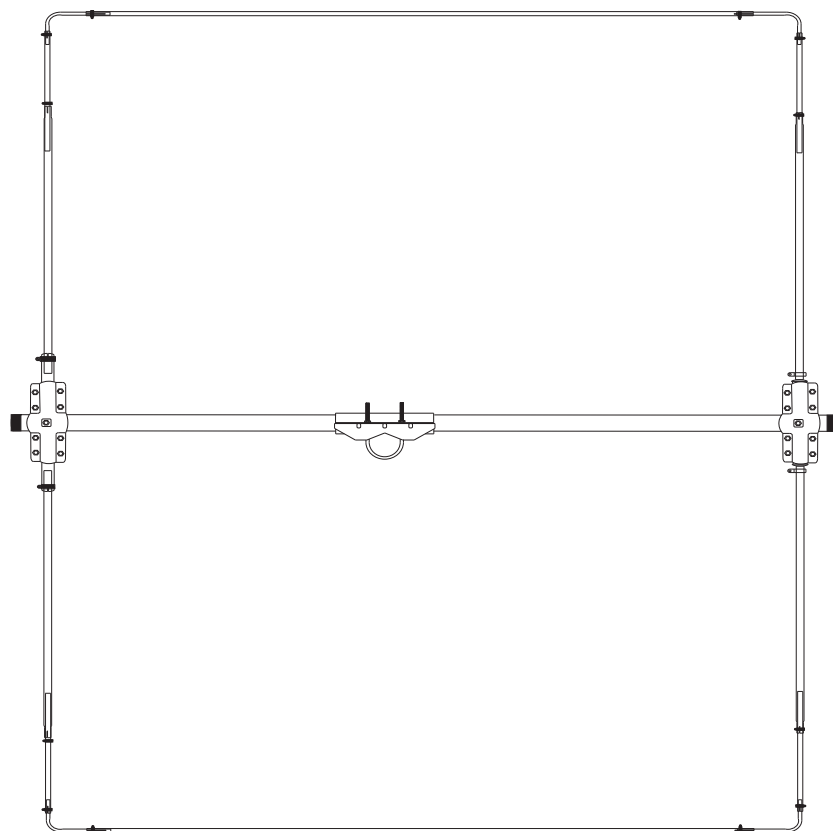


ASQ-20

20 Meter Squalo

INSTRUCTION MANUAL



CAUTION: Read All Instructions Before Operating Equipment

Cushcraft
Amateur Radio Antennas

308 Industrial Park Road
Starkville, MS 39759 USA
Tel: 662-323-5803 Fax: 662-323-6551

GENERAL DESCRIPTION

The Cushcraft ASQ20 is a horizontally polarized antenna for fixed and portable 20-Meter operation on SSB, CW, and legacy AM. The omni-directional pattern is also well suited for DX beacons and spotting.

Choosing a location

For best performance on receiving and transmitting, mount the antenna in a clear location above or away from buildings, towers, feedlines, utility wires, and other antennas. While your own ingenuity and particular circumstances will determine the final mounting method, we'll pass along a few ideas for both permanent installation and portable operation.

Never mount this antenna in a location that will permit unsuspecting people to come in contact with the antenna elements.

Never mount this antenna where a mechanical failure might allow the antenna to contact power lines or other utility wires.

Always ground the feedline at the point where it enters a building to a good earth ground for lightning protection.

WARNING Always mount this antenna so that it is out of reach of adults and children. The elements can cause injury and/or severe RF burns.

WARNING

WHEN INSTALLING YOUR SYSTEM, TAKE EXTREME CARE TO AVOID ANY ACCIDENTAL CONTACT WITH POWER LINES OR OVERHEAD OBSTRUCTIONS. FAILURE TO EXERCISE THIS CARE COULD RESULT IN SERIOUS OR FATAL INJURY

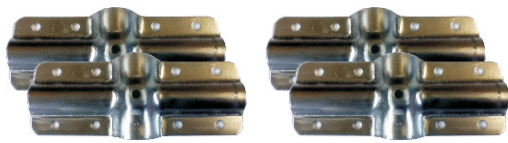
Permanent Installation

The ideal installation is a rigid pole or roof mount that puts the antenna completely in the clear. If the ideal installation is not possible, choose the best compromise. TV mast, heavy-duty rigid electrical conduit, and steel water pipes are suitable mast materials. The use of soft or thin wall mast is not recommended.

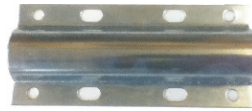
Portable Operation

The ASQ20 may be used for portable operation. The light weight and small size allows it to be installed almost anywhere. Keep in mind that metal objects close to the antenna will affect tuning and radiation patterns.

