

MFJ-864 HF/144/440 SWR/Wattmeter™**General Information:**

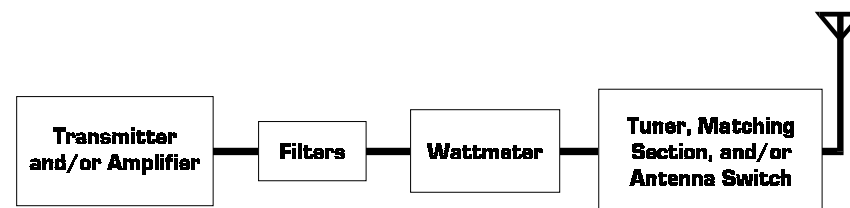
The **MFJ-864 HF/144/440 SWR/Wattmeter** measures forward and reflected power and indicates SWR for the **1.8 - 60, 144, and 440 MHz** ham bands. The MFJ-864 has 2 power scales for each band selected with the front panel rotary switch. The low power scale reads from **0-30 watts forward** and **0-6 watts reflected**. The high power reads from **0-300 watts forward** and **0-60 watts reflected**. SWR is indicated from **1:1 to 5:1**.

MFJ-864 Theory of Operation:

The MFJ-864 senses RF energy traveling along a 50 ohm stripline. A forward and reflected stripline couple to the 50 ohm stripline to make a directional coupler. A voltage is produced in the forward and reflected striplines that is proportional to the current and voltage traveling along the 50 ohm stripline. This signal is rectified by a diode and smoothed by a capacitor. Because the directional coupler's sensitivity increases with frequency, trimpots are used to adjust for different frequency and power settings (high or low power).

Connections:

Connect your HF transmitter and antenna to the **1.8 - 60 MHz HF Sensor** connectors labeled **XMTR** and **ANT** on the rear panel. Connect your VHF/UHF transmitter and antenna to the **144 / 440 MHz VHF/UHF Sensor** connectors labeled **TRANSMITTER** and **ANTENNA** on the rear panel. **It is important that you use good quality coax and connectors that are designed for HF and VHF/UHF!**



If you want to measure the power capability of a transmitter/amplifier or to recalibrate the MFJ-864 you should connect a quality dummy load (50 ohms) that is designed for VHF/UHF to the antenna jack.

MFJ-862 SWR/Wattmeter

The MFJ-864 has a lighted meter. To provide power for the meter light, a 12 Vdc supply such as the MFJ-1312B should be used. Use a standard 2.1 mm coaxial plug with the center conductor positive and the sleeve ground.

Using the MFJ-864:

To measure forward and reflected power turn the selector switch to the correct frequency and power setting. Transmit and read the power from the meter. Each unmarked hatch on the scale is an even division between the two marked numbers. SWR is read directly from the scale where the meter needles cross.

If a more exact reading for SWR is needed you may use the equation for SWR. Measure the forward and reflected power and put the values into the following equation:

$$SWR = \frac{1 + \sqrt{\frac{P_r}{P_f}}}{1 - \sqrt{\frac{P_r}{P_f}}}$$

P_r = Reflected Power
 P_f = Forward Power

Calibration:

Note that the readings for forward and reflected power (and thus SWR) are less accurate if the power levels you are reading are not near the calibration power level or within the correct power range. For an accurate reading of 10 watts forward use the low power scale. If your transmitter only transmits 10 watts, re-calibrate the low power scale at 10 watts for maximum accuracy.

The MFJ-864 has been calibrated at the factory for 10 and 100 watts. If re-calibration is necessary you will need a 50 ohm dummy load, good quality 50 ohm coax, and a transmitter of known power or another accurate wattmeter to use as a standard.

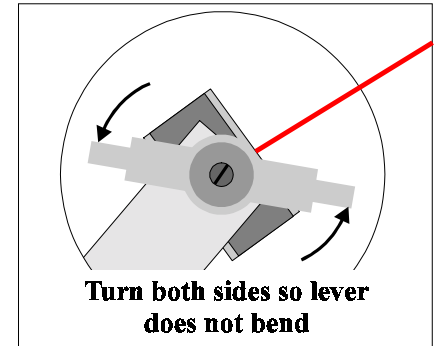
Connect the transmitter to the **TRANSMITTER** connector and a good length of coax between the **ANTENNA** connector and the dummy load. Transmit at a known power level and adjust the forward or reflected sensitivity pot, for the power scale and frequency you are using, until the correct reading is shown on the meter.

Meter Calibration

If the zero adjustment of your wattmeter should ever need to be re-adjusted, it is a simple procedure. The meter should be re-zeroed whenever a pointer is more than 2 pointer widths from the "0" mark.

To re-zero the pointer, first you must remove the meter from the chassis. Remove the screws from the meter tabs from either the front or the inside of the unit. Next carefully remove the clear plastic front by grasping it on both sides.

Use a pair of needle nose pliers to turn the zero adjustment lever. Turn clockwise to lower the needle or counterclockwise to raise the pointer. Adjustment is very sensitive and should require little force. Replace the meter cover and reinstall the meter into the chassis.

**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 at 601-323-5869. 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., P.O. Box 494, Mississippi State, MS 39762; by FAX to 601-323-6551; through Compuserve at 76206,1763; or by email to 76206.1763@Compuserve.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: