New! Full Catalog On-line

This is a mini-catalog. The full catalog is available on our web site. You can download or view all or specific parts of the full, General Catalog. The General Catalog is available in Acrobat PDF format to make downloading easy.

Other On-line Features

Sales - Monthly, last minute and clearance sales are featured.
Jim's Notebook - All sorts of useful information about antennas, plus many articles from the “Reference Catalog” and Jim’s “Most Asked Questions” books are available here.
Jim's Hamshack - It's a virtual tour of my ever changing hamshack, my latest nostalgia and Classic Rigs collection plus the new station I'm working on. I wonder what I'll do this time? You don't suppose that I'll finally go digital, do you?
There's lots more - It can take a couple of hours to see everything.

A Note About Email

I try to answer your email promptly, but .... I now receive between 600 and 1000 SPAM messages each day, so I am using aggressive filtering provided by my ISP and an exceptional filter for “Outlook” by Cloudmark.

Please don’t send attachments. My SPAM filters will look very closely at attachments and often delete your message or attachment if anything looks suspicious.

Be specific with “Subject Lines.” Spam filters are looking for vague and misspelled words. Even if everything looks right, you may still be filtered if you use an ISP that is supporting suspicious or high volume traffic. Further, you might not receive my messages because your ISP rejects my ISP. It's one of the largest in the country and has a huge traffic volume.

I try to respond to all questions and other email correspondence quickly, but there can be delays. If you don’t hear from me within a few days, send your message again. Let me hear from you.

Messages asking about our products are answered first. General questions and those unrelated to our products fall farther back in the queue.
The RADIO WORKS is Baluns

The RADIO WORKS introduced a full line of precision, ‘Current-type’ baluns several years ago. They were instantly popular because ‘Current-type’, baluns avoid the bad habits that conventional ‘Voltage-type’ baluns exhibit. ‘Voltage-type’ baluns try to produce equal and opposite voltages at the balun’s balanced output port regardless of the load impedance. Since low impedance antennas are current fed, a balun that produces equal and opposite currents at its output over a wide range of load impedances is desirable. There is little to be gained by forcing the voltages of the two antenna halves, whether the antenna is balanced or not, to be equal and opposite relative to the ground side of the balun input. The antenna field is proportional to the currents in the elements, not the voltages at the feed point.

Misconceptions

1. Baluns will not necessarily improve SWR (the exception is when a balun is used as part of a matching network, i.e. 4:1 baluns used in loops)
2. They are not lightning arresters, the winding inductance in most baluns is too low.
3. Built-in spark gaps don’t work. The radio equipment is long gone before the ‘gap’ arcs.
4. Baluns do not allow multiband operation of single band, coax fed antennas. Nor do they make antennas more broadbanded.

These are all generalizations. Of course, there may be specific exceptions to any of them.

A balun really has only two jobs
1. Isolate transmission line from the antenna.
2. Provide balanced output current

Proper Balun Design
A properly engineered balun will include these design points:

1. High winding inductance (reactance)
2. Low stray capacitance
3. Very short internal transmission lines- << 1/4 wave, the shorter the better.
4. High power components- high voltage wire and insulation to withstand high power or a mismatch.
5. Large wire gauge reduces IR losses.
6. Large cores - prevents saturation and provides the necessary inductive reactance values on the low bands.
7. Mechanical considerations:
   Weatherproofing, rustproof hardware and a strong case to withstand high physical loads.

To insure the utmost in reliability, wires from the internal windings of the B1, B4, Y1, and Remote Baluns are brought directly outside the case for connection to the antenna. This eliminates any chance of an unreliable connection. The trade-off is that the holes where these wires exit the balun’s case must be sealed. Coax Seal® is included with each balun for this purpose and to seal the coaxial connector.

The transmission lines or the balun’s windings are carefully designed for optimum impedance. The all-important wire used to make these internal transmission line(s) or other windings are insulated with a material similar to Teflon®.

All 1:1 and some 4:1 models are Current-type designs. Current-type baluns are extraordinarily saturation resistant and provide superior reactance characteristics. Signal distortion and RFI due to core saturation is practically eliminated. Current-type baluns are very forgiving when feeding antennas that do not provide an ideal load.

Retrofit Line Isolators

A very useful application for Line Isolators is to install them in series with a beam antenna’s normal feed system. The proper location is between the antenna’s balun or matching device/system and the feedline. Doing this will not affect antenna matching unless the feedline is acting as part of the antenna. This is, of course, not a desirable situation, and the installation of the Line Isolator will point out that a major problem exists with the antenna. In beam installations, using a Line Isolator in series with the antenna’s feed system can substantially improve the antenna’s front-to-back and front-to-side ratios. It does this by providing the antenna with balanced current at the feedpoint and by very effectively preventing the feedline from acting as part of the antenna. It is a seldom appreciated fact that ineffectively decoupled feedlines can act as efficient vertical antennas that can degrade an otherwise excellent radiation pattern. The addition of a Line Isolator or a proper balun can significantly reduce feedline radiation and dramatically decrease RFI and TVI. Beam antennas, especially, benefit from improved balanced drive and superior feedline isolation, but even simple dipoles benefit from properly selected and installed baluns and Line Isolators. Receiver noise also may be reduced by eliminating signal pickup by the feedline.

RFI Applications

Current-type baluns and Line Isolators are especially effective in reducing RF current on the outer surface of a coaxial cable’s shield while having no effect on the signal carried within the cable. Current-type devices are singularly well suited to this application, because of several exceptional features that are not present in other balun designs. In the list of desirable characteristics is a very high load isolation over a very wide bandwidth, extremely low loss characteristics and a wide, low SWR bandwidth.
### Important - Power Ratings

All RADIO WORKS' products power ratings are for standard duty-cycle SSB and CW transmissions. We do not rate any of our products for high duty-cycle modes including AM, RTTY and high duty-cycle digital modes. Essentially, these modes require devices designed for commercial service. It's either that or use low power levels. I have checked on prices for a commercial 2 kW baluns and the price was more than $1500. This is certainly beyond the range of most of our budgets. I know that there are some amateur radio baluns that claim power ratings of very high values. However, they say nothing about a duty-cycle rating, nor the load conditions under which they will survive their rated power. I am being up-front with our ratings.

Beside the problem of duty-cycle is the popularity of the use of older transmitters which run “class-C” output stages. It is common for these transmitters to have a high harmonic and spurious signal content. Some antenna components, among them, high quality current baluns and Line Isolators, absorb much of the harmonic and spurious energy which results in core saturation and excessive heating. You may say that this doesn’t happen in other types of devices. The reason is that these devices just pass the harmonics and spurious signals along to the antenna. This isn’t to say that current baluns and Line Isolators can be used as “low pass filters.” Their functions are different and they should be used together.

### PSK-31

I often receive questions about the compatibility of PSK-31 and our products since I warn against high duty-cycle modes. The operating habits and power used by most PSK operators are perfectly compatible with our baluns, Line Isolators and antennas. IMD levels will not be elevated and the typical duty-cycle is not significant when running power below 100 watts on PSK.

