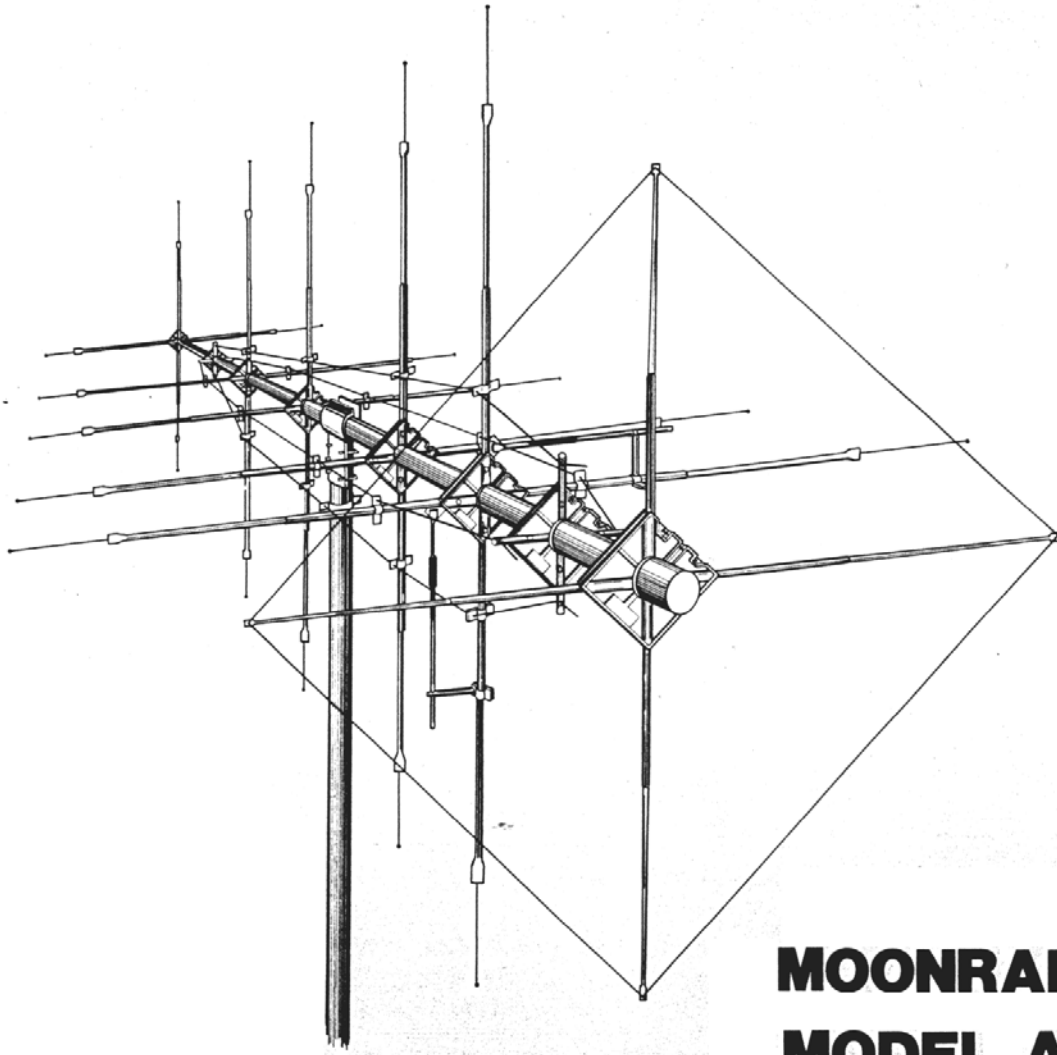


# INSTRUCTION MANUAL



**MOONRAKER 6**  
**MODEL AV-146**

**avanti**

# **IMPORTANT INFORMATION PLEASE READ CAREFULLY**

## **LIMITED WARRANTY**

AVANTI R&D, INC. guarantees the materials and workmanship under normal use for one year from date of purchase. AVANTI R&D, INC. will repair or replace parts which are found defective in either materials or workmanship at no charge to the customer. In no event shall AVANTI R&D, INC. be liable for special or consequential damage. No claim under this warranty will be honored if the equipment covered has been misused, tampered with, or changed in any way. This warranty is in lieu of all others, expressed or implied.

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It is not necessary to return a warranty registration card. However, **SAVE YOUR SALES RECEIPT**. Should a warranty claim ever become necessary, simply send your sales receipt, or a copy of the receipt, along with the defective part to AVANTI R&D, INC. It is suggested that you simply staple or tape your sales receipt to your instruction booklet for future reference. Your sales receipt is your proof of purchase date.

## **HANDLING OF WARRANTY CLAIMS FOR FASTEST SERVICING**

All warranty claims should be directed to AVANTI R&D, INC., 340 Stewart Avenue, Addison, Illinois 60101 in order to expedite prompt service. Any part that is felt to be defective in either materials or workmanship should be sent prepaid to AVANTI R&D, INC. for evaluation, repair or replacement. It is not necessary to return an entire unit, but only those part(s) that are defective. All returned units will be shipped prepaid.

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# PARTS LIST

MOONRAKER 6  
(Model AV-146)

Part No. QTY. DESCRIPTION

## SAG CONTROL

1767	4	Coupler Nut
1464	4	Collet End Fastener Nut
1463	8	3/16 x 12' long fiberglass rods
1465	16	3/16 Fiberglass Collet End Fasteners
1466	4	Tension Adjustors
1467	4	Guy Rod Anchors (Threaded)
1468	4	Guy Rod Anchors (Unthreaded)
1469	4	Tension Adjusting Lock Nuts
1492	1	Guy Rod Mast Fastener
1470	34	Guy Line Saddles
1471	16	#6 Sheet Metal Screws (To Fasten "Guy Fasteners")
1472	2	#12 Sheet Metal Screws
1187	30	1/4 x 1 1/4" Bolts
1189	13	1/4 x 1 1/2" Bolts
1053	24	5/8" Tube Clamps
1153	40	1/4" Star Washers
1152	43	1/4" Flat Washers
1099	37	10-32 Square Nuts
1195	63	10-32 x 1/2" Bolts
1091	24	10-32 Hex Nuts
1165	27	#10 x 5/8 Flat Washers
1151	46	#10 Stainless Steel Star Washers
1098	3	1/4-20 Square Nuts
1090	41	1/4-20 Hex Nuts

## BOOM

1473	1	1-5/8" x 12' Long Rear Boom Section
1474	1	1-5/8" x 10'3" Long Front Boom Section
Sub 132	1	1-3/4" x 11'3" Long Center Boom Section
1051	2	1-3/4" Stainless Tube Clamps
1003	2	1-5/8" Plastic End Boom Caps

## ELEMENTS

1477	4	1/2" x 53-3/8" Long Tubes
1478	2	1/2" x 49-7/8" Long Tubes
1479	4	1/2" x 49-3/8" Long Tubes
1571	4	1/2" x 47-7/8" Long Tubes
1480	2	1/2" x 44-7/8" Long Tubes
1481	2	1/2" x 39-1/8" Long Tubes
1482	2	1/2" x 38-3/8" Long Tubes

## ELEMENT ASSEMBLIES

1485	1	4" Mast Mount
1486	2	"Large Hole" Element Hubs (Half)
1007	14	Element Hubs (Half)
1742	4	5/8 x 36" Inner Element with Dimple and Hole
1743	4	5/8 x 36"-A Inner Element with 4-7/8" Hole*
1744	4	5/8 x 36"-B Inner Element with 5-1/2" Hole*
1745	8	5/8 x 36"-C Inner Element with 11-1/2" Hole*
1759	4	5/8 x 36" Long Tubes — Not Dimpled
Sub 131	4	Fiberglass Reflector Arms
1311	1	Roll #14 Ga. Wire
1072	3	1-3/4 Mast Clamps (with Lockwashers and 5/16 Nuts)
Sub 120	1	Connector Bracket
Sub 134	2	Horizontal (Red) Gamma Match Assembly
Sub 147	2	Vertical (Blue) Gamma Match Assembly
1059	2	Gamma Fasteners
1309	20	1/8" Stainless Steel Wire 2' Long
1487	16	Guy Fasteners
1488	1	Special Curved Bolt

## SWITCHBOX

Sub 133	1	AV-502 Double Switch Box
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\*Hole measurement is the distance from end of element to the hole.