Antenna Elements



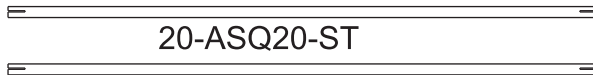
165141 (4 pcs)



385144-1



385142-1



20-ASQ20-ST

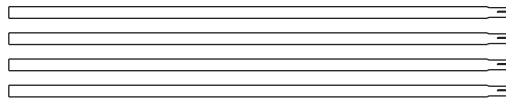
7/16 x 90 tubes (2 pcs)

20-ASQ20-ET



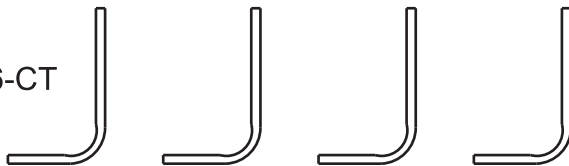
7/16 x 16 tubes with slot (4 pcs)

20-ASQ20-MT

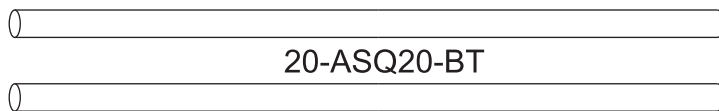


5/8 x 38 Tube with swage (4 pcs)

20-ASQ6-CT



Corner tubes (4 pcs)



20-ASQ20-BT

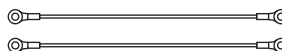
Boom tube 1-1/4 x 52" (2 pcs)

80-ASQ6-MB



Balun

13-ASQ20-JW



Jumpers (2 pcs)



