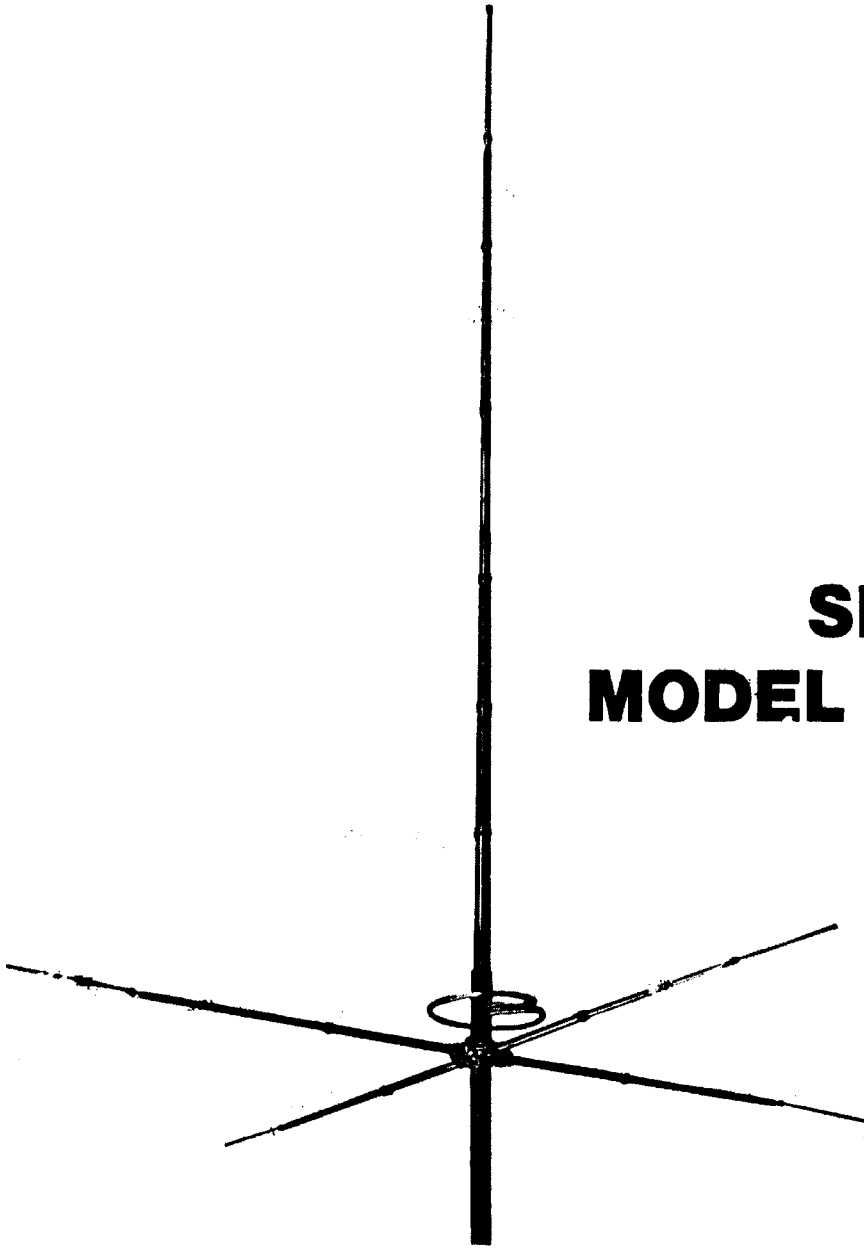


# INSTRUCTION MANUAL

**SIGMA  $5/8$ <sup>TM</sup>  
MODEL AV-170**



**avanti®**

**“WARNING: INSTALLATION OF THIS PRODUCT NEAR POWER LINES IS DANGEROUS. FOR YOUR SAFETY, FOLLOW THE INSTALLATION DIRECTIONS.”**

**YOU, YOUR ANTENNA,  
AND SAFETY**

**Hundreds of accidental deaths and permanent injuries occur each year as a direct result of carelessly installing an antenna. The following information is to help insure your safety and achieve a good installation.**

**Here are a few simple precautions for you to take. PLEASE read them. Read them again. FOLLOW THEM! They may save your life.**

## **SITE SELECTION:**

**Before** attempting to install your antenna, or if you are taking it down, think how you can best place your antenna for **safety** and performance.

To determine a safe distance from wires and power lines:

1. Measure the length or height of your antenna, whichever is longer,
2. Add this length to the length of your tower or mast, and then
3. Double this total for the minimum recommended **safe distance**.

