73 Review *by Bill Clarke WA4BLC*

Carolina Beam

It's easy to set up, and it works great!

Radio Works Inc.
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Tel.: (804) 484–0140; Fax (804) 483–1873
Price Class: 80-10m version $100; 40-10m version $90

Several years ago, I reviewed the Carolina Windom antenna. It was an excellent antenna for general use, and I've worked considerable DX with it and its cousin, the 160 Carolina Windom. The 160 lets me operate top band, as well as all the other bands. Of course, a tuner is required for all band operation with Windom type antennas.

In keeping with a fine tradition of well-designed wire antennas, Jim Thompson W4THU has introduced another innovative version of the Windom antenna. This new version has an updated, dedicated matching unit (balun), and bent wire elements.

Installation

The Carolina Beam is about as simple to install as any antenna I have seen to date. Just take it out of the package, clip a few cable ties, and unroll everything. It is completely built and you only have to attach the feedline, tie ropes to the insulators, and pull it into the air. My time was 20 minutes from "out of the package" to "on the air."

I do recommend that the end vertical legs be weighed down to keep them from moving in the wind. A one-pound lead weight will suffice nicely.

Coax-Seal™ is provided to weatherproof cable ends. Use it!

Performance

As standards for comparison, I used my 40/80 meter double-edged sword (a single feedline dipole with legs for 40 and 80 attached at the feedpoint) at 35 feet, and a 160 Carolina Windom (over 250 feet long) at 48 feet, in drooping configuration. Both antennas have been in place for over a year, and their performance on the bands is a known quantity.

I placed the Carolina Beam at 40 feet. Using good quality coax switches, I was able to make fast changes between the antennas.

My first observation was that the Carolina Beam hears as well as it talks. When a received signal was better on the Carolina Beam, the outgoing signal was better than that from the dipole or the Windom.

- 80 meters: As good as the dipole in all cases, and about 10 dB better than the 160 Windom for local work.
- 40 meters: Same as the dipole and same as the Windom.
- 30 meters: Same as the Windom in 90% of my contacts. Remainder slightly better.
- 20 meters: 50:50, with no clear winner. This is probably due to the distinct pattern differences between the Windom and the Carolina Beam. Having both to select from made a real difference in making DX contacts.
- 17 meters: In all cases, the Carolina Beam outperformed the Windom by 5 dB or better, except for one contact that was about 5 dB below the Windom (I really cannot say why).
- 15 meters: As with 20 meters, this band was quite variable.
- 12 meters: A distinct low-angle worker. The Carolina Beam always outperformed the Windom by at least 5 dB.
- 10 meters: Same as 12 meters.

It was interesting to note that there was little difference in signal reports from my station, compared to others using towers with directional beams (located near my QTH). The ionosphere is a great equalizer.

This antenna can be stretched out into a standard Windom configuration if you so desire. However, for the life of me I cannot understand why anyone would want to do it. By the way, Jim tells me the reverse is NOT true. Bending a standard Carolina Windom to look like a Carolina Beam will not result in Carolina Beam performance. The matching units are different.

Specifications

Length of horizontal portion: 84′*
Frequency: 80–10 meters
Radiator lengths: see diagram
Feedline: 50Ω coax
Wire: #14 stranded (7 x 22), hard-drawn
Matching method: DMU and transmatch
Power rating: 1500 watts
Minimum height: 30′*
Radials: not required

*The Carolina Beam can have the 32′ element reduced to only 16′ by changing the location of the support rope (the attachment insulator is factory installed on all Carolina Beams). This will increase the overall length to 100′, but allow a lower height. Note: I didn't try this modification during the evaluation.

How It Works

As with all Carolina Windom based antennas, the Carolina Beam is designed to create feedline radiation. This is induced by an unbalanced condition caused by the dedicated tuning unit. The feedline radiation is terminated by the line isolator to control the radiation pattern and to keep unwanted RF out of the shack. Thus, the coax feedline becomes a vertical radiator.

The horizontal portion of the antenna connects the three vertical radiators together and acts similar to a ground plane with inverted vertical elements.

Unlike trap antennas, the Carolina Beam radiates from all elements over the length of the entire structure on all bands. Because both vertical and horizontal elements are present, there is a good mixture of high and low angle radiation.

