www.WindomAntenna.com

Home of the **original WINDOM** Our Favorite Multi-Band Antenna
The number "1" HAM station, field-day, and contesting, wire type antenna in the world today.
The Windom is an antenna that enables operation, 80 through 2 meters, without an antenna tuner.

By G. E. "**Buck**" Rogers Sr; (60+ years as K4ABT)

VHF was fun, but most of our enjoyment was on HF; September 1949, I was exhausted from climbing poles and trees to move, remove, add, or change my single-band HF antenna's.

The trick of it all, was to remember and change the plug-in "tank-coil" to match the antenna band. My ole 807 rig was a home-brew, that I had built on an old Atwater-Kent radio chassis. I had wound the tank-coils on phenolic, plug-in coil forms (No, it was NOT a pi-section, tank-circuit, it was a real, sure enough, link coupled output, no less).

I won't forget the day and all the jumping up and down by some SWLs who were listening on another band. I had my 80 meter (3735 kc, now called kHz) crystal plugged into my homebrew rig, with the antenna connected and away I went to make some serious early morning CW contacts on 80 meters.

CAVEATE: The night before, I had been operating 40 meters. This morning, I wanted to make some 80 meter contacts.... BUT, and However, I forgot to change the "plug-in" tank coil from the 40 meter plug-in, to the 80 meter coil.

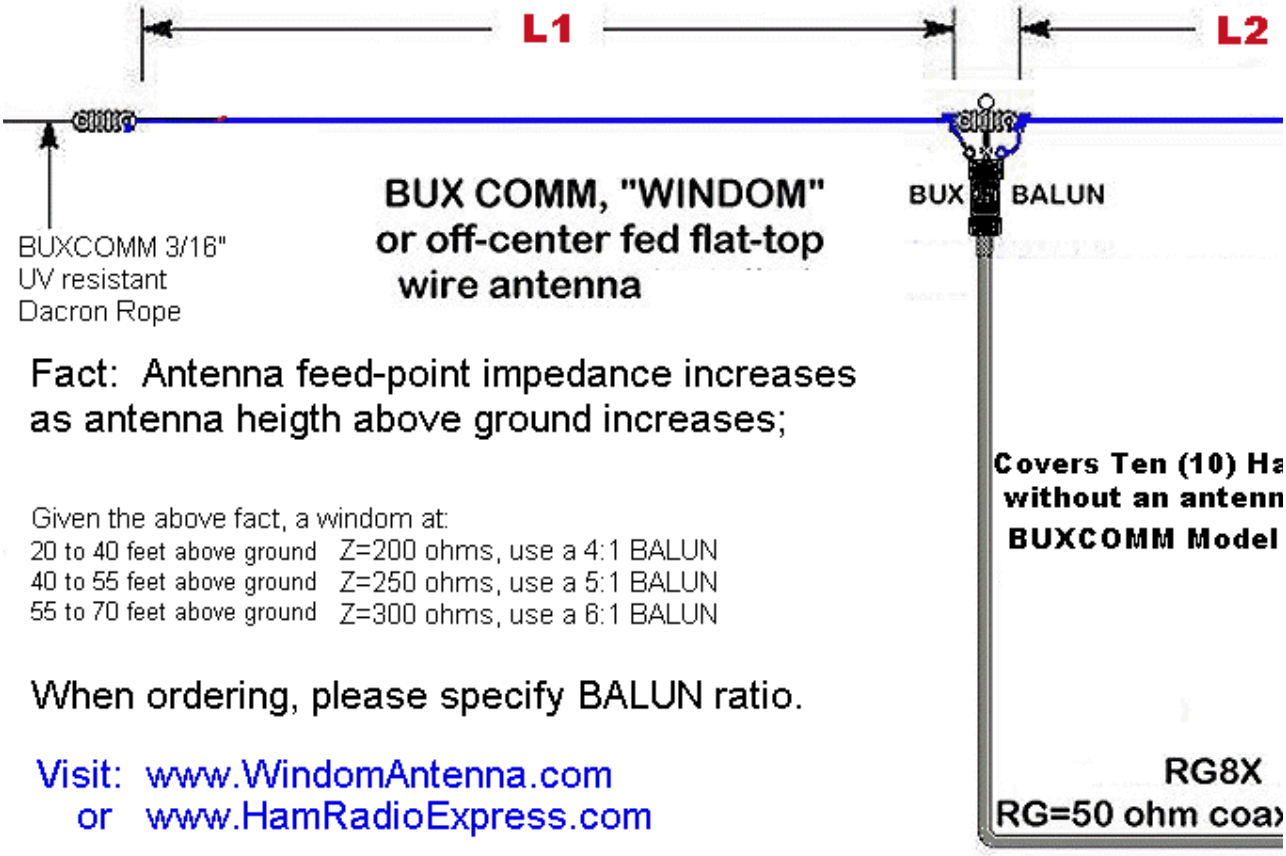
By forgetting to change the 40 meter plug-in coil to the 80 meter coil, I had doubled in the final.... and the 3735 rock, had put my RF signal output on 7470 kHz.

YES! you bet I got a letter... matter-of-fact, I received a "Show-Cause" notice from the FCC monitoring station at Powder Springs, Georgia, and furthermore, I received a letter from an OO in Delaware. Never again, did I forget to switch the plug-in tank coil when I changed bands... moreover, I made sure the crystal I was using was for the band I was operating on. To help me remember, I made an entry into my log book of each band change, and a check-mark to indicate that I had indeed changed the tank-coil to correspond with the crystal frequency.

Antenna tuners were few and far between. This being the case, it's a good thing the more up-to-date transmitter's used Pi-Section output tuning. Yes, I wrote, "transmitter's;" Transceivers were unheard of in those days..... In those younger years of my HAM radio hobby, I had used single band dipoles and doublets for almost every

HF Amateur band. I had tried long-wires, doublets, dipoles, and Zepps, but again, operation was restricted to single band operation, maybe two bands at most.

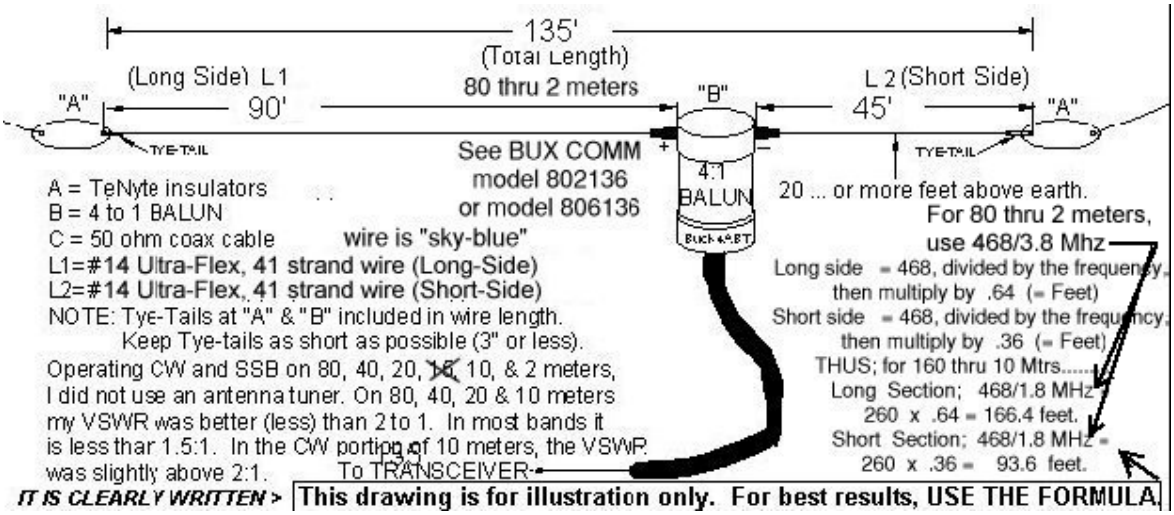
Enter; THE WINDOM: Call it what you like, OCF, OCFD, or the name for which it is named... its namesake is Windom. The Windom was, is, and will be the number one antenna in the world for many years to come. The Windom was first designed in 1923. It was fed by a single wire (coaxial cable was not around in those days), The designer William Litell Everitt (his photo is shown elsewhere on this page), brought it to the world in 1923, and later wrote a brief about it in 1926.



