

MFJ-1777 All Band Doublet

INTRODUCTION

The MFJ-1777 is a multi-band center-fed dipole antenna capable of handling 1500 watts. It consists of a 102-foot “flat top” antenna fed with a length of 450 ohm balanced “ladder line.”

This antenna requires the use of a suitable matching network (antenna tuner) with provisions for balanced-feed antennas, for interface with the 50-ohm unbalanced antenna outputs of modern transceivers and amplifiers.

This antenna will work as supplied, as a centerfed antenna, on all amateur bands 80 through 10 Meters. On 160 Meters it can be used as top loaded vertical antenna, with the dipole element acting as a capacitance hat on 160 meters (see “160 Meter Operation,” page 3). Operation on 160 Meters in this manner requires a ground screen or radial ground system, which is discussed on page 4. This antenna **will not** work effectively in its center-feed configuration on 160 Meters.

TOOLS AND TIME REQUIREMENTS

This antenna requires no assembly. The time needed for installation will vary with your skill and equipment. No special tools are required to install this antenna. Nylon ropes are needed to support the ends of the antenna from suitable structures or trees. If trees are used, you will need a way to get ropes over it. The most common method is to use a weighted arrow or a fishing rod and a sinker to place a small line over a tree. A larger line is then pulled up and used to pull the support rope over the tree. The ARRL Antenna Handbook has detailed suggestions for installing wire antennas.

WARNING: Always mount antennas so that they are out of the reach of adults and children. Contact with any part of this antenna can cause RF burns or other injuries. See the Safety Precautions on page 7.

INSTALLING THE ANTENNA

The best location for this antenna is as high and far away as possible from utility wires, other antennas, and other structures. It is difficult to find a perfect location, so the best compromise usually must be accepted. The antenna can be installed in three basic ways:

Horizontal Antenna: Requires two tall supports separated by more than 102 feet. Suspend the antenna with at least a 50 pound working load nylon rope or another equivalent strength weather resistant non-metallic rope. Never use wire or wire core rope to support the ends of the antenna. Attach the rope to the end insulators through the empty holes.

Try to keep the antenna as horizontal as possible. The antenna must be more than 35' above ground level to give acceptable performance, and as high as possible for the best overall performance. The ladder line should drop vertically from the horizontal section for ***at least*** 20 feet and should be kept several inches from conductive objects. If the antenna's ladder line has to be installed near conductive objects, space the line at least 6" from the object with non-conductive supports (for example: PVC pipe standoff supports 6" long). Use nylon cable ties to secure the feedline to the supports.

Be sure to allow enough slack or use some type of pulley and counterweight system to prevent the antenna or rope from breaking if the trees move in the wind. It is also possible to use masts, towers, or other tall structures for supports. Try to keep the ends of the antenna at least five feet from metallic supports.

IMPORTANT: Use weather resistant rope rated at at least 50 pounds working load to support this antenna.

Inverted "V" Antenna: This method requires only one tall support and also places the least strain on the antenna. Hang the center insulator of the antenna from the support using a nylon rope or other non-conductive rope tied to the center hole of the center insulator. The center insulator should be the highest point of the antenna. The antenna ends should be less than 25.5 feet below the center insulator. This avoids an inside angle of less than 120 degrees between the antenna's legs. The antenna ends should be secured with nylon or weather resistant non-metallic rope to suitable supports.

Sloper Antenna: This antenna can also be suspended as a sloping dipole. This requires one tall support and one short support. The center of the antenna must

be at least 30 feet above the ground in this configuration. The antenna radiates mainly in the direction of the downward slope. The optimum angle of "slope" will vary with the desired coverage distance and the frequency of operation, but will almost always be somewhere between 45 degrees and almost vertical.

160 METER OPERATION AND GROUNDING

The MFJ-1777 can be used on the 160 meter band as a "Marconi Antenna." Operation on 160 requires a tuner and a good RF ground system. ***Do not*** try to use this antenna in its supplied, center-fed configuration on 160 Meters, as you risk damage to your antenna tuner and/or transceiver.

To use the MFJ-1777 as a Marconi antenna, connect together the bottom ends of the feedline (ladder line) at your tuner. This allows the vertical feedline to become a radiating element, working against the station ground. The feedline should be kept as vertical and as clear of metallic objects as possible. Obviously, an "indoor" configuration such as this has complications, namely, that the feedline is "hot" inside. Take suitable precautions.