### B1-2K Plus

<table>
<thead>
<tr>
<th>Balun Type</th>
<th>Current</th>
<th>1:1</th>
<th>80 - 6 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio</td>
<td>Nil</td>
<td>50-ohms</td>
<td>HF/VHF ferrite</td>
</tr>
<tr>
<td>Operating Bandwidth</td>
<td>Nil</td>
<td>1.5 kW if SWR &lt;3:1</td>
<td></td>
</tr>
<tr>
<td>Power Loss, dB</td>
<td>Nil</td>
<td>300 watts</td>
<td></td>
</tr>
<tr>
<td>Saturation Resistant?</td>
<td>Yes</td>
<td>Excellent</td>
<td></td>
</tr>
<tr>
<td>Internal Xmsn line Z</td>
<td>Yes</td>
<td>Excellent</td>
<td></td>
</tr>
<tr>
<td>Core type, Ferrite</td>
<td>50-ohms</td>
<td>SO-239</td>
<td></td>
</tr>
<tr>
<td>SSB/CW Power @ 3.5 MHz*</td>
<td>HF</td>
<td>Wire</td>
<td></td>
</tr>
<tr>
<td>SSB/CW Power @ 50 MHz</td>
<td>4 kW</td>
<td>2.3” x 8”</td>
<td></td>
</tr>
<tr>
<td>Output Balance</td>
<td>Excellent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Variation Tolerance</td>
<td>Excellent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Connector</td>
<td>SO-239</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Connector</td>
<td>Wire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>2.3” x 8”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The B1-2K follows the same tradition of the uncompromising performance established by the incomparable C1 and B4 baluns. The C1-2K balun was produced nearly 20 years ago and is not in current production. It has been replaced with newer models.) The B1-2K is built into a conventional case with eyebolts. It is here that the similarity with other products ends. The B1-2K is a full power balun. The RADIO WORKS’ design brings the wires from the balun’s windings directly outside the case so you may solder them directly to your antenna wire.

The Best, Low Cost Current Balun

### B1-4K Ultra

<table>
<thead>
<tr>
<th>Balun Type</th>
<th>Current</th>
<th>1:1</th>
<th>160 - 10 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio</td>
<td>Nil</td>
<td>50-ohms</td>
<td>HF/VHF</td>
</tr>
<tr>
<td>Operating Bandwidth</td>
<td>Nil</td>
<td>4 kW</td>
<td></td>
</tr>
<tr>
<td>Power Loss, dB</td>
<td>Nil</td>
<td>Excellent</td>
<td></td>
</tr>
<tr>
<td>Saturation Resistant?</td>
<td>Yes</td>
<td>Excellent</td>
<td></td>
</tr>
<tr>
<td>Internal Xmsn line Z</td>
<td>Yes</td>
<td>SO-239</td>
<td></td>
</tr>
<tr>
<td>Core type, Ferrite</td>
<td>50-ohms</td>
<td>Wire</td>
<td></td>
</tr>
<tr>
<td>SSB/CW Power @ 3.5 MHz*</td>
<td>HF</td>
<td>2.3” x 8”</td>
<td></td>
</tr>
<tr>
<td>SSB/CW Power @ 50 MHz</td>
<td>4 kW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Balance</td>
<td>Excellent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Variation Tolerance</td>
<td>Excellent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Connector</td>
<td>SO-239</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Connector</td>
<td>Wire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>2.3” x 8”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

By popular request, I’ve brought back the B1-4K, the maximum isolation version of the B1-5K. The power rating is 4 kW PEP and frequency range is 160 - 10 meters.

The isolation factor of the B1-4K Ultra is about 10 times that of the B1-5K and more than 20 times the isolation provided by other manufacturer’s baluns.

### B1-5K

The B1-5K’s specifications are impeccable. It is as close to a laboratory quality unit as we can get with an economical balun made to handle high power. The B1-5K has a nearly flat reactance curve from 160 meters to 6 meters. I do not know of another balun with this combination of precision, specifications, high power rating, and construction quality.
If the manufacturer of your beam does not specify a particular balun for your beam, use the Y1-5K, a T-4 or T-4 Plus (see the note in the previous column). Unless a specific balun is part of the antenna’s matching system, and this is not usually the case, substituting the Y1-5K will not adversely affect antenna matching.

Adding the Y1-5K or T-4 Line Isolator can improve the front-to-side and front-to-back ratios in many beams by maximally isolating the feed line from the beam. For beams fed directly with coax and those using coiled-coax choke baluns, consider using the T-4 Line Isolator as an alternative to the Y1-5K. The T-4 is an excellent choice for all unbalanced, directly fed beam antennas.

### Specifications

<table>
<thead>
<tr>
<th>Y1-5K</th>
<th>B1-200</th>
<th>B4-100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balun Type</td>
<td>Current</td>
<td>Voltage</td>
</tr>
<tr>
<td>Ratio</td>
<td>1:1</td>
<td>4:1</td>
</tr>
<tr>
<td>Operating Bandwidth</td>
<td>80 - 10 m</td>
<td>80 - 10 m</td>
</tr>
<tr>
<td>Power Loss, dB</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Saturation Resistant?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Internal Xmax line Z</td>
<td>50-ohms</td>
<td>50-ohms</td>
</tr>
<tr>
<td>Core type</td>
<td>Ferrite</td>
<td>Ferrite</td>
</tr>
<tr>
<td>SSB/CW Power @ 3.5 MHz*</td>
<td>200 W if SWR &lt;3:1</td>
<td>200 W if SWR &lt;3:1</td>
</tr>
<tr>
<td>Output Balance</td>
<td>Excellent</td>
<td>Excellent</td>
</tr>
<tr>
<td>Load Variation Tolerance</td>
<td>Excellent</td>
<td>Excellent</td>
</tr>
<tr>
<td>Input Connector</td>
<td>SO-239</td>
<td>SO-239</td>
</tr>
<tr>
<td>Output Connector</td>
<td>Wire</td>
<td>Wire</td>
</tr>
<tr>
<td>Size</td>
<td>1.5” x 4.8”</td>
<td>1.5” x 4.8”</td>
</tr>
</tbody>
</table>

*Important: SSB/ CW duty-cycles only. Not rated for AM, RTTY or other high duty-cycle modes.

Our new 200 watt baluns offer the same outstanding performance as the B1-2K and the B4-2K. Only the package and components are smaller to meet the need for a physically small balun for barefoot, QRP, SWL, barefoot rigs, stealth and similar interests.

Special cores and high quality wire rated for high temperature and high dielectric ratings are used in this balun series. Now you have the parts you need to build small, carry-along antennas or those hidden, stealth antennas you've been planning. Finally, you have a precision, high spec. balun in a small size to meet your special needs.

### Applications:

- Open-wire to coax interface, external to the operating position. Use with tuner.
The RADIO WORKS
1-800-280-8327   http://www.radioworks.com

6

Baluns work best at low to moderate impedance levels. Often, a RemoteBalun will be used to drive very high impedance loads. Efficiency suffers when any balun operates under highly mismatched conditions. The power rating of the balun must be down-rated as the efficiency falls.

The RemoteBalun™ has more of everything - higher power rating, a wider load operating range, and a high efficiency design. A new, custom-made transmission line is used in the RemoteBalun™ to achieve this improved level of performance. This means that more power is delivered to the antenna, and you have a bigger signal!

Power Rating - Important

Putting a specific value on this specification is not possible because the power rating depends on so many factors. The load impedance and reactance presented to the RemoteBalun, combined with the operating frequency and duty cycles are interrelated factors which must be taken into account. The 1500 watt power rating assumes normal duty cycle modes (CW and SSB) with the balun operating into a moderate impedance. Monitor your SWR on your tuner's SWR meter. Any drift in SWR while operating may indicate that the RemoteBalun™ is overloaded. Reduce power or change the length of the ladder line feeding the antenna to lower the lead Z. This may reduce the impedance to tolerable levels.

