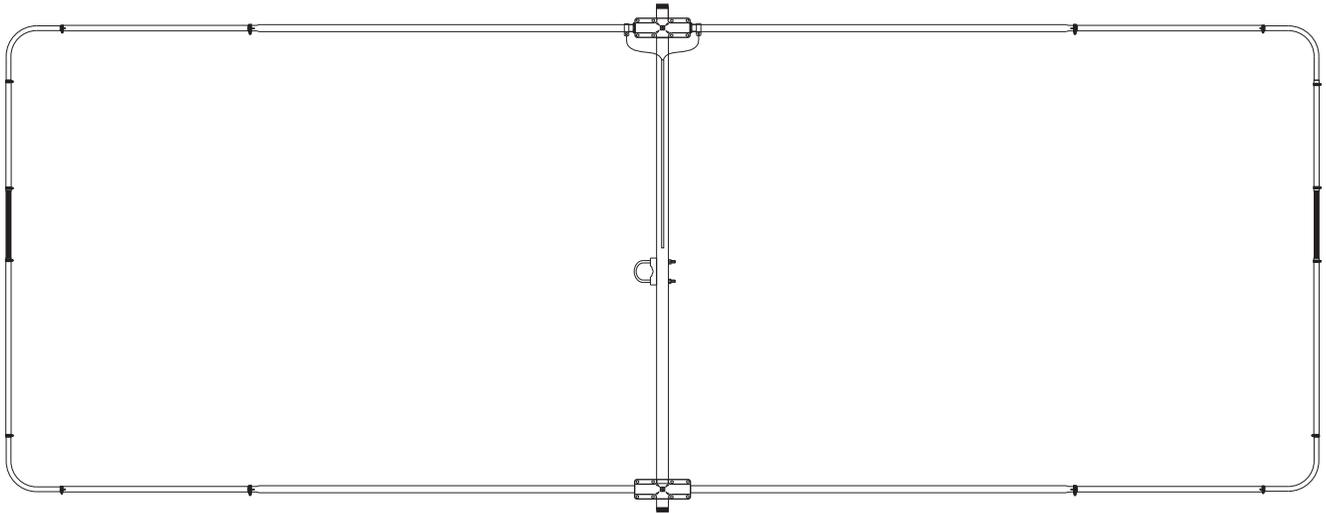


MFJ-1890

2 Element Moxon Beam for 10 meters

INSTRUCTION MANUAL



CAUTION: Read All Instructions Before Operating Equipment

MFJ

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Starkville, MS 39759 USA
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GENERAL DESCRIPTION

The Moxon Rectangle is a close-spaced 2-element Yagi consisting of a driven element and a reflector with the element tips folded toward each other to reduce turning radius. The Moxon features a broad cardioid pattern with roughly 3.3 dBd of forward gain and front to back ratio measuring -30 dB or more. Spanning just over 12 feet and weighing only a few pounds, it is well suited for rooftop installations using lightweight TV hardware.

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 MFJ-1890 may be easily transported to temporary locations for portable, emergency, and contest operation. Even for temporary or portable operation, do not be casual about selecting a suitable mast. If the antenna falls, it can be damaged and may cause serious injury. Whatever type of installation you choose, remember that the antenna should be installed where it cannot be contacted by people or animals or come in contact with power lines.

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. You may use a couple of saw horses or other means of support to aid assembly. Loosely assemble the #1 and #11 brackets using the 1/4-20 nuts, bolts and washers as shown in figure 1. Don't forget the square nuts that go inside the brackets. The square nuts are different for each bracket and also take different bolts.