A detailed article by Loren G Windom, W8GZ written in the September, 1929 issue of QST Magazine. The Windom gained it fame then and many times through the following years. I had heard of the "Windom" and read a few articles about the Windom, but most of my thoughts were ... ho-hum.. just another off center fed (OCF) dipole fed a bit off-center.

Then one fall evening in 1949, at a meeting of the GARC in the old "Sea Scouts" club house near the Coosa River in Gadsden, Alabama; I listened as some of my "Elmer's" discussed the Windom all-band HF antenna. It was when Jack Kennamer, (W4YPC) (SK), mentioned using one (Windom) antenna on all HF bands.... without an antenna tuner...! my ears went directional !

That last phrase caught my undivided attention. "all HF bands, ..etc" What ! A multi-band HF antenna? Surely I had been blessed.



To think that I could hang a Windom, and no longer have to climb the poles and trees to hang another (single band) HF antenna was great news to me. To be able to use it without an antenna tuner was icing-on-the-cake. For a kid without extra funds, an antenna tuner was a luxury that I could not afford. Even my transmitter was a single 807 rig I homebrewed on an old Atwater-Kent radio chassis, my grand-father had given me.

In those days (1945-1949), a BALUN was unheard of. My Elmer's described, a means of connecting the coax to the off-center fed antenna using a lossy, nine (9) turn coil of the coax feed-line at the feed point. This coil of feedline coax formed a "de-coupling" loop. The de-coupling loop provided a crude means of matching the feed coax to the antenna, and at the same time, it would reduce the "re-radiation" (RF currents) along the outside (shield) of the feeder coax. Later I began to study something called a "BALUN."

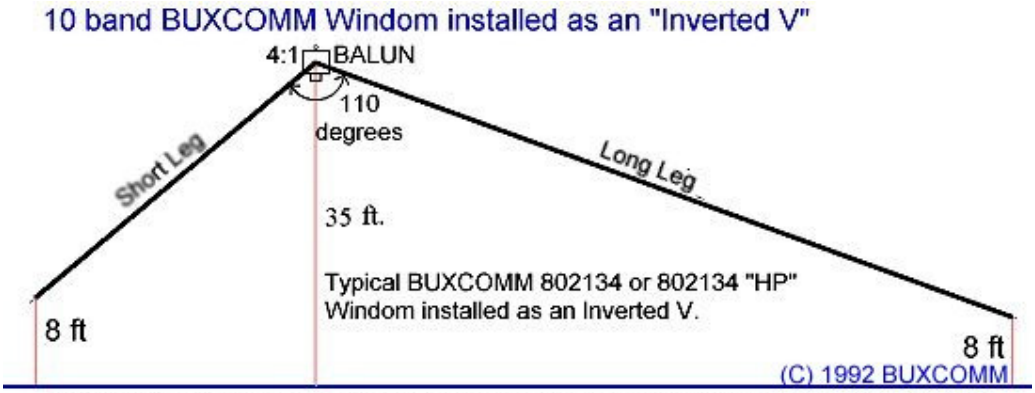
In 1958 I read more papers by Gillette Guanella which referenced a "current" type BALUN. then I came across Thomas O'Meara's papers, "Analysis and Synthesis with the 'Complete' Equivalent Circuit for the Wide-Band Transformer." This is when I made some changes to the design of the Windom antenna. In 1970, I met Lew McCoy W1ICP (SK). We talked about the Windom antenna and how we were building them. Lew had some ideas that we felt had merit enough to give them a try… walla, almost like magic, Lew's current type BALUN design gave us the bandwidth that we needed to make the WINDOM into an eight (8) band plus antenna (even adding some VHF bands).

Installation Information

The ideal height for the Windom is 30 to 40 feet. At this elevation, an angle of approximately 110 to 120 degrees at the feed-point, makes the BUXCOMM Windom ideal for use as an "Inverted V."

For use as an inverted V, erect the BUXCOMM Windom antenna at 35 feet above ground, with each leg tapering to approximately 8 to 10 feet above ground. Support the ends out of reach of human or animals.

With the ends having a fall from the apex of 60 degrees from horizontal the ***distance between ends*** (or real-estate required), is approximately ***118 feet.*** As a safety precaution, be sure the ends are at least 8 feet or more above ground.



Windom total length is 134 ft, when installed as an Inverted V, distance required is 118 ft.

Where possible, route the coax cable to the shack by running it away from the antenna at a 90 degree angle. Length of the coax is not critical, but remember, shorter is always better.

If the question ever prods your brain...; "Which end of the Windom should I elevate highest?"... Here is where common sense comes into play. **ALWAYS**, *and in never question the common-sense answer;* **ALWAYS whenever possible, *the longest end.***

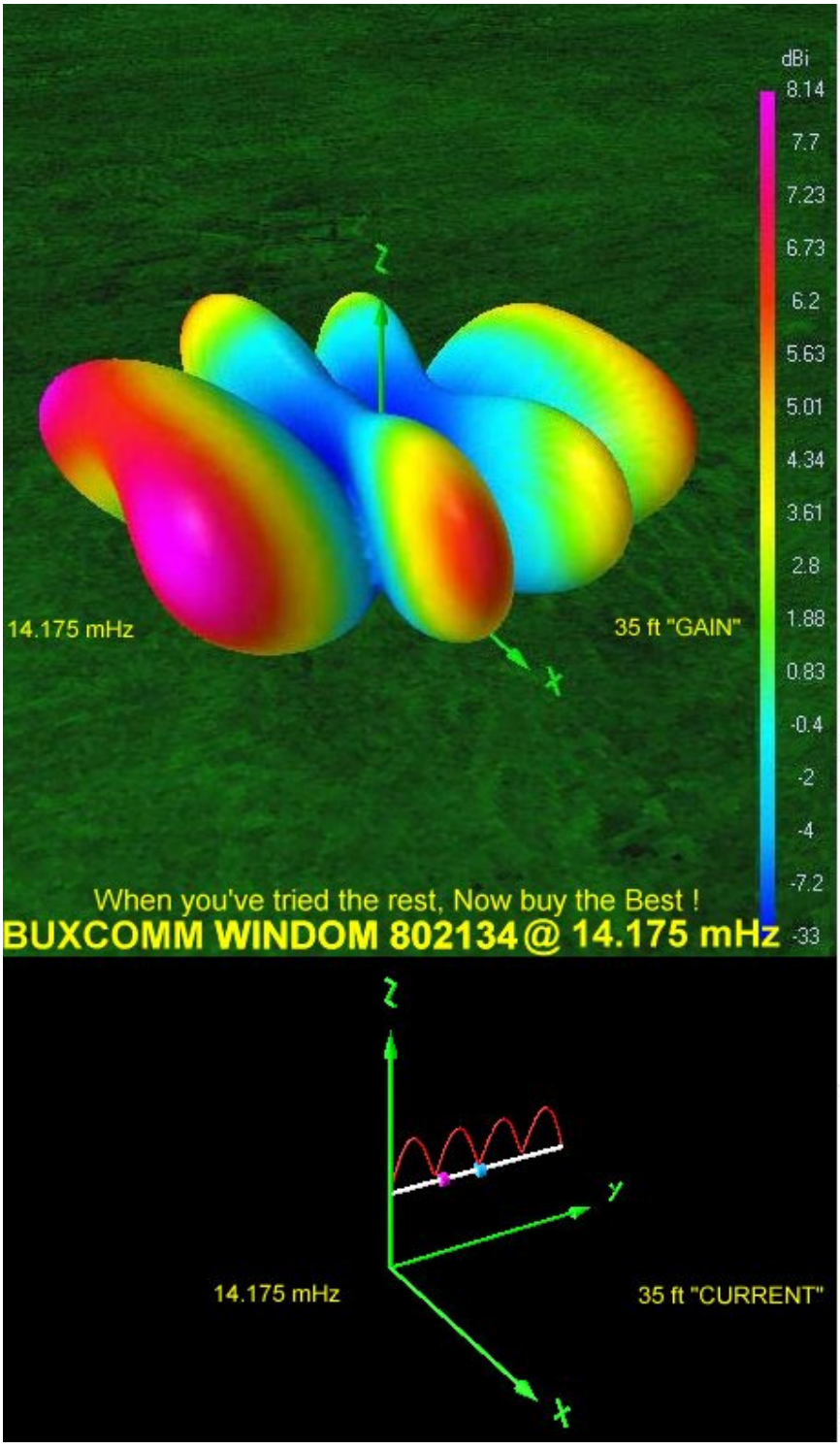
Here's why..... In the late forties, I raised my first Windom, and in doing so, I had our old farm-barn on one end at about 15 ft, and on the other, I had to use a 30 ft Martin Gourd (Home for Martin's (birds that chased bigger birds away).. kept the hawks away from our hen-house)), it was the highest point, so I opt'd to use it to attach the short element of my Windom. This allowed the feed-point to be nearest my ham shack.

