Low-Band Wonder

Inexpensive good gain antenna for 80–20 meters.

by Bill Clarke WA4BLC

IF shifts, notch filters, preamps, filters, and all those other sophisticated signal-enhancers of today's rigs are wonderful, but they all need a signal to shape. So, as it has been from the very beginning, it comes down to having a decent antenna system.

It's often difficult to impossible, however, to find a single antenna to adequately fit all your needs—gain, space efficiency, low-cost, directionality, etc.—especially if you like to operate on the lower HF bands. Directional beams certainly give you the gain, but at what cost? You need the space to erect it and, with the price of aluminum these days, fewer hams can afford even the hardware to "roll their own." And you still need to buy a rotator and control box to aim it where you want.

This problem leads many of us to keep several antennas, each for a specific job. After many years of experimenting, I still haven't found the elusive "be-and-do-everything" antenna. The Low-Band Wonder, however, is one of the better well-rounded antennas I've run across in a long time.

Loop Scoop

This antenna is *basic*. A loop antenna is a closed wire loop that, in free space, radiates perpendicular to its plane. This radiation pattern is bi-directional. Because of this, when you orient the loop horizontally and load it, one of the two lobes radiates upward in all directions.

Loop gain is about 2 dB over a dipole. Furthermore, since it is a closed antenna, it is less susceptible to static noise.

The accepted formula for a closed loop antenna is 1005/freqency (MHz). The results will be in feet. Radiation resistance, theoretically, will be about 100Ω at the design frequency.

Loop Construction

The horizontal loop antenna I use is about as simple as any antenna can be. It is a wire 260 feet in length, held in place at four points to form a 65' square. When you cut the wire at length, connect the center insulator to one end, and choose where you want the feedpoint to be positioned.

The shape can be altered to fit most locations (circle, pentagon, rectangle, etc), as long as it doesn't deviate too much from the basic loop shape.

Mounting height is flexible—try to keep it in the 20–40 foot range. I mounted mine at 25–35 feet, and use trees as the supports.

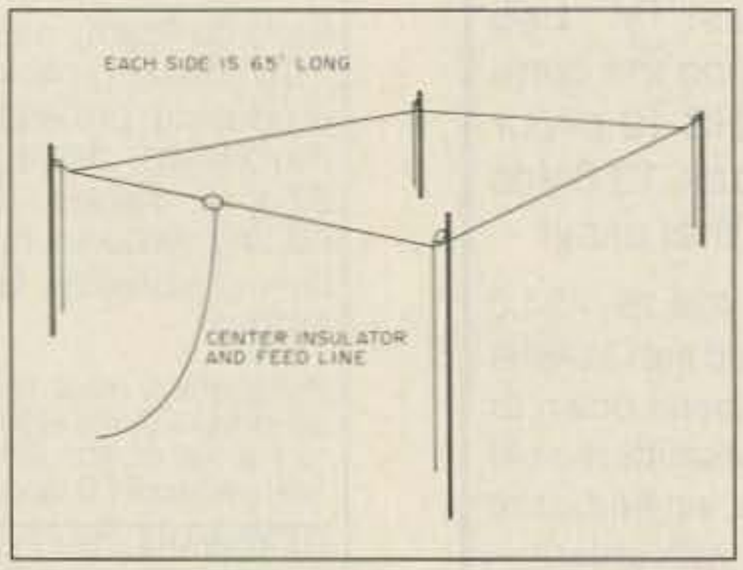

Figure 1. The erected Low-Band Wonder. Raise the loop corners to 20–40 feet.

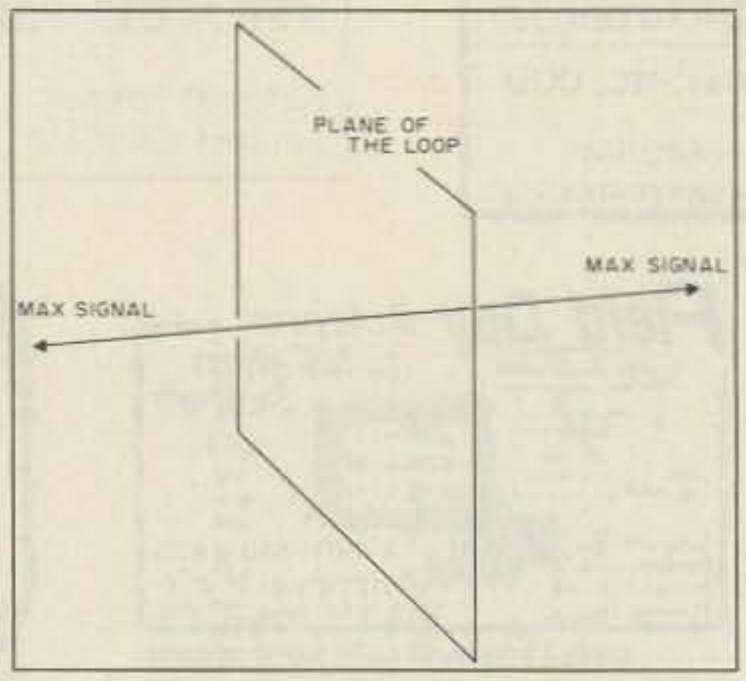

Figure 2. Maximum signal radiates bidirectionally from the loop center, perpendicular to the loop's plane.

Put your support insulators up (on push-up towers, corner of the barn, or trees), and fasten them in place with nylon "hamfest special" rope to allow for adjustment from the ground. You may want to use black rope—it has better resistance to UV light.

Lower each support insulator and feed the free end of your wire through each in order. Then, bring the wire around to the remaining side of the center insulator, and wrap and solder it.

Go to each support line and pull the insulator and loop up until it is near its final resting place. Avoid contact with branches and other antenna wires. BE CAREFUL—avoid power lines! Don't invite injury or possible death.

After you have raised the antenna, go back and make final height and tightness adjustments. Tautness requires only that the loop not be capable of excessive movement. There will be some slack between the support points, which is necessary, as the supports may move independently, causing stress on the loop.

Feedline length is not critical. I tried feeding the loop with twin-lead, open-wire feeders (4" spread), twin-coax, and plain 50Ω coax. I found the last to be the easiest to handle physically, and the most tolerant to tune. You will need a tuner to operate the loop as a tribander.

Now, just select your frequency and tune up as you normally would, adjusting the tuner for lowest SWR. Stand by for resounding signal reports!

Performance

Even though its high radiation patterns and resultant short skip doesn't make it a front-runner for DX, the loop consistently gave me excellent 20 meter signals within the US, and surprisingly good results on 75 and 40 meter DX into Europe.

I would appreciate hearing your comments and experiences with this antenna. 73

Parts List

260 feet of #12 to #18 hard-drawn or copper-weld wire.

200 feet of "hamfest special" nylon rope.

4 (or the number of proposed supports) high quality end insulators (AI-5 4 glass polymer by B&W).

1 center insulator with coax connector.

1 package of Coax-Seal.

Coax feedline in an appropriate length. Use RG-8X, except for very high power operation.

One stop mail-order shopping for the parts is available from: *Radio Works, Box 6159, Portsmouth, VA 23703, Telephone: (804) 484–0140*.