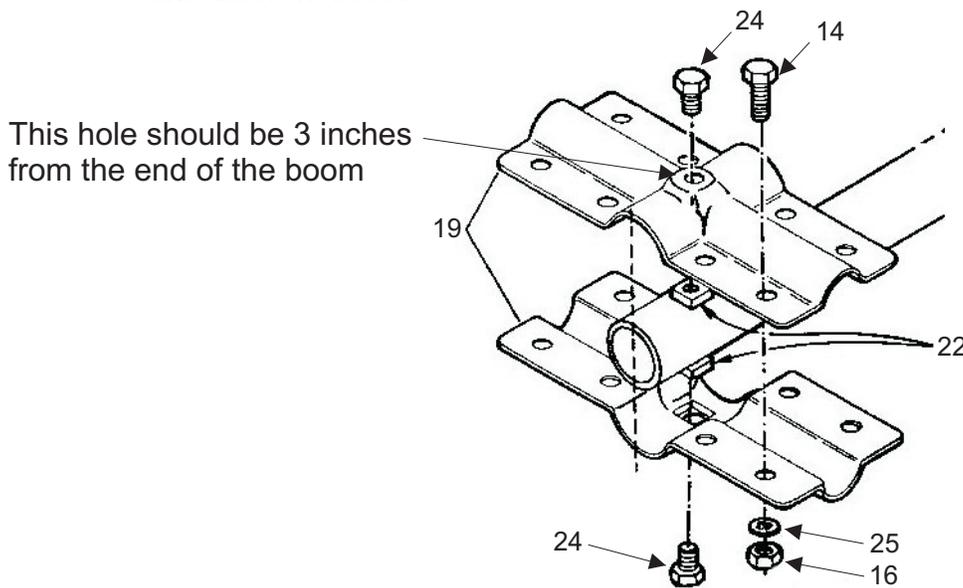


Figure 1

Install the 5/8 elements into the bracket while it is loose on the boom. Tighten them enough to hold the element but allow for the bracket to rotate on the boom as you will have to align the elements with the mast when the antenna is fully assembled.

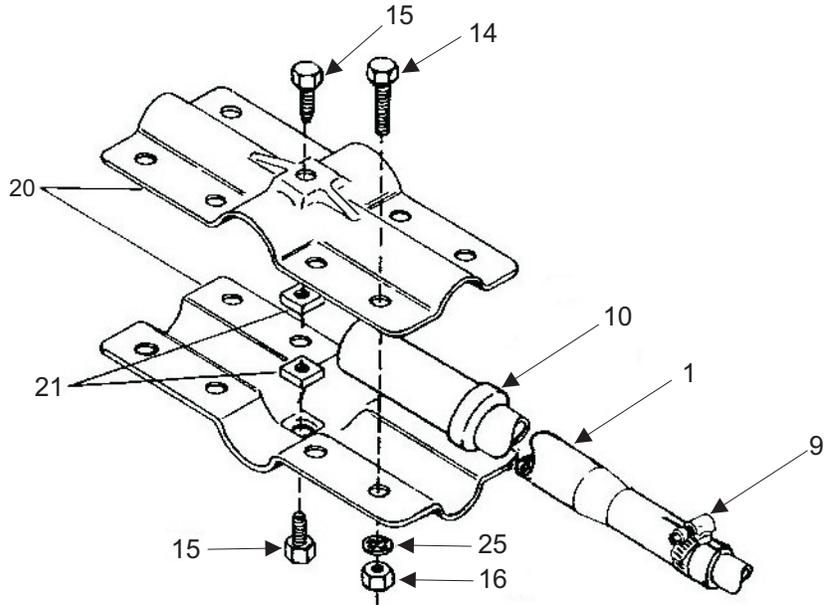
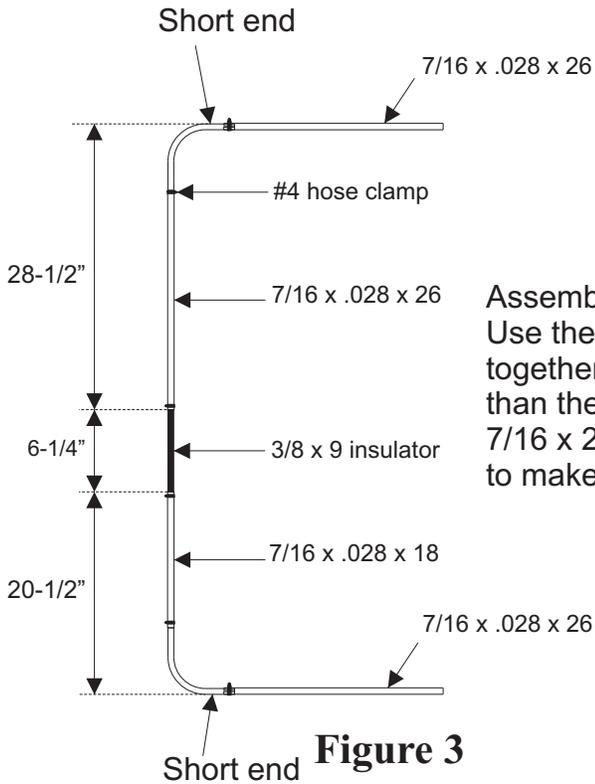


Figure 2

Secure the driven element insulator to the other end of the boom also allowing 3 inches from the center of the bracket to the end of the boom. Install the remaining two main elements to the insulator as shown in figure 2. Leave the bracket loose enough to align the elements when the antenna is finished.



