, and locknut (Items 69, 115, & 116). Accurately center these with the boom. Check the measurement from the front of the boom to the center of each center insulator to make sure the location is accurate. Tighten the element-to-boom clamps securely.

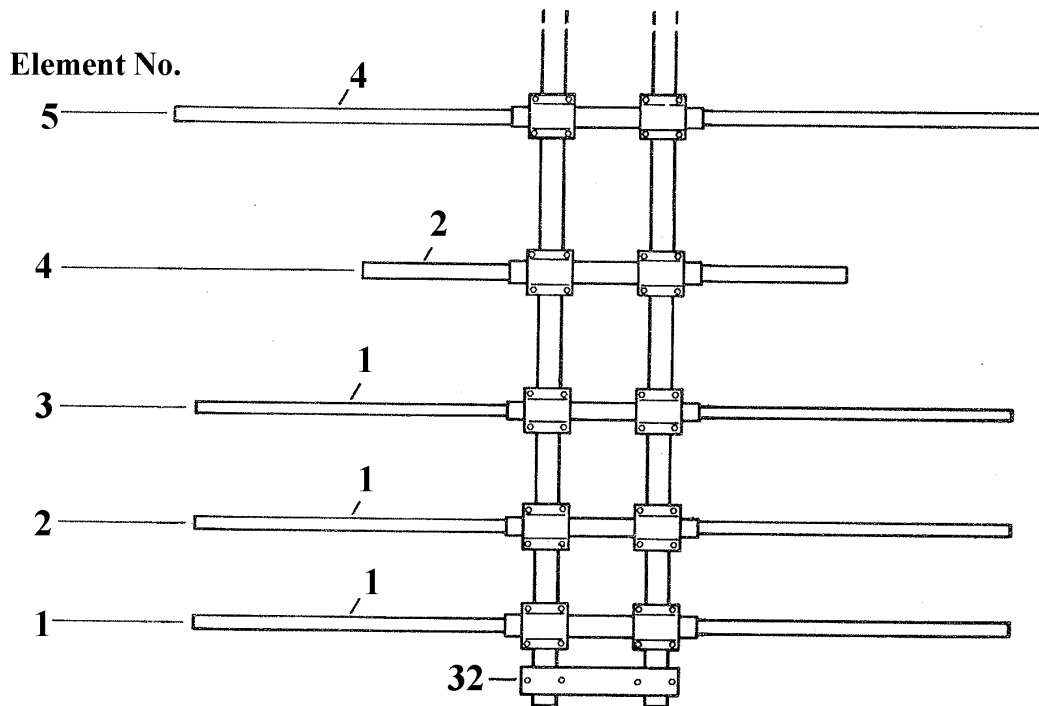
Chapter 2 - Installation

2.5 Installation Procedures

H. Center Insulator Assembly (Continued)

ELEMENTS 4 AND 5

These center insulators will require the 2" I.D. element-to-boom clamps (Item 35). Lay these center insulators (Items 2 and 4) at their respective locations on the boom, centered with the boom as called out in Figures 2-4 and 2-9. Secure the 2" I.D. clamps with the 1/4" x 3/4" bolts, flatwashers, and locknuts (Items 69, 115, and 116). Recheck the measurements from the front of the boom to the center of each center insulator as required in Figure 2-4. Tighten the hardware securely.



Item No.	Part No.	Description
1	870170	Center Insulator Assembly for Elements 1,2,3
2	870171	Center Insulator Assembly for Element 4
4	870173	Center Insulator Assembly for Element 5
32	470074	Blaun Support Plate

Figure 2-9
Elements 1 - 5, Center Insulator Attachment

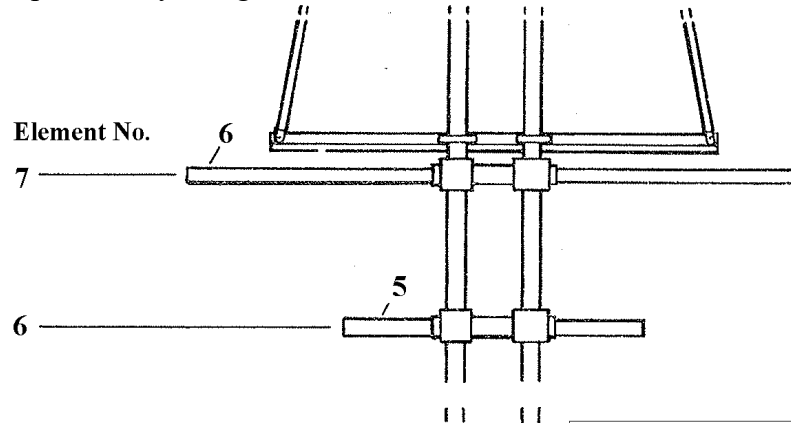
Chapter 2 - Installation

2.5 Installation Procedures

H. Center Insulator Assembly (Continued)

ELEMENTS 6 AND 7

Attach the center insulator assemblies (Items 5 and 6) at their locations as shown in Figure 2-4, using the 2" I.D. clamps (Item 35). Recheck the measurements from the front of the boom to the center of each center insulator as required in Figure 2-4. Tighten the 2" I.D. element-to-boom clamps securely using the 1/4" hardware.

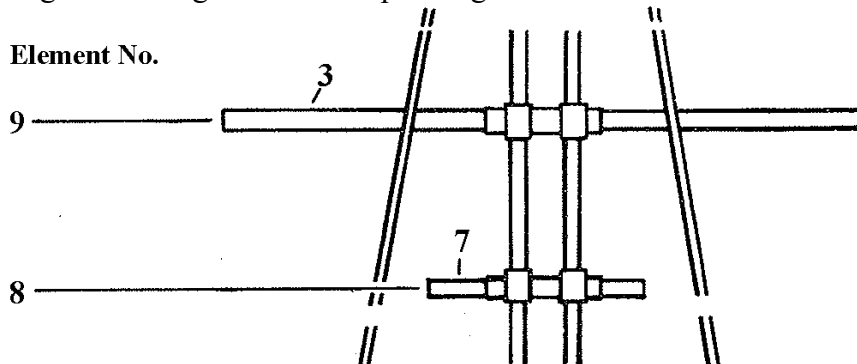


Item No.	Part No.	Description
5	870174	Center Insulator Assembly for Element 6
6	870175	Center Insulator Assembly for Element 7

Figure 2-10
Elements 6 and 7,
Center Insulator Attachment

ELEMENTS 8 AND 9

Refer to Figure 2-11. Center and attach the center insulator assemblies (Items 7 and 3) to their proper locations as shown in Figure 2-4, using the 2" I.D. element-to-boom clamps. Recheck the measurements from the front of the boom to the center of each center insulator as required in Figure 2-4. Tighten the clamps using the 1/4" hardware.



Part No.	Description
870172	Center Insulator Assembly for Element 9
870176	Center Insulator Assembly for Element 8

Figure 2-11
Elements 8 and 9,
Center Insulator Attachment

Chapter 2 - Installation

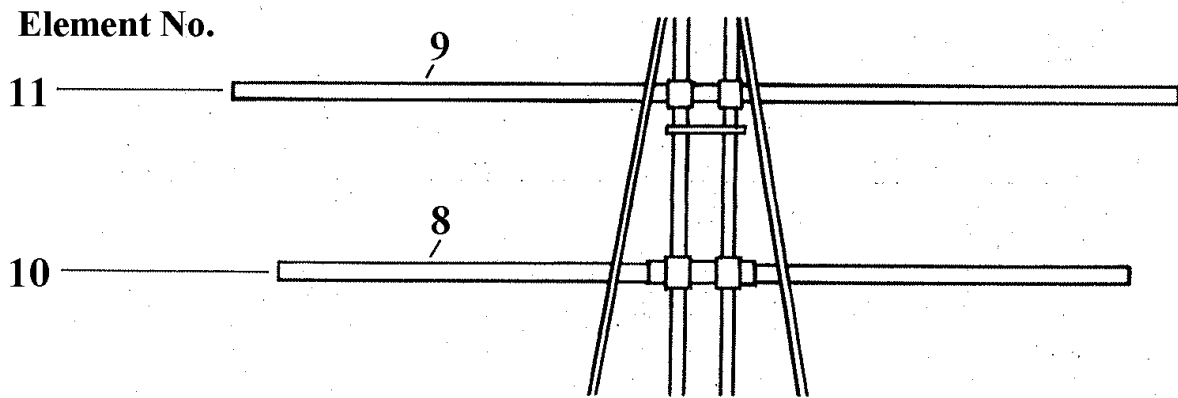
2.5 Installation Procedures

H. Center Insulator Assembly (Continued)

ELEMENTS 10 AND 11

Refer to Figure 2-12. Center and attach the center insulator assemblies (Items 8 and 9) at their proper locations as shown in Figure 2-4, using the 2" I.D. element-to-boom clamp.

Recheck the measurements from the front of the boom to the center of each insulator as required in Figure 2-4. Tighten the clamps using the 1/4" x 3/4" bolts and associated hardware.



Item No.	Part No.	Description
8	870179	Center Insulator Assembly for Element 10
9	878774	Center Insulator Assembly for Element 11

Figure 2-12
Elements 10 and 11, Center Insulator Attachment

Chapter 2 - Installation

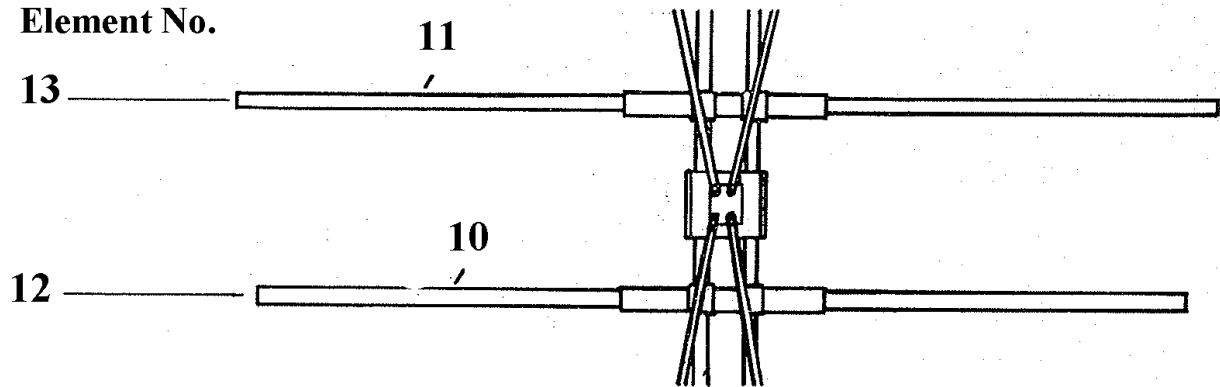
2.5 Installation Procedures

H. Center Insulator Assembly (Continued)

ELEMENTS 12 AND 13

Refer to Figure 2-13. Center and attach the center insulator assemblies (Items 10 and 11) at their proper locations, as shown in Figure 2-4, using the 2" I.D. element-to-boom clamps.

Recheck the measurements from the front of the boom to the center of each center insulator, as required in Figure 2-4. Tighten the clamps using the 1/4" x 3/4" bolts and associated hardware.



Item No.	Part No.	Description
10	878773	Center Insulator Assembly for Element 12
11	878770	Center Insulator Assembly for Element 13

Figure 2-13
Elements 12 and 13, Center Insulator Attachment

Chapter 2 - Installation

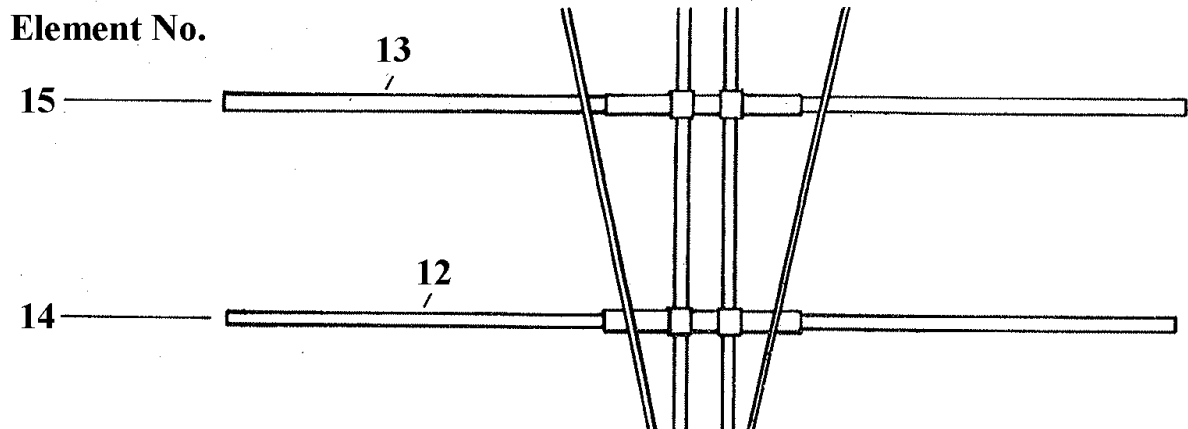
2.5 Installation Procedures

H. Center Insulator Assembly (Continued)

ELEMENTS 14 AND 15

Refer to Figure 2-14. Center and attach the center insulator assemblies (Items 12 and 13) at their proper locations as shown in Figure 2-4, using the 2" I.D. element-to-boom clamp.

Recheck the measurements from the front of the boom to the center of each center insulator as required in Figure 2-4. Tighten the clamp using the 1/4" x 3/4" bolts and associated hardware.



Item No.	Part No.	Description
12	878771	Center Insulator Assembly for Element 14
13	878772	Center Insulator Assembly for Element 15

Figure 2-14
Elements 14 and 15, Center Insulator Attachment

Chapter 2 - Installation

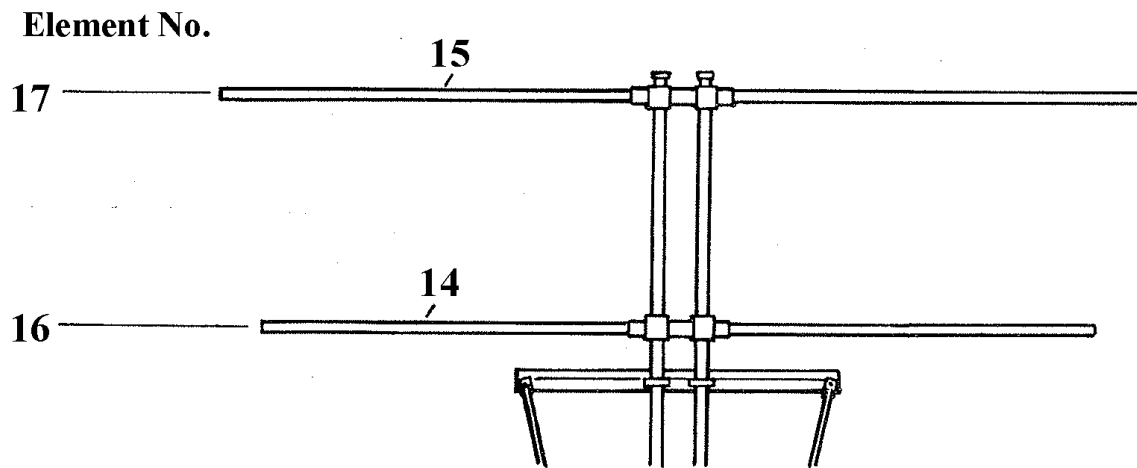
2.5 Installation Procedures

H. Center Insulator Assembly (Continued)

ELEMENTS 16 AND 17

Refer to Figure 2-15. Center and attach the center insulator assemblies (Items 14 and 15) at their proper locations as shown in Figure 2-4, using the 2" I.D. element-to-boom clamp.