20-ASQ20-IF
7/8 x 6 FG

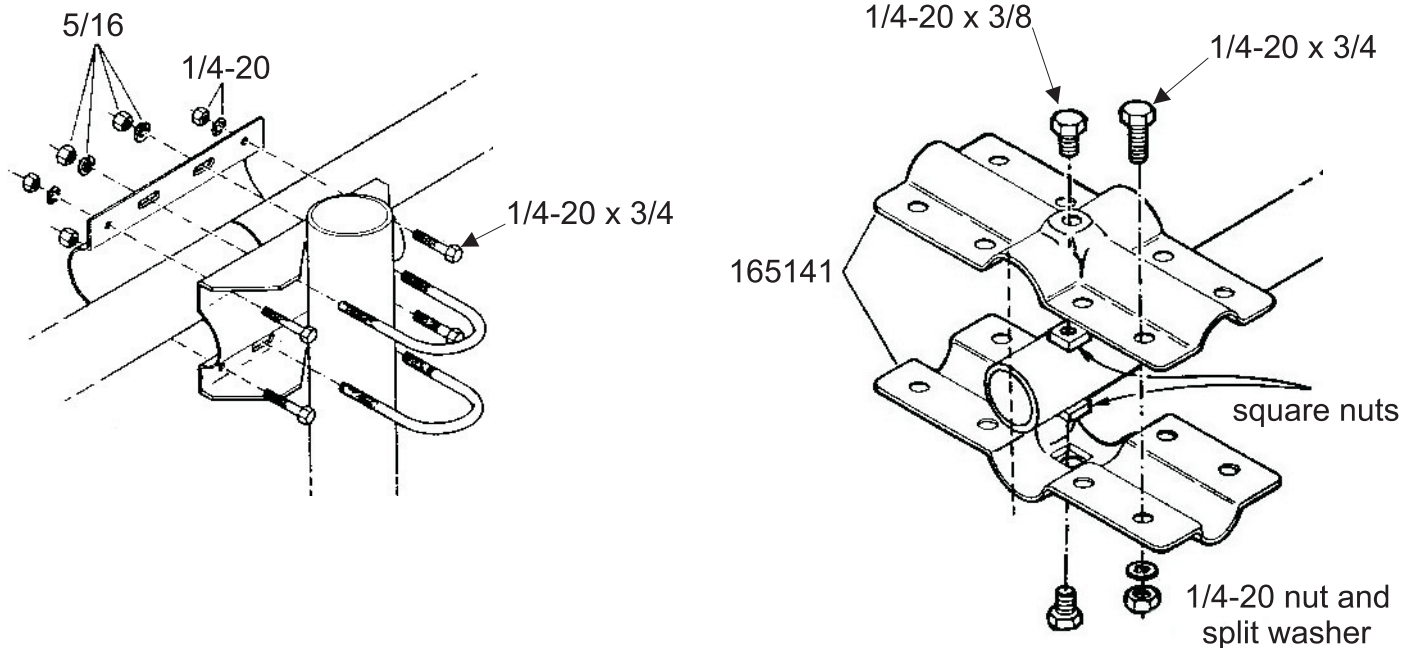


461057

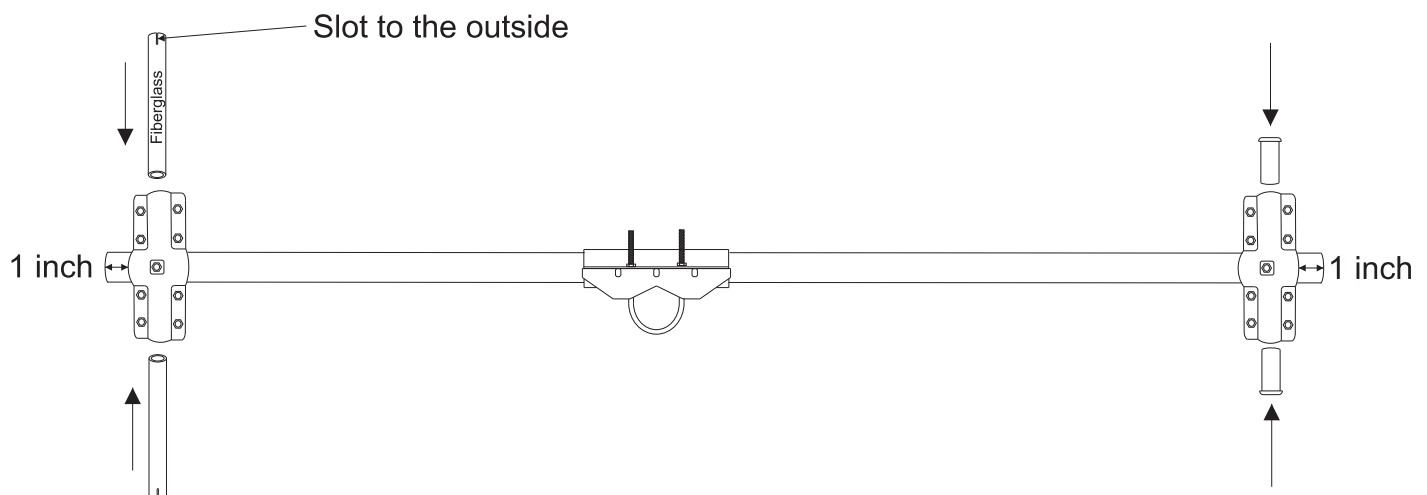
Insulators (2 each)

