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.

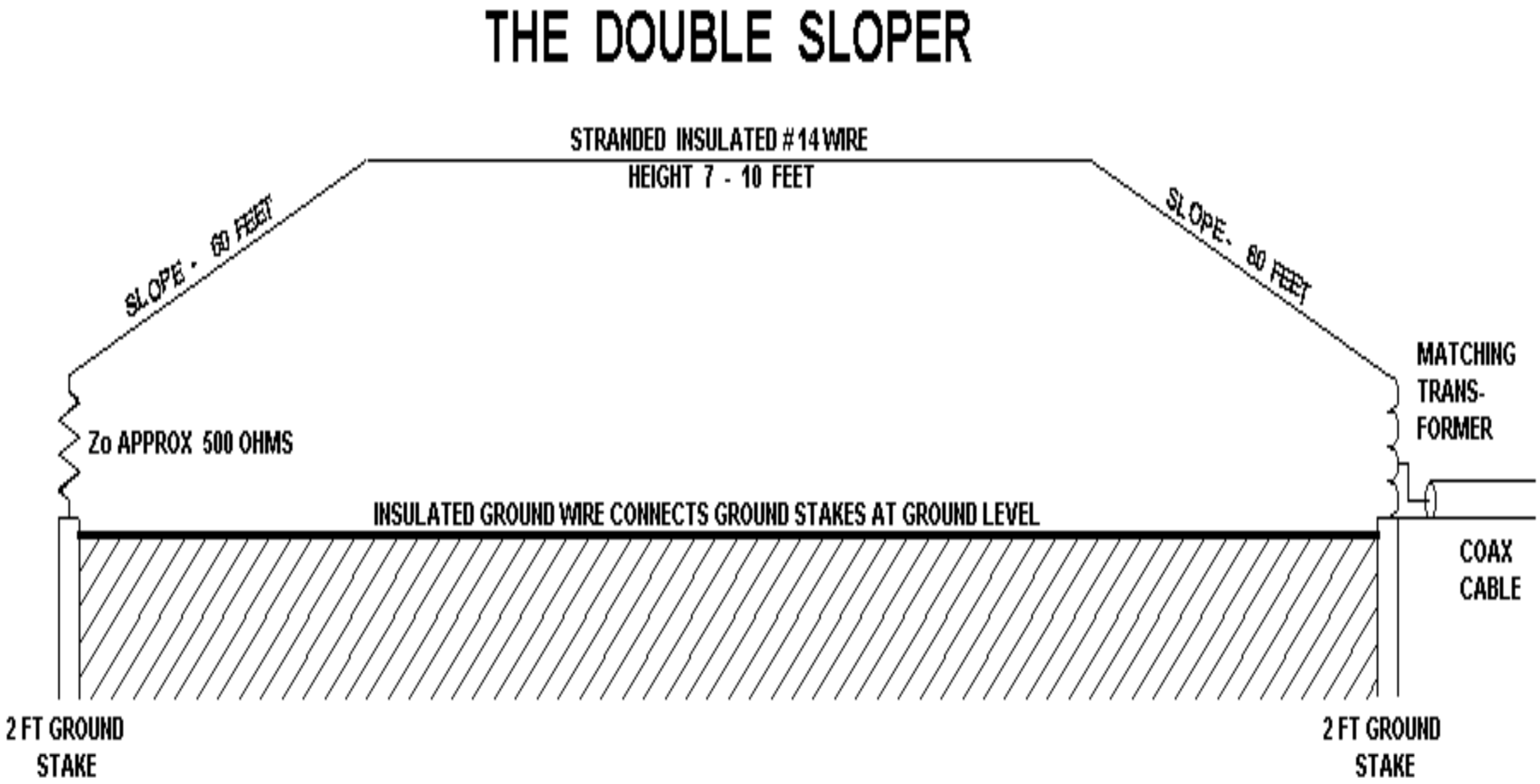
Choices of Receiving Antennas!

- 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



Beverage on the Ground

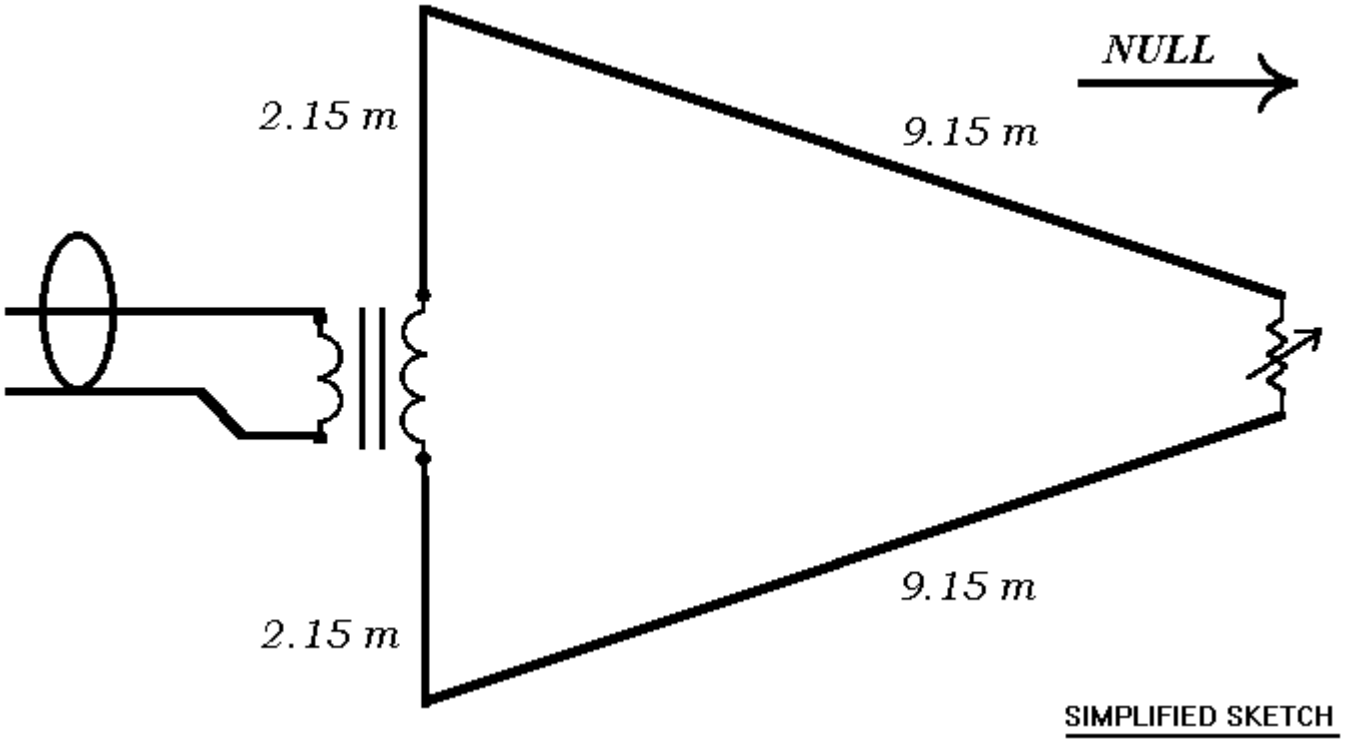
- Get 500’ roll of stranded wire from Lowes/Home Depot and roll it out after dark across yards, curb , down street, etc. on ground.
- Feed with 50 Ohm coax thru 9:1 balun.
- Terminate with 500 Ohm resistor to ground .
- Some users did not terminate the end(K5UR)
- Roll it back up before sunlight!
- Preamp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

