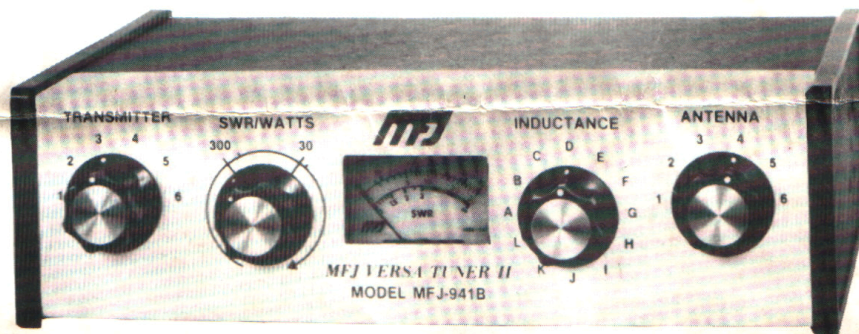




MFJ VERSA TUNER II
MODEL MFJ-941B



OWNER'S MANUAL

CAUTION: Read All Instructions Before Operating Equipment.

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MFJ-941B VERSA TUNER II INSTRUCTIONS

Thank you very much for purchasing the MFJ-941B Versa Tuner II.

GENERAL INFORMATION

The MFJ-941B is designed to match virtually any transmitter to almost any antenna, including dipoles, inverted vees, verticals, mobile whips, beams, random wires, and others fed by coax lines, balanced lines, or a single wire. A 1:4 balun is built in for connection to balanced lines. This unit will handle up to 300 watts of RF output power from the transmitter from 160 through 10 meters. The MFJ-941B will monitor either SWR or RF transmitter power in two ranges, 30W or 300W. The antenna selector switch allows switching to one of the two coax fed antennas (direct or through tuner) and either a balanced line antenna or random wire antenna. A bypass position allows switching to a dummy load or a direct coax antenna. The tuner is bypassed but not the meter circuit when antenna selector is switched to BYPASS, DIRECT COAX 1 or DIRECT COAX 2 positions. CAUTION: Do not use the MFJ-941B for over 300 watts of RF output power, ever in the bypass or direct positions. Do not operate the antenna selector while transmitting.

THE SWR/WATTMETER

The SWR/wattmeter of the MFJ-941B can be used with the tuner or by itself. The SWR/wattmeter is between the transmitter and the tuner when the antenna switch is in the COAX 1, COAX 2, or WIRE/BAL position. The SWR meter is sensitive down to approximately 5 watts RF output. The SWR reading will not be accurate for a transmitter power of less than 5 watts.

To read RF transmitter output power, simply push the SWR/WATT control in and set to either 30 or 300. At position 30, the meter will read a maximum of 30 watts. At position 300, the meter will read a maximum of 300 watts.

To read SWR, turn the SWR/WATT control, with the control pushed in, for a full-scale deflection and when pull the control out for the SWR reading. Note: The SWR sensitivity must be reset for each power level to obtain an accurate reading.

INSTALLATION

1. Install the MFJ-941B between the transmitter and the antennas. A coax line is connected between the transmitter and the SO-239 coax connector marked TRANSMITTER on the tuner.
2. One or two coax fed antennas may be connected to the SO-239 coax connectors marked COAX 1 and COAX 2. Note: Coax 1 and coax 2 antennas can be connected directly to the transmitter by turning the antenna selector to COAX 1 DIRECT OR COAX 2 DIRECT.
3. A random wire antenna may be connected to the five-way binding post marked WIRE. The random wire should be long, high, and as clear of surrounding objects as possible. Do not ground the random wire antenna and make sure that the tuner is well grounded to the transmitter. A five-way binding post, marked GND, is provided for ground connection.

