

ScorpionAntennas.com

*Scorpion*

Dipole  
Installation  
Manual



# Thank you for selecting *Scorpion* as your antenna!



Ron Douglass, NI7J  
<http://www.scorpionantennas.com>  
[info@scorpionantennas.com](mailto:info@scorpionantennas.com)  
623-326-8780

The SA-680 *Scorpion* dipole is supplied with two 58-inch whips allowing efficient operation for the 10–80-meter bands. In addition, two 50-foot sections of four conductor antenna control cable, two hand operated antenna control boxes, four #31 ferrite split type beads to stop common mode, two cigarette lighter plugs with a built in fuse holder and a 1-amp fuse installed in each. In addition, we offer an auto tune dipole controller on our site.

The antenna body is constructed of .065-inch wall and 304 stainless steel which provides high strength and durability for a long trouble-free life. The finger stock and coil support housing are CNC machined and hand polished 6061-T6 aluminum.

We use Delrin® for the base insulator, the motor support, the ball bearing support, and for the upper coil cap which supports the whip. We install a Delrin coil end cap on our antennas which allows the coil to be more efficient and maintain a very high Q or quality rating!

Our finger stock is a special-order tin-plated beryllium copper that maintains 37 pounds of combined pressure on the coil continually.

We use a Pittman, industrial-grade motor with steel gears in its gearbox and a seven-segment commentator motor. Capacitors are installed on the motor leads so tuning the antenna by ear is static-free.

We use a 3/8th by 16-inch stainless polished threaded rod to move the coil in and out of the stainless housing when rotated by the motor. The threaded rods are lubricated with Teflon grease which will withstand a minus 40 to a plus 475 degrees Fahrenheit.

For our coil forms, we use a 1/4-inch wall industrial-grade 3-inch diameter phenolic tube. Our resin formula is specially manufactured to our specs assuring superior strength and long life.

The SA-680 coil provides a coil Q of 410 and is wound with #10-gauge tinned wire at 6 threads per inch.

Our 1/8-inch wall Polycarbonate coil protector is the thickest in the industry and uses the same material as bulletproof windows on armored trucks..

Our antennas come equipped with an antenna positioning reed switch, which supplies two pulses per revolution of the Pittman Industrial grade motor resulting in far better antenna positioning.

## *Unpacking and Installing the Scorpion Dipole*

Please read these instruction sheets completely before opening the shipping tubes!

Your Scorpion antenna was carefully packaged to prevent damage during shipping.  
Failure to follow the directions could damage your antenna.  
Resulting damage is not covered under warranty.

- 1). Remove the packing tape from both ends and the middle of the shipping tube.
- 2). There are eleven Phillips head wood screws safely holding the antenna in the shipping tube. Six at the bottom of the tube, two in the middle of the tube and three at the top of the tube. All Phillips head wood screws are located under the packing tape that you just removed. Please remove all screws.
- 3). Using two of the removed screws, partly thread them into the center of the end caps. Once the wood screw is installed in the end caps use a claw hammer to remove the endcaps.
- 5). Remove the end caps carefully!
- 6). *AT THIS POINT DO NOT TRY TO REMOVE THE WHIP, IT WILL NOT SLIDE OUT!  
THE WHIP IS VERY WELL TAPED TO THE ANTENNA BODY!*
- 7). Remove all contents at the top end of the tube. This includes antenna controller, shunt coil, control cable, and any accessories. You will be able to see the top section of the whip.
- 8). At the bottom of the tube, you will see a  $\frac{3}{4}$  inch piece of threaded rod, washer, lock washer, and nut.
- 9). Place the shipping tube in the upright position. Note the word TOP printed at the top of the tube.
- 10). The antenna will be stuck in the shipping tube from the indents created by the wood screws being screwed into the two wood supports that hold the antenna safely inside the shipping tube. Slightly bump the tube on the floor, this should release the antenna from the tube.
- 11). Lay the tube on the floor, pull the antenna out of the bottom end or the end with the threaded rod. The washer and nut will be visible.
- 12). The whip can now be removed from the body of the antenna.

## *Antenna tuning and its pulse counting system*

Each antenna contains a normally open reed switch that is triggered by two magnets per revolution...that's two pulses every 360-degrees. The threaded rod that is connected to the coil has a thread pitch of sixteen threads per inch. One 360-degree revolution of the motor equates to two magnet pulses for the reed switch that equals 1/16 of an inch of coil travel. One pulse, or 180 degrees, is equal to 1/32 of an inch of coil travel.

The Dipole antennas will always have an offset of counts between the two antennas. Every antenna has a small degree of difference in the coil, or how many turns of coil are contacting the finger stock.

Example: 3.8 MHz...antenna 1 has 300 counts whereas antenna 2 has about 303 or less counts. Each Dipole system will show a small difference in offset number of counts depending on ground conditions, height of antennas and the location of installation in a building or an open field. With these types of variables, changes will be seen on any type of an antenna system, this is normal.

### *Tuning the antennas*

Let's start with the 20-meter band. With both antenna displays at zero and the radio set to a given frequency you will need to put the radio in low power and switch to the *AM or RTTY* mode. Key the microphone or press the send button on the radio then press both of the antennas' out buttons and monitor the SWR on the radio or remote meter until you see the SWR dip, or the lowest SWR that can be obtained by adjusting the antennas in and out.

After you have the lowest SWR then adjust Ant 1 counter down a few counts and then adjust Ant 2 in and out while monitoring the SWR meter, if the SWR has increased then adjust Ant 1 up a few counts higher and readjust Ant 2 for a lower SWR.

The lowest SWR should be when the antennas are about 2-3 counts apart close to the 20-meter band; your count might be a little higher or lower depending on install location.

An additional way of tuning is as follows, with both antennas fully retracted and the displays' reset to zero on both antennas, increase the count on Ant 2 to 5 counts. Now press both up-jog buttons at the same time while monitoring the SWR meter. Once you have a flat spot on 20 meters and you want to change bands (let's say go to 40 meters) make sure you press the up-jog buttons at the same time, this will get you closer to a lower SWR than if starting from zero! From this point, it's just a matter of fine tuning the antennas.

After spending a little time adjusting and getting a feel for the antennas you will see it is possible to have a flat SWR on any band. Record your count data or press one of the 10 memory buttons on the SDC-102 for each band for future reference. *NOTE:* If you disconnect the power to the antenna controller you might lose your count data. Reapply power, bring the antennas to their fully collapsed position, the SDC-102 controller will reset the display to zero, then extend the antennas back to your original count, it's that easy!

If you are having issues with tuning, don't get discouraged, in many cases it's simply something overlooked. Please give us a call.

Thank you for purchasing our product!

Ron Douglass NI7J

623.326.8780