## STEP 1

There are 24 5/8 x 36" tubes. Lay them all on the floor. Notice the small holes. SEE FIG. 3. There are 8 tubes which have this small hole 11 1/2" from one end. Take four of these 8 and mark them #3; take the other four and mark them #2. Set aside.

## STEP 2

There are four tubes which have the small hole 5 1/2" from one end. (FIG. 3.) Mark these #4 and set aside.

## STEP 3

There are four tubes which have the small hole 4-7/8" from one end. (FIG. 3.) Mark these #1 and set aside.

## STEP 4

There are 8 remaining tubes with no small hole. Mark the four tubes with the "dimples" #5. The remaining four with no dimples should be marked "R". Set aside.

## STEP 5 HUB ASSEMBLIES:

There are 16 hub halves. Two of these sixteen have a larger center hole. Construct one hub assembly as shown in FIG. 1, using the two "large hole" hub halves and four 5/8" arms you have marked #3. Use 1/4 x 1 1/4" long bolts with flat washers under the heads of the bolts and a 1/4" star washer under each nut. Use a 7/16" open end wrench on the HEAD of the bolt. The star washer should hold the nut from turning, so it will not be necessary to hold the nut while tightening.

## STEP 6

Construct 4 more hub assemblies as in step 2 using the smaller hole hubs. Use four 5/8" arms marked #2, #4, #5, and "R". Each assembly must contain four of the same number only.

## STEP 7

The #1 hub assembly is identical except that the connector bracket is attached as shown in FIG. 2. Two 1/4 x 1 1/2" LONG bolts are used on the side which holds the bracket. Note the orientation of the bracket on the hub.

## GUY ANCHOR ASSEMBLIES:

### STEP 8

There are eight anchor pins. SEE FIG. 4. They are 5/8 O.D. x 3" long and have two holes, one near each end. FOUR anchor pins have a threaded hole in one end. Separate the threaded anchor pins from the unthreaded ones.

Construct a guy anchor assembly the same as the hub assemblies in Step 5, except use 4 THREADED anchor pins instead of 5/8 x 36" arms. FIG. 4 shows typical construction. The THREADED hole is the one which is exposed.

### STEP 9

Construct another guy anchor assembly identical to the one in Step 4 except use the 4 UNTHREADED anchor pins. The larger of the two holes in the anchor pin should be the one which is exposed.

### STEP 10

There are three boom sections:

One 1 5/8 O.D. x 12' long

One 1 5/8 O.D. x 10'-3" long

One 1 3/4 O.D. x 11'-3" long. Make two marks on this section, 63" and 64" from the end which has the rivet.

## STEP 11

Slide #3 hub assembly which has the large center hole, onto this boom and position between the two marks. Leave loose.

## STEP 12

a) Slide the mast mount onto this boom also. The measurement should be 40" from the end of the boom with the rivet, to the edge of the mast mount. See FIG. 5 and FIG. 6. IMPORTANT: There are two ways the mast mount can be put on the boom. One way is WRONG. The flat portion of the mount which contains the 6 holes should be situated on the right side of the boom when looking at the front of the antenna. See FIG. 6.

b) Tighten mast mount to the boom using three 1/4" x 1 1/2" long bolts with flatwashers and 1/4" square nuts.

c) Install the three mast clamps on the mast mount. Use lockwashers under the 5/16" nuts FIG. 6 and FIG. 9. Leave nuts loose.

## STEP 13

a) Make a mark 10" from one end on the two remaining booms.

b) Slide the 12' boom, the longest of the two, into the end of the center section with the rivet. It should be inserted up to the 10" mark.

c) Place a large tube clamp over the slotted portion of the center boom and tighten. Keep the clamp close to the edge of the tube.

## STEP 14

Put the 10'3" boom into the other end of the center boom section similarly. As in step 13. Use a tube clamp and tighten.

## STEP 15

Slide all the hub assemblies and guy anchor assemblies onto the boom as shown in FIG. 11 except the reflector assembly "R"; leave it off. Notice #1 assembly is the assembly with the gamma bracket. The gamma bracket must face the mast. Refer to FIG. 13. To locate each assembly in its proper place on the boom, measure the spacings from center to center near the hub. Dimensions are shown in Fig. 11. NOTE: Orientate ALL hub assemblies so the slots are positioned upward as in FIG. 13. Gamma bracket must be installed as shown also.

## STEP 16

For ease of construction, it is suggested the antenna be temporarily mounted on a short mast which is anchored firmly. The mast size is 1 1/2" water pipe. 1 1/2" water pipe measures 1.900" outside diameter. Before mounting the antenna on the mast, prepare the mast fastener as in FIG. 21, (hardware should be finger tight only) and slip the mast fastener over the mast. Rotate all the hub assemblies so the vertical elements are in alignment with the mast. The slots in all the hubs should also be in alignment. (When facing the front of the antenna the slots should be toward your upper left.) Also make sure the gamma bracket on assembly #1 is positioned as shown in FIG. 13.

NOTE: Since all the hub assemblies have been installed on the boom except the reflector, the whole assembly will be off balance when mounted on the temporary mast. It is suggested that enough weight be temporarily attached to the reflector end to balance the boom.

## STEP 17

Secure the hub assemblies to the boom. Use this procedure:

- Start a  $\frac{1}{4}$ " nut onto a  $1\frac{1}{2}$ " bolt after a flatwasher and starwasher have been placed on the bolt. The flatwasher should be under the head of the bolt and the starwasher should be under the nut.
- Place this bolt in the hub assembly as shown in FIG. 7.
- Tighten with a  $\frac{7}{16}$ " open end wrench. Place the wrench on the head of the bolt (not the nut). The starwasher will keep the nut from turning while tightening.
- Secure all hub assemblies. The two anchor assemblies should be left loose.

## REFLECTOR ASSEMBLY CONSTRUCTION:

### STEP 18

- Select a flat surface about 10 feet square.

- Find the remaining hub assembly that has not been mounted on the boom, marked "R". Put a tubing clamp over each slotted end of the four  $\frac{5}{8}$ " arms — leave loose.

- Slide the four tapered fiberglass rods into the  $\frac{5}{8}$ " arms. The fiberglass rods are inserted in up to the marks (FIG. 12). Tighten tubing clamps. The screw heads on the tip of the fiberglass rods should face up (FIG. 20).

NOTE: Keep the tubing clamps near the edge of the slotted tubes. If this is not observed the fiberglass rods will not be secure.

### STEP 19

Install hardware on the tips of 3 tapered fiberglass rods as shown in FIG. 14, the fourth fiberglass rod has two flatwashers on its tip as in FIG. 15. Leave all screws loose.

## WIRE INSTALLATION ON REFLECTOR (R)

### STEP 20

IMPORTANT: Extreme care must be exercised in stretching and marking the reflector wire. The dimension of  $9' 8\frac{1}{2}"$  is critical and should be held within  $\frac{1}{16}"$ . Proper operation of the antenna depends largely on the care taken in making this measurement. The wire length cannot be measured correctly when it is installed on the fiberglass arms. The wire MUST be measured and marked, stretched out STRAIGHT. It is suggested that a flat surface be used for making this measurement, such as a sidewalk or floor. It is necessary to have a 50 foot tape measure to mark the wire.

Follow this procedure and refer to FIG. 22:

- Fasten one end of a wire to a nail, or clamp the end in a vise.
- At the opposite end, wrap the wire around a pair of pliers or a stick so that wire won't slip loose when pulling.
- Pull on stick so wire stretches a few inches. If done correctly, wire will be perfectly straight.
- Lay the tape measure next to the wire on the floor and mark the wire with a black magic marker or paint spot as shown.

NOTE: Put all five marks on the wire without moving the tape measure or wire. SEE FIG. 22. The total length of the wire from the first mark to the fifth should measure exactly  $38'10"$ .

- "String" the wire around the fiberglass tips, FIG. 20. Make sure the mark on the wire is in the center of the screw before tightening, FIG. 16. The fiberglass arm which has two flatwashers in its tip, is the tip which will terminate the two free ends of the wire. Wrap both ends around the screw. One end should be under one flatwasher, the other end should be under the other flatwasher. SEE FIG. 17.

NOTE: The marks on both ends of the wire should be positioned in the center of the screw. SEE FIG. 17 and FIG. 20.

## FINAL WIRE ADJUSTMENT

### STEP 21

After you have completed the reflector assembly, check to see if the wire is too tight. This will cause bowing as shown in FIG. 23. To check this, have someone hold the assembly up vertically off the ground. By sight, line up the wires. The wire closest to you and the one on the far side should cross the hub. See FIG. 23.

