G.C. "Mac" McFarlane VE3XI, SK
730 Kenora Ave.
Oshawa, Ontario
Canada L1J 1K6

Arachnida Warcum

Whatever you call it,
this WARC bands spider species is a triband delta loop well worth trying.

With apologies to Mr. A. King, my Latin instructor, for the title, let me point out at the outset that this will be a description of an HF antenna, not a technical treatment of why it works the way it does. But this antenna does work, and it works well.

There are three laws that apply to home-brewing a wire antenna. One, real estate. The space needed for the antenna is always smaller than the size of the antenna. Two, the cost of the antenna will be inversely proportional to the size of the builder's wallet. Third, the efficiency of the antenna is directly proportional to the size of the antenna.

With these problems facing the fledgling "Marconi," it could give pause at the start of this project.

Take heart. The following description, complete with dimensions, will suit the average wallet and will fit in the average yard. It also has a slight gain over a dipole, and it seems to be quieter than most antennas. What more could any ham want?

With propagation as good as it has been, this project should be up and running ASAP. According to the DX pundits, these conditions should be around for a while.

The antenna is a triband delta loop. The bands concerned here are the so-called WARC bands, but any number or coverage can be built to your specs. What this article will give you are the dimensions, and how I hung the loops with minimum interaction.

Basically, the antenna is three triangles mounted concentrically [**Fig. 1(b)**]. I used #18 stranded in green. This wire was chosen for strength vs. weight. Actually, I had a supply of this wire from a wise buy at a flea market. Any color or weight will do.

The wire was pre-stretched by looping each element around a tree or post and temporarily tying a square (reef) knot at the free ends around my waist. Then you really lean back against the wire. This stops the element from changing dimensions after it is hung.

The loops are hung one inside the other, with the 30m loop being hung as

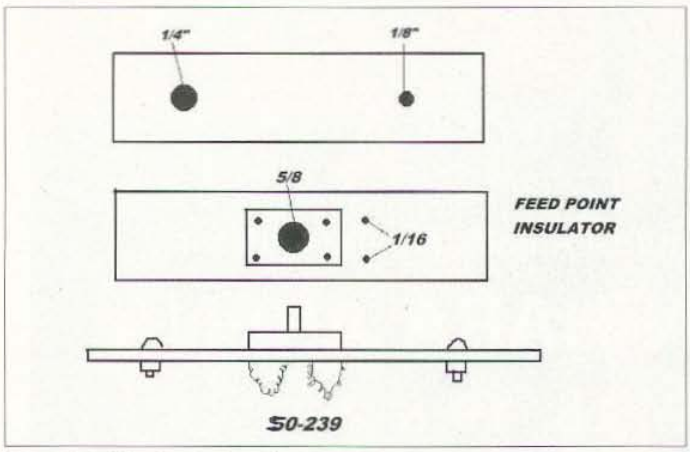

Fig. 1(a). Feedpoint insulator.

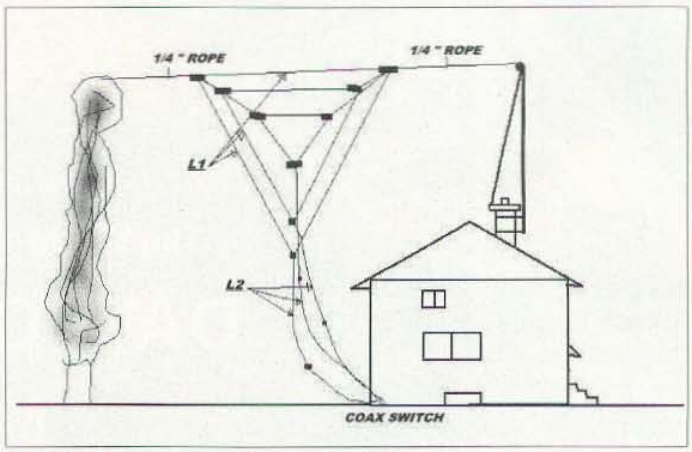

Fig 1(b). Overall hanging method.

TABLE 1

BAND	TOTAL L1	1/4-MATCHING SECTION	CENTRE FREQ.
30 MTRS	100.35 FT	16 FT.	10.125 MHz
18 MTRS	56.0 FT	8.96 FT.	18.125 MHz
12 MTRS	40.7 FT	6.5 FT.	24.925 MHz
FORMULA L1= $\frac{1016 \times VF}{FREQ\ ;\ MHz}$		FORMULA FOR MATCHING xFMR $\frac{246 \times VF}{FREQ.\ (IN\ MHz)}$	

Table 1. Element lengths.

