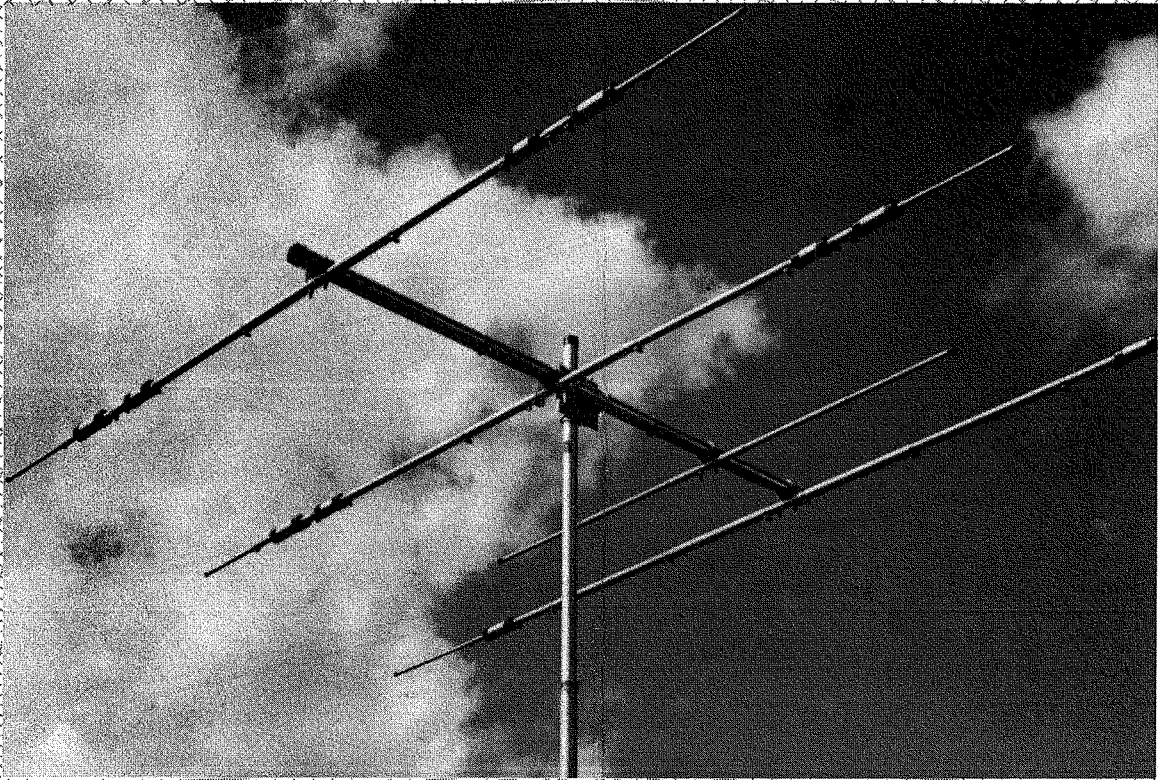


ASSEMBLY AND INSTALLATION

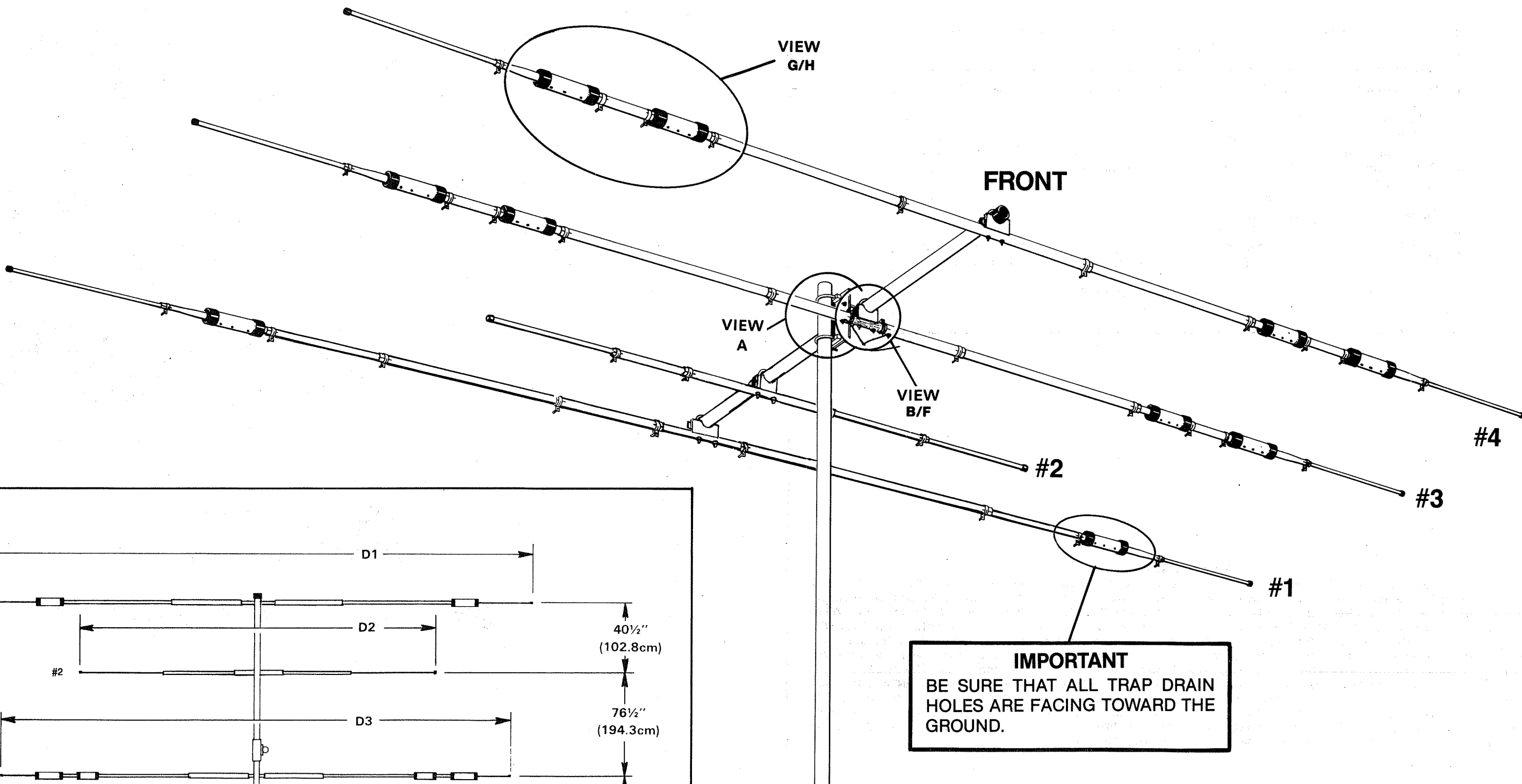


A4S

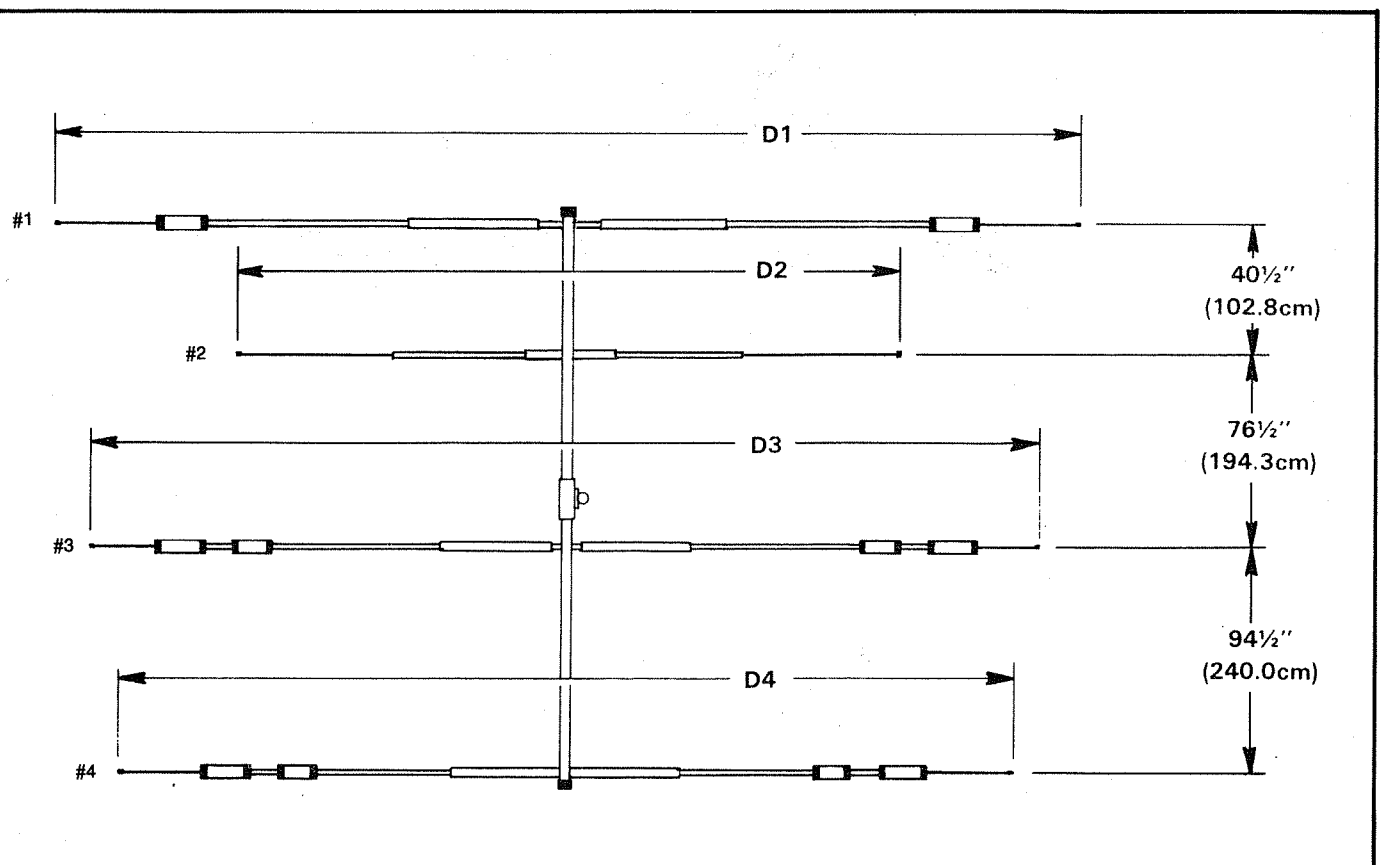
**20-15-10 METER
BEAM**

 **cushcraft**
CORPORATION
THE ANTENNA COMPANY

951279(4/88)



IMPORTANT
 BE SURE THAT ALL TRAP DRAIN HOLES ARE FACING TOWARD THE GROUND.



A4S Specifications

Forward Gain:	8.9 dBd	Wind Surface Area:	5.5 sq. ft. (0.51 sqm)
Front to Back Ratio Avg:	25 dB	Weight:	37 Lb. (16.8Kg)
VSWR:	1.2-1 Typical	Turning Radius:	18 Ft. (548.6 cm)
Bandwidth (Avg):	500 KHz	Mast Diameter:	1¼" to 2½" (3.2 to 5.4 cm)
Power Rating:	2000 W PEP	Material:	6063-T832 Seamless Aluminum
Feed Point Impedance:	50 OHMS	Connector:	Twin terminal. Takes all Coax.
Hardware:	Stainless Steel	Telescopic Method:	Taper tubing with full circle clamps
Boom:	2" x 18' (5.1 x 548.6 cm)	Longest Element:	1½" - ½" x 31'4½" (2.9 to 1.3 x 956.3 cm)
			UPS SHIPPABLE No Balun Required