If the wire is too tight or loose, adjust by loosening the  $\frac{5}{8}$  tube clamps and sliding the fiberglass arms in or out. Move the arms  $\frac{1}{8}"$  and re-tighten. Adjust all four arms equally. Repeat this procedure until the wire is as tight as possible without bowing the arms. Refer to FIG. 23.

IMPORTANT NOTE: Don't change the wire length as an adjustment. Always adjust the wire tension by changing the arm lengths.

### STEP 22

There are 16 guy fasteners and two gamma fasteners. The guy fastener and the gamma fasteners look very much alike. The only difference is that the gamma fasteners have a  $\frac{1}{4}"$  hole in the thick end. The guy fasteners have a  $\frac{3}{8}"$  hole. The guy fasteners have a small hole in the rounded portion of the fastener. The gamma fastener does not have this hole. Find the two gamma fasteners with the  $\frac{1}{4}"$  hole and set them aside.

### STEP 23

Install hardware on all the guy fasteners as shown in FIG. 24. Leave loose.

### STEP 24

Attach all 16 guy fasteners to hub assemblies #1, #2, #3, and #4. FIG. 25 shows #1 assembly as a sample. The  $\frac{3}{8}"$  hole MUST be positioned on the element arms as shown. FIG. 25 is shown as if you were in front of the antenna. To secure, the small hole on the rounded portion of the guy fastener is lined up with the small hole in the element tube and fastened with a sheet metal screw, after which screw "A" is tightened. (FIG. 24 and FIG. 25.)

## GAMMA ATTACHMENT

### STEP 25

Take the two gamma fasteners which were set aside in Step 22 and slide them over the proper  $\frac{5}{8}"$  arms of hub assembly #1. SEE FIG. 25.

### STEP 25A

The horizontal and vertical gamma tubes are different and must be installed in their proper place.

Referring to Figure 25, the horizontal gamma, which is the longest of the two and is coded red, must be attached to the horizontal connector and the horizontal arm.

The vertical gamma tube (coded blue) is connected to the vertical connector and vertical arm which is pointing down as shown.

#### STEP 26

Connect both gamma tubes to connectors as shown in FIG. 26. DO NOT TIGHTEN.

NOTE: There is a #10 starwasher used on each gamma, between the gamma tube and the flat lug.

#### STEP 27

Connect the other end of the gamma to the gamma fastener as shown. (Fig. 8, Fig. 10, and Fig. 25.) The end of the gamma rod should extend about 1/8" beyond fastener.

#### STEP 28

Tighten screw left loose in Step 26. Illustrated in FIG. 26.

#### STEP 29

Rotate the guy anchor assemblies so that by eye sight, the holes in the anchor pins line up with all the 3/8" holes in the guy fasteners. Lock this anchor assembly to the boom the same as the hub assemblies in Step 17 (FIG. 7). Fig. 27 shows the front guy anchor assembly. The rear guy anchor assembly follows the same procedure.

NOTE: Observe the 54" and 60" dimension in FIG. 11.

#### STEP 30

a) Find the four guy tension adjusters (FIG. 28).

b) Put a light film of oil or grease on the threads of the tension adjusters. CAUTION: Do not get oil or grease inside of hole.

c) Thread a 3/8" nut all the way onto each adjuster. FIG. 28.

d) Screw the tension adjusters into the guy anchor pins all the way in.

#### STEP 31

a) Separate 8 brass "collet end fasteners" and 8 large, special nuts (the largest nuts) from the rest of the hardware (FIG. 29). These 8 special nuts have a tapered threaded hole which will thread onto the brass collet ONE WAY ONLY.

b) Thread the proper end of each nut onto the brass collet LOOSELY.

c) The lines must be coupled by use of coupler (Fig. 31). Simply install guy lines as described in manual. Then couple them in center of antenna with couplers. The guy lines are to be equally inserted into coupler and end nuts securely tightened. For ease of installation, use one thickness of teflon tape on the parts indicated in Fig. 31.

#### STEP 32

Attach a "collet and fastener" to one end of each fiberglass guy line. (There are four lines.) Place them approximately 1" from the end. FIG. 29. To tighten, use two wrenches, a 1/2" wrench and a 5/8" wrench. Tighten securely.

CAUTION: Although it is okay to have a light film of oil or grease on the threads of the collet, it is important that the collet hole and the fiberglass guy line, at the point of attachment are clean of oil and grease.

#### STEP 33

a) Feed the free end of one guy line through the TOP tension adjuster. Continue feeding through all the 3/8" holes of the guy fasteners. (#4, #3, #2, and #1.) And finally, pull the end through the top hole in the anchor pin of the rear anchor assembly.

b) Slide a "collet end fastener" onto the end of this guy line.

c) Have someone hold the front end of the boom while you lift your end. Lift your end while sighting down the boom. When the boom looks straight and the sag is eliminated, pull on the guy line and slide the end fastener up to the anchor pin. With two wrenches tighten the end fastener as in STEP 32. FIG. 29.

#### STEP 34

WHEN VIEWING THE ANTENNA FROM THE FRONT AS IN FIG. 6:

a) Position mast fastener so the 3/8" hole is on the right side. (The same side as "nut side" of the mast mount.)

b) Secure mast fastener 6 1/2" from the bottom edge of mast mount to the top edge of the mastener, FIG. 6.

#### STEP 35

Install the bottom guy line as in Step 33. The only difference is that the guy line must pass through the 3/8" hole in the MAST FASTENER also, FIG. 6.

NOTE: Pull on the guy line while securing the end fastener to eliminate excess slack.

#### STEP 36

Install one of the two remaining "side guy lines."

a) Sight down the boom while pulling on the line, when it is straight, tighten end fastener.

b) Install the last "side guy line" similarly.

#### STEP 37

There are 17 pairs of guy line saddles. Insert a pair in the 3/8" hole of each guy fastener and one pair into the mast fastener. Slide both halves in and rotate them into the position shown in FIG. 30. Do not tighten the locking screw at this time.

### TO ADJUST GUY LINES

#### STEP 38

In order to adjust the tension adjuster for more guy line tightness, "unscrew" the tension adjuster from the anchor pin until the desired guy line tension is obtained. If the guy line must be loosened, the tension adjuster must be screwed inward.

Adjust the four tension adjusters for boom straightness and guy line tightness. Use this procedure:

a) Adjust the top guy line for no sag.

b) Tighten the bottom guy line.

c) Tighten both "side guy lines." Sight down the boom for straightness. It is possible to have a perfectly straight boom with no sag if done right. DON'T OVER TIGHTEN.

d) After all adjustments have been made tighten the lock nuts against the anchor pins. FIG. 28.

NOTE: After the installation of the remaining parts of the antenna in the future steps it may be necessary to make slight readjustment of the tension adjusters.

e) Tighten all 17 locking screws on the guy fasteners, and the one on the mast fastener. Make sure all the saddles are in the proper position before tightening. SEE FIG. 30.

### STEP 39

There are twenty  $\frac{1}{2}$ " tubes with flattened ends.

- a) Find two tubes which are 38  $\frac{3}{8}$ " long and mark them both "H5".
- b) Find two tubes which are 39  $\frac{1}{8}$ " long and mark them both "V5".
- c) Find two tubes which are 44  $\frac{7}{8}$ " long and mark them "V4".
- d) Find FOUR tubes which are 47  $\frac{7}{8}$ " long. Mark two of them "H4" and the other two, mark "V3".
- e) Find four tubes which are 49  $\frac{3}{8}$ " long. Mark two of them "H3" and the other two, mark "H2".
- f) Find two tubes which are 49  $\frac{7}{8}$ " long, mark them both "V2".
- g) Find four tubes which are 53  $\frac{3}{8}$ " long, mark two of them "H1" and the other two, mark "V1".

### STEP 40

On the flattened end of all  $\frac{1}{2}$ " tubes, attach stainless steel rods. See FIG. 18. Use a large sharp screwdriver. Fasten securely.

NOTE: It is important to use both starwashers on each tube.

### STEP 41

Sight down the tube and if rod is not protruding straight off the end of the tube, bend to correct. SEE FIG. 19.

### STEP 42

Horizontal Element Attachment: REFER TO FIG. 11 AND FIG. 25.