1.5 kW, 4:1 Broadband BALUN

<table>
<thead>
<tr>
<th>Balun type</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio</td>
<td>4:1</td>
</tr>
<tr>
<td>Operating Bandwidth</td>
<td>80 - 10 m</td>
</tr>
<tr>
<td>Power Loss, dB</td>
<td>&lt;0.8 dB nominal</td>
</tr>
<tr>
<td>Saturation Resistant?</td>
<td>Yes</td>
</tr>
<tr>
<td>Internal Xmsn line Z</td>
<td>40-ohms equivalent</td>
</tr>
<tr>
<td>Core type</td>
<td>HF ferrite</td>
</tr>
<tr>
<td>SSB/CW Power @ 3.5 MHz*</td>
<td>1.5 kW* if SWR &lt; 3:1</td>
</tr>
<tr>
<td>Output Balance</td>
<td>Good</td>
</tr>
<tr>
<td>Load Variation Tolerance</td>
<td>Good</td>
</tr>
<tr>
<td>Input Connector</td>
<td>SO-239</td>
</tr>
<tr>
<td>Output Connector</td>
<td>Wire</td>
</tr>
<tr>
<td>Size</td>
<td>3.5 x 9.5&quot; overall</td>
</tr>
</tbody>
</table>

B4-1.5K

| B4-2KX | 2x Ferrite |

Balun Type
 Ratio
 Operating Bandwidth
 Power Loss, dB
 Saturation Resistant?
 Internal Xmsn line Z
 Core type
 SSB/CW Power @ 3.5 MHz* |
 something special
 Output Balance
 Load Variation Tolerance
 Input Connector
 Output Connector
 Size

B4-2K

| B4-2K | 1.5 kW if SWR < 3:1 |

B4-2KXX

| B4-2KXX | 2 x Ferrite |

The B4-2KXX is the Only 4:1 Broadband Current Balun

Current-type™ baluns have several major advantages over common Voltage-type baluns. Simply stated, Current-type™ baluns are more tolerant of imperfect loads while providing excellent output balance and feedline isolation. Very wide bandwidth and high power operation are additional characteristics of all RADIO WORKS’ Current-type™ baluns. The electrical specifications of each RADIO WORKS’ balun far exceed industry standards.

Prices and specifications are subject to change without notice.

Something Special - The B4-2K is a high quality 4:1 balun. Special ferrite toroids manage reactance and provide the very high inductance values necessary in an effective 4:1 balun. Problems with other 4:1 baluns now on the market include low winding inductance, leakage inductance, high loss, poor balance, and inferior construction. In comparison, we use large, efficient, toroid cores, heavy, high-voltage wire, and special winding techniques. This combined with our exclusive L-C compensation networks achieves wide bandwidth with a high power safety factor. It's an unbeatable combination. It's an unbeatable balun.

The B4-2KX is the Only 4:1 Broadband Current Balun

Current-type™ baluns have several major advantages over common Voltage-type baluns. Simply stated, Current-type™ baluns are more tolerant of imperfect loads while providing excellent output balance and feedline isolation. Very wide bandwidth and high power operation are additional characteristics of all RADIO WORKS’ Current-type™ baluns. The electrical specifications of each RADIO WORKS’ balun far exceed industry standards.
T-4, T-4 Plus & T-4G, T-4G Plus

Used at "Voice of America" to solve ground loop problems.
Nothing Else Even Comes Close!

The T-4 Plus

The “Plus” versions of the T-4 add increased isolation at higher frequencies. With most of today's new rigs featuring all bands including 6 meters, we've developed a Line Isolator for these new rigs. You get all of the performance of the T-4, plus the added performance of improved ferrites which work well into the VHF range.

T-4G Plus

The T-4G Plus is the grounded version of the T-4 Plus. Its ground strap provides a direct path to earth so that RF traveling along the outside of the coaxial cable's shield sees a path straight to ground. Any stray RF heading for your shack sees only a very high impedance and seeks the direct ground path. The T-4G Plus should be located directly at a properly installed ground rod or other station ground system. In applications where access to earth ground is not possible, use the T-4 Plus.

Use jumpers and connectors of your choice.

All Line Isolators have SO-239's at their input and output. This permits you to use jumpers of the required length, with the connector of your choice for the application.

Type: Current
Ratio Input/Output: 1:1
Design Impedance: 50 ohms
Internal XMSN line Z: 50 ohms
Bandwidth:
  160-10 T-4, T-4G
  160-6 m T-4+, T-4-500, T-5G

Winding Z @ 3.5 MHz: >33 K (All T-4 & T-4G) 75K (T-5G)
Winding Z @ 14 MHz: >80 K (All T-4 & T-4G) 50K (T-5G)
Winding Z @ 50 MHz: >4 K (T-4+), 2K (T-4-500), >1K (T-5G)
Coefficient of coupling: 100%
Power Loss in dB: > 1500 watts (All T-4 models but T-4-500)
  500 watts (T-4-500)
Input connector: SO-239
Output connector: SO-239

* CW/SSB duty-cycle only. Not rated for AM, RTTY or other high duty-cycle modes. Derate power @ 28 MHz.

T-5G

An Even Better Line Isolator

In communications equipment, signals travel in two directions. The receiver can pick up trash collected by a coax cable's shield acting as a random length antenna. The ground strap nearest the antenna provides a direct path to ground for RF impressed on the shield from outside sources.

When transmitting, if the transmitter is not well grounded, unwanted RF can appear on the station's ground system and be conducted and radiated by the coax's shield. Thus, for maximum isolation, two ground straps are used.

What we are doing here is to provide a direct path to ground, eliminating the condition where one end of the Line Isolator is looking at a very high inductive reactance before going to ground.

In some cases, you will only want to ground one end of the T-5G. This is best determined experimentally.

Prices and specifications are subject to change without notice.
Do's and Do Not's of Antenna Installation

Do's

Inspect coaxial cable for flaws in its jacket. Don't be concerned about minor jacket irregularities.

Pay particular attention to station grounding. This is especially critical when your station is not on the ground floor.

In most cases, it is OK to bury standard coax. You can add some protection by running it inside standard garden hose. Bury coax below the frost line.

Carefully seal any coaxial connector exposed to weather. Follow the procedure outlined in this publication.

Check available space before purchasing an antenna. Make sure the antenna will fit. Reasonable bending of the elements will not hurt. Elements must never be bent back on themselves. If space is limited, consider alternatives.

To avoid kinks in antenna wire, roll out the wire using a hand-over-hand technique.

Antennas will work in trees. In most cases, it doesn’t hurt if the wire touches leaves, though you might set a leaf or two on fire. If you want, consider using insulated wire.

Definitely use Dacron™ antenna support line. Nylon, Polypropylene, Hemp, Cotton, or other rope types are not suitable in this application. Use Kevlar™ only if you don’t want any stretch in support lines, however some stretch is desirable.

Install your antenna as far away as possible from your or your neighbor’s house. Antenna installations close to houses are great candidates for RFI and TVI problems.

Don'ts

Do not change the length of manufactured antennas. Antenna lengths are critical.

Do not roll up the ladder line in G5RVs or SuperLoops.

Do not bury Ladder Line or let it get close to the ground or anything metal. Do not run it along side other cables. It must be in the clear.

Do not rely too much on inexpensive antenna analyzers. You can’t be sure what parameter you’re actually measuring.

Do not support a CAROLINA WINDOM so that its Vertical Radiator is closer than 15’ minimum to a tower or other metal object. If less than 15’, direct it away from the metal pole or tower at an angle.

Do not tie down the Vertical Radiator of a CAROLINA WINDOM. The weight of the coax and Line Isolator is usually enough to keep the Vertical Radiator in place.

Don’t lay the CAROLINA WINDOM’s Vertical Radiator on your roof.

Don’t use heavy weights in combination with pulleys to hold an antenna taut. Free falling weights accelerate the antenna like a bow string. The wire may fail.

Don’t worry about coax losses. With a coax length less than a couple of hundred feet, when the SWR is below 5:1 or so, you can’t measure the loss in signal strength. Use a tuner to make your rig happy when the SWR is higher than your rig will accept.
Here are the new Matching Transformer and Line Isolator compared to the standard Matching Transformer.

This is the new Low Profile CAROLINA WINDOM 80 LP

Shown is the complete assembly, including the Matching Transformer, Line Isolator and new Vertical Radiator, #16 hard drawn wire and end insulators.

Standard Type - This is the conventional CAROLINA WINDOM made with full-size components, #14 stranded, hard-drawn stranded antenna wire and a 1.5 kW power rating. Other wire types are available on special order.

LP Models - These are the new ‘Low Profile’ versions of the standard CAROLINA WINDOM. The only difference are the smaller sized components, the #16 antenna wire and the 600-watt power rating. Performance is the same.

Here are the new Matching Transformer and Line Isolator compared to the standard Matching Transformer.