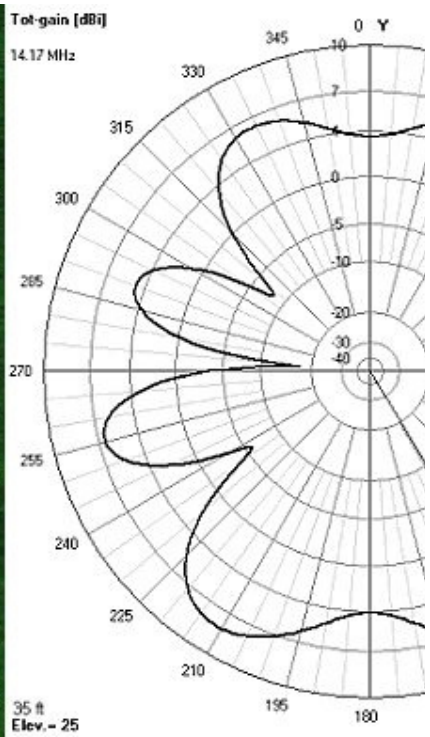
WRONG, not the best decision....

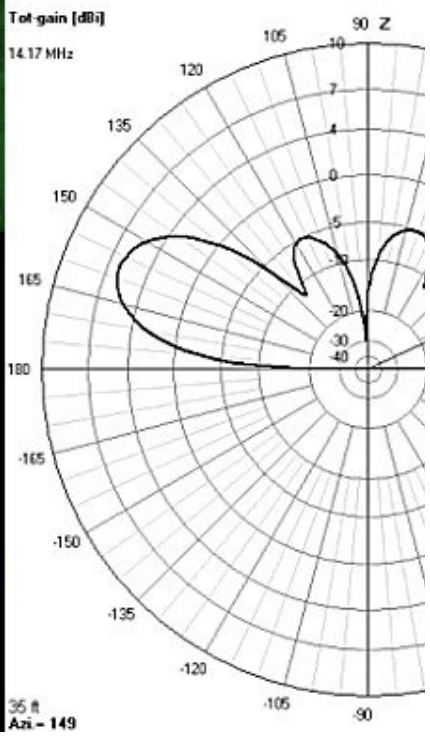
Having learned a valuable lesson, since then, I have always used the center conductor of the coax or the positive (HOT (+)) post of my 5:1 BALUNs to feed the longest element of my Windom(s). Since we began building and selling Windoms in 1959, we've built and sold more than 85,000 Windoms worldwide; All have been assembled and tested with the long-leg affixed to the "hot" post of the BALUN, and the recommendation "when possible," allow the long-element be at the greater height.

Use good quality 50 ohm coaxial cable such as: RG8X, RG8, or RG213.

It does not matter whose BALUN you use; PLEASE, Please seal all terminals and appendages in or out of the BALUN with Coax-Seal CS 104. It does not matter whose BALUN you use, NO ONE makes a BALUN that is impervious to driving Rain.... sooner or later, it will fail because of moisture ingress. If you don't wish to seal all the3 BALUN terminals, then drill a 1/8 inch "weep" hole in the bottom of the BALUN.







UP CLOSE, dealing with the reality of ground (earth's) influence on an antenna's feed-point:

Pay close attention to what I'm about to say. This is very a very important point that other wire-type antenna manufacturers won't tell you.

*** Impedance at the feed point of the Windom (or any wire type antenna) decreases at resonance as the height above ground decreases !**
or to say it vice-versa.... ***and still have the same meaning or result:***

*** Impedance at the feed point of the Windom (or any wire type antenna) increases at resonance as the height above ground increases !**

Having made this statement, I should clarify how we arrived at this axiom.
Here in the BUXCOMM lab and our antenna farm, we made many tests with the Windom at various heights above ground. After many, and I mean "many" trials with the Windom at various heights above terra-firma, we found optimum performance at thirty-three (33') feet above ground while using a 4:1 BALUN at the feed point.

When we raised the BUXCOMM Windom above 40 feet (to 45') we found the feed-point impedance at 75 meters rose to 266 ohms. To make our Windom appear at a more constant feed-point impedance, and at the same operating frequency, we made a change in the BALUN ratio from 4:1, to 5:1. With our 5:1 BALUN (model MM51), the impedance at resonance remained fairly constant when our Windom was 45+ feet above ground.

As we increased the height above ground to between 55 and 70 feet, we found the impedance at the feed point had risen to almost 300 ohms (actually 294 ohms MOL). To maintain a well-matched BALUN to feed-point equivalent, we changed the 5:1 BALUN to a (BUXCOMM MM61) 6:1 BALUN.

When in doubt, use the following *rule-of-thumb* to match/balance your Windom and BALUN;

Antenna height above ground:

20 to 40 feet (optimum performance) use Windom with 4:1 BALUN, 50>200 ohm (BUXCOMM model MM41)
40 to 55 feet, use Windom with 5:1 BALUN, 50>250 ohm (BUXCOMM model MM51)
55 to * 70 feet, use Windom with 6:1 BALUN, 50>300 ohm (BUXCOMM model MM61)
* No test results available above 70 feet

BucK4ABT

Today we have toroid cores and BALUN devices that provide a more efficient means of coupling RF energy to the antenna (reducing the VSWR, "standing-waves"), while performing better impedance matching. In the drawing shown above, I've drawn the exact dimensions of the Windom I built in 1949. The only differences in my Windom of 1949 and today are:

1) the material the insulators are made of, and 2) I've substituted a 4 to 1 BALUN for the (lossy) 9 turn, 8 inch diameter, decoupling loop.

As I soon learned, this is one of the best and least expensive HF multi-band antennas ever made. It appears as an off-centre-fed (OCF) dipole. This off-center fed design is actually the way the first Windom antennas were designed. The short side of this story is: the early Windom's were fed with a single wire (non-coaxial) which allowed the RF to radiated freely inside and outside the HAM shack.

UPDATING THE "ORIGINAL" WINDOM:

Using an open-wire feeder from the transmitter to the antenna was somewhat dangerous when running power levels above 50 watts. This is in difference to today's rules regarding RF radiation exposure, so to prevent this radiation by the feeder wire, we have adopted the use of coaxial cable to feed the Windom antenna. In order to do so, we had to move a bit further away from center than the designer of the Windom had.

Instead of using a 330 ohm feed point on the Windom (approximately 14% offset from center of the antenna and with the Windom more than 55 feet above ground), we found a more suitable feed point that was closer to 33 percent off-center. This point comes closer to being a 233 ohm feed-point, and since we adapted the Windom for coax feed, we now use a 1 to 4 (MM41) current BALUN when our Windom is 25 to 35 feet above ground, and a 1 to 5 (MM51) current BALUN when our Windom is 40 to 55 feet above ground.

With the offset at one third (1/3) distance from one end, we find the Windom has a median impedance of approximately 223 ohms. This impedance is more practical for using a 4:1 BALUN at the feed-point. In order to use a 6:1 BALUN and achieve a close impedance match, we must move the feed-point further away from ground.

With the use of our Windom antenna, many customers will order the 6:1 BALUN because a friend told them to do so. These are customers who are sometimes misled by the unknowing. The 6 to 1 BALUN is OK when employed with the Windom feed point above or more than 55 feet above ground. HOWEVER, we no longer use that 14 percent center offset. We have moved to a more desirable feed-point (33 %) offset, and use a 4:1 BALUN (20 to 40 ft above ground or a 5:1 BALUN when we have the Windom feed-point 40 to 55 feet above ground. When in doubt, use the 4 to 1 BALUN. In either case, the 4 to 1 and 5 to 1 BALUN's are more efficient than a 6:1 BALUN.