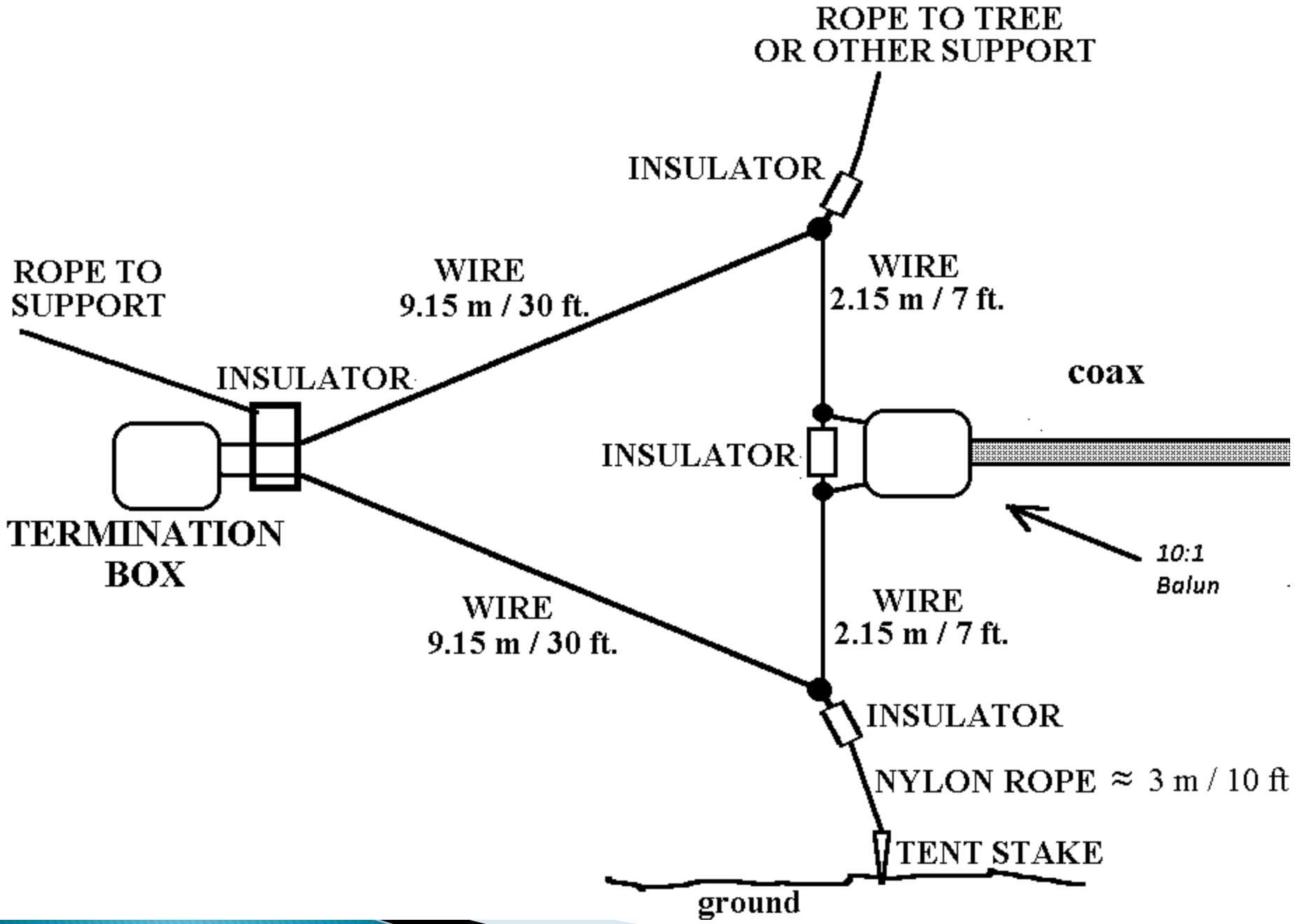
Pennant or Flag Antenna

- 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

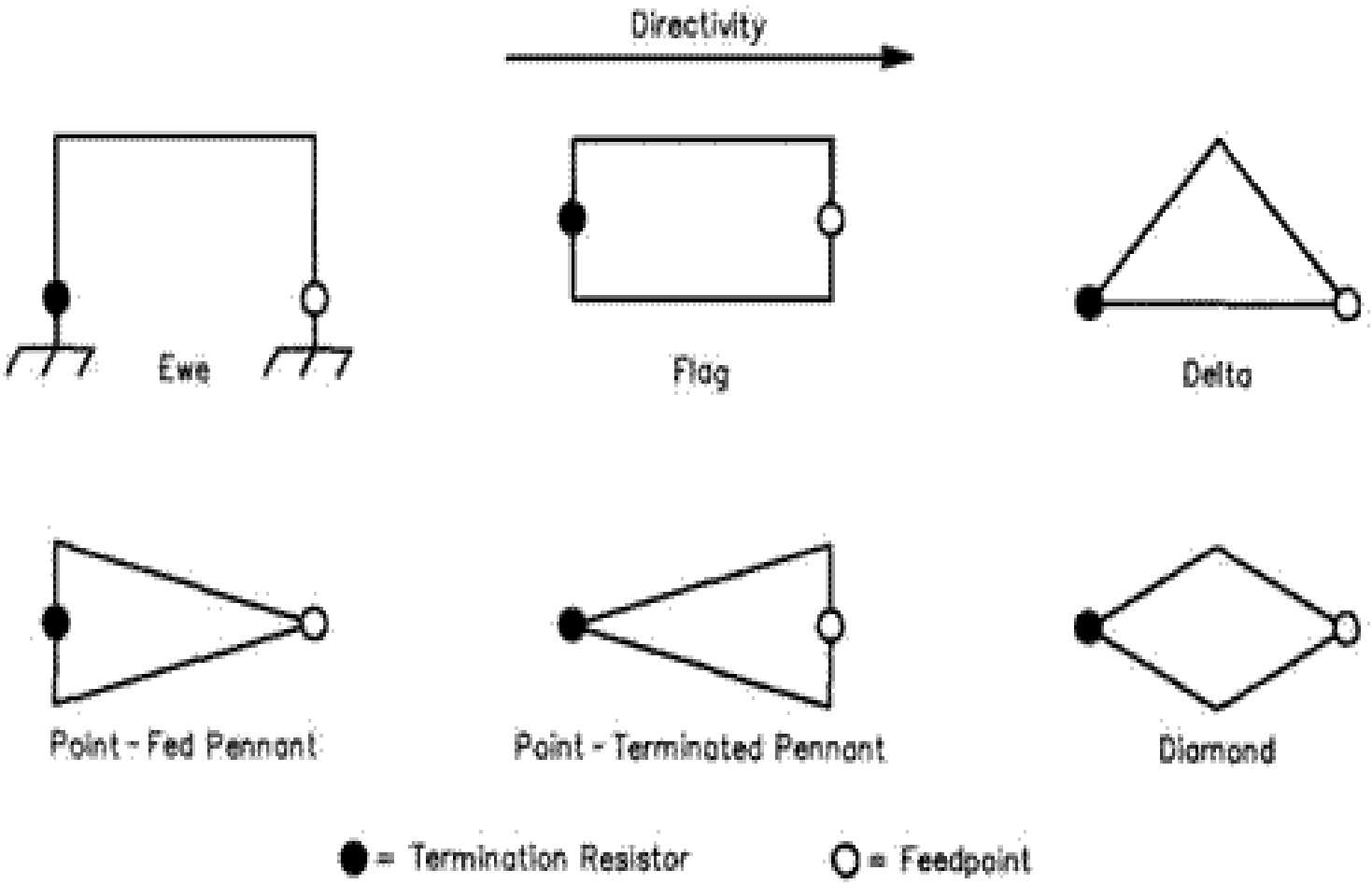
Rectangular Pennant configuration

Pennant Schematic




ROPE TO TREE
OR OTHER SUPPORT
INSULATOR
ROPE TO
SUPPORT
WIRE
9.15 m / 30 ft.
WIRE
2.15 m / 7 ft.
INSULATOR
coax
INSULATOR
TERMINATION
BOX
10:1
Balun
WIRE
9.15 m / 30 ft.
WIRE
2.15 m / 7 ft.
INSULATOR
NYLON ROPE ≈ 3 m / 10 ft
TENT STAKE
ground