Assemble the end elements as shown in figure 3. Use the #4 hose clamps to secure the tubing together. The corner tubes have one side longer than the other. The short end should insert into the 7/16 x 20 elements. Repeat this assembly again to make the other side of the antenna.

Figure 3

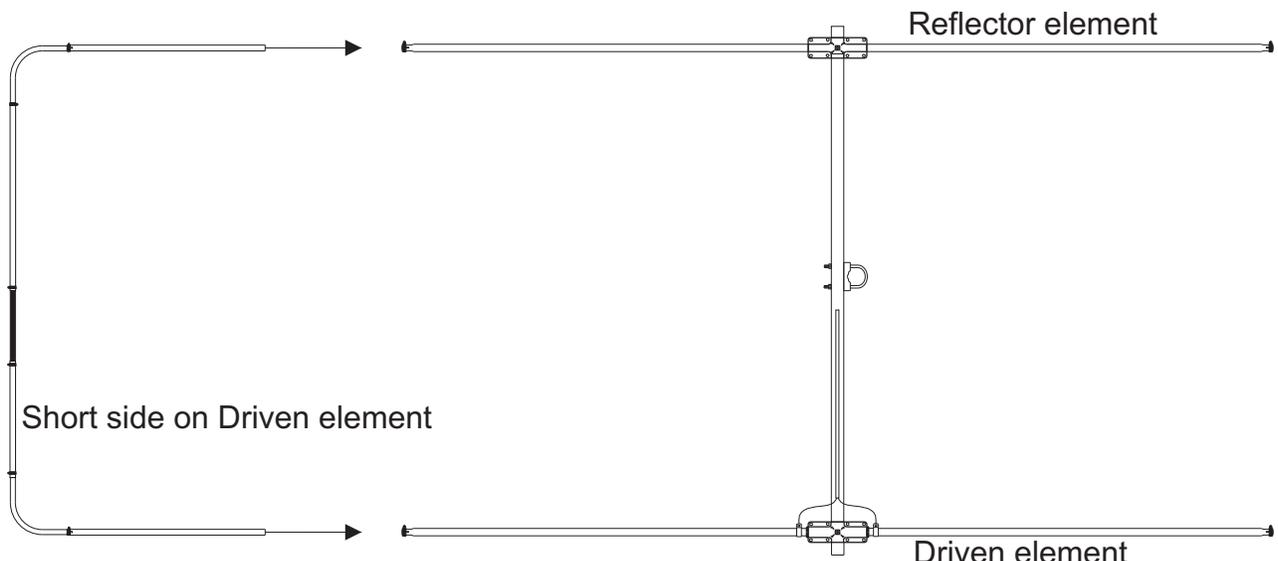


Figure 4

Install the end pieces onto the elements using the #4 hose clamps. Sliding these end pieces in and out will be how you adjust the final length of each element. Measure the distance from the center of the boom to the outside of the element. This distance will be the same for all four elements. Use the antenna diagram on the next page to verify all your measurements. Install the u-bolt on the boom. Place the 1-1/4 end caps on each end of the boom.

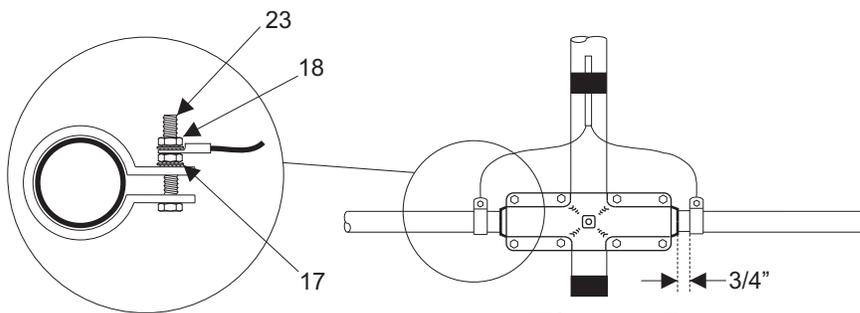


Figure 5

Attach the feed line to the driven element as shown in figure 5. Place the 5/8 clamps 3/4 inch away from the insulator. Use the 10-24 bolts nuts and lock washers to tighten the clamps to the tube. Place the feed line eyelets over the remaining section of the bolt and secure with another lock washer and nut. Secure the coax to the boom with electrical tape or other suitable fasteners.