Recheck the measurements from the front of the boom to the center of each center insulator as required in Figure 2-4. Tighten the clamps using the 1/4" hardware.



Item No.	Part No.	Description
14	870186	Center Insulator Assembly for Element 16
15	878768	Center Insulator Assembly for Element 17

Figure 2-15
Elements 16 and 17, Center Insulator Attachment

I. Feedline Assembly

NOTE

Read this entire section and study all illustrations thoroughly prior to assembling the feedline, the feedline spacers, and the feedline clips.

Select the 7/16" feedline sections- rear, front, middle, and curved (Items 40, 41, 42, & 43). Remove parts packs 5 and 6 from the master parts package. These contain feedline spacer feeder clips, feed wire, etc., for assembling the feedline.

Chapter 2 - Installation

2.5 Installation Procedures

I. Feedline Assembly (Continued)

Place the two 183-1/4" long feedline sections (Item 41) side-by-side with the 2 holes in each tube at one end toward the mast as shown in Figure 2-17. Referring to Figure 2-17, attach feedline spacers B and C as shown. Figure 2-16 shows the actual size of the feedline spacers. Compare the parts with the drawings to assure the correct size during assembly.

NOTE

When assembling the feedline spacers on the feedline make sure the small slots in the end of the feedline spacers are all on the same side. The B-size feedline spacers should be on the end of the feedline without holes (Front).

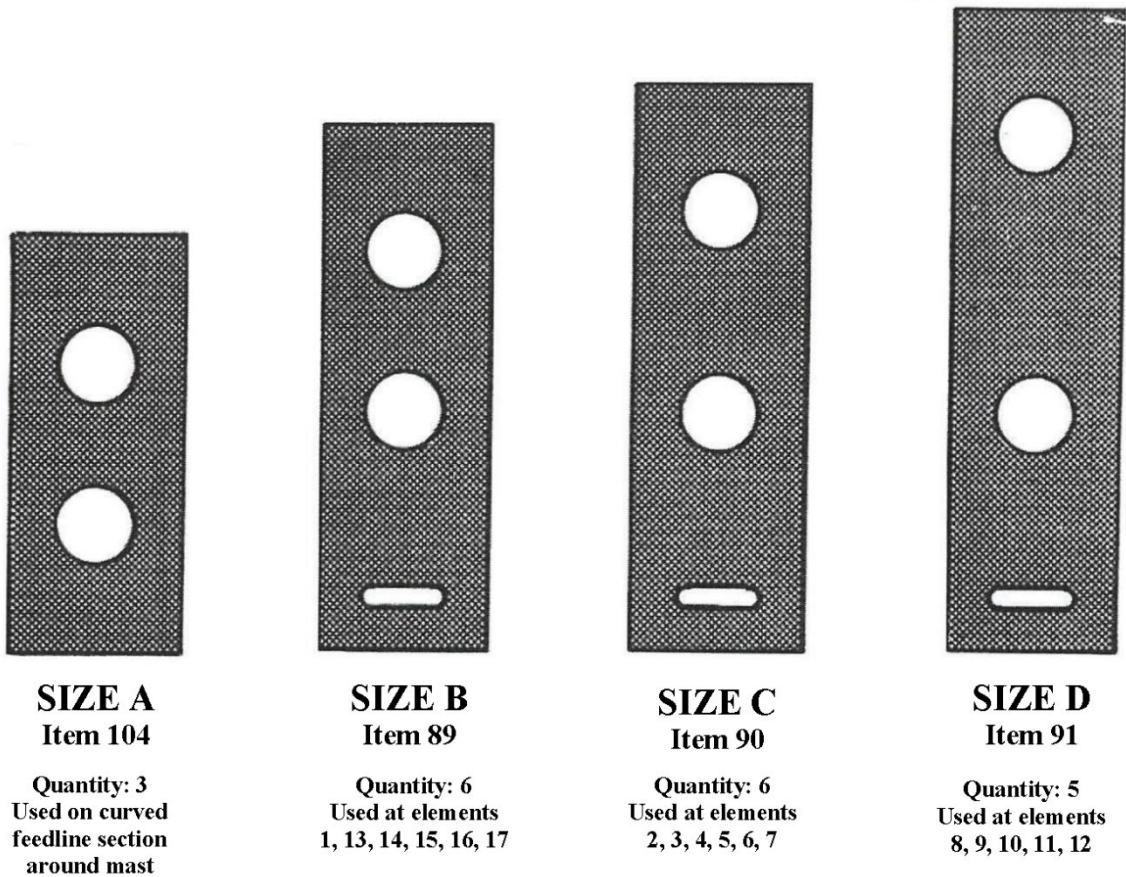


Figure 2-16
Feedline Spacers

Chapter 2 - Installation

2.5 Installation Procedures

I. Feedline Assembly (Continued)

As you assemble the feedline spacers on the 7/16" feedline, the feeder clips (Item 88), shown in Figures 2-18 and 2-19, should be assembled also. Assemble one feedline spacer, then a feeder clip on each tube, a feedline spacer, a clip, etc., until you have one B-size, six C-size, and three D-size feedliner spacers with a clip on each feedline between each feedline spacer.

Refer to Figure 2-17. Remove two feedline splices (Item 87) from parts pack 6. Align the holes with the holes on the end of the feedline and fasten securely using #6 x 5/8" bolts, lockwashers, and nuts (Items 72, 79, & 76).

1. Attach the 57" straight section of tubing (Item 42) to the splice. Align the holes and fasten securely using #6 x 5/8" bolts, lockwashers, and nuts (Items 72, 79, & 76).
2. Install two D-size feedline spacers (Item 91) and two pairs of feeder clips (Item 88) alternately on the feedline as preciously done.
3. Attach another splice to each tube. Fasten securely.
4. Slip three A-size feedline spacers (without clips) (Item 104) over the two curved pieces of feedline (Item 43) and space evenly.
5. Align the holes with the splice and fasten securely to the previously assembled feedline.
6. Attach the remaining pair of splices to the curved section of the feedline. Secure using #6 hardware (Items 72, 79, & 76).
7. Attach the last two sections of tubing (Item 40) to the curved section with the #6 bolts, lockwashers, and nuts (Items 72, 79, & 76).
8. Assemble the B-size feedline spacers and the feeder clips alternately as done previously.
9. Lay the feedline on top of the element center insulators which are now attached to the boom. Make certain the curved section fits around the mast and the front end of the feedline is 5-1/4" from the front of the boom and the slots in the feedline spacers are down, as shown in Figure 2-17.

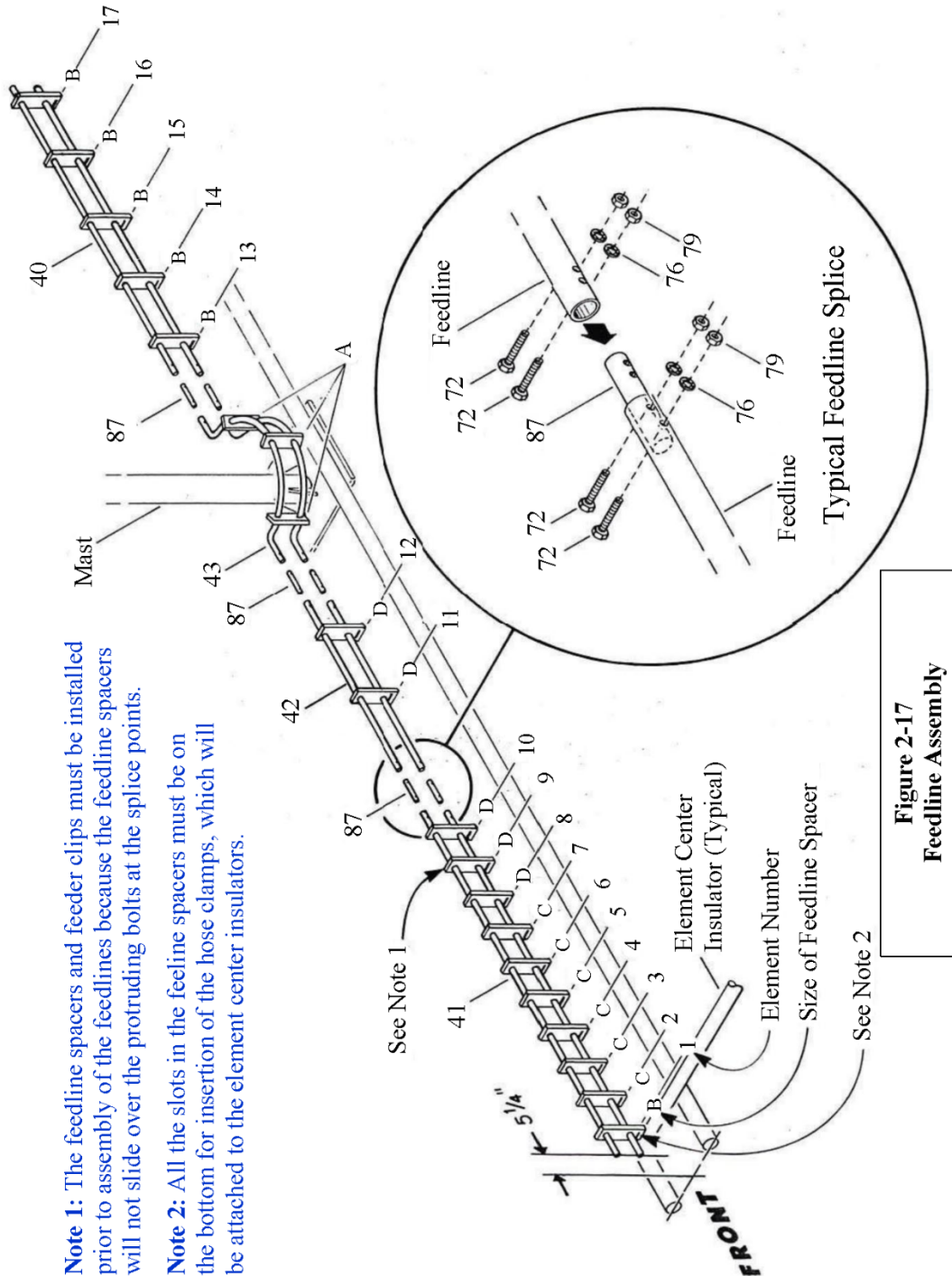
Parts List for Figure 2-17 on the next page

Item No.	Part No.	Description
40	170724	Feedline, Rear 177-1/2" long
41	170305	Feedline, 7/16" x 183-1/4" long
42	170294	Feedline, Middle 7/16" x .035 x 57"
43	170723	Feedline, Curved
72	506576	Screw #6-32 x 5/8", bind head
76	565889	Lockwasher, #6, internal
79	555888	Nut #6-32, Hex
87	170721	Splice, feedline

Chapter 2 - Installation

2.5 Installation Procedures

I. Feedline Assembly (Continued)



Chapter 2 - Installation

2.5 Installation Procedures

I. Feedline Assembly (Continued)

Space the feedline spacers to sit over each element's center insulator.

After the feedline spacers have been centered over each element, prepare to attach these securely by using the hose clamps supplied in parts pack 6. Table 2-2 lists the elements and the size of hose clamp used for each.

Table 2-2				
Hardware for attaching Feedline to Element Center Insulators				
Element No.	Feedline Spacer Size	Hose Clamp Item No.	Feedwire Assembly Item No.	Hardware (Nuts & Lockwashers)
1	B	92 large	84, 3" white	Items 78 & 75
2	C	92 large	84, 3" white	Items 78 & 75
3	C	92 large	84, 3" white	Items 78 & 75
4	C	92 large	83, 3" black	Items 74 & 77
5	C	92 large	83, 3" black	Items 74 & 77
6	C	92 large	83, 3" black	Items 74 & 77
7	C	92 large	83, 3" black	Items 74 & 77
8	D	92 large	85, 4" red	Items 74 & 77
9	D	92 large	85, 4" red	Items 74 & 77
10	D	92 large	85, 4" red	Items 74 & 77
11	D	92 large	85, 4" red	Items 74 & 77
12	D	92 large	86, 10-1/2" red	Items 74 & 77
13	B	92 large	86, 10-1/2" red	Items 74 & 77
14	B	92 large	86, 10-1/2" red	Items 74 & 77
15	B	92 large	86, 10-1/2" red	Items 74 & 77
16	B	92 large	85, 4" red	Items 74 & 77
17	B	92 large	85, 4" red	Items 74 & 77
Balun	---	---	85, 4" red	---

Chapter 2 - Installation

2.5 Installation Procedures (Continued)

J. Feedwire Assembly

Alternately attach the feedwire from the feedline to the element at this time.

Attach feedwire to feedline clamps with #10 x 3/4" bolt and hardware (Items 68, 78, 75).

Refer to Table 2-2 for the proper feeder wires and Figures 2-18 and 2-19 for the method of attachment.

CAUTION

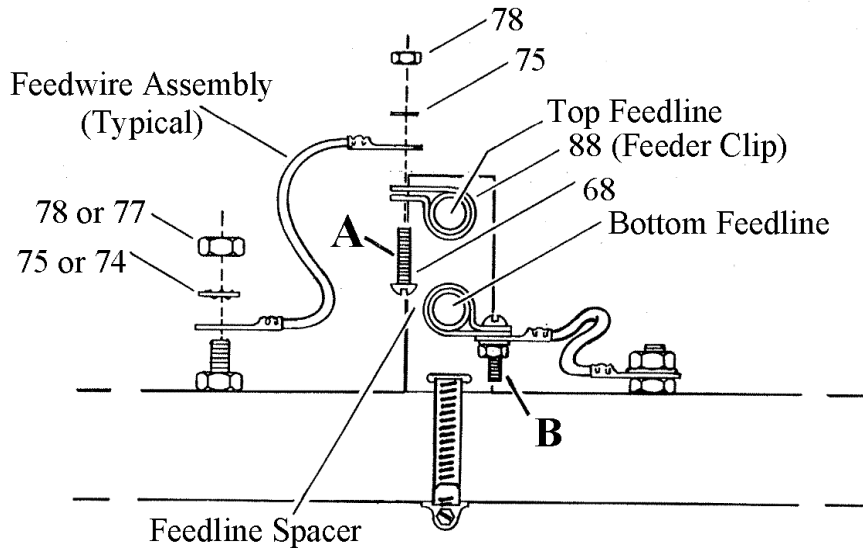
**The feedline wires must be attached to the elements in an alternating manner.
See Figure 2-19.**

Attach the feedwire (Item 85) from the feedline to the balun using the 1/4" x 3/8" bolts and 1/4" internal lockwashers (Items 114 and 74).

