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MFJ-948 "Deluxe Versa Tuner II" Antenna Tuner

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Reviewed by Mark J. Wilson, AA2Z

MFJ's 948 "Deluxe Versa Tuner II" caught my eye when I was assembling a Field Day station. I had a compact solid-state transceiver, and planned to bring along a multiband vertical antenna and an open-wire-fed dipole. The '948 seemed like just the accessory to tie everything together. It includes an antenna switch and SWR meter in addition to the antenna tuner, covers 160 through 10 meters, and is rated for 300 watts PEP maximum—the perfect companion to a barefoot transceiver.

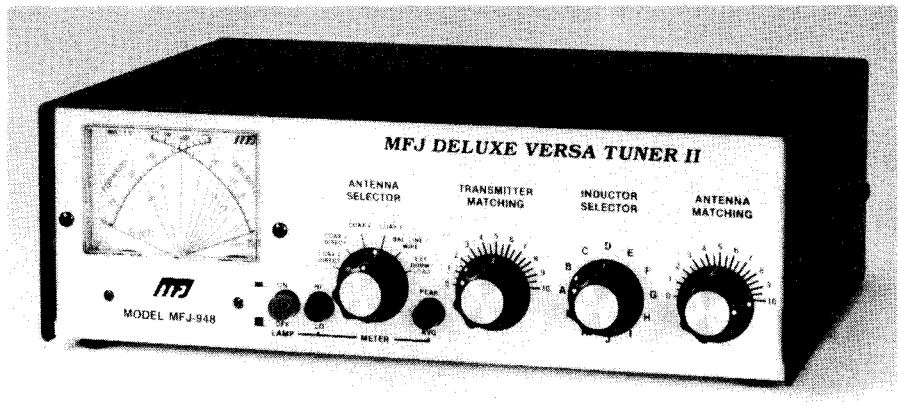


Table 1
MFJ-948 Deluxe Versa Tuner II

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: 1.8 through 30 MHz	As specified.
Maximum power: 300 W PEP maximum.	See text.
Wattmeter accuracy: Not specified.	See Table 2.
Insertion loss: Not specified.	1.8 MHz, 1.2 dB; 14 MHz, 0.3 dB; 28 MHz, 0.2 dB.

Colors: Black and white.
Size (height, width, depth): 3¼ × 10-3/8 × 7½ inches.
Weight: 3 lb.

Features

The Versa Tuner can match antennas fed with coaxial cable or open-wire feeders (open-wire line or twinlead), as well as random-length wires. It uses two 208-pF air-dielectric variable capacitors and a tapped, air-wound inductor in a **T** network. A 4:1 toroidal balun is included for use with high-impedance feed lines. The MFJ-948 would make my SWR-sensitive transceiver happy with the coax-fed multiband vertical on both modes (the vertical has a narrow SWR bandwidth on most bands) and would make the dipole usable on several bands.

The front panel includes **TRANSMITTER MATCHING** and **ANTENNA MATCHING** controls for the variable capacitors and a 12-position rotary switch, **INDUCTOR SELECTOR**, that selects among the coil taps. The capacitor-control scales are labeled **1** through **10**, and the coil switch **A** through **L**, making it easy to return to settings for each band once you've found them.

You can use the '948 to switch among three different antennas: two fed with 50-ohm coaxial cable and one fed with open-wire transmission line (or a random wire). If you have three antennas or fewer and don't use an amplifier, the '948 is all the antenna switch you'll need for your station.

The **ANTENNA SELECTOR** switch operates the six-position, PC-board-mounted rotary antenna switch. Unselected switch positions are not grounded. **EXT. DUMMY LOAD** provides a direct connection between the input and output connectors (UHF [SO-239] types), and a dummy antenna can be attached to this connector. (This is the only difference between the '948 and the MFJ-949D tuner; the '949 includes a built-in dummy antenna.) You can also use this switch position for an antenna that doesn't require a tuner. **COAX 1** and **COAX 2** are for antennas with coaxial feed lines (again, UHF connectors on the rear panel). You can feed either coax-fed antenna through or around the tuner by means of separate switch positions. **BAL. LINE/WIRE** selects the rear-panel binding posts for a random-length wire antenna or for open-wire feeders.