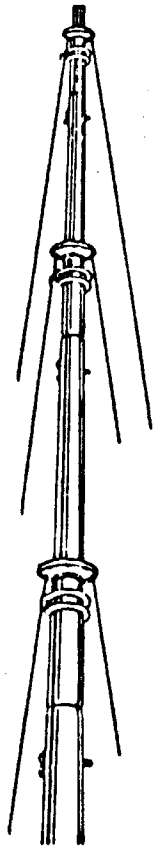
If you are unable to maintain this safe distance, **STOP!**

Call your electric power company. Tell them your plans and ask them to come look at your proposed installation. **This is a little inconvenience, considering your life is at stake.**

## **CHOOSE A PROPER MOUNTING METHOD:**

When a particular type of mounting method is recommended by the manufacturer or a professional antenna installer, follow those specific recommendations.

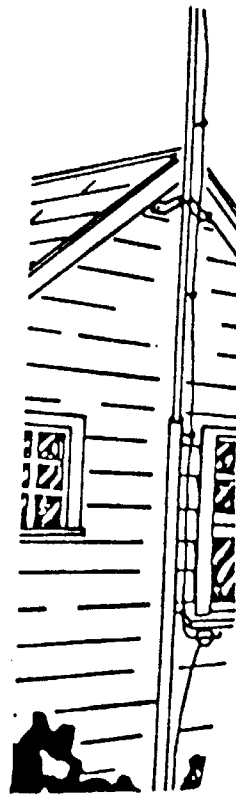
Following are some familiar antenna mountings:



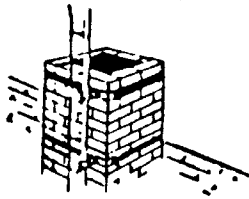
**Telescoping Mast**



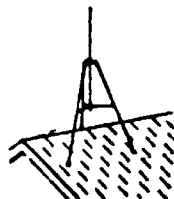
**Tower**



**Ground Up Mast**



**Chimney Strap**



**Tripod**



**Eave Mount**

Although there are many variations to the examples, all appear to be simple — but don't believe it! If you are installing an antenna for the first time, please, for your own safety as well as others, seek professional assistance. Never use plastic pipe, conduit, wood poles or thin walled tubing. Use only masting that is specifically made for antenna support and has a length and wall thickness that is designed to carry the weight and wind load of your antenna.

**Hundreds of people have been killed or mutilated trying to install a simple antenna.** Consult your dealer. He can explain which mounting method to use for the size and type antenna you are about to install.

To help **remember safety**, you will find a **warning label** in your parts bag. Put this label on your mast, tower or tripod near its base. It will help remind you of safety while installing your antenna. After you have installed your new antenna, you may wish to take it down — This label will again remind you of **safety**.

#### **EMERGENCY AID FOR SHOCK**

It is advisable to work with another person when installing or removing antennas. If your partner does receive a shock, don't touch him since his body could conduct the electricity to you; instead, try to pry or pull him away from the source of electricity with a length of dry wood, rope, a blanket, or another non-metallic object.

If breathing has stopped, use mouth-to-mouth resuscitation until the doctor or ambulance arrives and relieves you. If the heart has stopped, closed-chest cardiac massage must be done simultaneously. The ambulance should be informed when called that an electric shock has occurred; it can bring proper equipment such as an intensive care or cardiac care mobile unit equipped with a heart defibrillator and carrying trained personnel.

# PARTS LIST

## MODEL AV-170 SIGMA 5/8

QTY.	PART NO.	DESCRIPTION	PRICE EACH
1	SUB303	Main Assembly	\$19.50
1	PS030	1-1/4" x 36" Radiator Element	6.30
1	PS095	Internal Assembly W/Static Coil	7.10
1	2726	Fiberglass Insulator	7.85
1	1520	Rubber Seal	.90
2	1007	Hub Castings	1.80
2	SUB 130	Loop Sections	1.20
1	PS 060	Mast Support Tube	6.00
4	0998	5/8" x 36" Radial Element	4.20
4	1001	1/2" x 48" Radial Element	1.80
4	1309	1/8" x 24" Stainless Steel Tip Wire	1.35
1	1523	1-1/8" x 36" Radiator Element	4.20
1	1524	1" x 36" Radiator Element	4.20
1	1525	7/8" x 48" Radiator Element	4.20
1	1526	3/4" x 48" Radiator Element	4.20
1	1749	5/8" x 36" Radiator Element	4.20
1	2725	1/2" x 38" Radiator Element	1.80
1	SUB 302	Hardware Bag 170	9.50
2	1051	1-3/4" Band Clamp	.60
7	1060	5/8" Tube Clamp	.30
4	1090	1/4-20 x 3/16 Hex Nut	.06
5	1091	10-32 Hex Nut	.06
4	1092	5/16" Hex Nut	.06
1	1098	1/4-20 x 7/16 Square Nut	.06
10	1151	#10 Star Washer	.06
7	1152	1/4" Flat Washer	.06
10	1153	1/4" Star Washer	.06
4	1156	5/16" Star Washer	.06
5	1165	#10 Flat Washer	.06
5	1186	1/4-20 x 3/4" Bolt	.11
4	1187	1/4-20 x 1-1/4" Bolt	.11
1	1189	1/4-20 x 1-1/2" Bolt	.11
5	1195	10-32 x 1/2" Bolt	.11
4	1303	Plastic Tip For SS Radial	.06
3	1511	1" Band Clamp	.55
1	1519	5/8" Plastic Cap Plug	.30
2	1783	5/16" U-Bolt	1.00
2	2540	U-Bolt Retaining Bars	.50
2	2541	H-Brackets Milled	.60
1	2727	Instruction Manual	.00

