



DECEMBER 2020

Volume 9 Issue 12

# VE3ERC-LUB

**President:** Brian VA3DXK  
**Vice-President:** Ted VE3TRQ  
**Secretary:** Kirk VA3KXS  
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**Lighthouse:** Al VA3TET  
**Maple Syrup Display:** Al VA3TET  
**Newsletter:** Bob VE3IXX  
**ERC Website:** <https://ve3erc.ca>

## ERC REPEATERS

**UHF 444.700 + TONE: 131.8**  
**UHF 444.700 + TONE: 123.0**  
**VHF 147.390 + TONE: 123.0**  
**VHF 147.255 + TONE: 131.8**  
**EMERGENCY SIMPLEX: 147.51**  
**UHF-IRLP node 2404,ECHOLINK VE3ERC-L**  
**VHF- IRLP node 2403,ECHOLINK VE3ERC-R**

**In an emergency, tune  
Into our repeaters,  
UHF 444.700 or  
VHF 147.390 or  
HF 3.755 LSB or  
Simplex 147.510  
For coordination and  
assignments.**



**"I'm Dreaming of a White Christmas..."**



Radio Amateurs  
of Canada

# THE PREZ SEZ!

This club is Radio-ACTIVE  
This club is Radio-ACTIVE

## President's Update for December 2020

On behalf of all the executive of the Elmira Radio Club we would like to wish everyone a

**MERRY CHRISTMAS**  
**And**  
**A Happy New Year!**





# ONTARS

Daily 7am to 6 pm 3.755 Mhz LSB

**The Ontario Amateur Radio Service**

**Celebrating 49 years of service 8th Jan 2021**

Managed and funded by Barry VE3ISX



www.ontars.com



And don't forget to mark your calendar for January 8, 2021.

ONTARS is celebrating its 49th Birthday Party.

There will be new controllers every half hour from 7 am to 6 pm.

Check in often during the course of the day and wish ONTARS

A Happy Birthday.



# MERRY CHRISTMAS



**The ERC Christmas Party on Zoom.**

**And Rich ve3dcc sent the following:**

Our outdoor living room.. tree, presents, stockings and Lorraine, ve3VCL, waiting for Santa and the grandkids to roll thru... complete with light snow.. it felt like a winter wonderland... rain stopped at noon... and then it snowed..

**Merry Christmas, rich ve3DCC**



## **CONTRIBUTIONS TO VE3ERC-CLUB NEWSLETTER**

Do you have an article you'd like to submit? Or photos? Do you have any comments you'd like to make?

Perhaps you'd like to share a photo of your shack, a special project you are working on or a special interest!

**SEND THEM TO:**

**Bob** [bobve3ixx@gmail.com](mailto:bobve3ixx@gmail.com)  
**(519-787-2279)**



**First tower made of rubber...**  
(sent in by Tony VE3DWI)

## **WEDNESDAY NITE NET CONTROLLERS**

**NOVEMBER 4 - PAUL VE3PVB**

**NOVEMBER 11 - AL VE3DZZ**

**NOVEMBER 18 - BRIAN VA3DXK**

**NOVEMBER 25 - MEETING**

**DECEMBER 2 - BOB VE3IXX**

**DECEMBER 9 - TED VE3TRQ**

**DECEMBER 16 - AL VA3TET**

**DECEMBER 23 - VIRTUAL CHRISTMAS PARTY**

**DECEMBER 30 - KIRK VA3KXS**

**JANUARY 6 - REG VE3RVH**

**JANUARY 13 - FRANK VA3FJM**

**JANUARY 20 - TOM VE3DXQ**

**JANUARY 27 - MEETING**

**FEBRUARY 3 - BILL VA3QB**

**FEBRUARY 10 - WES VE3ML**



## CORRESPONDENCE

### Kirk, VA3KXS sent the following:

Days before Tony's email about having a bunch of headsets for sale I ordered all the bits to add a headset with boom mic and PTT foot switch for my FT-891. I am hoping this helps when contesting - having both hands free to type will make it a bit easier to record call signs and exchanges.