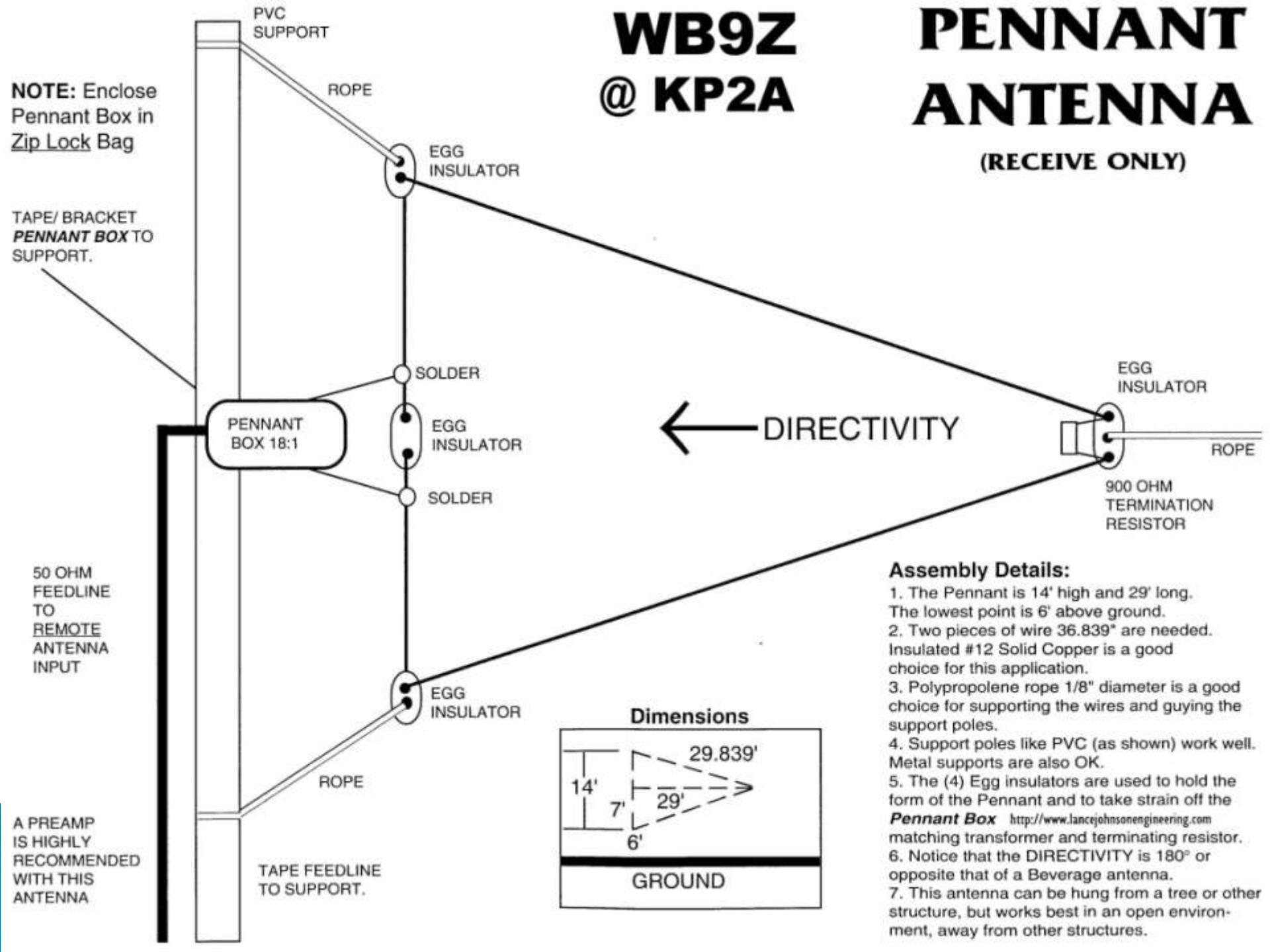
Other configurations for Pennant



WB9Z @ KP2A

PENNANT ANTENNA

(RECEIVE ONLY)



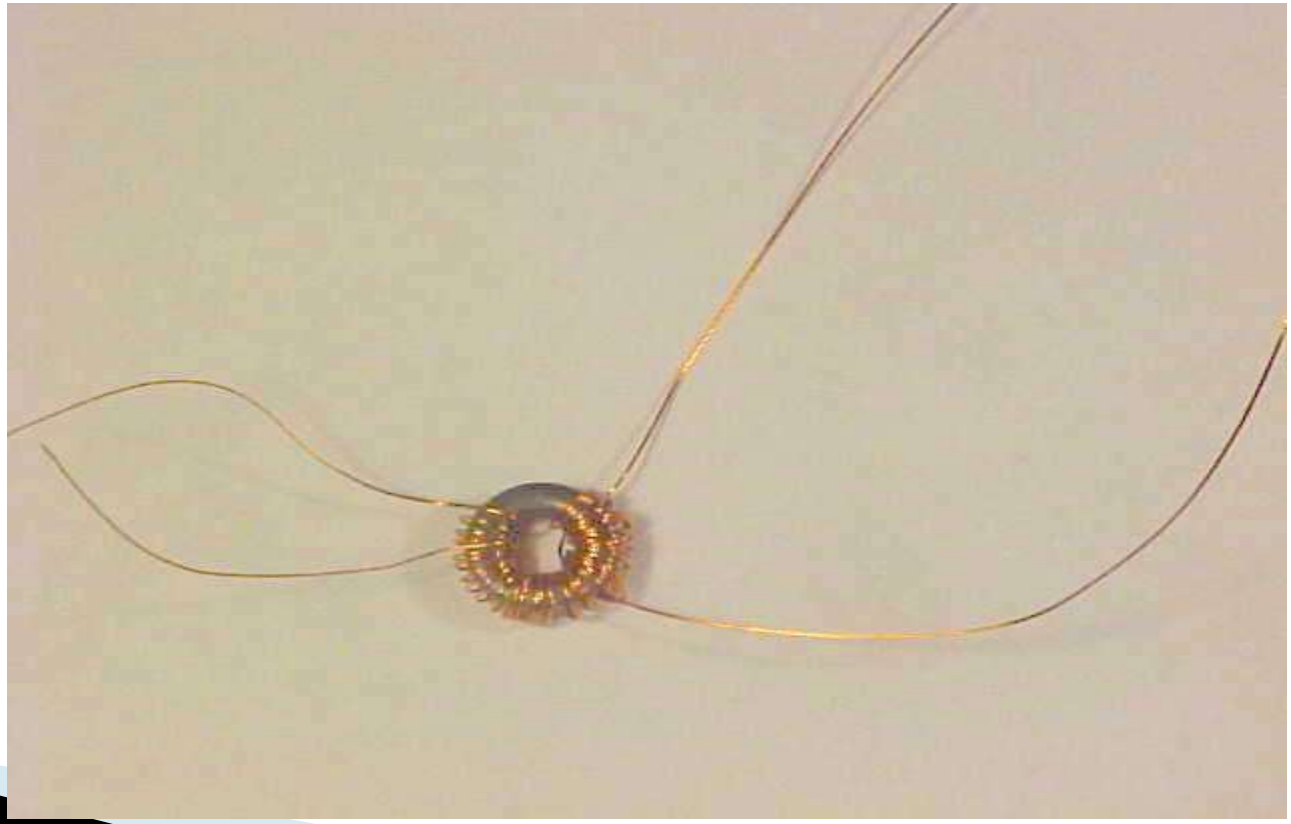
NOTE: Enclose Pennant Box in Zip Lock Bag

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. Polypropolene 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.