# LIMITED WARRANTY

AVANTI warrants all products manufactured by it to be free from defects in material and workmanship under normal use. This warranty shall apply only to defects appearing within one year from date of purchase. This warranty also does not extend to damage caused by misuse, abrasion, corrosion, negligence, accident nor shall it apply to any item which shall have been altered in any way so as to affect its use and operation.

In the event the products manufactured by AVANTI are found to be defective in workmanship or material, AVANTI will repair or replace free of charge such defective material if delivered freight prepaid within the above stated one year period to the factory at 340 Stewart Avenue, Addison, Illinois 60101, with proof of purchase and if found by AVANTI's inspection to be truly defective in workmanship or material.

AVANTI's liability and the purchaser's remedies hereunder are exclusively limited to the repair of such products if defective of the replacement thereof. If inspection of any such products by AVANTI does not disclose any defect in workmanship or material, or if in the opinion of AVANTI the damage was caused by conditions beyond AVANTI's control, repair or replacement will be made at a reasonable charge.

AVANTI does not assume responsibility for loss or damage in transit to products returned for inspection.

On any product returned for inspection or replacement, freight charges to AVANTI must be paid by the purchaser. AVANTI will return all repaired or replaced goods freight prepaid.

THE FOREGOING WARRANTIES ARE EXCLUSIVE, AND ARE IN LIEU OF ALL OTHER WARRANTIES (WHETHER WRITTEN, ORAL OR IMPLIED), INCLUDING BUT NOT LIMITED TO THE WARRANTY OF MERCHANTABILITY IN OTHER RESPECTS THAN EXPRESSLY SET FORTH ABOVE AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. EXCEPT AS HEREIN PROVIDED, EVERY FORM OF LIABILITY FOR DIRECT OR CONSEQUENTIAL DAMAGES OR LOSS IS EXPRESSLY EXCLUDED AND DENIED.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. 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.

This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

Mention this no.  
if you contact us  
about your purchase.

# **SIGMA 5/8 MODEL AV-170 ASSEMBLY INSTRUCTIONS**

**MOUNTING RECOMMENDATION:** Proper mounting requires a stable support. For proper support of the Sigma antenna we recommend the use of a tower, tripod, or telescoping mast. This structure must withstand the various weather conditions in your local area. For information regarding which of these supports would be best for your particular installation, contact a manufacturer of these products, an installer, or your local CB dealer for specific recommendations. Mention that the Sigma weighs 9 lbs., and has a wind load area of 1.7 sq. feet.

## **STEP 1**

Construct the hub assembly as shown in Figure 1. Use 1/4 x 1-1/4 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 2**

Place a 5/8" tube clamp on the slotted end of each 5/8" tube. **Do Not Tighten!**

## **STEP 3**

On the four 1/2 x 48" radial sections which have one end flattened, attach the stainless steel radial sections as shown in Figure 2. Fasten securely. Note: It is important to use both star washers. Sight down the radial and if not straight, bend to correct as shown in Figure 3. Install black plastic tips (1303) onto the ends of the stainless steel tips.

## **STEP 4**

Insert the 1/2 x 48" radial sections with the stainless steel radial sections into the ends of the 5/8 x 36" radial sections of the assembly. They should be inserted until they strike the dimple inside the 5/8 x 36" radial.

## **STEP 5**

Position the four 5/8" tube clamps over the slotted portion of the 5/8" radial and tighten. Note: The edge of the tube clamp should be even with the edge of the slotted 5/8" radial.

## **STEP 6**

Fasten the two Loop sections together with a 10-32 screw and nut. Use a star washer between the two flat surfaces and another star washer under the nut. See Figure 4.

## **STEP 7**

Attach the Loop to the main assembly as follows: 1) Remove bolts A & B (Figure 4); 2) Place a flat washer on both bolts; 3) Insert both bolts with the flat washers into the ends of the Loop; 4) Put a star washer between the ends of the Loop and the fiberglass insulator and tighten bolts into the same holes from which they were removed (A & B).

## **STEP 8**

Insert the small end of the mast support tube into the hub assembly (Figure 4).

## **STEP 9**

Feed your coax with a connector attached up through the mast support tube and affix it to the mating connector on the base of the main assembly. (Figure 4). Tighten with pliers.

**NOTE:** Do not remove any of the screws from the main assembly while tightening the coax connector. If screws are not attached damage to the internal assembly will occur.

