MFJ

Rotatable Mini-Dipole

Model MFJ-1775

INSTRUCTION MANUAL

CAUTION: Read All Instructions Before Operating Equipment

MFJ ENTERPRISES, INC.

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VERSION 1A

DISCLAIMER

Information in this manual is designed for **user purposes only** and is ***not*** intended to supersede information contained in customer regulations, technical manuals/documents, positional handbooks, or other official publications. The copy of this manual provided to the customer will ***not*** be updated to reflect current data.

Customers using this manual should report errors or omissions, recommendations for improvements, or other comments to MFJ Enterprises, 300 Industrial Park Road, Starkville, MS 39759. Phone: (662) 323-5869; FAX: (662) 323-6551. Business hours: M-F 8-4:30 CST.

MFJ-1775 PARTS LIST

As you unpack your antenna you should find the parts in the following list.

Part Description	QTY	MFJ Part No.
Balun	1	80-1775-10
6-32 x 3/8" screw	80	656-0375S
¼-20 x 1-3/4 bolt	2	662-1760S-HH
6-32 kep nut	80	705-0632S
10-32 hex nut	10	705-1032S
¼-20 hex nut	4	705-2520S
#10 lock washer	5	711-1037S-EX
¼ split lock washer	2	711-2537S-SL
Hose clamp (#16)	8	745-3116S
16" Threaded Rod (2M stub)	2	758-8252
55" Threaded Rod (6M stub)	2	758-8253
640 U-bolt Set	2	758-9200
1/8" Plastic Spoke Caps	35	765-1002
Aluminum "L" Stabilizer Bracket	4	805-1796-7
Fiberglass Stabilizer Insulator	4	807-1796-6
Aluminum Stub Channel Bracket	4	808-1796-5
1 x 12" Fiberglass Rod	1	808-1775-12
1-1/8 x 60" AL Tube	2	810-1796-2
30" LONG Spokes	4	810-1796-3C
26" MEDIUM Spokes	8	810-1796-5C
12" SHORT Spokes	24	810-1796-6C
Loading Coil Assembly	2	811-1796-1C1

For installation, you will need some items not supplied with the antenna installation kit:

- A 6'-8' rigid mast or other mounting pipe between 1" and 1.5" outside diameter. (suitable materials include TV mast sections, galvanized iron pipe, or heavy duty rigid conduit.)
- Quality low-loss 50-Ohm coax with a PL-259 from antenna to transmitter.

An Antenna Analyzer (MFJ-259B or similar), or SWR meter and transceiver

MFJ-1775 6-Band Rotatable Mini-Dipole

Introduction

The MFJ-1775 is a mini 14-foot rotatable dipole that is almost invisible from across the street. With its tiny 7-foot turning radius, it fits on the smallest roof and is perfect for town houses, apartments and condos. If necessary, it can even be mounted inside an attic!

The MFJ-1775 is inconspicuous and low profile -- not much bigger than a TV antenna, and can easily be turned by a lightweight TV rotator such as the Hy-Gain AR-35.

And this antenna is no wimp! Its bi-directional pattern can help reduce QRM/noise while maximizing your signal in the directions that you want -- so you can work some real DX. You can operate 6 bands -- 40, 20, 15, 10, 6 and 2 meters -- and run up to a full 1500 Watts SSB on all HF bands.

The MFJ-1775 features automatic band switching, and uses highly efficient end-loading with its entire length always radiating. With 6 and 2 Meters thrown-in, you have ham radio's most versatile rotatable dipole!

Each HF band uses separate, efficient end-loading coils wound on fiberglass forms with Teflon™ wire, and capacitance hats (no lossy traps). 6 and 2 meters are full-length half-wave dipoles.

The MFJ-1775 is built-to-last – using an incredibly strong, solid fiberglass rod center insulator and 6063 T-6 aircraft strength aluminum tubing for the radiator. And it assembles in an afternoon.

WARNING: Improper installation and assembly can be hazardous! Read these instructions thoroughly before attempting to assemble, install or operate this product! High power transmitting devices produce voltages that can cause severe burns or other injuries.

SPECIFICATIONS

The small size of the MFJ-1775 is accomplished by adding separate loading coils and capacitance hats at each end of the antenna for the HF bands. The efficient end-loading coils are wound on fiberglass forms. The six and two meter amateur bands are covered with the addition of four quarter-wave decoupling stubs.

Electrical Specifications

	Power		
Band	CW	SSB	2:1 SWR BW
40m	1500	1500	40 KHZ
20m	1500	1500	60 KHZ
15m	1500	1500	400 KHZ
10m	1500	1500	1.2 MHZ
6m	300	750	600 KHZ
2m	200	300	4.0 MHZ

Mechanical Specifications

Mast Size:	1- to 1-1/2" diameter
Overall Length:	14 feet
Turning Radius:	7 feet
Weight:	15 pounds
Wind Load:	2 square feet

CHOOSING A LOCATION FOR THE ANTENNA

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 loading spokes or any other part of the antenna.
- **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 the reach of adults and children. The capacitance elements can cause injury and/or severe RF burns.

