

# 28 and 24 MHz Limited Space 3/4 Wave Delta Loop

(With added modification for 360 degree coverage)

by KL7JR

Here is a simple and easy to build antenna in a Delta Loop configuration that should make 10 and 12 meters lots more fun if you have a limited space situation or you just like the idea of a smaller than normal sized Delta Loop. Gets lots of DX too and there is a simple modification using one boom and 2 Delta Loops for complete 360 degree coverage! John tells us how he did it....read on!

For winter portable DXing up north, I needed a compact, simple to install antenna for both 10 and 12 meters that offered directivity and was economical to build.

I decided on a  $\frac{3}{4}$  wavelength delta loop made from PVC pipe, (the backbone), and #14 gauge wire.

I reduced the size of the loop for ease of installation reasons (not because of space limitations) from previous experience of erecting antennas when the temperature was forty below!

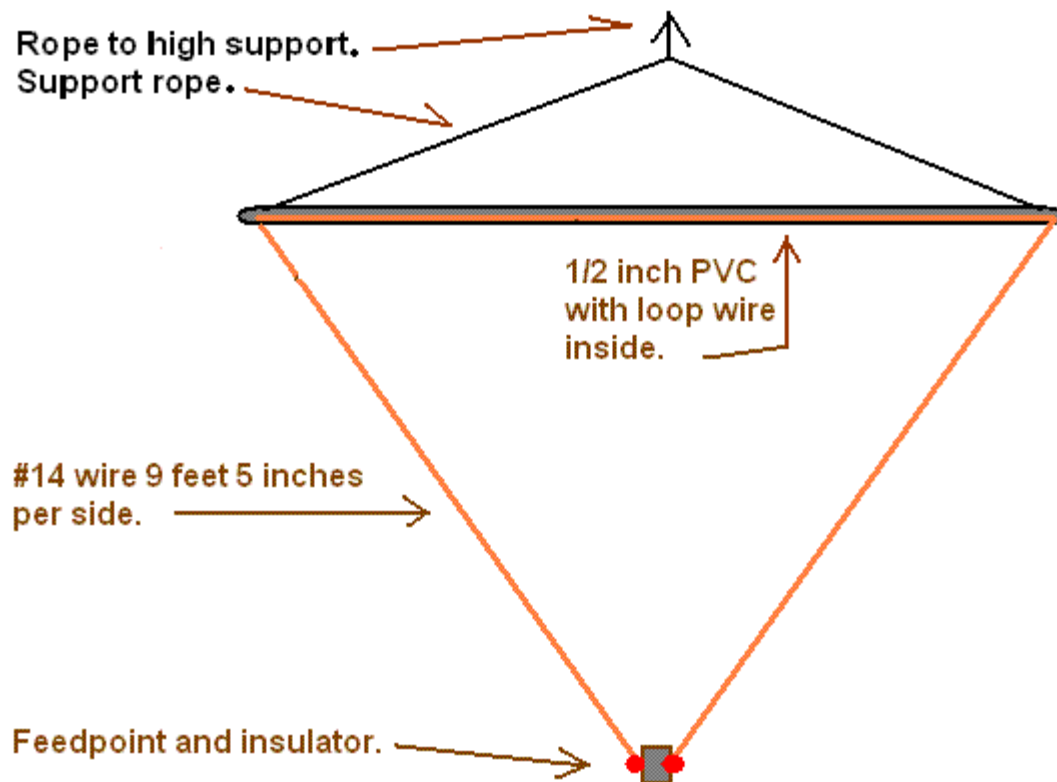
Using the standard formula for loops, 1005 divided by frequency in MHz gives us the one-wavelength design length for a particular band.

Now, what should I use for the design frequency when I want to use two different bands? Easy, just split the frequency difference like this:  
 $28.500 \text{ minus } 24.950 = 3.55 \text{ MHz divided by } 2 \text{ gives us } 1.78 \text{ MHz.}$

Add 1.78 MHz to 24.950 (or deduct 1.78 MHz from 28.500) gives us 26.73 MHz "center" design frequency.

Now take 1005 divided by 26.73 and you get 37.60 feet times .75  
(for  $\frac{3}{4}$  wavelength size) = 28.2 feet long.

Divide that number by 3 to get the length of each side of the delta loop gives us about 9 feet and 5 inches long each side.



**Note: Support ropes can also be attached to ends of PVC pipe for added stability under windy conditions. Pattern is broadside.**

A balun is not required but a good antenna tuner is for operating both bands.

You'll be amazed at the performance of this antenna especially for what it costs to build.

Get it up as high as you can and have fun on ten and twelve meters.

I worked a lot of DX from Alaska and the Yukon switching back and forth using a pair of these wire beauties (one facing north/south and the other east/west) at only 20 feet in the air! (See mod below for dual loop version)

Just remembered that I also used this antenna "indoor" for 2004 ARRL 10 Meter Contest when I was portable, ( Long Island , NY ), from a 3 story brick apartment complex.

Antenna was not in a perfect delta configuration and duct taped to a sheet rocked wall on an end apartment unit. It was easy to work a lot of DX even before and after the contest on 10 & 12M!

I'm sure I caused a lot of tvi, hi hi!

P.S. I also used this design, (cut for 10M), at my Washington state QTH hanging off my tower at about 30 ft.

It was a good performer there too!