### **STEP 10**

After the coax has been attached. Remove bolt C (1/4" x 3/4") and carefully push the main assembly into the mast support tube. Align the three holes in the main assembly with the three holes in the mast support tube. Install 3 (1/4" x 3/4") screws and star washers into the mast support tube and tighten. (figure 4)

**NOTE:** If trouble is encountered starting the screws, it is probably because of hole misalignment. Take a small pointed object and align holes before inserting the screw. Do not use a wood object as it may break off in the hole.

### **STEP 11**

To secure the hub assembly to the base assembly, follow this procedure and refer to Figure 5:

- a) Start a 1/4" nut onto a 1-1/2" long bolt — after a flat and star washer have been placed on the bolt.
- b) Place this bolt onto the hub assembly as shown. The flat washer should be under the head of the bolt, the star washer under the nut. See Figure 6.
- c) Tighten with 7/16" open end wrench. Place the wrench on the HEAD of the bolt (not the nut). The star washer will keep the nut from turning while tightening. Do NOT Overtighten!

### **STEP 12**

Assembly of the vertical radiator (Figure 6):

- a) Place the proper size tube clamp over the slotted end of each section of the vertical radiator. Start with the largest diameter section.
- b) Telescope all of the sections together. The sections will "bottom" against each dimple.
- c) Position the edge of each tube clamp even with the edge of the slotted tube and tighten.
- d) Press plastic cap onto the tip of the vertical radiator.

### **STEP 13**

There are two methods by which this antenna may be mounted to your mast. If your mast measures 1-1/2" outside diameter, use the method as shown in Figure 7.

- a) Place a tube clamp over the base tube.
- b) Feed coax cable through your mast.
- c) Slip base tube over your mast and tighten the tube clamp. The edge of the tube clamp should be even with the bottom edge of the base tube. Note: This mounting method will be satisfactory only with a mast that measures 1-1/2" O.D. EXACTLY.

**SECOND METHOD:** The mounting as shown in figure 8 is to be used if your mast is not exactly 1-1/2" O.D. Position the "H" brackets with U bolts and retaining bars as far apart as possible on the mast support tube. Do not place the lower U bolt on the slotted portion of the mast support tube. (Figure 8)

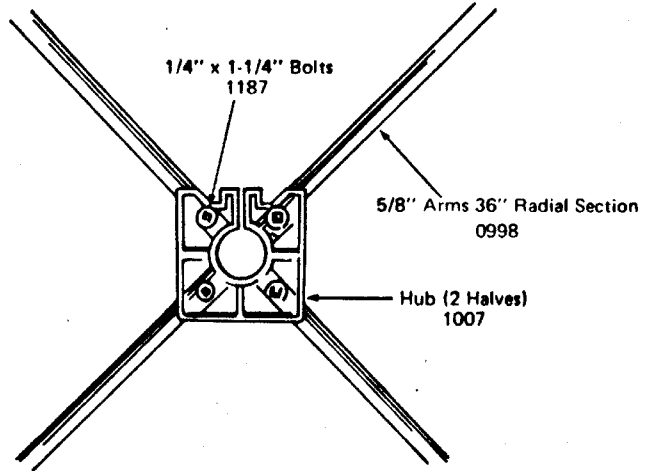
## **SPECIAL NOTES**

**SWR:** Standing wave ratio adjustments are normally not necessary for the Sigma 5/8. 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. However, if your antenna is mounted properly and a high S.W.R. does occur, it is possible to make minor adjustments by changing the length of the vertical radiator elements. If you encounter a high S.W.R. on high channels, shorten the length of the vertical radiator. If you have a high S.W.R. on the lower channels, make the vertical radiator longer.

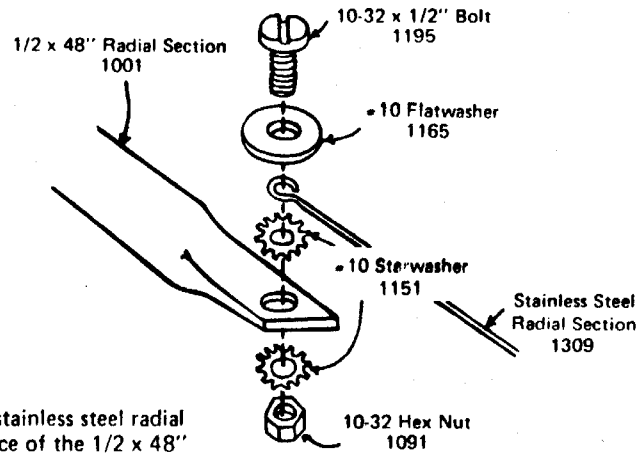
**NOTE:** Do not stand near the antenna while making S.W.R. measurements. This will affect the readings. It would be best if the S.W.R. readings are taken with the antenna mounted at its approximate operation height. An antenna being too close to the ground will change the S.W.R. readings. Refer to the "Antenna Testing Variables" section of this manual, page

**GROUNDING:** This AVANTI base station antenna is designed to be D.C. (Direct Current) grounded to the support mast using the mounting hardware provided. Proper grounding of the support mast can provide a considerable amount of lightning protection for the radio equipment. Grounding of the mast can also "bleed off" static preventing any buildup. Be sure your antenna mast tripod or tower are properly grounded. Consult the National Electrical Code, local building codes, your local CB dealer or antenna installation experts for installing a good, safe ground on your antenna.