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. This antenna will mount on masts between 1 and 1-1/2" OD. The use of soft or thin wall masts is not recommended

Portable Operation

The MFJ-1775 may be disassembled as necessary for transporting to a temporary location. Ideally, just remove the two HF loading coil assemblies leaving the two main elements and 2- & 6-meter stub assemblies intact. ***Some retuning may be required after moving the antenna.***

Even for temporary or portable operation, do not be casual about selecting a suitable mast. If the antenna falls, it will be damaged and may cause serious injury. Whatever type of installation you choose, remember that the antenna should be installed where it can ***never*** be contacted by people or animals or come in contact with power lines.

TOOLS AND TIME REQUIRED FOR ASSEMBLY

The estimated assembly time is two hours. Antenna assembly requires the following hand tools:

- #2 Phillips screwdriver
- 5/16" nut driver for #6 nuts and hose clamps.
- Small (4"-6") adjustable wrench OR
    - 3/8" wrench for 6 and 2 meter stub nuts
    - Two 7/16" open-end wrenches (or wrench and nut driver) for U-bolts and center insulator bolts.
- Heavy wire cutters for trimming capacitance spokes
- Pliers for holding the spoke ends as they are trimmed
- Safety glasses.

You also need two stable supports at least 30" tall (saw horses, trash cans, etc) during assembly, and a short (6-8') temporary mast (1 to 1-1/2" OD) for temporary mounting during tuning.

SAFETY PRECAUTIONS:

WARNING! You can be killed if the antenna, feedline, or the equipment used to install the antenna accidentally contacts any utility lines. Never install an antenna near power lines!

1. Be careful while climbing and carrying the antenna. It is heavy enough to cause you to lose your balance if it is handled too casually or if the capacitance spokes are snagged on a gutter, ladder, tree limbs, etc.

2. Mount the antenna high enough so that it is out of reach. The ends of the capacitance spokes can cause eye injury, serious RF burns or both.

3. Make sure that the mast is sturdy enough to support the 15 pound weight and the wind loading of approximately 2 square feet.

ASSEMBLY and INSTALLATION PROCEDURE

Refer to the figures in this manual during assembly. Assembly consists of putting together the balun/center insulator assembly, then connecting the aluminum radiating elements to the balun/center insulator assembly. Next the 6- and 2-meter stub elements are installed. Finally the loading coil assemblies are assembled and installed on the aluminum radiating elements.

The 6- and 2-meter stubs are not required if you have no interest in operating on these bands. HF band operation will not be affected if the 6- and 2-meter stubs are not present.

After the antenna is assembled and adjusted for resonant frequency and SWR, it can then be mounted on a tower or rooftop and given final adjustments.

WARNING: Wear safety glasses whenever working with this antenna.

Step-By-Step Procedure

1) Set up saw horses or other stable supports (plastic trash cans, chairs, folding tables, etc.) to support the antenna during assembly.
2) Prepare a temporary 6-8' ground-level mounting mast for easy initial testing and adjustment.
3) Sort the antenna parts into groups of similar parts. Be sure all parts are available.
4) After examining the antenna parts, gather the following tools needed for assembly:
    - #2 Phillips screwdriver
    - 5/16" nut driver for #6 nuts and hose clamps.
    - Small (4"-6") adjustable wrench OR
        - 3/8" wrench for 6 and 2 meter stub nuts
        - Two 7/16" open-end wrenches (or wrench and nut driver) for U-bolts and center insulator bolts.
    - Heavy wire cutters for trimming capacitance spokes
    - Pliers for holding the spoke ends as they are trimmed
    - Safety glasses.

5) Assemble the four small "L" brackets to the four long fiberglass insulators with 6-32 x 3/8" screws (3 each) and the 6-32 kep nuts (3 each) as shown in Figure 1.