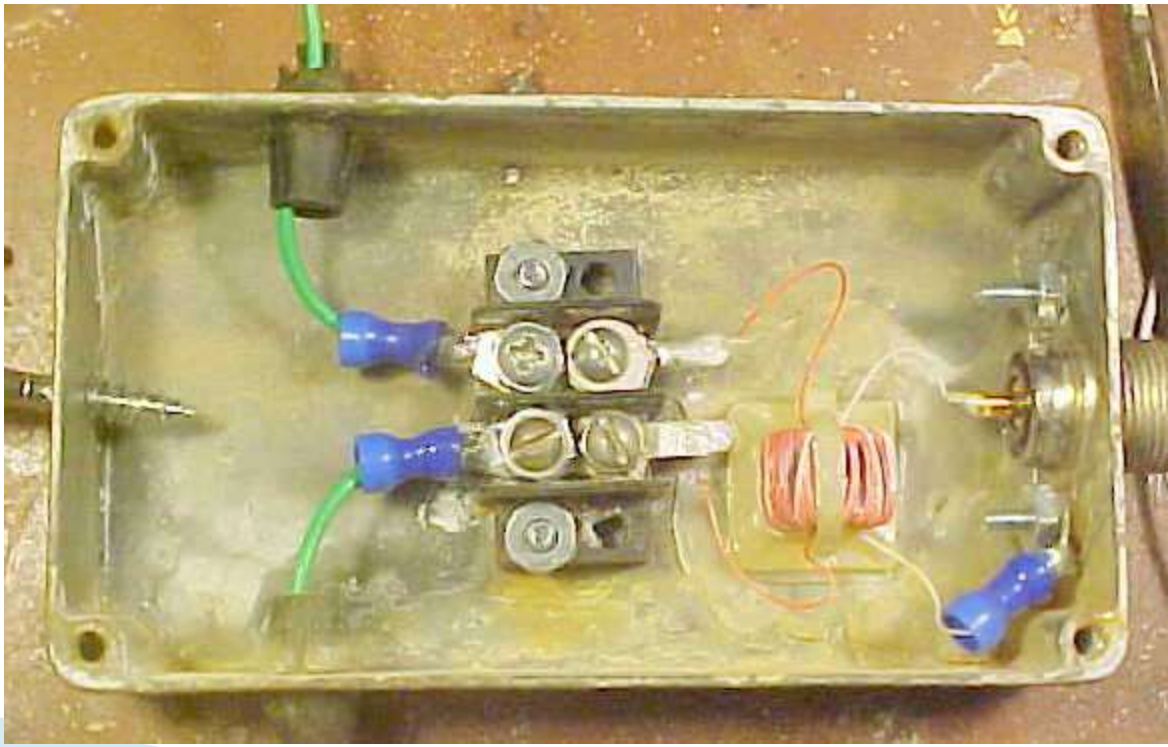
Baluns

- Easy to build- FT50-43 ferrite toroid
- AB0X Model 9:1



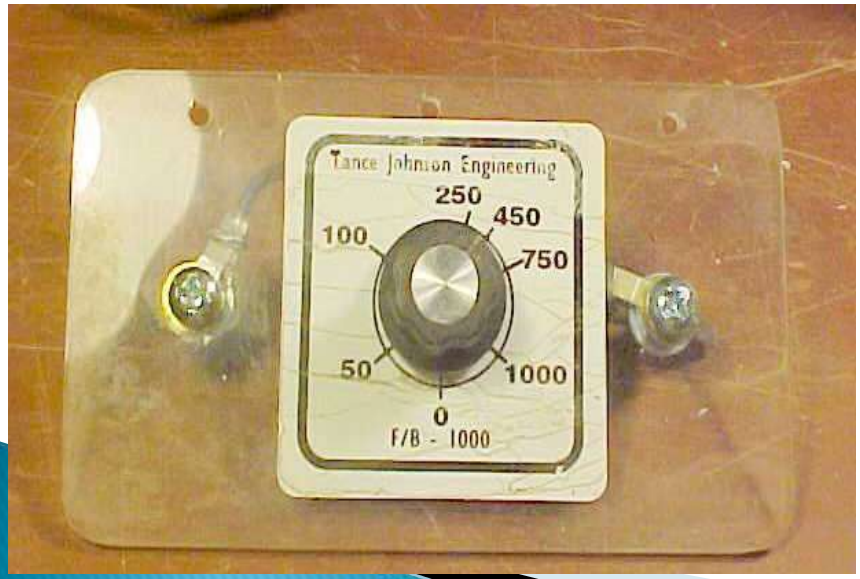
Lance Johnson Engineering

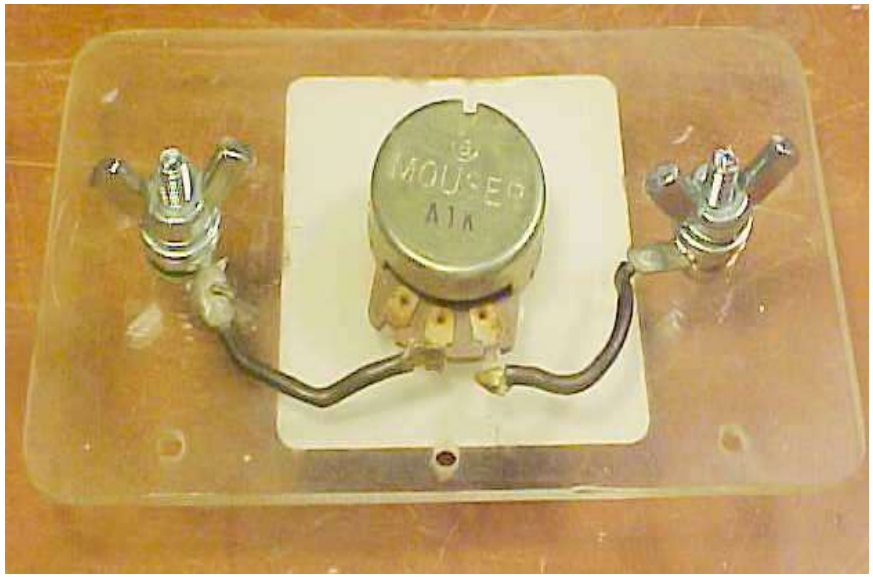
- K0CS Balun- Same as Homebrew but mounted in “weatherproof “ box.



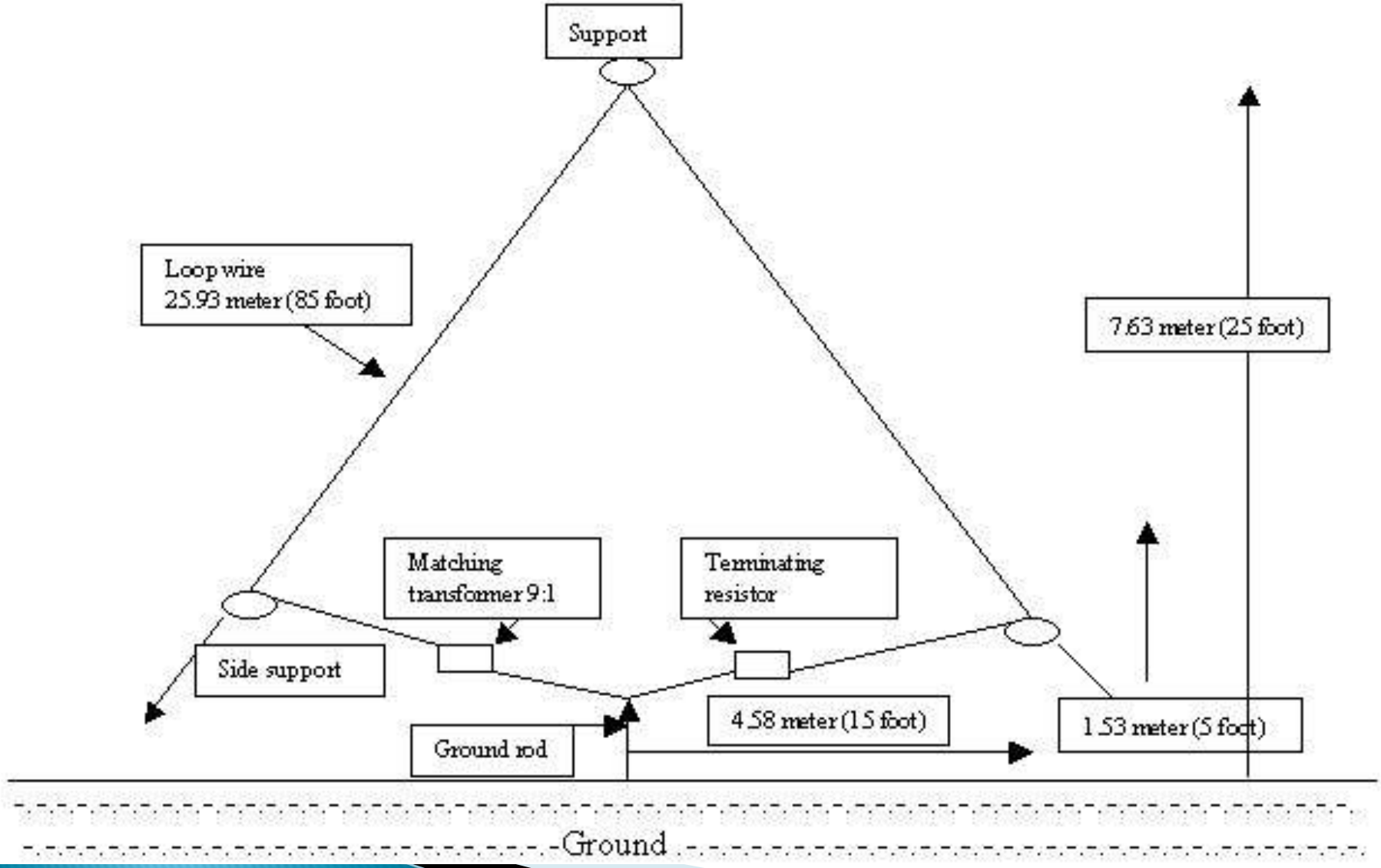
Terminating Resistor

- Lance Johnson Version with plastic antenna insulator.