**FIGURE 1**

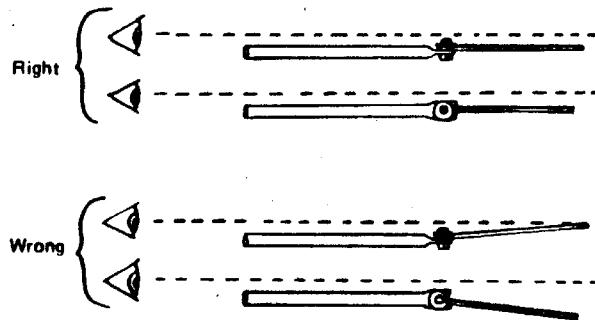


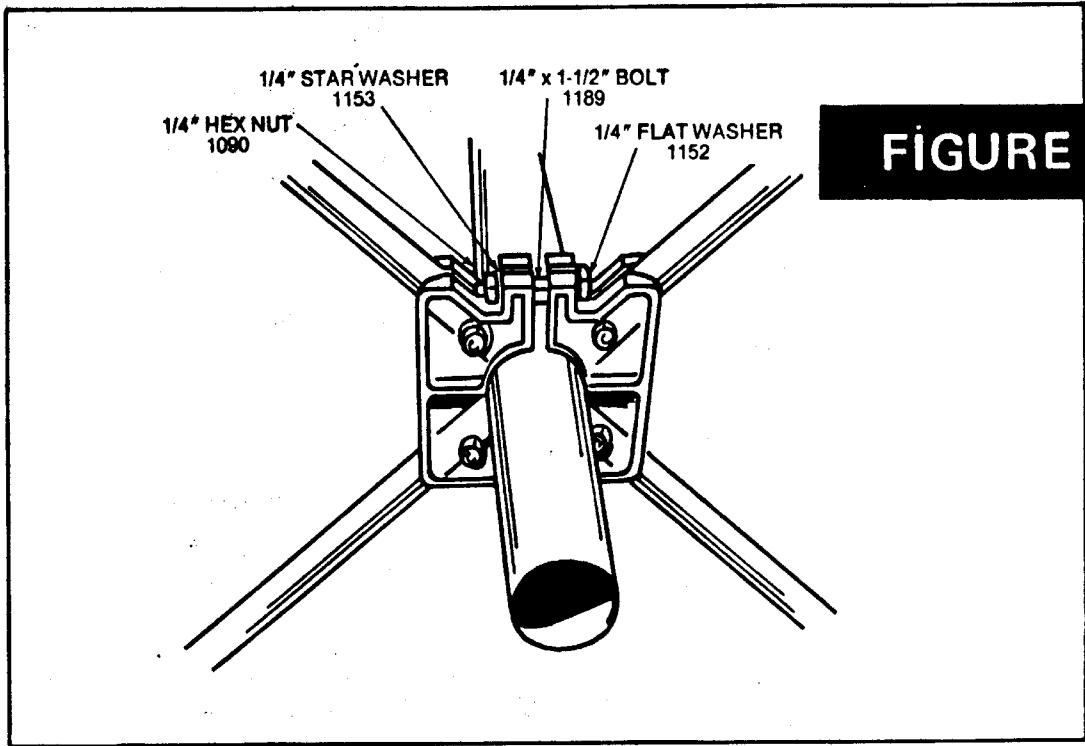
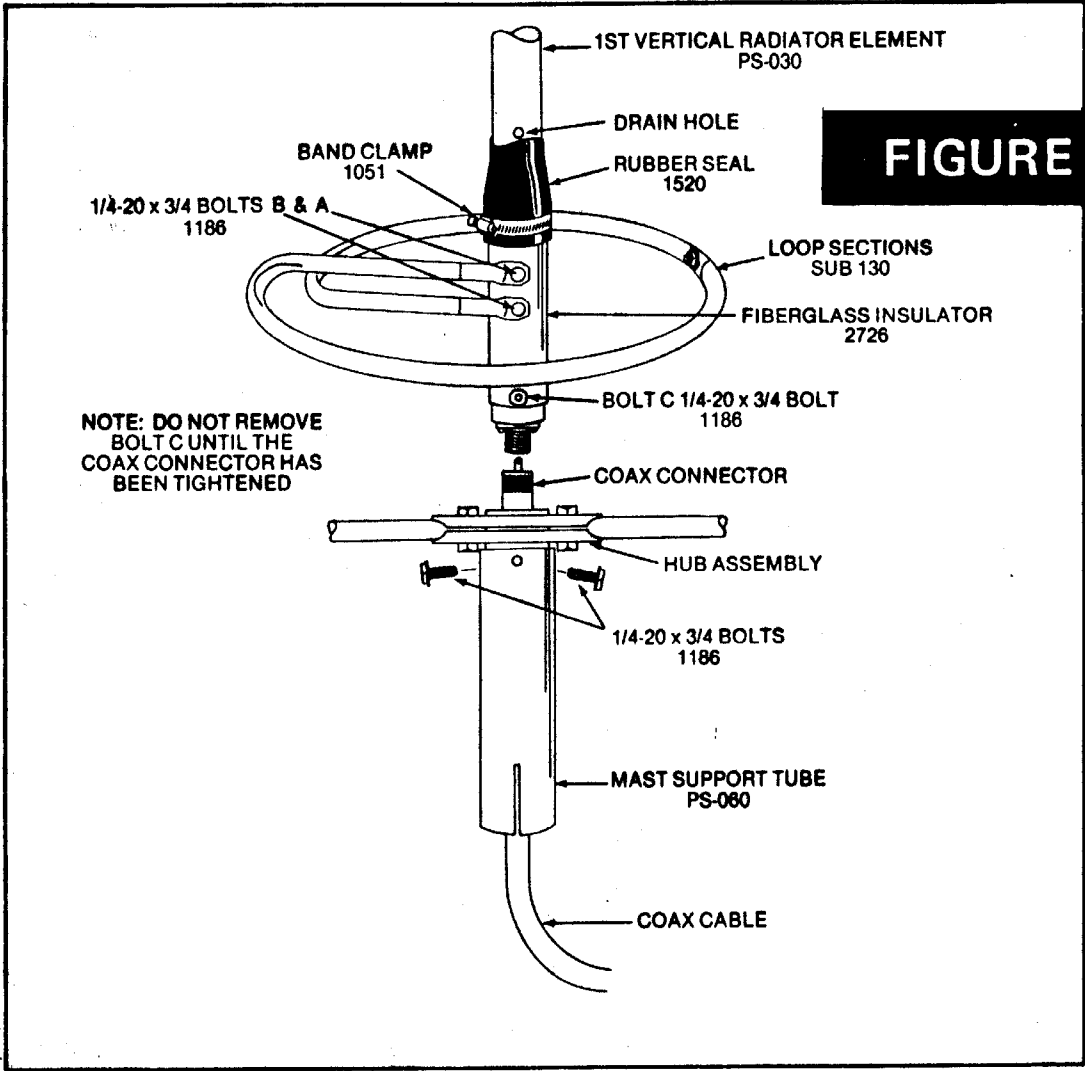
**FIGURE 2**



