MERCURY AMATEUR RADIO ASSOCIATION

MARA - NORTH AMERICA - NORTH EAST

NEWSLETTER - MAY 2007

The mayflower, or trailing arbutus (Epigaea repens L), was officially adopted by the province of Nova Scotia in 1901, when an act of the legislature stated that it "is hereby declared to be and from time immemorial to have been the emblem of Nova Scotia."

Consider this your botany lesson for the month!

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PRESIDENT'S MESSAGE

I'm very pleased with the increase in activity on the Saturday morning net. Please, keep up the good work. This simple exercise each week may seem trivial now, but one day it may not be trivial at all.

I ask that each of you take a look at the previous MARA NE newsletters on the website if you have not already done so. Dave has posted a good deal of very useful information for the amateur operator.

There's only a few weeks left until the annual meeting, and we can put faces to the voices we hear on the radio each week. As soon as we finalize the meeting place we'll let you know.

I'm looking forward to meeting with each of you.

Barry, N2PCT

E-mail your comments, ideas, or submissions to marane@mara.net

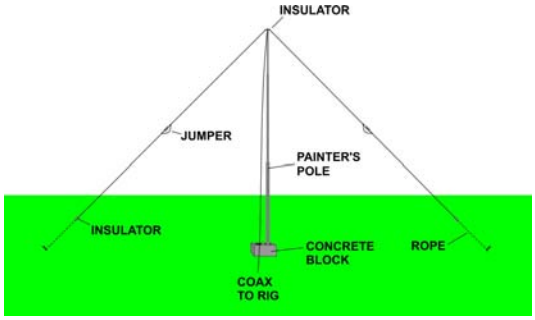
Please send copies of any old newsletters or pictures you might have, for the archives.

Join us on the Saturday morning SSB net at 0730 Eastern time on 3.8725 MHz

MORE POLE ANTENNAS

The painter's pole mentioned in the April newsletter can provide the basis for several more antennas.

Requiring only a single vertical support, the **inverted-V** is a quick and easy antenna to erect, provided the antenna wire and the support lines are pre-cut, and ready to install.



The portable version shown above uses the 24' collapsible painter's pole as the center support.

This height is enough for a 40 meter (or higher frequency) antenna with a 90 degree angle at the top. The one shown here uses an extra insulator with a jumper in each leg to provide an extra band such as 20 meters. Extra insulators (and jumpers) could be used for more bands. Traps could be inserted, but these usually mean a narrower frequency bandwidth requiring more frequent re-tuning if moving around a band.

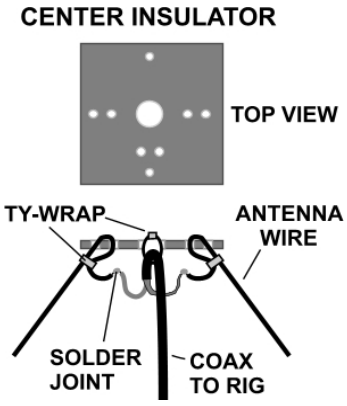
The antenna wire acts as two of the support lines. Small diameter rope can be used as the other two lines (not shown on the diagram) or the pole can be clamped to a rain gutter (see the April newsletter).

If the pole is fastened to the rain gutter then angle the wires out and away from the building slightly to clear the walkways.

It probably wouldn't hurt to tie some fluorescent tape or bright ribbons to the wires and support lines to keep people from blundering into them.

A concrete block acts to prevent the base of the pole from slipping out of place. It also temporally holds the pole upright while the antenna wires and support lines are installed on the ground.

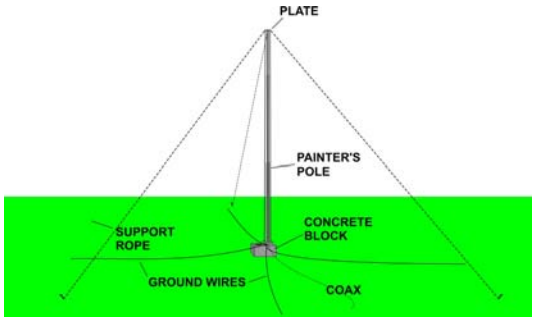
The center insulator sits on the threaded tip of the pole. Antenna wires and coax are held with ty-wraps. Use "Liquid Tape" (see the April newsletter for more details) to seal the coax braid and soldered junctions.



