

hy-gain®

INSTRUCTION MANUAL

Antennas, Towers and Accessories for
Commercial, Industrial, Military and
Private use.



MODEL 1017CA

6.2/30 MHz

Log Periodic Antenna

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8601 NORTHEAST HIGHWAY SIX, LINCOLN, NE 68505 U.S.A.

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CHAPTER I

General Information

General Description

The Hy-Gain 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 periodic structure. The rear elements are 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.

Specifications

Mechanical

Longest element	49 ft. 4 in. (15.04 m)
Boom length.....	37 ft. 9½ in. (11.519 m)
Turning radius	31 ft. 6 in. (9.601 m)
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. (18.288 m x 34.442 m) for 60 foot tower

Electrical

Frequency range	6.2 to 30 MHz continuous
Power handling capability	
average	1 kW
peak	2 kW
VSWR.....	2.5:1 maximum 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)

Section 2. Installation Planning

General

This section contains the instruction procedure for installing the Hy-Gain Model 1017CA antenna.

The assembly will follow these basic steps:

- a. Boom-to-plate assembly
- b. Boom assembly
- c. Boom support assembly
- d. Balun support plate
- e. Balun assembly
- f. Center insulator assembly
- g. Feedline assembly
- h. Beta tube assembly
- i. T-bar assembly
- j. Feedwire assembly
- k. Element assembly
- l. Feedline attachment
- m. Rotator
- n. Erection procedure

Recommended Manpower Requirements

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

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 shortened from the bottom to allow the boom-to-mast clamps to sit directly on top of the rotator mast clamps. Due to many varied mounting applicants, the mast clamps shown in the manual are not provided with the 1017CA. If your installation requires these clamps and accessory hardware, they may be ordered as separate items.

Section 3. Installation Procedure

Boom-to-Plate Assembly

NOTE: Three sawhorses, oil drums or some similar objects should be handy to simplify installation 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 crates just opened.

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

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.

Refer to Figure 2-1. Loosely assemble the two (2) boom-to-plate clamps to the mast assembly using the 1/4" hardware. Allow enough room to insert the middle swaged sections of two inch boom (item 48) into the clamps.

Insert the 1/2" bolt, nut, lockwasher, and flatwasher (items 57, 59, 60, & 61) into each of the four (4) 1/2" holes in the mast plate as shown. ***This hardware is used when the Hy-Gain Model 3501 rotator is adapted to this system.***

Align the holes and fasten securely with $\frac{1}{4}$ " x $2\frac{1}{2}$ " bolts (item 63, 505734), nuts (item 77, 554099) and lockwashers (item 74, 562961).

Using the 50' tape carefully measure along the boom from the front end 20 feet and 11 $\frac{3}{4}$ inches 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. Tighten the $\frac{1}{4}$ " x 1" screws securely. **NOTE:** Align all holes in the boom in a **vertical position**.

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 lie level, dig a hole at this point to allow the boom to set level.

Starting from the front of the boom measure along one boom section and place a mark at each measurement called out on the right hand side of the page of Figure 2-4.

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

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

Refer to Figure 2-2A and accurately center a 2" x 2" clamp (item 35, 170643) at each mark.

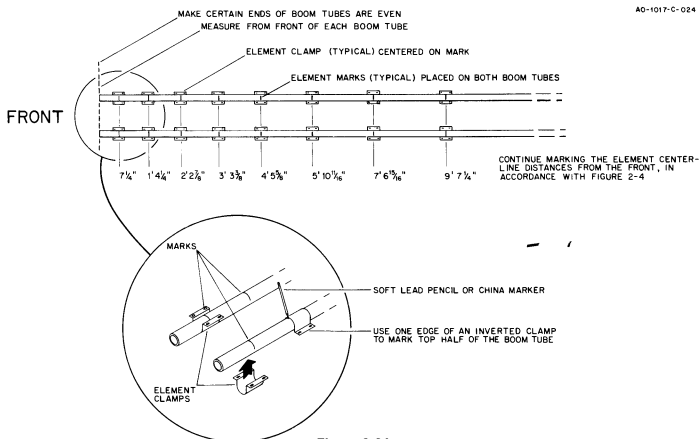


Figure 2-2A
Element Clamp Placement on Boom Tubes

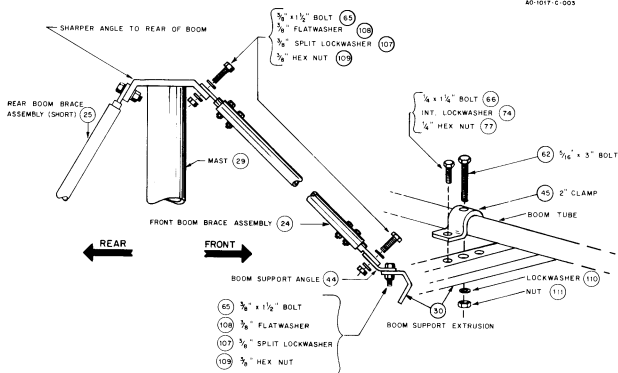


Figure 2-3. Boom Braces

Boom Support Assembly

Attach the boom support extrusions (item 30) to the booms using $\frac{1}{4}$ " x $\frac{1}{4}$ " (506518) hardware, the 2" clamp (item 45) and $\frac{3}{16}$ " hardware.

Refer to Figure 2-3 for attachment of the boom braces (items 24 and 25) to the boom support and the mast assembly.

Two longest braces (item 24) will go towards the front, while the two shorter braces (item 25) will go to the rear of the boom.

Fasten the four boom support angles (item 44) to the extrusions (item 30) as shown in Figure 2-3 using the $\frac{3}{8}$ " x $1\frac{1}{2}$ " hardware (items 65, 109, 108, & 107).

