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QST Issue: Oct 2001
Title: Yaesu FT-920 Automatic-Tuner Tricks
Author: Bob Schetgen, KU7G

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I also redressed the leads going to this board somewhat. Especially those going to the stepper motors. They seem three times longer than necessary. I bundled them with a wire tie.

That's it! Put the board back in place and replace all the connectors. Be sure to get the right connector to the right socket for each stepper motor.

Several people on the Internet reflectors reported problems similar to mine, even with multiband antennas such as a five-band vertical. At least five of them (the ones who contacted me) tried this modification and it solved the problem. In the real world, there are many variables. Perhaps Yaesu designed the tuner in a lab environment, then problems resulted outside that environment.

Other notes for FT-920 owners

The automatic tuner in the '920 "gives up" quickly if the SWR is high. In addition, if the SWR is more than 1.5:1, the settings will not be saved. A trick I've used is to turn the RF power to minimum and start the tune cycle. When it starts to tune, raise the power a little at a time so a rough match is attained, then turn it up completely near the end of the cycle. I have been able to get a good match on 40 through 6 meters on a half-length G5RV. The only thing I had to do was to increase the length of the feedline a little.

I've also seen that at certain frequencies the tuner will refuse to tune at all and give a "High SWR" indication. I found a way to get around this problem. Like before, turn the RF power all the way down, then start the tuning cycle. Now instead of gradually increasing the power, quickly rock the power control up and down until the tuner starts the sequence. Then like the other instance, increase the power a little at a time until it's at full power. This will take a few tries. You are really tricking the tuner because there's a slight dip that it sees.—*Anthony Bowyer, NT4X, 113 Cliffwood Rd, Bristol, TN 37620;* **adb1x1 @yahoo.com**

◊ Have you read the notes at the end of every Hints and Kinks column? Some Hints are useful, but not necessarily safe in all situations. The important part of Anthony's advice is that stray RF can cause automatic tuners to malfunction. If you experience this problem, first do everything you can to remove the RF: Is the antenna too close to the operating position? Are you using a shield choke at the back of the radio? Is the station properly grounded?

For example, when operated at any SWR greater than 1:1 there are periodic voltage maxima and minima that develop along a feedline. RFI problems sometimes result when a maximum occurs near the affected equipment. Such problems may be reduced or cured when the feedline length is changed by $\pm\lambda/8$ on the problem band, so as to move the voltage maximum away from the equipment. Of course, changing the feedline length may create a problem on another band, so it may take several iterative adjustments to reach a cure.

Once you have exhausted other possible remedies, consider whether you feel comfortable modifying your equipment and with the possible consequences.

In the "Other Notes," Anthony is fooling the tuner into functioning with SWRs beyond its design specifications (greater than 3:1). Although the tuner might be persuaded to match the impedance, there is a concern that the higher RF voltages associated with the higher SWR might exceed tuner-component specifications. (The component specifications presume that the tuner will *not* try to resolve higher impedances.) Perhaps the increased voltages contribute to the need for additional bypassing in the tuner? So, as with all the Hints and Kinks, this technique is definitely "at your own risk."—*Bob Schetgen, KU7G, Hints and Kinks Editor*

ONLINE GRID-SQUARE RESOURCES AND UTM COORDINATES

◊ When I visited the TopoZone site, I found that the coordinates associated with the cursor were given in UTM coordinates, not degrees. UTM stands for "Universal Transverse Mercator," a coordinate system used by the military and others for local navigation. The UTM system divides the world into 60 zones (each 6° of longitude wide, extending from 80°S to 84°N latitude) and superimposes a rectangular grid over each zone. A position is specified by its zone number and Cartesian coordinates (in meters) from a point on the equator 500,000 meters west of the zone center. The first coordinate is an "Easting" and the second a "Northing" (in the Northern Hemisphere, I saw no mention of a "Southing" for the Southern Hemisphere). With the cursor on the ARRL HQ building, UTM 18 688945E 4620367N shows in the status window of the map page. (For an explanation of the UTM system, visit the Map Tools Web page at **www.prusik.com/maptools/UsingUTM/** or the USGS Fact Sheet 157-99 at **mac.usgs.gov/mac/isb/pubs/factsheets/fs15799.html**.) Clicking on the QUAD INFO link at the upper right of the map takes you to a page of information about the USGS map that you are viewing. There, you can read the HQ position as latitude 41.7146°, longitude –72.7288°, where the negative sign indicates west longitude.

Many Web map sources include latitude and longitude information. I often use MapBlast (**www.mapblast.com/myblast/index.mb**). There, you simply enter an address, click the CREATE MAP button and read "Lat: 41.716905, Long: –72.727083" above the map's upper-right corner. MapBlast doesn't give topographic information.—*Bob Schetgen, KU7G, Hints and Kinks Editor*

YOUR GPS UNIT MAY DISPLAY GRID SQUARES

◊ Many VHF/UHF contesters and other hams make use of the Maidenhead system of grid squares. The grid squares are one degree of latitude tall by two degrees of longitude wide. They were agreed upon at a conference held in Maidenhead, England. Many of the populated areas of the world exist in the middle latitudes where the lines of longitude have converged to about half of the separation they have at the equator. This makes the grid squares look approximately square in the middle latitudes.

Over a year ago, I moved to Friendship, Maryland, so I am designing a new QSL card reflecting the new station location. In order to find my grid square for the new card, I took my latitude and longitude readings from a Garmin GPS 12 handheld GPS unit. Then I went out on the Web and found one of the many grid-square lookup pages. The lookup page wanted the latitude and longitude coordinates in degrees, minutes and seconds. The GPS was displaying degrees, minutes and decimal fractions of minutes. Well, it is easy enough to do the math and convert to seconds, but I chose to look in the GPS setup menu and have it display seconds. As I scrolled through the many display formats, I was surprised to find a choice labeled "Maidenhead." What a great deal! Just standing there in my backyard with a GPS and presto! I find that I am in Grid Square FM18QR.

Actually FM18 is the 1°×2° square. The fifth and sixth characters "QR" refine the location to 2.5′ of latitude by 5′ of longitude. For more information go to **www.arrl.org/locate/gridinfo.html**.—*Ric Creager, KK4GV, 24 Scrivner Dr, Friendship, MD 20758-9778;* **creager@erols.com**

◊ A rapid, accurate, interactive and free method to quantify latitude and longitude for locating Maidenhead grid squares, in addition to ordering paper USGS topographic maps or employing a GPS receiver, is to utilize the online USGS