- a) Place a tube clamp on all the slotted ends of all the 5/8" arms. There are 16 arms. Do not tighten.
- b) Locate the two "H1" tubes you have marked, and slide them in up to the dimple in the HORIZONTAL arms of #1 assembly.
- c) Tighten tube clamps. (Keep tube clamps even with the edge of the 5/8 slotted arm.)
- d) Install the two "H2" tubes in the horizontal arms of the #2 assembly. Tighten tube clamps.
- e) Install the two "H3" tubes in the horizontal arms of #3 assembly. Tighten clamp.
- f) Install the two "H4" tubes in the horizontal arms of #4 assembly. Tighten clamp.

g) Install the two "H5" tubes in the #5 assembly. Tighten clamps.

## VERTICAL ELEMENT ATTACHMENT

### STEP 43

The vertical element tubes are attached in the same manner as the horizontal tubes in STEP 42, the numbers on the tubes you have marked (V1, V2, etc.) must match with the assembly number. Example: The two "V1" tubes are installed on the #1 assembly. Note: If you have the antenna mounted on a temporary mast which is less than 9' long it will be necessary to leave all the bottom vertical element tubes off until the whole antenna is removed from this mast because the element tubes will not clear the ground.

### STEP 44

a) Attach the reflector assembly to the boom 83 $\frac{3}{4}$ " from hub assembly #1 (FIG. 11). The measurement is from the center of one hub to the center of the other.

b) Line up the fiberglass arms with the element arms and secure the hub to the boom as in Step 17 and shown in FIG. 7.

### STEP 45

Finally, with everything installed, sight down the boom. Readjust the tension adjusters for boom straightness if necessary. Important Note: a) Don't forget to tighten the mast fastener when remounting the antenna on the permanent mast. b) It is also very important that the locking screw Fig. 6 be tightened after the guy line saddles have been inserted in the 3/8" hole of the mast fastener. Make sure that the boom is parallel with the ground and "square" with the mast before tightening the locking screw of FIG. 6. c) Check the element lengths from tip to tip as given in the chart.

### STEP 46

After the antenna has been completely constructed and everything is in good alignment, drill two 3/16" holes approximately 5" in (toward the mast) from each end of the 1 3/4" center boom section and install a #12 sheet metal screw in both drilled holes. This is a double insurance against the booms turning inside one another in severe weather. SEE FIG. 11.

### STEP 47

Place a boom cap on each end of the boom.

### STEP 48

Connect your horizontal coax to the horizontal connector shown in FIG. 25 and the vertical coax to the vertical connector. Tape both coax lines to the boom up to the mast, and then down the mast.

### ELEMENT TIP TO TIP MEASUREMENT CHART See Fig. 11

#1 - Vertical = 221 $\frac{1}{8}$ "	#1 - Horizontal = 221 $\frac{1}{8}$ "
#2 - Vertical = 214 $\frac{1}{8}$ "	#2 - Horizontal = 213 $\frac{1}{8}$ "
#3 - Vertical = 210 $\frac{1}{8}$ "	#3 - Horizontal = 213 $\frac{1}{8}$ "
#4 - Vertical = 204 $\frac{1}{8}$ "	#4 - Horizontal = 210 $\frac{1}{8}$ "
#5 - Vertical = 192 $\frac{5}{8}$ "	#5 - Horizontal = 191 $\frac{1}{8}$ "