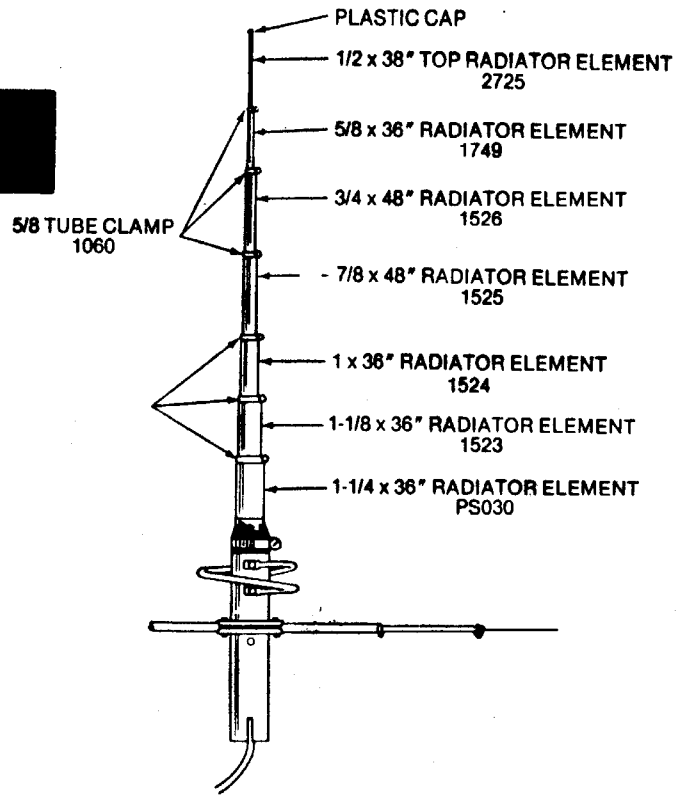
**NOTE:** Use a starwasher between the stainless steel radial section and the flattened surface of the 1/2 x 48" radial section. Use another starwasher between the flattened end of the 1/2 x 48" radial section and the hex nut.