Using a 4:1 or 5:1 BALUN at the feed-point of the Windom antenna, we can operate without the use of an antenna tuner. The Windom is an uncomplicated, easy to use, harmonic related antenna. If we are the owner of an antenna tuner then by all means use it. Since I run 200 watts (or less) I for one don't like the idea of placing too many obstacles in line with my antenna, because each transition from one feed-line, tuner, or other transmission line transformer simply adds more losses into the equation and thus reduces this wonderful antenna's high performance.

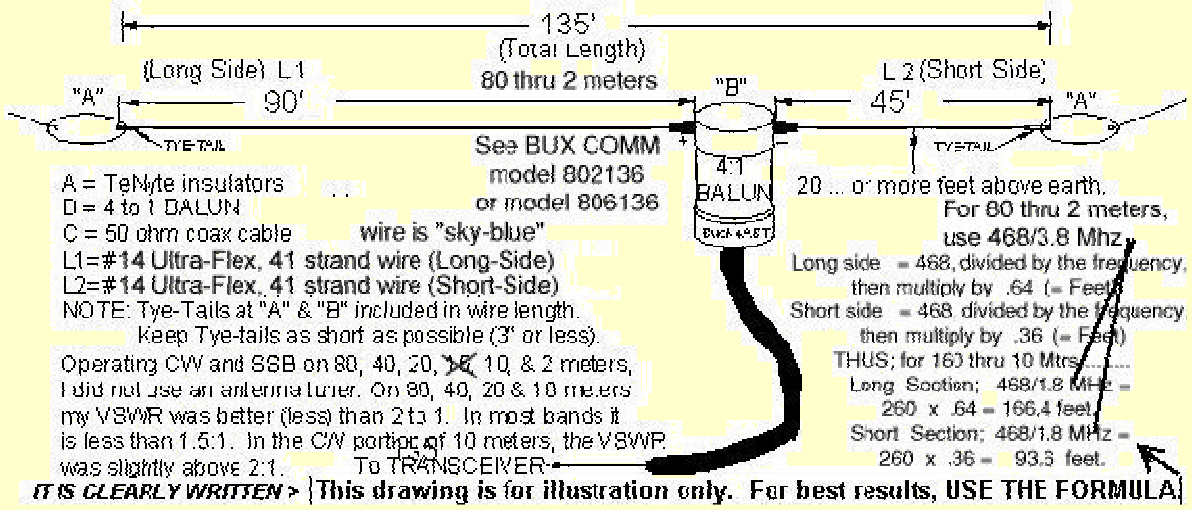
It could be that many young hams ignore the multi-band Windom antenna because of its sheer simplicity and may think it's too good to be true. Think about it, and while you are doing so, remember, the more trinkets, and unnecessary inserts that are placed into the RF path to the antenna are simply "window-dressing" or gimmicks. These added "gimmicks" become an obstacle or loss to that extra bit of RF signal that could have made that rare and needed contact in a contest pile-up. The original coax cable fed Windom has proven itself over and over, to be the number one wire type antenna with the most versatile and valued performance record in the HF communications world.

Today, many radio amateurs are using multiband Windom antennas with more than satisfactory results. It would not be without reason that Windom antennas are being employed during IARU HF World Championships! and most of all, by "high-stake-contests." The complexity of feeding other dipoles and doublets, the losses in dipoles with traps, and the esoteric marketing of some other antennas seem to appeal to them more.

Remember the axiom: "When you have achieved perfection, anything more becomes a point of diminishing returns." Enough said!

Trust me on the above paragraph, as I have experimented with every Windom and Jpole concept or design that can be imagined. Having built and sold thousands of these two antennas, I've found that It's difficult to improve on perfection.

80 through 2 meter WINDOMs are complete and factory assembled and tested.↓



Similar to WINDOMs shown above, These WINDOMs are completely assembled, ready to connect the coax, and erect. BUXCOMM Windoms are power rated at 1000 watts SSB and include all insulators, high-tensile strength, super flexible PVC covering, Power-Flex, tinned, copper wire, connectors, and BALUN. Our High-power versions are rated at 2000 watts and are identified with an "HP" in the model number. See coaxial cable and related items below. You can be on the air in no time, with any of our Windoms.
BUXCOMM Windoms are the choice of Hams, World Wide

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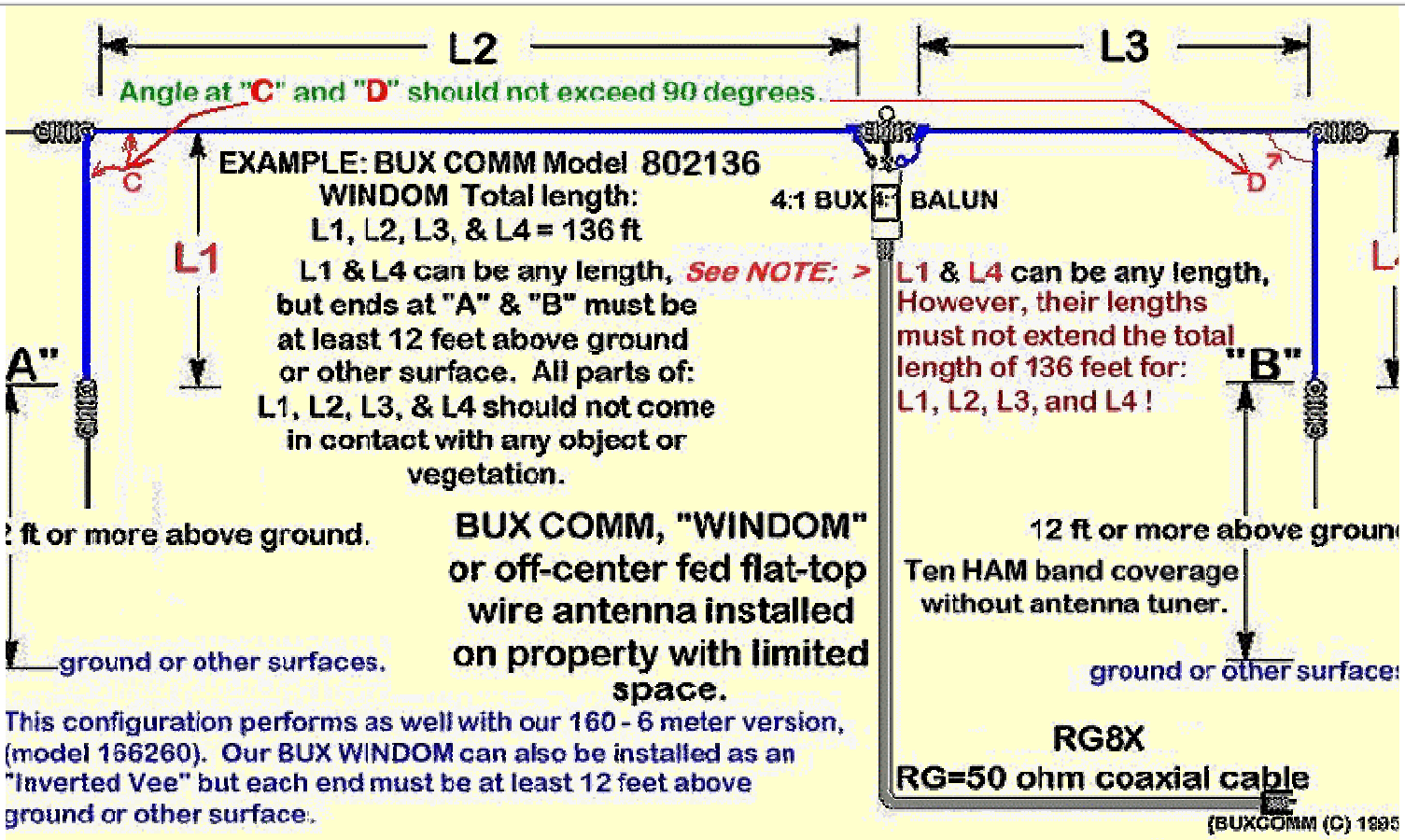


e Windom can be installed as a Droop-End (see figure D below) or as a sloper, but in no case, should the angle be ater than 90 degrees against itself. To use an angle that folds against the pattern of the opposite end, or the feed line Windom, could change the impedance of the feed-point, change the multi-band features, and most important, destro radiation characteristics of the antenna.