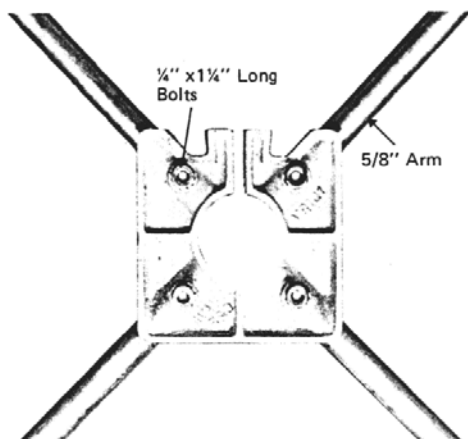


FIGURE 1

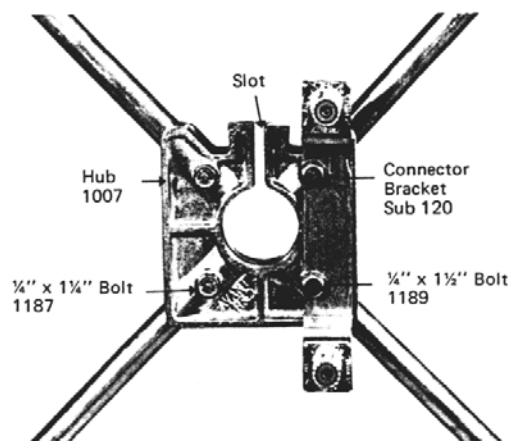


FIGURE 2

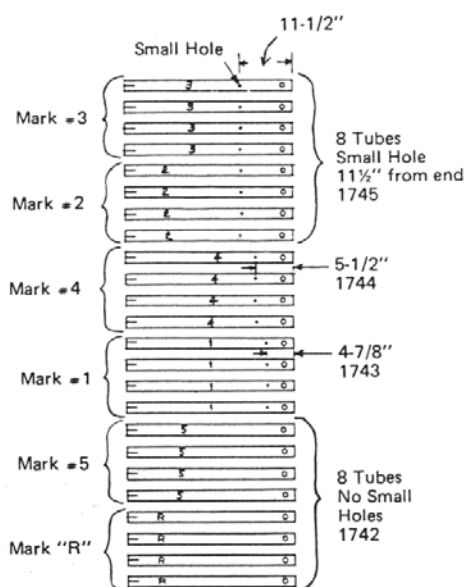


FIGURE 3

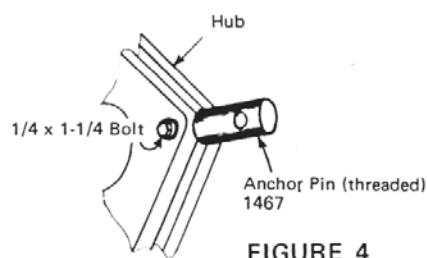


FIGURE 4

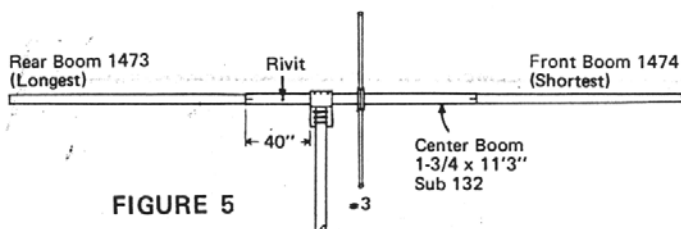


FIGURE 5

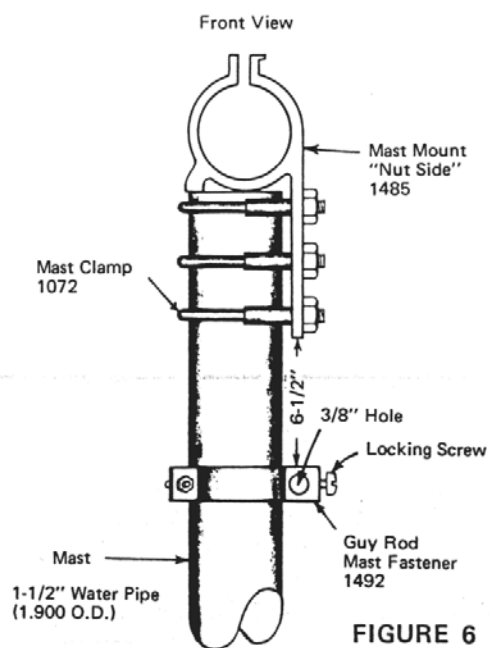
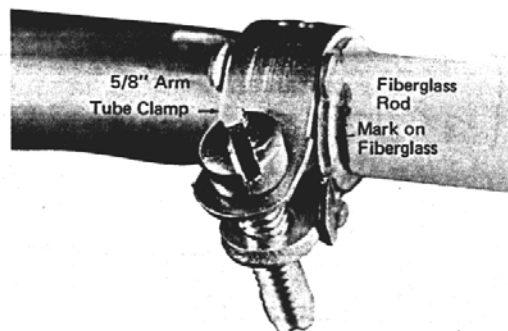
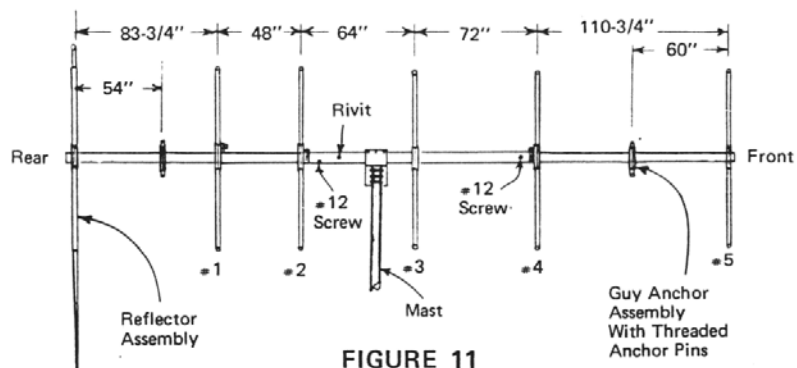
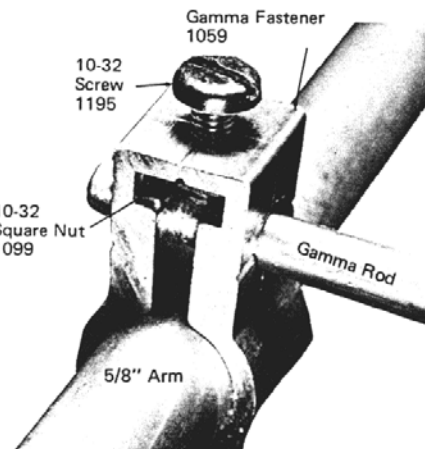
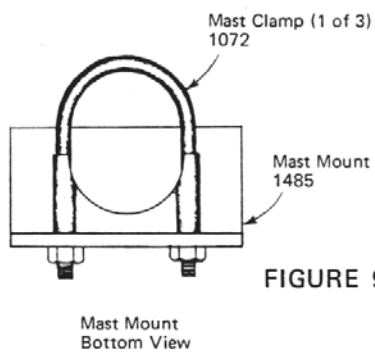
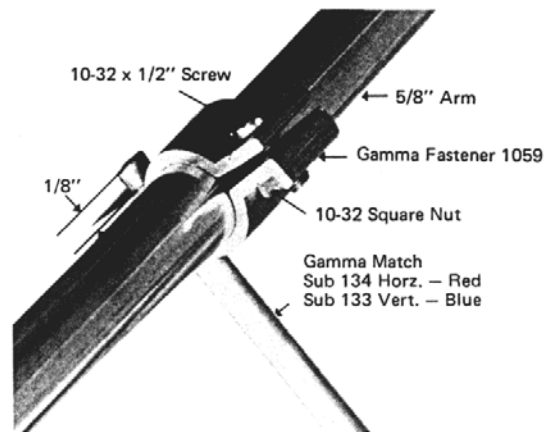
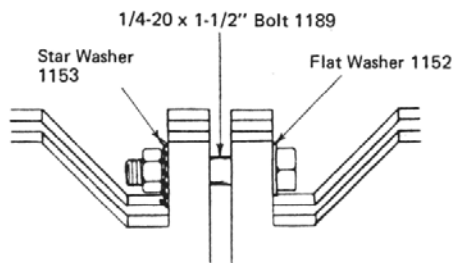


FIGURE 6





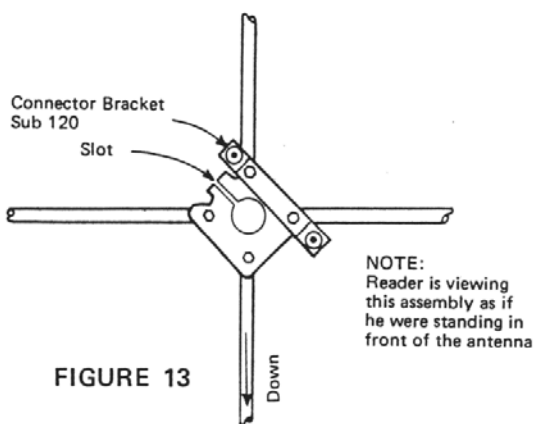
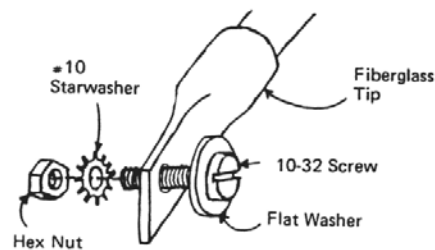
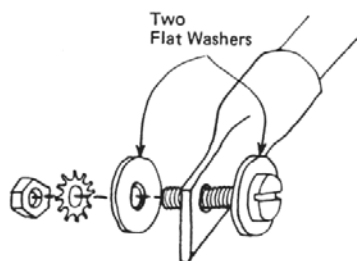


FIGURE 13



Three Fiberglass Tips Contain Hardware in This Order

FIGURE 14



One Fiberglass Tip Contains Hardware in This Order

FIGURE 15

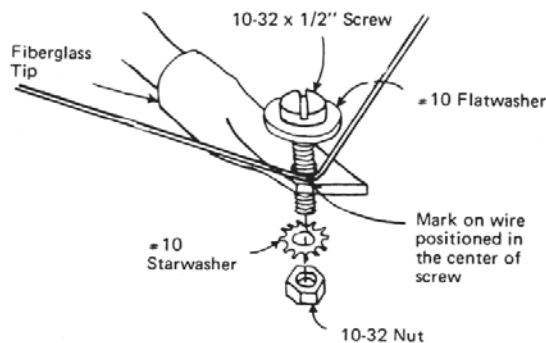


FIGURE 16

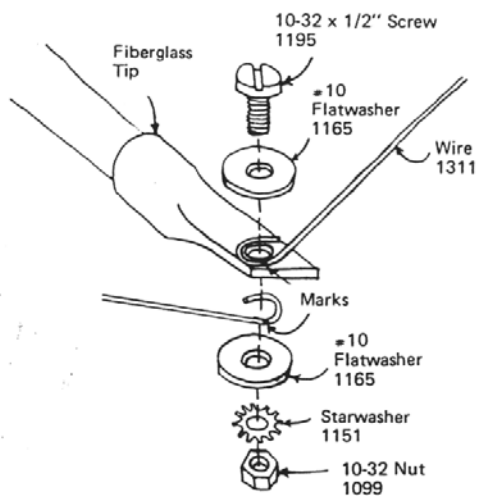
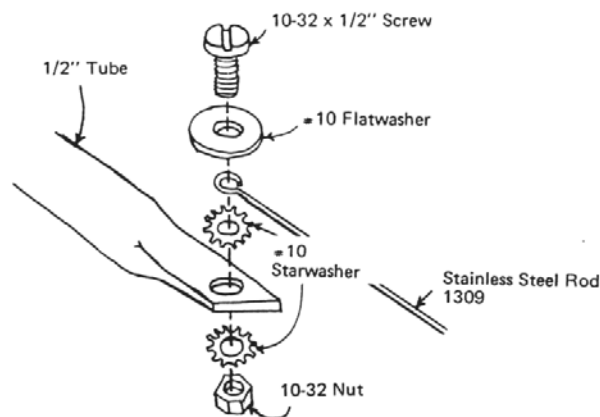


FIGURE 17



NOTE: Use a starwasher between the stainless steel rod and the flattened surface of the 1/2" tube. Use another starwasher between the flattened end of the 1/2" tube and the nut.