Attach the braces to their respective boom support angles using the $\frac{3}{8}$ " x $1\frac{1}{2}$ " hardware.

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.

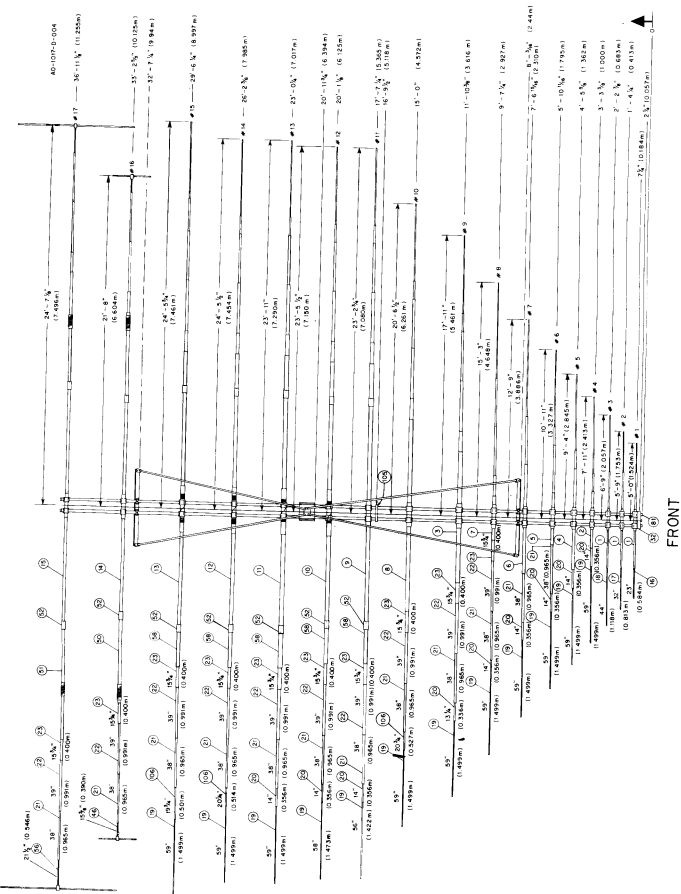
Balun Support Plate

Attach the balun support plate (item 32) and balun (item 31) to the front end of the boom. Refer to Figures 2-4 and 2-8.

Assemble Item 32 to antenna boom using two (2) narrow 2" boom clamps (item 39), $\frac{1}{4}$ " x $\frac{3}{8}$ " bolts and associated nuts and lockwashers.

CAUTION

Do not tighten these bolts too tight.



FRONT

Figure 2-4

Balun Assembly

Attach the balun (item 31) to the balun support plate (item 32) with the $\frac{1}{4}$ " x 1" hardware leaving the Type N connector protruding out the front end of the boom.

Remove the boom shorting strap (item 105) from the parts pack and attach it on the boom as shown in Figure 2-2 and Figure 2-4 using two narrow 2" boom clamps (item 39), $\frac{1}{4}$ " x $\frac{3}{4}$ " bolts, nuts and internal lockwashers.

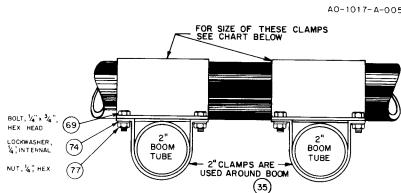
Center Insulator Assembly

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

Refer to Figure 2-4, Plan View, and the Parts List of this manual. Loosely assemble the center insulators at the location marked on the right hand side of Figure 2-4. Always measure from the front of the boom to the center of each element. See Figure 2-2A.

Figure 2-5 shows the size of element clamps used to fasten each element to the boom.

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



Item No.	Elements	Clamp Size	Hardware Used
36	1-3	1" I.D. clamp	$\frac{1}{4}$ " x $\frac{3}{4}$ " bolts
37	4-5	1 $\frac{1}{4}$ " I.D. clamp	$\frac{1}{4}$ " x $\frac{3}{4}$ " bolts
38	6-7	1 $\frac{1}{2}$ " I.D. clamp	$\frac{1}{4}$ " x $\frac{3}{4}$ " bolts
35	8-17	2" I.D. clamp	$\frac{1}{4}$ " x $\frac{3}{4}$ " bolts
35	boom	2" I.D. clamp	(at all locations)

Figure 2-5

Feedline Assembly

Select the $\frac{7}{16}$ " 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 insulators, clips, feedwire, etc. for assembling the feedline.

Place the two (2) 183 $\frac{1}{4}$ " long feedline sections (item 41) side by side with the hole in each tube at one end toward the mast as shown in Figure 2-7. Referring to Figure 2-8, attach insulators B and C as shown. Figure 2-9 shows the actual size of the insulators. Compare the parts with the drawings to assure the correct size during assembly.

NOTE: When assembling the insulators on the feedline, make sure the small slots in the end of the insulators are all on one side. The B-size insulator should be on the end of the feedline without holes (Front).