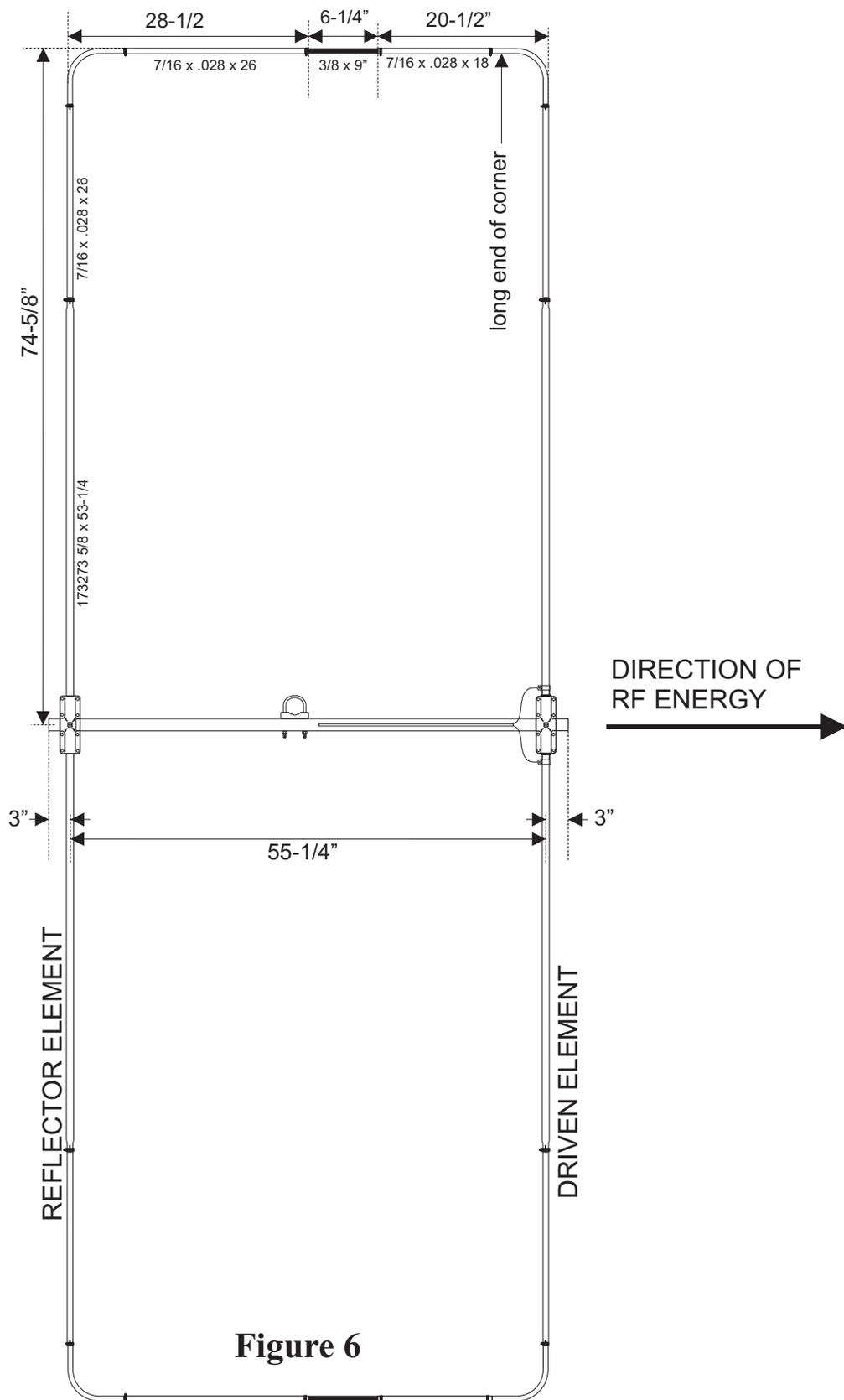


Figure 6

Final Assembly

Check the alignment of the elements and make sure all hardware is tight. Mount the antenna in the final location.