FIGURE 18

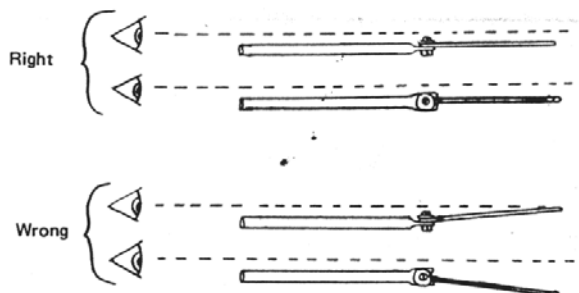


FIGURE 19

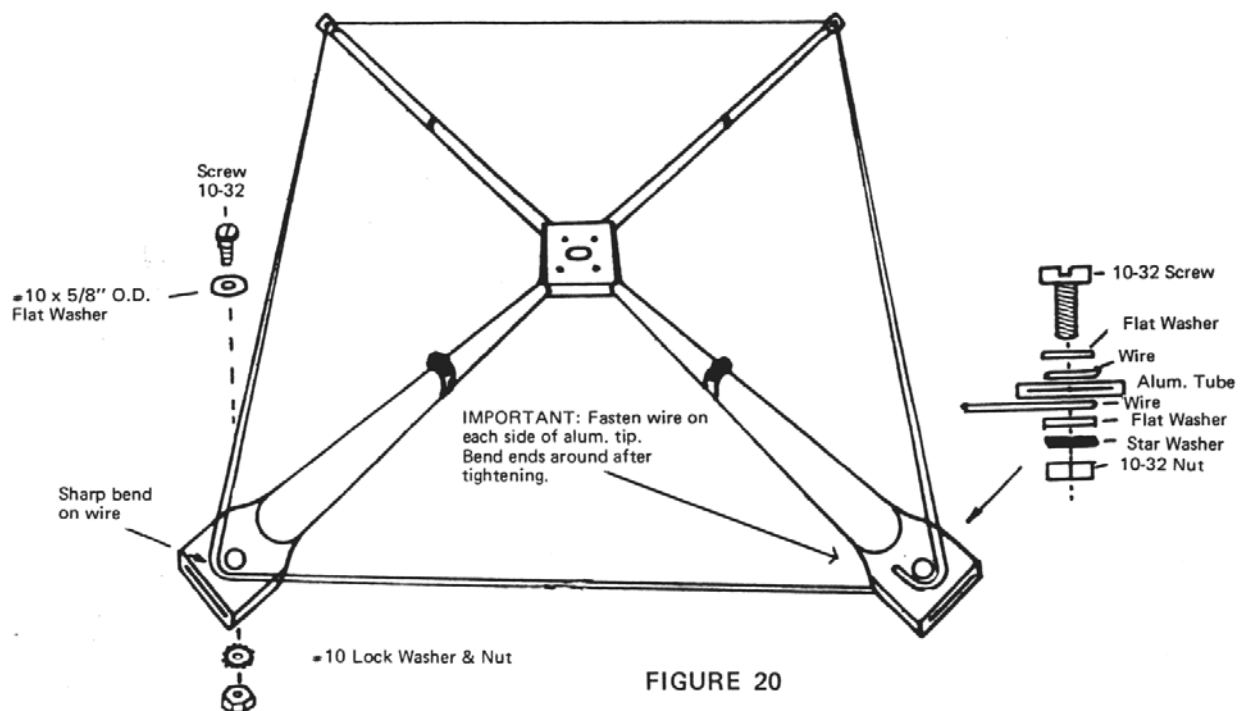


FIGURE 20

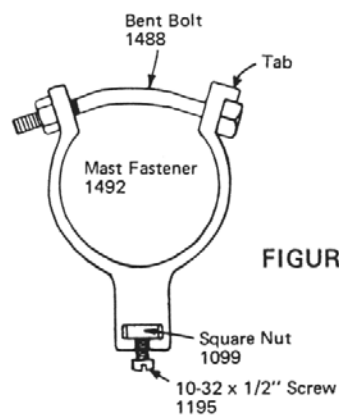


FIGURE 21

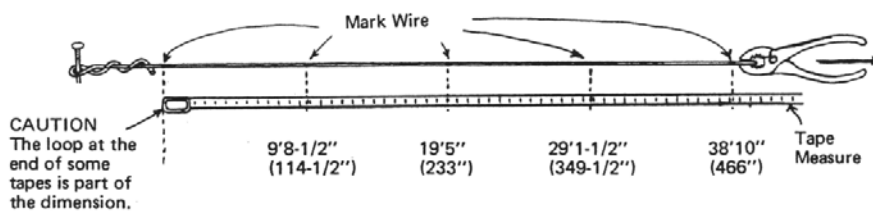


FIGURE 22

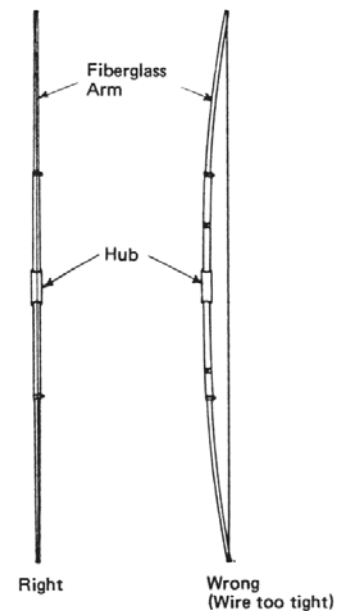


FIGURE 23

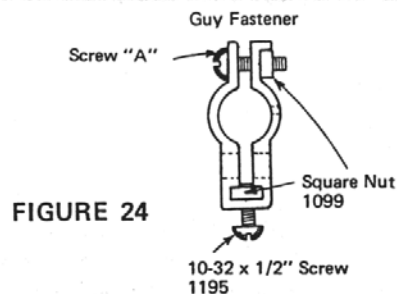
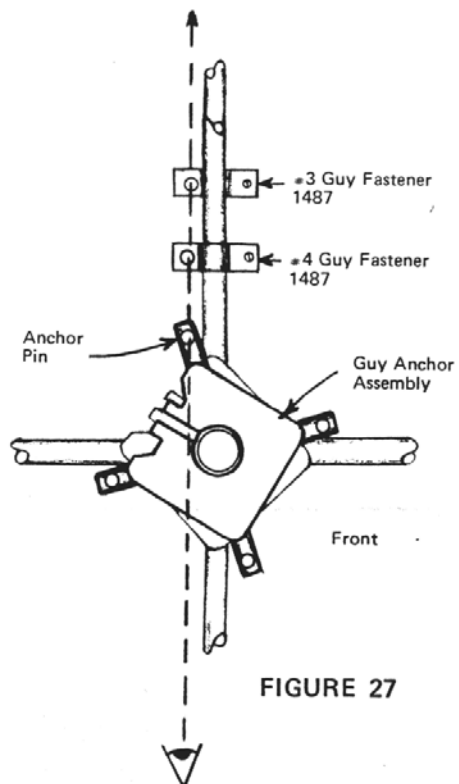
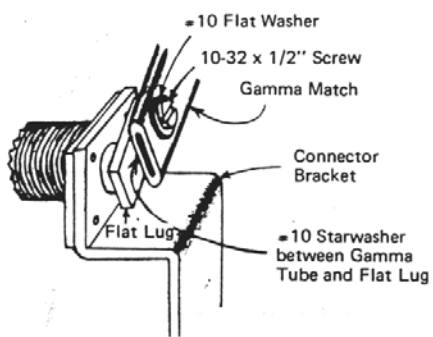
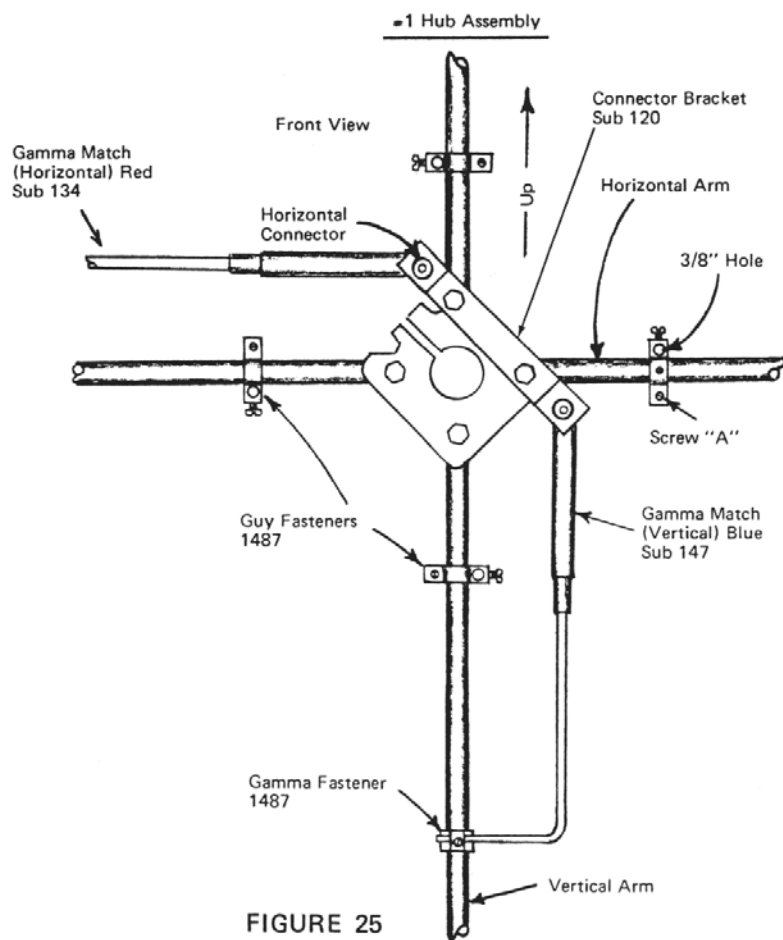