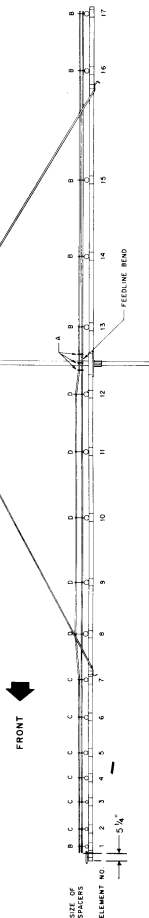


Figure 2-6

NOTE: See Figure 2-9 for Actual Size of the Feedline Spacers

Element No.	Feedline Spacer Size	Hose Clamp Item No.	Feedwire Assembly Item No.	Hardware (nut & lockwasher)
1	B	93 small	84, 3" white	Items 78 & 75
2	C	93 small	84, 3" white	Items 78 & 75
3	C	93 small	84, 3" white	Items 78 & 75
4	C	93 small	83, 3" black	Items 74 & 77
5	C	93 small	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	83, 3" black	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	—

Table 2-1

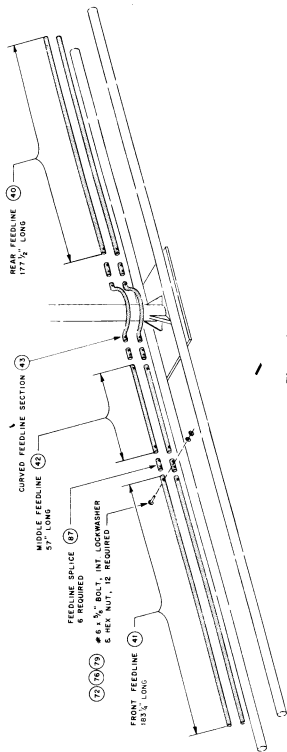
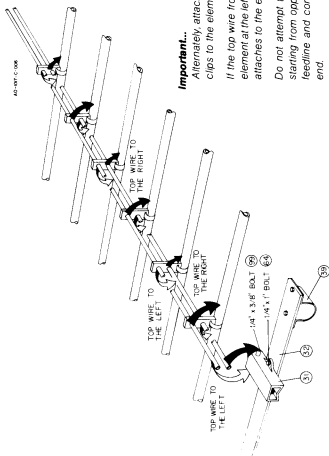


Figure 2-7



DETAIL A

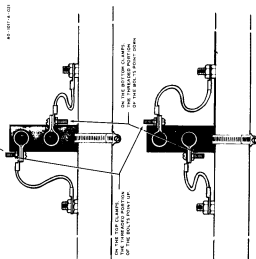
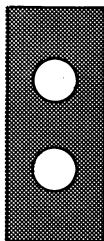
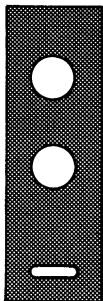


Figure 2-8

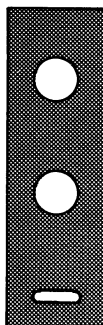
DETAIL B

**SIZE A****ITEM 104**

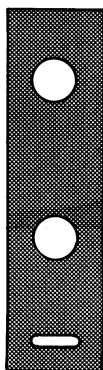
QUANTITY: 3
 Used only on
 curved feedline
 section around
 mast

**SIZE B****ITEM 89**

QUANTITY: 6
 Used at elements
 1, 13, 14, 15, 16, 17

**SIZE C****ITEM 90**

QUANTITY: 6
 Used at elements
 2, 3, 4, 5, 6, 7

**SIZE D****ITEM 91**

QUANTITY: 5
 Used at elements
 8, 9, 10, 11, 12

Figure 2-9
Feedline Spacers (Actual Size)

NOTE: Install all the feedline spacers with the hose clamp slots on one side.

As you assemble the insulators on the $\frac{7}{16}$ " feedline, the feeder clips (item 88) should be assembled also. Assemble one insulator, then a feeder clip on each tube, an insulator, a clip, etc., until you have one (1) B-size, six (6) C-size and three (3) D-size insulators with a clip on each feedline between each insulator.

Refer to Figure 2-7. Remove two (2) 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 $\frac{1}{2}$ " screws nuts and lockwashers (items 72, 76 and 79).

Attach the 57" straight section of tubing (item 42) to the splice. Align the holes and fasten securely using #6 x $\frac{1}{2}$ " screws (items 72, 76 and 79).

Refer to Figure 2-6 and install two (2) D-size insulators (item 91) and two pair of feeder clips (item 88) alternately on the feedline as previously done.

Attach another splice to each tube. Fasten securely.

Slip three (3) A-size insulators (without clips) (item 104) over the two curved pieces of feedline (item 43) and space evenly.

Align the holes with the splice and fasten securely to the previously assembled feedline.

NOTE: At this time have someone open up all the hose clamps.

Attach the remaining pair of splices to the curved section of the feedline. Secure, using #6 hardware (items 72, 76 and 79).

Attach the last two sections of tubing (item 40) to the curved section with the #6 screws (items 72, 76 and 79).

Assemble the B-size insulators and the feeder clips alternately as done previously.

Lay the feedline on top of the 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 5¼" from the front of the boom and the slots in the insulators are down. See Figure 2-6.

Space the insulators to site over each elements center insulator.

After the feedline insulators have been centered over each element, prepare to attach these securely by using the hose clamps supplied in Parts Pack 6. Table 2-1 lists the elements and the size of hose clamps used for each. Figure 2-6 identifies the hose clamp locations.

Beta Tube Assembly

Refer to Figure 2-10 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 2-10. Tighten securely.

Insert one end of the two beta tubes (item 54) through the insulator (item 55). Center these two (2) ¾" tubes with the center of the boom. Splice together securely using Item 49 and the #6 hardware called out in Figure 2-10.

Slide a beta match clamp (item 53) on each end of the #17 center insulator and then on the end of each ¾" beta tube. Fasten securely using hardware called out in Figure 2-10.

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

T-Bar Assembly

Refer to Figure 2-12 for the assembly of elements 16 and 17 and also the T-bar assembly. Refer to Figure 2-4 for correct exposed length of tubing.

