

## **INTRODUCTION**

The MFJ-904/904H Travel Antenna Tuner was specially compact-built with great features. The MFJ-904 has a Cross-Needle SWR/Wattmeter, 50 ohm SO-239 connectors and a tuner/bypass switch. The MFJ-904H adds a binding post for random wire and binding post with a 4:1 balun for balanced lines.

You can operate 80 through 10 Meters -- anywhere with any transceiver -- use any coax fed, random wire or balanced line antenna. It's great for mobile, base, backpack, etc. The MFJ-904/904H handles 150 watts RF output.

## **INSTALLATION**

The MFJ-904/904H should be installed between the transmitter and antenna.

1. Locate the tuner in a convenient location at the operating position.
2. Use a 50 ohm coaxial cable to connect the transmitter or transceiver to the SO-239 labeled TRANSMITTER on the back of the tuner.
3. Connect an antenna feed to the appropriate tuner output:
  - a.) COAX-FEED to the SO-239 connector labeled ANTENNA.
  - b.) RANDOM WIRE

MFJ-904: A random wire may be used by connecting to the center of the SO-239 connector with the supplied plug.

MFJ-904H: Connect to the red binding post labeled WIRE.

The MFJ-904/904H *must be* grounded when using a random wire.

- c.) BALANCED FEEDERS (MFJ-904H only) to the red binding posts labeled BALANCED LINE. When using a balanced feedline, connect a short jumper from the WIRE binding post to the closest balanced line post (see labeling on back of unit).
4. Connect your tuner and transmitter to a good earth ground.

## **OPERATION**

This tuner has a BYPASS/TUNE switch located on the back of the unit. Simply place the switch toward the BYPASS labeling to completely bypass the tuning circuit. Change the switch toward the TUNE labeling to place the tuning circuit between the transmitter/transceiver and the antenna.

In this tuner the TRANSMITTER and ANTENNA matching controls have maximum capacitance at position 0 (fully meshed), and minimum capacitance at

position 10 (fully open). Be sure to use the highest possible capacitance for each band. This will provide the smoothest tuning, highest efficiency, and greatest power handling capability.

The INDUCTANCE switch has maximum inductance in position "A", and minimum inductance in position "L". Less inductance is needed as the frequency is increased. If too little inductance is used, the tuner may not match the load properly. If too much inductance is used, the tuner will be "touchy", power handling will be compromised (capacitors could arc, etc.) and the bandwidth will not be as wide.

**Special Note:** Always use the minimum amount of inductance as possible. Minimum inductance gives the best efficiency, maximum power handling, and widest bandwidth.

The MFJ-904/904H covers 80 through 10 meters. **Do not operate on 160 meters.**

### **SWR/Wattmeter:**

The built-in SWR/Wattmeter measures forward and reflected power and indicates SWR. It has 2 power scales which are selected with the front panel push button switch. The low power scale reads from 0-30 watts forward and 0-6 watts reflected. The high power scale reads from 0-300 watts forward and 0-60 watts reflected. SWR is indicated from 1:1 to  $\infty$ .

The MFJ-904/904H has an illuminated meter. To provide power for the meter lamp, a 12 Vdc supply such as the MFJ-1312D should be used. Use a standard 2.1 mm coaxial plug with the center conductor positive and the sleeve ground.

To measure forward and reflected power press the selector switch to the correct power setting. Transmit a steady carrier and read the power from the meter. Each unmarked picket on the scale is an even division between the adjacent marked values. SWR is read from the SWR curve closest to where the meter needles cross.

### **Tuning Procedure:**

1. Position the TRANSMITTER control to 5 on the corresponding scale.
2. Position the ANTENNA control to 0 on the corresponding scale.
3. Place the BYPASS/TUNE switch in the TUNE position.
4. Apply just enough power to obtain noticeable deflection on the reflected power meter or SWR meter.

5. Adjust the INDUCTOR control for lowest deflection on the reflected power.
6. Carefully adjust the TRANSMITTER control for the lowest reflected power, then increase the ANTENNA control slightly and adjust the TRANSMITTER control for the lowest reflected power. Again, increase the ANTENNA control slightly and adjust the TRANSMITTER control for lowest reflected power. Repeat this process for lowest reflected power.

Note: These controls interact. Go back and forth between these adjustments as many times as required until the lowest reflected power (best SWR) is obtained.