The headset is a broadcast unit you normally see sportscasters wearing: the Audio-Technica

BPHS1. Reviews suggested it was relatively lightweight and comfortable to wear for long periods of time. The headphones are supposed to provide good isolation and the booms mic is apparently pretty good. I'll have to give a review after the next contest. The mic connection is a balanced XLR plug and the headphones a 1/4" stereo jack. I had to add an adapter to go from the 1/4" plug to a mini stereo plug on the FT-891.



For the PTT I ordered a Linemaster 632-C Clipper foot switch, which I think is normally used to control industrial equipment. It should take a decent amount of abuse. I also purchased a 1/4" stereo extension cable which I cut to wire to the foot switch with the plug and add the

1/4" jack as a pigtail from the radio mic plug. I could have used a mono extension cord here, but ordered the stereo one by accident and made it work.

The FT-891 has an RJ-45 connector for the microphone connection. I was able to take a standard CAT5 cable and wire it into a female XLR jack using the Ground, Mic + and Mic - leads. I added the 1/4" jack pigtail out of the back of the XLR to connect the PTT and Ground. The Frequency +, Frequency -, +5V and Fast leads were unused. Having both the CAT5 and 1/4" stereo cable coming out the back of the CLR jack was a mighty tight fit.

First time around I reversed the order of the leads and the radio started scanning frequencies when I turned it on. I got it right the second time I wired it up. I had a quick QSO with Jack VA3WPJ tonight and received a decent audio report.

This was a fun little project and I thought some of you might be interested.

73,

**Kirk VA3KXS**







**Bill VA3QB sent the following:**

I had the opportunity to visit the Repeater site last Thursday. Everything looked good on that date.

Tape on the doors holding up well.

**73, Bill VA3QB**







# From the PAST



**Thanks to Bill VA3QB for sending this picture from 2018 with the following e-mail and also to Roger VE3RKS for re-sending the photo in a jpeg file.**

I was digging through my computer and found this picture.  
Here is a picture taken at Point Clark, Light House event in August 2018.

Lets all hope that "Light House 2021" is the same as 2018 !!!  
Maybe we could retake this same picture.

Stay warm, stay safe !

73  
**Bill Reid**  
**VA3QB**

# **'VE3EGA MOBIUS STRIP - 450 ohm Window-Line LOOP ANTENNA'**

## **(aka "EGA Ladder Loop")**

**By Terry Bennett VE3EGA**

### **Overview**

Several of you will know that I have built a good many loop antennas, primarily for 20, 30 or 40m and following conventional design parameters.

Most of this information was obtained from the internet and my friend W4YU and I applaud the research and hard-work of the many authors and fellow radio-amateurs that have made our life much easier by meticulously producing graphs, charts and formulae and publishing this information in the Public Domain.

Most of my previous loops – built for personal use, have followed one or other of these conventions, although, I must admit that my need to incorporate welded-joints, silver plating or vacuum-variable capacitors has escaped my attention, only because my endeavors are focused on targeting outdoor QRP and Portable / Lightweight operation.

So, how did I stumble across the 'Mobius Strip'?

Well, I picked up a 'SDRPlay'™ RSPdx Receiver (excellent RX!) during the Summer and I used it with one of my existing loops but upon researching other antenna's I discovered an excellent little accessory from 'AIRSPY'™ called a "YOULOOP" which, surprisingly, well exceeded the bandwidth of my conventional loop, mostly because it inherently exhibited a lower Q.

See:

<https://airspy.com/youloop/>

The 'YOULOOP' is in fact based upon a 'Mobius Strip' Loop Antenna, designed to create a shielded / balanced electrical field in a coaxial loop...

This got me thinking about the principles of the 'Mobius Strip' and wondered if it could be applied to QRP fieldwork, and be made to radiate efficiently?

Obviously, The coaxial version would not be an efficient transmitting antenna, due to its inherent construction but what if we could retain these principles and use a different medium?

Most of the applications, so far have used the 'Mobius Strip' principles for overcoming noise at Low Frequencies and for RDF applications!