Connect the coax balun to a high quality low loss cable such as LMR-400 or equivalent.

SWR Check

Resonance can be checked with an MFJ-256 or MFJ-269. Alternately a transceiver and SWR meter can be used. Resonance may be changed by adjusting the length of the elements. If the resonance point is too low, shorten the element length. If the resonance point is too high, lengthen the element length.

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.

PARTS LIST

1	173273	Tube 5/8 x 53-1/4 swaged -----	4
2	20-1890-1	Tube, Boom, 1-1/4 .058 x 61-1/4" Drilled -----	1
3			
4	20-1890-3	Tube, 7/16 x .028 x 26" slotted -----	6
5	20-1890-4	Tube, 7/16 x .028 x 18" slotted -----	2
6	20-1896-5	Tube, 3/8 corner -----	4
7	20-1890-6	Rod, Fiberglass 3/8 x 9" -----	2
8	13-1890-1	Balun Assembly -----	1
19	161422	Bracket, # 11 -----	2
20	165138	Bracket, # 1 -----	2

17-1890-1

Parts Pack MFJ-1890

9	745-3104S	Hose Clamp #4 -----	16
10	461057	Insulator 1-1/4- 5/8 -----	2
11	171329	Clamp, 5/8 -----	2
12	455630	Caplug, 1-1/4 ABS -----	2
13	758-9199	U-bolt 1-3/4 -----	1
14	505266	Bolt, 1/4-20 x 3/4 -----	16
15	500156	Bolt, 1/4-20 x 3/8 -----	2
16	554099	Nut, 1/4-20 Hex -----	16
17	711-1037S	Washer, #10 Internal lock -----	4
18	554071	Nut, 10-24 Hex -----	4
21	551367	Nut, square 1/4-20 -----	2
22	555362	Nut, square 10-24 -----	2
23	504069	Bolt, 10-24 x 1 -----	2
24	500158	Bolt, 10-24 x 1/2 -----	2
25	562961	Washer, 1/4 Internal lock -----	16

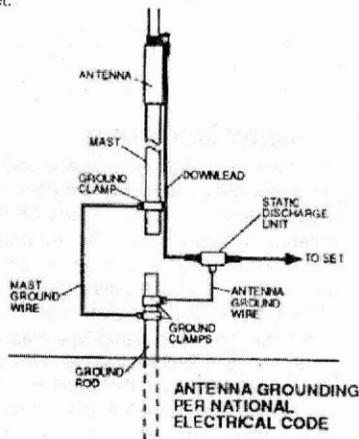
GENERAL INSTALLATION INSTRUCTIONS FOR MAST MOUNTED ANTENNAS

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 YOUR SELF. 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.

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SITE SELECTION

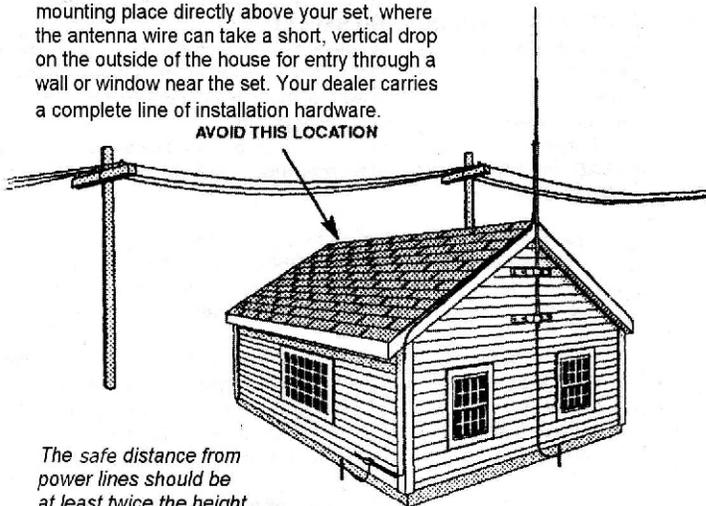
Before attempting to install your antenna, think where you can best place your antenna for **safety** and performance.

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.

