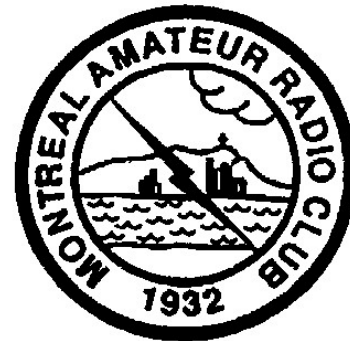


# marcOgram

Official Publication of The Montreal Amateur Radio Club Inc.  
Box 53047 - RPO Dorval, Dorval Quebec H9S 5W4



Volume 66, Number 7

May 2020

## NEXT MEETING

Tuesday 28 April 2020

**CANCELLED**

See the President's announcement  
and VE2RED net information  
page 4.

### FROM THE EDITOR'S DESK

Interesting times! The COVID-19 "shelter in place" has led to everyone getting to know their household members a whole lot better. Parents are reconnecting with their offspring, pets are puzzled by the rise in human population locally, and there is now ample time to work on projects, fix antennae or put up new ones, and indulge in more QSOs.

Nobody knows how long this situation will persist. Personally I'd be happier ending the separation edict if there was an effective vaccine or remedy; something one can do to counteract this novel coronavirus.

In the meantime, things could be worse. This is a war, but it doesn't involve bombs, ICBMs, and offensive weapons. All we are asked to do is remain at home, veg out and wait. **We can do this, folks!**

73 de Nora, VA2NH

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### New! Discussion Group

The MARC has a new discussion group/email reflector for all its members to use. You can find it here:

<https://groups.io/g/VE2ARC/>

You can use it to ask questions, make announcements of upcoming events or of your latest achievements.

Email invitations will be sent later this week to all members that we have a current email address.

Looking forward to seeing you in the group.  
If you have any questions, please let me know.

Marc-Andre Gingras, VE2EVN  
President - Montreal Amateur Radio Club

The opinions expressed herein are, unless otherwise stated, solely those of the authors concerned, and not those of the Club, the Directors or members and do not represent the policy of the Club.

The repeaters are open to all amateurs.

## UPCOMING FLEAS/EVENTS

### 2020

**What:** 44th Annual Durham Hamfest

**Who:** North Shore ARC & South Pickering ARC

**When:** **CANCELLED**

(Saturday, 25 Apr 2020)

**Where:** Pickering, ON

**What:** NEAR-Fest XXVII

**Who:** New England Amateur Festival

**When:** **CANCELLED**

(Fri & Sat, 1 & 2 May, 2020)

**Where:** Deerfield Fairgrounds  
Deerfield, NH

**What:** 36th Annual Smiths Falls Flea Market

**Who:** Rideau Lakes AR Club

**When:** **CANCELLED**

(Saturday, 9 May, 2020)

**Where:** Lakeside Heights Baptist  
Smiths Falls, ON

**What:** WIARC Amateur Radio Auction

**Who:** West Island AR Club

**When:** **POSTPONED**

(Saturday, 9 May, 2020)

**Where:** Lakeside Heights Baptist  
Pointe-Claire, QC

**What:** Dayton Hamvention

**Who:** Dayton Amateur Radio Assoc.

**When:** **CANCELLED**

(May 15, 16, 17, 2020)

**Where:** Greene County Fairgrounds  
Xenia, OH

**What:** 38th Quebec Hamfest 2020

**Who:** VE2CBS

**When:** Sunday, 31 May, 2020

(check their web page for changes)

**Where:** Sorel-Tracy QC

## CQMM DX CONTEST

Invitation from PY4WAS ([fonseca.ed@hotmail.com](mailto:fonseca.ed@hotmail.com)):

To OM / YL / Clubs / Groups !

We are pleased to inform you that the result of CQMM DX Contest 2019 is available. We are waiting for you this year. Again or for the first time. Your participation will be an honor for all of us and will give even more shine to this great CW party in the 5 bands. We ask for your help in the dissemination of CQMM DX contest / 2020, among radio amateurs in your country, clubs and groups. The contest is held annually on the third full weekend in April.

73's Ed - PY4WAS

CWJF GROUP, President

The CQMM DX CONTEST is a continuation of the successful Manchester Mineira All America CW Contest (MMAA CW CONTEST), being organized, coordinated and verified by the CWJF Group since 1993. The contest was initially limited to stations in Brazil (1993–1996), but with its rapid growth, eventually expanded throughout South America (1997–2006) and then expanded again to the Americas (2007–2010). From 2011, in a bold decision, the contest has become a world-wide competition and held between all six continents.