See:

<https://blogs.scientificamerican.com/roots-of-unity/a-few-of-my-favorite-spaces-the-moebius-strip/>



<http://www.cix.co.uk/~antcom/mtl.html>

Now, after reading the above article(s) and before You start thinking about the 'time-space-continuum' or 'time-travel', lets get back to our project, which is to build your own working Mobius Strip Loop Antenna for your favorite band...

## Time To Begin our Project

Let's start by putting aside everything you think you know about loop antennas and how they should be designed, calculated and built!

There are only really **TWO** physics formulae that I will share with you:

Any loop is a resonant L C circuit – no hiding that fact!

However, where it can resonate (at a moment in time) is our beginning point, if we want to make our Mobius Strip Loop Transmit, you will need a formula to start with, here it is:  **$XL=LC$** , in other words: 'resonance' will exist in a tuned circuit when the reactance of the capacitor and inductor are equal to each other.

Because inductive reactance increases with increasing frequency and capacitive reactance decreases with increasing frequency, there will only be ONE frequency where these two reactance's will be equal. So, thank God for the invention of variable capacitors!

So, lets get started; in order to build our ("really simple, its scary"), Mobius Strip Loop, We are going to use 450 ohm, Window Line as the strip medium!

## Gathering The Parts

(You also might want to look at the pictures about now!)

**You will need, 10ft of 450-ohm solid core (18 AWG, copper clad steel conductor) DX Engineering or Similar (see Text)**

**BNC Connector - DigiKey**

**Center Support Pole/mount – Home Depot or similar!**

**Tripod (not necessary but makes life easier!) mount to your box/base!**

**Small Toroid (see Text)**

**A 150pF Small Variable Trimmer Capacitor (See Text)**

**Tuning knob or mechanism to fit Capacitor.**

**An insulated capacitor shaft extension - (ball-point pen case?)**

**Terminal-Strips' (or means of fixing the Window Line to a base or box?)**

*(You could also run a screw through the Window line to secure it to a base!*

*If you use a project box you can mount the BNC and Capacitor within)*

*Wal-Mart' or 'Dollar Tree' has small food storage containers that can be also be used!*

---

## The Build

### Here's the second formula $234/f/4$

Choose your favorite band (example 40m)

Cut a length of WINDOW LINE (solid conductor) using this MODIFIED

Formula:  $234/f$  (example 7.060MHz)  $/4 = 8.28\text{ft}$   $\beta$  Why divide by 4 ?

*Well, you can read the above article again and now you will see that the Mobius Strip is actually continuous - has no beginning or end point - as we are achieving this by inserting a 'Twist' into the (450 ohm) Window line, (to create the Mobius Strip Effect!) our generated RF Current will flow in one direction until it sees the twist,, reversing in phase, and returning to the same generator source point - the toroid inductor, which will then add a very small reactive inductance to the circuit, the capacitor achieves the loop resonance ( $X_L = X_C$ ), cancelling out the reactance and thus begins the cycle all over again - ie becoming reactive, balanced and resonant at the same time!*

By its very broadband nature the bandwidth is quite forgiving for VSWR tolerance on 40m, so the actual physical length of the Window Line is **NOT** super critical as you would expect in a conventional single loop element design (My version shown in the pictures is 7.5ft long, as it was the ONLY long length I had left!) If you change the design frequency to 20m expect a higher inductive reactance and a slightly reduced bandwidth!

For all intents and purposes, you can actually visualize the antenna as a 2-Turn Loop of 16.57ft – but that's where the similarity ends because we are introducing a capacitor and a phase-reversal-twist to create a resonant balanced circuit.

## Matching

The VE3EGA 'Mobius Strip' Loop will **NOT** work well if you try to feed it with a Primary Loop (like in a conventional loop antenna!) or a gamma-match.

Use the 'Toroid matching transformer' as shown in the picture...

Be aware that REALLY, REALLY SMALL TOROIDS WILL GET HOT, even at 3-5W as this Loop Current is Very High!

If you do not have a small toroid, you can use substitutes, like a T-120, T-140 core, or even a salvaged VGA or USB Cable suppressor!

