The K9LA 160m/80m Antenna

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When my wife Vicky AE9YL and our two sons moved back North (from the Dallas/Ft Worth area) in late 1988 with a job change, one of the requisites of the house was for it to be tower and antenna friendly. We eventually found a very nice home on a couple acres in a rural environment.

The first antenna project before winter hit (boy, were we spoiled by winters in Texas) was to temporarily put up several sections of Rohn 25 with my 4-element 10m monobander on top to take advantage of the peak of Cycle 22. The second antenna project the following spring was to put up the permanent tower with a small Yagi for 20m, 15m and 10m.

Now with fall and winter approaching again in late 1989, I decided to do something about my desire to earn 160m DXCC (in Texas our property barely supported my 80m DXCC). Our property here in Ft Wayne, IN had a nice tall 80-foot tree on the east side, so I started thinking of ways to use it for 160m.

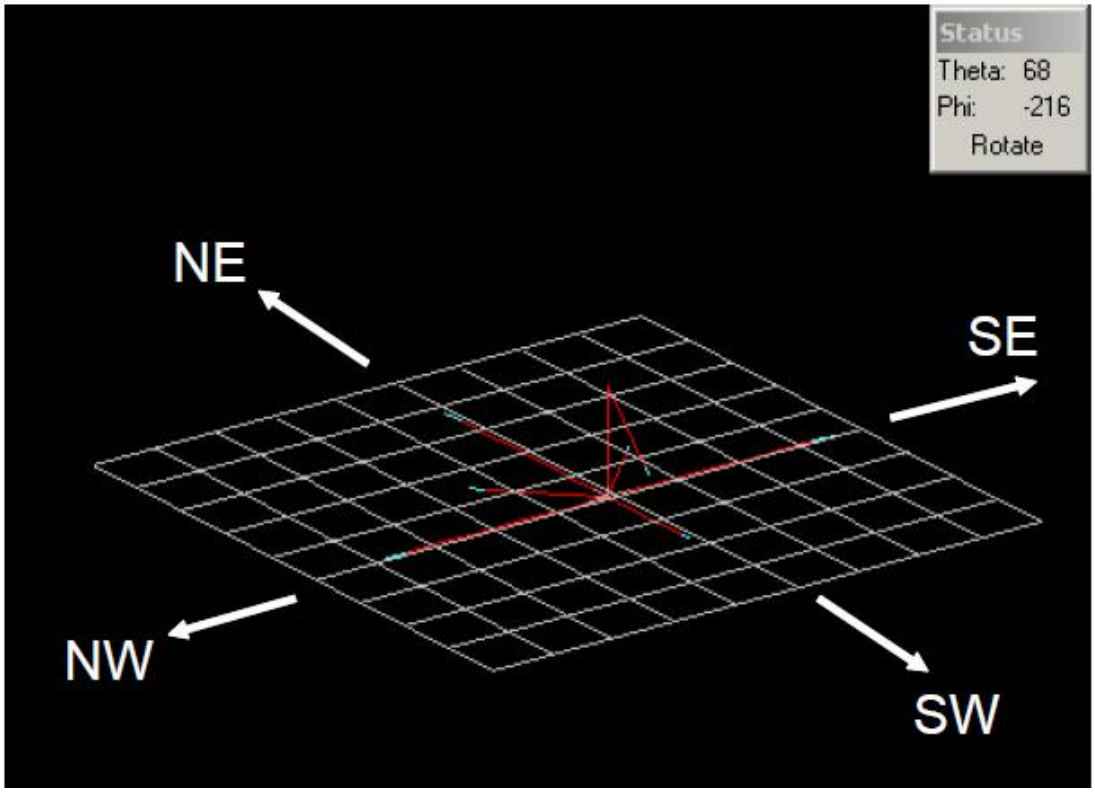
One of the guys at work (Ed WB9RMA) was a tree climber. He had the belt, harness and spikes for doing tree work. So one Saturday he came over and walked up the tree to the 60-foot level. On one of the big limbs that branched outward at that level he screwed in an eyebolt and pulley. Thus I had an easy way to raise a 160m antenna.

I pounded a 10-foot piece of plastic pipe in the ground so that it stuck up to about 7 feet. Next I ran a wire from there up to the pulley (using the rope through the pulley to pull it up). I installed a small loading coil made from B&W Miniductor at the bottom so that the wire resonated around 3550 KHz. I could then use an alligator clip to short out turns for operation around 3750 KHz.