### OBJECTIVES:

- A) Promote unity and integration of all hams in the world;
- B) Promote conditions for obtaining two CWJF Awards and other awards that exist in Brazil;
- C) Promote the art of the CW among the amateurs, clubs and groups that practice this mode in the world.

Rules can be found at: <http://www.cqmmndx.com/rules/>

### Important Observation:

The CWJF Group is also committed and concerned about this pandemic that has rocked the world and wishes you and your family a lot of health. Be very careful with COVID-19, as this terrible virus is causing a lot of pain and sadness in several families. Everyone should follow the recommendations and guidelines of the health areas.



## MESSAGE FROM THE PRESIDENT

In view of the latest directives from the Quebec government regarding COVID-19, the MARC has taken the decision to **CANCEL** both the March and April general meetings that were scheduled on March 31st and April 28th.

The March and April presentations will be re-scheduled at later dates, and we will keep you informed as to the status of the May Show and Tell meeting.

Instead of the meetings, we are holding a net on the VE2RED repeater on each Tuesday, at 20:00 local, 01:00Z.

Net Operator is Pawel, VE2ZPZ for the evening. Everyone is welcome; you don't have to be a MARC member.

Please join us for this event every Tuesday on VE2RED on 2m output frequency of 147.270 MHz (+600 kHz input offset)

Note: the repeater uses a CTCSS tone of 103.5 Hz for access.

Please be safe, and stay healthy.

Marc-Andre, VE2EVN



# V2CSTAYHOM

Special Event 6 April to 6 May, 2020

Michael Shamash, VE2MXU, is using VC2STAYHOM to raise awareness for social distancing during the COVID-19 pandemic and global public health emergency. He is a member of Radio Amateurs of Canada and is based in Montreal.

"In Canada we are unfortunately limited to a 7-character prefix, hence the VC2STAYHOM without the last 'E'. I would like to thank those at Innovation Science and Economic Development Canada (ISED) for expediting the process and allowing me to get this call sign up and running within a couple of days, without the traditional 60-day wait period.

I'm hoping that by using this call, I can help promote social distancing across the globe (or as far as my 100-watt rig will get me!) and remind people that we each have a role to play in helping contain the spread of this virus.

I will begin using the call on Monday, April 6, once the issued authority to use it begins, until the time it expires on Wednesday, May 6.

As a full-time undergraduate student in microbiology transitioning to Graduate studies in the fall, my schedule is quite busy over the next few weeks but I will try my best to get on the air and make contacts with those who would like this unique VC2 prefix and suffix in their logs! I am usually most active on 20m and 40m, split between SSB and FT8.

Before the COVID-19 crisis arrived in Canada, we were already discussing its possible implications in classes. That's when I came up with the idea to get a call sign set up, and with the recent 'stay home' and 'shelter in place' orders issued by many governments worldwide, the time felt right to do so, and it would give those who are stuck at home one more fun aspect of the hobby to work on!"

Michael, who received his training at the MARC radio courses, will operate on HF Bands and QSL via Logbook of the World (LoTW).

In addition to Canada, Australia has permitted the Radio Amateur Society of Australia (RASA) to use the special call sign AX2020STAYHOME. At 14 characters, that may set a record for world's longest call sign.

Here are some other special event call signs:

8A1STAYHOME: Indonesia  
9K9STAYHOME: Kuwait Amateur Radio Society  
A60STAYHOME: United Arab Emirates  
HZ1STAYHOME: Saudi Amateur Radio Society  
TC1STAYHOME: Turkey

"For a couple of weeks; stay home, stay safe please. We'll be on air between March 27 and May 25. Hope this threat leaves our World before the date ends."



Alan Griffin  
RAC MarCom Director

# VE2RED TUESDAY NET REPORT

2020-03-31 Net commenced 20:00 local, 01:00Z

Net control Pawel, VE2ARC (VE2ZPZ)

VE2XS, Mike

VE2EGN, Eamon

VA2NH, Nora, St-Lazare

VA2CNE, Cedric / Cedrick

VE2SI, Leo, St-Lazare

VE2WRH, Wayne

VE2AWC, Noel

VE2MVY, David

VE3MSZ, Mike

VE2EVN, Marc-André

VA2YXD, Dan ??? [subsequently identified as Sonny]

VE2JBP, Bob, NDG

VE2BQS, Norm

(1 weak, unidentified, not included in count)

Discussion: members gave their thoughts on effects of COVID-19.