A good way to visualize an RF ground is to picture a large conductive "mass" that the antenna pushes against. The "mass" should have a short connection to the ground point and extend as far as possible in every direction. The ideal ground system for 160 meters would have 120 straight evenly spaced radials at least 140 feet long. A marginally acceptable ground system requires a ***minimum*** of four or more long (60 foot or more) straight radials. Other large metallic masses (such as fences or water lines) should also be "tied in" to the ground system.

The earth and fresh water are poor electrical "masses" because of their poor conductivity (1 to 30 milliohms/meter). Although salt water is several hundred times (5000 milliohms/meter) more conductive than dirt, copper is several hundred times (millions of milliohms/meter) better than saltwater. Copper radials obviously offer a much better ground than saltwater.

Ground rods almost never suffice for RF grounding in applications like this because they connect to the lossy dirt. This is why radials are required when feeding this antenna as a Marconi. Radials will improve your signal even if the earth is wet or saturated with salt water.

Elevated counterpoise systems are also effective, but they also require as much "electrical mass" as possible. A supplemental earth connection is always required for lightning and low frequency ac grounding.

The earth ground should consist of at least one copper ground rod driven into the earth a minimum of 6 feet. Multiple ground rods and buried wires are superior to a single rod for lightning and RF protection. 160 meter operation requires special grounding considerations. These considerations are discussed in the "160 Meter Operation" section.

Never use woven flexible braiding for ground connections unless *absolutely necessary*. Braiding has high resistance to RF and lightning. Copper flashing, wide copper foil, or large gauge solid copper wires are the proper materials for use in RF and lightning grounding applications. Never ground the feedline on the antenna side of the balun.

In-line coaxial lightning arrestors offer a minimal improvement in lightning protection. The best method of protecting station equipment is to disconnect the feedline outside the building.

TUNER REQUIREMENTS

As noted earlier, this antenna requires an antenna tuner, ideally one that is able to tune balanced feedlines. If you have a tuner that tunes only unbalanced, 50-ohm loads (such as the internal tuner in some transceivers) it is still possible to use this antenna. Connect a suitable 4-to-1 current balun (such as the **MFJ-912** "W9INN Balun Box") between your balanced feedline and your transceiver through a short piece of 50-ohm coax.

TUNING THE ANTENNA

This antenna comes with 100 feet of high-quality balanced feedline. In general any length of feedline will tune on all bands with this antenna. You may add more feedline if necessary to span the distance from your tuner to the antenna, or you may shorten the feedline if it is much too long (there is nothing magic about the 100 feet supplied). Should you find that it is impossible to tune your antenna on one or more bands, after you have exhausted the recommendations in your tuner manual, then try changing the length of the feedline, by adding or subtracting, say, five percent, or three to six feet, of feedline length.

MAINTENANCE

This antenna is constructed of heavy duty materials and should withstand normal climates for many years. General Electric makes a pure silicone grease called "*silicone dielectric compound*" that can be applied *sparingly* to the soldered connections at the antenna's center insulator. ***This is the same type of sealer that commercial antenna installers and CATV companies use with great success.***

A less desirable but adequate sealer is the automobile seam sealer commonly marketed as "coax seal". This is a pliable black sealing compound.

TECHNICAL ASSISTANCE

If you have any problem with this unit first check the appropriate section of this manual. If the manual does not reference your problem or your problem is not solved by reading the manual you may call *MFJ Technical Service* at **662-323-0549** or the *MFJ Factory* at **662-323-5869**. You will be best helped if you have your unit, manual and all information on your station handy so you can answer any questions the technicians may ask.

You can also send questions by mail to MFJ Enterprises, 300 Industrial Park Road, MS 39759; by FAX to **662-323-6551**; or by email to techinfo@mfjenterprises.com. Send a complete description of your problem, an explanation of exactly how you are using your unit, and a complete description of your station.

SAFETY PRECAUTIONS

- **This antenna is an electrical conductor. Contact with power lines can result in death or serious injuries. Do not install this antenna where there is any possibility of contact with power cables or the service drop. The antenna should not be close to power lines during installation, operation, or removal.**
- **Follow the guidelines for antenna installation recommended by the U.S. Consumer Product Safety Commission.**
- **Keep this antenna out of reach of adults, children, and animals.**
- **Any contact with this antenna while transmitting can cause RF burns.**
- **Never place this antenna close to electric power lines of utility wires.**
- **Install the antenna away from living areas to reduce levels of electromagnetic fields.**
- **Never operate this antenna near RF sensitive medical devices such as pacemakers.**
- **Keep the ladder line away from buildings and metallic objects. Ladder line is a high impedance line that can develop high RF voltages with high transmitter power levels.**
- **Use a minimum of 50-pound working load weather resistant rope to support this antenna.**