COAX vs Twin-lead:

Whether you want to install an antenna on your roof, on a pole, or in your attic, using the right kind of cable is crucial to the performance of our HAM station. The two types of wire commonly used to connect an antenna to a transceiver are 50 ohm coaxial cable and 450 ohm ladder line. Ladder-line is a flat wire, sometimes called "twin-lead," while coax cable looks like the round cable installed in homes for cable TV service. In the distant past, ladder-line was the choice of us old timers, however, in recent years, we have learned that coax is a much better vehicle for the transfer of RF energy to the antenna. Almost all HAM's have made the transition to coaxial cable for this connection.

In the 30's, 40's and 50's, and even later years, twin lead, or ladder line was still being used, because many transmitters and receivers had two terminals to attach the twin-lead or ladder-line to. A hold-over from those years gone by, is still seen on most antenna tuners, which have both coax connectors (SO239), and the older binding posts type terminals.

Coaxial cable is far superior to ladder-line or twin-lead in every way and should be used as often as possible. *If your ham shack has an existing run of ladder-line cable, you might consider replacing it with coax.* Ladder-line is not shielded and its entire wire length can radiate RF just like an antenna. The fact that ladder-line can radiate its full length, more often than not, it will cause mismatch (high-VSWR, and cause problems with transmitting and receiving. Coax cable is shielded, which prevents signals from entering or exiting your antenna or feed-line system. Another important point to remember is that coaxial cable is unaffected by electrical wiring or by close proximity of metal objects. *And coax has a much longer lifespan than ladder-line or twin-lead.*

- For the best performance and reliability, use high-quality RG-8X, RG8U, or in the case of high power, and VHF, use RG213.

- Antenna cable should run as directly as possible from the antenna *BALUN* to the transceiver or tuner.

- Avoid sharp bends in the cable as they can impair performance by crimping or creating a time domain reflected (TDR) impedance change.

Antenna Feed-line and Cable Tips:

Outdoor antennas should have for lightning protection. Use a gas-stop or gap type BUXCOMM 7516 grounding (lightning) block where the antenna cable enters the house or transceiver/tuner. Run a wire from the grounding screw or tap, to your station's ground rod BUXCOMM 15929 GROUND ROD

- This is not only an important safety consideration but also a National Electrical Code (NEC) requirement

- Outdoor connections should be protected from exposure to the elements by applying silicone grease to prevent oxidation.

There is an exception; When the antenna "elements" are made of twin-lead, and fed with coaxial cable via a BALUN, then we understand how the ladder-line or twin-lead can indeed become the radiating element(s). e.g. "Folded Dipoles," JPOLE, and Compact Dipole, In the case of the G5RV, the thirty-three feet of ladder-line or twin-lead (TLT) should have a twist of one-half turn per foot.

A touch of Class, The Windom and the J-POLE
By Glynn E. "Buck" Rogers Sr (60+ years as K4ABT)

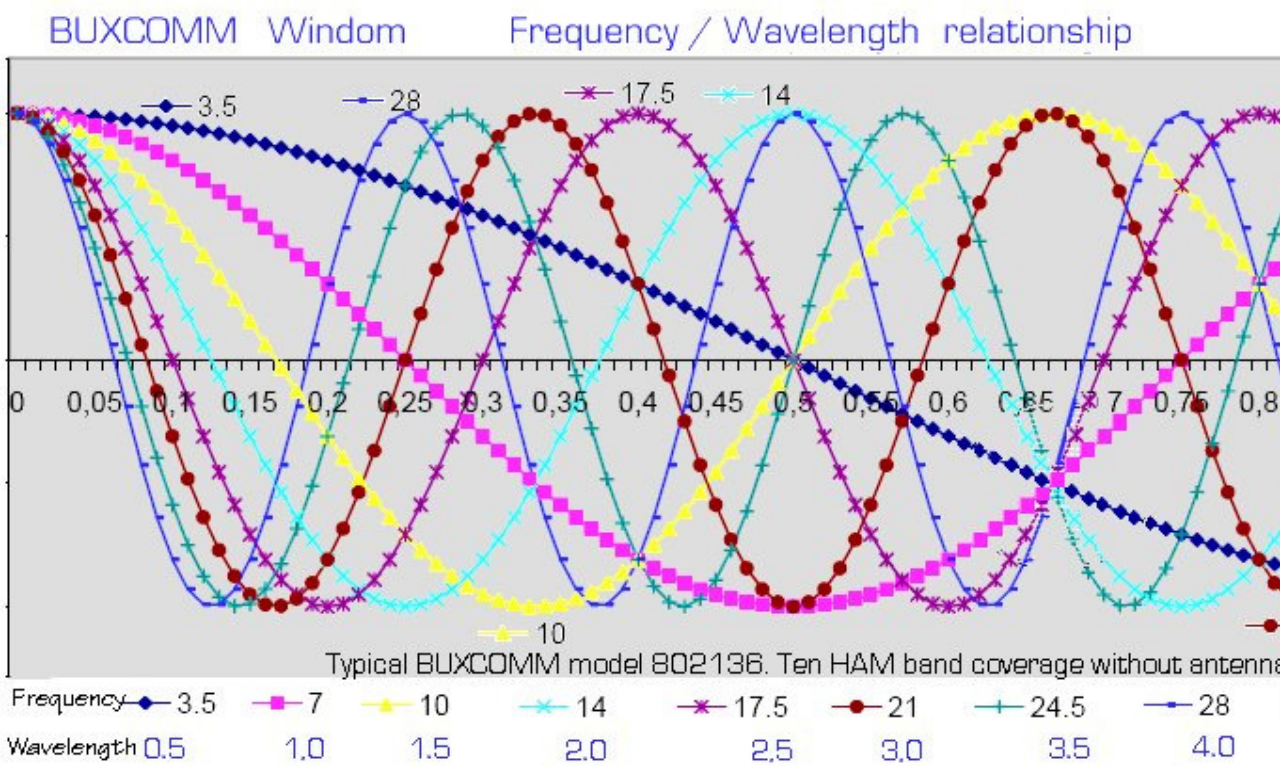
The J-POLE has been around since the early days of HAM Radio, and is a direct descendant of the "Windom" Like the Windom or ZEPP, the J-POLE is a spin-off, or a modified WINDOM for VHF and UHF. One of the first articles I wrote about the J-Pole was in HRC magazine in 1958. Since 1958, I've written several j-pole articles in other HAM Radio publications. Here, my references are to the early,

1923 (version) Windom (Article by Loren G. Windom September 1929, QST magazine) .

If you look at the feed method for the early Windom, it was fed with a single wire. You soon see the similarity between the Windom, ZEPP, and the J-Pole.

Look close at the configuration of the Jpole and the Windom, and you will understand why in many of my articles in CQ Magazine and other publications, that I often refer to the Jpole as a Windom, with the short section folded back on itself to form the parasitic element. It is for this reason that I feel these are two of the best antennas ever designed. Having said this, you will also note that the Windom (and the Jpole) are powerful antennas that provide outstanding performance on all bands above the band for which they are cut or designed for.

The reason these two antennas perform so well (as Multi-Band antennas; Windom for HF & lo VHF, Jpole VHF & UHF), is because they operate at harmonics of the fundamental or lowest frequency for which they are cut/designed. To add additional feeders (ladder-line), other than 50 ohm coax or UNUNs is a waste of RF energy. Only 50 ohm coaxial cable and a BALUN at the feed-point is all that is necessary. Anything more, add losses into the equation that cannot be overcome after-the-fact. See "frequency vs wavelength" and "ham-band, harmonic relationships" in the following color-coded chart.



From: Richard Soikkeli
Sent: Monday, May 19, 2008 11:35 AM
To: support@buxcomm.com
Subject: Thanks for your fantastic Windom antenna!

Dear Buck,
Thank you so much for your patient technical help and the Buxcomm Quality windom antenna. 2 weeks ago down came the 102' G5RV and up went the 802136 BUXCOMM Windom.