Features

Outstanding on all bands covered
One antenna that does it all
Usually low angle radiation pattern
Easily beats G5RV, dipoles, trap antennas
Enhanced, low angle, Vertical Radiator
High efficiency - no ground losses
Ground independent - radials not needed
The secret is the inverted VERTICAL RADITOR
Matching Unit enhances vertical radiation
Use Transmatch

Chosen by ‘Big Gun’ DX’ers and DX’peditions.

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>CW 160</th>
<th>CW 80</th>
<th>CW 40</th>
<th>CW 40+</th>
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</thead>
<tbody>
<tr>
<td>Coverage</td>
<td>160-10</td>
<td>80-10</td>
<td>40-10</td>
<td>40-10</td>
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<tr>
<td>Overall length</td>
<td>265’</td>
<td>135’</td>
<td>66’</td>
<td>66’</td>
</tr>
<tr>
<td>Short leg</td>
<td>83’</td>
<td>50’</td>
<td>25’</td>
<td>25’</td>
</tr>
<tr>
<td>Long leg</td>
<td>182’</td>
<td>83’</td>
<td>41’</td>
<td>41’</td>
</tr>
<tr>
<td>Vertical Radiator</td>
<td>22’</td>
<td>22’</td>
<td>10’</td>
<td>18’</td>
</tr>
<tr>
<td>LP models have the same dimensions</td>
<td></td>
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</tbody>
</table>

Recommended ht. >30’ >35’ >25’ >30’

Gain
As much as 10db*

Feedline
50-ohm, RG-8X recommended

Tuner
Manual tuner recommended. Will work with newer rigs with automatic tuners.

Power rating
All models rated 1500 watts CW/SSB**

* Based on user reports and field evaluations.

** CW/SSB duty-cycles only. Not rated for AM, RTTY or other high duty-cycle modes.

The CAROLINA WINDOM was the first antenna to take advantage of VERT™ (Vertically Enhanced Radiation Technique). VERT™ is a radiating feed line technique that produces a controlled, low angle vertical radiation pattern. The effect is absent from most ordinary antennas. Field tests, user reports and seven product reviews confirm that the CAROLINA WINDOM will give you a remarkable performance advantage.

The off-center fed CAROLINA WINDOM provides unusually good performance on all bands covered, including the WARC bands. It’s an ideal antenna for those of you who do not wish to use a tower and beam. The CAROLINA WINDOM is also ideal for those of you who want a high performance antenna to cover the bands not covered by your beam antenna.

The Real Secret

It’s the Vertical Radiator. Combined with the Dedicated Matching Unit and special Line Isolator, it is responsible for the low-angle, vertical radiation pattern.

Far more complete details are available on our web site at www.radioworks.com

Automatic tuner Range Extender

MFJ-914 1.8 - 30 MHz, 300 watts. Many auto-tuners do not have the necessary tuning range to match a CAROLINA WINDOM. The MFJ-914 solves the problem for only about $60. Or, use the fantastic, new LDG or MFJ automatic tuners.

Use any 50-ohm coax. RG-8X is recommended. Any length may be used in most installations.

Prices and specifications are subject to change without notice.
The “Short” Versions of the CAROLINA WINDOM

**Formally known as the CAROLINA BEAM**

The “Short” CAROLINA WINDOM™

The Short CAROLINA WINDOM™ is the antenna for everyone - DX, rag chewer, or net operator. You get full CAROLINA WINDOM performance on the lower bands and enhanced performance on the higher bands, and, all that in a shorter version of the antenna. There is no reason everyone shouldn’t take advantage of their secret weapon.

**The Short “CAROLINA WINDOM” combines the best characteristics of the CAROLINA WINDOM and the ‘BOBTAIL CURTAIN’ BEAM.**

The Short CAROLINA WINDOM™ is part CAROLINA WINDOM and part Bobtail Curtain (sometimes called a “Half-square”). It takes advantage of the best characteristics of both antennas. You have the performance advantages of the Bobtail Curtain, combined with the additional performance and convenience of the CAROLINA WINDOM. The Short CAROLINA WINDOM™ thus takes the lead in simple, high performance antenna systems. It sets the new standard for high performance, all band, wire antenna systems.

The Short CAROLINA WINDOM™ has three vertical radiators directly interconnected by the single horizontal radiator. It is this unique integration of horizontal and vertical radiation components that accounts for the outstanding performance of this antenna system.

**PERFORMANCE**

I compared the Short CAROLINA WINDOM 40™ (40-10 meters) and CAROLINA WINDOM 40™ against our G5RV. During daylight operation when incoming signals arrive at high angles, all antennas perform similarly, with the G5RV coming in last. The Short CAROLINA WINDOM 40™ was down a bit from the CAROLINA WINDOM 40™ due to the Short CAROLINA WINDOM’s extremely low takeoff radiation angle. However, at night, or anytime the band lengthens for long-haul DX, the Short CAROLINA WINDOM™ outperforms the G5RV by a couple of ‘S-units,’ sometimes more. Of course, the improvement depends on direction and distance. The CAROLINA WINDOM 40™ outperformed the G5RV nearly as well as the Short CAROLINA WINDOM 40™ until the bands really lengthened out and then the Short CAROLINA WINDOM 40 really moved to the front of the pack.

The Short CAROLINA WINDOM’s performance and characteristics are similar to the full-size CAROLINA WINDOM. The shorter length is the result of folding the antenna to provide the two extra Vertical Radiators. The result is higher performance (depending on propagation).

The phased multiple vertical radiator sections are the reason for the outstanding low-angle, long-haul performance of the Short CAROLINA WINDOM™. The three vertical sections generate a very low angle radiation pattern while radiation from the horizontal portions of the antenna provides a medium-to-high angle pattern.

**Short CAROLINA WINDOM**

For long-haul operation the “Short” CAROLINA WINDOM is in a **class by itself**. When the band gets hot, you get hotter - no more standing in line waiting your turn. And, you don’t have to give up casual operating, just because the “Short” CAROLINA WINDOM is a DX antenna. Non-DX’ers need a big signal, too. Besides, the “Short” CAROLINA WINDOM 80™ is **field reconfigurable**. You can select just the right combination of medium-angle and low-angle patterns. In fact, you can configure it as a standard CAROLINA WINDOM if you wish. It’s the perfect, high performance, antenna choice for the DX’er, traffic-handler, rag-chewer, or dedicated SWL.

The “Short” CAROLINA WINDOM requires far less space than other high performance antennas. Just look at the overall length in the specifications. Also, the antenna will work at reasonable heights. When the band opens, you will be ready!

Visit our web site for more detailed information

Prices and specifications are subject to change without notice.
160 meter operation

The characteristics of the CAROLINA WINDOM outlined on the previous pages hold for the CAROLINA WINDOM 160 Special and the CAROLINA WINDOM 80 Special.

The CAROLINA WINDOM was designed for 80-10 meter operation with optimization on 80, 40, and 20 meters. It has always been a top performer on 80 meters. Now, with its new, improved DMU and Line Isolator, the CAROLINA WINDOM 160 Special may be used on 160 meters, too. If you want to get your feet wet on 160 meters, but can't put up a full-size 160 meter antenna, the CAROLINA WINDOM 160 Special is a good choice. You don't give up any of the CAROLINA WINDOM's superior performance on 80-10 m, and you pick up acceptable 160 meters performance in the bargain. Performance on 160 m will be down one or two S-units from a full-sized CAROLINA 160.

Using the CW 40 on 80 meters is possible for the same reasons.

Note: Power Reduction on the lowest frequency band. The CAROLINA WINDOM has been modified to permit operation on the band lower than usual for the length of the antenna. You MUST reduce transmitter output power to under 500 watts PEP, CW/SSB.

Excessive power levels will destroy the Dedicated Matching Transformer or Line Isolator.

- IMPORTANT - CAROLINA WINDOM tower mounting technique

Keep the Vertical Radiator section well away from conductive objects such as towers, masts, gutters, metal roofing, etc. Detuning the Vertical Radiator will destroy the excellent performance of the CAROLINA WINDOM.