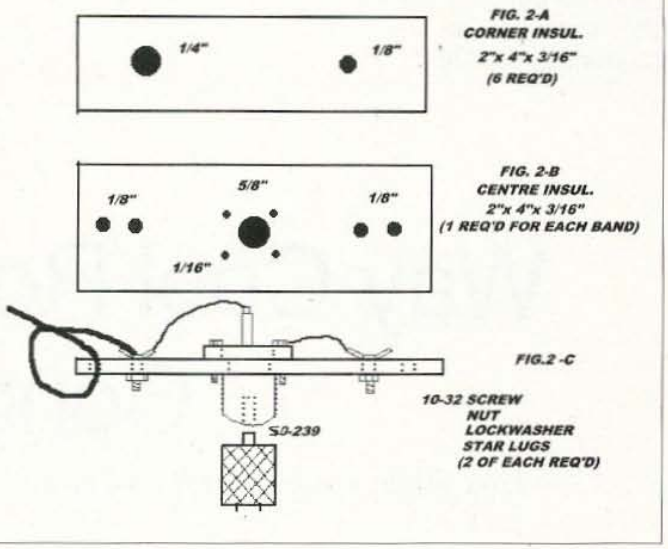

Fig. 2. (a) Corner insulator, 2" x 4" x 3/16" (6 required). (b) Center insulator, 2" x 4" x 3/16" (1 required for each band). (c) 10-32 screw, nut, lock washer, star lugs (2 of each required).

the main support. The 30m loop is supported by 3/16" marine halyard, which is weather- and UV-impervious, and has a breaking strength of over a thousand pounds. It will not stretch. I use pulleys at the end of the supports so it is easy to adjust the loops just by lowering each end. Then I do the pruning from the ground.

The coax used is RG-58U and RG-59U, to keep the weight to a minimum.

The feedpoint impedance of a delta loop is theoretically 125 ohms. I used a quarter-wave section of RG-59U as an inline impedance transformer, which makes the feedpoint approximately 100 ohms.

Now, don't panic. I said that there would be no technical stuff. So, with that out of the way, we can refer to **Table 1**. Now we assemble our coax 1/4-wave using the RG-9U. A little tip: When using UHF-type connectors, measure from the connector face, not the end of the center pin.

At this point, here is a list of hardware needed:

- 1 large roll of "Coax-Seal" or 1 roll of 3M #33 vinyl tape;
- 9 PL-259 UHF connectors;
- 6 UG-175 adapters;
- 3 UG-176 adapters;
- Enough RG-58U coax to make feedlines from the end of the 1/4-wave transformers to the first available site for a coax switch;
- Enough RG-59U to make the matching sections. Obtain some 3/16" or 1/4" scrap Plexiglas to make the required insulators. A source for this is your local auto glass repair depot. If that doesn't pan out, you can buy 5/8" to 3/4" hardwood dowels, and a pint of outdoor varnish.

In reference to the materials list, you don't have to have both the vinyl tape and sealant. They are used in weatherproofing the feedpoint connection. I have done it both ways. The sealant is easier to use, but I have used the tape method and after more than two years the join was clean and shiny. It takes a little more patience but it will do the job.

Now we're ready to start construction. Measure the element length (after pre-stretching) from **Table 1**. Now cut the coax to length. After you assemble the UHF connector, you'll be an expert at installing coax connectors.

When measuring finished coax cable you measure from the plug face to plug face, *not* the end of the center pin.

Remember, if you want to put up a good antenna (and who doesn't), follow the formulas or recut lengths exactly. I know they appear long according to a lot of antenna books, perhaps because they are close to the ground or to my two-story aluminum siding.

When hanging the loops, I made the horizontal section approximately 10% to 15% longer than the sides of the loop, to help raise the feedpoint above the ground.

The next step is to cut and drill the insulators as in **Fig. 1(a).** As illustrated, the element wire passes through the 1/8" hole, once over the end, and through the 1/8" hole again. This will stop the insulator from moving from its position.

At the feedpoint insulator, the wire goes through the hole twice and is then soldered as required.

For those who are purists, the SWR may not show unity. But with my installation, the SWR was never worse than 1.9:1 at the band edges.

If your rig's output circuit has trouble dealing with the SWR, use a tuner. Or, if you can source some 90–100 ohm coax, that would make the match right on the money. As previously stated, perfection in this project is not a requirement.

For those who are interested, the results were very satisfying. The first ten days produced 44 countries. After five weeks, I had logged 81 countries. In a little over a month, I logged more than I had in the previous year and a half.

The rig I use is a Kenwood TS-430S, which I run very lightly — about 60W–70W.

The antenna was installed with north/south orientation. The pattern should favor east-west, but I made a number of contacts off the ends. There appears to be no null or, at best (or worst), very narrow.

So, there you have it. A cheap and dirty antenna to work the world. This antenna worked almost enough stations to get my DXCC.

Continued on page 57

Arachnida Warcum

continued from page 17

Let's review its main points:

1. Very broadbanded.

2. Exceptionally quiet.

3. Low angle of radiation, even when close to ground.

4. No expensive, difficult-to-obtain parts.

5. High effectiveness-to-cost ratio.

And, you always get a great feeling when, in a ragchew, you say, "Antenna here is home-brew triband delta loop."