A cross-needle wattmeter occupies the left side of the front panel. It simultaneously displays forward and reflected power and SWR. The **METER HI/LO** push-button switch selects 30 watts or 300 watts forward power (and 6 watts or 60 watts reflected power). the **METER PEAK/AVG** button selects peak-reading or average-power modes. There's even a switchable meter light, but it requires an external 12-volt dc source to operate.

Wattmeter accuracy varies quite a bit[1] but is fine for casual use and for tuning antennas for minimum SWR. As Table 2 shows, it's best at the 100-watt level and off by quite a bit at the high and low ends. I deem this reasonable accuracy, considering that the tuner is designed primarily for use with 100-watt transceivers and that the wattmeter is essentially free when you buy the tuner. Consider using an external wattmeter if you need better accuracy—especially at power levels of 10 watts or less.

At one point, the reflected-power needle was sticking. I took the meter apart (an easy job) and discovered that the meter face had loosened and impeded the needle's travel.

[1]This isn't unusual. See "*QST* Compares: Peak-Reading MF/HF Wattmeters," Product Review, *QST*, Feb 1991, pp 33-36, 63.

Table 2
MFJ-948 Wattmeter Performance

Frequency (MHz)	*Actual Forward Power (W)*	*MFJ-948 Reading (W)*
1.9	10	24
	100	125
	225	300
14	10	22
	100	120
	247	300
	10 PEP	12 PEP
	100 PEP	100 PEP
	300 PEP	145 PEP
28	10	20
	100	110
	237	300

I glued the face back in place with silicone sealant and had no further problems.

Power Handling

We were puzzled as to how to test the '948's power-handling capability. The manual calls the '948 a "300-watt" tuner; one of MFJ's ads calls it a "300-watt" tuner, and another ad calls it a "300-watt PEP" tuner. Nowhere could we find a duty-cycle rating, although the manual cautions

against continuously transmitting through the tuner into a dummy antenna for more than two minutes. A call to MFJ confirmed that the power rating is 300 watts PEP, that they don't recommend long periods of continuous key-down operation, and that they conduct their tests with a 100-watt transceiver and a 50-ohm load. So consider the MFJ-948 a companion for your barefoot transceiver, and consider something else if you use an amplifier.

Oh yes, you're probably wondering what we settled on for power tests. In the lab, we ended up performing a series of tests that we thought would evaluate MFJ's power ratings and represent typical use in an amateur station. At 160 and 10 meters (both ends of the '948's frequency range), we tested the following: 300 watts PEP (50% duty cycle) and 110 watts continuous carrier—full output from a typical transceiver—into 50- and 25-ohm resistive loads. Each test lasted two minutes.

The '948 passed the 10-meter tests with no problems. On 160 meters, we heard arcing (but saw no evidence of it) after about 1 minute at 300 watts PEP with a 50-ohm load, and the coil became warm. We could not complete the 160-meter, 300-watt-PEP, 25-ohm load test; severe arcing occurred at about 200 to 250 watts. At 110 watts, the tuner did not arc, but the coil was warm after two minutes with a 50-ohm load and hot after two minutes feeding a 25-ohm load.

The tuner didn't appear to suffer permanent damage from the arcing or the coil heating. Don't transmit into an arcing tuner for any length of time, though, or you can expect to damage the tuner and/or the transmitter.

The Instruction Sheet

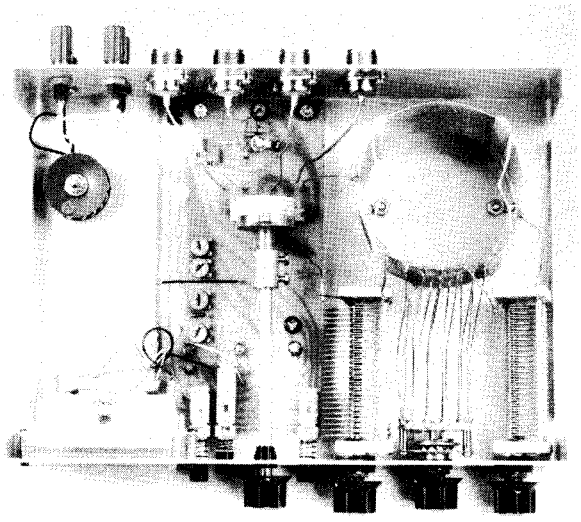
MFJ's manual is generally okay, but it contains a few minor errors. Most glaring was a text reference to a diagram showing how to connect the tuner to a transmitter and antenna; the diagram is nonexistent. The tuning instructions are clear, but a table showing approximate control settings for each band would be helpful.