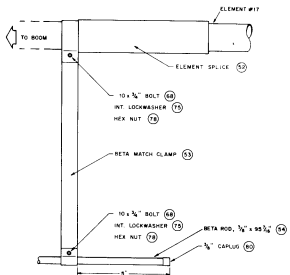
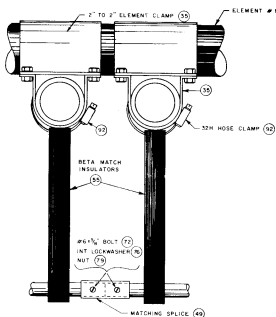
Feedwire Assembly

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

Attach feedwire to feedline clamps with #10 x ¾" bolt and hardware (items 68, 78 & 75).

Refer to Table 2-1 for the proper feeder wires and Figure 2-8 for the method of attachment.
Important — *The feedline wires must be attached to the elements in an alternating manner. See Figure 2-8, Detail A.*

Attach the feedwire (item 85) from the feedline to the balun using the ¼" x ¾" screws (item 99).



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NOTE: THE BETA TUBE WILL NOT BE LEVEL WITH THE 17th CENTER INSULATOR.



NOTE: AFTER FULL ASSEMBLY OF THE 17th ELEMENT, THE BETA TUBE WILL LEVEL OUT.

Figure 2-10. Beta Match Attachment

Element Assembly

NOTE: Make sure the element sections are free of all tape and dirt prior to assembly.

Assemble all element assemblies before attaching any elements to their respective center insulators.

Figures 2-11 and 2-12 show the correct compression clamps and associated hardware used for different element sections and splices.

Refer to Figure 2-4 for correct element sections and their exposed lengths.

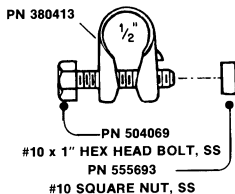
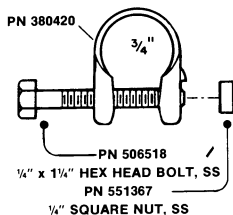
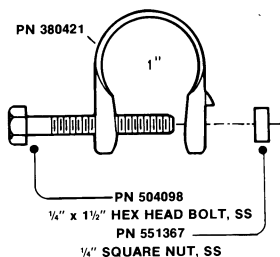
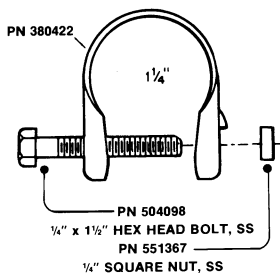
NOTE: The elements must be assembled exactly as shown in Figure 2-12.

Remove the 7/16" x 46" elements (item 18) from the crate and assemble in the center insulator assembly for element #3.

Secure using the 1/2" compression clamps (item 97).

Remove the 7/16" x 34" elements (item 17) from the crate and assemble on the center insulator assembly for element #2. Secure as before.

Remove the 7/16" x 25" elements (item 16) from the crate and assemble on the center insulator assembly for element #1.



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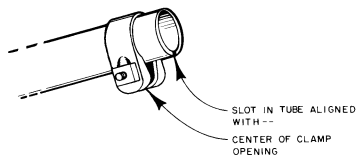


Figure 2-11
Stainless Steel Compression Clamps

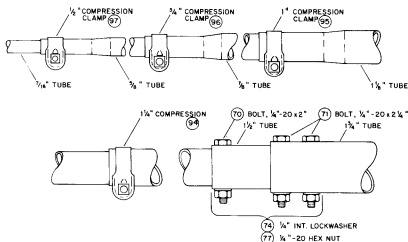


Figure 2-12

Recheck all dimensions by referring to Figure 2-4 and tighten all hardware and compression clamps securely.

Refer to Figure 2-13 and install the T-bar assembly (item 33, 870204) on elements 16 and 17 (item 34, 870205) as shown. Set lengths to those shown in Figure 2-4.

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

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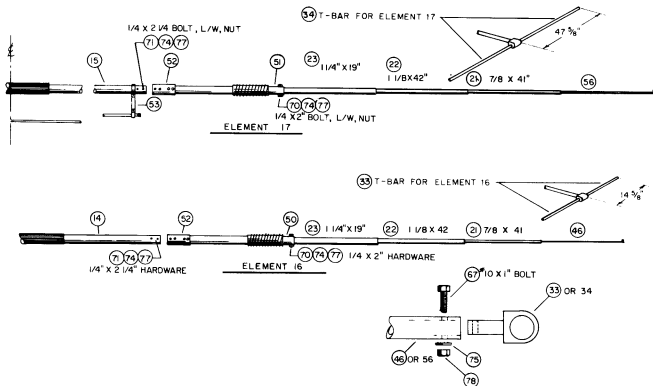


Figure 2-13

T BAR ASSEMBLY DETAIL

Feedline Attachment

Attach your feedline to the Type N connector at the balun.

An application of Burndy Penetrox or similar product can be applied at all electrical connections.

In or around coastal regions, a coating zinc chromate and/or a coat 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.

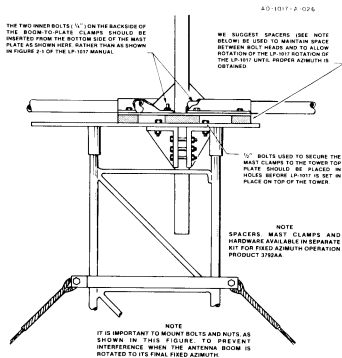
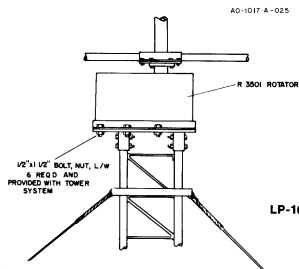
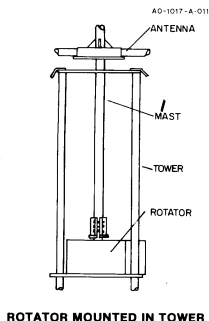
Rotator

Determine at this time if your rotator will set inside the tower or on top of the tower.

