THE K5USS 6 METER HENTENNA PROJECT!

Build a 6 Meter 3.5 dBd gain Hentenna directional antenna

By Charlie Taylor, K5USS

What do you call a directional antenna that is a full wave loop on 6 meters, is horizontally polarized but is mounted vertical, has a 50 ohm impedance, and works great for 6 meter SSB?
You call it the Hentenna.

The Hentenna antenna was designed in Japan back in the 1970's, and many JA stations are still utilizing them today! The Hentenna gains its name from the fact that it is "strange", or HEN in Japanese. By looking at the antenna one would think that it would be vertically polarized, but it is in fact horizontally polarized which is what you want for 6-meter DX openings. This antenna will give you 3dB gain over a dipole (dBd), is directional, has a low angle of take off, very little wind resistance, and is easy to build!

This antenna can assist you in getting onto the magic band for just a little out of pocket expense. I constructed, raised, and tuned this antenna in about 3 hours out of material that I had in the junk box, with the exception of the steel rods.

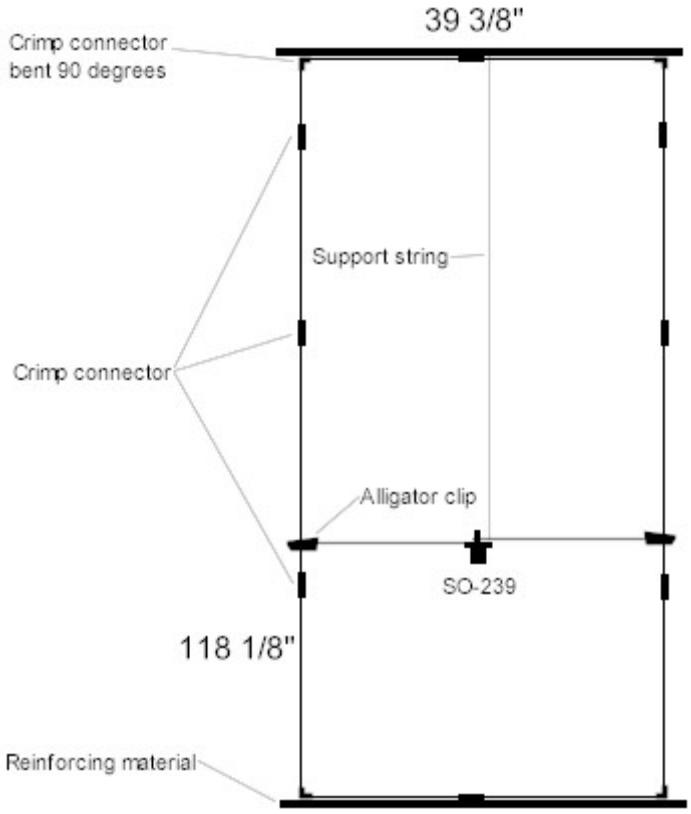
I live in an area where antennas that can be seen are not permitted. That does not mean that one cannot get on the air, you just have to be stealthy about it. This is an antenna that your neighbors will not see quickly if you play it right. I raised the antenna out back and then got into my truck to drive around to the back of the house (zero lot line) to look things over. Unless you are looking for it you will probably not see it. After cruising the alley, acting like the neighborhood CC&R spies, I began adjusting the Standing Wave Ratio (SWR) on the antenna. Getting a 1.3:1 SWR on 50.125MHz took only 5 minutes, and that includes the time it took to walk from the antenna to the shack and back a couple of times to get it where I wanted it. I have good SWR from 50.000MHz all the way up to 51.000MHz (<1.7:1).

The materials I used to build this antenna are:

10 – 36" copper clad steel rods with a 3/32" diameter (Northern Tools $4.99 for 14 rods)
8 – crimp on connectors without insulation (for 16-14 gauge wire)
4 – crimp on connectors without insulation bent 90 degrees
2 – alligator clips approximately 1.5" long
1 – SO-239 chassis mount connector
2 – reinforcing rods or tubes >39" each that are non-conductive
A handful of tie wraps (UV resistant if to be used outside)
Non-conductive string to help support

I chose to make this out of the solid rod to prevent twisting in windy environments. The rod can be substituted with any electrically conductive material.