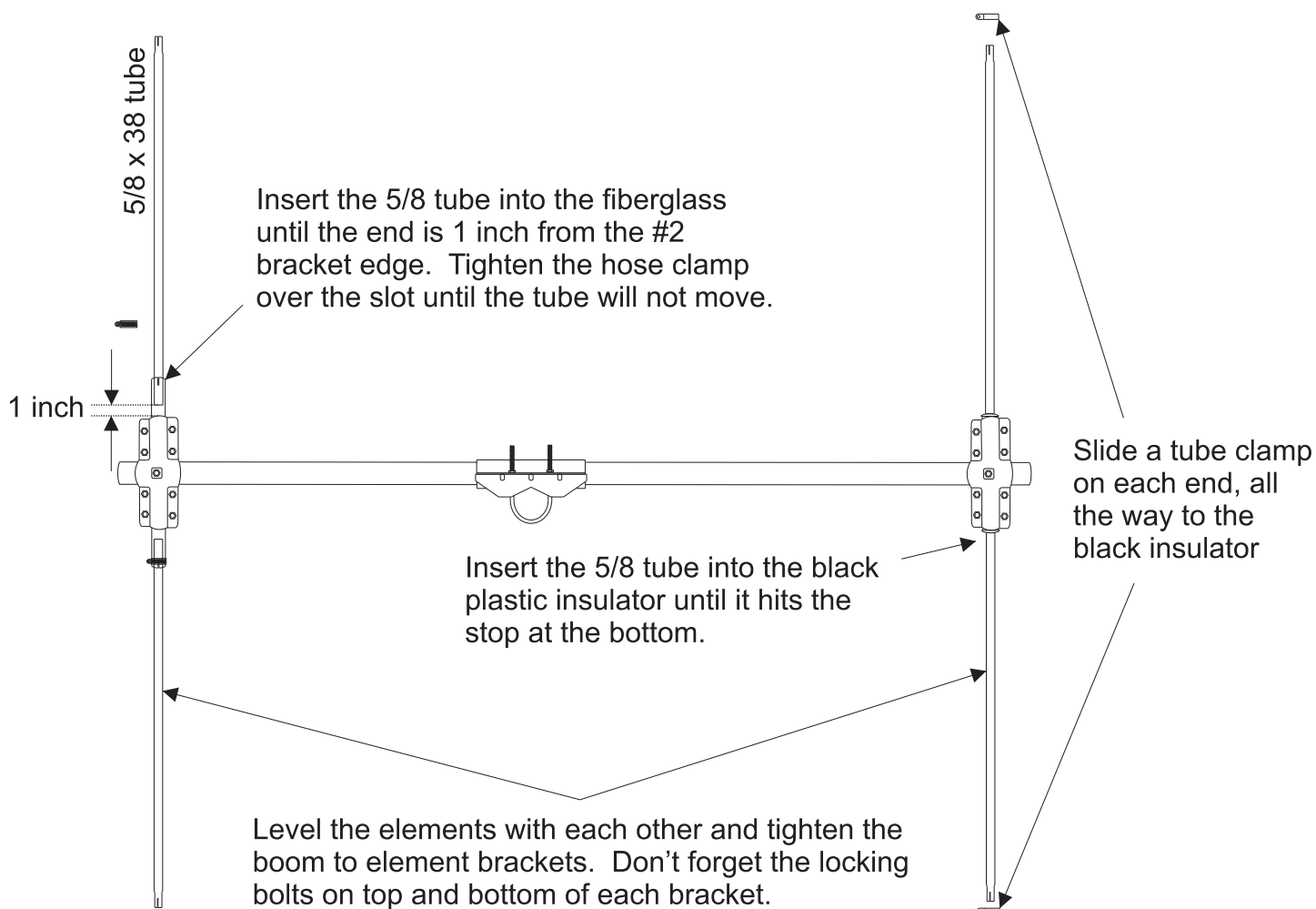
Antenna Assembly

Assemble the antenna on a flat level surface. Avoid assembly over grass as you may drop some of the parts and never find them again. Attach the Mast bracket to the boom tubes using the hardware in the figure below. The tubes should meet in the middle of the bracket. Use the 1/4-20 bolts and nuts to clamp the two booms together. Loosely insert the U-bolts and thread the washers and bolts on them. Tighten the clamp together but do not tighten the nuts on the U-bolts.

