

Product Review: MFJ-925 Compact *Intellituner*[™] Automatic Antenna Tuner
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Introduction

I really like the convenience of auto-tuners, and so I've been moving towards auto-tuners for all applications. For about a year I've had a MFJ-929 tuner that I use with my IC-706MKIIG, and a MFJ-994B auto-tuner that I use with my FT-1000MP MKV and ALS-600 amplifier. Both have performed flawlessly for me. However, I enjoy portable operation with my IC-706MKIIG when we go on vacation, and so I wanted a more compact auto-tuner for this application. Based on my experience with MFJ auto-tuners, I acquired a MFJ-925 for portable operation.

MFJ-92X Auto-Tuner Basics

The MFJ-92X series of Intellituners[™] all require just two-watts of transmit power for tuning, and match impedance ranges from 6-1600 ohms. And since they all handle up to 200 watts, they are ideal for both QRP and QRO transceivers. Unlike the SWR search algorithms normally used by other manufacturers, all MFJ Intellituners[™] use MFJ antenna analyzer circuitry to actually calculate the L/C values needed and then switch them in. Only if the antenna impedance is outside the analyzer measuring range will the tuner revert to an adaptive search algorithm, which requires a slightly longer tuning time.

The MFJ-929, MFJ-928 and MFJ-925 auto-tuners can be powered by your local DC voltage source using a supplied DC interface cable, or directly from your transceiver when equipped with an optional radio interface cable. And these tuners can also be powered by DC voltage impressed on the coax cable using an optional MFJ-4116/4117 Bias-Tee DC power injector. This is a great feature, as you don't need to run separate DC power cables to a remotely located MFJ-92X auto-tuner, and you can leave the tuner set for auto-tune so that it tunes automatically when the SWR exceeds 2:1.

Features differentiate these three tuners. The MFJ-929 has an integral digital read-out which gives detailed power and SWR information, and provides for setting a variety of features. This tuner also has manual tuning capability, A/B antenna switching, and separate coax and wire-output connectors. Each of the two antenna ports has four memory banks each with 2500 memories (20,000 memories total), permitting the tuner to memorize up to four different antennas per antenna port. The MFJ-928 is identical to the MFJ-929, except that it has no LCD display, and no manual tuning capability. Finally, the MFJ-925 is very compact (6-1/2"W x 2-1/8"H x 8-1/4"D) and lower-cost, and it only has a single coax output and LED indicators. For an end-fed wire, a banana plug is provided so you can plug the end-fed wire into the coax output. Photo A shows the MFJ-925 with my IC-706MKIIG, and Photo B shows the rear connections. Photo C shows an unobstructed view of the rear of the MFJ-925.

OK – Let's talk specifically about the MFJ-925

Right out of the box you can start using the MFJ-925 without even reading the manual. Just connect your rig, antenna and DC power and transmit a 2-20 watt constant carrier signal. If the SWR is greater than the default 2:1 "start-tuning" value, the MFJ-925 will

auto-tune to an SWR less than 1.5:1. Or you can push the TUNE button while transmitting and the MFJ-925 will auto-tune to less than 1.5:1 regardless of the SWR. The red "Tune" LED lights during tuning, and the green "SWR" LED lights when tuning is complete and SWR is less than 1.5:1. An audible indicator lets you know the approximate SWR with a series of beeps when tuning is complete, whether you need to increase tuning power (by beeping "QRO" in Morse code), that you are tuning with excessive power (by beeping "QRP" in Morse code), or that you are transmitting with more than 200 watts (by beeping "QRT" in Morse code). If you try to tune with excessive power, tuning will be inhibited. And under the "greater than 200 watt" transmitting condition, the MFJ-925 drops to bypass mode.

Once you read the manual, you'll find that you can change from the default automatic tuning mode (tuning starts automatically when SWR is greater than 2:1), to a semi-automatic tuning mode which requires you to push the TUNE button to start tuning. You can also turn-on "sticky-tune", which is a feature that enables auto-tuning whenever you transmit regardless of SWR.

On the rear of the MFJ-925 you'll find an RJ-45 connector for connecting an optional transceiver interface cable between the MFJ-925 and most current HF radios. The radios currently supported include:

- Alinco DX-70, DX-77, and any Alinco radio that supports the Alinco EDX-2 tuner.
- Icom IC-703, IC-706, IC-707, IC-718, IC-725, IC-728, IC-736, IC-738, IC-746, IC-756, IC-775, IC-7000 and any Icom radio that supports the Icom AH-3 or AH-4 tuner.
- Kenwood TS-50S, TS-450S, TS-480HX, TS-570S, TS-690S, TS-850S, TS-870S, TS-2000, and any Kenwood radio that supports the Kenwood AT-300 tuner.
- Yaesu FT-100, FT-817, FT-847, FT-857, FT-897, FT-1000MP series, FT-2000 series, and FTDX-9000 series radios.