20:50 Net closed.

14 check-ins, not including the unidentified signal.

---

2020-04-07 Net commenced 20:00 local, 01:00Z

Net control Pawel, VE2ARC (VE2ZPZ)

VE2SI, Leo, St-Lazare

VA2NH, Nora, St-Lazare

VE2XHL, Jong

VE2VE, Jim

Discussion: the lack of check-ins and ideas about spreading the word.

20:33 Net closed.

5 check-ins.

---

2020-04-14 Net commenced 20:00 local, 01:00Z

Net control Pawel, VE2ARC (VE2ZPZ)

VE2SI, Leo, St-Lazare

VA2NH, Nora, St-Lazare

VE2LRZ, Eric

VE2XHL, Jong

VA2XS, Mike

Discussion: what is everyone doing while confined at home.

20:50 Net closed.

6 check-ins

---

2020-04-21 Net commenced 20:00 local, 01:00Z

Net control Pawel, VE2ARC (VE2ZPZ)

VE2SI, Leo, St-Lazare

VA2NH, Nora, St-Lazare

VE2XFO, Charles

VE2XHL, Jong

VE2EVN, Marc-André

VE2LJV, Sam

VA2LEQ, Lee

VE2TOR, Frank

Discussion: how did we get involved in amateur radio, and questions about 900MHz operation.

20:50 Net closed.

9 check-ins.



# TEST EQUIPMENT: THE BASICS AND BEYOND

By Leo Nikkinen, VE2SI  
[leo49@videotron.ca](mailto:leo49@videotron.ca)

Part 3, Section 1 of 2:

Minimum Basic Test Equipment: **The Multimeter.**

In the last installment we went back in time to look at some very early test equipment. The quantities being measured, voltage, current and charge, were basic to developing an understanding of electricity as it was being studied in the 1700s.

This time we'll bring the discussion closer to home and examine what's needed in a ham shack or electronics experimenter's home shop. Voltage and current are still the basic circuit quantities that need to be measured while working on modern electronic circuitry. Add resistance measurement and you have the complete definition of the most useful item of test equipment, the multimeter or, as it used to be called, the VOM (Volt-Ohm-Multimeter). If you have an amateur radio station or are interested in electronics but don't know what to get as your first item of test equipment, buy a multimeter. Although analogue multimeters are still available, digital versions are more common; we'll discuss both types.

The capabilities of multimeters vary with the cost and manufacturer, however they will all satisfy your basic measurement needs. So, what are those specifications? We need a multimeter that will allow us to locate short circuits and open circuits, troubleshoot solid-state receivers and transmitters, audio equipment, power supplies, etc. It should be able to measure the DC and AC voltages and currents that we typically find in amateur radio equipment. For some applications, such as measuring the plate voltage on a linear amplifier with a 2000-volt supply, it's crucial to consider exactly what's needed to perform that measurement safely. What about measuring the current (20+ amps) drawn by your mobile HF radio when transmitting at 100 watts?

So far, both analogue and digital multimeters (DMMs) will satisfy the above needs and it should be realized that an analogue meter is adequate for troubleshooting the construction projects described over the many decades of the ARRL Handbooks. However, times have changed and the manufacture of solid-state electronics has made digital displays easier to produce than the delicate insides of

an analogue meter. While not the best instrument for all applications, DMMs are now cheaper to purchase than good quality analogue meters and they provide superior performance.

Finally, will a portable instrument best suit your needs or do you require the capabilities of a line-powered bench multimeter? In this context a portable meter means, essentially, a handheld meter. Early handheld multimeters could not compete with the precision and accuracy of a bench (desktop) meter but, not surprisingly, higher performance modern handheld meters now provide a measurement capability that's sufficient for all but the most demanding applications.

A brief look at the evolution of multimeters will be helpful in identifying desirable features and understanding the benefits of a modern DMM. The distinguishing feature appears most clearly in the measurement of voltage.