K9AY Antenna



K9AY Antenna

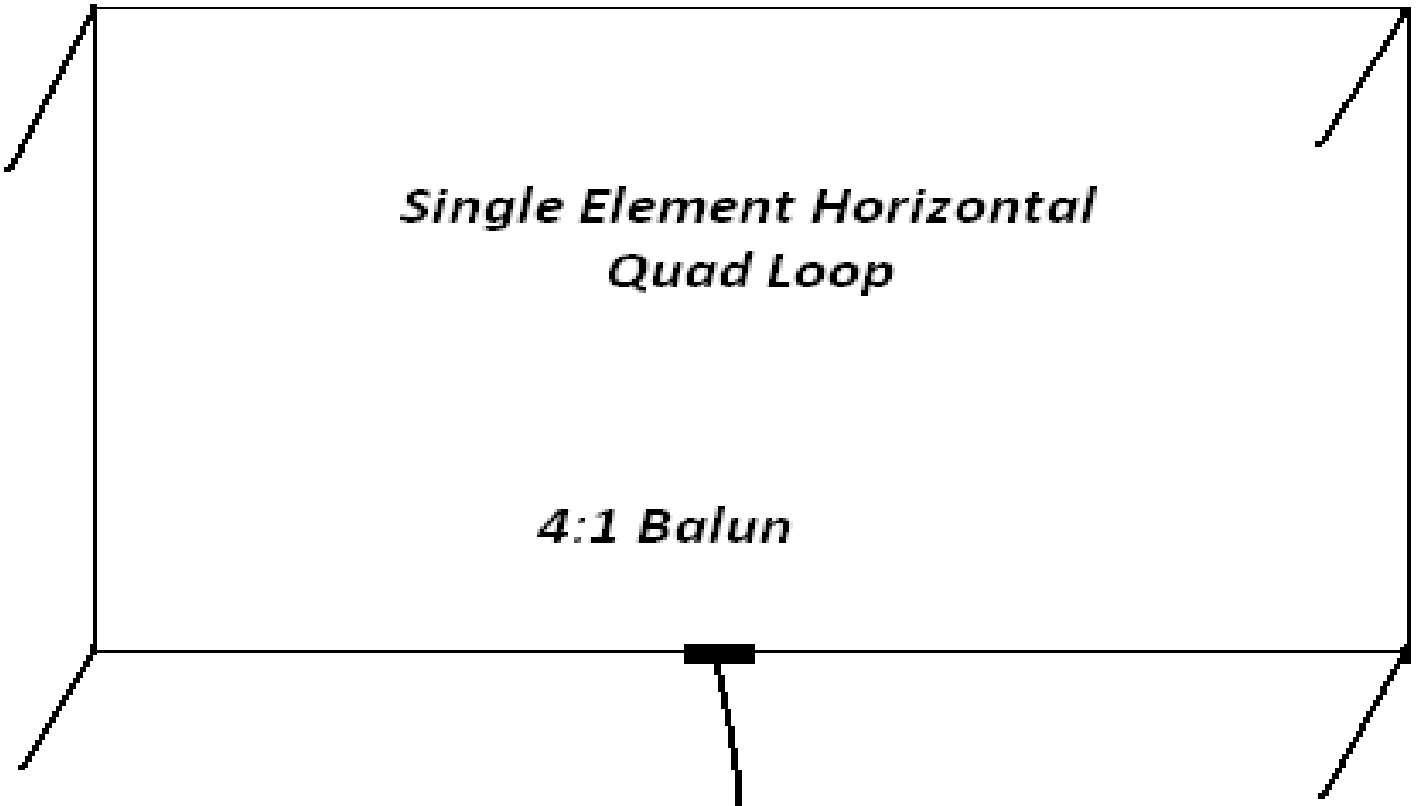
- Same basic set up as the Pennant or Flag: 9:1 Balun and Terminating resistor
- Relays set up at feed point to switch direction
- NE-SE-SW-NW
- Elements Bi directional
- Preamp needed

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!”

Full Size Quad Loop– "Secret Weapon"

- 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 !



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.

An equivalent length (125') of copper wire is buried at the base of the coax and connected to a 10' ground rod.

COAX TYPE	"A"	"B"	TOTAL
Foam Dielectric	100'	25'	125'
Solid Dielectric	88'	37'	125'

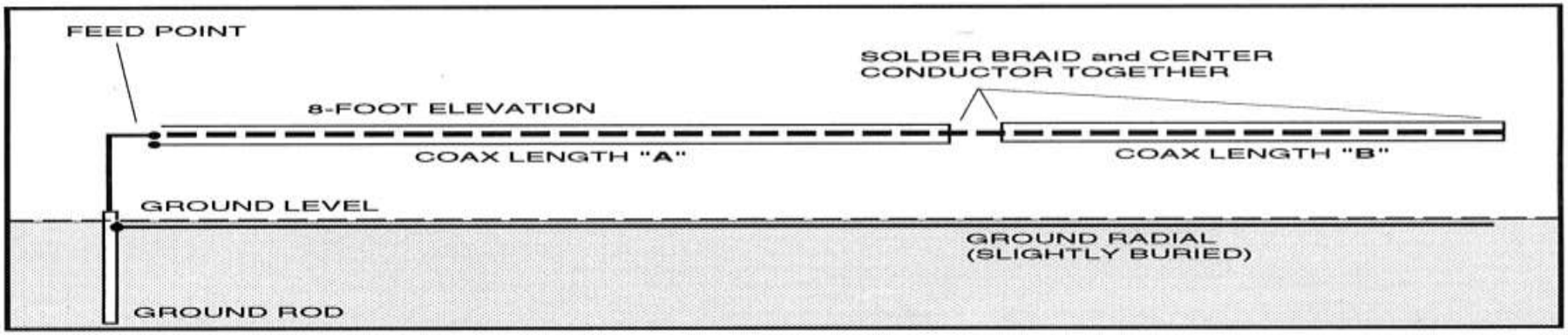
The coax feed line running to the coax can be of any length.

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)

Original Concept - There was an interesting Coaxial Inverted L article in the August 1984 issue of *CQ Magazine*, written by Coleman Rowland, **W4TWW** and James McQueen, **WB4LJP**.

My 160 meter coaxial antenna applies this concept in the horizontal orientation for receiving purposes only.

Materials - You will need 125' of coax for this project and three PVC or wooden support masts that will allow the coax to be elevated about 8 foot above ground.

I use RG-8X on my installation in Liberal, Kansas.

The total length of the coax antenna is 125', but the dimensions for "A" and "B" will vary with the coax type being used.

Refer to the following table for the dimensions.

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.

