Product Review: MFJ-929 Compact Automatic Antenna Tuner
Phil Salas – AD5X

Introduction

There are quite a few automatic antenna-tuners on the market now. One of the newer auto-tuner manufacturers is MFJ Enterprises. MFJ introduced the MFJ-991/993/994 series of auto-tuners a few years ago. Besides recently upgrading these auto-tuners to "B" models, MFJ just introduced the more compact MFJ-929/928/927 series auto-tuners. The MFJ-99X series auto-tuners are physically larger than the MFJ-92X series, handle higher power (600 and 300 watts vs 200 watts), include a balun, and can include an analog SWR/PWR meter. However, the more compact size of the MFJ-929 was more appropriate for my shack, and 200 watts is enough to handle the full power of my Yaesu MKV when necessary. Also, I didn't feel the need for analog meters when the digital meter provides all the information I need. And finally, should I ever need a balun, I can just add an external one!

MFJ-92X Auto-Tuner Basics

The MFJ-92X tuners all require just two-watts of transmit power for tuning, making them ideal for both QRP and QRO transceivers. And they all handle up to 200 watts of transmit power, and match impedance ranges from 6-1600 ohms. Unlike the SWR search algorithms normally used by other manufacturers, the MFJ-92X auto-tuners include MFJ antenna analyzer circuitry which permits the tuners 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 little longer tuning time.

The MFJ-928 and MFJ-929 are powered by your local DC voltage source using a MFJ-provided DC interface cable. Additionally, all three tuners can be powered by DC voltage impressed on the coax cable using a MFJ-4116 Bias-Tee DC power injector conveniently located near your power supply. This is a great feature, as you no longer need to run separate DC power cables to a remotely located MFJ-92X auto-tuner. The MFJ-4116 is supplied with the MFJ-927, but is an option for the MFJ-929 and MFJ-928.

Features and applications are what differentiate these three tuners. The MFJ-929 has an integral digital read-out which gives a variety of information. This tuner also has manual tuning capability and A/B antenna switching. Each of the antenna ports has four memory banks each with 2500 memories, 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-927 is specifically designed as a remote auto-tuner, and is enclosed in a weatherproof box.

OK – Let's talk about the MFJ-929

I wanted the MFJ-929 primarily due to its LCD display. And I really like this display. It displays frequency, L/C values, SWR, and forward and reflected transmit power. The transmit power and SWR can also be displayed on a bargraph simultaneously with the digital read-outs. And while the bargraph is calibrated with rather coarse indications on

the case, it tracks surprisingly well with the digital readout. I.e. when the digital readout shows 100 watts, the bargraph also shows approximately 100 watts.

While the MFJ-929 has plenty of tuning features, right out of the box it has default values so that you can literally start using the tuner without reading the manual. Just connect your rig, antenna and DC power. Then transmit (100 watts if your transmitter has SWR foldback, 20 watts without foldback). If the SWR is greater than the default 2:1 "start-tuning" value, the MFJ-929 will auto-tune to an SWR less than 1.5:1. Or you can push the TUNE button while transmitting and the MFJ-929 will auto-tune to less than 1.5:1 regardless of the SWR.

Once you read the manual, you'll find plenty of tuning-feature options that can be selected. You can decide at what SWR automatic tuning should start, you can select semi-automatic tuning which requires you to push the TUNE button to start tuning, or you can turn-on "sticky-tune" - a feature that enables auto-tuning whenever you transmit regardless of SWR. You can even enable an audio SWR indicator that lets you know the approximate SWR with a series of beeps.

On the rear of the MFJ-929 you'll find an RJ-45 connector which permits connecting automatic tuning interface cables between the MFJ-929 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-765, 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/MKV/MKV Field and any Yaesu radio that supports the Yaesu FC-30 tuner.

When the interface cable is plugged in, the tuning process is controlled by either the tuning control on the radio, or the TUNE button on the MFJ-929, depending on the specific transceiver used. In my case, I use the MFJ-929 with my FT-1000MP MKV where the interface cable plugs into the MKV FH-1 remote keypad jack. So when I tap the TUNE button on the MFJ-929, the MKV goes into a 10-watt cw tune mode during the short MFJ-929 tuning process.

Using the MFJ-929

I connected the MFJ-929 in-line with my MKV and started playing with it, primarily on 160 and 80 meters. On these bands, I have a Butternut vertical, which has a very narrow bandwidth due to its short electrical length. I was able to extend my 10 KHz bandwidth on 160 meters to 120 KHz, and my 80 KHz bandwidth on 80 meters to full-band coverage. It was pretty amazing to push the "Tune" button on the MFJ-929, hear a fraction of a second of clicks, and have an SWR less than 1.5:1 (and it was usually 1:1).

The next thing I did was to check the accuracy of the power reading. I immediately ran into a problem. When I'd key my MKV at 200 watts, the MFJ-929 would indicate about 220 watts, give me both an audible and visual warning, and then revert to the bypass mode. I immediately suspected the accuracy of the MFJ-929. Since the manual has the calibration procedure, I opened up the unit and hooked it up so I could calibrate it. For my power meters, I used a Diamond SX-1000 power/SWR meter connected in series with a MFJ-267 dummy load/wattmeter.

So guess what? The Diamond SX-1000, the MFJ-267 and the MFJ-929 tracked almost exactly across the entire 200-watt power range – all easily within 5% of each other. It was the MKV that was inaccurate (bargraph consistently read about 20% low). As I am also sort of a QRP nut, I was particularly pleased to see almost perfect tracking in the 1-10 watt range between the SX-1000 and MFJ-929. And this is on all bands from 160 -10 meters. So besides an auto-tuner, you also have a very accurate wattmeter. Incidentally, the MFJ-929 needs a second or so of power above about 205 watts to drop into the bypass mode. During normal CW or SSB operation, operation at my 220 watts maximum power does not trip out the auto-tuner..

Summary

The MFJ-929 adds another choice into your auto-tuner buying decision. The wide matching range, all the tuning and digital metering functions, and the ability to remotely power the tuner through the coax cable are just some of the features not normally seen in an under-$220 auto-tuner. And with its 2-watt minimum tuning requirement, 200-watt power capability, and accurate 1-200 watt power metering, the MFJ-929 works well for virtually all transceivers – from QRP to QRO.

Author's Yaesu MKV and MFJ-929

Close-up of MFJ-929