## **Analogue Multimeters**



Simpson 260



Triplet 630

Analogue voltmeters, employing a D'Arsonval (DC) meter movement, are no more complex than a current meter and some series resistors that can be switched in as needed. The value of the resistor is selected to produce a full-scale meter deflection at the desired maximum applied voltage. An example is the best way to illustrate the idea. Let's say that we wish to use a 50µA meter to make a voltmeter with a single range that can measure up to 10 volts. The value of the series resistor is calculated easily with Ohm's law:

$$R = V / I = 10V / 0.000050A = 200,000\Omega = 200k\Omega.$$

The coil in the meter is wound with fine-gauge wire and has a significant resistance. So, the 200kΩ resistance calculated above must include the resistance of the meter coil, typically around 5000Ω for a 50µA meter and contained in the meter's specifications. The value for the series resistor then becomes: 200,000Ω - 5000Ω = 195,000Ω

A multi-range voltmeter built around a 50µA meter will always draw 50µA at a full-scale reading, regardless of the voltage scale selected. That characteristic of analogue meters imposes some limitations on their use. It is also a characteristic that defines the sensitivity of a multi-range analogue voltmeter, expressed as Ohms per volt, and doesn't change with the voltage scale selected. Using the above example, our 10V meter has a total resistance of 200,000Ω, or a sensitivity of: 200,000Ω/10V = 20,000Ω/V, or 20,000 Ohms per Volt

*(Continued on page 7)*

**Production Manager**

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(Continued from page 6)

In simple terms, if you put the meter on the 10V scale and use it to measure a voltage, you are loading the circuit under test (CUT) with a 200,000 $\Omega$  resistor. Sometimes the load imposed by the meter will matter, sometimes it will be unimportant.

Adding a rectifier diode enables the multimeter to measure AC voltages, however with a reduced sensitivity, usually around 5000 $\Omega$ /V. It should be noted that virtually all analogue meters actually measure the peak voltage of a waveform and the displayed RMS value assumes a sinusoidal waveform. Analogue AC voltmeters do not actually measure the RMS value of an AC signal.

The measurement of resistance by a multimeter is limited by the sensitivity of the meter and a typical mid-scale value is around 120k $\Omega$  with a maximum measurable value of approximately 2M $\Omega$ . Without adding higher voltage batteries, it is not possible to produce currents that will visibly deflect the meter pointer with high-value resistors (say, above a few MOhms). An analogue meter using four 1.5 volt batteries to conduct a current through a 5M $\Omega$  resistor will result in a current of  $I = V / R = 6V / 5M\Omega = 1.2\mu A$ . This will barely move the meter pointer of a 50 $\mu A$  full-scale meter.

Analogue meter accuracy is limited by the linearity of the coil rotation (rotation vs. current), stray magnetic fields, meter pivot friction, meter zero-setting error and voltage divider/current shunt resistance tolerances. Typically, a good quality meter will have an accuracy of  $\pm 1.5$  to  $\pm 2.5\%$  of full-scale and trying to resolve the position of the needle to any higher precision is very difficult.

The above numbers are typical of analogue multimeters such as the Simpson 260 (with a DC sensitivity of 20,000 $\Omega$ /V and built using a 50 $\mu A$  meter).

## Vacuum Tube Voltmeter



IM-5228

The next step in the evolution of multimeters was the vacuum tube voltmeter or VTVM. Most VTVMs measure AC and DC voltages, and resistance, but they often omit current measurement capability. The VTVM used the high input impedance of a tube amplifier to reduce the current being drawn from the CUT. The use of a high input impedance DC amplifier allowed the various voltage measurement ranges to be provided by a simple voltage divider. This gives the VTVM a single, fixed, input impedance for all voltage ranges. Typically the voltage divider has a total resistance 10M $\Omega$ . A 1M $\Omega$  resistor was often included in the VTVM probe to isolate the CUT from any effects due to probe capacitance, giving the VTVM a fixed input impedance of 11M $\Omega$ . Loading a circuit with an 11M $\Omega$  resistor is less likely to disrupt circuit operation than the 200k $\Omega$  load imposed by the analogue voltmeter. Using our

analogue voltmeter to measure 10 volts will result in a current of 50 $\mu A$  being drawn from the CUT while the VTVM will draw:

$$10V / 11M\Omega = 0.91 \mu A$$

A tube rectifier enables the VTVM to measure AC voltages, although the input resistance was usually reduced, typically to 1M $\Omega$ , in order to eliminate the effects of VTVM input capacitance on frequency response. While a VTVM will measure AC signals, the displayed value assumes a sinusoidal waveform and is not a true RMS (TRMS) measurement of the signal.

The high-impedance amplifier used in VTVMs enables the meter to measure higher resistances than an analogue multimeter, typically 10M $\Omega$  mid-scale and with full-scale values up to 100M $\Omega$  and above.