## The "Mod" - Taking it further!

### Dual 5/8 Wave Delta Loops on a single boom for Omni Operation!

Let's take the "28 and 24 MHz Limited Space Delta Loop" design a step further.

Say you want two separate loops in opposite directions sharing the same "boom" (and don't mind going from  $\frac{3}{4}$  WL to  $\frac{5}{8}$  WL) and you only want one simple support for the antennas for 360 degree coverage.

Asking too much? I don't think so.

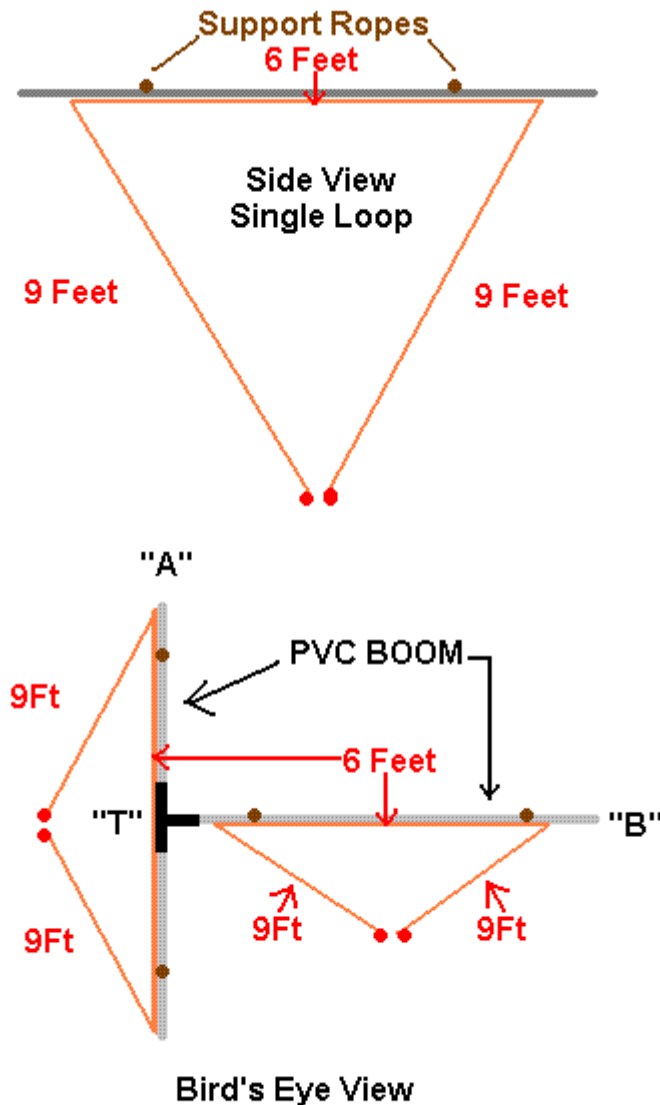
The 10 and 12 meter design frequency (ref. above design on Hamuniverse.com) is 26.73 MHz, therefore 1005 divided by 26.73 gives us 37.6 feet times .63 ( $\frac{5}{8}$  WL)= 23.69 ft.

Call it 24 feet for simplicity divided by 3 is 8 feet long each leg of one delta loop antenna.

Don't stop here, lets shorten the top legs of each delta loop (we're building two, remember?) by 25% to better fit on the shared boom (or PVC support frame).

The tops of the loops are now 6 feet long, therefore each side must be 9 feet long to maintain the total length of 24 feet. It's a bit odd looking but should work just fine according to my experience with loops.

Each loop will look something like the Side View drawing in the picture below:



N4UJW

Above Drawings not to scale.

Now, let's work on the PVC support frame. It's basically a "T" like the Bird's Eye View in the above drawing and includes rope supports from the top. Each loop is suspended from each "part" of the "T" boom facing different directions and 90 degrees from the other. Wires are hanging down towards the ground.....or can be tilted slightly from the "boom" at an angle to suit your height requirements at your location.

"Dots" on the boom in the drawing above are for rope slings to be top supported. Make the "A" PVC section 6 feet and 2" long and "B" PVC

section about 7 feet and 6 inches long, (for a little added space between the antennas).

I'd use 1 ¼" PVC Schedule 40 with one "T" fitting centered on the support.

You'll need separate feed lines for each antenna and an antenna switch plus a good tuner.

Total price of the dual antennas should be about half what you'd pay for a good CB vertical provided you have an extra feed line and antenna switch not in use.

The feeling of accomplishment of building it yourself will be priceless!

Although I haven't tried this design yet, but for those who do, you may want to offset the "T" fitting a bit more if you experience interaction between the loops. Good luck and have fun on 10 and 12 meters!

Now you will have a Delta loop for North/South or East/West coverage depending on how you install the antenna at the QTH. No matter how it is installed you should get a full 360 degree coverage!

**73, "Yukon John", KL7JR**

**John F. Reisenauer, Jr.**

#### **Editor's Note:**

**There are several ways to support or suspend this antenna whether it is a single or double loop. Aside from getting it as high as possible, you also want to prevent it from twisting or "flying" in windy conditions.**

**Just by chance that you do not have a way to support the Delta loop from the top, you could find the center balance point of the "boom" on each style of antenna in the above article and use that point on the boom for supporting on top of a PVC mast.**

**It is advisable to NOT use a metal mast "inside" the loop. It could interact with the antenna if used.**