The Carolina Beam does require the use of an antenna tuner. However, most solid-state rigs require a tuner anyway to keep the SWR from shutting them down.

Pattern Plots

The radiation pattern plots accompanying this article were made

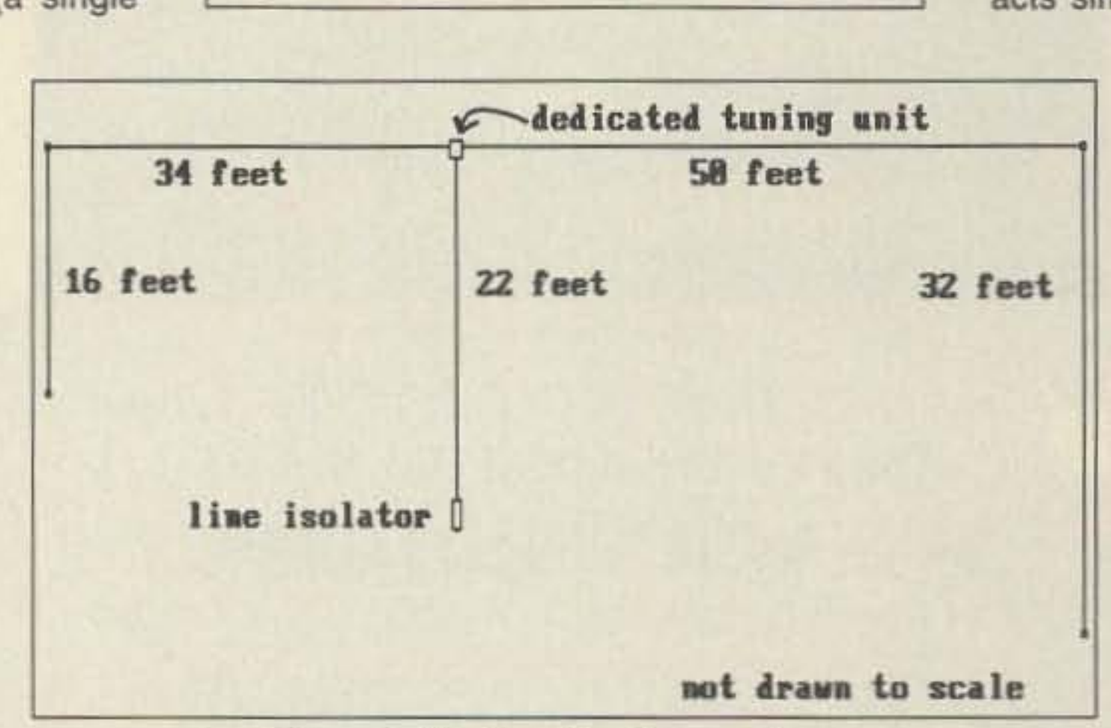

Figure 1. The Carolina Beam antenna.

using the Carolina Beam installed at a 50-feet height over average ground. I used the ELNEC program for computer analysis, output to a Canon laser printer.

Azimuth plots are shown for the angle of elevation which gives the maximum signal (the angle is indicated at the lower right corner). Plots for the WARC bands are not included, as they nearly duplicate other nearby bands. The 75 meter azimuth plot was perfectly omnidirectional, and therefore is not included.

My Comments

I am impressed by the Carolina Beam. It is a small antenna that is able to stand up to much larger systems. The entire package is precut and ready to go in the air. It comes with a dedicated tuning unit, RF line isolator, insulators installed at all points, and a pre-made primary vertical radiator (coax).

While not really a beam in the sense that most hams envision, and not giving the directional performance that you expect from a 3-element tribander at 70 feet, the Carolina Beam is a very workable antenna. It does not cost near what a tower, beam, and rotor would.

The Carolina Beam will fit into a space just over 80 feet in length, and give full 80 meter dipole performance. This is something for the small-lot ham to think about.

The Carolina Beam is about as close to one antenna do-all as you will ever get. For those with very limited space, Radio Works produces a cut-down version of the Carolina Beam, which requires only 42 feet of horizontal space and covers all bands from 40 through 10 meters.