Chapter 2 - Installation

2.5 Installation Procedures

J. Feedwire Assembly (Continued)



A When attaching the feedline assembly to the feeder clip (88), the bolt (68) is inserted from the bottom “up” for the top feedline, and from the top “down” for the bottom feedline. **B**

Item No.	Part No.	Description
68	505751	Bolt, #10-24 x 3/4", round head
74	562961	Lockwasher 1/4" internal
75	565697	Lockwasher #10, internal
77	554099	Nut 1/4" 20, hex
78	554071	Nut #10-24, hex
88	170706	Clip, feeder

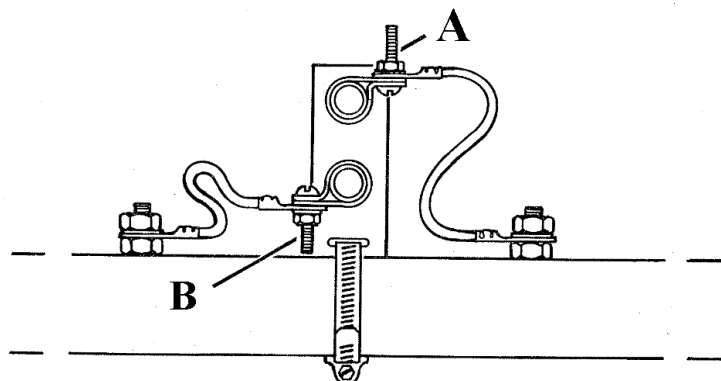


Figure 2-18
Feeder Clip and Feedwire Assembly

Chapter 2 - Installation

2.5 Installation Procedures J. Feedwire Assembly (Continued)

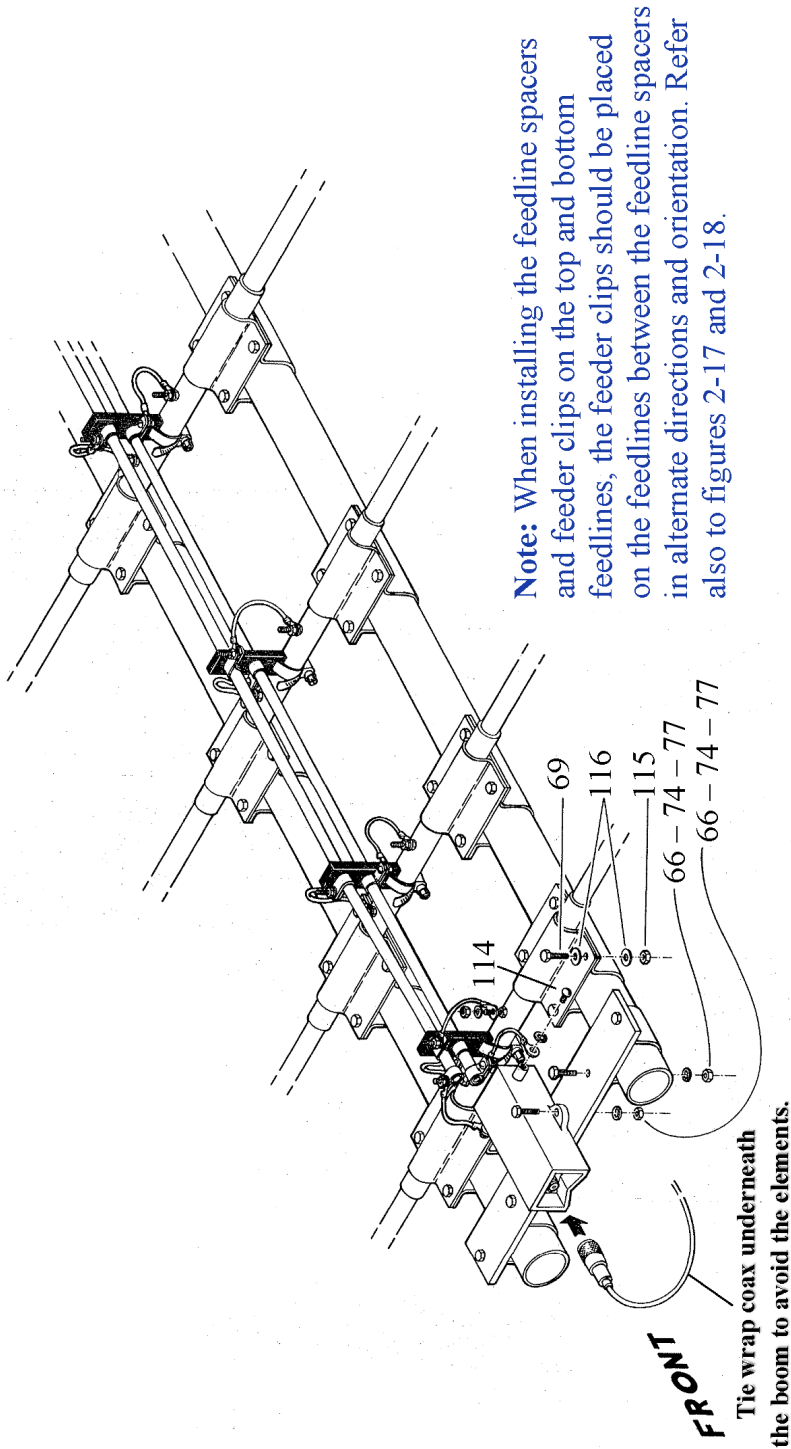


Figure 2-19
Feeder Clip and Feedwire Assembly

Item No.	Part No.	Description
66	506518	Bolt 1/4"-20 x 1-1/4", hex head
74	562961	Lockwasher 1/4", internal
75	565697	Lockwasher #10, internal
77	554099	Nut 1/4"-20, hex
114	501428	Bolt 1/4"-20 x 3/8", round head
115	550065	Locknut 1/4"-20, hex
116	566344	Flatwasher 1/4"

Chapter 2 - Installation

2.5 Installation Procedures

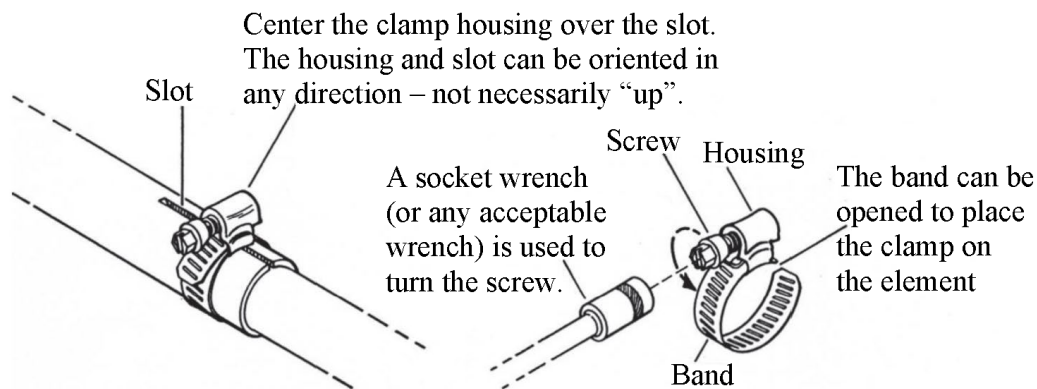
K. Element Assembly

Before beginning element assembly, make sure all element sections are clean and free of any foreign substances. To aid in assembly, apply a coating of Electroseal ® or Penetrox A ® to the end of the element tubing being inserted into another tube.

Electroseal ® is a registered trademark of Glasflex Corp.

Penetrox A® is a registered trademark of Burndy Corp.

Secure each element tubing section with the proper size compression clamp. See Figure 2-20 and 2-21 for usage.



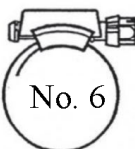
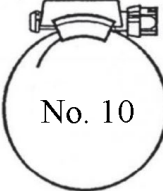
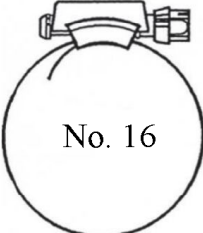
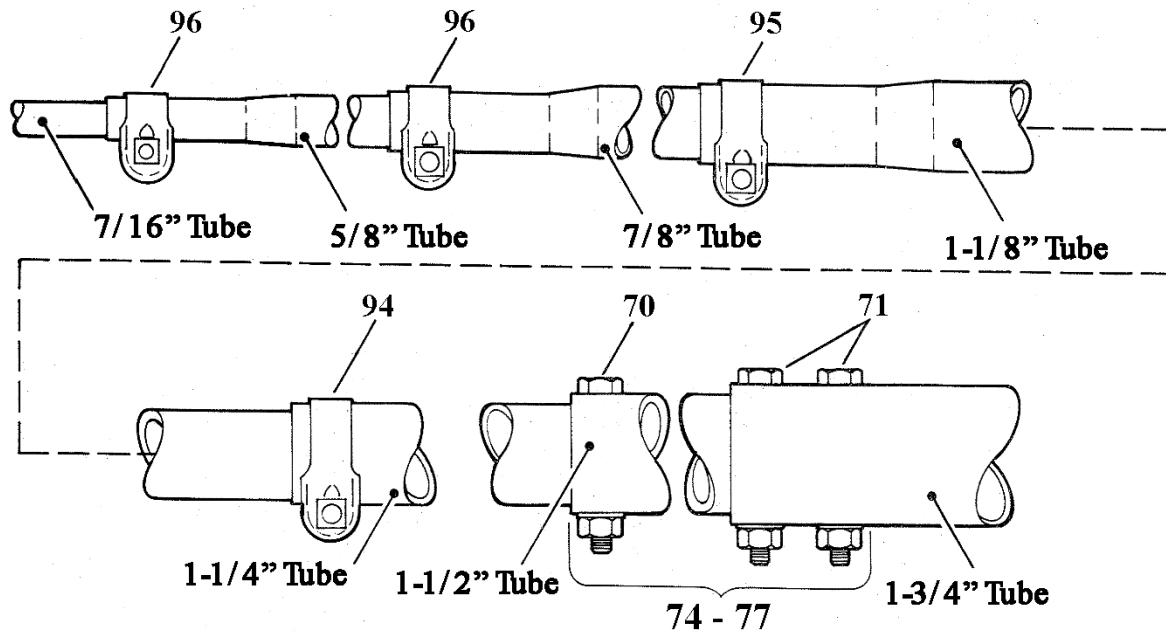
	<u>Part No.</u> 358756	<u>Description</u> Clamp, Size #6 all stainless steel 5/16" hex head screw	<u>Fits Tubing Sizes</u> 1/2" and 3/4"
	<u>Part No.</u> 358757	<u>Description</u> Clamp, Size #10 all stainless steel 5/16" hex head screw	<u>Fits Tubing Sizes</u> 1"
	<u>Part No.</u> 358758	<u>Description</u> Clamp, Size #16 all stainless steel 5/16" hex head screw	<u>Fits Tubing Sizes</u> 1-1/4"

Figure 2-20
Compression Clamp Identification

Chapter 2 - Installation

2.5 Installation Procedures

K. Element Assembly (Continued)



Item No.	Part No.	Description
70	505737	Bolt 1/4"-20 x 2", hex head
71	505736	Bolt 1/4"-20 x 2-1/4", hex head
74	562961	Lockwasher 1/4", internal
77	554099	Nut 1/4"-20, hex
94	358758	Clamp, compression, Size #16
95	358757	Clamp, compression, Size #10
96	358756	Clamp, compression, Size #6

Figure 2-21
Typical Element Assembly

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2.5 Installation Procedures

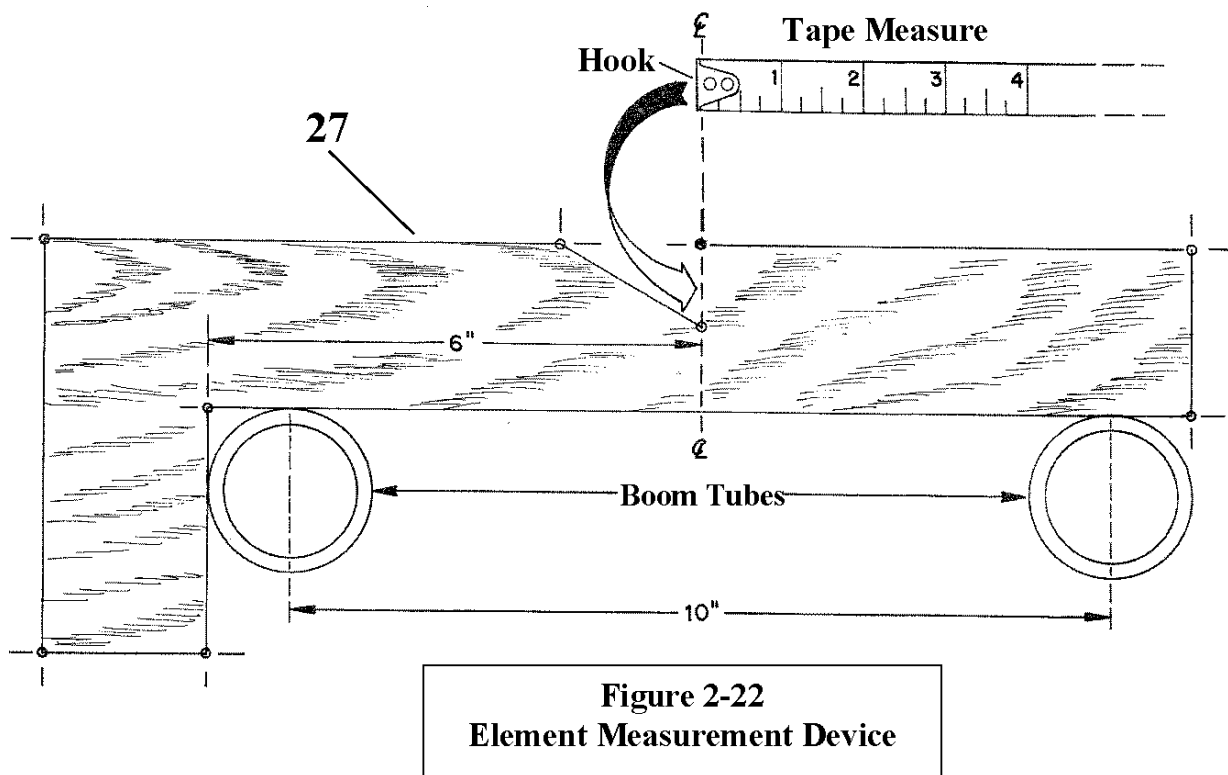
K. Element Assembly (Continued)

NOTE

The following instructions and Figure 2-22 on this page are provided for your information only and is a template to make Part No. 27, which is now provided for you.