Sides – 118 1/8" (3-36" rods and 1-10" rod the connectors will make up the extra 1/8")
Bottom and top – 39 3/8" (either use 2 of equal length or one full length and the other cut to size)



Start by taking the rods and soldering them together with the crimp on connectors in between each section. This provides more strength at your solder joint and allows you to be able to replace one of the rods if it becomes damaged at a later date. I found that a small handheld torch was more efficient for soldering these than a 250-watt gun. Be careful of the open flame! Solder one complete side at a time. All of the pieces at this time should be straight. Next take 4 of the crimp on connectors and place them, one at a time, into a vise and bend them at a 90-degree angle in order to have the corner pieces. Now it is time to solder the whole outside loop together. This will be more easily accomplished on a flat surface. If you try to do this in a vise make certain that all of your corner pieces are going to match up and everything will be straight. Don't ask how I know this.

At this time you should have a rectangle that is 118 1/8" tall by 39 3/8" wide. If you are off by a ¼" or so it will not hurt anything too terribly at this frequency, and you will be able to adjust for it in a few minutes with the SWR adjustment. Next, take a 36" rod and solder an alligator clip to each end. Make sure the clips are both oriented the same direction. The end result will be around 39" long and needs to be cut exactly in half. At each end where you made the cut place a 90 degree bend in the rod that is ¼" long. Bend the rod do not use crimp on connectors for this. These bends will be used to solder to the SO-239.

Take the SO-239 and place it into a vise, being careful not to damage the threads. Tin the end of both of the rods, tin the center pin of the SO-239, and tin one hole at a corner of the SO-239. Solder the rods to the connector. The rods should be straight out from each other and have an overall length of around 39 1/8".

Decide what is the top and what is the bottom of your antenna and install your reinforcing

rods. Do this with the tie wraps. From the bottom of the antenna measure up 24" on each side. This is close to 1/10th of a wave up from the bottom and will assist you in obtaining 50-ohm impedance. Place an alligator clip on each of the marks. Now take the weather resistant string and gently tie it off at the top of your antenna and at the SO-239. The knot at the top can be tight, but it is recommended that you leave it loose, or use a slip knot, at the connector since you will need to adjust the height of the connector.

Now, find a suitable mast and support for your new antenna. I used a 20 foot painters pole and a radio shack roof mount tripod for mine. The painter's pole is made from fiberglass and aluminum and fits nicely into the tripod. The top mount needs to be insulated from the mast if you will be using electrically conductive material for it. The bottom of my antenna is 8 feet above ground level, which makes the top almost 18 feet up.

Attach your coax, raise the mast and antenna, make certain it is not going to fall, and go check your SWR.
Be sure to perform the SWR checks on low power, or use an antenna analyzer.
If your SWR is high on 50.125 you will need to raise the connector and connector ends up from the bottom. I moved it 3" at a time and it only took 3 tries to get it pretty much flat. You want to make sure that the connector setup is parallel with the bottom of the antenna. Re-tie it and check the SWR again.

Once the SWR is good and you have the antenna in a permanent location you will want to solder the clips to the sides of the antenna to ensure that nothing changes. Big birds landing on the connector wire can really mess things up, again, don't ask how I know this.

Now it is time to hook up to your rig and get on the air! For a test of my new antenna I tuned into 50.070 MHz to see if I could hear the beacon that the North Texas Microwave Society has running in EM13. This beacon is 34 miles from my house putting out ½ a watt.
I was able to copy the beacon perfectly with the Hentenna and could not hear it at all with the loop in the attic. Not entirely convinced that the antenna made that big a difference I called Miles, W5RMH, for an on air performance test of the antenna. He called out to me on 50.135 MHz off of his vertical antenna and I showed about an S9 on the meter. He then switched to his 4-element beam and his signal went up to 20/9! Then it was my turn; I still had my power level at 10 watts and gave a 10 count over the air. Miles stated that I was about an S9 so I bumped up the power and went to 20/9. Just to be certain I then switched to the loop in the attic, at full power, 100 watts, I was less than an S7. This thing does provide some gain and directivity!

Now all I need is a good E opening!

Good luck with the MAGIC BAND and I hope to hear you calling CQ
during the next opening with your own Hentenna!

Charlie
K5USS