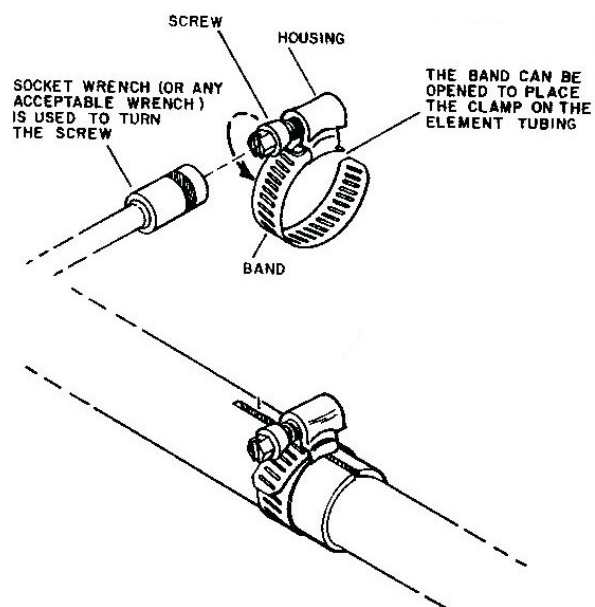


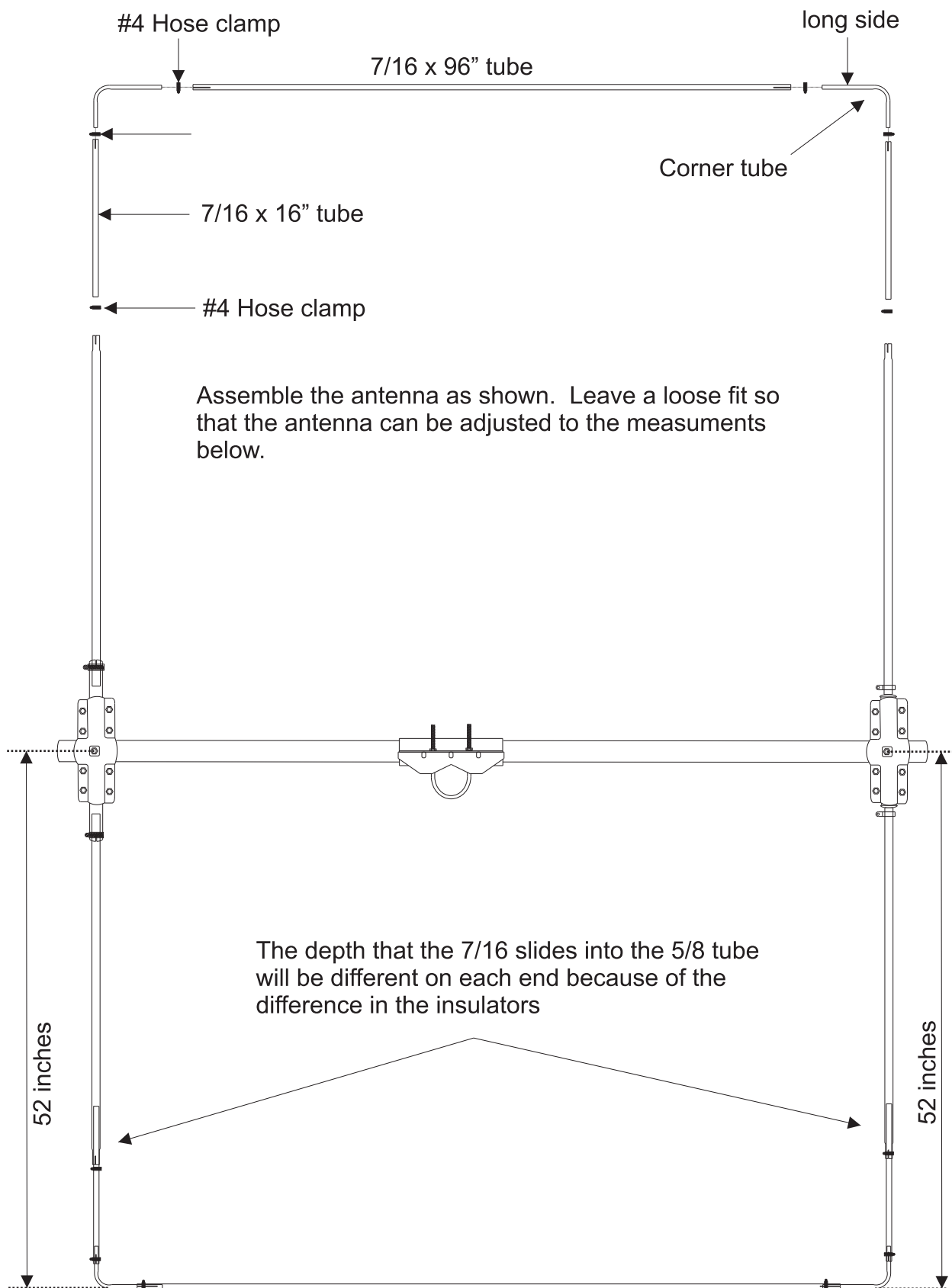
Loosely assemble the #2 boom to element brackets for each end of the antenna. Slide them over each end of the boom. Insert the fiberglass insulators into the brackets with the slot outward. Insert the black plastic insulators into the other end. It doesn't matter which end you choose for each type insulator. Push the insulators all the way in and snug the bolts so that they will not fall out.



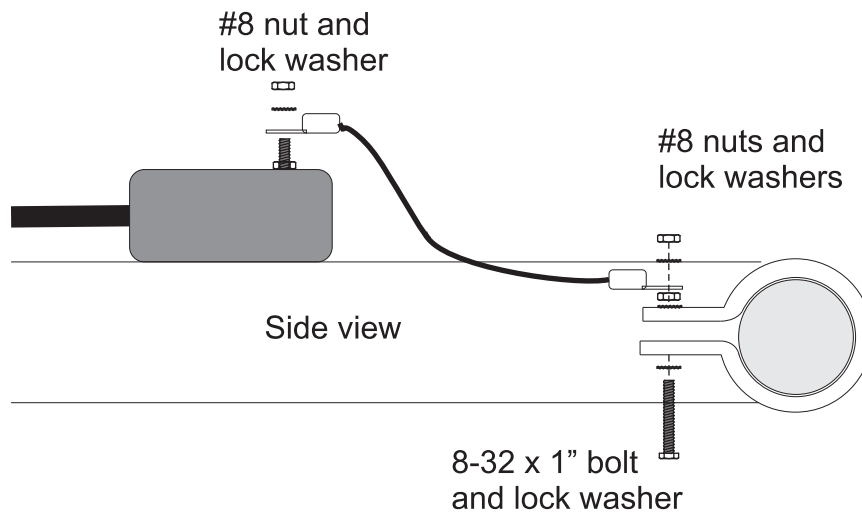


Assemble the antenna as shown in the diagram on the next page. Do not over tighten the hose clamps as it will damage the worm gear.