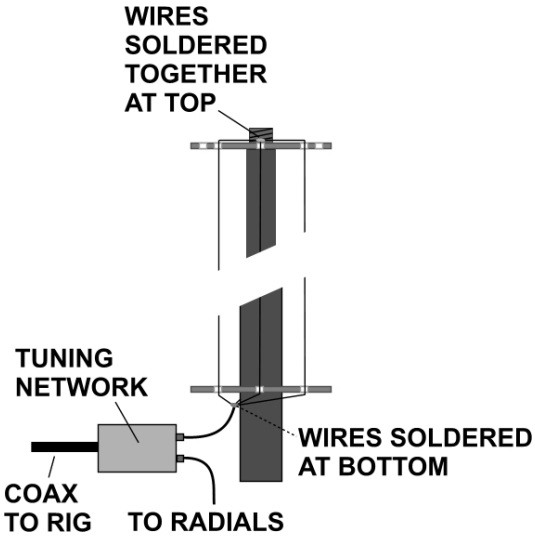
An 80 meter V could be supported but with a larger included angle and/or the wires angled outwards

and down from the top as shown below.

The painter's pole could also be used as the center support of a portable **vertical**.

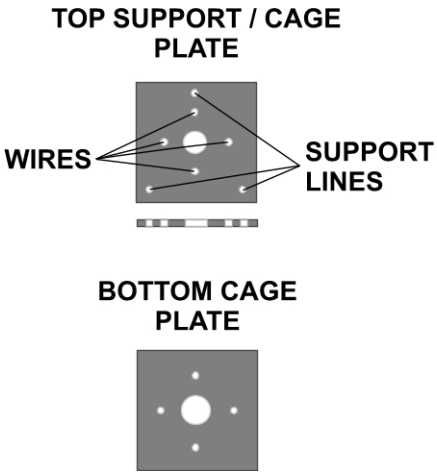


Make a "wire cage" out of four wires as shown in the diagram below. A four to six inch diameter "cage" will give a wider bandwidth than a single wire alone.



Four or more (…more is better!) radial wires cut to a quarter wavelength on the lowest frequency of operation should be connected to the coax braid and laid equally spaced on the ground around the base.

A tuning network at the base of the vertical is best. If a network at the base is not possible, then a tuner at the rig is better than nothing at all.



IN NEXT MONTH'S NEWSLETTER…

BUILD AN L - MATCH TUNER

PAPER ANTENNAS

Whether you use computers, or pencil and paper, you can do a lot of planning before you actually start building.

There is antenna software galore available on the 'net. **EZNEC** by Roy Lewallen, W7EL, is one program that has been around since the days of DOS. You can download the current demo version at…

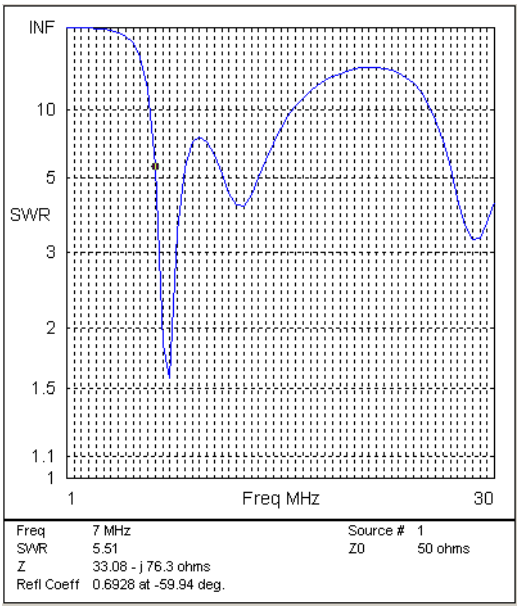
http://www.eznec.com/demoinfo.htm

Help files are included, or if you prefer, a manual may be downloaded and printed.

The demo is limited as to the number of wire "segments" but even with that, interesting things can still be discovered.

Start from scratch or modify one of the examples provided.

