

From WH2T - Dr. Ace's Full Wave Loop Antenna Info

I have personally used a 160 meter band Horizontal Full Wave Loop antenna with very good success. I worked all 50 states and several countries with 100 Watts using the antenna on the 160 meter band. With a good antenna tuner the antenna will work 6 thru 160 meters. I currently use a 75 Meter Full Wave Delta Loop on the 6 thru 75 Meter bands with a tuner. I am very pleased with it!

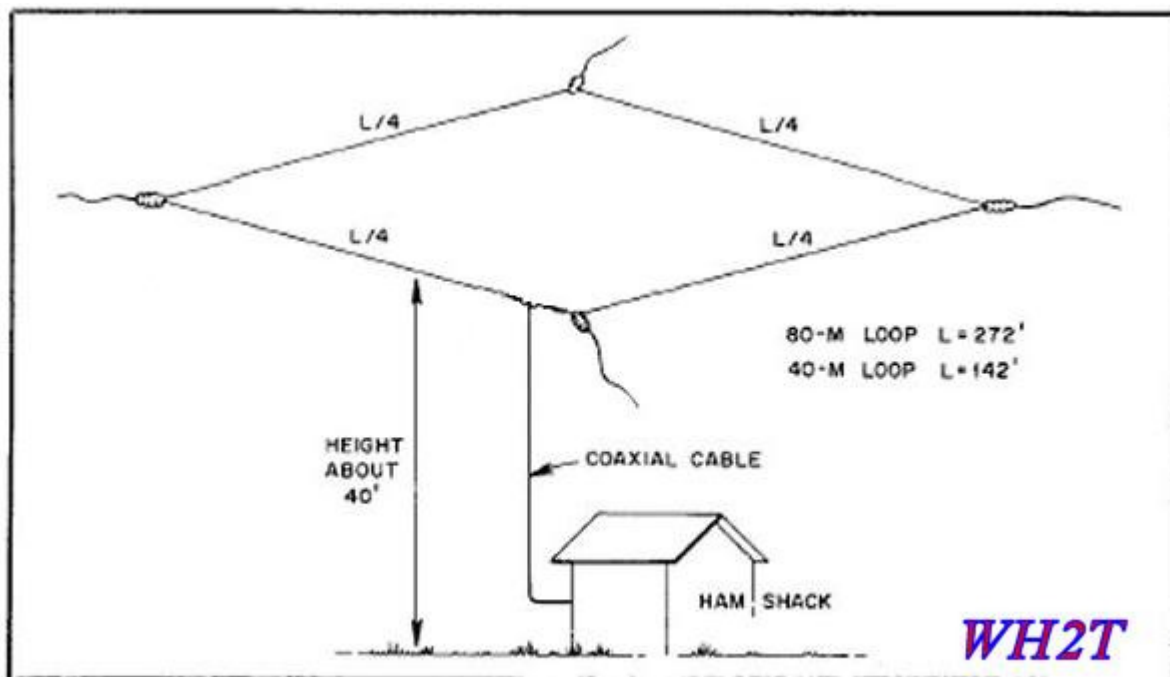
These Omnidirectional antennas offer Horizontal polarization, and about 2.1 dbd of gain. They are much quieter than a dipole or a vertical, have a broader bandwidth and will usually out perform a dipole antenna.

Feed 1 wavelength of wire with a piece of either 50 or 75 ohm coax. I am using 75 ohm because I had some.

To determine the approximate length in feet of a Full Wave Loop antenna use the formula $1005/\text{Freq in Mhz} = \text{length in feet}$. For 160 meters a full wave loop antenna resonant at 1.9 Mhz would be about 529 feet long.

For the 75 meter band a full wave loop antenna resonant at 3.85 would be about 261 feet long. A full wave for 3.9 Mhz = 257 Feet 8 inches.

These length antennas may require some pruning or trimming of the wire to obtain a low VSWR. But if you measure carefully you should get very close.



The Loop is erected horizontal to the earth.

Do not connect the antenna wire to the tower on this antenna.

This type of antenna doesn't depend on an efficient ground system for efficient performance. The impedance of a Full Wave Loop antenna is theoretically in the vicinity of 100 ohms.

Connect one end of the wire to the coax center and Connect the coax shield to the other end of the wire. Be sure and seal the end of the coax against water. Form the wire in a loop and run it horizontally to trees or whatever supports are handy. Be sure to insulate the wire from the supports.

Extend from the wire with ropes if necessary to reach your supports.

On the higher frequency bands a full wave loop antenna can be oriented as a vertical diamond or vertical cube. Fed at the top or bottom corner of a diamond this antenna has horizontal polarization.

Let me clearly state this Fact.

"A vertically oriented horizontally polarized one wavelength loop antenna with the bottom of the loop 1/2 wave length above ground is a FINE antenna".

Do NOT put the bottom of the vertically oriented loop more than 1/2 wave length above ground.

IMPORTANT

Any shape loop will work - octagon, pentagon, etc. The larger the area or aperture inside the loop the better, A circle has the largest area but is impractical. A circle has 1dbd gain over a square. Most people use a square but if you only have 3 supports you can shape it like a triangle. Triangle loops are called Delta loops. A square loop has 1dbd gain over an equal lateral triangle loop. If you use a triangle shape try to make each leg an equal length as this gives the largest inside aperture or area.