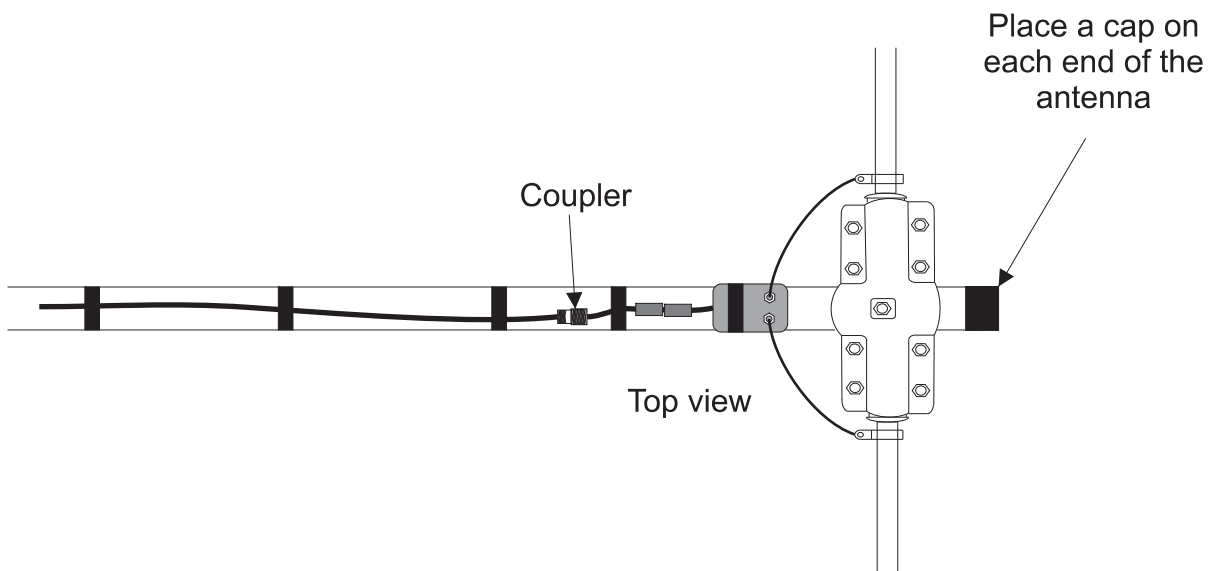




Attach the balun and jumper wires as shown in the diagram below. Use the #8 hardware to secure the clamp and the wire to the 5/8 tube that is inserted into the black plastic insulators.



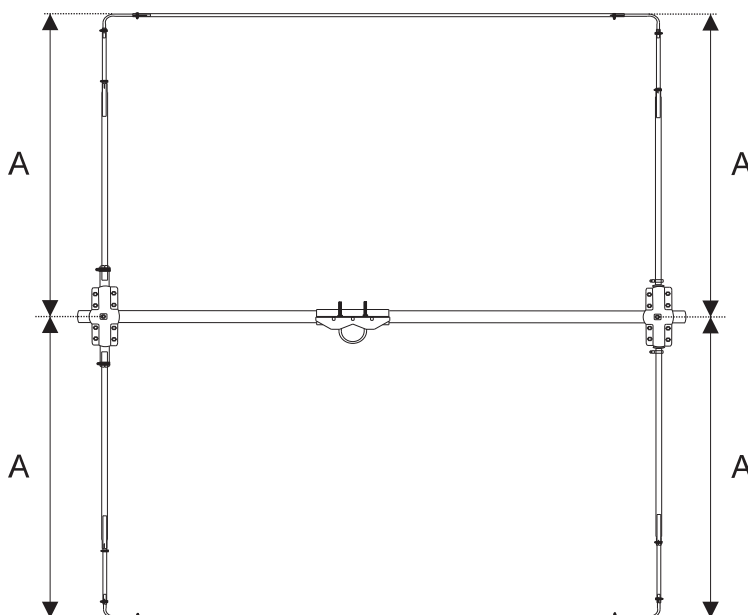
Use cable ties or electrical tape to secure the coax and balun to the boom of the antenna



SWR Check

Resonance can be checked with an MFJ-256 or MFJ-269. Alternately a transceiver and SWR meter can be used. The antenna should be at least 8 feet off the ground for testing. The Resonance point will be affected if the antenna is tuned too close to the ground. A slightly raised SWR may also be noticed if the antenna is too close to the ground.

Resonance may be changed by adjusting the diameter of the loop. If the resonance point is too low, make the loop smaller (Decrease "A"). If the resonance point is too high, make the loop larger (Increase "A"). Dimension "A" will determine the final operating frequency of the antenna. A = 52 inches will tune the antenna approximately to the middle of the 20 meter band. Remember that nearby objects including yourself can affect the tuning of the antenna.



ANTENNA MOUNTING

The ASQ20 is very light and should easily mount on any portable or permanent mast. No matter how secure you think the antenna is, NEVER mount it in a location where it could fall into or come in contact with power lines.

