

## The Most Common Problems (read this first!)

- The antenna is out of calibration, perform the calibration as described in the manual.
- The antenna length needs to be adjusted due to height above ground or more radials added. Any length of wire to the radial junction point adds directly to the antenna length. Keep the lead to 12" or less.
- The control cable is mis-wired.
- Interaction between power lines, other antennas, metal roofs, house wiring, gutters, etc, and the antenna.
- The automatic tuner is enabled on your rig, your linear or your external tuner is in line.
- Elevated mounting is much trickier than ground mounting. Read the manual section that discusses elevated mounting.
- Your antenna selector is on the wrong antenna
- Your rig is in the split mode and worse case, to a different band!
- A low pass filter is in line and 6 meters has very high SWR.
- Your in-line linear has a transmit / receive switch some of which may be poorly designed or faulty. This can make the SWR give incorrect higher readings. Remove as many things in-line on the coax as possible so you get a more accurate SWR reading.
- Blown driver board from shorting the control cable with power plugged into the controller. Even with the power button pushed "off" the cable is energized.
- Low cost SWR meters, especially those built into transceivers, can give incorrect readings, both higher and lower than reality. They also can be drastically affected by the length of the coax line. Removing a few feet of line can cause drastic differences in the reading ranging from 10% to as much as 100% ! Directional couplers such as the Bird watt meter or antenna analyzers are much more reliable. Make sure you really have a problem before you hit the panic button.
- Broken or damaged control cable or connector. See Cable Problems section.
- Bad coax or coax connector.
- Damaged driver board is pulling power supply voltage down causing the microprocessor to malfunction. Check to see if green LED is lit on power supply
- **Ground the controller**, this prevents crashes of the microprocessor and provides a path for static discharge.

## GENERAL:

**Be aware that just because the controller display says an element is a certain length there is no guarantee that it is, the element could have mechanical problems, or a broken wire in the control cable (the motor will run with only one winding driven in some cases) or a faulty driver board.**

The controller runs open loop and has no way of knowing if the element is really moving. The motors in the elements make three distinct noises:

1. A ratcheting sound lasting 1 – 2 seconds at the start and finish of the motor running, this is the ramp-up stepper motors require and is normal.
2. A smooth whirring sound indicating normal operation.
3. A loud rattling sound that sounds like gears slipping indicates the stepper is stalling. This occurs during the middle portion of a “calibrate” with the smooth running sound before and after it and is normal. Any other time (even for brief durations) this noise indicates unwanted stalling of the motor and should be investigated.

Check the resistance with an ohmmeter between the center conductor and ground of the coax connected to the antenna, it should read zero ohms.

## High SWR:

Whenever the antenna has a problem you will most likely observe higher than expected SWR. In our experience an SWR of 1.5:1 or less is normal.

## INTERACTION PROBLEMS:

The most common reason for higher than expected or shifted SWR is objects in the near field. Usually only one or two bands are affected but not always. It is important to take good notes so if you need to call us we can do a better job of helping you. Record the SWR on each band at least one place in the band, this is a good idea anyway so you can assess the health of your antenna over time. The usual culprits are slopers, other nearby antennas, gutters, power lines, house wiring, metallic guy wires, etc. You can usually tune out high SWR by using the “Create, Modify” mode to adjust **only the driven element** for best SWR and save it as described in the manual. Otherwise you will need to change your installation to reduce the interaction to an acceptable level.

## CABLE PROBLEMS:

The control cable uses 4 wires per motor (one motor is in the element), 2 wires for each of the two motor windings. This test assumes the antenna is connected to one end of the control cable and the measurements are taken at the 25-pin connector that mates to the controller. You need a ohmmeter capable of measuring 15 – 35 ohms with reasonable resolution or at least one that you can tell the difference between a dead short and 15 ohms. Remove the 25-pin subD control cable connector from the controller. Hold it so you are looking at the pins with them pointing at you. Orient the connector so the row with 13 pins is on top, now the upper left-hand pin is pin 1. You should read between about 18 ohms to 30 ohms (depends on cable length, 100’ is about 23ohms) between the pins listed below.

	Pin Numbers	
Driver	1 – 2	20 ohms (approximately)
	3 – 4	20 ohms

Next make sure there is an open circuit (> 100 K ohms) between the following pins:

- Connector case to pins 1, 2, 3 or 4
- Pins 1 - 3

## Antenna is off frequency:

It is hard to predict where the best length will be on the vertical so it almost always requires some adjustment to get the lowest SWR at the proper frequency. Set the Vertical to the same frequency as the radio and use the Create modify mode to adjust the driver length for the best SWR, this will need to be done for each band. The nature of the vertical is that if there is a problem with the motor housing or conductor strip it will show up when you use the antenna on 40M. If the antenna is off frequency on 20M after going to 40M and doing the setup mode calibrate or the home commands fix the problem on 20M the motor housing needs service.

The connection wire to your radial system should be kept to 12" or less. The length of the wire adds directly to the length of the antenna. This is not a problem to tune out by adjusting the element length but it also affects the feed point impedance. It is like using an offset feed point and if you allow the length of the radial connection lead to get too long you will not be able to get a good match.

## Element is not Moving:

If the element is not moving you will have very high SWR at all frequencies. However, it may have stopped at some length and you might have good SWR only at one particular frequency. Next go into the "Create, Modify" mode and vary the element length and monitor the SWR while you do it (100 watts or less is okay) and watch for dramatic changes (.5 SWR change, minimum). When you adjust the driven element you should be able to get an SWR of 5:1 or greater.

If adjusting the element does not affect the SWR the cause is one of the following:

- Bad or intermittent cable, check it again.
- Damaged driver board in the controller
- Mechanical problem with the element

Be aware that lightning or shorting the cable can partially disable a driver chip and it will still limp along moving the tape but you will see inconsistent SWR when changing from band to band.

Mechanical problems can range from an obstruction in the element, usually in the tip, such as packing material or in rare cases fiberglass bumps or imperfections. We check this by running a gage in the tip but once in a great while that doesn't catch it.