7. After the lowest reflected power (or SWR) is obtained in step 6, use the INDUCTOR switch to reduce the inductance one switch position (L is the lowest inductance setting). Adjust the TRANSMITTER and ANTENNA controls for the lowest SWR. Continue this process until the lowest SWR cannot be repeated, then use the INDUCTOR switch to increase the inductance by one switch position (A is the highest inductance setting). Tune for lowest SWR.

**WARNING: Never transmit while changing the INDUCTOR switch.**

Note: Always use as little inductance as possible. Step 7 minimizes the inductance and maximizes the capacitance.

8. After a low SWR is obtained, the transmitter power may be increased to any value up to 150 watts.

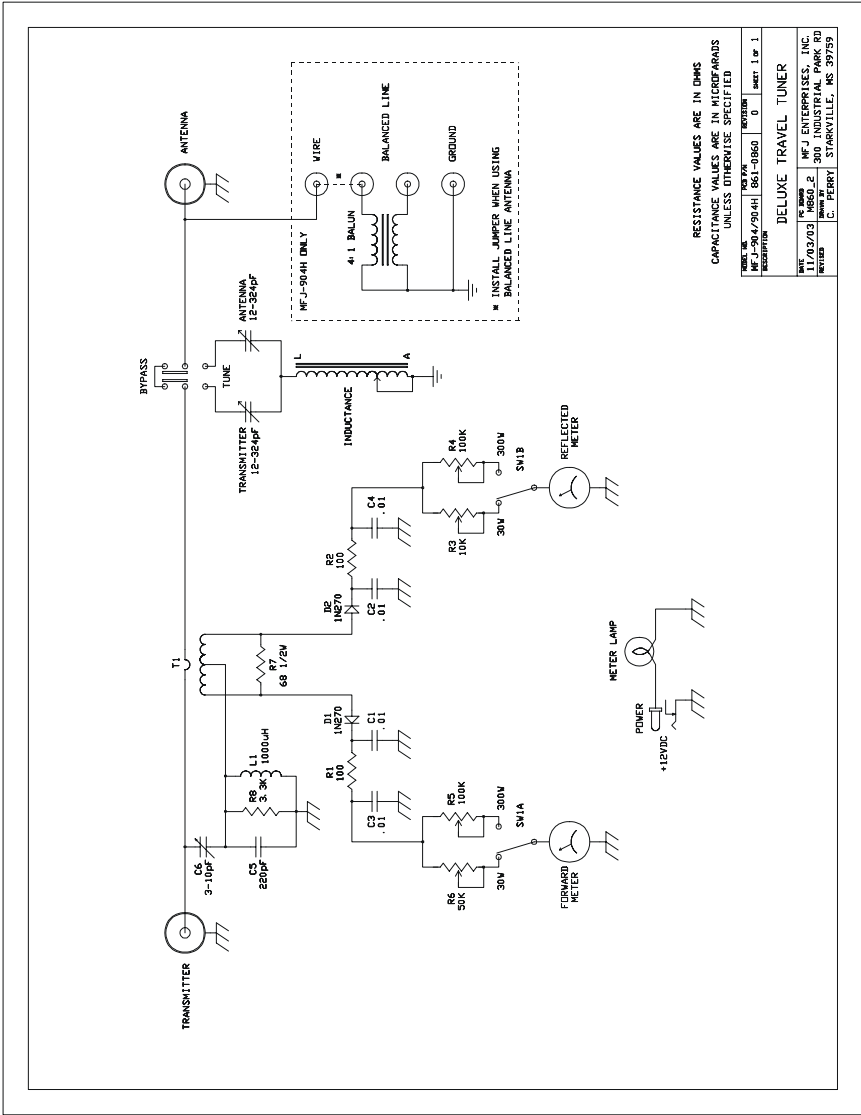
**WARNING: Do not exceed 150 watts output. You will damage the tuner!**

## **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 to 662-323-6551; or by email to [techinfo@mfjenterprises.com](mailto: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.

**SCHEMATIC**



RESISTANCE VALUES ARE IN OHMS  
CAPACITANCE VALUES ARE IN MICROFARADS  
UNLESS OTHERWISE SPECIFIED

MODEL NO.	MFJ-904/904H	REV.	0861-0860	REVISION	0	SHEET	1 of 1
<b>DELUXE TRAVEL TUNER</b>							
DATE	11/03/03	DESIGNED BY	MFJ ENTERPRISES, INC.	MANUFACTURED BY	MFJ ENTERPRISES, INC.	1000 W. STATE ST. STARKVILLE, MS 39759	
REVISED		BY	C. CLEARY	STARKVILLE, MS	39759		