LIMITED WARRANTY

CUSHCRAFT CORPORATION, P.O. BOX 4680, MANCHESTER, NEW HAMPSHIRE 03108, WARRANTS TO THE ORIGINAL CONSUMER PURCHASER FOR ONE YEAR FROM DATE OF PURCHASE THAT EACH CUSHCRAFT ANTENNA IS FREE OF DEFECTS IN MATERIAL OR WORKMANSHIP. IF, IN THE JUDGEMENT OF CUSHCRAFT, ANY SUCH ANTENNA IS DEFECTIVE, THEN CUSHCRAFT CORPORATION WILL, AT ITS OPTION, REPAIR OR REPLACE THE ANTENNA AT ITS EXPENSE WITHIN THIRTY DAYS OF THE DATE THE ANTENNA IS RETURNED (AT PURCHASER'S EXPENSE) TO CUSHCRAFT OR ONE OF ITS AUTHORIZED REPRESENTATIVES. THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESSED WARRANTIES, ANY IMPLIED WARRANTY IS LIMITED IN DURATION TO ONE YEAR. CUSHCRAFT CORPORATION SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM A DEFECT. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS OR EXCLUSIONS OR LIMITATIONS OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION AND EXCLUSION 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. THIS WARRANTY DOES NOT EXTEND TO ANY PRODUCTS WHICH HAVE BEEN SUBJECT TO MISUSE, NEGLIGENCE, ACCIDENT OR IMPROPER INSTALLATION. ANY REPAIRS OR ALTERATIONS OUTSIDE OF THE CUSHCRAFT FACTORY WILL NULLIFY THIS WARRANTY.



THE ANTENNA COMPANY
48 Perimeter Road, P.O. Box 4680
Manchester, NH 03108

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Your Cushcraft Three band beam is designed and manufactured to give top performance and trouble free service. The antenna will perform as specified if the instructions and suggestions are followed and care is used in assembly and installation. When checking the tubing received with your antenna package using the parts list, it is easiest to identify the various dimensions of tubing by separating them into groups of the same diameter and length.

All hardware is stainless steel.

MASTING:

The mast mount bracket will accommodate up to a 2 in. OD (5.1cm) mast. 1½ in. OD (3.8cm) or larger heavy wall tubing should be used.

ROTATOR:

A good heavy-duty antenna rotor will provide the best service and longest life.

LOCATION:

Location of the antenna is very important. Surrounding objects such as trees, power lines, other antennas, etc. will seriously reduce efficiency. To minimize the effects of surrounding objects, mount the antenna as high and in the clear as possible. If metal guy wires are used, they should be broken with strain insulators.

WARNING: THIS ANTENNA IS AN ELECTRICAL CONDUCTOR, CONTACT WITH POWER LINES CAN RESULT IN DEATH, OR SERIOUS INJURY. DO NOT INSTALL THIS ANTENNA WHERE THERE IS ANY POSSIBILITY OF CONTACT WITH OR HIGH VOLTAGE ARC-OVER FROM POWER CABLES OR SERVICE DROPS TO BUILDINGS. THE ANTENNA, SUPPORTING MAST AND/OR TOWER MUST NOT BE CLOSE TO ANY POWER LINES DURING INSTALLATION-REMOVAL OR IN THE EVENT PART OF THE SYSTEM SHOULD ACCIDENTALLY FALL. FOLLOW THE GUIDELINES FOR ANTENNA INSTALLATIONS RECOMMENDED BY THE U.S. CONSUMER PRODUCT SAFETY COMMISSION AND LISTED IN THE ENCLOSED PAMPHLET.

Plan your installation carefully. If you use volunteer helpers be sure that they are qualified to assist you. Make certain everyone involved understands that you are the boss and that they must follow your instructions. If you have any doubts at all, employ a professional antenna installation company to install your antenna.

MOUNTING:

Often it is desirable to mount several antennas on one mast. Antennas that are placed close together will interact but usually will only slightly change station performance. To keep interaction to a minimum, place your antennas as far apart as you can. Recommended minimum spacings between your A4S and other antennas are listed below.

Vertically polarized VHF Yagi	1 ft. (0.30m)
Ringo Ranger/Ringo Ranger II	1 ft. (0.30m)
Horizontally polarized VHF Yagi	
6 meters	5 ft. (1.52 m)
2 meters	3 ft. (0.91m)
220 MHz	2 ft. (0.61m)
440 MHz	1 ft. (0.30m)
HF Monoband Beam	8 ft. (2.44m)*

*Closer spacings may require retuning.

SYSTEM GROUNDING:

Direct grounding of the antenna, mast, and tower is very important. This serves as protection from lightning strikes and static buildup, and from high voltage which is present in the radio equipment connected to the antenna. A good electrical connection should be made to one or more ground rods (or other extensive ground system) directly at the base of the tower or mast, using at least 10AWG ground wire and non-corrosive hardware. For details and safety standards, consult the National Electrical Code. You should also use a coaxial lightning arrester. Cushcraft offers several different models, such as the LAC-1, LAC-2 and the LAC-4 series.

ASSEMBLY:

The procedure for assembly of the A4S is straightforward as depicted in the illustrations. See the main pictorial on pages 2 and 7, for an overall view of the assembled antenna. Begin by checking the parts supplied against the parts lists on pages 4 and 5. Progressively assemble the elements and boom as shown in figures A, B, C, D, E, F & G. The A4S boom sections are pinned to prevent rotation. It is necessary to align the holes as shown in figure A. The element dimensions are shown in chart 1 (on page 6) and illustrated in figure H. The boom to mast mounting assembly figure A can now be placed on the boom. It should be placed over the center of the splice BA. The element positions are shown on the illustration on page 2. Place the elements on the boom, then level and tighten them as shown in figures C, D & E. The feedline should be prepared as shown in figure F. Be sure to tape and seal the feedline against water at the point where the center dielectric and the braid separate. We recommend using an RF choke made from 8 turns of R-8/U coaxial cable with a 6 inch (15.24cm) diameter shown in figure F. A balun may be installed at the feedpoint but it is not required. Now attach the feedline to the feedpoint as in figure F. Tape the coaxial feedline, between the feedpoint and RF choke, to the boom as shown in figure F. Dress the coaxial cable from the RF choke, along the mast. If you plan to install the antenna in a salty or corrosive environment, you may want to consider coating it with a clear marine varnish or equivalent.

TUNING:








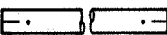




See the element lengths for the portion of the band you want to favor, by using chart 1 and figure H. Your A4S is now ready for use. Because of variations in trap caps, the overall dimensions D-1, 2, 3, 4 may vary as much as 1 inch from the individual dimensions. This will not affect performance. Always use the individual dimensions when adjusting your antenna.