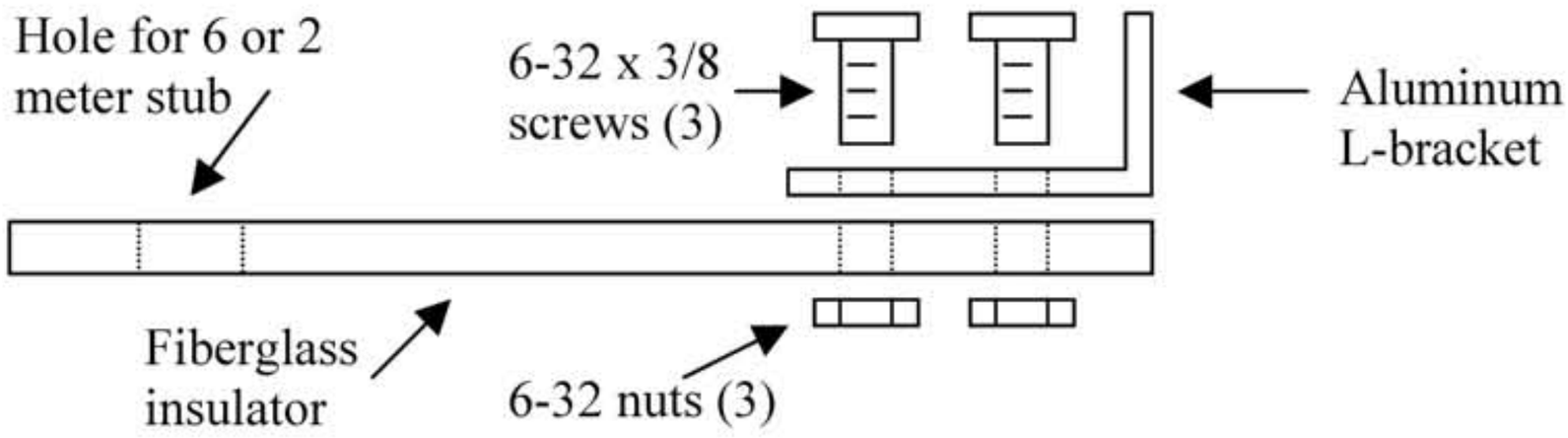

Figure 1

6) Bolt the balun loosely to the 1 x 12" fiberglass rod using the U-bolt set and ¼-20 hardware. The nuts will be tightened when the antenna is mounted on the mast. See Figure 2.

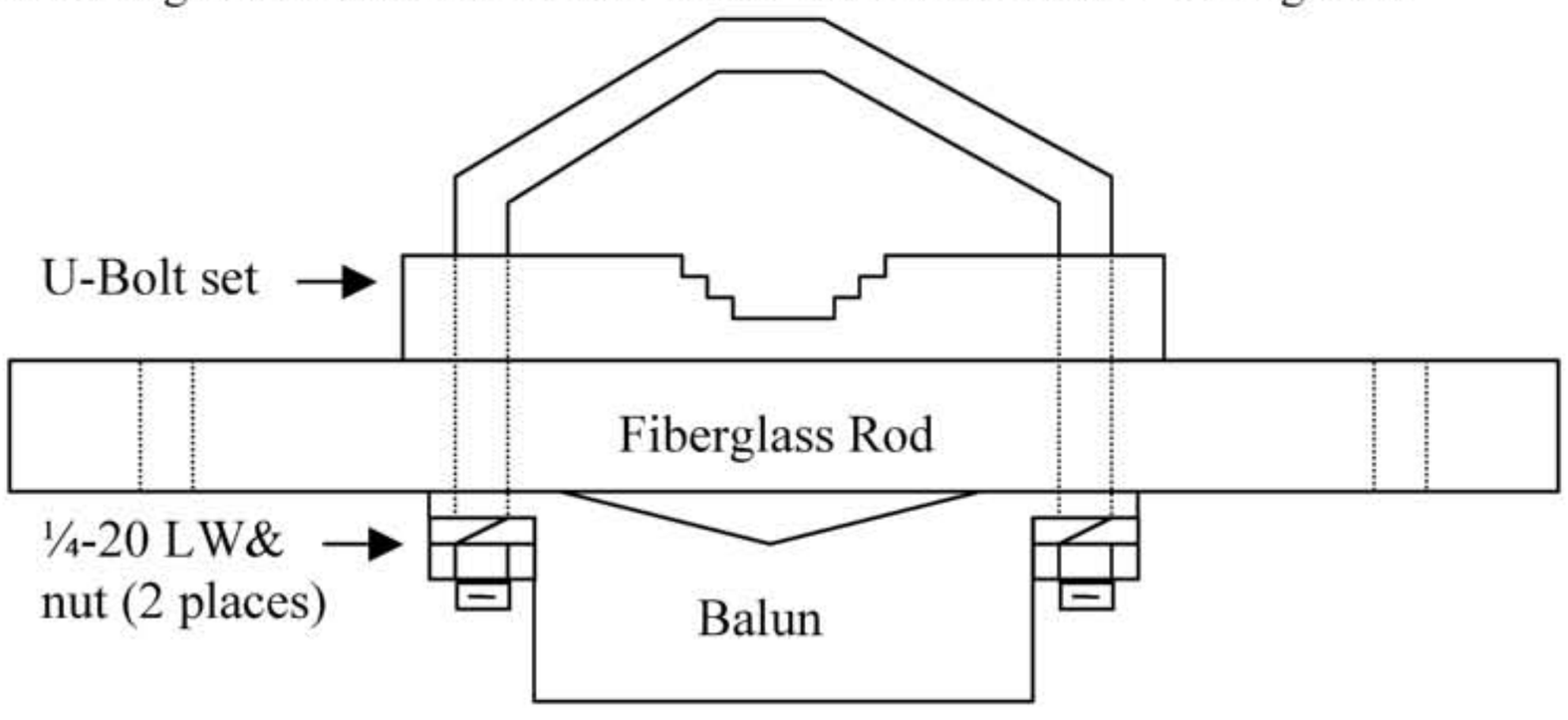

Figure 2: Balun/Center Insulator Assembly – Top View

Note: When the balun is mounted as shown, the mast size is limited to 1-3/8" diameter maximum. For a 1-1/2" diameter mast, you must mount the balun directly on the mast below the fiberglass rod with the additional U-bolt set provided.