To facilitate tower mounting, an extra end-insulator is included and you can install it on the long leg of the antenna. Use this insulator to support the antenna from a standoff on the tower. This standoff can be any length over 2 feet. The Vertical Radiator and LINE ISOLATOR** should be held at least 15 feet away from the tower. Full details are given in the instruction manual.

The RADIO WORKS’ ‘G5RV PLUS’ has two outstanding improvements over the many copycat versions of the G5RV on the market. First, I have added a Y1-5K, our precision, Current-type balun at the transition between the balanced stub and unbalanced coaxial cable feed line. The second improvement is the choice and length of matching stub.

After careful analysis, a change in stub resonance and a specific feed line length was necessary to achieve the best match on each band. Still, the match is not perfect on any band. It is lowest on 20 meters where the SWR drops to around 1.8:1 under ideal conditions. On all other bands, the SWR will be higher. Even with a slightly elevated SWR, losses in the system are low. Unless you are using a rig with tube finals that can accept a moderately high SWR, an antenna tuner is necessary. This advice goes for any G5RV. Contrary to what many antenna makers claim, the G5RV requires a transmatch unless your rig can tolerate a moderately high SWR.

Combining these technical improvements with the G5RV’s own attributes produces a very good antenna system. The RADIO WORKS' NEW G5RV is an excellent combination of performance modifications, high quality, and high power parts. You can't find a G5RV that works better than this one.

Watch out for all the cheaply constructed G5RV antennas now made by just about everyone with a soldering iron. Sure, a G5RV is a “no brainer” when it comes to making an antenna. It’s simple, and anyone can make one and put it on the market. Of course, if you want one that will stay in the air more than a few months, take a look at the construction. One major manufacturer uses little pieces of printed circuit board for insulators. Quality parts are the major ingredients in any successful antenna. Don’t accept less than the best.

** CW/SSB duty-cycles only. Not rated for AM, RTTY or other high duty-cycle modes.
New Dimensions - Even Better performance

**SuperLoop 80**

**SPECIFICATIONS**

FREQ. COVERAGE: 80 - 10 meters
POLARIZATION: Both vertical and horizontal
MATCHING METHOD: Combination of reactance + stub & dedicated tuning unit.
TUNER NEEDED: Yes, all bands
POWER RATING: 1500 Watts, CW/SSB**

**Coax Length is not critical. Any length may be used.**

The SuperLoop 80™ is an outstanding performer on all bands, 80 - 10 meters. Combine all band operation, coax feed, with gain on all bands, and the SuperLoop 80™ is the obvious choice in a multiband DX loop antenna system.

New Dimensions - Even Better performance

**Simply Terrific**

80 - 10 + 30, 17, 12 m WARC

The RADIO WORKS’ SuperLoop 80™ is a high performance, full size, full-wave 80 meter loop antenna. On 40 meters the SuperLoop 80™ is a 2 wavelength open loop or Bi-Square. The stub in the top leg of the antenna opens the loop when operating on 40 meters and selected other bands. This improves the antenna’s radiation pattern. Its gain is around 4 dB, but it will seem much higher due to its excellent, low angle, radiation pattern.

The Dedicated Matching Unit with all the other components in the antenna work together to provide a well managed SWR on all bands. While the SWR is not below 2:1, it is low enough to permit the use of coaxial cable. System losses are low.

The SuperLoop 80™ is an outstanding performer on all bands, 80 - 10 meters. Combine all band operation, coax feed, with gain on all bands, and the SuperLoop 80™ is the obvious choice in a multiband DX loop antenna system.

**Many of the newer rigs with automatic antenna tuners will tune the SuperLoop on all bands. If you have an older rig, you can still use your auto-tuner if you add the MFJ-914 tuning range extender. MFJ & LDG automatic tuners will work with the SuperLoop as do all manual tuners.**

**Prices and specifications are subject to change without notice.**

1-800-280-8327   http://www.radioworks.com

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**Custom Modified Antennas**

We can build CAROLINA WINDOMS and dipoles with insulated wire. It is not possible to use insulated wire with loop antennas. The wire will not twist back on itself well enough to hold an insulator in place.

**Wire types available** -

**#13 (19-strand) VariFlex copper-clad steel insulated wire.**

Very tough, slick, black insulation.

**#12 (259-strand) PE insulated copper wire**

A copper wire with a tough black insulation. Not as stiff as #13 and not as strong.

**#14 (168-strand) PE insulated copper wire**

Same as above but with #14 wire.

**#12 (259-strand) PVC insulated copper**

A very flexible insulated copper wire.

**#14 (168-strand) PVC insulated copper**

As above with #14 wire.

**#12 (7-strand) Copper-clad steel Uninsulated**

This is the standard copper-clad (copperweld-type) wire.

To calculate the price of the antenna, simply multiply the cost, per foot, of the wire times the length of the antenna. Add the building cost ($10) plus the price of the antenna and the cost of the wire.

**Example** - A CAROLINA WINDOM 80 is 133 feet long. #13 wire is desired. Multiply 133 (wire length) times the current wire price = cost of the antenna. Add to that the building cost of $10.

**CAROLINA WINDOM Shortwave**

Shortwave version of the CAROLINA WINDOM Shortwave version of the CW 40. Simply excellent and priced at $125.

**Ultima Dipole™**

High power conventional dipoles. Available in 2 kW and 3 kW models. Top quality parts. Models for any band. Prices range from $60 to $125.

See our web site for more antennas and complete details.
All cables used outside in the weather MUST be properly sealed. (The technique detailed on our website is the one I use... Jim) Here is a kit of everything you’ll need to seal a couple of dozen RF connectors. Illustrated instructions are included.

Contains -
1 roll of 3/4" x 60' black electrical tape
1 roll of 3/4" x 30' black cold shrink tape
1 roll of 1/2" x 12' Coax-Seal
1 tube of STUF

Consider purchasing extra RFI cores, jumpers and Line Isolators™ and weatherproofing for emergency situations

Sealing coaxial connectors and other antenna components is a multi step operation. Connectors are sealed from the inside and the outside. STUF™, Coax-Seal™, Cold-shrink tape, and quality electrical tape are all used to ensure lasting and reliable weatherproofing. When all products are applied properly, you should enjoy years of trouble-free service. Such confidence in the long term performance of your antenna system is well worth the slight extra effort.

Coax-Seal® is your first line of defense in your coax cable’s war against the ruinous effects of the weather. CoaxSeal® is a hand-moldable, plastic mastic, suitable for sealing a wide variety of materials, metals, plastics, and vinyls to accomplish a tenacious and waterproof, long-lasting seal for coaxial cable. CoaxSeal® is black, tacky, nonconductive, non-contaminating, 100% waterproof, and has low vapor transmission rate. It has self-healing qualities.

| #101 Pack | 1/2" x 10' |
| #104 Roll  | 1/2" x 5' |
| #105 Roll  | 1/2" x 12' |
| #105 Box  = 4 rolls |
| #106 Roll  | 1" x 12' |
| #106 Box  = 4 rolls |

See W4THU’s 5-step, foolproof, sealing process for connectors. It’s been used under saltwater for years without failure. Details on our web site.

Coax & Connector Weatherproofing

STUF

This a viscous white compound with dielectric properties that exceed those of the connectors to which it is applied. STUF forces air and moisture out of the connector from the inside during assembly, sealing it from the inside. One tube will fill several connectors. Tube contains a volume of 3.2 cubic inches, enough for a couple of dozen PL-259’s.

Do not use without Coax Seal or Cold Shrink outer protection.

Cold Shrink Tape

Ideal moisture barrier
Resists sunlight
Long-term protection
No heat needed, just wrap

Cold Shrink tape is wrapped around the connector with a slight stretch. After a few hours, the tape shrinks and forms a solid weatherproof seal. I like to use Cold Shrink tape over a layer of Coax-Seal as you will see on the next page. Illustrated instructions are included in the product manual.