In the latter case (as its tubular) run a wire or strip off a section of plastic from the Window Line, expose the wire cut it, insert it thru the toroid and re-solder it.. I like at least a good 1 (u-shaped) Turn winding!

The secondary windings, I find are somewhat dependent on the wire-gauge used. Plan to use 5 turns of 22 AWG



What you are aiming for typically is a 1:5 ratio, which works well with Window Line and pretty much all radios having an automatic or using an outboard tuner.

I have also successfully used a "YouKits"™ 'MT1' QRP Manual Tuner to which I added a BNC connector to the antenna side, replacing the RED binding post!

## Assembly

Build your antenna base (your choice Material) with the BNC, Toroid and Tuning Capacitor, leaving connection points for the two ends of the Window Line to attach (See Pictures).

Secure the loop ends to the base, ensuring that one set of opposite wire ends connect thru the capacitor (stator) and the other end connects to the rotor!

The opposite set of wire ends either thread thru the Toroid (depending upon your build) or connects together via a short piece of wire which will form the primary (not the BNC side) winding of the loop!

Connect the 5 Turn winding to the BNC (yes, I forgot once!)

Support the loop with your ABS or dowel parts – make sure the TWIST is in place half-way along the length!

If you have small NEON, try attaching one wire to the tuning capacitor and float the other wire – this will not load the circuit and is a good tuning indicator!

Now: connect to your radio and see below – testing/operating instructions!

## Initial Testing L/C

If you have a VNA or MNFJ Analyzer, you can connect it to the BNC

Mesh the capacitor (max capacitance) and tune your analyzer to find lowest frequency of your loop – will probably be around 5MHz?

Do the same with CAP fully unmeshed – should be around 14MHz

*(your mileage may vary depending upon your build and the Window Line)*

## Operating

***Firstly, a disclaimer: I will not be responsible for: blowing up or bricking your radio, deformity of your unborn children, Pacemaker Failure, Heart Attacks due to excitement or RF, Covid19, Dental Repairs, Your Insanity, Unexpected Pregnancy, failure to observe safe operating conditions, pertaining to RF exposure of small children or pets sitting inside the antenna and getting burnt, acts of God, XYL-Instigated Divorce Proceedings, using the antenna for deviant purposes other than QRP amateur radio operation..***

If you have followed these instructions so far – it should work as follows:

Connect BNC to you radio – **drop PWR to 3-5W**

Now tune radio to say 7.060 (QRP Calling Frequency)

Starting from a meshed capacitor position, slowly rotate until an increase in background noise is heard!

Hit Auto tune or tune for minimum SWR on your tuner

You should see a 1:1 VSWR

You can adjust the SWR a bit by slowly peaking noise and retuning!

If you change frequency 'significantly' just RETUNE!

If you have XL=XC right, your NEON should light up! If it doesn't, don't worry, some are less sensitive than others in which case try a small (10W) NOMA fluorescent bulb near the CAP or increase PWR to 5W or more!

No NEON, NO LAMP – NO WORRY – IT IS WORKING - Just tune for minimum SWR.

If your capacitor is wider spaced – you can increase PWR 10-15W!

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*I hope that you enjoy building this novel antenna as much as I did designing and refining it.*

*I'm sure that there are improvements that can be made to the basic design, so*

*Please feel free copy or share the project design, and develop it in frequency or coverage for your personal amateur radio operating needs. I have built other versions for 20, 30, 40, 6m and 10m with higher power level handling!*

*The design copyright belongs to VE3EGA. it is submitted here for Amateur Radio Use - by ALL ham operators to enjoy Free of Charge. If you build it, give me a shout out!*

*It is specifically forbidden for Independent Commercial Development/Manufacture of this antenna design for profit. Without written permission and a LETTER OF UNDERSTANDING from the author:*

*The Antenna is described / referred to (loosely) as:*

*"VE3EGA MOBIUS STRIP 450 ohm Window Line LOOP ANTENNA"*

*T. Bennett, ve3ega / va3ip, Dec 5, 2020 / email: ve3ega@sympatico.ca*

**Thanks to Mike VE3MKX for sending us this article.**



## How to prevent ESD damage

By Dan Romanchik, KB6NU

Here are some tips from Keysight Technologies, one of the leading electronic test equipment companies, on how to prevent ESD from damaging your electronics.