It is vital to understand the importance of good measurements during this next assembly procedure. This antenna will operate more efficiently and provide the user excellent results if the measurements taken during the elements assembly process are accurate.

To help with this measurement taking, the manufacturer has provided a tool seen in Figure 2-22. This will fit over the 2" boom tubes and can be used to measure the overall length of each element. The overall length of each element should be adjusted to $\pm 1/8"$ ($\pm 3\text{mm}$).



Chapter 2 - Installation

2.5 Installation Procedures

K. Element Assembly (Continued)

Elements 1 through 5 Assembly

Remove the 7/16" x 25" elements (Item 16) from the crate and assemble on the center insulator assembly for element one. Refer to Figure 2-23.

Using the measuring device (Item 27) and a tape measure, expose the 7/16" x 25" element to 23", as shown in Figure 2-23, for an overall dimension of 5'. Repeat this process for the other half of element one. Secure using the #6 compression clamps (Item 96).

Remove the 7/16" x 34" elements (Item 17) from the crate and assemble on the center insulator assembly for element two. Expose the 7/16" tube 32". Check the overall dimension of the element to make sure it measures 5' 9". Secure using the #6 compression clamps (Item 96). Repeat the process for the other half.

Remove the 7/16" x 46" elements (Item 18) from the crate and assemble on the center insulator assembly for element three. Expose the 7/16" tube 44". Check the overall dimension of the element to make sure it measures exactly 6' 9". Secure using the #6 compression clamps (Item 96). Repeat the process for the other half.

Remove the 5/8" x 17" element sections (Item 20) from the crate. Lay one section at the ends of the center insulators 4 thru 9. Assemble the 5/8" x 17" section on the ends of the elements 4 and 5. Expose the 5/8" tube 14". Secure using the #6 compression clamp (Item 96). Repeat the process for the opposite ends of element center insulators 4 and 5.

Remove the 7/16" x 61" elements sections (Item 19) and insert into the 5/8" tubes on elements 4 and 5. Expose the 7/16" tube 59". Secure using the #6 compression clamps (Item 96). Check overall dimension to make sure it measures 7' 11" and 9' 4" respectively.

Chapter 2 - Installation

2.5 Installation Procedures

K. Element Assembly (Continued)

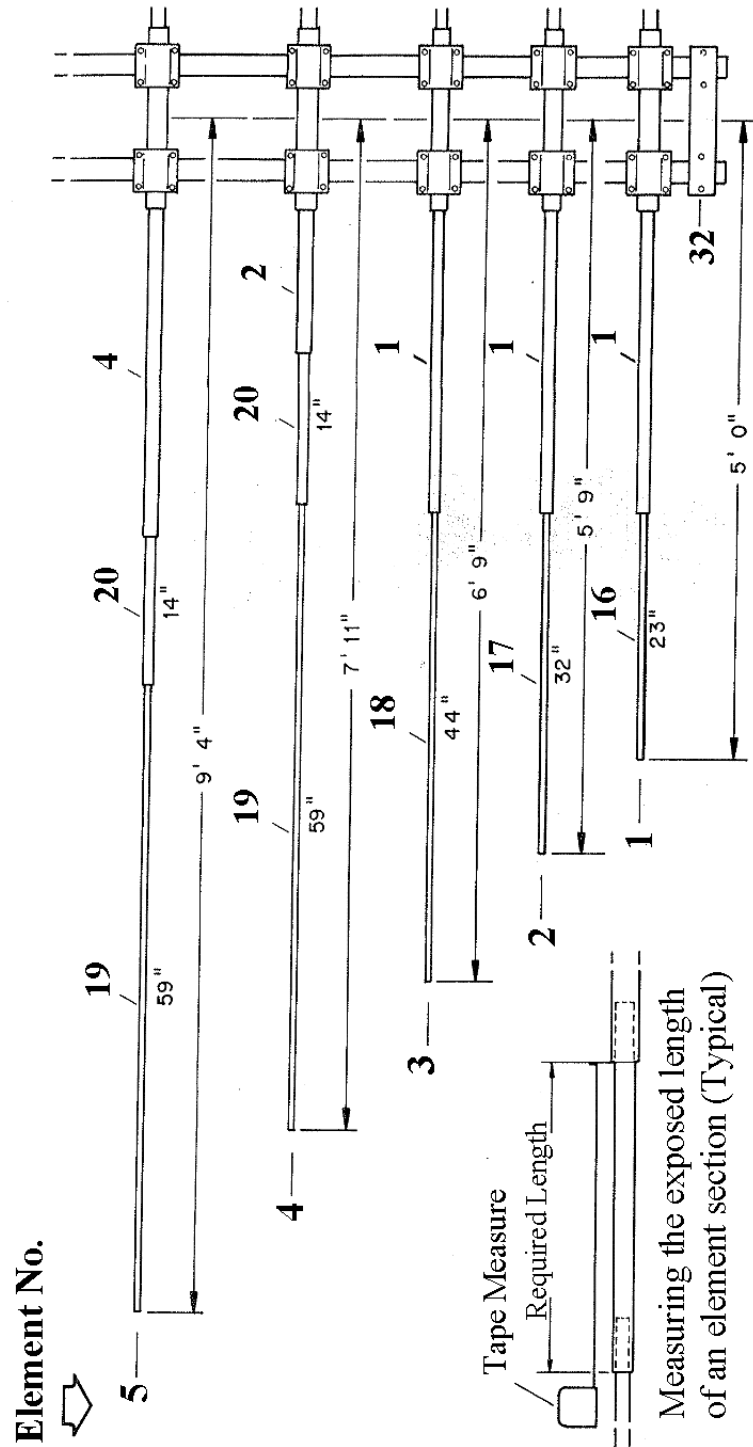


Figure 2-23
Element Assembly for Elements 1 – 5

Item No.	Part No.	Description
1	870170	Center Insulator, Element 1,2,3
2	870171	Center Insulator Assembly for Element 4
4	870173	Center Insulator Assembly for Element 5
16	170698	Element 1, 7/16" X 25"
17	170699	Element 2, 7/16" x 34"
18	170700	Element 3, 7/16" x 46"
19	170701	Elements 4-15, 7/16" x 61"
20	170638	Elements 4-9, 11-13, 5/8" x 17"
32	470074	Balun Support Plate

Chapter 2 - Installation

2.5 Installation Procedures

K. Element Assembly (Continued)

Assembly of Elements 6 and 7

Refer to Figure 2-24 for aid in assembling these two elements.

Remove the 7/8" x 41" element sections (Item 21) and assemble them on the ends of element center insulator assemblies 6 and 7.

Expose the 7/8" tubes 38" as shown in Figure 2-24. Secure using the #10 compression clamps (Item 95).

Assemble the 5/8" tubes and 7/16" tubes in the end of the 7/8" tubes. Expose to the length shown in Figure 2-24. Secure with the proper compression clamps. Check the overall dimension as shown for each element.

Assembly of Elements 8 and 9

Refer to Figure 2-25 for aid in this element assembly sequence. Remove the 1-1/4" x 18-5/8" tubes (Item 23) from their crate.

Insert the end with the holes into the end of element center insulator assemblies 8 and 9. Align the holes and secure using the 1/4" x 2" bolts, 1/4" lockwashers, and nuts (Items 70, 74, & 77).

Remove the 1-1/8" x 42" element sections (Item 22) from their crate. Insert them into the 1-1/4" x 18-5/8" tubes (Item 23), exposing 39". Secure using the #16 compression clamps (Item 94). Continue assembling element sections (Items 21, 20, & 19) as done previously on elements 6 and 7.

NOTE

The 5/8" x 17" section (Item 20) on element 9 should only be exposed 13-3/4".

Chapter 2 - Installation

2.5 Installation Procedures

K. Element Assembly (Continued)

Element No.

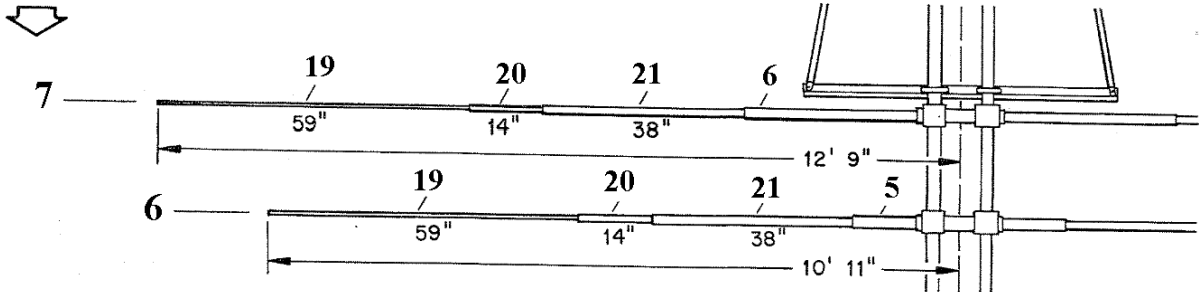


Figure 2-24
Element Assembly for Elements 6 and 7

Item No.	Part No.	Description
5	870174	Center Insulator Assembly for Element 6
6	870175	Center Insulator Assembly for Element 7
19	170701	Element Tubes, 7/16" x 61"
20	170638	Element Tubes, 5/8" x 17"
21	170705	Element Tubes, 7/8" x 41"

Element No.

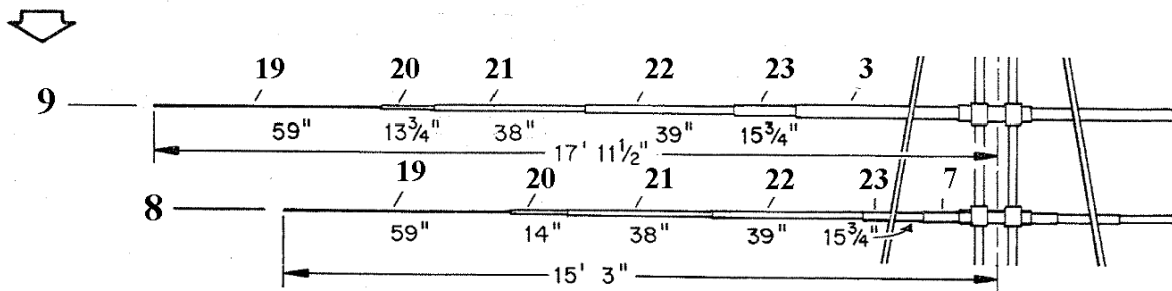


Figure 2-25
Element Assembly for Elements 8 and 9

Item No.	Part No.	Description
3	870172	Center Insulator Assembly for Element 9
7	870176	Center Insulator Assembly for Element 8
19	170701	Element Tubes, 7/16" x 61"
20	170638	Element Tubes, 5/8" x 17"
21	170705	Element Tubes, 7/8" x 41"
22	170704	Element 1-1/8" x 42"
23	170697	Element 1-1/4" x 18-5/8"

Chapter 2 - Installation

2.5 Installation Procedures

K. Element Assembly (Continued)

Assembly of Element 10 and 11

Refer to Figure 2-26 for assembly of elements 10 and 11.

For element 10, the assembly is the same as for elements 8 and 9, except the 5/8" x 17" section (Item 20) is replaced by a 5/8" x 28" tube (Item 106). This section should be exposed 20-3/4", as shown in Figure 2-26. Use all compression clamps as before. Check overall dimension to make sure it measures 20' 6-1/2".

For element 11, remove the 1-1/2" x 30" section (Item 58) and the element splice (Item 52). Bolt the splice to the end of the center insulator assembly (Item 9) using 1/4" x 2-1/4" bolts, lockwashers, and nuts (Items 71, 74, & 77). Insert the drilled end of the 1-1/2" x 30" section into the splice. Align the holes and secure using 1/4" x 2" bolts, lockwashers, and nuts (Items 70, 74, & 77), as shown in Figure 2-21.

The remaining element sections are assembled in the same manner as previously done for element 8. Refer to Figure 2-26 for the correct overall exposed length of element 11.

Assembly of Elements 12 and 13

Refer to Figure 2-27 for aid in this element assembly sequence.

Bolt the element splice (Item 52) and the 1-1/2" x 30" section (Item 58) onto the ends of the center insulator assemblies of elements 12 and 13 as shown in Figure 2-27 and as previously done with element 11. Assemble the remaining element sections, exposing each section to the dimensions shown. Secure each section in place using the correct compression clamps as done previously. Refer to Figure 2-21 as a guide.

Check to see that the overall dimension of each element is as called out in Figure 2-27

Chapter 2 - Installation

2.5 Installation Procedures

K. Element Assembly (Continued)

Element No.

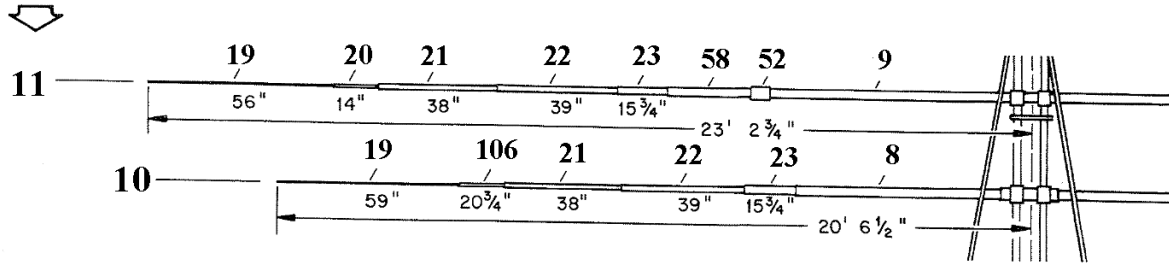


Figure 2-26
Element Assembly for Elements 10 and 11

Item No.	Part No.	Description
8	870179	Center Insulator Assembly for Element 10
9	878774	Center Insulator Assembly for Element 11
19	170701	Element Tube, 7/16" x 61"
20	170638	Element Tube, 5/8" x 17"
21	170705	Element Tube, 7/8" x 41"
22	170704	Element Tube, 1-1/8" x 42"
23	170697	Element Tube, 1-1/4" x 18-5/8"
52	170749	Splice
58	170290	Element Tube, 1-1/2" x 30"
106	170753	Element Tube, 5/8" x 28"

Element No.