Grounding Considerations

Although this antenna is designed to operate efficiently without the requirement of an earth ground, safety grounding must still be provided to protect equipment, property and persons from the hazards of lightning strikes and other weather related electrical discharges. In addition, the coaxial cable feeding the antenna should have the shield grounded to eliminate the risk of any indoor equipment failure allowing hazardous voltages that could create a shock hazard. Adequate protection can be accomplished by grounding the shield of the coax to a good earth ground where it enters the building, or directly burying the cable in the earth for several feet before it enters the building. For maximum lightning protection, the coaxial cable should be totally disconnected from the station during threatening weather conditions.

NOTES

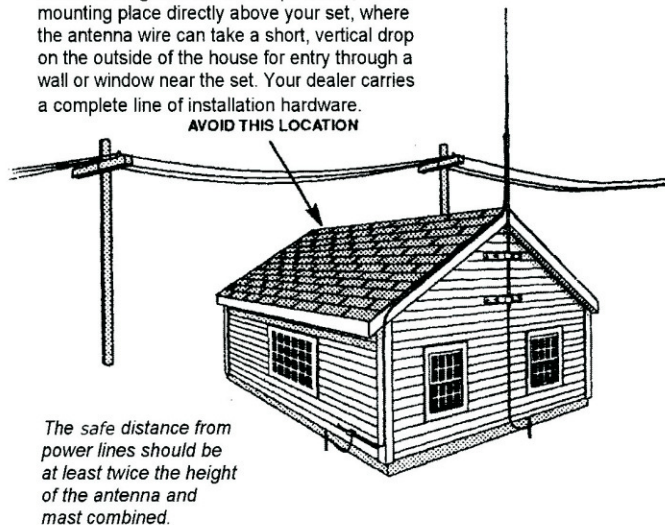
SITE SELECTION

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.

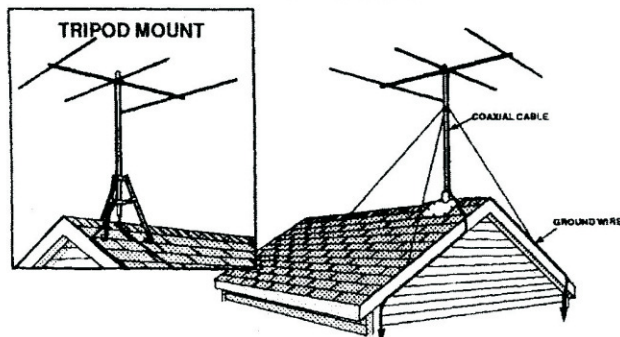
If you are unable to maintain this safe distance, **STOP! GET PROFESSIONAL HELP.** Many antennas are supported by pipe masts attached to the chimney, roof or side of the house. Generally, the higher the antenna is above the ground, the better it performs. Good practice is to install your antenna about 5 to 10 feet above the roof line and away from power lines and obstructions. Remember that 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.



CHOOSE A PROPER SUPPORT AND MOUNTING METHOD

However you decide to mount and support your antenna always make sure that safety is your first concern. Some of the more common installation methods are illustrated below.

ROOF MOUNTED



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.

TELESCOPING MAST

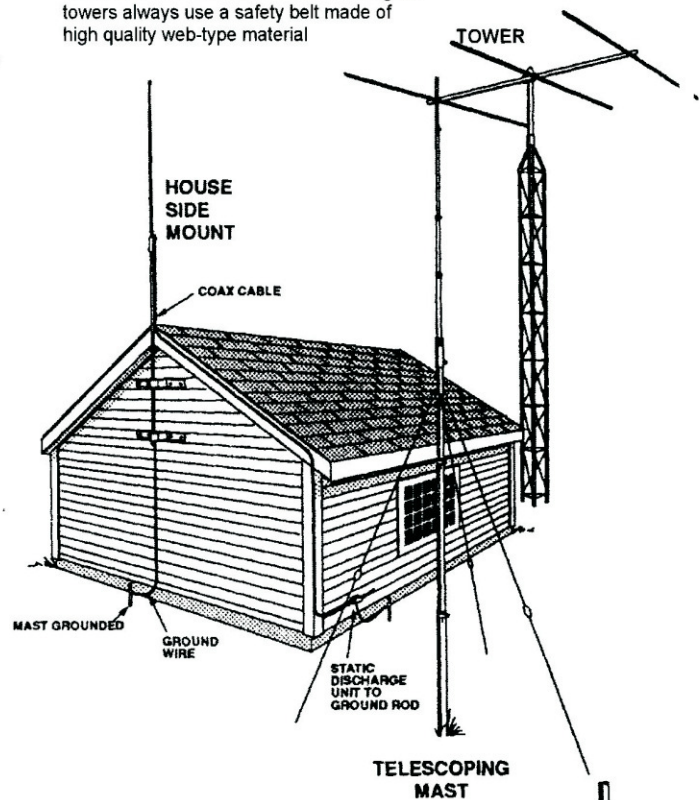
Guy wires should be equally spaced in at least three directions. Use at least three guy wires for each 10 foot section of mast.