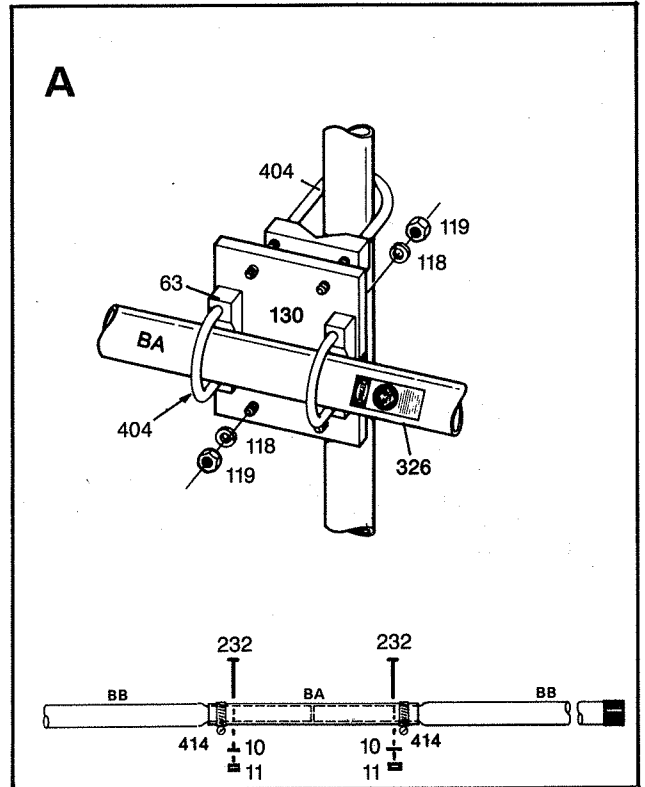
ADD ON KIT:

Adding 30 or 40 meters to your A4S beam is a breeze with the spectacular A744 add on kit. You'll be on the air quickly operating on your new band because the A744 easily clamps to your A4S. You can operate on 40 meters or with a simple adjustment 30 meters.










The kit comes complete with a reinforced insulator, teflon® protected high power traps, all hardware and non-stretch lamcord® support line. Cushcraft makes it easy to add more excitement to your hobby.

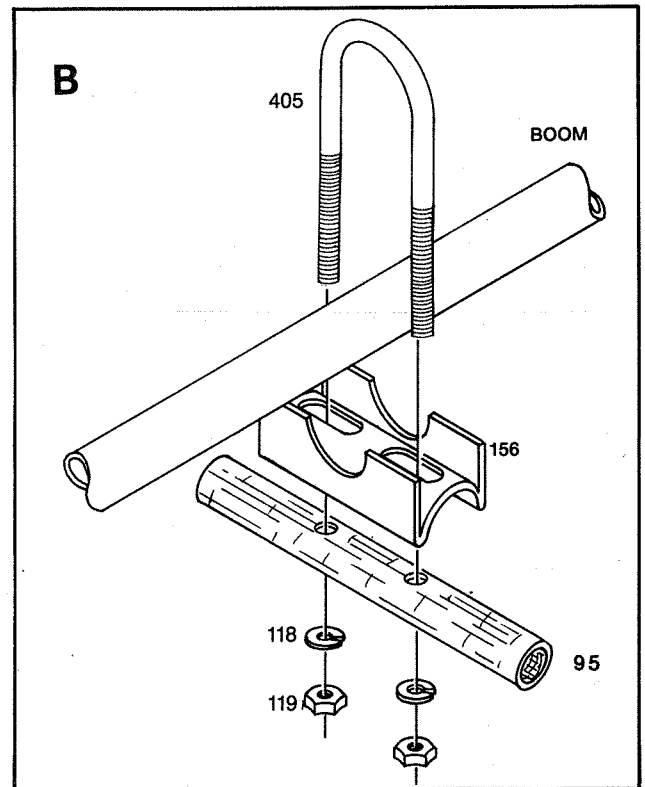
BOOM TO MAST ASSEMBLY

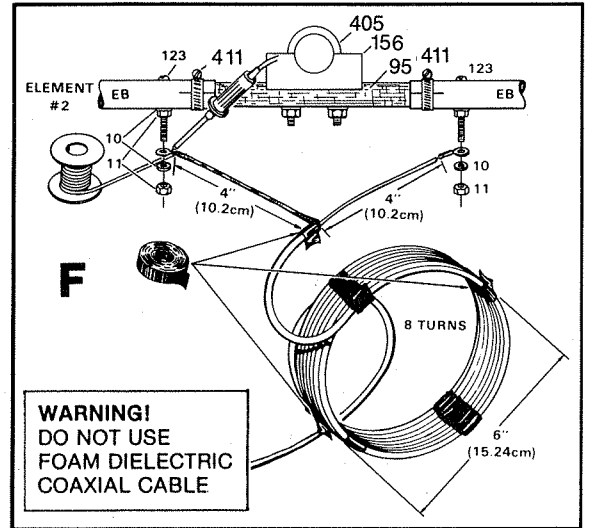
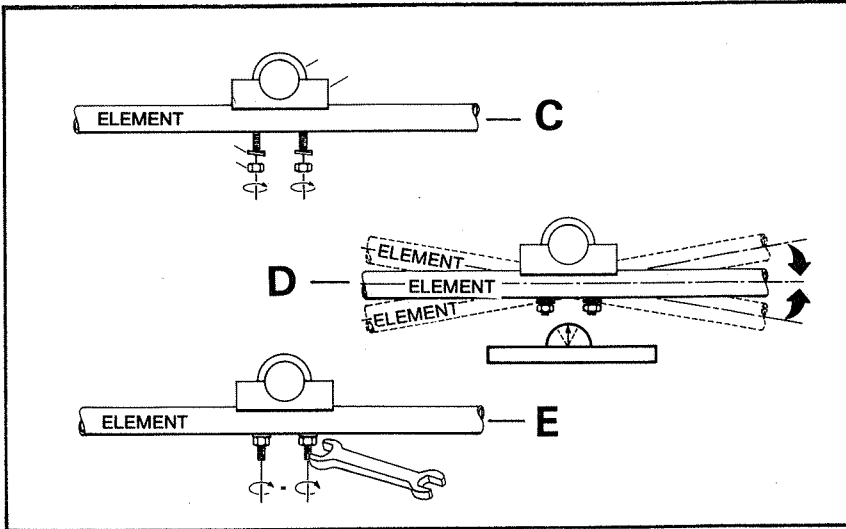
P/N	KEY	DETAIL	DESC.	SIZE	QTY.
010119	119		S.S. HEX NUT	5/16" (.8 cm)	8
010118	118		S.S. SPLIT WASHER	5/16" (.8 cm)	8
010404	404		S.S. U-BOLT	2 1/8" x 3 1/4" (5.4 x 8.3 cm)	4
190130	130		ALUM. MTNG. PLATE	3/16" x 6" x 6" (.48 x 15.2 x 15.2 cm)	1
170063	63		"V" BLOCK	3 1/2" (6.4 cm)	2
030414	414		WORM CLAMP	2 1/4" (5.7 cm)	2
050099	99		BL. PLASTIC CAP	2" (5.1 cm)	2
	BA		ALUMINUM TUBING	2 1/4" (5.7 cm)	1
	BB		ALUMINUM TUBING	2" x 75 1/4" (5.1 x 191.1 cm) x .058" WALL SWAGED	2
010011	11		S.S. HEX NUT	#8-32	2
010010	10		INT. TOOTH LK WASHER	#8	2
010232	232		S.S. MACH. SCREW	#8-32 x 2 1/2" (6.35 cm)	2