NOTE: The manufacturer suggests the rotator be set inside the tower for best results.

Refer to Figure 2-14 for attaching the antenna to your rotator.

After you have prepared your mast to fit your particular application, erect the antenna to the top of your support structure.



NOTE:
TORQUE 3/4" BOLTS TO 19 FT.-LBS.
TORQUE 1/2" BOLTS TO 40 FT.-LBS.

Figure 2-14.
Mast-to-Rotator or Tower Attachment

Erection Procedure

There are two recommended 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.

IMPORTANT: 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 men plus the crane operator. Attach the crane at the boom-to-mast plate. Attach a tag line near each end of the boom.

One man should operate each tag line to keep the antenna under control during entire erection procedure. Position one man on top of the support structure wearing a safety climbing harness. This man will connect the mast to the rotator clamps.

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

Secure the mast to the rotator.

Tape the feedline back to the boom near the mast.

Insert the end of the feedline through the large hole in the plate of the mast assembly and down the tower. On some models a hole has been cut in the side of the mast just above the plate. In this case insert the cable through this hole, 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.

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.

Gin Pole Method:

A gin pole with pulley that extends 12' or 14' above 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 a man 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 large hole in the plate of the mast assembly and down the tower. On some models a hole has been cut in the side of the mast just above the plate. In this case insert the cable through this hole, 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 III

Maintenance

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.

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 (forward 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.

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




CHAPTER IV

Parts List

This chapter contains a list of parts and/or assemblies found in the Hy-Gain Model 1017CA antenna. The first five pages show the actual size, shape and part number of all hardware used in this antenna.







NUMBER 6 HARDWARE

AO-1017-A-016

ITEM NO.	ITEM (ACTUAL SIZE)	SIZE	PART NUMBER
79		6-32 HEX NUT	555888
76		# 6 INTERNAL LOCKWASHER	565889
72	 BHSMS: BINDER HEAD SLOTTED MACHINE SCREW	6-32 x $\frac{5}{8}$ " BHSMS	506576








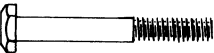
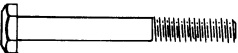
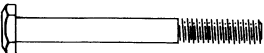
NUMBER 10 HARDWARE

AO-1017-A-017

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
73		10-24 x 1/2 " RHSMS	501041
68		10-24 x 3/4 " RHSMS	505751
67		10-24 x 1 " HHMS	504069

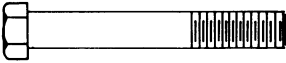


ONE-QUARTER INCH HARDWARE

AO-1017-A-018

ITEM NO.	ITEM (ACTUAL SIZE)	SIZE	PART NUMBER
98		$\frac{1}{4}$ " - 20 SQUARE NUT	551367
77		$\frac{1}{4}$ " - 20 HEX NUT	554099
75 & 103		$\frac{1}{4}$ " INTERNAL LOCKWASHER	552961
99		$\frac{1}{4}$ " - 20 x $\frac{1}{4}$ " HHMS	504098
69	 HHMS (HEX HEAD MACHINE SCREW)	$\frac{1}{4}$ " - 20 x $\frac{3}{8}$ " HHMS	505266
64		$\frac{1}{4}$ " - 20 x 1" HHMS	502958
66		$\frac{1}{4}$ " - 20 x $\frac{1}{4}$ " HHMS	506518
70		$\frac{1}{4}$ " - 20 x 2" HHMS	505737
71		$\frac{1}{4}$ " - 20 x $2\frac{1}{4}$ " HHMS	505736
63		$\frac{1}{4}$ " - 20 x $2\frac{1}{2}$ " HHMS	505734



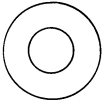
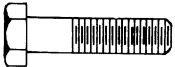
FIVE-SIXTEENTHS INCH HARDWARE

AQ-1017-A-022

ITEM NO.	ITEM (ACTUAL SIZE)	SIZE	PART NUMBER
		$\frac{5}{16}$ " - 18 x 3" HHCS	506969
		$\frac{5}{16}$ " SPLIT LOCKWASHER	564792
		$\frac{5}{16}$ " HEX NUT	555747



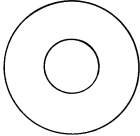
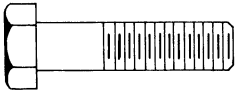
THREE-EIGHTHS INCH HARDWARE

AO-1017-A-019

ITEM NO.	ITEM (ACTUAL SIZE)	SIZE	PART NUMBER
109		$\frac{3}{8}$ "-16 HEX SELF-LOCKING NUT	555900
107		$\frac{3}{8}$ " SPLIT LOCKWASHER	561016
108		$\frac{3}{8}$ " FLAT WASHER	567180
65	 HHCS: HEX HEAD CAP SCREW	$\frac{3}{8}$ "-16 x $1\frac{1}{2}$ " HHCS	507873

ONE-HALF INCH HARDWARE

AO-1017-A-020

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	567066
57		$\frac{1}{2}$ "-13 x 2" HHMS	506977

NOTE: The following information pertains to the Parts List on page 28.

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 Hy-Gain Part Number used for reordering and in-house control.