4. A balanced line fed antenna may be connected to the two five-way binding posts marked BALANCED LINE, along with a jumper wire from the WIRE binding post to the adjacent BALANCED LINE binding post, as indicated by a dotted line on the MFJ-941B. This couples the MFJ-941B to the balanced line through a 1:4 balun. NOTE: Either a balanced line or random wire antenna can be connected at one time. If a random wire antenna is used, make sure that there is not a jumper wire between WIRE and BALANCED LINE.
5. An antenna or dummy load may be connected to the SO-239 coax connector marked BYPASS COAX. The antenna switch on the BYPASS position will bypass the tuner and allow the MFJ-941B to be used as a SWR meter or wattmeter.
6. The mobile mounting bracket may be installed, if mobile operation is desired, by first mounting the bracket to the selected location. Two #10-32 X 1/2" screws, two #10 lockwashers, and two #10 nuts are provided. Second, slide the MFJ-941B into the bracket and secure it with the four #6 X 3/8" sheet-metal screws also provided. Use one of the four flat-washers provided between the bracket and the bottom of the tuner for each of the four #6 sheet-metal screws. NOTE: Do not over-tighten the sheet-metal screws.

USING THE MFJ-941B

The INDUCTANCE switch on the MFJ-941B presents a minimum of inductance at position A and a maximum of inductance at position L. Less inductance is needed at high frequencies than at low frequencies for the same impedance. The TRANSMITTER and ANTENNA controls both present a maximum of capacitance at position 1.

For optimum operation of the MFJ-941B, the transmitter must be tuned for a 50 ohm output impedance for the frequency band in operation. The transmitter can be tuned with the MFJ-941B connected by connecting the 50 ohm load to the BYPASS COAX connector and turning the antenna switch to the BYPASS position. The MFJ-941B is then used only as a SWR meter or a wattmeter. NOTE: Always tune the transmitter at a low output power.

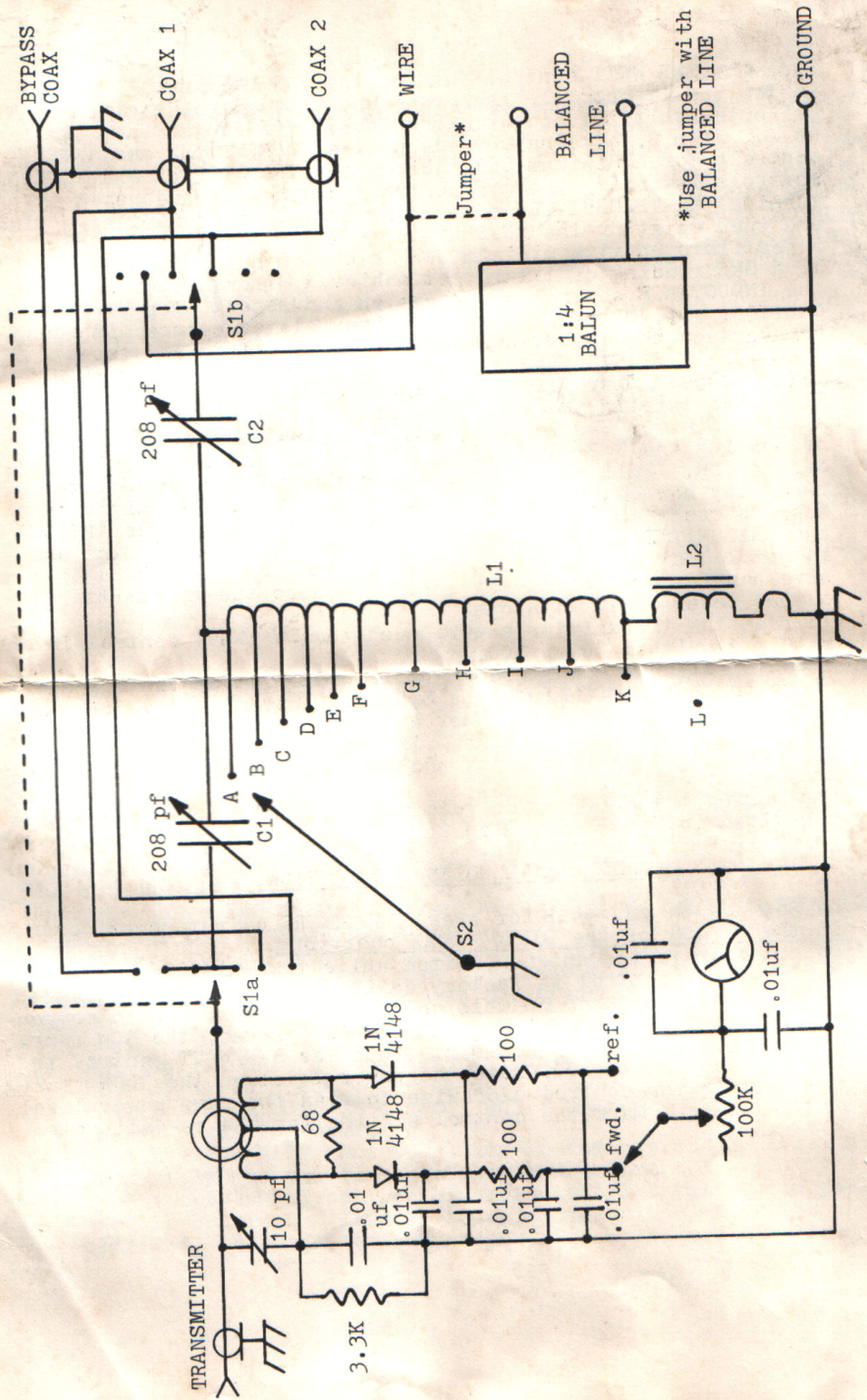
After properly tuning the transmitter, turn the antenna switch to the desired antenna and tune the tuner for a minimum SWR as described below. Do not readjust the transmitter setting after loading it to the 50 ohm load.

