

New Carolina Windom OCFD – Building and Tuning

AD6AE

Based on the revised design of K4IWL

[New Carolina Windom by K4IWL - Len Carson - Carolina Windom Project - New Version!](#)

[QRP Expressions \[new format\].pub](#)

Tuning an OCFD is not well documented and is NOT adjusted the same way as a symmetrical dipole where equal parts are removed from each half. The OCFD is asymmetrical and must maintain the correct ratio of asymmetry. The simple technique presented herein will apply to all similar designs and result in a properly tuned OCFD. This discussion is specific to the “New Carolina Windom” designed by K4IWL. His design is unique because a portion of the feedline intentionally radiates to fill in radiation pattern voids giving it a somewhat combined performance of both a vertical and horizontal antenna. It’s only 66 feet long with the *long leg 41 feet*, and the *short leg 25 feet* for a 62.2% / 37.8% split (**Fig. 1**).

Antenna Construction and Tuning Details

The resonant length of a 7.1 MHz antenna is 66’ or 792”. To be safe, cut from 69 feet of wire with each leg longer than necessary to allow for nature and adjustments. For improved accuracy, everything is in inches.

1. If using a center support mast, the top 10’ must be nonmetallic. For proper operation, the top 10’ of the coax is part of the antenna and radiates. Read posts above for full details but make a Guanella current balun as shown here. If as an inverted V, add paracord to extend the short length to that of the long leg.
2. Cut the **long leg**: 43 feet and the **short leg**: 26 feet. Measure then mark a 7.1 MHz reference line as directed for each leg, then add reference “tic-marks.”
3. **Long Leg**: From the balun end, mark the 7.1 MHz reference line at **492”**. From that line, make 12 ‘tic-marks’ spaced every **1-1/4”** out toward the end. That adds an extra 14-3/4” for adjustments. Keep all the unmarked excess for now. Solder a ring terminal to the balun end.
4. **Short Leg**: Mark the 7.1 MHz reference line at **299”**. From that line, make 12 ‘tic-marks’ spaced every **3/4”** out toward the end. That adds an extra 9” for adjustments. Keep the unmarked excess for now. Solder a ring terminal to the balun end.
5. **Tuning**: *Be sure and write everything down as you go.* Decide on type of installation: Flat dipole or inverted V? For now, as you shorten the legs, keep 12” of surplus wire neatly wrapped on or through the insulators (**Fig. 5**). Trim when finished.
6. Move each insulator to tic-mark 6. Raise antenna and measure VSWR. Decide which direction you need to go, then move each insulator by an equal number of tic-marks on each leg and measure again. Repeat until a VSWR of <1.4 occurs at 7.1 MHz. It needs not be perfect.
7. At this time, check the other three bands at their harmonic multiples: 14.2, 21.3, and 28.4 MHz. Changes that affect the fundamental of 7.1 MHz also affect the harmonics. That’s it! Now work it.

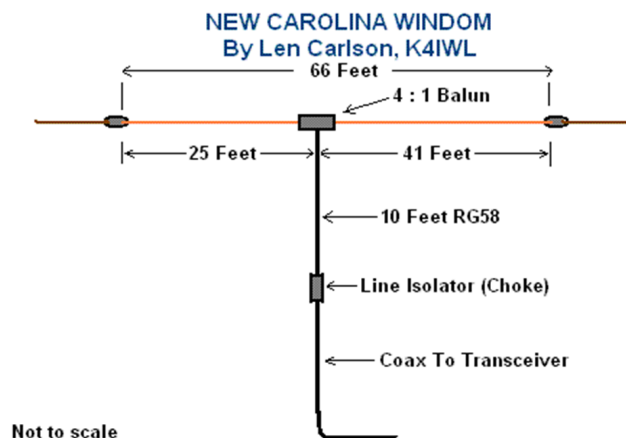


Fig. 1

- I installed this antenna as a flatter inverted V prototype, using a non-metallic (PVC) mast about 20 feet long at the apex. The ends are also elevated about 7 feet.
- VSWRs were measured using a nanoVNA H-4 at the pigtail about 16' below the line choke: 7.1 MHz: 1.4 <> 14 MHz: 1.0 <> 21 MHz: 2.2 <> 24 MHz: 2.6 <> 28 MHz: 1.5.
- I'll be fine tuning this after some use but I am extremely pleased with this new, low noise antenna.
- After two months of testing, it operates on all bands 40 and up if using a tuner for the WARC bands.

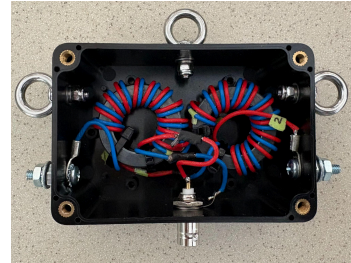
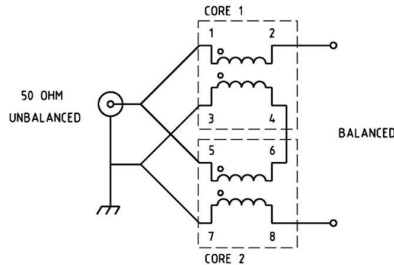


Fig. 2
4:1 Guanella Schematic

Fig. 3
4:1 Guanella in Enclosure



Fig. 4
CM Line Choke



Fig. 5
Insulator



Fig. 6
Insulator (Amazon)

4:1 Balun and Common Mode Line Choke Details

Figs. 2 & 4 Guanella 4:1 schematic and build. 4:1 balun constructed using two FT140-43 Ferrite Cores, 12 bifilar turns of PTFE insulated, #18 gauge, silver plated, stranded copper wire on each one.

Fig. 5 The CM choke was wound inline by threading 14 turns of a preassembled length of RG-316 through an FT140-77 ferrite core located 10 feet below the balun connector.

References:

1. [Center-Fed Half-Wave Dipole \(3-30 MHz \) - K7MEM](#)
2. [NewCarolina Windom by K4IWL - Len Carson](#)

NOTES: The below calculations apply to any OCFD. Simply maintain the ratio.

- Calculating the 0.25% 'Tic Marks': *Long leg:* $0.0025 \times 492'' = 1.25''$. *Short leg:* $0.0025 \times 299'' = 0.75''$.
- Long Leg: From the balun end, mark the 7.1 MHz reference line at 492"
(*Calculation:* $468/7.1 = 65.92' \times 12 = 791'' \times 0.622 = 492''$)
- Short Leg: Mark the 7.1 MHz reference line at 299"
(*Calculation:* $468/7.1 = 65.92' \times 12 = 791'' \times 0.378 = 299''$)
- Each tic-mark pair is 2". 2" is approximately 18 kHz of adjustment. MHz/inch is: $7.1/791 \approx 9$ kHz per inch. However, each tic-mark pair is 2" or ≈ 18 kHz of adjustment for each "tic-mark pair."

"I have not failed. I've just found 10,000 ways that won't work." ~ Thomas Edison