AVOID THIS LOCATION

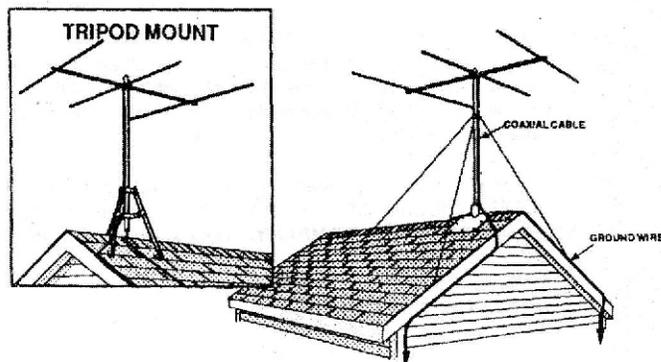


The safe distance from power lines should be at least twice the height of the antenna and mast combined.

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

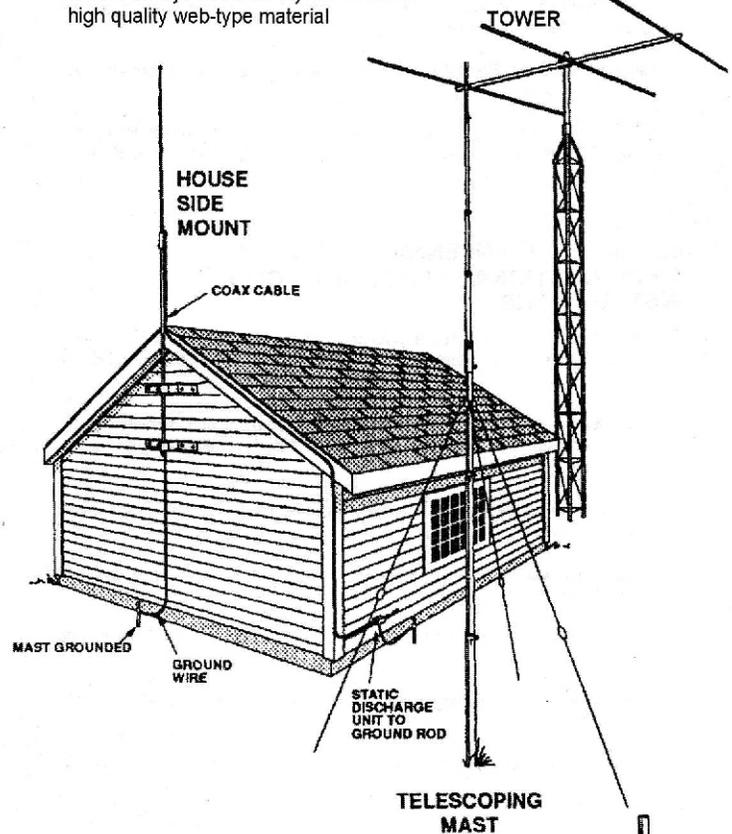
Guy wires should be equally spaced in at least three directions. Use at least three guy wires for each 10 foot section of mast.

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.

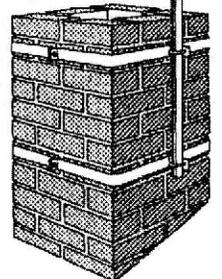
TOWER

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.



NOTES

FULL 12 MONTH WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free from defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, canceled check, credit card or money order receipt, etc.) describing the product to establish the validity of the warranty claim and submit the original of machine reproduction or such proof of purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery shall be cause to void any and all warranty terms immediately.
2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product under warranty provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashiers check, or money order for **\$7.00** covering postage and handling.
3. MFJ Enterprises, Inc. will supply replacement parts free of charge for any MFJ product under warranty upon request. A dated proof of purchase and a **\$5.00** personal check, cashiers check, or money order must be provided to cover postage and handling.
4. This warranty is **NOT** void for owners who attempt to repair defective units. Technical consultation is available by calling (601) 323-5869.
5. This warranty does not apply to kits sold by or manufactured by MFJ Enterprises, Inc.
6. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board product is returned**. Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, or cables, etc. sent to MFJ Enterprises, Inc. will be returned at the owner's expense unrepaired.
7. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or property by the use of any MFJ products.
8. **Out-of-Warranty Service:** MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is shipped prepaid. All repaired units will be shipped COD to the owner. Repair charges will be added to the COD fee unless other arrangements are made.
9. This warranty is given in lieu of any other warranty expressed or implied.
10. MFJ Enterprises, Inc. reserves the right to make changes or improvements in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.
11. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to **MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, Mississippi 39759, USA** and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.
12. This warranty gives you specific rights, and you may also have other rights which vary from state to state.

MFJ

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