

# Vertical Antenna Troubleshooting

current flow

If you cannot draw an swr curve on any band, you probably have a problem in the balun box. There are several things you can check. You can use an ohm meter for many checks, but an swr analyzer is more effective and reliable.

1. SO-239 connector - these have been known to have a faulty solder connection on the center pin. Reapply solder, or at least heat up the joint, and it should restore function. Also, check the coax side of the connector. It may have corrosion, or it may not be snug on a PL-259 center pin. You should feel resistance on the center pin when pushing or pulling it in, before screwing in the outer conductor shell.

2. Bottom radial jumper wire- This will affect all bands. The bottom radials are 1/3 of the antenna radiator, and will cause a huge problem if not connected. There is a solder lug on each end of the balun jumper wire. Reheat/resolder both of these, or replace the wire.

3. Inside the balun box, look for burns, broken wires, corrosion, or anything that doesn't look normal. Lightning will many times char the board or components. In particular, look at the small coil and capacitor on the circuit board. These provide a dc path to ground, so they are the main path that lightning will take. They are not essential to the antenna performance, but they can short to ground during a strike. This presents a high swr when the antenna is later checked. Replace as necessary. You can temporarily cut these components out of the circuit which will restore the antenna operation.

4A - Using an swr analyzer - Put the analyzer into real time mode, not sweep mode which takes some time to complete. Touch the center pin of the coax connector to verify that the analyzer changes when touched. This is adding capacitance and inductance to the measurement, and should be seen to change. Good or bad doesn't matter - as long as it changes.

4B - Connect the analyzer to the antenna connector. Touch the antenna feed tube and the analyzer should change. It may not be as much as before, but it should change. If not, the signal is not getting through the balun box. If it does, touch the jumper wire between the balun box and the bottom radials. Again, the meter should change. If not, touch the terminal on the balun. If it changes, the the jumper wire is the fault. Correct it and this should restore function.

4C - Some bands work and some don't - So, the current is making it out of the balun box and traveling up the antenna. The current first visits the higher frequencies, and finishes with the lower frequencies at the upper/outer extreme. The current flows upward like a thermometer, or sap in a tree. It is stopped by a band specific switch, which is activated by a trap, stub, or resonator, whichever applies. List the bands that you know show a good swr. There should be a clean break point, frequency wise. All bands below this point pass, and all bands above this point fail. With the analyzer, you can actually touch each side of the break point to localize it. Above this point, the analyzer does not respond.

4D - 40 and 80 meters - These seem to be the highest trouble bands, as they are at the end of the current flow. There is a jumper wire which connects between the main tube and the top assembly. If there is no response when touching the top assembly, verify that the main tube gives a response. If not, work your way back toward the transmitter until it again responds. When the tube responds and the top assembly doesn't, this verifies that the jumper wire is the fault. If the meter responds above the wire, then the wire is ok. A Hy-gain AV-680 has several branch paths at this point, but the R9 only has 40 and 80 meters. From the top of the jumper, the current takes one of these paths to the L/C band in use. Check for response at the lower part of the band coil. Check for response at the capacity hat spokes. If you do not have a response, work your way back down to the break point, and repair it. This should restore the antenna to operation.

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