FIGURE 24



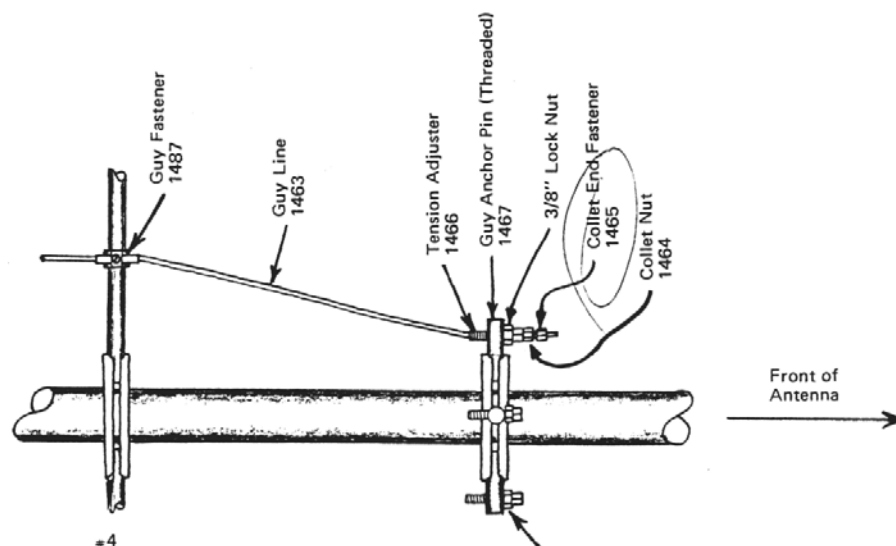


FIGURE 28

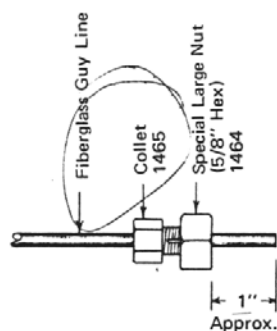
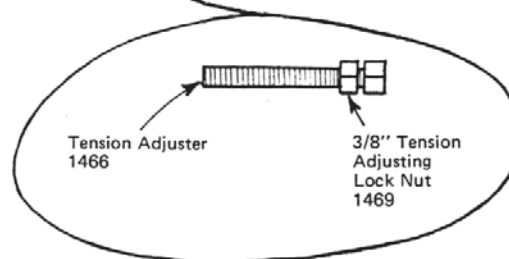


FIGURE 29

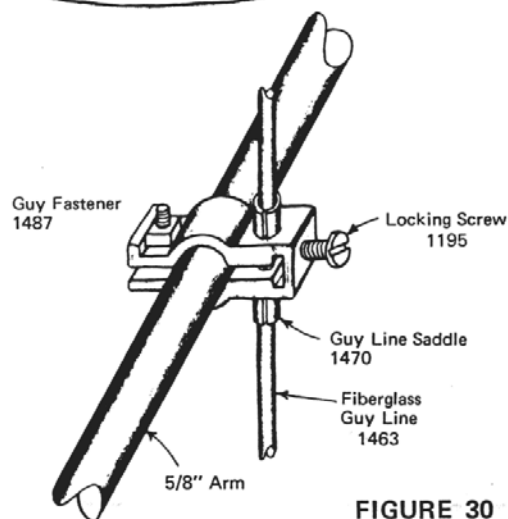


FIGURE 30

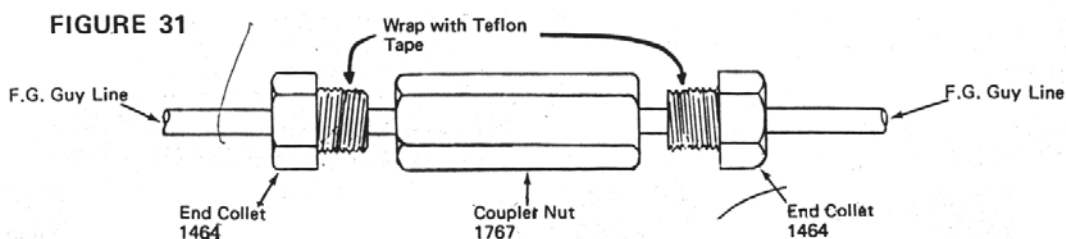
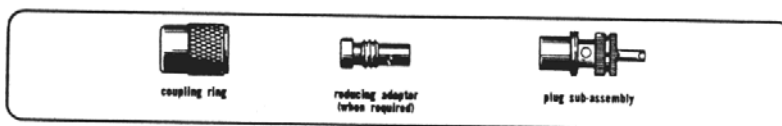


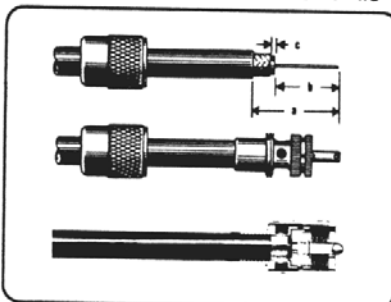
FIGURE 31

## COAXIAL CONNECTORS ASSEMBLY INSTRUCTIONS

GOOD SOLDERING AND TINNING  
ARE IMPORTANT TO PROPER ANTENNA  
IMPEDANCE WHICH EFFECTS PERFORMANCE  
- BE CAREFUL - FOLLOW DIRECTIONS.



FOR USE WITH LARGE DIAMETER COAX - RG-8/U

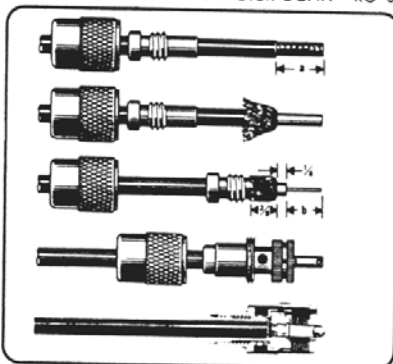


Cut end of cable even and strip jacket, braid, and dielectric to dimensions shown in table. Tin exposed center conductor and braid.

stripping dims. ( $\pm 1/16$ )	a	b	c
	1 3/4	3/4	3/16

**straight plugs.** Slide coupling ring on cable. Screw the plug sub-assembly on cable. Solder assembly to braid through solder holes, making a good bond between braid and shell. Solder conductor to contact. Do not use excessive heat. For final assembly, screw coupling ring on plug sub-assembly.

FOR USE WITH SMALL DIAMETER COAX - RG-58/U AND RG-59/U



Cut end of cable even. Remove vinyl jacket to dimension a in table below. Slide coupling ring and adapter on cable.

stripping dims. ( $\pm 1/16$ )	a	b
	3/4	1/8

Fan braid slightly and fold back as shown

Position adapter flush with cable jacket. Press braid down over body of adapter and trim to 3/4". Bare conductor to dimension b. Tin exposed center conductor.

Screw plug sub-assembly on adapter. Solder braid to shell through solder holes. Use enough heat to create bond of braid to shell. Solder conductor to contact.

For final assembly, screw coupling ring on plug sub-assembly.

## TROUBLE SHOOTING TIPS

NOTE: IT IS ASSUMED THAT THE COAX AND CONNECTORS ARE IN GOOD CONDITION.

**SYMPTOM:** High S.W.R.

**POSSIBLE CAUSES:** (1) Rotor and guy lines too close to the antenna elements.

**REMEDY:** (1) The Moonraker Antenna is designed to be mounted on a mast. This mast should be long enough so the bottom of the elements is above the top of the rotor or tower.

A ten-foot length of 1-1/2" galvanized water pipe used as a mast between the rotor and antenna T-Mount is recommended. If the rotor is placed inside of a tower, 10 feet of the 1-1/2" pipe should extend above the top of the tower to the T-Mount.

**NOTE:** 1-1/2" water pipe will measure approximately 1.9" outside diameter.

Guy lines should be attached to the mast or tower not closer than 10 feet below the T-Mount.