The Third column is the Part Description and the Fourth column is the Quantity used per system 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 No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1	870170	Center insulator, elements 1-2-3	3			Parts Pack 1 (stainless steel) — continued	
2	870171	Center insulator assembly, element 4	1	60	557648	Nut, $\frac{1}{2}$ "-13, hex.	5
3	870172	Center insulator assembly, element 5	1	61	565872	Lockwasher, $\frac{1}{2}$ ", split	5
4	870173	Center insulator assembly, element 6	1	62	506969	Bolt, $\frac{1}{2}$ "-18 x 3", hex head	4
5	870174	Center insulator assembly, element 7	1	110	564749	Lockwasher, $\frac{1}{2}$ ", split	4
6	870175	Center insulator assembly, element 8	1	111	555747	Nut, $\frac{1}{2}$ ", hex.	4
7	870176	Center insulator assembly, element 9	1				
8	870179	Center insulator assembly, element 10	1	878776		Parts Pack 2 (stainless steel)	1
9	878774	Center insulator assembly, element 11	1	63	505734	Bolt, $\frac{1}{2}$ "-20 x 2 $\frac{1}{2}$ ", hex head	9
10	878773	Center insulator assembly, element 12 (173 $\frac{1}{2}$ ")	1	64	502958	Bolt, $\frac{1}{2}$ "-20 x 1", hex head	19
11	878770	Center insulator assembly, Element 13 (181 $\frac{1}{2}$ ")	1	65	507873	Bolt, $\frac{1}{2}$ "-16 x 1 $\frac{1}{2}$ ", hex head	12
12	878771	Center insulator assembly, element 14 (14 $\frac{1}{2}$ ")	1	66	506518	Bolt, $\frac{1}{2}$ "-20 x 1 $\frac{1}{2}$ ", hex head	14
13	878772	Center insulator assembly, element 15 (184 $\frac{1}{2}$ ")	1	67	504069	Bolt, #10-24 x 1", hex head	9
14	870186	Center insulator assembly, element 16	1	68	505751	Bolt, #10-24 x $\frac{1}{2}$ ", round head	44
15	878768	Center insulator assembly, element 17	1	69	505266	Bolt, $\frac{1}{2}$ "-20 x $\frac{1}{2}$ ", hex head	168
16	170698	Element 1, $\frac{1}{2}$ " x 25"	2	70	505737	Bolt, $\frac{1}{2}$ "-20 x 2", hex head	21
17	170699	Element 2, $\frac{1}{2}$ " x 34"	2	71	505736	Bolt, $\frac{1}{2}$ "-20 x 2 $\frac{1}{2}$ ", hex head	57
18	170700	Element 3, $\frac{1}{2}$ " x 46"	2	72	506576	Screw, #6-32 x $\frac{1}{2}$ ", bind head	15
19	170701	Elements 4-15, $\frac{1}{2}$ " x 61"	24	73	501041	Screw, #10-24 x $\frac{1}{2}$ ", round head	3
20	170638	Elements 4-9, 11-13, $\frac{1}{2}$ " x 17"	18			Parts Pack 3 (stainless steel, except items annotated*)	1
21	170705	Elements 6-17, $\frac{1}{2}$ " x 41"	24	74	562961	Lockwasher, $\frac{1}{2}$ ", internal	296
22	170704	Elements 8-17, 1 $\frac{1}{2}$ " x 42"	20	75	565697	Lockwasher, #10, internal	56
23	170697	Elements 8-17, 1 $\frac{1}{2}$ " x 19"	20	76	565889	Lockwasher, #6, internal	15
24	870388	Front boom brace assembly, long	2	77	554099	Nut, $\frac{1}{2}$ "-20, hex.	296
25	870389	Rear boom brace assembly, short	2	78	554071	Nut, #10-24, hex.	56
26	172732	Clamp, boom-to-plate, 2", 10" long	2	79	555888	Nut, #6-32, hex.	15
27		(Not Assigned)		107	561016	Lockwasher, $\frac{1}{2}$ ", split	12
28		(Not Assigned)		108	567180	Flatwasher, #2	24
29	880038	Mast Assembly	1	109	*550031	Nut, $\frac{1}{2}$ "-16, hex, self-locking	12
30	170415	Boom support extrusions	2			Parts Pack 4	1
31	870226	Balun	1	80	455655	Caplug, $\frac{1}{2}$ "	2
32	470074	Balun support plate	1	81	455625	Caplug, 2"	4
33	870204	T-bar assembly, element 16	2	82	455644	Caplug, $\frac{1}{2}$ "	35
34	870205	T-bar assembly, element 17	2			Parts Pack 5	1
35	170643	Clamp, element, 2" to 2"	54	83	870210	Feedwire assembly, 3", black	10
36	170640	Clamp, element, 1" to 2"	6	84	870209	Feedwire assembly, 3", white	6
37	170641	Clamp, element, 1 $\frac{1}{2}$ " to 2"	4	85	870211	Feedwire assembly, 4", red	12
38	170642	Clamp, element, 1 $\frac{1}{2}$ " to 2"	4	86	870212	Feedwire assembly, 10 $\frac{1}{2}$ ", red	8
39	170663	Clamp, element, 2" to 2", narrow	4			Parts Pack 6	1
40	170724	Feedline, rear, 177 $\frac{1}{2}$ " long	2	878777		Splice, matching	1
41	170305	Feedline, $\frac{1}{2}$ " x 183 $\frac{1}{2}$ " long	2	49	170292	Clip, feeder	36
42	170294	Feedline, middle, $\frac{1}{2}$ " x 035 x 57"	2	88	170706	Insulator, feedline, size A	3
43	170723	Feedline, curved	2	104	470079	Insulator, feedline, size B	6
44	170875	Boom support angle	4	89	470067	Insulator, feedline, size C	6
45	380142	Clamp, 2" to 2"	4	90	470068	Insulator, feedline, size D	5
46	170740	Tube, $\frac{1}{2}$ " for element 16 T-bar	2	91	470069	Splice, feedline	6
47	170414	Boom, 2", rear and front	4	87	170721	Clamp, hose, 32H	14
48	170184	Boom, 2", middle, swaged	2	92	355195	Clamp, hose, 20H	5
50	870213	Loading assembly element 16	2	93	351559		
51	878769	Loading assembly element 17	2			Parts Pack 7 (stainless steel)	1
52	170749	Splice	14	870233		Clamp, compression, 1 $\frac{1}{4}$ "	20
53	170751	Clamp, beta match, element 17	2	94	380422	Clamp, compression, 1"	24
54	170291	Tube, beta rod, $\frac{1}{2}$ ", element 17	2	95	380421	Clamp, compression, $\frac{1}{2}$ "	28
55	470078	Insulator, beta match, element 17	2	96	380420	Clamp, compression, $\frac{1}{4}$ "	30
56	170717	Tube, $\frac{1}{2}$ ", for element 17 T-bar	2	97	380413		
58	170290	Elements 11-15, 1 $\frac{1}{2}$ " x 30"	10			Parts Pack 8 (stainless steel)	1
105	103311	Strap, boom shorting	1	870224		Nut, $\frac{1}{2}$ ", square	75
106	170753	Tubing, $\frac{1}{2}$ " x 28", elements 10-14-15	6	98	551367	Bolt, $\frac{1}{2}$ "-20 x 1 $\frac{1}{2}$ ", hex head	48
	879398	Parts Pack — Master Pack	1	99	504098	Bolt, $\frac{1}{2}$ "-20 x 1 $\frac{1}{2}$ ", hex head	30
				66	506518	Bolt, #10-24 x 1", hex head	32
879397		Parts Pack 1 (stainless steel)	1	67	504069	Nut, #10, square	34
57	506977	Bolt, $\frac{1}{2}$ " x 2", hex head	5	102	555693	Lockwasher, #10, internal	62
59	567066	Flatwasher, $\frac{1}{2}$ "	10	103	565697		