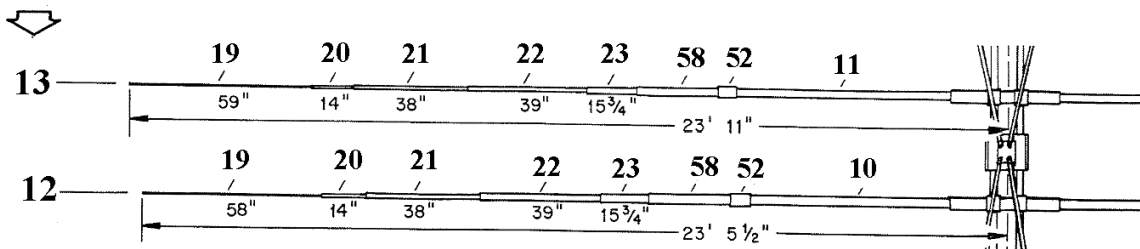


Figure 2-27
Element Assembly for Elements 12 and 13

Item No.	Part No.	Description
10	878773	Center Insulator Assembly for Element 12
11	878770	Center Insulator Assembly for Element 13
19	170701	Element Tube, 7/16" x 61"
20	170638	Element Tube, 5/8" x 17"
21	170705	Element Tube, 7/8" x 41"
22	170704	Element Tube, 1-1/8" x 42"
23	170697	Element Tube, 1-1/4" x 18-5/8"
52	170749	Splice
58	170290	Element Tube, 1-1/2" x 30"

Chapter 2 - Installation

2.5 Installation Procedures

K. Element Assembly (Continued)

Assembly for Element 14 and 15

Refer to Figure 2-28 for aid in assembling element 14 and 15. The assembly sequence is very similar to the pattern used on the previous elements. Take special note that the 5/8" x 28" element section (Item 106) is used with these two elements in place of the 5/8" x 17" section (Item 20).

Check all exposed lengths for accuracy. Also, check the overall dimensions of the elements. Tighten all compression clamps securely.

Assembly of Elements 16 and 17

Refer to Figure 2-29 for assistance with the assembly of elements 16 and 17. Note that loading assembly, element 16 (Item 50) and loading assembly, element 17 (Item 51) are required with these two elements.

The assembly sequence is similar to the ones used with other elements except the 5/8" x 17" section (Item 20) and the 7/16" x 61" section (Item 19) are replaced by 5/8" tubes, elements 16 and 17 (Items 46 and 56) respectively.

Re-check all dimensions by referring to Figures 2-23 thru 2-29 and tighten all hardware and compression clamps securely.

Chapter 2 - Installation

2.5 Installation Procedures

K. Element Assembly (Continued)

Element No.

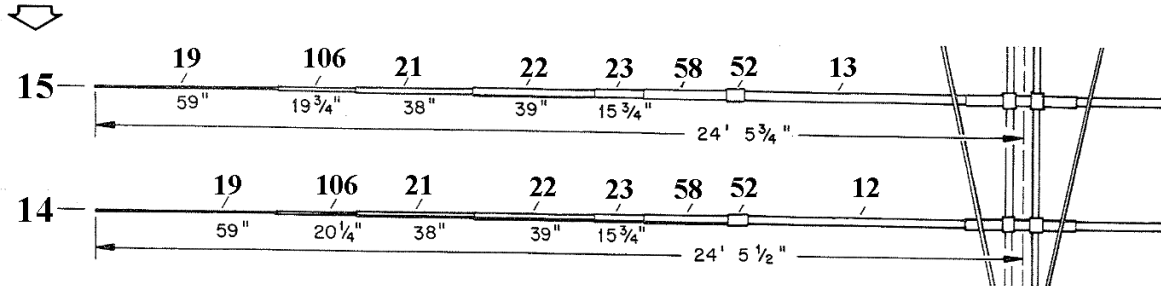


Figure 2-28
Element Assembly for Elements 14 and 15

Item No.	Part No.	Description
12	878771	Center Insulator Assembly for Element 14
13	878772	Center Insulator Assembly for Element 15
19	170701	Element Tube, 7/16" x 61"
21	170705	Element Tube, 7/8" x 41"
22	170704	Element Tube, 1-1/8" x 42"
23	170697	Element Tube, 1-1/4" x 18-5/8"
52	170749	Splice
58	170290	Element Tube, 1-1/2" x 30"
106	170753	Element Tube, 5/8" x 28"

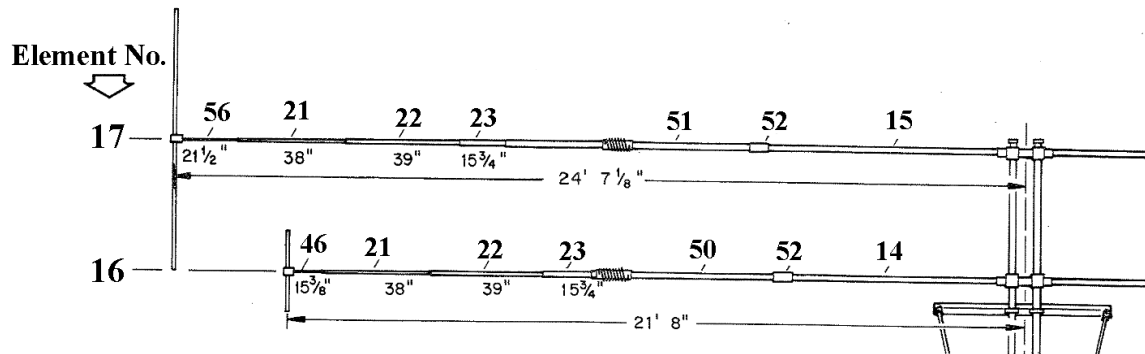


Figure 2-29
Element Assembly for Elements 16 and 17

Item No.	Part No.	Description
14	870186	Center Insulator Assembly for Element 16
15	878768	Center Insulator Assembly for Element 17
21	170705	Element Tube, 7/8" x 41"
22	170704	Element Tube, 1-1/8" x 42"
23	170697	Element Tube, 1-1/4" x 18-5/8"
46	170740	Tube 5/8" for Element 16 T-bar
50	870213	Loading Assembly Element 16
51	878769	Loading Assembly Element 17
52	170749	Splice
56	170717	Tube 5/8" for Element 17 T-bar

Chapter 2 - Installation

2.5 Installation Procedures (Continued)

L. Beta Tube Assembly

Refer to Figure 2-30 for the attachment of the beta match on element 17.

Attach beta match insulator (Item 55) to the end of each boom tube using the two remaining large hose clamps (Item 92) as shown in Figure 2-30. Tighten securely.

Insert one end of the two beta tubes (Item 54) through the insulator (Item 55). Center these two 3/8" tubes with the center of the boom. Splice together securely using matching splice (Item 49) and the #6 hardware called out in Figure 2-30.

Install a beta match clamp (Item 53) on each side of the #17 center insulator and then on the end of each 3/8" beta tube. Fasten securely using 1/4" and #10 hardware called out in Figure 2-30.

NOTE

Make sure the beta tube is directly below the #17 element.

Chapter 2 - Installation

2.5 Installation Procedures

L. Beta Tube Assembly (Continued)

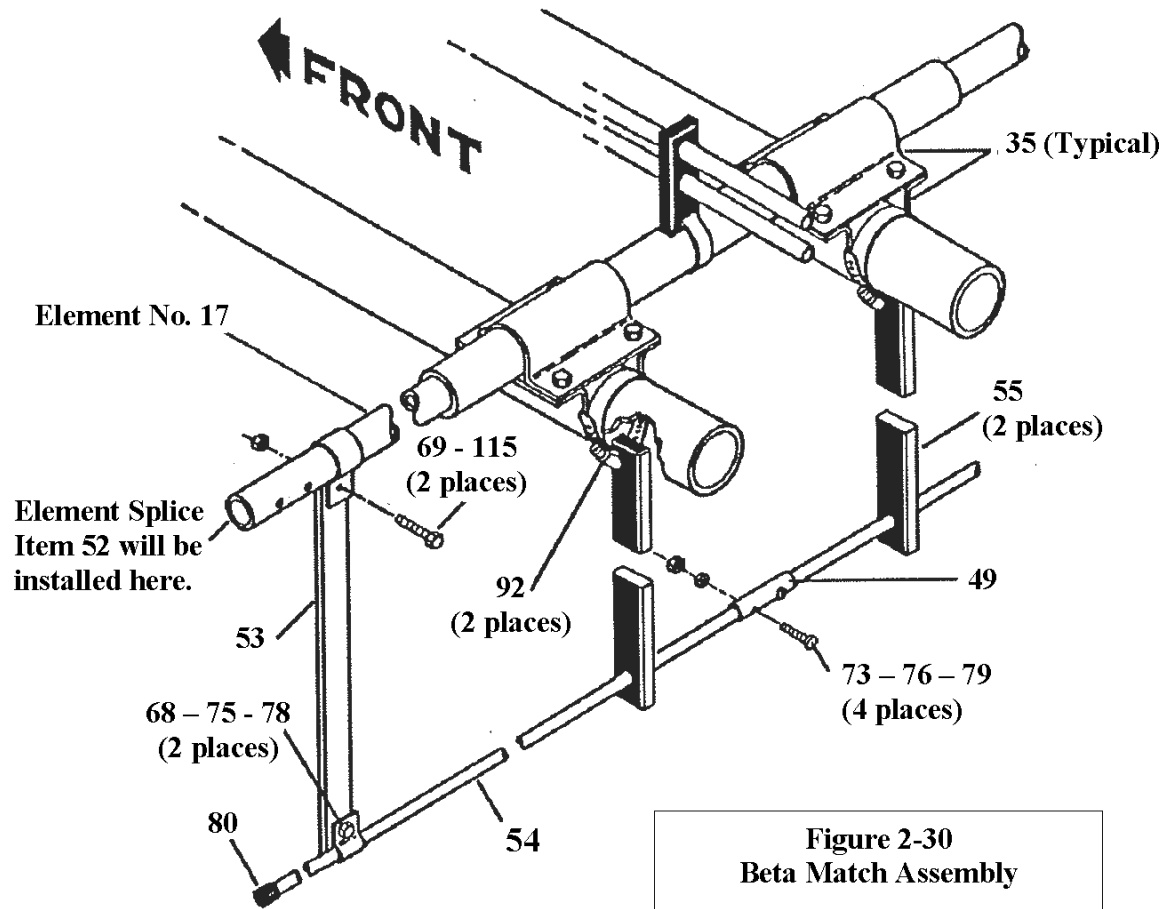


Figure 2-30
Beta Match Assembly

Item No.	Part No.	Description
35	170643	Clamp Element 2" to 2"
49	170292	Splice, Matching
52	170749	Splice
53	170069	Clamp, Beta Match, Element 17
54	170291	Tube, Beta Rod 3/8", Element 17
55	470078	Insulator, Beta Match, Element 17
68	505751	Bolt #10-24 x 3/4", round head
69	505266	Bolt, 1/4"-20 x 3/4", hex head
73	506731	Screw, #6-32 x 3/4", blind head
75	565697	Lockwasher, #10, internal
76	565889	Lockwasher, #6, internal
78	554071	Nut, #10-24, hex
79	555888	Nut, #6-32, hex
80	455655	Caplug 3/8"
92	350899	Clamp, hose, stainless steel
115	550065	Locknut, 1/4"-20, hex

Chapter 2 - Installation

2.5 Installation Procedures (Continued)

M. T-Bar Assembly

Refer to Figure 2-31 and install the T-bar assembly (Item 33) elements 16 and 17 (Item 34) as shown. Set lengths to those shown.

Place a 7/16" caplug on each end of elements 1 thru 15. Place a 2" caplug on both ends of each boom. Place a 3/8" caplug on each end of the beta rod tube.