NOTE #1

Don't use a Balun on this Antenna! On a horizontally oriented loop you can feed a corner, center of a side or anywhere it is unimportant.

NOTE #2

If you know you will be using a Loop, Dipole, Zepp, etc. on Multiple Bands and you want the most efficient performance of the antenna system you will always get less feedline loss if you use Open wire 450 - 600 Ohm window/ladder line.

If you feed the Full wave Loop antenna direct with a single piece of coax you can only adjust add/prune the antenna till the VSWR gets down to about 1.7:1 at resonance , so you will probably want to use a tuner if you want to cover an entire HF band . And Yes the tuner in the radio will work fine as long as you are not using a linear amplifier. The impedance of a Full Wave Loop antenna is theoretically in the vicinity of 100 ohms. That is why I use a 75 ohm "Q section" to provide a perfect match to the 50 ohm coax. My Loop antenna is flat 1:1 VSWR around 3.875 Mhz and rises to about 2:1 SWR at 3.75 and 4 Mhz . So I cover the entire 75 meter phone band without using a tuner.

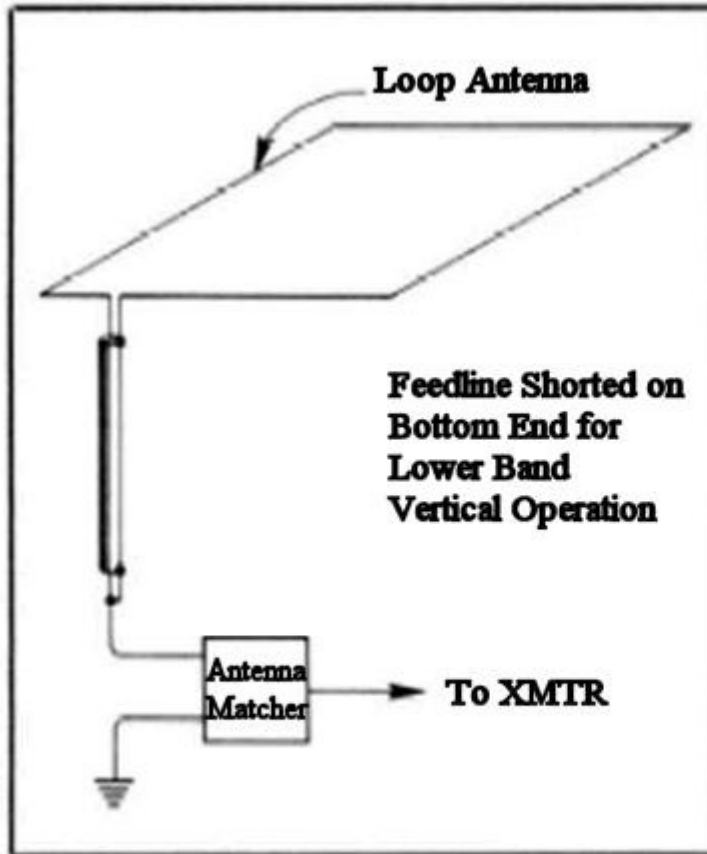
Here is How I Do It.

Connect the shield of a "Short Piece" of 75 ohm coax to one end of the loop antenna , Connect the center of the 75 ohm coax to the other end of the loop antenna. The length of the 75 ohm coax is most important. It will be used as a Q section. To determine the length to use, Use this formula "Length in feet = 246 x VF / Freq in Mhz" VF = the Velocity Factor of the coax. So multiply 246 by the Velocity Factor of the coax, then divide by the frequency .

If you use RG59 or RG11 with a Velocity Factor of 0.66 , For the 75 meter band the Piece of 75 ohm coax should be about 42 feet long , It doesn't need to be exact . RG59 and RG11 coax usually have a Velocity Factor of 0.66, Foam dielectric coax such as RG6 might have a Velocity Factor of 0.81 or more.

Put a PL259 coax connector on the unused end of the 75 ohm coax, Screw a PL258 double female coax connector onto this PL259 coax connector. Then connect 50 ohm coax to the other side of the PL258 double female coax connector, Use any length 50 ohm coax needed to reach your Transceiver.

This Antenna system can be fed as a Top Loaded Vertical fed against ground for use on a lower frequency band than the loop is resonant on.



The feed arrangement for operating the loop as a vertical antenna.

This antenna system can be operated as a vertical antenna with top-hat loading on all bands as well. This is accomplished by simply keeping the feed-line run from the antenna to the shack as vertical as possible and clear of objects. Both feed-line conductors are then tied together (via a shorted SO-239 jack, for example), and the antenna is fed against good ground. This method allows excellent performance of the 40-meter Loop on 80 meters, and the 80-meter Loop on 160 meters. When constructing the loop, connect (solder) the coaxial feed-line ends directly to the loop wire ends. Don't do anything else. Baluns or choke coils at the feed point are not to be used. They are unnecessary. The feed arrangement for operating the loop as a vertical antenna is shown in Fig. 4.

by WH2T

Note:

Dr.Ace - WH2T is very fond of the Full Wave Horizontal Loop Antennas, Another Great HF Antenna is the Double Extended Zepp. You may also want to consider that type antenna if you have the real estate. 73 de WH2T, Ace