3/4" x 30' roll
Up to this point, nearly all popular RFI beads were made with #73 material. As you can see from the chart above, they were useful from 1 through about 25 MHz. To cover the frequencies up to 300 MHz you would have to switch to #43 material. Now, at the RADIO WORKS, our new RFI “core,” which replaces about 6 beads, covers the spectrum from below 1 MHz all the way up to 300 MHz. Just as important, the impedance of the new bead is higher than previous types.

Each product on these two pages is important in the war on TVI and RFI, but the place to start is with the RFI Quick Fix™. The RFI Quick Fix™ is the installation of one or more of the RADIO WORKS’ Line Isolators. Installing our Line Isolators is the single most effective thing you can do to solve RFI problems or to prevent them in the first place. All those interconnecting cables are an easy entry point for RF to get inside your shack and equipment. The MFJ-854 should be in everyone’s arsenal of RFI test gear.

RFI or TVI prevention is not complete unless the RFI Quick Fix™ is installed.

The RADIO WORKS has all the right tools to get the job done properly.

Prices and specifications are subject to change without notice.
The RADIO WORKS
1-800-280-8327 http://www.radioworks.com

MFJ-931 Artificial RF Ground

Creating an artificial RF ground effectively places your rig near actual earth ground potential even if your rig is on the second floor or higher where no earth ground is possible. Reduces chances of TVI/RFI. The MFJ-931 creates an artificial RF ground. It resonates a random length of wire thrown along the floor and produces a tuned counterpoise. When used with a conventional ground system, the MFJ-931 places a far away RF ground directly at your rig — no matter how far away it is. It reduces the electrical length of the ground connection wire to virtually zero by tuning out its reactance. Tune with the built-in RF ammeter. 1.8 - 30 MHz.

MFJ-264      MFJ-260C

Dummy Loads

MFJ-264       - 50 ohm, 1500 watts for 10 seconds, 100 w continuously. 1.8 - 650 MHz. SWR < 1.3:1 @ 650 MHz. Dry, air cooled.

MFJ-260C      - 300 watt, air cooled, noninductive resistor. Full load for 30 seconds, derated curve to 5 minutes. SWR <1.5:1 @ 150 MHz, <1.1:1 @ 30 MHz.

MFJ-704 Low Pass Filter

Passband - 1.8 - 30 MHz
Cutoff frequency 40 MHz
Power capacity 1500 w
Impedance 52 ohms

Window Feedthrough Panels

Bring your cables into your shack the easy way.
I've been suggesting this method of cable entry for years. Now, it's easy to do. Just purchase one of these easily installed panels and your shack access problems are solved.

PaneRelief™ adjustable feedthrough panel. Fits windows 19.5” to 32.5” wide. Also available in 19.5-32.5” and 25.5 - 38.5” widths. Clear Plexiglas, includes connectors. Great when you can’t drill holes in the house. Includes two double-female connectors.

PainRelief™ panel with 4 UHF feedthrough connectors. Fits windows 20.5” to 32.5” wide. Wider width is available. Additional connectors are available on special order. Order as many as you like. Each added pair increases the minimum width by about 1.5”. UHF/UHF, UHF/BNC, BNC/BNC $ per pair additional

Ladder line (single) $ additional

Prices and specifications are subject to change without notice.

The RADIO WORKS 1-800-280-8327 http://www.radioworks.com
MFJ Tuners

We always have the latest MFJ models.

MFJ-962D
- Rated 1500 watts PEP Input
- 800 watts PEP Output
- Switch selected wide range inductor
- Peak and average reading cross-needle
- New, more accurate directional coupler
- 6 position ceramic antenna switch
- 2 coax lines (direct or through tuner)
- Random wire and balanced output
- 4:1 current balun

MFJ-986
- Differential-T Circuit
- Rated 3000 watts PEP Input Power
- 1500 watts PEP Output Power
- Roller inductor, 3-digit turns counter
- Peak and average reading cross-needle
- New, more accurate directional coupler
- 6 position ceramic antenna switch
- 2 coax lines (direct or through tuner)
- Random wire and balanced output

Current balun

Meter light uses 12 VDC or MFJ-1312B

MFJ-949E
- Rated 300 watts
- Built-in 300 watt dummy load
- Peak and average reading cross-needle
- Selectable 300/30 watt meter ranges
- 8 position ceramic antenna switch
- 2 coax lines (direct or through tuner)
- Random wire and balanced output
- 4:1 balun for balanced lines

Meter light uses 12 VDC or MFJ-1312B.

MFJ-941E
- Rated 300 watts
- Selectable 300/30 watt meter ranges
- 8 position ceramic antenna switch
- 2 coax lines (direct or through tuner)
- Random wire and balanced output
- 4:1 balun for balanced lines

Meter light uses 12 VDC or MFJ-1312B, $14.95

MFJ-976
1500 watt balanced tuner
- 12-2000 ohm tuning range
- 1.8-30MHz continuous tuning range
- For all balanced line types
- Four separate 500 pf variables
- True active peak reading meter
- Heavy 1:1 current balun give superb balance and stays cool at full power
- Peak and average meter readings
- True active peak reading lighted Cross-Needle SWR/Wattmeter lets you read SWR, true peak or average forward and reflected power all at a glance on 300/ 3000 Watt ranges. The MFJ-976 unit measures 12W x 6H x 5¾D inches.

MFJ-901B
- Rated 200 watts PEP
- Small size, 5” x 2.5” x 6”
- 4:1 balun for balanced lines

Remember to order jumpers to interconnect equipment.

MFJ-989C
- MFJ’s BIG Tuner
- 3 kW PEP SSB input
- 1.5 kW PEP SSB output
- Super heavy duty components
- Massive transmitting capacitors
- “AirCore Roller Inductor
- True Current Balun
- Built-in Dummy Load
- Lexan Front Panel

Meter uses 12 VDC or MFJ-1312B

MFJ-914
Auto-tuner Range Extender
- 1.8 - 30 MHz
- 300 watts
- 7 Load Positions
- Dummy Load Connector
- Ground & bypass
- Ground terminal

Extends the tuning range of your rig’s auto-tuner by a large factor. With this accessory, your rig’s auto-tuner will easily match our CAROLINA WINDOM or SuperLoop or G5RV under nearly all conditions.

Prices and specifications are subject to change without notice.
Custom Jumper

Installing RF connectors is not difficult, but it takes a lot of practice and the correct tools to do it properly and make them look and work right. We have the special tools and install dozens of connectors every day. This custom service usually delays your order only two or three days. Check for availability of Gold PL-259 and New N Silver-Teflon.

Choose connector and coax type

<table>
<thead>
<tr>
<th>Connector Type</th>
<th>9086, 9096</th>
<th>9096F</th>
<th>RG-213</th>
<th>RG-213+</th>
<th>RG-58, 59</th>
<th>RG-8X</th>
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Jumper Price = Sum of cost of connectors installed + price of coax

The connector price is included in the installation charge

Factory Made Jumpers

Unequaled Quality

Quality RG-8X Double Shield RG-8X

Coaxial Jumpers with Molded Strain-relief

Combine the best RG-8X I've ever seen and assemble the PL-259s with precision connector assembly machines and then apply the strain relief boots with expensive molding machines and you have an unequaled RG-8X jumper that's perfect for all of your station's needs. You can't buy better jumpers and they are available now, directly from the RADIO WORKS. The rubber boots are so good that it is all but impossible to pull the connectors apart. Stock up now. Check out the 100' special.

Coaxial Cable Specifications

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<tr>
<th>RG-8X+</th>
<th>Super 240</th>
<th>Double Braid</th>
<th>RG-8X</th>
<th>RG-213</th>
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Attenuation per 100 feet of coax

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<td>2.9</td>
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The values in this chart represent manufacturer's data.