There is a simple strapping set-up on the front panel pc board that selects the correct radio interface. When the interface cable is plugged in, the MFJ-925 can be powered directly from your transceiver and the tuning process is controlled by either the tuning control on the radio, or the TUNE button on the MFJ-925, or both depending on the specific transceiver used.

While you can purchase the appropriate cable from MFJ, you can also easily build your own interface cable with the information provided in the MFJ-925 manual. In my case, I built the equivalent of the MFJ-5114I interface cable for my IC-706MKIIG. I started with a short CAT5 cable and cut off the RJ45 connector on one end. Then I connected a 4-pin Molex connector to the cut-off end and wired it as shown in the MFJ-925 manual. The 4-pin Molex connector can be purchased from Radio Shack (RS274-224), or from Mouser Electronics (Plug: Mouser 538-03-09-2042, Pins: Mouser 538-02-09-2103)

Using the MFJ-925

First of all, I looked at the MFJ-925's ability to tune my home station antennas. My Butternut vertical has very narrow bandwidth on 160- and 80-meters since the antenna is electrically short on these bands. My 160 meter resonance point is 1817 KHz, and the SWR rises to >25:1 at 1864 KHz (measured with a MFJ-259B). I set my IC-706MKIIG to 1864 KHz and pushed the TUNE button, and in less than ½-second I had an SWR of less than 1.5:1. Next I went to 80 meters, where the antenna resonates at 3560 KHz. The SWR was 20:1 at 3960 KHz. The MFJ-925 just buzzed for a few tenths of a second, and the SWR was less than 1.5:1. Next I went to 40 meters and switched to my MFJ-1775 Rotatable Dipole. This is a short, loaded multi-band dipole resonant at 7.04 MHz. At the top of the 40 meter band, the SWR is 6.1:1. Again, no problem auto-tuning in a fraction of a second. Finally, I went to 20 meters where my MFJ-1775 antenna is resonant on 14.02 MHz. At the top end of 20 meters the SWR rises to 3.5:1. The MFJ925 auto-tuned this impedance to less than a 1.5:1 SWR almost instantly.

For most of my portable operation I use a quasi-resonant dipole (it is resonant in the clear, but normally is poorly installed during portable operation), or an end-fed long-wire that is 30 feet long. I have only operated from 40-10 meters with both antennas, and the MFJ-925 easily matched both antennas on all frequencies. It is pretty amazing to just push the "Tune" button on the MFJ-925, hear a fraction of a second of clicks, and have an SWR less than 1.5:1. And since the tuner "remembers" previous settings, transmitting on a frequency with stored memory settings results in an instant re-set to those stored values and then an automatic fine tune if the antenna characteristics have changed.

Incidentally, should you ever want to recalibrate the SWR circuitry for any reason, the MFJ-925 has an excellent software-based calibration procedure. You just need to call up the internal SWR cal procedure, transmit into a dummy load at 100 watts, and adjust the FWD trim pot until both LEDs light. You then reverse the transmitter and dummy load, transmit in the reverse direction through the MFJ-925, and adjust the REV trim pot so that both LEDs light. I nibbled the lip of the case as can be seen in Photo D to make adjusting these controls easier for me, as I wanted to experiment with these adjustments at different power levels. I.e., if you operate at less than 100 watts, adjust the LEDs at your desired maximum power level for maximum accuracy.

Summary

The MFJ-925 adds another choice into your auto-tuner buying decision. Its compact size, wide matching range, wide selection in transceiver interface cables, and the ability to remotely power the tuner through the coax cable make this a very flexible under-\$180 auto-tuner. And though the MFJ-925 is targeted more for portable operation, its 2-watt minimum tuning requirement and 200-watt power capability permit it to work well with virtually all transceivers in any home or portable set-up.



Photo A: MFJ-925 and IC-706MKIIG



Photo B: Rear connections



Photo C: Uncluttered back-side view

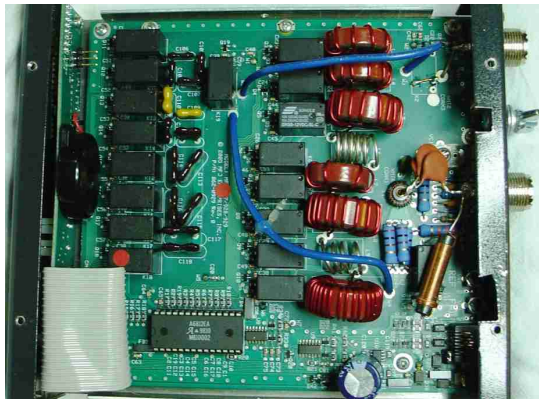


Photo D: Internal view of the MFJ-925