

The New Carolina Windom
By Len Carlson, K4IWL
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(Updated with new information 01-07-09)

"The copyright for the term 'Carolina Windom', as relates to the designs of Jim Wilkie (WY4R), Edgar Lambert (WA4LVB), and Joe Wright (W4UEB), is owned by Jim Thompson, (W4THU). All commercial use of the term the term 'Carolina Windom' and commercial distribution of 'Carolina Windom' antennas is reserved."

As with all ham stations QRO or QRP, ten percent of a station's success in quality QSOs is the equipment and the operator. Ninety percent is the antenna. This is especially true in QRP since with very low power, by comparison to the Power Mongers, we need to get more ERP per watt out into the ether to be heard.

So when I got back into QRP a few years ago I found the fascinating world of antennas and RF radiators to be an exciting challenge and a means to find the **perfect** antenna which I call the....

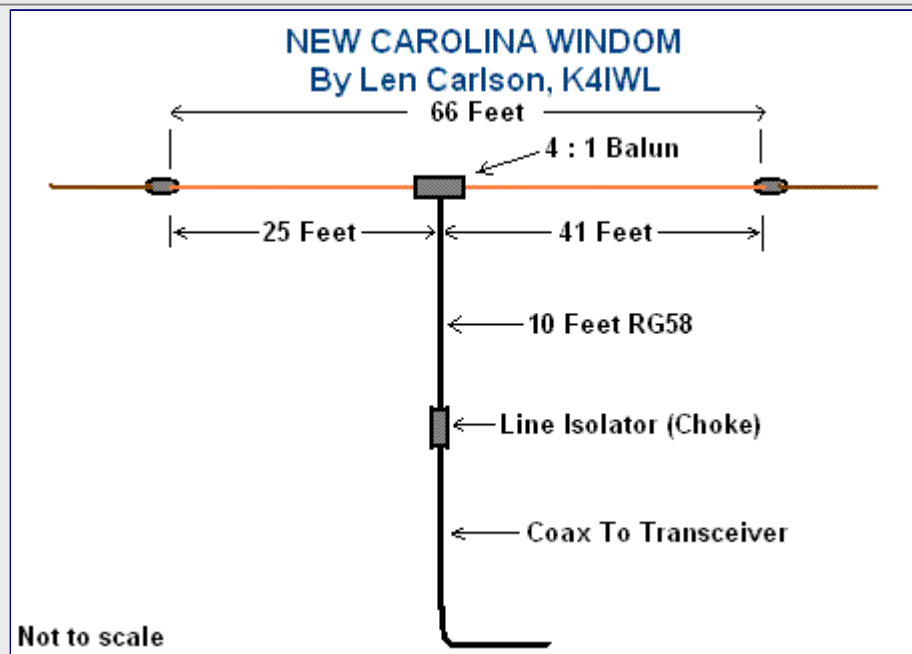
New [Carolina Windom](#)..

I don't have room for an 80-meter dipole or long wire so I have to restrict the length to 100 feet or less. Besides my primary interests are working only CW on 40, 30, 20, and 15 meters.

Based upon these parameters, I have found what I consider to be the **perfect antenna**. The antenna I will show you how to build in this article evolved from a concept that had its beginning back in 1929 when Loren G. Windom described his invention in the September issue of QST, 1929, pages 19-22. Just do a search on [Google](#) for more on the "Windom".

A few years ago, three hams, *Jim Wilkie (WY4R)*, *Edgar Lambert (WA4LVB)*, and *Joe Wright (W4UEB)*, came up with an idea for an off-center fed dipole that carried Windom's single feed line antenna to the next level. It has since become known as the Carolina Windom. I will call this the Traditional Carolina Windom since it was the first attempt at creating this specific type of multi-band antenna based loosely on Windom's original concept. The differences between the New Carolina Windom antenna and Windom's original is that the Original Windom is not a dipole.

Enter the New Carolina Windom



NEW Carolina Windom shown cut for 40, 20, 15 and 10 meters.
It will operate on 80, 30, and 17 meters but will require a tuner for these bands.

This more recent, New Carolina Windom, version has some very interesting characteristics as seen in the drawing above.