Conductor: al = aluminum  c = copper  tc = tinned copper  bc = bare copper  sc = stranded copper wire  scca = solid copper clad aluminum

Dielectric: p = polyethylene  fp = foam polyethylene

Jacket: I = PVC Polyvinyl chloride  IIA = Non-contaminating  PE = Polyethylene

Prices and specifications are subject to change without notice.

The RADIO WORKS  1-800-280-8327  http://www.radioworks.com

17
**Super 400**

Per ft in 50' increments

Due to its special nature, this cable is available only in 50' increments.

This is a copy of LMR 400 made by one of our most reliable coax manufacturers. Some report that it is better than the original. As you can see from its specifications, its loss is similar to our 9096IIA which is one of the best, low loss coaxial cables of the 9913 type available. It features a solid copper-clad aluminum center conductor and a tough foamed polyethylene dielectric. It's a perfect solid-dielectric alternative to ExtraFlex.

**CONNECTORS:**
- PL-259 - Standard types
- N - Use special 9913 type

---

**ExtraFlex 9096IIA**

10 - 99'

100' - 499'

See web site for spool price

This is International 9096-IIA. This is a top-of-the-line, flexible 9913-type coax. Construction is excellent with a 19-strand center conductor. It bends as easily as conventional RG-8 or RG-213. Will handle the legal power limit even at UHF.

**RECOMMENDATIONS:**
All VHF and UHF installations. HF runs over 200' feet. A must for crank-up towers and rotatable antennas in systems where low loss cables are needed.

**CONNECTORS:**
- PL-259 - Standard types
- N - Use special 9913 type

---

**Bury Flex™**

Per ft in 50' increments

See web site for spool price

Due to its special nature, this cable is available only in 50' increments

It's highly flexible for rotator loops and applications requiring nonrigid coaxial cable. The jacket is Polyethylene, PVC, so this is a true directly buriable cable. Low loss is insured by a slightly enlarged center conductor (vs. 9913) and the high tech foam PE dielectric.

**RECOMMENDATIONS:**
All ExtraFlex 9096IIA applications.

**CONNECTORS:**
- PL-259 - Standard types
- N - Use special 9913 type

---

**SuperCable**

10 - 99'

100' - 499'

SuperCable is International's type 9086. It is a very low loss, double shielded, high quality coaxial cable. 9086 is similar to Belden 9913 but has better braid coverage.

**RECOMMENDATIONS:**
Use for 2 meters and up unless cable runs are over 200'.

**CONNECTORS:**
- PL-259 - Standard types
- N - Use special type, in stock

---

**RG-213**

Call for availability

RG-213 is the standard 50 coax replacing RG-8 which was the popular choice for years. RG-213 is similar to RG-8 but is built to a much higher standard.

**RECOMMENDATIONS:**
All HF installations and short runs on VHF and UHF. Use RG-8X for wire antenna installations due to the size and heavy weight of this cable. Good for HF runs out to 200'.

**CONNECTORS:**
- PL-259 - Standard types
- N - Standard types

---

**RG-213 Plus**

10 - 99'

100' - 499'

There are always ways to improve a product and that is what was done to RG-213 Plus. It features an improved braid and even better quality, non-contaminating jacket.

**RECOMMENDATIONS:**
All RG-213 recommendations apply.

**CONNECTORS:**
- PL-259 - Standard types
- N - Standard types

---

**Premium RG-8X**

10 - 99'

100' - 999'

100' with PL-259 on each end

Premium Quality RG-8X is a low loss, low cost, 50 ohm coax that WILL handle the legal power limit. Losses on HF are only slightly higher than RG-213. LOW cost, LOW weight, and LOW loss make RG-8X a very best buy.

**CONNECTORS:**
- PL-259 - Std types + UG-176
- BNC - Special crimp type

---

**RG-8X Plus**

10 - 99'

100' - 999'

This is an RG-8X size version of the popular LMR-400 type, low loss coax. Gas-injected foam dielectric. 100% shield - bonded aluminium tape plus tinned copper braid. DC breakdown 1500 V. Shield effectiveness is >90dB Top of the Line! Special crimp-on connectors are available. Standard type OK.

**CONNECTORS:**
- PL-259 - Std types + UG-176
- BNC - Special crimp type

---

**Super-240**

10 - 99'

100' - 999'

Factory rated for 1.5 kW @ 30 MHz

This is a heavy duty, top quality, high loss coaxial cable. Used most often for space coast installations. This cable is capable of handling the highest power levels up to 30 MHz.

**See web site for spool price**

Prices and specifications are subject to change without notice.

The RADIO WORKS 1-800-280-8327 http://www.radioworks.com
Antenna Wire, Ground Strap, Ladder Line, Rotator Cable

特殊情况的线缆
# 14 Stranded (7x22) Hard-drawn / ft
This is the standard antenna wire. Stranding is very tight, well beyond industry standards. It is flexible, has long service life, and is easy to use. For all wire antennas up to 150' between supports.

# 14 Stranded (7x22) Copper-Clad / ft
Stronger than #14 hard-drawn. A bit harder to work with. Use when heavy weather is a factor.
See Variflex #14 below.

# 13 Variflex Insulated (19 strand) / ft
#13 copper-clad steel. Extremely tough jacket over a very flexible wire. Combination is about as stiff as hard-drawn 7-strand wire. Use whenever a very strong insulated wire is desired, in trees, for example. This wire is resistant to acid rain and corrosive contaminants in the air. Copper-clad steel wire.

# 26 Variflex Insulated (19 strand) CW / ft
Insulated with a thin, tough, black, polyethylene jacket. This wire is made specifically for hidden antennas. It is extremely strong for its very small size. Use sky colored buttons for insulators, and an antenna made of this wire is nearly impossible to see in the air.

GROUND BRAID
For ground systems. Much more effective than any heavy gauge wire. Tinned for long life.

½” Tinned Copper Braid (CMA aprox. 9600) / ft
1” Tinned Copper Braid (CMA approx. 20,800) / ft
2” Solid Copper Strap .020” thick / ft
.020” x 2” Soft Copper strap is easily bendable. Strap ground rods together. Solder ground wires from each piece of equipment directly to this low inductance strap. Makes a low impedance ground. Most ground strap is only .010” thick or less. This is twice as heavy.

Ground Strap
For connecting ground wires to ground stakes.

Rotator Disconnect
Makes rotator installations easy. Pre-wire the rotator with a plug and jack assembly. No need to try to wire your rotator while on your tower. We use simple 8 pin trailer-type plug and jacks that splice into your rotator line.

Ladder Line
This new, stranded, heavy-duty, poly-coated, window-type, Ladder-Line has become the new standard, replacing the old type made with #18 solid wire. Power rating far exceeds the legal limit.

# 16 stranded, copper-clad conductors, actual impedance is approx. 420-ohms
# 14 stranded, copper-clad conductors, actual impedance is approx. 390-ohms

10-99'
100' - 999'
1000' Spool

Rotator Cable

Flex-Weave™ is a revolutionary hybrid antenna wire. It is strong, doesn’t kink or rust. It is available in bare and insulated versions. Jacket is a high grade polymer PVC or PE. The bare and PVC insulated versions are amazingly flexible. This virtually kink-free wire can be tied into a knot (just like rope) at the insulators. This size is excellent for quads, wire beams, dipoles, and long wires.

Bare Copper
# 14 16-8-strand, bare per foot
# 12 259-strand, bare per foot
100% copper, rope-type construction for strength, ultra-flexibility, and easy handling.

PVC or Polyethylene Insulated
# 14 16-8-strand PVC Insulated. / ft
# 12 259-strand PVC Insulated. / ft
Jacket is a high grade polymer PVC. Color is black.

# 14 16-8-strand PE Insulated.
# 12 259-strand PE Insulated. / ft
Jacket is a tough quality .015” slick black polyethylene. It’s very tough. Perfect for heavy weather. Polyethylene insulation is not as flexible as PVC.