BOOM TO ELEMENT ASSEMBLY

P/N	KEY	DETAIL	DESC.	SIZE	QTY.
010405	405		S.S. U-BOLT	2 1/8" x 4 1/4" (5.4 x 10.8 cm)	4
010119	119		S.S. HEX NUT	5/16" (.8 cm)	8
010118	118		S.S. SPLIT WASHER	5/16" (.8 cm)	8
190156	156		FORMED ALUM. BRACKET	2" x 1 1/8" (5.1 x 2.9 cm)	4
010123	123		S.S. MACH. SCREW	8-32 x 1 1/2" (3.8 cm)	2
010011	11		S.S. HEX NUT	#8-32	4
010010	10		S.S. INT. TOOTH LK. WASHER	#8	4
122095	95		FIBERGLASS INSULATOR	1" OD x 10" (2.5 x 25.4 cm)	1
100453	453		TERMINAL		2





ELEMENT ASSEMBLY

P/N	KEY	DETAIL	DESC.	SIZE	QTY.
030412	412		WORM CLAMP	1 1/2" (3.8 cm)	4
030411	411		WORM CLAMP	1 1/4" (3.18 cm)	8
030410	410		WORM CLAMP	1" (2.5 cm)	16
030409	409		WORM CLAMP	7/8" (2.2 cm)	8
290326	326		WARNING LABEL		1
	TB		15 METER TRAP		2
	TC		15 METER TRAP		4
	TD		10 METER TRAP		2
	TE		10 METER TRAP		2
050053	53		PLASTIC CAP	1/2" (1.3 cm)	6
050027	27		PLASTIC CAP	3/8" (1.6 cm)	2

EB		ALUMINUM TUBING	1 1/8" x 36" (2.9 x 91.4 cm)	2
EK		ALUMINUM TUBING	1 1/8" x 24" (2.9 x 61 cm)	1
EL		ALUMINUM TUBING	1 1/4" x 50" (3.2 x 127 cm)	2
EM		ALUMINUM TUBING	1 1/8" x 72" (2.9 x 182.9 cm)	2
EA		ALUMINUM TUBING	1 1/8" x 72" (2.9 x 182.9 cm)	1
ED		ALUMINUM TUBING	1" x 65" (2.5 x 165.1 cm)	2
EE		ALUMINUM TUBING	1" x 46 1/2" (2.5 x 118.1 cm)	2
EN		ALUMINUM TUBING	1" x 24" (2.5 x 61 cm)	2
EF		ALUMINUM TUBING	1" x 5 1/4" (2.5 x 13.3 cm)	4
EC		ALUMINUM TUBING	7/8" x 36" (2.2 x 91.4 cm)	1
EH		ALUMINUM TUBING	3/4" x 48" (1.9 x 121.9 cm)	2
EJ		ALUMINUM TUBING	5/8" x 48" (1.6 x 121.9 cm)	2
EG		ALUMINUM TUBING	1/2" x 35 7/8" (1.3 x 91 cm)	4
EP		ALUMINUM TUBING	1/2" x 48" (1.3 x 121.9 cm)	2