ONE YEAR LIMITED WARRANTY

Hy-Gain/TELEX COMMUNICATIONS, INC. warrants all products manufactured by it and bearing the Hy-Gain model numbers to be free from defective material and workmanship and agrees to repair such products under normal use and service, if investigation discloses the defect to be the fault of our manufacture. Hy-Gain's obligation under this warranty is limited to repairing any such product which, upon our examination, proves to be so defective. Hy-Gain reserves the right to determine if defective products are to be returned to the factory for repairs. If return of products is required, transportation will be prepaid by the purchaser, within one year from date of original purchase price of the product.

This warranty applies only to the original purchaser. Warranty valid only in the U.S.A.

Upon receipt of equipment, the purchaser is responsible for checking the contents for damage. Any shipping damage claims should be referred to the carrier.

This warranty does not apply to any Hy-Gain products which have been repaired, worked upon or altered by persons not authorized by Hy-Gain to do so, or products to which the repair has injured the stability or reliability of such product or which has been the subject of misuse, negligence or accident, or the serial number of which has been removed, altered, effaced, or in any way rendered unidentifiable. Neither does this warranty apply to any of our products which have been connected, installed, used, or otherwise adjusted other than in accordance with instruction furnished by Hy-Gain. Nor does Hy-Gain assume any liability for consequential damages and, in any event, our liability shall in no case exceed the original purchase price of the product.

Accessories supplied by, but not manufactured by Hy-Gain, shall carry only such warranty as is available from the manufacturer of such goods and are specifically excluded from Hy-Gain warranties.

This warranty is void if Hy-Gain shall inspect equipment and find it to have been modified, improperly installed or used. This warranty is expressly in lieu of all other warranties expressed or implied, and all other obligations or liabilities on the part of Hy-Gain and no person, including any dealer, agent, distributor, or representative of Hy-Gain is authorized to assume for Hy-Gain any liability on its behalf or in its name, except to refer purchasers to this warranty.

All claims of defect or shortage should be addressed to:

CIM Department
Hy-Gain
TELEX COMMUNICATIONS, INC.
8601 N.E. Highway 6
P.O. Box 5579
Lincoln, Nebraska 68505 U.S.A./Phone: (402) 467-5321

You must furnish model number, date, place, and proof of purchase, such as a copy of the sales receipt to establish warranty. Your letter should include all pertinent details along with part or item numbers involved. Do not return anything until requested to do so. No warranty card is furnished. You must supply the above information.

Any returned items must have prior authorization. Unexpected returns are greatly delayed in handling. These delays can be avoided by writing in advance and furnishing the necessary information.

DESIGN: Hy-Gain reserves the right to make changes in design and improvement on its products without assuming any obligation to install the same on any of its products previously manufactured. Further, Hy-Gain reserves the right to ship new and/or improved products which are similar to the form, fit and the function of products originally ordered.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

TELEX[®] *hy-gain*[®]

TELEX COMMUNICATIONS, INC.

8601 NORTHEAST HIGHWAY SIX, LINCOLN, NE 68505 U.S.A.

ADDENDUM

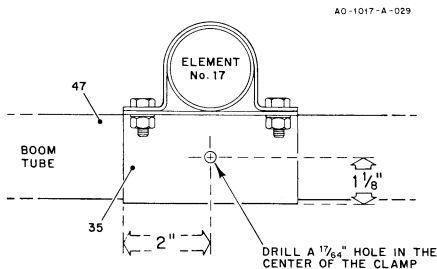
1017CA Antenna

This Addendum covers several changes to the 1017CA Antenna. Change the manual (Part Number 801106-1) to reflect these changes.

Securing Element No. 17 to Boom

It is recommended that the following modification be made to the 2-inch clamps around the boom tubes on Element No. 17. The $\frac{1}{4}$ "-20 x $2\frac{3}{4}$ " bolts (Item No. 112), $\frac{1}{4}$ "-20 nuts (Item No. 77) and the $\frac{1}{4}$ " split lockwashers (Item No. 113) needed for this modification are supplied.