1. Set the TRANSMITTER and ANTENNA controls to 3.5.
(The capacitors are half-opened.)
2. Rotate the INDUCTANCE control until maximum noise is obtained in the receiving mode.
3. With the SWR/WATT control pushed in and set at 30, set the transmitter to the tune position and transmit.
4. Turn the SWR/WATT control clockwise until a full-scale deflection is obtained. If a full-scale deflection cannot be obtained, increase the output power from the transmitter.

5. Pull the SWR/WATT control out for the SWR reading.
6. If the SWR is not 1:1, then tune the MFJ-941B for a minimum SWR.
7. While transmitting and with the INDUCTANCE control set the same as for Step 2, alternately adjust the TRANSMITTER and ANTENNA controls for a minimum SWR. Since the TRANSMITTER and ANTENNA controls interact, the two controls can best be adjusted by turning the TRANSMITTER control at a small increment at a time and then rotating the ANTENNA control for the minimum SWR. Repeat this until a minimum SWR is obtained.
8. If a SWR reading of 1:1 is not achieved, increase or decrease the INDUCTANCE control one position and repeat Step 7. CAUTION: If arcing between capacitor plates occurs, increase or decrease the INDUCTANCE control one position and repeat Step 7. NOTE: If a SWR of 1:1 cannot be achieved at this point, repeat Step 7 for each INDUCTANCE control position. Again, do this in the tune mode or at a low transmitter power.
9. After a minimum SWR is achieved, readjust the SWR sensitivity by pushing the SWR/WATT control in and adjust for a full-scale deflection. Pull out for the SWR reading. The transmitter power may now be increased up to 300W. The SWR sensitivity must be reset again after full power is applied. The ANTENNA and TRANSMITTER controls may need fine adjustment if the SWR is not 1:1 at high power. NOTE: On the 160 meter band, excessive heating or arcing may occur. Reduce the transmitter output power until it stops.
10. To read the transmitter power, push the SWR/WATT control in and set it to either 30 or 300.
11. A SWR of 1:1 can occur from more than one set of control settings on the MFJ-941B. When a SWR of 1:1 is obtained, be sure to check the transmitter power and make sure that the transmitter power is relatively high. If the transmitter power has decreased substantially, try another INDUCTANCE control setting and repeat Step 7.
12. When using the MFJ-941B for receiving only, tune the MFJ-941B as described in Step 1 and Step 2.

ADDITIONAL NOTES AND CAUTIONS

1. Do not use the MFJ-941B for over 300W of RF output power, even in the BYPASS or the DIRECT COAX positions.
2. Do not operate the antenna switch while transmitting.
3. The SWR/WATT control is factory calibrated for the 300W range. Do not reset the knob on this control. However, due to component tolerance when precision reading is desired, the 30W range can be recalibrated as follows: Push the SWR/WATT control in. Set the control to 300, note the power level on the 300W scale, then rotate the control clockwise to read the same power level on 30W scale. Mark the control setting for the re-calibrated 30W range.



MFJ-941B CIRCUIT DIAGRAM