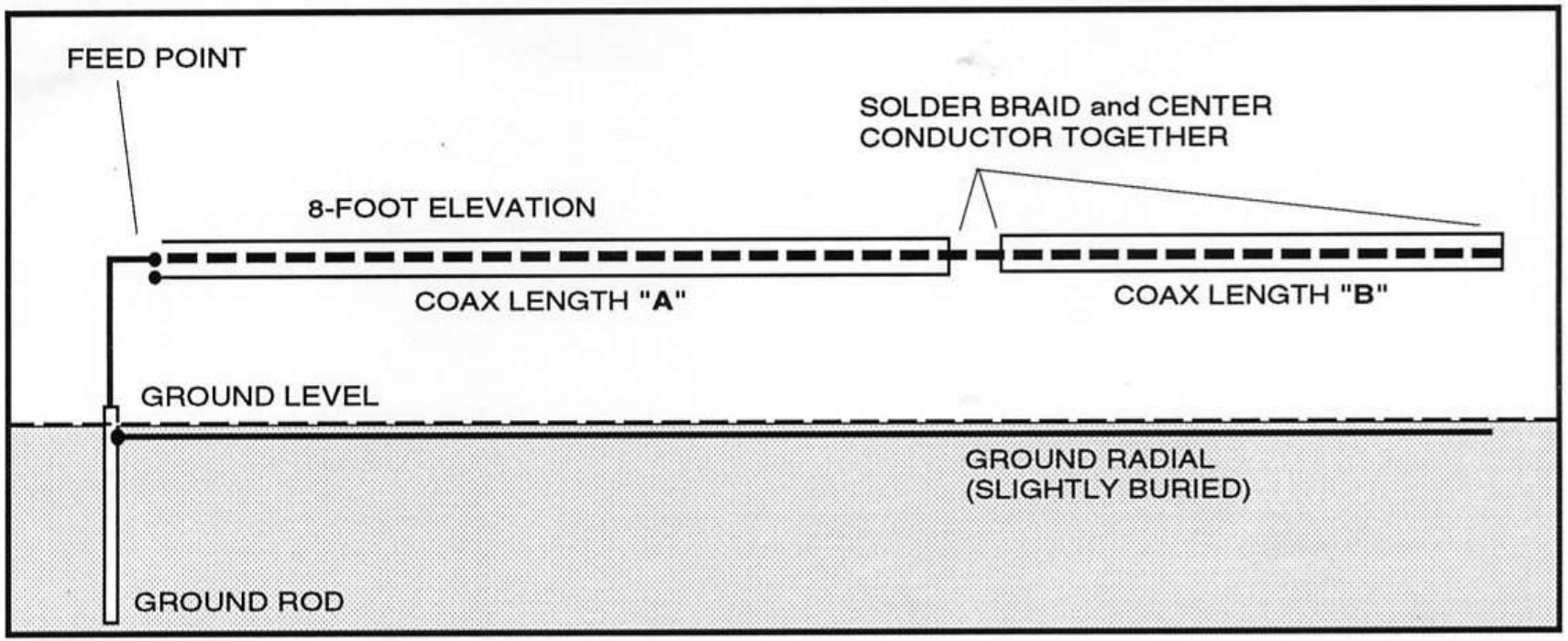
The Peter I operation was a good example. I oriented the coax in the Northerly direction, available in my yard and was able to bring the groups 160 meter signal out of the noise and make a successful **3YØPI** two way QSO.

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.

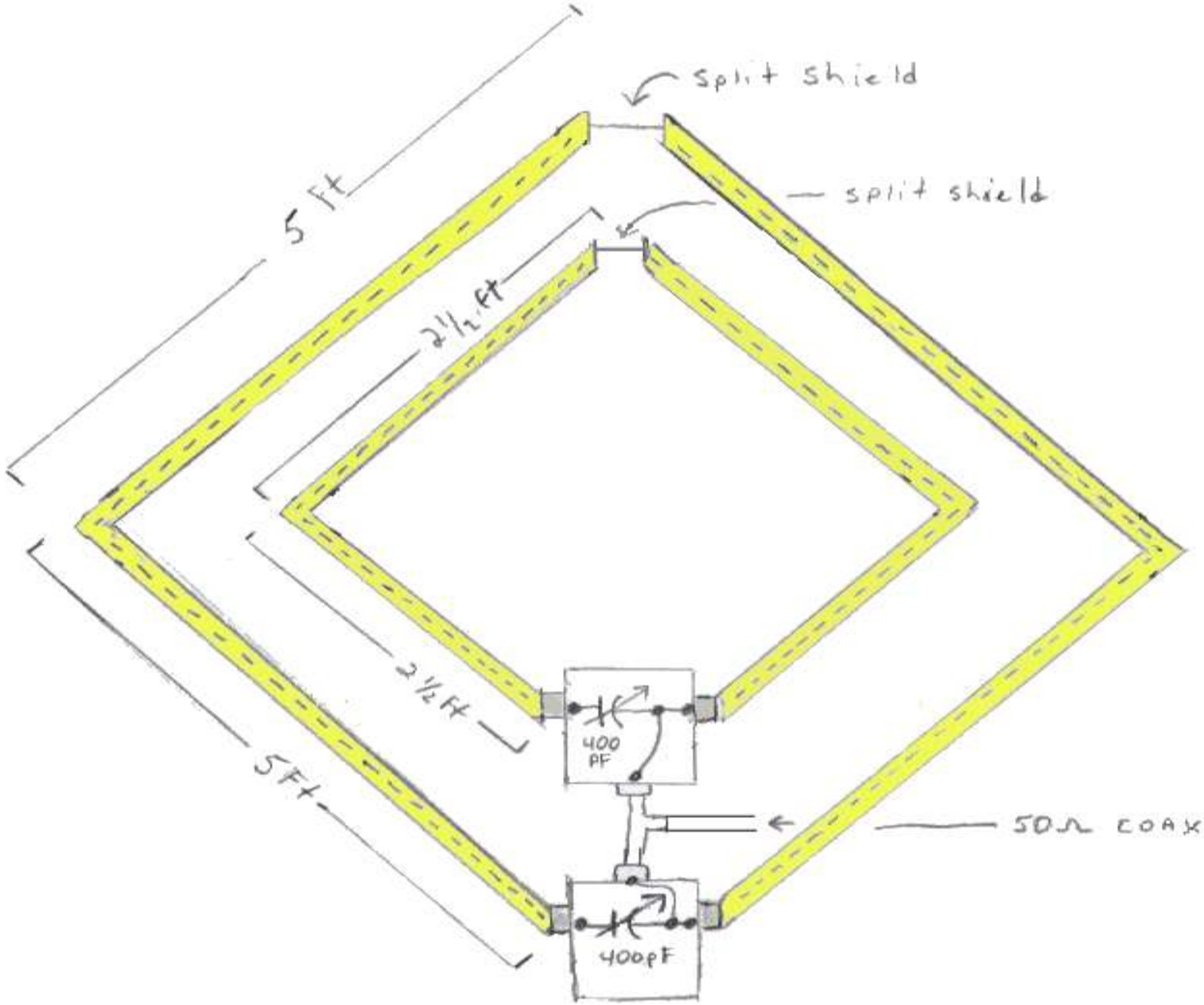
Let me know if it helps your 160 meter reception!

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 in160 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!