7) Slide the 1-1/8 x 60" aluminum radiator tubes over the center insulator/balun assembly with the slot on each aluminum tube on the topside of the fiberglass rod/balun assembly. Insert the ¼-20 bolts through the aluminum tube/fiberglass assembly and through the balun lugs. Add the ¼-20 split lock-washers and nuts and tighten securely. See Figure 3.

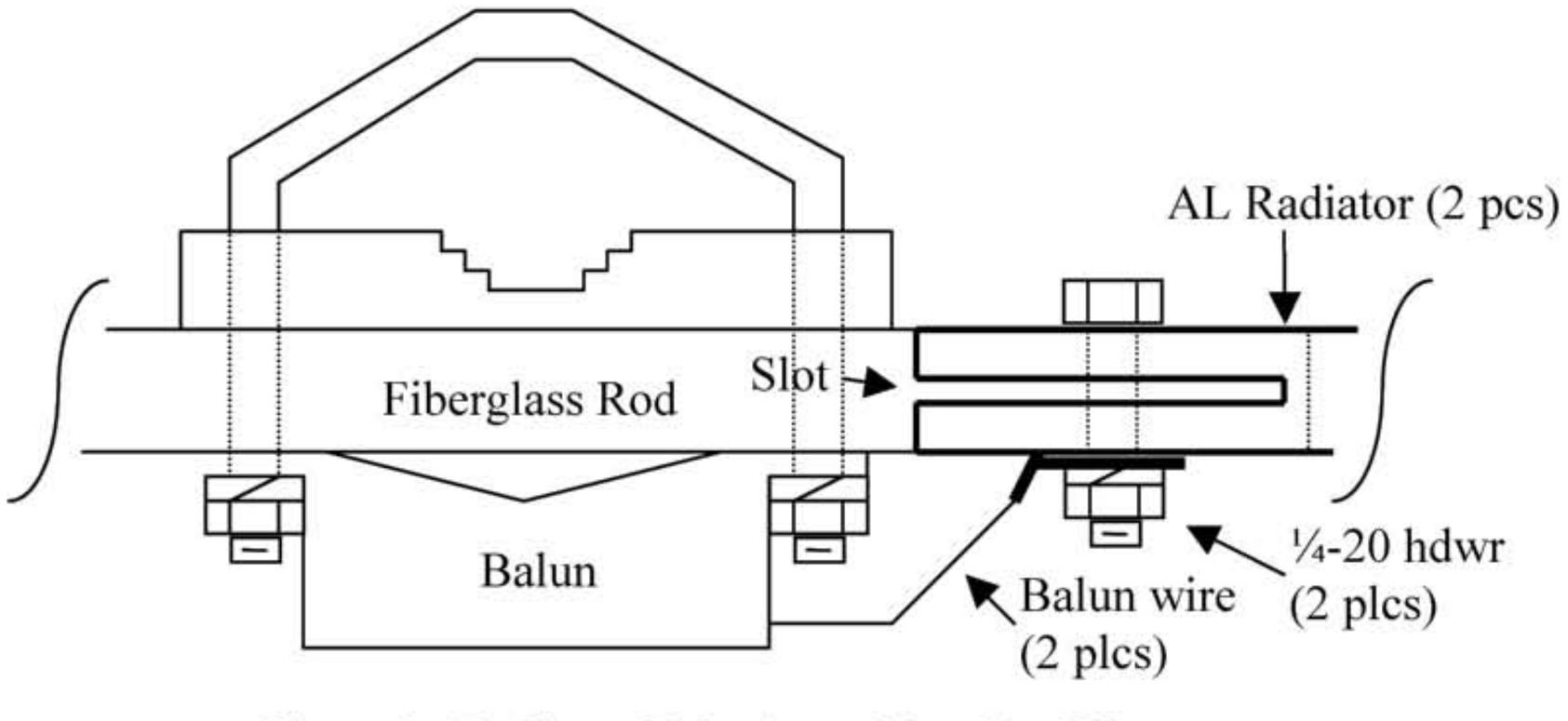

Figure 3: Radiator Tube Assembly – Top View

8) Slide four hose clamps over each aluminum tube. Slide two hose clamps (one on each aluminum radiator tube) up against the ¼-20 hardware and clamp the four aluminum stub channel brackets (two on each radiator) on opposite sides of the aluminum radiator tubes as shown in Figure 4.