Now I am filling the log book with countries I rarely could even hear before, much less work, even with 500w CW. I have "busted" some pile ups with a first or second call and got real 599 rpts from DX over 8000 miles away. The low noise factor and gain does the trick. Also, I don't have RF into my son's computer speakers any more and I'm sure the neighbors are happier.

I am advising our Field Day team to ditch the g5rv's as they don't compare at all as you told me would be the case. I only wish I had heard about BUXCOMM Windom's sooner and had more fun working DX over the years. I just installed a 2nd windom for my jr. high ham station. Now its time to break out the QRP rig and see what it will do too. I will be ordering more parts soon.

73 and thanks again, Rick AE6RS

To manage both CW and Phone portions of the HF bands with the Windom, some "pruning" of the elements L1 & L2 can be made. Pruning (reducing) the length of L1 & L2 may cause an increase in VSWR at the lower ends of the band(s). Always remember to make the cuts proportional to each element. If you remove 12 inches (1 ft) from L1, remove only six (6) inches from L2.... If you remove 2 feet from L1, remove one (1) foot from L2. Do not remove more than 3 feet total (L1=2 ft, L2=1 ft)

The Windom above is cut for the CW portions of the HF bands.

For the technical minded Windom builder, we opt for the 4:1 BALUN because it is; more efficient, and weighs less. Another nice feature we found using our Rhode & Swartz Antenna Systems Analyzer, the Windom exhibits similar feed-point impedance across the bands from 75 through 6 meters.

A word to the wise.... NEVER make any angle of the Windom (or any flat-top antenna) more than 90 degrees. Ends can hang down, from a horizontal plane, but do not allow the angle to be tighter than 90 degrees e.g. 75, 45, degrees etc. A Windom may also be installed as an Inverted Vee, as long as the Apex (Point where BALUN feeds the Windom) is not sharper than 90 degrees. The Windom is suitable for mounting as an inverted V, supported between two masts, tower, or trees. The Windom wire elements must not come in contact with limbs, vegetation or metal objects. In practice, try to keep both ends (wire elements) of the Windom three (3) or more feet away from any limbs, vegetation or metal objects.

The BUXCOMM Windom can be purchased in several different band or lengths. The number of bands covered is determined by the length.

The 160 thru 6 meters version is approximately 260 total length. BUXCOM P/N 166260 With Current BALUN attached The 75 thru 2 meters version is approximately 130 ft total length. BUXCOM P/N 752130 With Current BALUN attached The 80 thru 6 meters version is approximately 137 ft total length. BUXCOM P/N 802136 With Current BALUN attached The 40 thru 6 meters version is approximately 66 ft total length. BUXCOM P/N 40670 With Current BALUN attached The 20 thru 6 meters version is approximately 37 feet, total length. BUXCOM P/N 20634 With Current BALUN attached

AN UPDATE:

Since writing this article several decades ago for a major HAM radio magazine, I've received tons of mail (and eMail) asking for more information, especially with regards to my 160 meter version;

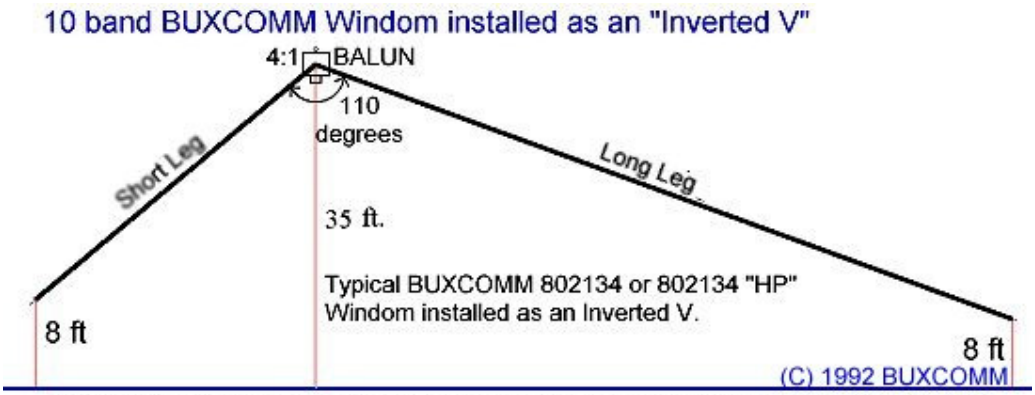
The BUXCOMM model 166260 Windom antenna is a horizontal wire, multi-band antenna intended for use without an antenna tuner on 160, 80, 40, 30, 24, 20, 17, 15, 10, 6, abd 2 meters. The WARC bands of 30, 17, 15, and 12 meters by using an antenna tuner. The antenna wire is made of 61 strands of silver flashed wire and covered with non-metallic, super-flexible PVC insulation. Each end of the BUXCOM Windom's have end insulators made of high tensile strength TyNYTE. The Center insulator is also Tynyte, and is fed by customer's choice of either a 4:1 or 6:1 BUXCOMM MasterMatch BALUN transmission line transformers. The BALUN feed is attached near the one-third offset point according to the feed-point required by the BALUN ratio (200 ohms/4:1, 250 ohms/5:1,or 300 ohms/6:1) MOL. By using a different feed-point for 4:1 BALUNS, a slight increase in antenna efficiency is realized when using the MM51 (266 ohm) feed which results good VSWR on all referenced HAM bands. The antenna is suitable for mounting as a dipole, supported between two masts, tower, or trees.

The Windom wire elements should not come into contact with any limbs or other vegetation. Here's why;

The sky-blue insulation on the wire elements of our Windom antennas provide esthetic blending with surroundings, added tensile strength, and most important, it prevents oxidation of the wire. Oxidation can wreak havoc after a few years exposure to the elements.

A few new HAMS do not understand why we advise against allowing the wire elements (although insulated) to come in contact with metal objects, tree limbs, and similar vegetation. Here, insulation does not prevent "proximity influence (added capacitance), and RF absorption" by nearby vegetation, be it limbs, or metallic objects. The same thing happens when the "sap" is up in the limbs, as happens when the antenna elements come in contact with, or near metal objects; stray capacitance, both inductive and capacitive will surely detune a well engineered antenna

The BUXCOMM Windom's may also be installed as an "inverted Vee".



Do not exceed 90 degrees when erecting the Windom as an "inverted Vee". Specifications: Frequency range: 1.8 – 2.0 MHz 3.5 – 4.0 MHz 6.8 – 7.4 MHz 13.9 – 14.7 MHz 27.8 – 29.8 MHz 49.5 – 54.0 MHz Feed-point Impedance 50 ohms VSWR <2.0:1 Horizontal Polarization (If suspended as an Inverted Vee, do not exceed 90 degrees) Maximum power 1200 Watts SSB, 750 W AM/CW, Wire Length model 166260 = 260ft. WARC bands of 30, 17, 15, and 12 meters by using an antenna tuner. Now-a-days, I see a lot of knock-offs of the windom, they even try to change the name or use acronyms and try and relate it to the dipole. The Windom is still a Windom, regardless of what they call it. As with the "apple." The apple is still an "apple" regardless of what other name they try to give it!

Having said that: Here then is "the rest of the story."

First of all, we'll address the formula, and how to determine the length(s) of each section, using the same old formula that I used in 1949.

Long side.... = 468, divided by the frequency, then multiply by .64 (= Feet)

Short side.... = 468, divided by the frequency, then multiply by .36 (= Feet)

The "Windom Antenna" was described by Loren G. Windom in QST magazine, September 1929. Pages 19 through 22. It is named after its inventor/designer.

Loren Windom, W8GZ, was first to reveal the antenna to the radio amateur community by describing the antenna in the September 1929 issue of QST. Although it was first build and tested by William Everitt (see photo), it was by Windom's name that the antenna became known.

The Windom antenna is an off-center fed dipole with an unbalanced coax feedline. In 1937, the Windom was first described as a compromise multi-band antenna. The antenna can be employed on 80, 40, 20 and 10m with considerable, though acceptable levels of VSWR. What became perhaps the most popular multi-band

Windom design of all, was the German-made Fritzel FD4 antenna, described by the late Dr. Fritz Spillner1, DJ2KY, in 1971. It had the same dimensions as the multi-band Windom antenna, but fitted with a 200 Ω to 50 ohm, (4:1) BALUN at its feed-point and fed with coax.