**FIGURE 3**

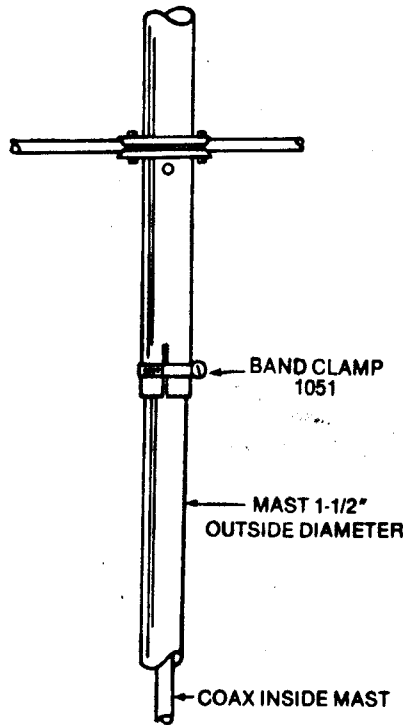




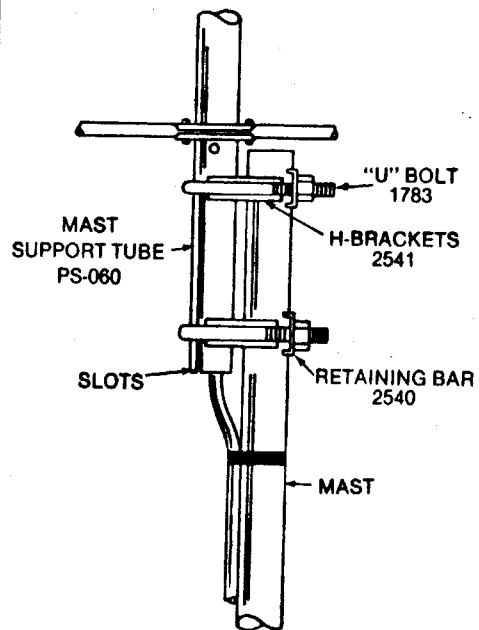
**FIGURE 6**



**FIGURE 7**



**FIGURE 8**



## **ANTENNA TESTING VARIABLES**

From time to time, many CBer's are heard to make the remark that a particular antenna is not living up to the advertised performance figures such as gain, S.W.R., or front-to-back ratio. These statements are usually founded on their personal field tests; often based on comparisons between one antenna and another. The disparity in the results between the tests of the CBer and the factory usually stems from the conditions under which the tests were run. The following is a short discussion of some of the variable conditions that do occur and how they affect antenna performance.

### **EFFECT OF OTHER ANTENNAS**

When two antennas are mounted near each other (even if they are used for different frequencies), a coupling usually results which in some way alters their operation. This coupling is even more pronounced when the antennas are mounted less than one wavelength apart. So, if another antenna is less than 36 feet from your CB antenna, there is a good chance that it changes its performance in some way.

### **THE EFFECT OF METAL STRUCTURES**

Not only antennas, but water towers, power lines, buildings, or any material of a metallic nature has the ability to misdirect transmission. Sometimes these obstacles will act as directors and sometimes as reflectors – causing the signal to increase or decrease in the intended direction.

Complaints of poor front-to-back ratio or lower than expected gain can usually be traced to this above circumstance – especially in beam-type operation.

### **SIGNAL INTENSITY**

The signal strength of a remote transmitting station can never be assumed to be of the same strength as in previous transmissions. Signals of incoming stations should be recalibrated to the antennas being compared. For this reason, you cannot take down one antenna, put up another one a week later, and expect to make accurate measurements. If the stations being used are using beam type antennas, a slight change in the beams' directions can also be critical. Contacts with mobiles are even less valid. A movement of five feet sometimes makes measureable differences in mobile communications.

### **S METER CALIBRATION**

Depending upon the CB set, an S meter is calibrated so that one S unit is equal to 6 db. Therefore, an antenna responsible for 1 S unit gain over another has also about 6 db over that other antenna. Some S meters, however, are calibrated at only 3 db per S unit and others at 3 or 4 at the low end, and 6 or 7 at the top of the scale.

Another problem encountered with S meters is the ability to measure high strength inputs. Some bounce back at a powerful signal and appear erratic in

operation even reading lower on the scale with an increased signal.

### **COAX AND CONNECTORS**

The quality of the coax and connectors and especially the soldering of the coax to the connector can affect S.W.R. and gain. Many times an unsuspecting CBER will buy a low grade coax and lose 2 or 3 db after paying good money for an expensive transceiver and antenna. A quick check for good coax and connections can be run by substituting a dummy load on the antenna end of the coax. If all is right, the S.W.R. with the dummy load should be a 1 to 1 match.

There are generally two types of coaxial cables in common use. One has solid dielectric and the other, foam dielectric. The dielectric portion of the coax is the plastic substance surrounding the center conductor.

If you are using solid dielectric coax, you should cut your length to multiples of 12 feet such as 12, 24, 36, etc.

If your coax is foam type, it should be cut to 14 foot multiples, 14, 28, 42, etc.