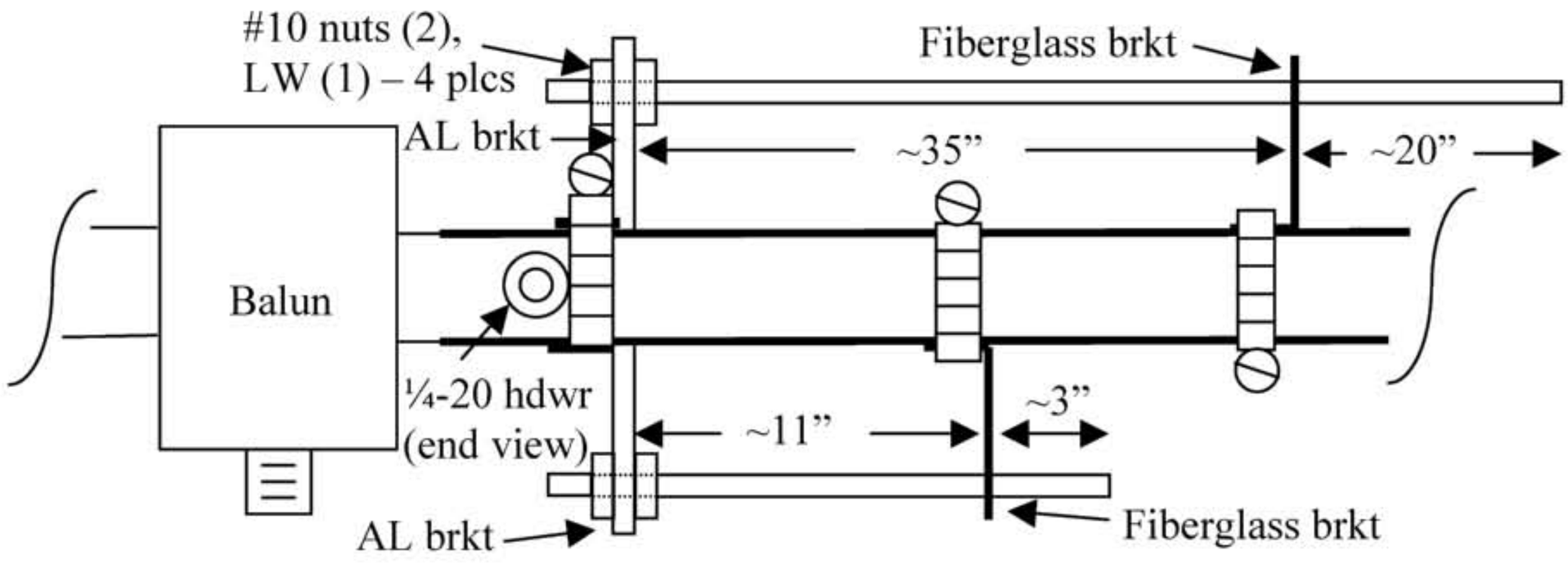

Figure 4: 6 and 2-meter stub assembly and mounting

9) Using eight hose clamps (four on each radiator), clamp the fiberglass insulators so as to support the 16" and 55" threaded rods. Position the insulators as shown in Figure 4.

10) Mount the four stubs by threading a 10-32 x 3/8" nut 1/2" near the end of the threads. Add a second nut and lock-washer to sandwich the bracket between the two nuts, leaving no more than ¼" of threaded rod exposed beyond the aluminum bracket. See Figure 4.

IMPORTANT: Use a 5/16" nut driver to tighten the capacitance spokes in place. Tighten by hand only. A high torque electric screwdriver will shear the screws.

11) Install the 6-32 screws in all rings of both loading coil assemblies, loosely holding them in place with their associated nuts. Position the screws so the threaded ends of the screws are pointed outward towards the two ends of each loading coil assembly as shown in Figure 5. .

NOTE: You can ease your tuning effort by pre-marking the outer ends of the spokes prior to installation. You can do this by placing 1", 2", and 3" marks on one end of each spoke using a black permanent marker pen. Then subdivide these marked sections into ¼" segments using a red permanent marker pen.

NOTE: Install the spokes through the rings until they come in contact with the fiberglass rod. This will give you about 1/4" of spoke available to slide back out should you trim too much off a spoke during tuning.

12) Install four **short** spokes in the 20-meter rings of both loading coil assemblies. With a 5/16" nut driver, tighten the nuts until the spokes are snug.

13) Install four **short** spokes in the 15-meter rings of both loading coil assemblies. With a 5/16" nut driver, tighten the nuts until the spokes are snug.

14) Install four **short** spokes in the 10-eter rings of both loading coil assemblies. With a 5/16" nut driver, tighten the nuts until the spokes are snug.

15) Install four **medium** (see note below) spokes in the 40 meter rings of both loading coil assemblies. With a 5/16" nut driver, tighten the nuts until the spokes are snug.