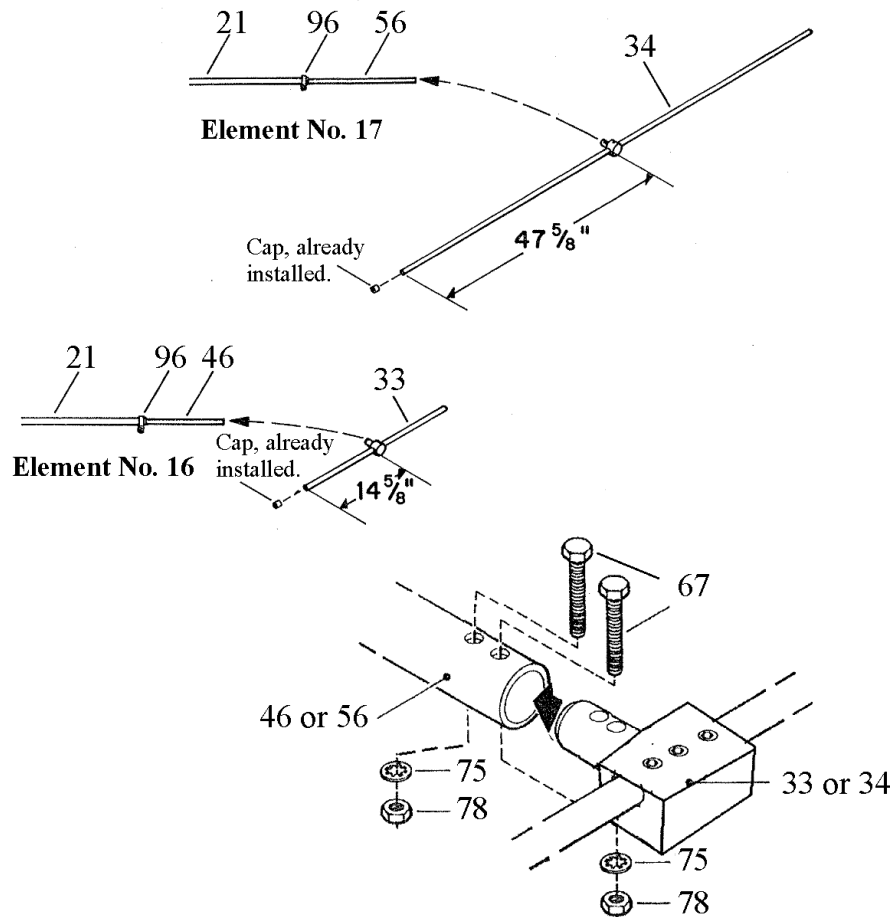


Figure 2-31
T-Bar Assembly

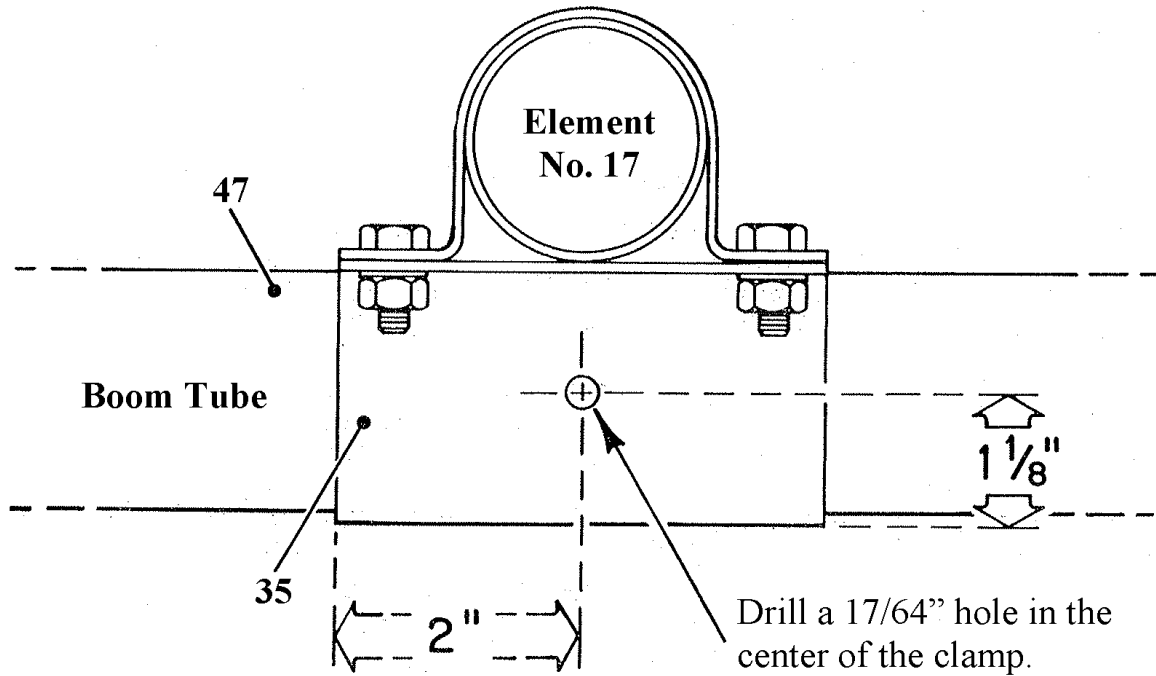
Item No.	Part No.	Description
21	170705	Elements 6-17, 7/8" x 41"
33	870204	T-Bar Assembly, Element 16
34	870205	T-Bar Assembly, Element 17
46	170740	Tube, 5/8" for Element 16 T-Bar
56	170717	Tube, 5/8" for Element 17 T-Bar
67	504069	Bolt, #10-24 x 1", hex head
75	565697	Lockwasher, #10, internal
78	554071	Nut, #10-24, hex
96	358756	Clamp, #6, Tubing

Chapter 2 - Installation

2.5 Installation Procedures (Continued)

N. Securing Element 17 to Boom

Following completion of the antenna assembly, make certain the boom and element 17 are level. Drill a 17/64" hole through the element clamps and boom tubes shown in Figure 2-32.



Item No.	Part No.	Description
35	170643	Clamp, Element 2" to 2"
47	170414	Boom, Rear and Front 2"

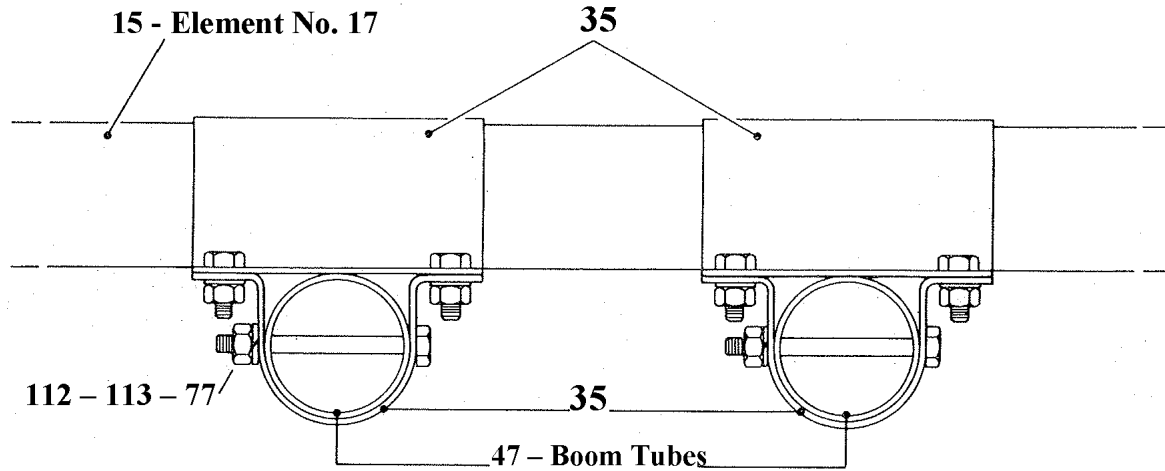
Figure 2-32
Dimensions for Drilling Hole

Chapter 2 - Installation

2.5 Installation Procedures

N. Securing Element 17 to Boom (Continued)

Install 1/4"-20 x 2-3/4" bolts, 1/4" split lockwashers, and 1/4"-20 nuts. Tighten, but DO NOT OVER TIGHTEN. Over tightening of the bolts could cause distortion to the clamps and the boom tubes. Refer to Figure 2-33.



Item No.	Part No.	Description
15	878768	Center Insulator Assembly Element 17
35	170643	Clamp, Element 2" to 2"
47	170414	Boom, Rear and Front 2"
77	554099	Nut, 1/4"-20, hex
112	505733	Bolt, 1/4"-20 x 2-3/4"
113	561177	Lockwasher, 1/4", split

Figure 2-33
Securing Element Clamp to Boom

Chapter 2 - Installation

2.5 Installation Procedures (Continued)

O. Feedline Attachment

Attach your feedline to the Type N connector at the balun. Be sure to tape the coax to one of the boom legs every few feet back to the mast.

An application of Penetrox A ® or similar product can be applied to all electrical connections. **(Penetronx A © is a registered trademark of the Burndy Corp.)**

In or around coastal regions, a coating of zinc chromate and/or a coating of polyurethane enamel should be applied to all metal parts to prevent atmospheric deterioration. The manufacturer recommends an application of RTV 109 sealing compound around all fasteners to prevent corrosion.

P. Rotator

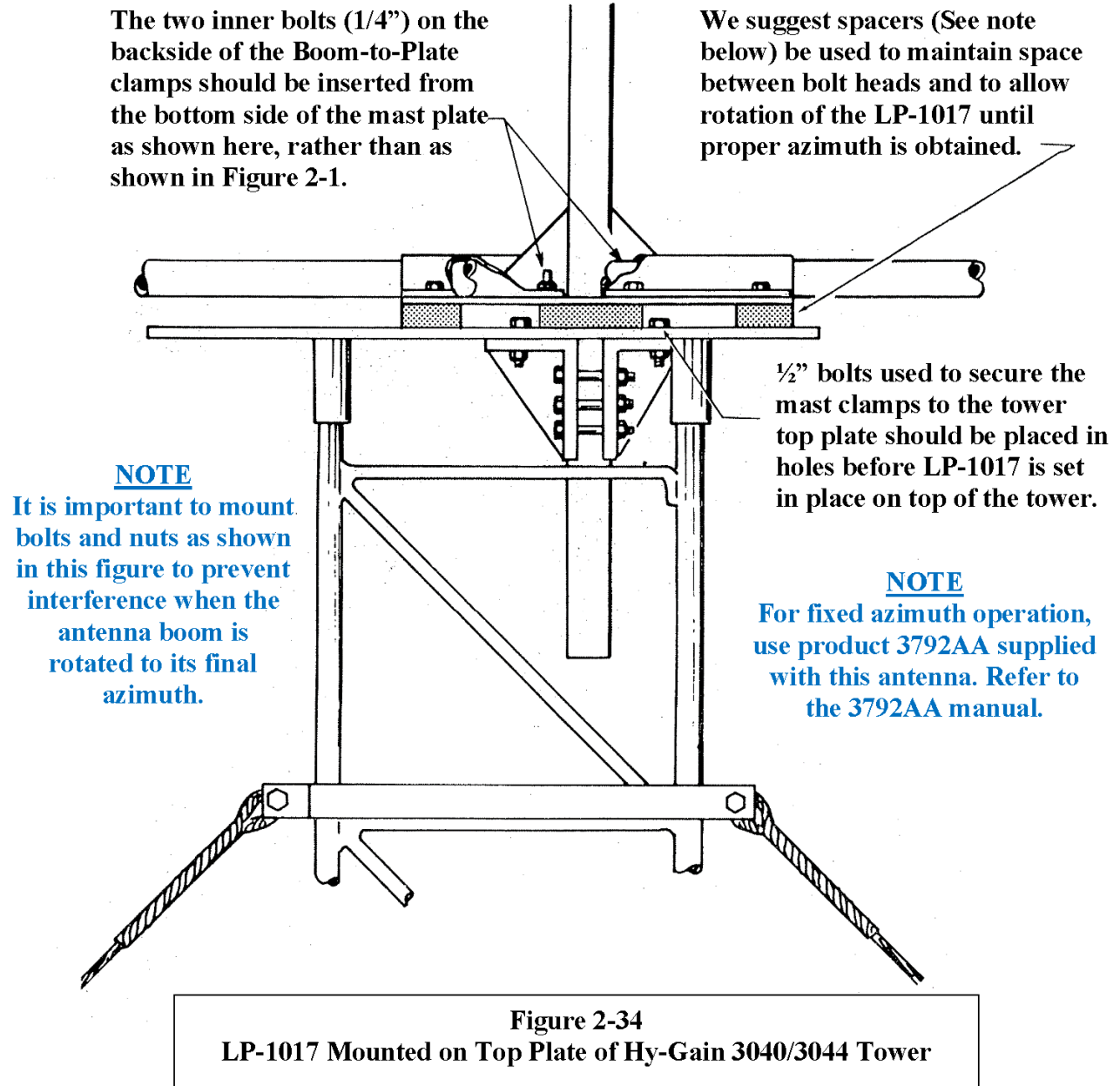
Determine at this time if a rotator will be used. Refer to Figure 2-35 for attaching the antenna to your rotator.

If your rotator sits inside your tower, the mast assembly may be used as is. If your rotator sits directly on top of the tower the mast must be cut off from the bottom to allow the boom-to-mast clamp to sit directly on top of the rotator mast clamps. Refer to Figure 2-35. For fixed azimuth mounting, refer to Figure 2-34 and the 3792AA manual supplied with this product.

Chapter 2 - Installation

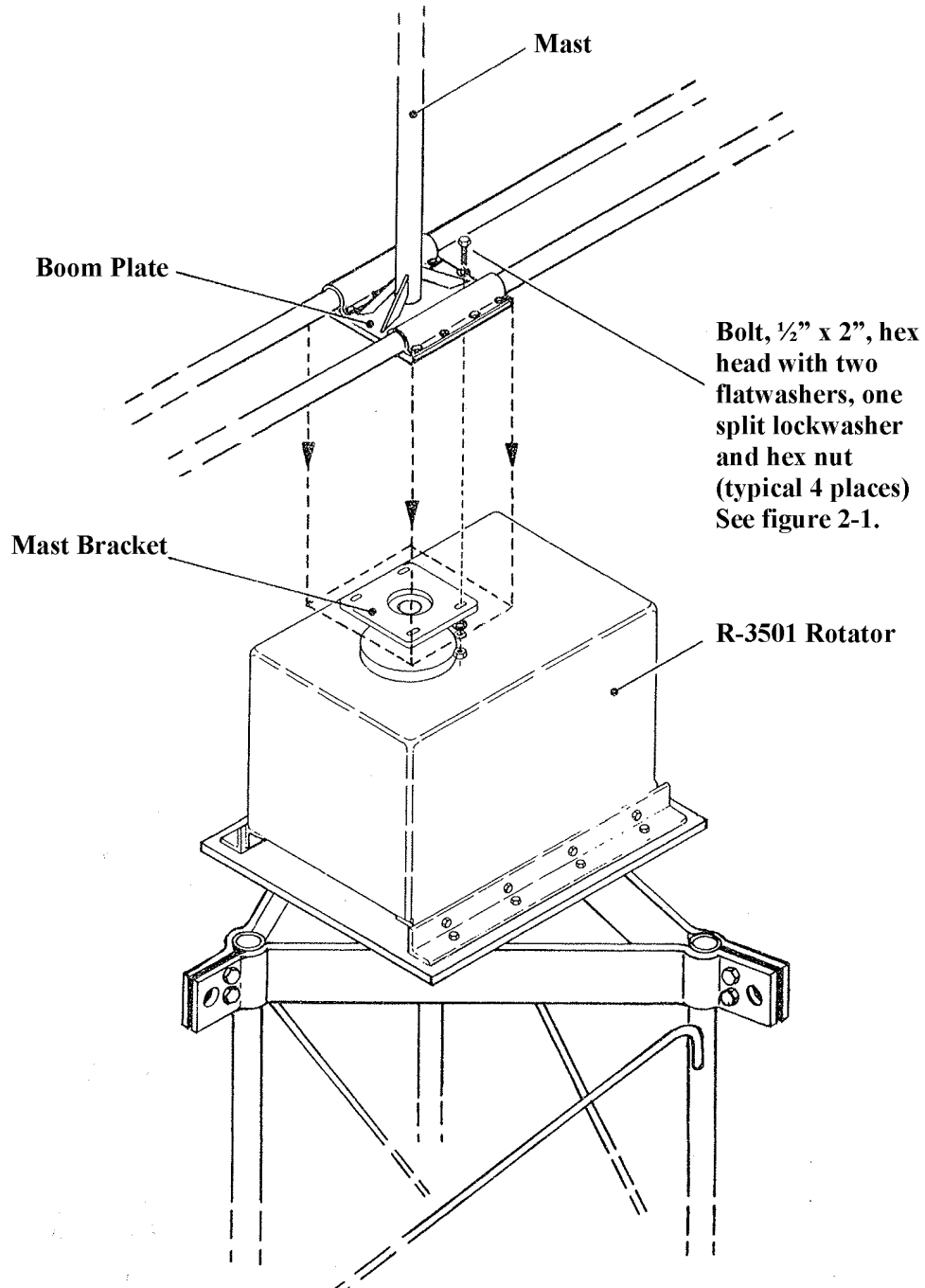
2.5 Installation Procedures

P. Rotator (Continued)



Chapter 2 - Installation

2.5 Installation Procedures P. Rotator (Continued)



**Figure 2-35
LP-1017 Mounted on Rotator**

Chapter 2 - Installation

2.5 Installation Procedures

Q. Erection Procedure

There are two methods for installing the antenna system on your support structure, the use of a crane or the use of a gin pole and tag lines.

CAUTION

The antenna should be lifted to the top of the tower with the elements level with the ground or close to it. Damage to the boom will occur if the elements are in a vertical manner or tilted beyond 30 degrees with horizontal.

Crane Method

This method is the simplest and should require three people plus the crane operator. Attach the crane, using a sling, rigged directly under the mast cap on item 29. A tag line is required near each end of the boom to assist in maneuvering the antenna. Be sure to have a method of disconnecting the tag lines once the antenna is erected.