For one, the 4:1 Balun has been moved to the antenna radiator and is built into the center insulator. The other interesting feature is that the 10 feet of coax from the Balun is terminated in a choke or line isolator. I have fitted the 10 foot stub with PL-259 UHF connectors on each end. This allows the coax vertical radiator to be easily removed if desired. **It is designed to hang vertically which is one reason why this antenna is so effective. The radiation pattern when using the vertical radiator combines both horizontal and vertical radiation components and lowers the effective angle of radiation getting more of your signal near the horizon.**

This antenna is in use the world over by DX'ers and DX'peditions. In one Navassa DX'pedition, of the 33,000 QSOs made, more than 27,000 were accomplished with this antenna. The DX'pedition team also had a beam and verticals, but the *New Carolina Windom* was the antenna they used. Its reputation for excellent performance is so good that it served as one of the antennas in setting two 40 meter "mile-per-watt" world records of nearly 4,000,000 miles-per watt.

The antenna can be used without the vertical radiator but the radiation pattern will lose the low angle component and may make the antenna less effective. If the vertical radiator is removed then you should move the line isolator to the bottom of the balun.

NOTE: This antenna should not need a tuner on the 40, 20, 15, and 10 meter bands although you may use one if you feel the need to. It will operate on 80, 30,

and 17 meters but will require a tuner for these bands.

Here is the math for designing the New Carolina Windom cut for your lowest band operation:

Holding true to the original Windom formulas, we use a ratio of 37.8% for one side and a ratio of 62.2% for the longest side after determining the half wave length at the lowest operating frequency....

EXAMPLES:

Using 7.1mhz as lowest frequency of operation we use:

$468 / 7.1\text{mhz} = 65.9$ feet (round to 66 feet) for total half wave length.

Short side length = $.378$ (37.8%) $\times 66 = 24.9$ feet = 25 feet rounded

Long side length = $.622$ (62.2%) $\times 66 = 41.05$ feet = 41 feet rounded

So we have the short length of 25 feet, and long side of 41 feet using the formula.

Vertical length for RG58 from balun to choke = 4 to 1 ratio (meter band / 4)
 $40 \text{ meters} / 4 = 10 \text{ feet}$

Using 3.9mhz (80/75 Meters)

$468 / 3.9\text{mhz} = 120$ feet for total half wave length.

Short side length = $.378$ (37.8%) $\times 120 = 45.36$ feet

Longest side length = $.622$ (62.2%) $\times 120 = 74.64$ feet

Vertical length 4 to 1 ratio = $80 / 4 = 20$ feet

Editors note: The New Windom can be designed for 160, 80/75, or any fundamental frequency you desire as the lowest band of operation and it should perform better on that fundamental frequency and still resonates on the harmonically related bands without a tuner. Just keep the original ratios (37.8% and 62.2%) the same by using the formula.

You will have to adjust the balun to choke length of RG58 in the same ratio by doubling the length from 10 feet at 40 meters to 20 feet at 80 meters and 40 feet at 160 meters. The ratio is meters / 4 = length of vertical feeder.

If you are a perfectionist, then you may want to trim ends for best SWR.

According to all who have build the New Windom using these formulas, they work great! Get is up as high as possible and have fun!

For the complete article and plans for a homebrew balun and choke, check out Len's [full article here](#) at the Dallas ARC web site! Or....commercial units can be used!

Latest Updates courtesy of 2E0JCA via email from Len, K4IWL 01-09 (Refer to [full article here](#))

"On the balanced side of the 4:1 balun, I.e., the aerial side, it makes no difference which side is connected.

A note about the choke [between the balun and the feedline]: The choke [line-

isolator] is simply a straight piece of coax with ferrite cores strung on it. Just use the same coax that you are using for the field line from the Xceiver to the choke. I have made a mod to the choke also. Instead of bending it back inside of the CPVC tube, make it a straight piece of coax about 0.3 meter. The length is not critical but should be no shorter than about 12 inches. Use as many ferrite tubes that will fit in-line on that length.

By the way, not sure if you have the latest updates to the article. I am enclosing what I have been sending to all who have requested interest and/or are building the antenna from "scratch".

The antenna is designed for QRP. About 25-watts or less on CW. The antenna itself can handle 1KW or more power but the balun cannot. Hence the following corrections.

Notes on balun updates: (01-09)

If you are building the 4:1 balun per the article here is a correction:

The core should be a T106-2 (red) core [for QRP]. The wire should be the larger AWG 20 enameled copper wire (not AWG 26 like in the article). The minus-2 (red) is the MIX. This IRON CORE TOROID value MUST BE USED for the Balun to work and be broadbanded for 4MHz-29MHz. Wind 26 bifilar turns. This should work to about 25-30 WATTS. For higher power to about 150W use a T250-2 (red) core and the larger diameter AWG 16 enameled copper wire. Should be around 30 bifilar turns."

Questions? Email Len at k4iwl@arrl.net