Note: *One or two of the 40 meter **medium** spokes **on one loading coil only** may need to be replaced with **long** spokes, depending on the desired 40 meter operating frequency. See the 40 meter tuning instructions below.*

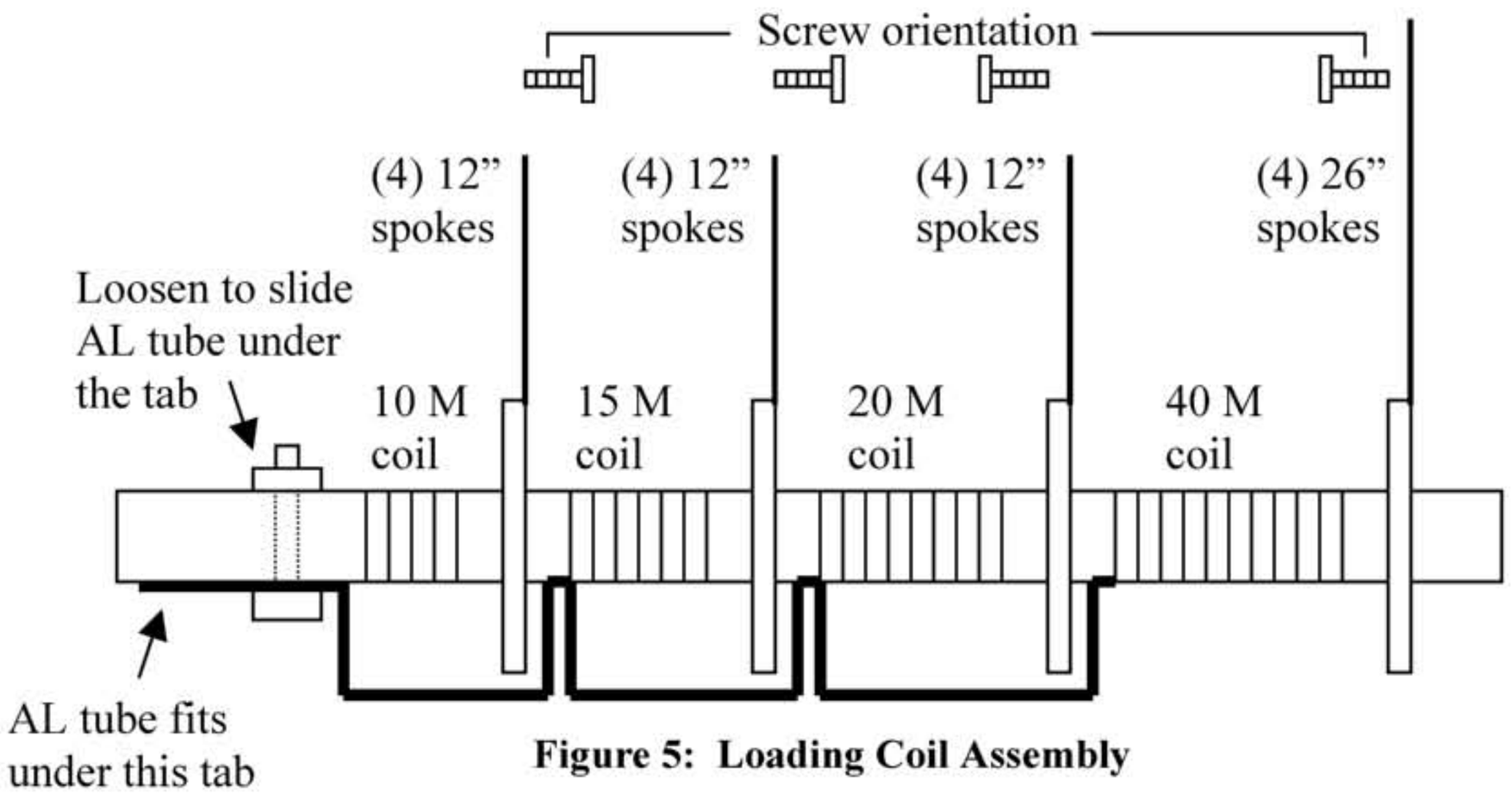

Figure 5: Loading Coil Assembly

16) Loosen the mounting screw indicated in Figure 5 so that the aluminum radiator can be slid under the aluminum tab. Slide the aluminum radiator tube until it contacts the mounting screw that was just loosened. Tighten the mounting screw. ***Do not over-tighten this screw or you may BREAK the fiberglass form.*** Slide the last hose clamp over the tab and tighten the hose clamp to firmly attach the loading assembly to the aluminum radiator.

17) Double check the tightness of all the hardware you installed and then mount the antenna on the short temporary tuning mast 6-8 feet above the ground.

18) Tune the antenna as discussed in the next section.

19) Mount the antenna in the final location. Slight re-tuning may be necessary.

FREQUENCY AND SWR ADJUSTMENT

An SWR analyzer such as the MFJ-259B or equivalent is highly recommended when tuning the MFJ-1775. While a transceiver and SWR meter can be used, an SWR analyzer will significantly decrease the time and effort necessary to tune the antenna.

