LOW BAND RECEIVING ANTENNAS FOR CITY LOTS
By AB0X
11-28-11
Objective:

- To provide members with some comparisons of various Low band receive antennas.
- To give some “semi” scientific analysis of common receiving antennas in the literature.
- Expose members to some new types of antennas that are available, but may not be well known.
Choices of Receiving Antennas!

- Transmitting Antenna! – UGH!
- More noise – Vertical or Inverted L
- Omnidirectional – Loud W5’s, 6’s & 7’s
- Will have to attenuate signals on receiver – improve signal to noise ratio!
- Will hear loud, super stations… ex. ON4UN, but average stations will only be heard when you have great openings! Only a few a year!
Ewe, Short Beverage

- Shaped like an upside down U. Made to fit in your yard.
- Fed just as a real Beverage with 9:1 balun, resistor and radials.
- NO secret, magical length.
- Preamp needed
- Should not run across any radial fields!!!
Classic Beverage

The Double Sloper

Stranded Insulated #14 Wire
Height 7 - 10 Feet

Slope - 60 Feet
Zo Approx 500 Ohms

Insulated Ground Wire Connects Ground Stakes at Ground Level

Matching Transformer
Coax Cable

2 FT Ground Stake
Beverage on the Ground

- Get 500’ roll of stranded wire from Lowes/Home Depot and roll it out after dark across yards, curb, down street, etc. on ground.
- Feed with 50 Ohm coax thru 9:1 balun.
- Terminate with 500 Ohm resistor to ground.
- Some users did not terminate the end (K5UR).
- Roll it back up before sunlight!
- Preamp needed
Pennant or Flag Antenna

- Can be Rectangular, or true Pennant shaped (triangle)
- Fed with 9–10:1 Balun, 300–500 Ohm Terminating resistor
- High directivity toward feed point.
- Must be supported at 20’ up, plus 15’ on point.
- Preamp needed!
- Best if a wavelength away from Transmitting antenna … But!
- www.angelfire.com/md/k3ky/page37.html
Rectangular Pennant configuration
Pennant Schematic

2.15 m

2.15 m

9.15 m

9.15 m

NULL

SIMPLIFIED SKETCH
Other configurations for Pennant

- Ewe
- Flag
- Delta
- Point-Fed Pennant
- Point-Terminated Pennant
- Diamond

○ = Termination Resistor
● = Feedpoint
WB9Z @ KP2A

PENDANT ANTENNA
(RECEIVE ONLY)

NOTE: Enclose Pennant Box in Zip Lock Bag

TAPE/BRACKET PENNANT BOX TO SUPPORT.

PENNANT BOX 18:1

SOLDER

SOLDER

EGG INSULATOR

EGG INSULATOR

EGG INSULATOR

900 OHM TERMINATION RESISTOR

50 OHM FEEDLINE TO REMOTE ANTENNA INPUT

A PREAMP IS HIGHLY RECOMMENDED WITH THIS ANTENNA

Dimensions

14' 7' 29.839'

GROUND

Assembly Details:
1. The Pennant is 14' high and 29' long. The lowest point is 6' above ground.
2. Two pieces of wire 36.839' are needed. Insulated #12 Solid Copper is a good choice for this application.
3. Polypropylene rope 1/8” diameter is a good choice for supporting the wires and guying the support poles.
4. Support poles like PVC (as shown) work well. Metal supports are also OK.
5. The (4) Egg insulators are used to hold the form of the Pennant and to take strain off the Pennant Box http://www.lancejohnsonengineering.com matching transformer and terminating resistor.
6. Notice that the DIRECTIVITY is 180° or opposite that of a Beverage antenna.
7. This antenna can be hung from a tree or other structure, but works best in an open environment, away from other structures.
Baluns

- Easy to build – FT50–43 ferrite toroid
- AB0X Model  9:1
K0CS Balun—Same as Homebrew but mounted in “weatherproof” box.
Terminating Resistor

- Lance Johnson Version with plastic antenna insulator.
K9AY Antenna

- Same basic set up as the Pennant or Flag: 9:1 Balun and Terminating resistor
- Relays set up at feed point to switch direction
- NE–SE–SW–NW
- Elements Bi directional
- Preamp needed
Erected over Radials

- All previous antennas can be severely compromised if erected over radial field!!
- Radials radiate noise picked up by the transmitting antenna.
- Resulting in high noise levels on low noise antennas!!
- Resulting in balled up wire on the floor of your garage: “This #@*% antenna don’t work!”
Quad element turned horizontally on its side
Full size 540’, fed with 4:1 balun and coax, 8’ up on insulated supports.
Many people have space for this if large city lot … and can be made smaller with some inductance.
Nearly as good as beverage! No Preamp Used
N0XA(AB0X op.)– Broke CQ WW 160 Record!
Some other guy broke record too!
Over 120 JA’s worked!
Single Element Horizontal Quad Loop

4:1 Balun

Can be made to fit shape of yard, 500-540'

6-8' on insulated support PVC is good choice!
WØCM's Secret Weapon

A Coaxial Quarter Wave 160 Meter Receiving Antenna - by WØCM

Editor's note: Walt "Pete" Wessel, WØCM lives in Liberal, Kansas. Get out your map and look at this QTH, close to the center of the U.S.