SPECIAL ANTENNA WIRES

#12 259-strand, bare per foot per foot per foot per foot per foot
#14 168-strand, bare per foot per foot per foot per foot per foot
#12 259-strand, PVC Insulated. / ft / ft / ft / ft / ft
#14 168-strand, PVC Insulated. / ft / ft / ft / ft / ft
#12 259-strand, PE Insulated. / ft / ft / ft / ft / ft
#14 168-strand, PE Insulated. / ft / ft / ft / ft / ft

#14 259-strand, clear poly-insulated. / ft / ft / ft / ft / ft
#18 259-strand, clear poly-insulated. / ft / ft / ft / ft / ft

Prices and specifications are subject to change without notice.
The RADIO WORKS 1-800-280-8327 http://www.radioworks.com 19
# RF Connectors - Top Quality, Low Prices

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<thead>
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*Prices and specifications are subject to change without notice.*
## Top Quality, Lowest Prices

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### PL-259

- **Silver & Teflon**
- **Gold & Teflon**
- **Bag of 20**
- **Currently Unavailable - Call**

### 100 foot RG-8X with connectors

- **Top Quality RG-8X**
- **2 PL-259s installed**
- **Molded-on strain-relief**
- **Unbeatable price**

*Prices and specifications are subject to change without notice.*
Synthetic Rope Characteristics

Man-made fiber ropes are stronger and more durable than those made of natural fibers. Most chemicals, rot, or mildew do not affect synthetic rope. Most synthetic rope may be stored wet or dry.

NYLON

Nylon is highly elastic and can absorb sudden shock loads that would break ropes of other fibers. It has very good resistance to abrasion, rot, oils, gasoline, grease, marine growth and most chemicals. Nylon deteriorates more rapidly than Polyester when subjected to direct sunlight. Due to the characteristic stretch of nylon, wire antenna installations will require frequent retensioning of the support ropes.

POLYESTER (i.e., Dacron®)

Dacron® Polyester is not quite as strong as nylon, but has far better resistance to ultraviolet degradation from sunlight. It is not as elastic as nylon and therefore does not stretch as much as nylon. These characteristics are a plus in an antenna support rope. Other than these two distinctions, the nylon and polyester characteristics are practically the same.

POLYPROPYLENE

This is a strong, lightweight rope. It is waterproof, and resistant to rot, oils, gasoline and most chemicals. Polypropylene is subject to rapid deterioration when exposed to direct sunlight, so its life is very short when used as an antenna support rope.

POLYETHYLENE

Polyethylene is similar to Polypropylene, but is slightly heavier. It is not as strong. It, too, deteriorates quickly in direct sunlight.

KEVLAR®

By weight, Kevlar® is stronger than steel. This is the material used in ‘bulletproof vests.’ The molecular structure is such that it does not stretch and this characteristic makes it perfect for many antenna applications (boom and element support in beams, and general antenna use). Without a protective jacket, it deteriorates rapidly in sunlight. To counter this problem, Kevlar rope, meant for out-of-doors use, has a protective outer jacket made of Dacron® Polyester. The combination results in an incredibly strong, stretchless, long life rope. Remember, Kevlar does not stretch. Take this into account when using it with wire antennas in trees.

The Vertical Antenna Support Line

Our Kevlar line is perfect for guying vertical antennas. It is strong (500 pound test), is made to endure severe weather and the devastating UV effects of the sun. Most importantly, Kevlar line DOES NOT STRETCH. You don't have to keep readjusting the length of the guys.

We recommend guying all verticals. One set of guys will dramatically increase the survivability of the antenna in heavy weather. If the vertical antenna is over 25 feet tall, you might want to consider using two or more sets of guys. Follow the antenna's instructions for guying. If instructions are not included with your antenna, you can just tie our Kevlar line to any appropriate point on the antenna. Kevlar line is nonconductive.

Do not use this Kevlar line to guy towers.

Our new 3/8" single-braid Dacron line is perfect for running through trees. We have found that it lasts better than the 5/16" double-braid we used to sell. This line is very substantial and cannot be used to hold the antenna in the air directly. It is too strong and will break the antenna wire in high winds and it is too large to fit through the holes in the end insulators.

The Rope Grip™ works perfectly with our 3/16" Double-braid line. The Rope Grip™ is great for adjusting the tension on your antenna support lines. The harder the rope pulls, the harder the Rope Grip™ grips.

Note: Rope Grip™ does not work well with our Mil Spec rope. The single diamond weave type is not compatible.

All rope is factory fresh
The most important center insulator in any antenna, i.e. dipole, sloper, etc., is a quality Current balun. We build the best current baluns, and each has the needed stainless steel wire strain relief eyebolts and center support eyebolt. No other center-insulator is needed.

NEW
Ceramic Strain Insulators
17A01, ceramic strain insulator for a 3/16” wire. It has a 5/16” hole with 2-5/16” length and 1-3/8” dia.
17B01, ceramic strain insulator for a 1/4” wire. It has a 5/8” hole with 3-1/2” length 2-1/2” diameter.

End-Insulators
#1 - 6” Universal
Works as a strain insulator or conventional end-insulators. Ribs are spiral cut for winding loading coils, etc. Black plastic.

#2 - Plastic Strain
These inexpensive plastic strain insulators are great for any light-duty project. They are not suitable for tower guying, but are OK for masts, verticals, etc. We use them on wire antennas, because you can install them in the middle of a wire without removing the end-insulators.

#3 - HQ-2
The HQ-2 end-insulator is made by the same manufacturer as the HQ-1 center-insulator. These are only about 1 ½” long. Yet, with its deep ribs, the leakage path is nearly 6”. They are glass-filled and nearly impossible to break.

#5 - Delta Cin
Rugged, UV resistant DELTALLOY. Long leakage path. This is the insulator we use in most of our antennas. That says it all!

Center-Insulators
HQ-1
The HQ-1 is a light weight but incredibly tough glass-filled ABS plastic center-insulator. A built-in drip-lip over the SO-239 connector helps weatherproof the connector. They are perfect for any type wire antenna that does not require a balun at the feedpoint.

RADIO WORKS’ B-I
Top quality conventional center insulator made just like our baluns. #14 insulated wire are brought directly outside the case for soldering to your antenna to avoid any chance of failure so prevalent with screw and nut compression connectors. Stainless steel hardware. You can’t build a more reliable center insulator.

Ladder-Loc
If you use ladder line, this is the correct center insulator for your project. It properly supports and strain relieves ladder line for the longest possible life. Full instructions are included. 9” x 6”

The most important center insulator in any antenna, i.e. dipole, sloper, etc., is a quality Current balun. We build the best current baluns, and each has the needed stainless steel wire strain relief eyebolts and center support eyebolt. No other center-insulator is needed.

GUIDE TO SHIPPING COST
Antennas and wire are heavy items. Here is a guide to help estimate shipping charges. Consider the distance and weight when estimating shipping cost.

Minimum S&H is $10. As a general guide, on orders approaching $100, add 15% S&H. If you are ordering heavy items, such as coaxial cable and large quantities of wire, allow for the extra weight. YOU WILL BE CREDITED FOR ANY OVERAGE.

PAYMENT
Visa and Master Charge, Money Orders, Bank Checks, and personal checks. Allow 10 days for personal checks to clear. Allow travel time for your letter to reach us and the shipment to return. The handling charge is $3.
I have suggested using high quality marine “Sailboat” pulleys in several of my publications. This type pulley is precision made so that there is little space between the sheave and sides of the pulley. Unlike hardware store pulleys, it’s impossible for the rope to jam by rolling off the sheave.

Since pulleys of this type are almost impossible to find in most areas of the country, I have selected five different models which are well suited for use with the high quality antenna support rope that we sell. They are manufactured by one of the preeminent makers of sailboat rigging.

I recommend using the “swivel” pulleys because they do not twist your antenna wire if the rope twists under tension (which often happens). It’s a must for loops.

Important - These pulleys are designed specifically to protect soft support ropes. These are not the correct pulleys for use with wire or Kevlar.

Prices and specifications are subject to change without notice.