The MFJ-1775 covers wider frequency ranges on the higher bands, and narrower segments on the lower frequency bands. The 40 meter band has the narrowest range of operation (approximately 40 KHz) and is the most sensitive to adjustments.

The entire antenna must be accessible during initial coarse tuning and testing. Any repair or adjustment to the antenna after it is installed on a tall support will make adjustments difficult and time consuming. It is best to install the antenna on a short temporary mast or pipe that is located in a reasonably clear location for tuning. The antenna should be mounted horizontally 6-8 feet above ground to make tests and adjustments easy.

During tuning, feed the antenna with a reasonably short length of good quality 50 ohm coaxial cable to ensure proper results. If using a transceiver and SWR meter, set the transceiver to the lowest power possible when making measurements.

The normal resonant frequency of this antenna is at or just below the bottom of each amateur band. This allows the user to "trim" a small amount off the capacitance spokes to raise the resonant frequency. Conversely, adding a longer capacitance spoke will lower the resonant frequency of a loading assembly. Spare spokes are included in case you need to lower the resonant frequency of the antenna.

CAUTION: **Always start tuning on 40 meters and adjust each band progressively higher in frequency**. Adjustment of a lower frequency band will always have the most effect on the next higher frequency band. The tendency of the interaction is that if you move one band higher ALL the other bands move higher, but only very slightly. It is always best to "shoot for" the lowest end of the range you intend to use and "trim in" by adjusting the outermost (40 meter) loading coil assemblies after the antenna is in its final location.

NOTE: When you tune the antenna at a height of 6-8 feet, you will find that the resonant <u>40 meter</u> frequency will shift up in frequency 30-50 kHz when the antenna is

raised to the final height. However, when the plastic end caps are installed on the ends of the spokes, the resonant frequency on all bands is lowered 30-50 kHz

Tuning the Antenna

1) Measure and record the frequency of lowest SWR for each band. The lowest SWR should be at or below the bottom end of each HF band. The SWR should be below 2:1 at resonance on each band.

   The following is a typical chart for initial measurements of a new antenna before tuning:

40 M 1.7:1 at 6.99 MHz	10 M 1.7:1 at 27.97 MHz
20 M 1.2:1 at 13.9 MHz	6 M 1.2:1 at 50 MHz
15 M 1.2:1 at 20.85 MHz	2 M 2.0:1 at 146 MHz

If you are using a transceiver and SWR meter, the initial resonant frequency may be lower than you can measure. If so, remove one spoke from each loading coil assembly to raise the resonant frequency. Measure this resonant frequency and calculate the approximate resonant frequency as if the spokes were in place using the chart on the next page.

WARNING: You will be trimming the outer ends of the spokes. The sharp sends can cause a hazard until they are covered with the plastic caps. Therefore it is VERY IMPORTANT to wear safety glasses when trimming the spokes, or when working near the antenna.

CAUTION: Use a pair of pliers to hold the outer piece of each spoke that is to be cut off so as to keep the cut piece from flying off and causing injury.

The following tips will help you obtain a better SWR on 40 meters than the tuning method used on other bands. On 40 meters the lowest SWR is usually not obtained with left and right loading spokes adjusted to the same frequency.

Low End of 40 Meters: If you desire operation below 7.1 MHz, the lowest SWR will be obtained by adding two **long** spokes to ONLY ONE of the 40 meter loading coil assemblies. It is best to add the spokes on opposite sides of the coils. **Medium** 40 meter spokes from both coils can then be trimmed equal amounts to resonate the antenna. This will leave one loading coil assembly with two spokes that are longer than those on the other loading coil assembly.

High End of 40 Meters: If you desire operation above 7.2 MHz the lowest SWR will be obtained by trimming the spokes on one of the loading coils only until the antenna is resonant approximately 15 KHz below the operating frequency.

Middle of 40 Meters: For operation between 7.1 and 7.2 MHz, add **ONE** long spoke to one of the loading coil assemblies only.

2) Begin tuning by trimming one 40 meter spoke ***from each end of the antenna*** by cutting off small, equal sections from the end of the spoke until the antenna resonates approximately 15 KHz below the desired operating frequency. Use the chart below to ***approximate*** the amount of spoke to be trimmed. Trimming only one spoke from the top or bottom results in half the frequency change.

   40 M: 1" trimmed off a pair of spokes equals ***approximately*** 25 KHz

20 M: 1" trimmed off a pair of spokes equals ***approximately*** 100 KHz
15 M: 1" trimmed off a pair of spokes equals ***approximately*** 175 KHz
10 M: 1" trimmed off a pair of spokes equals ***approximately*** 250 KHz

Note: Typical final spoke lengths for the low end of each HF band are shown in the table on the next page.

3) If the SWR is acceptable at the desired operating frequency, the adjustment for that band may be skipped.

4) Now tune progressively higher frequency bands by trimming pairs of spokes on each of the two loading coil assemblies. Keep each pair of capacitance spokes equal in size. 20 meters must be the second HF band adjusted, 15 meters the third, and 10 meters last. After adjusting 10 meters go back and check the other bands. Re-check the tightness of all spoke screws.