Clearly, the VTVM offers some advantages over the analogue multimeter when measuring voltages. However, early VTVMs operated from 120V line power and were not portable. So, you have the opportunity to purchase two instruments, a multimeter for portability, and maybe current measurements, and a higher-performance VTVM for use in the shop or shack. Accuracy might not be any better than an analogue multimeter; a typical value would be  $\pm 3\%$  because of thermal drift in the tube amplifier and heating of the other components.

## FET Voltmeter

The advent of field-effect transistors (FET) offered the possibility of developing portable analogue meters equivalent to the VTVM. FETs have very low input currents and can be used as a substitute for the vacuum tube amplifier in the VTVM. Replacing the tube rectifier with solid-state diodes allowed a portable, battery-powered, version of the VTVM to be produced. Once again, the displayed value of an AC signal is not a TRMS value.

FET meters could also measure resistance and some included the ability to measure current. FETs do not require high operating voltages and are low-power devices, so portable analogue FET multimeters became a viable alternative to the long-standing line-powered VTVM.

The accuracy of a FET voltmeter was similar to that of a VTVM or maybe a little better since component heating wasn't an issue. Typical values were around  $\pm 2\%$  of full scale.

## Mini Summary

A multimeter is the one indispensable piece of test equipment that should part of every amateur radio station. Wait for section 2 (DMMs) before going out to buy something, and it's important to be aware of the safety issues.

Next Month

Part 3, Section 2 of 2 will explore digital multimeters and safety concerns.

Leo, VE2SI

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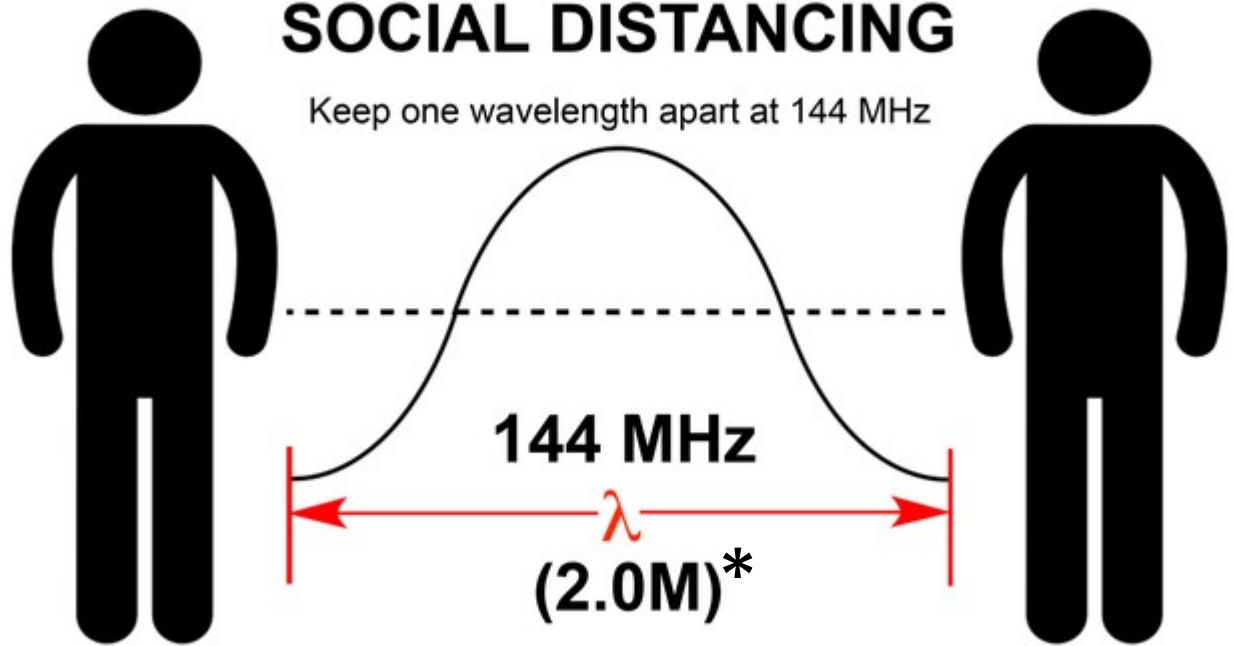
Sources:

Triplet 630: <https://antiqueradio.org/art/Triplett630-NA01.jpg>

IM-5228: [https://www.radiolaguy.com/images/equipment/Heathkit\\_IM-5228.jpg](https://www.radiolaguy.com/images/equipment/Heathkit_IM-5228.jpg)

Amateur radio enthusiast guide to  
**SOCIAL DISTANCING**

Keep one wavelength apart at 144 MHz



\* Actually 2.0833333 metres ...