

## **How do I?**

### **An occasional series**

#### **This week: Tune it up!**

The American Radio Relay League (ARRL) sells an excellent book, *The ARRL Guide to Antenna Tuners*, by Joe Hallas W1ZR. The ARRL Handbook and other resources, as well as *QST* talk extensively about the science of matching the 50 ohm impedance your radio is usually looking for to whatever is actually present at the antenna. An external antenna tuner is a box that sits in line between the radio and the antenna and connects to both. There are many manufacturers and each has its own merits. The antenna tuner, also called a “trans-match” or “matchbox” lets the radio see something closer to the 50 ohm impedance for which it was designed to work.

The objective of using an antenna tuner is to let the radio circuitry see something closer to a 50 ohm impedance for which it was designed to work. In turn, the radio sees a lower SWR at the point where it connects to the feed line. The antenna tuner does this by providing its own capacitive and/or inductive reactance which offsets the opposite reactance that is present in the antenna and its feed line. However, the feed line and the antenna components, which are in place following the antenna tuner, will continue to have the types and amounts of reactance and SWR they originally exhibited.

With a coaxial cable feed line, there may be limits to how much voltage (caused by high SWR) the cable can handle before the coaxial cable insulation is compromised. Without an antenna tuner, the radio itself would have reduced the power level to minimize the high voltage potential for damage. Typically a modern radio is OK with a SWR of 3:1 or less. About 3:1 it will typically derate the power level to protect itself from damage.

Your HF radio probably has a simple SWR meter built into it. This is usually not very easy to read and may not be as accurate as a stand alone meter or an antenna analyzer, but should give an indication if the SWR is really bad. Most modern radios will derate the power output to protect the radio if the SWR is too high.

If you peruse the articles and catalogs, many antenna tuners seem to have lots of buttons. Some seem to take a lot of manual effort to get the buttons or knobs set “just right”. Authors write about recording values for many frequencies on different bands to aid them in tuning “the next time”.

When I was looking for my first HF rig I essentially had three requirements: affordable,

simple to use, able to do as much as possible. I really didn't know how much I would be on HF. When I got my license I didn't even plan to buy a radio of any kind. I spent about 5 years shopping for a radio and antenna system. I settled on a Comet CHA250B vertical antenna that covers 80-10 meters "with no radials" and "don't need to do anything to change bands". Many commercial antennas seem to require doing something to the antenna when changing bands. Sorry, but that doesn't work for me. I want to stay on the warm side of the wall. Yes, the Comet is a compromise, but I can get on 80-10 meters without a tuner and 160m and I think 6m with a tuner. I have worked 6 continents with it, so I am happy.

Many rigs today have a simple built in tuner. They are generally a few hundred dollars more than the same transceiver without the tuner. The tuner is usually only good with 50ohm coax and cannot handle balanced line (twin lead) or some antennas like the popular G5RV multi band wire antenna. My first two HF rigs didn't have built in tuners. I somehow determined the LDG push button tuners were the correct solution for me. For my Icom 718 tuning it is more of a process: select CW as the mode, turn the power down to 20 watts or less, find an unused frequency and tune. Then put everything back to where it was. The tuner needs its own power supply. I found a product called "Tune Rite" that simplifies the process though. For the Yaesu 857D I bought the appropriate LDG tuner. It draws its power from the radio and to tune you simply push the tune button on the tuner and it does everything else automatically. Easy peasey as they say!



**Yaesu FT DX1200 with LDG Y1200 antenna tuner and Signalink USB sound card**

Catch ya on the air!