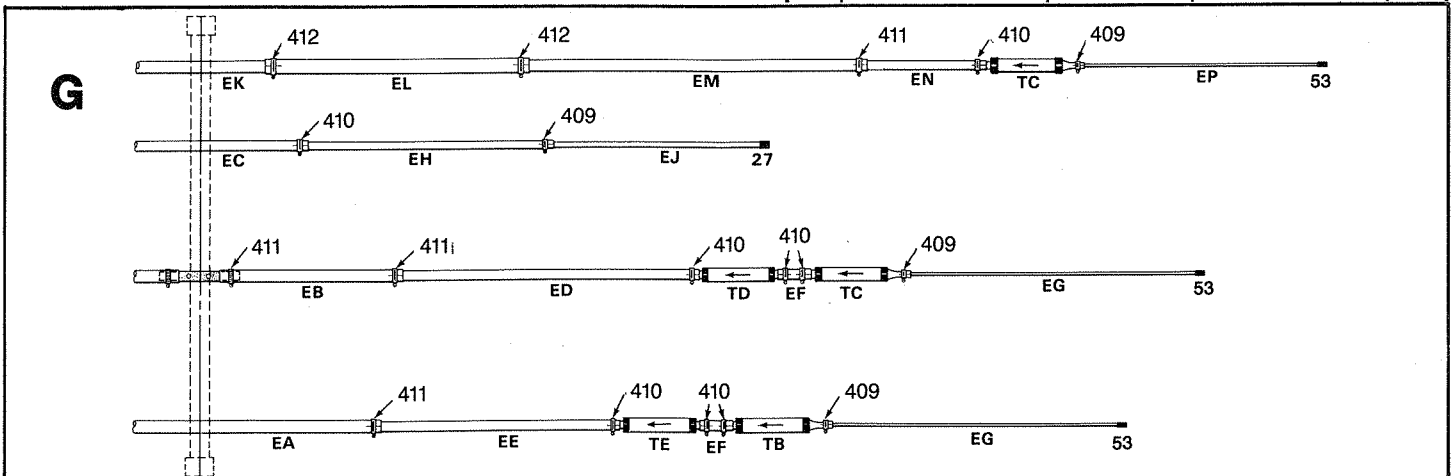


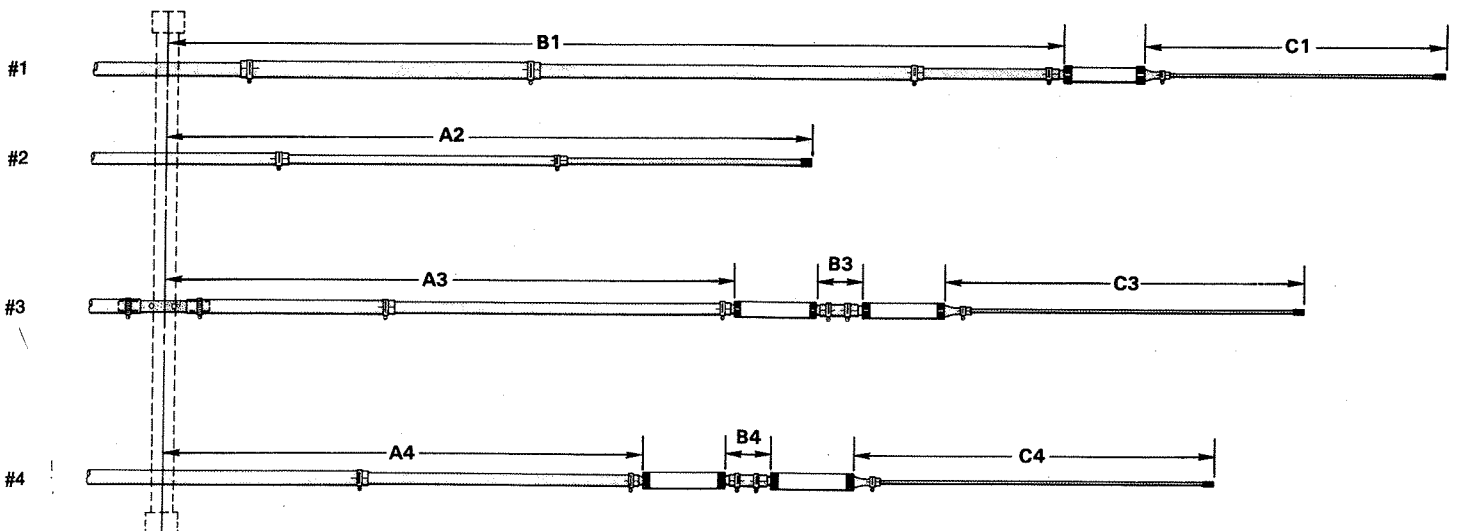
CHART #1

	#1 REFLECTOR			#2 REFLECTOR		#3 DRIVEN ELEMENT				#4 DIRECTOR			
	B1	C1	D1	A2	D2	A3	B3	C3	D3	A4	B4	C4	D4
PHONE	125½" 3.188 m	46½" 1.181 m	30' 8¼" 9.354 m	106½" 2.705 m	17' 9" 5.41 m	78" 1.981 m	5¾" 14.6 cm	38¼" 97.2 cm	24' 2½" 7.379 m	72½" 1.842 m	7" 17.8 cm	34¾" 88.3 cm	22' 10¾" 6.979 m
CENTER	128" 3.251 m	46½" 1.181 m	31' 1¼" 9.481 m	107½" 2.73 m	17' 11" 5.46 m	79" 2.007 m	5¾" 14.6 cm	38¼" 97.2 cm	24' 5½" 7.455 m	74½" 1.892 m	7" 17.8 cm	34¾" 88.3 cm	23' 3" 7.087 m
CW	129½" 3.289 m	46½" 1.181 m	31' 4½" 9.563 m	108½" 2.756 m	18' 1" 5.51 m	82½" 2.09 m	6¾" 17.1 cm	38¼" 97.2 cm	25' 1½" 7.658 m	76½" 1.943 m	7½" 19.0 cm	34¾" 88.3 cm	23' 8" 7.214 m

CHART #2

BAND	20M	15M	10M
Phone	14.25	21.325	28.60
Center	14.170	21.275	28.40
CW	14.10	21.15	28.15
CENTER FREQUENCY (MHz)			

H



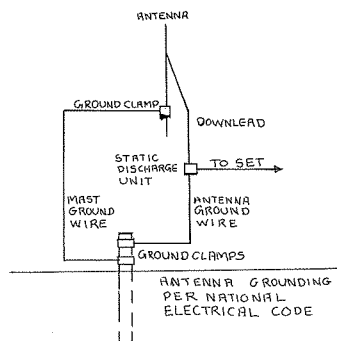
GENERAL INSTALLATION INSTRUCTIONS FOR MAST MOUNTED ANTENNAS

1. Assemble your new antenna on the ground at the installation site. Keep separate assembly instructions that come with it. Large CB and Amateur beams may have to be finally assembled on the tower or mast.
2. On the ground, clamp antenna to mast, pull enough coaxial cable and connect to antenna.
3. To insure that a mast does not fall the "wrong way" if it should get away during the installation or takedown, durable non-conductive rope should be secured at each two foot level as the mast is raised. The boss stands in a position where he can yank or pull the ropes if the need arises to *deflect* the falling mast away from hazards (such as power lines) into a "safe fall" (such as a yard or driveway). The ropes are tied taut at the base of the mast after installation and in place at the various levels.
4. Install selected mounting bracket.
5. If you are going to use guy wire installation instead of a mounting bracket:
 - install guy anchor bolts
 - estimate length of guy wire and cut
 - attach a mast using guy ring.
6. Carefully take antenna and mast assembly to mounting bracket and insert. Tighten clamp bolts. In case of guyed installation, it will be necessary to have at least a second person hold the mast upright while the guy wires are attached and tightened to the anchor bolts.
7. Install self-adhering "DANGER" label packaged in antenna hardware kit at eye level on your mast.
Install ground rod to drain off static electricity build up and connect ground wire to mast and ground rod. Use special ground rods, not a spare piece of pipe.

