The MFJ Versa-Tuners

BY JOHN J. SCHULTZ*, W4FA

MFJ Enterprises brought out a series of antenna tuners dubbed "Versa-Tuners." Units in the series differ according to the power level they can handle and whether they include metering facilities or a built-in dummy load for the lower power units. However, they all use the same basic circuitry for impedance matching. This review only goes into detail about a Versa-Tuner III unit (rated at 1500 watts), which falls in between the Versa-Tuner II and IV units (rated at 300 and 3000 watts respectively), but the general performance features noted should be applicable to all units in the series. The features of the IV are discussed, however, as a basis of comparison.

The Versa-Tuner III, Model MFJ-962, is a full feature unit. As can be seen from the front view, the front panel contains quite a few controls. Aside from the three controls directly associated with the impedance matching network (Antenna Matching, Transmitter Matching and Inductor), there is an antenna selector switch and two meter controls. The antenna selector switch allows one to select either one of two output coaxial lines either directly, without going through the internal impedance matching network, or through the matching network. Also the switch can route the input through the matching network to a single wire output or to a balanced line output via a built-in balun. Regardless of which output is selected, the metering circuitry remains active. The meter switch allows the usage of the metering circuitry as either a conventional s.w.r. meter, where one has to set the meter for full scale deflection in the forward reading position using the s.w.r. set control, or as a direct reading r.f. wattmeter for both forward and reflected power requiring no meter adjustments. The wattmeter is calibrated to measure r.f. power either in the forward or reflected directions in two ranges—200 and 2000 watts. On the 200 watt range, the lowest power level which can be read is about 5 watts. The tuner itself is rated to handle 1500 watts r.f., output into most antenna loads.

The rear view shows the rear panel of the tuner. SO-239 connectors are used for all input and output coaxial line connections. Generously dimensioned ceramic feed-through Insulators are provided for the connection of a balanced transmission line and/or a single wire feeder. There is also a small jack provided for an external 9-12 volt source to power a lamp which provides back-lighting of the panel meter, an option not found in the IV.

Fig. 1 shows the schematic diagram of the tuner. Note that the basic configuration of the impedance matching network is a T network with two variable capacitor arms. This network is not as commonly found in tuners as perhaps some variation of the familiar pi-network. However, the T network usually can match a wider range of complex impedances over the h.f. range with more reasonable component values than those required by a pi-network. The pi-network, particularly on the lower frequency bands and when working into low load impedances, can require very high values of capacitance, which usually necessitates the switching in of fixed capacitors across the variable ones used for tuning purposes. Such an arrangement is awkward and can introduce additional loss in the matching network. The author makes no particular claim for being the first to point out the advantages of the T network configuration. However, his first articles on the subject appeared in CQ almost 13 years ago! (See references at end of the article.) The only real disadvantage of the T network is in its construction in that both variable capacitor arms have to be insulated from ground.

The schematic also shows the details of the s.w.r./power metering circuitry. A balanced r.f. sampling transformer, which is wound on a ferrite core, is used. Adjustments, which are all factory calibrated, provide for nulling out stray capacitance in the transformer and for calibrating the meter on its two power ranges. Finally, the schematic also indicates how a 4:1 ferrite core balun is used to couple the output of the tuner to a balanced transmission line.

The inside view of the tuner reveals a very sturdily built unit. The cabinet consists of two rolled steel sections. One is a bottom section to which the front and back panels are attached, while the other is a top cover section. The cabinet measures about 5 1/8 x

* c/o CQ Magazine

The rear view of the Versa-Tuner III. A fourth coax connector is added in the IV which will be seen in a later photograph.
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The MFJ-984 Versa-Tuner IV is the big gun of the MFJ line. It is rated at handling power up to 3 kw and will match coax, balanced or random wire feedline. Several nice features are included in this model. They include: built-in 200 watt, 50 ohm dummy load, and a unique 10 Amp r.f. ammeter.

The MFJ-984 Versa-Tuner IV is priced at $299.95. The interior view shows the extra coil for 10 and 15 meters. The dummy load resistor can be seen to the right.

The rear view of the Versa-Tuner IV showing the extra coax connector.

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There are 6 more switched positions on the inductor switch in the Versa-Tuner IV than in the III, allowing for greater flexibility in matching. The antenna selector switch (7 positions) can switch from balanced line, random wire, 3 coax lines, 1 coax line through the tuner and directly to the antenna, and finally switch in the dummy load.

Power equipment for that band, the values of the components used would indicate that the tuner should be just as useful on 160 with the types of antennas mentioned as it was on 80-10 meters. The instruction pamphlet that comes with the tuner provides a number of hints as well as precautions for its proper use. Probably the most important of the latter to follow is not to attempt to change the setting of the antenna selector or inductor switches while operating at full power. The switches can be manipulated freely during tune-up at low power levels (100 watts or less). The switches can carry 9 Amperes of r.f. but they can safely switch only a fraction of that value.

Overall, the MFJ Versa-Tuner III makes a very favorable impression. It is ruggedly built with impressively dimensioned components. The metering circuitry covers all possible needs. The antenna selection possibilities should suffice for almost any situation where a station might be using various forms of antennas on different bands. It doesn't tune itself, but it appears capable of doing just about anything one might expect out of a high-power antenna tuner up to that point.

**References**