One person should operate each tag line to keep the antenna under control during the entire erection procedure. Position one person on top of the support structure wearing a safety climbing harness that meets all current safety requirements. This person will connect the mast to the rotator or tower according to Figures 2-34 and 2-35.

Prepare to raise antenna carefully and slowly. Exercise caution to assure against damage to elements.

Secure the mast to the rotator or tower. Refer to Figures 2-34 and 2-35 depending on mounting choice.

Insert the end of the feedline (coax) through the hole in the mast assembly that has been cut in the side of the mast just above the plate. Route the feedline down the inside of the mast and through the rotator into the rotary joint (if supplied). If a rotary joint is not used, allow enough slack in the feeding to permit at least a slow 360-degree rotation of the antenna without damage due to twisting or binding of the feedline.

Tape the feedline to the tower leg in several places to protect against wind damage.

Detach the tag lines.

Connect the feedline to your transceiver.

Chapter 2 - Installation

2.5 Installation Procedures

Q. Erection Procedure (Continued)

Gin Pole Method

CAUTION

United States Antenna Products, LLC does not recommend the Gin Pole Method of erection unless there is a seasoned, well experienced crew that is familiar with this antenna and method of erection.

A gin pole with pulley that extends 12' to 14' above the tower should be attached to tower on a leg opposite the side of the antenna is to be erected.

The erection cable from a winch truck should be placed over the pulley on top of the gin pole, extended down the opposite side of the tower and attached to the boom-to-mast clamp.

Attach tag lines to the ends of the boom.

Position someone on each tag line to guide the antenna away from tower guy wires, etc. during the raising procedure.

Slowly raise antenna to top of tower using the winch truck. When the antenna is at the top of the tower, attach it to the rotator clamps.

Insert the end of the feedline through the hole in the mast assembly that has been cut in the side of the mast just above the plate. Route the feedline down the inside of the mast and through the rotator. Allow enough slack in the feedline to permit a slow 360-degree rotation of the antenna without damage due to twisting or binding of the feedline.

Remove the tag lines and winch cable.

Tape the feedline to the tower.

Connect the feedline to your transceiver.

Chapter 3 - Maintenance

3.1 Visual Inspection

Quarterly checks should be made of the coaxial feedline.

Quarterly checks of the boom-to-mast bracket should be made to see that all bolts are tight. Retighten if necessary.

3.2 Maintenance

Perform the following steps to check the standing wave ratio of the Model 1017CA antenna using a directional wattmeter:

- Turn the transmitter (RF power source) on-off switch to “off”.
- Connect a directional RF wattmeter in series with the transmission line from the transmitter to the antenna.
- Insert a 50-, 100-, or 250-watt plug-in element in the wattmeter with the arrow pointing from the transmitter to the antenna (toward power direction).
- Select an unmodulated frequency from 6.2 to 30 MHz
- Limit the RF power output to the range of the wattmeter plug-in element used and turn on the transmitter.
- Key the transmitter and record the forward power on the wattmeter.
- Release the transmitter key.
- Turn the wattmeter plug-in element until the arrow points from the antenna to the transmitter (reflected power).
- Key the transmitter and record the reflected power.
- Release the transmitter key.
- Calculate the SWR using the following formula:

$$SWR = \frac{1 + \sqrt{\frac{\text{reflected power}}{\text{forward power}}}}{1 - \sqrt{\frac{\text{reflected power}}{\text{forward power}}}}$$

The SWR should not exceed 2.5:1 throughout the frequency range.

Chapter 3 - Maintenance

3.2 Maintenance (Continued)

Table 3-1 Organizational / Field Maintenance Test Equipment	
Test Equipment	Characteristics
Wattmeter, Bird Model 43 with plug-in elements 50 H, 100 H, or 250 H, and 50 A and 250 A	Type-directional RF wattmeter Impedance - 50 ohms Power - 50 to 150 watts Frequency - 6.5 to 30 MHz
RF source	Power - 100 watts maximum Frequency range - 6.5 to 30 MHz

3.3 Penetrox A® Instructions

Quarterly checks should be made of the coaxial feedline.

To minimize the corrosive effect on the antenna all aluminum to aluminum should be coated with Penetrox A®. (Penetronx © is a registered trademark of the Burndy Corp.)

This material has been included with your antenna.

The critical points to apply this material is at all connections in the feedline (at the splice points), and the feedline straps.

All connections on the beta match should have material applied.

Important, but not critical, is at the elements where the sections are bolted.

When you take the parts apart, corrosion will be evident by the presence of a white powder at the contact point.

The presence and amount of this powder will give you a guide to the priority.

Additionally, if the antenna has a film of any kind over all the surfaces it should be cleaned to remove the film.

Film, especially a salt-based film, will degrade the performance of the antenna.

Any concern with corrosion on the feed wires can be corrected by replacement or the application of liquid electrical tape at the solder connections.

Do not get any of this material on any part of the actual connection ring.

Chapter 3 - Maintenance

3.4 Penetrox A® Material Safety Data Sheet (Page 1 of 2)



MATERIAL SAFETY DATA SHEET

IDENTITY- PENETROXTM-A OXIDE INHIBITING COMPOUND

SECTION I

Manufacturer's Name

FCIUSA INC.,
BURNDY ELECTRICAL

Emergency & Information Telephone Number

603-647-5000

Address

47 EAST INDUSTRIAL PARK DRIVE
P.O. BOX 9507
MANCHESTER, NEW HAMPSHIRE 03108-9507

Signature of Preparer (optional)

Supersedes: January, 2002

Date Prepared: June 1, 1994

Date Revised: April, 2006

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components: (specific chemical identify; common name(s))

	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (Optional)
Zinc\ 7440-66-6 (fume,dust)	5, 15 mg/m	5,10.0 mg/m	5.0 mg/m	51-53%
Mineral Oil	Not applicable	Not applicable		42-46%
Napthenic Vacuum Distillate				
Hazardous Material Information System (HMIS) Rating:				
Health=0 Flammability= 1 Reactivity= 1				

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point	Not Applicable	Specific Gravity (H2O =1)	1.47
Vapor Pressure (mm Hg)	Not Applicable	Melting Point	Not Applicable
Vapor Density (AIR= 1)	Not Applicable	Appearance and Odor	Odorless grase,gray-brown in color
Evaporation Rate (Butyl Acetate= 1)	Not Applicable	Solubility in Water	Insoluble

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Flammable Limits	LEL	UEL
375°F per ASTM D92	Not Volatile	Not Applicable	Not Applicable
Extinguishing Media:	Dry Powder, CO ₂ , Sand/Earth		
Special Fire Fighting Procedures:	Dry Powder, CO ₂ , Sand/Earth, do not use water except as fog.		
Unusual Fire and Explosion Hazards:	None,however, cover of container may pop off it ambient temperature exceeds 110°F (43°C).		

Chapter 3 - Maintenance

3.4 Penetrox A® Material Safety Data Sheet (Continued - Page 2 of 2)



SECTION V - REACTIVITY DATA

Unstable- Stable Conditions to Avoid - exposure to flame and strong oxidizers; e.g., hydrogen peroxide, bromine, etc.
Incompatibility (Materials to Avoid) None- except will cause rubber to swell
Hazardous Decomposition or Byproducts- On burning- carbon monoxide, carbon dioxide.
Hazardous Polymerization- Will not occur

SECTION VI - HEALTH HAZARD DATA

Route(s) of Entry- Principle routes of entry through skin absorption or ingestion
Inhalation Skin Ingestion Health Hazards (Acute & Chronic)
YES YES None known
Carcinogenicity NTP IARC Monographs OSHA Regulated
N/A
Signs and Symptoms of Exposure- Prolonged skin contact may cause dermatitis to occur in some individuals.
Medical Conditions Generally Aggravated by Exposure- Dermatitis
Emergency and First Aid Procedure
EYES- Flush with water for 15 minutes; Call Doctor. SKIN- Wash off with soap and water
INHALATION- Remove to fresh air; Call Doctor INGESTION- Call Doctor immediately

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be taken in case material is released or spilled- Recover free product; add sand, earth or other absorbent to spill and sweep up.
Waste Disposal Method- Dispose of as solid waste in accordance with Federal, State and Local regulations.
Precautions to be taken in handling and storing - Avoid storage in temperatures exceeding 110 °F (43 °C). Avoid strong oxidizers such as hydrogen peroxide, bromine, etc.
Other precautions- None

SECTION VIII - Control Measures

Respiratory Protection (Specify Type)- None Ventilation- None Local Exhaust- None
Mechanical (General)- None Other- None Special None
Protective Gloves- Chemical resistant gloves when prolonged skin contact may occur.
Eye Protection- Safety Glasses when eye contact may occur.
Other Protective Clothing or Equipment- Not needed.
Work/Hygienic Practices- Avoid eye and prolonged skin contact; wash before eating.

SARA NOTICE

FCL is required to notify you that you have purchased product which contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR, Part 372. FCL is providing the name of each toxic chemical, the associated Chemical Abstract Service (CAS) registry number and percent by weight of each toxic chemical in the product. This notification must not be detached from the MSDS and any copying or re-distribution of the MSDS shall include a copy of this notice.

Product: PENETRQXTN -A Oxide Inhibiting Compound
SARA Toxic Chemical: Zinc (fume or dust)
CAS No: 7440-66-6
Percentage by Weight: 51-53



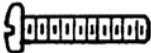
Chapter 4 - Miscellaneous

4.1 Parts List

This chapter contains a list of parts and/or assemblies found in the Model 1017CA antenna.

These pages show the actual size, shape, and part number of all hardware used in this antenna unless otherwise noted.






NUMBER 6 HARDWARE

Item No.	Item (Actual Size)	Size	Part Number
79		6-32 Hex Nut	555888
76		#6 Internal Lockwasher	565889
72		6-32 x 5/8" BHSMS	506576
	BHSMS: Binder Head Slotted Machine Screw		

Chapter 4 - Miscellaneous

4.1 Parts List (Continued)







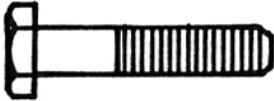
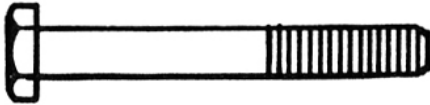
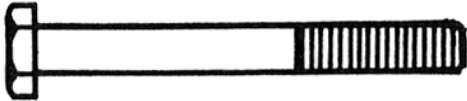
NUMBER 10 HARDWARE

Item No.	Item (Actual Size)	Size	Part Number
102		10-24 Square Nut	555693
78		10-24 Hex Nut	554071
75		No. 10 Internal Lockwasher	565697
68		10-24 x 3/4" Round Head	505751
67		10-24 x 1" Hex Head	504069

Chapter 4 - Miscellaneous

4.1 Parts List (Continued)

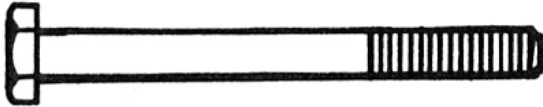
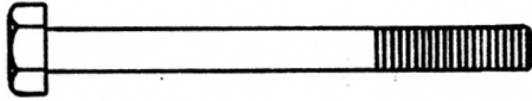




ONE-QUARTER INCH HARDWARE

Item No.	Item (Actual Size)	Size	Part Number
98		1/4"-20 Square Nut	551367
77		1/4"-20 Hex Nut	554099
74		1/4" Internal Lockwasher	552961
99		1/4"-20 x 1 1/2" Hex Head	504098
69		1/4"-20 x 3/4" Hex Head	505266
64		1/4"-20 x 1" Hex Head	502958
66		1/4"-20 x 1 1/4" Hex Head	506518
70		1/4"-20 x 2" Hex Head	505737
71		1/4"-20 x 2 1/4" Hex Head	505736

Chapter 4 - Miscellaneous

4.1 Parts List (Continued)

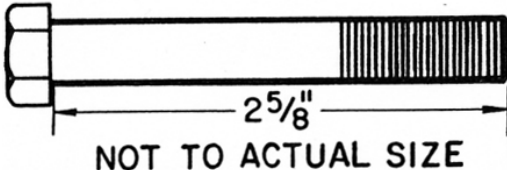


ONE-QUARTER INCH HARDWARE

Item No.	Item (Actual Size)	Size	Part Number
63		1/4"-20 x 2 1/2" Hex Head	505734
112		1/4"-20 x 2 3/4" Hex Head Bolt	505733
113		1/4" Split Lockwasher	561177
114		1/4"-20 x 3/8" Round Head Bolt	501428
115		1/4"-20 Locknut	550065
116		1/4" Flatwasher S.S.	566344

Chapter 4 - Miscellaneous

4.1 Parts List (Continued)



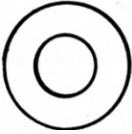
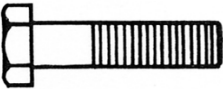
FIVE-SIXTEENTHS INCH HARDWARE

Item No.	Item (Actual Size)	Size	Part Number
62		5/16"-18 x 3"	506969
110		5/16" Split Lockwasher	564792
111		5/16" Hex Nut	555747

Chapter 4 - Miscellaneous

4.1 Parts List (Continued)


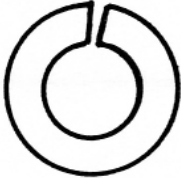
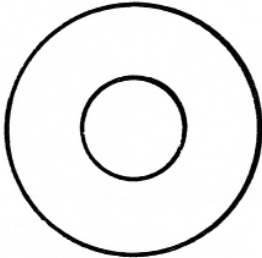
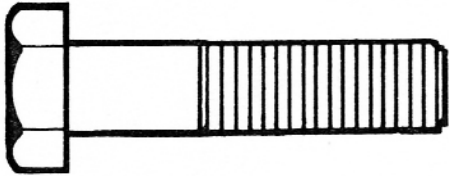
THREE-EIGHTHS INCH HARDWARE

Item No.	Item (Actual Size)	Size	Part Number
109		3/8"-16 Hex Self-Locking Nut	550070
107		3/8" Split Lockwasher	561016
108		3/8" Flat Washer	567180
65		3/8"-16 x 1 1/2" Hex Head	507873

Chapter 4 - Miscellaneous

4.1 Parts List (Continued)

ONE-HALF INCH HARDWARE

Item No.	Item (Actual Size)	Size	Part Number
60		$\frac{1}{2}$ "-13 Hex Nut	557648
61		$\frac{1}{2}$ " Split Lockwasher	565872
59		$\frac{1}{2}$ " Flat Washer	561481
57		$\frac{1}{2}$ "-13 x 2" Hex Head	506977

Chapter 4 - Miscellaneous

4.1 Parts List (Continued)

NOTE

The following information pertains to the Parts List beginning on this page.

The first column is the Item Number Corresponding with the item numbers found on the illustrations and in the installation procedure.