5) The six and two meter bands are tuned by lengthening or shortening the threaded portion of the stubs. This adjustment is very coarse. If the frequency is still too low with the stub element extension at a minimum, the unthreaded ends of the stubs can be trimmed. Once again the lower frequency stub (6 meters) should be adjusted first.

NOTE: The six meter stub covers from 50 to 54 MHz as it is adjusted. Be careful because the third harmonic resonance of the six meter stub will show up as a low SWR on the third harmonic of it's setting, usually between 150 and 160 MHz. The range of the two meter stub allows frequencies as low as 130 MHz to be covered with the stub fully extended and 148 MHz with the stub fully contracted.

NOTE: The 2-meter resonance is affected by other resonances in the overall antenna structure. You may find a fixed resonance close to the 2-meter band that has a very low SWR, but the resonant frequency of this resonance will not be adjustable. Ignore this point and look for a higher SWR resonance that ***is*** adjustable. Typically, you may find a fixed, low SWR resonance at 144 MHz, and an adjustable resonance at 147 MHz with a 2:1 SWR. This higher frequency, higher SWR resonance is the desired resonance point. Note that between these two resonant points, the SWR should be 2:1 or less across most of the 2-meter band.

6) Final frequency adjustments can be made by trimming spokes on one of the loading coil assemblies only if desired, though symmetrical trimming is preferred. The minor adjustment of one side only without the symmetrical trimming of the other side is perfectly acceptable so long as the frequency is changed less than 30 KHz on 40 meters and 60 KHz on the higher bands during final adjustment. Moving the resonant frequency too far with only the spokes on one loading coil assembly will increase the SWR of the antenna at the resonant frequency.

NOTE: The spokes can also be bent toward another spoke ***in the same mounting ring*** to raise the frequency slightly without cutting.

7) When all tuning is complete, install the plastic end caps on the outer ends of all spokes. Note that the plastic end caps will lower the resonant frequency on all HF bands by 30-50 kHz. The plastic end caps should fit snugly on the spokes. Should a cap fit too loosely, add a drop of glue to the spoke end before sliding on the cap.

TYPICAL FINAL SPOKE LENGTHS FOR HF CW BAND OPERATION

- 40 Meters: 31-1/4" (full length) for two spokes on **one** loading coil only. 24-1/2" length for the remaining six 40 meter spokes.
- 20 Meters: 12-1/4" length for all eight spokes.
- 15 meters: 12-1/4" length for all eight spokes.
- 10 meters: 10.5" length for all eight spokes.

TYPICAL 6- AND 2-METER STUB LENGTHS

- 50.150 MHz: 54 inches (flat side of aluminum mounting bracket to end of stub)
  - **Note:** A fixed non-tunable resonance will also be seen at approximately 43 MHz, and a tunable higher frequency resonance will be seen at approximately 52 MHz.
- 147 MHz: 13.5 inches (flat side of aluminum mounting bracket to end of stub)
  - **Note:** A fixed non-tunable resonance may also be seen at approximately 144 MHz.

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 lighting 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.

A less effective method of protecting station equipment is to install an in-line coaxial lightning arrestor with a heavy duty ground wire to a suitable earth ground, or a safety switching system as part of the basic ham station equipment.

MAINTENANCE

Your antenna is constructed of heavy-duty non-corrosive materials and should withstand normal climates for many years. The use of some type of coaxial connector moisture protection is recommended at the balun coax connection, and also around the center-feed connections, especially in coastal areas where salty mist is commonplace.

GE makes a pure, silicone grease called "SILICONE DIALECTRIC COMPOUND" that can be applied SPARINGLY to the threaded area of the female connector. This compound, or even a clear silicone heatsink compound, will prevent moisture from entering the connector through the threads and protect the connectors from corrosion. This is the same type of sealer that commercial antenna installers and CATV companies use with great success.

Plast-Dip™ and Liquid Electrical Tape™, available at your local hardware store, also do an excellent job of insulating/waterproofing connectors, and can be easily peeled off when desired.

A less desirable, but still adequate sealer is the automobile seam sealer commonly sold as "coax seal". This is a semi-pliable black or white sealing compound.

When installing any "coax seal", NEVER completely cover the barrel of the coax connector. The sealer should ONLY be placed near the junction of the threaded part of the chassis connector and the knurled area of the male connector. This will leave the bottom of the male outer sleeve open and permit the connector to "breathe" so it does NOT collect moisture!

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, INC., 300 Industrial Park Road, Starkville, MS 39759; by Facsimile (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.

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 or machine reproduction of 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, of 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 provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashiers check, or money order for **$10.00** 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 **$8.00** 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 (662) 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 Rd, 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 and a telephone number.

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

MFJ

MFJ ENTERPRISES, INC.
300 Industrial Park Road
Starkville, MS 39759

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