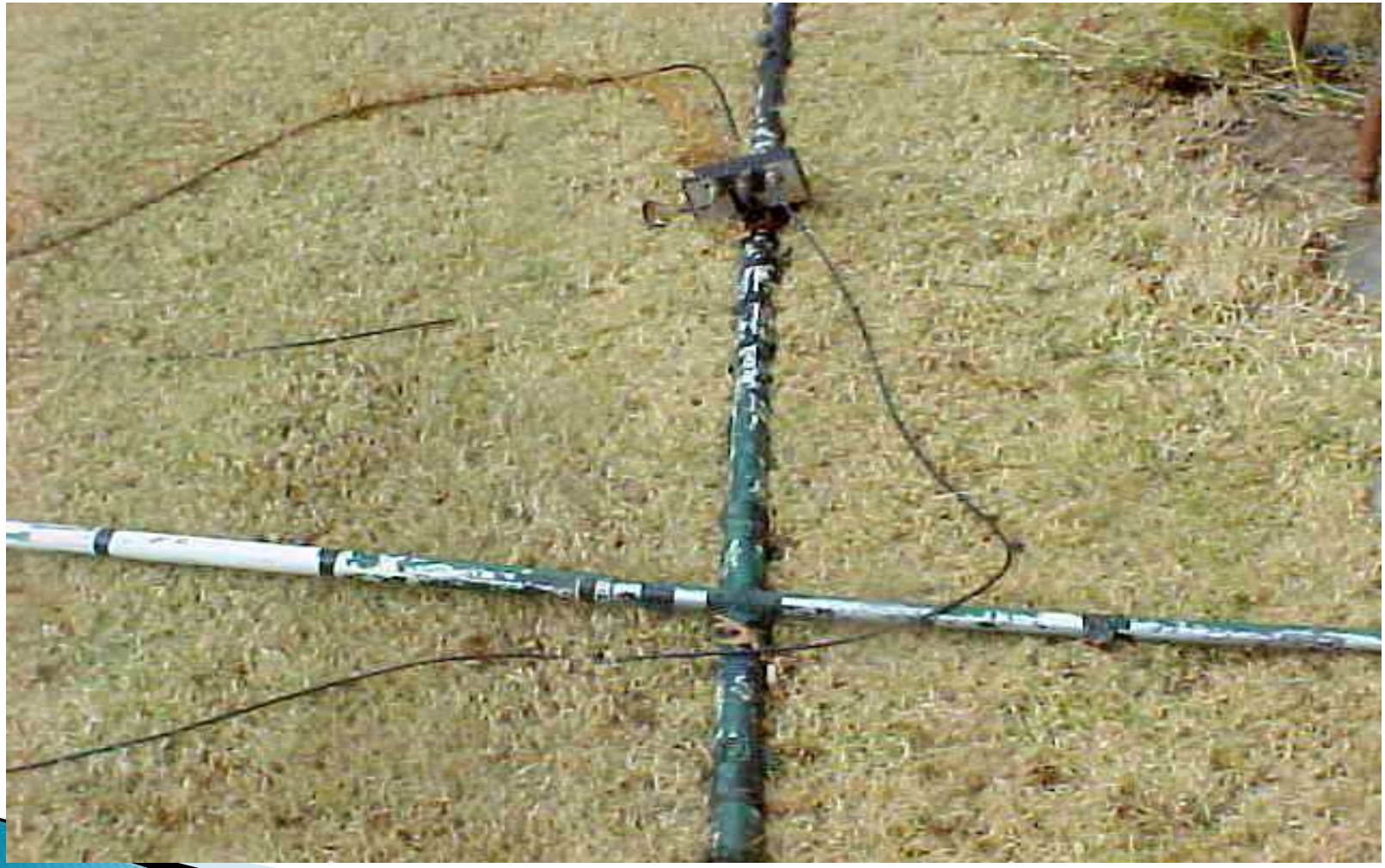

split shield
split shield
5 ft
2½ ft
2½ ft
5 ft
400 PF
400pF
50Ω COAX

AB0X's Loop

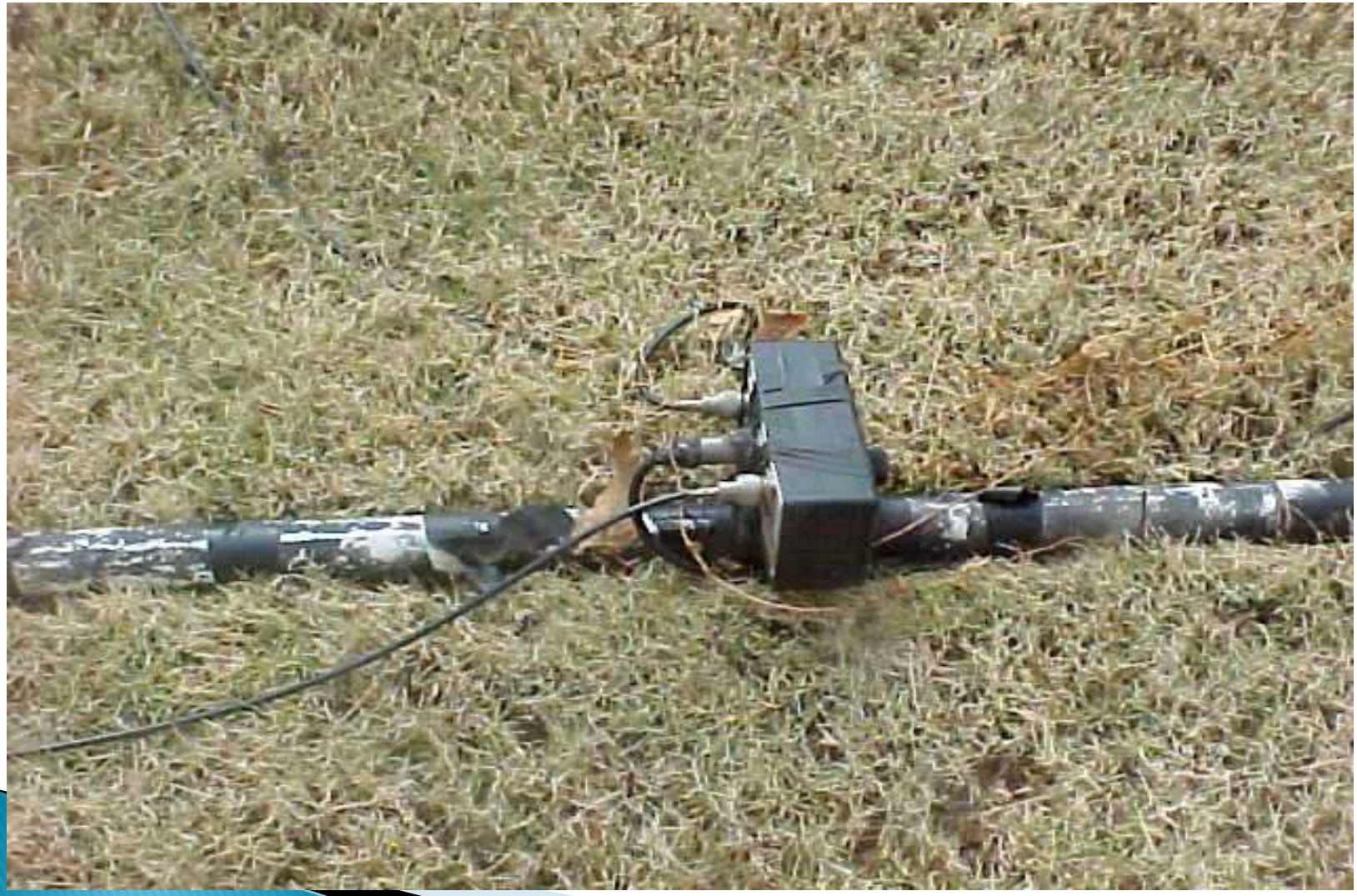
Any Insulator can support a loop.

Tuning Unit of Loop

AB0X'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

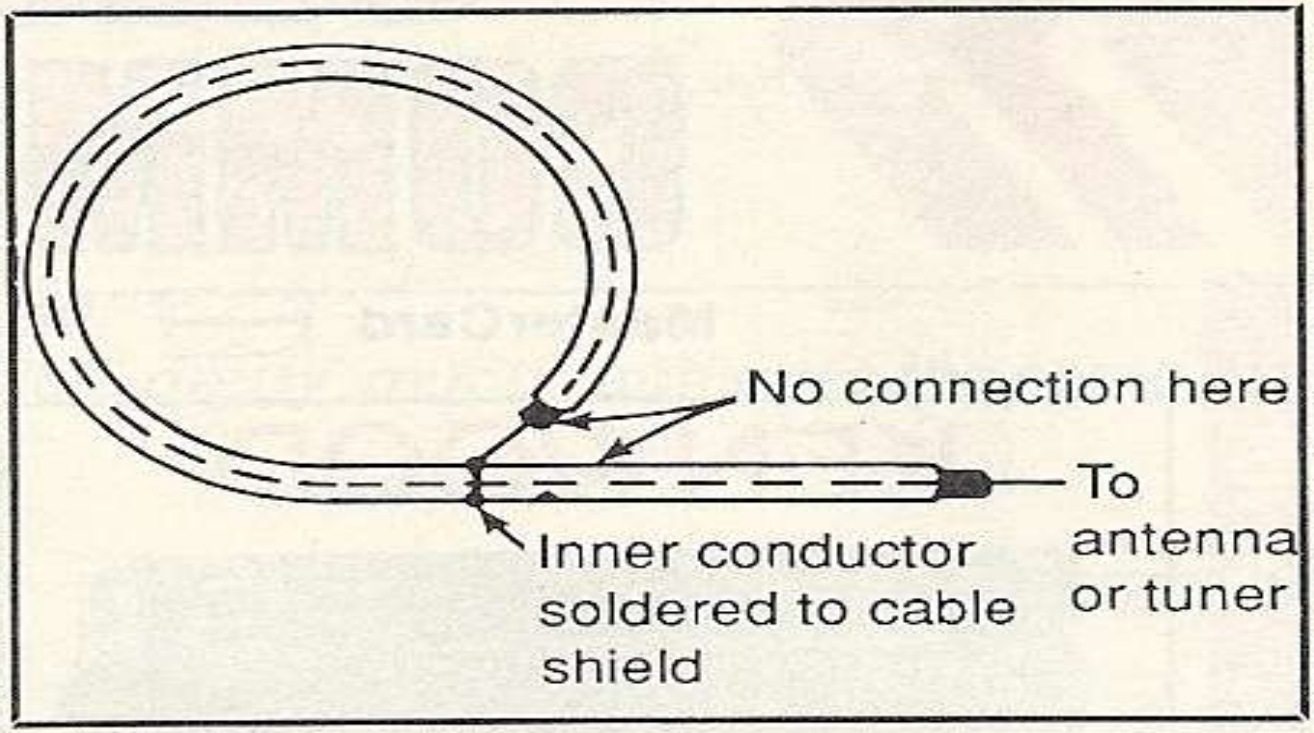


Fig. 1– A shielded coupling link constructed from coaxial cable.

