At the Repair Bench – MFJ-949 – October 2025

Figure 1 - MFJ-949 antenna tuner

As much as we try to prepare everything in advance for Field Day, it seems as if it is inevitable that *something* just has to go wrong. It is for exactly this reason that I bring out much more equipment than that which is strictly needed, but my concept is that I want to be prepared. Being prepared, in this case, means having equipment redundancies that will allow the rapid substitution of one piece of equipment for another that may be operating at some sub-par level. This is *exactly* what happened at Field Day 2025, where I was serving as band chair for the 20-meter phone team.

I had brought both automatic and manual antenna tuners for both of my radios, the Icom IC-718 and the Icom IC-746 PRO. The initial setup with which we would face the start of the event was settled on as being the IC-718 radio, connecting through the MFJ-949 antenna tuner. The MFJ-949 was chosen simply because of its larger cross-needle SWR meter on its front panel. The trouble started almost immediately after we connected the MFJ-949 into the circuit.

As we went to tune the radio/antenna combination, team member **Lee Hafele WA2LH** noted that the SWR indication was jumping around repeatedly but quite erratically as he attempted to tune the system. At the time, I simply put the MFJ-949 aside, swapped in my MFJ-941 in its place, and enjoyed the rest of Field Day. Now, a bit more than a week after Field Day, I got around to checking out the MFJ-949, so as to see why it was displaying SWR variations.

I had noted that the inductor selector switch felt rather "mushy" when operated, and since that was what we were adjusting when we noticed the SWR excursions, I decided to start there. Of course, apart from the fact that the switch was loose in its mounting and the knob was incorrectly indexed, the switch itself was OK. I secured the switch properly in the front panel. As to the mis-indexed switch knob, that was a simple matter of placing the switch in its "A" position (selecting the highest tap on the coil) and then installing the knob with its pointer aligned with that "A" position marking on the front panel.

In a similar manner, both of the tuning capacitors were loosely mounted to the front panel. This was less noticeable because the capacitors do not have detents as the inductor switch has, but it was an annoyance nonetheless. I corrected that problem by once again tightening the securing shaft nuts – one on each capacitor – and then properly indexing the knobs to the front panel markings.

OK – I found a couple of minor issues and corrected them, but they were *not* causal to the problem at hand. I decided to perform an in-depth physical examination of the unit. I began by focusing on the signal path.

The MFJ-949 was marketed as a *"Deluxe Versa Tuner II"* and the unit tries hard to live up to the hype. It has a large cross-needle SWR/Power meter on the front panel, with switched meter illumination available when a 13.8VDC supply is connected to the power jack on the rear panel. The meter is selectable to either a 30W or a 300W value range, and it is also able to switch between average (*"AVG"*) or peak (*"PEAK"*) power displayed on the meter.

The front panel function switch provides for four separate outputs, all of which are available via either the *"TUNED"* or the *"BYPASS"* operational mode. The four outputs on each mode are as follows:

- COAX 2;
- COAX 1;
- BAL WIRE LINE; and
- DUMMY LOAD.

Figure 2 - Loose connector indication

One of the deluxe features in this antenna tuner is the fact that it as an internally-mounted dummy load. As a result, there is no *Dummy Load* connector on the rear panel. In point of fact, the rear panel is remarkable for its simplicity, In addition to the three SO-239 connectors labeled *COAX 1, COAX 2,* and *TRANSMITTER*, there are three binding posts for the balanced wire antenna connection, a DC power socket for the meter illumination power source, and a ground terminal. In keeping with the clean appearance of the rear panel, each of the SO-239 connector sockets is secured to panel by two aluminum pop rivets.

My deep-dive into the physicality of the MFJ-949 turned up the cause of the SWR excursions. The GCARC Club member and the individual who was working with me to match the radio and antenna via the MFJ-949 said at the time that the unit was behaving as if there was a loose connection. In a sense, he was exactly correct in his initial assessment. It turns out that two of the three SO-239 connectors were actually loose on the rear panel.

Despite the fact that the sockets themselves are of the four-hole flange type, MFJ chose to secure them with, as noted earlier, only two rivets (Figure 3). The SO-239's are mounted from the inside of the unit, so the fact that there are two unused holes on each connector is not immediately evident. However, it is my belief that the choice to secure these connectors with only two rivets is directly causal to the problem that this unit exhibited.

It must be understood that the flange of the SO-239 connector is an integral part of the circuit and must therefore be tight and secure. This is necessary to a) avoid the

introduction of unwanted resistance into the circuit, and b) to prevent SWR excursions that result from loose antenna connections.

Figure 3 - Factory stamping of real panel

The two connectors that were loose were the *TRANSMITTER* and *COAX 2* connectors, with the *TRANSMITTER* socket being quite loose. This is evident in the Figure 2 illustration of the mounted SO-239, where black aluminum oxide marks are visible around the rivets. This looseness of the connectors was sufficient to interrupt the ground path through the connector shell and into the chassis of the MFJ-949. It is this interruption of the ground path that caused the intermittent fluctuation of the SWR indication.

You may be wondering at this point, why was the connector moving around? If the cable was tightened to the connector, and the antenna tuner was sitting firmly on the table, why should the connector shell move at all? The answer to that question has to do with the looseness of the inductor and capacitor controls on the front panel, but especially with the inductor switch. Because of the loose mounting of the switch, any manipulation of the inductor switch also caused movement of the entire unit on the table top, which in turn flexed the cable connection at the SO-239, causing movement of the connector on the chassis.

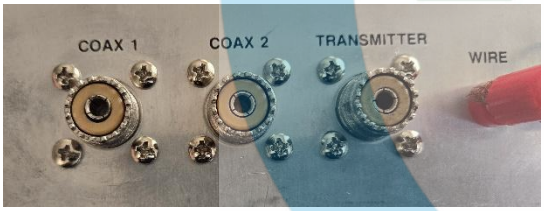

Figure 4 - re-mounted SO-239 jacks

The obvious solution to this problem was to drill out the rivets and replace them with machine screws and KEPS nuts. However, I did not stop there. I also drilled the remaining mounting hole positions and installed machine screws there as well (Figure 4). It is my firm belief that, had the SO-239 connectors been mounted with four fasteners instead of the two that were used, it would probably have held better over time. I see the use of only two fasteners as a purely financial decision, and I see the use of rivets instead of threaded fasteners as a similar financially-motivated choice. By the way, for those who may not be familiar with the term, a *KEPS nut* is basically a standard hex nut with a captive but rotatable externally-toothed lock washer attached. The use of these nuts simplifies the assembly process and reduces the parts piece count.

Granted – there *may* have been some concern about the heads of screws interfering with the connection of standard PL-259 coaxial connectors to the SO-239 sockets, but that fear is groundless, as I have learned clearly through my repairs to this unit. I used machine screws with standard pan heads, and the PL-259 shells fit perfectly despite the presence of the screw heads.

Testing of the MFJ-949 after the repairs showed that the problem was gone. Thus, the repair was completely successful and the antenna tuner is now back in fully-operational condition. This is a problem that will most likely affect *any* antenna tuner with riveted connectors, and most especially those with only two fasteners per jack. It is an easy fix, but it makes a great difference in the performance of the tuner.

The lesson to be learned from this repair is that the manufacturers may not always have the utmost in longevity designed into the construction of their products, and that we can sometimes improve upon what the manufacturers give us.