On the Air

I used the MFJ-948 with a variety of antennas and a 150-watt-output transceiver at my home station. My antennas—a tribander and shortened 40-meter beam—have low SWRs across only part of each band. With the '948, I was able to achieve a 1:1 SWR across each band, making my transceiver happy. I also used the tuner with a 130-foot-long dipole and had no trouble tuning that antenna on 10-80 meters. I noticed no internal arcing as long as I followed the instructions and tuned the MFJ-948 for minimum SWR at low power. The cross-needle SWR meter is great—it's helpful to see forward power and SWR simultaneously when adjusting the tuner with an SWR-sensitive solid-state rig.

The MFJ-948 is a great transceiver companion, once you understand its power limitations. It provides an antenna tuner, SWR/power meter and antenna switch all in one compact box for an attractive price. If you also need a dummy antenna, consider the MFJ-949D for $25 more. Its air-cooled internal 50-Ω, 100-W resistor is helpful for adjusting transmitters that require final-amplifier tuning. MFJ offers a 1-year unconditional warranty and telephone support.

Manufacturer's suggested retail price: $129.95. Manufacturer: MFJ Enterprises, Box 494, Mississippi State, MS 39762, tel 601-323-5869.



An inside view of the MFJ-948 antenna tuner shows the coil and capacitors (right), the PC board supporting the metering components, range switches and antenna-selector switch (center), and the open-wire/long-wire transformer (upper left). The antenna and transmitter connectors occupy the upper part of the back panel.

SOLICITATION FOR PRODUCT REVIEW EQUIPMENT BIDS

[In order to present the most objective reviews, ARRL purchases equipment off the shelf from Amateur Radio dealers. ARRL receives no remuneration from anyone involved with the sale or manufacture of items presented in the Product Review or New Products columns.—*Ed.*]

The ARRL-purchased Product Review equipment listed below is for sale to the highest bidder. Prices quoted are minimum acceptable bids, and are discounted from the purchase prices.

Kenwood TS-850S 160-10 meter transceiver with YK-88C-1 500-Hz IF filter, YG-455CN-1 250-Hz IF filter, DRU-2 digital voice recorder/player and DSP-100 digital signal processor (see Product Review, July 1991 *QST*). Sold as a package only. Minimum bid: $1770.

The following MF/HF peak-reading wattmeters (see Product Review, February 1991 *QST*), sold separately:

Wattmeter	*Minimum Bid*
NCG Comet CD-160H	$120
Mirage MP1	$105
Diamond Antenna SX-100	$85
Daiwa NS-660PA	$110

Advanced Electronic Applications LA-30 160-10 meter amplifier.* Minimum bid: $473.

Advanced Electronic Applications AT-3000 antenna tuner.* Minimum bid: $266.

Sealed bids must be submitted by mail and must be postmarked on or before August 27, 1991. Bids postmarked after the closing date will not be considered. Bids will be opened seven days after the closing postmark date. In the case of equal high bids, the high bid bearing the earliest postmark will be declared the successful bidder.

In your bid, please clearly identify the item you are bidding on, using the manufacturer's name, model number, or other identification number, if specified. Each item requires a separate bid and envelope. Shipping charges will be paid by the successful bidder, FOB Newington. The successful bidder will be advised by mail. No other notifications will be made, and no information will be given to anyone regarding final price or identity of the successful bidder.

Please send bids to Bob Boucher, Product Review Bids, ARRL, 225 Main St, Newington, CT 06111.

*This product has been discontinued and will not be reviewed in *QST*. The product is in working condition, but no warranty is offered by ARRL.

Strays

COMMUNICATIONS SHIP REUNION

☐ The annual reunion of the communications ship *USS Appalachian* is Sep 30-Oct 3 in San Diego. All personnel who served aboard the ship from commissioning to the Bikini Atoll bomb tests, contact Aaron Weissman, K3VWP, 404 W 38th St, Wilmington, DE 19802.

POWERFUL INTEREST IN QRP

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