**USE A GROUNDED WRIST STRAP** whenever you are handling equipment or boards. Using a grounded wrist strap prevents your body from building up charge and causing damage when this built-up charge discharges into your equipment or test boards. Make sure to connect that alligator clip to ground!



**USE GROUNDED WORK SURFACES OR MATS** for your boards. Do NOT use static generating or insulating materials as a work surface. Non-grounded mats and static generating/insulated materials can inductively charge boards, especially exposed ones. When connecting a charged board to equipment, the board can cause damage by discharging into the equipment's inputs.

**KEEP CHARGED MATERIALS AT LEAST 0.3 METERS FROM EXPOSED ASSEMBLIES.**

This includes plastics, foam, or other materials that can build up charge. Having a charged material near an exposed assembly can inductively charge the assembly. The assembly can then discharge into the equipment's inputs.

**DISCHARGE YOUR CABLES BEFORE CONNECTING THEM TO YOUR EQUIPMENT.** Electrostatic charges can build up on test probes and test leads, so it's important to discharge them before connecting them to your test equipment:

Ensure your device is off.

Connect your cable to your device.

Attach a 50  $\Omega$  shunt to the open end of the cable.

Remove the shunt and immediately attach your device to your equipment. This prevents the center conductor of your cable from discharging stored charge into your equipment. A charged assembly can charge connected cables.

**USE BOARD STANDOFFS AS NEEDED.** In some situations, you need board standoffs to provide extra insulation for your exposed assemblies. This prevents your grounded mats from making unwanted connections on your board.

**NEVER USE "PINK" PACKING MATERIAL FOR BOARD TRANSPORT OR AS A WORK SURFACE.** While many people think pink packing material is ESD safe, in most cases it easily builds up unwanted charge. Unless continuous, thorough testing is done, treat pink packing materials as charged.

**CAP UNUSED EQUIPMENT INPUTS** to avoid accidental ESD and physical damage. Damage often occurs by accidentally contacting equipment inputs. Capping unused inputs protects them from incidental ESD damage.

**USE ESD-SAFE BAGS WHEN TRANSPORTING BOARDS.** This protects boards from ESD damage while moving between ESD-safe locations.

**DO NOT OVERDRIVE EQUIPMENT INPUTS.** Start your testing at the least sensitive input setting and zoom in on your signal. Additionally, observe the maximum input levels for your specific equipment. The least sensitive setting is the most resilient, so starting there ensures that your inputs are at safe operating levels

After I posted this to my blog, Dave, N8SBE offered some further tips. He writes:

Grounded heel straps also help reduce static charge. Test them with a floor tester every time you put them on. The floor needs to be somewhat conductive—not metal, that’s a safety hazard—so use conductive wax on tiles, or conductive carpet to drain of electrostatic charges.

Keep materials, such as styrofoam cups, that form electrostatic charges easily away from your workspace. A styrofoam cup can generate thousands of volts.

Keep the humidity up in the workspace. That helps to keep static generation down as well.

I like to think that I follow ESD-safe procedures, but there are a couple of things here that I hadn’t thought about before. For example, I’d never really thought about discharging test equipment cables before connecting them. I think that’s a good tip

To learn more, go to <https://www.keysight.com/find/PreventESD>

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Dan Romanchik, KB6NU, is the author of the KB6NU amateur radio blog (KB6NU.Com), the “No Nonsense” amateur radio license study guides (KB6NU.Com/study-guides/), and often appears on the ICQPodcast (icqpodcast.com). When he's not worrying about electrostatic discharge, he teaches online ham radio classes and operates CW on the HF bands.

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## OUR CONDOLANCES

To Paul Birke VE3PVB  
On the Passing of His Wife  
Rosemary  
On November 28, 2020