SIDE OF HOUSE MOUNTING

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

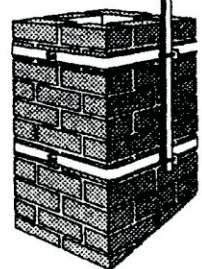
TOWER

Tower safety is paramount to a good installation and requires that you take location, tree growth, soil depth and proximity to buildings into consideration. Tower foundations must be securely based on a solid concrete/tower mounting plate. An alternative is to sink a 4-6 foot section of tower into a concrete base for an extremely rugged mount. Proper guying is essential to a safe weather-resistant installation that must handle severe wind loading and is best accomplished with preformed guy grips, torque brackets and turnbuckles. When working on towers always use a safety belt made of high quality web-type material



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 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.



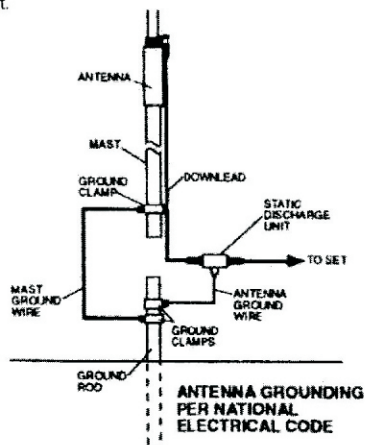
GENERAL INSTALLATION INSTRUCTIONS FOR MAST MOUNTED ANTENNAS

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 the antenna to mast and connect the coaxial cable to the antenna.
3. To insure that the mast does not fall the "wrong way" 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 arise 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 camp 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.
8. 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

1. Use No.10 AWG copper or No. 8 AWG or larger copper-clad steel or bronze wire, as ground wires for both mast and lead-in. Securely clamp the wire to the bottom of the mast.
2. Secure lead-in wire from antenna to antenna discharge unit and mast ground wire to house with stand-off insulators spaced from 4 feet (1.2 meters) to 6 feet (1.8 meters) apart.
3. Mount antenna discharge unit as close as possible to where the lead-in wire enters the house.
4. Drill a hole in wall (CAREFUL! There are wires in that wall.) near your set just large enough to permit entry of cable.
5. Push cable through hole and form a rain drip loop close to where it enters the house.
6. Put small amount of caulking around cable where it enters house to keep out drafts.
7. Install static electricity discharge unit.
8. Connect antenna cable to the 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

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 small 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 complete an electrical path through the antenna 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.

If an accident should occur with the power lines call for qualified emergency help immediately.

PARTS LIST

385142-1	Boom bracket -----	1
385144-1	Boom bracket -----	1
190012	Tube 5/8 x 38 sw 7/16 ---	4
165141	Element to Boom #2 -----	4
20-ASQ20-ST	Side tube 7/16 x 90"-----	2
20-ASQ20-ET	End tube 7/16 x 16-----	4
20-ASQ20-BT	Boom Tube 1-1/4 x 52----	2
20-ASQ20-CT	Corner tube 3/8"-----	4
20-ASQ20-IF	Insulator, Fiberglass-----	2
80-ASQ6-MB	Matching Box-----	1

17-ASQ20-HK

461057	Insulator 5/8-1-1/4-----	2
010084	Washer 1/4 split-----	4
010085	Nut 1/4-20-----	20
540067	U-bolt-----	2
010118	Nut 5/16-----	4
010119	Washer 5/16 split-----	4
010214	Bolt 1/4-20 3/4-----	20
551367	Square Nut 1/4-20-----	4
010215	Bolt 1/4-20 x 3/8-----	4
015890	Screw #8 x 1"-----	2
010011	Nut 8-32-----	2
011941	Washer #8 split-----	2
030407	Hose clamp #4-----	12
745-3106S	Hose clamp #6-----	2
030409	Tube clamp 5/8-----	2
100432	Barrel Connector-----	1
13-ASQ20-JW	Jumper Wire-----	2
050013	Tube Cap 1-1/4 -----	2

LIMITED WARRANTY

Cushcraft Amateur Radio Antennas, 308 Industrial Park Rd., Starkville, MS 39759, warrants to the original consumer purchaser for one year from date of purchase that each Cushcraft antenna is free of defects in materials or workmanship. If, in the judgment of Cushcraft, any such antenna is defective, then Cushcraft Amateur Radio Antennas will, at its option, repair or replace the antenna at its expense within thirty days of the date the antenna is returned (at purchasers 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 Amateur Radio Antennas shall not be liable for any incidental or consequential damages that 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 that vary from state to state. This warranty does not extend to any products that have been subject to misuse, neglect, accident or improper installation. Any repairs or alterations outside of the Cushcraft factory will nullify this warranty.