Loop on the Roof!

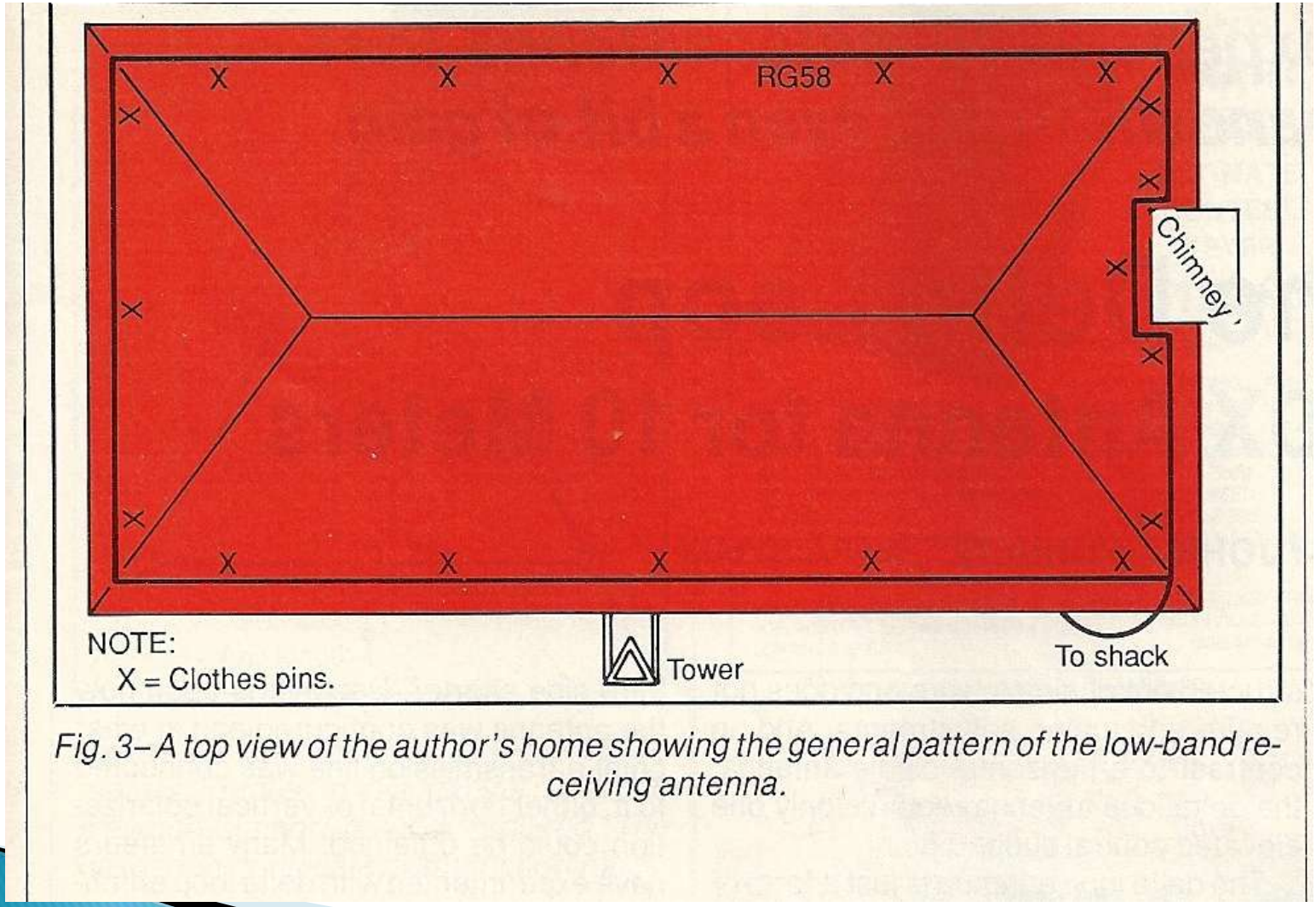


Fig. 3–A top view of the author's home showing the general pattern of the low-band receiving antenna.

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

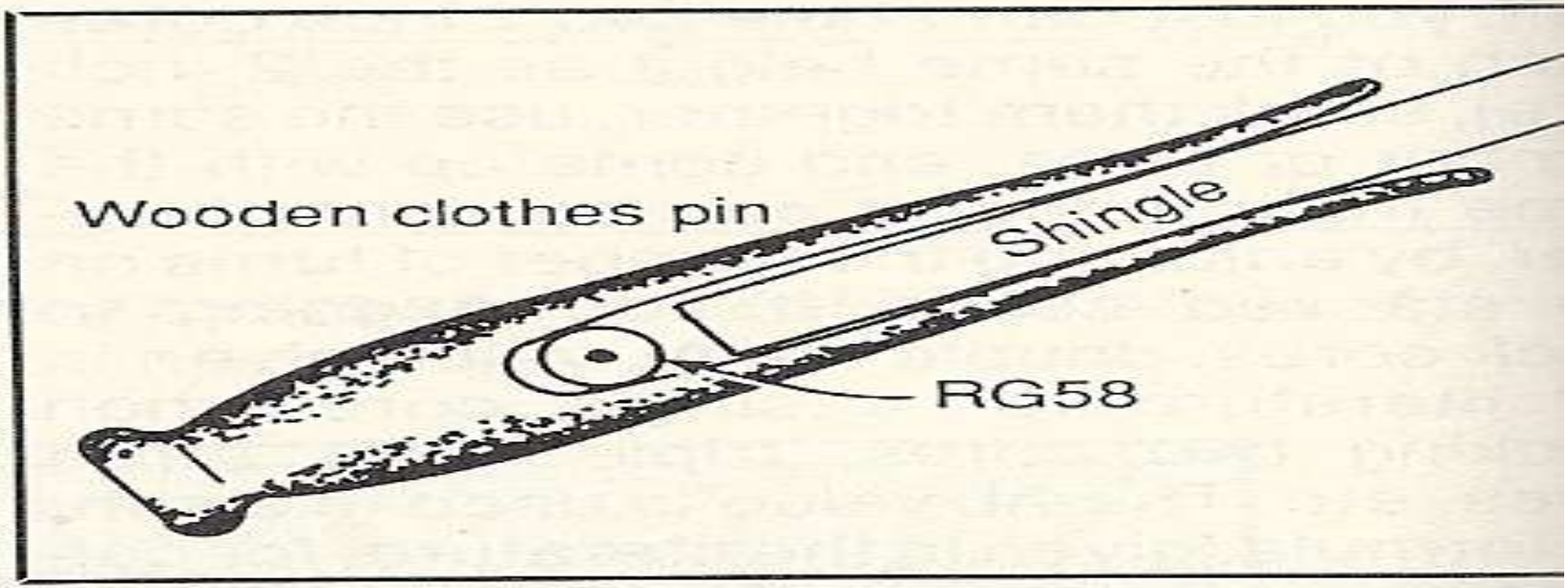


Fig. 2– A side view of a wooden cloth pin used to anchor the coaxial cable the roof shingle.

EXPERIMENT!
EXPERIMENT!
EXPERIMENT!

- 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 AB0X 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. AB0X Roof Loop
- 2. Small Coaxial Loop tuned for specific band

Help!

- 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!!