**SYMPTOM:** High S.W.R.

**POSSIBLE CAUSES:** (2) Elements - Wrong Lengths

**REMEDY:** (2) 1. Check element lengths from tip to tip. Refer to step 48.

**SYMPTOM:** High S.W.R.

**POSSIBLE CAUSES:** (3) Gammas installed wrong.

**REMEDY:** (3) Refer to Figure 25 for proper gamma match orientation. When viewing the antenna from the front, the vertical gamma should be to the right of the element, facing down. The horizontal gamma should be facing to the left, positioned above the horizontal element. Make sure the gamma bracket is installed on the hub as shown.

**SYMPTOM:** High S.W.R.

**POSSIBLE CAUSES:** (4) Gammas Defective or Misadjusted.

**REMEDY:** (4) Gamma Adjustment: Refer to Figure 8 and Figure 10. The gamma rods are factory pretuned and should show a low S.W.R. measurement on an antenna which has been correctly assembled and mounted.

However, environmental conditions could affect the match somewhat. This can be compensated for by gamma adjustment. The proper gamma setting is accomplished by two variables on each gamma. These two variables are (1) the distance the gamma rod is telescoped into the gamma tube and (2) the position the gamma rod is in the fastener.

To make gamma adjustments: remove the spring clamps on the gamma tube and loosen the aluminum nut. The gamma rod can now be slid in or out of the plastic tube, 1/4" at a time, taking readings after each adjustment. After a minimum S.W.R. has been obtained, but is still too high, move the gamma rod element toward, or away from the rod taking care not to change the gamma rod setting. Make 1/2" adjustment at a time. When the lowest S.W.R. has been obtained, lock the gamma rod to the fastener. If the S.W.R. is still not acceptable the first step should be repeated until the match is satisfactory.

The horizontal and vertical adjustments will not interact. In other words, you may make adjustments on the vertical gamma without affecting the horizontal match and vice versa.

All S.W.R. measurements should be made without using any switch boxes or any other devices in the coax line that is being checked.

Connect the S.W.R. bridge between the transmitter and the vertical or horizontal coax, whichever gamma you are adjusting.

**NOTE:** Do not stand near the antenna while making S.W.R. measurements. This will affect the readings. It would be best if the S.W.R. readings are taken with the antenna mounted at its approximate operation height. An antenna being too close to the ground will change the S.W.R. readings.

**SYMPTOM:** High S.W.R.

**POSSIBLE CAUSES:** (5) Antenna not mounted "In the Clear" or high enough.

**REMEDY:** (5) Antenna height is very important. The working range of your equipment will be increased with increased antenna height.

If possible, your antenna should be mounted high enough to clear all interfering objects such as metal structures, wires, metal poles, and other antennas—especially other C.B. antennas. Besides affecting the radiation pattern these interfering objects could cause the S.W.R. to be higher than normal.

**SYMPTOM:** High S.W.R.

**POSSIBLE CAUSES:** (6) Coax Connectors loose.

**REMEDY:** (6) Coax connectors at the antenna should not be merely finger tight. They should be tightened with pliers. Wind and vibrations will cause them to become loose.

**SYMPTOM:** High S.W.R.

**POSSIBLE CAUSES:** (7) Defective Switch Box.

**REMEDY:** (7) Remove the switch box. Connect the S.W.R. meter between the transmitter and the vertical or horizontal coax, whichever line is being checked.

If the S.W.R. is O.K. on both vertical and horizontal without the box in the line, the switch box or short jumper cable is defective.

**SYMPTOM:** Poor Directivity (Low Front-to-Back Ratio)

**POSSIBLE CAUSES:** (1) Elements wrong length; (2) Spacing incorrect.

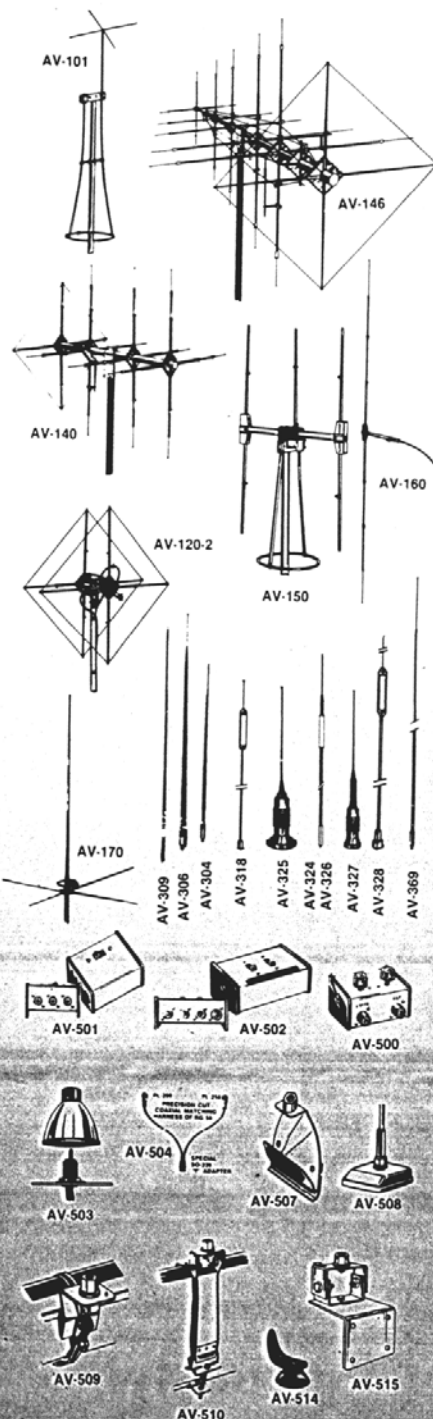
**REMEDY:** (1) & (2) Compare antenna element measurements with Drawing Figure 11.

**SYMPTOM:** Poor Directivity (Low Front-to-Back Ratio)

**POSSIBLE CAUSES:** (3) Reflector wire length wrong.

**REMEDY:** (3) The reflector wire length controls the front-to-back ratio, and it is extremely important that the total length is 38'10" when stretched out and layed on the floor.

## MINI CATALOG



**AV-101 ASTRO-PLANE** Base Station, 4.46 db, over Isotropic

**AV-120-2 PDL II "Orbital Gamma Match"** And AV-501 Switchbox, Dual Polarity

**AV-130 STACKING KIT** For 2 AV-120's Complete With Harness (Not Illust.)

**AV-140 MOONRAKER** Base Station With Switchbox, 14.5 db, over Isotropic

**AV-146 MOONRAKER 6** Base Station With AV-502 Switchbox, 17 db over Isotropic

**AV-150 ASTRO BEAM** Base Station, 40 db Front to Back, 11 db over Isotropic

**AV-160 RAMROD** Multi-Purpose Base Station (Tunable 27-170 MHz)

**AV-170 SIGMA 5/8** Base Station — Full 5/8 Wave Length, 5.14 db over Isotropic

**AV-304 4'** Fiberglass RACER with Tunable Tip

**AV-306 6'** Fiberglass RACER with Tunable Tip

**AV-309 96"** Fiberglass RACER Whip

**AV-318 18"** MINI-FAZER

**AV-324 4'** HIPPO Top Loaded Mobile Antenna — 250 Watts Maximum Power

**AV-325 6'** HIPPO Base Loaded Mobile — 500 Watts Maximum Power

**AV-326 6'** HIPPO Top Loaded Mobile Antenna — 350 Watts Maximum Power

**AV-327 RACER 27** Base Loaded Mobile With Spring, High Durability Tunable Whip

**AV-328 48"** FAZER Top Loaded Mobile

**AV-369 GATOR-WHIP** (Tunable 25-40 MHz)

**AV-500 500 Watt** AVANTI Matchbox

**AV-501 CS-1** Coaxial Switchbox

**AV-502 CS-2** Coaxial Switchbox For Use With Standby Antenna

**AV-503 RACER 1/2"** SNAP MOUNT With Standard 3/8-24 Thread

**AV-504 Co-Phasing** Harness For Installation Of 2 Mobile Antennas

**AV-506 3/8-24** Adapter For Use With AV-521's Or Other Trunk Mounts

**AV-507 Gutter Clip** 3/8-24 Thread Mount

**AV-508 AV-506** Installed In AV-521 No-Hole Trunk Lid Mount

**AV-509 Bumper Strap** Mount For Compact Cars 3/8-24 Threads

**AV-510 Bumper Strap** Mount For Standard Cars 3/8-24 Threads

**AV-514 Suction Cup** Tie Down — No Tools Necessary For Installation

**AV-515 Camper** Mount With 3/8-24 Threads — Fold-Down Feature