### **CRYSTAL VARIATIONS**

Mr. A. and Mr. B. are neighbors and they are comparing the performance of their antennas by their ability to transmit to Mr. C. about 20 to 30 miles away. If Mr. A. has a crystal slightly high on frequency, he might show a weaker signal to Mr. C. even though his operation has more power. This would make A's antenna seem inferior to B's. This problem can be eliminated by Mr. C's having a tunable receiver on his transceiver to match A's variation.

### **ANTENNA HEIGHT**

Whenever antennas are being compared, they should be installed at the proper distance above the ground and preferably in an open field. This operation is not even legal for CB'ing when using a horizontal beam because the proper distance above ground for this mode of transmission is 36 feet or more. Only the test of a vertical antenna may be run at a legal height of 60 feet in an open field.

### **TIME VARIATION**

Any test of antennas should be performed with a time variation of about 15 minutes or less to eliminate variations due to tropospheric shifts and other changes that affect performance.

### **GUY WIRES AND SUPPORTING STRUCTURES**

Guy wires should preferably be of the non-metallic type using ski tow rope or other plastic lines. If metallic guy wires are used, they should be broken up at uneven intervals along their length to avoid interference and possible high S.W.R. In many cases, a manufacturer intends his antenna to be mounted on a metal mast or tower and in some cases, the mast or tower is used as a radiating element.

## **PROPER CONSTRUCTION**

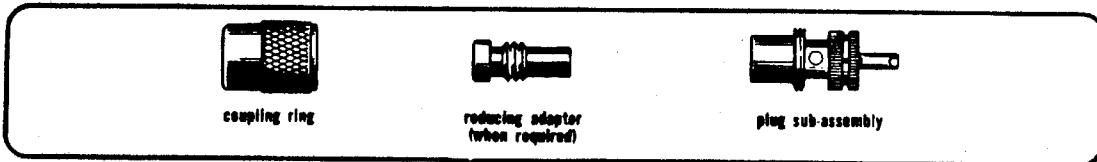
If they could, manufacturers would ship all antennas fully assembled in order to eliminate mistakes in construction often found in antenna installations. Even the best instructions are sometimes mis-read and an antenna condemned only because of an error in assembly. If an antenna does not perform up to par, contact your local distributor or dealer, and if he can't help you, call the manufacturer. Chances are that somebody will get it working.

These are by no means all of the possible variations to consider in antenna measurements; however, they are some of the most important and understanding them will certainly be to the CBer's benefit and may save time in finding a trouble source.

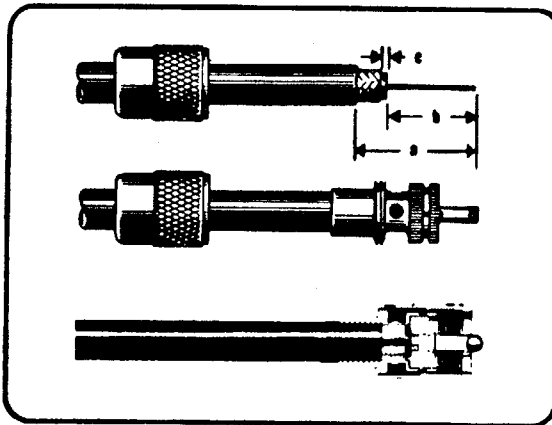
If any further information is desired or any difficulties are encountered, contact Avanti Research and Development 312-628-2260 sales service department. We will be happy to assist you.

# 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



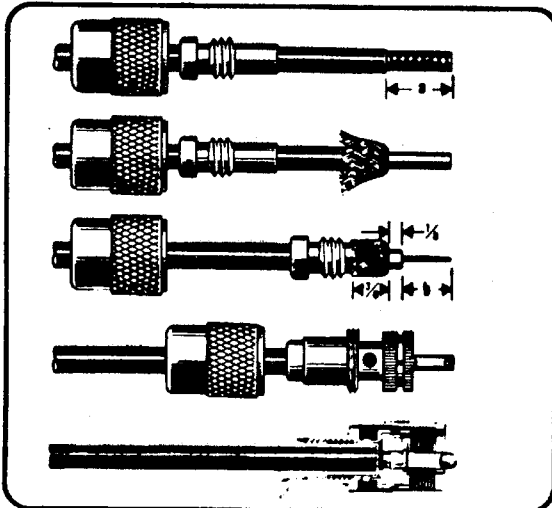
Cut end of cable even and strip jacket, braid, and dielectric to dimensions shown in table. Tin exposed center conductor and braid.

stripping dims. ( $\pm 1/64$ )

a	b	c
$1\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{8}$

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. ( $\pm 1/64$ )

a	b
$\frac{1}{4}$	$\frac{3}{8}$

Fan braid slightly and fold back as shown

Position adapter flush with cable jacket. Press braid down over body of adapter and trim to  $\frac{3}{4}$ " 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.