In recent years, some operator's are using 300 to 50 ohm, or 6:1 baluns. They base their decision on the simple math that the feed point is three (30) ohms closer to 300, than 200. In reality and measured with highly accurate antenna bridges, we have found the feed point impedance of the Windom to be 243 ohms. The feed-point of the Windom is 243 ohms nominal, this is a measured impedance while the Windom is suspended at 40 feed above ground. Has anyone ever heard of "surge-impedance?" In tests, we've found, there's no significant difference in performance either way. Therefore, the trade-off is a matter of personal choice. Mine of course, is the Windom with a 4:1 Current BALUN (MM41). If you plan to run more than 1000 watts SSB into our Windom, we suggest you request our Windom with the BD2K41 Current BALUN rated at 2kW SSB.

Here are some final notes:

In our BUXCOMM BALUN's, we make it a point to polarize the posts of our MasterMatch series, identified by a RED or BLACK dot, or ring on the brass terminal posts. This provides the user with a benchmark that allows the BLACK post to be used towards the "cold" side of the antenna and the RED post is connected to the long, or "hot" side of the antenna. Some old-timers of my vintage, refer to the cold side of the antenna as the "parasitic" element.

As a point of interest, in some installations, the coax feed-line may pass through the RF field of the antenna, RF current can be introduced into the feed-line after the balun. In this situation, a 1:1 Current Choke should be inserted into the feedline near the feed-point of the antenna.

A few notes about "SkyWires" or, the full-wave Loop Antenna

Loop antennas have a fairly low impedance when they are built one (1) wavelength in circumference. The low feedpoint impedance at harmonic multiples of the resonant frequency as opposed to dipole antennas, have low feed-point impedances at ODD multiples of the resonant frequency.

When a Full-Wave Loop is operated near resonance on the desired band, a 5 to 1 or 2 to 1 balun works very well, when using 50-ohm coaxial cable to the radio from the balun, VSWR at resonance will normally be below 2:1. An external antenna tuner is not required. If necessary, the transceiver's internal antenna tuner may be used.

Typical SWR Plot of full-wave horizontal loop at approximately 40 feet above average ground using BUXCOMM MM21, 2:1 balun should exhibit an VSWR at resonance below 1.5:1.

Application Notes for BUXCOMM BALUN`s

Definitions: BALUN = Asymmetrical to Symmetrical; UNUN = Asymmetrical to Asymmetrical

1:1 BALUN: 50 ohms to 50 ohms, or to feed dipoles and similar antennas with 40 to 75 ohm feed points.
BUXCOMM model MM11

1:2 BALUN: 50 to 100 ohms. This Balun is suitable for feeding Vertical Antennas, Quads, Loop antennas and Ladder Line antennas.
BUXCOMM model MM12

1:4 BALUN: 50 to 200 ohms. This Balun is suitable for the coupling 50 ohm coaxial cable to Windom's, and off-center-fed antennas.
BUXCOMM model MM41

1:5 BALUN: 50 to 250 ohms; Suitable for coupling 50 ohm coaxial cable to a Windom's, when the Windom is more than 50 above ground.
BUXCOMM model MM51

1:6 BALUN: 50 to 300 ohms. This BALUN is suitable for the adjustment to asymmetric fed dipoles such as Windom's, G5RV, and zepp antennas. The BALUN is fed directly to the Windom and similar antennas. With double-zepp and G5RV antennas and use of asymmetrical feeder, the BALUN is positioned before entry of the cable into a building.
BUXCOMM model MM61

1:9 BALUN: 50 to 450 ohms for coupling Asymmetrical to Symmetrical feeders.
BUXCOMM model MM91

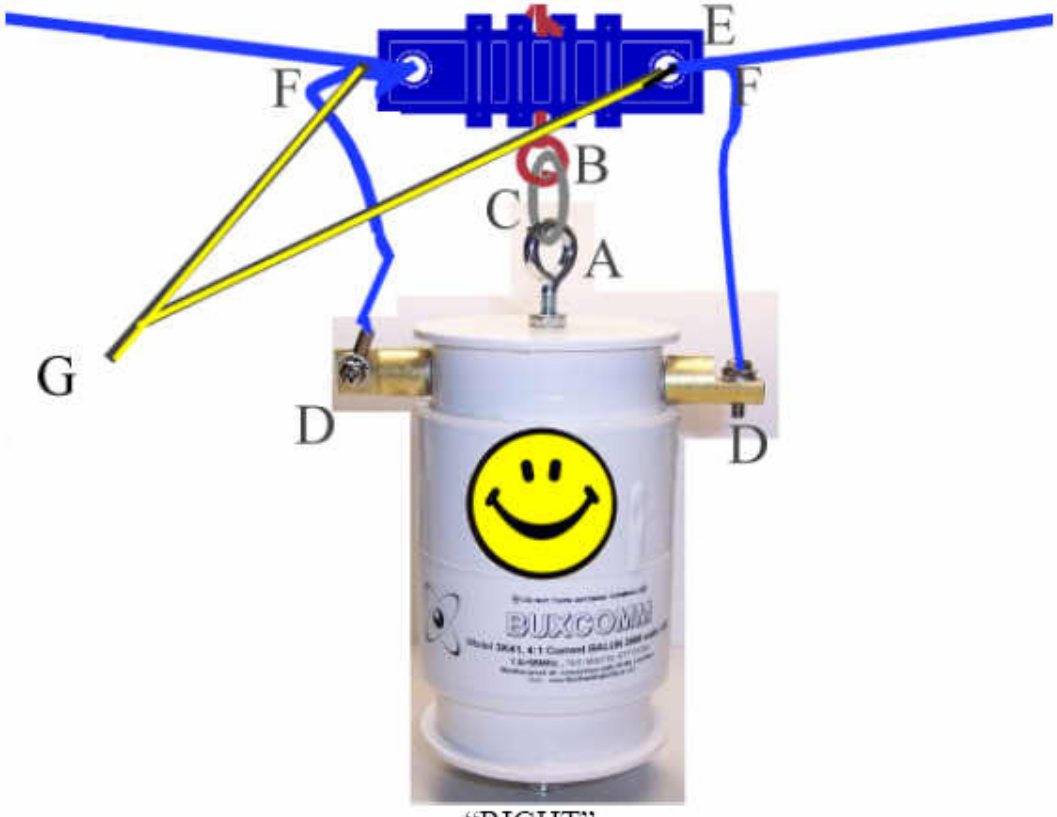
1:9 UNUN: asymmetrical to asymmetrical (unbalanced to unbalanced) Long wire antennas, Ground Plane`s, Verticals, and some types of "beverage" antennas,.. etc.
BUXCOMM model MM19LW

1:16 UNUN: Similar to above application; asymmetrical to asymmetrical (unbalanced to unbalanced) Long wire antennas, Ground Plane`s, Verticals, and some types of "beverage" antennas,.. etc

How to hang a BALUN without damaging BALUN Antenna termin

"WRONG"
Do not support BALUN by Antenna Wire/Elements,

Use Eyebolt to support BALUN from Center Insulator.



"RIGHT"

A= BALUN Support Eyebolt,
B= Center Insulator Eyebolt Support
C= Support Link between Center Insulator and BALUN Eyebolt
D= Antenna Terminals/BALUN Connectors
E= Center Insulator
F/F=Loop antenna wire element(s) through insulator holes ,
G= Fold back wire element onto itself, secure with Ty-Wrap and cover with tape.

An Improved G5RV Antenna:

The original G5RV antenna was developed by Louis Varney G5RV for 20 meters. Although his design was a good one, he used the 450 ohm ladder line as a feed-line-to-antenna impedance match, and without the use of a BALUN. We discovered that feeding the 450 ohm ladder-line directly with an antenna tuner, left us with a shack full of RF…HOT mics, hum, and in some cases, we had "squeals" from rectified RF getting into the microphone audio path, within the transceiver, a sure sign of RF-Feedback (base rectification).