Now get out your 1995 DXCC Yearbook and notice WØCM has 184 countries confirmed on 160 meters, that today stands at 191. Pete is not a cattle baron with sections of land to use for Beverages. He lives on a typical suburban lot.

Here's his "Secret Weapon" for receiving on 160 meters.

Background - The typical suburban low band DXer usually has access to enough real estate to erect a tower and assemble the usual Inverted-L or shunt fed system for transmitting on 160 meters.

The receiving antenna is always a problem, as at least 290' is needed for a short compromise Beverage antenna.

The antenna presented here has been used at the WØCM QTH for a number of years and has been a good performer on the 160 meter band.

<table>
<thead>
<tr>
<th>COAX TYPE</th>
<th>&quot;A&quot;</th>
<th>&quot;B&quot;</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foam Dielectric</td>
<td>100'</td>
<td>25'</td>
<td>125'</td>
</tr>
<tr>
<td>Solid Dielectric</td>
<td>88'</td>
<td>37'</td>
<td>125'</td>
</tr>
</tbody>
</table>

The coax feed line running to the coax can be of any length.

Feed Point - The feedpoint is a bit tricky—note that:

- The center conductor of the coax from the station receiver connects to the BRAID of the coax antenna.
- The braid of the coax from the station receiver connects to the CENTER CONDUCTOR of the coax antenna.

Limitations - This antenna is not designed for receiving on 40 or 80 meters, but should enhance the signal to noise ratio on the 160 meter band.

The WØCM 160 Meter Coax Receiving Antenna - The three 8' supports and feedline from the station are not shown. (See text)

Directivity - This antenna has directivity off the ends. I have a number of poles in my yard and pivot the coax to suit my particular need at the time.

The Peter I operation was a good example. I oriented the coax in the Northerly direction, available in my yard and was able to bring the groups 160 meter signal out of the noise and make a successful 3YØPI two way QSO.

Enhancements - My plans for the near future will be to have four of these antennas in different orientations that can be switched with DPDT relays.

Conclusion - This receive antenna is relatively low in cost and will enhance 160 meter reception for those who do not have the room for longer Beverage antennas.

Let me know if it helps your 160 meter reception!
The center of Coax from station connects to the braid of the antenna. The braid of coax from the station connects to the center conductor of the antenna.
Coaxial Loop

- Easy to build—PVC poles & duck tape!
- Quality Coax recommended 97%+ braid
- Tune to resonance in 160 M Band – MFJ–259B
- Works best if single band!
- Can be rotated if put on pole
- Nulls noises—Peaks signals?
- Two can be fixed and cover world—(generalizing)
- Parts easy to find and build!
ABOX’s Loop

Any Insulator can support a loop.
Tuning Unit of Loop
ABOX’s Second Loop down for Repair
Electrical tape supports Tuner
Secret Weapon on 40 and 80! ..... And Sometimes 160

- *CQ Magazine* article – August 1989
- “The Search for the Perfect Low Band Receiving Antenna”
- Hidden on most roofs!
- Excels on 40 and 80!
- Easy to install!
- Low noise!
- Super Simple!
Schematic of Loop

Fig. 1 – A shielded coupling link constructed from coaxial cable.
Fig. 3—A top view of the author’s home showing the general pattern of the low-band receiving antenna.

NOTE:
X = Clothes pins.

To shack

Chimney

Tower
Easy to Construct!

- 176’ total length – one piece of rg-58 or rg-8X.
- Length is not critical.
- Quality coax! High braid %
- Clothes Pin attaches coax to shingle.
- Same antenna tried on a wooden fence, But...
- Raising it up in the air brought antenna to Life!
- Useful on all bands receiving! More Experimenting needed!
- Can Transmit with it! Tuner required!
Old Fashioned Coax Holder

Fig. 2—A side view of a wooden cloth pin used to anchor the coaxial cable to the roof shingle.
Have coax switch before preamp to compare antennas.

Best to have 2 antennas to compare signals!

Devote at least a year to test antenna before giving up on an antenna.

Serious 160 M ops have a listening antenna focused on Europe: 45–60 Degrees.

Latin America Probably doesn’t need listening antenna.

Listening antennas for Asia and Pacific Needed!
Trial & Error Rating of Antennas at ABOX over the years!

- **160 Meters:**
  1. Full Size Quad Loop
  2. 500’ roll of wire on ground
  3. Small Coaxial Loop
  4. Pennant
  5. W0CM
  6. K9AY
  7. Short Beverage or EWE

- **40–80 Meters:**
  1. ABOX Roof Loop
  2. Small Coaxial Loop tuned for specific band
AB0X is available for consultation: Reasonable rates!
Toroids are easy to wind.
Must Have Tenacity & self discipline!
“Working DX on 160 Meters is #$%ing hard!” – N0CWR
Check Web sites: K3KY and W8JI
Questions???
CU in the Static!!