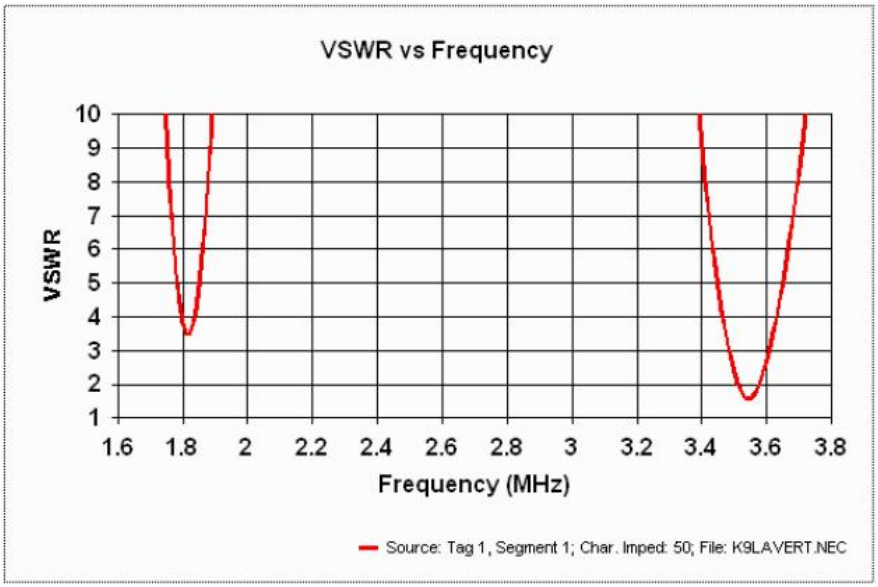
I also put a homebrew 80m trap at the top of the vertical wire using a piece of Miniductor and doorknob (high voltage) capacitors. A wire ran from the top of the trap back towards the house to resonate the system on 1830 KHz. Thus I had a duo-band antenna.

For radials, I decided to go with elevated radials – that's why I had driven the plastic pipe into the ground. I used three 120-foot radials for 160m and three 60-foot radials for 80m. They were about 7 feet off the ground so the deer wouldn't run into them. They were anchored to trees at the 7-foot level using screw-in TV twinlead standoffs.

The following image shows the layout of this antenna. The three 160m radials run northeast, northwest and southeast. The three 80m radials run east, north and southwest. They run in those directions because of support issues with existing trees. The slanted wire that runs from the top of the 80m trap back to the house angled down at an angle again based on support issues.



As mentioned earlier, tuning the 80m portion was easy using a small Miniductor to resonate it to 3550 KHz. The 160m portion was tuned to 1830 KHz by varying the length of the slanted wire. The modeled SWR at the antenna was as follows, and actual SWR measurements were extremely close to the modeled values.



The impedance on 160m was around 15 ohms. After about 200 feet of RG-8 coax, the SWR was around 2.5:1 – my Commander HF-1250 amplifier had no problem loading

into that SWR without arcing. The impedance on 80m and 75m was close to 50 ohms after the 200-foot run of coax.

Modeling showed essentially an omni-directional pattern in azimuth, and a maximum around 20 degrees in elevation. The gain was about 0 dBi, which is as expected over average ground.

This antenna worked very well in the transmit mode, and allowed me to earn 160m DXCC. I used this antenna a lot in the receive mode, too. Being in a quiet rural noise environment certainly helped, but I now have a low-noise receiving system.

For those with a desire to model this antenna system, here's my model.

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CM K9LA 80m/160m antenna
CM vertical on 80m, inverted-L on 160m
CM base coil Q=100, trap coil Q=100
CM three 60ft elevated radials, three 120ft elevated radials
CM #12 wire
GW 1,10, 0,0,8, 0,0,60, .0042          52ft vertical radiator
GW 2,10, 0,0,8, 0,120,8, .0042         120ft elevated radial
GW 3,10, 0,0,8, 0,-120,8, .0042        120ft elevated radial
GW 4,10, 0,0,8, 120,0,8, .0042         120ft elevated radial
GW 5,10, 0,0,8, 43,43,8, .0042         60ft elevated radial
GW 6,10, 0,0,8, 43,-43,8, .0042        60ft elevated radial
GW 7,10, 0,0,8, -60,0,8, .0042         60ft elevated radial
GW 8,10, 0,0,60, -31.0,0,27.5, .0042   slant wire back to house for 160m resonance
GS 1 0 0
GE 1 -1 0
GN 2 0 0 0 13 .005
EX 0 1 1 0 1 0
LD 0 1 1 1 1.5 13.8E-6 1               base loading coil for 80m resonance
LD 1 1 10 10 30E3 26.8E-6 75E-12       80m trap (26.8uH/75pF) at top of vertical radiator
FR 0 220 0 0 1.6 .01
RP 0 1 361 1000 65 0 1 1
RP 0 181 1 1000 -90 0 1 1
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