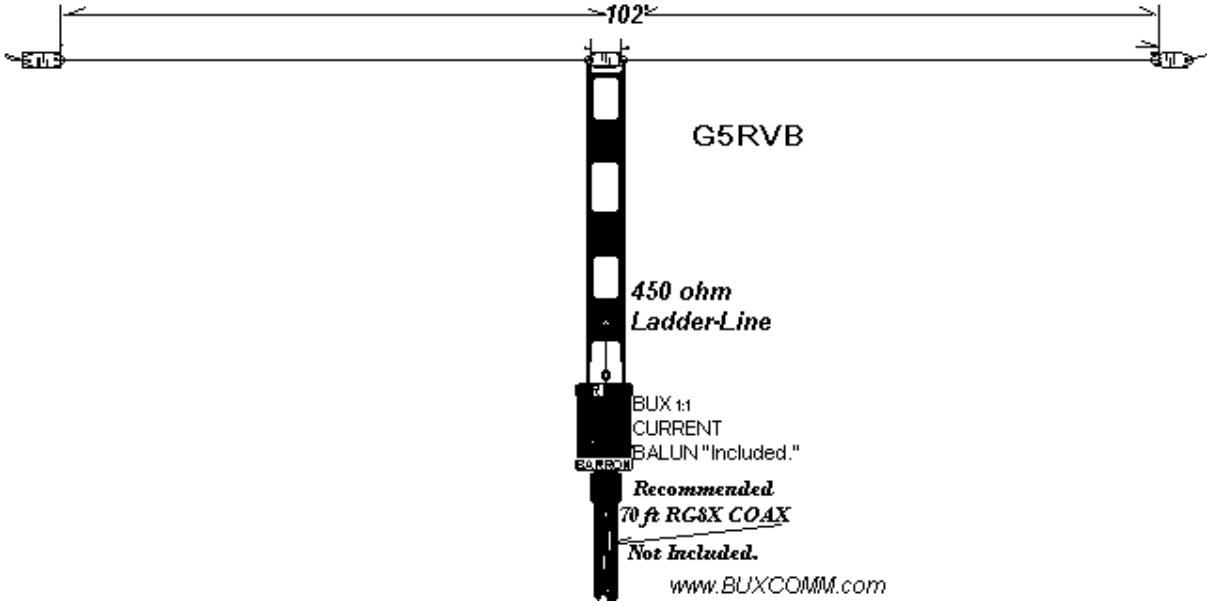
To make the G5RV more "user-friendly" and with less RF exposure within the HAM-shack, we added an MM11 BALUN at the lower end of the 450 ohm ladder-line, and from the asymmetrical input of the MM11 BALUN (outside the HAM shack), we used 50 ohm (low impedance) coax to reach the antenna tuner inside the HAM shack. We've found that this improvement to the G5RV has put more of our transmitted RF into the elements of the antenna, and made the antenna virtually noise free and reduced re-radiation as much as 85 percent.

Without using an external antenna tuner, we've found that our transceiver will work into the 50 ohm coax and the MM11 BALUN with VSWR below 2:1 on the bands the G5RV is cut for.

By making the additional BALUN and coax improvement to the original 20 thru 10 meter G5RV, it is now possible to build the G5RV for more bands, and thus cover lower bands and frequency's. We now have a means by which we can have an antenna that fits almost any real-estate configuration, from as little as 27 feet (8.2 m), (20 thru 10 meter bands) to 207 feet (64 m) (160 thru 10 meter bands).

BUXCOMM now builds G5RV antennas in four (4) versions and lengths. Depending on your available space, you may choose the size and version to fit your needs and available real-estate space.

Model 80 thru 10 meter band coverage; Overall Length BALUN



G5RV-16010 160 to 10 meters 208 feet or 63 meters

G5RV-8010 80 to 10 meters 102 feet or 31 meters MMG5

Here's more commendation for our BUXCOMM Windom antennas:

From: M33Access Sent: Monday, October 16, 2006 2:55 PM To: support@buxcomm.com Subject: BUXCOMM WINDOM

Hello

I couldn't resist the opportunity to tell you about your Windom antenna I bought a couple weeks ago. I have been off the air for a number of years. Probably close to 15 to be exact. My oldest son got his ham ticket this past summer and started buggin me to get on the air. That's when I decided to bite the bullet and get on.

After working for days trying to make my old "Inverted V" work. I turned to you folks and your off center fed Windom. Since then I hung the antenna at the 70' mark on my tower and the long end to about the 55' mark on a tree in the back yard. My station is simple, I use the Kenwood TS-180s barefoot to the Windom. I love to work rtty and packet. I am using an ancient AEA Pakratt232.

I have heard DX that I never heard in my years of being a licensed Ham. I have worked Italy, England, South Africa and last night I worked a station in Chile. CHILE! Now that is at the other end of the world! This is so neat, I can't tell you how much I am loving your antenna. Remember this is barefoot. I have my dad's SB-230 amp, but it's not hooked up. I don't have the DIN plug for my 180 yet.

If you have customers asking how your BUX Comm Windom antenna works, give them my call and I will be happy to meet them on the air.

73, and thanks again.

Bob WB8UJB

From: Andy KA3ODJ

Sent: Wednesday, June 07, 2006 6:49 PM To: support@commparts.com Subject: 166261W100 Just wanted to let you know that your 166261W100 antenna here at KA3ODJ is working like Gang Busters. Purchased the antenna primarily as a 160 Meter antenna for the Internet Remote Base. The SWR and performance exceeded what I had expected, I have added it to the selection choices for the other bands. Can not wait to get the ends up higher, they are only 35" or so right now. Getting good reports from the users of the Internet Remote Base. No RF Problems at the coax end either, I also am using one of your Master Match at the antenna switch. I am running an Icom PW1 and in the past, I've had RFI issues in the shack resetting the computer, but no more, with this new BUXCOMM Windom, it's clean as a whistle. Feel free to give your antenna a try if you like. To operate Remote, You will have to download W4MQs software to get access. http://wpmq.com. Thanks for a great product at a fair price. Andy KA3ODJ

Our Windom Measurements

Freq mHz	1.9	3.5	7.1	10.7	14.2	21.4	28.5
SWR	1.8	1.2	1.8	1.55	1.33	2.1	1.25
Impedance	233	218	158	161	280	256	190

Metric Conversion

INCHES	FEET	YARDS
To Millimeters Inches x 25.40 To Centimeters Inches x 2.54 To Meters Inches x 0.0254 From Millimeters M x 0.03937 From Centimeters C x 0.3937 From Meters M x 39.3701	To Millimeters Feet x 304.8 To Centimeters Feet x 30.48 To Meters Feet x 0.3048 From Millimeters M x 0.00328 From Centimeters C x 0.03281 From Meters M x 3.28084 From Centimeters C x 0.01094 From Meters M x 1.0936	To Millimeters Yards x 914.4 To Centimeters Yards x 91.44 To Meters Yards x .9144 From Millimeters M x 1.094 x 10- 3 From Centimeters C x 0.01094 From Meters M x 1.0936

WINDOM, to ZEPP, to VHF J-POLE.

BUXCOMM BALUNS are more than just antenna matching devices:

*** Help keep RF out of the shack.**

*** Provides maximum transfer of RF to the antenna.**

*** Elemination of radiation from the feeder cable**

*** Makes the antenna radiation pattern predictable.**

*** Reduces QRN and TVI to the neighbors.**

BUXCOMM BALUNs should be installed at the antenna feed point, or where the coax or feed-line attaches to the above ground antenna. BUX BALUNs are used to connect balanced antennas to unbalanced transmission lines, such as coax cable. Their primary purpose is to prevent antenna (RF) currents from flowing down the outside of the cable. Another function of the BUX BALUN41 is to match the impedance of an unbalanced coax to the balanced feed point of a balanced input antenna(s). BUX Line-Isolator BALUNS may also be installed anywhere along the cable to prevent the destructive influence of induced RF currents (VSWR). The best location for the BUXCOMM LISO is to install it at the output of the transceiver or between the linear and the coax cable feed line to the BALUN at the antenna.

At BUX COMM, *We don't cut corners!

The components used in the manufacture of our BALUNs are of top quality components, beginning with the Silver Plate SO239 connectors and center insulator is made of teflon™E.I Dupont). The wire we use to wind the ferrite donut is heavy-duty, silver flashed wire, with teflon™insulation that will handle RF voltages above 5000 volts, and extremely high temperatures. The binding posts are heavy-duty, tempered brass, with side-thru holes to accommodate either type loop-thru connection, solder-lug, or screw attachment. A double-shoulder brass capture nut is used to add a secure bite and improve antenna wire electrical connections.