As well as a good choice for a home station antenna, I personally think the Carolina Beam and other Windom-type antennas, are excellent for Field Day exercises. They are certainly more convenient than towers and beams! 73

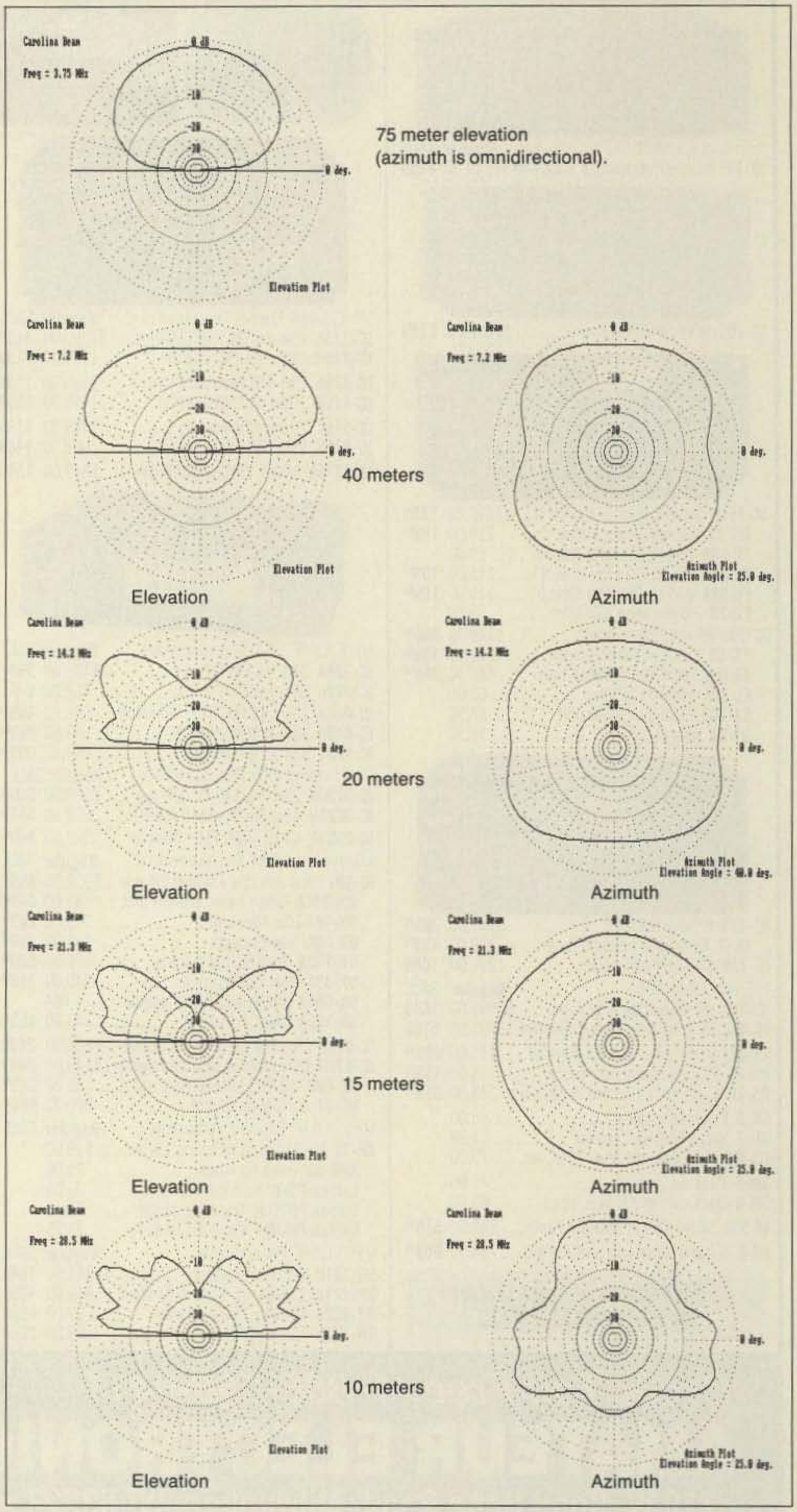

Figure 2. Elevation and Azimuth plots for the Carolina Beam.