The second column is the six-digit part number used for reordering and in-house control.

The third column is the part description, and the fourth column is the quantity supplied and not necessarily the quantity used per assembly.

NOTE

Item numbers may not necessarily be in numerical sequence and may appear more than one time, depending on how often a part is used for identical parts being placed in different parts packs.

Item #	Part Number	Description	Quantity
1	870170	Center Insulator Elements 1-2-3	3
2	870171	Center Insulator Assembly, Element 4	1
3	870172	Center Insulator Assembly, Element 9	1
4	870173	Center Insulator Assembly, Element 5	1
5	870174	Center Insulator Assembly, Element 6	1
6	870175	Center Insulator Assembly, Element 7	1
7	870176	Center Insulator Assembly, Element 8	1
8	870179	Center Insulator Assembly, Element 10	1
9	878774	Center Insulator Assembly, Element 11	1
10	878773	Center Insulator Assembly, Element 12 (173-3/8")	1
11	878770	Center Insulator Assembly, Element 13 (181-7/8")	1
12	878771	Center Insulator Assembly, Element 14 (14-3/8")	1
13	878772	Center Insulator Assembly, Element 15 (184-3/8")	1
14	870186	Center Insulator Assembly, Element 16	1
15	878768	Center Insulator Assembly, Element 17	1
16	170698	Element 1, 7/16" x 25"	2
17	170699	Element 2, 7/16" x 34"	2
18	170700	Element 3, 7/16" x 46"	2
19	170701	Elements 4-15, 7/16 x 61"	24
20	170638	Elements 4-9, 11-13, 5/8" x 17"	18
21	170705	Elements 6-17, 7/8" x 41"	24
22	170704	Elements 8-17, 1-1/8" x 42"	20
23	170697	Elements 8-17, 1-1/4" x 18-5/8"	20

Chapter 4 - Miscellaneous

4.1 Parts List (Continued)

Item #	Part Number	Description	Quantity
24	878190	Fronts Boom Brace Assembly, Long	2
25	870389	Rear Boom Brace Assembly, Short	2
26	172732	Clamp, Boom-to-Plate, 2", 10" Long	2
27	991017	Element Measuring Device	1
28		(NOT USED)	
29	880038	Mast Assembly	1
30	170415	Boom Support Extrusions	2
31	879959	Balun, BN 4000 N	1
32	470074	Balun Support Plate	1
33	870204	T-Bar Assembly, Element 16	2
34	870205	T-Bar Assembly, Element 17	2
35	170643	Clamp, Element, 2" to 2"	68
36	Not Used	Not Used	
37	Not Used	Not Used	
38	Not Used	Not Used	
39	170663	Clamp, Element, 2" to 2"	4
40	170724	Feedline, Rear, 177-1/2" Long	2
41	170305	Feedline, 7/16" x 183-1/4" Long	2
42	170294	Feedline, Middle, 7/16" x .035 x 57"	2
43	170723	Feedline, Curved	2
44	170875	Boom, Support Angle	4
45	380142	Clamp, 2" to 2"	4
46	170740	Tube, 5/8" for Element 16 T-bar	2
47	170414	Boom, 2", Rear and Front	4
48	170184	Boom, 2" Middle, Swaged	2
50	870213	Loading Assembly, Element 16	2
51	878769	Loading Assembly, Element 17	2
52	170749	Splice	14
53	170069	Clamp, Beta Match, Element 17	2
54	170291	Tube, Beta Rod, 3/8", Element 17	2
55	470078	Insulator, Beta Match, Element 17	2
56	170717	Tube, 5/8", for Element 17 T-bar	2
58	170290	Elements 11-15, 1-1/2" x 30"	10
105	170311	Strap, Boom Shorting	1
106	170753	Tubing, 5/8" x 28", Elements 10-14-15	6

Chapter 4 - Miscellaneous

4.1 Parts List (Continued)

Parts Pack			
Item #	Part Number	Description	Quantity
	879397	Parts Pack 1 (Stainless Steel) (Boom-to-Mast Assembly)	1
57	506977	Bolt, 1/2" x 2", Hex Head	5
59	561481	Flatwasher, 1/2"	10
60	559715	Nut, 1/2"-13, Hex	5
61	569714	Lockwasher, 1/2", Split	5
62	506969	Bolt, 5/16"-18 x 3", Hex Head	4
110	564792	Lockwasher, 5/16", Split	4
111	555747	Nut, 5/16", Hex	4
	879905	Parts Pack 2 (Stainless Steel) (Assembly Hardware)	1
63	505734	Bolt, 1/4"-20 x 2-1/2", Hex Head	9
64	502958	Bolt, 1/4"-20 x 1", Hex Head	19
65	507873	Bolt, 3/8"-16 x 1-1/2", Hex Head	12
66	506518	Bolt, 1/4"-20 x 1-1/4", Hex Head	18
67	504069	Bolt, #10-24 x 1", Hex Head	13
68	505751	Bolt, #10-24 x 3/4", Round Head	44
69	505266	Bolt, 1/4"-20 x 3/4", Hex Head	170
70	505737	Bolt, 1/4"-20 x 2", Hex Head	20
71	505736	Bolt, 1/4"-20 x 2-1/4", Hex Head	57
72	506576	Screw, #6-32 x 5/8", Bind Head	28
73	506731	Screw, #6-32 x 3/4", Bind Head	4
114	501428	Bolt, 1/4"-20 x 3/8", Round Head	3
	878775	Parts Pack 3 (Assembly Hardware)	1
74	562961	Lockwasher, 1/4", Internal	160
75	565697	Lockwasher, #10, Internal	124
76	565889	Lockwasher, #6, Internal	28
77	554099	Nut, 1/4"-20, Hex Head	162
78	554071	Nut, #10-24, Hex	60
79	555888	Nut, #6-32, Hex	28
107	561016	Lockwasher, 3/8", Split	12
108	567180	Flatwasher, 3/8"	24
109	550070	Nut, 3/8"-16, Hex, Self-Locking, SS	12
112	505733	Bolt, 1/4"-20 x 2-3/4"	2
113	561177	Lockwasher, 1/4", Split	3
115	550065	Locknut, 1/4"-20, Hex	138
116	566344	Flatwasher, 1/4"	272

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4.1 Parts List (Continued)

Item #	Part Number	Description	Quantity
	870220	Parts Pack 4 (Endcap Assembly)	1
80	455655	Caplug, 3/8"	2
81	455625	Caplug, 2"	4
82	455644	Caplug, 7/16"	35
	870221	Parts Pack 5 (Feed Strap Assembly)	1
83	870210	Feedwire Assembly, 3", Black	8
84	870209	Feedwire Assembly, 3", White	6
85	870211	Feedwire Assembly, 4", Red	14
86	870212	Feedwire Assembly, 10-1/2", Red	8
	878777	Parts Pack 6 (Feedline Assembly)	1
49	170292	Splice, Matching	1
88	170706	Clip, Feeder	36
104	470079	Insulator, Feedline, Size A	3
89	470067	Insulator, Feedline, Size B	6
90	470068	Insulator, Feedline, Size C	6
87	170721	Splice Feedline	6
91	470069	Insulator, Feedline, Size D	5
92	350899	Clamp, Hose, 32H, SS	19
93	Not Used	Not Used	
	879904	Parts Pack 7 (Clamps)	1
94	358758	Clamp, #16, Tubing	20
95	358757	Clamp, #10, Tubing	24
96	358756	Clamp, #6, Tubing	58
97-99	Not Used	Not Used	

Chapter 4 - Miscellaneous

4.2 LP-1017CA Antenna Component Layout Drawing

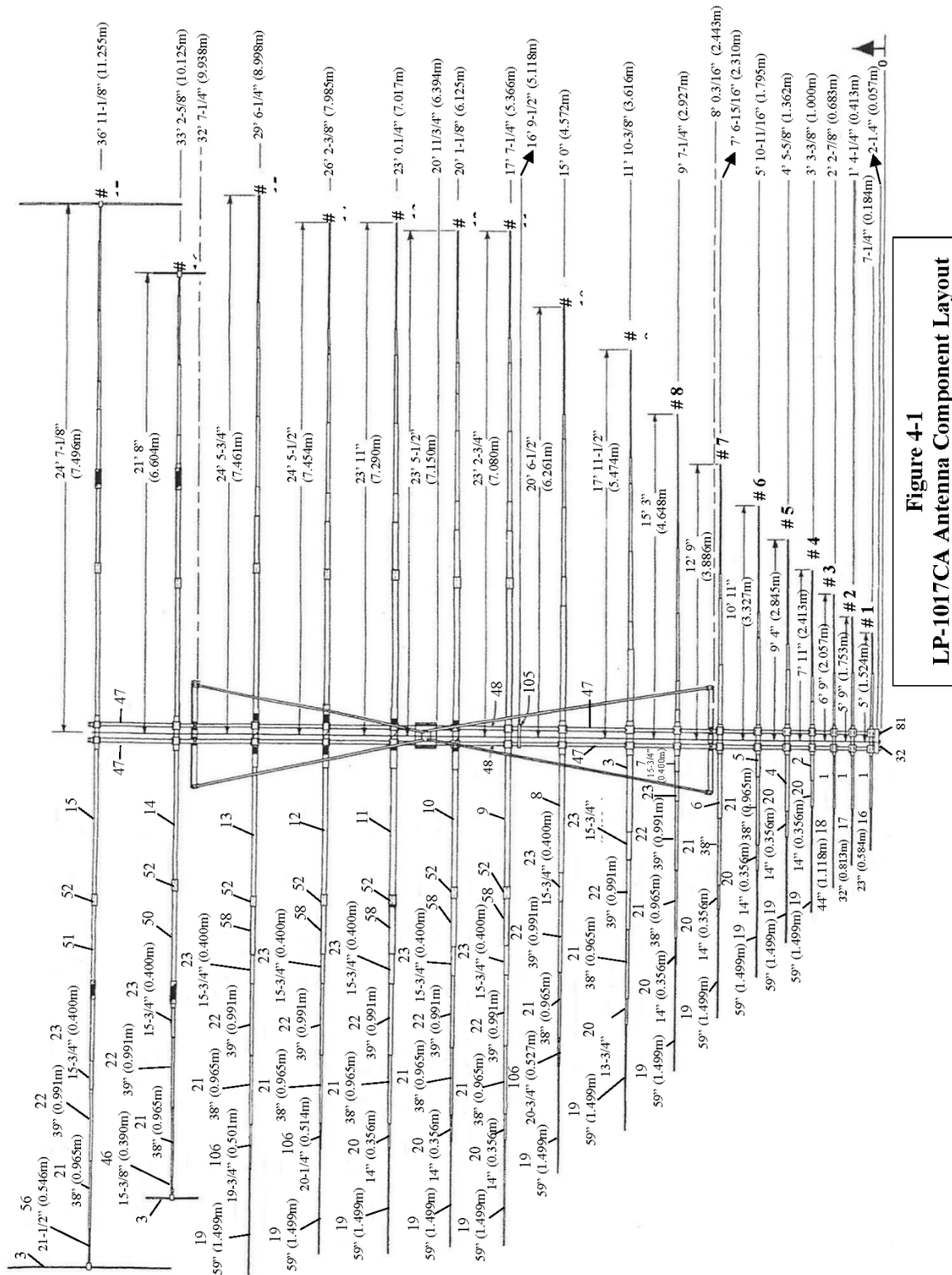


Figure 4-1
LP-1017CA Antenna Component Layout

4.3 United States Antenna Products, LLC Limited Warranty

UNITED STATES ANTENNA PRODUCTS, L.L.C.

LIMITED WARRANTY

Subject to the terms and conditions provided below, United States Antenna Products, L.L.C. ("USAP") warrants that equipment manufactured and sold by it, and bearing USAP's model and serial numbers, shall conform to specifications described in any applicable purchase order that has been accepted in writing by USAP and shall be free from defective material and workmanship under normal use and conditions for:

1. With respect to equipment that is installed by USAP or its affiliates, one (1) year from the date of USAP's invoice; and
2. With respect to any equipment that is not installed by USAP or its affiliates, one (1) year from date of USAP's invoice.

Should equipment subject to this warranty fail in normal service and under normal conditions through no fault of purchaser, purchaser shall notify USAP in writing within the warranty period at the address provided below and obtain a return authorization ("Return Authorization"). Purchaser's request for a Return Authorization must include a detailed description of the claimed defect, the date, place and proof of purchase, and a copy of the sales receipt reflecting purchaser's warranty. Failure to notify USAP in a timely manner and/or to provide such information will result in a delay in processing purchaser's claim or may result in voiding this warranty in its entirety. Upon receipt of a Return Authorization, purchaser shall return the equipment, at purchaser's expense for freight and insurance, to USAP's facility located at 5263 Agro Drive, Frederick, Maryland 21703. If USAP determines that this warranty applies, USAP shall, at USAP's sole discretion, either repair the equipment or furnish a replacement to the purchaser. Any repaired or replacement equipment is warranted (as set forth herein) for sixty (60) days from the date of shipment, or the remaining portion of the original equipment's warranty, whichever is longer.

This warranty is valid only for the ultimate purchaser of the equipment, and only after purchaser secures a Return Authorization from USAP. USAP reserves the right at any time, either before a Return Authorization is issued or after inspection of the equipment, to determine whether a claimed defect is subject to this warranty. This warranty shall not apply, and shall become void, if (i) the equipment is not installed, maintained, operated and used in accordance with instructions or directions furnished by USAP, (ii) the equipment has been subject to damage from misuse, negligence, accident, acts of God or other occurrences not occurring in the normal use and operation, or (iii) the serial number on the equipment is in any way defaced or rendered unidentifiable. This warranty shall not extend to any products or accessories that are manufactured by anyone other than USAP. This warranty shall be governed in all respects by the laws of the State of Maryland, United States of America.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE FOREGOING REMEDIES OF REPAIR OR REPLACEMENT BY USAP CONSTITUTES PURCHASER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ANY AND ALL OTHER REMEDIES WHICH MAY BE AVAILABLE TO PURCHASER. USAP SHALL NOT BE LIABLE FOR INDIRECT, INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES AND IN NO EVENT SHALL THE LIABILITY OF USAP ARISING IN CONNECTION WITH ANY EQUIPMENT SUBJECT TO THIS WARRANTY EXCEED THE ACTUAL AMOUNT PAID BY PURCHASER TO USAP FOR PRODUCTS DELIVERED.

All claims under this warranty shall be effective upon receipt by USAP and sent by certified mail, return receipt requested, email with read receipt, or courier to: United States Antenna Products, L.L.C., 5263 Agro Drive, Frederick, Maryland 21703. This warranty embodies the entire understanding of the parties as it relates to the subject matter hereof and supersedes any prior representations, warranties, agreements or understandings made by or behalf of USAP. No amendment or modification to this warranty shall be valid or binding upon USAP unless in writing and signed by an officer of USAP.



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