I used the included example "Elevrad1.ez" as a starting point for the painter's pole vertical. The radial elevation in this example is a fraction of an inch above ground. Grass height will account for this. The length of the vertical section was changed to 25 feet (24' on the pole and 1' from there to the matching network), and the diameter of the same element was changed to 4 inches. The radials were changed to #14 wire size and shortened to 35 feet. The resulting frequency run from 1 to 30 MHz is shown in the next column.



The first resonance is just slightly higher than the 40 meter band. At 7 MHz it has an impedance of 33 – j76 ohms. The negative **j** operator indicates that it is a bit short in length, and the low value of 33 ohms would not make your transmitter output happy.

Using a tiny DOS program called **L_TUNER.EXE**, you can find the inductor and capacitor values to match to 50 ohms. This and other antenna related free software can be downloaded from…

http://www.rfcascade.com/antenna.html

E-mail your comments, ideas, or submissions to marane@mara.net

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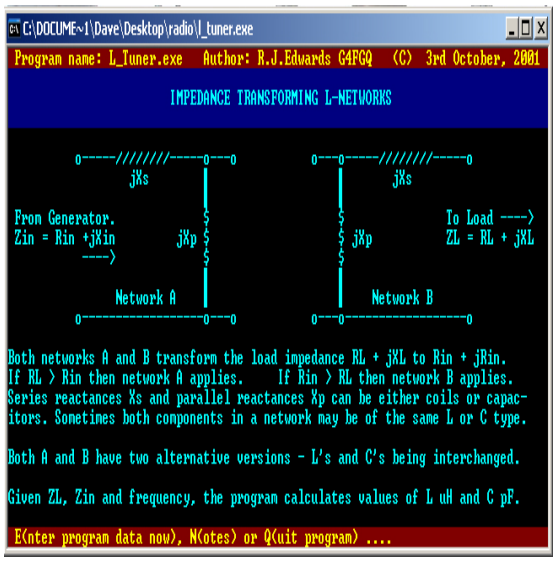
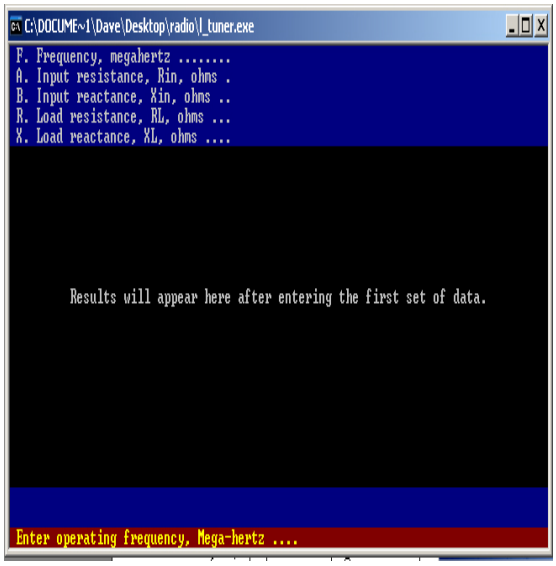


The opening screen is shown above. Pressing your keyboard “e” key will take you to the data entry screen shown below.

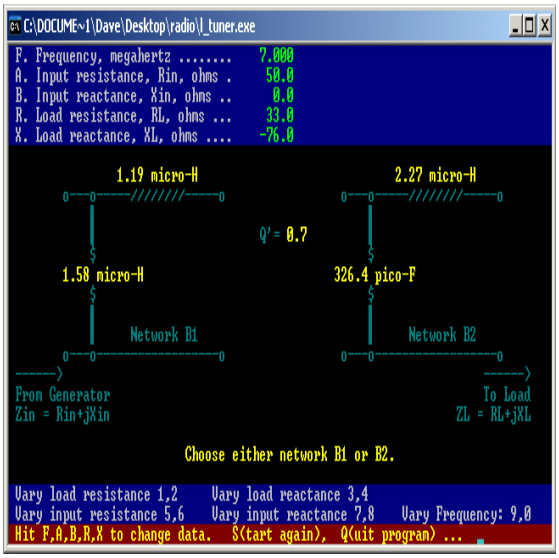
If R-Load is greater than R-In use the network on the left. If R-In is the greater of the two then use the network on the right.