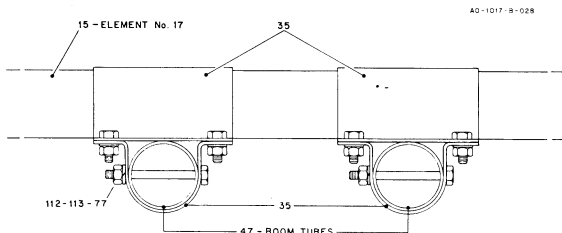
Following completion of the antenna assembly, make certain the boom and Element No. 17 are level. Drill a $\frac{17}{64}$ " hole through the element clamps and boom tubes as shown in Illustration 1.



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

Illustration 1
Dimensions for Drilling Hole

Install the 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 Illustration 2.



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

Illustration 2
Securing Element Clamp to Boom

PAGE 15

When assembling the 1 1/4" Compression Clamps (Item No. 94), use the 1/4"-20 x 2" Bolts (Item No. 70) in place of the 1/4"-20 x 1 1/2" Bolts (Item No. 99).

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Change the size on Item No. 99 to read: 1/4"-20 x 1 1/2" HHMS.

PARTS LIST

Make the following changes to the Parts List:

Item No.	Part No.	Description	Qty	
			Old	New
70	505737	Bolt, hex head, 1/4"-20 x 2"	21	41
77	554099	Nut, hex, 1/4"-20	296	298
99	504098	Bolt, hex head, 1/4"-20 x 1 1/2"	48	28

Add the following Items to the Parts List:

Item No.	Part No.	Description	Qty
112	505733	Bolt, 1/4"-20 x 2 3/4"	2
113	561177	Lockwasher, split, 1/4"	3

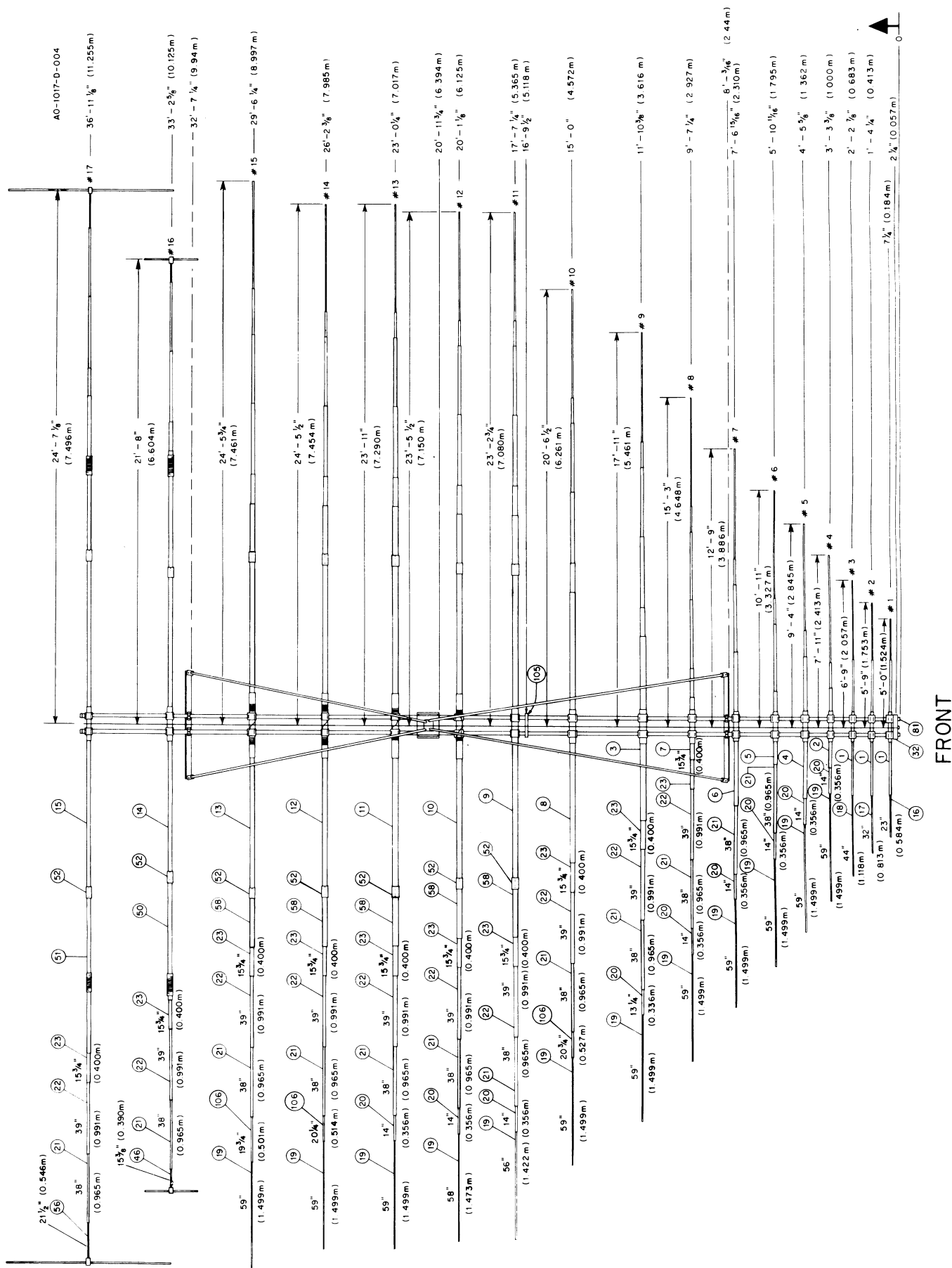


Figure 2-4