EXAMPLE OF ANTENNA GROUNDING AS PER NATIONAL ELECTRICAL CODE INSTRUCTIONS

- a. Use No. 10AWG copper or No. 8 AWG aluminum or No. 10 AWG copper-clad steel or bronze wire, or larger as ground wires for both mast and lead-in. Securely clamp the wire to the bottom of the mast.
 - b. Secure lead-in wire from antenna to antenna discharge unit and mast ground wire to house with stand-off insulators spaced from 4 feet (1.22 meters) to 6 feet (1.83 meters) apart.
 - c. Mount antenna discharge unit as close as possible to where the lead-in wire enters the house.
9. Drill a hole in wall (CAREFUL! there are wires in that wall!) near set just large enough to permit entry of cable.
 10. Punch cable through hole and form a rain drip loop close to where it enters house.
 11. Puts a small amount of caulking around cable where it enters house to keep out drafts.
 12. Install static electricity discharge unit.
 13. Connect antenna cable to set.

You should not attempt to raise a mast in excess of 30 feet in height/length (not including the antenna proper) in a fully-extended condition. Thirty to fifty foot tubular masts must be elevated a section at a time with the base or outer section secured in place with guy wires.
GET PROFESSIONAL HELP.



WARNING
INSTALLATION OF THIS PRODUCT NEAR POWER LINES IS DANGEROUS. FOR YOUR SAFETY, FOLLOW THE ENCLOSED INSTALLATION DIRECTIONS.

HOW TO INSTALL YOUR OUTDOOR ANTENNA SAFELY IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE U.S. CONSUMER PRODUCT SAFETY COMMISSION

THESE SAFETY RECOMMENDATIONS APPLY TO ALL CUSHCRAFT CB, TV, AMATEUR AND GENERAL PURPOSE COMMUNICATION ANTENNAS.

YOU, YOUR ANTENNA, AND SAFETY

Each year hundreds of people are killed, mutilated or receive severe permanent injuries when attempting to install an antenna. In many of these cases, the victim was aware of the danger of electrocution, but did not take adequate steps to avoid the hazard.

For your safety, and to help you achieve a good installation, please **READ** and **FOLLOW** the safety precautions below: **THEY MAY SAVE YOUR LIFE!**

1. If you are installing an antenna for the first time, please, for your own safety as well as others, seek **PROFESSIONAL ASSISTANCE**. Consult your dealer. He can explain which mounting method to use for the size and type antenna you are about to install.
2. Select your installation site with safety, as well as performance, in mind. (Detailed information on Site Selection appears in a separate section of this booklet.) **REMEMBER: ELECTRIC POWER LINES AND PHONE LINES LOOK ALIKE. FOR YOUR SAFETY, ASSUME THAT ANY OVERHEAD LINES CAN KILL YOU.**
3. 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**.
4. Plan your installation procedure carefully and completely *before* you begin. Successful raising of a mast or tower is largely a matter of coordination. Each person should be assigned to a specific task, and should know what to do and when to do it. One person should be designated as the "boss" of the operation to call out instructions and watch for signs of trouble.
5. When installing your antenna, **REMEMBER: DO NOT** use a metal ladder.
DO NOT work on a wet or windy day.
DO dress properly—shoes with rubber soles and heels, rubber gloves, long sleeve shirt or jacket.
6. If the assembly starts to drop, get away from it and let it fall. **REMEMBER:** The antenna, mast, cable, and metal guy wires are all excellent conductors of electrical current. Even the *slightest touch* of any of these parts to a power line completes an electrical path through the antennas and the installer—**THAT'S YOU!**
7. If any part of the antenna system should come in contact with a power line—**DON'T TOUCH IT OR TRY TO REMOVE IT YOURSELF. CALL YOUR LOCAL POWER COMPANY.** They will remove it safely.
8. If an accident should occur with the power lines—
DON'T grab hold of the person in contact with the antenna and power line or you, too will be electrocuted. Use a DRY board, stick or rope to push or pull the victim away from the antenna. If the victim has stopped breathing, after moving, administer artificial respiration—and stay with it. Have someone call for medical help.



THE ANTENNA COMPANY

P.O. BOX 4680, MANCHESTER, N.H. 03108

SITE SELECTION:

Before attempting to install your antenna, think where you can best place your antenna for safety and performance.

To determine a safe distance from wires, power lines and trees:

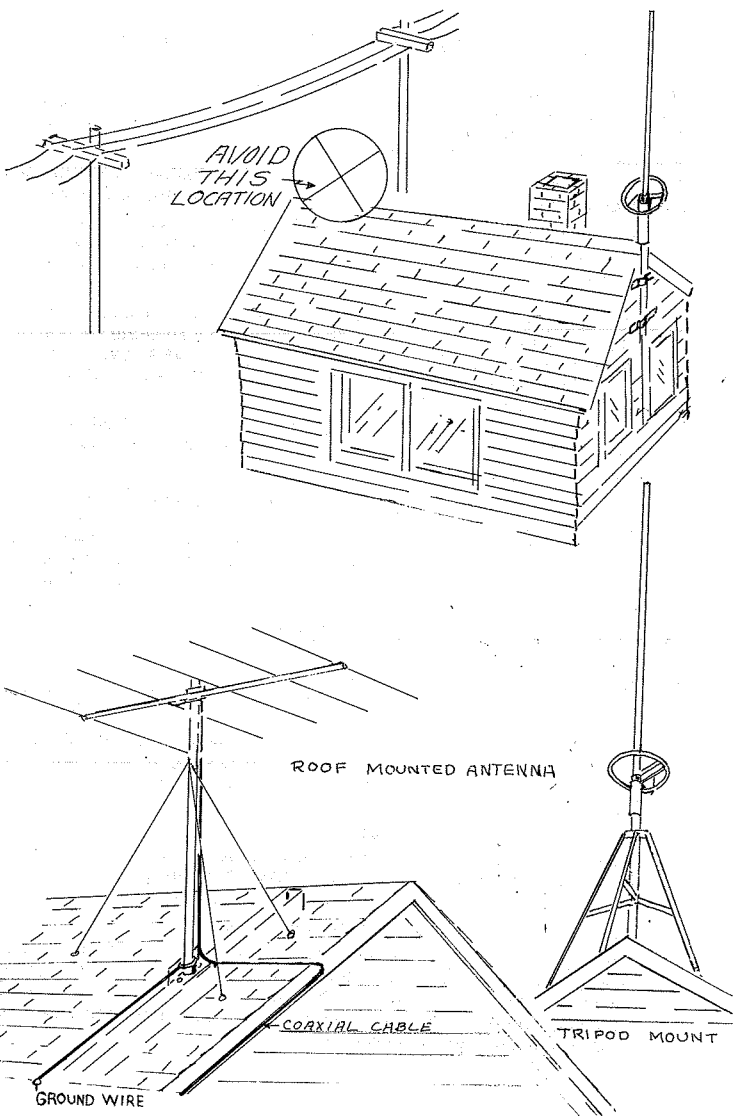
1. Measure the height of your antenna
2. Add this length to the length of your tower or mast, and then
3. Double this total for the minimum recommended safe distance.