Entering the values derived from EZNEC:
Frequency = 7.0 MHz
Input resistance = 50 ohms
Input reactance = 0
Load resistance = 33 ohms
Load reactance = -76 ohms

- don’t forget the sign + or –

…gives the two solutions as shown below.



With the EZNEC values entered previously, the matching network works out to be one of two choices. The first is to use (network B1 - left) with two coils as shown or with one tapped coil with a total value of the two combined – 2.8 microHenrys. Set the tap at 1.58 microHenrys to go to the rig and feed the antenna from the top of the entire coil. The second is a 2.27 microHenry coil in series with the antenna and a 326 pf capacitor from the rig side of the coil to ground (shield and radials). Either one will work, just choose the one

easiest for you to make with what you have in your junk box.

With any of this software there is a huge "**beware**". All of these neat and precise figures may be nowhere near the reality of your actual antenna! The best thing is to measure your setup using test equipment like the Autek VA1 Analyst or the MFJ-249B/259B Analyzer.

Software like EZNEC can, in many cases, get you close and will certainly give you ideas about what happens if… But it will not (at least not now) replace actual measurements.

What about using the vertical on other frequencies you ask?

Using EZNEC gives the following:

10 MHz = 299 + j139
14 MHz = 181 + j109
18 MHz = 316 + j360
21 MHz = 936 + j359
24 MHz = 459 – j426
28 MHz = 161 – j50

You can work out the matching network values if so inclined.

The radials are too short for 80M. If you contemplate using it on this band then lengthen them each out to a quarter wavelength.

When working on antennas, at least on paper, handy tools to have around are a drawing compass, mechanical drafting pencil, plastic triangle, protractor, eraser (!), and graph paper.

Graph paper in various formats can be had online for printing at…

http://incompetech.com/beta/plainGraphPaper/

A great article on calculating L-network components for any antenna is "Designing Impedance-Matching Systems" by Bob Baird W7CSC, on page 58 in the July '73 Ham Radio Magazine. If anyone wants a copy just let me know.

I used this method and came up with almost exactly the same parts values as with L_TUNER - except it took a lot longer!

If you want to experiment with these matching networks you might wish to build an L tuner with a variable coil and capacitor. Use clip leads to configure as required. Not those cheap ones from RS but something shorter in length, with a decent wire size, and with soldered joints!

DI-DAH-DI-DAH-DIT

For years, hams built and maintained their own equipment, largely because it wasn't made commercially, they couldn't afford the store bought stuff, they could make it for less, or they just wanted "to see if they could do it".

With technology advancing so rapidly, the vast majority of amateur radio ops cannot hope to build the sophisticated HF/VHF/UHF radios that are now available.

That same technology also means that it is just about impossible to repair today's radios. A lot of us wouldn't even recognize the sub-miniature parts used today, even if our eyes could see them!

Less and less of the old analog and more and more of the new digital ways of doing things are leaving most of this ham generation behind, and not only hams, but also the technicians and engineers now graduating from tech schools and universities with little understanding of audio and RF. Emphasis is now on bits and bytes, 1's and 0's.

The last quarter century has also seen the death of most of the ham and hobby electronics magazines devoted to construction.

Despite the increasing digital world around us, we can still build things.

Simple test equipment is still within our capability to make.

Lots of digital projects made with PIC's (programmable interface controllers) show up in QST – if you can't beat 'em – join 'em.

Wire antennas, while they can be complex in theory and under-standing, are still inexpensive and simple to build and tune with basic tools and test equipment.

And don't forget QRP. Check out the American QRP website for kits and links to lots of things you can still build yourself. How about a cw transceiver the size of a post card?

Perhaps you just need to be more like the little engine who thought, "I think I can, I think I can…"

… and do it.

--- MARA NE ---

73,
DAVE
VE1VQ

MARA NE SSB NET – 3.8725 MHz @ 0730 Eastern Time – every Saturday morning

MARA NE ANNUAL MEETING WASHINGTON DC – 2ND JUNE DETAILS TO FOLLOW