If you are unable to maintain this safe distance, **STOP! GET PROFESSIONAL HELP.** Many antennas are supported by pipe masts attached to the chimney, roof, or side of the house. Generally, the higher the antenna is above ground, the better it performs. Good practice is to install your antenna about 5 to 10 feet above the roof line and away from power lines and obstructions. Remember that the FCC limits your antenna height to 60 feet. If possible, find a mounting place directly above your set, where the antenna wire can take a short, vertical drop on the outside of the house for entry through a wall or window near the set. Your dealer carries a complete line of installation hardware.

The safe distance from power lines should be at least twice the height of antenna and the mast combined.

CHOOSE A PROPER SUPPORT AND MOUNTING METHOD:

These are three types of supporting structures commonly used in antenna installations. Illustrations of these devices and various mounting methods follow.



ROOF MOUNTING

The swivel feature of "universal" type mounting brackets makes a convenient antenna mount for flat or peaked roofs. One clamp type bracket is used with 3 or 4 guy wires equally spaced around the mast and anchored to the roof or eaves by eyebolts. Apply roofing compound around the base of the bracket, screws and eyebolts for moisture sealing.

THESE MOUNTING STRUCTURES CAN BE FREE STANDING OR ALONG SIDE OF BUILDING

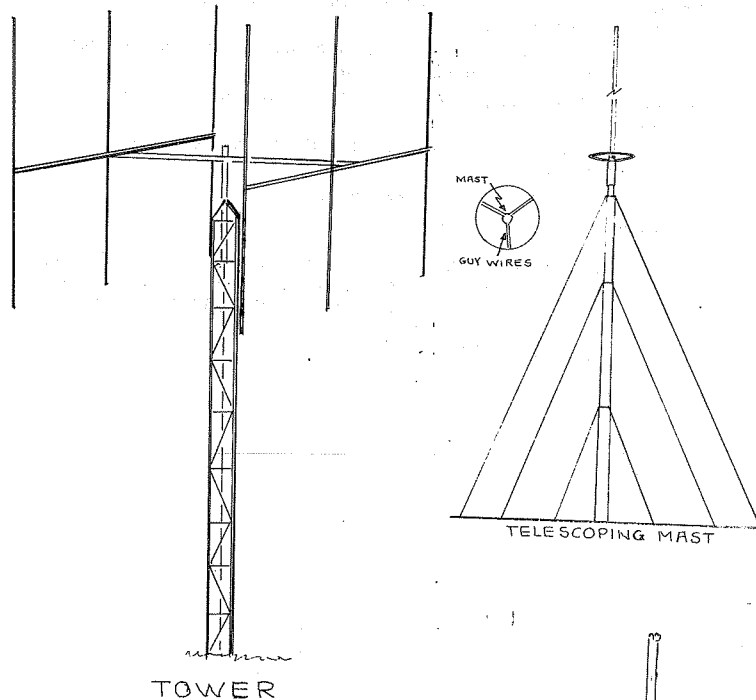
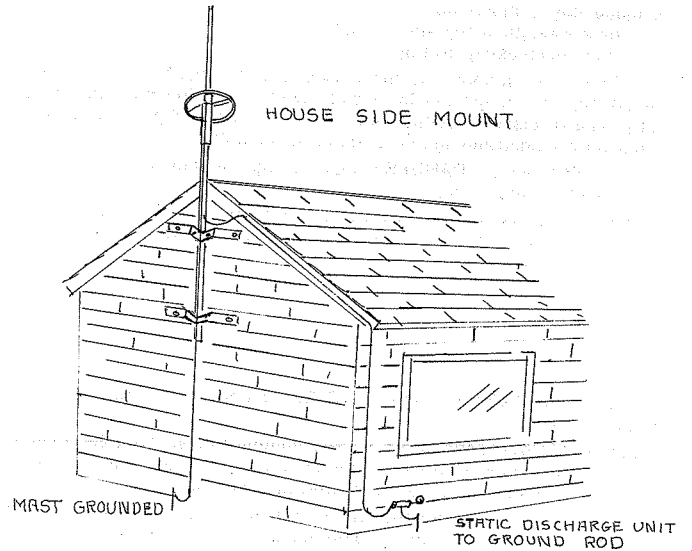
Guy wires should be equally spaced in at least three directions. Use at least three guy wires for each 10 foot section of mast.

SIDE OF HOUSE MOUNT

The safe distance from power lines is at least twice the height of antenna and the mast combined.

SIDE OF HOUSE MOUNTING

Where roof overhang is not excessive, the side of the house provides a convenient mounting. Position the brackets over a stud if possible, one above the other, and space two or three feet apart. For metal siding, first mark mounting holes, then drill pilot holes through the siding to accept mounting screws.



CHIMNEY MOUNTING

The chimney is often an easy and convenient mounting place. But the chimney must be strong enough to support the antenna in high winds. Do not use a chimney that has loose bricks or mortar. A good chimney mount makes use of a 5 or 10 foot 1 1/4" diameter steel mast, and a heavy duty two strap clamp-type bracket. Install the upper bracket just below the top course of bricks, and the lower bracket two or three feet below the upper bracket. For maximum strength, space the brackets as far apart as possible.

